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ment, properly insulated with a rubber dam, was cleaned with a prophylaxis brush to eliminate bacterial plaque before treatment. The main steps are: etching with ICON Etch, 15% hydrochloric acid, for the duration of 2 min, for a maximum of three applications each of 2 minutes; Icon-Dry application for 30 seconds; two infiltrations with Icon-Infiltrant for 3 minutes with respective curing of 40 seconds. For the elimination of excess cotton pellets and dental floss were used and for the polishing of composite rubbers. For each lesion, a pre-treatment, post-treatment and a follow-up picture of one week was taken, time needed to restore the tooth's hydration and to heal any marginal gingival wounds.

CONCLUSIONS: following our experience we can consider the product a valid alternative to resolutions of aesthetic defects of incisors of low and moderate severity whose infiltration with the resin has given excellent aesthetic results since the lesions disappeared from view. In general, the ability to mask the lesion depends on the histology and severity of this, consequently, in the most severe cases, or in the deepest lesions, the result will not be optimal, requiring the removal of dental tissue to obtain better aesthetic results. Nevertheless, even in these cases the pretreatment with ICON has allowed to reduce the surfaces to be treated, limiting the interest to the only irreparably damaged.

Experimental study on the clown therapy as a psycho-emotional approach of the hospitalized child to the promotion of oral health

E. Buonifacio, D. Corridore, F. Calcagnile, O. Brugnoletti, I. Vozza

BACKGROUND: The child's anxiety linked to dental treatment is still a barrier to dental care. In fact, anxious children may lose or avoid dental procedures, judging them to be erroneously painful and invasive. The studies carried out in recent years have reinforced the idea that happiness should be promoted and introduced in all environments, to improve the psychophysical well-being of individuals. Especially in these circumstances, the intervention of clowns of entertainment even during therapeutic procedures, can determine a shift of children's attention from the body to different external stimuli such as soap bubbles. The purpose of the study was to examine odontophobic pediatric patients and the different levels of difficulty that arise from the approach with them and their parents, reporting the various procedures that can be used, from a simple friendly and persuasive interview of the operator to the support of psychologists and drugs. Dental environment plays an important role in the child's behavior and his cooperation in planned dental treatment.

METHODS: The study was carried out in the pediatric unit of Santobono Hospital in Naples, where there are two dental units for hospitalized children. An anonymous self-assessment questionnaire was administered to 6-15 years aged patients and their parents, about the perception of oral hygiene conditions and behavior of children and parents in relation to oral health including: brushing techniques, tools for oral hygiene, use of mouthwashes, tongue brushing, sealing, exchange of tools with friends or siblings, time spent between meals and oral hygiene etc. In this first phase of the study, as clowns, we tried to explain and change the habits considered wrong by the patient. The second part of the study consisted of a clinical examination, previous informed consent, for the collection at T0 and T1 (one month from the first visit) of the

clinical indexes such as: plaque index (PI), gingival bleeding index (GBI), DMFT. In order to obtain better results, in addition to the experimental method of clown-therapy approach, the traditional tell-show- method was also used to improve patient learning.

RESULTS: 50 questionnaires were filled over a period of time from 30th August 2017 to 30th October 2017. Of these 50 patients, only 25 received two check-up for the collection of the clinical indices at T0 and T1. Over time the improvements obtained in relation to the compliance of small patients have been observed. The children showed a good level of learning after questionnaire and also the clinical indexes showed a marked improvement, but above all there was no more odontophobia in the small patients.

CONCLUSIONS: At the end of the study an optimal result was achieved by all the young patients responding positively to their oral hygiene care. Many patients appreciated the presence of clowns in the dental clinic, were able to relax during treatment and enjoyed time with the clowns and wanted to do it again. These results confirm and validate the positive effects of clown therapy in promoting oral health in pediatric dentistry and assess its potential as an alternative method to sedation.

Clinical and epidemiologic study about tooth decay incidence in a population of 500 patients between the age of 8 and 12 years

F. Flauret¹, G. Giannatempo¹, E. Coccia², G. Rappelli², O. Di Fede³, G. Capocasale³, M. Giuliani¹

¹Dipartimento di Medicina Clinica e Sperimentale, Università di Foggia, Foggia, Italy; ²Dipartimento di Scienze Cliniche Specialistiche ed Odontostomatologiche, Università Politecnica delle Marche, Ancona, Italy; ³Dipartimento di Discipline Chirurgiche, Oncologiche e Stomatologiche, Università di Palermo, Palermo, Italy

BACKGROUND: The aim of this study is to evaluate the incidence of tooth decay in a population of 500 patients between the age of 8 and 12 years using a clinical and epidemiologic survey in order to understand all phenomena undermining the community oral health. Tooth decay is one of the most diffuse chronic disease worldwide. For World Health Organization (WHO) it is important the realization of national epidemiologic studies to monitor the oral health status in specific age-related population groups.

METHODS: The study was conducted on a sample of 500 patients of 8-12 year age in order to evaluate the clinical-epidemiological incidence of tooth decay.

RESULTS: The analysis of this data showed that 39.6% (198 children) were affected by an active tooth decay. 91.9% of 198 children affected by tooth decay showed tartar and plaque accumulation with an evident inadequate oral hygiene, and 100 of these patients (50.54%) showed hypertrophic and red colored gingiva, while in 18 (9.1%) the individual susceptibility and alimentation represented the main predisposing factors. 25.4% has never undergone a dental control, the 22% has been visited just once during childhood, the 21% is visited once a year, the 10% twice a year and the 21.6% three times a year. The reason for dental visit in the 14.2% was the presence of tooth decay, in the 8% the tooth extractions, in the 22.4% the orthodontic problems and in the 30% the prevention, even if only 4.4% of children showed the presence of sealants and the 2.8% of fluorosis.

ABSTRACT

CONCLUSIONS: These data showed that the WHO goals predicted for 2020 in Europe, 95% of 5-6 years old children with no tooth decay, 12 years old patient with a DMFT index ≤ 0.7 , was not satisfied. The strong interest showed by the scientific community towards the tooth decay incidence is strictly related to its high incidence, especially among children. Its causal factors are commonly known, but every effort to reduce its mobility results unsatisfying. The main reasons would be related to the low patient ability in following the simple rules of oral hygiene and alimentation. Most children evaluated by this study showed notable plaque accumulation, even if they claimed to brush their teeth at least twice a day. Probably their mistakes are related to an inadequate brushing technique. So, the study underlines the importance of primary prevention.

Comparative evaluation between cervical vertebral maturity, hand-wrist radiograph exam and serum levels of growth factors in young patients

L. Di Marco¹, R. Fastuca¹, A. Caprioglio², T. Arrigo³, R. Nucera¹, F. Forestieri¹, M. Portelli¹, A. Lo Giudice¹, S. Costa¹, A. Milioti

¹Department of Biomedical and Dental Sciences and Morphofunctional Imaging, School of Orthodontics, School of Dentistry, University of Messina, Messina, Italy; ²Department of Medicine and Surgery, University of Insubria, Varese, Italy; ³Department of Pediatrics, University of Messina, Messina, Italy

BACKGROUND: This study was performed to investigate skeletal maturity, in particular to evaluate skeletal age and growth spurt, in order to obtain the prediction of facial growth (most critical aspect of the orthodontic clinic). Indeed, orthodontic appliances such as functional appliances and extra-oral devices should be used during the peak of growth. On the other side, orthognathic surgery can be performed only after the pubertal growth spurt as considerable post-surgical growth can cause relapse. Therefore, correct identification of the different phases of skeletal maturation represents a crucial issue in orthodontic diagnosis and treatment planning, as chronological age is not a valid indicator of skeletal maturity. Several methods were proposed to perform skeletal maturity evaluation in orthodontics such as the cervical vertebral method (CVM) but its reliability is still controversial. The aim of the present study was to investigate the correlation between CVM method, hand-wrist radiograph and growth mediators (IGF-1 and growth hormone, GH).

METHODS: A total of 25 patients (8-12 years old), who referred to Orthodontic Department of Dental School and who had never been treated before, were enrolled. After obtaining the informed consent, hand-wrist radiograph, dental panoramic and lateral cephalometric radiographs and a peripheral venous blood specimen to evaluate IGF-1 and GH were performed on all the patients, before the start of treatment. Hand-wrist radiographs were analyzed such as lateral radiographs according to CVM stage system by one trained operator and the measurements were repeated two months later to perform the method error. Then IGF-1 and GH were standardized according to the reference tables in order to assign a patient to a range of skeletal maturity. Then the variables were compared by using a Pearson correlation coefficient.

RESULTS: The correlation between the the hand-wrist skel-

etal maturation stages and CVM stages was low and as a matter of fact they cannot be used alternatively to estimate patients' skeletal age or to predict the peak bone growth spurt. Indeed, the comparison between hand-wrist radiographic assessment and GH, IGF-1 and then between CVM and GH, IGF-1, showed significant correlation ($P < 0.05$) between the radiographical method and the serum variables, when separately tested.

CONCLUSIONS: Finally, to evaluate growth assessment, it seems that the concordance between vertebral maturation and hand-wrist radiographs methods were not acceptable; instead, using growth factors method, on one hand we have allowed to limit the patient's exposure to X-rays and on the other hand we have reduced the time necessary to plan the treatment, as serum levels of GH and IGF-1 are reliable growth indicators that respond positively to correlation values obtained through the other growth factors: CVM and hand-wrist radiograph.

Oral health related quality of life: dental treatment under general anesthesia in preschool aged children and its influence on the ecchis

L. Giroto, P. Mariuzza, A. Semisa, S. Mazzoleni, E. Stellini

Padua University, Faculty of Odontology, Postgraduate School of Pediatric Dentistry, Padua, Italy

BACKGROUND: Most pediatric patients are able to face dental treatment in conventional setting. Notwithstanding, for a considerable minority usual management modalities are not suitable: sometimes children cannot cope with in-office conscious state, not necessarily owing to peculiar psychiatric or organic pathologies. Dental disease and treatment experience can negatively affect the "Oral Health Related Quality of Life" (OHRQL) of preschool aged children and their parents/caregivers. These negative influences are currently described (with reference both to the young patients and their families) through the "Early Childhood Oral Health Impact Scale" (ECOHIS). This prospective pair-matched design evaluates how dental treatments under general anesthesia affect the quality of life.

METHODS: An experimental group of 31 "under-five" pediatric patients (14 males and 17 females, none of whom affected by psychiatric or organic pathologies) was asked to fill the ECOHIS form in, both before and one month after undergoing dental treatment under general anesthesia. With the aim of toning down age-related and sex-related biases, a pair matched control group, consisting of 31 other "under-five" pediatric patients who didn't undergo general anesthesia and received dental treatment over multiple visits, was also asked to complete the ECOHIS scale both before and one month after the treatment. None of the patients (in both groups) had previously undergone any dental treatment, neither under general anesthesia nor in multiple visits, and at first diagnosis all of them showed at least 8 involved teeth.

RESULTS: Before treatment, both groups scored similar, without significant statistical difference ($P > 0.05$); but in the after-treatment evaluation the experimental group scored much better than the control group and the difference was statistically significant ($P < 0.001$). The total mean effect in the experimental group was much higher (85,5%) than that of the control group (65,7%).

CONCLUSIONS: According to the statistical comparison

between the experimental and the control groups, dental treatment under general anesthesia can provide better quality of life restoration when compared with treatment over multiple visits. One cannot on the other hand forget that all anesthetic agents are associated with some reports of morbidity and mortality and could represent some sort of hazard to the young patient's overall health. Therefore, general anesthesia is only to be considered in pediatric preschool-aged patients when routine office practices cannot successfully be adopted.

Traumatic dental injuries in pediatric age: conservative and orthodontic approach. Case report

G. Ottaviani, M.G. Tarantino, E. Galli, G. D'Angeli, A. Vallone, D. Campenni, F. Pepe

Sapienza University of Rome, Dept. of Oral and Maxillo Facial Science, U.O.C. Pediatric Dentistry, Pediatric Dentistry Specialization School, Rome, Italy

BACKGROUND: Dental traumas involving the deciduous and permanent dentition acquire significant evidence, occurring in 25 – 30 % of the population with a certain degree of variability. In corono-radicular fractures, a clinical examination shows the coronal fracture line which continues below the gingival margin; these are considered complicated with the presence of pulp exposure and uncomplicated when there is no pulp exposure. Corono-radicular fractures are complex traumatic events, which require not only an evaluation of the extent of the fracture but also of the potential pulp exposure; they therefore need different rehabilitative recovery interventions.

CASE REPORTS: Patient C.M., aged 11, comes to Paediatric Dentistry Unit, Department Head and Neck, Policlinico Umberto I, Sapienza University of Rome for a first dental visit. The patient's mother reports that in the month prior to the visit the girl had a bicycle accident, in which she violently hit her face. The intra-oral clinical examination, supported by the intraoral radiographic examination, shows the presence of a coronoradicular fracture of the tooth 2.1 and of an uncomplicated crown fracture of the tooth 1.2. The element 2.1 had a negative response to pulp vitality test, whereas the 1.2 responded positively. The of element 1.2 needed a simple resin restoration, while 2.1 required a more complex approach.

Besides for a further diagnostic evaluation and for a more precise therapeutic program a Cone-Beam CT of the upper dental arch is required. The therapy consisted of: firstly pulpectomy of the element 2.1 with partial crown reconstruction, secondly placement of orthodontic brackets on the whole of the dental arch and specifically on the 2.1 an orthodontic button for extrusion. Later on, after about 9 months, a gingivectomy on the element 2.1 is performed in order to increase the clinical crown for further rehabilitation. After 15 months from the beginning of the orthodontic treatment, brackets are debonded and a glass fiber post is placed in the 2.1 root canal, to allow the cementing of an acrylic – resin temporary crown. A further 16 months wait is necessary before finalising the case with a zirconium crown. Certainly, a zirconium crown is preferred in anterior sectors because of the high aesthetic value compared to a classic metal ceramic crown.

Correlation between breathing function and IGF-1 in young patients presenting maxillary transverse deficiency

F. Forestieri¹, R. Fastuca¹, A. Caprioglio², T. Arrigo³, R. Nucera¹, L. Di Marco¹, M. Portelli¹, E. Gatto¹, A.M. Bellocchio¹, A. Militi¹

¹Department of Biomedical and Dental Sciences and Morphofunctional Imaging, School of Orthodontics, School of Dentistry, University of Messina, Messina, Italy; ²Department of Medicine and Surgery, University of Insubria, Varese, Italy; ³Department of Pediatrics, University of Messina, Messina, Italy

BACKGROUND: The effect of type of breathing on craniofacial growth has been widely debated as a controversial issue within orthodontics for decades. It has been maintained that when significantly large adenoids are present, nasal breathing is (partially) obstructed leading to mouth breathing or in extreme cases to obstructive sleep apnoea (OSA). Along with breathing issues, body growth retardation is frequently observed in OSA patients. The complex mechanisms behind growth retardation are still unclear. OSA might interrupt slow-wave sleep, when GH is preferentially secreted. GH modifications were often related to serum levels of insulin-like growth factor-1 (IGF-1) and IGF-binding protein 3 (IGFBP-3) which are related to diurnal GH secretion. The aim of the present study was to investigate correlations among apnea/hypopnea index(AHI), oxygen saturation (SpO₂), serum levels of IGF-1 and body mass index(BMI) in growing patients presenting maxillary deficiency.

METHODS: The present study followed the guidelines of the World Medical Organization Declaration of Helsinki. The sample was selected according the following inclusion criteria: i) good general health according to medical history and clinical examination; ii) maxillary transverse discrepancy (skeletal discrepancy) with or without unilateral posterior crossbite; iii) age between 7 and 10 years old (this age range was chosen to prevent bias in terms of pubertal peak growth since at this age it is assumed males and females have not had it yet); iv) body mass index (BMI) normal (not below the 25th percentile and not above the 75th percentile) according to age. PSG exam (Embletta - EMBLA, Thornton, CO, U.S.A.), blood samples for the evaluation of serum levels of IGF-1 and BMI were collected at T0. Shapiro-Wilk test revealed normal distribution of the variables, then parameter tests were applied for the evaluation of the correlation among the variables tested. The means and standard deviations (SD) were calculated for the variables. AHI and SPO₂ values indicated alterations in the breathing function. Pearson correlation coefficient was used to evaluate the correlations among the variables in a correlation matrix. Multiple linear regression analysis was then used to evaluate the association between IGF-1 and the other tested variables (age, BMI, BMI normalized, SpO₂, AHI).

RESULTS: Pearson correlation analysis showed a medium-high significant correlation between the IGF-1 and the BMI, both the normalized value ($r = 0.549$, $p < 0.05$) and the non normalized value ($r = 0.665$, $p < 0.05$). No correlations were found between SpO₂ and AHI with BMI and / or IGF-1 values. Multiple regression analysis showed that the variables tested affected values of IGF-1 for 60% ($R = 0.777$, $R^2 = 0.604$) with a tendency to significance for the BMI variable.

CONCLUSIONS: Patients presenting maxillary transverse discrepancy (skeletal discrepancy) with or without unilateral posterior crossbite showed alterations in the breathing function and a medium-high significant correlation between the IGF-1 and the BMI. Moreover age, BMI, BMI normalized, SpO₂, AHI affected values of IGF-1 for 60%.

ABSTRACT

BMI and behavioral factors on caries in Mexican urban/rural populationsC. Lara-Capi^{1,2}, M.G. Cagetti^{1,2}, F. Cocco^{2,3}, P. Lingstrom^{2,4}, I. Laudicina³

¹Department of Biomedical, Surgical and Dental Sciences, School of Dentistry, University of Milan, Milan, Italy; ²WHO Collaborating Center for Epidemiology and Community Dentistry, University of Milan, Milan, Italy; ³Department of Surgical, Medical and Experimental Sciences, School of Dentistry, University of Sassari, Sassari, Italy; ⁴Department of Cariology, Institute of Odontology, The Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

BACKGROUND: To investigate if, in Mexican adolescents, body weight and caries severity are associated, and if this association differs between rural and urban populations. **METHODS:** Adolescents from the rural area of Tepanacan and the city of Veracruz were enrolled. Caries was recorded using the International Caries Detection and Assessment System and the body mass index (BMI) was calculated. Oral habits (toothbrushing, flossing, dental check-ups) and dietary patterns (sweets intake) were assessed. A dummy variable between BMI and living area (BMI/Area) was generated. Data were analysed using STATA and a multinomial logistic regression model was run, using caries severity as the dependent variable.

RESULTS: Four-hundred and sixty-four subjects, 12–15 years of age, participated (rural = 240; urban = 224). The BMI and area of residence were significantly associated ($\chi^2 = 12.59$, $P < 0.01$). Area was also associated with caries severity ($\chi^2 = 24.23$, $P < 0.01$), with the highest number of caries in dentine recorded in participants from the rural area. The dummy variable BMI/Area was related to caries severity ($\chi^2 = 27.47$, $P < 0.01$): overweight adolescents with caries in dentine were most frequently found in the rural area. A higher prevalence of caries in enamel and a lower prevalence of caries in dentine ($P < 0.01$) were recorded in adolescents from the urban area, where better oral habits, but higher sweets intake ($P = 0.04$), were encountered. According to the multinomial logistic regression model, BMI/Area was significantly associated with caries severity ($P < 0.01$).

CONCLUSIONS: Overweight was not associated with caries severity in the overall population, but it became a statistically significant risk indicator in adolescents living in the rural area.

Oral health inequalities in Italian schoolchildren: a cross-sectional evaluationG. Carta¹, M.G. Cagetti², S. Sale¹, G. Congiu¹, L. Strohmenger², M.C. Morcaldi³, M. Bossu⁴, P. Lingström⁵, G. Campus^{1,2} and the Italian Experimental Group on Oral Health

¹Department of Surgical Medical and Experimental Sciences, University of Sassari, Sassari, Italy; ²WHO Collaborating Centre for Epidemiology and Community Dentistry of Milan, University of Milan, Milan, Italy; ³Istituto Superiore di Sanità, Rome, Italy; ⁴Department of Dental Sciences, Sapienza University of Rome, Rome, Italy; ⁵Department of Cariology, University of Gothenburg, Gothenburg, Sweden

BACKGROUND: To evaluate which of the following indicators of socio-economic status (SES) has the strongest association with dental caries status in a 6-years-old population: the educational level of each parent (individual-level); the mean

price of housing/m² in the area where the family resides; or the mean per capita income in the area where the family lives (area-level).

METHODS: Dental caries was recorded in 2,040 schoolchildren (42.5% boys, 57.5% girls) using decayed/missed/lined surface index (d3 level) in primary dentition. Parents filled in a standardised questionnaire regarding nationality, level of education, frequency of dental check-up and perception of child's oral health and child's oral hygiene habits.

RESULTS: At the individual-level of SES, mothers' educational level was associated with their children's caries severity ($\chi^2 = 147.51$, $p < 0.01$): as educational level rose the proportion of children with high numbers of carious lesions fell. The two income indicators (area-level SES) were not associated. A multinomial logistic regression model was run for caries risk factors. Caries severity was used as dependent variable and the model was stratified by mothers' educational level. Mothers' perception of child's oral health was the only covariate that was always associated in every caries severity strata and for each level of mothers' education.

CONCLUSIONS: The present study shows that mothers' educational level is a useful individual SES indicator for caries in Italian children living in a low-income population.

Surface analysis on primary teeth after using of two toothpastes with different fluoride concentration: an *in vivo* study

A. Salucci, D. Campenni, G. Ottaviani, G. D'Angeli, G. Nardacci, M. Rampino, M. Saccucci

Department of Oral and Maxillo-Facial Sciences Unit of Pediatric Dentistry; Department of Odontostomatologic and Maxillofacial Science, Sapienza University of Rome, Rome, Italy

BACKGROUND: The aim of the study was to observe *in vivo* the surface effect of two different toothpastes, available on the market, with different fluorine concentration. The analysis was conducted *in vivo* on deciduous teeth.

METHODS: A selection of 20 deciduous molars, from 20 patients, was prepared. The selected teeth showed no alteration of the enamel. The teeth were extracted as a result of orthodontic treatments or physiological replacements. The procedures were performed at the UOC of Pediatric dentistry Sapienza University of Rome department of Oral and Maxillo-Facial Science. The selected patients were successively divided in two groups of ten patients each one respectively. The daily oral hygiene procedures was carried out with 500 ppm of fluorine, for the first Group and 1400 ppm of fluorine for the second Group. After 15 days the aforementioned primary teeth were extracted and preserved in normal saline. Successively the primary teeth were sectioned at a cementum-enamel junction and were viewed with VP-SEM electronic microscope to analyze the characteristics of the enamel surface.

RESULTS: Micrographic analysis of the samples treated with toothpaste at 500 ppm of fluorine shows non-uniform layers, with a high surface roughness and the presence of irregularly scattered amorphous precipitates. Patient samples that instead used toothpaste with a fluoride concentration of 1400 ppm, show a less irregular surface with a present, but more attenuated, roughness. A finer granulation than the previous ones is visible in an uneven manner, which confers a non-uniform but in any case more structured stratification.

CONCLUSIONS: In the pediatric field the prevention of caries lesions is one of the main targets. Early remineralization of initial enamel alterations may result in a delay in the progression of the carious process and an arrest of the same. The use of toothpaste with a high content of fluorine showed a better remineralizing effect, resulting in a more uniform surface compared to teeth after toothpaste treatment with 500 ppm fluorine. These do not improve the superficial morphology of the teeth, maintaining a relevant roughness that exposes the enamel more to the bacterial insult and the onset of carious lesions.

Comparative evaluation of the surface effect of two toothpastes with different fluorine concentration on primary teeth surface

F. Semprini, A. Salucci, G. Ottaviani, E. Battaglia, G. Nardacci, M. Saccucci

Department of Oral and Maxillo-Facial Sciences, Unit of Pediatric Dentistry, "Sapienza" University of Rome, Rome, Italy

BACKGROUND: The purpose of this study is to analyze the effect of two toothpaste, with different fluorine concentrations, on the enamel surface of deciduous teeth. The study was performed *in vitro* by means of SEM microscopy.

METHODS: A selection of 20 deciduous molars was prepared. The teeth were extracted as a result of orthodontic treatments or physiological replacements. The procedures were performed at the UOC of Pediatric dentistry Sapienza University of Rome department of Oral and Maxillo-Facial Science. Each element, with no sign of cracks on the enamel, was preserved in normal saline and then sectioned at a cementum-enamel junction level. Successively the external and occlusal surfaces have been etched with 37% orthophosphoric acid for 1 minute in order to reproduce the demineralization that occurs in the oral environment. Each fragment of the same tooth was treated with two different toothpastes (with 500ppm and 1400ppm fluorine concentration respectively) for 15 days and manually brushed three times a day using pediatric toothbrushes for 2 min. Each section was rinsed and preserved in normal saline, renewed every brushing session. Finally a roughness analysis was carried out.

RESULTS: In the samples treated with 500 ppm both surfaces present a cribrous layer, uneven, with a worn out appearance and visible crater-like spaces. In the samples treated with toothpaste at 1400 ppm of fluorine, an improvement of the surface morphology of the enamel has been highlighted, which however maintains a superficial roughness not completely attenuated, due to a non-homogeneous distribution of the same material. The roughness analysis values highlight these differences between the two materials.

CONCLUSIONS: The use of toothpaste with a high concentration of fluorine, compared to those with low concentration, shows a greater remineralizing power on surfaces of artificially demineralized deciduous teeth, ensuring a character of caries prevention. Toothpastes with 500 ppm, despite reducing the potential risk of systemic accumulation of fluorine (due to accidental ingestion of the material during daily oral hygiene), do not demonstrate significant effectiveness in the repair and protection of the enamel surface by acidic substances attack. These findings therefore translates into an increased risk of the onset of caries.

Lesch-Nyhan syndrome: evaluation of a modified bite device to prevent bite injuries

M. Fioravanti, G. Ottaviani, M.G. Tarantino, M.P. Balocchi, E. Battaglia, D. Campenni

Department of Oral and Maxillo Facial Sciences, "Sapienza" University of Rome, UOC Pediatric Dentistry, Pediatric Dentistry Specialization School, Rome, Italy

Lesch-Nyhan syndrome (LNS) is a hereditary purine metabolism disorder, characterized by hypoxanthine-guanine phosphoribosyltransferase deficiency with uric acid overproduction, neurological and behavioral disorders. The prevalence reported in the literature is 1/380,000 to 235,000 births. Males are affected and females are heterozygous carriers. LNS begin to appear at 3-6 months of age with muscle hypotonia and difficulties in maintaining the sitting position and supporting the head. Other signs include psychomotor and mental retardation of varying degrees of severity and obsessive-compulsive self-injurious behavior, usually marked by stress, with bites and injuries to lips, tongue, cheeks and fingers. A 4-year-old patient with LNS showed up at the Department of Pediatric Dentistry of "Sapienza" University of Rome. The first signs of the disease occurred at approximately 3 months of age, but only genetic test confirmed the definitive diagnosis. From three months of age the patient showed typical bite injuries to hands and lips. Initially, patient's parents controlled hand injuries with application to arms of guardians which prevented bending of the elbow. As a solution to intraoral injuries, parents used an extraoral elastic as attempt to prevent biting. This solution was a source of discomfort for the child and caused decubitus of the lips. In agreement with other studies in the literature, the following therapy has been proposed by our department: two 2mm thick silicone soft bites applied to two arches. In the following days compliance and results were monitored: the upper bite had a positive effect, with good compliance, but the patient could easily remove the lower bite for inadequate retention given reduced dental support. Because literature does not provide specific guidelines, an individual bite device with innovative features was built. New silicone putty dental casts were taken and a study model was realized and digitized. This virtual working model could then be reproduced in the lab with the great advantage of not having to take further casts from the patient, without discomfort and stress. The main goal was improving comfort and compliance of new device with a better retention and stability. The inner part, in contact with teeth, was realized in 2mm thick soft silicone. The external part has been realized with hard transparent resin, extended to the fornix, with two shields which removed muscular pressure of lower lip and cheeks. A front handle in soft resin was inserted to help the parents inserting the device in child's oral cavity and improve the device' overall stability. A review of previous case reports from literature showed usual failure of standard mouth guards and successive resort to tooth extractions. In this case report, the patient underwent regular follow up visits that highlighted device positive effect. Compliance was excellent, the child wore device regularly without discomfort, no intraoral bite injuries were found, and parents reported a normal night's rest, which also improved the quality of life by reducing stress and pain due to injuries. Bites were also worn during soft food feeding, increasing adherence with a standard denture adhesive. The current 10 months follow up confirms the results obtained in the first few days of use. This case report show a correct management to prevent bite injuries due to LNS. For future studies, it is important to improve the multidisciplinary

ABSTRACT

of the treatment and, after completing the current treatment programs, to provide scientific value out of what is now clinical evidence.

The management of oral health in autistic pediatric patients: an innovative approach

D. Visentini, M. Guaragna, T. Marinucci, N. Petrazzuoli, S. Vitali, C. Sbarbaro, D. Corridore

Facoltà di Medicina e Odontoiatria, Dipartimento di Scienze Odontostomatologiche e Maxillo Facciali, "Sapienza" Università di Roma, U.O.C. di Odontoiatria Pediatrica, Rome, Italy

BACKGROUND: At the UOC of Pediatric Dentistry of the Policlinico Umberto I, a project is in place that involves the use of approach techniques adapted to the needs of the various patients with autism spectrum (age 0-17 years) studied on the basis of careful observation and an anamnestic survey complete with specific information regarding the behavioral therapies performed and on the subjective perceptions of the child (positive and negative). We use the Alternative Augmentative Communication technique that facilitates the child's understanding of the type of therapy and the duration of the same. The goal is to minimize the interventions in General Anesthesia only to cases of more complicated therapies (extractions of permanent teeth and root canal therapies) managing to intercept all other at risk situations with prevention interventions (sealing and ablations) and Minimal Intervention, as well as managing patients treated under General Anesthesia with long-term follow-up to maintain long-term results.

METHODS: For the study, subjects with autism spectrum

disorder aged between 4 and 17 years were enrolled. The subjects examined are autistic patients who already have "serious" cognitive-behavioral deficits at the age of 2/3 years, with problematic relational modalities and verbal difficulties. Of these patients the proximate and remote medical history was collected and the DMFT data on the Silness and Loe plaque index. They were subsequently divided into groups of three phases depending on the first access to the ward and the type of therapies that were managed in these phases.

RESULTS: The sample of 149 subjects, 108 males and 41 females. In the First Phase the approach was carried out in 74% of the sample, in 23% tartar ablation, in 2% respectively controls and prevention techniques and in 1% of cases it was necessary to resort to General Anesthesia. In the second phase 61% of the sample performed a tartar ablation, 18% minimally invasive conservative treatments, 15% continued with the approach, 3% preventive treatments, 2% performed minor surgery and 1 % checks. In the Third and Last Phase (to date) 45% performed tartar ablation, 27% conservative treatments, 10% preventive treatments, 5% controls, 4% continue with the approach, 3% small surgery and in 6% of cases the appeal to General Anesthesia was necessary.

CONCLUSIONS: The multidisciplinary approach (Odontoiatra, Dental Hygienist, Pedagogist and Psychiatrist) has proved effective in order to obtain the collaboration of patients with autism. In fact, out of a total of 149 enrolled subjects, it was possible to treat more than 90% of them (mainly with preventive treatments) and only 11 of them had to schedule treatment under Day Hospital under general anesthesia. The Alternative Augmentative Communication is the technique that manages to reconcile the therapeutic needs with the most effective type of communication approach to make the treatments as comfortable as possible for patients.

ORTOGNATODONZIA

Prevention on impacted canine to achieve correct occlusion

BACKGROUND: The aim is to present the most innovative interceptive treatment option during the early mixed dentition in subjects with a early displaced maxillary permanent canine. Impacted canine prevention is an important diagnostic and therapeutic challenge to the orthodontist. Impacted canine prevention in an important diagnostic and therapeutic challenge to the orthodontist. A tooth is impacted when, after passing the physiological period of eruption and with the apex now formed, it remains inside the bone. On the other hand, a tooth is malpositioned when it is in an abnormal position inside the bone even prior to the development period. case A) a 7.10 years old female presented missing lateral incisor, suspect of displaced maxillary canine.

METHODS: Orthodontic finalization with asymmetric distalization, bilateral 1st class occlusion, midline coincidence, presence of permanent canine in dental arch.

Progress:

1st phase with:

- 1) ERP
- 2) Extraction C
- 3) Extraction D

2nd phase with:

- 4) Slicing E
- 5) Distalization with Pendulum
- 6) Extraction E
- 7) Traction 5

Case B) a A 8-year and 6-month old girl who falls within the second degree of severity because of great pericanine congestion caused by mesialization of the buds of the 1st and 2nd premolars and displacement of the lateral incisor in the vestibular area. Early orthodontic treatment is indicated due to the presence of crowding in the pericanine region and where the OPT shows an inclination of the first premolar and abnormal inclination of the canine with respect to the midline.

The protocol used for this level of severity consists of:

Orthopedic maxilla expansion phase

Extraction of element C

Extraction of element D

Slicing of element E

Recovery of Leeway space

Distalization by Pendulum

Extraction E

Application of a fixed brace on both arches

RESULTS: The results were impressive both in esthetic, occlusal and functional terms and there was the presence of permanent canine in the occlusal arch. **Discussion:** Displaced canine presents some peculiar difficulties related to some challenge during the diagnostic and therapeutic phase, and functional aspects. Orthopedic and orthodontic early appliance has been chosen in order to avoid more invasive treatments.

CONCLUSIONS: In this case, with an early treatment, there was a spontaneous recovery of a canine with an high risk of displacement avoiding extraction and other invasive therapy. Interceptive therapy procedures, using distalizing action obtained with a pendulum, are able to reduce the rate of impaction of maxillary canines: Avoiding the need for active treatment in patients with an acceptable occlusion. Reducing the need for combined orthodontic-surgical treatment for recovery and alignment of the canine in the arch. Cancelling the risk of any damages to adjacent teeth caused by the malpositioned canine.

RME anchored on deciduous teeth: comparative study on different anchoring systems

G. Rubino, R. Favero, C. Cicognini, A. Volpato, L. Favero

University of Padua, Faculty of Medicine and Surgery, Department of Neurosciences: Neurological, Psychiatric, Sensory, Reconstructive and Rehabilitative Sciences, Padua, Italy

BACKGROUND: The aim of the current study is to verify the efficacy and effects of using baby screw expander (A0620-11 Leone of 11 mm) anchored to the second deciduous molars in early mixed dentition on the upper and lower arch in three groups of patients: expander with only front arms (Group A), expander with front and rear arms (Group B), expander with only rear arms (Group C).

METHODS: Inclusion criteria: early mixed dentition, presence of the second deciduous molars, the deciduous canines and the first permanent molars (in partial eruption) in both arches, and patients requiring 24 activations (4.8 mm). The number of patients for group is 30 divided into 20 males and 10 females with an average age of 7-8 years, treated by application to the removal of the RME. The statistical analysis is based on "t-test", applied at different time intervals: start of treatment (T0), after 24 activations (T1), at 6 months after T1 (T2). Another "t-test" is used to compare the different groups at T2. The following measurement were made on virtual dental casts: 1 (intercanine width), 2 (primary intermolar width), 3 (intermolar width) in the upper and lower arch.

RESULTS: The data obtained in the t-test gave the following indications.

Group A: in the upper arch, increases the intercanine width (from 28.67 ± 2.31 mm to 33.67 ± 3.2 mm), the primary intermolar width (from 38.00 ± 2.00 mm to 43.67 ± 2.08 mm) and the intermolar width (from 44.00 ± 2.83 mm to 46.00 ± 4.24 mm). In the lower arch the intercanine width is from 25.67 ± 4.16 mm to 25.67 ± 3.06 mm, the primary intermolar width remains at 36.50 ± 2.12 mm, intermolar width is from 39.00 ± 4.24 mm to 40.50 ± 4.95 mm.

Group B: in the upper and lower arch, increases the intercanine width (from 31.25 ± 2.50 and 22.50 ± 5.00 mm to 34.25

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± 2.22 mm and 23.25 ± 4.57 mm), the primary intermolar width (from 37.75 ± 0.96 mm and 32.00 ± 1.63 mm to 43.50 ± 1.73 mm and 33.00 ± 2.58 mm), and the intermolar width (from 44.00 ± 2.65 mm and 36.75 ± 3.50 mm to 48.00 ± 4.00 mm and 39.00 ± 1.83 mm).

Group C: in the upper arch, increases the intercanine width (from 33.00 ± 2.16 mm to 33.75 ± 0.96 mm), the primary intermolar width (from 40.25 ± 0.96 mm to 45.25 ± 2.63 mm), and the intermolar width (from 43.75 ± 3.10 mm to 49.50 ± 1.73 mm). In the lower arch the intercanine width is from 27.62 ± 1.97 mm to 25.75 ± 1.50 mm, the primary intermolar width is from $34.751.71$ mm to 37.00 ± 1.41 mm, the intermolar width is from 40.25 ± 4.57 mm to 42.50 ± 2.08 mm.

The increase of group C patients intermolars widths was shown to be statistically significant when compared to other groups. However, the expansion of the maxillary anterior area was statistically significant better in group B.

CONCLUSIONS: a) Unlike the other types of expanders examined, the expander with only the rear arms is the most effective and hygienic. b) Patients with an expander with anterior and posterior arms have a greater improvement of anterior dental crowding or anterior crossbite.

Treatment of deep bite in patient with TMJ disorder: case report

V. Fiore, M. Macri, F. Festa

Università degli Studi "G. D'Annunzio" di Chieti, Chieti, Italy

BACKGROUND: Resolution of a skeletal Class II malocclusion with deep bite using invisible aligners in patient with TMJ disorders.

METHODS: the patient, 39 year old male, reported frequent episodes of headache, neck pain and soreness to the chewing muscles. A low dose cone beam is performed for diagnostic purposes. From this type of radiological survey we obtain the 2d plates conventional as opt, tele L / L, vertex subment and much more. We diagnose a posterior position lower jaw, maxilla contract, dental crowding in both arches, deep bite and loss of physiological cervical lordosis. At first the treatment was conducted with passive aligners to get muscle relaxation, a neuromuscular programming with a gymnastics of proprioception of the tongue and of the entire group of chewing muscles. Reached this, we decided to treat malocclusion with Invisalign aligners. The therapy was aimed at expanding the upper arch, to solve the overcrowding by stripping and for the correct management of the incisors torque. The dental aligners are an orthodontic technique now consolidated over the years. The aligners are removable and individualized invisible masks made of thermoplastic polymers so they are also ideal for patients allergic to nickel for example element present in normal metal brackets. We reiterate are individualized devices to be used approximately 22 hours a day that change every 15 days. The aligners are created from virtual dental arches models obtained by scanning the normal dental impressions, but not only thanks to the intraoral scanners we have directly the scan of the dental arches of our patient. In order to guarantee and to respond to the principles of biomechanics, the so-called attachments are usually used in the planning of the treatment, they are nothing more than beads made of composite material that are reproduced through a template on the dental surface. We recognize

retention attachments generally on molars or at most on the diatonic but still rectangular or horizontal vertical attachments up to the optimized attachments.

RESULTS AND CONCLUSIONS: Bite opening has been reached with 34 aligners, so let's talk about an actual time of scarcely 17 months with the possibility to make a finish with aligners certainly very small number. After the first cycle of aligners, we request a series of finishing masks, 15 aligners, that allow us an exemplary resolution of the malocclusion, restoring the patient's desired smile. Once a Cone beam control has been performed, we confirm the support with the restoration of the physiological cervical lordosis. The lower jaw has repositioned forward with remission of neck pain and headache. The stability of the treatment is performed by passive aligners and the correct application of anti-squeezing protocol.

Three-dimensional evaluation of dental models in cleft lip and palate subjects using an automated digital tool

S. Meneghello¹, D. Cassi^{1,2}, M. Magnifico¹, G. Pedrazzi³, A. Di Blasio¹

¹Centro Universitario di Odontoiatria, Department of Medicine and Surgery, University of Parma, Parma, Italy; ²University of Modena and Reggio Emilia, Department of Medicine and Surgery, Modena-Reggio Emilia, Italy; ³Unit of Euroscience, University of Parma, Parma, Italy

BACKGROUND: To analyze the three-dimensional digital models of patients with cleft lip and palate (CLP) with regard to maxillary arch width and dental arch relationships, employing an automated software tool which calculates dental distances and the modified Huddart and Bodenham index (MHB).

METHODS: Seventy-seven CLP patients (51 male, 26 female) consecutively referred to the Orthodontic Section of the Academic Hospital of Parma were included. Subjects were classified according to the cleft phenotype as follows: 48 subjects with unilateral CLP (UCLP), 14 with bilateral CLP (BCLP), 4 with cleft lip (CL), 5 with cleft palate (CP) and 6 with cleft soft palate (CSP). Alginate impressions for the construction of plaster models were taken before orthodontic treatment (mean age 7.2 ± 2.7 years). Digital dental casts were obtained using a 3 Shape B500 laser scanner and exported as STL files. Digital models were landmarked for automatic scoring using a software plug-in: overjet, intercanine and intermolar widths were measured; additionally, the modified Huddart and Bodenham index (MHB) was automatically calculated. Such a numerical scoring system requires all maxillary teeth to be scored according to their buccolingual relationship to the corresponding mandibular tooth and reflects the maxillary arch constriction. After one-month interval, the same examiner repeated the landmarks identification on 30 models randomly selected. Intra-observer reproducibility was tested using Pearson's and Linn's coefficients. Analysis of variance (ANOVA) and Tukey post-hoc tests were used to calculate the statistical differences between the cleft groups. The results were considered to be significant at values $P < 0.05$.

RESULTS: Intra-observer reproducibility was substantial (Pearson's r and Linn's $ccc = 0.96$). A statistically significant difference was found for MHB score between all groups and for OVJ between BCLP versus SCP and CL versus CP. No statistically significant differences were found between

the groups comparing intermolar and intercanine distances. BCLP patients had the lowest mean values both of OVJ and MHB score.

CONCLUSIONS: The digital automated system is a new, objective approach to analyze dental cast and assess surgical and orthodontic outcomes. In the present study, subjects with BCLP have significantly reduced MHB, while intercanine and intermolar widths are similar to those measured in other cleft groups. Thus, the automatic MHB scoring might be considered a reliable and accurate method to quantify maxillary arch constriction and interarch discrepancy among various cleft phenotypes.

Morphological and three-dimensional analysis of ponticulus posticus on orthodontic patients: prevalence study by gender

C. Labellarte, M. Macri, F. Festa

Università degli Studi "G. D'Annunzio" di Chieti, Chieti, Italy

BACKGROUND: the aim of this study is to improve the knowledge on Ponticulus Posticus (PP) regarding prevalence and morphological characteristics, exploiting the high diagnostic power of Cone Beam Computed Tomography (CBCT) as a method of evaluation. The PP is an anatomical variation occurring on the atlas vertebra, which is the first cervical vertebra of the spine. The PP is a bony bridge between the posterior part of the superior articular process and the posterolateral part of the superior margin of the posterior arch of the atlas. The PP can be evaluated radiographically in lateral cephalography, in computed tomography and in cone beam computed tomography. The PP is formed by ossification of the atlanto-occipital membrane that offers the passage in the skull to the vertebral artery. In fact, the vertebral artery originates from the subclavian artery and ascends passing through the transverse foramina of the cervical vertebrae up to the atlas. At this point it passes between the articular process and the posterior arch of the atlas and enters the skull.

METHODS: A cross-sectional study was performed on CBCT images obtained from a random sample of 500 Italian patients (age range: 6-87 years; average age: $27,08 \pm 15,12$ years) who were referred to the Department of Medical, Oral and Biotechnological Sciences of the University "G. D'Annunzio" of Chieti for the orthodontic diagnosis and treatment planning. The sample was composed of 202 males and 298 females.

CBCT images were obtained using Pax Zenith 3D CBCT (Vatech, Korea) with low radiation dosage protocol.

The study included all types of PP: complete bilateral, complete on the left, complete on the right, complete on the right and partial on the left, complete on the left and partial on the right, partial bilateral, partial on the left, partial on the right. Complete PP was considered a bone bridge that extends from the articular process to the posterior arch of the atlas, instead partial PP was defined as a bone spicule over the groove of the vertebral artery, extending from the upper articular process or from the posterior arch of the atlas.

A P-value lower than 0,05 was considered the reference to indicate a statistically significant difference.

RESULTS: The study results showed the presence of PP in 110 patients, suggesting a prevalence of 22 % in the Italian population. There aren't any statistically significant differences in gender distribution of PP.

CONCLUSIONS: The present study suggests a prevalence of

the PP of 22% on a sample belonging to the same racial group (Italians), without differences between males and females. The PP is a fairly common anatomical anomaly, occasionally found during routine exams. It therefore becomes important for the clinician to be aware of the symptomatology related to vertebral artery compression linked to the presence of PP, such as headache, vertigo, diplopia and migraine.

Prevalence of teeth agenesis in a class II division ii group of orthodontic Italian patients: a case-control study

A. Frezza, E. Conte, G. Bruno, A. De Stefani, A. Gracco, E. Stellini

University of Padua, Department of Neuroscience, Dental School, Padua, Italy

BACKGROUND: Tooth agenesis is a frequent condition in general population. A meta-analysis of Polder B. found that the most frequent teeth affected by agenesis are the mandibular second premolars, followed by the maxillary lateral incisors and the maxillary second premolars. In literature prevalence of agenesis is reported between 2.7% and 11.3%. Percentages of frequency change because of geographic variations and gender: for example, prevalence is higher in European Caucasians (males 4.6%; females 6.3%) and in Australian Caucasians (males 5.5%; females 7.6%) rather than in North American Caucasians (males 3.2%; females 4.6%). Different frequencies of agenesis can also be found in different sample of patients classified for Angle's malocclusions or skeletal malocclusions. The purpose of this study was to evaluate the prevalence and pattern of tooth agenesis in Italian patients with a Class II division II malocclusion compared to an Italian control group of general orthodontic patients, and with previous studies performed in other countries.

METHODS: In this observational study, a sample of 600 patients, aged 7 or older, from University of Padua Dental Department was analyzed. The entire sample consisted in a group of 37 patients with Class II division II malocclusion and a control group of general orthodontic patients with the remaining 563 patients. For Class II division II group inclination of central incisors and the relationship of first molars (Class II end to end or worse on at least one side in maximum intercuspitation) were evaluated from dental casts, intraoral photographs and lateral cephalograms (U1-SN less than 90°, overbite >3mm). Presence of agenesis of permanent teeth, except for third molars, was judged from panoramic radiographs.

RESULTS: Prevalence of teeth agenesis in patients with Class II division II malocclusion (18.9%) was more than double towards that one of the control group of general orthodontic patients (8.3%). The pattern of tooth agenesis in Angle Class II division II was: 53.85% mandibular second premolar, 23.08% maxillary second premolar, 15.38% mandibular lateral incisor.

CONCLUSIONS: Prevalence of permanent tooth agenesis was almost 2 times higher in the Class II division II group than in the control group. No agenesis of maxillary lateral incisors was found in the Class II division II group. This result was in contrast with other studies in Japan or Germany, questioning the higher prevalence of this tooth agenesis as a characteristic of a Class II Division II malocclusion.

ABSTRACT

Transversal contraction of maxilla and allergic respiratory disease: an epidemiological and statistical correlationS. Hajrulla ¹, R. Favero ², N. Camurri ³, A. Volpato ⁴, L. Favero ⁵¹*Odontostomatology Institute, Department of Neuroscience, University of Padua, Padua, Italy;* ²*Odontostomatology Institute, Department of Neuroscience, University of Padua, Padua, Italy;* ³*Odontostomatology Institute, Department of Neuroscience, University of Padua, Padua, Italy;* ⁴*Odontostomatology Institute, Department of Neuroscience, University of Padua, Padua, Italy;* ⁵*Odontostomatology Institute, Department of Neuroscience, University of Padua, Padua, Italy*

BACKGROUND: According to Moss' Theory of the Functional Matrix, functional needs and soft tissues are determining factors in the growth and development of craniofacial structures. The effect of prolonged mouth breathing on craniofacial growth remains a widely debated topic in orthodontic literature. Many authors sustain the hypothesis that a prolonged habit of mouth breathing, as a consequence of nasal obstruction, interferes with the normal process of growth resulting in different types of malocclusion. Allergic rhinitis is one of the main causes of nasal obstruction in the pediatric population. The present retrospective epidemiological study aims to investigate the role of allergic rhinitis/asthma in the etiology of transverse orthodontic problems, represented by posterior crossbite and ogival palate. Furthermore, the study aims to assess the influence of allergic rhinitis/asthma on the long-term stability of the effects induced by the transverse expansive treatment in patients aged between 5-12 years.

METHODS: The clinical record of 319 patients who had turned to an orthodontist specialist for orthodontic evaluation and treatment were included in the study. The sample was divided into a case and a control group: the case group consisted of subjects that presented with mono- or bilateral posterior crossbite/ogival palate; the control group consisted of patients who were affected by malocclusions other than maxillary contraction. For both groups the following data was collected from the clinical records: presence or absence of perennial or seasonal allergic rhinitis, asthma, habit of mouth breathing, medical therapy for allergic rhinitis/asthma, past interventions of adenoidectomy/tonsillectomy. In patients of the case group that had completed the transverse expansive treatment, we investigated the occurrence of relapse. Clinical records were selected randomly, excluding subjects not belonging to the pre-established age range, subjects that presented genetic malformations and subjects who had undergone previous orthodontic treatments.

RESULTS: Case group: 174 subjects aged between 5-12 years (mean=8,8; median=9; standard deviation=1,96); prevalence of allergic rhinitis 24,13%; prevalence of asthma 5,7%. 108 subjects had completed the orthodontic therapy. In 77 subjects treatment effects were stable, among which 18 suffered from allergic rhinitis; in 31 subjects relapse had occurred, among which 10 suffered from allergic rhinitis. Control group: 145 subjects (mean=9,7; median=10; standard deviation=1,93); prevalence of allergic rhinitis 15,17%; prevalence of asthma 4,13%. The results of the statistical analysis performed showed that there was a statistically significant correlation between the presence of posterior crossbite/ogival palate and the presence of allergic rhinitis (confidence interval=95%; p-value=0,05; odds ratio=1,77). No significant correlation was found between the occurrence of relapse and the presence of

allergic rhinitis/asthma (confidence interval=95%; p-value=0,34; odds ratio=1,55).

CONCLUSIONS: A statistically significant correlation emerged between posterior crossbite/ogival palate and allergic rhinitis (p-value=0,05). Our findings, therefore, suggest the existence of a cause-effect relationship between the presence of respiratory allergies and transverse maxillary contraction. No correlation was found between allergic rhinitis and the occurrence of relapse after the transverse expansive treatment.

Personality traits are associated with propensity to use mandibular advancement devices for obstructive sleep apnea syndromeL. Mezzofranco, A. De Stefani, G. Bruno, A. Gracco, E. Stellini
University of Padua, Department of Neuroscience, Dental School, Padua, Italy

BACKGROUND: Obstructive Sleep Apnea Syndrome (OSAS) is a respiratory syndrome that may involve the dentist within a multidisciplinary team, because of the possibility of using Mandibular Advancement Devices (MAD). Although not achieving the efficacy of CPAP (Continuous Positive Airway Pressure) in decreasing nocturnal respiratory events, MAD may provide similar short-term health (*i.e.* daytime symptomatology) and cardiovascular benefits than CPAP. These results may be related to the better compliance of MAD, thus identifying the subjects who are disposed to using MAD is important to offer adequate treatment options. The aim of this study was to evaluate the association between potentially relevant personality traits (including the desire to have firm answers, the aversion to ambiguity, the anxiety and the resistance to something new) and the propensity to be treated by a dentist for a general health problem such as OSAS and snoring.

METHODS: One hundred and forty-eight participants (35 males and 113 females) were enrolled in the study and were asked to fill in the questionnaires. Median age was 30 years (IQR 21-45). Sixty-six participants (45%) were University students while the remaining 82 (55%) were enrolled at local dentistry wards while waiting for a visit. Potentially relevant personality traits were evaluated using NFC (Need for Closure), PER (openness to new experiences), STAI-Trait and STAI-Stat questionnaires. The propensity to be treated with dental devices for a general health problem such as OSAS and snoring was evaluated with a specific questionnaire (Mad-related distress).

RESULTS: Higher NFC was associated with older age (p<0.0001) and being non-student (p<0.0001), while higher STAI-Trait was associated with younger age (p=0.0007) and being student (p=0.0003). PER, STAI-State and Mad-related distress were not associated with age or student/patient group. Males and females showed similar scores. A positive opinion on dental devices for alignment was associated with a lower Mad-related distress (p=0.02). Eight out of ten participants would accept to use dental device to be kept at night for the solution of a health problem or the treatment of a disease that does not affect the teeth, and they had lower STAI-Trait than those who would not (p=0.03). Only five participants had already been visited or treated for OSAS, while 60% of subjects already knew about such issue. A positive opinion on device used to treat OSAS was associated with higher PER (p=0.02) and lower Mad-related distress (p=0.03), while the opinion of usefulness of the device was positively associ-

ated with higher PER ($p=0.03$) and STAI-Trait ($p=0.04$). Underestimating the snoring when sleeping alone and underestimating the benefit of dental device on preventing a heart attack or a stroke were associated with lower PER and higher Mad-related distress (all $p<0.05$). Greater distrust on dental devices was associated with higher NFC, STAI-State and Mad-related distress (all $p<0.05$). A positive opinion about treatment of snoring and OSAS using dental devices was associated with higher PER, while lower STAI-Trait was associated with positive opinion on treatment of snoring using dental devices (all $p<0.05$).

CONCLUSIONS: The results suggest that some personality traits are associated with the propensity to use MAD to treat a general pathology as OSAS. In addition, more information on MAD should be provided to OSAS patients.

Cephalometric evaluation of saddle angle excluding nasion point

C. Benetazzo, G. Bruno, A. De Stefani, A. Gracco, E. Stellini
University of Padua, Department of Neuroscience, Dental School, Padua, Italy

BACKGROUND: The lateral cephalometric radiograph represents a fundamental diagnostic tool in the description of the skeletal and dental relationships, horizontally and vertically. The cephalometric tracing highlights the linear and angular relationships between the various selected points, thus analyze the most important components of the face: skull and cranial base, maxilla and mandible, upper and inferior teeth with their concerning alveolar processes. Regardless of the tracing used, the purpose is to develop an individualized treatment plan. The starting point of the present study is the Björk-Jarabak polygon ($396^\circ \pm 6$), defined by Nasion (Na), Sella (S), Articular Point (Ar), Gonion (Go) and Menton (Me). This structure is useful to determinate the direction and the potential of growth and for the determination of the facial biotype. Among the various measurements which the polygon includes, the present study focused on the Saddle Angle ($123^\circ \pm 5$), formed by the anterior cranial base (line Na-S) and the posterior cranial base (line S-Ar). It describes the temporomandibular joint (TMJ) position inside the glenoid cavity and thus it influences the sagittal projection of the mandible. However, this measurement is not precise, since it is influenced by the Na-S plane orientation, which is extremely variable, so much that it can distort the value of this angle. For this reason, it could be better evaluating an angle determined by the landmarks S and Ar and the use of the True Vertical Line (TVL) or the True Horizontal Line (THL), which are more reliable than the intracranial referent lines. Therefore, the aim of this study is to evaluate how much the Nasion position affects the Saddle Angle's value and to identify a new angle (THL-S-Ar) that excludes that point. At last, this angle will be compared to the "traditional" one, in order to evaluate if they match or not.

METHODS: This is an observational study. 154 patients were evaluated, randomly selected among those under treatment at the Padua's Dental Clinic. Lateral cephalometric radiograph of the head and right-side photography for every patient were taken. All the radiographs have been oriented in Natural Head Orientation (NHO) by superimposing them on the photos previously taken in Natural Head Position (NHP). Roth-Jarabak cephalometric tracing was made and the THL passing for the S landmark was drawn, in order to identify a new angle determined by the following landmarks: THL-S-Ar. Therefore, a new normal range has been identified and compared to the

"traditional" one, in order to evaluate if there were any differences. All the measurements were made by the same operator. **RESULTS:** In the present study, approximately the 30% of the patients analyzed does not match. Above all, about the 60% of patients, previously categorized such as "open angle", actually had a normal angle, if we considered the new identified range of normality.

CONCLUSIONS: These results seem to confirm that the Nasion can affects negatively on the Saddle Angle evaluation. Therefore, this measurement should be used with caution, especially because it is a structural factor, which cannot be modified by the orthodontic treatment, influencing the treatment plan.

A new method to evaluate compliance of patients with Down syndrome

C. Strappa¹, C. Romeo², B. Ricci³, I. D'Apolito³, C. Grippaudo⁴

¹Dental School, Catholic University of Sacred Heart, Rome, Italy; ²Postgraduate School in Orthodontics student, Catholic University of Sacred Heart, Rome, Italy; ³PhD Program in Cellular and Molecular Clinical Research in Dental Diseases; ⁴Postgraduate School in Orthodontics, Catholic University of Sacred Heart, Rome, Italy

BACKGROUND: Down syndrome (SD) is usually associated with a delay in cognitive ability and physical growth, as well as typical cranio-facial dysmorphic features and dental malocclusion, frequently characterized by open bite, cross bite, III skeletal class and agenesis. Although the need for orthodontic treatment is often present, it is not always feasible until the pursuit of all possible treatment goals. Often, due to the poor collaboration of patients, partial targets are established and minimally invasive orthodontic treatments are used. The aim of the work was to assess the use of a questionnaire to estimate collaboration of patients with Down syndrome who need orthodontic treatment.

METHODS: To evaluate the patient's collaboration, a questionnaire was subdivided into 3 levels, to be completed in the appointments that precede the beginning of the orthodontic therapies. Each level describes the procedures that are usually performed before starting an orthodontic treatment, in sequence. Each one is assigned a score from 0 to 3 based on the collaboration offered, where 0 matches a non-cooperative patient and 3 a fully cooperative patient. Level 1 assesses the possibility of performing the procedures usually performed during the first dental visit. Level 2 includes the evaluation of the procedures necessary for the acquisition of diagnostic records (photos and impressions) of orthodontic treatment. Finally, level 3 aims to evaluate the patient's short- and long-term compliance. At the end of the assessment, for each level, the totalized values are added together and the patient is assessed to have obtained a sufficient score to pass the execution of the procedures planned in the next level. If the score is insufficient, the evaluation is repeated at the next appointment, and a sustainable treatment plan will be established based on the patient's clinical needs and compliance. This method was tested on 39 patients divided into 3 age groups: 8-15 years; 15-25 years; > 25 years, by two operators, over a period of one year.

RESULTS: The patients observed showed a variability in obtaining the scores expected from the use of the questionnaire. Therefore, 22 had access to complex orthodontic therapies, with fixed multibrackets devices, as they achieved

ABSTRACT

adequate scores at the end of the third-level assessment; 15 patients, who had been assessed as unable to access the third level but had passed the second level score, received orthodontic treatment with simple and minimally invasive devices, such as removable orthodontic appliances for palatal expansion. Finally, only 2 patients did not achieve sufficient scores to guarantee an adequate and continuous collaboration, necessary for orthodontic therapies, and therefore received preventive care and maintenance of oral hygiene and dental health. In this case it was not possible to start orthodontic treatment. **CONCLUSIONS:** Unlike other dental treatments, orthodontic treatments may be deferred or not performed in non-cooperative patients, because their ultimate goal is improvement of patient's quality of life. On the other hand, it is not possible to correctly perform orthodontic care without the involvement of the patient, who must follow the orthodontist's instructions, must not damage the equipment and must maintain an excellent level of oral hygiene. If these aspects of collaboration fail, the presence of an orthodontic appliance constitutes a risk, more than a benefit, for oral health. This questionnaire has been a valuable tool for the screening of patients with Down syndrome who guarantee the collaboration necessary to carry out orthodontic treatments.

The correction of the occlusal plane: diagnosis, technique, indications and complications

E. Bica ¹, C. Manenti ¹, F. Poletti ¹, A. Nota ¹, A. Castaldo ^{1,2}, S. Tecco ¹

¹Dental School, Vita-Salute San Raffaele University, Milan, Italy;

²Department of Medical, Surgical and Health Sciences, University of Trieste, Trieste, Italy

BACKGROUND: The correction of the occlusal plane in orthodontics is an hard goal. The analysis of the occlusal plane depends on the adopted diagnostic methodology in evaluating the presence of a malocclusion, as well as other different situations (facial aesthetics, temporomandibular disorders, posture and facial asymmetry). The analysis of the occlusal plane frontal inclination (occlusal cant) is one of the parameters affecting smile esthetics. Occlusal cant can be related or not with facial asymmetry due to asymmetric development of the mandible, unilateral extruded molars, or asymmetric dentoalveolar development. Even if it can be observed also with relaxed lips it can be clearly studied during smile. Therefore, the management of the occlusal cant, is a complex variable during an orthodontic treatment. The aim of the present review is to analyse the published literature about the occlusal cant, its diagnosis, the indications to its correction and the management of the treatment techniques and possible associated complications.

METHODS: This literature review includes articles and books indexed in different databases: PubMed, Medline, Science Direct. Longitudinal, cohort, case-control, cross-sectional, experimental and case series studies were compared. Literature reviews were also included. We excluded articles that did not talk about the correction of the occlusal plane frontally. The investigation was restricted to articles and books published in English, Spanish and Italian languages.

RESULTS: The final search yielded 60 citations. After excluding repetitions, 18 were excluded, which returned 42 references. In order to complement the relevance and the validity of the review 10 books, 9 case report/series, 14 clinical studies, 4 literature reviews, 1FEM study, 4 expert opinion

articles, were analysed. Most of the references studied the generalities and implications on the canted occlusal plane. Moreover, scientific evidence about the correction of occlusal cant with different techniques as micro-screws like valid alternative to orthognathic surgery is reported and was showed by clinical studies and case reports.

CONCLUSIONS: The inclination of the occlusal plane on the frontal view could be a clinical manifestation of facial asymmetry. Occlusal plane canting is a characteristic that must be evaluated in any assessment of smile esthetics and before an orthodontic treatment. Changing the occlusal plane angle does affect relative smile attractiveness. The perception of occlusal cant varies between patients and dentists. Cants of 4° or greater are noticeable and may be unacceptable to a patients. The most commonly used diagnostic methods are the 3D images, the frontal photos, the frontal cephalometric tracing, and the clinical view with a tongue depressor or the fox plane. According to the indications, the correction techniques are different. If there is a small occlusal inclination or just an incisal inclination, an intrusion arch with braces could solve the problem. Some complications can be associated to this technique. Mini-screws have proven to be a useful addition to the orthodontist's arsenal for the control and correction of occlusal cant and in patients who meet less or do not meet the standards could be a valid alternative to orthognathic surgery. Complications may arise during the placement of the mini-screw and then in terms of patient stability and safety. An in-depth knowledge of proper technique placement, bone density and location, soft peri-implant tissues, regional anatomical structures, and patient's home care are essential for the optimal success of the mini-screw.

Management of impacted maxillary canines: comparison of therapeutic methods

C. Manenti ¹, E. Bica ², N. Nardi ², A. Lucchese ², R. Vinci ²

¹Dental School, Vita-Salute San Raffaele University, Milan, Italy;

²Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy

BACKGROUND: The orthodontic-surgical treatment of impacted teeth represents one of the most challenging clinical situations the orthodontist would face. Second to the third molars, that are usually condemned to be extracted, the maxillary canines are the most commonly impacted permanent teeth, with prevalence of between 1% to 3%, females are more commonly affected. Moreover, canines are impacted palatally more frequently than labially. The diagnosis is based on both clinical and radiographic examination. The clinical inspection guides us with easiness to notice the absence of a permanent tooth in the dental arch and to locate it frequently as a bulge that represents the osteomucosal retention of the canine. The radiological inspection helps us with high reliability to distinguish the path of eruption of the tooth. The periapical radiographs assist in locating the position of the impacted tooth whether it's palatal or labial. Panoramic radiographs are used to determine if the tooth is totally impacted or simply retained. The clinical approach will be orthodontic-surgical with the totally impaction or ostemucosal retention. Usually it's one of two approaches to adopt, on a case by case basis: extract or not. The aim of this study is to confront and investigate the differences in the periodontal state outcome after exposing totally impacted canine, by the use of rotating instruments compared to piezoelectric terminal

METHODS: We have picked 12 patients, 4 males (age from 15 to 37) and 8 females (age from 16 to 32). All the patients had one or both the canines in total palatal impaction. The standard of impaction used in the study is the absence of: orofacial trauma, Systemic diseases, congenital disorders, mental retardation and prepubertal periodontal diseases. Before following the patients all of them have had finished orthodontic treatment to improve the alignment of the teeth and create adequate space in the dental arch to accommodate the impacted canine. Then the patients undergone a surgical exposure of the canines. In one group the osteotomy was performed by rotating instruments while in the other group with piezoelectric terminal. Consequently, to bring the tooth into the line of occlusion, the patients continued the orthodontic therapy. At that point, the patients returned to our observation to evaluate clinical attachment level (CAL), eventual gingival recessions (REC), plaque index (PI), bleeding on probing (BOP), bone loss, pulpar canal obliteration and/or radicular resorption.

RESULTS: The outcome of this study showed that the CAL was slightly higher in the test group. Only one patient had gingival recession of 2mm. Bleeding and plaque index was positive in two patients of the test group and the same for the control group. Only one patient has demonstrated alveolar bone loss which is the same tooth that suffered of gingival recession in the control group.

CONCLUSIONS: Mainly there are no statistically significant differences between the two techniques. The periodontal state was acceptable in both methods. The critical analysis of the results indicated that piezoelectric instruments are more efficient and widely used in oromaxillofacial surgery; due to simplicity of execution, better visibility of the operating field, respecting the sensible structures such as vessels and nerves, high cutting precision and reduction of healing time and postoperative discomfort owing to its minimum damage to soft tissues.

Cephalometric evaluation in patients with bilateral and unilateral cleft lip and palate

V. Montanari, G. Bruno, A. De Stefani, A. Gracco, E. Stellini

¹University of Padua, Department of Neuroscience, Dental School, Padua, Italy

BACKGROUND: Cleft lip and palate is a malformation of the lip and the palate present since the birth and it is one of the most prevalent deformities of the oral and facial region. Cleft is a missed connection of the lip and the palate. Cleft lip can have different levels of severity: it can concern only the vermilion of the upper lip, or it can be a complete split. Cleft palate, instead, can concern the hard palate only or the soft palate too. Cleft can be unilateral or bilateral; if there is an unilateral cleft, it can be both in the right side and in the left side. Often, patients with cleft lip and palate have dental and structural cranio-facial abnormalities, like a sagittal deficiency of the maxilla. The aim of this study is to examine the cephalometric analysis of both the groups of patients (with unilateral and bilateral cleft lip and palate) and to verify if there are associations or differences between the data.

METHODS: This is a retrospective study. Lateral radiographs were used to get the cephalometric evaluation. 40 patients between five and fifteen years old were evaluated in the study: 20 patients with bilateral cleft lip and palate, 10 patients with

unilateral cleft lip and palate in the right side, 10 patients with monolateral cleft lip and palate in the left side. All the radiographs were evaluated by the same operator. In this study both skeletal and dental measurements were considered. The cephalometric parameters analyzed were: saddle angle, articular angle, gonial angle, upper gonial angle, lower gonial angle, anterior cranial base, posterior cranial base, ramus height, corpus length, SNA, SNB, FMA, anterior face height, posterior face height, overbite, overjet, IMPA, U1-SN, U1-FH. Statistical analysis was performed on the data obtained to compare bilateral and unilateral groups.

RESULTS: Compared to normal values, patients with cleft lip and palate (both unilateral and bilateral) have lower values of anterior cranial base, ramus height, corpus length, SNB, posterior face height, anterior face height and a light retroinclination of the upper and lower incisor (U1-SN, IMPA). Even if they have lower values of posterior face height (HFP) and anterior face height (HFA), the measure HFP/HFA results correct. Data shows that between patients with unilateral cleft lip and palate and patients with bilateral cleft lip and palate, articular angle and lower gonial angle are bigger in patients with unilateral cleft, whereas upper gonial angle is bigger in patients with bilateral cleft; despite the last two results, gonial angle is similar between the two groups of patients.

CONCLUSIONS: Only some cephalometric parameters shows differences between patients with unilateral cleft lip and palate and patients with bilateral cleft lip and palate, but in general there is not an important difference between the data of the groups. Moreover, only some parameters of all patients with cleft lip and palate (both unilateral and bilateral) are very different compared to normal values.

Eruption problems solving in patients with crowding

D. Carozza, M.C. Chiarenza, R.P. Rotolo, A. Correra, L. Perillo
Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy

BACKGROUND: The amount of crowding in cases having tooth-size/dental arch length discrepancy is an important factor when deciding between extraction and nonextraction orthodontic treatment. Because of mandibular anatomical constraints, the mandibular dental arch usually serves as a guideline to determine required changes in the maxillary dental arch. The aim of this study was to evaluate short- and long-term mandibular dental arch changes in patients treated with a lip bumper during the mixed dentition followed by fixed appliances, compared with a matched control sample. **METHODS:** Dental casts and lateral cephalograms obtained from 31 consecutively treated patients before (T0), after (T1) lip bumper, after fixed appliances (T2), and a minimum of 3 years after fixed appliances (T3) were analyzed. The control group was closely matched. Arch width, perimeter and length, and incisor proclination were evaluated. Repeated measures ANOVA were used to analyze changes in measurements over all four time points between treatment and control groups. **RESULTS:** For the dental cast measurements, interreliability was ICC = 0.99 CI 95% (0.97, 0.99). The standard error for the cephalometric analysis, based on the IMPA angle calculated by Dahlberg's formula, was not considered clinically significant. Statistical analyses for the reliability and accuracy

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assessments were repeated after removing all outlying data points. Since they were determined to have no significant effect on the results, all data points were maintained for the analyses in this study. The results of this study increased our understanding of mandibular dental arch dimensional changes and their short- and long-term stability among growing patients treated with the lip bumper followed by fixed appliances. Analysis of the lip bumper effects in the mixed dentition followed by fixed appliances showed statistically and clinically significant increases in arch widths and decreases in crowding after an average 6.3-year follow-up. Arch widths and crowding were significantly different except at T2-T1. At T1-T0, only crowding decreased 3.2 mm while intercanine, interpremolar and intermolar widths increased. Changes at T3-T2 showed a significant decrease of 2.1 mm for crowding and an increase for intercanine, interpremolar, and intermolar widths and arch perimeter, respectively. Finally, at T3-T0, the reduction in crowding of 5.03 mm was significant and clinically important in the treated group. The differences between intercanine, interpremolar, and intermolar widths were also significant in the treated group.

CONCLUSIONS: Mandibular dental arch dimensions were significantly changed after lip bumper treatment. At follow-up, all arch widths were slightly decreased without clinical relevance. Changes remained stable after an average 6.3-year follow-up.

Digital dental casts: 3-dimensional evaluation of the maxillary arch and palate in cleft patients

M. Scerra, M.G. Schiavone, A. De Benedictis, M. Vitale, L. Perillo

University of Campania "Luigi Vanvitelli", Caserta, Italy

BACKGROUND: Cleft lip and palate (CLP) is the most common craniofacial malformation that orthodontists will encounter with an incidence of 1 out of 700 newborns. The morphology of the upper arch and palate has been widely investigated in cleft patients mainly using conventional two-dimensional dental cast analysis. This method, although reliable, is very time-consuming and limited to provide reliable volumetric data. More recently, several studies used different three-dimensional (3D) imaging systems to accurately record the upper arch and palate in cleft subjects. The aim of this study was therefore to evaluate and compare arch width, palatal surface area, and volume of unilateral CLP (UCLP) subjects and non-CLP subjects (NCLP) in the mixed dentition phase using 3D laser scanning.

METHODS: A total of 38 Caucasian subjects, aged from 5.6 to 11.9 years, were included. 19 in each group (UCLP and NCLP). All patients were treated at the Division of Maxillofacial Surgery at the University of Campania "Luigi Vanvitelli", Naples, Italy, by the same surgeon, using the same protocol and method as follows: lip surgery at 6 months according to the Delaire technique, soft palate surgery at 12 months and hard palate surgery at 18 months by pushback with two aps. Digital dental casts were obtained using a 3Shape R700 laser scanner. Intercanine and intermolar widths (cusp and gingival levels), palatal surface area and volume were measured. **RESULTS:** A post hoc analysis of the obtained power for each variable with statistical significant differences

showed a power of 99.9 per cent for both intercanine measurements, of 66.6 per cent for the area difference and of 82.9 per cent for the volumetric difference. Intercanine widths at the cusp (5.60 mm; $P < 0.001$) and at the gingival level (3.11 mm; $P = 0.014$), palatal area (141.5 mm²; $P = 0.009$) and volume (890.7 mm³; $P = 0.029$) were significantly lower in the UCLP compared to the control group. **CONCLUSIONS:** Subjects with UCLP have significantly reduced intercanine maxillary arch widths, while intermolar widths are similar to those measured in matched subjects without malocclusion. Furthermore, a significantly smaller palatal surface area and volume is seen in UCLP subjects in whom early orthodontic or orthopedic treatment was not performed. Therefore, based on the results of the present study expansion of the anterior part of the maxillary arch could be beneficial.

The efficacy of retention protocols after orthodontic treatment: a systematic review and meta-analysis

L. Rustico, A. Mili, A. Lo Giudice, M. Portelli, A.M. Bellocchio, A. Farah, P. Leonardo, A. Costantino, F. Mincica, R. Nucera

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, School of Dentistry, University of Messina, Policlinico Universitario "G. Martino," Messina, Italy

BACKGROUND: The aim of this systematic review and meta-analysis was to evaluate the amount of relapse of anterior crowding and to evaluate the efficacy of retention protocols applied after orthodontic treatment by the best scientific evidence available represented by randomized prospective clinical trials.

METHODS: A survey of articles published up to January 2018 about stability of dental alignment and retention after orthodontic treatment was performed using 7 electronic databases (MEDLINE, EMBASE, OvidSP, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, Scopus, Web of Science) with 3274 initial identified articles. Only randomized clinical trials investigating patients previously treated with multi-brackets appliances and with a follow-up period longer than 6 months were included. Two authors performed independently study selection, data extraction, and risk of bias assessment. All pooled data analyses were performed using the random-effect model. Statistical heterogeneity was evaluated.

RESULTS: In total, 8 RCTs were included, grouping data from 987 patients. The ages of the patients varied across the studies, ranging between 13 and 17 years. Observation period ranged between 6 and 24 months. The appliance features were heterogeneous among the selected studies: 6 trials evaluated the effects of vacuum-formed retainer, 4 trials evaluated the effects of bonded fixed retainers, 2 trials evaluated the effects of the Hawley retainer, 1 trial evaluated the effects of the Begg retainer and 1 trial evaluated the effects of the positioner. Data showed no significant intercanine width modifications during the retention period with both fixed and removable retainers. Significant modification of Little's Index were found for the mandibular removable retainers with a mean difference of 0.72mm (95% CI, 0.47 to 0.98) and for the maxillary removable retainers with a mean difference of 0.48mm (95% CI, 0.27 to 0.68). Not significant changes were found evaluating Little's Index modification for mandibular fixed retainers. 4

RCTs reported the failure rate of the fixed retainer during the observation period, the summarized failure rate was respectively the 41,3% (72/174) for the maxillary arch and 36,7% (115/313) for the mandibular arch.

CONCLUSIONS: The results of this meta-analysis showed that all the considered retainers are effective in maintaining dental alignment after fixed orthodontic treatment, however fixed retainers showed a greater efficacy compared to removable retainers. The most important issues for the fixed and removable retainers are respectively: the risk of failure and the patients' compliance. Further RCTs studies with a longer observation period are needed in order to assess the long-term effect of retainers in maintaining the occlusal results obtained with fixed orthodontic appliance.

Palatal surface and volume on 3D digital casts of patients with different types of orofacial clefts

M. Cinotti¹, D. Cassi¹, A. Di Blasio², P. Puddu³, P. Sassatelli³, U. Consolo¹

¹University of Modena and Reggio Emilia, Modena and Reggio Emilia, Italy; ²Section of Orthodontics, Centro Universitario di Odontoiatria, Department of Medicine and Surgery, University of Parma, Parma, Italy; ³Department of Engineering "E. Ferrarini", University of Modena and Reggio Emilia, Modena and Reggio Emilia, Italy

BACKGROUND: The aim of this study is to measure and compare palatal surface area and volume of patients affected by different types of cleft lip and palate (CLP), using three-dimensional digital models.

METHODS: The sample included 76 subjects, which were classified according to the subtype of clefting as follows: 48 patients (16 girls, 32 boys; aged 6,9±4,3 years) with unilateral CLP (UCLP); 14 patients (3 girls, 11 boys; aged 6,2±0,4 years) with bilateral CLP (BCLP); 5 patients (2 girls, 3 boys; aged 9,1±0,7 years) with cleft soft palate (CSP); 4 patients (3 girls, 1 boy; aged 7,0±0,9 years) with cleft lip (CL) and 5 patients (3 girls, 2 boys; aged 8,3±4,1 years) with isolated cleft palate (CP). All the patients were in the deciduous or early mixed dentition phase. Digital dental model were obtained from plaster study casts by using 3 Shape B500 laser scanner. 3D casts in STL file format were converted into a different format by Geomagic Studio in order to be processed by SolidWorks. From each cast the palatal area was isolated using two reference planes: the horizontal plane was identified selecting three points on the gingival border; the posterior vertical plane was tangent to the distal surfaces of the last permanent molar. On the horizontal plane a curve line crossing the lowest points of the gingival border of each tooth was drawn to define the perimeter of the palatal area. When the isolation was correctly achieved, the software measured total surfaces (mm²) and volume (mm³). After 40 days interval, measures were repeated by the same operator on 30 models randomly selected. Intra-observer reproducibility was tested using Intra-Class Correlation (ICC) coefficients. Statistical analysis was performed using the analysis of variance (ANOVA) and Tukey post-hoc test, with p<0.05 as a significant level of difference.

RESULTS: The statistical analysis of the repeated measurements showed high level of reproducibility. The analysis of variance revealed a statistically significant variability of measures between the groups. Particularly, palatal surface area

and volume were significantly greater in CL and SCP groups compared to UCLP, BCLP and CP groups. No statistically significant differences were found between the UCLP and BCLP for both palate parameters.

CONCLUSIONS: Maxillary arch constriction varies among cleft patients, being more severe when the congenital defect involves alveolar and palatal hard tissues. Compared to linear interdental measurements, three-dimensional evaluation can better describe maxillary morphological characteristics, being a reliable indicator of palatal growth and dentoalveolar development.

Accuracy and reliability of digital measurements on dental scanned models. A preliminary study

E. Gatto, R. Castellaneta, L. Incardona, A. Costantino, P. Cingari, G. Messina, A. Lo Giudice, A. Militi, R. Nucera, M. Portelli.

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, University of Messina, School of Dentistry, Messina, Italy

BACKGROUND: The aim of this preliminary study is to evaluate and compare the measurements performed on plaster and digital models to calculate the indexes of Bolton, Peck and Little.

METHODS: The study was carried out on 10 patients models of the Orthodontics Department of University of Messina. Only models in permanent dentition with all the teeth perfectly erupted, without caries and dental filling were selected. The included models for the preliminary study showed a slight-moderate overcrowding index, the patients didn't have previously orthodontic treatment or dental abnormalities, genetics syndromes or systemic disease with possible dental correlation. The measurements on the plaster models (mesio-distal diameter of the teeth in the upper and lower arches, buccal-lingual dimension of the lower incisors, the distance of contact point of mandibular incisors) were performed using a sliding caliper (Dentaurum, Germany) with the Vernier scale set at 0.1 mm for accuracy according to the technique proposed by Moorees et al. [1947]. Before using the caliper was calibrated, to avoid measurement errors. For the intra-examiner calibration, an experienced operator measured 5 pairs of double arched models one week a part. Moreover a second operator carried out the same measurements for the inter-examiner calibration. The same measurements were done on the models scanned through Maestro 3D dental scanner model MDS500 (Age-Solutions srl, Pisa, Italy). Measurements were performed with the software Rhinoceros 5.0 (Robert McNeel & Associates, Seattle, Usa). Coupled T-Test analysis was performed. The level of significance was set at P< 0.05. It was calculated the methodological error of measurements with Dahlberg test. The degree of correlation between the recorded indexes in this study was calculated instead with the correlation index.

RESULTS: From the data processing were calculated the indexes of Bolton, Peck and Little for both considered groups. There were no statistically significant difference between the examined indexes calculated with manual and digital measurements; this indicated a certain level of agreement between the methods tested (P<0.05). The correlation index showed a high correlation between digital and manual measurements. **CONCLUSIONS:** The measurements performed on the

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scanned models result to be reliable and superimposable to those achieved in plaster models. The digital calculation of the considered orthodontic indexes can be considered as a reproducible and validated procedure.

Evaluation of nasopharyngeal microbial flora in patients treated with rapid palatal expansion

G. Tornaboni, S. Capriglione, G. Mannelli, L. Di Vece, T. Doldo
Department of Medical Biotechnologies

BACKGROUND: The purpose of our study was to evaluate through throat swab whether the palatal expansion treatment can determine a microbial flora change in the upper respiratory tract.

METHODS: Eighteen patients candidates for palatal expansion treatment, average age 8.5 years old, were recruited. Each patient was subjected to: an anamnestic questionnaire; rapid palatal expansion (RPE); active anterior rhinomanometry and a nasal endoscopy at time T0; three throat swabs were performed at:

T0: before the palatal expander application;

T1: 15 days after the application of the palatal expander;

T2: 15 days after the suspension of the expander screw activations.

Samples have been analysed by cultural test agar medium for the detection of pathogens.

RESULTS: In all patients included in this study the RPE resulted in: a resolution in the upper jaw contraction and a respiratory improvement, initially in subjective terms and subsequently - following a otorhinolaryngological ENT check-ups - in objective ones. From the microbiological point of view, the analysis of the samples on the agar plate showed that seven patients of 18 have a normal microbiotic flora, while the other 11 have a potentially pathogenic one - at least in one of the times of this study. The highest level of prevalence of samples presenting a potentially pathogenic flora has been detected at T2 (46%). Fifteen samples among the 54 tested have shown the presence of a potentially pathogenic flora which have been detected with: a MALDI technique (*matrix-assisted laser desorption/ionization*) analysis to detect *H. influenzae*, *M. catarrhalis* and *C. albicans*; agglutination test to detect *S. pyogenes* and *S. aureus*; optochine test to detect *S. pneumoniae*. The germs prevalence among the 15 positive samples is as follows: *H. influenzae* 73,3%; *S. aureus* 33,3%; *S. pyogenes* 26,6%; *S. pneumoniae* 26,6%; *M. catarrhalis* 6,6%; *C. albicans* 13,3%. The distribution of each pathogenic species, evaluated on the basis of the number of colonised samples at T0, T1 and T2, has been largely consistent regarding the following germs: *H. influenzae*, *S. aureus*, *S. pyogenes*.

There has been an increase from T0 to T2 regarding *S. pneumoniae* and *C. albicans*. Another factor which has been analysed is seasonality: the higher strength of positive samples has been detected during spring months. Comparing the degree of adenoid hypertrophy with the presence of potentially pathogenic germs reported during the ENT check-up, we have noted that 100% of the patients presenting a normal microbiological flora at each time of the study is now showing an adenoidal hypertrophy between 20-40%, while 70% of the patients with at least one swab containing a potentially pathogenic flora shows an hypertrophy between 50-80%. Student t-test has indicated a statistically significant difference ($P < 0,005$) between the two groups. Making a further

distinction based on gender among the 11 patients with at least one positive throat swab, we have detected a statistically significant difference ($P < 0,01$) between the two groups. **CONCLUSIONS:** Children showing an adenoidal hypertrophy require the orthodontist to treat the patient in a multi-disciplinary manner, not only in order to restore the correct respiration but also to supervise the potential risk of infection - with special attention being given to immunosuppressed patients. Our study, albeit preliminary and involving a limited sample of patients, has shown that the rapid palatal expansion may represent a significant factor in the increase -probably transitory- of potentially pathogenic species in the nasopharyngeal tract.

Orthodontic treatment of obstructive sleep apnea syndrome: resolution and comparison of apnea cases

F. Poletti¹, E. Storti¹, S. Ehsani¹, E. Bica¹, A. Nota¹, A. Castaldo^{1,2}, S. Tecco¹

¹Dental School, Vita-Salute San Raffaele University, Milan, Italy; ²Department of Medical,Surgical and Health Sciences, University of Trieste, Trieste, Italy

BACKGROUND: Over the last few years, Sleep Disorder Breathing (SDB) and especially OSAS (Obstructive Sleep Apnea Syndrome) have been the subject of increasing interest from the medical community; a search made on Pubmed with the words "sleep apnea" result as 12,610 items found only in the last 5 years, a sign of interest and more thorough research and growing implications of this type of disorder in many branches of medicine including dentistry. OSAS is a respiratory sleep disorder that may occur in both adult and pediatric age, characterized by repeated episodes of complete (apnea or suspended respiratory activity for at least 10 seconds) or partial (hypoapnea) upper airway obstruction with signs and symptoms that can determine the onset of important systemic dysfunctions that cause a reduction of the quality of life, such as phasic reductions arterial oxygen saturation values and a possible increase of carbon dioxide in the blood, heart rate variations, sleep fragmentation and increased blood pressure values, both systemic and pulmonary. The dentist has an important role as a "diagnostic sentinel" for this syndrome, also providing therapeutic resolution through the application of specific intraoral medical devices.

METHODS: The dentist and especially the orthodontist, play an important role in the diagnostic and therapeutic because they have the ability to intercept early signs and symptoms of OSAS, thanks to a careful clinical and instrumental examination (CBCT and teleradiography of skull in lateral-lateral projection) especially polysomnography, the gold diagnostic standard and, at the same time, can evaluate if the patient has the indications for treatment with specific oral devices (Oral Appliances,OA). Two documented clinical cases, show how whether in adulthood or pediatric age, the dentist has the ability to intervene in a therapeutic way on mild and moderate OSAS with MAD (Mandibular Advancement Device) SILENSOR and RME (Rapid Maxillary Expander) respectively. These devices have the goal to maintain the upper airway patency during sleep through protrusion and advanced positioning of the jaw in the case of SILENSOR and with the transverse maxillary expansion by opening the midpalatal suture in the case of the RME.

RESULTS: Documented case reports demonstrate a reduc-

tion in the number of sleep apneas in post-orthodontic polysomnography. The pediatric patient (Apnea/Hypoapnea index 0,1/h, ODI 0,4/h, SpO₂ 94%) treated with RME presents the complete cessation of apneas: Apnea/Hypoapnea index AHI 0/h, ODI desaturation index 0/h and an increase of SpO₂ from 94% to 96%. The adult patient treated with SILENSOR showed an improvement in respiratory performance: the number of apneas decreased from 16/h to 13/h (Apnea/Hypoapnea index), ODI desaturation index from 21/h to 20/h and SpO₂ is increased from 91,3% to 91,7%. Being SILENSOR MAD a device that allows to obtain gradually increasing mandibular advancements, after checking the efficacy, the device was then modified in order to adapt it to the patient's therapeutic needs and obtain the optimal reduction/disappearance of the apneas.

CONCLUSIONS: OA therapy represents a treatment for OSAS that achieved a large growth during the last years and whose clinical efficacy has been demonstrated in the scientific literature. Therefore, especially for mild and moderate cases, it can be considered a valid alternative to traditional CPAP (Continuous Positive Airway Pressure) therapy, not accepted by many OSAS patients for its noise and physical size.

Oral hygiene and management of orthodontic appliances: a survey among orthodontic patients and their parents

C. Cinquini¹, E. Carli¹, L. Scarpata¹, G. Ceccanti²

¹University of Pisa, Department of Surgical, Medical, Molecular and Critical Area Pathology, U.O. Odontostomatology and Oral Surgery, Pisa, Italy; ²Private Practice, Pisa, Italy

BACKGROUND: Oral hygiene is an important factor controlled by the patient during orthodontic treatment, which can affect the quality and timing of the therapy. Fixed orthodontic appliances may cause a temporary deterioration of oral hygiene with a plaque augmentation, enamel demineralization and periodontal inflammation. During orthodontic treatment some urgencies can occur to the patients (loose or broken brackets, bands or wires, misplaced or poking wire, bracket or tie), causing pain, discomfort and anxiety in patients themselves and in their parents. We asked patient's parents how they felt about the orthodontic treatment of their children, their perception of ability to handle urgencies, to maintain a good oral hygiene and an adequate dietary behavior. Plaque Index score was used to assess the quality of oral hygiene of the patients.

METHODS: A questionnaire was given to the mother or the father of the patient undergoing orthodontic treatment during a control visit. Inclusion criteria were a fixed orthodontic treatment (multibrackets, rapid maxillary expander, space maintainers) started from 6 to 24 months before the examination in children aged between 5-18 y.o. All information about oral hygiene, alimentation and the management of the urgencies were given to the parents at the beginning of the treatment. The dentist recorded the Plaque Index score and explained briefly the aim of the questionnaire both to the parents and the patients and an informed consent were signed.

RESULTS: Fifty-two patients met the inclusion criteria and their parents completed the questionnaire, thirty-two males and twenty females. The mean age of the patients was fourteen years. Ten patients underwent rapid maxillary expansion, forty had a multibrackets treatment and two of them had a space maintainer, the mean time from the beginning of the

treatment was 12,2 months. Twenty-four parents stated their children had difficulty in maintaining a good oral hygiene, two were uncertain. The 85% of the patients used a manual toothbrush while 15% used an electric toothbrush. Twenty patients used in addition a mouthwash and fourteen used an interdental brush or dental floss. The 25% of the parents thought the needed more explanations on the maintaining of oral hygiene. Twenty-six of fifty-two parents thought they were capable of handling an urgency at home, ten stated they had called the dentist in that case, fourteen felt totally inadequate and needed more explanations. Thirty-four of them never had an urgency. Thirty parents thought they had sufficient information about the dietary changes during orthodontic treatment, the remaining twenty-two parents needed more explanations. Only two parents referred difficulties in the alimentation of the patients just at the beginning of the treatment. The mean PI score was 1,3.

CONCLUSIONS: The level of oral hygiene of the patients was quite good. The majority of the patients used a manual toothbrush, considered to be easier to use with orthodontic appliances. Fourteen parents felt inadequate to handle orthodontic urgencies and ten always call the dentist if urgencies happen. Diet changes did not represent a problem for the majority of patients. Even though some parents were capable of managing the fixed orthodontic device, oral hygiene and alimentation related, it may be useful to give more detailed explanations, in order to prevent anxiety and discomfort especially in the case of urgencies easily resolvable by the parents themselves.

Treatment of class II malocclusions with Herbst miniscope appliance: aesthetical and profilometrical changes

D. Aiello, C. Malara, D. Dibetta, L. Barbara, S. Paduano

Università degli Studi "Magna Graecia" di Catanzaro, Catanzaro, Italy

BACKGROUND: The relationship between facial profile changes and orthodontic treatment is currently object of interest of many studies. In this study we evaluated the profile changes following orthopedic/orthodontic treatment with Herbst miniscope fixed appliance in subjects affected with class II malocclusion with mandibular retrusion.

METHODS: A total of 44 patients were included in this study. All the patients presented a skeletal Angle Class II malocclusion due to mandibular retrusion and a cervical maturation stage included between CS2 and CS3. Of these 44 patients 22 treated by using the Herbst appliance, 22 (14 boys, 8 girls; mean age 11.9 ± 1.3, HBT group) while 22 were followed for a 12 months observational period (14 boys, 8 girls; mean age 10.6 ± 1.3, CTR group). A cephalometric tracing was performed, by one single blinded operator, at the beginning of treatment (T0) and after 12 months of observation or after appliance removal (T1). A customised Pancherz's analysis focused on soft tissues cephalometric points was used. The variables assessed were the position of: Pronasale, Subnasale, soft tissue A point, Upper lip, Lower lip, Mandibular sulcus, Pogonion. Data were analysed by means of Shapiro-Wilk test to assess their distribution and between groups and within group differences were assessed by means paired and unpaired Student's T-Test.

RESULTS: In both group there was a significant advancement of soft tissue pogonion (HBT = 3.49 ± 3.03 mm, P < 0.001;

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CTR = 2.24 ± 2.94 mm, $P < 0.001$) but the difference between groups was not significant ($P = 0.172$). On the contrary, both group had a significant advancement of the mandibular sulcus (HBT = 3.66 ± 2.80 mm, $P < 0.001$; CTR = 1.17 ± 2.25 mm, $P < 0.001$) and a lower lip protrusion (HBT = 3.45 ± 2.51 mm, $P < 0.001$; CTR = 1.66 ± 2.74 mm, $P = 0.008$) but in both cases the HBT group showed a statistically significant increase in sulcus protrusion ($P = 0.002$) and lower lip protrusion ($P = 0.029$). Regarding the upper jaw, no one of the variable assessed, position of the Subnasale, position of the soft tissue A point and position of the upper lip presented statistically significant differences between the two groups, but all increase due to the growth.

CONCLUSIONS: The Herbst appliance did not reduce the soft tissue growth of the upper jaw, while advanced the position of the lower lip and of the mandibular sulcus.

Evaluation of facial profile attractiveness of growing class II division 1 patients after orthodontic treatment with functional appliances

D. Dibetta, A. Dieni, F. Rende, L. Barbara, S. Paduano

Università degli Studi "Magna Graecia" di Catanzaro, Catanzaro, Italy

BACKGROUND: The most important goal of orthodontic treatment is to improve facial appearance. Indeed, dental and facial aesthetics have a key role for patients seeking an orthodontic consultation. 1 Sagittal skeletal malocclusions, such as Class II and Class III, are often characterized by a convex or concave facial profile, which significantly affect a patient's facial appearance. 2 In almost 80% of the cases, Class II skeletal malocclusions are due to a mandibular retrusion associated with a normal, protruded or retruded maxilla. This configuration determines a convex profile with a reduced chin projection. 3 The aim of this study is to determine if orthodontic treatment with functional appliances improves the facial profile attractiveness of subjects with Class II Division 1 malocclusion. The null hypotheses is that the orthodontic treatment with functional appliances did not achieve any significant improvement in facial profile attractiveness in Class II Division 1 patients.

METHODS: Twenty patients (CLII) with Angle Class II Division 1 malocclusion (mean \pm SD = 11.1 ± 0.6 years) treated with fixed or removable functional appliances, and 20 controls (CLI) with Angle Class I malocclusion (11.7 ± 0.8 years) were included in the study. Profile pictures taken before (CLII T1 and CLI) and after treatment (CLII T2) were transformed into black silhouettes. Three panels of observers including 30 orthodontists (39.0 ± 10.1 years), 30 dentists (40.0 ± 9.7 years) and 30 laypeople (39.0 ± 9.2 years) evaluated each patient's profile attractiveness, using a visual analog scale (VAS 100 mm). Furthermore, the positions of upper lip, lower lip and chin before and after treatment, was judged using a 3-point Likert scale. Data were analyzed by means of a two-way analysis of variance and a chisquared test ($\alpha < .05$).

RESULTS: The CLII T2 silhouettes showed the most attractive profiles (67.8 ± 5.9 mm) as compared to CLI (59.2 ± 4.4 mm) and CLII T1 profiles (37.3 ± 4.5 mm, $P < 0.001$). Laypeople rated the profiles of each group as more attractive than orthodontists and dentists ($P < 0.001$). CLII T2 silhouettes showed protruded upper lips (52.7%) and retruded lower lips (71.3%) and chins (72%). CLII T2 silhouettes after treatment

were mostly judged to present with a normal position of the upper lip (69.5%), lower lip (74.9%), and chin (72.3%).

CONCLUSIONS:

— Children with skeletal Class II malocclusion showed a less attractive profile than children with skeletal Class I and exhibited a more retruded lower lip and chin, and a protruded upper lip.

— The functional treatment of skeletal Class II malocclusion in children improved the profile attractiveness, and they were judged, on average, as more attractive than skeletal Class I children. Hence, functional treatment is suggested in patients with a skeletal Class II malocclusion to improve the facial appearance.

— Finally, laypeople always gave the statistically significant highest scores for each group of silhouettes.

The prevalence of oral pathologies and the association between malocclusion and TMD in Calabrian population aged 9 - 13: epidemiological study

D. Aiello, A. Dieni, C. Malara, F. Rende, S. Paduano

Università degli Studi "Magna Graecia" di Catanzaro, Catanzaro, Italy

BACKGROUND: To describe the actual oral health status of primary school children and adolescents in the province of Catanzaro (Southern Italy), in order to facilitate further preventive activities.

METHODS: The sample was collected from 31 primary schools, all located in the province of Catanzaro, Southern Italy. 1086 children (578 males and 508 females) enrolled in the third, fourth and fifth grade of these schools were examined, aged 9-13. Children were asked if they had periodical examinations from dentists. Dental caries status was assessed for the primary and permanent dentitions using Klein's dental caries index, which sums the number of decayed (d/D), missing (m/M), and filled (f/F) teeth (t/T). The Community Periodontal Index (CPI)⁶ was used to assess periodontal condition. Angle dental class, overjet, overbite, crossbite were recorded for orthodontic evaluation. Opening path of the mandible, click presence and pain of the TMJ were considered for gnatologic assessment. Furthermore, presence of dental agenesis, teeth in ankylosis and supranumerary teeth was recorded. Data analysis: Descriptive statistics mean and standard deviation (SD) for continuous data, and frequencies and percentages for categorical and ordinal data were calculated. A standard statistical software package (SPSS version 22.0, SPSS IBM, New York, NY) was used for statistical analysis. **RESULTS:** Among the 1086 children (mean age 10.3 ± 0.72 yrs), 84.6% had periodic check-ups from their dentists. Considering plaque-related pathologies, 41.6% had active dental caries in permanent teeth (mean DMFT = 1.25 ± 1.75 , DMFS = 1.31 ± 1.94), 40.3% in deciduous teeth (mean dmft = 1.1 ± 1.74 , dmfs = 1.38 ± 2.65), and 54.8% experienced periodontal problems, revealed from the CPI. Analyzing data from orthodontic examinations, a typical pattern of malocclusions was noticed: 54.3% of the patients had Angle Class I, 40.1% Class II and 5.5% Class III. 50.3% had a pathological overjet, 57.6% an overbite minor than 0mm or major than 3mm, 13.2% of them had crossbite and only 2.8% was found with agenesis. Data from TMJ evaluations showed 13.8% of children had a deviated opening pattern,

and some of them experienced TMJ clicking and pain, 5.7 and 2.2%, respectively. DMFT greater than 0 was associated with positive CPI ($p=0.042$, $\beta=0.73$), along with dmft ($p<0.001$, $\beta=0.222$) and dmfs ($p<0.001$, $\beta=0.198$). An interesting greater susceptibility to periodontal disease was found in males, compared to females (OR=1.30, 95% CI= 1.19-1.66). On the other hand, lack of periodic examinations was not related to higher decay prevalence.

CONCLUSIONS: This study found a noticeable prevalence of oral diseases among children of Southern Italy, considering the DMF and CPI indices. Besides, the association between malocclusions and TMDs, periodontal disease and dental decay was investigated, reporting a correlation between a decreased overbite and TMJ pain ($\beta=-0.089$, $p=0.004$). The Community Periodontal Index was related to DMFT ($p=0.042$, $\beta=0.73$), dmft ($p<0.001$, $\beta=0.222$) and dmfs ($p<0.001$, $\beta=0.198$); an increased susceptibility to periodontal disease was found in males, compared to females (OR=1.30, 95% CI= 1.19-1.66). Given these conclusions, a higher number of preventive interventions are recommended in the area. Specifically, there is still a certain amount of children not having periodical examinations from their dentists, thus not being counseled to meet the major preventive measures.

Invisalign® and conventional fixed orthodontics. Comparison at the periodontal, aesthetic and comfort levels

M. Maschio, A. Fama, F. Parisi

BACKGROUND: The objective of this work is to perform a bibliographic review that allows comparing the fixed multibrackets orthodontic appliance with the removable Invisalign® system from the point of view of periodontal health, aesthetic perceptions of patients, pain and comfort generated by the two systems.

METHODS: A literature search was conducted through the following electronic databases: Pubmed and Medline, using combinations of the following keywords: "Clear aligners", "Invisalign®", "Fixed Orthodontic", "Oral Hygiene", "Plaque index", "Quality of life", "Aesthetics". The inclusion criteria were: Articles between 2007 and 2017 were selected. Using the "limits" option, only articles referring to "Humans" published in English, Spanish and Italian were considered. The following types of studies were included in this review: case-reports, case-series and reviews. The electronic search strategy produced 499 starting articles. Successively, duplicates and articles considered as non-relevant on the basis of abstract, title and study design, were eliminated. Only 28 articles met the inclusion criteria.

RESULTS: In all the investigations, the following periodontal indices were analyzed: plaque index (PI), gingival index (IG), periodontal probing (PS) and bleeding on probing (BOP). For each parameter, a significant improvement was obtained during the treatment with Invisalign® system in comparison with the fixed orthodontics appliance. This is mainly due to the difficulty of maintaining a correct oral hygiene in fixed orthodontic devices, producing an evident accumulation of periodontopathogenic bacteria. From an aesthetic point of view, the articles show that adult patients prefer the Invisalign® system over traditional brackets, both lingual and vestibular ceramics. Children prefer brackets with colored elastics. Teenagers well accept both of them. Demineralization and white spot lesions

have a high rate of rapid onset with multibrackets fixed orthodontic appliances. No articles have been found which relate Invisalign® system to the appearance of white spot lesions. Finally, the analyzed articles show a lower perception of pain and anguish in patients treated with Invisalign compared to those treated with braces, especially in the first three days of treatment.

CONCLUSIONS: Based on the results of this study, it is possible to conclude that Invisalign® devices give better index in terms of periodontal health, aesthetic and comfort. On the other hand, the planning and analysis of each case is indispensable for the choice of treatment to be performed. A determining factor in the choice of therapy is patient collaboration and disposition.

Effects of rapid maxillary expansion on alveolar bone assessed with computed tomography: a systematic review and meta-analysis

G. Messina, P. Spinuzza, A.M. Bellocchio, E. Gatto, L. Rustico, P. Leonardo, S. Costa, M. Portelli, R. Nucera, A. Mili

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, School of Dentistry, University of Messina, Messina, Italy

BACKGROUND: The aim of this study is to evaluate the effects of rapid maxillary expansion on alveolar bone in growing patients assessed with Computed Tomography.

METHODS: This systematic review and meta-analysis was conducted according to the guidelines of the Cochrane Handbook for Systematic Reviews of Interventions (version 5.1.0) and is reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement. Nineteen electronic databases were searched without languages restrictions up to October 2017. Clinical trials selected in this systematic review were those that include growing subjects with transversal maxillary deficiency treated with RME and evaluating the change of alveolar bone width and thickness on buccal and palatal side before and after rapid maxillary expansion by means of one of the following 3D imaging CT techniques: CBCT, spiral CT and low-dose CT. Two authors independently executed study selection, data extraction, and risk of bias assessment. To evaluate the effects on alveolar bone, were taken into account studies which consider alveolar bone width and thickness in the first molar maxillary area. According to the period of time passed between the first and second observation the included studies were divided into two groups: after expansion group (2-6 weeks, average of 3 weeks); after retention group (3-6 months, average of 5 months).

RESULTS: According to inclusion criteria 21 studies were selected. The considered studies presented prospective and retrospective design. The ages of the patients varied across the studies with a mean age of 12 years. The effect of rapid maxillary expansion on alveolar bone width in the first molar region was an increment of 3.89 mm (95% CI, 2.94 mm to 4.83 mm) on buccal side and 3.08 mm (95% CI, 1.95 mm to 4.20 mm) on palatal side after expansion; the same outcome was 3.15 mm (95% CI, 2.07 mm to 4.23 mm) on buccal side and 3.31 mm (95% CI, 2.69 to 3.93 mm) on palatal side after retention period. The effect on alveolar bone thickness in the first molar region was -0.54 mm (95% CI, -0.98 mm to -0.09 mm) on buccal side and 0.37 mm (95% CI, 0.04 mm to 0.69

ABSTRACT

mm) on palatal side after expansion; the same outcome was -0.66 mm (95% CI, -0.98 mm to -0.34 mm) on buccal side and 0.68 mm (95% CI, -0.23 mm to 1.59 mm) on palatal side after retention period.

CONCLUSIONS: This systematic review with meta-analysis evaluates, for the first time in the orthodontic literature, the effects of rapid maxillary expansion on alveolar bone at different treatment stages by means of computed tomography. The results indicate that the alveolar bone width increment gained after expansion on buccal side shows a reduction (-19%) after 3-6 months of retention period, however the increment on palatal side shows a little increase (+7%) after 3-6 months of retention period. The results indicate also that the alveolar bone thickness shows a reduction on buccal side (-0.66 mm) and an increment on palatal side (+0.68 mm) after 3-6 months of retention period.

Sagittal and vertical facial growth and attainment of circumpubertal middle phalanx maturation (MPM) stages: a multiple regression study

M. Mason, D. Sverko, B. Dal Borgo, G. Perinetti, L. Contardo
Department of Medical, Surgical and Health Sciences, School of Dentistry, University of Trieste, Trieste, Italy

BACKGROUND: Orthodontic treatment for most of the skeletal malocclusions have specific optimal timing according to the skeletal maturation phases. The knowledge of whether attainment of a specific maturation phase is associated with the different sagittal and vertical craniofacial growth pattern then becomes of clinical relevance. Therefore, using multivariate models, this cross-sectional study evaluated whether sagittal and vertical craniofacial growth pattern, has an association with the age of attainment of the circumpubertal skeletal maturation phases according to the MPM method.

METHODS: A total of 300 subjects (170 females and 130 males) were included in the study (mean age, 12.0 ± 1.5 years; range, 8.3-15.6 years). They were equally distributed in the circumpubertal middle phalanx maturation (MPM) stages 2, 3 and 4. Subsequently, multiple regression models were run for each MPM stage group to assess the significance of the association of cephalometric parameters (SNA, SNB, ANB, PP/MP, CoGoMe, SN/MP and NSBa angles) with age of attainment of the corresponding MPM stage (in months). A dedicated X-ray machine (KODAK 8000C; Eastman Kodak Company) was employed for the recording of lateral head cephalograms. An experienced orthodontist assisted by a second operator screened the cases for inclusion. A further experienced orthodontist was involved to ensure correct enrollment and, in case of disagreement, discussion was made until satisfaction of both operators. A customized digitization regimen and analysis with the cephalometric software Viewbox was used for all cephalograms examined in this study. The SPSS software version 20 was used to perform the subsequent data analysis. After testing the normality of the data with the Shapiro-Wilk test and Q-Q normality plots of the residuals, and the equality of variance among the datasets using a Levene test, parametric methods were used for data analysis. Moreover, within each MPM stage group, the association of each of the craniofacial parameters (explanatory variables) with the chronological age in months (dependent variable) were investigated by means of multiple linear regressions

RESULTS: Only sex yielded significant associations, with females having an anticipated attainment of each of the circumpubertal MPM stage.

CONCLUSIONS: Only a previous study investigated on possible associations between vertical craniofacial growth and timing of attainment of skeletal maturation phases. Through multivariate models, the present study showed no significant correlations of the different sagittal and vertical cephalometric parameters with the age of attainment of each of the circumpubertal MPM stages 2, 3 and 4. Moreover, the MPM stages 2 and 3 have been associated with the onset and maximum mandibular growth peak, respectively, in most of the subjects. The only significant association was with sex, where females had anticipated attainment of each MPM stage as compared to males.

Does asymmetry in the stomatognathic system correlate with body posture impairments? A systematic review

B. Dal Borgo, G. Perinetti, L. Contardo

Department of Medical, Surgical and Health Sciences, University of Trieste, Trieste, Italy

BACKGROUND: The knowledge of any potential effect of the stomatognathic system on body posture would have major clinical implications in the management of patients with malocclusion. Therefore, the present systematic review was aimed at the evaluation of potential correlations between anatomical and functional asymmetry in the stomatognathic system (without signs and symptoms of TMDs) and body posture impairments.

METHODS: Articles were identified through a literature survey carried out through the Medline, SCOPUS, LILACS and SciELO databases, the Cochrane Library and a manual search. Experimental studies, in which any treatment for the asymmetry was included, and observational studies were considered, irrespective of the method used to record body posture. Type of asymmetry, treatment and/or recording conditions, follow-up, postural examinations, main results and clinical implication were extracted, and risk of bias was assessed.

RESULTS: Only 11 (including one randomized clinical trial) out of 1,056 screened studies were included according to the inclusion and exclusion criteria. Most of the studies were focused on the posterior monolateral crossbite or other occlusal traits such as asymmetrical dental Class. The only RCT was focused on the body posture effects of the treatment of monolateral crossbite by slow maxillary expansion. Only one study included subjects with major skeletal asymmetries irrespective of the presence of a crossbite. Regarding the posturographic recording, all the studies recorded body posture exclusively under static conditions. According to the risk of bias analysis, 6 studies (including the only RCT) were judged to have a high risk of bias. Regarding the other studies, only in 5 investigations, the risk of bias was judged to be medium.

In 8 studies no significant or very minimal correlations were seen between asymmetry in the stomatognathic system and body posture impairment. Only 3 studies, all with a high risk of bias and without follow-up, reported significant correlations between the asymmetry in the stomatognathic system and body posture impairments.

CONCLUSIONS: The quality of the existing study reports is low and further investigations with qualitatively better study designs are necessary. Using current methodology, asymmetry in the stomatognathic system (in the absence of TMDs) do not appear to be correlated to body posture impairments at a clinically relevant level. According to the limited available evidence, prevention or treatment of the body posture imbalance may not be included at present among the indications for the treatment of the asymmetry in the stomatognathic system.

Treatment of post orthodontic recessions: the bilaminar technique

A. de Sanctis¹, F. Giugno¹, M. Martinelli¹, L. Di Vece¹, T. Doldo²

¹University of Siena, Siena, Italy; ²Department of Medical Biotechnologies, University of Siena Siena, Italy

BACKGROUND: The aesthetic improvement of a patient's smile is an everyday request and most of the time it is due to the evidential presence of one or more gingival recession when smiling. Many factors are related to its development including orthodontic movement beyond limits of the osseous. Today we can utilize several surgical techniques that yield very good results both in terms of root coverage and aesthetic improvement, obviously an ideal technique should possibly solve the problem of gingival lower recession. This two case report shows how is possible to develop gingival recessions especially in inferior incisors post orthodontic therapy and how to solve the problem both in terms of aesthetics and periodontal health through the bilaminar technique. The clinical re-evaluation was made 1 year after surgery.

METHODS: Surgical methods were proposed by recruiting two healthy adults who made a fixed orthodontic treatment for a severe dental crowding and have completed orthodontic treatment with a gingival recession defect in the lower incisors. The cause of movement of the incisors out of the osseous envelope of the alveolar process may be associated with a higher tendency for developing gingival recessions and a thin gingival tissue. In the first patient of 28 years old the gingival recession was on the 4.1-3.1, the dental elements were vital and there were no signs of mobility, but only tooth hypersensitivity. In the second patient of 24 years old the gingival recession was on the 3.1, also here the dental elements were vital with no signs of mobility, but hypersensitivity. All recessions fall into Miller class I or II. Gingival recession coverage, in both cases, was performed using mucogingival surgery with bilaminar technique. The bilaminar surgical approach shown here consisted of a connective tissue graft covered by a coronally advanced pedicle flap. The connective tissue graft was placed inside the root concavity to compensate the abrasion space and to prevent soft tissue flap collapse internally. The graft, by acting as a "biologic filler" or space maintainer inside the concave abrasion area, stabilized the covering flap and helped restore a correct tooth emergence profile.

RESULTS: One year after surgery, an average of 97% root coverage was achieved. The amount of recession coverage was stable as of the 3rd month. From day 1, pain and bleeding decreased over time, however, there were peaks on days 2 and 3 for swelling and bruising, respectively, followed by a subsequent decrease in both. Post-surgical complications were clinically evaluated and resulted negative. The size of

the recession was also re-evaluated after 12 months, with positive results.

CONCLUSIONS: The results achieved regarding the above mentioned cases demonstrated that the bilaminar technique was a highly effective procedure for the treatment of gingival recession caused by orthodontic therapy, therefore a better result in terms of an aesthetic outcome can be obtained. Recession coverage achieved at 3 months remained stable in the 1-year follow-up period.

3D geometric morphometric analysis of the palatal morphology in young subjects with marfan syndrome

N. Venza, D. Palmacci, E. Cretella Lombardo, V. Paoloni

Department of Orthodontics, Department of Clinical Sciences and Translational Medicine, University of Rome Tor Vergata, Rome, Italy

BACKGROUND: To evaluate the variability of palatal shape in a group of Marfan subjects (MG) compared with a control group (CG) through geometric morphometric analysis.

METHODS: 5 subjects with a clinical and genetic diagnosis of Marfan Syndrome, (MG, mean age 4.8 ± 0.4 years) were recruited from the Centre for Rare Disease, Marfan Clinic of Tor Vergata Hospital and evaluated in the Department of Orthodontics of the same University. After the selection this MG was compared with a control group of 5 non-syndromic subjects (CG, mean age 4.7 ± 0.6 years). The inclusion criteria for both MG and CG were: presence of deciduous dentition, presence of bilateral/unilateral cross-bite, Caucasian ancestry and CS1 stage of cervical vertebral maturation as assessed on lateral cephalograms, good quality of records. Exclusion criteria for both MG and CG were: presence of sucking habits, previous orthodontic treatment, cleft lip and/or palate, other genetic diseases. For each subject dental casts were taken and scanned using an extraoral scanner with a manufacturer's reported accuracy $<20 \mu\text{m}$. All models were exported in a Standard Tessellation Language format (.stl digital file). To study the shape of the palate at any point of the surface, 3D geometric morphometrics (GMM) analysis was used. A template for data set/collection of homologous landmarks describing a palate was created with Viewbox 4 (dHAL software, Kifissia, Greece). On each digital cast three curves were drawn and a total of 239 landmarks were digitized. Procrustes superimposition and principal components analysis were used to reveal the main pattern of the shape variation. In order to determine the reliability of the method, all the casts were re-digitized by the same operator ten days after the first digitization.

RESULTS: Although both groups presented bilateral or unilateral cross bite, an important difference between the palate's shape of MG and CG was found the most significant morphological variability ($PC1 = 61.2\%$ of total shape variability), describes changes in all the three dimensions. MG mainly presents alteration of the palatal vault in the vertical plane and in the transverse dimension of the posterior region. **CONCLUSIONS:** Comparing with a control group of non-syndromic subjects with unilateral/bilateral cross-bite, the MG have a specific palatal morphology with several alterations in all dimensions of the space also in deciduous dentition. Further investigations on more numerous samples are necessary for a complete comprehension of palatal morphology in Marfan syndrome.

ABSTRACT

Skeletal, dento-alveolar and aesthetic effects of ba-RME and facial mask treatment on a growing III class patient with maxillary hypoplasia, following Alt-RAMEC protocol: a case report

P. Bursi¹, E. Sartori¹, E. Simeoni¹, L. Tomasi¹, A. Compri², D. Bertossi³

¹Dentistry, University of Verona, Verona, Italy; ²Orthodontics and Dentistry, University of Verona, Verona, Italy; ³Maxillo-Facial Surgery, University of Verona, Verona, Italy

BACKGROUND: The purpose of this study is to analyse the maxillo-facial effects of the facial mask therapy associated with bone-anchored miniscrews, during and after Alt-RAMEC protocol in a growing male child with maxilla hypoplasia. Skeletal, dental and soft tissue changes have been considered. **METHODS:** A 8-years-old patient came to observation at the department of Orthodontics of the University of Verona presenting a skeletal III class caused by a maxillary retrusion. Firstly, clinical examination (with Arnett's aesthetics analysis), photographs, ortopantomograph and telerradiograph in latero-lateral were required in order to elaborate a preliminary study to the end of producing an accurate treatment plan. Cephalometric analysis was conducted using QuickCeph® software. Considering the clinical and cephalometric situation, a postero-anterior traction of the facial mid third using the facial mask was suggested. In addition, an exclusive bone-anchored Rapid Maxillary Expansor (ba-RME) in accordance of Alt-RAMEC protocol (alternate rapid maxillary expansions and constrictions) was proposed, in order to open the circumaxillary sutures and enhance protraction. After collecting the consent to treatment from the patient's mother, selective slicings on 5.4 and 6.4 were performed to create the grooves that hold the buccal wires. Since the miniscrews are positioned according to EasyDriver® technique, a CBCT of the palate has been required and polyvinyl siloxane impressions were recorded to verify the feasibility of the treatment planned. In May 2017 the miniscrews and ba-RME were applied and after two weeks the patient started 8 weeks of Alt-RAMEC Protocol and 9 months of maxillary protraction. 400g force per side was applied to the facemask. Total treatment time was 9 months. Photographic analysis has been taken every 2 months from the baseline.

RESULTS: The miniscrews withstood the orthopaedic forces exerted during treatment (both expansion-constriction forces and posterior-anterior traction). Cephalometric findings show that maxilla moved anteriorly of 2,5 mm and rotate 1,6° counter-clock wise, and maxillary incisors rotate 1° in vestibular direction. The mandible rotated 2,8° clock-wise, moved backward 1,5 mm and downward 2 mm. ANB and Wits improved of 3,4° and 4,89 mm. Aesthetics improvements following Arnett's analysis were achieved: the cheekbone contour changed from "flat" to "soft"; the upper lip prominence changed from "retruded" to "normal" and the upper lip support changed from "weak" to "normal"; the lower lip prominence and the soft tissue pogonion changed both from "retruded" to "normal". Both the patient and his parent's aesthetic expectation were fulfilled. Further clinical and radiographical recalls will objectify if long term maintainance will be attained.

CONCLUSIONS: Facial mask treatment combined with Alt-RAMEC protocol resulted effective in this patient in terms of skeletal, dental and soft tissues improvements. It would be significant to extent this combined approach to a wider sample in order to evaluate the reproducibility of the results obtained.

Evaluation of new generation orthodontic devices: attractiveness and economical value

A. Sedran¹, G. Rossini², A. Cortona¹, M.G. Piancino³, T. Castrolorio⁴, A. Deregibus³

Resident, Orthodontic specialist; Orthodontic specialist; Aggregate Professor, University of Turin, Department of Surgical sciences CIR - Dental School; Post-graduate Specialization in Orthodontic

BACKGROUND: The aim of this study is to identify significant differences regarding laypeople's perception of attractiveness, acceptability and economical value of orthodontic appliances.

METHODS: A photo master of the smile was obtained from a previously selected model. The photo was taken with a Nikon D32 camera (Macro 105mm lens, ring flash) and imported in RAW format in a photo editing program (Photoshop, Adobe Inc.). 6 different orthodontic devices were applied using a photo-editor software on the smile photograph:

- Brackets Jupiter (TNB Dental, Turin, Italy) with aesthetic Teflon-coated wire (J)
- Orthodontic aligners (ALL)
- Self-ligating brackets with metal wire (SLB)
- Self-ligating ceramic stirrups with aesthetic Teflon-coated wire (SLEB)
- Metal brackets with metal wire (B)
- Ceramic brackets with metal wire (EB)

Evaluation template with questions regarding attractiveness, acceptability and economical value of orthodontic appliances have been submitted to 30 randomly selected adults who have never received any kind of professional dental education. The assessment sheet consists of a 100mm VAS scale and 3 questions regarding the willingness to subject themselves and their children to the treatment with the equipment shown, as well as an assessment of the additional economic contribution that observers would be willing to pay for that device if they want to undergo orthodontic treatment. Each image was submitted to the observers twice in non-consecutive order, for a total of 12 evaluation sheets obtained for each observer. After verifying the normal distribution of measurements, a one-way ANOVA test was used for paired samples and inter-group comparisons were performed for all equipment.

RESULTS: For all analyzed features, the flowing hierarchy was obtained: ALL > J > SLEB > SLB > EB > B. Significant differences (p<0.05) were revealed regarding attractiveness and perceived economical value. Metal components influenced negatively the scoring for all variables.

CONCLUSIONS: Analysis of the opinions of possible patients regarding the perception of orthodontic equipment has provided statistically and clinically significant results. The lack of aesthetics of the metal parts has influenced all the remaining variables analyzed, going also to affect the evaluation of the economic value. The additional economic contribution according to adults for aesthetic equipment can be up to twice that for standard metal brackets. Limitations of this study are the non-stratification of groups based on socio-cultural conditions and income, as well as the fact that it is only a sample of adults and not teenagers / children, who have shown different opinions about orthodontic devices. Esthetics of orthodontic appliances is significantly related to attractiveness, acceptability and perceived economical value from adult laypeople's point of view.

Early functional treatment in skeletal class II non growing patients: a comparative study of two appliances

F. Barra, A. Sedran, F. Spadaro, T. Castroflorio, M.G. Piancino, A. Deregibus

University of Turin, Department of Surgical Sciences, C.I.R - Dental School, Turin, Italy

BACKGROUND: The aim of this retrospective study was to compare the effectiveness of two orthodontic interceptive appliances in growing patients at CVM2 stage with Skeletal Class II malocclusion.

METHODS: 80 lateral cephalograms were obtained from 40 skeletal Class II malocclusion growing subjects at the beginning (T0) and at the end (T1) of their functional orthodontic treatment to assess skeletal and dental changes. 20 patients (Group 1) underwent EF class II (OrthoPlus, Igny, France) and for 20 subjects (Group 2) Functional Generating Bite (FGB) was adopted; 40 lateral cephalograms were obtained from 20 untreated subjects as control group (Group 3). The differences between groups before and after treatment were compared with the mixed 2-way analysis of variance (ANOVA) with repeated measurements. Skeletal measurements: ANB Angle, A:Po, WITS Dental measurements: 11° SpP, 41° GoGn, 11° 41

RESULTS: Statistically significant differences between the two appliances were shown both for skeletal and dental variables; Wits index values for Group 1 were significantly improved with respect to Group 2 ($P=0,02$) at the end of the treatment, as well as upper incisors proclination, with an average decrease of 11° SpP of $9,33^\circ \pm 5^\circ$ ($P=0,004$)

CONCLUSIONS: Skeletal class II growing patients seem to partially benefit of early functional treatment, showing a significant decrease of overjet and a Wits index improvement with EF device.

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Analysis with finite elements method of upper incisor root torque with clear aligners

A. Cortona, M. Rolfo, E. Grifalconi, P.A. Deregibus, T. Castroflorio, M.G. Piancino

Division of Orthodontics, Department of Surgical Sciences, C.I.R. Dental School, University of Turin, Turin, Italy

BACKGROUND: Clear aligners treatment is spreading in orthodontic world and it is cited to be safe and efficient, but only few papers investigated the predictability and the possible negative periodontal effects of orthodontic movement with clear aligners. Two reviews carried out by Univeristy of Turin in 2015, reported respectively only 11 and 5 papers

within their inclusion criteria. However, despite the low number of good studies on the topic, the overall quality of the included papers was quite good and thus based on those reviews it is possible to conclude that Invisalign aligners are quite effective in controlling root movement.

The force system and displacement created by plastic aligners on the whole upper arch, during palatal root movement of an upper central incisor, was evaluated with Finite Element Analysis (FEA), considering several configurations of aligner activation and attachments in order to find the best approach. **METHODS:** A CAD model of a complete upper arch and periodontal tissues were imported in a FEA software. Two different aligner activation were considered: at the centre of the clinical crown and at the incisal edge. Aligner activation was set at 1 degree of palatal root torque on right upper central incisor. Different configurations of attachments and pressure areas were evaluated.

RESULTS: Aligner activation around the centre of the clinical crown resulted more efficient than the one around incisal edge. All simulations resulted in better control of posterior and anterior teeth when posterior attachments with one or two pressure areas were adopted. Furthermore, as previously described in similar FE studies as well as in recent trials on tooth movement with aligners, auxiliaries are mandatory to improve the expression rate of prescribed tooth movement. The present study confirms this assumption, stating that the best combination is the one including posterior attachments (from second molar to canine) and single or double pressure areas on the tooth crown. The adoption of a second pressure area on the incisor incisal-lingual region together with attachments decreased the efficiency of tooth movement but showed the highest generated torquing moment.

To perform efficiently root torque movement with clear aligners, a moment-to-force ratio between 6.5 and 7.5 was indicated. Maximum values of pressure and tension areas of periodontal ligament are pointed out at the apex of the upper right central incisor.

CONCLUSIONS: Clear orthodontic aligners associated with auxiliaries, such as attachments and altered geometries, can produce tooth root movement. The most efficient configuration produces 0.1 mm of apex displacement for a 1° activation.

A comparison of the effects of fan-type rapid maxillary expansion and rapid maxillary expansion on dentofacial structures in early mixed dentition. A case series

L. Di Tonno, M.G. Paolone, E. Staderini, F. Guglielmi, A. Camodeca, P. Gallenzi

Department of Surgical Sciences for Head and Neck Diseases, School of Dentistry, Catholic University of Sacred Heart, Rome, Italy

BACKGROUND: The aim of this study is to test the hypothesis that there is a difference between the effects of fan-type rapid (FRME) and rapid maxillary expansion (banded RME) on dentofacial structures in early mixed dentition.

METHODS: The FRME group had an anterior constricted maxillary width with a normal intermolar width, while the banded RME group had bilateral constricted maxillary width. The FRME group consisted of 8 patients and the banded RME group consisted of 10 patients. Lateral and frontal cephalometric radiographs and dental casts were taken before and after expansion and 3 months after completing treatment for

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each patient. The screws were activated twice a day in the first week to overcome the resistance of the sutures and then once a day after suture opening. Patients met the following inclusion criteria: no systemic diseases; no history of orthodontic treatment; no pathologic periodontal status; mixed dentition; and erupted first permanent molars.

RESULTS: The maxilla moved downward and forward in both groups. The nasal cavity and maxillary width were expanded more in the banded RME group and there were only a few relapses in this group during the retention period. There was significant labial tipping of the upper incisors in the FRME expansion group. The expansion of intercanine width was similar in both groups, but the expansion of intermolar width was significantly greater in the banded RME group.

CONCLUSIONS: The transversal deficiency problems of all subjects were corrected. There was a difference between the effects of FRME and banded RME on dentofacial structures in early mixed dentition.

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Clear aligners' effects on aesthetics: evaluation of facial wrinkles

A. Camodeca, S. Meuli, F. Guglielmi, E. Staderini, L. Di Tonno, P. Gallenzi

Department of Surgical Sciences for Head and Neck Diseases, School of Dentistry, Catholic University of Sacred Heart, Rome, Italy

BACKGROUND: The aim of this retrospective cohort study is to evaluate the facial aesthetic effects of orthodontic treatment performed with clear aligners and compare it with an untreated control group. Evaluation will be focused on lower third facial ageing in adult patients through the use of the assessment of the severity of wrinkles (WSRS) at the beginning (T0) and at the end (T1) of the study period.

METHODS: The examined sample consists of subjects enrolled in a retrospective observational study at the "Agostino Gemelli" dental clinic Foundation - Teaching Hospital of Rome. The study project was approved by the Ethics Committee at the Catholic University of the Sacred Heart, Rome. A sample of 101 patients with moderate crowding was enrolled for the study and informed consent was obtained for all participants. These were divided into a group of 68 patients treated with clear aligners (TG) and a control group of 33 untreated patients (UG). Each group has been divided into 2 subgroups based on age: subgroup 1 if younger

than 40 years old and subgroup 2 if older. The facial aesthetics of the lower third were evaluated at the time T0 and T1 by a group of five aesthetic experts with WSRS. In the TG a set of clear aligners (Invisalign®, Align Technology, San José, CA, USA) was used as the sole appliance. Each aligner has a thickness of approximately 0.75 mm. Patients were instructed to wear aligners for 22 hours / day, remove them only for meals and teeth cleaning and to change them regularly every 14 days. Patients belonging to the UG did not receive any form of orthodontic treatment during the study period. Extraoral front projection photographs of T0 and T1 were taken in the same room with steady light conditions with the same camera parameters (distance, focus and flash). All patients belonging to the treated groups had their clear aligner removed before taking the photographs.

RESULTS: No significant differences were found between the age groups of the T0 participants and the duration of the study period (Table I and II). Statistically significant changes were found in all subgroups comparing the WSRS scores at T0 and T1. Comparisons between the groups revealed that the use of clear aligners produces a statistically significant improvement in lower third facial aesthetics both in younger ($p < 0.05$) and older ($p < 0.001$) patients. The skeletal, molar and canine class, the overjet and the overbite did not register any significant change during the study period.

CONCLUSIONS: The present retrospective cohort study successfully shown that malocclusion therapy conducted through the use of clear aligners in a population of adults with dental crowding has beneficial effects on lower third facial ageing. In addition, the effect of wearing clear aligners can be interpreted as a complex and multiple phenomenon involving blood vessels, cells, growth factors, dermis and muscles. Such phenomenon has led to a positive aesthetic impact of the face even if its results should be considered partial and interpreted with caution due to the need for further research.

Evaluation of orthodontic movement by using intraoral scanner

D. Giovannoni¹, A. Putrino², G. Galluccio¹

¹Orthodontics, Department of Oral and Maxillo-Facial Sciences, "Sapienza" University of Rome, Rome, Italy; ²Orthodontics, Innovative Technologies in Diseases of the Skeleton, of the Skin and of the Oro-Maxillofacial District, Department of Oral and Maxillo-Facial Sciences, "Sapienza" University of Rome, Rome, Italy

BACKGROUND: Intraoral-scanner is a device that creates digital models in real time by placement and shift in the oral cavity; the purpose of this study is to quantify the orthodontic movement in three space directions, mesio-distal, vestibular - oral and vertical (M-D, V-O and V), during high-tech edgewise phase of Damon System® (Ormco). This is the second archwire sequencing of Damon System® (Ormco) and defines completion of leveling and aligning, continues arch development, resolves remaining rotations, begins torque control and consolidates minor spacing. The archwires used to perform these movements are 0.014x0.025 inch Cu-Ni-Ti and 0.017x0.025 inch Cu-Ni-Ti or 0.018x 0.025 inch Cu-Ni-Ti respectively kept for ten weeks, 6-8 weeks and 8-10 weeks. The archwires considered in this study are the first two only. **METHODS:** It was realized a sample of 15 patients bonded with Damon brackets coupled with 0.014x0.025 inch Cu-Ni-Ti archwire, activated at least by ten weeks (t0). Patients

have been recruited at Orthodontic Unit of Department of Oral and Maxillo-facial Sciences of Sapienza, University of Rome. It has been used Carestream© 3500 intraoral-scanner; it is a stytching type scanner with a green light guide system and doesn't need powders or dry surfaces to acquire the images and create a digital models. A first digital impression of bonded dental arches was taken on every patient at time considered zero (t0) by using intraoral scanner; after ten days, archwire has been changed with an 0.017x0.025 inch Cu-Ni-Ti and after further 15 days (t1), a second digital impression of bonded dental arches was taken. Through digital models superimposition, movements of each tooth were measured in the 3D dimensions by using the software Meshlab2016.12 and furthermore, intermolar and intercanine distances change has been evaluated. Moreover, every measurement was performed independently by two calibrated (K=1) operators.

RESULTS: According to ANOVA variance analysis, overall average movements on three space plans are statistically significant in both dental arches; mesiodistal overall average movements are prevalent in the inferior dental arch and V-O overall average movements in superior dental arch; vertical overall average movements resulted smaller in both dental arches. According to linear regression index, intermolar and intercanine distances variations aren't statistically significant ($P=0.05$ gdl=5 $F=0,000$). Moreover, about the average movements of each tooth in the three space plans evaluated, there are more movements in the posterior sectors of dental arches, more in the upper arch than in the lower.

CONCLUSIONS: Orthodontic movements in the high-tech edgewise phase of Damon System®(Ormco) are statistically significant and correspond to those expected.

Dental arch dimensional changes in class II patients treated with clear aligners: comparison between pre-treatment and pre-refinement digital models

L. Tallone, M. Saettoni, B. Nebiolo, M. Piancino, T. Castrolforio, A. Deregibus

Division of Orthodontics, Department of Surgical Sciences, C.I.R Dental School, University of Turin, Turin, Italy

BACKGROUND: To identify the dental arches shape changes in class II patients treated with Invisalign© (Align Technology, San José, CA, USA), comparing the arch form of pre-treatment and the pre-refinement three-dimensional digital models (STL files) by using facial axis (FA) points.

METHODS: 64 adult Caucasian patients were selected for the study but only 44 met the following inclusion criteria: complete permanent dentition excluding the third molars; normal tooth size and shape; absence of supernumerary teeth; no extraction. Each stl model was imported in GOM Inspect© software (GOM GmbH, Braunschweig, Germany) to identify the FA points and to create a coordinate system. In each model the origin of coordinate was locate in the contact point of central incisors and the the cartesian axes were oriented as follows: x-axis adjusted to be parallel to the mean inclination of the lines connecting the bilateral contact points of the first and second premolars and the second premolars and the first molars, y-axis perpendicular to the x-axis and passing through the contact point of the central incisors and z-axis perpendicular to the x and y axis. Besides an average arch form was obtained for both pre-treatment and pre-refinement

models. Therefore the comparison was performed between the two average arch shapes.

RESULTS: The pre-refinement average mandibular arch showed an average buccal movement of 0,7 mm ($P<0,05$) for canines, 1,3mm($P<0,05$) for first bicuspid, 1,7mm ($P<0,05$) for second bicuspid, 1,5mm ($P<0,05$) for first and second molars in the mandibular arch. The pre-refinement average maxillary arch showed a buccal movement of 0,8mm for canines, 1,3mm ($P<0,05$) for first premolars, 1,5mm ($P<0,05$) for second premolars, 1,3mm($P<0,05$) for first molars and 0.8mm for second molars. Moreover was observed a sagittal mesial movement of 0,7mm for second premolars ($P<0,05$), of 0,9mm ($P<0,05$) for first premolars and of 0,5mm for canines ($P<0,05$).

CONCLUSIONS: the orthodontic treatment of class II patients with invisalign© aligners results in an expansion of the dental arches, in particular in the region of premolars and molars both in the mandibular and maxillary arch. Moreover, a mesial movement of premolars and canines was observed in the maxillary arch probably due to the expansion of the arch.

Initial force system of upper molars distal rotation with clear aligners: a finite element study

L. Tallone, F. Barra, E. Ursu, M. Piancino, T. Castrolforio, A. Deregibus

Division of Orthodontics, Department of Surgical Sciences, C.I.R Dental School, University of Turin, Turin, Italy

BACKGROUND: To investigate, using FA models, the force system and displacement patterns produced by clear aligners on the whole upper arch during distal rotation of both upper molars and to evaluate the influence and efficiency of clear aligners in association with attachments.

METHODS: Three CAD models of upper arch and periodontal tissues were designed with a CAD software (SpaceClaim© Corporation; www.spaceclaim.com) and imported into FE software. CAD models included alveolar bone, periodontal ligament (PDL), teeth (complete upper arch except for third molars), plastic aligner and composite attachments. For each model, aligner activation of 2-degrees of distal rotation of upper molars was performed with different configurations of attachments: without attachments (NA), with vertical rectangular attachments on upper first molars (ATT6) and with vertical rectangular attachment on upper molars, upper premolars and upper canines (ATT3-7). Vertical rectangular attachments were designed with a 3mm height a width of 2 mm and a mean thickness of 1 mm. A 0.8 mm bevel was applied to coronal edge.

RESULTS: Differences were registered within all configurations analysed. Rectangular attachments are effective in transmitting enough force from aligner's activation to tooth crown to perform rotation, locating the main anchorage unit distally, and thus, preventing incisors flaring with the consequent lack of tracking between teeth and aligner. The values of anchorage loss differed significantly between the tested environments despite displacement pattern was similar for all the simulated conditions. Rotation with attachments only on upper first molars resulted to be as efficient as rotation obtained with attachments from upper canine to upper second molar but presented less collateral forces. Together with tooth rotation, a variable amount of distal tipping was observed. Regarding PDL stress, maximum pressure areas were detected in the most mesial-coronal part of second molars PDL,

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while tension areas were concentrated on first premolars PDL distal surfaces. On first molars, PDL was more compressed on the distal surface of the distal-buccal root. In simulations with attachments, aligners active stress areas were revealed on the mesial surfaces of first molars attachments. A mean lack of 0.02 mm between aligner activation and tooth displacement has been revealed in simulations with attachments, while a 0.04 mm lack resulted from NA simulation.

CONCLUSIONS: Clear orthodontic aligners can produce a controlled tooth movement in association with attachments during upper molars rotation. Sequencing of attachments applications may improve clinical efficiency for molar rotation moreover overcorrection aligners may be required to compensate the “elastic play” of the aligner.

Lingual fixed retainers: clinical aspects

A. Gramuglia, M.G. Paolone, L. Di Tonno, E. Staderini, M. De Luca, P. Gallenzi

Department of Surgical Sciences for Head and Neck Diseases, School of Dentistry, Catholic University of Sacred Heart, Rome, Italy

BACKGROUND: Retention is one of the most difficult and discussed problems in orthodontics. Fixed retainers have been a retention solution during last years. Cochrane recent reviews on retention procedures concluded that there was insufficient data to draw clear conclusions about the best retention procedure. New studies have shown clinical complications such as bonding failure and unwanted tooth movements. These movements include increase of the Irregularity Index or a variation of the incisor torque and buccal canine movements. In particular bonding failure can be hidden or partial and not immediately evident to the patient. The increase of irregularity of lower incisors during retention period seems to be strongly related to the bonding failures of the retainer. 2.7% out of 221 patients who received a FSW canine-to-canine lingual retainer bonded to all 6 anterior teeth showed, according to Renkema et Al., unexpected post-treatment complications (torque differences of the incisors, increased buccal canine inclination). The aim of this study is to detect these unexpected clinical complications.

METHODS: 30 Patients treated by one operator have been examined two years after the end of active fixed appliance treatment and lingual inferior fixed retainer application in order to examine clinical complications. Clinical aspects of the unwanted tooth movements are described and shown.

10% of the patients showed unwanted torque incisor movement or partial bonded failures. Previous *in vitro* studies showed that the pull out detachment forces in the best conditions are 20MPa which is far below the habits such as clenching, nail biting and tongue malposition. Maximum biting force at the level of the molars is 651 N and for incisors 113 N. Some children and adults bite their nails: a finger pinch force is 80.4 N and the total hand pinch is 504.2 N. Normal functional forces created by the tongue are 63 kPa. These values are very close to the ultimate retention forces of the wires and composites that orthodontists commonly use in fixed retainers.

CONCLUSIONS: Fixed retainers cannot be considered a panacea for every patient and careful selection of materials and patients is essential before they are used. Further studies *in vivo* and *in vitro* are needed to obtain a guideline for fixed retainers use in daily practice for strict selection and follow up of patients during retention.

Long-term evaluation of rapid maxillary expansion and bite-block in open-bite growing subjects: a controlled clinical study

D. Fusaroli, G. Di Fusco, A. Milazzo, M. Mucedero

Department of Orthodontics, Department of Clinical Sciences and Translational Medicine, University of Rome Tor Vergata, Rome, Italy

BACKGROUND: The purpose of this study was to evaluate the long-term stability of Rapid Maxillary Expander (RME) and posterior Bite-Block (BB) treatment in growing subjects with dentoskeletal open-bite.

METHODS: Sixteen subjects (2 boys, 14 girls; mean age, 8.1 ± 1.1 ys) were treated consecutively with RME and BB appliances. Each patient underwent a standardized treatment protocol with RME soldered to bands on the second deciduous molars or on the first permanent molars. The expansion screw was activated once a day until the palatal cusps of the maxillary posterior teeth approximated the buccal cusps of the mandibular posterior teeth; then the appliance was left in place for at least 8 months working as a retainer. The BB appliance was constructed in the form of a Schwartz plate for the lower arch with posterior occlusal resin splints of 5 mm thickness. Removable mandibular BB was applied for 12 months to control the vertical dimension. The patients were instructed to wear the BB 24 hours a day. The patients were reevaluated at the end of active treatment with RME and BB (mean age, 9.6 ± 1.2 ys) and at least 4 years after the completion of treatment (mean age, 13.5 ± 1.4 ys). A control group of 16 untreated subjects with the same dentoskeletal disharmony was used for the statistical comparison (independent t-test). The inclusion criteria included: no sucking habits before treatment; overbite < 0 mm; transverse discrepancy ≥ 3 mm; Frankfort horizontal to mandibular plane angle greater than 26° ; full eruption of first permanent molars, and maxillary and mandibular incisors (to prevent the “pseudo-open bite” due to undererupted permanent incisors), no permanent teeth extracted before or during treatment, and 3 consecutive lateral cephalograms of good quality with adequate landmark visualization, taken before treatment (T1), at the end of the active treatment with the RME and BB (T2), and at a follow-up observation at least 4 years after the completion of treatment (T3).

RESULTS: Active treatment with RME and BB (T1-T2 interval) was effective in correcting dental open bite with a significantly greater increase in overbite compared with the controls (+2.0 mm). The treated group showed a significantly greater decrease of facial divergence when compared with the control group (-1.9 degrees). The improvement of the dental open bite was associated with a significantly smaller increase of the sum of upper and lower molar extrusion in the treated group in comparison with the control group (-1.3 mm). No significant differences in posttreatment changes (T2-T3) were found between the treated group and the control group. In the long term (T1-T3), the treated group showed, a greater increase in overbite (1.8mm), an extrusion control of maxillary and mandibular molars (-1.9mm; -1.3mm), and a decrease in facial divergence (-2.8°) when compared with the controls. **CONCLUSIONS:** In the long term, the use of the RME and BB protocol led to successful outcomes in 100% of the growing children considered. The treated patients exhibited reduced extrusion of maxillary and mandibular molars and, consequently, a significant improvement in vertical skeletal dimension when compared with untreated open bite subjects. The effects of early treatment with RME and BB resulted stable at a long-term follow-up.

A combined orthodontic-surgical approach for the treatment of periodontally compromised patients

B. Toni, M. Panetta, K. Gardini, D. Loli, G. Galluccio, E. Barbato

Sapienza University of Rome, Orthodontic Department, Rome, Italy

BACKGROUND: An orthodontic therapy is recommended to improve periodontal tissues health in clinical situations which favor periodontal tissues health impairment. The treatment does not only allow to resolve the original malocclusion but also to obtain a physiological and balanced distribution of occlusal forces and contacts, with great functional and aesthetic results. In periodontally compromised patients with dentofacial deformities, combined orthodontic-surgical approach is required to correctly and stably resolve the malocclusion and to improve the periodontal tissue status of the patient.

METHODS: Several patients with dentofacial deformities (class I, II, III) and some clinical conditions that are cofactors or have caused clinically observed periodontal tissue damage, were treated at the Unit of Orthodontics of the Rome "Sapienza" University. Patients were treated with a combined orthodontic-surgery approach in order to resolve both dental and skeletal discrepancies and to improve periodontal tissue health. We included patients that, after intraoral examination, didn't present limiting factors to orthodontics treatment and underwent to a careful protocol of oral hygiene and regular Periodontal Screening Recording (PSR) follow up.

RESULTS: In specific clinical situations where a periodontal tissues impairment is clinically observed, an orthodontic treatment is suggested to avoid the worsening of periodontal defects and to improve periodontal tissues health. Those clinical cases with dentofacial deformities associated with periodontal disease require a multidisciplinary approach with specialized figures as orthodontist, periodontist and surgeon. Before the orthodontic treatment, a careful case selection with adequate intraoral examination, active periodontal treatment to improve periodontal status, monitoring of the patient's oral hygiene and his motivation and collaboration and evaluation of presence of limiting factors is fundamental. In patients with active periodontitis (plaque-infected deep pockets evidenced by bleeding on probing) orthodontic tooth movement may accelerate the periodontal disease process. Once orthodontic treatment is started, periodontal follow up is recommended at shorter intervals (6 weeks) with sessions of oral hygiene and PSR protocol. The placement of orthodontic brackets, wires, bands, ligatures, auxiliaries and elastics represents a challenge for the patient to maintain an adequate oral hygiene, with plaque accumulation and consequently gingivitis and, as the subgingival bacterial pattern has an anaerobic shift once bands are placed in, thus leading to periodontal damage. Some tooth movements such as dental intrusion shift supragingival plaque to a subgingival location, favoring worsening of periodontal health. The use of steel rather than elastic ligatures has been recommended on brackets, because elastomeric ones have been shown to attract significantly more plaque than steel ligatures; the use of low force systems and delayed archwire changing sequence is recommended so that the periodontal tissues are not stressed and physiologically moved.

CONCLUSIONS: A multidisciplinary orthodontic-surgical approach in periodontally compromised patients is suggested in specific cases when untreated dental and /or skeletal dis-

crepancies lead to the worsening or impairment of the periodontal health status. Orthodontic treatment alone with the supervision of the periodontist, in selected cases, is useful in order to improve the periodontal tissues health. However, when the underlining malocclusion doesn't allow to achieve a stable and physiological occlusion between dental arches with orthodontics only, a combined multidisciplinary orthodontic-surgery approach is required.

Oral microbiota and orthodontic appliances: a systematic review

N. Nardi¹, F. Toma¹, M. Marcolina¹, A. Liguori¹, G. Ghilardi¹, R. Burioni², M. Manuelli^{1,3}, A. Lucchese^{1,3,4}

¹Department of Orthodontics, Vita-Salute San Raffaele University, Milan, Italy; ²Department of Medical Microbiology, Vita Salute San Raffaele University, Milan, Italy; ³Unit of Dentistry, Division of Orthodontics, Research area in Dentofacial Orthopedics and Orthodontics, IRCCS San Raffaele Scientific Institute, Milan, Italy; ⁴Department of Orthodontics, Vita Salute San Raffaele University, Milan, Italy

BACKGROUND: In daily clinical practice, orthodontic appliances, both fixed and removable, may be associated with an increased cariogenic risk and a worsening of pre-existing periodontal diseases; the mechanism by which this phenomenon is realized is the increase of retentive sites where bacterial plaque and potentially pathogenic species can proliferate more easily. The purpose of this review is to investigate the association between orthodontic appliances and changes in the quality and quantity of oral microbial flora.

METHODS: The research included all the articles published until October 2017 with the keywords: "Orthodontic appliance* AND (microbiological colonization OR periodontal pathogen* OR Streptococcus OR Lactobacillus OR Candida OR Tannerella forsythia OR Treponema denticola OR Fusobacterium nucleatum OR Actinomyces actinomycetemcomitans OR Prevotella intermedia OR Prevotella nigrescens OR Porphyromonas gingivalis)" and it was conducted in the major medical databases. Inclusion criteria were: clinical studies in humans; presence of orthodontic appliance; standardization and training in oral hygiene; analysis of microbial flora from the whole mouth, not only from orthodontic appliance; microbiological analysis of collected material. The methodological quality of selected papers was scored, using the "Swedish Council on Technology Assessment in Health Care Criteria for Grading Assessed Studies" (SBU) method. **RESULTS:** With the initial research, we found 587 articles of which 58 met the inclusion criteria. Then of the 58 studies, 43 of them were classified as having a moderate methodological quality, but the biggest bias in these studies is the absence of repeatability test, and the others 15 were classified as having a low quality. The articles classified as having low quality were excluded. The results showed that orthodontic appliances influence the oral microbiota with an increase in the counts of Streptococcus Mutans and Lactobacillus and in the percentage of potentially pathogenic Gram-negative bacteria. Increase in quantity and variation in quality of microbiota was observed also in patients undergoing orthodontic treatment with removable appliances, suggesting the influence of these appliances in modifying the whole oral environment. Plaque index and the bleeding on probing index showed an increase on fixed appliances, however results were not homogeneous and the differences in the results of the stud-

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ies were related to the fact that distinct methods of analysis were applied.

CONCLUSIONS: There is moderate evidence regarding the association between orthodontic appliances and changes in oral microbiota.

Maxillary orthodontic expansion assisted by unilateral alveolar corticotomy and low-level laser therapy: a new protocol for the treatment of posterior unilateral cross-bite in adults

R. Bertino ¹, P. Spinuzza ¹, A. Farah ¹, P. Cingari ¹, E. Gatto ¹, G. Caccianiga ², A. Militi ¹, M. Portelli ¹, R. Nucera ¹, A. Lo Giudice ¹

¹Dipartimento di Scienze Biomediche Odontoiatriche e delle Immagini Morfologiche e Funzionali, Sezione di Ortognatodonzia, Università degli Studi di Messina, Messina, Italy; ²Facoltà di Medicina e Chirurgia, Università di Milano-Bicocca, Milan, Italy

BACKGROUND: The treatment of true unilateral posterior crossbite often requires asymmetric maxillary expansion, however this is challenging to achieve with conventional expansion methods because of several biomechanical limitations. In this paper, we introduce a new protocol for the treatment of unilateral posterior crossbite in adults based on maxillary orthodontic expansion assisted by corticotomy and low-level laser therapy (LLLT) performed on the crossbite side.

METHODS: The study sample included 15 adults (8 females, 7 males) with a mean age of 21.6 ± 3.1 years old, affected by true unilateral posterior crossbite. Exclusion criteria were: bilateral posterior crossbite or functional unilateral crossbite, dental agenesis, cranio-facial syndromes and periodontal disease. The same day of application of orthodontic appliances (palatal expander and self-ligating brackets), corticotomy was performed on the buccal aspect of the crossbite side. A full thickness flap was raised in the area between the distal aspect of the upper first molar and the mesial aspect of the canine/lateral incisor. Vertical incisions in each interproximal space were performed and maintained apical to the interdental papilla. Cortical bone was cut for 3 mm of depth, assessed by a periodontal probe. Vertical corticotomies were connected by a horizontal corticotomy, at least 2 mm apical to the root apex of each tooth. Finally, the flap was sutured using a non absorbable 4/0 suture. In seven subjects corticotomy was carried out with the Piezosurgery BS1, while in eight subjects the Erbium:Yag laser was used (wavelength of 2940 nm, 180 mJ output and frequency of 20 Hz, 600 micron sapphire glass tip). Once a month, all patients underwent LLLT at the cross-bite side using a diode laser with a wavelength of 980 nm (Wiser, Doctor Smile – Lambda Spa, Brendola, VI), power of 1 Watt set on continuous wave mode. The beam was delivered by means of a plane wave optical fiber (AB 2799, Doctor Smile – Lambda Spa, Brendola, VI). Irradiation was performed for 50 seconds at each point, for three times, and repeated every 2 minutes on relaxing time. LLLT procedure was conducted up to the correction of the crossbite. The efficacy of the technique was evaluated on digital models by assessing differential expansion on both sides relative to the maxillary midline at levels of canine, first and second premolars and first molars.

RESULTS: All subjects reported successful correction of posterior unilateral crossbite, functional occlusion was

achieved as well. The average expansion was greater at the crossbite side compared to the unaffected side and such difference was significant at first premolars ($p < 0.05$), second premolars ($p < 0.05$) and first molars ($p < 0.05$) levels.

CONCLUSIONS: Orthodontic maxillary expansion assisted by unilateral corticotomy and LLLT was effective in the treatment of true unilateral crossbite.

Geometric morphometric analysis of maxillary morphology in children with impacted incisors: a three-dimensional evaluation

V. Di Fazio, V. Brunelli, S. Loeberto

Departments of Orthodontics, University of Rome Tor Vergata, Rome, Italy

BACKGROUND: To analyse variations in palatal morphology in subjects presenting with unilaterally impacted maxillary permanent central incisors (IIG) compared with a control group (CG) of subjects without eruption anomalies using three-dimensional (3D) analysis.

METHODS: A sample of twenty-six subjects (10 females, 16 males; mean age 9.5 ± 1.5 years) with IIG were selected. The inclusion criteria for the enrollment of the subjects in IIG were the following: European ancestry (white), eruption of the contralateral incisor at least 6 months earlier or deviation from the normal sequence of eruption (lateral incisor erupted prior to the central incisor), no posterior or anterior crossbite, normal overjet and overbite values, intermediate mixed dentition, Class I or edge-to-edge molar relationship (46.2% Class I, 53.8% end-to-end molar relationship), skeletal Class I relationships, prepubertal skeletal maturation (CS1, CS2). Exclusion criteria included: previous orthodontic treatment or tooth extraction, multiple and/or advanced caries, tooth agenesis, supernumerary teeth, sucking habits, craniofacial syndromes, cleft lip and/or palate and other genetic disease. For each subject a panoramic radiograph and cephalometric radiograph were taken at the time of initial observation to confirm the diagnosis of incisors' impaction and planned a treatment. IIG was compared with a CG of 26 subjects (14 females, 12 males, mean age 8.7 ± 1.6 years) presenting no eruption disorders. The CG group matched the IIG as to occlusal development, skeletal maturation, skeletal and occlusal relationship. To analyse the palate's shape, study casts of the maxillary arches of all subjects were scanned using an intraoral scanner (Carestream 3500) with a reported accuracy of 30 μ m. All models were exported in a Standard Tessellation Language format (.stl digital file). To study the entirety of the shape of the palate at any point of the surface, 3D Geometric Morphometrics Method (GMM) was applied. **RESULTS:** IIG showed skeletal adaptations of the maxilla. In the IIG, both superior palatal region and lateral palatal surface showed significantly different morphologies when compared with CG, with a narrower and higher palatal vault. **CONCLUSIONS:** GMM can be a useful tool for describing the 3D shape changes of maxillary surfaces in children with impacted incisors. The absence of maxillary central incisors over the physiological age of eruption influenced the development of palatal morphology compared to subjects without eruption anomalies. Children with unilaterally impacted maxillary permanent central incisors showed a narrower and higher palatal vault when compared with a control group of subjects without impaction.

Orthognatodontic treatment of a diabetic patient with a caries-free functional appliance

M. Rolfo, L. di Benedetto, P.A. Deregibus, T. Castroflorio, M.G. Piancino

Division of Orthodontics, Department of Surgical Sciences, C.I.R. Dental School, University of Turin, Turin, Italy

BACKGROUND: Diabetes mellitus (DM) is a chronic disease resulting from a relative or absolute insulin deficiency, which affects the metabolism of carbohydrates, proteins and fats. There are two main types of DM: type 1 is caused by immune-mediated destruction of pancreas' beta cells, which leads to insufficient production of insulin; type 2 occurs when the body is non-responsive to insulin. In oral care, DM causes two main effects: caries and periodontal disease. Studies indicate that DM increases the risk of periodontal disease by three times when compared to healthy patients. Risk of caries, one of the most common chronic disease with dietary-bacterial etiology, increases particularly in DM-affected children. These patients, in fact, are often asked to follow special dietary regimes, where amount, type and distribution of carbohydrate is controlled and spread during the day in numerous meals and snacks in order to promote an optimal growth and control of blood glucose. Furthermore, unbalanced diabetes is associated with significant cariogenic changes in the oral environment: reduced saliva flow, lower saliva buffering capacity in presence of acidic pH, higher salivary glucose, higher salivary albumin concentrations, high proportion of salivary mutans streptococci and yeast. Changes in the oral microflora in subjects with poor glycaemic control may significantly influence the prevalence of gingivitis and caries. Young orthodontic patients affected by DM need no-caries appliances in order to minimize the risk of dental caries during the orthodontic treatment. This case report shows why Function Generating Bite (FGB) can be considered the first choice appliance to treat this type of patient.

METHODS: The case of a 10 years old girl, referring to the Orthodontic Division of C.I.R. Dental School in Turin, with bilateral molar class 2, anterior open bite, hyperdivergent skeletal pattern of growth (SpP^oGoGn: 27°) and a history of Diabete Mellitus type 1 is described. Function Generating Bite (FGB) was used in order to correct the dental malocclusion and to improve the hyperdivergent pattern of growth and the pathological vectors. The appliance was individually manufactured with acrylic resin and resilient stainless steel posterior bites. It's removable to allow an optimal oral hygiene. The patient was instructed to use this device always, day and night, except during meals and physical activity.

RESULTS: After one year of treatment, the malocclusion was corrected and the patient achieved a canine and molar class one, physiological overbite and overjet without signs of caries.

CONCLUSIONS: The reason for no-appliance-caries is due to the fact that Functional appliances do not have any dental anchorage, any hook, leaving teeth free to move, and avoiding constrictions that cause caries. They work with dental point contacts, intermitted and self-regulating forces. For these reasons, Functional appliances can be considered the gold standard in orthodontic patients with systemic disease that are a risk factor for caries.

Diagnosis of condylar asymmetry in juvenile idiopathic arthritis

L. di Benedetto, C. de Biase, R. Cannavale, M.G. Piancino

Orthodontic Division, Department of Surgical Sciences, CIR Dental School, University of Turin, Turin, Italy

BACKGROUND: Juvenile idiopathic arthritis (JIA) is characterized by chronic inflammation of one or more joints, with an onset before the age of 16 years and a minimum duration of 6 weeks. TMJ involvement in JIA was recognized by Still in 1897, both unilateral and bilateral. Being the TMJs characterized by adaptive growth during development, it is likely that TMJs are involved from the early stages of the disease. The diagnosis of condylar and ramal asymmetry is important to establish an appropriate and early treatment and it can readily be determined using ortopantomography (OPT). The latter is the only imaging showing simultaneously the two condyles, giving a clear idea of the asymmetry between sides. Of course, to detect the condylar morphology CBCT or MRI are necessary, but it is not so easy to properly obtain these images in children. OPT is a cost benefit favorable imaging tool, routinely used in the dental field, at an early stage in development also; it can be used as a first screening examination, for monitoring and follow-up of the therapy. The aim of this study was to evaluate in ortopantomography condylar and ramal asymmetry of JIA patients with respect to normal subjects.

METHODS: Thirty patients (23 females, 12.8 ± 4.8 years) with confirmed diagnosis of JIA (according to the ILAR 2003 criteria), free of signs and symptoms of temporomandibular joint disorders, and 30 matched healthy subjects (23 females, 13.6 ± 4.8 years) were selected for this study. All patients had a panoramic radiograph. The method of Habets et al. was used to compare the vertical heights of the condyles and rami of both sides in OPT. The ramus tangent (A) was drawn between the most lateral point of the condyle (O1) and of the ascending ramus (O2). The condylar height (CH) was measured as the distance on the ramus tangent between the B line (perpendicular to the ramus tangent from the most superior point of the condyle) and O1. The ramus height (RH) was measured as the distance between O1 and O2. To evaluate the symmetry between the condyles and the rami, the following formula was used: $(R - L) / (R + L) \times 100\%$. According to Habets et al., a 6% difference between the condylar vertical sizes in OPT is an acceptable limit for diagnosing a condylar asymmetry. For statistical analysis, data were expressed as mean ± SD and the significance of between-group differences were assessed using Mann-Whitney test. Statistical significance was set at $p < 0.05$.

RESULTS: Results showed a significant difference regarding the condylar asymmetry (expressed in percentage from 0 to 100%), being the asymmetry index in the JIA group 15.58% ± 10.98 and in the control group 1.72% ± 1.21 ($p < 0.0001$). No differences were found in the range of asymmetry of the ramus between groups ($p = 0.47$), being the asymmetry index in JIA group of 2.97% ± 2.42 and in the control group of 2.33% ± 1.7. The intra-group comparison between males and females showed a significant difference in the range of asymmetry of the condyle in the JIA group ($p < 0.05$), being the females more asymmetric. No differences were found in the range of asymmetry of the ramus in both groups ($p > 0.05$).

CONCLUSIONS: The results of this study confirm that TMJ is highly susceptible to inflammatory alterations during growth, even in absence of symptoms, and that OPT is a valuable simple tool for early diagnosis of condyles asymmetry.

ABSTRACT

Occurrence of sella turcica bridging in patient with palatally displaced canine impaction: a lateral cephalogram investigation

F. Squillace, F. Germanò, G. Padalino, R. Guarnieri, E. Barbato
Department of Oral and Maxillo-Facial Sciences, Sapienza, University of Rome, Rome, Italy

BACKGROUND: Palatally displaced canine is a common dental anomaly and several theories contributing to define its etiology. In particular, the calcification of the sella turcica bridge might be positively associated with PDC because dental epithelial progenitor cells, maxillary and sella turcica share a common embryologic origin and development by neural crest cells. Sella turcica bridging is a frequent morphologic anomaly caused by abnormal ossification of the dura mater between the anterior and posterior clinoidal process of sphenoid, or caused by an excessive embryologic development of the same bone. The purpose of this study was to investigate the incidence of the calcification of the sella turcica bridge in lateral cephalometric of a pool of 35 orthodontic patients affected by palatal displaced canine and to sensitize orthodontists and clinicians for examining the cervical area carefully.

METHODS: The study was carried out at the Department of Oral and Maxillo-Facial Sciences, Sapienza, University of Rome, Rome, Italy. The lateral cephalometric radiographs of 35 orthodontic patients affected by palatally displaced canine were collected and examined retrospectively to detect the presence of the calcification of the sella turcica bridge. This group was composed by 27 females and 8 males. Thirty-five patients with maxillary canines normally erupted were randomly selected and included in the control group. Chi square test was used to evaluate the presence of statistically significant differences between two groups in incidence of sella turcica bridge.

RESULTS: Sella turcica bridging occurrence was positively associated with impacted palatally canine. The numerosity of complete and partial calcification of the sella in the patients were of twenty and eight respectively. Statistically significant differences between the case group and control group were found (χ^2 square, $P = 0,003$)

CONCLUSIONS: Conventional imaging is routinely used in orthodontics for various purposes, including diagnosis of impacted canines and morphologic anomalies of teeth and craniofacial skulls. Cephalometric radiographs can be used to evaluate the development and the relationships between craniofacial and dental structures. Indeed anomalies of cervical vertebrae might be associated with malformations of the jaw, maxillary and teeth and they could be useful as predictive indices. Sella turcica bridging was often associated with PDC and so, according to what has been said, the authors affirms that this spinal anomaly could be helpful for an early diagnosis of the palatally impacted canine. Finally, is fundamental to improve a correct and complete reading of cephalometric radiographs in order to locate early this anomalies.

Agensis of the lateral incisor: close or open spaces? A systematic review

M.M. D'Emidio, F. Squillace, F. Germanò, E. Barbato

Department of Oral and Maxillo-Facial Sciences, Sapienza, University of Rome, Rome, Italy

BACKGROUND: Dental agensis is the result of a disorder in the dental lamina formation process that can generate both

functional and aesthetic disorders. Nowadays the therapeutic alternatives are mainly based on the closure of the spaces and the replacement of the lateral incisors with the canines or opening of the spaces and insertion of implants. The purpose of this review is to explain the guidelines to be followed by evaluating advantages and disadvantages as well as the distinct indications of each of the two therapeutic options.

METHODS: A literature search was performed in main database like Pub Med Central, Cochrane Library, Embase and Google Scholar. In a first research, fifty-two articles were evaluated. Twenty-one articles were excluded from the fifty-two articles. In a second research, forty-nine articles were evaluated. Of the forty-nine articles, sixteen were excluded. In total the articles used were sixty-four.

RESULTS: The research carried out in the literature has allowed to delineate a series of elements that identify the situations in which it is better to open the space compared to situations in which the best indication would seem instead to close the space. Specifically, it opens the space is preferred in case of: adult patient, generalized space in the upper arch, absence of gingival smile, third skeletal class, first skeletal class with absence of crowding in the inferior arch, verticalization of the lower incisors, little alveolar ridge developed, shape, size or color inadequate about canine or premolar, biological or economics costs major. Instead, a closure of the space is preferred in case of: young patients, lack of space in the upper arch, presence of gingival smile, first skeletal class with presence of crowding in the inferior arch that needs extraction, protrusion of the dento-alveolar arch, absence of overbite, color, shape and size appropriate about canine and premolar, biological/economic costs minor.

CONCLUSIONS: Each therapeutic alternative has its advantages and disadvantages and will be recommended one or the other after careful analysis of different parameters. In any case, there may be equally valid therapeutic alternatives. Each therapeutic choice can achieve excellent results if based on a correct initial diagnosis and a multidisciplinary therapeutic approach. The excellence of a good treatment result, for both techniques, is based on an accurate diagnosis, a correct initial analysis of the situation, the individualization of each patient and the choice of the most suitable treatment plan for the patient from the beginning. In addition to orthodontics, a multidisciplinary approach is essential among the different branches of dentistry such as aesthetics, periodontology, prosthetics and implantology in the treatment of these patients to achieve optimal aesthetic and functional results.

Dental effects after rapid maxillary expansion assessed with CT: tooth-borne vs. bone-borne appliance

L.M. Valentini, E. Fantasia, A. Gavillucci, E.M. Pompeo, G. Galluccio

¹Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, School of Dentistry, Rome, Italy

BACKGROUND: Our objective was to investigate the changes in maxillary posterior teeth caused by the Rapid Maxillary Expansion with the tooth tissue-borne and tooth-borne expanders assessed using computed tomography (CT). **METHODS:** To analyze this aspect a Review of English-language literature from 1990 to March 2017 was conducted on Pubmed (Medline), Lilacs and Scopus with the words Rapid maxillary expansion; Hyrax expander; Bone-borne expander; Cone-beam computed tomogram; Alveolar bone to

identify all articles reporting on the effects of Rapid Maxillary Expansion with both tooth-borne and Bone-Borne Appliances. We finally selected 12 articles. The inclusion criteria were: young subjects with Class I or II division 1 malocclusion, with unilateral or bilateral posterior crossbites; age above 12 years, with the presence of only secondary tooth dentition; necessity of only orthodontic treatment, without extractive or orthognathic approaches. The exclusion criteria were: absence of maxillary posterior permanent teeth, metallic restorations on the maxillary posterior teeth, previous periodontal disease, previous orthodontic treatment. The sample was divided into two groups: patients treated with tooth tissue-borne expanders vs patients approached with bone-borne appliances. All patients were subjected to CT imaging before expansion and after when the expander was removed to compare the dentoalveolar effects of the two treatments. The evaluated parameters were: the distance of the center of the palatal root of the first premolars and molars and center of the root of the second premolars, as the distances of dental crowns for the same teeth on both sides.

RESULTS: RME led to a buccal tipping of the posterior teeth, especially of the second premolars when compared with the banded teeth, namely the first premolar and the first molar. In group I, the tooth tissue-borne expander, showed significant buccal tipping of all posterior teeth. On the other hand, group II did not demonstrate any significant change in the inclination of the anchorage teeth but only in the inclination of the second premolars. Intergroup comparison revealed a statistically significant difference only for the first premolars, which presented more buccal tipping in the tooth tissue-borne expander group.

CONCLUSIONS: Overall, the analysis provided evidence that dental inclination occurs in molars for both RME treatments but the second premolars displayed more buccal tipping with tooth borne type rather than the bone-borne type.

Evaluation of spontaneous decompensation of the jaw after rapid maxillary expansion

G. Rodi, F. Germanò, F. Squillace, C. Vompi, A. Costantini, G. Galluccio, E. Barbato

Department of Oral and Maxillo-Facial Sciences, Sapienza, University of Rome, Rome, Italy

BACKGROUND: The purpose of this study was to measure and evaluate the decompensation and the increase of Wilson curve of lower jaw after rapid palatal expander therapy.

METHODS: 10 patients were recruited. Subjects in growing skeletal age (stage CS2-CS3), with mild to moderate malocclusion, presenting a transverse skeletal deficit of the upper arch or non-syndromic and patients in good general, oral and periodontal health, with increased Wilson curve were included. Adult subjects, patients with previous orthodontic treatment, with acute and / or chronic diseases affecting the musculoskeletal system and who had not given consensus to the diagnostic investigation and all the total or partial lack of the requested radiographic evaluations and/ or radiograms that do not comply with the required standards were excluded. First of all, each patient has been taken an alginate imprints to realize the initial plaster model. Each patient has been mounted a rapid expander of the palate anchored to the two first upper permanent molars and it included two lateral arms. The screw that has been chosen is 10mm so it was possible to position it as high as possible and it could be as close as possible to the center of jaw strength and maximize the skeletal effects

of the expansion. No other devices were applied on patient lower arch. The active expansion phase lasted 9 months until it was possible to appreciate contacts between the palatal sides of the cusps of the first upper molars and the vestibular side of the cusps of the first lower molars. The maintenance phase lasted 9 months. At the end of this phase the palate expander was removed and alginate imprints were taken for the final study models. It was possible to compare and measure with a precision caliper, on initial and final plaster models of lower jaw, the distance from the cusp-distal-palate of 36 to the cusp-distal-palatine of the 46. Then it has been calculated the inter-mediate distance before the expansion, after the expansion and the difference between the two measures.

RESULTS: In all patients an increase of intermolar diameter was found. A statistics average difference of 3 millimeters was calculated between the pre-expansion and post-expansion inter-molars diameter.

CONCLUSIONS: The expansion of the upper arch with palate expander causes an almost complete spontaneous correction of the lower Wilson curve. The entity of the decompensation demonstrate that it is not necessary to decompensate the lower arch simultaneously with a device.

A lateral cephalogram investigation of ponticulus posticus in patients with palatal canine impaction

F. Germanò, F. Squillace, M. Mezio, R. Guarnieri, E. Ersilia

Department of Oral and Maxillo-Facial Sciences, Sapienza, University of Rome, Rome, Italy

BACKGROUND: Ponticulus posticus is an anomaly of first cervical vertebra due to ossification of the posterior atlanto-occipital ligament of atlas identified as a bony bridge between the lateral mass and the posterior arc. This calcification of the bony bridge could be completed or partially and it is visible in lateral cephalogram. Some authors have also noticed that the occurrence of complete and incomplete ponticulus posticus was correlated positively to the incidence of palatally displaced canine; this could be attributed to the activity of the neural crest as the common embryonic origin of the neck and shoulder skeletal development as well as the origin for dental development and eruption. Unfortunately, it is often undetected by orthodontists and other specialists. The purpose of this study was to investigate the incidence of Ponticulus Posticus in lateral cephalometric of a pool of 35 orthodontic patients affected by palatal displaced canine and to sensitize orthodontists and clinicians for examining the cervical area carefully.

METHODS: The study was carried out at the Department of Oral and Maxillo-Facial Sciences, Sapienza, University of Rome, Rome, Italy. The lateral cephalometric radiographs of 35 orthodontic patients affected by palatally displaced canine were collected and examined retrospectively to detect the presence of partial or complete ponticulus posticus. This group was composed by 27 females and 8 males. Thirty-five patients with maxillary canines normally erupted were randomly selected and included in the control group. Chi square test was used to evaluate the presence of statistically significant differences between two groups in incidence of ponticulus posticus.

RESULTS: Ponticulus posticus was observed in twenty patients with palatal canine impaction and eight patients without anomaly. About the twenty cases of inclusion with

ABSTRACT

ponticulus, eleven had partial ponticulus posticus and nine had complete ponticulus posticus. Statistically significant differences between the case group and control group were found (chi square, $P = 0,007$).

CONCLUSIONS: As reported in literature, the prevalence of skeletal anomalies was increased in patients with PDC. In this study the relationship between ponticulus posticus and PDC was confirmed although the restricted group of patients suggest a largest investigation. The authors affirm that this spinal anomaly could be helpful for an early diagnosis of the palatally impacted canine; especially if it is associated with others skeletal or dental anomalies. It's important to let know the existence of the ponticulus posticus and how easy is to detect it on the lateral chefalogram not just for dentistry but also for the possible future implications that this anomaly lead to (headaches, dizziness..)

A retrospective study in pre-surgical patients treated with self-ligating techniques: variability in timing of arches alignment

K. Gardini, M. Panetta, B. Toni, D. Loli, G. Galluccio, E. Barbato

Sapienza University of Rome, Orthodontic Department, Rome, Italy

BACKGROUND: Self-ligating techniques have been emphasized in the scientific literature because of the ability to reduce treatment times of the first orthodontic phase, which consists in the alignment and leveling of the dental arches, caused by a decrease in friction between arch and bracket. The variables related to the reduction of friction is related to bracket, wire and crowding. Aim of the study is to verify the time necessary to completely align the arches measuring the time elapsed between application of the first arch and the second one, based on clinical observation of effective wire passivation.

METHODS: The population consisted of 16 patients subjected to pre-surgical orthodontic treatment for skeletal Class III malocclusion at Unit Orthodontics, "Sapienza" University of Rome. Out of the sixteen patients, ten were treated with passive self-ligating Damon Q (Ormco) technique, 6 with interactive self-ligating Empower (Micerium) technique. A retrospective analysis was made on these patients by measuring the time elapsed between the banding and the positioning of the second archwire based on clinical observation of effective first arch passiveness. The first archwire was chosen on the basis of the severity of clinically observed crowding. The measurements were performed both on the upper and lower arch. Both the upper and lower arches have been analyzed separating clinical data from the specific technique used.

RESULTS: The time necessary to have passiveness of a 0.013 arch was about 6 months, justified by the complexity of dental arch crowding and misalignment. Similar results were obtained for the lower arch. The 0.016 arch was used for minor degree of crowding that allowed a full wire engagement without creating sharp angles and the notching phenomenon was missing. The time of application was 7 months for upper arch, probably due to increased frictional resistance related to the increased contact area between wire and bracket, and 4,4 months for lower arch. The 0.014 arch was the most widely used by us in both techniques, with less time spent between the application of the first and the second arch (4,1 months for upper arch and 4,3 months for lower arch). In the lower arch, the time of the first arch was low despite the fact the shortest interbracket distance is a factor of sliding resistance.

The clinical data of our study are compatible with the work of Pandis et al. reporting an average time of about 90 days for moderate crowding degree and 120 for severe ones. The increased length of the timing recorded in our study cases is probably due to the fact that all patients have also an altered muscle component subsequent to the dento-facial deformity with negatively effects on wire performance.

CONCLUSIONS: Our study outlines that the timing of arch replacement, as determined from clinical observation of its passiveness, is not standardized neither based on active or passive technique, nor on the diameter of the arch or to the upper and lower arch position. The variability of timing is caused by the choice of the arch diameter determined by the severity of crowding and then by the clinical observation of wire passivation.

Tandem skeletal appliance to orthopedically correct transverse maxillary deficiency in an adult. Case report

E. Paoletto ¹, G. Seccia ², M. Seccia ², L. Lombardo ³, G. Sciliani ³, G. Maino ², B.G. Maino ³

¹Orthodontic Technician, Thiene (VI), Italy; ²Private Practice of Orthodontics, Bari, Italy; ³Department of Orthodontics, University of Ferrara, Ferrara, Italy

BACKGROUND: This case report describes the use of Tandem Skeletal Appliance (TSA) in order to orthopedically correct a transverse maxillary deficiency in an adult patient. The TSA is a rapid palatal expansion appliance that involves the use of four microimplants and two expansion screws, one front and one rear. The expansion forces transmitted through the teeth in traditional rapid palatal expansion appliances create unwanted dental effects rather than true skeletal expansion, particularly in older patients with more rigid interdigitation of the midpalatal suture. The TSA appliance provides a purely skeletal anchorage with the bicortical engagement of the microimplants into the palate, this should minimize these side effects.

METHODS: This 23-year-old patient had maxillary constriction with a unilateral posterior crossbite. Before the TSA was installed, we designed the sites and the guided insertion of the miniscrew through the MAPA method (Patent). This type of method guarantees a safe insertion of miniscrews for both the patient and the orthodontist. The activation of the front screw started with 1 turn per day during the first 30 days. The rear screw has been activated 2 times a day for the first 20 days, once a day for the remaining 10 days. The active phase of the expansion lasted in total 50 days. The opening of the diastema occurred on the twentieth day. Activation was stopped when the patient reported some discomfort in the palate and nasal cavity areas and headache. The pain was resolved after a short interruption of the activation.

RESULTS: At the end of the expansion the maxillofacial structures are significantly expanded and this determined the complete resolution of the crossbite on the right. Comparing the pre and post-TSA images, both in 2D and in 3D, it is possible to observe the skeletal changes obtained.

CONCLUSIONS: As a result of this study and as a conclusion of this report it is possible to show how to achieve a successfully transverse expansion of the maxilla in an adult patient without using surgery and without affecting any tooth. This achievement was made possible through the use of a skeletal anchorage specially developed, 3D technologies and the MAPA system.

A systematic review of the literature about two-dimensional and three-dimensional methods for the diagnosis of facial asymmetry

L. Pedersoli, D. Dalessandri, A. Fabbri, L. Sangalli, A. Rolfi, F. Nervi, S. Bonetti, C. Paganelli

Department of Orthodontics, School of Dentistry, University of Brescia, Brescia, Italy

BACKGROUND: The primary goal of this systematic review was to review the literature about the methods available for the clinicians to diagnose facial asymmetry. All methods reported from different Authors in the selected papers, both in two-dimensions (2D) and in three-dimensions (3D), were presented and critically analysed in this review. A secondary aim was to try to compare mostly used methods in terms of accuracy, precision and sensitivity.

METHODS: The online databases selected for the literature search were PUBMED (National Library of Medicine, NCBI), Scopus, LILACS and Google Scholar. The search was conducted on papers dated from 1982 to 2018; the last access on these databases was on 1st February 2018. 781 papers remained after duplicates elimination. Reading their abstracts, the majority of them were eliminated because they distanced themselves from the topic of this study. 58 papers, available in full text, were considered relevant and analysed in details. **RESULTS:** 2D and 3D methods are used to diagnose facial asymmetry. The complete list of these methods includes both x-ray based and not based techniques. Regarding 2D methods, panoramic radiography (OPG), postero-anterior cephalograms (PA), submentovertex projection and digital photography are available for the clinicians. Submentovertex projection is no longer used in the daily routine because during its execution an important dose of radiation strikes patients' thyroid. It represents an uncomfortable exam and it is characterised by the superimposition of different anatomical structures. Also the panoramic radiography is not frequently used in the diagnosis of facial asymmetry because it is affected by a lot of limitations such as distortion and magnification of the structures. Regarding 3D methods, different methods are available for the orthodontists: Cone Beam Computed Tomography (CBCT), stereophotogrammetry, laser scanning, contact digitalization and, less used, morphoanalysis, stereolithography, 3D ultrasonography, facial morphometry, digigraph imagines, moiré topography and contour photography. Some of these latter methods seems to be extremely rare in orthodontic routine especially because their use requires certain instruments and specific knowledge.

CONCLUSIONS: Several methods are potentially available for the clinicians to diagnose facial asymmetry. Three-dimensional ones seems to be more accurate, precise and sensitive than two-dimensional methods. However there is a literature agreement that, regardless of the method used, the first fundamental step in the diagnostic process of a patient with facial asymmetry must be the clinical exam.

BACKGROUND: The aim of this poster is to show the efficacy of class II malocclusion treatment in growing patients using Sander Bite Jumping Appliance. In the case discussed in this article, the patient presented a class II-division 2 malocclusion with a deep bite. The overbite was 6 mm, while the 1 mm overjet was caused by the retroversion of the upper central incisors. The initial radiographs of the patient were evaluated and a cephalometric diagnosis was performed. SNA value was 81, that indicated a normally-developed upper jaw, and SNB value was 77, that was an indication of mandible underdevelopment. The patient had a concave profile and an open nasolabial angle. The treatment plan foresaw an initial upper arch alignment to reduce the deep bite and increase the overjet in order to create space for mandibular protrusion. After this first phase of treatment the malocclusion became class II - division 1. Subsequently, an orthopedic-functional treatment was undertaken to correct the sagittal basal defect. **METHODS:** The orthopedic-functional treatment was performed using Sander Bite Jumping Appliance. It is a mobile device that consists of two resin plates. The upper plate has a median expansion screw and it is joined to two robust steel extensions (clamps). The clamps form an angle of 60° with the occlusal plane. Associated with the upper plate, there is a vestibular arch, that covers the front group up to the canines and two Adams hooks resting on the sixths. The lower plate, on the other hand, has an inclined plane constructed to be parallel to the clamps. The lower plate provides a vestibular arch for the anterior elements and a resin overlay on the incisal portion of the latter to prevent their proclination. Mandibular propulsion is determined by the advancing construction bite and the upper plate clamps resting on the inclined plane of the lower plate. In the case presented in this work, the resolution of the second class was evaluated through an intensive use of this mobile device by the patient, higher than the 14 hours a day usually indicated.

RESULTS: Six months after the SBJA delivery, a hyper-correction was obtained: the initial class II malocclusion became class III. Overbites and overjets were reduced. Posterior disclusion at rest is a sign of future relapse of the hyper-correction, which will lead the patient from a class III occlusion to a class I occlusion and to a restoration of correct overbite and overjet values.

CONCLUSIONS: The device, if worn more than 14 hours a day, is effective in correcting class II malocclusion. However, this orthopedic-functional treatment must be prescribed only after an assessment of the overjet, to allow the jaw to grow in a sagittal sense. The presented case demonstrates how patient compliance in treatment with SBJA is essential for the achievement of short-term results.

The orthopassion approach to mini-implants: case report

M. Pellegrino^{1,2}, G. Ghilardi^{1,2}, C. Manenti^{1,2}, G. Caldara^{1,2}, T. Saladino^{1,2}, R. Vinci¹, A. Lucchese¹, M. Manuelli¹

¹Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy; ²Dental School, Vita-Salute San Raffaele University, Milan, Italy

BACKGROUND: A different and always more frequent therapeutic choice in orthodontics is the use of Mini-implants. They can represent a helpful anchorage device as a substitute for more traditional techniques requiring patient collaboration. Titanium mini-implants are frequently used for their advantages like versatility, small size, low cost and the easiness

Efficacy of class II malocclusion treatment using sander bite jumping appliance

S. Bazzanella¹, E. Gumirato¹, F. Faccioni²

¹University of Verona, Verona, Italy; ²Department of Orthodontics, Dentistry, Department of Maternal-Infant and Surgical Odontostomatological Sciences, University of Verona, Verona, Italy

ABSTRACT

in positioning and removal. With this system osseointegration is not necessary and it can be used for a large range of orthodontic procedures. The use of mini-implants is indicated for both sagittal movements, as retrusion and protraction and vertical movements, as intrusion and extrusion. This study has the purpose to demonstrate the clinical employment of mini-implants in a female patient with severely compromised teeth and to show their benefits.

METHODS: The patient was a 47 years woman, after an appropriate case study through dental impressions and X-rays (T0), a titanium mini-implant was considered the best treatment solution. The mini-implant was placed in her mouth between the maxillary second premolar and first molar of right on the vestibular side (T1). The mini-implant had the following dimensions: 1.8 mm of diameter and 7 mm of length. The loss of premolars and molars in one dental arch often brings to super-eruption of the antagonist teeth, causing insufficient space for the prosthetic rehabilitation. In this situation the possible treatments are odontoplasty of the extruded teeth with the necessity of endodontic treatment, or maxillary impaction surgery or orthodontic treatment. This case report shows the situation of an adult patient requiring the intrusion of the first maxillary molar of right to obtain enough space for a removable prosthesis to replace the lower lost teeth. Furthermore, this clinical case demonstrate the utility of mini-implants to obtain a reduction of the upper incisor protrusion. Optimal results were reached in only 6 months (T2) from the first orthodontic visit (T0).

RESULTS: The mini-implant allowed the intrusion and the backward movement of the maxillary anterior teeth. This kind of treatment allowed a high preservation of dental structures and a good restoration of the mandibular dentition. Through this technique the patient obtained a safety and proper solution to her dental serious problems.

CONCLUSIONS: The use of mini-implants during orthodontic therapy as a temporary devices is the most appropriated solution in many different clinical situations. If slight forces are involved, the immediate-loading of these devices is not a cause of failure. For an appropriate mini-implants stability good bone quality (adequate cortical bone thickness and high trabecular bone density), no inflammation of peri-implant soft tissues and a correct placement procedure are necessary. Furthermore, also a limited distance between the mini-implant center of resistance and application point of the force is required.

Laypeople's preferences of facial profile aesthetics by analyzing different silhouettes with specific cephalometric values: preliminary study

F. Spadaro, G. Bellagarda, M. Saettone, P.A. Deregibus, T. Castroflorio, M.G. Piangino

Division of Orthodontics, Department of Surgical Sciences, C.I.R. Dental School, University of Turin, Turin, Italy

BACKGROUND: The aim of this study is to identify the facial profile aesthetics preferred by laypeople who do not have specific knowledge in dental field. This study was carried out to compare it with dentists' perception of facial profile aesthetics.

METHODS: 30 different silhouettes of facial profiles were produced and they were grouped in 6 different groups. Each group contained 5 silhouettes (1 of this silhouettes have meso-

type values) in which a specific cephalometric value varied. The analyzed values were: SN^oGoGn, S^oNA, S^oNB, Ls:E, Li:E, SnPg^oGsn. In each group there were the mesotype values with its standard deviation. To get the other four silhouettes at first we added and subtracted one and half standard deviation and in a second moment two times standard deviation. A questionnaire was submitted to 108 laypeople; the questionnaire asked for age, sex, education level and contained 30 VAS scales, each corresponding to a different silhouette. The age, sex and education level have been requested because in literature it was showed that by changing this characteristics also the laypeople's preferences change. When the questionnaire as proposed to laypeople, they analysed a group of images at a time and they were not made aware of what value changed and if there were repeated silhouettes.

RESULTS: Laypeople preferred a mesodivergent or slightly hypodivergent facial profile compared to a hyperdivergent one. They also preferred a maxilla anteriorly positioned to the mesotype rather than a posteriorly one; on the other hand the mesotype is highly preferred for the mandible. Both the upper lip and the lower lip are preferable not excessively protruded. The facial convexity highly preferred by laypeople was mean value. In particular the laypeople's preference about divergent facial profile was with Sn^oGoGn. For that concern the position of maxilla and mandibular considering the angles S^oNA and S^oNB, they preferred S^oNA=85° and S^oNB=80° The distance between the upper and lower lips and E was respectively -7mm and -2mm. At the end the facial convexity value preferred was angle Sn-Pg^oG-Sn = 12°

CONCLUSIONS: Analyzing the averages obtained from the scores attributed to the silhouettes with the VAS scales by the 108 subjects interviewed, it is possible to identify a facial profile aesthetics with precise cephalometric values preferred by laypeople, in particular the facial profile preferred was mesotype one.

Three dimensional analysis of facial morphology in children with non-syndromic cleft lip and palate

R. Tafa¹, D. Cassi^{1,2}, M. Magnifico¹, A. Di Blasio¹

¹Section of Orthodontics, Centro Universitario di Odontoiatria - Department of Medicine and Surgery, University of Parma, Parma, Italy; ²Doctoral School in Life and Health Science, PhD Program in Experimental Medicine and Therapy, 29th cycle, CIR Dental School, University of Turin, Turin, Italy

BACKGROUND: Orofacial clefts are a heterogeneous group of disorder and can occur as isolated, nonsyndromic events, or as part of Mendelian syndromes. Expressivity, which describes the severity of the disease, may vary considerably among affected individuals, ranging from cleft lip alone, to cleft lip plus cleft palate, to cleft palate alone. In addition to this substantial phenotypic diversity, recent evidence suggests that minor defects, including microforms or sub-clinical physical features, are also part of the clinical presentation. The aim of this study is analyse three dimensional (3D) facial morphology of patients with non-syndromic cleft lip and palate (NSCLP) compared to unaffected controls, using digital surface stereophotogrammetry.

METHODS: This prospective cross-sectional, case-controlled morphometric study was performed on 15 children with NSCLP (11 male, 4 female) aged 5-14 years and 20 controls (10 males, 10 females). 3D stereophotogrammetric facial scans

were recorded for all participants in a natural head position. Ten anthropometric soft tissue landmarks were digitized on each image and x-, y-, z-coordinates for each landmark were extracted. From these different landmarks were obtained three vertical and six horizontal linear measurements. Based on soft tissue points, 9 linear facial distances (3 vertical and 6 horizontal) were measured. After one-month interval, the same operator repeated landmark identification and linear measurements on 25 images randomly selected. Intra-operator's repeatability was tested using Intra-Class Correlation (ICC) coefficient. A statistical analysis was performed with unpaired Student's t-test to investigate differences in anthropometric measurements between patients and case controls. The significance level was set as $P < 0.05$.

RESULTS: Based on ICC results, intraobserver agreement was above 0.85 for all measurements. Significant differences were observed between the groups with regard to some horizontal and vertical distances. Particularly, cleft children had increased intercanthal width and upper facial width as well as midface reduction.

CONCLUSIONS: The results revealed that 3D shape analysis provides a quantitative assessment of the craniofacial phenotype, allowing morphometric discrimination between subjects with congenital malformation and the control group. Stereophotogrammetry has proven to perform an accurate, non-invasive analysis of the face, being a useful tool for diagnoses and management of craniofacial anomalies such as cleft lip and palate.

Clear aligners therapy and periodontal health: a systematic review and meta-analysis

P. Leonardo, A. Costantino, P. Spinuzza, G. Messina, R. Bertino, L. Rustico, E. Gatto, M. Portelli, A. Militi, R. Nucera

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics School of Dentistry, University of Messina, Messina, Italy

BACKGROUND: Perio-orthodontic relationship has been subject to a lot of investigations so far, and it is still a controversial issue. Orthodontic therapy with fixed appliance is often associated with alterations in the oral hygiene habits and periodontal health. Clear aligners are considered to facilitate better oral hygiene when compared with conventional brackets. The aim of this systematic review and meta-analysis was to evaluate the periodontal health of patients treated with clear aligners.

METHODS: A survey of articles published up to March 2018 about clear aligner therapy and periodontal health was performed using 7 electronic databases (MEDLINE, EMBASE, OvidSP, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, Scopus, Web of Science) with 690 initial identified articles. Only clinical trials investigating patients treated with clear aligners and with a comparable control group were included. Two authors independently performed the study selection, data extraction, and risk of bias assessment. All pooled data analyses were performed using the random-effect model. Statistical heterogeneity was evaluated. To evaluate the periodontal health of the treated sample two outcomes were considered: Plaque Index (PI) and Gingival Index (GI).

RESULTS: Four relevant articles were selected. In total, data from 277 patients (117 treated with clear aligner and 160 with fixed appliances) were collected. Mean age at the start of the treatment in the evaluated samples ranged from

11 to 62 years. The group treated with clear aligners showed a significant improvement for the Plaque Index [-0.28 (95%; -0.56 to -0.00)] and for the Gingival Index [-0.30 (95%; -0.43 to -0.16)] compared to the group treated with fixed orthodontic appliances.

CONCLUSIONS: To the best of our knowledge, this is the first meta-analysis that specifically investigated the current literature about periodontal health during clear aligner therapy. The results of this meta-analysis showed that clear aligner therapy produce a significant improvement of periodontal health, evaluated by means of Plaque Index and Gingival Index, compared to fixed orthodontic appliances therapy. The conclusions of this systematic review and meta-analysis should be considered with some caution because of the low quality of evidence found among the original studies. Thus, further high-quality studies, such as RCTs, are needed to elucidate the effects clear aligner therapy on the periodontal health.

Comparison of the accuracy of intraoral and extraoral scanners: a review

S. Costa, A. Militi, M. Portelli, L. Rustico, A. Lo Giudice, A. Farah, E. Gatto, L. Incardona, R. Castellaneta, R. Nucera

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, School of Dentistry, University of Messina, Policlinico Universitario "G. Martino", Messina, Italy

BACKGROUND: Digital models represent an alternative to the conventional plaster models. They can be produced directly, via intraoral scanning, or indirectly, using extraoral scanners. Digital models allow electronic storage, digital measurements, and faster reliable manufacturing processes. However, it is not yet clearly established how accurate both scanning methods are. Similarly, there are no clear indications regarding which type, intra- or extraoral, should be preferred in a treatment work-flow. Aims of this review are to determine whether or not intraoral and extraoral scanners can produce clinically acceptable digital impressions, and which method achieves better results in terms of accuracy and reliability.

METHODS: An electronic search of the literature was conducted through Pubmed, Google Scholar and Cochrane Library, using the query terms "accuracy", "trueness", "precision", "intraoral scanner" and "extraoral scanner", combined by the Boolean operators "OR" and "AND". No time or language limitation was applied. The search strategy led to 127 articles. If the title and/or abstract seemed to be relevant to the topics of the study, full texts were retrieved. Once the full text were obtained, they had to satisfy the following inclusion criteria to be finally included: studies focused on the accuracy, precision, trueness of intraoral and extraoral scanners; human-based studies and in vitro studies; studies considering full-arch impressions; studies published in english. Additionally, these exclusion criteria were applied: lack of clear description about criteria for full-arch measurements; studies dealing with implant impressions, prosthetic unit preparations or single crowns; studies not including full-arch impressions; impressions taken on fully or partial edentulous arches; pilot studies; studies published in languages other than english. Finally, four articles were selected.

RESULTS: The articles investigate the accuracy of several scanners with different technologies. Nine intraoral (Cerec Omnicam, Cerec Bluecam, Planmeca Planscan, Carestream 3500, Cadent iTero, 3Shape Trios, Lythos, Lava COS, E4D)

ABSTRACT

and four extraoral scanners (3Shape D800, Ortho Insight 3D, D250, D700) are described. Each study successfully makes a comparison between intraoral and extraoral scanners, focusing on accuracy, reliability and validity of full-arch digital impressions through different means.

CONCLUSIONS: Within its limits, this review suggests that both intraoral and extraoral scanners represent a valid tool to obtain dental impressions. Overall, digital models and plaster models are alike in terms of reproducibility and measurement accuracy. Regarding intraoral scanners, patient-related factors may impair the scanning accuracy. When used in an extraoral environment, intraoral scanners underperform when compared to the extraoral scanners. In orthodontics, intraoral scanning could be used reliably for diagnostics and treatment planning, while extraoral scanners, showing higher accuracy, allow higher precision of appliances built with computer-aided design and computer-aided manufacturing.

Swallowing activity and temporomandibular disorders in adults

M. Laurenziello ¹, G. Montaruli ¹, G. Illuzzi ¹, M. Tepedino ², C. Cianci ³, D. Ciavarella ¹

¹Dipartimento di Medicina Clinica e Sperimentale, Università di Foggia, Foggia, Italy; ²Dipartimento di Medicina Clinica, Sanità Pubblica, Scienze della Vita e dell'Ambiente, Università degli Studi dell'Aquila, L'Aquila, Italy; ³Dipartimento di Meccanica, Matematica e Management, Politecnico di Bari, Bari, Italy

BACKGROUND: Temporomandibular disorders (TMDs) are a heterogeneous group of disorders affecting the masticatory system with pain as the dominating characteristic. The aetiology is multifactorial and is related to many perpetuating, predisposing and initiating factors. The daytime parafunctions may have an important role in TMD pathogenesis, and also may be consequences of TMD due to muscles compensatory responses. In literature the most frequent parafunction evaluated are: the static parafunction (i.e. clenching) and the dynamic parafunction (i.e. grinding) but there are poor data about the role of the tongue. In the present paper the authors evaluated the swallowing activity (an oral function/parafunction) with the surface electromyography (sEMG) in patients with TMD. **METHODS:** Twenty patients with TMD problems (NHP) (mean age: 32,5 ± 1.997; 7 men and 11 women) and 20 healthy matched subjects (HP) (34.4 ± 2.782; 6 men and 14 women) were selected and examined. On each patients an 8 channels surface electromyography was performed during saliva swallowing activity. The parameters evaluated in both HP and NHP patients were: 1. Muscles tension (uV), 2. Muscles right and left percentage of balancing (%), 3. Time of swallow (t), 4. Muscles Frequency (Hz). Data were evaluated on statistical "GraphPad" software. Statistical significance was set at 0.05. **RESULTS:** NHP patients presented higher masseter and temporalis activation than HP (P<0,05) but no difference has been found during sub mental muscles activation. The NHP patients showed an unbalancing of temporalis and sub mental muscles activation (P<0,05) and an higher swallow time than HP (P<0.001).

CONCLUSIONS: The oral parafunctions may have an influence in Temporomandibular disorder (TMD) pathogenesis. The most important parafunctions correlated were: clenching and grinding. Swallowing is one of the most important oral function and this act involves cortical

and subcortical structures and many head/neck muscles. In the present paper authors evaluated the swallowing using the sEMG in patients with TMD (NHP) paired to an healthy group patients (HP). Our data showed that patients with TMD has an alteration in the swallowing pattern, and this suggest a possible key role of the swallowing phase in the pathogenesis of TMD and so the importance of the evaluation of the swallowing function/parafunction during diagnosis phase of patients with TMD.

Orthodontic-surgical management of skeletal class III malocclusion in adult patient

BACKGROUND: Class III malocclusions are considered one of the most difficult problems in the orthodontic treatment. Their causes are multifactorial and include genetic and/or environmental factors. Class III malocclusions are generally classified into skeletal and/or dental. The diagnosis is important due to the different treatment approaches. Generally a dental class III can be treated with orthodontics alone, while a true skeletal class III requires a combination of orthodontics and surgery. The aim of this case report is to describe the orthodontic-surgical management of skeletal Class III malocclusion due to maxillary deficiency in adult patient.

METHODS: A 50 years old male patient came to our observation seeking orthognathic correction of Class III malocclusion. He had a concave and retrusive profile, a dento-skeletal Class III malocclusion due to maxillary deficiency, reduced overjet and overbite and decreased teeth exposure during smiling. The alternative treatments were surgical treatment or dental compensation (camouflage). The treatment objectives were to achieve a good functional occlusion, improve the skeletal and soft tissue profile, to correct the dento-skeletal Class III, and to normalize OVJ and OVB values. Camouflage would correct the dental class III without improvement of profile and facial aesthetic. For this reason the surgical treatment with orthodontic presurgical dental-decompensation was chosen.

RESULTS: The treatment plan consisted in bonding of the upper and lower dental arches in order to obtain the dental decompensation and passive stainless steel archwires were placed; maxillary osteotomy Le Fort I with advancement and post surgical orthodontic treatment was performed. Six months after surgery, orthodontic treatment went on to achieve arch form coordination and the fixed appliance was removed. Retention was provided by upper Hawley biteplate and lower 3-3 bonded lingual retainer. Total treatment duration was 24 months. There was a good improvement in facial harmony and in the profile of the patient. Ideal overjet and overbite, Class I molar and canine and coincidence of upper and lower midline were achieved. Moreover has been obtained a good exposure when smiling.

CONCLUSIONS: In the present case report only maxillary surgery was performed in order to achieve a normal facial appearance. When reviewing the patient's final records, the major goals set at the beginning of treatment were successfully achieved, providing the patient with adequate masticatory function and pleasant facial aesthetics. After a 1-year clinical follow-up, the maxillary and mandibular stability was preserved. In conclusion surgical treatment with only maxillary advancement is a short-term effective therapy for mild/moderate Class III malocclusion. However the long-term stability of these approach needs further evaluation.

Treatment of pseudo-class III malocclusion in children with SOCIA III

G. Illuzzi¹, G. Montaruli¹, A. Landolfi¹, M. Laurenziello¹, C. Pappalettere², D. Ciavarella¹

¹Dipartimento di Medicina Clinica e Sperimentale, Università di Foggia, Foggia, Italy; ²Dipartimento di Meccanica, Matematica e Management, Politecnico di Bari, Bari, Italy

BACKGROUND: Class III malocclusion is a condition characterized by an inverse relationship between maxilla and jaw with a prevalence that varies among populations from 0% to 26%. In the specific field, Pseudo class III malocclusion the anterior cross bite is due to a forward functional displacement of the mandible. Many type of treatment are suggested in dental literature for treatment of Class III malocclusion and Pseudo Class III malocclusion. The aim of the present paper was to evaluate the dentoskeletal effects of Swallowing Occlusal Contact Intercept Appliance (SOCIA) III in pseudo Class III malocclusion treatment.

METHODS: Thirty patients (mean age: 9.58 years old) with pseudo Class III malocclusion and nine-teen controls (mean age 8.4 years old) were selected and treated for 20 months with "Modified Swallowing Occlusal Contact Intercept Appliance" appliance. It is composed by several acrylic components consisted of a palatal body with a sixty degrees tilted lingual flight with respect to an occlusal plane ending with a hole near palatal wrinkle, and a vestibular pad set 4mm buccal to the deciduous molars with metallic posterior bite blocks embedded in them. An Eschler arch built to touch the lower incisor labial surface was used to control the mandibular growth. All patients presented with a stage CS2, CS3 or CS4. Patients with CS5 were not enrolled in the study. Cephalometric analysis was performed before phase 1 treatment (T1), and immediately following phase 2 treatment (T2). A statistical analysis of cephalometric values before and after treatment was done.

RESULTS: The effect of the SOCIA III was evaluated after 20 months of treatment and paired with case control group. SOCIA III had skeletal and dental effects. Authors evaluated 12 dento-skeletal parameters: 2 about the vertical growth, 5 about the sagittal growth; 5 of dental position; among them 8 were statistically significant. On vertical plane the modification was about the facial height (+ 4,185 mm; $P < 0,0001$). On sagittal plane ANB correction (+ 1,33°; $P < 0,001$), CB growth (+4,14 mm; $P < 0,0001$), ACB growth (+2,468 $P < 0,0001$) Co-A modification (+ 5,6 mm; $P < 0,001$), Co-Gn (+7,09 mm; $P < 0,0007$) were evaluated. The most important modifications of dental parameters were: the upper and lower incisors inclination (U1-SN +4,17°; $P < 0,01$ and L1-MP -5,64°; $P < 0,0007$) and overjet (+2,58 mm; $P < 0,0001$)

CONCLUSIONS: Authors evaluated that SOCIA III had skeletal and dental effects in treatment of pseudo III Class. They are resumed as follow: a) an effective maxillary sagittal increase on sagittal plane; b) a vertical jaw control; c) a resolution of overjet; d) no changes in overbite; e) a stimulation of ACB growth

Analysis of the variability of the condilion-gonion-menton angle in a population of orthodontic patients

R. Baiano, S. Perrotta, R. Rongo, G. Monti, S. Gagliardi, R. Valletta, V. D'Antò

Department of Neuroscience, Reproductive Sciences and Oral Sciences, Section of Orthodontic and Temporomandibular Disorders, University of Naples Federico II, Naples, Italy

BACKGROUND: To evaluate the distribution and to determine a mean value of the Condilion-Gonion-Menton

(CoGoMe) angle in a population of patients from south of Italy.

METHODS: The cephalometric analysis was performed on a sample of 290 subjects (168 females, 122 males; mean age of 15.58 ± 6) recruited among orthodontic patients of the University of Naples "Federico II". The inclusion criteria were: age ≥ 8 and a good quality of x-ray; the exclusion criteria were: presence of systemic diseases and genetic syndromes, previous orthodontic treatment, history of obstructed nose breathing. All cephalograms were traced by using the software Dolphin (Chatsworth, CA, U.S.A.). One operator (G.M.) localized the cephalometric landmarks and measured the angles. The method error for the CoGoMe[^] was 0.87°, there was no systematic error for any measurements (Student's t-test: $P = 0.539$). Continuous variables were reported as means, standard deviations, medians, and range. Regression analysis were performed to evaluate CoGoMe[^] changes according to the age. Differences in CoGoMe[^] among individuals with different A-N Pogonion angle (ANPg[^]) and Sella/Nasion-Gonion-Gnathion angle (SnGoGn[^]) were estimated as appropriate using ANOVA followed by Bonferroni's post hoc test.

RESULTS: the CoGoMe[^] resulted normally distributed ($P = 0.289$) and the mean was 127.2° ± 7.7° [IC 95% 112.1° - 142.3°] (range min 102.5° max 156.5°). The regression analysis showed a decrease of the CoGoMe[^] during the growth ($B = -0.58$; $P = 0.014$; $CONST = 135.54$ °). The total sample was divided in three groups according to ANPg[^] (Group 1 including 32 patients with ANPg[^] ≤ -1°; Group 2 including 196 patients, with 1 ≤ ANPg[^] ≤ 5 and Group 3 including 62 patients with ANPg[^] ≥ 5°). No significant differences of the CoGoMe[^] values were found among these three groups ($P = 0.559$). Furthermore, the total sample was divided in three groups according to SnGoGn[^] (Group 1 including 60 patients with SnGoGn[^] < 27; Group 2 including 166 patients with 27 ≤ SnGoGn[^] ≤ 37 and Group 3 including 64 patients with SnGoGn[^] > 37). Significant differences of the CoGoMe[^] values were found among these three groups ($P < 0.001$).

Conclusions: In this study, the mean and standard deviation of CoGoMe[^] were of 127.2° ± 7.7°. Results demonstrated that sagittal occlusion does not influence the CoGoMe[^]. From the age of 8 to 16 year old the CoGoMe[^] decreases 0.58° per year starting from the initial value of 135°.

CONCLUSIONS: The CoGoMe[^] may be considered a useful cephalometric parameter for the diagnosis of the facial growth pattern.

Analysis of dental parameters in subjects with agenesis of maxillary lateral incisors: a retrospective study

L. Caterini, R. Di Giorgio, R. Guarnieri, E. Barbato

Department of Oral and Maxillo-Facial Sciences, Sapienza, University of Rome, Rome, Italy

BACKGROUND: Agenesis of maxillary lateral incisor, unilateral and bilateral, is one of the most common dental anomalies. This often presents a significant clinical challenge for orthodontists who are faced with the decision to open or close spaces. The type of treatment is conditioned in particular by: profile- malocclusion- available space in the arch and tooth size. The aim of this retrospective study was to investigate the association between upper lateral incisors agenesis and the differences in the dental structures compared with patients

ABSTRACT

without congenitally missing lateral incisors. Different dental parameters will be analyzed to guide the clinician to design a proper therapeutic plan.

METHODS: A sample of 120 patients was selected. A total of 60 patients with one or two congenitally missing lateral incisors were retrieved; 25 (41,7 per cent) patients presented unilateral agenesis, whereas 35 (58,3 per cent) had bilateral agenesis. The control group consisted of 60 orthodontic patients. Panorographic radiographs and dental casts were analyzed for each patient. The following Inclusion criteria were selected: absence of previous orthodontic treatment; absence of sequelae of traumatic injuries; cleft lip and palatal or other craniofacial syndromes; availability of pre-treatment panoramic radiographs performed in mixed or permanent dentition and lateral telerradiography of the head as a diagnostic tool used to evaluate the skeletal class and the facial divergence of each subject; good quality radiograph views. The largest mesiodistal crown dimension for all teeth, except for the third molars, was measured on plaster casts using an electronic digital caliper to the nearest 10th of a millimetre. T-test was used to evaluate the presence of statistically significant differences between two groups. Statistical testing was performed using the analysis of variance model ($P < 0.05$) to test for differences in the mesiodistal dimension between the sample and the control group. Significance has been assessed using a P-value threshold level of 5 per cent.

RESULTS: Patients who were missing maxillary lateral incisors had smaller teeth compared to control subjects, except for the lower right central incisor, second lower premolars and second lower molars. The reduction of the mesio-distal diameter of patients in the unilateral agenesis group is greater than those in the bilateral agenesis group. A higher prevalence of microdentic contralateral incisors was found in patients with unilateral agenesis with respect to the control group. (Upper left lateral incisor: average difference of 1.69 mm). Patients with agenesis of the upper lateral incisors are more likely to have other agenesis involving different dental elements. (Frequency of 23.3 per cent). These patients are more likely to have class II malocclusion, reduced overjet and absence of overcrowding in the upper arch, which is generally square-shaped.

CONCLUSIONS: Agenesis of maxillary lateral incisors was found to be a significant predictor of tooth size. The element whose mesio-distal diameter has the greatest reduction is the upper lateral incisor which in most cases is microdentic or conoid. Moreover, further studies are needed to establish with greater certainty the dental parameters, along with the skeletal parameters of patients with unilateral and bilateral agenesis maxillary lateral incisors. It is important to start from a careful early diagnosis that takes into account the need for aesthetics and function in order to direct the patient towards the most suitable therapeutic choice.

Bone and cortical bone characteristics of mandibular retromolar trigone and anterior ramus region for miniscrew insertion in adults

A.J. Farah, A.M. Bellocchio, M. Portelli, G. Oteri, R. Leonardi, G. Cordasco, R. Nucera

¹Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, School of Dentistry, University of Messina, Messina, Italy; ²Department of Medical-Surgical Specialties, Section of Orthodontics, School of Dentistry, University of Catania, Italy

BACKGROUND: To date, no quantitative and qualitative assessment of the skeletal characteristics of MRTARR has

been performed for miniscrew insertion. The aim of this study was to evaluate bone depth, cortical bone thickness and vestibulo-lingual bone dimension of mandibular retromolar trigone, an anatomical area positioned distally to the second mandibular molar, recently documented in literature as a strategic insertion site for orthodontic miniscrews.

METHODS: The sample included CBCT records of 60 adult subjects (mean age 32.8 ± 8.2) retrospectively evaluated, including 30 males (mean age 33.4 ± 8.6) and 30 females (31.7 ± 9.1) selected from the digital archive of a private practice. The CBCT exams were preselected if the examined subjects fulfilled the following selection criteria: Caucasian subjects, age between 20 and 45y.o., absence of: periodontal disease, metallic restorations in the first and second permanent mandibular premolars and molars, missing teeth except for third molar, genetic syndromes, craniofacial dysmorphisms, facial trauma, and previous orthognathic surgery treatment.

All CBCT examinations were performed with i-CAT CBCT scanner (Imaging Sciences International, Hatfield, Pa). Each exam was converted into DICOM format and processed with OsiriX Medical Imaging software. The following procedure was used in order to obtain proper view sections of MRTARR for quantitative and qualitative bone characteristics evaluation. On reproducible sagittal scan views, bone depth and cortical bone thickness were evaluated on specific lines parallel and 45° angulated to the occlusal plane and at 3 and at 6mm dislocated from it. Vestibulo-lingual bone dimension was computed in 4 different cross section scans and at 3 different level of depth (0, 6 and 11mm).

RESULTS: All the considered insertion sites showed on average more than 10mm of bone depth. Significant differences ($p < .05$) were found comparing bone depth in cross-sectional scans at different inclinations (parallel vs 45° oriented compared to the occlusal plane). This finding suggests that the insertion with a parallel disposition to the occlusal plane is potentially safer compared with a 45° insertion inclination modality. No significant difference of bone depth was found comparing cross sectional scans with the same orientation (parallel or 45° inclined) but at a different dislocation (3 vs 6mm) from the occlusal plane. Vestibulo-lingual bone dimension evaluation showed adequate values for miniscrew insertion.

CONCLUSIONS: MRTARR can be successfully used as a miniscrew insertion site for different clinical applications. Retromolar trigone and anterior ramus region showed enough bone quantity and adequate bone quality for safe mini-screw insertion in adults. Miniscrew insertion with a parallel orientation to the occlusal plane offers increased bone depth compared to the 45° insertion orientation. Vestibulo-lingual bone dimension showed a significant reduction in the posterior regions. Considering the average cortical bone thickness, pre-drilling is always recommended before screw insertion.

A finite element analysis of the distalization movement of an upper molar: a clinical case

R. Valentino ¹, A. Pango ¹, C. Klain ¹, M. Piergentili ¹, R. Valletta ¹, R. Savignano ², V. D'Antò ¹

¹University of Naples Federico II, Department of Neuroscience, Reproductive Sciences and Oral Sciences, Section of Orthodontic and Temporomandibular Disorders, Naples, Italy; ²Nivol s.r.l., Cascina (PI), Italy

BACKGROUND: Finite Element Analysis (FEA) represents a numerical simulation method used to evaluate the effective-

ness of orthodontic appliances without the need of physical prototyping. AirNivol® developed a specific tool to predict the outcome of the orthodontic treatment by thermoplastic appliances. The aim of this research is to evaluate the predictability of the distalization movement for a maxillary second molar.

METHODS: The patient was a 25 years-old female showing a dento-skeletal class II with a convex profile and lower incisors severely buccally inclined. A full maxillary patient's arch (14 teeth) was modelled by combining two different imaging techniques: Cone Beam Computed Tomography to reconstruct tooth roots and bone tissues, and Surface Structured Light Scanning to create digital tooth crown models from patient's impressions. The reconstructed surface digital models were imported within the Finite Element Model (FEM) software (Ansys® 17) to simulate all planned orthodontic movements.

The treatment simulation included 4 mm of sequential distalization of upper teeth and 1.5 mm of anchorage loss at the lower arch with a set of 32 upper and 15 lower aligners. **RESULTS:** The FEA results show the second molar distalization determined mesial displacement of the first molar and buccal tipping of the incisors. Therefore, the attachment did not bring to a bodily movement as expected, at least in the initial tooth displacement. However, it enhanced the target tooth displacement. The Force system of second molar measured at the CRES was ($F_x = 0,18$ N; $F_y = 7,9$ N; $f_z = -1,36$ N) and ($M_x = -72,8$ Nmm; $M_y = -0,7$ Nmm; $M_z = -16,6$ Nmm).

CONCLUSIONS: Computer Aided Engineering (CAE) can be usefully applied to the study of orthodontic thermoplastic appliances. AirNivol® treatment protocol is based on the latest development of the research in the field of digital design and manufacturing. It is possible to analyze the effects of different attachment options and to highlight the difference between the designed orthodontic movement and the expected result calculated by the FEA. Further efforts will be concentrated on the analysis of multiple movements for different teeth aiming the selection of the appropriate auxiliary element for each treatment stage. This will allow an accurate and predictable orthodontic treatment.

Maxillary sinusitis prevalence in juvenile idiopathic arthritis: cone beam CT study

U. Garagiola, P. Cressoni, L. Cigni, C. Occhipinti, B. Colangelo, P. Campagna, E. del Rosso

University of Milan, Biomedical Surgical and Dental Sciences Department, Maxillo-Facial and Odontostomatology Unit, Orthodontics and Gnathology Department, Fondazione Cà Granda IRCCS Ospedale Maggiore Policlinico, Milan, Italy

BACKGROUND: To evaluate a possible correlation between Juvenile Idiopathic Arthritis (JIA) and sinusitis of the maxillary sinuses and determine their prevalence.

METHODS: The Juvenile Idiopathic Arthritis is a chronic inflammatory disorder of probable autoimmune origin. The most important manifestation of this disease is chronic synovitis, synovial fluid pressure is produced in it often causes pain. The JIA begins before the age of 16 years of age. Sinusitis of the maxillary sinus is an inflammatory process, acute or chronic, causing a marked thickening of the mucosa, with or without local pain. This study analyzed 200 Cone Beam Computed Tomography (CBCT). Of

these 100 patients suffering from JIA, 100 were healthy. All patients who fall in this study were aged between 8 and 16 years. CBCT data were captured using an I-CAT™ Cone Beam 3-D imaging system (Imaging Sciences International, Hatfield, PA, USA) and processed using the I-CAT Vision viewing software (Croall Radiography, San Jose, CA, USA), which allows 3D image visualization and measurement: images are shown as a three-dimensional rendering and in their three spatial projections (frontal, lateral and axial). All CBCT were observed in the three planes of space, bringing attention to the coronal and transverse sections. Were not considered pathological maxillary sinuses presenting with mucous cysts and those with mild thickening of the membrane of the maxillary sinus (within 2-3 mm). Were considered acute sinusitis showed that, in the above sections, air-fluid level visible and those that showed complete obstruction (empyema) of the maxillary sinus and the complex osteomeatale.

RESULTS: The analysis of CT slices showed involvement of the maxillary sinuses in greater proportion in patients with JIA (24%), whereas in healthy subjects are involved in only 11% of cases. The difference between the two study groups was statistically significant ($p = 0.0156$) ($\chi^2 = 5.85$). Of the 24 patients with JIA, 50% showed bilateral sinusitis, 50% unilateral sinusitis. In healthy patients with sinusitis, however, the percentages vary: 36.4% 63.6% unilateral and bilateral sinusitis.

CONCLUSIONS: Only 1 from 11 healthy patients showing acute sinusitis, the remaining 10 cases had chronic sinusitis. Of the 24 patients with JIA, only 2 have acute sinusitis. In most cases analyzed, therefore, the sinusitis is chronic, especially in patients with JIA. In light of what, it is possible to assume a correlation between Juvenile Rheumatoid Arthritis (JRA) and sinusitis.

Ossification timing of the spheno-occipital suture of skull: juvenile idiopathic arthritis vs. healthy patients

U. Garagiola, L. Cigni, C. Mauro, C. Occhipinti, P. Campagna, E. del Rosso, P. Cressoni

University of Milan, Biomedical Surgical and Dental Sciences Department, Maxillo-Facial and Odontostomatology Unit, Orthodontics and Gnathology Department, Fondazione Cà Granda IRCCS Ospedale Maggiore Policlinico, Milan, Italy

BACKGROUND: The aim of this to evaluate, by TC Cone Beam (CBCT), any discrepancy about the age range of the complete ossification of the spheno-occipital suture, comparing a sample of patients with Juvenile Idiopathic Arthritis (JIA+) with a sample of healthy patients (JIA-).

METHODS: We analyzed 210 CBCT of Juvenile Idiopathic Arthritis patients (JIA+) between the ages of 4 and 26 years treated at the Department of Orthodontics, University of Milan, and compared with the results of a sample of 230 healthy patients (JIA-) aged between 5 and 25 years being treated in the same department. CBCT data were captured using an I-CAT™ Cone Beam 3-D imaging system (Imaging Sciences International, Hatfield, PA, USA) and processed using the I-CAT Vision viewing software (Croall Radiography, San Jose, CA, USA), which allows 3D image visualization and measurement: images are shown as a three-dimensional rendering and in their three spatial projections

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(frontal, lateral and axial). All the patients have already had the CT we evaluated in this study because of the diagnosis of condylar disease (JIA+) or for the cephalometric evaluation. Sections obtained were studied in three planes of space through the use of dedicated software for the three-dimensional volumetric reconstruction. According to the radiographic images observed, were divided into two groups: the first one in which there is a complete speno-occipital ossification, characterized by the absence of radiolucent band separating the two bones considered; a second one in which is not observed bone fusion.

RESULTS: Direct observation of three-dimensional images available to us shows that: in subjects JIA + no female patient presents complete speno-occipital ossification before 10 years and no male patient has the same ossification before the 11 years. Also is noted that no female subject has incomplete ossification after 15 years or any male subject after the age of 13 years.

CONCLUSIONS: The results we obtained from this study allow us to say that considering female groups we observed comparable data in the two samples analyzed; instead in male groups there are slight differences. We can affirm that both juvenile idiopathic arthritis and its therapy does not significantly change the growth of the cranial base or the mean age ossification of speno-occipital suture.

Torque control efficacy of elastomeric ligatures for lingual appliances over time: an experimental study

C. Calzolari, M. Migliorati, D. Poggio, S. Drago, A. Silvestrini-Biavati

Orthodontic Department, DISC, University of Genoa, Genoa, Italy

BACKGROUND: The aim of this in-vitro study was to evaluate the torque control efficacy of elastomeric ligatures in a customized lingual appliance over time.

METHODS: A home-made typodont was built with extracted human teeth and bonded with Incognito® customized lingual brackets (3M Unitek). Two different ligatures were evaluated: Alastik™ O-ring ligatures (3M Unitek) and Alastik™ Lingual ligatures (3M Unitek). The tested wire was a 0.016x0.022-in. Nickel-Titanium. An extension was laser-welded to the missing tooth's bracket in order to apply the forces with Zwick/Roell Z0.5 machine (sensitivity <1%, displacement sensibility 1µm, full scale range 500N). The machine generated forces from 0 N to 1N. TestXpert® II software was used for data collection. Torque moment (Nmm) was calculated by multiplying the force applied through the arm at T0. Torque angle was algebraically calculated: the ZwickLine® machine measured also the displacement performed by the extension, knowing the displacement and the arm we could derive the sine of the torque angle. The same tests were repeated after one month (T1), without changing the ligatures. During this period specimens were kept in saline solution.

RESULTS: After one month (T1) for each ligature the torque control was similar to the one recorded at T0. This finding was evident for both ligatures, (O-ring ligature and Alastik lingual ligature).

CONCLUSIONS: After one month both elastomeric ligatures (Alastik™ O-ring ligatures and Alastik™ Lingual ligatures) showed a good efficacy of torque control.

Temporomandibular disorders before and after use of low energy polarized light

U. Garagiola, P. Cressoni, R. Soldo, L. Cigni, C. Occhipinti, E. del Rosso

University of Milan, Biomedical Surgical and Dental Sciences Department, Maxillo-Facial and Odontostomatology Unit, Orthodontics and Gnathology Department, Fondazione Cà Granda IRCCS Ospedale Maggiore Policlinico, Milan, Italy

BACKGROUND: The objective was to assess the effectiveness of a therapy using low energy polarized light (PL) devices, in reducing pain, promoting healing of soft tissue injuries and reducing inflammation, improving function and quality of life of the temporomandibular disorders (TMD) patients.

METHODS: 48 patients (21 males and 27 female), with TMD diagnosed using standard criteria, were assessed using electromyography (EMG) and computerized mandibular scan (K6). 8 minute PL therapy has been applied, 3 times per week for 4 weeks. No other treatment was given and patients were asked to refrain from taking analgesics during the course of the study. Polarized light therapy used a non-invasive optical device to project a beam of light on to the skin and mucosa. This light has four characteristics: polarization – the light waves move in parallel planes, producing a narrow, concentrated beam, unlike ordinary light, where waves oscillate in all directions; polychromy – it contains a broad spectrum of wavelengths or colours, including visible light & part of the infrared range, enabling it to stimulate a range of light receptors on the skin (cf. lasers, which are monochromatic, i.e. they contain only one wavelength); incoherency – the light waves are out of phase or unsynchronized, unlike laser light, which is coherent; it has low energy density, unlike laser light, which may have high or low energy density. Patient-reported questionnaires (PORs) and performance measures are used to assess TMD pain and function in clinical practice. PORs assess the patient's perspective, while performance measures assess functions such as mandibular kinesiology (mouth opening and closing or other standardized maneuvers) in a controlled setting. Standardized assessment of patient outcomes allows physicians to measure the success or failure of diagnostics and treatments that TMD patients receive.

RESULTS: Electromyographical, kinesiological and clinical data showed statistically significant reductions in pain and muscular spasms, improvements in function and increases in muscular strength were reported (compared to baseline measures). (P<0.01).

CONCLUSIONS: Joint pain typically involving the TMJ is the predominant complaint of people living with temporomandibular disorders. Pain is what drives patients to seek medical care. People with TMD are most distressed by the intensity, quality, and predictability of their joint pain, as well as its impact on physical function, sleep, fatigue, and mood. Valid and reliable PORs and performance measures are available to assess these aspects of the pain experience. The polarized light characteristics enable to penetrate the skin and underlying tissues in order to stimulate various biological processes. PL improves microcirculation, stimulates regeneration and repair, promotes wound healing and relieves pain, with no adverse effects. Low energy polarized light could be a valid alternative or concomitant treatment of temporomandibular disorders.

Comparative analysis of torque control efficacy using different archwires in fixed vestibular bracket-wire system: an *in vitro* study

M. Migliorati, C. Calzolari, D. Poggio, S. Drago, A. Silvestrini-Biavati

Orthodontic Department, DISC, University of Genoa, Genoa, Italy

BACKGROUND: The aim of this study was to compare the torque control efficacy obtained in a fixed vestibular bracket-wire system using: (1) archwire of different size, (2) archwire of different material.

METHODS: A home-made typodont was built with eight extracted human teeth and bonded vestibular .022 x .028-in. brackets without torque pre-information. Teeth were positioned in a straight line to study the mechanical properties of the system, without following the natural shape of the arch. Teeth's roots were incorporate in transparent orthodontic resin (methyl-methacrylate). The teeth were in contact with one another, leaving space for one missing tooth. The tested wires were: Tru-Chrome .018x.025-in., .017x.025-in. β -Titanium, .016x.022-in. stainless steel. Ligatures used were standard elastic ligatures. An extension was laser-welded to the missing tooth's bracket in order to apply the forces with Zwick/Roell Z0.5 machine (sensitivity <1%, displacement sensitivity 1 μ m, full scale range 500N). The machine generated forces from 0 N to 1N. TestXpert® II software was used for data collection. Torque moment [Nmm] was calculated by multiplying the force applied through the arm; the arm was obtained, measuring the distance between the axis of rotation and the point of force application. The torque angle was algebraically calculated: the ZwickLine® machine measured also the displacement performed by the extension, knowing the displacement and the arm we could derive the sine of the torque angle. Torque angle changes corresponded to arm force changes, so the error was corrected after data collection.

RESULTS: Torque moment was increased with larger SS wire sizes.

There was a significant difference in torque moment using stainless steel wires of different size (.016x.022-in., .017x.025-in., .019x.025-in. wires). There was a significant difference in torque moment between the SS and beta-titanium wire, using the same wire section.

CONCLUSIONS: Increasing SS wire section, we needed higher torque moment to obtain equal degrees of torque (stainless steel .016x.022-in., .017x.025-in., .019x.025-in.). Using wires with the same section but different materials (beta-titanium .017x.025-in and stainless steel .017x.025-in) and applying an equal torque moment, beta-titanium wire produced a greater torque angle. To obtain the same torque angle value we had to apply a greater torque moment using stainless steel wire than beta-titanium wire.

Dento-skeletal effects of maxillary expansion: a systematic review and meta-analysis

P. Spinuzza, G. Messina, L. Rustico, A.M. Bellocchio, A. Farah, F. Forestieri, F. Mincica, A. Lo Giudice, M. Portelli, A. Militi, R. Nucera

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, School of Dentistry, University of Messina, Messina, Italy

BACKGROUND: The aim of this systematic review and meta-analysis is to evaluate the dento - skeletal effects of rapid maxillary expansion in growing patients assessed by computed tomography.

METHODS: This systematic review and meta-analysis was conducted according to the guidelines of the Cochrane Handbook for Systematic Reviews of Interventions (version 5.1.0) and is reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement. No language or age restrictions were applied in the nineteen electronic databases searched up to October 2017. Clinical trials were included in this systematic review if they were conducted including growing subjects with transversal maxillary deficiency treated with RME and evaluating skeletal and dental effects before and after rapid palatal expansion by means of one of the following 3D imaging CT techniques: CBCT, spiral CT and low-dose CT. Two authors executed study selection, data extraction, and risk of bias assessment independently. To evaluate the efficacy of the treatment, studies considering transverse skeletal increase assessed in the anterior, middle and posterior area of nasal cavity width, palatal basal bone and total alveolar bone; and considering additionally interdental width and dental tipping were taken into account. Then the studies included here were divided into different groups, according to the time frame between the first and second observation: 0-1 month, and 6-8 months, respectively.

RESULTS: 22 studies were included, according to our selection criteria. The studies considered here present a prospective and retrospective design. The patients' age varied across the studies, with the majority of them aged between 8 and 12 year old. The small number of studies for the anterior and middle area did not allow to carry out a metanalytic analysis. The mean treatment effect of rapid maxillary expansion was measured in the first molar region. They showed an increase on nasal cavity width of 1.94mm(81% CI, 1.29mm to 2.58mm) after 1 month, reduced to 1.77mm(84% CI, 0.71mm to 2.83mm) after 6-8 months; on basal bone dimension an increase of 2.71mm(93% CI, 2.14mm to 3.28mm) after 1 month; and the same outcome was 2.40mm(89% CI, 1.71mm to 3.10mm) after 6-8 months; while on total alveolar buccal bone the studies showed an increase on the crest of 3.89(96% CI, 2.94mm to 4.83mm) after 1 month; reduced to 3.15mm(93% CI, 2.07mm to 4.23mm) after 6-8 months; the same outcome on the palatal level was 3.08mm(85% CI, 1.95mm to 4.20mm) after 1 months; reduced to 3.31mm(94% CI, 2.69mm to 3.93mm) after 6-8 months. Dental effects measured in the posterior area were for intermolar width of 5.24mm (100% CI, 2.37mm to 8.11mm) after 1 month and 5.23mm(95% CI, 4.36mm to 6.10mm) after 6-8 months. Finally the dental tipping was 3.77°(95% CI, 2.64° to 4.91°) after 1 month and 2.50°(64% CI, 1.28° to 3.72°) after 6-8 months.

CONCLUSIONS: This systematic review with meta-analysis evaluates, for the first time in the orthodontic literature, the skeletal effects of rapid maxillary expansion at different treatment stages by means of computer tomography. The results indicate that rapid maxillary expansion show a transverse increase of the maxillary bone during activation period and even if during the retention period the skeletal basal bone seems to decrease the relapse is about 11.64%. On the dental effects the relapse is about 36.75%, reflecting a root uprighting evidenced by the decrease in the level of the buccal alveolar bone, and his increase to the level palatal.

ABSTRACT

Orthopassion on the treatment for class II malocclusion: the influence of twin block appliance on mandibular growthA. Martintoni¹, S. Croce¹, S. Korolija¹, A. Liguori¹, G. Ghilardi¹, M. Manuelli^{1,2}, R. P. Mc Laughlin^{1,2}, A. Lucchese^{1,2}¹Department of Orthodontics, Vita Salute San Raffaele University, Milan, Italy; ²Unit of Dentistry, Division of Orthodontics, Research Area in Dentofacial Orthopedics and Orthodontics, IRCCS San Raffaele Scientific Institute, Milan, Italy**BACKGROUND:** The aim of this clinical study was to evaluate the skeletal effects induced by Twin Block in the therapy of Class II malocclusion during, or slightly after, the onset of pubertal bone growth peak.**METHODS:** The study sample, obtained from the records of the author's private practice, consisted of a primary sample of 70 Class II division 1 subjects, of whom good quality lateral cephalogram were available, and they were treated with the Twin-block appliance. From this sample, 30 subjects (Study Sample, 15 males and 15 females) were selected according to the following inclusion criteria: ANB greater than or equal to 4°, full Class II or end-to-end molar relationships, no history of previous orthodontic treatment or surgery treatment, absence of congenital anomalies, caucasian race. All patients received active treatment with Twin-block before or during their pubertal growth peak, as assessed by the cervical vertebral maturation (CVM) method. Lateral cephalogram were digitized for each subject by a single author (AL), respectively at time 1 (T1) immediately before treatment (mean age 10.0 ± 1.1 years) and at time 2 (T2) immediately after treatment (mean age 12.0 ± 1.1 years). The error of the method was calculated with the formula described by Dahlberg (1940). In addition systematic error and the reliability coefficient were determined as suggested by Houston. The Control Group consisted of untreated Class II subjects, with the same inclusion criteria. A modification of the Twin-block appliance, originally developed by Clark, was used in this study. In the present study the mean duration of the Twin -block treatment was 1.2 ± 0.5 years.**RESULTS:** The statistical comparisons between Study Sample (treated subjects) and Control Group (untreated subject), during the T1–T2 observation, showed significantly changes in favour of the treatment: the mandibular length (Co-Me), the ramus height (Co-Go) and the corpus length (Go-Me) increased more in cases than in controls. Our results show a significantly higher average answer in the Study Sample, both in the paired t- test, comparing pre and post treatment, and in the unpaired t- test, comparing the Study Sample and the Control Group. Paired T-test data for the variables Co-Me, Co- Go, Go- Me, with a P = 0.05 significance level, lead us to reject the null hypothesis (differences average = 0) in favour of the alternative of a positive differences average, meaning that the average of the values is higher after the treatment.**CONCLUSIONS:** An important mandibular growth was showed using the Twin-block appliance in the Study Sample, higher than the Control Group; moreover this appliance is more effective during the pubertal peak.**Soft tissue effects of twin block functional appliance in patients with class II division 1 malocclusion: a review of literature**

D. Jamshir, A. Chudan, A. Boboc, G. Galluccio

*Dipartimento di Scienze Odontostomatologiche, Università di Roma La Sapienza, Rome, Italy***BACKGROUND:** The aim of the present review was to evaluate changes in the facial profile resulting from the use of Twin Block functional appliance in the treatment of Class II division 1 Malocclusions. The Twin Block appliance is one of the widely used removable functional appliances to correct class II dentoskeletal disharmony. The Twin Block appliance consists of two separate, unattached upper and lower bite block components which work together as one. Subjects presenting with a Class II division 1 malocclusion have specific clinical characteristics such as an unfavourable profile which may produce negative feelings of self-image and self-esteem.**METHODS:** We reviewed the literature recording the number of publications in relation to specific keywords using Pubmed database. Only articles written in English was included in the study. The period considered was from 2005 to 2016. Key words: Twin Block appliance; soft tissue changes; Angle class II malocclusion.**RESULTS:** A systematic review of soft tissue changes after TB therapy have found some statistically significant changes, but the magnitude of the changes may not be considered as clinically significant. Changes produced in the upper lip seem to be controversial. No change in the anteroposterior position of the lower lip and the soft tissue menton or improvement of the facial convexity was observed. Many authors on the contrary have found statistically significant soft tissue changes using Twin-block therapy. Some studies showed important increase in the LAFH in patients treated with Twin Block appliance. An advancement of the soft tissue pogonion and mandibular soft tissues in general was observed by some authors after Twin-block therapy. Other significant effects that many studies evidenced using Twin-block appliance were the decrease of H angle and mentolabial angle. Many authors have found a reduction of soft tissue profile convexity when the nose is no taken into consideration in Class II patients treated with Twin Block appliance therapy. The most significant effects were a retraction and flattening of the upper lip, anterior movement of soft tissue pogonion and a significant improvement in the facial profile, which closely followed the underlying dentoskeletal changes.**CONCLUSIONS:** Improving facial aesthetics is one of the aims of orthodontic treatment. However, changes in the facial profile may occur due to many factors, such as dental movement or growth. All studies showed that Twin Block appliance lead to changes in soft tissue profile in terms of improving facial balance and aesthetics. However often controversial studies are still available today about the soft tissue effects produced by functional appliance therapy of the treatment of class II malocclusions.**Potential risks and complications of orthodontic treatment: a review of literature**

A. Chudan Poma, D. Jamshir, A. Boboc, E. Lombardelli, G. Galluccio

*Dipartimento di Scienze Odontostomatologiche, Università di Roma La Sapienza, Rome, Italy***BACKGROUND:** This review provides an overview of the main risks linked to orthodontic interventions in clinical practice and analyze how different treatment factors and patient factors interact to modify the risk. Although orthodontic treatment has many recognized benefits, including improvement in dental health, function, appearance, and self-esteem, however

orthodontic appliances can cause unwanted complications if adequate care is not taken during the treatment. A good understanding of these risks is required for clinicians to obtain informed consent before starting treatment as well as to prevent associated complications.

METHODS: A review of the literature was carried out using the scientific database PubMed with precise inclusion criteria. Only articles written in English was included in the study. The period considered was from 2004 to 2016. Search keywords were combinations of words: complication, orthodontic treatment, risks, side effects, iatrogenic factors, systemic risks, white spot lesions, root resorption, temporomandibular disorder.

RESULTS: According to numerous authors, there are a lot of conditions to which orthodontic treatment can be linked. Even if there are no proofs of direct cause/effect relationships for most of them, we must still consider them seriously and inform our patients about them. The possible risks and complications associated with orthodontic treatment, according to their effects, can be divided into three main groups: intra-oral risks; extra-oral risks and systemic risks.

— Intra-oral risks includes: Enamel demineralization (white spot lesions) ; fracture during debond; root resorption; pulpal reaction (ischemia, pulpitis, or even necrosis); periodontal complications (gingivitis, periodontitis, gingival recession or hypertrophy, alveolar bone loss, dehiscence, fenestrations, dark triangles).

— Extra-oral risks: Temporomandibular dysfunction (TMD), profile damage, trauma.

— Systemic risks: Cross infection, Infective endocarditis. The occurrence of these complications depends on a synergy between treatment factors and patient factors. Treatment factors that can influence risk include the orthodontic technique, appliance type, force vectors, duration of treatment and medical knowledge in this field; patient factors include patient's general and oral health. These must be considered even from the start because it might influence the treatment objectives, phases, and goals.

CONCLUSIONS: This review has considered some of the main risks of orthodontic treatment by way of an overview of the literature. It has been shown that the risks of orthodontic treatment vary between individuals and treatment plans. Before proceeding with orthodontic treatment, both the patient and the orthodontist should reflect on the risks and the benefits of the proposed treatment. Clinicians should develop treatment plans based on their patients' susceptibility to these risks and patients should be duly informed of these risks as part of informed consent. With vigilant selection, diagnosis, treatment planning, monitoring, timely intervention, and good cooperation between patient and orthodontist, we can minimize most of the adverse effects of orthodontic treatment.

Evaluation of cranio-facial asymmetries using cone-beam computed tomography (CBCT): a review of literature

A. Chudan Poma, D. Jamshir, A. Boboc, G. Galluccio

Dipartimento di Scienze Odontostomatologiche, Università di Roma La Sapienza, Rome, Italy

BACKGROUND: Cranio-facial asymmetry is common in humans, however significant asymmetries causes functional and esthetic problems and needs combined orthodontic and

surgical treatment. Medical imaging is helpful for objective diagnosis and measurement of the asymmetry, as well as for treatment planning. The purpose of this article is to evaluate the use of cone-beam computed tomography (CBCT) images for the detection and the treatment of asymmetry.

METHODS: A review of the literature is carried out using the scientific database PubMed with precise inclusion criteria. The period considered was from 2010 to 2017. Only articles written in English was included in the study. Keywords: asymmetries diagnosis; asymmetries CBCT; three-dimensional cephalometric.

RESULTS: Cone-beam CT (CBCT) was developed for the three-dimensional (3D) imaging of the maxillofacial area and has become popular in dentistry, orthodontics, and maxillofacial surgery. Recent studies have shown that computed tomography (CT) scans with 3D reconstruction and cone-beam CT (CBCT) images are useful to identify skeletal and dental landmarks for orthodontic and craniofacial analyses and to evaluate asymmetry in the facial skeleton. Studies showed that CBCT technique have many advantages: 3D images can allow for analysis of the size, shape and volumetric differences in bilateral structures as well as growth changes in 3D; measurement error from CBCT are lower than those from cephalograms and uses a low dose of radiation; it eliminates the problems of deformation, magnification, superimposition, and artifacts. CBCT imaging offer the ability to capture images and to analyze the craniofacial hard and soft tissues and their spatial relationship using virtual models and specific software; also, the virtual models can be used to simulated or test treatment options; 3D measurements from CBCTs can be made in several visualization modes, including multiplanar(MPR), volume rendered (VR) and shaded surfaced display (SDD).

CONCLUSIONS: CBCT has been shown to produce accurate 3D images of the craniofacial region and a 1-to-1 image-to-reality ratio, which has greatly reduced errors of frontal cephalometry and improved our ability to diagnose asymmetry. The advent of CBCT has also greatly reduced magnification errors from geometric distortions that are common in conventional radiographs, furthermore recently were introduced 3-dimensional software enables 3D reconstruction and quantitative measurement of the maxillofacial complex. Therefore, a CBCT scan should be considered when a visible deviation is present which requires surgical correction. The innumerable advantages offered by this technique allow us to state that it is the best technique available today for the evaluation and treatment of cranio-facial asymmetries.

Early treatment of deep bite with the infant trainer

S. Cammarata ¹, A. Volpe ², I. Giorgini ², T. Doldo ³

¹University of Siena, Siena, Italy; ²Department of Medical Biotechnologies, University of Siena, Siena, Italy

BACKGROUND: Current trends in pediatric orthodontics aim at identifying incorrect development of mouth and medium/lower facial third as early as possible. Early preventive treatment with infant-trainer device resulted in avoiding dysfunctional forces from acting on the skeletal pattern, so reaching a balance between bone basis and muscular components. The infant trainer can be used easily in an early phase of development at 4-5 years of age for the deep bite correction. The infant trainer, a polyurethane prefabricated functional

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appliance, is proposed as a substitute of the dummy without its negative consequences. The device is indicated for the resolution of deep bites because it is made in such a way as to provide the front teeth depressive forces and, simultaneously, to encourage the posterior teeth to erupt and fit in their optimal vertical position, so that stabilizes an overbite vertical front minimum. In relation to timing of treatment and to the parameters cost-benefits-precocity of intervention, the infant-trainer use is predictable and repeatable in anterior deep-bite management.

METHODS: The clinical cases considered are children aged 4 and 5 years referred to the Department of orthodontics, University of Siena. They all presented early mixed dentition, absence of caries in act and a anterior deep bite. Intra and extraoral photos were made and the infant-trainer device was given to the young patient and was easily accepted. Patients had to wear it 2-4 hours during the day and throughout the night. After 1 month usually a good compliance was achieved and the children were checked every 2 months. After 4 months it was observed correction of the anterior deepbite and an improvement of the jaw relationship. Total treatment time was about 12 months in average. 2 years after treatment the correction achieved was stable.

RESULTS: Pictures of patients pre, during and at the end of the early interceptive phase of functional treatment demonstrates the effectiveness of the use of the infant-trainer in the resolution of deep bite in the short and long term. The infant trainer is proposed as a substitute of the dummy but it hasn't negative consequences. The treated show that the infant-trainers are an indication predictable and repeatable if handled properly and at a correct time.

CONCLUSIONS: Early treatment of the vertical anomalies of growth or any other alterations to the aesthetic of the profile of the pediatric patient is extremely important to avoid their aggravation and/or consolidation and orthodontic treatment that might be required later will be of a shorter duration. In this way the young patient is allowed to grow at the level panel inside-skeletal-facial in the ideal condition. The infant-trainer makes the child approaching to the orthodontic world already at the age of 4 years and requires only the intra and extraoral examination, by delaying around 6 years of age more invasive diagnostic investigation such radiographs. The treatment, carried out in a very early phase of the patient life, lead to a stable and balanced relationship between basal bones and muscle components over time. The present cases highlight how a deep bite can be managed with a simple, low-cost and user friendly appliance.

2 different options for the agenesis of mandibular second premolar: case reports

M. Chazine¹, L. Parrini¹, S. Grandini², P. Lucchi³, M. Rosa⁴, T. Doldo¹

¹Department of Medical Biotechnology, University of Siena, Siena, Italy; ²Department of Medical Biotechnology, University of Siena, Siena, Italy; ³University of Cagliari, Cagliari, Italy; ⁴University of Insubria, Varese, Italy

BACKGROUND: Agenesis of the mandibular second premolar is very common. The treatment plan consists of maintaining the space either by leaving the deciduous molar in situ or making a fixed space maintainer, or in alternative closing the space using fixed appliances. However, whichever treatment plan is chosen, the most important aspect is timing. The aim

of these case reports was to demonstrate how two different methods of treatment can give predictable results. In the first case, the emisection of the deciduous second molar allowed the first permanent molar to spontaneously close the space. In the second case, maintaining the deciduous teeth allowed the patient to not overcome major treatments (implants or bridges) when she was older.

CASE REPORTS: C,T, female 9 years old with multiple agenesis of 12, 22, 35, 45. The orthodontic treatment plan consisted of closing the inferior agenetic space. This was obtained by the emisection of the second deciduous inferior molar, allowing the permanent first molars to drift mesially. The superior spaces and the remaining inferior spaces were then closed using fixed appliances. A.A, female 12 years old, with multiple agenesis of 3.5 and 4.5. The orthodontic treatment plan consisted of mantaining 7.5 and 8.5. The space was reopened and maintained after the treatment to allow the patient to have an implant placed later in life.

RESULTS AND CONCLUSIONS: In both cases, a good occlusion stability was obtained. The timing and an accurate diagnosis are the most important aspects for good results. In the first case the slicing of the deciduous second molar can be a valid alternative to conventional treatments. Controlled slicing of the deciduous second molar, between the ages of 8 and 9 years produced a bodily controlled mesial movement of the permanent first molar in less than 1 year with no or minor rotations or inclination. The emisection can reduce the time of treatment or sometimes make the orthodontic treatment not necessary at all.

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Auriculotherapy for the management of orthodontic pain

E. Serritella¹, C. Vompi¹, A. M. Boboc¹, A. Liguori², G. Galluccio¹

¹Unit of Orthodontics, Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, Rome, Italy; ²"Paracelso" Institute, Italian Centre of Non Conventional Medicine, Rome, Italy

BACKGROUND: Orthodontic therapies can cause emotional stress to the patient, and are often associated with pain perception, even very intense. Different methods are studied for the orthodontic pain management, including the use of pharma-

cological and mechanical therapies, laser therapies and behavioral strategies. Even today, however, there are no versatile tools and standardized protocols. Consequently, alternatives to conventional analgesic methods are needed. This study aims to verify the analgesic effects of Auriculotherapy (AT) during the first 3 months of fixed orthodontics treatment.

METHODS: A population of 36 subject, 14 males and 22 females (mean age of 19.5 years), was studied and divided in two homogeneous groups: Study Group (SG) and Control Group (CG), depending on the application / non-application of AT. Patients rated pain scores monthly on 0 to 10 visual analogue scales (VAS) at the time of bonding (t0) and subsequent two appliance adjustment (t1 and t2), relative to 6 different time moments (TM): immediately before, immediately after, after 4, 8, 24 and 72h. Descriptive statistical analysis and Student's t-test has been applied (statistical significance for $p < 0.05$).

RESULTS: Patients treated with Auriculotherapy (SG) report on average a lower pain intensity compared to no-treated patients (CG), both at t0, t1 and t2, and this difference is statistically significant ($p = 0.0497$). On average, male seem to experience more pain than female but, despite this, belonging to a specific gender is not such a significant factor in determining the onset and the intensity of pain sensation ($p = 0.359 / p = 0.418$). It was instead significant if they received or not the auricular treatment, regardless of the belonging gender ($p = 0.0315 / p = 0.0246$). The average pain intensity values, moreover, are lower in SG for all TM analyzed, for each of which the t-test was significant. ($p < 0.05$).

CONCLUSIONS: This research has for the first time verified that the application of AT is effective in the pain management of patients undergoing fixed orthodontic treatment. Furthermore, it has allowed the development of a standardized therapeutic protocol that is versatile, easy to apply and minimally invasive, and therefore can also be used in pediatric subjects. We can therefore consider Auriculotherapy as a valid analgesic alternative in patients with fixed orthodontic appliances.

Orthopassion for OSAS: the importance of interdisciplinarity

G. Rubini¹, A. Martintoni¹, M. Pellegrino¹, F. Toma¹, N. Nardi¹, M. Manuelli^{1,2}, A. Lucchese^{1,2}, E.F. Gherlone³

¹Department of Orthodontics, Vita-Salute San Raffaele University, Milan, Italy; ²Unit of Dentistry, Division of Orthodontics, Research area in Dentofacial Orthopedics and Orthodontics, IRCCS San Raffaele Scientific Institute, Milan, Italy; ³Dental School, Vita-Salute San Raffaele University, Milan, Italy and Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy

BACKGROUND: Too often the obstructive sleep apnea syndrome (OSAS) is not taken sufficiently into account, although it's a disease which affects about 6% of the population. The aim of this study is to highlight the importance of having a team of specialists, which includes a dentist, an otorhinolaryngologist, a nephrologist, a neurologist, a pulmonologist and a nutritionist, working synergistically to treat this disease. Furthermore this study aims to demonstrate how this condition should not be underestimated and indeed requires early intervention, since its effects are reflected on everyday life: going from the risk of accidents caused by somnolence to clinical consequences which can bring to cardiovascular, cerebrovascular and nephrological problems.

METHODS: Why involve nephrologist? Apneas in obese, or even just overweight patients, don't allow an adequate oxygenation of their entire organism. The first organs to be affected are the ones which are usually the most perfused such as kidneys, and in the long term episodes of renal ischemia may occur. It has been shown that after such ischemic injuries these patients may become affected by hypertension, resulting in a concrete risk of stroke. Why involve nutritionist? The role of the nutritionist is to keep under control hypertension and proteinuria (resulting from kidney damage) by educating them about correct dietary habits. Why involve pulmonologist? The pulmonologist is often the first specialist to be interviewed by the patient suffering from sleep apnea. He prescribes to the patient the polysomnography, a diagnostic test that records the progress and changes of some physiological parameters during REM and NON-REM sleep in individuals with suspected sleep disorders. CPAP (Continuous Positive Airway Pressure) are given to people who have major problems that don't allowed them to breath spontaneously. Why involve otorhinolaryngologist? This figure can improve the quality of these patients' sleep through interventions of functional nasal surgery such as septoplasty and the reduction of the inferior turbinate. In addition, after performing a polysomnography and having received the data, he can re-quest a Sleep Endoscopy that can be used to identify the type of intervention which could be more effective against the specific cause each patient's sleep apnea. Why involve dentist? During the session of Sleep Endoscopy MADs (Mandibular Advancement Devices), made by the dentist after a careful examination, are applied to see if they can work for that specific patient. In case of a positive effect these devices could be a valid alternative to CPAP (which is more bulky and presents more side effects such as claustrophobia, aerophagy and earache). Furthermore, the compliance of patients using MADs turns out to be higher than that of patients using CPAP (65%).

RESULTS: The main result that this study aims to achieve is an interdisciplinary approach to this disease. This is essential, not only for systemic health correlations, but also to prevent the patient from feeling abandoned by making him able to rely on the most experienced specialists in the field which can help him solve this problem.

CONCLUSIONS: After explaining what risks and complications a patient suffering from sleep apnea can undergo to, the aim is that of taking care of the patient in Day Hospital so to perform in a single day: Holter monitoring, sleep endoscopy, dental exam, neurological exam, pneumological exam and visit by the nutritionist.

Orthopassion for OSAS: the importance of interdisciplinarity

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¹Department of Orthodontics, Vita-Salute San Raffaele University, Milan, Italy; ²Unit of Dentistry, Division of Orthodontics, Research area in Dentofacial Orthopedics and Orthodontics, IRCCS San Raffaele Scientific Institute, Milan, Italy; ³Dental School, Vita-Salute San Raffaele University, Milan, Italy and Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy

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Methods of approach for maxillary, impacted, labially or in crest, canines: a review

M. Dari, C. Carreri, S. Del Prete, M.L. Favale, G. Galluccio

Unit of Orthodontics, Department of Oral and Maxillo Facial sciences, Sapienza University, Rome, Italy

BACKGROUND: The aim of this work is to describe the advantages and disadvantages to help the clinician in making her choice, among the various surgical techniques of access to the canines labial impacted into maxilla.

METHODS: An initial research of the abstracts has been performed using the scientific archives "PubMed" and Google Scholar, using the keywords "labial maxilla impactect canine" "labially maxillary impactect canine" "buccal maxilla impactect canine". The research was limited to the international literature in the English language. The abstracts of 22 articles were read, case reports and studies that were not meaningful for research were excluded. The articles with scientific accuracy in explaining the problem were selected for a total of 12 articles.

RESULTS: After third molars the most common included dental elements are canines. Of those the 17% is represented by canines impacted labially or in crest. Buccal Canine's impaction in most cases results from a lack of space for the eruption of the element. The absence of the element leads to aesthetic and functional problems. Treatment often requires a surgical-orthodontic approach: characterized by a first phase of space creating, followed by a surgical intervention to expose the impacted tooth and to place an element of traction with the aim of carrying the canine into the arch. The orthodontist plays a fundamental role in all the steps, even in the choice of the surgical technique since it is fundamental to avoid subsequent aesthetic and periodontal problems, particularly relevant in the anterior area. The methods described in the literature for the surgical exposure of the maxillary impacted canines are four: apically positioned flap, excisional uncovering, the closed eruption techniques and "VISTA technique" (vestibular-incision-subperiosteal-tunnel acces). The latter was used classically in periodontal recession surgery and was modified by dr. Chris Chang to be applied to treat this type of malocclusions. With this technique a periosteal tunnel is created surgically, this tunnel acts as a traction corridor for the included element. The data obtained from the review were analyzed and represented in graphical form by tables. The first table summarize the criteria to choose the various techniques, the choice of which is taken considering the spatial position of the included element and its relations with the adjacent structures. In the second table, the aesthetic and periodontal results of the four techniques were analyzed highlighting the specific disadvantages of each. **CONCLUSIONS:** From the literature review emerged that the current data are insufficient to establish which of the techniques is the better for periodontal's health. The data suggest that apically positioned flap presents more periodontal consequences than closed eruption. The VISTA technique seems to be a valid alternative which minimally invasive to prevent recessions and scars in the esthetic zone.

Clinical assessment methods for generalized joint hypermobility and correlation with prevalence: a review of the literature

A. Boboc, A. Chudan, D. Jamshir, G. Galluccio

Dipartimento di Scienze Odontostomatologiche, Università "Sapienza" di Roma, Rome, Italy

BACKGROUND: Joint Hypermobility (JH) is an increase of joints mobility over physiological limits and has

been reported as a predisposing factor to the development of Temporomandibular disorders (TMD). The term Generalized joint hypermobility (GJH) is used when multiple joints are affected and its prevalence varies widely in literature, ranging from 10% to 30% in the adult population, and from 2% to 65% in children and adolescents. In addition to the necessity of taking into consideration important influencing factors like age, gender, and ethnicity, one reason for the wide range of prevalence may be the use of different clinical assessment methods and that the cutoff level used to identify GJH often vary in different studies. Therefore, the aim of the present study is to evaluate the clinical assessment methods for GJH and the cutoff point for diagnosing GJH.

METHODS: Literature was searched using Pubmed and Cochrane Library from 2004 to 2018. Only articles written in English were included in the study. The following key words were used: joint hypermobility, generalized joint hypermobility, joint laxity, evaluation, tests, assessment methods, Beighton tests, Carter and Wilkinson, five-part questionnaire, prevalence, reproducibility, diagnostic criteria.

RESULTS: The main clinical assessment methods for GJH were: Beighton scoring system (BS), Carter and Wilkinson, Rotès-Quérol and two questionnaires (Five-part questionnaire and Beighton score self-reported). Most of the studies used the BS for assessment of GJH with 9 tests and scores ranging from 0 to 9. Regarding questionnaire assessment methods the Five-part questionnaire (5PQ) by Hakim and Grahame is the most frequently used method, so far used only for adults, and include additional historical information because joint mobility, and therefore BS, is known to decrease by age. Among different authors which use the BS there is a lack of consensus for a GJH diagnostic cutoff level: most consider GJH present when ≥ 4 of 9 tests are positive, whereas others use $\geq 5/9$ or $\geq 6/9$. Generally, in the different studies was used a cutoff point of ≥ 4 or ≥ 5 positive joints of 9 tests and $\geq 2/5$ in 5PQ to determine GJH for adults. A cutoff level of 4/9 for GJH is included in the Brighton Criteria (Major and Minor criteria) for JHS. While for children to date there are no consensus criteria for GJH and the cutoff level in the different studies varies from 5/9 to 7/9. Since joint mobility decreases with age, a higher BS has been suggested as a diagnostic criterion for children ($\geq 6/9$). When a most rigorous cutoff was used the prevalence decrease. Prevalence of GJH varies according to age, gender, ethnicity and also to diagnostic criteria used and the reliability of the diagnostic procedures for joint mobility.

Also, many individuals with GJH are asymptomatic, that makes difficult to estimate an accurate prevalence.

CONCLUSIONS: Beighton tests seem to be reproducible by experienced examiners but a methodological shortcoming is that there haven't been yet reported detailed descriptions of test procedures so there can be discrepancies (e.g., the starting position with thumbs apposition with flexed or straight elbow, knee extension in standing or supine lying) in the test's performance of different researchers and clinicians that can influence the prevalence of GJH and limit the ability to make cross-study comparisons. More studies are required to establish a clear standard protocol for test performance and to identify a consensus-based cut-off level for GJH. In conclusion, applying uniformity in performing the test-

ing procedures, the recommendation for clinical practice is Beighton score, in addition to historical information, especially in adults.

Unilateral condylar hyperplasia: the comparison of the condyle volumes

A.M. Costantini, C. Vompi, F. Germanò, N. Gjoka, G. Galluccio, P. Cascone

Department of Oral and Maxillo-Facial Sciences, Sapienza, University of Rome, Rome, Italy

BACKGROUND: Unilateral Condylar Hyperplasia (UCH) is a pathologic condition characterized by an increased condylar growth due to osteoblastic hyperactivity, resulting in a facial asymmetry, malocclusion and articular dysfunction. Nitzan et al. classified UCH as transverse, vertical or combined. The diagnosis between the different forms can be due with clinical parameters. The vertical growth is clinically characterized by three-dimensional volume increase of the affected side, ipsilateral deviation or no deviation and tilting of the occlusal plane and absence of cross-bite. The transverse growth clinically results in contralateral chin deviation, contralateral cross-bite, preserved occlusal plane, extending of the affected side. The purpose of the study is to quantify condylar volumes using Dolphin Imaging Software, make a comparison between the affected and unaffected sides and between transverse and vertical form.

METHODS: For this study, the Authors selected four patients. They all presents an active UCH, diagnosed according to clinical and radiological exams (SPECT), two affected by the vertical form and the other two affected by the transverse form. The volume quantification has been done using the 3D module of Dolphin Imaging Software. Condylar volume was considered from the perpendicular line to the posterior mandibular margin, passing for the sigmoid notch. It allows to isolate only the condylar volume, to do a precise rating method in preparation for condylectomy.

RESULTS: In the transverse form, a 16 years old male: the affected condyle measured 3039,80 mm³ and the unaffected was 2167,66 mm³. In the transverse form, a 12 years old female: the affected condyle measured 2410,03 mm³ and the other one was 1087,66 mm³. In the in the vertical form, a 17 years old male: the affected measured 3001,79 mm³ while the unaffected was 1301,37 mm³. In the in the vertical form, a 12 years old female: the affected measured 2534,58 mm³ and the other one was 1020,60 mm³.

CONCLUSIONS: The affected condyle volume is much higher than the other one in both patients and, as clinical and radiological experience hypothesizes, the vertical affected condyle volume results bigger than the transverse one. The volumetric rating method is important to do a precise diagnosis and to decide the better way to do the condylectomy: it can be useful in surgical condylectomy preparation to establish the condyle amount to remove. It's needful also in the post-surgical evaluation, to estimate the morphological TMJ remodeling and to do an accurate follow-up. Considered this preliminary study feed-back, the authors are working to extend the volume evaluation to a bigger number of patients.

ABSTRACT

Correlation between alveolar bone loss and torque variation after fixed orthodontic treatment: three-dimensional analysis

F. Gaffuri, S. Bertini, A. Abate

*Università degli Studi di Milano, Scuola di Specializzazione in Ortognatodonzia, Dipartimento di Scienze Biomediche, Chirurgiche ed Odontoiatriche. Fondazione IRCCS Cà Granda, Ospedale Maggiore Policlinico, Milan, Italy***BACKGROUND:** The aim of this study was to evaluate the correlation between dental torque changes and the amount of cortical bone thickness and height loss after fixed orthodontic treatment using Cone Beam Computed Tomography (CBCT) and three-dimensional (3D) models.**METHODS:** The sample included 22 individuals (9 males and 13 females) with a mean age of 13 years at the baseline, selected if the following eligible criteria were met: patients presenting with Angle Class I malocclusion and mild or moderate dental crowding, during the stage of permanent dentition and with no previous orthodontic treatment. The database contained dental CBCT scans obtained before and after orthodontic therapy (Roth prescription). Vertical alveolar bone distances and horizontal thicknesses were measured by the same examiner, around the maxillary and mandibular central/lateral incisors, canines, first/second premolars, first molars. The images were analyzed using a specific software Horos™, a free 64-bit medical image viewer, Version 3 (LGPL-3.0). Axial-guided navigation (AGN) was used to locate all landmarks and reference points moving the axial cursor on the sagittal or coronal multiplanar reconstructions guided by the plane along the dental root axis to achieve an optimal visualization of the marginal bone in the chosen view. Vestibular (BHv) and palatal/lingual bone height (BHp) indicated the distance between cement-enamel junction (CEJ) and alveolar bone crest (AC), measured parallel to the long axis of the tooth. To determine which slice should be used to evaluate these lengths we selected, for anterior teeth, the sagittal section following the vertical dental axis, whereas for posterior teeth, we selected the coronal one. The vestibular (aBTv, mBTv) and palatal/lingual (aBTp, mBTp) bone thicknesses were measured at mid-root and root apex level, perpendicularly to the long axis of the tooth. Dental models were processed by means of a 3D scanner (3Shape R700) and all dental torque, before and after orthodontic therapy, were measured using 3D VistaDent software (Dentsply, New York, USA). Of the 22 CBCT scans, a total of 7392 measurements were defined; 528 vestibular and 528 palatal surfaces for each maxillary and mandibular tooth were evaluated.**RESULTS:** Measurements of 200 teeth, randomly selected from the total sample, were repeated after two weeks by the same investigator (F.G) to evaluate method reproducibility. Reliability was evaluated using the Intra-class Correlation test (ICC), which gave a strong intra-examiner reliability (ICC 0.8897). To standardize measurements, data were checked by another senior clinician (G.C.) one month after initial examination and the Dahlberg's formula showed minimal error. The Pearson-Correlation Test showed a high association between torque increasing of anterior teeth and alveolar bone thickness loss ($R>0.7$) The most statistically significant correlation ($P<0.02$) was found for lower canines, considering the mid-root level. The CEJ-AC distance was greater than or equal to 2 mm, classified as bone dehiscence, in 97 (18.37%) vestibular and 60 (11.36%) palatal sides of the total 528 surfaces at baseline. After orthodontic treatment,the increasing of surfaces with a CEJ-AC width ≥ 2 mm was 17.61% vestibular and 8.53% palatal.**CONCLUSIONS:** Torque variation was shown to be strongly associated with the amount of alveolar bone thickness and height loss for anterior teeth. The alveolar bone remodeling due to tooth movement should be considered during orthodontic treatment planning to prevent or make more predictable clinically relevant findings as gingival recessions.**Dimensional variations of the mandibular triangle in orthodontic patients affected by juvenile idiopathic arthritis**

U. Garagiola, P. Cressoni, F. Bellomia, W. Brounsouzoghly, A. Fama, C. Occhipinti

BACKGROUND: To highlight the dimensional variations of the mandibular triangle of the healthy patients versus patients with Juvenile Idiopathic Arthritis (JIA) by means of Cone Beam CT (CBCT).**METHODS:** 75 CBCTs, 36 of healthy patients and 39 of patients with JIA, aged between 6 and 15 years, were analyzed. The study was based on the identification of the right Gonion cephalometric point (Go dx), left Gonion (Go sx) and Menton (Me) through a 3D Medical Image Processing Software, thus obtaining the mandibular triangle.**RESULTS:** From the observation of the collected values, it is showed that the Gonial angle corresponding to the healthy side undergoes a reduction of the amplitude. Contrariwise, the Gonial angle corresponding to the side affected by the disease, undergoes an increase of its amplitude. The proportionality of these values is strongly influenced by the age in which the patient has been evaluated, considering that the sample is composed of patients ranging from 6 to 15 years, younger the patient is, less would be the difference evident and significant between the lengths of the sides and relative angles, at time 0 and at time 1.**CONCLUSIONS:** The results show that patients suffering from JIA have a reduction in the sagittal growth of the jaw, corresponding to the side affected by the disease; this implies a proportional increase of the angle associated with it. On the other hand, the growth of the healthy side appears to be normal and physiologically active as it is not affected by the disease. The final result is the presence of a pronounced asymmetry of the mandibular bone of the patients with Juvenile Idiopathic Arthritis (JIA).**Magnetic resonance 3 TESLA, 3D cephalometric analysis**

A. Abate, F. Gaffuri, S. Bertini

*Università degli Studi di Milano, Scuola di Specializzazione in Ortognatodonzia, Dipartimento di Scienze Biomediche, Chirurgiche ed Odontoiatriche. Fondazione IRCCS Cà Granda - Ospedale Maggiore Policlinico, Milan, Italy***BACKGROUND:** Determine the reproducibility of the 3D cephalometric analysis of the University of Milan on MRI 3 Tesla compared to CBCT. Evaluate the MRI diagnostic accuracy in the bone measurements having the CBCT as point of reference.**MATERIALS:** A sample of 9 female subjects with TMD (temporo-mandibolar-disorder) and age between 18 and 53 (average age 38,5) has been selected from a sample of 800

CBCT. During the study, patients have not been subjected to any odontoiatric and ortodontic therapy. The operative procedure consisted in a CBCT (I-cat®) and a MRI (3 T-philips achieve®), with a maximum distance between the two exams of 1 month (the same equipment has been adopted for all the sample). Files have been exported as file dicom and evaluated through Materialise Mimics software 18®. 3D Cephalometric analysis of University of Milan has been performed on CBCT and on MRI. The real three-dimensional cephalometry is created, providing 18 points, including 10 middle and 8 side counterparts, identified on a CT slide hard tissue and subsequently verified on the two remaining and the rendering of the volume generated by the software Mimics. From these 18 points arise 36 measurements, which provide sagittal, vertical and transverse information. All the measurements have been analyzed and compared. Statistical analysis has been performed: T Student with $P < 0.05$ has been calculated for intra and inter operator comparisons and Pearson ICC to evaluate reproducibility of the method. Finally, MRI and CBCT values have been compared through ANOVA test and Tukey's HSD (SPSS 17.00®), to evaluate the methodology validity.

RESULTS: Results are showed in the table 1: not exists any statistically relevant difference between 3D cephalometric analysis on MRI 3 Tesla and CBCT for all the measurements analyzed. Values which consider intracranial cephalometric points show much better superimposition than the extracranial cephalometric points.

CONCLUSIONS: 3D cephalometry on Magnetic Resonance is a repeatible and accurate method for the cranial valuation of skeletal structures. It resulted to be a reliable support for 3D cephalometric analysis in orthodontic diagnosis. Moreover, MR exam does not expose patients to ionizing radiations and gives the possibility to evaluate soft, muscular and articular tissues with just one exam.

Use of occluso-guide and position trainer in patient in growth

S. Bertini, F. Gaffuri, A. Abate

Scuola di Specializzazione in Ortognatodonzia, Università degli Studi di Milano, Dipartimento di Scienze Biomediche, Chirurgiche e Odontoiatriche, Fondazione IRCCS Cà Granda - Ospedale Maggiore Policlinico, Milan, Italy

BACKGROUND: According to the Orthodontic School of the University of Milan, the phases of orthodontic treatment must find a correspondence to the different growing periods of the patients. According to this point, we can distinguish four stages of growth (before the pubertal peak, at the pubertal peak, at the end of the peak, at the end of growth) to which correspond four phases of the orthodontic treatment: preventive, interceptive, corrective and retention phase.

In the dynamic phase of growth, therefore, the purpose of our equipment will be twofold: to limit damage from extrinsic factors (bad habits) and to counteract the inherent negative genetic factors that will manifest throughout the dynamic growth span.

METHODS: Technological progress and evolution in the field of materials have made available equipment made of resilient material, which respond well to the therapeutic needs of contrasting bad habits and functional guidance in improving the patient's growth potential. In our study we treated 30 patients (18 females and 12 males) belonging to the Orthodontics

department of the Dental Clinic pavilion of the University of Milan, via della Commenda. All the patients were in pre-pubertal peak stage. The patients were treated with two elastodontic devices: Position Trainer and Occluso-Guide. The Position Trainer was used in patients with deciduous teeth, while the Occluso-Guide was preferred for patients with mixed dentition. Upon delivery, the patients were informed about the way to use appliances, specially about the request to wear it during evening and night time, and in every moment patients usually shows the bad habit.

RESULTS: The recovery of the correct spatial relationships between the upper and lower incisors was obtained quite early. In control after 3 months, in many cases we have verified a significant reduction in overjet and the complete disappearance of bad habits.

CONCLUSIONS: The preliminary clinical results obtained in this research have demonstrated the efficacy of elastodontic devices in early orthodontic therapy, the efficacy in the resolution of bad habits and in the consequent restoration of the correct dento-alveolar relationships. Therapeutic success is, however, conditioned by the correct indications that must support the prescription of the equipment and the achievement of sufficient patient compliance.

Transverse and torque dental changes after passive self-ligating fixed therapy: a two-year follow-up study

A. Lucchese^{1,2}, A. Martintoni^{1,2}, P. Albertini^{1,2}, L.H. Ghislanzoni^{1,2}, M. Manuelli^{1,2}, E. Gherlone^{1,2,3}

¹Department of Orthodontics, Vita-Salute San Raffaele University, Milan, Italy; ²Unit of Dentistry, Division of Orthodontics, Research area in Dentofacial Orthopedics and Orthodontics, IRCCS San Raffaele Scientific Institute, Milan, Italy; ³Dental School, Vita-Salute San Raffaele University, Milan, Italy

BACKGROUND: Self-legating passive appliances are claimed to expand the arches but evidence is missing about stability of results. Our aim was to measure the width of the maxillary and mandibular dental arches and torque changes after treatment with a passive self-ligating appliance, and stability at a 2-year follow-up.

METHODS: Maxillary and mandibular 3D models from a sample group of 32 subjects (mean initial age 14.9 ± 0.9 yrs), consecutively treated with a self-ligating appliance, were obtained before, immediately after treatment and 2yrs after the end of treatment. The dental arches were examined by a 3D software to evaluate the differences in transverse arch dimensions and torque values.

RESULTS: An increment of the arch widths was recorded, especially for the upper and lower premolars. The increase in the transverse diameters was associated to a significant positive torque gain. No significant changes in arch perimeter and arch depth were recorded. In the retention period a slight significant changes in transverse diameters were recorded, and a transverse diameters constriction was detected. Torque values remained almost unchanged in the follow up period.

CONCLUSIONS: Transverse arch dimensions, along with the torque values, increased significantly after the treatment with passive self-ligating appliance. In the two years after the end of the treatment, a slight tendency to transverse diameter restriction, especially for the upper and the lower premolars, was observed even though not statistically significant.

PARODONTOLOGIA

Regenerative periodontal treatment with the single flap approach in smokers and non-smokers

L. Toselli¹, A. Simonelli¹, R. Farina^{1,2}, L. Minenna¹, L. Trombelli^{1,2}

¹Research Center for the Study of Periodontal and Peri-Implant Diseases, University of Ferrara, Ferrara, Italy; ²Operative Unit of Dentistry, University-Hospital of Ferrara, Ferrara, Italy

BACKGROUND: In 2007, a simplified surgical technique (Single Flap Approach, SFA) was introduced for the regenerative treatment of periodontal intraosseous defects. The basic underlying principle of the SFA consists of the elevation of a limited mucoperiosteal flap to allow access to the defect from either the buccal or oral aspect only, depending on the main buccal/oral extension of the lesion, preserving the integrity of the interproximal supracrestal gingival tissues. The combination of enamel matrix derivative (EMD) with deproteinized bovine bone mineral (DBBM) in periodontal regenerative surgery, in general, and SFA, in particular, was shown to ensure a substantial attachment gain while limiting the post-surgery recession. Smoking has been recognized as a factor affecting the outcomes of periodontal treatment. The present study was performed to evaluate the impact of smoking status on 6-month clinical outcomes of the buccal SFA with EMD and DBBM.

METHODS: The present study is a retrospective analysis of a patient cohort. De-identified data were retrospectively derived from periodontal patients seeking care at the Research Centre for the Study of Periodontal and Peri-Implant Diseases, University of Ferrara, Italy, and one private dental office in Ferrara, Italy. Twenty-two defects were selected in smoker (n= 11) and non-smoker (n= 11) patients. Each defect had been treated with buccal SFA. A sandwich technique had been applied to stratify EMD and DBBM: first, a layer of EMD had been injected to condition the bone defect; then, DBBM had been mixed with EMD and positioned to fill the intrabony component of the defect; finally, a second layer of EMD had been injected over the grafted DBBM particles to condition the portion of the root surface coronal to the bone crest. Immediately before surgery and 6 months after surgery, the following measurements had been collected: probing depth (PD); clinical attachment level (CAL); interdental REC (iREC). At suture removal, performed 2 weeks after surgery, the Early Healing Index (EHI) had been evaluated.

RESULTS: Twenty-two patients (14 males and 8 females; mean age: 50.2 ± 11.4 years, range: 29 - 68 years; 11 smokers, 11 non-smokers) were included for the analysis. The procedure resulted in significant change in CAL from 10.0 ± 1.9 mm to 5.5 ± 1.9 mm in smokers ($p=0.003$) and from 10.1 ± 2.5 mm to 6.5 ± 2.0 mm in non-smokers ($p=0.003$), the 6-month CAL gain being not significantly different between groups. Also, PD was significantly reduced from 8.4 ± 1.6 mm to 3.1 ± 0.5 mm in smokers ($p=0.003$) and from $7.7 \pm$

1.2 mm to 3.6 ± 0.9 mm in non-smokers ($p=0.003$), with a significant difference between groups ($p=0.028$). At 6 month, PD was similar ($p=0.151$) in smokers and non-smokers. At 2 weeks, smokers and non-smokers showed a significantly different patient distribution according to EHI ($p=0.009$). In particular, the number of sites showing optimal wound healing (i.e., EHI= 1) was 5 (45.5%) in non-smokers while was 0 for smokers.

CONCLUSIONS: Treatment of intraosseous defects with buccal SFA in association with EMD and DBBM may similarly lead to substantial CAL gain and limited residual PD in smokers and non-smokers.

Subgingival microbiota of diabetics and non-diabetics with different periodontal condition: a metagenomic analysis

M. Severi¹, R. Farina^{1,2}, C. Scapoli^{1,3}, A. Carrieri³, A. Benazzo³, E. Mamolini³, C. Bassi⁴, E. Callegari⁴, E. Miotto⁴, S. Sabbioni⁴, L. Trombelli^{1,2}

¹Research Centre for the Study of Periodontal and Peri-implant Diseases, University of Ferrara, Ferrara, Italy; ²Operative Unit of Dentistry, University-Hospital of Ferrara, Ferrara, Italy; ³Department of Life Sciences and Biotechnology -Section of Biology and Evolution, University of Ferrara, Ferrara, Italy; ⁴Department of Life Sciences and Biotechnology - Section of Pathology and Applied Microbiology

BACKGROUND: The study was performed to characterize the subgingival microbiota of patients with and without type 2 diabetes (T2D) with different periodontal status.

METHODS: Twelve caucasian non-smoker subjects participated in a cross-sectional study. Subjects were considered diabetics if having a history of T2D for at least 2 years and showing insufficient metabolic control (i.e., Hb1Ac >7%). Subjects were classified into one the following 4 groups (of 3 subjects each): diabetics with or without periodontitis (T2D+P+ and T2D+P-, respectively) and non-diabetics with or without periodontitis (T2D-P+ and T2D-P-, respectively). Each subject underwent subgingival plaque sampling at 4 sites with probing depth (PD) ≤ 3 mm and negative to bleeding on probing (BoP) (in patients without periodontitis) or 4 sites with PD ≥ 4 mm and BoP+ (in patients with periodontitis). For each patient, DNA was then obtained and subjected to enzymatic fragmentation to obtain 400bp fragments. Fragments were used to create library by mean of a specific kit and then sequenced using an High-Output sequencer (Illumina NexSeq 500).

RESULTS: Diabetic subjects had received the diagnosis of T2D at least 3 year before participation in the study, and their HbA1c levels were comprised between 7.1% and 8.0%. Subjects with P had a number of sites with PD ≥ 5 mm varying between 19 and 39 in T2D-P+ group, and between 18 and 29 in T2D+P+ group. The number of known species detected in the subgingival microbiome varied between 101 (T2D+P+

group) and 150 (T2D-P- group). In T2D+P- group, DNA copies for *Wolinella succinogenes* was significantly higher, at nominal level, compared to T2D-P- group. DNA copies of 9 species differed significantly between T2D+P+ and T2D-P+ groups, with those of some periopathogens being significantly lower in T2D+P+ group.

CONCLUSIONS: The composition of the subgingival microbiota differs between subjects with and without poorly controlled T2D. These differences are related to a limited number of species under conditions of periodontal health, while are more marked (9 species) under conditions of periodontitis.

Post-surgery healing with a chlorhexidine-based mouthrinse containing hyaluronic acid and an anti-discoloration: a randomized controlled trial

A. Simonelli¹, R. Farina^{1,2}, M. Pramstraller^{1,2}, M.E. Guarnelli^{1,2}, E. Maietti³, L. Trombelli^{1,2}

¹Research Center for the Study of Periodontal and Peri-Implant Diseases, University of Ferrara, Ferrara, Italy; ²Operative Unit of Dentistry, University-Hospital, Ferrara, Italy; ³Center of Clinical Epidemiology, University of Ferrara, Ferrara, Italy

BACKGROUND: The primary aim of the study was to evaluate the healing of gingival tissues following post-surgical chemical plaque control with two different chlorhexidine (CHX) mouthrinse formulations: (i) 0.2% CHX, and (ii) 0.2% CHX + anti-discoloration system (ADS) + 0.2% hyaluronic acid (HA). The secondary aim was to compare the anti-plaque, anti-gingivitis and staining effects of the two mouthrinse formulations.

METHODS: Thirty-five patients were selected for participation in a single center, parallel-arm, triple blind, RCT. Patients were included only if the surgical flap involved the interdental papilla between the canine or the first premolar or between the first and second premolar due to enhanced surgical visibility. Teeth in this area had to present an intact or reduced but healthy periodontium and were identified as the *experimental teeth*. After surgery, patients used the assigned mouthrinse (CHX or CHX+ADS+HA) three times a day for 21 days. At day 7, patients were asked to re-establish their self-performed oral hygiene regimen at experimental teeth using a specific post-surgical toothbrush, to be used up to day 21. At day 7 and 21 one calibrated examiner assessed all experimental parameters at experimental teeth. Gingival Healing Index (GHI), a composite index specifically created to assess the post-surgery conditions of the interdental papilla, was obtained by the combined evaluation of the severity of wound dehiscence and the profile of the buccal and oral aspects of the interdental papilla. Also, Plaque index (PII), Gingival Index (GI), Angulated bleeding score (AngBS) as well as tooth discoloration and tongue staining were assessed.

RESULTS: At either 7 or 21 days after flap surgery, CHX and CHX+ADS+HA mouthrinse formulations were associated with optimal GHI in $\geq 50\%$ of patients, along with a limited number of cases of major wound dehiscence and/or necrosis of the marginal portion of the papilla. Both treatment modalities showed a substantial antiplaque and antigingivitis effect with low median values of PII, GI and AngBS during the entire experimental period. Except for a lower GI in CHX group at day 7, no other significant inter-group differences were found. In both groups, tooth discoloration showed a modest but significant increase (CHX+HA+ADS: $p=0.001$; CHX: $p=0.004$), with no inter-group differences. Moreover, in both groups a

reduction in the proportion of patients with non-pigmented tongue was observed with time. At day 7, the proportion of patients with $\leq 25\%$ stained area was significantly higher in CHX+HA+ADS group than in the CHX group ($p=0.047$), but the difference was not detected at day 21. At day 21, the majority (about 50-60%) of patients in both groups showed 50% or lower of pigmented tongue area and mild intensity of tongue staining.

CONCLUSIONS: The results of the present study showed that post-surgery use of CHX and CHX+ADS+HA mouthrinses results in similar optimal plaque control and quality of gingival healing along with limited staining.

Clinical and histological evaluation of patients with altered passive eruption (APE): a case-control study

R. Aghazada, F. Nardo, C. De Gennaro, A. Pilloni

Sapienza Università di Roma, Dipartimento di Scienze Odontostomatologiche e Maxillo Facciali, Cattedra di Parodontologia, Rome, Italy

BACKGROUND: Despite literature suggests that patients with APE are more susceptible to gingivitis and periodontitis, due to the excess of gingiva which impedes the correct oral hygiene procedures, there is no clinical study confirming this assumption. This study wants to examine an experimental gingivitis (EG) in patients with APE compared to healthy patients and analyse the histological aspect of soft tissues in APE.

METHODS: 9 patients with APE for test group (TG) and 9 patients with normal anatomy of gingival tissues, as control group (CG) were selected for the study. Clinical parameters have been compared intrapatiently: an EG in one selected side (test) of maxillary arch, another side as control. The following clinical parameters were obtained from selected test and control sites:

Angulated bleeding score (AngBS)

Gingival index (MGI)

Plaque index (PLI)

Quigley Hein Plaque Index - QH

Gingival crevicular fluid volume (GCF)

Individual cast models were prepared and customized stents were obtained from the model. The stent was adapted to fit teeth (from central incisor to canine) only in test quadrant. The stents were delivered on day 0. Subjects were asked to wear the stent during oral hygiene sessions throughout the EG period, to prevent plaque removal. After EG period, patients with APE underwent a surgical correction of gingival smile. Secondary flap was removed during surgery and analyzed histologically.

RESULTS:

PI: On day 42 (T6) QH was 1.22 ± 1.64 in TG and 0.56 ± 1.33 in CG ($p=0.258$)

GI: At the end (T6) of EG, the difference in the inflammatory indices was not significant. On day 42 (T6) AngBS was 0.33 ± 0.50 in TG and 0 in CG ($p=0.206$) and MGI was 0.67 ± 0.71 in TG and 0 in CG ($p=0.029$).

Gingival crevicular fluid (µl): On day 42 (T6) GCF was 0.1 ± 0.07 in TG and 0.08 ± 0.04 in CG, which was similar to day 0 (T0) 0.10 ± 0.06 and 0.11 ± 0.03 in TG and CG respectively ($p=1.0$).

The histologic aspects were compatible with chronic gingivitis with different degrees of severity. By dividing the sub-epithelial connective tissue into two portions, collagen fibers were

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more dense in the deeper areas, parallel to gingival epithelium where the less dense surface fibers came off, with a “sunburst” pattern with respect to the alveolar bone and root surface but perpendicular to the gingival lining epithelium. In patients with APE there was an increase in size and number of fibers, corresponding to a significant sclerotization of the deep part and a loss of “laxity” of the superficial part. Microscopic characteristics confirm the hypothesis of chronic traumatism in subjects with APE associated with histologic signs of chronic plasmacellular gingivitis.

CONCLUSIONS: EG clinical trial revealed that among TG and CG there were no significant differences in plaque accumulation time and its amount. However, in case of plaque accumulation, APE is factor which facilitate the rapid development and progression of gingivitis with higher inflammation indexes (AngBs and MGI). The causes of this phenomenon could be found in anatomical differences of periodontal tissues between TG and CG; excess of gingiva, making oral hygiene difficult; a deeper gingival sulcus, facilitating bacterial growth. Our findings are compatible with studies in literature, showing that a gingival margin more coronally located reduces the protective capacity of periodontal tissues against chewing traumas, contributing to the development of chronic inflammation and predisposition to gingivitis.

Influence of flap position in fiber retention osseous resective surgery on keratinized tissue increase and patient's postoperative discomfort: a 6-month randomized, split-mouth study

G.M. Piccoli, N. La Bruna, M. Giraudi, F. Ferrarotti, F. Romano, M. Aimetti

Department of Surgical Sciences, C.I.R. Dental School, University of Turin, Turin, Italy

BACKGROUND: To the current state of our knowledge, limited information is available on soft tissue regrowth following osseous resective surgery with fiber retention technique (FibReORS) in chronic periodontitis patients. In particular, no study examined the changes over time of keratinized tissue (KT) width in relation to flap placement with respect to the bone crest after surgery. Therefore, the present randomized split-mouth study primarily aimed to assess the influence of primary flap position, apically or at the level of the bone crest, on the amount of KT at 6 months after FibReORS and secondly to compare patient-related outcomes.

METHODS: A total of 16 patients with advanced chronic periodontitis showing persistent periodontal pockets in at least two posterior sextants after cause-related therapy were consecutively enrolled. Each sextant, treated with FibReORS, was randomly assigned either to primary flap positioned 2 mm below the bone crest (Test group) or at the level of bone crest (Control group). Measurements were performed by a blind and calibrated examiner using a customized acrylic stent. KT increase and soft tissue rebound in terms of relative recession reduction after flap suture were monitored at 1-, 3- and 6-month follow-up. Patient-related outcomes were recorded during the first three weeks after surgery.

RESULTS: An overall mean KT gain was observed during the 6-month follow-up period (2.15 ± 0.92 mm in the test group versus 1.80 ± 0.87 mm for control group, $p = 0.11$). The mean amount of soft tissue rebound following surgery was 2.23 ± 1.29 mm for the test group and 1.56 ± 0.76 mm for the control group ($p = 0.05$). Interestingly, in the apically

positioned flap group about 87.6% of the coronal re-growth occurred during the first 3 months after surgery, while in the crestal group approximately 78% of the coronal re-growth occurred in the last 3 months. Both groups referred the same discomfort during the healing phase ($p = 0.51$).

CONCLUSIONS: The results of this study confirm the benefits of FibReORS in the treatment of intraosseous defects ≤ 3 mm. The positioning of the primary flap apical to the bone crest results is related to a general trend of greater coronal soft tissue regrowth and formation of wider band of KT without lowering the healing process and worsening patient discomfort.

Impact of professional hygiene and motivational strategies on the gingival health of patients with orthodontic treatment: a pilot study

A. Pango, R. Piccialli, R. Bucci, V. Donnarumma, R. Valletta, V. D'Antò

Department of Neuroscience and Reproductive Sciences and Oral Sciences, School of Orthodontics and Temporomandibular Disorders, University of Naples Federico II, Naples, Italy

BACKGROUND: The most significant etiological factors in the development of periodontal disease is the dental plaque (biofilm). Orthodontic treatment might influence the accumulation and composition of the supragingival and subgingival microflora, giving rise to inflammation, gingivitis, gingival bleeding, gingival enlargement and increased gingival pocket depth. Therefore, the association of orthodontic treatment and poor oral hygiene can cause serious damage to the periodontium. The aim of this study was to evaluate the effects of clinical and motivational strategies of the dental hygienist on the gingival health of patients undergoing fixed orthodontic treatment and clear aligners therapy after a 3-months follow-up.

METHODS: The sample comprised 40 orthodontic patients (26 females; 14 males, mean age 27.63 ± 12.62) recruited at the Section of Orthodontics and Temporomandibular Disorders of the University of Naples Federico II (Italy) with full permanent dentition. Twenty subjects (mean age 20.55 ± 8.09 years) were undergoing multibracket fixed therapy (Fixed Group – FG), while 20 subjects (mean age 34.7 ± 12.5 years) were in treatment with clear aligners (Clear Aligners Group – CAG). At the baseline (T0) the patients were submitted to an evaluation of the periodontal health status through a periodontal charting. The following clinical parameters were measured: probing deep (PD), plaque index (PI), bleeding on probing (BOP) and gingival recession (REC). Subsequently, the patients underwent a professional oral hygiene, supra- and subgingival scaling for removing bacterial plaque and calculus. Finally, all the patients were instructed for individualized toothbrushing technique. Every two weeks, the subjects were re-called for reinforcement of the instructions of the daily oral hygiene. After 3 months (T1), all patients were re-evaluated through periodontal charting. The intra-group comparisons (T1 vs. T0) were calculated with a paired sample t-test, while two-way ANOVA was used for the inter-group comparisons. The statistical significance level was set at P value < 0.05 .

RESULTS: In both groups, a significant improvement of PD (FG: p value < 0.001 ; CAG: p value < 0.0001), BOP (p value < 0.0001 in both groups) and PI (p value < 0.05 in both groups) was observed at T1. Instead,

REC was unchanged over time (FG: p value 0.1; CAG: p value 0.7). For all the variables, no effect of the appliance was shown in the inter-group comparisons. CONCLUSIONS: The role of hygienist is important in setting up oral hygiene prevention and education programs, by choosing appropriate methods and personalized tools during orthodontic therapy. An adequate control of bacterial plaque and professional dental hygiene every 3 months allows to maintain optimal gingival health, independently of the type of orthodontic therapy applied.

Effects of partial recording protocols on estimates of prevalence of periodontitis using the CDC/AAP case definition: a cross-sectional study in an adult population from North Italy

F. Romano¹, F. Deli¹, S. Perotto², A. Castiglione³, M. Aimetti¹

¹Department of Surgical Sciences, C.I.R. Dental School, University of Turin, Turin, Italy; ²Private Practice, Turin, Italy;

³Unit of Clinical Epidemiology, Città della Salute e della Scienza and CPO Piedmont, Turin, Italy

BACKGROUND: Underestimation of periodontitis prevalence for different severity thresholds of probing depth (PD) and clinical attachment loss is well documented in partial-mouth recording (PMR) protocols. Limited data is available on their accuracy when applying the periodontitis case definition introduced in 2007 by the Centers of Disease Control and Prevention and American Academy of Periodontology (CDC/AAP) for population-based surveillance. Therefore, the aim of the present study was two fold: 1) to evaluate the bias for PMR protocols in estimating prevalence of periodontitis and 2) to assess the impact of disease level and extension on periodontitis misclassification according to CDC/AAP case definition.

METHODS: This cross-sectional study enrolled a representative sample of 721 dentate individuals, 20-75 years old, living in a city in North Italy. Full-mouth examination (FME), excluding third molars, was performed to determine the true prevalence of severe and moderate periodontitis according to the CDC/AAP definition. Two PMR systems, both producing 56 sites per individual, were compared to the FME results (gold standard). They were the full-mouth mesio-buccal-distal-lingual protocol (fMB-DL) and the diagonal half-mouth four sites protocol using the mesio-buccal, disto-buccal, mesio-lingual and disto-lingual sites (pMDB-MDL) of teeth in two randomly selected diagonal maxillary and mandibular quadrants. Prevalence, absolute bias, relative bias, and sensitivity were derived for these protocols according to the CDC/AAP definition.

RESULTS: Under FME, the prevalence estimates of moderate and severe periodontitis were 39.81% (95% CI: 36.23; 43.38) and 38.14% (95% CI: 34.60; 41.69), respectively. A relative bias of approximately -3% in moderate periodontitis prevalence was provided by both PMR systems, whereas the underestimation level for severe periodontitis prevalence ranged from -28.74% (pMDB-MDL) to -14.55% (fMB-DL). The percentage of false negatives was 9% for the fMB-DL protocol and increased to 27% for the pMDB-MDL system. When CDC/AAP algorithm was applied to PMR methods, it required a threshold of $\geq 5\%$ of sites with PD ≥ 4 mm to properly identify cases of moderate periodontitis and of $\geq 25\%$ for cases of severe periodontitis. If the percentage of

pockets ≥ 6 mm deep was less than 5%, subjects with localized severe periodontitis were misclassified as healthy. This implies that PMR systems are not suitable for their early detection in population-based screening programs.

CONCLUSIONS: Both PMR protocols provided large underestimation of the prevalence of periodontitis with the pMDB-MDL protocol performing the worst under the study conditions. In spite of the advantage of requiring less resource, this limits their applicability in periodontitis surveillance. On this basis, an improvement of CDC/AAP algorithm would need to be introduced to enhance adherence to the clinical requirements.

Generalized aggressive periodontitis in 5-year-old patient: a case report with 17 years follow-up

E. Simeoni, A. Pardo, A. Signoriello, G. P. Bertelè, L. Malchiodi, G. Lombardo, P.F. Nocini

Department of Surgery, Dentistry, Pediatrics and Gynecology, Università degli Studi di Verona, Verona, Italy

BACKGROUND: Although aggressive periodontitis is a rare condition in young patients, this disease still may affect children. Several authors suggest that this form of periodontitis may be followed by severe periodontitis of permanent teeth or by healthy permanent dentition, and that the affected patients may have some underlying systemic disorder. The purpose of this study was to report about a non-surgical/ surgical periodontal and orthodontical combined approach to diagnose and effectively treat a GAgP/ LAgP diagnosed 5- years old child. The clinical and radiographic findings as well as the patient's clinical response to treatment after a 17-years follow up period are discussed.

METHODS: This study presents a case of generalized aggressive periodontitis in a 5-year-old girl. In January 2001, the patient received a diagnosis of aggressive periodontitis affecting her deciduous teeth with abundant clinical loss of attachment that started to involve also the definitive first molars. With the purpose of reduce pain and improve her oral condition, the teeth with highest mobility were extracted, and the patient was referred to a pediatrician in order to exclude the possibility of other syndromes that can include periodontitis as a clinical presentation. In March 2002 to reduce patient's discomfort, the remaining hopeless deciduous teeth were extracted and the girl was referred to the personal dentist. In November 2005, the 9-years-old girl presented deep intraosseous defects, spontaneous bleeding and mobility of the erupted teeth, receiving a diagnosis of aggressive periodontitis. The treatment consisted of Full-mouth Ultrasonic and manual subgingival debridement sessions (US-RP Full mouth) every 3-4 months, the first of which associated with antibiotic local therapy using metronidazole gel (Elyzol25% gel Colgate). In February 2007 the first permanent molars in mandible were treated with a periodontal regenerative approach using enamel matrix derivative. In May 2008, the patient started an orthodontical treatment in order to correct her III class malocclusion associated with maxillary hypoplasia. After collecting radiographical and photographic findings, the orthodontist chose to start the treatment in May 2009 with the purpose of realizing an orthodontical presurgical therapy since the skeletal discrepancies between the maxilla and the mandible did not allow a complete correction if treated only orthodontically. In 2010, the patient

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was diagnosed with polycystic ovary syndrome and profound insulin-resistance by the endocrinologist. In September 2014 the orthodontical treatment stopped waiting for the surgery to be performed. The patient decided to proceed with the usual 3-months recalls in order to maintain stable her periodontal health and to postpone the surgery in 2019. In February 2018, a complete radiographical and clinical examination was performed in order to assess the patient's general oral and periodontal condition.

RESULTS: After therapy, clinical measurements demonstrated decreasing to a maximum of 4 mm in PD (Probing Depth) of the affected sites with no suppuration and full-mouth Bleeding Score (FMBOP) lower than 5%. In 2018 periodontal and radiographic examination revealed stable clinical improvements with FMBOP of 1% and a FM-vPI score of 1%. The periodontal novel condition obtained was maintained also through the orthodontical treatment by an accurate plaque control achieved both at home and professionally with 3-months recalls followed thoroughly for 10 years.

CONCLUSIONS: Successful treatment of GAgP is considered to be dependent on early diagnosis, a suitable therapy aiming to eliminate or suppress the periodontal pathogenic microorganisms. A multi-disciplinary approach involving periodontal, surgical and orthodontical therapies led to an oral healthy environment promoting long-term maintenance for more than 15 years.

Evaluation of the knowledge of oral pathologies and oral hygiene techniques by means of who questionnaire. Multicentric epidemiologic study

E. Volpe, P. de Paola, M. Nicolò, A. Blasi, V. Iorio Siciliano, L. Fortunato

BACKGROUND: An appropriate knowledge of oral pathologies and oral hygiene methods is basic to prevent periodontal and dental pathologies. Oral disease is associated with an array of structural determinants. It is also associated with daily living conditions, and social gradients have been reported for dental caries, periodontal disease, and tooth loss. Several studies have reported a mediocre knowledge of oral hygiene pathologies, techniques and devices by the population. The aim of this study was to evaluate the knowledge level of oral pathologies and home oral hygiene techniques of population, by means of questionnaire.

METHODS: Two examiners from two different University Center (University of Naples "Federico II", University "Magna Graecia" of Catanzaro) have recruited a sample of 836 subjects, aged 18 and 65 years old. An examiner for each centre has submitted to the participants the questionnaire illustrating the contents. The questionnaire was completed anonymously, in the absence of the examiner, who recovered it after about 30 minutes.

RESULTS: The statistical analysis of the results has shown a homogeneity in terms of the mean age, gender distribution, degree of education and smoking among the subjects recruited in the two university centres. The most part of the subjects included in the study have knowledge of gingivitis, especially those that have a medium-to-high level of education. About the other two most common oral pathologies, periodontitis and caries, it has been demonstrated that the knowledge of these diseases is only the prerogative of subjects with a higher level of education. The most part of the

subjects with a medium-high level of education recognize the importance of the biannual frequency of dental check-ups. As to the oral hygiene habits of the subjects included in the study, it appears that everyone is using the toothbrush. The less common devices (interdental brush and dental floss) are used by subjects presenting medium-high education. The knowledge of these devices is less broad and transversal.

CONCLUSIONS: Within the limits of present study, the degree of education would seem to be a determining factor in the knowledge of oral and periodontal pathologies, as well as the homemade oral hygiene procedures.

Subepithelial connective tissue graft maturation over 5 years: a clinical observation

M. Corana, D. Collivasone, L. Zacconi, F. Vezzoni

Periodontal Unit, School of Dentistry, Department of Clinical-Surgical Diagnostic and Pediatric Sciences, University of Pavia, Pavia, Italy

BACKGROUND: The aim of this case report is to describe the so-called "creeping attachment" of a subepithelial connective tissue graft over 5 years considering the potential factors involved.

METHODS: A 47-year-old male patient presented with a Miller Class I recession on the buccal aspect of the mandibular right first molar, associated with a cervical abrasion. Less than 1 mm of keratinized tissue remained. The recession was treated with a subepithelial connective tissue graft partially covered with an envelope flap. Before treatment and during the supportive periodontal therapy the patient was instructed to brush the teeth properly according to the modified Bass technique. The results of the surgical procedure were evaluated after 3, 12, 24, 36 and 60 months. The abrasion was not restored because it was not symptomatic and the cervical discoloration was considered as a stable reference point to observe the maturation of the graft.

RESULTS: The initial recession measured 3.5 mm. Three months after surgery less than 50% of the defect was covered (2 mm of residual recession). The amount of residual recession decreased to 1.5 mm 12 months after treatment and to 1 mm at 24 months. The next re-evaluation of the site was made 3 years after surgery and an additional maturation was observed (0.5 mm of residual defect). Another slight improvement was noted during the 5-year recall. As a result, an almost complete root coverage was obtained.

CONCLUSIONS: This case report shows that the maturation process of a connective tissue graft could last several years; this process could significantly improve the results of the surgical correction of a gingival recession. Some studies evaluated long term results achieved using various root coverage procedures. In particular it was shown that a progressive coronal improvement of the gingival margin level could be expected using a subepithelial connective tissue graft in comparison with sites treated only with a coronally advanced flap; in the second case an apical shift of the gingival margin was observed during a five-year follow-up. Moreover, the "creeping attachment" seems to be influenced by: the convexity/concavity of the tooth surface, the thickness of the connective tissue graft and the tooth brushing method. However, the role of the factors involved

with the long term coronal maturation of a subepithelial connective tissue graft has never been deeply analyzed in the literature.

Complications of peri-implant mucogingival surgery: a challenging case-report

G.P. Patianna, L. Pittari, F. Raimondi Lucchetti, B. Poletti de Chaurand, R. Vinci

¹Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy; Specialization School in Oral Surgery, Faculty of Medicine and Surgery, Vita-Salute San Raffaele University, Milan, Italy

BACKGROUND: The main goal of the implant rehabilitation in the aesthetic area is patient satisfaction and function. A major concern is the appearance of soft tissue dehiscence in the facial aspect, common finding following implant restorations. To date, international literature shows that periodontal plastic procedures like Coronal Advanced Flap (CAF) with Connective Tissue Grafts (CTG) technique present high predictability in terms of exposed implant surface coverage.

Periodontal plastic procedures are complex, technique-sensitive interventions that require advanced skills and expertise. The aim of the following case is to report a complication after a bilaminar technique in the aesthetic buccal area of an upper central implant.

METHODS: A female patient (42 yo) in general health condition came to our attention with a complex history on an implant placed in position #11. After a trauma, she lost her central incisor and received a bone block graft harvested from the mandibular branch. After 6 months, an implant was placed and the prosthetic treatment was completed after 6 months more, without any complication or suppuration. Due to a gingival recession on the facial aspect of the implant, a Coronally Advanced Flap (CAF) with a connective tissue graft (CTG) was executed by another operator. After 12 weeks, the patient finally came to our attention with suppuration on the buccal aspect of the implant. The fistulography and CTscan showed two threads of the implant exposed. The implant was removed and a post-extractive immediate-loading implant was then placed. After an observational period of 1 month, the buccal suppuration continued. An explorative access flap was then elevated to observe the peri-implant submucosal environment and find the cause of the suppuration. Primary horizontal crestal incision was performed after removing the provisional crown from the implant, extended mesially and distally with a papilla preservation flap technique. A vertical incision was then carried out distally to increase the visibility of the operatory field, keeping the incision area away from the highly aesthetic area. A total thickness flap was elevated in order to manage properly the periostium and access directly to the fistulae. The presence of sub-connective epithelial tissue was noticed within the raised flap. The presence of this tissue highlights the importance of the management of the grafted tissue and the receiving vascular bed. In particular, the grafted connective tissue was not carefully de-epithelialized: so the epithelium proliferated below the submucosal layer. The epithelial pearls were then surgically removed with 15C blade and the flap was repositioned and sutured with 5/0 polypropylene sutures.

RESULTS: After 8 weeks of follow-up and soft tissue maturation and adaptation to the implant provisional crown, com-

plete absence of suppuration was noticed. Due to the previous surgeries, a soft tissue deficiency was observed.

CONCLUSIONS: Periodontal plastic procedure are great solutions to enhance aesthetic outcome and increase ketaritized tissue improving the peri-implant emergency profile. By the way they must be performed in the best way: in order to avoid complications, the management of the connective tissue graft and the preparation of the vascular bed with the de-epithelialization are extremely crucial.

The effects of periodontitis on adverse pregnancy outcomes

F. Graziani, S. Gennai, M. Tonelli, M. Nisi, M. Gabriele, M. Petrini

Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Pisa, Italy; Sub-Unit of Periodontology, Halitosis and Periodontal Medicine, University Hospital of Pisa, Pisa, Italy

BACKGROUND: Adverse pregnancy outcomes (APOs) cause every year the death and disability of many newborns and women all over the world. The most common APOs are low birth weight (LBW, that is defined as weight <2.5 kg at birth), preterm birth (PTB, birth at <37 weeks of gestation) and pre-eclampsia (PE, maternal hypertension, and proteinuria after the 20th gestational week). Periodontitis and APOs have been frequently associated because they are both correlated with bacterial infections and increased local and systemic inflammation. However, a not clear evidence in literature exists.

METHODS: A systematic literature review has been performed through hand and electronic search; in particular, Medline, Embase, Web of Science and Cochrane Central databases have been used to find articles published until April 2017. Studies to be included had to be non-intervention, observational studies such as cohort, case-control (cases represented by periodontally-affected pregnant women and controls by periodontally healthies pregnant) or cross-sectional in design. In the selected studies, exposure had to be the periodontal status of pregnant women (measures of inflammation, signs of disease such as pocketing and attachment level excluding tooth loss/edentulism) and outcome one parameter related to pregnancy-related complications. Only studies in the English language were selected. Once completed the electronic and hand searching and after the elimination of papers present in duplicates, a total of 1182 studies were identified for inclusion in this review. After the title, abstract and full-text analysis, a total of 109 studies were included and categorized for the following adverse pregnancy outcome: 31 LBW, 43 PTB, 17 PTLBW and 18 PE.

RESULTS: A significant association between maternal periodontitis and APOs have been found in 57 of the included studies: 19 for LBW, 20 PTB, 7 PTLBW and 13 PE. Despite the studies included in this review have been conducted in different parts of the world and results are generalizable, they are characterized by a great heterogeneity. In particular important differences have been found for the modalities of periodontal examination adopted by the studies: partial or total examination, single or multiple examiners, different calibration and training of the examiners, the different definition of periodontitis adopted as cut off of disease. Other factors that could influence results were connected with sample population enrolled in the studies: different numbers of the

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probands, different ethnicity and timing of gestation at the moment of the enrolment and examination.

CONCLUSIONS: Solid and definitive conclusions cannot be drawn, while further research is strongly encouraged. A consistent association between maternal periodontitis and PE has been found; on the contrary, the evidence about LBW, PTB, and PTLBW suggest that there might be an association with periodontitis but reported data are of high heterogeneity.

Antimicrobial photodynamic therapy as an adjunct to non-surgical periodontal treatment: a randomized, controlled clinical trial

M. Annunziata, L. Natri, G. Persico, R. Migliaccio, G. Cecoro, L. Guida

Department of Dentistry, Orthopedics and Rehabilitation, University of Campania "L. Vanvitelli", Naples, Italy

BACKGROUND: Antimicrobial photodynamic therapy (aPDT) has been suggested in adjunct to subgingival debridement for the treatment of chronic periodontitis, with the aim to benefit periodontal treatment, especially in areas of difficult access. However, its efficacy is controversial, and only limited data from controlled clinical trials are available to date. The aim of the present study was to clinically and microbiologically assess the efficacy of aPDT in adjunct to full-mouth subgingival debridement in the treatment of chronic periodontitis.

METHODS: In this 6-month single-masked, parallel group clinical trial, 24 chronic periodontitis patients were selected to receive one session of full-mouth ultrasonic subgingival debridement (FMUD). Afterwards, patients were randomly assigned to a test treatment, consisting of two adjunctive sessions of aPDT performed, one and three weeks apart, by an indocyanine green solution (Emundo, Sweden & Martina, Padua, Italy) activated by a 810nm diode-laser (Fox ARC Laser, Sweden & Martina, Padua, Italy) in sites with initial probing pocket depths (PD) >4 mm, and to a control treatment, consisting of two adjunctive sessions of sham aPDT treatment. The main outcome variable was the change in PD and, as secondary outcomes, changes in clinical attachment levels (CAL) and proportions of bleeding on probing (BOP) sites, which were assessed at baseline, 3 and 6 months. At the same time points microbiological evaluation of *Aggregatibacter actinomycetemcomitans* (A.a), *Porphyromonas gingivalis* (P.g.), *Prevotella intermedia* (P.i.), *Prevotella nigrescens* (P.n.), *Parvimonas micra* (P.m.), *Campylobacter rectus* (C.r.) was performed by real time polymerase chain reaction. Data were analysed with an intention to treat analysis, using t-test or the Mann-Witney U-test to assess for inter-group differences.

RESULTS: Both treatments resulted in significant clinical improvement at both 3 and 6 months. A higher PD reduction values in the deepest pockets ($\geq 7\text{mm}$ vs $< 7\text{mm}$) in the test group compared to the control group was registered ($P < 0.0002$ at 3 months), whereas none other inter-group difference could be evidenced. No difference in terms of microbiological changes was found between test and control group, excepting for a more pronounced reduction in A.a. and P.m. levels in the test group.

CONCLUSIONS: The additional use of aPDT to FMUD in the treatment of chronic periodontitis provided limited benefit in terms of additional clinical and microbiological improvement,

although some encouraging results in favour of the combined approach were found, e.g. for the treatment of hardly accessible sites. Further RCT performed on larger patient populations are required to confirm these results, and to see whether there is a rationale for the application of aPDT in conjunction with FMUD for the treatment of chronic periodontitis patients.

Improved technique to augment the soft tissue in atrophic ridge: case series

C. Franceschini, R. Lombardi, S. Bonomo, M. Galli

Department of Oral and Maxillo-Facial Sciences, Sapienza, University of Rome, Rome, Italy

BACKGROUND: The aim of this work was to treat and to solve horizontal localized defects of alveolar crest (1 class of Saibert) by soft tissue's augmentation in a fixed partial prosthetic. The surgical techniques consist in using connective subepithelial palatal free grafts.

METHODS: 6 patients (3 male and 3 female) aged from 25 to 55 years old were included. All patients were chosen through these criteria: intercalated missing teeth in the aesthetic zone, presence of moderate Saibert's 1 class defects, impossibility to realize implantprosthetic rehabilitation and negative medical history to systemic diseases. All surgical procedures were performed by a single operator. The used technique is the one proposed by Garber and Rosemberg. First of all, defect's size is measured by using a periodontal probe. Then we realized vestibular pouch by a single split flap on the crest; after that a dissection extended over the defect's entire surface and in proximity to the periosteum is performed, that for maximize the increase of tissue thickness. Lorenzana and Allen technique is used to taking a tissue graft from palate by a single access incision and the residue epithelial peduncle has healed by first intention. The graft is placed on the receiving site and that stabilized by suture: the first patch connects the graft to the vestibular flap by controlling the right apical-coronal position, than other stitches were positioned for restricting flap movement, at the end the vestibular flap's free margin is sutured at the palatal margin.

RESULTS: In all cases GAL (gingival aesthetic line) was respected and also patients were satisfied about the obtained result. After 6 and 12 month, tissue stability turns out to be optimal. In the final analysis we can assert that this kind of surgery is not painful for patients and don't cause distress in post-operative period. Just in two cases FANS were taken due to patients reported pain in the donor site.

CONCLUSIONS: According to the last forty years literature, the alveolar crest's augmentation by periodontal plastic surgery represents a good solution for bone defects treatment. Many techniques have been proposed during the years but everyone has specific indication according to the adopted procedure and defect's characteristics. Thanks to soft tissue increase it's possible to obtain an excellent aesthetic result because: there are no worse concavities in the crestal surface, the ridge acquires her natural form smooth and blunt, mucosa and pontic elements takes a shape than mimic a natural profile of teeth. A limit of this technique is that his effectiveness and predictability are correlated to operator skill an expert one is more capable in preparing donor and receiving sites and in the tissue management. These factors reduced accidents and complications in this surgery procedure.

PPAR15 - Adjunctive hyaluronic acid application in coronally advanced flap in miller class I single gingival recession sites: a randomized controlled clinical trial

P. Russo¹, P. Sahrman², M. Rojas³, L. Ottolenghi¹, A. Pilloni¹

¹Sapienza, University of Rome, Department of Dental and Maxillofacial Sciences, Sections of Periodontology and Preventive Dentistry, Rome, Italy; ²University of Zurich, Center of Dental Medicine, Clinic of Preventive Dentistry, Periodontology and Cariology, Zurich, Switzerland; ³University of Buenos Aires, School of Dentistry, Section of Periodontology, Buenos Aires, Argentina

BACKGROUND: Animal and in-vitro studies have demonstrated that hyaluronic acid (HA) increases the tensile strength of granulation tissue, stimulates clot formation, induces angiogenesis, increases the osteogenic potential during healing and does not interfere in the calcification nodules during bone formation. Furthermore, HA facilitates cell migration and differentiation during tissue formation and repair of both soft and hard tissues. Recently, it has been shown to improve ligament cell viability and even early osteogenic differentiation in vitro. All these aforementioned properties are essential for tissue regeneration and wound healing that take place after interventions for root coverage. Accordingly, the aim of this randomized controlled clinical trial (RCT) was to evaluate the possible advantages of adjunctive HA application in coronally advanced flaps (CAF) in the treatment of single Miller Class I gingival recessions.

METHODS: Thirty patients with one recession each were enrolled. Fifteen were randomly assigned to CAF + HA and fifteen to CAF alone. Clinical parameters like recession reduction (RecRed), clinical attachment level gain (CAL-Gain), changes in probing pocket depths (PPD) and the change in the width of keratinized tissue (KT), the number of complete root coverage (CRC) and the mean root coverage (MRC) were assessed and calculated after a healing time of 18 months. Post-operative morbidity like pain intensity, discomfort and swelling was recorded seven days after treatment using a visual analogue scale (VAS). Non-parametric distributed continuous data was tested for possible intergroup differences using the Mann-Whitney U test. Ordinal data were tested by Pearson's chi-square test. For all tests, the level of significance was 5%.

RESULTS: After 18 months, recession reduction was significantly enhanced in the test group ($p < 0.007$) as compared to controls, displaying medians and [interquartile ranges] of 2.7 [1] mm vs. 1.9 [1] mm, respectively. PPD were found to be slightly but not significantly increased in both groups without significant intergroup differences. No statistically significant difference was found for KT gain between treatment groups.

CRC turned out to be 80% for the test sites and 33.3% for control sites, resulting in a statistically significant intergroup difference of $p = 0.025$. MRC of $93.8 \pm 13.0\%$ for test and $73.1 \pm 20.8\%$ for control sites was calculated and a statistically significant difference between the groups was found ($p = 0.003$).

The test group reported lower swelling values 7 days post-surgery with VAS scores of 1 [1] for the test group and 2 [1] for the controls ($p = 0.01$). Likewise, discomfort was reported to be different with VAS score of 1 [1] for the test and 2 [2] for the control group ($p = 0.029$). However, no statistically significant difference was found for pain intensity.

CONCLUSIONS: A coronally advanced flap with adjunctive hyaluronic acid application is a predictable and safe method for single Miller class I gingival recession site treatment. The present findings indicate that the use of HA may not only improve the clinical results but also represent an option to reduce patient morbidity.

The use of a new xenogeneic 3D collagen matrix for root coverage of miller class i localized recession type defects: a 1-year follow-up case report

C. Cavalcanti¹, V. Blandi¹, M. Carere², A. Pilloni², R. Cavalcanti²

¹Sapienza, Università di Roma, Corso di Laurea Magistrale in Odontoiatria e Protesi Dentaria, Rome, Italy; ²Cattedra di Parodontologia Percorso Diagnostico Odontoiatrico Complesso, Rome, Italy

BACKGROUND: In the modern surgical periodontal therapy, reconstruction of periodontal soft tissues is a key aspect of the treatment for aesthetic and functional purposes. Over the years, different surgical methods have been proposed for the treatment of keratinized tissue deficiencies, and for single and multiple recession defects, with different techniques and approaches, with different flap designs and with or without the use of connective tissue grafts, reaching a high level of scientific evidence. More recently, research has focused on collagen matrices as substitutes for connective tissue grafts, in order to reduce post-operative discomfort and morbidity for patients, allowing to avoid a second wound at donor site. Our aim was to clinically evaluate the performance and efficacy of the use of a new collagen matrix, with a three-dimensional structure, in association with a coronally advanced flap, to achieve root coverage in Miller class I localized gingival recession type defects.

METHODS: A Miller Class I and Cairo RT 1 single gingival recession type defect was treated in order to possibly achieve complete root coverage. The gingival recession was localized on the buccal aspect of the upper right canine in a 40 years old patient. The contralateral canine was already successfully treated by mean of a coronally advanced flap and connective tissue graft (bilaminar technique) one year before, and was used for a clinical comparison between the two different techniques and approaches utilized. After periodontal causal therapy, finalized to control tissue inflammation and to give the patient proper oral hygiene instructions, in order to prevent possible pathology recurrence, surgical approach to the recession defect was performed. During surgery a trapezoid flap was designed, with two vertical release incisions on the distal and mesial aspect, with a sulcular incision at the coronal aspect and with two horizontal anticipated incisions at papilla level. The flap was elevated in a split-full-split manner, in order to get an easy advancement of the flap itself. A collagen matrix (Geistlich Fibro-Gide) was trimmed to fit to the recipient bed and, after placement, was sutured to the periosteum by mean of a 7-0 PGA resorbable suture. The flap was then sutured (6-0 PGA resorbable) above the matrix in a more coronal position. Suture removal occurred 14 days later and patient received new customized oral hygiene instructions. Patient underwent a series of control visits at 3 days, 1 week, 2 weeks, 4 weeks, 2 months, 3 months, 4 months, 5 months, 6 months, 9 months and 1 year.

RESULTS: Complete root coverage of the gingival recession was achieved and was stable at 1 year follow-up. The amount

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of keratinized tissue present at baseline was maintained after surgery and its dimension was stable after 1 year. There was no difference in terms of root coverage and surgery outcomes compared to the contralateral canine treated by mean of bilaminar technique. The contralateral site showed an excess of soft tissue volume that was judged as less aesthetic.

CONCLUSIONS: The use of a new 3D collagen matrix in a localized gingival recession surgical treatment, in association with a coronally advanced flap, gave satisfying aesthetic outcomes and seems to be a reliable procedure in terms of root coverage.

The use of a new xenogeneic 3d collagen matrix for root coverage of miller class I multiple recession type defects: a 1-year follow-up case report

R. Cavalcanti, C. Cavalcanti, E. Pacifici, M. Carere, A. Pilloni
Sapienza Università di Roma Cattedra di Parodontologia, Rome, Italy

BACKGROUND: In the modern surgical periodontal therapy, reconstruction of periodontal soft tissues is a key aspect and a goal of the treatment for aesthetic and functional purposes. Over the years, different surgical methods have been proposed for the treatment of keratinized tissue deficiencies, both for single and for multiple recession defects, with different techniques and approaches, with different flap designs and with or without the use of connective tissue grafts, reaching a high level of scientific evidence. More recently, research has focused on collagen matrices as substitutes for connective tissue grafts, in order to reduce post-operative discomfort and morbidity for patients, allowing to avoid a second wound at donor site. Our aim was to clinically evaluate the performance and efficacy of the use of a new collagen matrix, with a three-dimensional structure, in association with a coronally advanced flap, to achieve root coverage in Miller class I multiple gingival recession type defects.

METHODS: A Miller Class I and Cairo RT 1 multiple gingival recession type defect was selected to be treated in order to possibly achieve complete root coverage. The gingival recessions were localized on the buccal aspect of the upper right canine and first premolar in a 22 years old patient. The contralateral side was already successfully treated by mean of a coronally advanced flap with selective placement of connective tissue graft (bilaminar technique) one year before, and was used for a clinical comparison between the two different techniques and approaches utilized. After periodontal causal therapy, finalized to control tissue inflammation and to give the patient proper oral hygiene instructions, in order to prevent possible pathology recurrence, surgical treatment of the recession defects was performed. During surgery an envelop coronally advanced flap for multiple recessions (Zucchelli & De Sanctis) was designed, with an intrasulcular incision at the coronal aspect of each tooth and with angulated horizontal anticipated incisions at papilla level. The flap was elevated in a split-full-split manner, in order to get an easy advancement of the flap itself. A collagen matrix (Geistlich Fibro-Gide) was trimmed to fit to the recipient bed and, after placement, was sutured to the periosteum by mean of a 7-0 PGA resorbable suture. The flap was then sutured (6-0 PGA resorbable) above the matrix in a more coronal position. Suture removal occurred 10 days later and patient received new customized oral hygiene instructions. Patient underwent a series of control

visits at 1 day, 4 days, 10 days, 3 weeks, 1 month, 2 months, 3 months, 4 months, 5 months, 6 months, 9 months and 1 year. **RESULTS:** Almost complete root coverage of the two gingival recessions was achieved and was stable at 1 year follow-up. The amount of keratinized tissue present at baseline was maintained after surgery and its dimension was stable after 1 year. There was no difference in terms of root coverage and surgery outcomes compared to the contralateral canine and first premolar treated by mean of bilaminar technique. The contralateral site showed a prominence in the soft tissue contour that was considered less aesthetic by the patient perception.

CONCLUSIONS: The use of a new 3D collagen matrix in surgical treatment of multiple gingival recessions defect, in association with a coronally advanced flap, gave good aesthetic outcomes and seems to be a reliable procedure in terms of root coverage.

Surgical treatment of a periodontal infra-bony defect associated with a cemental tear using hyaluronic acid. A case report with two-year follow-up

F. Nardo, M.A. Rojas, N. Cvetkova, A. Pilloni

Department of Oral and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy

BACKGROUND: Cemental tears are an unusual type of dental root fracture which consists in the detachment of a cemental fragment from the underlying root surface. These lesions can cause a rapid localized attachment and bone loss and even a periapical tissue destruction. The aim of this report is to present a case of periodontal involvement associated with a cemental tear and to describe its surgical treatment using a regenerative approach with hyaluronic acid and a collagen membrane.

METHODS: A 61 year-old man presented with spontaneous pain on the maxillary right central incisor which displayed an erythematous area and swelling at the level of the attached gingiva. Clinically, probing pocket depth was less than 4 mm at all sites of the element, tooth mobility was absent and the tooth was vital. Radiographic and CT scans examination revealed a moderate loss at periapical and buccal wall bone. An exploratory surgery was performed: a mucoperiosteal flap was elevated (according to Modified Papilla Preservation Technique) and the granulation tissue was removed. A three-walls infra-bony defect was then observed in correspondence of the aforementioned tooth: the buccal wall bone was absent. A small partially detached cemental fragment of the root structure was found on the mesial side of the tooth and it was removed. A root planing was performed and the root surface was carefully observed in order to prevent the presence of a root fracture. The infra-bony defect was treated with hyaluronic acid and covered with a reabsorbable collagen membrane. The flap was coronally displaced and sutured covering the cementum-enamel junction. Sling and interrupted sutures were used and a frenulotomy was made at the end of the surgical procedure. Post-operative pain and edema were controlled with anti-inflammatory drugs. The patient was instructed to avoid any trauma at the surgical site. A 60 second rinse with 0.12% chlorhexidine digluconate was prescribed twice a day for two weeks. The sutures were removed two weeks later.

RESULTS: Four weeks after the surgical procedure, a control visit was made: the patient was asymptomatic and soft tissues

revealed good healing. No clinical signs and symptoms were noticed during the periodontal maintenance. Two-year follow-up was successful: CBCT scans showed bone filling of the periapical defect, the reconstruction of the buccal wall bone and there was no evidence of any cemental root fragments. Besides, soft tissues were clinically healthy.

CONCLUSIONS: Moderate to severe periodontal attachment and bone loss associated with cemental tears can be successfully treated with the removal of the detached cemental fragments and a regenerative surgical approach. This is the first case reported in literature concerning an infra-bony defect associated with cemental tear treated with hyaluronic acid and a reabsorbable membrane by which clinical and tomographic success and stability were achieved at two-year follow-up.

Early periodontal wound healing assessment methods: a literature review

L. Marini, W. Floris, R. Aghazada, M. Rojas, P. Russo, M.A. Cassini, A. Pilloni

Sapienza, Università di Roma, Corso di Laurea Magistrale in Odontoiatria e Protesi Dentaria, Cattedra di Parodontologia, Percorso Diagnostico Odontoiatrico Complesso, Rome, Italy

The early phase of wound healing seems to be decisive to reach the periodontal surgical final outcome. In particular, the first postoperative weeks appear to be critical for the maintenance of wound stability and have been universally recognized to be determinant for periodontal wound healing following regenerative procedures. Therefore, early wound healing assessments methods, that allows clinicians to follow and over time manage its evolution, could be important. Up to date, numerous methods have been proposed for the determination of oral soft tissues wound healing. The first index, the Healing Index (HI), was introduced by Landry et al. (1988) and evaluated tissue color, bleeding response to palpation, presence of granulation tissue, characteristics of incision margin, and the presence of suppuration. This index permits the clinician to assess the wound healing through a classification from grade 1 to grade 5. The very poor healing wound is classified as grade 1, whereas the excellent as grade 5. The second one, the Early Healing Index (EHI), was developed by Watchel et al. (2003), classifying the healing wounds in 5 degrees, following surgical treatment of intrabony defects. It differentiates not only between complete and incomplete closure of flaps but also it registers both the amount of fibrin or necrosis in case of complete or incomplete closure, respectively. The third index, the Wound Healing Index (WHI), was introduced by Huang et al. (2005), which evaluated the periodontal soft tissue wound healing, subsequently a root coverage procedure, with a differentiation from score 1 to score 3.¹⁰ Wounds were scored 1 in case of absence of gingival edema, erythema, suppuration, patient discomfort and flap dehiscence; 2 uneventful healing with slight gingival edema, erythema, suppuration, patient discomfort and flap dehiscence, but no suppuration; 3 poor wound healing with significant gingival edema, erythema, suppuration, patient discomfort and flap dehiscence, or any suppuration. Furthermore, other authors choose to evaluate periodontal soft tissues healing after surgery through different approaches: Cortellini et al. (2001), Tonetti et al. (2004), and Sanz et al. (2004) recorded independently and dichotomously parameters such edema, hematoma, suppuration, flap dehiscence; Hagenaaers et al. (2004) developed a two-level score (both from 0 to 2) regarding swelling and color of gingival tissues. Even though numerous methods have been developed,

an assessment system ready to use during the early wound healing of the whole spectrum of periodontal surgical procedures seems to be still complex to achieve. Among the limitations of the previously described methods can be listed: (1) not all the parameters, referred to the wound healing clinical features, are included in each assessment method; (2) most of them are designed to follow the wound healing starting the evaluation at 1 or 2 weeks after surgery and not since the very beginning (e.g. 24h after surgery); (3) some of them comprehend excessive parameters in the same score of the index, assembled in an inflexible arrangement, avoiding a proper classification of the wound and generating confusion when the evaluation is performed; (4) some methods evaluated the healing features dichotomously without an integration of the information obtained by each parameter, leading to a less organic assessment of wound healing; (5) some parameters could not be objectively evaluated because lacking of an adequate definition of their different clinical presentation; (6) do not allow their use in the evaluation of every kind of surgical procedure.

Analysis on the impact of patients' age and sex on the length of first upper premolars

A. Punzo¹, L. Montanaro¹, M. Rojas², C. Trezza¹, A. Pilloni¹

¹Sapienza, Università di Roma, Corso di Laurea Magistrale in Odontoiatria e Protesi Dentaria, Cattedra di Parodontologia, Percorso Diagnostico Odontoiatrico Complesso, Rome, Italy; ²Universidad de Buenos Aires, Catedra de Periodoncia, Buenos Aires, Argentina

BACKGROUND: Root trunk is the multi-rooted tooth's portion that is located between the cementum enamel junction (CEJ) and furcation. Root trunk dimensions (RTD) play an important role in the diagnosis, prognosis and treatment of periodontitis. In general, periodontal therapy (especially non-surgical therapy) is less effective in multi-rooted than in single-rooted teeth and the progression of the disease is quicker in the multi-rooted. The aim of this study is to evaluate the RTD of first maxillary premolars and its association with age and sex in this context.

METHODS: The sample included 110 cone beam computed tomographies (CBCT). Images comprised 220 maxillary first premolars (of both sides, each) from Italian systemically healthy patients aged between 18 and 70 years presenting for dental treatment in the periodontal section of "Università La Sapienza". None of these teeth had previously undergone periodontal treatment. The tooth length (TL) and the root trunk length (RTL) were measured. These two parameters were considered dependent variables, while sex and age were considered as independent variables.

RESULTS: Dependent variables were found to have a normal distribution. No statistically significant correlation was found between RTL and TL. Within the assessed cohort, longer RL (Root length) and longer RTL were observed in younger patients than in older subjects. Single rooted first left premolars were more frequent in older patients while right ones did not show a significant difference regarding the root number. Females had statistically significant more first premolars with only one root than male patients ($p = 0.05$).

CONCLUSIONS: Patients' age was found to be associated with RTL and RL but only in left premolars. Moreover, first premolars with one root only were found more frequently in older patients, where the distribution was symmetrical in the left and right maxilla. Sex seemed to have only a minor

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influence on the frequency of single rooted teeth of the right side of the mouth. Further studies should evaluate a possible asymmetry as observed between the two sides of the maxilla in the present study in order to strengthen evidence and understanding of different variables that could influence the root trunk dimensions. These future studies should not only rely on maxillary first premolars, but on all multi-rooted teeth in both jaws.

Influence of local risk indicators upon relative site-specific bacterial charges in chronic periodontitis patients: multilevel and cluster analysis on 6 periodontal pathogens identified by mean of quantitative real-time pcr microbiological test

L. Lo Bianco ¹, M. Montevecchi ¹, A. Spighi ¹, G. Piana ², L. Checchi ¹

¹*Alma Mater Studiorum, Università di Bologna, Unit of Odontostomatological Sciences, Division of Periodontology and Implantology, Department of Biomedical and Neuromotor Sciences, Bologna, Italy;* ²*Alma Mater Studiorum - Università di Bologna, Unit of Odontostomatological Sciences, Dental service for patients with special needs - Department of Biomedical and Neuromotor Sciences, Bologna, Italy*

BACKGROUND: The aim of the present study was to analyze the correlation among the site-specific relative bacterial charges and the local risk indicators.

METHODS: The data have been collected from the clinical and radiographic records of 40 consecutive chronic periodon-

titis patients. The examined indicators analyzed were presence or absence of: furcations, open contacts, enamel pearls, malposition, root proximity, root fracture, endodontic problem, over hanging restoration and resorption. Furcation involvement and open contacts were previously identified by a pilot study as guidance indicators. The sample was divided into two groups: 20 subjects with at least one guidance indicator and 20 subjects with out. The studied bacteria were: *Aggregatibacter actinomycetemcomitans* (Aa), *Porphyromonas gingivalis* (Pg), *Tannerella forsythia* (Tf), *Treponema denticola* (Td), *Fusobacterium nucleatum* (Fn) e *Campylobacter rectus* (Cr). The relative charges of the above mentioned bacteria were analyzed by mean of a site-specific quantitative Real-Time PCR microbiological test. With the Cluster analysis ecological niches presence was searched and the Multilevel analysis was used to quantify local risk indicators influence upon bacterial relative charges.

RESULTS: The Cluster analysis shows that all sites with the presence of at least one guidance indicator fall in the cluster where the relative bacterial charges are the highest. The Multilevel analysis indicates that the relative charges of *Tannerella forsythia* (Tf) and *Porphyromonas gingivalis* (Pg) are significantly more elevated in sites with presence of furcation and open contacts compared to the ones without ($p=0,004$; $p=0,021$).

CONCLUSIONS: The results show the prognostic importance of the individuated guidance local risk indicators and their influence on the examined site-specific relative bacterial charges. From this study emerges that such local risk indicators can be considered as real ecological niches. In a comprehensive periodontal treatment a special effort should be made to eradicate these ecological niches.

PATOLOGIA E MEDICINA ORALE

Application of a non-invasive sampling procedure based on oral brushing and DNA methylation analysis of a 13-gene panel to study high risk patients to develop oral cancer

R. Rossi¹, L. Morandi², A. Gabusi¹, A. Tarsitano³, L. Sozzi¹, S. Kavaja¹, C. Amadasi¹, A. Spinelli¹, D. B. Gissi¹

¹Department of Biomedical and Neuromotor Sciences, Section of Oral Sciences, University of Bologna, Bologna, Italy; ²Department of Biomedical and Neuromotor Sciences, Section of Anatomic Pathology "M. Malpighi" at Bellaria Hospital, University of Bologna, Bologna, Italy; ³Department of Biomedical and Neuromotor Sciences, University of Bologna, Section of Maxillo-facial Surgery at Policlinico S. Orsola-Malpighi, Bologna, Italy

BACKGROUND: Screening populations for the early detection of patients at risk to develop an oral neoplasia is an attractive strategy to reduce the burden of Oral Squamous Cell Carcinoma (OSCC). Recently our research group developed a non-invasive procedure based on oral brushing as method for collecting samples followed by DNA methylation analysis of 13 pre-selected genes. In a recent paper, using this non-invasive method, we correctly stratified OSCC from healthy donors (sensitivity 97,1%, specificity 100%, AUC 0.981). The purpose of the present study is to apply this non-invasive procedure in four different risk groups of patients: a group of healthy donors, two different groups of patients with Oral Potentially Malignant Lesions (Oral Leukoplakia and Oral Lichen Planus) and a group of patients surgically treated for oral cancer. **BACKGROUND:** of the study is to evaluate the between-group differences and the epidemiologic, clinical and histological variables that may influence the methylation profile in each group.

METHODS: Oral brushing samples were collected from 54 healthy donors, 44 patients with OPML (28 Oral leukoplakia "OL" and 16 Lichen Planus "LP") and 26 patients surgically treated for OSCC (ex-OSCC). In all cases DNA methylation analysis was applied as previously described by a precedent paper of our research group. Each sample was defined as positive or negative in relationship to a calculated cut off value. One-way ANOVA analysis with multiple range test and Chi square analysis were used to evaluate the presence of any between-group significant difference and the variables that may influence the methylation profile in each group.

RESULTS: None of healthy donors was detected as positive, whereas 20/28 (71,4%) of patients with OL, 3/16 (18,8%) with LP and 8/26 (30,7%) ex-OSCC showed higher values with respect to cut off. OLs showed significant ($p<.01$) higher values with respect to all other groups while healthy donors showed significant ($p<.01$) lower values with respect to all other groups. In patients with OLs, presence of high grade dysplasia was the only variable significantly related to posi-

tive results: indeed 8/8 OLs with high grade dysplasia resulted positive with respect to 12/20 OLs with no or mild dysplasia (Chi 4,480 $p<.05$).

CONCLUSIONS: Larger population studies and an adequate follow-up period are necessary to confirm these preliminary data, but DNA methylation analysis in epithelial cells collected by oral brushing seems to be a promising genetic method to discern lesions at high risk of developing OSCC.

Outcome of gingival epithelial dysplasia: a retrospective study in 17 years

A. Gambino, M. Brega, E. Bressan, G. Antonucci, R. Broccoletti
Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy

BACKGROUND: Gingival epithelial dysplasia (GED), frequently the precursor of squamous cell carcinoma (SCC), characteristically presents itself as a predominantly white, red, or a mixed of white and red mucosal lesion also in the gingiva. The management of OED is far from satisfactory and there are no large trials that propose guidance as to the most reliable form of treatment, with regard to the prevention of future development of oral cancer. It is not possible to offer evidence-based recommendations for specific surgical, medical or other interventions. The aim of this study to analyze the management and prognostic factors of GED in a population of North-Western of Italy.

METHODS: It have been analyzed data collected of gingival precancerous lesions of patients afftered to Oral Medicine Section- CIR Dental School , University of Turin, from January 2000 to December 2017. Demographic information of age at the time of diagnosis, gender, smoking, site of lesion, grade of GED (mild, moderate, severe) SCC evolution, treatment and recurrence were examined.

RESULTS: A total of 219 patients with diagnostic hypothesis of GED were initially selected. After the data trimming process, 18 cases of GED were studied, 6 men and 12 women (mean age: 63.80) was observed. The average age at diagnosis was 63.58 years for females and 64.17 years for males. Two patients were smokers. Maxillary gingiva was the side mainly involved and with lesions are mainly described as elementary clinical feature. 61% patients had lesions with histopathological features of mild GED, 28% had moderate GED and 11% had severe GED. During the follow-up period, 5 patients developed an oral SCC at the site of the OED; the diagnosis was based on histopathological examination of a representative incisional specimen. All patients underwent active treatment after the initial histopathological diagnosis and the recurrences we have found in... patients.

ABSTRACT

CONCLUSIONS: The risk of malignant development does not seem to be predictable. Surrounded by the limitations of the retrospective designs, we have showed the principal features of GED: it is frequently in maxillary gingiva of a female population, mild GED developed SCC and smoke wasn't real risk factor in these patients. Some articles reported that patients with periodontitis were more likely to have poorly differentiated oral cavity SCC than those without periodontitis: this is another aspects for further prospective studies.

The role of microRNA in the early diagnosis of oral cancer: validation of a new procedure based on non-invasive sampling method

A. Spinelli ¹, L. Scapoli ², L. Morandi ³, A. Gabusi ¹, A. Tarsitano ⁴, L. Felicetti ¹, R. Rossi ¹, L. Luccarini ¹, D. Servidio ¹, D. B. Gissi ¹

¹Department of Biomedical and Neuromotor Sciences, Section of Oral Sciences, University of Bologna, Bologna, Italy; ²Department of Experimental, Diagnostic and Specialty Medicine, University of Bologna, Bologna, Italy; ³Department of Biomedical and Neuromotor Sciences, "M. Malpighi" Section of Anatomic Pathology at Bellaria Hospital, University of Bologna, Bologna, Italy; ⁴Department of Biomedical and Neuromotor Sciences, University of Bologna, Section of Maxillo-Facial Surgery at Policlinico S. Orsola-Malpighi, Bologna, Italy

BACKGROUND: MicroRNAs are short non-coding RNAs that regulate gene expression and are crucial to tumorigenesis. miRNAs possess unique properties that make them promising markers to be used in screening tests associated with non invasive collecting procedures: they are abundantly expressed in lesions and in control tissues and their isolation and quantification seems to be easy, convenient and reproducible also in body fluids or in exfoliated cells. The aim of the present study was to analyze the expression of a panel of miRNAs in epithelial cells collected by oral brushing from Oral Squamous Cell Carcinomas (OSCC), from regenerative areas after OSCC surgical resection and from their respective normal distant mucosa.

METHODS: Oral brushing specimens were collected from: 14 OSCC and their respective normal mucosa in distant areas, 13 samples from regenerative areas after OSCC surgical resection. Finally oral brushing specimens from 24 healthy donors were collected as control. In all different groups the expression levels of miRNAs were evaluated by real time PCR. Eight target were evaluated (mir-21, miR191, miR-375, miR-345, miR-181b, miR146a, miR-649 and miR-518b). RNU44 was used as endogenous reference for data normalization. The miRNA expression levels across groups were assessed by ANOVA statistics, Tahmane post-hoc test and t-student for paired samples.

RESULTS: A highly significant between-group difference in expression was found for miR21 (F=6.576 p<.000), miR191 (F=17.707, p<.000) and miR146a (F=6.974 p<.000). The major difference was observed between samples from healthy donors and from OSCC brushing, whereas no significant differences were observed between areas infiltrated by OSCC and their respective normal distant mucosa. Furthermore, altered expression of miR-146a and miR-191 was also observed in regenerative areas after OSCC resection.

CONCLUSIONS: Altered miRNA profiles can be expressed both in OSCC and in distant areas from OSCC, but even in regenerative areas following OSCC resection. These

preliminary results suggest that microRNAs sampled with a non invasive method can be reliable biomarkers in oral tumorigenesis.

The role of fascin in oral squamous cell carcinoma

S. Rizzato ¹, C. P. Rodrigues ², T.A. Salo ², A. Angelini ³, M. Fedrigo ³, S. Sivolella ¹

¹Department of Neurosciences, Section of Dentistry, University of Padua, Padua, Italy; ²Unit of Cancer Research and Translational Medicine, Faculty of Medicine and Medical Research Center Oulu, Oulu University Hospital, University of Oulu, Oulu, Finland; ³Department of Cardiac, Thoracic and Vascular Sciences, University of Padua, Padua, Italy

BACKGROUND: Fascin is a highly conserved actin-binding and bundling protein that plays a key role in the assembly and stability of cell protrusions and other actin-based structures underneath the plasma membrane that aid in cell mobility, migration and invasion. Over the last decade, multiple studies have reported that fascin is upregulated in more aggressive and metastatic epithelial cancers and that its overexpression is a relevant independent prognostic index of poor outcome. An overview of the potential value of fascin in oral squamous cell carcinoma (OSCC) is presented.

METHODS: A systematic search of the literature was performed through PubMed database by using the following key words strategy: ("fascin"[Supplementary Concept] OR "fascin"[All Fields]) AND (("mouth"[MeSH Terms] OR "mouth"[All Fields] OR "oral"[All Fields]) AND ("carcinoma, squamous cell"[MeSH Terms] OR ("carcinoma"[All Fields] AND "squamous"[All Fields] AND "cell"[All Fields]) OR "squamous cell carcinoma"[All Fields] OR ("squamous"[All Fields] AND "cell"[All Fields] AND "carcinoma"[All Fields])). The search identified 8 relevant articles and after abstract review, 7 studies were classified appropriate.

RESULTS: The expression levels of fascin protein in OSCC tissues and cell lines were evaluated by most of the studies. Fascin is upregulated in tumoral cells and tissues and may functionally contribute to disease progression. The levels of fascin expression and frequency of overexpression show a gradual increase in the progression from normal epithelium, to dysplasia, and finally OSCC. The fascin-overexpressed OSCC cells form longer and thicker microspikes, develop more filopodia, show significant increase in cell motility, disorganization of cell-cell contacts and decrease in E-cadherin levels (events that are often observed during epithelial mesenchymal transition). Both the intensity and distribution of fascin immunoreactivity are correlated with size of the tumor, lymph node metastasis, clinical staging, histological grading and poor patient survival. Fascin knockdown, obtained by silencing its gene, has no significant effects on viability and proliferative potential of OSCC cells but it results in significant suppression of migration and invasion as well as decreased adhesion of OSCC cells.

CONCLUSIONS: The identification of protein expression profiles is important to understand oral tumorigenesis, as well as to undercover new biomarkers for early detection, prognosis and development of new therapeutic targets. Fascin is one of the most significant protein upregulated in OSCC and its expression is related with increased cytoskeletal protrusions, invasive and metastatic ability of

OSCC cells. Fascin may have an important role on OSCC development and progression. However, the role of fascin protein has not been yet well clarified. Thus, further studies are needed to understand its mechanisms of action and to establish fascin as a routine therapeutic target for patients with OSCC.

Narrow band imaging in the follow-up of high-risk patients for early diagnose of OSCC: preliminary results

A. Guida¹, A. Crispo², M.G. Maglione¹, F. Longo¹, S. Villano¹, E. Pavone¹, C. Aversa¹, F. Ionna¹

¹S.C. Chirurgia Maxillo-Facciale-ORL, "INT, IRCCS Fondazione G. Pascale", Naples, Italy; ²S.C. Epidemiologia e Biostatistica, "INT - IRCCS Fondazione G. Pascale", Naples, Italy

BACKGROUND: Oral Squamous Cell Carcinoma (OSCC) is the sixth cause of cancer death throughout the world. Early diagnosis may dramatically influence survival. OSCC has high recurrence rate and it is strongly related to smoking. It may also arise from dysplastic lesions or chronic inflammatory disease (oral lichen planus, chronic hyperplastic candidiasis). Narrow band imaging (NBI) is a novel optical digital method of image-enhanced endoscopy, revealing the thin capillary network on the mucosal surface (intrapapillary capillary loops, IPCL); four different IPCL patterns are usually identified, from I-IV, increasingly associated with malignant lesions. We investigated if NBI could be a useful tool in high-risk patients' follow-up in order to perform early diagnosis of neoplastic lesions.

METHODS: High risk patients (history of OSCC, oral dysplasia, chronic inflammatory disease, voluptuous risk factors) were prospectively enrolled in this non-randomized study from 2014 to December 2017. Patients underwent NBI visits every 3, 4 or 6 months, according to their anamnesis. Lesions showing NBI pattern IV were considered as "positive"; if a pattern IV lesion turned out as a OSCC/Cis or High Grade Dysplasia at histopathological evaluation, it was considered a true positive. Lesions showing IPCL I-II-III were considered as "negative"; they were considered true negative if histopathological diagnosis excluded OSCC/Cis or High Grade Dysplasia. White lesions with nbi pattern I and II, which did not showed clinical compatibilities to Oral Lichen Planus, were not biopsied and classified as "frictional hyperkeratosis" (at least 24 months follow-up). Positive Predictive Value (PPV), Negative Predictive Value (NPV), Sensitivity, Specificity, Positive Likelihood Ratio (PLR), Negative Likelihood Ratio (NLR) and accuracy were calculated; sex, age and voluptuous factors (smoking) were statistically evaluated as independent factors, to avoid biases.

RESULTS: 47 lesions from 45 patients (age median 60 – range 19-90; mean 59 ± 14) were examined. Mean follow-up was 21 ± 13 months. Histopathological diagnoses were 11 OSCC/Cis, 1 High Grade Dysplasia, 2 Medium Grade Dysplasia, 3 Low Grade Dysplasia, 1 Proliferative Verrucous Leukoplakia (PVL), 12 Lichen Planus, 1 Chronic Hyperplastic Candidiasis, 11 frictional hyperkeratosis, 2 Actinic Keratosis, 3 Papilloma. Sex (p=0.9), age (p=0.1), and smoking (p=0.5) were not found significantly associated with NBI pattern. NPV and PPV were 100% and 70.6% respectively; sensitivity was 100%, specificity was 85.7%; PLR and NLR were 7 and 0 respectively; accuracy was 89.4%. All these statistical evaluations were found statistically significant (p≤0.5). In two cases, patients being followed-up for previous OSCC,

had a negative white-light surgical scar, but thanks to a pattern IV NBI examination a recurrence was early diagnosed. In another patient, in follow-up for an erosive lichen planus, which had steadily shown NBI patterns II – III for more than a year, OSCC was early diagnosed thanks to a NBI pattern switch to IV.

CONCLUSIONS: NPV, PPV, sensitivity, specificity, PLR, NLR and accuracy of the present study were coherent with literature. Three OSCC early diagnoses in clinically white-light negative patients were performed; as showed by literature, this will have a strong impact on these patients' survival and quality of life. In the definitive study, further statistical evaluation will be performed, to understand implications between histopathological diagnosis and NBI pattern. Our study showed positive preliminary results, coherent with abundant scientific literature; NBI may be thus considered a reliable diagnostic tool for expert clinicians in the follow-up of high-risk patients.

Uncommon presentation of actinomycosis in a young healthy woman

D. Karimi, M. Cabras, A. Gambino, R. Broccoletti, P.G. Arduino

Department of Surgical Sciences, Oral Medicine Section, CIR-Dental School, University of Turin, Turin, Italy

BACKGROUND: Actinomycosis is an infrequent chronic infection considered one of the most misdiagnosed oral diseases. Tongue involvement is rare and, if undetected, can lead to extensive tissue destruction. The aim of this work is to present a case report of such unusual manifestation.

METHODS: A 35-year-old woman with unremarkable medical history was referred to the Oral Medicine Section of the CIR Dental School of Turin, complaining about a lesion arisen on the upper surface of the tongue three days before. When thoroughly questioned, she recollected of a similar lesion, which had appeared two months before in the same area but successfully treated with systemic antibiotic and corticosteroid therapy. At conventional oral examination, a solitary submucosal nodule on the right paramedian surface of the tongue dorsum was detected, presenting with a pinkish-yellowish color and stretched-elastic consistency, causing mild tenderness to palpation; however, neither restriction of the tongue movement nor cervical lymphadenopathy were noticed. Due to these non-specific clinical features, an incisional biopsy was performed on the same day: a purulent leakage enriched with yellowish granules, suggestive for bacterial aetiology, occurred right after the first scalpel incision. Therefore, a subsequent antibiotic treatment, in the form 1 gram of amoxicillin, 3 times daily for seven days, was administered; local antiseptics was also provided through chlorhexidine mouth rinse tid for the next seven days. At the same time, a series of blood tests were carried out in the form of a complete blood count with leukocytes differential count, as well as a lymphocyte typing. On the other hand, serum ACE and Quantiferon TB were required to evaluate the presence of underlying granulomatous diseases. Finally, the pathologist's examination revealed the presence of inflammatory infiltrate of granulocytes within the oral mucosa, in relation with colonies of Actinomyces organized in fungus-like branched networks. One month after the first visit, a complete healing of the tongue was obtained, with no traces of the pre-existing nodule; at the same time, all the blood tests were within range:

ABSTRACT

hence, a final diagnosis of oral actinomycosis was formulated. RESULTS: Actinomycosis is a chronic suppurative infection mainly caused by *Actinomyces israelii*, although other types such as *A. naeslundii*, *odontolyticus*, *mayeri*, *viscosus* are found. A presumptive diagnosis can be made based on the identification of the so-called "sulfur granules" which represent colonies of bacteria. Clinical manifestations of oral actinomycosis can be often confused with other type of infections, such as granulomatous diseases and also different types of neoplasms.

CONCLUSIONS: Lingual actinomycosis is rare, representing less than 3% of all reported cases. This rarity can be explained by the fact that the histophysiological characteristics of the tongue make it resistant to infection. For these reasons, differential diagnosis of a yellowish submucosal nodule of the tongue should also contemplate lingual abscess, lipoma, and granular cell tumour.

Recurrent aphthous ulcerations in the patient affected by gastrointestinal disorders: a questionnaire as a complementary diagnostic tool

A. Melis, M. Cabras, A. Gambino, P.G. Arduino, R. Broccoletti
Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy

BACKGROUND: Recurrent aphthous ulcers are the most common lesions of the oral mucosa in the general population. Local trauma, genetic factors, nutritional deficiencies, viral and bacterial infections, immune or endocrine disturbances have all been implicated as etiologic factors. Although a subset of patients may have a diagnosis of idiopathic recurrent aphthous stomatitis (RAS), sometimes oral aphthous-like ulcers (ALU) can be the earliest manifestation of an unacknowledged systemic disease. BACKGROUND: of the work was to focus on the association between oral ALU and four diseases with gastrointestinal involvement - Behçet disease (BD), Crohn disease (CD), Coeliac disease (CoD) and Reactive Arthritis (ReA) - and to propose a questionnaire as a further diagnostic tool for everyday clinical practice.

METHODS: At first was conducted a literature research in PubMed in order to acquire the most thorough and recent reviews, published between 2010 and 2017, concerning BD, CD, CoD and ReA. Therefore, a second PubMed research was outlined, investigating the muco-cutaneous, gastrointestinal, genital, articular and ocular manifestations of the above mentioned disease.

RESULTS: Oral ALU can be recognized in 20-30% of CD, in 3-61% of CoD, in 92-100% of BD and 9-40% of ReA. Gastrointestinal system can be associated in CD with alternating constipation and diarrhea, in ReA as a prodromal acute diarrheic episode, whereas CoD and BD may have overlapping symptoms, such as abdominal pain, recurring diarrhea with blood and/or mucus in stools. Urogenital manifestations include typical ulcers in BD, urethritis in ReA, cystitis and higher risk of urolithiasis in CD and higher risk of spontaneous miscarriage or premature childbirth in CoD. Skin may be affected by blisters, such as those of dermatitis herpetiformis in CoD, by nodules, in the form of a proper erythema nodosum in CD or with erythema nodosum-like lesions in BS and by ulcers, such as pyoderma gangrenosum, again in CD. Eyes can be one of the most affected sites in ReA and BD, respectively with conjunctivitis or uveitis, an important

deficiency of vitamin A may cause ocular affection in CoD, furthermore episcleritis and uveitis can arise in CD. Peripheral arthritis and enthesitis can occur in BS, CD and CoD, whereas an asymmetric oligoarthritis of the lower limbs is one of the three major criteria required in ReA. The whole group of these clinical information was processed into a questionnaire characterized by simple questions concerning the features of the aphthous stomatitis and the signs and symptoms of gastro-intestinal, ocular, articular, cutaneous and uro-genital involvement.

CONCLUSIONS: The clinical validity of this questionnaire must be tested more extensively on a large number of patients. Further proposals may consider integration with specific hemato-chemical tests usually required in an Oral Medicine Unit for patients with a clinical history of recurrent aphthous ulcerations.

Exclusively oropharyngeal histoplasmosis leading to diagnosis of AIDS: a singular case report and review of literature

M. Cabras¹, A. Gambino¹, L. Chiusa², P. G. Arduino¹, R. Broccoletti¹

¹Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy; ²Pathologist Unit, Città della Salute e della Scienza di Torino, University of Turin, Turin, Italy

BACKGROUND: To describe a case of exclusively oropharyngeal histoplasmosis leading to diagnosis of AIDS and review the current literature.

METHODS: In September 2017, a 60-year-old male patient was referred to our Oral Medicine Section, complaining of severe pain, arisen a few months before, which had reached such an intensity that was preventing him from feeding or properly speaking; he reported to be otherwise well. At the conventional oral exam the patient presented a wide, infiltrative ulcer involving the left cheek and the retromolar trigone, as well as the left anterior and posterior palatine pillars. Due to the worrying extension and clinical features, suspecting an oral squamous cell carcinoma (OSCC), an incisional biopsy of both left cheek and of palatal mucosa was performed. Opioids were prescribed to reduce pain, facilitating food and water ingestion. The pathologist's examination of the samples did not confirm the hypothesis of an OSCC, reporting an inflammatory, granulomatous process, rich with histiocytic nests, lymphocytes and intra-histiocytic yeasts of *Histoplasma capsulatum*. Due to these unexpected results, a complete blood cell count and a lymphocyte typing were urgently required, showing leucopenia (WBC 3.41 x10³/μl), hypochromic microcytic anemia (HGB <11.8 g/dl, HCT <36.5%, MCV <68.4 fl, MCH < 22.1 pg), and a T-helper count under 200/μl (TCD3+/CD4+ <68/μl; < 8.6%) with elevation of TCD8+ (TCD3+/CD8+ > 64.4 %). A thorough recollection of anamnestic data was acquired, revealing the exposure of the patient to risky sexual behavior and exposure to birds. An HIV test was finally required, resulting positive (HIV-1 RNA 13326 cp/ml). A conclusive diagnosis of acquired immunodeficiency syndrome (AIDS) was at last formulated. The patient was referred to the Infectious Diseases Unit of the "Ospedale Amedeo di Savoia" in Turin, for an appropriate treatment of AIDS and to assess if histoplasmosis was indeed limited to the oropharynx or already disseminated. A follow-up visit three months later revealed no systemic involvement, with a

mild improvement of the oral lesion, thanks to the itraconazole therapy (200 mg bid for six weeks). Unfortunately, the patient admitted to having dismissed HAART at his own will, only a month after its first administration: therefore, the latest exams have showed only a mild increase in T-helper count (<11.3%; < 129/ μ l), with HIV RNA being four times higher than three months before (53546 cp/ml).

RESULTS: A PubMed search was conducted with search-terms "oral histoplasmosis AND AIDS" "oral histoplasmosis AND HIV" "oral Histoplasma capsulatum AND HIV" "oral Histoplasma capsulatum AND AIDS". Three hundred eighty-seven (387) results were obtained: 196 doubles and 25 not-in-English articles were removed; 101 studies were not inherent to the purposes of the present review. Of the remaining 65 studies, 15 described histoplasmosis in immunocompetent patients; 34 presented oral manifestation of disseminated histoplasmosis in HIV patients, with two of these in which disseminated histoplasmosis lead to detection of HIV; nine studies illustrated cases of exclusively oral histoplasmosis in HIV patients. Only seven reports were similar to the presented case.

CONCLUSIONS: To date, only seven patients in which exclusively oral histoplasmosis lead to HIV detection and diagnosis of AIDS have been reported in literature.

Unilateral parotid gland swelling related to chlorhexidine 0.2% mouthwash: a case report

G. Pipinato, F. Berton, M. Maglione, R. Di Lenarda

Department of Medical, Surgical and Health Sciences, University of Trieste, Trieste, Italy

BACKGROUND: Many pathologic conditions may cause parotid gland swelling such as dehydration, bacterial or viral infections, traumas, tumors, Sjögren's Syndrome, sialolithiasis, etc. Unilateral or bilateral parotid gland swelling is also a reported side effect of chlorhexidine mouthwashes. This adverse reaction is extremely rare and the clear mechanism has to be determined yet; however, only three reports of parotid gland swelling caused by the use of other mouthwashes are reported (containing hexetidine, a saturated pyrimidine derivative cationic antiseptic). Here we report the clinical management of unilateral parotid swelling caused by chlorhexidine mouthwash.

METHODS: The patient, a healthy 66 years old man, underwent a sinus augmentation with lateral approach on the right side of his maxilla. The patient was prescribed to take amoxicillin clavulanate 875mg+125mg twice a day for five days together with metronidazole 250mg three times a day for five days. As part of his postoperative care, he was prescribed to rinse with a 0.2% chlorhexidine mouthwash three times a day for one week, until the appointment for suture removal. After three days, the patient reported a sudden swelling of his left cheek, therefore he was examined at our department. The patient, asymptomatic, presented a swelling in the parotid region without any sign of local inflammation (no redness, no fever, no pain). All the teeth on the left side were asymptomatic, without any sign of acute inflammation or infection, clear saliva was flowing from the Stenone's duct at the manouvre of squeezing of the left parotid gland. An orthopantomography and ultrasound of the gland, executed to exclude other pathologic conditions, confirmed the presence of edema and hyperemia of the gland (characterized by an augmented vascularization at the color-

doppler), without any other organic alteration. Therefore, a diagnosis of parotid gland swelling due to rinsing with chlorhexidine was formulated. This patient has not previously experienced this type of adverse event. Subsequently he was advised to stop rinsing and it was decided to simply monitor the condition for the following days. On the evening of the same day the swelling increased and the patient went to emergency department in which methylprednisolone 40mg was administered IM.

RESULTS: After seven days, the parotid swelling decreased significantly. The patient did not report any other sign or symptoms and the healing of the surgical wound (contralateral side) was uneventful. Three weeks after the sinus surgery, at follow-up appointment, the patient came without any sign of swelling and a complete restitution was gained.

CONCLUSIONS: Even if unilateral or bilateral parotid gland swelling after using chlorhexidine mouthwashes represents a rare adverse event, it has to be taken into account whether other organic or infective conditions can be excluded. A correct clinical and instrumental examination should be provided in order to evaluate every possible pathologic condition related to parotid swelling. Even if the clear mechanism has not been determined yet, the patient showed a good response to corticosteroid administration. More case-control studies should be carried out to better understand the underlying pathophysiology of this phenomenon.

How nutrition can affect the occurrence and prevention of autoimmune diseases

I. De Pasquale, A. Gambino, A. Cafaro, P. G. Arduino, R. Broccoletti

Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy

BACKGROUND: The occurrence of autoimmune diseases involving the oral cavity and of nutrition issues has increased exponentially over the past 20 years. It is not a sufficiently long period of time to justify genetic changes, environmental factors therefore being a potential cause. This paper aims to search the medical literature in order to find potential connections between autoimmune diseases and nutrition.

METHODS: We used Pubmed as a search engine in order to find the scientific work needed for our project, using the following keywords: "autoimmune disease", "gut", "molecular mimicry", "food", "diet" and "microbiota".

RESULTS: Recent publications by different universities suggest that alterations of the following 3 levels of defence within the intestine, where 65% of the immune system is located, can cause: 1) alteration of gut microbiota, resulting in microbial dysbiosis; 2) alteration in the intestinal membranes, triggering zonulin release and disruption of intercellular junctions resulting in intestinal permeability (leaky gut syndrome), which allows metabolism residues and small intestine microbial toxins to invade the blood flow where the immune system related to the gastrointestinal tract is located; 3) alterations in the immunosensitivity of the immune system in some genetically predisposed patients could potentially memorize the amino acid chain of the metabolic residues and of the microbial toxins penetrated, and due to the similarities to some body parts with a similar chain, it could be recognized as potentially harmful and be attacked by lymphocytes.

CONCLUSIONS: As stated by Fasano, a useful method of prevention consists in maintaining intestinal eubiosis, by

ABSTRACT

avoiding abuse of some prescription drugs and adopting an anti-inflammatory diet. According to Longo, periodic therapeutic fasting might reduce immunosenescence, increase immunosensitivity, reduce RCP levels, promote the proliferation of anti-inflammatory bacteria, reduce oxidative stress and enhance stem cell function.

Clinical and histological features of gingival squamous cell carcinoma (GSCC) vs. tongue squamous cell carcinoma (TSCC): a descriptive analysis of a population of Northwest Italy

L. Cecchinato, A. Gambino, M. Carbone, P.G. Arduino, R. Broccoletti

Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy

BACKGROUND: The onset of oral carcinoma is a source of serious global concern as its incidence is constantly growing, and the difficulty in the differential diagnosis often determines a diagnostic delay such that 5 years after diagnosis the survival rate is attests below 50%. The aim of this study was to analyze and compare the clinical appearance and histopathological features of a population affected by gingival squamous cell carcinoma (GSCC) and a population affected by tongue squamous cell carcinoma (TSCC).

METHODS: The medical case records of 219 patient with diagnosis of GSCC and TSCC, followed from 2000 to 2017 at the Unit of Oral Medicine, CIR – Dental School- University of Turin, were reviewed. We obtained personal data and clinical and histopathological features from ward's database and medical records.

RESULTS: We obtained TSCC in 135 patients, and GSCC in 84 patients was diagnosed. In particular, there were 127 cases of TSCC and 8 of Tongue Verrucous Carcinoma (TVC), and 77 cases of GSCC and 7 of Gingival Verrucous (GVC). In both groups, the squamous variant is present in > 90% of the patients, while almost half of the verrucous form has been presented at the gingival level. Almost all the Squamous cell carcinoma (SCC) we have documented in this regard are infiltrating, and in both groups the prevalent degree of differentiation is G2 followed by G1. The distribution by gender was rather balanced with a 1:1 ratio in the gingival population and a slight male prevalence in the lingual population, in both samples there was also a medium age of insurgence slightly higher in females. The most affected sites were border tongue, followed by the pelvis, and lower adherent gingiva, followed by lower edentulous ridge. Specifically, were significantly positive for SCC the border tongue ($p < 0,035$) and lower adherent gingiva ($p < 0,018$), while for Verrucous Carcinoma (VC) back tongue ($p < 0,007$) and upper adherent gingiva ($p < 0,049$). The ulcerative appearance is the most represented in both groups, followed by white lesions in the tongue group and exophytic lesions in the gingiva group. Statistical analysis highlighted for both lingual SCC and VC positive significance for ulcerative appearance, for gingival SCC the significativity results positive for ulcer and for gingival VC for esophytic appearance. If we analyze the same data statistically, however, by comparing the manifestations of the SCC in the different districts (tongue and gingiva) then gingival SCCs show statistical significance for the esophytic and not ulcerative appearance.

CONCLUSIONS: In conclusion, the uniqueness of this study is given by the statistical analysis of clinical manifestations and how much is connected to it in two different structures of

the oral cavity. The result obtained from the analysis of the elementary lesions of GSCC is peculiar, since apparently in contrast with what has been ascertained up to now. Therefore, must be given great importance at the analysis and description of the clinical aspect of the lesions, which must be carried out systematically, and in the presence of ulcerated lesions with an increase in gingival volume the hypothesis of being in front of a carcinoma should be considered.

Erosive-atrophic OLP and oral candidiasis: diagnostic workup and review of literature

S. Giacometti, A. Gambino, C. Gioppo Boggio, M. Cabras, P. G. Arduino

Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy

BACKGROUND: In this work are evaluated two different clinical pictures. Oral Lichen Planus, a chronic inflammatory disease, whose erosive appearance is symptomatic and it manifests, especially, on mucosal tissues; oral sites are geniene mucous (85%), tongue (28-4%) and gum (10-38%). Oral Candidiasis is an acute infectious disease, whose clinical aspect consists of a reddened and atrophic mucous; oral sites are geniene mucous, tongue and palate. The aim of this study is to research the exactly relationship between erosive-atrophic OLP and oral candidiasis, analysing previous literary sources.

METHODS: Candida is present in a common oral microbial flora. The considered studies have analysed microbial culture in agar, cytological examination, istopathological and clinical examination (with fungal hyphae feedback), PCR exam (that indicates candida species). In a range of 67 articles on the topic, only 13 of these have been in accordance with the purpose.

RESULTS: Some studies compared healthy and erosive-atrophic OLP patients (no use of cortisone and antimicrobial previous therapy) coming to contrasting results probably because the number of OLP patients is too low. However, Candida Albicans is the most widespread species in patients with lichen planus. Other studies payed attention about erosive-atrophic lichen patients and micetica flora changes during a topical corticosteroid therapy: after steroid administration, all patients presented, in addition to C. Albicans, also C. Glabrata and Parapsilosis. It could lean towards the fact that a immuno-suppression state leads to the development of less common forms of candida. There was a relationship between the genotypes A and C of Candida albicans and pathogenesis and progression of OLP erosions (Zeng 2008). Further literature studies showed that administration of miconazole and chlorhexidine may prevent the onset of oral candidiasis. The antifungal treatment of erosive lesions with-infection by candida may change in reticular lesions; on the other hand, there were no statistically significant differences in resolution of erosive lesions in patients taking an antifungal as a precautionary measure.

CONCLUSIONS: The reported articles evidence that it's not totally clear relationship between erosive-atrophic OLP and Candida. Biopsy and fungal hyphae controls are very important to diagnose a over candidosic infection, while cytological examination and swabs can give false positives results (Candida is, often, present in a healthy oral cavity). This analysed literature studies are important but it would be interesting evaluate further studies to deepen this topic.

Oral manifestation of iron deficiency anemia: a case report

M. Garrone, A. Gambino, C. Gioppo Boggio, M. Cabras, R. Broccoletti

Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy

BACKGROUND: Iron deficiency anemia (IDA) is a common type of anemia, with women being more frequently affected than men. Women of childbearing age may be iron-deficient due to the chronic blood loss associated with excessive menstrual flow. Moreover, adult men can be iron-deficient because of chronic blood loss related to gastrointestinal diseases, such as peptic ulcer, diverticulosis, or malignancies. In addition to chronic blood loss, an increased demand for red blood cell production during childhood growth spurts and during pregnancy, a decreased intake of iron during infancy and old-age stage, and a reduced absorption of iron in patients with total gastrectomy or celiac sprue are also possible causes of IDA. Patients with IDA may have characteristic systemic symptoms such as fatigue, weakness, lightheadedness, shortness of breath, and palpitations. Oral symptoms and signs may include atrophic glossitis, angular cheilitis, generalized oral mucosal atrophy and tenderness or burning sensation of oral mucosa.

METHODS: We report the case of a 75-year-old female patient suffering from diverticulitis, genital ulcers, non-specific inflammation of the auricle, general fatigue, which attended our Department complaining about the onset from about three months of oral lesions lasting 15-20 days, with monthly recurrence, burning of the tongue and difficulty in feeding. During the intraoral examination, we were highlighted a ulcer on the hard palate, angular cheilitis, reddening of the tip of the tongue. Given the clinical picture, the diagnostic hypotheses formulated foresaw Behcet syndrome, the MAGIC syndrome. Histochemical examinations are therefore prescribed for in-depth diagnosis and a therapy with topical clobetasol and chlorhexidine mouthwash to manage pain and to allow the patient to resume proper feeding and diflucortolone valerate and isoconazole nitrate to treat the cheilitis.

RESULTS: After 3 weeks the patient takes us to the required examinations, which show iron deficiency and reduction of the average hemoglobin content. When new lesions appear, the pain is controlled well with the prescribed therapy, the burning of the tongue persists, but the patient manages to feed. She also brings a vision of a gynecological examination with a diagnosis of genital lichen sclerosis and reports that the episode of auricular inflammation was treated with anti-biotic therapy, thus suggesting a possible otitis, rather than a cartilage disorder. At this point the diagnostic hypotheses change, including the atrophic-erosive lichen considering the patient's age, erosions and atrophy of the dorsal tongue. Hypochromic iron deficiency anemia also possible due to iron deficiency, fatigue reported by the patient and the compatible intraoral frame work. Then an integrative iron therapy is prescribed and the patient is reviewed after 1 month. At the follow-up visit, the patient has no oral lesions and reports that she has had no new episode of oral ulceration.

CONCLUSIONS: IDA may cause oral manifestations as ulcers, atrophic glossitis, angular cheilitis, generalized oral mucosal atrophy and tenderness or burning sensation of oral mucosa. Moreover, routine haematological screening and tests for serum iron, folic acid and vitamin B12 deficiency should be assessed in patients with recurrent ulcers and other oral manifestation to treat any known nutritional deficiency and to prevent more important related systemic manifestations.

Efficacy of ultramicronized palmitoylethanolamide in burning mouth syndrome-affected patients: a randomized double-blind controlled trial

M.T. Bogdan Preda, G. Ottaviani, K. Rupel, M. Gobbo, A. Poropat, V. Zoi, R. Di Lenarda, M. Biasotto

Department of Medical, Surgical and Health Sciences, University of Trieste, Trieste, Italy

BACKGROUND: Burning mouth syndrome (BMS) is an intraoral burning or dysaesthetic sensation of the mucosa of the mouth, recurring daily for more than two hours per day over more than three months. It typically involves the tongue, with or without extension to the lips and oral mucosa and without clinically evident causative lesions. Classically, BMS is accompanied by gustatory disturbances dysgeusia and subjective xerostomia, while no objective alterations in oral mucosa are detectable. Among treatments, palmitoylethanolamide belongs to a class of naturally-occurring molecules, namely, the N-acyl ethanolamines. These are produced on-demand within the lipid bilayer in conditions of cell/tissue stress or injury. Palmitoylethanolamide (PEA) has been proposed to act as a protective endogenous mediator produced on-demand during inflammatory and neurodegenerative conditions to counteract inflammation pain, and neuronal cell damage. The aim of this randomized double-blind controlled trial was to verify the efficacy of ultramicronized PEA treatment in patients affected by burning mouth syndrome.

METHODS: Patients with burning intensity greater than 4, according to a 0-10 numeric rating scale, were included in the trial according to established inclusion and exclusion criteria. Patients were randomized into two groups: one group received um-PEA 600 mg micro-granules twice daily for 60 days (Normast®, Epitech Group SpA), while the other group placebo (inactive product) with the same time schedule. Patients were assessed at baseline (T0), 30 (T1) and 60 days (T2) after treatment start and 4 months after treatment discontinuation (T3). The evaluation was carried out on the basis of: a) the type of manifestation of burning symptoms during the assessments (T0, T1, T2, T3) following the Lamey and Lewis classification; b) the referred location of symptoms in the oral cavity: tongue, upper and lower lip, palate, gums, buccal mucosa, floor of the mouth, oral cavity; c) the simultaneous presence of symptoms such as xerostomia and dysgeusia, gastritis and anxiety. The intensity of burning/pain and the mode in which it was perceived were assessed by the Neuropathic Symptoms Pain Inventory. All recorded data were analyzed using the Generalized Linear Mixed Model in order to evaluate changes across time between treatment and control groups. Age, sex, Lamey and Lewis classification, xerostomia, dysgeusia, gastritis and anxiety were used as covariates. Data are expressed as mean +/- standard error; a 'p' value lower than 0.05 was used for rejection of the null hypothesis.

RESULTS: A total of 35 patients were enrolled in the study according to the inclusion and exclusion criteria. It has been registered 6 withdrew prior to the end of treatment. A statistically significant reduction in patients' burning sensation ($p=0.0132$) was registered at the end of the active treatment in the ultramicronized palmitoylethanolamide group compared to the placebo one. Any side effect related to the active treatment was neither observed nor reported both by patients and by the physician.

CONCLUSIONS: The significant decrease of burning sensation in the ultramicronized PEA group compared to the placebo group suggests that this natural-occurring molecule, as a food for special medical purposes, may represent a viable therapy in the management of burning mouth syndrome.

ABSTRACT

Enzyme linked immunosorbent assay diagnostic performance in oral pemphigus and oral pemphigoid

A. Patano, F. Della Vella, V. Ivone, G. Maiorano, D. Conte, C. Laudadio, G. Benizio, P. Callea, G. D'Ostuni, A. Ferraro, M. Petruzzi

Sezione di Odontostomatologia- Dipartimento Interdisciplinare di Medicina, Università degli Studi di Bari "Aldo Moro", Bari, Italy

BACKGROUND: Enzyme Linked Immunosorbent Assay (ELISA) is considered a practical, highly standardized and widely available diagnostic tool in the diagnosis of Pemphigus vulgaris and Pemphigoid. High sensitivity and specificity have been reported in patients with cutaneous pemphigus and pemphigoid. Few data exists in exclusively oral localized pemphigus vulgaris (OPV) and oral mucous membranous pemphigoid (OMMP). **BACKGROUND:** of this study was to evaluate the ELISA performance in OPV and OMMP.

METHODS: Consecutive patients with a provisional diagnosis of OPV and OMMP referred to the Oral Medicine Section of University Hospital Policlinico of Bari were enrolled. Each patient was tested with direct immunofluorescence and ELISA (detection of IgG against desmoglein 1 and 3, BP180, BP230). Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), accuracy and Kohen's K value of ELISA were calculated in comparison to direct immunofluorescence, considered as the gold standard.

RESULTS: Fifty-four patients (41 women and 13 men, mean age 61 ± 12 yrs.) were enrolled. Eleven patients were diagnosed as OPV, the remaining 43 were affected by OMMP. Considering OPV and OMMP patients as an unique group, we recorded an ELISA sensitivity of 71% and 54% of specificity, 63% of PPV, 64% of NPV, 63% accuracy, 0.254 K value (moderate agreement). In OPV group, ELISA showed a sensitivity of 88% and a specificity of 65% with an accuracy of 73% and 0.233 Kohen's K value (moderate agreement). PPV and NPV was 78% and 50% respectively. In OMMP group ELISA showed a sensitivity of 65% and a specificity of 56% with an accuracy of 60% and 0.213 Kohen's K value (moderate agreement). PPV and NPV was 57% and 65% respectively. **CONCLUSIONS:** ELISA in OPV and OMMP is less specific and sensitive than in cutaneous counterpart. In particular, we evidenced low specificity and agreement with Direct Immunofluorescence that remains the milestone in the diagnostic pathway. Lack of diagnostic efficacy of ELISA is probably due to polymorphic antigenicity of different epitopes of desmogleins and BP-Antigens, circulating IgA autoantibodies, antigens different from desmogleins and BP-Antigens (e.g. alpha1, beta4, laminin). On the other hand, ELISA can be considered as an adjunctive prognostic test for initially positive ELISA patients affected by oral vesiculobullous diseases. Further studies are necessary to better investigate the role of ELISA in OPV and OMMP and it is important to develop more specific commercially available ELISA kit for OPV and OMMP.

Dorsal tongue red and orange autofluorescence: is candida implicated?

C. Laudadio, P. Callea, A. Ferraro, G. D'Ostuni, G. A. Benizio, A. Cassandro, A. Patano, D. Conte, F. Della Vella, V. Ivone, G. Maiorano, M. Petruzzi

Sezione di Odontostomatologia, Dipartimento Interdisciplinare di Medicina, Università degli Studi di Bari, Bari, Italy

INTRODUCTION: Candida species commonly colonize the oral cavity; in particular *Candida albicans* is a major human fungal pathogen, isolated in the 40-60% of healthy patients. Saprophytic Candida is able to induce opportunistic infections if predisposing conditions and factors permit its overgrowth. Autofluorescence of the oral tissues is employed in the detection of microstructural and biochemical changes of the oral mucosa, which are directly related to neoplastic derailment. The VELscope is an optical device that allows proper autofluorescence examination of the oral tissues. Loss of fluorescence, enhancement in fluorescence or maintained fluorescence are common outcomes recorded during the VELscope inspection. Red/orange fluorescence is usually described on the dorsal tongue but its significance is still unexplored. **BACKGROUND:** Background of this study was to evaluate the effectiveness of autofluorescence test by the VELscope device in the detection of Candida colonization of on the dorsal tongue surface and to compare it with a lingual swab test.

METHODS: Fifty-six consecutive patients were subjected to conventional lingual swab test followed by the VELscope examination. The analysed sites were photographed by Nikon 3100 digital equipment, with a dedicated adapter provided by the manufacturer; then the same sites were examined in autofluorescence with the parameters ISO 1600-F 8t 1/60. Red and/or orange fluorescence was reported and photographed (if present) for each patient. Patients who did not show protoporphyrin fluorescence were indicated as positive for Candida colonization while patients with protoporphyrin fluorescence were considered as negative for Candida colonization. Sensitivity, Specificity, Positive Predictive value and Negative Predictive value of the red/orange autofluorescence test were calculated analytically. Accuracy and K Cohen's test were also evaluated.

RESULTS: Twenty-seven patients (48,2%) were positive and 29 patients (51,9%) were negative for red/orange autofluorescence evaluation. Twelve patients were positive to the Candida swab test. The autofluorescence evaluation by the VELscope device showed sensitivity and specificity values of 83% and 57%. Positive and negative predictive values were 34,5% and 93% respectively. Accuracy was of 62,5% and K Cohen value of 0,6%, indicating a good agreement between the tests.

CONCLUSIONS: The absence of red/orange autofluorescence indicates with a sufficient validity and reliability the presence of Candida. Sensitivity was high while Specificity was not so efficiently high and was negatively influenced by False Negative. The main strength of the present study is the off-label use of oral tissue autofluorescence as an adjunctive device for diagnostic-microbiological purposes. These results suggest that the use of Autofluorescence could represent an alternative, quick and cheap method in Candida detection in the oral cavity.

***Helicobacter pylori* and oral cavity: descriptive analysis of the literature**

G. El Haddad, M. Cabras, A. Gambino, P. G. Arduino, R. Broccoletti

Department of Surgical Sciences, Oral medicine Section, C.I.R. - Dental School, University of Turin, Turin, Italy

BACKGROUND: In 1982, Marshall and Warren identified the *Helicobacter pylori* (Hp). It was cultured from gastric

biopsy specimens from patients with gastric inflammation and peptic ulcer. Based on these results, they proposed that Hp could be the etiologic agent of these conditions. In 1994, this microorganism was recognized as a type I carcinogen, and it is now considered the most common etiologic agent of infection-related cancers. To this date, the transmission routes of Hp infection within and between humans are not clear. Transmission of Hp could occur through iatrogenic, fecal-oral, and oral-oral routes, or through contaminated food and water. The microorganism may be transmitted orally and has been detected in dental plaque and saliva. **BACKGROUND:** of the present study is to review the scientific literature concerning the intriguing relationship between Hp and oral cavity, in order to assess the role of saliva, plaque and periodontal pockets as a niche for Hp and, more importantly, if there is a correlation between oral colonization and gastrointestinal recurrence.

METHODS: A bibliographical research on Pubmed was carried out, revising the literature from 1989 to the present date. The strings used were: "Helicobacter pylori infection" "Helicobacter pylori diagnosis" "Helicobacter pylori epidemiology" "Helicobacter pylori Treatment" "Helicobacter pylori dental plaque" "Helicobacter pylori oral cavity" "Helicobacter pylori mouth" "oral Helicobacter pylori recurrence" "Helicobacter pylori gastric recurrence" "Helicobacter pylori saliva" "Helicobacter pylori salivary tests" "Helicobacter pylori oral diagnostic tests".

RESULTS: Prevalence of Hp in the oral cavity varies from 0% to 100%. The inconsistency of these results may be due to undeniable differences concerning study design, heterogeneity in subgroup analyses, different Hp testing methods, with some Authors using several methods for Hp identification. Detection through culture may just indicate a transient colonization of the mouth, while isolation of fragments of Hp DNA through PCR can be still considered insufficient evidence to prove effectively an ongoing replication of Hp in the mouth. Some salivary tests have been tested through the years, but their low specificity and sensibility discouraged further research; the most recent salivary antigen test HPS / HPF from Asia has given promising results, although its reliability is still under investigation in Western countries. In any case, polymerase chain reaction (PCR) seems to be the most promising and reliable approach for detection of Hp in the oral cavity, thanks to its high sensitivity and specificity (> 90%). Some Authors speculate that the oral cavity is not only an extra gastric reservoir of the Hp but can also be a source of gastric re-infection, suggesting therefore the possibility to combine the usual eradication via systemic therapy with plaque removal by causal therapy, in order to reduce the chances of gastric recurrences. However, the most recent and thorough systematic reviews, including a Cochrane review published in 2016, have attributed a mere low-level of evidence to this captivating association, with too many biases and very few randomized-controlled trials (RCT) to reflect upon. **CONCLUSIONS:** Further studies must be conducted to understand if oral cavity is indeed compatible with survival and replication of Hp. A non-invasive, cost-effective method for detection of Hp within saliva or plaque is needed. Moreover, multicentric RCTs are imperative to determine if periodontal treatment can actually decrease the percentage of gastric relapses, thus becoming a precious ally in sheltering patients from the most notorious long-term consequences related to Hp reappearances, such as development of peptic ulcer or cancerization.

The morphogenesis of molar tooth in the mouse: post-natal evaluation of polarization of odontoblast and expression of KI-67 in dental mesenchymal tissue

R. Balzano ¹, C. Mucignat-Caretta ², E. Stellini ¹

¹University of Padua, Department of Neuroscience, Padua, Italy; ²University of Padua, Department of Molecular Medicine, Padua, Italy

BACKGROUND: Cytological differentiation of odontoblasts with exit from the cell cycle, cytological polarization and secretion of predentin/dentin is controlled by the inner dental epithelium. The basement membrane plays a major role both as a substrate and as a reservoir of paracrine molecules. Cytological differentiation implies changes in the organization of the cytoskeleton and is controlled by cytoskeleton-plasma membrane-extracellular matrix interactions. The induction of differentiation starts from the expression of soluble growth factors from BMP/TGFβ family. Cytological polarization occurs during the elongation of the cell body and is characterized by changes in the distribution of organelles, the appearance of a terminal web, and the formation of a cell process. Odontoblasts express vimentin and nestin, two intermediate filament proteins that guide polarization. To erupt, the mesenchymal tissue surrounding the tooth gives rise to a cell lineage, that control the formation of the eruption pathway. Demonstrating the presence of Ki-67, a nuclear antigen, could give a clue about the proliferating cells in adjacent mesenchymal tissue. In the present study we wanted to identify the expression of intermediate filaments and Ki-67 in the post-natal stages of mouse first molar.

METHODS: Experiments were conducted according to directive 86/609/EEC in the Department of Molecular Medicine, University of Padova. Mouse CD-1 specimen from post-natal day 1, 5, 8, 11, 15 and 19 were sacrificed, fixed in formalin and decalcified in EDTA for 3 weeks. Once decalcified the mandibles were cut off and embedded in paraffin. A series of 6µm slices were placed on polylysine slides. After deparaffinizing the slides in xylene and rehydrating in water, the samples were submitted to classic histological staining (Hematoxylin & Eosin staining and Gomori trichromic staining) and immunohistochemistry (IHC) procedures. For IHC the primary antibody anti-nestin (Santa Cruz Biotechnology SC 21247), anti-vimentin (Sigma V2258) and anti-Ki-67 (Sigma P6834) were used. The secondary peroxidase-labelled antibody was visualized with diaminobenzidine. Samples were then observed on light microscope.

RESULTS: A morphological study in developmental first mouse molar, from enamel formation to eruption, was obtained thanks to classic histological staining. IHC protocols revealed the localization of intermediate filaments in differentiating odontoblasts, and the presence of proliferating cells in developing tooth and its surroundings tissues.

CONCLUSIONS: The present study allowed us to localize intermediate filament nestin and vimentin in differentiating odontoblast until 19 days post-natally prior to tooth eruption. Proliferating cells, expressing Ki-67 antigen, were shown to be present even in surrounding mesenchymal tissues. Mesenchymal tissues, particularly the dental follicle, seems to be involved in tooth eruption. Further analyses are necessary to investigate whether dental follicle contains pluripotent stem cells able to give rise to a cell line guiding tooth eruption.

ABSTRACT

Myxoma of the maxillary gingiva: report of a rare case

M. Carbone, A. Gambino, M. Cabras, R. Broccoletti, P.G. Arduino
Department of Surgical Science, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy

BACKGROUND: To describe a case of gingival myxoma. Soft tissue myxomas of the oral cavity are rare and considerably less common than odontogenic myxoma of the jaws. These neoplasms are benign tumors, slowly growing, insidious and potentially infiltrative. Differently from osseous myxomas, they show a less-aggressive behavior, and rarely recur after excision. We present a case of gingival myxoma arising from the left maxillary adherent gingiva in a 45-year-old female patient.

METHODS: Intraoral examination revealed a painless and well-defined nodule in the vestibular gingiva of the left maxillary central incisor, which measured 1.2 x 0.8 cm in diameter, with a tense elastic consistency on palpation. Radiologically, neither the erosion of the underlying bone nor other signs of radiolucency were present. The lesion was fully excised under local anesthesia, using a diode laser DMT Raffaello®, 645-980nm with power setting of 3.5w. Histological examination with Masson's trichrome stain, Alcian-Blue and Reticulin, and immunohistochemical reactions with anti-Actin antibodies, CD117, S-100 and Ki67 were also performed.

RESULTS: The patient's medical history and an extra-oral examination did not reveal other abnormalities. The lesion has been previously removed 5 years earlier, with only clinical diagnosis of pregnancy epulis, and 3 years earlier at the same site, with subsequent histological diagnosis of gingival fibroma. Microscopic analysis of the lesion showed spindle-shaped and stellate cells arranged in a myxoid fibrous stroma, with collagen fibers distributed uniformly. Immunohistochemical reactions yielded negative results. The differential diagnosis arises with nerve sheath myxoma, benign tumor of perineural or Schwann cell origin; in this case, the spindle-shaped and stellate cells in the lobulated areas show strong positivity for S-100. Instead, the immunohistochemical reaction of our patient was negative for S-100. On the basis of histological and immunohistochemical findings, the final diagnosis was soft tissue myxoma. Six months after surgery, no signs or symptoms of recurrences were observed. Only four cases of myxoma of gingiva have been reported in the literature to date: three cases were located in the mandibular gingiva, and only one was located in the maxillary area. To the best of our knowledge, our clinical case is the second soft tissue myxoma located in the maxillary gingiva.

CONCLUSIONS: Because soft tissue myxoma is a benign tumor, conservative surgical resection is the treatment of choice. The recurrence rate is 3-8%, and the neoplasm is most likely to recur within 2 years; hence, close follow-up is required. Further studies are necessary to clarify the origin and histogenesis of this lesion.

New cancer therapies and jaws necrosis

L. Brizzi, E. Giofrè, W. Colangeli, C. Tortosa, R. Cordaro, C. Boschetti, D. Caruso

Department of Experimental and Clinical Medicine, Unit of Oral and Maxillofacial Surgery, University "Magna Graecia" of Catanzaro, Catanzaro, Italy

BACKGROUND: The jaws have a predisposition to developing osteonecrosis. The mandible is more predisposed

to necrosis, when compared to the remaining skeleton, because of its high bone metabolism and ready exposure to bacteria through breaches in the thin oral mucosa or the dentition. The two well-known predisposing risk factors are radiation and bisphosphonate medication. A number of new cancer drugs are reported to induce osteonecrosis. As treatment outcomes improve the pool of 'at risk' patients in the population will increase and with it the prospect of developing necrosis of the jaw. The aim of this study is to present a case of osteonecrosis of the jaw in a patient treated with Radium-223 dichloride (Xofigo®) and Zoledronic acid (Zometa®).

METHODS: In December 2017, a 69-years-old man, affected by prostate cancer with symptomatic bone metastases, presented to the Unit of Oral and Maxillofacial Surgery at University "Magna Graecia" of Catanzaro, complaining severe pain on right lower jaw. Patient told us that, from 2010 to September 2017, he started an experimental therapy with Xofigo and Zometa. At clinical examination, the patient had swelling in submental region, paresthesia of right lower lip and intraoral pus excretion; furthermore, OPT and CT stated a relevant loss of alveolar crest in mandible and a diffuse inflammatory reaction of the soft tissues of the submental region. Diagnosis of Medication related osteonecrosis of the jaw (MRONJ) was made.

RESULTS: In January, patient has been undergone to surgical debridement of necrotic bone, remodeling of alveolar crest, hemostasis and cleaning of the surgical site. Antibiotic protocol (Amoxicilline 1gr/2 times a day starting 5 days before the surgery; Metronidazole 500 mg/3 times a day starting 1 day before surgery) and antibacterial rinses, for a total duration of 10 days, were prescribed. Surgery was conducted opening a full thickness flap; then, with piezoelectric shovel, necrotic bone was removed until bleeding of the bone could be clinically appreciated. A week after surgery, there was a wound dehiscence and so we carried out a new remodeling operation of alveolar process and advancement flaps for wound closure; also we have applied resorbable hemostatic material (Tabotamp®). At subsequent clinical check, surgical dehiscence remains but no signs of infection are present.

CONCLUSIONS: Radium-223 dichloride (Xofigo®) is given as an intravenous infusion as an internal form of radiotherapy. Radium is a calciummimetic and is therefore taken up by the active tumour and normal bone cells. The high bone turnover in the jaws will attract the drug. From this paper we can conclude that presence of radiopharmaceutical can increase the risk of ONJ and of surgical failure. There is emerging evidence that Radium-223 dichloride is related to osteonecrosis of the jaw, but randomized controlled clinical trials are indicated.

Ossifying epulis in pseudohypoparathyroidism: a case-based therapeutic approach and review of the literature

F. Guglielmi, E. Staderini, A. Camodeca, M. Cantiani, P. Galenzi

Department of Surgical Sciences for Head and Neck Diseases, School of Dentistry, Catholic University of Sacred Heart, Rome, Italy

BACKGROUND: The term Pseudohypoparathyroidism indicates a group of rare conditions characterized by an end-organ resistance to the parathyroid hormone (PTH) action.

Ossifying epulis (OE) is an exophytic gingival lesion characterized by spontaneous bone formation beneath the mucosa. We report a representative case of a peripheral ossifying epulis in a patient performing a drug treatment protocol for pseudohypoparathyroidism with optimal serum markers. A literature review is performed to review and update the knowledge about the remarkable occurrence of drug-resistant GNAS mutations.

METHODS: An Italian 11-year-old girl was referred to the Operative and Paediatric Dentistry Unit of the Department of Surgical Sciences for Head and Neck Diseases – in “Agostino Gemelli Hospital - Università Cattolica del Sacro Cuore” of Rome. The medical history of the patient revealed a diagnosis of pseudohypoparathyroidism and of Albright’s hereditary osteodystrophy at the age of 5 years, caused by a frameshift GNAS mutation. She complained a single subgingival bulky neof ormation - 0,6 cm in diameter - of hard-wooden consistency, with well-defined margins and sessile-based attachment to the underlying bone. It was covered by a non-keratinized ulcerated epithelium, in correspondence of the dental element 2.1. A moderate gingival inflammation was noticed, with no bleeding, pain or tenderness. The extraoral examination no evidence of facial or skeletal abnormalities. Medical records were matched with clinical features, radiological and pathological findings for a definitive diagnosis. After her mother’s consent, it was decided to keep the lesion under control and to re-evaluate monthly. During the first observation, intraoral photographs were carried out and an ortopantomotography was prescribed to evaluate the general oral status. After four months, the lesion did not show any signs of spontaneous regression; therefore, clinicians decided to perform a surgical enucleation and a biopsy. The informed consent was obtained, even if the surgical procedure had a minimal risk for the patient. Histological analysis revealed some typical features of a chronic and acute inflammatory microenvironment with plasma cells and bone tissue fragments with rehashing aspects referable to flogistic osteolysis.

RESULTS: Clinical and radiological follow-up appointments were scheduled every 6- and 12 months, respectively. Two years after excision, no signs of scar or recurrence were noticed. Histological analysis revealed typical features of a chronic and acute inflammatory microenvironment with plasma cells (positivity for CD38, MUM1, Lambda and Kappa chains) and bone tissue fragments with rehashing aspects, referable to flogistic osteolysis. The biopsy result leads to hypothesise a change in the patient’s drug therapy.

CONCLUSIONS: We have reported a patient with OE associated with POH, in whom an autoimmune thyroiditis has furthermore developed. According to the available literature the evidence-based gold standard approach for this multisystemic disorder is still controversial. There is a strong evidence supporting the link between thyroid hypofunction and the development of benign calcified lesions. The aim of this study is to review and update the knowledge regarding the remarkable occurrence of drug-resistant GNAS mutations. This case represents a clinical practice guideline, worthy of further studies to explore whether there are successful customized treatment modalities for this systemic condition. Considering the localization of peripheral ossifying epulis all over the body, all clinicians should focus their efforts to an early diagnostic assessment and, when possible, a multidisciplinary referral of the patients for a specialist examination.

Risk factors for a bad wound healing due to oral biopsies: a preliminary report

C. Lajolo, I. Rizzo, I. Vanella, G. Vittorini, M. Cordaro

Oral Medicine Department, Catholic University of Rome, Rome, Italy

BACKGROUND: Oral biopsy is a common and fundamental surgical procedure: literature reports focused mainly on the reliability of surgical sample, but few studies evaluated wound healing after biopsy procedures. The aim of this observational study was to evaluate subjective and objective aspects related to wound healing, either in incisional or excisional biopsies, and determine risk factors for bad healing.

METHODS: Sixty seven patients underwent oral biopsies for diagnostic or therapeutic purpose (Oral Medicine Department, Fondazione Policlinico Universitario A. Gemelli), between January 2017 and February 2018. Mean age of patients was 58.9 (range: 23-88), 42 were female and 25 male. Type of biopsy, location, instruments, biopsy time, postoperative bleeding, other intra-surgical complications were recorded. Photos were taken at time 0 (before the surgery), after the biopsy and after one week (at suture removal); furthermore a photo of the sample was done in a standard photographic setting, in order to calculate the harvested volume through an image software (ImageJ, NIH, Betesda, USA). Visual number scale of pain (VNS) was recorded at 6h, 7 days and 21 days after biopsy. A post operative VNS 4/10 was considered representative of painful healing.

RESULTS: Forty biopsies were incisional and 27 were excisional, 24 were in OLP patients, 12 for fibromas, 10 for leukoplakia and 21 for other lesions. Twenty-three were made in cheeks, eight in the dorsal tongue and thirty six in other sites. Eight patients had during the following 6 hours post operative bleeding easily kept under control, and 7 needed pain killer therapy; no patients presented severe intra-operative or post-operative complications. The mean sample volume was 231.24 mm³ (15-1250 mm³). The VNS one week after the biopsy was <4 in 94% of cases: diameter of suture (p 0.023) and number of stitches applied (p 0.016) were correlated with an higher VNS. One week after the biopsy, only 10.4% of the sample presented a wound dehiscence and silk suture was a risk factor for a bad wound healing (6 on 24 biopsies), whereas resorbable suture was associated with a better healing (0 on 31 biopsies – p=0.049).

CONCLUSIONS: Although biopsy is a safe surgical procedure, with a low risk of complications, some clinical precautions, such as resorbable or small diameters suture, can be used to decrease the post-operative discomfort; with all the limitation of this study, the sample volume seems not to influence a lot post-operative discomfort. It is suggested to increase the population to improve the statistical significance.

Oral painful ulcers due to TNF-alpha inhibitors drug: a case report and literature review

C. Lajolo, I. Vanella, G. Gioco, M. Cordaro

School of Dentistry, Catholic University of Rome, Rome, Italy

BACKGROUND: We present a case of oral painful ulcers arisen in a woman suffering from psoriatic arthritis (PsA) treated with a TNF-alpha inhibitors (Adalimumab).

METHODS: A 70 years old Slavic women suffering from psoriatic arthritis since 2000, was referred to our Department for evaluation of oral mucous membrane ulcerative lesions

ABSTRACT

developed during treatment of PsA. The patient, affected by type 2 diabetes, hypertension, fibromyalgia and COPD (chronic obstructive pulmonary disease), was under therapy for PsA since 2001 with different therapeutic protocols: due to low efficacy on arthritis activity of all the different drugs, she underwent to a new drug protocol (Methotrexate - 20 mg/week and Adalimumab - 40 mg/2 weeks) from 2006 up to our examination. Oral exam showed multifocal ulcers with keratotic margins, mainly affecting right buccal mucosa and ventral tongue: ulcers arose 4 months earlier with a tendency to recur without a complete healing. Ulcers were very painful and presented an increased consistency; Nikolsky's sign and auto-antibody for blistering diseases were negative. A biopsy was taken and pathology examination revealed an ulcer with an unspecific inflammatory reaction; acantosis and hyperparakeratosis were also present at ulcer borders. Since pathology was non-contributing, we hypothesized a drug reaction due to biologic therapy and, in accordance with her rheumatologist, a 30 days of drug holiday and a further re-examination was proposed. After 30 days, oral clinical conditions were considerably improved and, due to poor general health (i.e., lymphocytosis, thrombocytopenia and vitamin B12 deficiency anemia), the patient underwent systemic and local corticosteroid therapy with a further clinical improvement.

RESULTS: Ulcerative conditions of oral mucous membranes can be due to several local and/or systemic factors, being a diagnostic and therapeutic challenge for clinicians, and can be clinically classified into acute or chronic: malignant nature of persistent, non-healing ulcers must be always excluded through biopsy. The present case showed uncommon features, being acute in the onset, highly painful, but chronic in their natural history: oral manifestations of systemic or infectious diseases were excluded since no systemic signs and/or symptoms (e.g. fever, weakness, gastrointestinal disorders, auto-immunity) were present; local trauma and blistering diseases were also excluded, thus a drug related adverse reaction was suspected. Among the different drugs taken by the patient, Adalimumab was the most suspected: even if the most common side effects of Adalimumab are injection site reaction and upper respiratory infections, other serious side effects, (i.e., TB, deep fungal infections and other atypical pathogens) must be kept in mind when treating patients. Muco-cutaneous drug eruptions (erythema multiforme, Stevens-Johnson syndrome, bullous pemphigoid and pemphigus), anti-TNF- α -induced lupus, liver and hematological abnormalities (especially thrombocytopenia) are rare side effects of TNF- α antagonists, but must be always considered. **CONCLUSIONS:** The relatively recent introduction of TNF- α antagonists in the treatment protocols and the possibility to use new biological drugs warrants complete awareness of the incidence and management of common and rare side effects associated with their use.

Neuroendocrine tumor of the submandibular gland: a case report

E. Luconi ¹, M. Mascitti ¹, L. Lo Muzio ², L. Lo Russo ², V. Panzarella ³, A. Santarelli ¹, M. Procaccini ¹

¹Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy; ²Department of Clinic and Experimental Medicine, University of Foggia, Foggia, Italy; ³Department of Surgical, Oncological and Stomatological Disciplines, University of Palermo, Palermo, Italy

BACKGROUND: Neuroendocrine tumors (NETs) are a heterogeneous group of malignancies with a broad spectrum of

histomorphologies, tissue origins, and clinical outcomes, that arise from neural crest cells with neuroendocrine differentiation. Salivary gland tumors account for 3 to 6% of all head and neck neoplasms in adults, while salivary gland NETs are extremely rare tumors, with few cases reported in literature, on which only 5 cases involving submandibular gland. The rarity of NETs in salivary glands is probably related to the scarcity of neuroendocrine cells in this tissue. In fact, the presence and distribution of neuroendocrine cells in human salivary glands is still a matter of debate. In this work we present a case of NET involving a submandibular gland.

METHODS: On February 2016, a 21-year-old Caucasian man was referred to Department of Maxillofacial Surgery, Ospedali Riuniti General Hospital, Ancona by his general practitioner for a painful swelling in left submandibular region. Past medical history was unremarkable. On palpation, a firm and painful small nodule was detected in this region. The radiologic exams showed a nodular, well-enhanced tumor, about 2.5 cm in maximum diameter, in the left submandibular gland, with a moderate swelling of some locoregional lymph nodes of the homolateral neck region. The fine-needle aspiration cytology of the nodule was non-diagnostic. The patient underwent total left submandibular gland and lymph node removal and the material was sent to the Institute of Pathology, Marche Polytechnic University, Ancona, for histological examination. **RESULTS:** On gross examination, the submandibular gland showed a grayish-white, firm and solid nodule, measuring 2.5 x 1.8 cm. This lesion had well-defined margins, with a margin distance of 0,1 cm. On microscopic examination, this lesion was composed of small necrotic areas and poorly differentiated neoplastic cells, scarce cytoplasm, polymorphic nuclei, thickened chromatin, and small nucleoli, organized in solid nests. The proliferative index, evaluated with Mib1/Ki67, was about 30-35%. The neoplastic cells were stained positively with AE1/AE3, CAM 5.2, p63, and Synaptophysin. No immunostaining was observed for CK7, CK20, Chromogranin A, S100, and HMB45. Based on the cell morphology, growth pattern, proliferative index and immunophenotype, this lesion was classified as poorly differentiated neuroendocrine carcinoma. During 2-year follow-up, clinical and radiological follow-up showed no evidence of recurrence.

CONCLUSIONS: As an exceedingly rare entity, NETs of the salivary glands represent a diagnostic and therapeutic challenge in the routine practice, and an appropriate registry of the cases could be useful to gather experience in its management.

Immunohistochemical evaluation of pon-2 expression in OSCC

S. Ripanti ¹, M. Mascitti ¹, L. lo Muzio ², K. Zhurakivska ², O. di Fede ³, M. Procaccini ¹, A. Santarelli ¹

¹Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy; ²Department of Clinic and Experimental Medicine, University of Foggia, Foggia, Italy; ³Department of Surgical, Oncological and Stomatological Disciplines, University of Palermo, Palermo, Italy

BACKGROUND: Reactive oxygen species (ROS) are generated in cellular response to several processes and their adverse effects are opposed by antioxidant defense systems. This balance is critical for preventing cell damage; in fact, the imbalance between ROS generation and removal results in damage to cellular macromolecules. ROS are responsible for pathogenesis of different diseases including cancer and the process of carcinogenesis can be induced by redox imbalance.

Oral squamous cell carcinoma (OSCC) is the most common phenotype of oral cancer, and chronic irritating factors, such as tobacco and alcohol, play a critical role in its development. The paraoxonase (PON) gene family includes three members (PON1, PON2, and PON3), that share structural homology and antioxidant activity. Paraoxonase 2 (PON2) is involved in the antioxidative and anti-inflammatory response and, in contrast to PON1 and PON3, is not found in plasma, being instead expressed in several tissues. Several studies suggest that PON2 significantly enhances cellular stress resistance by attenuating ROS-mediated apoptosis in cancer cells. The aim of this study is to investigate the role of PON2 in OSCC. METHODS: This study included 15 specimens of primary OSCC (7 graded as G1 and 8 graded as G3). Data were retrieved and cataloged from clinical records and from the archive of the Institute of Pathology of Marche Polytechnic University. For each case, 4- μ m sections were cut from formalin-fixed paraffin-embedded tissue blocks. Immunohistochemistry was performed on 4- μ m histological sections mounted on poly-L-lysine coated glass slides. After deparaffinization in xylene and rehydration in a graded series of alcohol, slides were treated with microwave for heat-induced epitope retrieval in EDTA Buffer (1 mM EDTA, 0.05% Tween 20, pH 9.0) for antigen retrieval. Endogenous peroxidase was quenched by incubation with 0.3% hydrogen peroxide in methanol for 20 minutes. Then, the sections were incubated with the monoclonal antibody anti-PON2 (1:200 dilution; Sigma-Aldrich, St. Louis, MO, USA) in humidified atmosphere at room temperature for 1 h. After incubation with 0.05% 3,3'-diaminobenzidine (Sigma-Aldrich) in 0.05 M Tris buffer, pH 7.6 with 0.01% hydrogen peroxide, sections were counterstained with Mayer's hematoxylin (BioOptica, Milan, Italy), permanently mounted on slides and examined by light microscopy. To evaluate PON2 expression, the percentage of positive cells was determined from the analysis of 1000 cells at x40 magnification. RESULTS: PON2 expression in apparently normal mucosa was almost undetectable, while there was a significant correlation between PON2 overexpression at the invasive zone and grading. In fact, well differentiated OSCC group showed an expression pattern similar to normal mucosa, while in G3 cases the number of PON2+ cells were significantly increased (> 50%). CONCLUSIONS: According to these data, PON2 was overexpressed in less differentiated OSCC, suggesting a possible role of this marker in aggressive clinical behavior.

NNMT: potential involvement in oral malignant melanoma

L. Togni ¹, D. Sartini ¹, G. Troiano ², L. Lo Muzio ², M. Procacini ¹, M. Emanuelli ¹, A. Santarelli ¹

¹Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy; ²Department of Clinic and Experimental Medicine, University of Foggia, Foggia, Italy

BACKGROUND: The oral malignant melanoma (OMM) is extremely rare, accounting for about 0.5% of all oral malignancies and 0.2-8.0% of all melanomas. Unlike its cutaneous counterpart, the aetiology of OMM is not known: most OMM seem to arise from apparently normal oral mucosa, while one-third of these tumours develop from pre-existing oral pigmentations. OMM are aggressive tumours, and unfortunately most of them showed deep tissue invasion at initial

presentation. The prognosis for patients with OMM is worse than for those with cutaneous melanomas, and the overall 5-year survival rate is 10-25%. The study of the molecular mechanisms that are involved in the development of OMM is necessary to identify new prognostic markers, as well as to identify new targets for molecular-based treatments. The aim of the present retrospective study was to correlate the expression of Nicotinamide N-Methyltransferase (NNMT), a Phase II drug-metabolizing enzyme overexpressed in many tumours, to clinicopathologic data and with the prognosis in patients affected by OMM.

METHODS: This study included surgical resection specimens obtained from 15 OMM and 15 cutaneous melanoma (CM). Data were retrieved and cataloged from clinical records and from the archive of the Institute of Pathology of Marche Polytechnic University by a single operator, in order to ensure the uniformity of the collected data. Serial sections (5 μ m) from formalin-fixed, paraffin embedded blocks were cut for each case and mounted on poly-L-lysine-coated glass slides. The sections were incubated for one hour at room temperature, with the rabbit polyclonal anti-NNMT antibody (Sigma-Aldrich, St. Louis, MO, USA) diluted 1:1500 in a humidified chamber at room temperature for 1 h. To evaluate extension of NNMT expression, the percentage of positive cells was determined from the analysis of 1000 cells at x40 magnification. The intensity values of NNMT staining was scored and reported into a dichotomous scale: “-” (negative-weak expression); “+” (moderate-intense expression).

RESULTS: The extension of the NNMT expression in tumor cells showed a statistically significant difference between the two groups (P = 0.0008), showing higher values in CM group (41.7% vs 14.6%). A significant correlation was observed in NNMT staining intensity, showing more highly stained cases in OMM group. The expression of NNMT was significantly lower in the cases of CM that showed recurrences (P = 0.0037), while no statistically significant correlation was found between NNMT expression in OMM and the risk of recurrence. Regarding the relationship between ulcerated lesions in the melanoma samples and NNMT expression, OMM showed no significant differences between the extension of the NNMT expression and the presence of ulcers, while the NNMT staining intensity was significantly higher in OMM cases with ulceration (P = 0.0440). Regarding the prognostic significance of this enzyme, the univariate analysis showed a negative effect of NNMT expression on the disease-free survival rate (log-rank test, P = 0.0452).

CONCLUSIONS: This study is the first report to evaluate NNMT overexpression in OMM, showing a different expression pattern from that of CM, suggesting the presence of molecular and metabolic differences between these two types of melanocytic neoplasms.

Interventions for treating osteonecrosis of the jaw stage III: may conservative surgical management be a viable option?

R. Mauceri ¹, O. Di Fede ¹, M. Dioguardi ², L. Lo Russo ², N.F. Testa ², G. Capocasale ¹, G. Campisi ¹

¹Dept. of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy; ²Dept. of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

BACKGROUND: Osteonecrosis of the jaw (ONJ) is a serious adverse reaction of anti-resorptive and anti-angiogenic

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agents, potentially painful and debilitating condition that can considerably affect the quality of life of patients.

The goals of the ONJ therapy are to reduce pain, to control infection and to stop the progression of the disease or, when it is reachable, to eradicate completely the necrotic bone in order to have a complete healing.

However, the ONJ management is still controversial and there are no evidence-based guidelines on the management of this disorder. Surgical approach should be defined due to the stage of the disease; symptomatic patients with stage III disease may require segmental resection and bone reconstruction if indicated.

Nevertheless, lately, conservative treatments are increasingly performed at all stages of the disease. The aim of this study is to describe a case report regarding a conservative surgical approach of an ONJ stage III.

METHODS: A man was referred to our Sector of Oral Medicine (UNIPA) for the presence of bone exposure, on February 2017.

RESULTS: A 60-year-old partially edentulous male presented to our attention with a necrotic bone exposure of the mandible.

Anamnestically, the patient was affected by a prostatic cancer with bone metastases and reported 2 cycles of anti-resorptive therapy (i.e. zoledronic acid ev); no consumption of tobacco or high consumption of alcohol was reported.

Extraoral examination revealed the presence of a painful swelling in the left mandibular body, with a beginning of a fistula. Intraoral examination showed a bone exposure on the left side of the mandible, with presence of suppuration.

A CT scan was requested and medical therapy was prescribed according to PROMaF protocol for acute infection control (http://www.policlinico.pa.it/portal/index.php?option=com_content&Itemid=264&op=page&SubMenu).

The ONJ process involved the entire mandibular body and the ONJ was classified as stage III (AAOMS staging system).

Applying the PROMaF protocol, pre- and post-operative antibiotic systemic treatment was given (ampicillin/sulbactam im and metronidazole per os) as well as the use of chlorhexidine mouthwashes and sodium-hyaluronate gel topically. The surgical protocol expected:

- 1) anesthesia without adrenaline;
- 2) full-thickness mucoperiosteal flap;
- 3) curettage of the necrotic bone, by mean of a piezo-surgery device;
- 4) irrigation with rifamycin sodium;
- 5) tension-free suture.

Post-operative instructions were given. Follow-up visits were scheduled to remove the suture (10 days), then at 1,3,6 and 12 months.

Ten days after, the healing process was incomplete, indeed the wound presented a central depression covered by granulation tissues. At one month, the complete mucosal healing was achieved. After 12 months of follow-up, the patient was free of symptoms or clinical signs related to ONJ.

CONCLUSIONS: Preserving the quality of life of cancer patients should be a key point in choosing the surgical approach; therefore, when reasonable, ONJ stage III may be treated initially with conservative treatment, avoiding more complex procedures for the clinicians and demanding surgery for the patients (e.g. segmental resection). Further studies, particularly controlled clinical trials, are necessary in order to validate and standardize the surgical technique reported here.

Proposal of a diagnostic and therapeutic pathway for oral health complications related to sjogren syndrome in autoimmune diseases

G. Setti ¹, G. Sandri ², S. Pozzi ³, L. Panari ¹, P. Bellini ¹, U. Consolo ¹

¹Unit of Dentistry and Oral-Maxillofacial Surgery, Surgical, Medical and Dental Department of Morphological Sciences related to Transplant, Oncology and Regenerative Medicine, University of Modena and Reggio Emilia, Modena and Reggio Emilia, Italy; ²Unit of Rheumatology, Department of Diagnostics, Clinical and Public Health Medicine, University of Modena and Reggio Emilia, Modena and Reggio Emilia, Italy; ³Unit of Hematology, Department of Diagnostics, Clinical and Public Health Medicine, University of Modena and Reggio Emilia, Modena and Reggio Emilia, Italy

BACKGROUND: According to Dentistry and Rheumatology Units of Azienda Ospedaliera Universitaria Policlinico di Modena, the lack of a diagnostic and therapeutic pathway for oral health problems related to primary and secondary Sjogren Syndrome, makes necessary to develop a database for rheumatology autoimmune disease affected patients. Usually, after the oral cavity comprehensive clinical examination and patient history interview, dental and oral health condition are not registered by the operator who perform labial glands biopsy. Moreover, general oral conditions are not actually followed-up after pathologic glands evaluation, requested as a criterion for syndrome diagnosis; also, clinical and serological patient course are not shared between dental and medical specialists. Thus, is not actually possible to evaluate onset, progression or remission of oral diseases and to follow-up patient for effects of xerostomia such as decays, periodontal diseases and mucositis. Setting-up a data base will provide us the possibility to follow-up patients over years and register oral health conditions in relationship to the progression of main diseases and drug therapy.

METHODS: A literature review to identify the diagnostic parameters for primary and secondary Sjogren syndrome was performed. Histological results of all labial salivary glands examination, performed at Azienda Ospedaliera Universitaria Policlinico di Modena from 2011 to 2018, were collected. Then exclusion criteria were defined: patients with pulmonary and rare respiratory diseases, nephropathic disease and glands biopsy for oncological suspect or traumatic lesions (such as mucocele). By the gathering of medical reports, pharmacological history, serological exams, functional salivary glands test, imaging (e.g. sialography), we could appreciate basal conditions at time of suspected diagnosis, and fill the database comprehensively. Moreover, a pathological re-evaluation of biopsies performed by the same pathology specialist would let us retrospectively compare diagnostic scores with clinical course of disease.

RESULTS: We have currently collected 134 cases of patients who undergo to labial salivary glands biopsy in our department between January 2011 to December 2017, respecting exclusion criteria. We made a database recording age, sex, and the histological reports. Evaluation of histological reports showed non homogeneous diagnostic criterion (focus score Greenspan; grading by Chisholm&Mason; Tarple&Cipolletti; Baldini); in addition, scores overlapping not always couple with positive diagnosis or disease severity.

CONCLUSIONS: Histological specimen revision could give us a homogeneous diagnostic score for the inflammatory infiltrate. Medical and pathological data crossing

could let us retrospectively understand the natural history of autoimmune disease and the influence on oral health. Additionally, reviewing data collection will indicate us which criterion to select in future prospective quality evaluation.

Epithelial-myoepithelial carcinoma of the minor salivary glands: a case report

V. Panzarella¹, R. Mauceri¹, G. Di Gioia², C. Mangione², A. Cocco², O. Di Fede¹, G. Campisi¹

¹Dept. of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy; ²Dept. of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

BACKGROUND: Epithelial-myoepithelial carcinoma (EMC) derives from the intercalated ducts of salivary glands. The EMC is a rare malignancy, showing an incidence of 0.48% – 1% of all salivary glands tumour and it usually affects the parotid glands (73.5% - 80%). EMC lesions arising in minor salivary glands are rare, only 5% - 6.2% of reported EMCs. The aim of this paper is to report the rapid onset of a EMC of the minor salivary glands.

METHODS: We report the case of a woman, who was referred by his dentist to our Sector of Oral Medicine (UNIPA) for a swelling of the palate, on January 2018.

RESULTS: A 56-year-old female presented to our attention with an asymptomatic lesion of the hard palate. Anamnestically, the patient reported no health concern and no consumption of tobacco or high consumption of alcohol. Clinical examination revealed a firm swelling area on the right side of the hard palate, the overlying mucosa presented an ulcerated red-purple surface. The lesion was asymptomatic. Radiographically, the patient was already in possession of a magnetic resonance and CT scan of the head and neck. Both radiographic examinations exhibited a solid tissue formation, with oval shape, irregular margins and intense post-contrastographic enhancement. The lesion involved the hard and soft palate, slight commitment of the maxillary bone and approximately a size of 13 x 16 mm. Based on clinical features and radiology evidences (CT, MRI), the clinical diagnosis was salivary gland tumour (pleomorphic adenoma), and different diagnosis included low-grade adenocarcinoma, low-grade muco-epidermoid carcinoma, mantle cell lymphoma. After obtaining the consensus of the patient, an incisional biopsy was performed and the histopathologic examination revealed a newly formed epithelial atypical tissue, predominantly solid architecture, rare ductal structures, elevated proliferative activity (Ki67=about 30%) and with morphological and immunophenotypic characters consistent with an epithelial-myoepithelial origin. The histopathological analysis associated with macroscopic and radiographic examinations permitted the definitive diagnosis of epithelial-myoepithelial carcinoma. Patient was subsequently referred to the Department of Oncology for the management.

CONCLUSIONS: Epithelial-myoepithelial carcinoma is very rare, especially in minor salivary glands. Occasional indolent multifocal lesions of the oral cavity should be carefully investigated; during the differential diagnosis is fundamental to remember that unusual lesions like EMC with a low-grade malignancy can occur. Indeed, early diagnosis may contribute to a better prognosis.

Exfoliative cheilitis in a young adult patient: a case report

B. Mainardi, F. Toma, A. Peri, C.M. Morini, P. Capparè, A. Lissoni, S. Abati

Oral Pathology, Dept. of Dentistry - IRCCS San Raffaele University Hospital, University Vita-Salute San Raffaele, Milan, Italy

BACKGROUND: Exfoliative cheilitis is a condition that affects the upper and lower lip with the consequent dehydration and flaking off of the lip mucosa. The lips appear chopped and cracked, bleeding may occur spontaneously and the patient experiences sensitivity and pain especially in unfavorable weather conditions such as excessive sun exposure or chilling days. Therefore, they look unattractive, itchy and this condition results as extremely challenging for the quality of life of the affected patient.

METHODS: A young male patient of 21 years old came for a consult with the oral medicine expert referred by his physician. He was previously visited by several dermatologists that hypothesized different diagnosis and treated the condition with therapeutical approaches that did not give any consistent results. His medical history was clear, the patient never smoked and reported that this condition appeared after an excessive sun exposure in 2015. As the first manifestations he had erosive and crusted labial lesions cured initially as a herpetic form or an alleged propolis allergy. Dermatologists performed also some patch testing that gave negative results. In 2016 a biopsy was performed and the consequent diagnosis was a psoriasiform hyperplasia of the epithelium with diffused spongiosis and intradermal granulocytes. Other exams were carried out without any relevant positivity (fecal exams, lactose allergies ...) The patient reported that the evolution of the condition followed a 2-week cycle and that there were not any correlation with other symptoms. The clinical extraoral and oral examination showed a poor oral hygiene condition, tonsillar hypertrophy and painful erosive chopped lips that easily peeled off. The previous therapeutical approaches prescribed by the dermatologists with acyclovir, tacrolimus, prednisone and doxycycline were ineffective. The oral medicine expert decided for a topic treatment with professional oral hygiene prophylaxis to reduce the bacterial load, dedicated oral hygiene home instructions with a mild fluoridated toothpaste without Sodium Lauryl Sulfate, Chlorhexidine mouthwash in a low concentration (CHX 0.06% 2 times a day), an oral lubricant gel and an hypoallergenic lip balm. Furthermore, nasal irrigations with an isotonic solution to improve the air flow through the turbinates and prevent mouth breathing that enhanced the lip and mucosal dryness. Hematologic exams to check the antibodies anti-transglutaminase, anti-endomysium and anti-gliadin were requested. After 3 weeks the lip condition was greatly improved and the lips were further treated with borax glycerin to improve the hydration and the patient was relieved of the burning and itchiness.

CONCLUSIONS: Exfoliative cheilitis may be exacerbated by weather conditions, chemical agents such as SLS, and its treatment should be just topical. The improvement of oral hygiene and the rehydration of the lips with specific ointments was indeed successful. In absence of any other systemic condition that could be responsible of this clinical manifestation and the treatment with topical agents resulted effective for the patient that is still improving noticeably.

ABSTRACT

Non-drug induced gingival hyperplasia: a case report in a young woman

B. Mainardi, F. Toma, A. Lissoni, A. Peri, C.M. Morini, R. Vinci, M. Clementini, S. Abati

Oral Pathology, Dept. of Dentistry IRCCS San Raffaele University Hospital, University Vita Salute San Raffaele, Milan, Italy

BACKGROUND: The purpose of this report is to describe a clinical case with a massive bilateral gingival hyperplasia that is not related to drug treatment, in a young woman from Philippines. Gingival enlargements such as diffuse or multifocal gingival hyperplasias are usually related to the chronic assumption of medications such as immunosuppressants, antiepileptic and calcium channel blockers. Therefore, it is essential to investigate thoroughly the medical history and drugs assumption of affected patients to exclude any possible correlation with the clinical aspect of hyperplasia.

METHODS: In December 2017 a 39 years old Asiatic female patient came for a first visit in our Clinical Unit of Oral Pathology complaining about an unusual enlargement of the maxillary gingiva in the area of the palate that slowly began one year earlier. The mass was indolent but worrisome. Her general practitioner prescribed her the blood tests that did not reveal any particular condition. The oral medicine expert reviewed the medical history of the patient that was completely cleared. The woman did not report any habit such as smoking, alcohol, drugs or a particular diet. She just had two pregnancies in 2008 and 2010. She did not refer any familiarities with her clinical manifestation. The medical investigation was further complicated by a linguistic barrier since the patient spoke just her native language and a little of English, with the help of her husband. The radiographic exam (OPT) showed a severe grade of periodontal disease with a generalized horizontal bone loss and molar furcation involvement both in the maxilla and mandible. Her oral hygiene status was poor. The massive gingival growth was not edematous and firm, with irregular but demarcated borders. A diagnostic incisional biopsy was performed to exclude any metaplasia or malignancy, such as a lymphoma. The teeth 1.6 and 1.7 were extracted and the dental hygienist performed a professional oral hygiene at the following appointment. The histopathology reported gingival hyperplasia with a moderate lymphoplasmacytic infiltrate. The lesion is slowly reducing after the extractions and the clinical and final diagnosis, excluded a congenital gingival fibromatosis or any other genetic condition that could exacerbate the gingival status.

CONCLUSIONS: In this unusual case of massive gingival enlargement, the clinical and final diagnosis excluded a congenital gingival fibromatosis or any other genetic condition that could affect the gingival tissues. The disruption of periodontal attachment caused by the accumulation of bacteria due to pseudopocketing in the areas of hyperplasia led to the loss of the involved teeth.

Diseases and conditions of the oral mucosa in a cohort of consecutive patients at the oral medicine and pathology unit and relation with oral symptoms

F. Toma, B. Mainardi, A. Peri, M. Moretti, C. M. Morini, G. Gastaldi, A. Lissoni, S. Abati

Oral Pathology - Dept. of Dentistry - IRCCS San Raffaele University Hospital - University Vita Salute San Raffaele, Milan, Italy

BACKGROUND: The aim of this retrospective study has been to highlight the prevalence of oral mucosal inflammatory

diseases and conditions in a 12-months time period at the Oral Medicine and Pathology Unit of the Dental Clinic in Hospital San Raffaele, Milano. The relations between the oral inflammatory disorders and subjective symptoms like burning, pain and xerostomia have been evaluated.

METHODS: Medical histories, clinical charts and records of the patients visited at the oral medicine and pathology unit in Hospital San Raffaele, Milano, were collected and filed in a customized secured digital database. Data collection included demographic informations such as sex and age, education and profession, systemic diseases, drug therapies, biopsies, oral clinical and histopathological diagnosis. The sample included 228 patients firstly accessed to the unit and followed during 2017. The patients' files were statistically analyzed with JMP 9.0 software in a Macbook pc, showing descriptions and correlations between demographic and clinical data.

RESULTS: Among the 228 patients, 148 were females and 80 males; the mean age was 54.5 yrs \pm 17.96 sd (age range 1 - 93, females mean 56.1 males 51.5). 47.7% of the patients were systemically healthy while 52.3 % were affected by different general conditions: 36 pts with cardiovascular diseases, 23 with neurological disorders, 21 pts with metabolic and/or endocrine diseases, 16 pts with immunopathological diseases and/or allergies, 10 pts with gastroenteric diseases and 10 pts with cancer. Eighty-seven (38%) of the studied subjects were chronically treated with xerogenic drugs. The most frequent oral conditions evidenced were benign growths like traumatic fibromas and salivary cysts (43 pts, 18.8%); oral lichen planus was present in 42 pts (18.4%), aphthous ulcers were seen in 15 pts (6.6%), migratory glossitis in 9 pts (3.9%), mucosal keratosis in 14 pts (6.1%) and oral squamous carcinomas in 5 patients. Burning and/or mucosal pain were the chief complaint in 52 subjects (22.8%), significantly prevalent in inflammatory oral conditions ($p < 0.0001$); subjective symptoms of dry mouth were reported by 59 pts (25.9%), more common in women (n.s.) and in patients with inflammatory oral conditions ($p < 0.011$) and obviously prevalent in patients taking xerogenic drugs.

CONCLUSIONS: Oral inflammatory mucosal diseases and conditions can affect the patients' quality of life and are able to induce symptoms of burning, pain and xerostomia that should be taken care of with appropriate relieving treatments.

Diagnostic pathway for a blue-grayish pigmentation of the hard palate: a case report

F. Toma, A. Peri, A. Lissoni, B. Mainardi, C.M. Morini, G. Arigoni, S. Abati

Oral Pathology, Dept. of Dentistry IRCCS San Raffaele University hospital, University Vita Salute San Raffaele, Milan, Italy

BACKGROUND: Dark pigmentations of the oral mucosa can be caused by many different factors, the most common are ethnic pigmentations with a brownish variation of the mucosal appearance. Other pigmentations may be caused by amalgam particles that enters through micro lesions of the mucosa during the tooth prosthetic preparation. Some others are a secondary effect induced by the chronic assumption of certain drugs, such as minocycline, tetracycline, antimalarial agents (in particular with chloroquine and hydroxychloroquine), birth control pills or hormonal replacement therapies and ketoconazole. Ultimately the differential diagnosis must be carried out also with the melanoma, a malignant tumor with a very poor prognosis for the patient.

METHODS: A female patient of 69 years old came for

the clinical assessment and diagnosis of a blue pigmentation area in the hard and soft palate below the upper complete denture, noticed by her GDP. Her medical history reported hypertension, a smoking habit and rheumatoid arthritis treated with chloroquine and prednisone; moreover, her elevated blood pressure was compensated with ace-inhibitors, diuretics, beta blocker agents and she mentioned allergies to nickel and contrast media agents. At the clinical observation the palate had a bluish pigmentation area with a 3 cm diameter, the lesion was slightly tingling because of the direct contact with posterior ridge of the denture. The biopsy for the suspicious lesion was performed within a week after the first observation. The differential hypothetical diagnosis was carried out with an extended tattoo, melanoma, melanocytic deposits and drug induced pigmentation. The incisional punch biopsy of 5 mm was immediately sent for the histopathology evaluation. The diagnostic assessment initially suggested a tattoo-like lesion, but this was not convincing both the pathologist and the oral medicine expert according to the histopathology and the clinical pictures of the oral lesion. The specimen was then processed one more time and revealed many deposits of hemosiderin (Perls +) with a mild fibrosis and keratosis with lymphohistiocytic infiltrate and a moderate microvascular proliferation and endothelium thickening with lymphocytic infiltrate that lead to vasculitis. **CONCLUSIONS:** This case report shows how an oral pigmentation should not be underrated and misdiagnosed with a simple amalgam tattoo. Although the patient cannot modify her systemic therapies for rheumatoid arthritis, the pigmentation has been classified as a drug induced one, excluding also malignancies such as melanoma. The oral medicine expert set up a 6 month follow-up.

Oral squamous cell carcinoma on immune-mediated diseases: study of a sample of 31 patients

L. Limongelli, S. Capodiferro, F. Dell'Olio, G. Barile, D. De Falco, S. Di Nanna, G. Favia.

Complex Operating Unit of Oral Pathology and Surgery, Department of Interdisciplinary Medicine, University of Bari, Bari, Italy

BACKGROUND: The recent literature shows a statistically significant relationship between oral carcinoma and immune-mediated diseases, probably due to the established correlation between chronic inflammation and carcinogenesis. The rate of malignant transformation in Oral Squamous Cell Carcinoma (OSCC) is in a range of 0.4-5.3% in the Oral Lichen Planus (OLP) and 15% in Graft Versus Host Disease (GVHD). The aim of this study is to report the clinical records of OSCC on patients affected by immune-mediated diseases referred to "Complex Operating Unit of Oral Pathology and Surgery (University of Bari)".

METHODS: To carry out this study, the authors analyzed the database of OSCC comprehending 722 patients (950 OSCC) referred to "Complex Operating Unit of Oral Pathology and Surgery (University of Bari)" from 1977 to 2017. The authors used as inclusion criteria: patients affected by immune-mediated diseases referred from 2000 to 2015 with a OSCC. Of these patients, the following variables were assessed specifically: sex, age, multiple carcinomas, site, clinical presentation, TNM classifications, staging and grading, kind of therapy, histological features (tumor thickness - TT, tumor depth - TD, muscular and vassal infiltration) and status of the patients.

RESULTS: The authors found 31 patients affected by immune mediated diseases: 21 with diagnosis of OLP (60.34% of OSCC), 7 with GVHD (29.31% of OSCC), 2 with Pemphigus (P - 5.17% of OSCC) and 1 with Mucous Membrane Pemphigoid (MMP - 5.17% of OSCC). To these 31 patients corresponded 58 OSCC: 35 in the OLP group, 17 in the GVHD group, 3 in P group and 3 in MMP group. There is no preference for sex (M: 51.7%, F: 49.3%), average is 63 years old; the most frequent sites are: tongue (44,83%), followed by cheek (20,3%) and gingiva (18,2%). The lesions present as ulcer (42%), leukoplakia (21%), nodule (14%), eritroplakia (5%), mixed (18%). The OSSC considered are in 85% of cases at stages I-II. All the OSCC underwent to the same diagnostic-therapeutical protocol consisting in HD intraoral ultrasonography and RMN for lesions occurred on soft tissues and OPT and TC for lesions occurred on gums and alveolar ridges for the diagnosis, and wide laser excision with piezoelectrical tools for lesions of hard tissues as surgical treatment. Three patients underwent lymphadenectomy because of the presence of clinical lymph nodes and one patient (GVHD) underwent chemotherapy for a T4N2aM0 OSCC. At histological analysis, the OSCCs presents more frequently as well-differentiated carcinoma (54%). TT ranged from 2 to 7 mm and TD from 1.5 to 6. Lymph nodes metastasis were detected only in two patients presenting OSCC with grading 3, TD>5mm and infiltration of vessels. All the patients healed except the patient with stage IV that died for OSCC.

CONCLUSIONS: The obviousness of the higher risk of development of OSCC in patients affected by immune-mediated diseases allows to establish programs of primary and secondary prevention with customized follow-up. Indeed, based on this experience, surely it is possible to set up a rescue level considering GVHD at most risk compared to the other immune-mediated disease and so in need of more frequent follow up.

Early tongue squamous cell carcinoma: tri-dimensional diagnosis, therapy and clinical-pathological correlations in 85 patients

F. Dell'Olio, L. Limongelli, A. Tempesta, S. Capodiferro, G. Coti, A. Carrasi, R. Altieri, G. Favia

Complex Unit of Odontostomatology, DIM, Interdisciplinary Department of Medicine, Aldo Moro University of Bari, Bari, Italy

BACKGROUND: Early oral cancer is a malignancy characterized by a maximum diameter of 4 cm, occurring after the fourth decade, with few or no symptoms, rare metastasis and high rate of healing after surgery. The aim of this study is to report the clinical records regarding the early tongue squamous cell carcinomas (stage 0, I, and II) referred to the Oral Pathology and Surgery Unit of University of Bari from 2005 to 2015 focusing on the diagnostical and therapeutical management and Histological Prognostic Parameters (HPP) in order to establish the more predictive ones for the occurrence of metastasis in lymph-nodes.

METHODS: All the patients underwent the same protocol of diagnosis and therapy: W.H.O.'s 8-steps examination, application of T-blue and Lugol, HD intra-oral ultrasonography in order to assess Tumor Thickness (TT) as the total thickness of the tumor and Tumor Depth (TD) as the thickness of the invasion beyond basal membrane, TC or RMN to complete pre-surgical cTNM staging. Micro-invasive laser excision of

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cancers was performed with intra-operative exam of resection margins; definitive histological exam to assess HPP. Follow-up performed with clinical exam and ultrasonographical evaluation of neck's nodes, in order to perform lymphadenectomy only on pathological ones. Medical records were collected for each patient, focusing on risk factor, clinical presentation, site and W.H.O.'s sub-site classifications, and HPP used (grading, TT, TD, histological structures invaded by cancer, like muscles, vessels, nerves, salivary ducts). HPP's correlation with occurrence of nodal metastasis was assessed with χ^2 -test (1 g.l. and $\alpha < 0,05$), then compared to select the more reliable ones.

RESULTS: The database gathered 85 cases of oral tongue cancer occurred from 2005 to 2015. The early tongue cancer affects more males (58,82%), during the seventh decade of life (31,74%), occurring on tongue's lateral margins more frequently (77,64%) than other tongue's sub-sites, in form of ulcer (54,11%) or of exophytic mass (31,76%). The early tongue cancers are often of stage one (56,47%) and rarely of stage zero (2,35%), according to cTNM stadiation. The most frequent histological form is invasive (98,83%) well-differentiated (52,94%) carcinoma, with a large nest invasion pattern (75,29%) extended to the extrinsic muscles of tongue (72,94%) and rarely extended to vessels (7,06%), nerves (17,65%) or salivary ducts (15,29%). Few lymphadenectomies were performed (10,58%), with only two cases of occult metastasis in nodes that needed a pTNM re-stadiation to third stage (2%). The 98,73% of patients involved in this study is still alive, documented by a follow up period lasting from 2 to 12 years. Only one died because of multiple carcinomas and 6 because of other reasons. Our statistical analysis allowed to correlate all HPP to occurrence of nodal metastasis (except TT) with statistical significance. The HPP more predictable are: grading, TD, invasion of intrinsic muscles of tongue, invasion pattern, vascular invasion.

CONCLUSIONS: This study about the early tongue cancer proves the efficacy of the management used in Odontostomatology's Unit of University of Bari revealing a 98,73% of patients without carcinomas in a period from 2 to 12 years. The main Histological Prognostic Parameters useful to evaluate the risk of nodal metastasis are: grading, TD, invasion pattern (proper of OSCC), vascular invasion and invasion of the intrinsic muscles of tongue (exclusive of early tongue cancers). TT can't be considered as a HPP useful for early tongue cancer.

Cost of illness of oral lichen planus: preliminary report of a multicentric study

C. Lajolo¹, G. Gioco¹, T. Salo², M. L. Specchia³, P. Cacciatore³, M. Giuliani⁴, M.K. Siponen⁵

¹School of Dentistry, Oral Medicine Department, Catholic University of Rome, Rome, Italy; ²Cancer and Translational Medicine Research Unit, Faculty of Medicine, University of Oulu and Oulu University Hospital, Oulu, Finland; ³Public Health Department, Catholic University of Rome, Rome, Italy; ⁴Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Rome; ⁵Department of Oral and Maxillofacial Diseases, Kuopio University Hospital, Kuopio, Finland

BACKGROUND: To estimate the economic costs of oral lichen planus (OLP) through an out-patient multicentric study conducted in Finland and in Italy.

METHODS: A multicentric retrospective study was conducted, retrieving clinical records of patients affected by OLP and

followed at Kuopio University Hospital (Kuopio, Finland) and at Oral Pathology Departments of Catholic University (Rome, Italy), to evaluate the economic burden of OLP. Direct costs concerning diagnostic procedures (i.e., biopsies, swabs, blood exams), therapeutic management (either local and/or systemic) and follow-up visits were obtained from clinical records.

RESULTS: One hundred and eight patients with confirmed diagnosis of OLP (81 females and 27 male), 50 Finnish and 58 Italians, with a mean age of 60.8, were enrolled in this study. Buccal mucosa (81%) and gingiva (48%) were the most involved sites, followed by the tongue (37%). Considering clinical presentation, 59 patients (54.6%) had mixed form, 32 the red (29.6%) and 17 white form (15.7%). The mean follow-up was 24.58 months with a mean of 8.6 visits per patient (4.2 times per year). The study population was divided into two subgroups according to need of therapy: 73 subjects received therapy (Group 1) and 35 did not (Group 2). Group 1 had a mean follow-up time of 30 months, receiving a mean of 10.4 visits (range 2-36; 4.2 per year), 1.4 biopsies (range 1-3; 0.57 per year) and 1.9 swabs (range 0-17; 0.7 per year) with a mean of 395 applications of immunosuppressive topical therapy (range 24-2610; 132 administrations per year) and 273 administrations of topical anti-mycotic (range 21-2264; 96 administrations per year); Group 2 had a mean follow-up time of 14 months, receiving a mean of 5.1 visits (range 1-17; 4.4 per year), 1.2 biopsies (range 1-3; 1.0 per year) and 0.5 swabs (0.4 per year). Within each group, it was possible to compare costs between Finnish and Italian patients: in Group 1 (treated patients) the mean cost was 1249 euros per Finnish patient, whereas 398 euros per Italian patient; in Group 2 (untreated patients) the mean cost was 805 euros per Finnish patient, whereas 352 euros per Italian patient.

CONCLUSIONS: This multicentric study provides a preliminary estimate of OLP patients management cost: the most interesting aspect was the different economic burden between Finnish and Italian Health Care Systems, being the Finnish one more expensive. Moreover, in both health care systems, to undergo therapy for OLP highly increased the economic impact. Some difficulties were encountered during the study, in fact many different pharmacological regimens were adopted, due to variable clinical response to therapy. Since OLP is considered a potentially malignant disorder, future studies should address the impact of neoplastic transformation on the economic burden of this disease.

Stomatitis and VR-TKI: a review of current literature in 4369 patients

C. Arena¹, G. Campisi², V. Panzarella², M. Procaccini³, K. Zhurakivska¹, G. Troiano¹, L. Lo Muzio¹

¹Dipartimento di Medicina Clinica e Sperimentale, Università di Foggia, Foggia, Italy; ²Dipartimento di Discipline Chirurgiche, Oncologiche e Stomatologiche, Università di Palermo, Palermo, Italy; ³Dipartimento di Scienze Cliniche Specialistiche ed Odontostomatologiche, Università Politecnica delle Marche, Ancona, Italy

BACKGROUND: Traditional treatment of malignancies with chemotherapeutic agents often cause the damage of normal healthy cells. Oral toxicities are a common cause of dose delays and interruption of cancer therapy. In the last decades, new targeted agents have been developed aiming to decrease the rate of side effects on healthy cells. Multitargeted tyrosine kinase inhibitors (TKI) represent a class of target specific anti-neoplastic agents. Even this kind of targeted therapy based

on VR-TKI shown some class specific adverse events that include fatigue/asthenia, anorexia/loss of appetite, hand-foot reactions, dysgeusia, diarrhea/abdominal pain, hypothyroidism, hypertension, myelosuppression and stomatitis. Literature reports that one quarter of patients treated with multitargeted angiogenesis kinase inhibitors develop an oral adverse event within 2 months of therapy.

METHODS: The following review was performed to answer to the question "What is the rate of incidence of oral stomatitis in patients treated with VEGF TKIs?". A systematic search was performed on the PubMed online database using a combination of MESH terms and free text words: "sunitinib" (free text) OR "sorafenib" (free text) OR "axitinib" (free text) OR "cabozantinib" (free text) OR "pazopanib" (free text) OR "regorafenib" (free text) OR "nintedanib" (free text) OR "vatalanib" (free text) combined through the use of Boolean operator AND with the key words "stomatitis" (MESH) OR "mucositis" (MESH). (i) performed on human subjects, (ii) reporting about the use of an mTOR inhibitor, (iii) written in the English language, and (iv) reporting about the incidence of stomatitis or oral mucositis. Case reports and studies on animal model were excluded from this study. No restrictions were applied to the year of publication.

RESULTS: The incidence of stomatitis of any grade according to the agent was 35.2% for sunitinib, 20.52% for sorafenib, 20.63% for axitinib and 34.21% for cabozantinib. All the agents showed high rates of low grade stomatitis (G1-G2) while the onset of severe stomatitis (G3-G4) was low.

CONCLUSIONS: Analysis of the reports with patients treated with sunitinib, sorafenib, axitinib and cabozantinib showed a clear prevalence of stomatitis grade 1 or 2. These data differ from that of patients treated with conventional chemotherapy in which mucositis is predominantly of grade 3 or 4.

Celiac disease and clinical manifestations in the oral cavity in the pediatric patient

C. Dargenio¹, S. Cefola², A. Sinesi², G. Giannatempo¹, L. Lo Russo¹, G. La Torretta¹, E. Lo Muzio³

¹Dipartimento di Medicina Clinica e Sperimentale, Università di Foggia, Foggia, Italy; ²Associazione Italiana Celiachia, Puglia, Italy; ³Dipartimento di Scienze Odontostomatologiche e Maxillo-Facciali, Università di Roma La Sapienza, Rome, Italy

BACKGROUND: Celiac Disease (CD) is extremely variable: it may arise with the typical gastrointestinal symptoms, but also with extra-intestinal signs and/or symptoms such as those of the oral cavity. Therefore, it is often detected lately or not diagnosed at all: approximately 70-80% of cases still escape diagnosis. The aim of this study is to observe the presence of alterations in the oral cavity of the celiac children and, in particular, the enamel hypoplasia, at variable degree (see Aine classification), and Recurrent Aphthous Stomatitis (RAS) in order to assess whether these have statistical significance such as to consider the dental visit useful to intercept the atypical forms of CD.

METHODS: We performed an accurate objective examination of the oral cavity in 38 celiac patients from 4 to 16 years (27 F - 71%, 11 M - 29%; average age 9.7, range 4-16), diagnosed according to the ESPGHAN criteria by a team of dentists at the dental clinic of the University of Foggia. The team searched changes in the enamel and the RAS. The parents were asked to complete a survey in order to bring out data concerning the manifestations of RAS and to evaluate some other

statistical and clinical aspects of Celiac Disease. Hypoplasia from Grade 0 to Grade IV were observed, according to Aine classification based on the symmetry and the bilateralism of the lesions and on the chronological coherence.

RESULTS: After objective examinations, 10.5% of patients did not show any defect of the enamel, while in 89.5% these alterations appear with a variable frequency, with a total of 221 affected teeth. Grade I lesions occur with a frequency of 68%, Grade II lesions in 15%, Grade III lesions in 12%, grade IV lesions in 5%. The most affected teeth were the incisors (frequency of 41%) followed by molars (frequency of 28%). The third incisor is the most involved dental portion (48% frequency). The manifestation of RAS occurred in 61% of cases and, after a gluten-free diet, ulcers disappeared or decreased in 77% of cases.

CONCLUSIONS: The results obtained with this study represent a significant statistical value that supports the possibility to use such clinical manifestations as markers of CD in those forms that manifest themselves in a non-specific way and to consider them equal to all other atypical clinical manifestations related to it. Starting from an objective examination of the oral cavity, the doctor may consider necessary to investigate about the familiarity with CD and any other signs and symptoms related to it and, therefore, decide whether and what exams require to make an early diagnosis.

Oral amelanotic melanoma of the hard palate: a case report

A. Tempesta, L. Limongelli, P. Mezzapesa, S. Di Nanna, G. Barile, A. De Caro, G. Favio

Complex Operating Unit of Oral Pathology and Surgery, Department of Interdisciplinary Medicine, University of Bari, Bari, Italy

BACKGROUND: Oral melanoma is an uncommon malignant neoplasm which arises from melanocytes; the amelanotic one is extremely rare in oral cavity. Oral melanomas have unknown etiology because the affected sites are not exposed to solar radiations, however some studies have underlined a possible role of ill-fitting dentures, tobacco, amalgam tattoo, nevus and racial pigmentation as risk factors. This malignant neoplasm is really aggressive therefore an early diagnosis is mandatory to improve patient prognosis. Since an early diagnosis is difficult, amelanotic melanoma has a poorer prognosis than the pigmented one. Immunohistochemical staining is crucial for the histological diagnosis. The aim of this work is to describe a case of oral amelanotic melanoma occurred in a 50-years-old male patient.

CASE REPORT: In november 2017 a 50-years-old male patient, 10 cigarettes/day smoker since 20 years old, referred to Complex Operating Unit of Oral Pathology and Surgery, University of Bari, with a wide bleeding and painless lesion on the anterior and left hard palate. Clinical oral examination revealed a swelled, ulcerated, reddish and multi-lobular lesion with a firm-elastic consistency. Ortopantomography (OPT) and Computed Tomography (CT) with 3D reconstruction showed the presence of a wide and expansive osteolytic lesion involving the anterior part of the hard palate and extending on the left hard palate and the left nasal floor. Fine Needle Aspiration Cytology (FNAC), Fine Needle Aspiration Biopsy (FNAB) and incisional biopsy were performed to obtain a certain pre-surgical histopathological diagnosis. Histological features revealed a low differentiated malignant neoplasia with high replication index (Ki67 > 90%)

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and both epitheliomatoid and sarcomatoid (fuscellular) aspects. Immunohistochemical (IHC) staining was essential for neoplasm identification; positivity for S-100 and CKpool (dot-like) was found thus suggesting the diagnosis of oral amelanotic melanoma. Abdominal and neck ecography were performed in order to evaluate possible secondary locations and to achieve a neoplasm staging. No abdominal space-occupying lesion (SOL) came up (M0), while a lymphadenopathy (3,4 cm) at the left mandible angle and several bilateral hypoechoic neck lymph nodes with evident germinal centres were identified. Then, oral lesion was surgically removed by radical bone resection, extended to left upper jaw, premaxilla and nasal floor. The Patient was also sent to oncologist to organize both chemotherapy and radiotherapy treatment. Radical surgical treatment allowed the complete clinical healing of oral lesion and the patient has been rehabilitated with an obturator prosthesis. However Patient is undergoing chemotherapy and radiotherapy.

CONCLUSIONS: The oral amelanotic melanoma has a poor prognosis and an high aggressivity, therefore an early diagnosis and a multidisciplinary approach using medical and surgical treatments are essential for the correct management of the disease. Immunohistochemical stainings have an essential role for the correct diagnosis and, consequently, for a better therapeutical approach.

Lymphoepithelial carcinoma in a HCV patient: a case report

F. Torelli¹, G. Campisi², R. Mauceri², C. Arena³, M. Mascitti¹, F. Bambini¹, A. Santarelli¹

¹Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy; ²Department of Surgical, Oncological and Stomatological Disciplines, University of Palermo, Palermo, Italy; ³Department of Clinic and Experimental Medicine, University of Foggia, Foggia, Italy

BACKGROUND: Lymphoepithelial carcinoma (LEC) is a rare subtype of oral squamous cell carcinoma, characterized by a prominent reactive lymphoplasmacytic infiltrate, morphologically indistinguishable from nasopharyngeal carcinoma. This tumor is mainly located in the nasopharynx region, although has been reported in other head and neck regions, such as oral cavity, oropharynx, nasal cavity, and paranasal sinuses. The average annual incidence rate of LEC is less than 1 case per 100,000 persons, but it has an endemic geographic distribution, particularly in Southeast Asia. This condition exhibits close association with Epstein-Barr virus (EBV). Diets deficiencies in vitamin C and consumption of food that contains potentially carcinogenic N-nitrosamines have been implicated as contributing factors. Tobacco also has been implicated as a risk factor; however, the magnitude of its contribution to carcinogenesis is subject to debate. To date, no concomitant HCV infection in patients with LEC has been reported. The first case of metastasized LEC in a man with concurrent EBV and HCV infection is described herein. **METHODS:** On April 2017, a 43-year-old Caucasian man was referred to dentistry clinic of Marche Polytechnic University by his general practitioner for 4.8 tooth extraction. Furthermore, a 2-months history of lateral cervical adenopathy was reported. His medical history was significant for HCV infection in treatment with interferon. A past history of heroin and cocaine abuse was reported, but denied any recent drug use. Regarding pharmacological anamnesis, the patient was in treatment with methadone and lorazepam. Extra-oral

examination showed an enlarged and firm neck mass, with a diameter greater than 4 cm. Diagnostic iter included neck ultrasonography, complete CT scan, and ENT examination.

RESULTS: Ultrasonographic investigation revealed a hypoechoic, not confluent group of lymph nodes with clear signs of periadenitis and colliquation in its innermost part. CT examination showed diffuse and confluent laterocervical adenomegalies which were associated to a hypodense ill-defined nasopharyngeal lesion and a volumetric increase of right side submandibular gland which reached basicranium passing through oval foramen. Given the CT results, an endoscopic investigation was performed. A neoplastic lesion on the right side of the nasopharynx spreading into the homolateral nasal fossa. Biopsy specimen was obtained. Histological examination showed mild differentiated nonkeratinizing squamous cell carcinoma with a prominent reactive lymphoplasmacytic infiltrate. The presence of the EBV within tumor cells was proven with in situ-hybridization.

CONCLUSIONS: The exam findings were consistent with a final diagnosis of locally-advanced LEC of nasopharynx with multiple latero-cervical lymphadenopathies. To date, this is the first case of a LEC of nasopharynx occurring in a patient affected with HCV infection. This is similar to the case reported by Terada et al. In 2013, describing a LEC of esophagus in a patient with concurrent EBV and HCV infection.

MRONJ in patients treated with antiresorptive or antiangiogenic agents: a preliminary study

V. Zavaglia¹, A. Nori¹, F. Mazzoni², A. Tesei¹, N. Testa³, L. Lo Muzio³, A. Santarelli³

¹Special and Surgical Stomatology Department, "Ospedali Riuniti" Hospital of Ancona, Ancona, Italy; ²Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy; ³Department of Clinic and Experimental Medicine, University of Foggia, Foggia, Italy

BACKGROUND: Medication related osteonecrosis of the jaw (MRONJ) is a potential adverse effect related to the use of several drugs, including antiresorptive and antiangiogenic drugs. This pathology is triggered by a continuity solution of the mucosa, such as a dental extraction, and is characterized by the progressive bone destruction in the maxillofacial region. The presence of all the following characteristics may indicate that the patient is affected by MRONJ: current or previous treatment with antiresorptive or antiangiogenic agents; exposed bone or bone that can be probed through a fistula in the maxillofacial region that persists for more than 8 weeks; no history of head and neck radiotherapy or metastatic disease to the jaws. Regarding the pathogenesis, there are several hypotheses that could explain its unique localization to the jaws, involving inflammation and infection, bone remodeling suppression, and compromised angiogenesis. In this retrospective work we present the recurrence rate of MRONJ in a group of patients in treatment with antiresorptive (zoledronic acid) or antiangiogenic agents (denosumab).

METHODS: We report a case series of 12 consecutive patients affected by MRONJ, allocated in three groups on the basis of previous/current administered therapy: group A (zoledronic acid), group B (denosumab), and group C (zoledronic acid + denosumab). All patients were treated against osteoclast-mediated bone loss due to bone metastases. Age, sex, type of therapy, systemic and local risk factors were recorded. Treatment depended on the stage of MRONJ, consisting in medical and minimally-invasive surgical procedures. Follow-

up consists in regular clinical and radiological evaluation at days 10, 30, months 2, 4, 6, 8, 10, and 12, to ascertain the absence of recurrences.

RESULTS: 12 patients with MRONJ were selected (4 patients per group). Our results showed a mean patient age of 59.8 years (range 43-76 years). The mean bisphosphonate and denosumab administration time were 60 and 18.5 months, respectively. According to MRONJ staging, 7 cases were Stage 1, and 5 cases were Stage 2. The lesions were predominantly located in the mandible (n = 8). The most common predisposing factor was the presence of residual roots (n = 4), while regarding systemic risk factors was long-term use of systemic corticosteroids (n = 5). 3 cases of recurrent MRONJ were observed: 2 cases of Stage 2 MRONJ in group A (after 4 and 6 months, respectively) and 1 case of Stage 1 MRONJ in group C (after 4 months). No statistical differences were observed in these 3 groups regarding recurrence risk.

CONCLUSIONS: For prevention of MRONJ recurrences, periodical dental examinations are recommended.

Peripheral odontogenic myxoma: report of two cases

M. Mascitti¹, F. Badioli¹, V. Panzarella², L. Lo Russo³, C. Rubini⁴, M. Procaccini¹, A. Santarelli¹

¹Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy; ²Department of Surgical, Oncological and Stomatological Disciplines, University of Palermo, Palermo, Italy; ³Department of Clinic and Experimental Medicine, University of Foggia, Foggia, Italy; ⁴Department of Biomedical Sciences and Public Health, Marche Polytechnic University, Ancona, Italy

BACKGROUND: Odontogenic myxoma (OM) is a benign mesenchymal odontogenic tumor characterized by stellate and spindle-shaped cells dispersed in an abundant myxoid extracellular matrix. OM is believed to originate from embryonic connective tissue associated with the tooth-bearing apparatus: dental papilla, follicle or periodontal ligament. The evidence for its odontogenic origin arises from several aspects, such as the almost exclusive location in the tooth-bearing areas of the jaws, the occasional association with missing or unerupted teeth, and the possible presence of odontogenic epithelium. Peripheral odontogenic myxoma (POM) is considered the extra-osseous counterpart of OM. It is very rare and significantly less aggressive, compared to OM. POM may be difficult to differentiate microscopically from other tumors with myxoid features. Hence, most POM is misdiagnosed as fibroma, irritation fibroma, neurofibroma, lipoma, fibro-epithelial polyp, extra-osseous odontogenic fibromas, nerve sheath tumors or oral focal mucinosis. We thereby present two cases of POM.

METHODS: Two male Caucasian men (47-year-old and 23-year-old) were referred to the Department of Maxillofacial Surgery with mucosal swellings in right mandible region. The lesions were completely excised, and histologic examination was performed.

RESULTS: Histologic examination of the first excised tissue revealed a white nodule with elastic consistency measuring 4.5 x 3 cm, while in the second case fragile fibrous fragments measuring 1 cm. Microscopically, the lesions were characterized by stellate and spindle-shaped cells, embedded in an extensively, discrete vascularized fibromyxoid extracellular matrix. Neither atypia, nor mitotic

activity were seen. The erosive mucosa was covered by epithelium free of atypia. The connective tissue proved chronic inflammatory infiltrate with hemosiderin iron deposits. Based up on these features, the diagnosis of POM was made in these two cases. No evidence of recurrence was found after a 7 and 9-year follow-up, respectively.

CONCLUSIONS: OMs can be classified into two types: central variant, located in the bone, and peripheral variant, located in the soft tissue overlying the tooth-bearing areas. According to 4th Edition of WHO Classification of Head and Neck Tumors, central OM is the third most frequent odontogenic tumor; however, POM is a very rare lesion with reported incidence less than that of other peripheral odontogenic tumors. Usually, POM presents as an asymptomatic, exophytic gingival mass without bony involvement. Clinically and histologically, POM resemble many other soft tissue lesions, so they must be diagnosed by histological examination. This is a benign tumor, less aggressive compared to its central counterpart. It showed no evidence of recurrence or metastasis, however a follow-up period is clearly necessary.

Steinert dystrophy: a case report

R. Franco¹, M. Miranda², M. Benegiamo², F. Valle³, F. Lucici³, M. B. Silvi³, M. Dauri³, A. Barlattani, P. Bollero²

¹Department of Biomedicine and Prevention, University of Rome Tor Vergata, Rome, Italy; ²Department of Systems Medicine, University of Rome Tor Vergata, Rome, Italy; ³Department of Clinical Sciences and Translational Medicine, University of Rome Tor Vergata, Rome, Italy

BACKGROUND: Myotonic dystrophy 1 is an autosomal dominant genetic disorder. Myotonic dystrophy is caused by the expansion of the CGT triplet of the DMPK gene. The number of repetitions of the CGT triplet determines the severity of the pathology. Over 50 repetitions are present in affected individuals. The disease is subdivided clinically depending on the age of onset and the severity of symptoms in congenital, childhood-onset, adult-onset and late onset. The main symptoms are myotonia, weakness of distal striated muscle, cognitive and learning deficits, changes in cardiac conduction. A complication of myotonic dystrophy is malignant hyperthermia, which may occur following administration of some halogenated general anesthetics or by administration of muscle relaxants or surgical stress. Malignant hypertension is caused by the massive release of calcium from the endoplasmic reticulum. It is a fatal complication if not treated immediately by administration of dantrolene sodium. The aim of our study is to create recommendations for the treatment of patients with this rare syndrome.

METHODS: The patient S.B., suffering from myotonic dystrophy of Steinert, turns to our attention to perform an oral surgery. The patient has been inserted into a path of odontostomatological day hospital. Before the operation an anesthetic examination, blood tests and electrocardiogram were performed. The patient takes the following medications: eutirox, cardioaspirin. Cardioaspirin has not been suspended. The operation was performed using bupivacaine without vasoconstrictor, the syndesmotomy of the elements 3.2.3.1,4.1,4.2 was performed, affected by carious dextruent process, were dislocated using a lever and were avulsed by means of a clamp. During all the dental treatment an anesthesiologist was present with the constant presence of dantrolene sodium. The patient was observed for 5 hours after surgery.

ABSTRACT

RESULTS: The patient showed no complications of any kind either perioperatively or postoperatively. There was no postoperative bleeding and no malignant hyperthermia crisis occurred.

CONCLUSIONS: The odontostomatological treatment of the patient with Steinert's dystrophy must be carried out in a protected regime and the use of local anesthetic without vasostrictor, anxietyolysis and with the constant presence of dantrolene sodium is advisable given the possibility of triggering a malignant hyperthermia crisis due to surgical stress.

Bioinformatic and immunohistochemical analyses of BIRC5/survivin expression in oral squamous cell carcinoma

G. Troiano ¹, G. Pannone ¹, M. Pace ¹, K. Zhurakivska ¹, V.C.A. Caponio ¹, M. Mascitti ², L. Lo Muzio ¹

¹Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy; ²Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University

BACKGROUND: Survivin is a well-known protein involved in the inhibition of apoptosis in many different cancer types. Bioinformatics analysis focused on genetic mutations, mRNA expression, methylation and gene network. In addition, immunohistochemistry analysis from a single institution database was performed in order to study the prognostic significance of cytoplasmic and nuclear expression of survivin in OSCC. The aim of this study was to perform an integrate bioinformatic and histologic analysis in order to study the role of survivin and its related gene BIRC5 in OSCC.

METHODS: The expression level of the BIRC5 mRNA in OSCC samples compared to normal tissue was analyzed through Oncomine gene expression array datasets (<https://www.oncomine.org/>). In addition, the gene expression profile of two published databases (GSE85195 and GSE10121) were downloaded from Gene Expression Omnibus (GEO) using the GEO2R platform (<https://www.ncbi.nlm.nih.gov/geo/geo2r/>). In addition raw data from The Cancer Genome Atlas (TCGA) were also obtained in order to analysis: the rate of mutations, gene expression and methylation in patients with oral squamous cells carcinoma (OSCC). Immunohistochemistry (IHC) was also performed, on a Tissue Micro Array (TMA) of a single institution, in order to evaluate the nuclear and cytoplasmic expression of Survivin in samples from OSCC patients.

RESULTS: Data from this study revealed that Survivin is rarely mutated in OSCC samples, and is upregulated compared to non-cancerous tissue. Data from the TCGA database revealed that BIRC5 gene expression is an independent prognostic factor for OSCC. Analysis of the network revealed that: CDKN2a, MYC and FOXM1 control the expression of BIRC5, while: AKT1-3, PRCACA, BUB1 and CSNK2A1 controls a reaction that changes the state of the survivin protein (Figure 3). Correlations analysis between BIRC5 mRNAs expression, methylation and clinicopathologic parameters of patients with OSCC revealed a significance inverse correlation between the methylation and the mRNA expression of BIRC5, in addition mRNA expression correlated with the stage of the disease. In addition, IHC staining revealed that cytoplasmic but not nuclear expression of Survivin correlates with a poor overall survival in OSCC patients.

CONCLUSIONS: Aggregate bioinformatic and immunohistochemical analysis revealed that survivin is overexpressed both at mRNA and protein level. In addition, it represents an independent prognostic factor in patients with oral squamous cell carcinoma.

PD-L1 expression in oral squamous cell carcinoma microenvironment and prognostic correlations

V.C.A. Caponio ¹, G. Troiano ¹, M. Pace ¹, G. Pannone ¹, C. Arena ¹, G. Campisi ², L. Lo Muzio ¹

¹Dipartimento di Medicina Clinica e Sperimentale, Università di Foggia, Foggia, Italy; ²Dipartimento di Discipline Chirurgiche, Oncologiche e Stomatologiche, Università di Palermo, Palermo, Italy

BACKGROUND: Tumor Microenvironment stands for the complex organization and pool of different cell types that are able to produce different molecules, which take part in different cellular mechanisms, such as cell growth and metastasis. Tumor Associated Macrophages (TAM) seems to be involved in increase of survival cells, angiogenesis and metastasis, leading to a poorer prognosis. Recently, different studies showed the importance of PD1-PDL1 interaction in the therapy of different cancers. PD1 (Programmed Death 1) is usually expressed on the extracellular side of the T-cell membrane. In many cases, PD-L1 has been showed to be overexpressed on the surface of tumoral cells. The interaction between PD1/PD-L1 leads to a T cell dysfunction, decreasing the immune response against the cancer cells. Nivolumab and Pembrolizumab, are monoclonal antibodies directed against the Programmed Cell Death Protein 1 (PD-1) receptor. They both showed a therapeutic benefit in different kinds of cancer. Anyway, in one hand, it has emerged that not all PD-L1-expressing tumors respond to PD-1/PD-L1 inhibitors. On the other hand, PD-L1-negative tumors can respond to these agents (Aguir et al. 2016). Background of this study is to investigate the PD-L1 expression in the Microenvironment of Oral Squamous Cell Carcinoma (OSCC) samples and its correlation to prognostic data.

METHODS: Three paraffine recipient blocks for Tissue Micro Array (TMA) were constructed by coring 44 paraffine donor blocks. The HPV status was assessed by performing In Situ Hybridation (ISH) using probes for HR-HPVs 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, e 66 (Inform HPV family-III 16 Probe; Ventana -Roche) and s for LR-HPVs, 6, 11 (Inform HPV family-II 6 Probe; Ventana - Roche). Immunohistochemistry (IHC) to detect PD-1 and PD-L1 expression was performed on consecutive 4-micron sections by using Ventana Benchmark® autostainer using rabbit monoclonal anti-PD-L1 clone SP142 and PD-1 (NAT105) by Ventana-Roche. Every 0,6 mm core section has been evaluated for degree of lymphoid cell infiltration surrounding the tumor nests, according to Wada grading system [Wada T. et al. Nature of monoclonal cell infiltrates in oral squamous cells carcinoma and its clinical significance Wakayama Med Rep 30: 103-117. 1989]. Tumor-infiltrating lymphocytes (TILs) was identified by morphology. PD-1, PD-L1 IHC expression has been assessed in tumor cells and inflammatory cells evaluating the intensity of stain. Statistical analysis was performed by using SPSS.Ink Software v.20.

RESULTS: Kaplan-Meier Univariate Analysis showed correlation between presences of tumor associated lymphocytes (TIL) and better survival data (p=0,024). We observed positivity for PD-L1 tumor cells in 8 cases on 38 cases that were evaluable, 21% of total cases, against a mean of 60% in literature. This data was not significant in any association. Kaplan-Meier Univariate Analysis showed correlation between the presence of macrophages and better prognosis in patients (p=0,008) Hazard Ratio=0,092 (CI 95% 0,009-0,926). We observed a correlation between PD-L1 negative macrophages and a worst prognosis. This data was near Statistical significance p=0,054. **CONCLUSIONS:** Different studies showed a different

pattern of expression of PD-L1 in different cell types associated to the tumor, highlighting the differences in therapeutic response. A better understanding of PD-1/PD-L1 expression in the different cell types involved in the tumor environment should be the new aim of next studies, for a better understanding of this molecular process and the selection of patients, which could undergo new immune therapies.

Relevance of hypovitaminosis D in the etiology of periodontitis in special needs patients

F. Gianfreda, M. Miranda, N. Ranieri, C. Gionta, C. Raffone, R. Franco, P. Bollero¹, A. De Lorenzo²

¹Associate Professor of Special Odontostomatological Pathology, University of Rome "Tor Vergata"; ²Professor of Diet and Human Nutrition, University of Rome "Tor Vergata"

BACKGROUND: The aim of this review is to focus on the probable correlations between Periodontitis due to *Porphyromonas gingivalis*, pro-inflammatory cytokines and Hypovitaminosis D associated to several systemic diseases such as Hepatitis B and C, Morb of Crohn and Celiac Disease. **METHODS:** It proceeded with the review of the literature on the search engine PUBMED/MEDLINE, combining the keywords "Hypovitaminosis D", "Systemic Diseases" and "Periodontitis". The selection criteria were articles conducted in vitro or in clinical trial mode on humans. **RESULTS:** Periodontitis is not directly caused by *P. gingivalis* infection but has a multifactorial etiology and is associated after inflammation with the adherence and colonization of pathogenic bacteria on the gingival epithelium. The importance of Vitamin D is that reduces periodontitis related to *Porphyromonas gingivalis* by the inhibition of IL-8 expression in periodontal ligament cells (Tang et al). What is more, also IL-10 might be involved in the repair of periodontal tissue (Goutoudi et al.). Many studies suggest that 1,25(OH)2D3 improved the expression of IL-10 that might suppress the inflammatory response, promote the repair of periodontal tissue, and reduce immune-associated injury to periodontal tissue. DBP was measured in the GCF and plasma of patients with GAgP but without systemic disease. It was found that patients with GAgP had lower GCF DBP concentrations (Xin Zhang et al). The aim of this cross-study was to underline that many systemic diseases can lead to vitamin D or DBP deficiency that can involve to a predisposition to Periodontitis. Celiac disease leads to an altered intake of Calcium or Vitamin D, but it has also been hypothesized (Sadeghian et Al. 2016) that Crohn's disease leads to a deficit of the same micronutrient. Being DBP is an alpha-globulin it is synthesized by the liver and therefore its deficit is resistant to all hepatic diseases such as cirrhosis, hepatitis B and C. Therefore all these diseases can indirectly favor the presence of severe periodontitis. In these patients, subsequent studies could focus on topical administration of deficient micronutrients. In this way it could be possible to modulate the action of *P. gingivalis* and in general of many cytokines that act negatively on inflammation. **CONCLUSIONS:** Since periodontitis is a multifactorial disease it is very difficult to investigate the correlation between hypovitaminosis D, systemic diseases and oral manifestations of this. More cross studies are needed to clarify how all these factors can affect oral health.

Salivary biomarkers for diagnosis of cardiovascular disease: a systematic review

M.E. Pezzi Margherita¹, M.V. Viani¹, B. Borrello², P. Vescevi¹, I. Giovannacci¹, M. Meleti¹

¹Unit of Oral Medicine, Oral Pathology and Oral Laser Surgery, Centro Universitario di Odontoiatria, Department of Medicine and Surgery, University of Parma, Parma, Italy; ²Cardio-surgery Department of General and Special Surgery, Azienda Ospedaliera Universitaria di Parma, Parma, Italy

BACKGROUND: Cardiovascular disease (CD) is the first cause of death for disease, approximately 17.3 million people per year in the world. The global prevalence of this group of diseases has been 422,7 million in 2015. CD has a terrific economic impact, on the basis of costs for diagnosis and therapy, early death of patients and disability. It has been estimated a total amount of expenses of around 400 billion of dollars for year. Apart the development of traditional diagnostic approaches for CD, alternative methods have gained interest in the last year. Among these salivary diagnostics if rapidly gaining popularity. Saliva is a complex fluid, easy to transport and store, non-invasive to collect, and it reflects somehow blood composition. Several molecules dispersed in saliva can be used as diagnostic and prognostic biomarkers for a wide range of diseases. The aim of the present systematic review is to define if there is scientific evidence to support the role of salivary biomarkers for diagnosis of CD. **METHODS:** We searched into Medline, Scopus and Web of Science databases using as entry terms the combination of "saliva" with "diagnosis", "systemic disease", "biomarkers", "cardiac disease", "heart", "myocardial infarction" and "coronary disease". We included only studies in English and published after 2000. We considered only studies on saliva sample, addressing CD, and evaluating biomarkers for diagnosis. We excluded studies on animals or *in vitro* samples and papers dealing with systemic microbial infections, hormones, drugs dosage. Research investigating correlation between CD and periodontal disease were not considered. References listed in reviews, were screened in order to identify papers possibly missing from the database search. Information extracted included title, Authors, publication year, type of biomarker, biochemical method and device used to analyse saliva. Quality of studies was assessed according to the guidelines of the National Institute of Health (NIH - scores ranging from "poor" to "good"). **RESULTS:** Starting from a total amount of 18348 records, we selected 13 studies meeting inclusion and exclusion criteria. Two more papers were identified through the screening of the reference lists of five reviews. One article was excluded because concerning the state-of-art of devices for detecting molecules in cardiopatic patients. Eventually, 14 papers were taken into consideration for inclusion in the present review. In all studies biomarkers were proteins. Twelve out of 14 papers reported statistically significant results of association between CD and biomarkers. Following the NIH quality assessment, twelve articles were scored as "fair quality" (85%) and two articles as "good quality" (15%). No one of the papers included was considered as having "poor quality". **CONCLUSIONS:** The use of saliva as a diagnostic tool seems to be a realistic possibility for the diagnosis of CD. Most of the articles evaluated here showed statistically significant results.

The future for research should include the sensibility and specificity of methods and devices used in salivary diagnostics.

ABSTRACT

Gingival tuberculosis in a systemically compromised patient: a case report

L. Perini, C. Zappella, P. Cappare', A. Lissoni, S. Abati

*Oral Pathology - Dept. of Dentistry IRCCS San Raffaele University hospital - University Vita Salute San Raffaele, Milano Italy; *Military Airforce - Centro Sportivo Aeronautica Militare, Vigna di Valle (Roma) Italy*

BACKGROUND: This case report has the purpose to present an unusual case of gingival tuberculosis in a compromised and immunosuppressed female patient. It is crucial to perform a thorough diagnostic evaluation in a case with an unusual necrotizing gingival disease resistant to conventional treatments. Tuberculosis is an infective granulomatous disease, caused by different species of mycobacterium, especially by *Mycobacterium tuberculosis*. Even though the disease is mainly pulmonary, the infection can be present as extrapulmonary tuberculosis with several different localizations and with rather uncommon lesions in the mouth. The disease is transmitted through air droplets and, in immunocompetent patients, is usually asymptomatic. Recently an increase in the prevalence of extrapulmonary manifestations of the disease has been described.

METHODS: A 73 years old female patient was referred to the Oral Pathology Dept. with chronic necrotizing periodontitis with gingival pain and hemorrhage in the upper central gingiva, gingival hyperplasia, purulent secretions and upper labial swelling. The gingival disease worsened in the last weeks, in spite of repeated appointments for periodontal local treatment. The patient was in poor medical conditions and reported a previous diagnosis of granulomatous vasculitis n.o.s., Addison disease, chronic bronchitis and severe asthma; moreover she had recently a severe episode of fecal impaction due to the electrolytic imbalance. The clinical oral examination revealed a localized and severe necrotizing periodontitis with exposure of root areas of the central incisor, lateral incisor and canine in the upper right maxilla. She also had a painful gingival hyperplasia, with purulent and malodorous secretions and a remarkable upper labial swelling. In suspicion of a gingival granulomatous disease and/or infection, the possibility of tuberculosis explaining the respiratory symptoms was not confirmed as the quantiferon test and the chest radiography had negative results. Despite the poor medical condition of the patient, the oral pathologist scheduled a gingival biopsy. Unfortunately just two days before, the patient accidentally fell at home with a hip fracture. During the orthopedic admission, new exams were executed due to the respiratory symptoms and distress; the bronchoscopy revealed the presence of pulmonary nodules associated with positivity of *Mycobacterium tuberculosis* specific PCR and confirmation of the suspect for the hypothesized tuberculosis. The patient was transferred to the regional Tuberculosis Center and the specific treatment established with specific treatment with isoniazid, ethambutol and rifampin. The therapy was effective for the oral and systemic symptoms: in about three months the vasculitis, the respiratory symptoms, the upper labial swelling and the gingival disease subsided with re-epithelialization of the gingival mucosa.

CONCLUSIONS: Tuberculosis is mainly known as a pulmonary disease, but in the present case the gingival disease was the leading manifestation of the disease although the diagnosis was very difficult to achieve due to the systemic impairment of the patient. After the PCR confirmation the appropriate treatment has been administered and lead to the improvement of the clinical conditions and the regression of the oral lesions.

Clinical and epidemiological differences in patients treated with denosumab and bisphosphonates with regard to medication-related osteonecrosis of the jaws (MRONJ). Analysis of 296 cases

G. Ghidini, M. Meleti, M. Manfredi, P. Vescovi

Oral Medicine and Oral Surgery Laser Unit, University Center of Dentistry, Department of Medicine and Surgery, University of Parma, Parma, Italy

BACKGROUND: Since the update released by the American Association of Oral and Maxillofacial Surgeons (AAOMS) in 2014 new drugs have emerged as being associated to the development of medication-related Osteonecrosis of Jaws (MRONJ). Among these, denosumab, a monoclonal antibody, appears to be the most frequently prescribed drug both for oncologic and non-oncologic patients. The present study aims to highlight possible differences between patients affected by MRONJ and treated with bisphosphonates alone and patients affected by MRONJ treated with denosumab alone or in combination with bisphosphonates.

METHODS: We retrospectively analysed 296 patients affected by MRONJ referred at the Center of Oral Medicine and Laser Surgery of the Academic Hospital of the University of Parma, between January 2004 and March 2018. We subclassified patients into 3 groups according to therapies. Group 1 (G1) included 279 (94%) patients treated with bisphosphonates alone. Group 2 (G2): 9 patients, who were administered with denosumab in combination with bisphosphonates (3,3%) and Group 3 (G3): 8 patients (2,7%) who underwent therapy with Denosumab alone. We compared gender, stage, possible cause of MRONJ (dental extraction, placement or presence of implants, bone surgery, periodontal disease, unfitting prosthetic or "spontaneous MRONJ" when a specific cause was not to be identified) and disease for which the drug was administered (cancer or non-cancer).

RESULTS: G1 included 71 males (25,45%) and 208 females (74,55%), 204 were treated for cancer reason (73,12%) and 75 (26,88%) for non-cancer. Stages were as follows: 10 patients stage 0 (3,58%), 106 stage I (37%), 115 stage II (41,22%) and 48 stage III (18,2%). In 132 cases (47,31%) MRONJ followed a dental extraction, in 16 patients it was associated with dental implants or bone surgery (5,73%), 33 patients presented unfitting prosthesis (11,83%), 19 were affected by periodontal disease (6,82%) in the area of necrosis and in 79 patients (28,31%) no causes were identified. G2: 3 males (33,4%) and 6 females (66,6%), 6 of them treated for cancer reason and 3 for non-cancer. Two patients presented with stage I, 5 with stage II (55,6%) and 2 with stage III. Two patients underwent dental extractions before developing MRONJ, two had unfitting prosthesis and 5 MRONJ were classified as "spontaneous". G3 included 5 males (62,5%) and 3 females (37,5%), 7 (87,5%) treated for cancer and 1 (12,5%) for non-cancer. Stages were: 3 stage I, 4 stage II (50%) and 1 stage III. Three MRONJ were classified as "spontaneous", 3 were preceded by dental extraction, 1 was associated with implants and 1 with an unfitting prosthesis.

CONCLUSIONS: Even if patients undergoing monoclonal antibodies therapy are fewer than patients treated with bisphosphonates, such a category is likely to become more representative in the near future, because of the higher number of prescriptions of the newest anti-resorptive-antiangiogenic drugs. Patients treated with denosumab show to be more frequently males and to develop more frequently "spontaneous" MRONJ.

A more accurate description of features of patients with monoclonal antibodies-associated ONJ might allow clinicians to better treat or prevent MRONJ. Further investigations are needed especially on epidemiological aspects and management.

Snus, the smokeless tobacco: a digital survey in a cohort of young italians

C.M. Morini, A. Lissoni, B. Mainardi, F. Toma, P. Cappare', G. Gastaldi, S. Abati

Oral Pathology, Dept. of Dentistry IRCCS San Raffaele University Hospital, University Vita Salute San Raffaele, Milan, Italy

BACKGROUND: *Snus* is a heat-treated oral moist snuff tobacco, a kind of smokeless tobacco, that represents an alternative to traditional tobacco smoking. The purpose of this survey is to demonstrate the existence of this relatively new trend among the young Italian population, with the aim to extend and spread the awareness and acknowledgment about this substance and the possible oral lesions that may derive from its abuse.

METHODS: A specific digital questionnaire has been created through the Google Forms platform and released with its own link through the Internet and the social supports for 4 weeks. According to the affirmative answers of the respondents, the questionnaire automatically proceeded with more specific questions about the use, frequency and any visible change inside the oral cavity that were noticed by the consumers.

RESULTS: The survey was completed by 332 interviewees of which 65% were males with a mean age of 22.7 years old and 61% of them were college students. Among the 52 different areas of residence, the most representatives of the sample were in the Northern areas of Italy, with Sondrio, Milano, Bergamo, Aosta and Belluno. Two-hundred thirty-two respondents declared to know what is *snus* tobacco and one-hundred eighty-nine subjects did try it once in their lifespan. One-hundred fifty subjects use habitually *snus* tobacco: 53% more than once a day and 17% at least once a day. The 35% of the 150 users uses regularly *snus* from more than 5 years. The single tobacco pouch of *snus* is usually applied between the upper lip and the gingiva and it stays in the oral cavity for a time frame that goes from 15 to 30 minutes. The 71% of the subjects among the regular users referred a color change of the gingiva and the 53% reported a color change of the labial mucosa. Gingival bleeding is mainly reported in the subjects with a high intake of *snus*. No teeth changes were reported in 72% of the users, but gingival recessions were recorded in the 26%, increased dental sensitivity, teeth erosion and discoloration. Bad breath (halitosis) was reported by the 16% of the subjects. The 50% of the habitual users believe that their body developed an addiction and 90% of them do not smoke regular cigarettes.

CONCLUSIONS: The *snus* tobacco use is no longer an exclusive prerogative of the countries of Northern Europe and North America, but it is a rising phenomenon in countries such as Switzerland and with a potential diffusion in the regions and areas of Northern Italy. It is mainly used in the mountain area. This kind of tobacco can induce lesions of the oral cavity, such as gingival recessions and leukoplakia and other possible correlations with other pathologies are actually under investigation. It is essential to keep an update about the possible other alternative use of tobacco products, to be able to identify the clinical signs, to give to the patients a reliable and effective education promoting the prevention of the oral and systemic health.

Clinical evaluation of specific oral manifestations in pediatric patients with ascertained versus potential coeliac disease

G. Matacena ¹, M. Cicciù ², L. di Benedetto ¹, M. G. Piancino ¹, E. Bramanti ³

¹CIR Dental School, Department of Surgical Sciences, Division of Orthodontics, University of Turin, Turin, Italy; ²Department of Human Pathology, School of Dentistry, University of Messina, Messina, Italy; ³Resident Department of Clinical and Experimental Medicine and Stomatology, University of Messina, Messina, Italy

BACKGROUND: Coeliac disease (CD) in children may present not only with classical gastrointestinal symptoms but also with a large variety of nonspecific signs and symptoms. Nowadays it is widely demonstrated that, among these atypical signs of CD, there are some oral manifestations which are strictly related to ascertained coeliac disease but no paper has analyzed these oral lesions in potential coeliac patients. The aim of this study was to investigate the presence of specific oral hard and soft tissue lesions in potential and ascertained coeliac disease children.

METHODS: A total of 71 paediatric patients (2-16 y.o.) referred to the Department of Pediatric Gastroenterology and Cystic Fibrosis of "AOU G. Martino Hospital" in Messina with the suspected diagnosis of CD, underwent to a specialist paediatric visit, based on the positivity of CD-related serological tests, following by histological confirmation on duodenal biopsy. They were divided into two groups, according to the histopathological diagnosis they received: A Group: 50 ascertained coeliac patients with 2 or 3 histotype according Oberhuber (i.e. patients who show positive serological patterns with damage to the intestinal mucosal architecture); B Group: 21 potential coeliac patients with 0 or 1 histotype according Oberhuber (i.e. patients who report positive coeliac-related antibodies but with normal mucosa at the jejunal biopsy). 54 healthy subjects who were age-/sex-matched, were enrolled as controls, belonging to the C Group. Every patient was subjected to a specialist dental visit performed by the same blind operator, who did not know patients' diagnosis. For all 125 children the following intra- and extraoral clinical manifestations were evaluated, recorded, classified, and finally photographed:

- specific and unspecific enamel defects (SED-unSED)
- dental delayed eruption (DDE),
- recurrent aphthous stomatitis (RAS)
- geographic tongue (GT),
- burning tongue (BT)
- atrophic glossitis (AG),
- angular cheilitis (AC)
- dental caries (DC).

Statistical Analysis: categorical variables were analyzed using chi-square test or Fisher's exact test, as appropriate. $P < 0.05$ was considered statistically significant.

RESULTS: The overall oral lesions resulted more frequently present in coeliac patients than in healthy controls ($P < 0.05$). The prevalence of oral soft tissue lesions (RAS, GT, BT, AG, AC) was 62% in A Group, 76.2% in B Group, and 12.96% in C Group ($P < 0.05$). Clinical DDE was observed in 38% of A Group and 42.5% of B Group versus 11.11% of C Group ($P < 0.05$). The prevalence of specific enamel defects (SED) was 48% in A Group and 19% in B Group versus 0% in controls ($P < 0.05$; OR = 3.923).

CONCLUSIONS: The oral soft tissue lesions were more frequent in potential coeliac patients, while oral hard tissue lesions affected a greater number of ascertained coeliac children.

ABSTRACT

Specific enamel defects could have an etiological link with the malabsorption condition induced by histopathological intestinal damage and villous atrophic lesion. The preventive recognition of these specific oral lesions by the dentist should allow preventing the disease's manifestations on the intestinal mucosa, making an early suspected diagnosis of CD, avoiding the occurrence of gastrointestinal symptoms and more severe pathological injury with a better prognosis. In this way, an early diagnosis of potential CD permits to set a gluten-free diet in order to avoid intestinal histopathological degeneration and to ensure a balanced childrens' growth.

Salivary cytokines and chemokines in patients affected by oral squamous cell carcinoma: a case-crossover study

M. Val, L. Manini, R. Marino, M. Pentenero

University of Turin, Department of Oncology, Unit of Oral Medicine and Oral Oncology, Turin, Italy

BACKGROUND: Oral squamous cell carcinoma (OSCC) is the 6th most common malignancy worldwide with significant morbidity and mortality. The well-known poor survival rate are often due to diagnostic delay. Salivary biomarkers for the early detection of OSCC could be tested through non-invasive sampling performed by practitioners without specific clinical experience, thus representing an important aid in early diagnosis. The present study aims at evaluating potential variations in the salivary concentration of cytokines in presence of OSCC. **METHODS:** The salivary concentration of cytokines has been assessed in OSCC patients, in a case cross-over setting, thus eliminating the potential bias related to inter-individual variations. Patients with newly diagnosed primary OSCC who underwent surgical excision were prospectively enrolled in the present study. Unstimulated whole saliva were collected and stored -80°C for future analyses. Samplings were performed at the moment of diagnosis (T0) and 2 months after surgery (T1) in cases with free margins, no indication to adjuvant treatments and absence of clinical suspicion of residual disease. In 2 cases, a third sample was obtained in occasion of relapsing/recurrent disease (T2). The concentration of cytokines was evaluated with the BIO-PLEX® system (Bio-Rad Laboratories Inc, Hercules, CA, USA), which exploit suspension immunofluorescence array, according to manufacturer's indications. The concentration of the following 27 salivary molecules was simultaneously analysed: IL-1 β , IL-1 α , IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-12, IL-13, IL-15, IL-17, basicFGF, Eotaxina, G-CSF, GM-CSF, IFN- γ , IP-10, MCP-1, MIP-1 α , MIP-1 β , PDGF-BB, RANTES, TNF- α and VEGF. In order to address potential intra-individual variability, in 5 patients repeated samplings before surgery were performed. Tests for repeated measures were performed: the Friedman test to analyse the intra-individual differences and the t-test or Wilcoxon test to evaluate differences in cytokines' salivary concentration before and after treatment of OSCC. Data were analysed using SPSS statistical software for Windows version 22 (IBM SPSS Software). **RESULTS:** After surgery, one patient was excluded due to the pathology report; therefore, 21 patients with an average age of 65.4 years entered the study. The analysis of intra-individual repeated measures did not show any significant variation. The comparison between samples obtained in presence or in absence of disease showed that OSCC lead to an increase in concentration of IL-8 ($p = 0.004$), IL-6 ($p = 0.005$), VEGF ($p = 0.014$),

MIP-1 β ($p = 0.033$), IP-10 ($p = 0.047$), IL-1 β ($p = 0.049$) and to a reduction in the concentration of IFN- γ ($p = 0.036$) and IL-5 ($P = 0.048$). Of interest in cases with relapsing/recurrent disease IL-5 (increased), IL-6 (decreased) and MIP-1 β (decreased) seemed to reflect the presence of carcinoma.

CONCLUSIONS: Very little is known about factors influencing intra/inter individual variations of salivary concentration of cytokines, so that such variations could bias their role as diagnostic biomarkers for SCC. Comparing the same subject in presence or in absence of disease reduces potential biases avoiding intra-individual factors. The present results are in keeping with previous literature citing significant variations of IL-6, IL-8, VEGF, and IL-1 β and highlight other molecules never previously addressed. Before using such test for early detection of carcinoma, further studies are needed in order to confirm such preliminary results and to determine reference values indicating presence or absence of the disease.

Effectiveness of treatment of oral lichen planus with a short course of topical steroids: a case report

C. Casu¹, R. Botta², L. Viganò³, L. Casula², O. La Spesa Martinengo², F. Mottola², A. Lissoni², R. Vinci², S. Abati²

¹Private Dental Practice, Cagliari, Italy; ²Dept. of Dentistry, University Vita Salute San Raffaele, Milan, Italy; ³University of Milan, Dept. Radiology, Milan, Italy

BACKGROUND: Oral lichen planus (OLP) can have severe and bothering symptoms with burning and painful lesions interfering with oral functions. Thus the dentist should take care of the affected patient and prescribe an appropriate therapy accordwith the indication with the oral physician to relieve the distress of the patient.

METHODS: A 76-years-old female patient came to our observation for the evaluation of the clinical condition of the oral mucosa. She reported the medical history with two episodes of myocardial infarction, occurred 7 and 9 years before and a congenital liver angioma surgically treated 26 years before. She also reported G-6-PD enzyme deficiency and several food allergies. With the clinical oral examination the oral mucosa showed diffuse inflammation, with erythematous reddish appearance localized mainly in the tongue borders, the cheek mucosa and vestibula of the lips; the diseased areas showed white striae, with a reticular arrangement, present since about 8 months. The patient was symptomatic and reported a severe burning sensation in her mouth interfering with food and beverages assumption. The clinical aspect led to an hypothetic diagnosis of Oral Lichen Planus (OLP). An incisional biopsy with cold blade surgery was programmed and obtained from a relevant area in the inferior labial mucosa. Histopathological examination confirmed the diagnostic hypothesis. Following the suggestions of the oral medicine expert, the GPD prescribed a course of topical therapy for three weeks with: 0.05% clobetasol ointment mixed with hydroxypropyl cellulose to be applied on diseased area of oral mucosa daily t.i.d.; nistatin suspension in oral rinses t.i.d.; hyaluronate and aminoacid gel (Aminogam Gel®) to be applied on injured mucosa t.i.d for 1 month.

CONCLUSIONS: At the one month follow-up appointment the patient showed almost complete remission of the lesions and cessation of the clinical symptoms. This clinical case showed that an approach with a correct diagnosis and an appropriate therapy could be resolutive even in a short period of time.

Rare case of odontogenic cyst in special need patient: case report

M. Basilicata, F. Cecchetti, R. Franco, G. Vazzana, M. Iannò, L. Roselli, J. Accardo, A. Barlattani

¹Department of Clinical Sciences and Translational Medicine, University of "Tor Vergata", Rome, Italy; ²Special Needs Dental Unit, Policlinico University of Rome "Tor Vergata", Rome, Italy

BACKGROUND: Cyst is a pathological cavity that contains liquid, not ascribable to purulent material. They are divided in two main groups based on the probable origin of the coating epithelium: odontogenic cysts, whose epithelial residues derive from the organ from which the tooth originates, non-odontogenic cysts. Odontogenic cysts are classified according to the WHO 1992 classification in the gingival cyst of the infant, odontogenic keratocysts, follicular cysts, eruption cysts, lateral periodontal cyst, adult gingival cysts, odontogenic glandular cyst, inflammatory root cyst. The most frequent odontogenic cyst is the inflammatory radicular cysts (frequency 60-65%). The aim of our study is to describe the abnormal presence of a cyst located on the surface of the adherent gingiva in correspondence of the elements 4.4.4.5 and the surgical resolving approach.

METHODS: The special need patient, affected by Myotonic Dystrophy, presented himself to Special Needs Dental Unit of Policlinico University of Rome "Tor Vergata" for the presence of a neof ormation localized on the adherent gingiva in correspondence of the elements 4.4-4.5. All risk factors for neoplasia were excluded as non-smokers and lack of traumatic factors. Tc Dentalscan of the lower dental arch is prescribed and cortical erosion has been noted in correspondence with the dental elements in question which were vital. We have decided to perform an excisional biopsy of the lesion and to cruet the areas of bone erosion. The patient carried out a pre-operative antibiotic prophylaxis and after performing local anesthesia with vasoconstrictor a full-thickness trapezoidal flap was set up. The gingival lesion was removed and the bone has been cleaned. The area was sutured with 3.0 silk and the finding after formalin fixation was sent to the pathological anatomy service.

RESULTS: The histological sample has been analyzed and it has emerged that it is an odontogenic cyst with gingival localization probably attributable to gingival odontogenic cyst which is a very rare condition.

CONCLUSIONS: This case report showed how odontogenic cysts can occur in very abnormal localizations such as the gingiva and which can also cause cortical erosion. This abnormal localization could be linked to the genetic pathology. This correlation will surely be the object of our next research.

YouTube content analysis for oral lichen planus

F. Loffredo, C. Maio, R. S. Paparella, M. Di Petrillo, F. Fiori, A. Romano, C. Salerno, L. Laino, A. Lucchese, R. Serpico, D. Di Stasio

Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy

BACKGROUND: Oral lichen planus is a chronic inflammatory mucocutaneous disorder that typically affects the oral

mucosa and the skin. The etiology of OLP is still unknown and the disease presents a multifactorial pathogenesis. Clinically, OLP may manifest in four clinical forms: papular/reticular, plaque-like, erythematous and erosive. YouTube™ is increasingly being used from patients to obtain health-related information. No studies have evaluated the content of YouTube™ videos on OLP. The aim of this work is to examine the quality of information offered by this platform about OLP.

METHODS: The term 'oral lichen planus' was searched on YouTube™. The first 60 videos were examined. Each video was given a score from 0 to 13 to indicate its usefulness in informing patients about clinical findings, local and general health effects, prevention and therapeutic strategies. Descriptive statistics were generated using R software, Pearson's analysis was used to examine correlations between variables; analysis of univariate variance and linear regression analysis were made to confirm the correlation hypothesis.

RESULTS: The main source of upload was from healthcare channel (61.54%), followed by healthcare professional (23.07%), individual users (12.82%) and generalist information channels (2.57%). 20.5% did not give any clinical informations about OLP. The majority (48.7%) presented at least one image showing the clinical presentation of the pathology and 17.9% of the videos discussed about the local health effects, in particular all of them mentioned burning sensation and pain as symptoms. Only 12.9% gave more accurate informations, showing images demonstrating the clinical presentation of OLP and describing the possible symptomatology. 62.5% gave explanations about therapy. Of these, the majority focuses on homeopathic strategies. The mean US score of all the videos analyzed was 2,18±1.62 with a maximum score of 9.0 and a minimum score of 1.0; in fact, 84.61% of them resulted to be slightly useful, the 12.82% moderately useful and only the 2.57% of them resulted to be very useful for the patient; anyway, no videos have been cataloged as not useful. Pearson's analysis revealed a strong correlation between US and VL ($r=0.466$), US and NL ($r=0.549$) and US with VR ($r=0.422$).

CONCLUSIONS: The revealed evidence of a significant correlation between the effectiveness of Youtube™ video's contents and the parameters related to users allows us to reflect on how much the patient is able to perceive the didactic accuracy of what is expressed on the web platform. Nevertheless, the quality of the medical-scientific content of the videos is to be considered still poor. By virtue of the fact that most of the advisors belong to the HP and HC groups, scientific community should aim to standardize the basic requirements to disseminate contents through educational videos, or to carefully check and verify their accuracy, adequacy and appropriateness.

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ABSTRACT

Knowledge, practice and attitude about OSCC prevention among Calabrian primary care physicians: an observational studyG. Romeo¹, V. Panzarella¹, A. Santarelli², M. Giuliani³, L. Lo Muzio³, G. Campisi¹, O. Di Fede¹¹Dept. of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy; ²Dept. of Specialistic and Stomatological Clinical Sciences, Marche Polytechnic University, Ancona, Italy; ³Dept. of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

BACKGROUND: The oral squamous cell carcinoma (OSCC) is the most frequent malignant tumour of the oral cavity, covering more than 95% of all oral cancer diagnoses. Notwithstanding the therapeutic progress, the mortality of patients with OSCC remains one of the highest and most stable of the last 20 years, compared to other cancers. Primary care physicians must play an important role both in *primary prevention*, by giving advices on risk factors related to OSCC (e.g. smoking cessation, alcohol diminution), and in *early detection* of signs and symptoms. The main purpose of this observational retrospective study was to assess the knowledge, diagnostic concepts, practices and opinions about OSCC primary and secondary preventions among primary care physicians (PCP) in Calabria.

METHODS: The investigation was conducted using a self-administered questionnaire performed by Google Forms sent to 50 Calabrian primary care physicians. This questionnaire collects 11 items about:

- i) demographic variables of participants (e.g. age, sex);
- ii) knowledge on OSCC risk factors (e.g. smoking and drinking habits) and early clinical features (e.g. oral potentially malignant disorders);
- iii) practices and attitudes on prevention strategies (e.g. follow-up/screening approaches).

RESULTS: The majority (54%) of primary care physicians were female. About the professional update on OSCC, 21 (42%) of the participants answered that it was never performed, 11 (22%) of the participants performed it for at least four years, 18 (36%) of the participants have been updated this topic in the last 4 years. About the question regarding the timing of recommended preventive dental visit, a good percentage of PCP, 43 (88%), suggest it at least once a year, 5 (12%) of the participants at least once every 3 years and 2 participants at least every 5 years. Among the knowledge on risk factors related to OSCC, smoking was identified as the major risk factors by 49 (98%) of the doctors. On the contrary, only 30 (60%) and 21 (42%) of PCP identified alcohol and chronic trauma as a risk factors, respectively. 36 (72%) of PCP knew that early diagnosis of OSCC improves the survival rate. In contrast, only 26 (52%) of the physicians identified the tongue as the most common site for OSCC.

CONCLUSIONS: Understanding the knowledge, attitudes and practices of primary care physicians is crucial to assess their effectiveness in the primary prevention and early detection of oral cancer (particularly OSCC), thus helping to reduce its mortality and morbidity. The findings of the present study revealed that the population of PCP recruited were informed about OSCC screening strategies. However, given the presence of a reasonable percentage of general physicians with poor knowledge of these topics, there is a need for continuing education programs on OSCC prevention.

Early detection of amyloid light-chain amyloidosis: a case report of oral primary manifestationG. Capocasale¹, O. Di Fede¹, C. Rubini², M. Dioguardi³, M. Giuliani³, V. Panzarella¹, G. Campisi¹¹Department of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy; ²Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy; ³Dept. Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

BACKGROUND: Amyloidosis represents a rare disorder characterized by extracellular deposits of protein amyloid in a single organ (e.g. brain, lung, skin/localized form) or several organs (systemic form). Localized amyloidosis in the oral cavity as primary involvement of systemic amyloidosis is extremely rare. The most widely documented oral manifestations of amyloidosis are macroglossia, petechiae, papulae, nodular/exophytic and ulcerative lesions, mainly localized on the tongue and on the buccal mucosa. We present a case of early diagnosis of amyloid light-chain (AL) amyloidosis with primary involvement of oral cavity.

CASE REPORT: A 60-years-old man was referred to the Sector of Oral Medicine "V. Margiotta" (Department of Surgical, Oncological and Oral Sciences, University of Palermo) for the diagnostic assessment of dysphagia of the tongue and difficulty of swallowing and speech. His clinical history included hypertension and arthritis rheumatoid. The intra-oral examination showed multiple nodular/exophytic lesions on the dorsum and anterior-lateral borders of the tongue and on lower labial mucosa. Incisional biopsy was performed in the lesions of the labial mucosa and histological examination showed an amorphous eosinophilic fibrillary accumulation in the connective tissue. This sample had positive staining for Congo red, exhibiting a reddish color under light microscopy. Serum and urine protein electrophoresis were negative. So, the provisory diagnosis of oral localized amyloidosis was made. During follow-up period, the patient reported weight loss (5 kg in one month) and hands paresthesia. Then, the additional laboratory and instrumental tests were achieved in order to discover associated disorders or organ dysfunctions. Echocardiography and digestive endoscopy were negative but the fine-needle aspiration biopsy (FNA) of the abdominal fat pad was performed. Then a definitive diagnosis of AL Amyloidosis was made. The patient was treated with: proteasome inhibitor, corticosteroids and with synthetic folic acid analogue.

CONCLUSIONS: Dentists and pathologists as well as general practitioners should be able to cooperate for the diagnosis, treatment and follow-up of patients affected by amyloidosis. Histologic examination is the first step towards diagnosis, followed by immune-histochemical tests. The diagnosis of AL amyloidosis should always be followed by blood tests, echocardiography and digestive endoscopy to intercept organ dysfunction. Indeed, amyloidosis can have devastating consequences for patients, and this case demonstrates the heterogeneous nature of the condition and how important it is for clinicians to be aware of the unusual ways in which it may present within the oral cavity.

Peripheral cementifying fibroma of the gingiva: a case report

F. Caporali, G. Palaia, M. Fioravanti, L. De Vincentiis, D. Pergolini, C. Di Gioia, M. Mohsen

International Medical School, Oral Diseases, "Sapienza" University of Rome, Rome, Italy

BACKGROUND: Peripheral Cementifying Fibroma (PCF), calcifying fibroblastic granuloma, peripheral fibroma with

cementogenesis and calcifying fibrous epulis are different ways to describe a benign fibro-osseous lesion of the jaws consisting of cellular fibroblastic tissue containing rounded or lobulated masses of calcified cementum. PCF is a reactive focal overgrowth of gingival mucosa that is considered to be reactive rather than neoplastic. It has also been reported that it represents a maturation of a pre-existing pyogenic granuloma or of a peripheral giant cell granuloma. It can be differentiated from the central type, that arises from endosteum or the periodontal ligament adjacent to the root apex and causes expansion of the bone; the peripheral type is localized on the gingiva or on the mucosa. PCF appears as a nodular mass, either pedunculated or sessile. The color ranges from red to pink, and the surface is frequently, but not always, ulcerated. It occurs approximately 2 to 4 times more frequently in females than in males most often between 25 and 35 years of age. It has a slight predilection for anterior jaw segments. The recurrence rate is high. It has been reported in the literature from 9 to 20%. The aim of this article is to present a case of PCF focusing on the management and the surgical approach.

METHODS: A 12 years old female referred for an intraoral swelling lasting about one year in the anterior right maxilla; it originated from the interdental papilla between 1.1 and 1.3, with 1.2 orally sited. Medical and family history was non-contributory. The mass was painless, smooth, mobile, sessile, pink and firm in consistency, in addition, from the radiographic examination was observed the involvement of bone. The excisional biopsy and the debridement of the elements involved, to prevent the recurrence, were performed. The bone was smoothed using a surgical bur. The patient was informed about the postoperative instructions and medications were prescribed.

RESULTS: The complete healing was observed within 21 days and the patient was ready to start her orthodontics therapy for repositioning the element 1.2. The histopathologic exam confirmed the diagnosis of calcifying fibroblastic granuloma. **CONCLUSIONS:** Histological exam is mandatory in the diagnosis of PCF. Furthermore, excisional biopsy, flap reflection and debridement were essential to prevent recurrence. According to the literature, it is suggested to perform periodic follow-up for a period up to 10 years.

The role of human papillomavirus in oral cancer and oral potentially malignant disorders

P.J. Fantozzi¹, A. Villa², C. Ciolfi¹, G. Tenore¹, G. Palaia¹, A. Pierangeli³, U. Romeo¹

¹Department of Head and Neck, Sapienza University of Rome, Rome, Italy; ²Department of Oral Medicine, Infection, and Immunity, Harvard School of Dental Medicine, Division of Oral Medicine and Dentistry, Brigham and Women's Hospital and Dana Farber Cancer Institute, Boston, MA, USA; ³Department of Molecular Medicine, Sapienza University of Rome, Rome, Italy

BACKGROUND: Human Papillomavirus (HPV) infection (mainly HPV16 and 18) is responsible for more than 70% of oropharyngeal cancers in Europe and United States, and about 5% of oral squamous cell carcinomas (OSCC). Interestingly, High-Risk HPV types (16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59 and 68) may also play a role in the development of a subset of leukoplakias, and Immuno-mediated disorders such as oral lichen planus (OLP). As such, the aim of this study was to identify and compare the presence of HPV in

patients affected by oral benign lesions, leukoplakia, Immuno-mediated lesions and OSCC.

METHODS: We collected demographic information, social history and HPV status for 99 patients who were seen at the Oral Medicine Unit at the Department of Oral and Maxillofacial Sciences, Sapienza Università di Roma. HPV status was classified by High Risk Type (16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59 and 68) and Low Risk Type (6, 11, 40, 42, 43, 44, 53, 54, 61, 72, 73 and 81). For the purpose of this study we compared the HPV status across four groups (benign lesions vs. leukoplakia vs. OLP vs. OSCC) and by histology for those patients with a clinical diagnosis of leukoplakia (dysplasia vs. Keratosis of Unknown Significance). All p-values were considered to be statistically significant at p<0.05

RESULTS: Overall there were 22 patients with oral benign lesions (22,2%), 38 patients with leukoplakia (38,3%), 20 patients with OLP (20,2%), and 19 patients with OSCC (19,2%). The median age at diagnosis was 60 years (range: 12-87). Approximately 27,0% of the patients were never smokers. Alcohol consumption was reported by 35,3%. Among patients with benign lesions (n=22), three (13,6%) were HPV16 positive; among those affected by leukoplakia (n=38), four (10,5%) were HR positive (16,18), and four (10,5%) were LR positive (6,12,70). Four out of twenty (20,0%) patients with OLP were HPV positive; three were HR (16,58) positive and one LR (6) positive. No patients with OSCC were HPV positive. When histology was considered, six out of 32 patients with KUS (18,8%) were HPV-HR positive (50,0%) and LR positive (50,0%). Among patients with epithelial dysplasia, two out of eight (25,0%) were HPV positive (one HR [50,0%] and one LR [50,0%]). Among oral HPV positive patients, the tongue was the most common infected site (30,0% of positivity). There were no statistically significant differences between current smokers and never smokers and HPV status (p=0.06).

CONCLUSIONS: This study evaluated the prevalence of HPV infection among patients with oral benign lesions, leukoplakia, immune-related disorders and OSCC detected with a non-invasive technique. As expected, there was no association between HPV infection and OSCC. Even though the prevalence of HPV infection was similar among patients with oral benign lesions and leukoplakia and OLP, individuals with leukoplakia had the highest rate of infection (21,1%). Future studies should include a larger sample of patients and additional Immunohistochemistry (IHC) studies for the detection of HPV.

Local anesthetics efficacy on patients affected by Ehlers-Danlos syndrome

A. Montori, A. Nuvoli, F. Rocchetti, G. Palaia, A. Del Vecchio
International Medical School, Oral Diseases, "Sapienza" University of Rome, Rome, Italy

BACKGROUND: Ehlers-Danlos Syndrome [EDS] is a group of rare heritable connective tissue disorders, which vary from mildly loose joints to life-threatening complications. EDS is classified by Villefranche that recognizes six major types: the classical type (I and II), the hypermobility type (III) [EDS-HT], the vascular type (IV), the kyphoscoliosis type (VIA), the arthrochalasia types (VIIA and VIIB), and the dermatosparaxis type (VIIC). The types are distinguished by their signs and symptoms, their underlying genetic causes, and their patterns of inheritance. According to Villefranche Classification, EDS - HT is the most frequent form and is characterized by joint hyperlaxity, recurrent joint dislocations, mild skin hyperextensibility, tissue fragility and extra-musculoskeletal mani-

ABSTRACT

festations. Hipermobility type is also tied to a sort of inefficiency of local anesthesia, most likely to an excessive dispersion of the local anesthetic in the tissues. Chronic pain is a serious complication of the condition and can be both physically and psychologically disabling. Psychological dysfunction, psychosocial impairment, and emotional problems are common. On a molecular and microscopic level, EDS is characterized by alterations of extracellular matrix: collagen fibrils are organized into tissue-specific macroaggregates because of a disorder of fibrillar collagen metabolism; there's also an increase of Mast cells (MCs) number or an increase MCs activity due to a Mast cell activation disorder (MCAD). MCs exhibit different biological properties: phagocytosis, antigen presentation, cytokine production, and the immediate release of vasoactive substances. The aim of this paper is to describe our experience with a EDS patient that come to our attention after local anesthesia multiple failures.

CASE REPORT: The patient was a 44-year-old woman affected by EDS-HT, rheumatoid arthritis, fibromyalgia, hyperinsulinaemia and thrombophilia. She has come to our attention because she was feeling pain in right and left upper molar regions due to destructive decays of 1.6 and 2.6; it was decided to extract both the teeth. The preliminary visit showed that the patient referred a bad experience with her previous dentist with an extreme pain during previous treatments. On the day of surgery the patient underwent sedative and analgesic premedication with 10 drops of Diazepam and Paracetamol 1000 intravenously, local anesthesia (Mepivacaine + Adrenaline 1:100.000) and a painless surgical technique like pulling mobile tissues and compressing not mobile tissues during anesthesia. Postoperative treatment consisted in 3 more days of Amoxicillin + Clavulanic Acid 1g, Paracetamol 1000mg on demand and Chlorhexidine 0,2% mouthwashes for a week. After 7 days suture was removed.

DISCUSSION: Vasodilatory activity of MCs may be an important aspect of the observed resistance to local anesthesia in EDS patients. Infact anesthetic residence time in the site of injection depends on blood flow: if blood flow increases, the anesthetic is quickly removed and its efficacy shorter. Furthermore, not all local anesthetics have the same duration of action, it depends on active substances and on efficacy as pharmacokinetic parameter. We have investigated the better anesthetic to use in patients affected by EDS - HT because different active substances have different effects: for example, Mepivacaine with Adrenaline could remain in place for a longer period of time than Lidocaine.

CONCLUSIONS: Our main target is pain control. It's important to investigate patient previous experiences with anesthesia, be flexible choosing local anesthetic and do some tests to find the effective one. Sedative premedication can be useful to control anxiety and pain perception. Local vasoconstrictor in anesthetic management of EDS patients is essential in absence of contraindication.

Intraoral ultrasonography in oral pathology: a narrative review

F. Rocchetti, A. Montori, G. Tenore, A. Del Vecchio, V. Cantisani, U. Romeo

Department of Head and Neck (Prof. A. Polimeni) "Sapienza" University of Rome, Rome, Italy

BACKGROUND: Ultrasonography has been used in medical fields for decades, but nowadays recent progress in tech-

nology have led to the applications in many maxillofacial procedures.

The introduction of latest generation equipments, different sizes of transducers, ultrasound (US) elastography and Color-Doppler has provided enhanced spatial resolution. US is generally used transcutaneously; however, intraoral US has recently been drawing more interest. US possible applications ranges from pre-operative evaluation to post-operative management of patients. US is harmlessness, non-invasive, effective cost, repeatable and avoid of metal artefacts caused by dental restorations. Disadvantages of US include difficulty in imaging intraboned structures and its dependence on a trained operator. The aim of this narrative review is to analyze the potential role of intraoral US in oral pathology, showing possibilities and limits of this technique in daily clinical practice.

METHODS: Bibliographical research was performed using PubMed and Embase databases, selecting original articles published from January 1990 to February 2018. The following keywords and the Boolean operators "AND" and "OR" were used in combining more keywords: "ultrasound, ultrasonography, intraoral, oral cavity, oral cancer, oral vascular lesions, oral vascular malformations, salivary glands, scialothiasis". We excluded from this search: articles not published in English, case reports, letters to the editor and/or no-human studies. Images were intraorally obtained with an E-CUBE 15 EX scanner (Alpinion®, Seoul, Korea) with an 3-12 MHz and 15 MHz transducers.

RESULTS: 158 publications were identified. Intraoral US can be clinically applied in oral pathology to evaluate oral vascular lesions, soft tissue diseases and salivary gland disease. About oral vascular lesions, Color Doppler US is an effective tool in the management of vascular anomalies by obviating, in many cases, the need for biopsy. Specifically, Color-Doppler spectral curve analysis of a blood vessel determines the haemodynamic characteristics, in order to plan the most appropriate and safety treatment. Furthermore, Werner and Miyazaki have suggested the use of US for driving laser fiber insertion in the intraoral photocoagulation in the vascular malformations treatment. About soft tissue diseases, recent studies have evaluated the use of US to evaluate pre-operatively tumor thickness and tumor depth in early oral cancer, in order to establish the need for neck-dissection. In fact, the decrease of tumor size corresponds to a reduced specificity and sensitivity of Computer Tomography (CT) and Magnetic Resonance Imaging (MRI). Intraoral US represents an imaging tool for oral palpable soft tissue swellings such as lipomas, lymphangiomas, liposarcomas, shwannomas. According to Gaspari and Wong, US is extremely useful in facilitating the diagnosis of abscesses and delineate their anatomic location, differentiating them from cellulitis. About salivary gland diseases, a near unanimity of authors consider US the first choice in the detection of salivary glands diseases; recent studies have shown the validity and reliability of US in the detection of small ductal calculi, while transcutaneous US is recommended for intraparenchymal calculi.

CONCLUSIONS: Since the recent improvements, US offers new prospects in oral pathology with a features and utility comparable with CT and MRI. Unfortunately, US is considered one of the most complex examinations to be interpreted, requiring a specialist with deep knowledge of the head-neck area. In conclusion, US should become an integral part of diagnostic flow chart in oral pathology.

Subcutaneous emphysema, an uncommon complication of dental procedures: clinical aspects and management

M. Caputo, A. Bellisario, A. Montori, F. Caporali, G. Tenore, G. Palaia, U. Romeo

Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, School of Specialization in Oral Surgery, Rome, Italy

BACKGROUND: *Subcutaneous emphysema (SE)* is the result of air or gas introduction into the fascial planes of the subcutaneous connective tissue. It represents an uncommon complication during dental procedures, but dentists should be able to diagnose it and know its potential life-threatening consequences. SE may result from the use of: a high-speed air-driven handpiece for endodontic, surgical and prosthetic procedures, compressed air syringes, sodium hypochlorite and hydrogen peroxide as root canal irrigants and lasers with air projection systems, such as the Er:YAG. Its usual clinical presentation is characterized by a sudden onset of hemifacial swelling with crepitation detected on palpation.

METHODS: This work, according to modern literature, wants to highlight the right management of SE when it occurs during or after dental treatments.

DISCUSSION: Unilateral facial and neck swelling is the first clinical sign of SE, so it is necessary to make a differential diagnosis with hematoma, allergic reactions and angioedema, that produce similarly a volume increase. SE pathognomonic sign is crepitation on palpation, odynophagia and dysphagia are uncommon. Air can seldom spread through the fascial planes of the neck, resulting in para and retropharyngeal emphysema, with the risk of further extension to chest and mediastinum, causing pneumothorax, pneumopericardium and pneumomediastinum. Rarely air emboli may enter blood vessels because of a pressure gradient, with the risk of patient's death for pulmonary embolism or ischemic lesions. If a subcutaneous emphysema is suspected, it is necessary to stop immediately the procedure to determine its extent and location. This can be achieved by palpation of the skin over the affected area, which may indicate the spread and extent of trapped air. Conventional radiographs (intraoral radiographs and ortopantomographies) are not helpful to diagnose SE, while cone beam computerized tomography (CBCT) can detect the extension of air diffusion more easily. Treatment of SE is based on observation and reassurance of the patient; in fact it is usually self-limited and solves in 3 to 10 days, being the gas reabsorbed into the bloodstream and eliminated through lungs. Administration of antibiotics may be recommended to prevent bacterial superinfections and corticosteroids are indicated to reduce swelling. Incision, drainage and aggressive supportive treatment, such as a chest tube, are sometimes necessary in severe cases.

CONCLUSIONS: In conclusion dentists and oral surgeons should be aware of the possibility of generating iatrogenic subcutaneous emphysema using compressed air, sodium hypochlorite or hydrogen peroxide and dental lasers and they should be able to diagnose and manage it quickly and properly.

Oral ulcer induced by Paan: a case report

A. Montori, F. Rocchetti, M. Capocci, G. Palaia, G. Tenore
School of Dentistry, "Sapienza" University of Rome, Rome, Italy

BACKGROUND: The Smokeless Tobacco (ST) is the use of tobacco without combustion alone or in combination with

other substances. ST practice include: chewing, sniffing, dipping or application to the skin. Nicotine and other components are so absorbed through the oral mucosa. ST is worldwide diffuse in many countries as India, Pakistan, several Asian regions and North and Centre America, where different associations of tobacco and other substances are used by people of all ages and both genders. For example Paan, also called betel quid, is an indian kind of ST and it is made up by areca nut, slaked lime, catechu, spices and tobacco, folded in a betel leaf. People mostly use paan due to a lack of information and education, being not aware about the harmful effects associated with these products. Paan is chewed because of its stimulant and psychogenic effects and for some perceived beneficial effects, such as mouth freshening, digestion aid, astringency, mood enhancement, tension relief, and oral clearing. However, about 28 chemical constituents present in it are true carcinogens. In particular, areca nut and tobacco cause fibroblasts and DNA damages and increase collagen synthesis and reactive oxygen species (ROS) production; slaked lime has genotoxic effects and increases cells turnover and ROS production too. Oral lesions due to the use of ST include gingival bleeding, lichenoid lesions, leukoplakia, frictional keratosis, ulcers and oral submucosal fibrosis (OSF). Among these conditions, OSF is the most severe, with a potential of degeneration in oral cancer ranging between 1.9 and 10%. This report presents a case of an oral ulcer secondary to the use of Paan.

CASE REPORTS: A 31-years-old male from Pakistan was referred to the Department of Oral and Maxillo Facial Sciences, Sapienza University of Rome, for a painless ulcer. The medical history was negative and he denied any alcohol consumption. A long history of Paan chewing habit was established since he was 17. Intraoral examination showed an ulcer with thick and reddish irregular margins surrounding a white-yellowish surface; the lesion was localized on retromolar mucosa in the left mandible. The patient noticed the lesion since two months. Laboratory tests including complete blood cell count, erythrocyte sedimentation rate, and liver function were normal. A picture of the lesion was taken in order to evaluate its evolution. The Paan use was forbidden for at least two weeks and during the intense counselling, the carcinogenic potential effects of chewing tobacco was explained. The patient came back for follow-up control after 15 days and the lesion regressed, for this reason no scalpel biopsy was performed. A follow-up program was started to observe any oral mucosal alteration and to motivate the patient to pursue more healthy life habits.

CONCLUSIONS: The greater and greater presence in our country of people coming from areas in which there are different religious and cultural habits creates the necessity for our dental clinicians to enlarge their knowledge about *potential local and systemic risk factors and their impact on oral health*; we also emphasize the importance of a detailed anamnesis and of careful intra-oral soft tissue examination in these patients to preserve or re-establish oral healthy conditions.

Clinical management of oral proliferative verrucous leukoplakia

M. Fioravanti, D. Pergolini, G. Palaia, F. Caporali, A. Mohsen
International Medical School, Oral Diseases, "Sapienza" University of Rome, Rome, Italy

BACKGROUND: The aim of this study is to emphasize the correct and early diagnosis of oral proliferative verrucous leukoplakia (OPVL).

ABSTRACT

METHODS: OPVL is a rare lesion, slowly growing, considered as a rare aggressive form of leukoplakia with a high tendency of malignant transformation. However, it is an enigmatic and difficult entity to define. The etiology of OPVL remains unknown. Use of tobacco does not seem to have a significant influence on the appearance of OPVL. In fact, OPVL may occur in both smokers patients and non-smokers ones. It often affects more frequently women and elderly patients over 60 years old, especially on the buccal mucosa and tongue. Clinically, it develops initially as a white plaque of hyperkeratosis that potentially become a bilateral and multifocal with confluent, exophytic and proliferative features. In literature, case series presented OPVL as a disease with aggressive biological behavior, a high probability of recurrence and a high rate of malignant transformation. Histopathologically, the OPVL aspect may range from simple hyperkeratosis to various degrees of dysplasia up to Verrucous Carcinoma.

RESULTS: Despite the authors' attempts to draw up diagnostic criteria for the OPVL, there is no common agreement in international literature on clinical and histologic aspects that allows early identification and diagnosis of OPVL. Many therapeutic approaches (especially the surgical ones) have been proposed over the years to manage the OPVL. Although improvements have been noted in some of these treatments, recurrence rates after cessation of therapy are high.

CONCLUSIONS: Since the OPVL does not have pathognomonic histologic features, the diagnosis of OPVL is achieved through the association of its clinical aspect, the characteristics of evolution and their progression associated with histopathological analysis. The risk of malignant transformation of OPVL is around 70% and often the anatomo-pathologists hardly differentiate it from a true neoplastic lesion. The same efficacy of follow up is questionable. In fact, some authors recommend a close follow up (each 3 months) and long-lasting (never less than 5 years). While many other authors suggest a life-time follow-up. Other authors consider the possibility to make repeated and multifocal biopsies, in order to consider the dysplastic or neoplastic evolution of the lesions. Since the difficulty to treat the OPVL, its management must be done by an expert and formed practitioner of oral pathology and medicine.

Momax project: evaluation on time management patients

L. D'Alessandro, L. Aprea, F. Rocchetti, A. Montori, G. Tenore, U. Romeo

Department of Head and Neck (Prof. A. Polimeni) "Sapienza" University of Rome, Rome, Italy

BACKGROUND: The Multidisciplinary Team Care (MDT) approach has become the care model for cancer patients worldwide and recently has been extended to oral cancer (OC) and to potentially oral malignant disorders (POMD). Three main factors affect the management delay for OC e POMD patients: first of all, patients unawareness about the real dangerousness of pathology; practitioners misdiagnosis and mistreatments; and last the time elapsing from diagnosis and the beginning of treatments. The main advantage of MDT consists in a great reduction of this latter enhancing greatly the general prognosis of these patients as widely demonstrated in the Literature. The MoMAX project (Oral

Medicine and Maxillo-facial surgery) was created on June 2014, at the Department of Oral and Maxillo-Facial Sciences, Sapienza University of Rome, to simplify the pathway of these patients ensuring the shortest and most effective therapeutic protocols. MoMAX care team involves oral pathologists, prosthodontists, maxillofacial surgeons, oral hygienists, all united in a unit. Moreover, once a week a special team, including oncologists, anatomo-pathologists and radiotherapists, called the Head and Neck Tumor Board, discuss about oral cancer cases, assuring the most appropriate and efficient therapy. To the MoMAX refer also patients requiring radiotherapy and/or chemotherapy in order to avoid oral negative side effects related to these treatments such as mucositis and osteonecrosis. The aim of this study is to evaluate the MoMAX patients elapsing time from first visit to the appropriate therapy in order to underline the efficiency of this multidisciplinary approach.

METHODS: A retrospective analysis of medical records and clinical database was performed. Patients data, first visit date, biopsy date and histological diagnosis were considered, differentiating OC and OPMD from other lesions. For patients requiring radiotherapy or/and chemotherapy the first examination date, eventually dental treatments date and final authorization to the therapy data were considered.

RESULTS: 359 patients referred to MoMAX, from June 2014 to February 2018, were evaluated. Among these patients, 256 requiring scalpel o laser biopsy and 103 requiring authorization to radiotherapy and/or chemotherapy. Among biopsies, 156 were for POMD and 33 for OC lesions. For POMD, the average time recorded from the first visit to the biopsy was 12,5 days meanwhile for OC the average time was 7,8 days. Regarding the other 77 non suspicious or non potentially malignant lesions the average time was 15,01 days. About patients requiring authorization to radiotherapy and/or chemotherapy the average time from the first visit to the release of the authorization was 18,36 days. More specifically, from first consultation to the begin of dental treatments the average time recorded was 9,16 days while about 13 days elapse from the end of treatments to authorization release. This delay is due to the biological time needing for tissue healing after teeth extractions.

CONCLUSIONS: Available studies in Literature support MDT approach compared to single-specialist treatment to improve not only the prognosis but also the quality of patients' life. Through this study, we could achieve awareness on the time required to manage POMD, OC and medical compromised patients in MoMAX project till now. Further research is needed to analyze MoMAX efficacy especially in patients survival rate.

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Bisphosphonate related osteonecrosis of the jaws in Italy: an observational report of 24 cases

K. Zhurakivska ¹, G. Guglielmi ¹, C. Abate ¹, O. Di Fede ², G. Campisi ², C. Rubini ³, L. Lo Muzio ¹

¹Dipartimento di Medicina Clinica e Sperimentale, Università di Foggia, Foggia, Italy; ²Dipartimento di Discipline Chirurgiche, Oncologiche e Stomatologiche, Università di Palermo, Palermo, Italy; ³Dipartimento di Scienze Cliniche Specialistiche ed Odontostomatologiche, Università Politecnica delle Marche, Ancona, Italy

BACKGROUND: Bisphosphonates (BPs), drugs inhibiting the osteoclast function, are widely used. They are prescribed for several oncological and not diseases involving the skeletal system. Although providing excellent results, the increase in the use of bisphosphonates led to emerge a complication related to their administration, described with the term of Bisphosphonate-related osteonecrosis of the jaw (BRONJ). The most of patients affected by BRONJ are oncologic patients that frequently assume high doses of these drugs (incidence 1% to 15%), while the incidence in osteoporosis patients is estimated at 0.001% to 0.01%, due to absolutely lower doses of bisphosphonates. Among the risk factors for BRONJ development, the oral surgery procedures seem to play an important role, so that the prevention strategies include elimination or stabilization of oral disease prior to undertake a protocol of antiresorptive therapy with BPs. The present observational study aims to describe the preliminary data resulting from a sperimental protocol, still in progress, developed at IRCCS

“Casa Sollievo dalla sofferenza” for prevention, diagnosis and therapy of BRONJ.

METHODS: Clinical and radiological evaluation of 24 patients with BRONJ was performed in the period between 2011 and 2014. Data about age, sex, systemic pathology and modality of the pharmacological therapy with BPs were collected. An eventual presence in the medical history of oral surgery procedures was annotated. A protocol of tertiary prevention consisting of antibiotic therapy or/and surgical treatment was also undertaken. The results were evaluated after a certain period of time.

RESULTS: The observed group was composed of 13 males and 11 females with an average age of 73,1 years old. A history of oral BPs administration emerged in 6 (25%) patients, one case (4%) was treated with intramuscular injections, while the other 17 (71%) patients reported endovenous treatment. The mean duration of treatment with oral BPs was 44.8 months, whereas the intravenous treatments lasted 29.8 months in average. The most used molecule was zoledronic acid. Only 8 (33.3%) patients referred a previous oral procedure. In 22 cases a medical treatment was chosen with appropriate antibiotic therapy. After treatment, only about half of the patients experienced improvement or resolution of the osteonecrotic lesion, while the others had no improvement or showed worsening of the initial condition.

CONCLUSIONS: The present study reports data from 24 patients who developed maxillary osteonecrosis following a period of bisphosphonate intake. Only 8 (33.3%) patients referred a previous oral procedure. The epidemiological data, however, are limited because the number of patients examined.

PREVENZIONE ED IGIENE DENTALE

Development of the emission factor to calculate the concentration of legionellae in respirable aerosols generated by contaminated dental unit waterlines

A. Foglietta, S. Petti

Department of Public Health and Infectious Diseases, Sapienza University, Rome, Italy

BACKGROUND: Legionnaires' Disease (LD) is a waterborne pneumonia transmitted through inhalation of respirable water particles or aspiration of water contaminated with microorganisms of the *Legionella pneumophila* species. Although transmission from the community setting is primarily responsible for disease incidence, several episodes occur in healthcare settings. LD in dental healthcare settings would result from the exposure to waterborne droplet clouds, or aerosols, containing viable legionellae generated by the dental instruments during treatment. Paradoxically, although 4% dental units are contaminated with legionellae worldwide and, thus, yield the potential to produce contaminated aerosols, there are no confirmed LD cases despite billions of dental treatments annually provided, while the dental staff is not at occupational risk. Therefore, the aim of this study was to try to explain this paradox developing the Emission Factor (EF) to assess the level of legionellae in respirable aerosol resulting from the nebulization of contaminated dental unit water. **METHODS:** The study was performed on a dental unit highly contaminated with legionellae that was interdicted from clinical use since several months. Water and air contamination levels were assessed as follows. The day of the test, 1 L of water from air-water syringe, ultrasonic scaler, micro-motor and turbine hand-pieces, was collected and processed within 1 hour according to standardized sampling and cultivation methods. An air sampler (DUO Surface Air System (SAS) Super 360 -pbi) was placed on the dental chair mimicking dental patients. An ultrasonic scaler, flushing 16.5 mL/min of dental unit water, was put at 40 cm from the air sampler and was run during the 3 minutes necessary to collect the respirable aerosol (diameter, 1-10 μ m) produced by the dental hand-piece contained in 1 m³ of air. In a second test, spatter contamination, due to larger and non-respirable particles (diameter, 10-40 μ m), was assessed removing the top of the air sampler thus leaving large droplets to sediment on the plates within 60 sec from their production. Air samples were also performed before and five minutes after the ultrasonic scaler was run and contamination levels were considered as background levels. The EF, namely, the *Legionella* concentration in respirable aerosol (colony forming units -CFU/m³) generated by dental instruments spraying dental unit water with *Legionella* concentration of 1 CFU/L, was assessed. The formula (CFU/m³)/(CFU/L) was used.

RESULTS: The days of the two tests, room temperature

and relative humidity ranged between 29-30 C and 68-72%, respectively. *Legionella* level ranged between 2.29 and 3.49x10⁷ CFU/L in water, while in air was 2.00 and 2.57x10² CFU/m³ in respirable aerosol and spatter, respectively. The EF was 5.73x10⁻⁸ L/m³ for respirable aerosol and .12x10⁻⁵ L/m³ for spatter. Practically, if dental unit water is contaminated with 100,000 *Legionella* CFU/L, patients and staff may ingest 1 legionella every 3 min through spatter and inhale 1 legionella every 9-10 hours through respirable aerosol.

CONCLUSIONS: The assessment of *Legionella* level in water is not enough to evaluate the risk of LD, since legionellae must be inhaled or aspirated for an optimal deposition in the alveolar lung region. Using data on Gram-negative bacteria produced by the dental turbine, the estimated EF was 3.62x10⁻⁷ L/m³. Thus, the EF in dental healthcare settings is low compared to typical sources of LD, such as cool mist humidifiers, hot-water faucets and showers that yield EFs as high as 3.4-8.8x10⁻⁴ L/m³. The low EF reported in this study helps explain why the LD risk in dental healthcare settings is minimal.

Review of the literature on the use of an adhesive system to increase the effectiveness of occlusal seals

N. De Rossi, S. Mazzoleni, E. Stellini, S. Piovan, M. Caburlotto
University of Padua, Padua, Italy

BACKGROUND: It was decided to conduct this systematic review of the literature because, as it is well known, innovations in dental exchange are constantly changing both from the point of view of materials and therapeutic technique. Concerning dental sealants, there have been innovations in sealing materials, but the application technique has remained the same for many years. For these reasons we wanted to evaluate the possible advantages of an alternative application procedure. This revision aimed to evaluate the possibility of using a modified technique in the practice of sealing compared to the traditional one, evaluating the effectiveness and convenience in its use. Specifically, it has been examined a specific technique which involves the use of an adhesive system applied before the sealant respect to the sole use of the sealant. **METHODS:** For the elaboration of this review of the literature, numerous scientific articles were searched in the PubMed, CINHAHL, Cochrane Library and MedLine databases, obtaining a first filter of the scientific literature. Several primary studies have been founded with different combinations of keywords: sealant, sealant retention, pit and fissure sealants, clinical trial, clinical evaluation, intermediate bonding, bonding agents, bonded, adhesive systems, etch and rinse, self-etch. These words have been combined in different ways within each database. Furthermore, to obtain relevant material for research purposes, some inclusion criteria have been

defined, such as: articles in Italian and English, articles written from 2000 to date, sealings performed on healthy teeth. The exclusion criteria have been: papers which were not free for the consultation and items not relevant to the research. Then, the research has been proceeded by consulting sites of interest and scientific literature in the dental and oral hygiene fields. Thanks to this research, in vivo clinical studies based on an evaluation over time have been collected and they have allowed this literature review to be carried out.

RESULTS: The results of the review showed that some adhesive systems applied before the sealant had a significant positive effect on micro-mechanical and micro-infiltration retention rates and, consequently, they proved to be advantageous in preventing the carious pathology of which it is the main objective. This is because the smaller molecular size of adhesives, compared to that of sealants, allows greater penetration into the microcavities of the etched enamel, leading to a consequent greater bond strength. Furthermore, concerning the type of adhesive to be used, it has emerged that etch-and-rinse adhesive systems are the most effective for this practice as they can create a better microretent bond compared to self-etching systems. The fourth generation etch-and-rinse adhesive systems are more suitable in cases where it is possible to obtain a completely dry operating field, whereas in cases where this is not possible, it is preferable to use a fifth-generation ethanol-based adhesive.

CONCLUSIONS: In conclusion, it has emerged that the use of the adhesive system, if used respecting the correct procedure and the necessary precautions, can be applied in place of the traditional technique.

Fluorine prophylaxis and the caries prevention: current indications in domiciliar and professional use

S.M. Bendeac, S. Mazzoleni, S. Piovan, E. Gobatto, A. Salmaso, M. Caburlotto

BACKGROUND: The purpose of this work is to evaluate the current importance of the use of fluorine in dental caries prevention. In addition, emphasis will be placed on the various safeguards available for these applications and the state of the art of their use. One of the Dental Hygienist's duties is the prevention of dental caries in young peoples through the correct oral health education. That means providing advices and guide in the use of different methods for the administration of fluorine according to the different needs of the patient (individual risk level). Moreover the Dental Hygienist has to proceed with the professional topical application of various prophylactic means and above all to promote health education. **METHODS:** Search engines such as pubmed and cochrane library and textbooks on the subject matter were used using different combinations of keywords; which: fluoride varnish, fluoride toothpaste, water fluoridation, sodium fluoride, stannous fluoride, fluoride gel, fluoride foam. For the purpose of this review of the literature the scientific articles examined were from 2010 to today.

RESULTS: Analyzing both textbooks and articles it is clear how, even today, the most used and effective dental caries prevention method still results in the administration of fluorine. The latter is prescribed both domiciliary and professionally. To date, however, we must put the patient in the foreground and therefore we must evaluate, according to the subjective risk of the onset of caries, the most appropriate method for

the acquisition of fluorine. From the Literature's review it has been stated therefore that is still important for the entire population to wash the teeth twice a day with a toothpaste containing at least 1000 ppm of fluorine. It has also been found that, according to the subjective risk of caries development, for patients with medium risk, in addition to dentifrices, it is possible to prescribe mouthwashes or gels to use at home, while for high risk patients the use of fluoride varnish is more efficient thanks to her consistency which allows a longer stay with the tooth surface. It is the Dental Hygienist's task to identify and suggest the proper individual use method based on personal caries risk that can be performed at home and when it is appropriate the professional applications of fluoride products at the dental office. Protocols for selection and use have been identified.

CONCLUSIONS: The revision work carried out reiterated the importance that the use of fluorine preserves in caries prevention. It was also possible to identify current protocols that allow the dental hygienist to determine the most appropriate, home and / or professional use in the study of the most suitable fluoride products for individual prevention of caries based on the risk of the individual subject

Clinical efficacy of lactobacillus reuteri containing lozenges in the supportive therapy of generalized aggressive periodontitis: six months results of a randomized placebo-controlled study

S. Bossini ¹, S. Calza ², V. Cappa ^{2,3}, G. Garzetti ¹, E. Scotti ¹, M.G. Grusovin ⁴, M. Mensi ¹

¹Section of Periodontics, School of Dentistry, Department of Surgical Specialties, Radiological Science and Public Health, University of Brescia, Brescia, Italy; ²Unit of Biostatistics & Bioinformatics, Department of Molecular and Translational Medicine, University of Brescia, Brescia, Italy; ³Big&Open Data Innovation Laboratory (BODaL-Lab), University of Brescia, Brescia, Italy; ⁴Vita-Salute San Raffaele University, School of Dentistry, Milan, Italy

BACKGROUND: The aim of this 12-months mono centric double-blind randomized placebo-controlled clinical study was to evaluate the efficacy of Lactobacillus Reuteri containing lozenges as adjuvants during the supportive therapy of patients affected by Aggressive Periodontitis (AgP) with residual pockets. Clinical endpoints are pockets closure and BoP reduction.

METHODS: Patients that were treated for AgP trough Full Mouth Instrumentation and following periodontal supportive therapy for at least 6 months were selected. A sample size of 20 patients was deemed necessary and patients were randomly divided in two groups. The test group received two 3-months-long administrations of L. Reuteri (2 lozenges/day after brushing) with a 3-months washout period, while the control one received a placebo with the same modality. The patients were taught to slowly chew the lozenges until they dissolve into saliva and not to eat or drink during the subsequent hour. Professional follow-up and oral hygiene sessions were fulfilled quarterly. Outcome measures were: tooth survival, complications and adverse events, Probing Pocket Defect, Probing Attachment Level, Bleeding on Probing, Plaque Index patient compliance and feedback about treatment. Measurements were collected at 3, 6, 9 months and 12 months. Binary coded outcomes were modelled with multi-level mixed models using binomial family function and con-

ABSTRACT

sidering three nested random levels, patient, tooth and sites. RESULTS: At 6 months no drop out, tooth loss, complications or adverse event were recorded. Patients reporting a baseline PPD higher than 4 mm increased over time probability of closure of probing pocket, especially if they used probiotic, although interaction between type of treatment and visit is not statistically significant. BoP decreased over time in both treatments but reduction is more remarkable in patients treated with probiotic (from 14.6% to 11.6% in controls and from 22.0% to 9.9% in cases, interactions $p < 0.051$). Treatment partially influenced also PAL, reduction of plaque was observed in both treatments (from 16.7% to 10.7% in controls and from 24.6% to 15.4% in cases) although interaction between treatment and time was statistically significant only at visit 1 ($p = 0.003$). CONCLUSIONS: After 6 months, a significantly higher rate of pocket closure was observed in the treatment group. Pocket closure in the placebo group was satisfactory but inferior. BoP reduction also suggest probiotics efficacy in the management of periodontal inflammatory rate. Within the limitation of the study, the use of L. Reuteri probiotics lozenges improved clinical out-comes during the maintenance therapy in patients with diagnosis of AgP, and could be considered a safe adjunct to the supportive therapy in this group of patients.

Efficacy of sonic toothbrush compared to manual brushing in reduction of plaque index and gingival index: randomized clinical trial

V. Brognoli¹, S. Calza², V. Cappa^{2,3}, G. Garzetti¹, E. Scotti¹, M. Mensi

¹Section of Periodontics, School of Dentistry, Department of Surgical Specialties, Radiological Science and Public Health, university of Brescia, Brescia, Italy; ²Unit of Biostatistics & Bioinformatics, Department of Molecular and Translational Medicine, University of Brescia, Brescia, Italy; ³Big&Open Data Innovation Laboratory (BODaL-Lab), University of Brescia, Brescia, Italy

BACKGROUND: The aim of this study is to compare in healthy subjects two methods (manual VS sonic) of tooth brushing in terms of impact on the bleeding on probing (BoP), gingival index (GI) and plaque index (PI) at 6 weeks after one session of Professional Mechanical Plaque Removal (PMPR) with Erythritol Powder and ultrasonic tips.

METHODS: 32 healthy subjects, after GBT, were randomly trained and motivated to use sonic or manual toothbrush. Binary coded outcomes (1/0) BoP, GI, PI were collected at baseline and after 6 weeks (visit 1), aggregated as counts within patient for each visit and then modelled using Generalized Poisson mixed models. Differences between two methods (manual VS sonic) over time, were estimated.

RESULTS: Generally, the sonic toothbrush use, statistically reduced BoP, GI and PI more than manual method. In particular, the reductions of BoP and GI were about 3 times higher than manual method and the PI was 4 time higher ($p < 0.0001$). Additionally, differences between baseline and visit 1 among two tooth-brushing methods, were more remarkable using sonic toothbrush. Mean reductions over time were 85.4% for BoP, 92.3% of PI and 78.0% of GI using sonic toothbrush ($p < 0.0001$) and 60.3%, 68.6% and 35.4% for BoP, PI and GI respectively with the manual one ($p < 0.0001$).

CONCLUSIONS: The results of this study indicate that sonic toothbrush can significantly help in reduction of plaque and gingival margin inflammation more than a manual toothbrush.

Moreover, this study shows that the benefits of professional oral hygiene are influenced by home-use compliance in terms of the outcomes, and it may be that the greatest improvements in oral health derive from devices that increase compliance. In addition to instruction and motivation, satisfaction questionnaires were administered to patients, and it was found that sonic toothbrush is most appreciated than manual one, due to the greatest ease of use and to the comfort perceived during brushing. It can be concluded that sonic toothbrush gives more benefits in terms of clinical results and patient compliance compared to the manual one.

Efficacy of disclosing plaque agent as a guide to the supra-gingival biofilm removal: randomized clinical trial

R. Agosti¹, M. Mensi¹, E. Scotti¹, V. Cappa^{2,3}, S. Calza²

¹School of Dentistry, Section of Periodontics, Department of Surgical Specialties Radiological Science and Public Health, University of Brescia, Brescia Italy; ²Unit of Biostatistics, Department of Molecular and Translational Medicine, University of Brescia, Brescia, Italy; ³Big&Open Data Innovation Laboratory (BODaL-Lab), University of Brescia, Brescia, Italy

BACKGROUND: Evaluate the efficacy of disclosing plaque agent as a guide to the supra-gingival biofilm removal during recall appointment, in periodontally healthy patients, with a plaque index exceeding 25%.

METHODS: 32 healthy patients, who needed prophylaxis, divided in two groups, were treated either with (A) or without (B) disclosing plaque agent application before treatment. After therapy, disclosing plaque agent was applied and three photos (frontal, lingual and palatal) were taken and digitalized to quantify residual plaque area (RPA). The quantification of RPA was made thanks to an image processing software (Image-J) that allowed us to highlight the percentage of area with residual plaque colored by disclosing plaque agent on the tooth. Statistical evaluations were performed separately for different portions, specifically overall measure and gingival margin only. Treatments effect were tested using linear mixed models. All data analysis will be carried out according to a pre-established analysis plan by a biostatistician blinded to group allocation. Comparison between treatments will be performed using independent sample t-Test. All statistical comparisons will be conducted at the 0.05 level of significance.

RESULTS: Percentage of tooth surface with RPA was significantly higher in patients treated with B compared to A, both for the overall measurement ($p = 0.006$) (OR = 2.68, 95%CI: [1.35;5.33]) and gingival margin only ($p = 0.004$) (OR = 2.44, 95%CI: [1.36;4.38]), with an interaction 90.1 (17.8) that can be interpreted the proportional variation of the OR (B vs A) in gingival margin only versus the overall measure. That is the OR in gingival margin is reduced by approximately a 10% compared to the overall measure.

CONCLUSIONS: Within the limits of this study we can confirm the efficacy of disclosing plaque as a guide to remove supra-gingival biofilm during the professional hygiene, especially in less accessible areas, as gingival margin or interdental space. The clinical approach that not include the guide of the disclosing plaque is still valid, therefore it's up to the clinician the evaluation and pick the better technique in the different patients and clinical set-ups.

Relationship between periodontal disease and hashimoto's thyroiditis: literature review and a pilot study

G. Laurenti, E. Brun, M. Gargari, L. Cerroni

Department of Clinical Science and Translational Medicine
University of Rome Tor Vergata

BACKGROUND: Autoimmune thyroid diseases (AITDs), including the Hashimoto's thyroiditis (HT) are the most common autoimmune diseases and are often observed together with other autoimmune diseases. Periodontal disease is a multifactorial infectious disease caused by mixed microbiota and modulated by environmental and genetic factors. The involvement of autoantibodies in the pathogenesis of aggressive periodontitis has been observed, suggesting the role of autoimmunity in periodontitis. Autoimmune disease may be correlated to periodontal disease, as for example Rheumatoid arthritis (RA) and to a lesser extent, systemic lupus erythematosus (SLE). A common feature of autoimmune diseases is the breakdown of tolerance of self antigens, a consequence of which is the production of autoantibodies reactive with multiple self proteins. This is a condition found both in periodontal disease, although not classified as autoimmune disease, and in thyroid diseases on an autoimmune basis. The purpose of this study was to perform a review and a pilot study to estimate the possible association between Hashimoto's thyroiditis and periodontal disease.

METHODS: A literature search was performed using Pubmed and Cochrane databases from January 1990 to December 2017, search was carried using the keywords "thyroid" and "periodontal". 10 female patients with a mean age of 45 years, from 25 to 60 years with autoimmune thyroid disease in pharmacological therapy (Group I), were sent by the Department of Endocrinology to the Operative Unit of Odontostomatology "Fra G.B. Orsenigo", San Pietro Hospital, Rome. 10 female subjects with a mean age of 45 years, from 25 to 60 years of good general and oral health with no thyroid dysfunction were included in Group II. Periodontal parameters such as Plaque Index (PI), Bleeding on Probing index (BOP), Periodontal Pocket Depth (PPD) were recorded. Groups were compared using the t test and linear regression.

RESULTS: The electronic search identified 39 citations. Two possible hypothetical models that can be extrapolated for the causal relationship between Hashimoto's thyroiditis (HT) and periodontitis include: 1) apoptosis, B-cell-activated superantigens, reactive T cells with clonal expansion, pro-inflammatory cytokine activity mediated by genetic and environmental factors; 2) a reduced caliber of capillaries, as well as a greater number and tortuosity of capillary loops is considered as a risk factor for periodontal disease in patients with HT. The results of the pilot study showed that in all 10 HT the PI was $24 \pm 6\%$, BOP was $35 \pm 11\%$ and PPD $> 4\text{mm}$ was $16 \pm 7\%$, while in control group the PI was $29 \pm 8\%$, BOP was $30 \pm 13\%$ and PPD $> 4\text{mm}$ was $6 \pm 4\%$. The clinical condition in HT patients showed deeper probing depth ($p < 0,05$) and higher gingival bleeding respect to the control group, while the plaque index was higher in the control group.

CONCLUSIONS: Limited data are available regarding the relationship between thyroid hormone imbalance (thyroid disease) and periodontal health. This study reported preliminary results on a small sample of patient affected by Hashimoto's thyroiditis, in all HT patients bleeding and therefore inflammation were highlighted respect to the con-

trol group. The presence of gingival bleeding not justified by the presence of abundant plaque, should make one think of a thyroid involvement, especially in women of 35-55 years with no other systemic disease. In this regard the role of the dental hygienist in terms of prevention appears to be very important. Dental hygienist should be familiar with the signs and symptoms of thyroiditis, so they can send the patients to the endocrinologist.

Probiotics and oral health: a cognitive survey on knowledge and use in dentistry

C. Cossu, E. Brun, L. Cerroni, M. Gargari

Department of Clinical Science and Translational Medicine
University of Rome Tor Vergata

BACKGROUND: The use of probiotics for oral health has been recently introduced, as scientists have discovered that they could be effective against periodontal disease, pathogenic bacteria and halitosis. Introducing probiotics in diet, can stop, slow or delay the process of infection that leads to oral disease. The effect of probiotics can be divided into three main categories: normalization of the gut microbiota, modulation of the immune response, and metabolic effects. From the literature analysis resulted that: *L. reuteri* and *L. brevis* have improved gingival health, by decreasing gingival bleeding; probiotic chewing gums containing *L. reuteri* decreased levels of pro-inflammatory cytokines in GCF; the use of *L. brevis* decreased MMP (collagenase) activity and other inflammatory markers in saliva. The use of *L. casei* Shirota decreased PMN elastase and MMP-3 activities in GCF, and gingival inflammation was lower in the group consuming the probiotic product, as measured by MPO activity. *L. salivarius* decreased the gingival pocket depth, particularly in high-risk groups such as smokers. The aim of this pilot study, was to evaluate the knowledge and the use of probiotics among dental practitioners. The study is aimed at the cognitive survey, to then expand and evolve into a project for dental personnel, to raise awareness regarding the recognition and the daily use of most effective probiotics for oral health.

METHODS: A single multiple-choice and open reply questionnaire, was administered to a sample of 100 dental operators including Physicians, Dentists and Dental Hygienists, to evaluate their knowledge and use of probiotics in daily practice first, and they were asked also, to express their willingness to deepen their knowledge regard probiotics. Data were processed by using descriptive and inferential statistical analysis methods. For each question, an alphanumeric label corresponding to each answer has been assigned. Tests of statistical significance by using Pearson's χ^2 calculation were taken into consideration only for generated p-values $< 0,05$, which determine that the observed associations have less than 5% of possibility to be due to fortuity.

RESULTS: 86% of the professionals interviewed said they knew about probiotics, of which 85.7% of the Physicians, 78% of the Dentists and 100% of the Dental Hygienists. 73.91% of Dental Hygienists have used probiotics against the 46.34% of Dentists and 14.28% of Physicians. 56% of Dental Hygienists recommended probiotics, followed by 14.30% of the Physicians and finally by only 3.65% of dentists. From the total of sample emerged that 30% of the operators advised probiotics for oral health promotion, 23.3% for antibiotic therapy support, 20% in support of periodontal therapy and only 10% for of all three purposes. 82% of the sample agreed on the benefit of receiving further information about probiotics.

ABSTRACT

CONCLUSIONS: Probiotics could be a valid support for oral health, through mechanisms of competition with periodontopathogenic species, their protective action towards hard and soft tissues and their ability to work synergistically with antibiotic therapy and SRP techniques. They could reduce periodontal indexes and promote a good balance of the resident microflora. Accordingly the significance of the data collected in this study, emerged that professionals has few and confused knowledge about probiotics for oral health. Probiotics are more known by the class of dental hygienists. Furthermore, the most encouraging data showed that high percentages of professionals, declared the wish to receive further information about probiotics and their application in the dental field to corroborate knowledge and strategies of causal and non-causal intervention.

Oral health conditions and cardiovascular diseases in elderly italian patients

A. Visca, F. De Angelis, M. Senatore, P. Lomelo, S. Di Carlo
Department of Oral and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy

BACKGROUND: The objective of this study was to investigate the associations between oral health status and presence of cardiovascular diseases (CVD) in elderly patients.

METHODS: The study population consisted of 533 patients (308 females, 225 males) aged 65 to 98 years. The mean age of patients was 73.93 (± 7.8 standard deviation (SD)). Patients were asked to visit the Geriatric Dentistry Department of "Policlinico Umberto I" of Rome for a routine check of their oral health status. All subjects gave informed, signed consent to participate in the study. A predesigned medical history questionnaire including social status, habits, medical history, general health and drug assumption were filled by each patient. Medical history, particularly focused on CVD and common atherosclerotic risk factors (arterial hypertension, diabetes, body mass index, etc.) have been recorded. Dental status was detected measuring the Decayed, Missing, and Filled Teeth (DMFT) and Community Periodontal Index (CPI) indexes. Geriatric Oral Health Assessment Index (GOHAI) was also used to evaluate masticatory function, oral self-perception and psychosocial impact on patients. The chi-square test with a 95% confidence level was used to assess qualitative variables. Odds ratios (ORs) and stepwise logistic regression were used to calculate risk estimates; the independent variables: age, gender, DMFT, CPI index, GOHAI index score, and tooth loss were included in the statistical model. P value < 0.05 was considered a statistically significant cut-off.

RESULTS: The mean of the DMFT was 13.8 (SD: 7.1). Among all patients, 8.6% (n = 46) had more than 12 decayed teeth, 43.7% (n = 233) had more than 12 missing teeth. A total of 122 patients (52.4%) had more than 18 missing teeth. No difference between females and males was seen in DMFT and CPI index. GOHAI data were worst for females and it significantly decreased with age. Vascular diseases affected 69.8% of subjects (n = 372). Patients with CVD had less education and oral care (P < 0.05), higher CPI index and lower of filled teeth (P < 0.05). Moreover, the number of missing teeth was higher in patients with vascular disease and patients with more than 18 missing teeth have 2.5 times greater risk of CVD. CVDs are also associated with type 2 diabetes mellitus, underweight, and obesity (P < 0.05).

CONCLUSIONS: From the finding of this study, it can be confirmed a significant link between CVD and oral health. A cooperation among geriatrician, cardiologist, and dentist is suitable to counteract the development of CVD and to early identify patients risk of CVD.

Long term evaluation of oral health indices in patients who undergone head and neck radiation therapy in association with vitamin E (case-control group)

I. Casula, R. Rossini, T. Anzaldi, E. Marchesini, A. Ganda, L. Bonfanti, M. Bianchi

Department of Medical and Surgical Specialties, Radiological Sciences, and Public Health (DSMC), University of Brescia

BACKGROUND: Most head and neck cancers are squamous cell carcinomas that develop in the upper aerodigestive epithelium (oral cavity, pharynx, larynx) after exposure to carcinogens such as tobacco, alcohol, or to some virus (HPV, Epstein Barr). Treatments for this kind of cancer are: surgery, radiotherapy and chemotherapy, which are often combined. Many are the complications associated with radiotherapy such as xerostomia, mucositis, caries, trismus, candidiasis, dysgeusia, dysphagia and osteoradionecrosis. Management of oral health is especially important in order to limit side effects. Therefore, the aim of this study was to evaluate, in the long term, the maintenance of oral health indices in patients who had undergone head and neck radiation therapy, in association with vitamin E (case-control group).

METHODS: An observational study was conducted to evaluate, in the long term, the oro-dental characteristics of patients undergoing head and neck radiotherapy, in association with vitamin E. This study is the forth stage of work which started in April 2013. It includes an oro-dental assessment in 41 months. 17 patients with cancer (4 f., and 13 m.), aged between 48 and 72, were selected, then divided into a case group (7 patient) which received products containing vitamin E, and a control group which didn't receive products containing vitamin E. Each patient was informed about the protocol approved by the ethical Committee of our Institution. They sign an informed consent and have been evaluated by a single dental hygienist. During each visit (T0, T1, T2) the patients received a questionnaire, then the dental hygienist performed an extra-oral examination, an intra-oral examination, a detection of oral health indices through the use of a plaque index and a bleeding index (Ainamo & Bay 1975), motivation and home oral hygiene education, professional cleaning. Professional cleaning was performed using an ultrasonic scaler above and below the gum, soft non-abrasive cups, prophylaxis paste (RDA < 40).

RESULTS: To manage the side effects a good oral health is necessary, which can be reached by a perfect plaque control (patient compliance). The effectiveness of our protocol of study is evident, as both indices (plaque and bleeding) were significantly reduced from T0 to T1. Plaque index average: T0: 79%, T1: 5%. Bleeding index average: T0: 69%, T1: 3%. The vitamin E reduced pain and burning sensation.

CONCLUSIONS: Patients who undergone radio-therapy, are special needs patient. The role of a dental hygienist is essential in following up oral hygiene and food habits, in short, medium and long term. Also vitamin E, can give a good relief from pain and burning sensation (although more clinical evaluation need to be done).

Oral microbiota and oral aspects in celiac disease before and after gluten free diet

C. Occhipinti, N. Marziali, P. Cressoni, C. Iovane, A. Bernier, E. Aref, V. Benvenuto, A. Zanoncelli, V. Zana, U. Garagiola

Università degli Studi di Milano, Irccs Ca' Granda Fondazione Ospedale Maggiore Policlinico - UOC Odontostomatologica and Unit, Milan, Italy

BACKGROUND: Celiac disease is an autoimmune disease. The immune reaction produces an inflammation that damages the lining of the small intestine, in particular the duodenal mucosa, leading to a general malabsorption of nutrients that causes intestinal symptoms and manifestations to the oral cavity. The aim of the work is to identify any dental or mucosal manifestations of celiac disease before and after the gluten-free diet, in order to find a new diagnostic method for this disease. The oral examination could make a significant contribution to the revelation of celiac disease. Finding the connection between this disease and oral problems, the oral clinical examination could be considered an easy, non-invasive and effective method for the identification of autoimmune disease. **METHODS:** 300 celiac patients will be examined before the gluten-free diet (T0) and then they will be reevaluated three months after the beginning of diet (T1).

In T0 will be performed:

- anamnesis;
- DMFT / dmft (decayed, missing, filled, teeth);
- evaluation of mucosal lesions such as recurrent aphthous stomatitis;
- collection of information related to the last professional oral hygiene and the brushing habits;
- pH through a saliva sample examined with pH meter;
- quantitative analysis of basal salivary flow;
- identification of C-reactive protein that detects and controls an inflammation in the organism;
- FMPS (full mouth plaque score) and FMBS (full mouth bleeding score) considering six surface a tooth in order to exclude poor oral hygiene as a cause of inflammation;
- microbiological analysis (GENOMIC KIT for the extraction of bacterial DNA processed in PCR-Real-Time)

The patients will be treated with professional oral hygiene to remove tartar and plaque. In the second visit (T1) the parameters considered in T0 will be re-evaluated using the initial methods. The data obtained will be compared with those observed in T0. **RESULTS:** Comparing 300 patients' clinical exams, it will be possible to define if celiac patients have more oral manifestations than healthy people.

CONCLUSIONS: The identification of oral signs caused by celiac disease will give more importance to clinical oral examination because this exam will be considered an easy, non-invasive and effective method to identify the autoimmune disease.

Biostimulation of salivary glands in the prevention of oral problems related to diseases with reduced salivary volume

C. Occhipinti, A. Zanoncelli, P. Cressoni, C. Mauro, E. Aref, V. Zana, A. Bernier, C. Iovane, N. Marziali, V. Benvenuto, U. Garagiola

Università degli Studi di Milano, Irccs Ca' Granda Fondazione Ospedale Maggiore Policlinico - UOC Odontostomatologica and Unit, Milan, Italy

BACKGROUND: Multiple test procedures were performed for patients with Xerostomia and oral saliva reduction, which promote a higher production of saliva in order to choose the

most effective. Biostimulation will be carried out using different methods, such as with low-energy polychromatic and incoherent polarized light, which will stimulate cellular mitochondrial activity and Diode laser and comparing the results with two other types of salivary stimulators, such as lemon juice and chewing gum.

METHODS: Randomized study on a population of healthy adult subjects non-smoking and of both sexes of basal and stimulated salivary flow with:

- Low energy polychromatic and incoherent polarized light for five minutes
- Diode laser 810 nm-1w defocused handpiece (distance 1 cm time 50 seconds)
- Chewing-gum for three minutes
- Lemon Juice (one drop 0,04 mL minute for five minutes, and after subtracting 0,04 x 5)

The salivary collection will be carried out at a distance of 2 hours from the consumption of food and beverages and also from home and professional oral hygiene. The collection technique is that of spitting in a container for five minutes. The measurements will be compared with the standard values of Leo M. Sreeley and Arijan Vissin. (0,25 mL/min \leq Vflu.salbasale \leq 0,35 mL/min; 1mL \leq Vflu. sal-stimolata \leq 3 mL/min.)

Our interest will be mainly on the stimulation of the glandular secretion through with polarized light and Diode laser.

RESULTS: The use of Polarized light and Diode laser in patients with Xerostomia or saliva reduction give hope for positive and better results of salivary stimulation than using lemon juice and chewing-gum.

CONCLUSIONS: It was identified the salivary stimulation method more effective and without side effects for the daily management and for prevention oral problem of the patient with reduced salivary. The use of low-energy polarized light and Diode laser use in this study do not have any known side effects, either short or long term and no risk of tissue damage. Therefore there are no restrictions even for pediatric use.

Evaluation of the oral microbiota in surgical extraction of symptomless third molar enclosed: oral hygiene instructions associated with chlorhexidine without antibiotic therapy

C. Occhipinti, A. Bernier, P. Cressoni, N. Marziali, V. Benvenuto, A. Zanoncelli, V. Zana, E. Aref, C. Iovane, U. Garagiola
Università degli Studi di Milano, Irccs Ca' Granda Fondazione Ospedale Maggiore Policlinico - UOC Odontostomatologica and Unit, Milan, Italy

BACKGROUND: Surgical site plaque accumulation is one of the problems that leads to bad healing. Of clinical relevance is the fact that the structure of the plaque biofilm might restrict the penetration of antimicrobial agents, while bacteria grows on the surface; only with mechanical therapy we can to destroy it.

Antibiotic Prophylaxis (AP) represents a common but often misused procedure in dental practice, thus aggravating the risk for antimicrobial resistance and adverse effects occurrence. Aim of the study is to prove that on healthy individuals a good oral hygiene associated to an antiseptic is enough in order to prevent from infections.

METHODS: Randomly selecting healthy individuals for the extraction of the impacted symptomless mandibular third molar. We take a sample of dental plaque before the extrac-

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tion and another one after 7 days, that will be subjected to microbiological analysis. To half of the selected patients (that for convenience we will call the "educated patients") we provide an accurate oral hygiene lesson using models and brushes in order to show the correct movements to be implemented; in addition, to that half of sample, we will prescribe Chlorhexidine (CHX) mouthwash and toothpaste and we will recommend to use them for the following 7 days twice a day (every 12 hours). Each patient will fill out a questionnaire in order to be divided into 3 groups:

- educated patients who didn't have AP and post-operative antibiotic therapy but used CHX;
- uneducated patients who didn't have AP and post-operative antibiotic therapy but used CHX;
- uneducated patients who didn't have AP and post-operative antibiotic therapy and didn't use CHX.

RESULTS: An efficient oral hygiene and the use every 12 hours of CHX gives hope for a faster and better healing of the treated gingival tissue and in a lower and less aggressive presence of bacterial plaque compared to patients who don't follow these measures.

CONCLUSIONS: The plaque biofilm is the main cause of postoperative complications in the extraction of the third molar, and since we are not able to destroy it if not through the brushing, an exclusively antibiotic therapy would not prevent the infection. Providing a good education to oral health instructions is essential for oral cavity health. A mechanical therapy associated with the use of an antiseptic is sufficient to avoid an infection.

Oral microbiota and clinical variations in Ramadan fasting patients

C. Occhipinti, E. Aref, P. Cressoni, V. Benvenuto, C. Iovane, A. Bernier, N. Marziali, V. Zana, A. Zanoncelli, U. Garagiola

Università degli Studi di Milano, Irccs Ca' Granda Fondazione Ospedale Maggiore Policlinico - UOC Odontostomatologica and Unit, Milan, Italy

BACKGROUND: Evaluate, compared to standard parameters, changes in diet, nutrition frequency and other health-related habits and identify guidelines aimed to preventing oral issues of fasting in the month of Ramadan: Muslim religious fasting belief, which it believers shall refrain from taking food or drink from Sunrise until sunset.

METHODS: The study will be conducted at the dental clinic, IRCCS Ospedale Maggiore Policlinico of Milan, where they'll be selected 60 adults who follow the Ramadan fasting, divided randomly in two groups of people:

- A. 30 subjects educated and motivated to correct oral hygiene habits and maneuvers at home;
- B. 30 subjects not educated and not motivated to correct oral hygiene habits and maneuvers at home.

Both groups are evaluated at 3 different moments:

- from 1 to 30 days prior to the commencement of fasting (T0);
- 7 days before the end of the fasting period (T1);
- 7 days after the end of the fasting period (T2).

Initial treatment at T0 will be: scaling, DMFT/dmft (decayed, missed, filled, teeth), caries receptivity index and, considering 6 surfaces for each dental element, full mouth plaque score (FMPS), the semi-qualitative plaque index of Sinless and Loë (IP), full mouth bleeding score (FMBS) and semi-qualitative bleeding index (IS). Will be evaluate the oral microbiota following a dental plaque levy, processed afterwards in PCR-real time for amplification and quantization of bacterial DNA.

Analyzed, by means of a pH meter, the salivary pH and, through the Griess reagent (NO), the endothelial dilation factor, that represents the degree of gingival/periodontal inflammation expressed as concentration of $[NO_2]$ g/L: $4NO + O_2 + 2H_2O \rightarrow 4NO_2 + 4H^+$. For last, they will be given a questionnaire to rate their eating habits and their initials oral hygiene habits at home. In T1 and T2 will be again recalculated as well the same indexes and repeated the same analysis.

RESULTS: The results of the data collected in the three moments of the study, compared to standard parameters, will allow us to identify any risks to the oral health of these patients. In addition, may advance in the month of Ramadan fasting guidelines modeled on the Group A or group B.

CONCLUSIONS: Fasting inevitably causes dietary changes. Therefore, there may be a correlation between caries receptivity and/or periodontal disease in correspondence to a shift in the timing of eating. It highlights, therefore, the importance of knowing any changes of the oral microbiota and oral health related to the month of Ramadan in the two different groups considered in the study.

Low energy polarized light in the care of inflammations and gingival injuries in patients affected by juvenile idiopathic arthritis

P. Cressoni, V. Benvenuto, C. Occhipinti, V. Zana, E. Aref, C. Iovane, A. Zanoncelli, A. Bernier, N. Marziali, U. Garagiola

Università degli Studi di Milano, Irccs Ca' Granda Fondazione Ospedale Maggiore Policlinico - UOC Odontostomatologica and Unit, Milan, Italy

BACKGROUND: Testing a useful procedure based on a complex periodontal repair and regeneration system through the use of a photobiomodulator device in which light, at low energy levels, modulates intra- and extracellular photoreceptors through molecular and cellular processes that can stimulate both anti-inflammatory mechanisms that a cell proliferation response.

METHODS: Healthy orthodontic patients (A) and affected by juvenile Idiopathic Arthritis (B) are selected at the dental clinic of the IRCCS CA' GRANDA Ospedale Maggiore Policlinico in Milan. Both groups will be submitted to the Griess test to quantify the degree of gingival / periodontal inflammation, found at the salivary level as NO_2^- .

The quantitative bleeding (FMBS) and semi-qualitative (IS) indices will be evaluated, the latter using four different codes:

- Code 0: absence of bleeding in the survey;
- Code 1: presence of bleeding in the survey, without redness and edema;
- Code 2: bleeding in the survey with redness and edema;
- Code 3: spontaneous bleeding.

In addition, the quantitative (FMPS) and semi-qualitative plaque indices of Silness J & Loe H (IP) will be calculated, considering six surfaces per tooth; the latter attributing four different codes:

- Code 0: lack of plaque;
- Code 1: 1/3 of the dental surface covered with plaque;
- Code 2: 2/3 of the dental surface covered with plaque;
- Code 3: more than 2/3 of the dental surface covered with plaque.

Our attention will focus on the use of the medical device Light Therapy System that emits polarized, polychromatic, non-coherent and non-invasive light. Subjects with gingival / periodontal inflammation will be treated with the following method: 1st and 4rd quadrantà treated with phototherapy; 2nd

were achieved in every mouthguard for the other parameters: presence of complaints, liquid assumption, presence or absence of salivation.

CONCLUSIONS: In conclusion, after the evaluation of every parameter, the most appreciated mouthguard was the D-Fender mouthguard. However, this finding does not compromise the good structure of the other mouthguards. Furthermore, this is a preliminary study that needs other tests with a bigger sample of athletes (possibly mainly involved into contact sports) and additional physical tests of load and break.

School-age dental screening: oral health and eating habits

F. Calcagnile, F. Capasso, D. Corridore, A. Anelli, L. Ottolenghi, I. Vozza

Dental Hygiene School C, Latina, Italy

BACKGROUND: The aim of this work was to correlate the clinical data collected from dental screening carried out on children with their eating habits, especially those related to the consumption of sugars

METHODS: The dental screening was carried out on a sample of 73 eight-year-old children (34 males and 39 females) attending the third grade of the elementary schools of Gaeta (Latina). Clinical data and periodontal status indexes were recorded on a special clinical folder: in addition to the personal data, the number of present teeth, number of decayed, missing or filled teeth, both deciduous and permanent, were detected; the degree of oral hygiene was expressed with a judgment (insufficient, poor, good, excellent), the type of malocclusion, the frequency of brushing and the frequency of dental checks were identified. Data analysis was performed by recording the frequency distribution and using Anova analysis for the correlation of variables.

RESULTS: The results showed an average of 1.4 carious teeth per child ($ds \pm 2.3$) with a slightly higher average in females compared to males. More than 68% of the sample had poor or insufficient oral hygiene conditions with plaque presence in 64% of cases even if 80% of children reported to wash their teeth two or three times a day. In more than half of the children (70%) there was no presence of calculus and gingivitis. 57% of children had class II malocclusion with increased overjet and oral breathing respectively in 37% and 30% of cases. 12% of the sample had a premature delivery, only 24% were breastfed in the first months of life and more than 40% maintained a bad habit for over two years of age. About eating habits, more than 80% of the sample consumed sweets or sweet drinks every day or almost every day. More than 38% of children did not eat fruit during the week and 21% did not eat vegetables. The analysis of the data showed as children consume several snacks throughout the day, 55% make at least three and 47% eat while watching TV.

CONCLUSIONS: The results of this study show how, although parents are very attentive to the health of their children by periodically bringing them to dental controls, this is often not enough to motivate and sensitize children to perform proper home hygiene. In fact, the critical issues emerge both in the evaluation of the quality of child's oral hygiene and in the choice of foods to be eaten out of the meal.

This is why prevention program carried out through the School is more effective on children for learning of content especially when the acquisition of knowledge follows the application and verification of theoretical and practical skills in terms of oral health.

Experimental study on the oral health approach of cancer patients

E. Camedda, D. Corridore, V. Caldarazzo, L. Ottolenghi, I. Vozza

Corso di Laurea in Igiene Dentale C-ASL Latina, "Sapienza" Università di Roma, Rome, Italy

BACKGROUND: Chemotherapy is associated with both acute and chronic systemic side effects, including oral complications. The immediate ones can be: hyposcissalia, xerostomia, dysphagia, dysgeusia, mucositis and opportunistic infections; the delayed ones are: dental caries, bone friability and osteonecrosis. These conditions can further compromise the patient's well-being as they interfere with normal oral swallowing, chewing and phonation functions, preventing nutrient uptake and slowing down treatment time. The study aims to realize an operative protocol able to INFORM cancer patients on the importance of their oral hygiene and correct diet to be pursued and then to INSTRUCT, showing them the means to achieve these objectives. All of this in order to prevent or limit the onset of oral complications.

METHODS: The study took place at the oncological Day Hospital of A. Fiorini Hospital in Terracina (ASL of Latina). An anonymous questionnaire was administered to the patients after signing an informed consent. The survey included a section dedicated to oral hygiene habits and risk factors and one to eating habits; one containing a remote and proximate pathological anamnesis and the antiblastic therapy established by the oncologist; one dedicated to the IOHIP-14 questionnaire and a clinical diary; one about the extra and intra-oral clinical examination notes as well as the evaluation of restorations and prostheses congruity. The following indices were noted: plaque, calculus, bleeding, DMFT in order to establish the onset of a gingivitis or periodontitis. Photographs were taken for a better evaluation in order to allow the patient to participate in his initial situation and progress. Personalized information and instructions were provided through the delivery of equipment useful for the maintenance or achievement of good oral hygiene and for the correct management of fixed and / or removable prostheses as well as the management of the resulting complications. All of this was accompanied by specific dietary advice according to the oral complications that the patient expressed.

RESULTS: The study was conducted on a sample of 30 people, including 19 women and 11 men, with an average age of 64 years. 40% of patients were uninformed about oral complications that may occur during and / or after chemotherapy, 23% did not remember, 37% were informed. 57% of patients showed hyposcissalia of which 13% associated with dental and labial hypersensitivity, 3% associated with mucositis with over candida infection; 27% did not show any immediate consequence, 16% other. 50% of patients did not have a dental check-up for more than a year, 37.5% from 12 months, 12.5% from 6 months. Informed patients: 10% have a plaque index of 2.35, 14% a plaque index of 1.38 and 3% a plaque index of 0.9. Uninformed patients: 17% have a plaque index of 2.15, 7% a plaque index of 1.24 and 3% a plaque index of 0.9.

CONCLUSIONS: The study allowed to approach the cancer patient paying attention to the clinical aspects but also to the psychological state, through an attitude of courtesy, availability and active listening. The data show us that there is not adequate information about the oral side effects of antiblastic therapies and that patients, even if they are informed, have a

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high plaque index. This is because there is no awareness about limitation of some side effects through a good oral hygiene. The cancer patient converges all his energies in the resolution of the main pathology, therefore he needs a constant motivation to oral hygiene.

Flipped classroom teaching in dental education

C. Alpaslan ¹, G. Alpaslan ¹, Y. Boucher ², P. Bouchard ², K. Vandamme ³, L. Ottolenghi ⁴, A. Battaglia Mayer ⁴, M.M. Jensen ⁵, T.R. Mikkelsen ⁵

¹Gazi University, Ankara, Turkey; ²Paris Diderot, Paris, France; ³KU Leuven, Leuven, Belgium; ⁴Sapienza University, Rome, Italy; ⁵VIA University College, Horsens, Denmark

BACKGROUND: For decades, the way of teaching in higher education has traditionally been teacher-centered. In such educational model, students put all of their focus on the teacher. The teacher talks, the students exclusively listen as interaction and collaboration is discouraged, and the students write the memorized content back in exams with low level of analysis or comprehension. However, this way of teaching has been claimed not only tedious, but ineffective as well. Moreover, teaching is limited with the teacher's current knowledge and capacity to teach. With the easy access to vast information through information and communication technology (ICT), the traditional model of teacher as the sole steward of knowledge has become obsolete. Flipped classroom teaching or 'inverted teaching' is a method that allows to use class time to engage students in active learning activities, rather than traditional lectures. Moreover, flipping the classroom may be considered to be a win-win situation for both students and teachers. In this report, the Erasmus+ Partnership Project on Flipped Classroom Model (FCM) in Dental Education is presented. The context of the project is developing a certified FCM teaching course for teachers in dental education that will provide a guidance to use this teaching model effectively and empower them to integrate technological tools into teaching. Also, specific priorities in higher education are addressed, as promoting more student-centered learning approaches, better use of different ICT tools and supporting innovation and creativity.

METHODS: Partners from five European Countries (Belgium, Denmark, France, Italy, Turkey) are involved in the project, to develop a course for teachers to flipping the classroom in dental education. Emphasis is put on the methodology ('how to'), providing know-how on planning, creating and implementing FCM in dental education. Main priority contents of the FCM course are (i) the concept, advantages, limitations and challenges of FCM; (ii) the FCM planning; (iii) the offloading of specific syllabus parts through e.g. video production; (iv) the design of in-class activities, student-centered active learning; and (v) methods for evaluation of FCM. Educators will be provided with all the knowledge and tools they need to deliver high-quality educational activities and meet the increasingly diverse student needs. ICT will be used effectively at all levels as well as enhancing digital integration and promoting access to and learning through Open Educational Resources.

RESULTS: After completing the course, teachers will be capable of providing a short module or a complete course according to the FCM, and will have learned new educational skills such as the ability to identify the course parts

suitable for the offloading, creating and producing videos and other digital learning tools, and implementing active learning activities in class.

CONCLUSIONS: There is an actual need of modernization in higher education, through a shift from teaching to learning, by implementing innovative pedagogical models and empowering dental students to take responsibility of their learning activities by blended learning. The course on flipped classroom for dental educators will contribute to the modernization of dental education through dissemination in local, national and European levels.

The management of xerostomia by the dental hygienist

A. Lissoni, M. Ballanti, G. Pasini, E. Polizzi, S. Abati

Oral Pathology - Dept. of Dentistry - IRCCS San Raffaele University Hospital - University Vita-Salute San Raffaele, Milano Italy; Dental Hygiene - Dept. of Dentistry - IRCCS San Raffaele University Hospital - University Vita-Salute San Raffaele, Milan, Italy

BACKGROUND: The aim of this study was to highlight the prevalence and characteristics of the "dry mouth" subjective disorder in a cohort of consecutive patients in the dental hygiene department of San Raffaele Hospital. Dry mouth or "xerostomia" is a condition characterized by the subjective perception of dryness of the oral mucosa mainly due to the reduction or absence of the salivary flow, but it should not be confused with hypocalcemia that refers to an abnormal salivary reduction determined by a reversible or irreversible damage to the functions of the salivary glands. The causes underlying this symptom may be different, and should generally be sought through a careful review of the medical history of the patient. The severity of the disorder is related to the patient's habits, which often complains a constant need to take liquids to swallow or chew foods, especially the dry ones, the need to drink liquids even at night time to relieve the symptom of aridity and the effectiveness of commercially available oral lubricants to improve the dryness.

METHODS: Sixty patients have been enrolled in this study (age range from 21 to 84 years), divided in three groups: systemically healthy patients, patients with Sjögren syndrome (SS), and patients previously undergoing radiotherapy in the head/neck area. They were thirty-five females and twenty-five males, who reported the "oral dryness" symptom. Each of them was given a specially developed questionnaire aimed at gathering the most information about their state of general health, home oral hygiene habits and the oral cleansers used daily by the patients. In addition, specific questions were asked about their oral conditions and the severity of the "dry mouth" symptom. Following this preliminary phase, each patient was subjected to a visual examination of the oral cavity to assess whether they had lesions associated with decreased or not salivary flow. Each patient was advised to use a saliva lubricant substitute at least three times a day for a two-week period. After two weeks, each patient was asked to go back to the oral hygiene department to assess the benefits of using the recommended lubricant.

RESULTS: The data were analyzed using a statistical software, and the results showed that the female component was superior in healthy subjects and those with Sjögren's syndrome, while in the case of radio and chemotherapy of the head-neck region they were predominantly male. Each

patient's disorder was evaluated using the NRS scale (Numeric Scale, from 0 to 10 in which 0 corresponds to the absence of the symptom and 10 indicates the utmost discomfort), and it emerged that before using the lubricant the mean values of the intensity of the disorder were 6.98. After fifteen days the symptomatology of oral dryness was reduced by 45%.

CONCLUSIONS: From the analysis and the results obtained, the efficacy of salivary substitutes in the treatment of xerostomia and hyposalivation is clearly highlighted. The dental hygienist must take care of the patient's oral health, especially those who have undergone radiotherapy in the head and neck region, motivating them to have a proper oral hygiene and to use permanently oral lubricants to relieve their symptoms.

The management of children with autism spectrum disorder in orthodontic treatment

N. Conselmo, D. Corridore, G. Ierardo, V. Luzzi, I. Vozza

Autism spectrum disorder (ASD) refers to a group of neurodevelopmental disabilities with a core set of defining criteria that comprise impaired social interaction, communication, and restricted or repetitive behavioural stereotypes. Most dental manifestations diagnosed are bruxism, tongue thrusting, caries, erosion, xerostomia, gingivitis. In literature a few studies discuss about the management of children with autism spectrum disorder in orthodontic treatment. For this reason, the Unit of pediatric dentistry, Head-Neck Department, Policlinico Umberto I in Rome has taken up a study about management and oral prevention in autistic individuals, using tell-show-do technique, visual pedagogy (CAA), sounds and shapes, verbal reinforcement, and several basic behaviour methods for accommodation of these patients including the presence of parents. We have employed these innovative methods to start an orthodontic treatment on autistic patients following their improvement in oral health.

METHODS: For our study was selected a 7-year-old autistic child who presented eruptive difficulties of 2.1 because of the permanence of 6.1 and single-left posterior cross bite. The dmft was 0.17 and the plaque index was code 3 of silness and loe index, indicating abundant plaque accumulation over the gingival margin.

Orthodontic treatment was performed with a rapid palate expander activated twice a day for 15 days. After 15 days it was held for 6 months, during which, due to the annoyances caused to the child, it was replaced with an upper plate with a transversal expansion screw as maintenance without activating the screw. During each appointment a blackboard was used and images related to the oral hygiene devices were presented on it, adopting the Alternative Aid Communication (CAA). This technique improved communication with the patient and influenced the success of orthodontic treatment and oral health management.

RESULTS: From the beginning of orthodontic therapy, once a month, oral hygiene instructions were given, motivating the child and his mother with plaque detectors and toothbrush. During each follow-up, the plaque index was significantly reduced and no caries were reported. The dmft remained, therefore, unchanged and no gingival inflammation or lesions to the oral mucosa were found and the eruption of 21 was successfully achieved.

CONCLUSIONS: In literature only one case of orthodontic treatment on a patient with Autism spectrum disorder was

found but this deals with the subject from the orthodontic point of view. In our project the dental hygienist plays a fundamental role in the management of oral hygiene, contributing decisively to prevent the appearance of dental and gingival problems in autistic patient wearing orthodontic appliances, which could result in needing anesthesia sessions for the resolution of these problems.

Analysis of antimicrobial effect and antibiofilm of two toothpastes at different fluorine concentration

S. Vitali, A. Perrone, M. Saccucci, F. Covello, G. Ottaviani, C. Sbarbaro, A. Salucci

"Sapienza" University of Rome, Department of Oral and Maxillo-Facial Sciences, Unit of Pediatric Dentistry, Pediatric Dentistry Specialization School, Rome, Italy

BACKGROUND: Our research was focused on the analysis of the antimicrobial and antibiofilm power of two commonly used oral toothpastes containing different concentrations of fluorine. These toothpastes were tested in vitro on deciduous teeth.

METHODS: Culture of *S. mutans* was inoculated in 1 mL of sterile phosphate buffered saline (PBS) with a 5% of toothpaste concentration. with 500ppm e 1400ppm of fluorine. The ability of the bacteria to form colonies was measured by counting the number of Colony Forming Units (CFU). Results were compared with the control sample, represented by untreated solution. Later A selection of 20 deciduous molars was prepared. The teeth were extracted as a result of orthodontic treatments or physiological replacements. The procedures were performed at the UOC of Pediatric dentistry Sapienza University of Rome department of Oral and Maxillo-Facial Science. Each element, was preserved in normal saline and then sectioned at a cementum-enamel junction level. Successively the external and occlusal surfaces have been etched with 37% orthophosphoric acid for 1 minute in order to reproduce the demineralization that occurs in the oral environment. Subsequently, 10 elements were treated, by manual brushing, with a toothpaste containing 500 ppm of fluorine, the remaining 10 with a toothpaste at 1400 ppm of fluorine. The brushing process was performed with a duration of two minutes, three times a day for a period of 15 days. In a second phase, each sample was exposed to a bacterial suspension of *S. mutans* for biofilm cultivation. After growing, a Crystal Violet (CV, Sigma) assay was performed to quantify biofilm formation on teeth samples.

RESULTS: The microbiological tests performed on 5% solutions of the two toothpastes, compared to the untreated aqueous solution (UT), showed a statistically very similar antimicrobial effect. The viability rate of bacterial colonies decreases with the passage of exposure time and is similar for the two products. The analysis of bacterial biofilm formation on the surfaces of the dental elements indicates an inhibiting action of the biofilm, similar for both toothpastes.

CONCLUSIONS: The present study demonstrated that the use of two toothpastes has been shown to have similar antimicrobial and antibiofilm characteristics. The use in pediatric patients of a low-fluoride toothpaste as well as providing protection against the bacterial attack also reduces the potential risk of fluorosis.

ABSTRACT

A randomized clinical trial study comparing efficacy between two salivary substitutes in radiotreated patients for head and neck cancerG. Rivetti, G. Gassino, M. Carossa, N. Bocca, P. Ceruti, F. Bassi
Università degli Studi di Torino, Turin, Italy

BACKGROUND: Management of xerostomia following radiation therapy is difficult. When residual gland function remains it may be possible to stimulate gland function by means of local measures or with systemic medication. When saliva cannot be stimulated, use of wetting agents or salivary substitutes are considered. The aim of this study is to compare differences in salivary flux, salivary pH and VAS in patients using two types of salivary substitutes, Hydral Gum® and Biotene®, before and after the radiotherapy in order to identify the most satisfactory for the radio-treated patients, to keep the oral conditions under control and to guarantee the best possible lifestyle to the patient.

METHODS: Subjects were recruited from patients starting the radiation therapy to the head and neck at Città della Salute e della Scienza di Torino. The patients have been divided randomly in group A (Biotene®) and group B (Hydral Gel®). At T0 salivary flux and pH before radiotherapy were registered; at T1, one month after the beginning of radiotherapy, results of VAS scale have been collected; at T2, two months after the end of radiotherapy, salivary flux, pH and VAS have been registered. Criteria of inclusion were diagnosis of head and neck tumors, need of radiation therapy, age between 18-75, minimum 10 teeth. Patients with preexistent hyposalivation, radiotherapy already started, advanced periodontal disease, diabetics and severely debilitated patients with advanced tumors (stage IV) or treated only with surgery or chemotherapy has been excluded. Patients were motivated and instructed to the correct techniques of oral hygiene, and to use the oral gel a minimum of four times a day. Whole unstimulated saliva was collected in the morning for 5 min and paraffin-stimulated saliva was collected after 5 min at each visit; pH measurements and the buffering capacity has been recorded. Patients were asked to record the severity of symptoms using visual analogue scales (VAS) for the following symptoms: dry mouth at rest/when eating, difficulty speaking/swallowing due to dry mouth, altered taste.

RESULTS: A group of 26 subjects (23 men and 3 women, medium age 55 years old) were recruited. Every test has a 5% level of significance, the maximum error that allows to make is 0,05. Data from both groups have been analyzed using T-student test: 1) Group A (Biotene®): VAS T1-T2 p value > 0,5; salivary flux T0-T2 p value < 0,5; salivary pH T0-T2 > 0,5; 2) Group B (Hydral Gel®): VAS T1-T2 p value > 0,5; salivary flux T0-T2 < 0,5; salivary pH T0-T2 p value > 0,5; 3) Comparison between group A and B reveals p value > 0,5 at T2 for VAS, p value > 0,5 at T2 for salivary flux, p value > 0,5 at T2 for salivary pH.

CONCLUSIONS: The statistical analysis reveals 1) in Group A no significant differences for salivary flux and VAS but statistically significant improvement of salivary flux 2) in Group B no significant differences for salivary pH and VAS but a significant improvement of salivary flux 3) no differences between substitutes A and B at T2 for VAS, salivary flux and salivary pH. However, patients went through an improvement assessable from the statistic analysis of the single group; patients from both groups reported improvement in swallow, speaking, dysphagia and gum burning. The study underlines how continuative use of salivary substitutes improves the quality of life of patients undergoing radiation therapy of head and neck.

Risk factors between I, II, III class occlusion and periodontal disease: appraisal through TC-Cone Beam

P. Cressoni, C. Iovane, C. Occhipinti, V. Benvenuto, A. Bernier, A. Zanoncelli, N. Marziali, V. Zana, E. Aref, U. Garagiola

Università degli Studi di Milano, School of Orthodontics, Dental Hygienist School; IRCCS Ca' Granda Fondazione Ospedale Maggiore Policlinico - UOC Odontostomatologica and Unit

BACKGROUND: The aim of this study is to measure the periosteal bone loss of some dental elements, previously chosen as benchmarks, in the I, II and III skeletal class and to evaluate the correlation between malocclusion and periodontal disease. **METHODS:** 90 TC-Cone Beam of healthy patients, between the ages of 14 years and 20 years, in the pre-orthodontic phase will be examined. 30 of these TC-Cone Beam will be related to patients with I skeletal class, 30 with II skeletal class and 30 with III skeletal class. The TC-Cone Beam for each group studied will be randomly selected. Some dental elements will be taken as samples for each patients. Maxillary and mandibular dental incisors (11, 21, 31, 41), maxillary and mandibular canines (13, 23, 33, 43) and maxillary and mandibular first permanent molars (16, 26, 36, 46) will be the samples. Through the use of the Materialise 3-matic software, the distance between the cemento-enamel junction (CEJ) and the alveolar bone will be evaluated considering all the sites of the dental elements: disto-vestibular, vestibular, mesio-vestibular, distal-lingual / palatal, lingual / palatal and mesio-lingual / palatal. If a correlation between a specific skeletal class and periodontal disease is noticed, in vivo studies will be performed in order to confirm what has been noted in TC-Cone Beam. In the oral clinical examination will be evaluated periodontal disease in relation to some indices like FMPS (full-mouth plaque score), FMBS (full mouth bleeding score), loss of attachment, gingival recession, mobility and furcations. The dental elements considered in this exam are the same of the evaluation on the TC-Cone Beam.

RESULTS: The study of TC-Cone Beam relative to the bone level of the dental elements taken into consideration could reveal a correlation between malocclusion and periodontal disease in pre-orthodontic patients. There could also be a different incidence of bone defect between I, II, III skeletal class.

CONCLUSIONS: It is important to evaluate the periodontal parameters in patients in the pre-orthodontic phase to intercept any problems related to the skeletal class. In this way it may be possible to draw up personalized protocols during the orthodontic treatment plan in order to prevent any periodontal risks.

Treatment of periodontal pockets with hydrogen peroxide and hyaluronic acid: evaluation of oral microbiota

P. Cressoni, V. Zana, C. Occhipinti, A. Zanoncelli, N. Marziali, V. Benvenuto, E. Aref, C. Iovane, A. Bernier, U. Garagiola

Università degli Studi di Milano, School of Orthodontics, Dental Hygienist School; IRCCS Ca' Granda Fondazione Ospedale Maggiore Policlinico - UOC Odontostomatologica and Unit

BACKGROUND: Evaluation of the oral microbiota after treatment with hydrogen peroxide and hyaluronic acid, of periodontal pockets in order to alleviate the pain symptoms, reduce the pathogenic bacterial load, the probing depth and reduce bleeding in the survey.

METHODS: 25 adult patients of both sexes are randomly

selected. The patients under examination are treated with two product applications at a distance of 5 minutes from each other, 1 mL of hydrogen peroxide undiluted and 1 mL of hyaluronic acid undiluted at application, performed by sterile syringe directly inside the periodontal pockets greater than 3.5 mm of multirooted and monoradicular elements. During the first visit (T0) and / or after a week from the latter (T1), the quantitative bleeding (FMBS) and semi-qualitative (IS) indices will be performed, considering six surfaces per tooth, the latter using four different codes:

- Code 0: absence of bleeding on probing;
- Code 1: presence of bleeding on probing, without redness and edema;
- Code 2: bleeding on probing with redness and edema;
- Code 3: spontaneous bleeding.

Furthermore, the quantitative (FMPS) and semi-qualitative plaque indices of Silness J & Loe H (IP) will be calculated considering six surfaces per tooth; the latter attributing four different codes:

- Cod.0: absence of plaque;
- Cod.1: 1/3 of the dental surface covered with plaque;
- Cod.2: 2/3 of the dental surface covered with plaque;
- Cod.3: greater than 2/3 of the dental surface covered with plaque.

Moreover, before washing the pocket (T0) and after 5 minutes from the last application of the solution (T1) a bacterial plaque pick-up will be performed, positioning a periopaper for 30 seconds inside one of the periodontal pockets with greater probing depth, processed in PCR-Real-Time.

Painful symptomatology is evaluated by administering two different tests:

Numerical Reating Scale - NRS (Downie, 1979; Grossi, 1983);

Visual Analogical Scale - Vas (Scott Huskisson, 1976);

Verbal Rating Scale - VRS (Keele, 1948; successive validations JPSM, 2002).

RESULTS: The formulation thus constituted seems to possess antibacterial and hemostatic action and alleviate painful symptoms.

CONCLUSIONS: After treatment of periodontal pockets, it is therefore advisable to wash with hydrogen peroxide, hyaluronic acid and glycine to relieve painful symptoms, reduce the pathogenic bacterial load and bleeding on probing.

Oral health in the population held at the third district house of rebibbia

D. Corridore, E. De Paolis, M. Mazur, M. Capocci, N. Ndokay, F. Rinaldo, D. Salvi, P. Patti, D. Pasqualotto, F. Ripari, G. M. Nardi, F. Guerra, L. Ottolenghi

Department of Oral and Maxillo-Facial Sciences, "Sapienza" University, Rome, Italy; School of Dentistry, "Sapienza" University, Rome, Italy; Oral Diagnosis Unit (Sted 02), Policlinico Umberto I Rome; Dental Hygiene School, Sapienza University of Rome, Italy

BACKGROUND: The Third District House is a weakened custodial institution that houses drug addicts who want to participate in a recovery and rehabilitation program. The aim of the study is to evaluate the state of oral health of prisoners and the impact it has on the quality of life, bearing in mind that the problems related to the oral cavity are the most frequent among those associated with drug abuse.

METHODS: Three different questionnaires were used, admin-

istered in a face to face interview mode: EGOHID II - Full Standard Clinical Survey From 2007, which collects clinical data such as CPI and DMFT; Questionnaire OHIP-14, which assesses the quality of life in relation to oral health and the EGOHID Adult Questionnaire which collects data on various habits and lifestyles.

RESULTS: The survey was attended by 29 of the 32 prisoners present, with a compliance of 91%. The age of the participants ranges from 23 to 62 years, with an average age of 42.9 years. The population examined results to have a lower level of education and disadvantaged socio-economic conditions compared to the free Italian population. Furthermore, the survey showed that almost all the participants use tobacco; that 10 out of 29 prisoners are infected with Hepatitis C and 4 of them also have co-morbidities with HIV. The high incidence of these diseases is linked to substance abuse that involves 100% of the population, in which cocaine is the most widely used substance. Regarding the clinical data, the DMFT results to be equal to 15, of which the component of the decayed teeth is 5.1; that of the treated teeth 2.6 and that of the missing teeth 7.3. The latter value is probably linked to the lack of prosthetic rehabilitation services for prisoners. The CPI (Community Periodontal Index) shows that only 14% of subjects enjoyed periodontal health, while 19% had bleeding at the survey and 25% were detected periodontal pockets with depths greater than 6 mm. Although we have found negative oral health conditions, it seems that they have a low perception of the problems related to their oral cavity, not feeling any particular discomforts associated with them.

CONCLUSIONS: The investigation showed that the oral health of prisoners is precarious and oral hygiene is very poor. In this regard, it would be advisable to promote a prevention program in the prison context and a course of oral health education aimed at improving the care of oral hygiene and consequently preventing the diseases related to it. To this end, it might be useful to disseminate brochures from the various instructions for proper home hygiene and to distribute eligible devices in the interproximal oral hygiene penitentiary institutions. This preventive program would reduce the incidence of diseases, thereby decreasing the therapeutic interventions for their care and consequently their health care costs. Furthermore, it would increase the detainee's confidence and self-esteem, thus fostering the possibility of reintegration in an easier way within society.

Oral health and quality of life correlated in a population of female prisoners in the city of Latina

D. Corridore, G. Verre, M. Mazur, M. Capocci, A. Ndokay, F. Rinaldo, D. Salvi, P. Patti, D. Pasqualotto, F. Ripari, G. M. Nardi, I. Vozza, L. Stamegna, F. Guerra, L. Ottolenghi

Department of Oral and Maxillo-Facial Sciences, "Sapienza" University, Rome, Italy; School of Dentistry, "Sapienza" University, Rome, Italy; Oral Diagnosis Unit (Sted 02), Policlinico Umberto I Rome; Dental Hygiene School, Sapienza University of Rome, Latina, Italy

BACKGROUND: For many years the WHO has dealt with the issue of prisoners health through the publication of specific reports that outline a picture made up of a rather young population suffering mainly from psychic, infectious and oral

ABSTRACT

diseases. Women in prison often come from unfavorable environments and many of them have suffered psychologic problem, from alcohol or drug addiction and inadequate health care prior to detention, and bad condition of oral cavity are nothing more than the direct consequence. Moreover this population presents a greater risk of traumas of the complex gold-facial, due to the health implications of the frequent episodes of violence and abuse that they are found. The aim of the study is to pay particular attention to the specific health needs of the inmates and to guarantee a system of promotion of sensitive oral health, recognizing the opportunity to strengthen and support the care of one's own person, promoting the recovery of esteem and safety.

METHODS: The study took place at the Latina District House "in which prisoners awaiting trial are present and those sentenced to sentences of less than five years. Inside the prison there are also 35 prisoners belonging to the high security AS2 and AS3 circuit, traditionally dedicated to the detainees belonging to organized terrorist and mafia groups. Three different questionnaires were used, administered in a face to face interview mode: EGOHID II - Full Standard Clinical Survey From 2007, which collects clinical data such as CPI and DMFT; Questionnaire OHIP-14, which assesses the quality of life in relation to oral health and the EGOHID Adult Questionnaire which collects data on various habits and lifestyles. The informed consent was made verbally for each detainee who took part in the visit, and for completing the questionnaires.

RESULTS: The total female sample is 26 inmates. The age range is between 20 and 79 years with an average age of 42 and 96.4% is a smoker. 96.2% of the prisoners (25) are Italian nationals, 3.8% (one inmate) of foreign nationality. The sample presents a DMFT of 13.84 and poor management of soft tissue presenting generalized loss of attack in 61.6% of cases, a plaque index corresponding to 3 in 65.5% and accumulation of generalized tartrate in 57.7% of cases. The data related to the OHIP-14 show the presence in more than 50% of the sample of painful points inside the mouth, difficulty in relaxing and chewing. In fact, in 62% of the cases the last dental visit was requested for an emergency intervention.

CONCLUSIONS: Very often visit of the oral cavity is able to intercept situations of abuse and violence otherwise silenced. Good oral health also makes it possible to communicate effectively and relate positively with the community once the sentence has ended, also in relation to a potential job placement, possibly incurring a minor percentage in abuses and acts of psycho-physical violence. For this reason, the promotion of a management and prevention campaign in the field of oral health is desirable to improve the living conditions during and after the period of detention.

Oral health survey in the adult Barbadian population

M.A. Straker, D. Corridore, M. Mazur, F. Guerra, L. Ottolenghi
Department of Oral and Maxillo-Facial Sciences, "Sapienza" University, Rome, Italy; School of Dentistry, "Sapienza" University, Rome, Italy; Oral Diagnosis Unit (Sted 02), Policlinico Umberto I Rome

BACKGROUND: To understand the current state of oral health in the adult Barbadian population (35-64yrs) with

a particular focus on the relationship between oral health and diabetes. The World Health Organization (WHO) has indicated that the same risk factors for oral disease are the same as those of Non-Communicable Diseases (NCDs). Barbados has one of the highest rates of type 2 diabetes in the Americas and it is fundamental that both medical and dental practitioners collaborate in the treatment needs of diabetic patients. In preparation for the future oral health survey to be conducted in Barbados a review of the literature was conducted to determine the quantity and quality of information available regarding adult oral health surveys and oral health and diabetes.

METHODS: An electronic database search was conducted during September – October, 2017 using the MEDLINE database, Google Scholar and the Cochrane Library. Key words used for the searches conducted included: 'oral health assessment', 'adult oral surveys', 'diabetes mellitus and oral health', 'oral hygiene index', 'periodontal status', 'periodontitis and diabetes'. Abstracts were read to determine topic significance and relevant articles with full-text were extracted. 70 full-text articles meeting the inclusion criteria were read.

RESULTS: No published literature regarding oral health surveys solely conducted on adults in the Americas was found. Published studies on adult oral health surveys are severely lacking and are almost non-existent in developing countries. Literature reviewed established the connection between diabetes and the prevalence of severe periodontitis in adult populations compared to nondiabetic adult populations with a near three-fold susceptibility for diabetic patients of developing chronic periodontitis. In particular the majority of recent studies are focusing on the bidirectional nature of the relationship; diabetes increasing the risk of periodontitis and periodontitis having a negative impact on glycemic control. Results also highlighted the shortcomings regarding health practitioners' knowledge on oral health and diabetes. In Barbados there is currently no data available as to the periodontal status of the nearly 40,000 Barbadian adults living with diabetes. Added to this, is the realization that oral health is not included in the developed guidelines for Caribbean medical practitioners. The dietary habits of Barbadians is concerning as intake of carbonated and sugary beverages exceeds the Caribbean recommendation by four-fold.

CONCLUSIONS: To continue to lack detailed information in the area of oral health and diabetes prevents Barbados from interpreting the true success of earlier implemented childhood oral health programs, the current state of oral health status and behavior of adults in Barbados and to understand what protocols and guidelines should be implemented specifically for adult diabetics.

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Microbiome and periodontitis: a systematic review and meta-analysis

A. Ndokaj, M. Mazur, D. Corridore, M. Capocci, F. Rinaldo, D. Pasqualotto, D. Salvi, P. Patti, F. Ripari, G. M. Nardi, L. Ottolenghi, F. Guerra

Department of Oral and Maxillo-Facial Sciences, "Sapienza" University, Rome, Italy; School of Dentistry, "Sapienza" University, Rome, Italy; Oral Diagnosis Unit (Sted 02), Policlinico Umberto I Rome

BACKGROUND: The term microbiome signifies "the ecological community of commensal, symbiotic, and pathogenic microorganisms that literally share our body space and have been all but ignored as determinants of health and disease" (1). The association between the oral microbiome and periodontal diseases is still unclear. The aim of the present study was to perform a systematic review and meta-analysis of the existing literature to (i) identify the association between the variation of the oral microbiome and periodontitis; and (ii) to estimate the risk of developing inflammation of the periodontal space in subjects who present a specific variation of the taxonomy of the oral microbiome.

METHODS: This systematic review was conducted according to the PRISMA statement (2) and the Cochrane Handbook for Systematic Reviews of Interventions (3). Literature searches of free text and MeSH terms were performed by using MedLine (PubMed) and Scopus (30th May 2017). Articles from 1950 were searched using the following keywords: A) ["oral flora" OR "oral ecosystem" OR "dental microflora" OR "microbial consortium" AND ("periodontitis" OR "periodontal inflammation")]; B) ["oral flora" OR "oral ecosystem" OR "dental microflora" OR "microbial consortium"]. The search strategy identified 275 potential articles, 99 from Pubmed and 176 from Scopus. After removal of duplicates, 170 articles were analyzed. Subsequently, 146 papers were excluded because they did not meet the inclusion criteria. Of the remaining 24 papers, 7 were excluded because not relevant to the subject of the study. The remaining 17 papers were included in the qualitative synthesis, and 11 of them in the meta-analysis (Fig 1).

RESULTS: 11 RCTs involving 2111 patients were included. The retrieved case-control studies evaluated the presence or absence of different targeted pathogens. Among the microorganisms evaluated *Porphyromonas gingivalis* [OR (95% CI) 2.93(0.98,8.87); P< 0.0001] and *Streptococcus mutans* [OR (95% CI) 1.77 (0.89-3.54); P=0.03] were found to be risk factors for the development of periodontitis, while *Aggregatibacter actinomycetemcomitans* [OR (95% CI) 0.52 (0.33-0.83)] played a protective role for periodontitis.

CONCLUSIONS: Our results show that *Porphyromonas gingivalis* and *Streptococcus mutans* were found to be associated with an increased risk for the development of periodontitis, while *Aggregatibacter actinomycetemcomitans* was found to be protective for periodontitis. Better understanding of the relationship between oral microflora composition and host oral and systemic conditions (plaque, calculus, oral hygiene behaviors, smoking) in health and disease can be of value to develop new diagnostic and therapeutic tools, which could be oriented toward a more topic or holistic approach.

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Dental erosion in patients affected by eating disorders: a preliminary study

M. Capocci, D. Corridore, M. Mazur, N. Ndokaj, F. Rinaldo, D. Pasqualotto, D. Salvi, P. Patti, F. Ripari, G. M. Nardi, F. Guerra, L. Ottolenghi

Department of Oral and Maxillo-Facial Sciences, "Sapienza" University, Rome, Italy; School of Dentistry, "Sapienza" University, Rome, Italy; Oral Diagnosis Unit (Sted 02), Policlinico Umberto I Rome

BACKGROUND: Dental erosion, which is the irreversible loss of hard tissues of the tooth due to a chemical process on the dental surface, sees the presence of acids as a fundamental prerequisite: erosive wear is complex and depends on the interaction of biological, chemical and behavioral disorders, making it a multi-factor etiology injury. This preliminary study aims to show the correlations between Eating Disorders and the onset of dental erosion, from the point of view of clinical objectivity and focusing on the subjective perception of oral health in this type of patients. The long-term goal is also to promote an interdisciplinary collaboration to deepen the knowledge of the most frequent oral and perioral manifestations in people affected by Eating Disorders and to determine operational, preventive and clinical paths.

METHODS: This study was conducted by evaluating oral health in two experimental groups organized in a coherent way by number of participants, gender and age. In the first phase, the complete Italian version of the Oral Health Impact Profile 49 (OHIP 49) on the Oral Health related Quality of Life (OHRQoL) was administered to both groups. A dental visit was then proposed to all patients whose data concerning the experience of caries (D₃MFT), periodontal health (CPI) and the presence of erosions (BEWE) were recorded on a specific clinical chart.

RESULTS: The summary of the OHIP-49 questionnaire reported that the Study Group was the one with the greatest perception of oral health interference on the quality of life, especially regarding psychological and social disability, with repercussions on the sleep-wake rhythm and consequent depression, difficulty in concentration or relaxation and impediments in social relationships. From the objective examination, in the Studio Group the average BEWE score was 2.0 compared to 0.9 of the control group; the CPI was found to be 2 (presence of tartar) in 57.9% of patients with DCA (against 9.4% of the Control Group) and the total DMFT in the two groups was 9.2 and 4.2 respectively.

CONCLUSIONS: In the last twenty years various studies in the literature report a significant prevalence of enamel erosions in patients with eating disorders. The incidence of these disorders is constantly increasing, therefore more and more dentists and dental hygienists, through intra-oral clinical examination, will play a fundamental role in the identification and early diagnosis of such food pathologies. To further investigate the perception that these patients have of their oral health status about both their daily life and their relationship with themselves and others may be important for their clinical management.

ABSTRACT

Effect of biofilm removal from the occlusal tooth surfaces on fluorescence measurements: a clinical study

F. Rinaldo, N. Ndokaj, M. Mazur, D. Corridore, M. Capocci, D. Salvi, P. Patti, D. Pasqualotto, F. Ripari, A. Spota, F. Guerra, L. Ottolenghi, G.M. Nardi

Department of Oral and Maxillo-Facial Sciences, "Sapienza" University, Rome, Italy; School of Dentistry, "Sapienza" University, Rome, Italy; Oral Diagnosis Unit (Sted 02), Policlinico Umberto I Rome

BACKGROUND: Early diagnosis and monitoring of caries lesions are the most important issues of primary and secondary prevention policies. This is crucial especially in case of initial lesions that if not recognized or underestimated could be delayed in treatment and can evolve in destructive dentine lesions. The intraoral auto-calibrated camera Vista Cam iX (Durr Dental, Bietigheim-Bissingen, Germany) uses the fluorescence phenomenon for a non-invasive, quantitative caries diagnosis, by scanning demineralized lesions of enamel and dentin. In order to make a precise evaluation, according to the camera manufacturer instructions, the tooth surface must be completely cleaned and without biofilm. The air polishing with glycine powder allows removing completely the biofilm from the enamel surface giving a whole cleanse of the tooth surfaces. In this study, we used the air-polishing protocols using the Combi device (Mectron SpA). The current study aimed to evaluate the effects of biofilm removal, using air-polishing device with glycine, on fluorescence VistaCam iX camera quantitative measurements of caries. The null hypothesis is that the presence of the bacterial biofilm on the tooth surface does not affect the values assigned by the camera VistaCam iX given to the occlusal surfaces of the analysed teeth.

METHODS: Patients with complete permanent dentition without any kind of restorative treatments in the lateral and posterior section of upper and lower dental arches were enrolled. Patients with inadequate oral hygiene, orthodontic treatments and systemic diseases that could influence oral health were excluded. One skilled dentist using the fluorescence terminal Proof of the intraoral camera VistaCam iX photographed the occlusal surfaces of molars and premolars and registered the highest values. A professional dental hygienist performed oral hygiene with air polishing procedures using the Combi device with glycine. In order to evaluate the influence of biofilm, fluorescence assessment was repeated after air-polishing procedures by a third blind skilled dentist, with the same fluorescence terminal Proof, registering the highest value gained for each occlusal surface.

RESULTS: In this in vivo study, 133 cuspidate permanent teeth, 62 molars and 71 premolars of patients aged between 13 and 25 were analysed. Descriptive analysis showed an average of 0.82 (SD= 0.65; Min= 0.00; Max= 1.80; Median= 1.20) and of 0.93 (SD= 0.60; Min= 0.00; Max= 1.70; Median= 1.20) for values before and after treatment, respectively. However, descriptive analysis and non-parametric Wilcoxon signed-rank test show that, even if the median value does not change and so do the min and max values, analysed data have statistically significant different distribution. This results demonstrated that, the scores assigned by VistaCam iX Proof fluorescence based camera to the occlusal surfaces, after the air-polishing treatment, are averagely higher than those before treatment, especially in the diagnosis of initial tooth decay.

CONCLUSIONS: From the data obtained, we can affirm that biofilm removal with glycine air-polishing improves the VistaCam camera accuracy in recognizing healthy tissue from the decayed one, due to the fact that air-polishing treatment increases the decayed tissue reaction to the fluorescence.

Spectrophotometric measurements and its correlation to human eye color perception. Influence of white/black vs. Cuspal/non cuspal backgrounds on tooth color assessment

D. Pasqualotto, A. Ndokaj, M. Mazur, F. Rinaldo, D. Corridore, M. Capocci, D. Salvi, P. Patti, F. Ripari, G.M. Nardi, L. Ottolenghi, F. Guerra

Department of Oral and Maxillo-Facial Sciences, "Sapienza" University, Rome, Italy

BACKGROUND: The aim of this in vivo study was to compare spectrophotometric backgrounds - white (WB) with cuspal (C), black (BB) with non cuspal (NC) - in order to determine if the oral natural conditions could be used as reliable backgrounds instead of the traditional black and/or white for in vivo color matching.

METHODS: Spectrophotometric measurements were performed on ninety-three upper right permanent central incisor. Among inclusion criteria were A1, A2, A3 (Vita Classical scale) tooth shade. Each tooth was measured on black, white, cuspal and non cuspal backgrounds. ΔE between black and non cuspal (ΔE_{BBNC}) and ΔE between white and cuspal (ΔE_{WBC}) were calculated and correlated to human eye color perception (AT, PT). Opalescence (O) and contrast ratio (CR) were calculated on the four different backgrounds.

RESULTS: The comparison between black and oral cavity natural backgrounds shows high clinical acceptability: 98.9% in the central, 96.8% in the gingival and 92.4% in the incisal tooth area. Clinical acceptability between white and oral cuspal backgrounds was 90.3% in the gingival, 79.6% in the central and 7.6% in the incisal tooth area.

CONCLUSIONS: Natural oral black background can always be used instead of the artificial one, while the natural bright oral background can be used instead of the artificial one only for an overall tooth shade matching. Our results support the natural backgrounds as valid alternatives to artificial ones. Using individual oral features as referral points, sustain personalized practices and provide a sustainable and easy clinical procedure.

Dental, ophthalmological, audiological screening on a sample of population from Togo: results and clinical appearance and criticism of the intervention

P. Palattella, S. Spagnolo, A. Musacchio, F. Mallone

Dirigente Medico, Dipartimento Testa-Collo dell' Azienda Policlinico Umberto I di Roma; Medico specializzanda in Oculistica Università Sapienza di Roma

BACKGROUND: Identify, through a screening, the most relevant diseases in Togo at a dental, ophthalmic and audiological level, in order to plan subsequent step, regarding clinical and surgical treatments.

METHODS: A dental, ophthalmological and audiological screening was carried out on a sample of 1097 subjects, out of which 65% were school age, inhabitants in the central area of Togo in the village of Amakpapè and surroundings. Along with a prevention work carried out in three schools and an orphanage. A training has been carried out in three schools and an orphanage to stimulate children (and where possible to the families) proper personal hygiene and appropriate use, for example, of the dental toothbrush.

RESULTS: The most common pathologies from dental point of view were: dyschromies from drugs, due to the wide use of antibiotic treatments carried out also , during the periods of pregnancy and malocclusions; from ophthalmic point of view were : cataracts , pterigium, glaucoma, chronic conjunctivitis results of viral, bacterial and parasitic infections, amblyopia; from audiological point of view were: chronic purulent average otitis, hipoacusias and deep deafness.

CONCLUSIONS: The poor and insufficient health care and poverty conditions in Togo affect both the high level of infant mortality (56.8%) and the low average age of the population (59 years) and therefore medical action are necessary also through an external support to the country. The most important thing beside the screening of the population of the villages was that a lot of medicines has been supplied such as antibiotic, anti inflammatory, painkillers, glasses and sunglasses ,very expensive for the greatest part of our patients. In addition we are planning to collect material from Italy to send in Togo, also with the help of some Onlus. Prevention and training to people in order to train personal in various specialist aspects at local level represent the strengths of the next actions and therefore a long-term planning must be carried out in order to obtain a sufficient level of health in this country compared to other world realities that makes the lives of the inhabitants of this of this forgotten African dignified .A project that takes into account the primary need to train local staff, both through training in Togo, and through specialization courses in Italy. With the common goal of being able to create a medical school that would represent a revolution in the health field for the African country.

Plaque detector evaluation to improve the quality of domiciliary oral hygiene

M. Caburlotto, S. Piovani, J. Martin, A. Zuccon, A. De Stefani, S. Mazzoleni

BACKGROUND: Dental plaque is difficult to be identified during the domiciliary oral hygiene, so the dentist or dental hygienist can promote an oral prophylaxis at planned intervals. The domiciliary oral hygiene is an essential aspect in order to remove the dental plaque and to

avoid decay development and periodontal disease. A correct domiciliary hygiene can preserve teeth and periodontal tissue health. An accurate evaluation of plaque sites is essential to prevent the accumulation. The purpose of this study is to assess the effectiveness of domiciliary plaque detector, which would allow the patient to recognize sites with the plaque accumulation, in order to improve the quality of daily oral hygiene.

METHODS: The clinical trial was conducted among 26 patients, without orthodontic devices or prosthetic rehabilitation, with at least 20 natural teeth. A control group was not evaluated in the study. Before the clinical evaluation, all the patients received a professional hygiene by a dental hygienist and a month later plaque and bleeding indexes were detected (T0) using the "Plaque Control Record of O'Leary, Drake and Naylor, 1972", and the "Bleeding Index of Ainamo & Bay,1975". After the use of a two-tone liquid detector Mira-2-Ton® (Hager & Werken GmbH & Co. KG) with food dye inside (C45010 and C42090) the plaque and bleeding indexes were evaluated. Each tooth was divided into six sections and a percentage value was obtained by dividing the dental areas covered by the plaque and the number of total dental areas. The same procedure was applied for the bleeding index. Patients were requested to use plaque tablets during the domiciliary oral hygiene once a week for the following month. They had to brush their teeth, chew the tablet for a minute, rinse and brush another time the teeth to remove colour residues. A month later plaque and bleeding index were evaluated by the dental hygienist (T1). The data collected for each patient at T0 and T1 were compared.

RESULTS: The data were processed through the SPSS Statistics® program. The quantitative variables were synthesized through averages and standard deviations and a t-Student test was performed. A p-value lower than 0.05 was considered statistically significant. The difference between the measurements of the plaque index at T0 and T1 was statistically significant. Despite there was a decrease between the bleeding index at T0 and the bleeding index at T1, the difference wasn't statistically significant.

CONCLUSIONS: The result of the study shows that the use of plaque detectors improves the domiciliary oral hygiene procedures in a plaque reduction and periodontal tissue health improvement.

PROTESI

Mechanical characterization of uni-directional vs. multi-directional carbon fiber frameworks for dental implant applications

L. Repetto ¹, P. Pesce ¹, F. Barberis ², P. Pera ¹, A. Lagazzo ², M. Menini ¹

¹Implant and Prosthetic Dentistry Unit, Department of Surgical Sciences (DISC), University of Genoa, Ospedale S. Martino, Genoa, Italy; ²Department of Civil, Chemical and Environmental Engineering, University of Genoa, Genoa, Italy

BACKGROUND: The aim of the present study was to investigate the mechanical characteristics of a unidirectional carbon fiber-reinforced composite (UF) to be used for dental implant frameworks and to compare them with those provided by multidirectional carbon fiber-reinforced composite (IF).

METHODS: 7 identical UF beam samples were manufactured with standard dimensions (70x5x3 mm) by Micro Medica s.r.l., following their Bio Carbon Bridge Protocol. A microscopic analysis was performed using Nikon® Eclipse LV100 microscope (Nikon Instruments Europe BV, Amsterdam, Netherlands). The magnifications used were 50×, 100×, 200× and 500×. The transversal sections of the samples were analyzed using two digital microscopes perpendicularly positioned (one oriented along the vertical axis of the samples, while the other one along their horizontal axis). Pictures were elaborated using Dinocapture software (Dinolite, New Taipei City, Taiwan). An experimental Complex Modulus apparatus, developed at the Department of Civil, Chemical and Environmental Engineering of the University of Genoa (Italy), was used to perform a non-destructive mechanical test in order to evaluate dynamic elastic modulus. Classic destructive stress-strain tests were performed using an Instron-like machine (Zwick Roel ProLine Z010, Zwick Roell Italia Srl, Genoa, Italy) in order to evaluate static elastic modulus.

Wettability was evaluated measuring the contact angle of deperated water small drops brought into contact with the solid surface of the samples through a precision pipette.

The outcomes were compared with those of 6 IF samples tested following the same protocol – data reported in Menini M et al. 2017.

RESULTS: UF samples presented mean values of 107.6 GPa and 53.1 GPa respectively for dynamic and static modulus, whereas IF ones presented a mean dynamic modulus of 92.2 GPa and a static modulus of 84.5 GPa. UF contact angles presented mean values of 94.2° after five seconds, 90.1° after one minute and 82.5° after three minutes; such values are similar to the IF ones.

CONCLUSIONS: According to the present results, unidirectional carbon fiber-reinforced composite appears suitable for the fabrication of frameworks for implant-supported full-arch dentures. Dynamic elastic modulus was higher for UF, while

static elastic modulus was higher for IF. However in a clinical evaluation, longer carbon fibers can be placed in a UF framework compared to the ones placed in an IF framework, which needs a cutting-fabric technique, and the use of longer fibers probably allows better stress dissipation.

Further research is needed to evaluate the clinical significance of such differences.

Screw-retained versus cemented provisional prosthesis on implants: evaluation of per-implant tissues health. Pilot study

G. Gastaldi, F. Bova, F. Manazza, F. Cattoni, E. F. Gherlone
Università Vita-Salute San Raffaele, Milan, Italy

BACKGROUND: Implant-prosthetic techniques result in a high long-term survival rate, which in scientific literature reaches about 98%. This result depends on mechanical and material and microbiological factors, which are related to the absence of inflammatory phenomena in the per-implant tissues that provide implant stability through osteointegration. An important aspect for the outcome of the implant-supported rehabilitation is a correct implementation of the prosthesis, as early as the provisional phase. In this first phase of functional load, the clinician can choose between a screwed-retained or a cemented solution. To evaluate if at 4 months from the functional load the temporary type of prosthesis can be related to the health status of the peri-implant tissues.

METHODS: 40 patients were evaluated: 20 patients rehabilitated with cemented provisional prosthesis on 27 implants and 20 patients with cement solution on 31 implants. In these subjects, appropriate clinical parameters were observed to describe at 4 months from the functional load, the state of health of per-implant tissues: probing depth, bleeding on probing, plaque accumulation. At 4 months, clinical stability tests of the provisional restorations and a radiologic control were also performed. The collected data were then analyzed with an inferential and descriptive statistical method to investigate if there was any correlation with the type of provisional used.

RESULTS: Within the limits of the sample taken in exam, the data collected and analyzed by applying the Chi-square test and the Manova Test did not allow to reveal any significant correlation between the type of provisional restoration and the health status of per-implant tissues ($p > 0.05$). Within the two observed groups, the incidence of mechanical complications, as partial deconstruction of the prosthesis, is also not correlatable. As regards to the marginal bone levels, mean values result very close to each other in both groups: 0,3906 mm (s.d. 0,0364) in the case of the cemented prosthesis and 0,3885 mm (s.d. 0,0284) in the case of the screwed prosthesis. **CONCLUSIONS:** The comparison between the two methods

does not show any correlation between the type of provisional, screwed or cemented, and the health of per-implant tissues, according to the parameters that have been taken into account for this study. In the absence of statistically significant correlations, the clinical observations suggest, within the limits of a pilot study, that both the observance of precise surgical and prosthetic protocols, and a home and professional effective management of oral hygiene in patients rehabilitated by implant-prosthetic solutions represent an effective method for the maintenance of the health of per-implant tissues when provisional prosthesis is under functional load.

Margin relocation in cavities restored with CAD/CAM lithium silicate endocrowns: load to fracture analysis

D. Angerame ¹, M. De Biasi ¹, M. Moratti ², M. Lenhardt ¹, G. Marchesi ¹

¹Clinical Department of Medical Science, Surgery and Health, University of Trieste, Trieste, Italy; ²Private Practice, Gorizia, Italy

BACKGROUND: To assess the resistance to fracture of CAD/CAM lithium silicate endocrowns luted on maxillary molars with or without the margin relocation with flowable composite in a proximal box simulating a deep defect.

METHODS: Sixteen sound maxillary third molars were selected from a pool of freshly extracted teeth and randomly divided into two experimental groups of eight elements each. The teeth were horizontally cut with a cylindrical diamond bur 2 mm above the cemento-enamel junction and were subjected to standardized preparation to receive an endocrown restoration. After the preparation of the endodontic access cavity, the teeth were endodontically treated with nickel-titanium instruments (Mtwo, Sweden & Martina) and the canals filled with the continuous wave of condensation technique. In the control group, no further preparation was carried out. The canal orifices and the undercuts of the access cavity were sealed with a flowable composite (AP+ flow, Sweden & Martina) after standard self-etch adhesive procedures (Clearfil SE, Kuraray). In the experimental group, a 4 mm-wide box was prepared 2 mm below the cemento-enamel junction and the margin relocated with the flowable composite. The prepared teeth were scanned to obtain zirconia-reinforced lithium silicate endocrown restorations (Celtra DUO, Dentsply) with the Cerec 3 CAD/CAM system (Dentsply Sirona). The milled endocrowns were luted with self-adhesive cement (RelyX Unicem 2, 3M ESPE). The restored teeth were subjected to thermomechanical aging with a chewing simulator and loaded to fracture with a universal testing machine. The type of failure was classified as crack/fracture and above/below the cemento-enamel junction. The difference in maximum load to fracture between the groups was evaluated with an independent sample t-test, while the fracture pattern was compared with a chi-squared test ($p < 0.05$).

RESULTS: The mean value of maximum load to fracture was 1459.12±308.24 N and 1298.67±306.52 N in the control and margin relocation group, respectively. All the restored teeth experienced fractures, which were more frequently localized below the cemento-enamel junction. The statistical analysis did not point out significant differences between the groups in terms of both resistance to load and fracture pattern.

CONCLUSIONS: Zirconia-reinforced lithium silicate endocrown restorations showed high values of resistance to fracture, which exceeded the maximum force that can be applied

during the masticatory function. The margin relocation in an interproximal box with flowable composite did not negatively affect the maximum load to fracture or the modality of restoration failure. Further studies are needed to test the clinical performance of lithium silicate endocrowns with margin relocation.

Effect of combined therapy : postural and prosthetic in the adult

BACKGROUND: To evaluate the effect on the articular movement in the older patients, after combined treatment : postural and prosthetic

METHODS: The old patient in general has double problem: postural problem with a pathologic position of body on the space and loss of teeth (in general posterior teeth) and consequential change of position of mandible on the space and the pathologic position of head. The postural therapy involves the use of foot soles that have at the center of the foot plan a stack that reprograms the posture of the patient. The operator then inserts thicknesses under the foot plan to eliminate muscular interferences. Oral level apply occlusal evaluation to eliminate occlusal interferences of the head and neck.

RESULTS: Immediately after application of the foot soles and the occlusal elevation, the patient can better flex his torso forward and rotate his neck better. Distance he changes in the plantar contact. The results of the treatment are immediately in the improvement of the patient's flexibility and the rotation of the head. Obviously to have a stabilization it is necessary to wear the soles at least 12/18 months. (also because the patient is adult). At occlusal level, such a massive and immediate increase in the vertical size had been made (usually the technician recreate the usual occlusion of the patient by restoring in practice the pathological occlusion than was created over time)

CONCLUSIONS: After therapy the patient improves articular movement of body and improves its posture

An aesthetic and neuro-muscular balanced implant-prosthetics rehabilitation achieved with the provisional restoration and a functional activator: a case report

E. Simeoni, J. Lai, P. Bursi, E. Sartori, L. Tomasi, S. Orlandi, G. Lombardo, L. Malchiodi

Department of Surgery, Dentistry, Pediatrics and Gynecology, Università degli Studi di Verona, Verona, Italy

BACKGROUND: The aim of the present study was to verify the achievement of occlusal stability obtained using the wax up, the provisional restoration and a functional activator.

METHODS: A sixty-two-year-old woman with an inadequate implant prosthetics and signs and symptoms of temporomandibular disorder has been selected for a complete new functional and aesthetic prosthetic rehabilitation. Firstly, the patient was radiographed and photographed with the purpose of making a meticulous investigation as a basis for treatment planning. After a thorough skeletal and morphological analysis (respectively assessment of palatal and mandibular asymmetries and evaluation of facial asymmetry) the traditional prosthetics criteria consisting of face bow, bite registration waxes and articulator were followed to produce an appropriate wax up that led to a provisional restoration. Measuring the

ABSTRACT

distance between 1.4 and 2.4 on the provisional restoration, an Equilibrator O.S.A. device (equilibrator designed by Ovidi, Santi, and Aprile for Eptamed SRL; Cesena, Italy; www.eptamed.com) was delivered to the patient in order to check the occlusion and balance the function of the muscles around the temporo-mandibular jaws by the thickness and consistency of the functional activator itself. The patient underwent radiographic checks. Following the verification of aesthetics and occlusal stability achieved with the functional activator and the provisional restoration, final dental impressions were recorded and the definitive restoration realized. The definitive restoration has been manufactured in respect of late occlusal stability reached by the patient through the functional activator and provisional restoration. Both the prosthetic and dental volumes settled by the provisional restoration were considered in order to optimise the support of the peri-oral tissues.

RESULTS: A satisfying functional and aesthetic result has been achieved. No biological and mechanical complications were recorded. On the contrary, forces generated while using the activator resulted in a complex reduction of muscular tension in the area around the temporal-mandibular jaws. The patient referred improvement of symptoms relatively to her previous temporo-mandibular disorder. No clinical signs of the disorder were noticeable either. Occlusal stability was maintained throughout further periodical recalls every 6 months for 5 years. Moreover, the patient's desire for a better and more harmonious aesthetics was fulfilled.

CONCLUSIONS: Not only was the occlusal stability attained, but also a neuromuscular balance was promoted on the basis of a preparatory study which includes traditional prosthetic criteria, a correct and precise management of the provisional restoration and a proper application of the recently introduced functional activator.

No-preparation ceramic veneers: a systematic review

F. Zarone ¹, R. Leone ², M.I. Di Mauro ³, M. Ferrari ⁴, R. Sorrentino ⁵

¹Department of Neurosciences, Reproductive and Odontostomatological Sciences, University "Federico II" of Naples, Naples, Italy; ²Department of Neurosciences, Reproductive and Odontostomatological Sciences, University "Federico II" of Naples, Naples, Italy; ³Department of Neurosciences, Reproductive and Odontostomatological Sciences, University "Federico II" of Naples, Naples, Italy; ⁴Department of Medical Biotechnologies, Division of Fixed Prosthodontics, University of Siena, Siena, Italy; ⁵Department of Neurosciences, Reproductive and Odontostomatological Sciences, University "Federico II" of Naples, Naples, Italy

BACKGROUND: The main objective of the present systematic review was to investigate the validation of no-preparation ceramic veneers as restorations.

METHODS: A systematic search for papers published between 1980 and 2017 was performed, since particular attention to a non-invasive approach in restorative dentistry began to be paid in the 80s; only articles written in English were considered. The search strategy was based on a literature review of papers available in electronic databases: Pubmed, Evidence-Based Dentistry, BMJ Clinical Evidence, Embase, Dynamad and OpenGrey were analyzed in order to identify randomized controlled clinical trials evaluating the

clinical outcomes of no-preparation ceramic veneers; manual researches were performed as well. The systematic review was structured following the PRISMA guidelines. The eligibility of investigations was assessed according to the P.I.C.O. and the quality assessment of the included studies was carried out using the criteria reported by the Cochrane Handbook for Systematic Reviews of Interventions.

RESULTS: Database search produced 2551 records. After removal of duplicates and a careful examination of titles and abstracts, the reviewers excluded all of the studies. Manual and grey literature did not yield any other relevant article. The main reasons for exclusion were: not the topic of interest, non-RCTs and studies without control.

CONCLUSIONS: Due to the lack of data, at the moment achieving a definitive clinical statement regarding the "no-prep" technique is not possible. Further clinical studies are needed to assess the effectiveness of no-preparation ceramic veneers. No-prep veneers can be considered as conservative treatments which should be carefully recommended and request a cautious selection of cases. Although prepless and minimally invasive veneers are sometimes described as simplified techniques, they actually represent operator-sensitive procedures, due to the frequent difficulty in obtaining a fairly natural and harmonic shape, avoiding detrimental and unaesthetic overhangs. Further controlled clinical researches are necessary to clearly identify predictable clinical protocols and evaluate the long-term outcomes of such restorations.

Approach to total prosthetic rehabilitation on implants: review of the literature and presentation of the innovative technique ex assembly system

C. Pinna, F. Mulas, M. Deias, E. Spinaz

Department of Surgical Sciences, Division of Sport Dentistry, University of Cagliari, Cagliari, Italy

BACKGROUND: The current dental market is looking for techniques that facilitate the design and production of prosthetic structures for dental rehabilitations which very often concern edentulous patients. With increasing frequency, patients require implant-supported rehabilitations and today the clinician has the possibility to use different surgical techniques. In this research work, space is given to the type of materials that can be used for the manufacture of total dental prostheses on implant support and how the production technique influences the success of the product. The work consists in the presentation of a dental assembly technique on CAD-CAM method called EXE Assembly System and how the technique allows the clinician to choose among the different prosthetic materials available on the market previously tested in the laboratory.

METHODS: In this study it is presented the protocol for the design of a prosthetic product according to the EXE Assembly System technique in its CAD component using Dws and CAM software through the use of software for Hyperdent cutting strategies and machining using Roland DWX-51D. Laboratory tests have been performed on the latest generation materials found in the literature and applicable to the EXE method, specifically, specimens of glass fiber, PEEK, reinforced PEEK and PMMA have been tested. Bending and traction tests were performed using the Graphwork2 software and the Galdabini sun 500 electromechanical tensometer.

RESULTS: The result shows that the latest generation materials are compatible with the manufacture of dental prostheses and can be used successfully in the aforementioned technique. From the bending tests carried out, the material with the highest breaking strength turns out to be the glass fiber. The two technopolymers based on PEEK are comparable in terms of resistance.

CONCLUSIONS: Concluding: the EXE Assembly System technique not only allows an unlimited reproducibility of the prosthetic product but allows its production in different metal-free materials, without jeopardizing its structure or fidelity.

Masticatory performance of older patients: impact of prosthodontic fixed rehabilitation

E. Coccia¹, L. Aquilanti¹, A. Santarelli¹, A. Vignini², M. Mascitti¹, G. Rappelli¹

¹Dipartimento di Scienze Cliniche Specialistiche ed Odontostomatologiche, Sezione di Scienze Odontostomatologiche; ²Dipartimento di Scienze Cliniche Specialistiche ed Odontostomatologiche, Sezione di Biochimica, Biologia e Fisica

BACKGROUND: Chewing ability is closely related to the number and distribution of teeth remaining: it seems to be satisfactory with more than or equal to 20 teeth. Especially in elderly, with a decreased number of teeth, a reduction in chewing function can contribute to changes in food choices and ultimately impact on overall nutritional status. Patients treated with fixed prostheses have better quality of life and better masticatory function than patients treated with removable prostheses. Nowadays an increasing number of older adults retain their natural teeth for longer in life. However few evidence about how teeth should be saved and restored to guarantee satisfactory oral functionality is available in literature. The aim of this study is to verify the impact of the fixed prosthetic rehabilitation for partially dentate older patients on masticatory performance.

METHODS: 40 subjects over 65 years old, all having more than 20 teeth, were visited the dental clinic of the Polytechnic University of Marche. For each patient age, sex, number of teeth in the mouth, presence of fixed prosthesis, presence of partial and/or complete removable prosthesis were recorded. Patients were divided in two groups: 20 subjects showing fixed prosthodontics (group A) and 20 with without fixed prosthetic rehabilitation (group B). Presence of removable rehabilitation was an exclusion criteria. In all 40 patients masticatory efficiency was assessed with a colour mixing test, using two pieces of chewing gum of different colours. In order to calculate the mixed fraction (mixed pixel/2 total pixel), digital images were realised and analysed with dedicated software.

RESULTS: In the group A the mean number of teeth was 22,95 among which the mean number of fixed prosthodontics (crown and bridge elements) is 5,5. The masticatory performance was 0,2397. In the group B the mean number of teeth was 26,7. The masticatory performance was 0,2403. No statistical difference was found between the masticatory efficiency of two groups.

CONCLUSIONS: These results indicate that, in cases of few number of prosthetic elements, fixed rehabilitation is equivalent to natural teeth in terms of chewing capacity for older patients. Therefore, treatment plan should focus on the preservation and rehabilitation of the strategic parts of the dental arch that are critical for adequate oral function.

Telescopic overdenture using innovative metal free TRINIA[®] material: a case report

BACKGROUND: In edentulous cases, Telescopic Overdenture on dental implants, could be an efficient and valiant alternative to traditional dentures, which are usually considered unsatisfying by the patient, since the extent of tissue coverage and their lack of stability (particularly in the lower arch)¹. It also facilitates the maintenance of oral hygiene, being removable, and increases the retention of the prosthesis. TRINIA[®] material provides for the aesthetic and resilience features.

CASE REPORTS: A 70 years old, complete edentulous female patient, was referred to our clinical department with the chief complaint of difficulty in masticatory functions and high aesthetics expectation. After medical and radiological 3D investigations, four Bicon[®] short implant (1 out of 8 was of 5mm, the rest were of 8mm length) were inserted in each dental arch, a split crest technique was performed where required. The choice of short implants comply with the necessity of any bone grafting procedure, reducing the waiting time of functional loading required. After four months, impressions and diagnostic wax rim, were taken and a conometric connection was chosen for the realization of a removable telescopic dentures. This kind of prosthesis ensure better stability, due to its better distribution of transferred compressive forces which are converted into tensile, reducing movements that dislodge the denture and forces that increase residual ridge resorption². Moreover, TRINIA[®] framework (a CAD-CAM made fiber resin) was used for its features of being biocompatible, lightweight, aesthetic, durable and resilient/flexible, allowing up to 21mm distal cantilever. Policeramic composite material was hence used for final restoration, thus allowing within the aesthetic, a better attitude toward stress loading forces and parafunctional cycles³. This particular prosthesis enables patients to better follow hygienic instructions and reduces mucosal tissues compression compared to the traditional dentures.

CONCLUSIONS: Conometric coupling connection, improved with the innovative features of TRINIA[®] and policeramic composite restorative materials, allows Clinicians to offer to edentulous patient a valid and more suitable alternative option to traditional removable dentures. Improving both aesthetic, stability and tissue comfort as referred by patients⁵. Moreover, the use of short implants allows to expand the portion of patients that meet eligible surgical criteria with no need of additional bone grafting.

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ABSTRACT

The snap-on smile: a new clinical option

M. Iervolino, G. Leonetti, R. Leone, R. Sorrentino

Department of Neuroscience, Reproductive Sciences and Dentistry, University of Naples "Federico II", Dental Prosthesis Area, Naples, Italy

BACKGROUND: The Snap-On Smile (SOS) is a removable, multi-purpose appliance that requires no preparation or altering of tooth structure, no injections and no adhesives. Its action is reversible. It is made of thermoplastic acetal, which is a poly-oxy-methylene based material. It is very strong, flexible, resists wear and fracturing. The SOS material can be as thin as 0.5 mm and maintains its strength and is highly resistant to odors and stains. It does not impinge on gingival tissue, it does not cover the palate. Retention is completely tooth-borne, it literally snaps on at the third gingival of teeth because of the material's unique memory properties. Clinical indications are: cosmetic smile enhancement; removable partial denture; implant provisional; raising and restoring vertical dimension; patients with parafunctional habits; as a transitional, removable new smile before the patient commits to a permanent prosthodontic treatment. Depending on the treatment objective, the occlusal design of Snap-on Smile can be: 1) where it is necessary to increase or restore the vertical dimension, the occlusal surfaces of the posterior teeth will be covered by the device; 2) if the occlusion of the patient is to be maintained, the occlusal surfaces of the posterior teeth will not be covered by the device; 3) in the case of a deep bite, the palatal surfaces of the central incisors will also be uncovered by the device. Contraindications are: severe periodontal cases, edentulous, severe class III bites, cantilever distal extensions >22mm, edentulous spans > 40mm. The aim of this study is to describe some clinical cases in which the SOS was used for several reasons. In the first case, the SOS was used in a dystonic patient, whose illness led to the abrasion of all his teeth. In this case, no traditional procedure can be performed due to the extreme difficulty of the various operating phases and the poor predictability of the long-term results. The SOS represented the only possible alternative to restore the smile to this patient, for its easy manufacture and insertion. Other cases show patients with abraded teeth for various reasons, in which the SOS has been used both to obtain an increase in the vertical dimension, and as an aesthetic and functional guide for the final prosthetic treatment.

METHODS: Using a polyvinylsiloxane or polyether material or a digital scanner, an impression was taken of the patient's dental arches, as well as a bite registration. Next, the clinician selected the shade and shape of the SOS. The impressions were sent to the laboratory where the appliance was made. The patients were instructed to properly insert and remove the appliance, and to perform the minimal routine maintenance.

RESULTS: from the review of the clinical cases, the Snap-On Smile can be a valid alternative to the traditional procedures, it can be used in the diagnostic phase, in the phase of provisioning and in the definitive phase of a treatment. **CONCLUSIONS:** The Snap-On Smile represents another clinical option in the range of prosthetic treatments. In some cases Snap-On Smile is considered as a medium/long-term solution; in others it is an intermediate cosmetic device that provides patients with a "trial run" with regard to available and appropriate permanent options.

The functional implant prosthodontic score (FIPS) as an objective and reproducible tool for implant and prosthetic assessments

S. Sgroi, R. Sorrentino, M.I. Di Mauro, F. Zarone

Dipartimento di Neuroscienze, Scienze Riproduttive e Odontostomatologiche, Università degli Studi "Federico II" di Napoli, Area di Protesi Dentaria, Naples, Italy

BACKGROUND: The aim of this study was to investigate the reproducibility and observer variability of the Functional Implant Prosthodontic Score (FIPS) and, secondly, to validate the clinical application of the FIPS for objective outcome evaluation of implant crowns, considering different levels of dental expertise for intra- and inter-examiner analysis and its potential influence. The following null hypothesis was tested: there was no association between the participants' expertise and FIPS outcome.

METHODS: The study setting and the material submitted to all the enrolled subjects in this research are part of a previously published study. According to the participants' level of dental experience, a total of 62 examiners, were divided into 2 groups, representing undergraduate dental students and skilled dentists. All examiners of this study were calibrated before completing the questionnaires in order to avoid overconfidence bias. Including clinical and radiographic examinations, the 5 FIPS-variables defined for calculation of total FIPS score were applied to a series of 10 sample cases for an objective outcome validation and to assess the implant restorations. The FIPS evaluations of the ten sample cases, each showing one implant-supported single crown for premolar and molar replacements, were performed by the different groups of examiners (group A: n = 31 undergraduate dental students; group B: n = 31 skilled dentists). Furthermore, all the participants carried out 2 FIPS ratings for each sample case with a break of 2 days between the compilations of the experimental questionnaires (round 1 and round 2). For the second round of evaluation, the sequence of cases was reversed to reduce any kind of possible bias.

RESULTS: The mean values of the total FIPS scores of all participants were 5,96 +/- 0,08 for round 1 and 5,99 +/- 0,06 for round 2. The mean age of all examiners was 35 years (min 23 years – max 68 years), while the mean age for the undergraduates and for skilled dentists were respectively 25 years and 45 years. The mean value of dental experience for the Group B was 20 years (min 2 years – max 42 years). K Cohen calculation for the defined five FIPS-variables pointed out high correlation for both groups high correlation between the evaluations in round 1 and round 2. There were statistically no significant differences in relation to the different variables and there is a very good degree of agreement between the values. For both groups, calculations pointed out strong correlation for all the five FIPS-variables between the 2 time-points applying FIPS. The inter-examiners analysis showed very congruent results for reproducibility testing of FIPS. The intra-examiners analysis demonstrated no significant differences between round 1 and round 2. The analysis of homogeneity in relation to the five FIPS's different variables showed congruent values, so FIPS can be considered as a potential valid and reliable instrument.

CONCLUSIONS: The null hypothesis was accepted, since there was no association between the participants' expertise and FIPS outcomes. Independently from the dental experience level, the FIPS-variables seem to be valid parameters for standardized evaluations of implant reconstruction in posterior sites. The findings of this study confirm the poten-

approval was obtained a priori. Thirty restorations were made with LiSi Press (Group 1, GC) and the other 30 using IPS e.max (Group 2, Ivoclar). Preparations provided at least 0.5-1 mm space at the margin and 1.0-1.5 mm occlusally. Margins were mainly located in enamel (only interproximal box might have cervical margin on dentin-cementum). At least one cusp was covered. All teeth were tested for vitality. Test stimuli and assessment: Before applying the adhesive material, pain was measured was performed utilizing a simple pain scale based on the response method. A score of 0 was defined as no pain, 1-4 as mild sensitivity (which was provoked by the dentist's air blast), and 5-10 as strong sensitivity (which was spontaneously reported by the patient during drinking and eating). Dentin was sealed using the adhesive and the deepest part of the cavity was built up with a proprietary flowable resin composite (G-aenial Universal Flo, GC and Tetric Flow, Ivoclar, respectively) and the cervical margin was relocation when needed. After preparation, an impression of the prepared tooth was taken and sent to the laboratory. In the lab, the disilicate crowns were made strictly following manufacturers' instruc-

tions. In Group 1, LiSi onlays were luted with G-Premio Bond in combination with G-CEM LinkForce resin cement after sandblasting, etching with 10% Hydrofluoric acid for 30 seconds and application of Resin Primer for 1 minute. In Group 2, IPS e.max onlays were luted with AdheSE Universal in combination with Multilink Sprint after sandblasting, etching with 10% hydrofluoric acid for 30 seconds and application of Monobond Plus for 1 minute. The status of the gingival tissues adjacent to the test sites was observed at baseline and at each recall. Patients were recalled at our department for testing post-operative sensitivity after 2 weeks, 6 months, 1 and 2 years.

RESULTS: There were no statistically significant differences even though no sensitivity was reported in Group 1 at the 24-month recall, while in Group 2, mild sensitivity in two teeth was reported.

CONCLUSIONS: When lithium disilicate crowns were luted in combination with their proprietary bonding-luting materials, there was almost no post-operative sensitivity after 24 months of clinical service.