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**Aim:** The aim of the study was to investigate whether or not there is an association between generalized joint hypermobility (measured using the Beighton score) and temporomandibular laxity as within joint disk displacement. Generalized joint hypermobility (GJH) is a disorder characterized by excessive joint movement. The evaluation test and criteria established by Beighton have been used for many studies of hypermobility. The criteria are as follows: 1) Passive hyperextension greater than 90° of the fifth finger; 2). Apposition of the thumb to the volar aspect of the forearm; 3) Hyperextension of the elbow greater than 10°; 4) Hyperextension of the knee greater than 10°; 5) Trunk flexion, placing the palms of the hands on the floor with the knees straight.

**Methods:** This Review of English-language literature from 1990 to February 2019 was conducted on Pubmed (Medline), Lilacs and Scopus with the words generalized joint hypermobility, generalized joint laxity, temporomandibular disorders and ligamentous laxity to identify all articles reporting on the prevalence of generalized joint hypermobility and its correlation with temporomandibular joint as with temporomandibular disorders. We finally selected 11 articles.

**Results:** From early 1,179 articles we excluded 92 innot-English language, 100 without abstract, 175 experimental experiences on animals or in vitro, 540 not inherent our topic, we finally selected 11 articles. From a study on over 6,022 children, the prevalence of generalized joint hypermobility (defined as a Beighton score of >4 [i.e., >4 joints affected]) in girls and boys age 13.8 years was 27.5% and 10.6%, respectively. Fortyfive percent of girls and 29% of boys had hypermobile fingers. Another study, on 15-16 years children, observed that the prevalence of GJH is 43%, while that of temporomandibular joint hypermobility is 27,3%, whit a significant reduction of it incidence in the second group. In particular, only three articles analysed the possible relation between GJH, temporomandibular joint laxity and temporomandibular disorders, considering all the possible forms of them: closed-lock, open-lock, articular click, articular pain and/or muscular pain. The frequencies of joint noise and deviation during mouth opening were greater in the hypermobility group (52.9% vs. 38.5% and 76.5% vs. 50%, respectively), but without statistical significance; and none study evidenced a clear correlation between joint hypermobility and articular click.

**Conclusion:** This review confirms a clear correlation between generalized joint hypermobility and temporomandibular joint laxity, but even if a correlation exist between temporomandibular joint hypermobility and changes in occlusion, major mouth opening or joint noise during opening; not a clear relation exists between temporomandibular joint laxity and disk displacement.

## Reliability and accuracy of cephalometric analysis in cone-beam computed tomography. a review

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**Aim:** The aim of this study is to evaluate the reproducibility and reliability of cephalometric landmarks with three-dimensional (3D) cone-beam computed tomography (CBCT) in comparison with conventional two-dimensional (2D) cephalometric radiography.

**Methods:** The research was made on Pubmed using these keywords: cefalometric AND landmarks AND cbct AND 3D AND reliability. The inclusion criterias used were:

- methodological reliability and reproducibility studies
  - studies using CBCT
  - articles with a sample size at least of 12 cases
  - studies in human or dry skulls
  - studies including both skeletal and dental landmarks
- The exclusion criterias used were:
- studies using only conventional radiographies or 2D images generated from CBCT
  - studies in animals
  - case reports and author opinion articles
  - studies with a number of observers inferior to 3

**Results:** Electronic database searches provided 21 articles; excluding repetition the number resulting was 18, of which a final total of 8 titles satisfied the selection criteria and were included in this review. Gribel et al. (Angle Orthod. 2011) in this article investigated the accuracy of craniometric measurements made on lateral cephalograms versus CBCT images. The conclusion of their study is that CBCT craniometric measurements are accurate and can be used for craniofacial analysis. In addition, lateral cephalograms have some limitations due to distorted images. De Oliveira et al. (Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009) evaluated reliability in 3D landmark identification using CBCT between intra-observer and inter-observer. They found that following a protocol for operator training and calibration offers consistent and reproducible data. Lisboa Cde O. et al. (J Appl Oral Sci. 2015) in this systematic review found an higher reliability of the dental landmarks and the median sagittal line, while the landmarks of the curve surfaces such as condyle, porion and the orbitale presented a lower level of faithfulness. The author found important variations according to the parameters of image acquisition, software, types of visualization and in the anatomic references marked. In their research, Neiva MB. et al. (Angle Orthod. 2015)



investigated the reliability of landmarks identification using two different visualization techniques: 3D reconstruction and multiplanar views. The author found a better reproducibility of cephalometric landmarks using CBCT in multiplanar views than in 3D image reconstructions. Furthermore, the points with lower reliability were the condyle, ramus point and sella turcica, while the most reliable are the ones found on the midsagittal plane.

**Conclusion:** 2D conventional images may have some issues with distortion and magnification that can lead to cephalometric measurements inaccuracy. Cephalometric landmarks and measurements on 3D CBCT are reliable and can possibly be used as a quantitative orthodontic diagnostic tool. The midsagittal plane and the dental landmarks demonstrated the highest reliability. Landmarks with the lowest reliability included those marked on the condyle and other anatomic structures with prominent curvatures.

### Evaluation of tooth size in non-syndromic unilateral and bilateral cleft lip and palate patients: a case-control study

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**Aim:** Cleft lip and palate is the most common craniofacial aberration, with a general prevalence of 7.94 every 10.000 births. Those patients display a higher rate of various dental anomalies such as: tooth agenesis, microdontia, eruption and root development anomalies. Between those anomalies tooth agenesis is the most frequent with a range of prevalence varying from 50% up to 56.9%, while microdontia is attested in percentage from 36.8% to 69.6%. Literature point out a relationship between tooth agenesis and reduction of mesio-distal dimension of tooth upon the general population, in particular a study of Mirabella et Al. demonstrated how patients with missing upper lateral incisor presented a lowered tooth size compared to a control group without agenesis. The knowledge of dental anomalies in patients with cleft lip and palate is important in order to plan an adequate multidisciplinary treatment. The aim of this study was to evaluate the tooth size in patients with cleft lip and palate presenting at least one upper lateral incisor compared with a first control group of general orthodontic patients without agenesis and a second control group with at least one missing lateral incisor.

**Methods:** In this retrospective study, records of 30 cleft lip and palate patients recruited from the maxillo-facial surgery clinic of the San Bortolo Hospital of Vicenza, beyond 30 patients representing the control group of

general orthodontic patients from the Padua Dental Clinic and 40 patients with at least one missing lateral incisor treated by a freelance in Trento were collected and analyzed. Patients were selected according to the following inclusion criteria: no other syndromes, no previous teeth extractions, complete development of dentition (excluded secondo and third molars), and adequate orthodontic records composed of panoramic radiographs, cephalograms, and dental casts. Mesio-distal tooth size of all tooth excluded second and third molars has been measured on digital or plaster dental casts.

**Results:** Non-syndromic patients with at least one missing lateral incisor show a significant reduction of mesio-distal tooth size, especially of the contralateral upper lateral incisor and of the lower bicuspid. Tooth size in cleft lip and palate patients is similar to that of the control group of general orthodontic patients without tooth agenesis.

**Conclusions:** In this study cleft lip and palate patients don't have a reduction of tooth size dimension towards the general orthodontic population.

Lowered tooth size is a characteristic pattern of patients with missing lateral incisors and not of cleft lip and palate patients.

### Upper airways 3D study before and after oral appliance therapy in Obstructive Sleep Apnoea

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**Aim:** Obstructive Sleep Apnoea Syndrome (OSAS) shows apnoea or hypopnea due to upper airways stenosis during sleep with its typical symptoms including snoring during sleep and excessive daytime sleepiness. Cone Beam Computed Tomography (CBCT) is useful to reach an accurate 3D volumetric analysis of upper airways. The Oral Appliances (OA) are considered to be an effective treatment for Obstructive Sleep Apnea Syndrome (OSAS). The aim is to detect morphological changes in upper airways using CBCT before and after oral appliance therapy.

**Methods:** The study included 30 patients (18 males and 12 females). They were diagnosed with OSAS using polysomnography (PSG). Some criteria has been applied to diagnose OSAS: an apnoea-hypopnoea index (AHI) of >5 per hour during sleep and pathological daytime sleepiness. The therapeutic effect of oral appliance was evaluated by using PSG