children

Review

Characteristics, Diagnosis and Treatment of Compound Odontoma Associated with Impacted Teeth

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Abstract: Compound odontoma is a malformation typical of young adults below the age of 20, with a slight preference for the male gender and the anterior region of the maxilla. Clinically asymptomatic, it can be detected during a radiological investigation in connection with the persistence of deciduous dental elements and the impaction of definitive ones. The treatment of choice is excisional surgery and recurrence is a rare event. The need for orthodontic therapy for impacted elements is usually not necessary because in most cases, odontomas are small, circumscribed lesions the size of a permanent tooth. In this article, the diagnostic and therapeutic surgical excision procedure is presented in three patients at developmental age with large compound odontomas associated with at least one retained canine, and in two of the cases, with serious transmigration to the impacted tooth elements.

Keywords: compound odontoma; odontoma; transmigration; impaction; developmental age; oral surgery

Citation: Mazur, M.; Di Giorgio, G.; Ndokaj, A.; Jedlinski, M.; Corridore, D.; Marasca, B.; Salucci, A.; Polimeni, A.; Ottolenghi, L.; Bossù, M.; et al. Characteristics, Diagnosis and Treatment of Compound Odontoma Associated with Impacted Teeth. *Children* **2022**, *9*, 1509. https://doi.org/10.3390/children9101509

Academic Editor: Massimo Corsalini

Received: 30 August 2022
Accepted: 29 September 2022
Published: 2 October 2022

1. Introduction

Odontomas are hamartomatous developmental malformations of the dental tissues [1]. According to the World Health Organization (WHO), a compound odontoma is defined as "a malformation in which all dental tissues are represented in a more orderly pattern than in the complex odontoma, so that the lesion contains many tooth-like structures. Most of these structures do not morphologically resemble the teeth in the normal dentition; however, enamel, dentin, cementum and pulp are arranged as in the normal tooth" [2,3].

Odontomas are developmental anomalies consequential to the growth of totally differentiated epithelial and mesenchymal cells that generate ameloblasts and odontoblasts [4]. These cells and tissues can look either normal or not fully developed in structure. The level of differentiation in the formed tissues can be variable, and both enamel, dentin, cementum, and pulp may be present within the compound odontoma [3]. The complex odontomas are characterized by non-descript masses of dental tissues, while compound odontomas by multiple, well-formed tooth-like structures [3].

Typically asymptomatic, they are revealed on routine radiographs or upon assessing the origin of delayed tooth eruption [1,5–8]. Radiographically, depending on the development stage, they may appear as radiolucent in the initial phase and as a radiopaque form at progressive stages [5]. The diagnosis is based on clinical examination and radiographic images, and following surgical removal, it must be further confirmed by histological examination. Differential diagnosis is made with all other ossified bone lesions, such as ossifying fibroma, odontoameloblastoma, ameloblastic fibroma or fibro odontoma, osteoma and fibrous dysplasia; or florid osseous dysplasia [5] to decide the most appropriate treatment [9].

Very rarely, the spontaneous eruption can occur with exposition within the oral cavity of the odontoma, and it may be associated with pain, localized inflammation, or infection with suppuration [6].

Odontomas can be diagnosed at any age and in any location of the oral cavity, but more frequently during the second decade of life, on average at 14.8 years [3]. Odontomas show an incidence of 22–67%, being the most common odontogenic tumours [6]. Males (59%) and the anterior maxilla (67%) are more frequently affected by odontomas [3,9].

Odontomas are commonly asymptomatic and constitute casual findings. Clinical signs may be delayed eruption and persistence of the deciduous teeth. In severe cases, infection or regional lymphadenopathy may be observed [9].

Management usually consists of surgery to prevent further complications with the permanent tooth eruption in the paediatric population [4,10], and the prognosis after treatment is favourable, with scant relapse [9].

Following surgical removal of the odontoma, orthodontic therapy is often not prescribed to reposition any impacted tooth elements [11]. In the great majority of cases, the removed odontoma is smaller than a tooth by size, and the impacted tooth is not highly deviated; if the root is still forming, it will manifest full potential to erupt. Radiological assessment of the developmental status of the impacted tooth root can be helpful in deciding which therapeutic choice to make on a case-by-case basis [11,12].

This article presents three clinical cases of patients at developmental age diagnosed with large compound odontomas, associated with the inclusion of at least one permanent canine and impacted teeth transmigration in two of the cases. The diagnostic process and surgical treatment of choice are described, in which the two transmigration cases led not only to the removal of the odontoma but also to the extraction of the impacted and transmigrated tooth elements. In all cases, histopathological diagnosis was performed and was compatible with compound odontoma.

Besides, literature searches of free text and MeSH terms were performed using PubMed and Google Scholar from 2000 to 2022. All searches were conducted using a combination of subject headings and free-text terms. The keywords used in the search strategy were as follows:

("compound odontoma" AND "complex odontoma") AND ("paediatric age" AND "children" OR "developmental age") AND ("tooth impaction" OR "impacted teeth" OR "impacted tooth" AND "tooth transmigration").

The aim of this review was to hightlight the anatomical, demographic, gender and dental parameters associated with complex and compound odontoma.

Inclusion criteria were as follows: (a) prospective studies; (b) retrospective studies; (c) case series; (d) in-vivo studies; (e) studies published in English, French, Polish and Albanian. These criteria have been broadly selected to be as sensitive as possible. The exclusion criteria were as follows: (a) in-vitro studies; (b) articles without statistical analysis; (c) abstracts and letters to the editor.

A manual search was also conducted to try to find other additional studies as well. Based on the inclusion criteria, two authors (MM and GDG) reviewed the titles and abstracts and selected the studies from the literature independently. The full text of each study was then read to decide whether it could be included or not. Disagreements in this case were set on by consensus between both authors or by discussion with another author (AN).

1.1. Case Number 1

A 14-year-old female patient, treated in our paediatric surgery unit in 2021 (Figures 1–4).

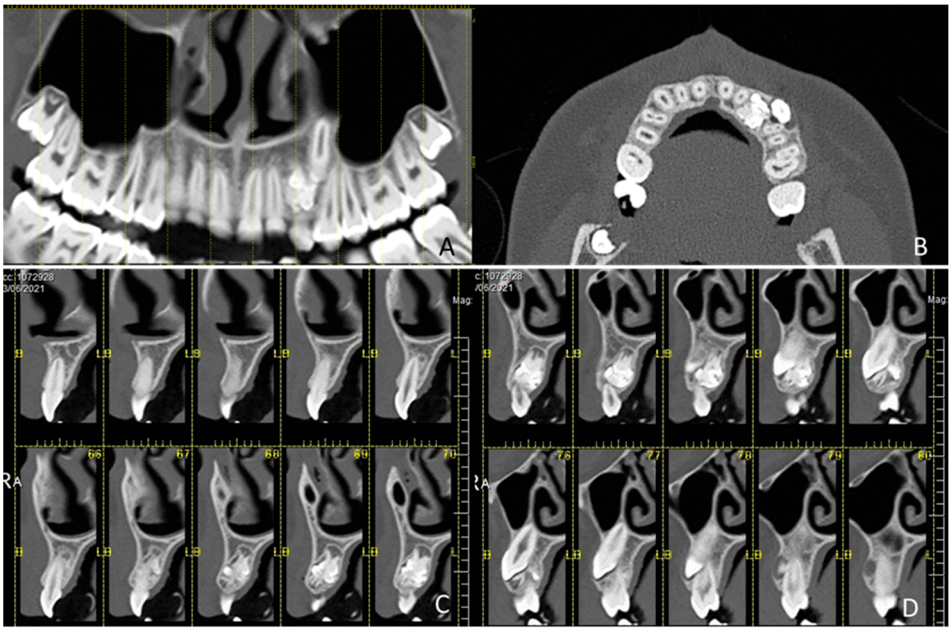

Figure 1. Series of images from cone beam computed tomography (CBCT). (**A**) Orthopanoramic CBCT view shows the persistence in the arch of the upper left deciduous canine 63 and the overlapping presence of a compound odontoma, which in its evolution blocked the eruption of the corresponding permanent canine; (**B**) A cross-section image highlights the permanent canine that has been displaced vestibular due to the presence of an odontoma that is palatal to the canine; (**C**,**D**) Parasagittal images that show that the odontoma completely occupies the entire thickness of the bone between the buccal and palatal cortex. Absence of bone trabeculae and displacement of the permanent canine towards the vestibulum.

Figure 2. Intra-oral photographic images at baseline. (**A**,**B**) Front and side view before surgery; (**C**,**D**) Detail in the lateral and occlusal view with a temporary prosthesis in place 23. An expansion of the bone cortex is visible in line with the odontoma and the permanent area of the canine.

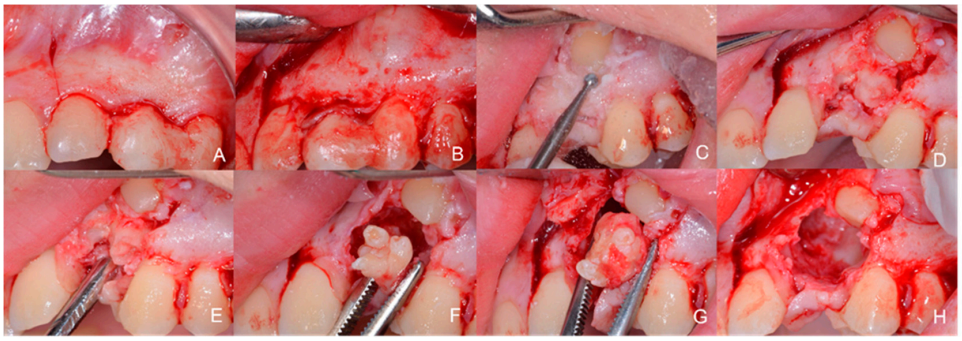

Figure 3. Intraoperative images. (**A**) L-shaped flap with a convex indentation on element 22 and an intrasulcular incision extending to the tooth 24; (**B**,**C**) Removal of the temporary denture, exposure of the canine with a ball bone cutter (bone cutter ball head 018 Meisenger, Neuss, Germany); (**D**) Exposure of the canine; (**E**) Onset of exposure of the odontoma; (**F**) Enucleation of odontoma, good cutting plane visible; (**G**) Detail of the odontoma structures that are removed together; (**H**) Extensive residual bone fissure palatal to the position of the canine.

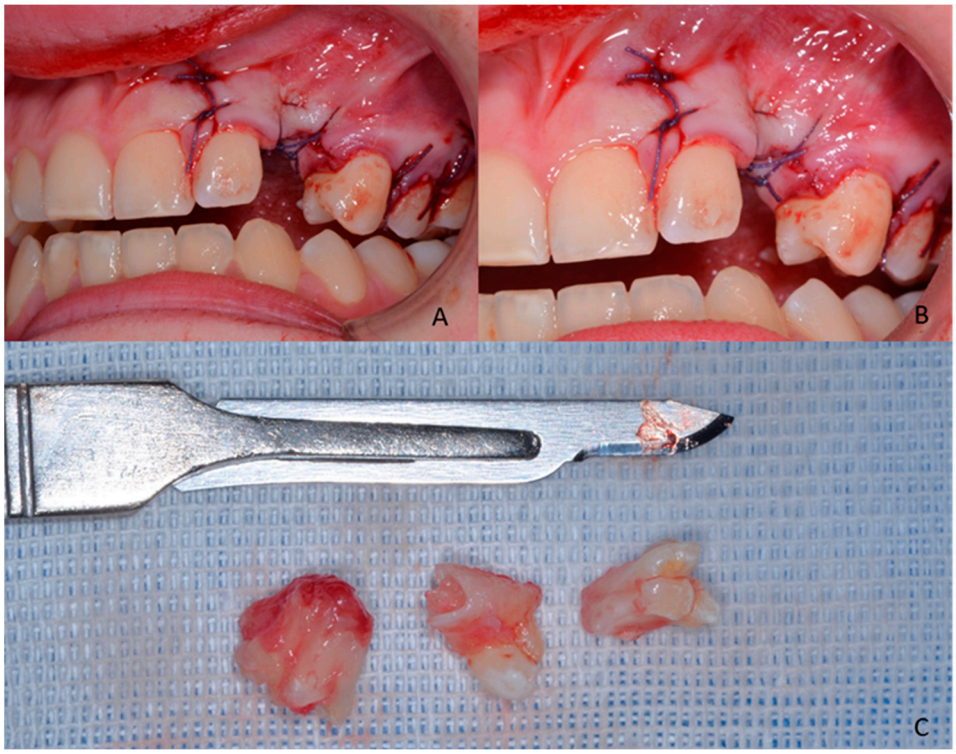

Figure 4. (**A**,**B**) Suture of the flap (Vicryl Ethicon 3.0, 17 mm 1/2c, Johnson & Johnson International, Hamburg, Germany); (**C**) clinical aspect of the odontoma, (Bard-Parker stainless steel size 15, Benefits srl, Genova, Italy). (**A**,**B**) The suture is visible at the level of the relief incision in the ridge; (**C**) various fragments of the removed odontoma are recognizable, the neoformation is organized in variously cusped denticles. The structures of the compound odontoma with crowns and roots are recognizable.

1.2. Case Number 2

The second clinical case concerns a 14-year-old male patient who was referred for consultation to our paediatric oral surgery unit. The patient was operated on in November 2021 (Figures 5–8). The diagnosis of odontoma was made in conjunction with routine radiographic control, motivated by the lack of teeth 32 and 33 in the dental arch.