

Case reports

Diagnosis and treatment of supernumerary teeth in the pediatric clinic – case report

Gisele Fernandes Dias^{1,2}

<https://orcid.org/0000-0002-7932-9647>

Henrique Hagedorn²

<https://orcid.org/0000-0002-5706-9661>

Murilo Della Latta Maffezzoli²

<https://orcid.org/0000-0003-1662-7599>

Filipe de Freitas da Silva²

<https://orcid.org/0000-0002-9500-8165>

Fabiana Bucholdz Teixeira Alves^{1,3}

<https://orcid.org/0000-0001-9955-1811>

¹ Universidade Estadual de Ponta Grossa – UEPG, Ponta Grossa, Paraná, Brasil.

² Centro Universitário de União da Vitória – UNIUV, União da Vitória, Paraná, Brasil.

³ Hospital Regional dos Campos Gerais – UEPG, Residência em Neonatologia, Ponta Grossa, Paraná, Brasil.

Conflict of interests: Nonexistent



ABSTRACT

The present study aimed to discuss the etiology, diagnosis, prevalence and treatment of mesiodens based on current scientific evidence. Two clinical cases of patients of the pediatric dentistry clinic, both with complaints of dissatisfaction with their smile for showing “strange teeth”, were presented. After the clinical, radiographic and tomographic diagnosis, the presence of supernumerary teeth (mesiodens) was diagnosed. The treatment consisted in the surgical removal of the supernumerary teeth and subsequent referral to orthodontics to proceed towards recovering adequate aesthetics and function. The removal of mesiodens in children has the purpose of avoiding possible aesthetic and functional disorders resulting from the presence of the pathology allied to the favorable prognosis in early age.

Keywords: Supernumerary Tooth; Oral Surgical Procedures; Prognosis

Received on: January 31, 2019

Approved on: October 30, 2019

Corresponding address:

Gisele Fernandes Dias

Rua General Carneiro 215, apto 131 -

Centro

CEP: 84010-370 – Ponta Grossa, Paraná,

Brasil

E-mail: giodonto@hotmail.com

INTRODUCTION

The initial phases of teeth formation may cause development disorders, which can result in anomalies, including the growth of supernumerary teeth in the pediatric dentistry clinic. By definition, the supernumerary teeth are extra teeth in comparison to normal dentition, possible to occur both in the maxilla and in the mandible. The mesiodens is the supernumerary tooth localized at the maxillary midline, present between the upper central incisors^{1,2}. The most common type of supernumerary tooth is the mesiodens, which may occur as single, multiple, unilateral or bilateral².

The prevalence of supernumerary teeth reported in the population in general varies from 0.15% to 1.9%, and it is more common among men than women². The diagnosis of the clinical condition in the deciduous and mixed dentition can prevent additional complications to the stomatognathic system. The panoramic, occlusal and periapical radiographs are recommended to aid in the diagnostic process of the mesiodens, allied to the findings of the computerized tomography^{1,3}.

The mesiodens seems to be transmitted as a dominant autosomal character in some generations⁴. One of the predisposing factors to such hyperdevelopment is the facial process mobility during face development, which may cause the rupture of the dental lamina⁵. Thus, the epithelial prolongations of the dental lamina are responsible for the development of the enamel organ and, due to the excessive proliferation, there is the risk of a supernumerary tooth being formed. The mesiodens can present different morphologies, such as: conical, tuberculate or molariform, of which the conical is the most common³. In some individuals, the mesiodens erupt normally; however, they can remain impacted or erupt in inverted position, which results in it staying in the ectopic position^{2,3}. It is most commonly conoid-shaped, short rooted and, is most often impacted.

Although the etiology of the mesiodens is not defined, some theories have been suggested. It may be seen as an isolated finding, or as part of a syndrome allied to heredity, arising as an etiologic factor¹. The complications resulting from the presence of the mesiodens are related to the delay in eruption, crowding, permanent incisors impaction, abnormal root formation, midline diastema, cystic lesions, intraoral infection, rotation, adjacent teeth root resorption, or even nasal cavity eruption⁶.

For the early diagnosis, it is necessary to perform clinical examination, as well as panoramic and

periapical radiographs in children in the mixed dentition phase, so as to prevent functional and aesthetic problems in the adjacent teeth. The presence of supernumerary teeth, when impacted, may go unnoticed by the clinician, due to their small size, as they are not detected by palpation, asymptomatic and retained intraosseously. Therefore, the objective of this study was to present the report of clinical cases in children with mesiodens, with emphasis on review of the current literature.

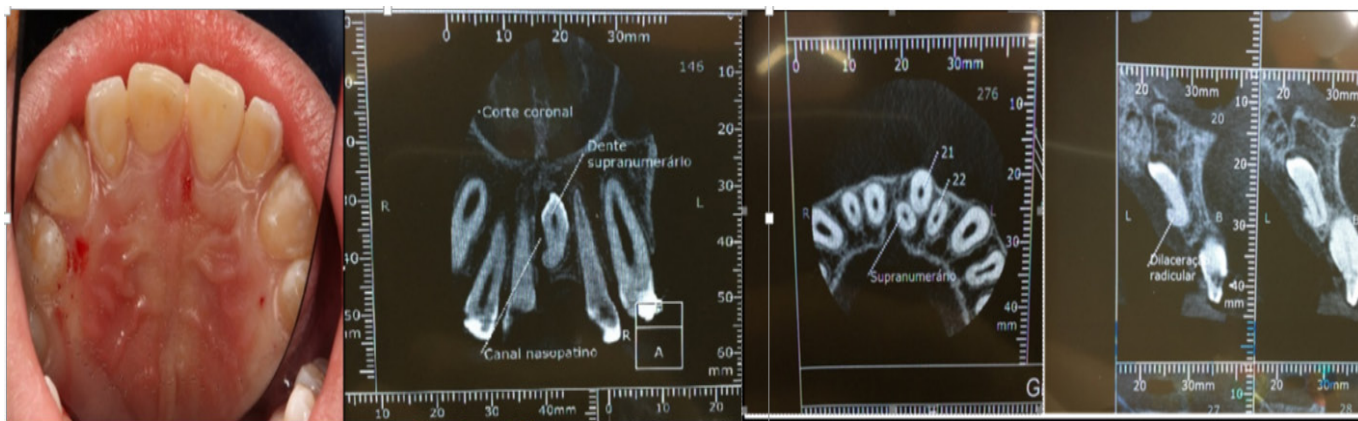
PRESENTATION OF THE CLINICAL CASES

In accordance with the ethical aspects, those legally responsible for the patients signed the Informed Consent Form, so that the procedures could be carried out (APPENDIXES A and C), in a model preformatted by the institution. For the use of the photographs, authorization from those legally responsible was requested, since the patients were under age (APPENDIXES B and D). The research protocol was approved by the evaluation report number 2.710.494 of the Research Ethics Committee of the Centro Universitário dos Campos Gerais - CESCAGE.

Clinical Case 1

A male patient, 12 years old, sought for treatment at the dental clinic of the UNIUV - Centro Universitário de União da Vitória, União da Vitória, Paraná, Brazil, referred by an external dental service, accompanied by the one responsible for him, with a request for the extraction of a supernumerary teeth due to orthodontic treatment.

The adult responsible for him reported that there had been no previous history of dental anomaly related to the number of teeth among the relatives. The patient did not present any systemic alteration that could contraindicate surgical intervention. In the initial clinical examination, it was possible to observe that the patient was in his permanent dentition, he did not need any previous dental treatment, his gum had a healthy aspect, but the supernumerary was not visible in the mouth. In the panoramic radiography, the supernumerary appeared in the midline region, between upper central incisors, characterizing an inverted position mesiodens. Posteriorly, in order to establish the final diagnosis and to plan the case, a complementary computerized tomography of the area in question was requested (Figure 1).



Source: Author, 2017

Figure 1. Clinical case 1 - Initial patient photograph; tomographic exam in the anteroposterior region.

The treatment proposed for the case was of surgical removal of the supernumerary teeth with the purpose of enabling the dental alignment in the upper arch

associated with the orthodontic treatment. The surgical procedure was conducted with the precise technical norms for the region (Figure 2), (Figure 3).



Source: Author, 2017

Figure 2. Clinical case 1 - Surgical access; local osteotomy, removal of the supernumerary element.



Source: Author, 2017

Figure 3. Clinical case 1 - mesiodens removed; postoperative suture (B).

Clinical Case 2

A male patient with leukoderma, 9 years old, went to the pediatric dentistry clinic of the Centro Universitário da Cidade de União da Vitória – UNIUV. According to medical and dental history, the patient presented good

general condition, and was not on any medication. He presented severe crowding of the upper central incisors, and clinical presence of the supernumerary element, the mesiodens. The same previously mentioned care was taken in the second patient for the surgical removal of the mesiodens (Figures 4, 5, 6).



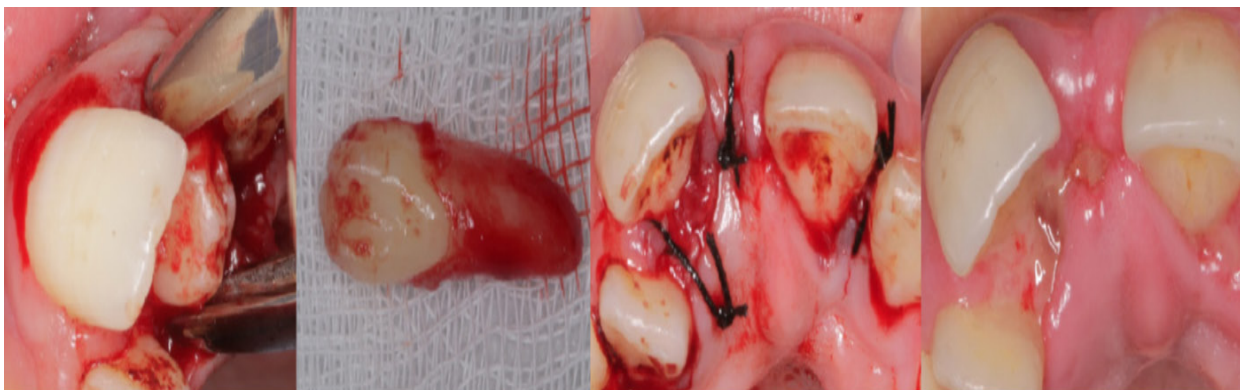
Source: Author, 2017

Figure 4. Clinical case 2 - Initial patient photograph



Source: Author, 2017

Figure 5. Clinical case 2 - Local anesthesia; incision and held-back flaps



Source: Author, 2017

Figure 6. Clinical case 2 - Mesiodens removal; Final suture, Scarring after seven days.

RESULTS

The guidelines for postoperative care were given immediately after the surgery. Seven days after the surgical procedures had been performed, the patient returned to the clinic for evaluation. According to the report form those responsible for him and the professional clinical evaluation, normal scarring and function was identified. In the treatment prescribed for this clinical case, the aesthetic and the occlusion will be improved by means of referral of the patient to the orthodontics, for the continuity of comprehensive treatment.

DISCUSSION

The child clinic attends the particularities of the child's world. Through the attentive professional clinical look, and the complementary panoramic and modified occlusal radiography, associated with a comprehensive view of the developing child patient, it is possible to promote the identification of supernumerary teeth at an early age.

The supernumerary teeth are defined in the literature as dental elements exceeding the number of teeth normally present on the arches. They can occur both in the deciduous dentition (with prevalence of 0.3-0.8%) and in the permanent dentition (0.1-3.8%)⁴. According to the same author, they can affect the mandible or the maxilla, unilaterally or bilaterally, with the presence of a single or even several supernumeraries.

They can appear morphologically malformed or be normal in size and shape, in correct or inverted position, and erupt or remain impacted⁵. Although they may occur in any region of the maxillae, the supernumeraries occur with greater prevalence on the maxilla (from 8.2 to 10 times more) specifically in the anterior region, where it is called mesiodens⁴. The etiology of the mesiodens is related to the combination of genetic and environmental factors⁷. It can occur in addition to systemic disorders, such as: Gardner syndrome, cleidocranial dysplasia, orofacial-digital syndrome, Rothmund-Thomson syndrome, and cleft lip/palate⁴. Wang and Fan (2011)⁸ state that, in nonsyndromic patients, about 76% to 86% of the cases can present a single supernumerary tooth, 12% to 23% present two, and only 1% of this portion of patients present more than two supernumeraries, which occur more often in the mandibular premolars region. Due to the uncertainties related to the etiology of the supernumerary teeth, some theories have been suggested to explain

their occurrence. The atavism theory suggests that the supernumerary teeth result from the genetic expression of extinct primates with three pairs of incisors⁸. The dichotomy theory states that the tooth germ splits in two equal or different-sized parts, resulting in the formation of two teeth of equal size, or one normal and the other dysmorphic⁹. And lastly, the dental lamina hyperactivity theory, which relates them to the development of lingual extension of an accessory tooth germ, while a rudimentary form would develop from the epithelial proliferation of the remnants of the dental lamina¹⁰.

Regarding the mesiodens, it appears small in size and of irregular shape¹¹. Morphologically, they are conical (approximately two thirds of the cases), which makes eruption in the oral cavity easier, and contributes to surgical removal¹². However, they can appear with tuberculate or molariform aspect¹³. The mesiodens can be vertically positioned, either in normal or inverted form, at risk of erupting in the nasal cavity, or in horizontal position¹⁴.

Among all regions of the dental arch, there is a preference of approximately 90% for the anterior upper arch⁴ localized in the region of upper central incisors. The mesiodens may occur as a single or multiple teeth, either two or more, unilaterally or bilaterally¹. There is greater prevalence of mesiodens in male patients, in a proportion of 1.5:1 in relation to females^{5,14}.

It has been suggested that the early diagnosis of supernumerary teeth has a positive impact on the prognosis. Supernumerary teeth can be asymptomatic, and be casually diagnosed during a routine radiography at a child clinic. Nevertheless, most of the cases is associated with clinical complications related to dental impaction, delayed eruption (especially of those with tuberculate morphology, placed in the palate towards the upper central incisors), or ectopic eruption of an adjacent tooth¹⁵. The presence of dental crowding can be caused by supernumerary teeth in the anterior region of the maxilla, room anomalies, laceration or abnormal development of the root, or formation of follicular cyst, radiographically detected¹⁰.

The clinical examinations and radiographies are crucial to detect supernumerary teeth. The computerized tomography has been recently introduced as a very precise complementary diagnostic method to determine the exact location of the supernumerary tooth¹⁵. The occlusal and periapical radiographies are essential for the diagnosis of the supernumerary in the incisors region. Clark's technique allows the position

of the supernumerary tooth to be detected in the vestibulo-lingual direction¹⁵.

The most common sequelae related to the mesiodens are impactions (prevalence of 26 to 52%) and ectopic eruption (28 to 82% of prevalence) of the permanent central incisor¹¹. The least common sequelae are necrosis, laceration, resorption of the permanent central incisor's root, eruption in the nasal cavity, and formation of dentigerous cyst^{11,16}. Lara et al.¹⁴ adds, among the most common sequelae, the presence of midline diastema. Resulting from the sequelae, the indication of exodontia is a final issue in deciding when to remove a supernumerary. Hence, it is necessary to analyze the rate of clinical complications associated with the presence of mesiodens, frequency of damages to adjacent permanent teeth during surgical intervention, and frequency of a subsequent orthodontic treatment or a second surgical intervention to expose an impacted incisor^{11,14,16}. For the removal of the mesiodens, the following should be given attention: the patient's age (four years or younger, up to nine years or older), dental maturation stage of the upper central incisor (equal to, or lower than, Nolla stage 6, up to, or higher than, Nolla stage 9), location of the mesiodens in relation to the upper central incisors (close to the crown, cervical to the tooth, close to the root, or at root apex level)⁴. Lara et al.¹⁴ mentions that mesiodens in deciduous dentition is normally not recommended for removal, due to the risks of lesion to the developing incisors, as well as the lack of cooperation of patients in this age.

When the presence of a supernumerary is found, the recommended procedure should be extraction, as long as it does not impair the adjacent teeth's root development. This treatment should not be conducted later in time, so as to favor the prognosis and minimize surgical trauma⁴. Clinical detection of the mesiodens is easily identifiable when erupted, due to the characteristic shape and size. On the other hand, if they had not erupted, radiographic evidence associated with the clinical characteristics (such as deciduous tooth late exfoliation, rotation and delay in permanent teeth eruption, bad positioning of adjacent teeth) can be suggestive of the intraosseous presence of mesiodens^{5,10,14}. It is also evident the risk of mesiodens eruption in the nasal cavity, dentigerous or follicular cyst development, adjacent teeth root resorption, headaches, paresthesia, and cystic edema on the premaxillary region^{4,9,15,17}.

The prevalence of mesiodens varies between 0.15% and 3.8% in the general population, according to the authors listed in this paper. The male population is more prone to being affected in comparison to the female population (2:1)^{5,14}. Nonetheless, the heredity factor weighs more on individuals presenting cases in the family^{5,14}. Among all regions in the dental arches, there is a preference of approximately 90% for the anterior upper area⁴. The presence of supernumerary generates risk of occlusion aesthetic and functional impairment. Depending on their morphology, the mesiodens can be classified as conical, supplementary, tuberculate and infundibular, of which the conical is the most prevalent^{10,18}. It is a supernumerary small-sized, short- and thin-rooted tooth, situated between the upper central incisors^{4,7,9}.

The etiology of the mesiodens is unknown⁸; however, the theories refer to genetic and environmental factors, being the atavism theory, the dichotomy theory, and the dental lamina hyperactivity theory suggested in studies. Nevertheless, the dental lamina hyperactivity theory has been the accepted one among the studies^{9,10}. It is unanimous between the surveyed authors that the presence of the mesiodens, besides the theories listed above, is related to cleft lip or palate, ectodermal dysplasia, and cleidocranial dysostosis; or even local causes, as inflammation, trauma, abnormal pressure, or odontogenesis-related disorders^{4,7}.

The diagnosis of the supernumerary tooth is both clinical and radiographic. Nonetheless, the clinical examination and the complementary exams (radiography and tomography) aid in the correct diagnosis and most adequate conduct for each patient. The professional clinical experience allied with clinical history of family background with presence of mesiodens should be considered. Panoramic, occlusal and periapical radiography is recommended to aid the mesiodens diagnosis and to define the vestibulo-lingual direction when impacted^{15,17}. The early diagnosis of the condition minimizes problems, such as dental impaction, delayed eruption, or ectopic eruption^{4,7,15}. In the presence of mesiodens that can interfere in the establishment of normal occlusion, removal is indicated to reduce the possibility of risk to the adjacent anatomical structures^{9,10}. The possibility of early intervention, before the patient is six years old, can prevent possible disadvantages, as loss in potential/strength of central incisors eruption, and the need of surgical exposure of the impacted incisors^{9,10,15}. After the diagnosis of presence of a supernumerary, the adequate conduct suggests

the individual evaluation of each case. It is consensus between the authors that the removal of the mesiodens involves surgical risk of damage to the tooth germ of the normal series; nevertheless, removal is still indicated, as there is risk of the presence of the mesiodens delaying the eruption of the adjacent teeth^{4,9}. In order to prevent possible damage to the adjacent tooth germs, the procedure can be postponed until the development of the root of the adjacent tooth is almost complete, which normally means the patient has minimal age between 8 to 10 years^{10,14}.

In a study by Lara et al. (2013)¹⁴, three in every four supernumerary were not erupted and in vertical position. The clinical case 1 fits in this majority, but it did not present any of the most common sequelae, such as impactions and ectopic eruption of the permanent central incisor, as well as midline diastema^{11,14}. Clinical case 2 differs from the majority in that it appears erupted in the oral cavity, though presenting common sequelae, as ectopic eruption of the central incisor and midline diastema^{4,10}. Both cases occurred in male patients, agreeing with the proportion of 1.5:1 in relation to the female gender^{4,14,19}. Hence, the early treatment of the clinical condition is the indicated for cases in which the development of the adjacent upper incisors is in Nolla stage 9, or higher^{4,9,10}.

Various conditions will determine the early or late intervention concerning the mesiodens. The patient's age, the capacity to tolerate the surgical procedure, and the evaluation of the need of sedation must be considered. It is recommended to evaluate the stage of dental development and the proximity of the mesiodens to the root of the permanent incisors when pondering about the risk of surgical trauma and the amount of bone removal^{4,9,10}. As the abovementioned conducts are followed, the prognosis will be satisfactory.

CONCLUSION

In spite of their low incidence, the mesiodens can cause irreversible damage to the adjacent teeth, such as root resorptions, late eruption, and cystic degeneration, in addition to the risks to dental occlusion. The early diagnosis and intervention in both dentitions avoid and minimize aesthetic, functional and pathologic damages, and potentially decrease the need of future complex treatments in children.

REFERENCES

1. Agrawal NK. Dentigerous cyst in a child associated with multiple inverted supernumerary teeth: a rare occurrence. *Int J Burns Trauma*. 2012;2(3):171-3.
2. Günduz K, Çelenk P, Zengin Z. Mesiodens: a radiographic study in children. *Jour of Or Sci*. 2008;50(3):287-91.
3. Pakdaman A, Meighani G. Diagnosis and management of supernumerary (mesiodens): a review of the literature. *J Dent (Tehran)*. 2010;7(1):41-9.
4. Shah UD, Patel H, Patel N, Ranadheer E, Shoba F. Interception in pursuit of exquisite aesthetics – a case series. *Intern Journ. Of Adv. Research*. 2015;3(7): 590-8.
5. Anegundi RT, Tegginmani VS, Battepati P, Tavargeri A, Patil S, Trasad V et al. Prevalence and characteristics of supernumerary teeth in a non-syndromic South Indian pediatric population. *J Indian Soc PedodPrev Dent*. 2014;32(1):9-12.
6. Van Buggenhout G, Bailleul-forestier I. Signs in dysmorphology mesiodens. *Eur J Med Genet*. 2008;51(2):178-81.
7. Samuel V. Overview of mesiodens- a review. *Int J Pharm Bio Sci*. 2014;5(2):526-39.
8. Wang XP, Fan J. Molecular genetics of supernumerary tooth formation. *Genesis*. 2011;49(4):261-77.
9. Rao PVVP, Chidzonga MM. Supernumerary teeth: literature review. *Cent Afr J Med*. 2001;47(1):22-6.
10. Penalva LPM, Martinez PAC, Fernandez RPP, Sanchez MVJE, Guirado CJL. Mesiodens: etiology, diagnosis and treatment: a literature review. *BAOJ Dent*. 2015;1(1):1-5.
11. Ayers E, Kennedy D, Wiebe C. Clinical recommendations for management of mesiodens and unerupted permanent maxillary central incisors. *Eur Arch Paediatr Dent*. 2014;15(6):421-8.
12. Mukhopadhyay S. Mesiodens: a clinical and radiographic study in children. *Journ Of Indian Soc Of Pedod and Prev Dent*. 2011;29(1):34-8.
13. Toureno L, Park JH, Cedeberg RA, Hwang EH, Shin JW. Identification of supernumerary teeth in 2D and 3D: Review of literature and a proposal. *J Dent Educ*. 2013;77(1):43-50.
14. Lara TS, Lancia M, Filho OGS, Garib DG, Ozawa TO. Prevalence of mesiodens in orthodontic patients with deciduous and mixed dentition and its association with other dental anomalies. *Dental Press Journ. Orthod*. 2013;18(6):93-9

15. Ata-aliF, Ata-ali J, Peñarrocha-oltra D, Peñarrocha-diago M. Prevalence, etiology, diagnosis, treatment and complications of supernumerary teeth. *J. Clin. Exp. Dent.* 2014;6(4):414-8.
16. Khambete N, Kumar R, Risbud M, Kale L, Sodhi S. Dentigerous cyst associated with an impacted mesiodens: report of 2 cases. *Imaging Sci Dent.* 2012;42(4):255-60.
17. Reis LFG, Giovanini A. Dentes supranumerários retidos interferindo no tratamento ortodôntico. *RSB0.* 2006;3(2):20-5.
18. Garvey MT, Barry HJ, Blake M. Supernumerary teeth - an overview of classification, diagnosis and management. *J Can Dent Assoc.* 1999;65(11):612-6.
19. Primosh RE. Anterior supernumerary teeth – assessment and surgical intervention in children. *Ped Dent /The Amer Acad of Pedod.* 1981;3(2):1-12.