

Case report

Gemination of maxillary incisors in deciduous and permanent dentition - a case report

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Summary

Introduction. Shape variations of teeth can be present both in permanent and in deciduous dentition. Gemination, fusion, concrescention, and „twin teeth“ are development anomalies. Aim of this article is to show different cases of simultaneous gemination in deciduous dentition and supernumerary teeth in permanent dentition in upper incisors region.

Case report. A nine-year-old girl, suffering from juvenile idiopathic arthritis, has been sent to the Dental Clinic of Vojvodina. The clinical examination and OPG (orthopantomography) analysis revealed the presence of supernumerary tooth in the region of tooth 51, and also supernumerary tooth in tooth region 11. There was the presence of a cyst in the region 23, which was corresponding to the follicular cyst. The treatment plan included extraction of tooth 51 and supernumerary tooth, extraction of tooth 52, and control examination after three months with 3D radiography.

Conclusion. Full cooperation between pediatric dentist, oral surgeon and orthodontics is required. Therapy should be focused on balancing the occlusion and gaining best aesthetic results. The significance of highlighting the importance of this case lies in its contribution to expanding our understanding of gemination anomalies in the dental field. By presenting a rare occurrence involving gemination of maxillary incisors in both deciduous and permanent dentition, this case report offers valuable insights into the clinical manifestations, diagnostic approaches and treatment strategies associated with this condition.

Key words: twin teeth, pediatric dentistry, germination, variations

Introduction

The gemination of maxillary incisors, a rare dental anomaly characterized by the partial division of a single tooth bud resulting in the formation of two separate crowns with a common root, has garnered attention in the field of dentistry due to its unique clinical and diagnostic challenges [1, 2].

While this phenomenon has been sporadically reported in the literature, a comprehensive understanding of its etiology, prevalence, and clinical implications remains elusive. The

limited available data highlight the necessity for in-depth investigations to shed light on the underlying factors contributing to gemination, its varied presentations in deciduous and permanent dentition, and the subsequent impact on patient management. This study aims to contribute to the existing body of knowledge by presenting a detailed case report, coupled with a critical review of relevant literature, thereby enhancing our understanding of the complexities associated with gemination in maxillary incisors [3, 4].

The prevalence of gemination ranges from 0.5% to 2.5% [5]. It is most commonly found in the anterior maxillary region [6]. Gemination is more frequently observed in the deciduous dentition compared to the permanent dentition [7]. The anomaly is most common in deciduous maxillary incisors [8]. Bilateral presentation of gemination is very rare, with the prevalence of 0.01% to 0.04% in the deciduous dentition and 0.05% in the permanent dentition [5]. Gemination can also occur in mandibular premolars and third molars, although these cases are less commonly reported.

The significance of gemination in dentistry lies in its potential to pose intricate diagnostic and treatment challenges. The unique morphological characteristics associated with gemination often necessitate precise clinical evaluation and radiographic interpretation for accurate diagnosis. Understanding the etiological factors contributing to gemination is crucial for developing effective management strategies, especially in cases where the anomaly may impact occlusion, aesthetics, and overall oral health [9]. Moreover, the occurrence of gemination in both deciduous and permanent dentition underscores its importance across various stages of dental development. Insights gained from studying gemination contribute not only to individual patient care but also to the broader knowledge base within dentistry, aiding practitioners in refining their diagnostic acumen and treatment approaches for similar cases. As the

dental community strives for enhanced clinical proficiency, investigating the significance of gemination serves as a valuable endeavor towards comprehensive patient care and advancing the field of dentistry [10].

The objectives of this case report are two-fold: first, to provide a detailed examination of a rare occurrence of gemination in maxillary incisors, encompassing a thorough analysis of the patient's clinical presentation, radiographic findings, and treatment approach. Second, to contribute to the existing dental literature by offering insights into the diagnostic and management challenges associated with gemination in both deciduous and permanent dentition. By presenting a comprehensive overview of the case, including its clinical nuances and potential implications for patient care, this report aims to enhance the understanding of gemination within the dental community, facilitating improved diagnosis, treatment planning, and ultimately, better outcomes for patients with similar dental anomalies.

Case report

A nine-year-old girl was sent from the Department of Immunology at the Institute for Child and Youth Health to the Clinic of Dentistry of Vojvodina, specifically to the Department of Pediatric and Preventive Dentistry, for an examination regarding a focal source of infection. According to the medical history, the girl has been undergoing treatment for juvenile idiopathic arthritis (JIA) for the past three years and is receiving regular therapy (corticosteroids, methotrexate).

Upon clinical examination, the presence of mixed dentition corresponding to the child's age is observed. The persistence of upper deciduous incisors is noted, and an extra tooth is observed in the region of tooth 51 (Figure 1). The analysis of the orthopantomographic image reveals the presence of an extra tooth

in the region of tooth 51, as well as an additional tooth in the region of tooth 11. The radiograph shows the upper lateral deciduous incisor in a rotated position, and two teeth in the region of tooth 11 that do not conform to the usual morphology of tooth 11. The mesially positioned tooth in this region exhibits macrodontia, which may also appear as gemination in the permanent dentition. However, the distal tooth in this region has inadequate shape and a significantly smaller mesio-distal diameter. Additionally, the cyst in the area of tooth 23 is observed, corresponding to the follicular cyst (Figure 2).



Figure 1. Clinical photograph showing geminated deciduous first maxillary incisor

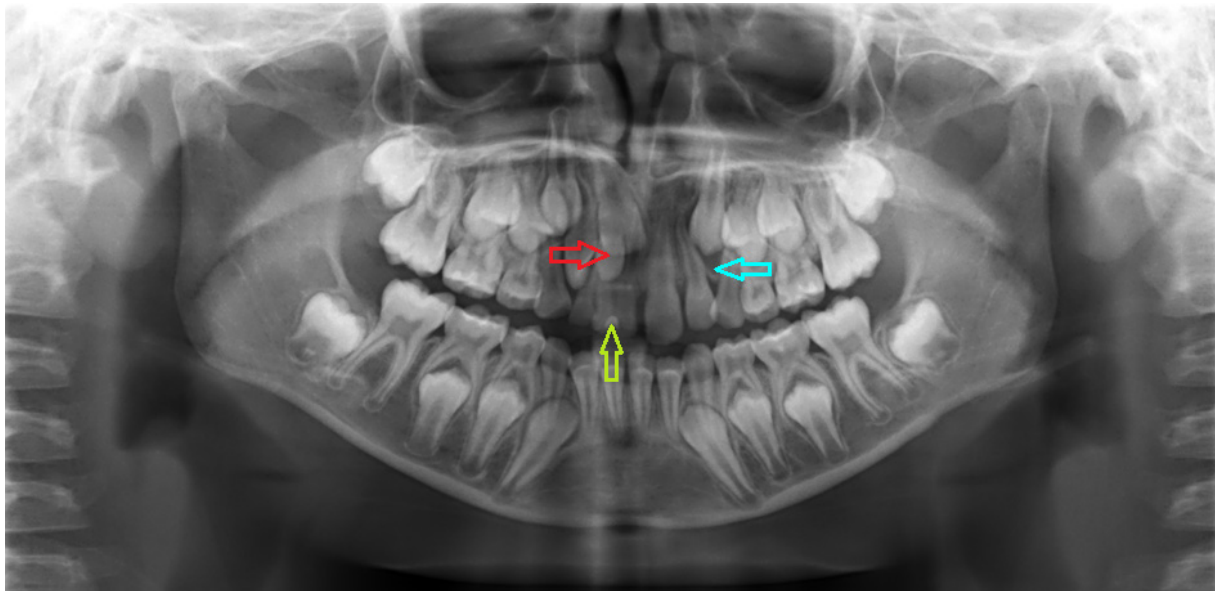


Figure 2. Orthopan with marked abnormalities

In collaboration with a specialist in orthodontics, the following treatment plan was devised: extraction of teeth 51, 52, and the supernumerary tooth in the region of tooth 51. After three months, continued therapy would involve the potential extraction of the supernumerary tooth in the permanent dentition and surgical treatment of the follicular cyst. Immediately before the dental intervention, the patient underwent endocrinological preparation, involving adjustments to the therapeutic doses of corticosteroids and methotrexate. The Department of Pediatric and Preventive Dentistry performed the extraction of tooth



Figure 3. Extracted geminated deciduous first maxillary incisor and second deciduous maxillary incisor

51 with the supernumerary tooth and tooth 52 (Figure 3). Further treatment involves obtaining a 3D scan of the jaw to determine the position of the existing supernumerary tooth and to rule out the possibility of gemination in the permanent dentition.

Discussion

Gemination represents the result of developmental disorders in both the mesoderm and ectoderm. These disorders involve local metabolic disturbances occurring during the morphodifferentiation of tooth buds. The main etiological factor for gemination remains unknown, but physical pressures leading to tooth fusion are considered, with genetic inheritance also being considered as a possible factor [11]. Multiple theories have been proposed in order to elucidate the etiology of fusion including the possibility of an augmented force generated during the process of growth, the utilization of thalidomide or encountering viral infection while in the state of pregnancy, and a genetic etiology. Moreover, it is important to note that the genetic etiology could also result in fusion as evidenced by previous research [12]. It is postulated that there are more than 300 genes playing a crucial role in the development of teeth. Any abnormality or defect in these genes has the potential to lead to the alteration of tooth morphology. Furthermore, it is worth mentioning that disturbances affecting these genes may transpire prior to or after birth. Consequently, it is possible for both deciduous and permanent dentition to be affected by these disturbances [4].

Clinically, it is often challenging to differentiate between fusion and gemination, and many authors have recently made efforts to clearly define the difference between these two disorders. The number of teeth present in the jaw is the only factor distinguishing these two conditions. During gemination, a normal

number of teeth is present, while in fusion, the number of teeth is reduced [10, 13]. The terms gemination and fusion are increasingly used interchangeably, and some authors use terms such as “joined teeth” or “double tooth” for both conditions to avoid confusion [14]. Nik-Hussein’s research indicates that anomalies in the permanent dentition are frequently associated with anomalies present in the deciduous dentition. Therefore, gemination that occurs in the deciduous dentition is present in the permanent dentition in 60% of cases [15].

Nandini pointed out that maxillary central incisors are most commonly affected by gemination, which aligns with our case [16]. Many authors note that the occurrence of gemination is not sex-dependent, and the number of gemination cases is equally distributed among patients of both sexes [17].

Clinical manifestations of gemination can range from a notch on the incisal edge to the complete division of two teeth, as seen in this patient. Diagnosis requires both clinical examination and radiography, with modern diagnostic protocols requiring computed tomography. The use of this method reduces radiation exposure by 50-90% (particularly significant in pediatric cases) while providing the 3D image without artifacts and superimposition [18]. Several studies have confirmed that the occurrence of caries and disorders of the temporomandibular joint in individuals with JIA is greater in comparison to the general healthy population. It is common for pediatric patients with JIA to undergo treatment with Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) containing sugars, therefore, the frequency of caries can be associated with this factor. It is important for dentists to consider that patients on corticosteroid therapy have an increased susceptibility to infections and experience challenges in the healing process. Additionally, individuals receiving methotrexate treatment may exhibit symptoms consistent with ulcerative stomatitis [19].

Conclusion

For the practicing dentist, it is exceptionally important to timely recognize the occurrence of gemination to plan appropriate therapy. If gemination in the deciduous dentition hinders the eruption of permanent teeth, the extraction is necessary. However, gemination in

the permanent dentition itself does not necessarily indicate extraction. In the diagnosis and treatment of teeth in children, collaboration between pediatric dentists, orthodontists, and oral surgeons is often essential. Therapy should focus on balancing occlusion and achieving optimal aesthetic results.

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Ethical approval. The Ethics Committee of the Faculty of Dentistry Clinic of Vojvodina in Novi Sad approved the study and informed consent was obtained from all individual

respondents. The research was conducted according to the Declaration of Helsinki.

Conflicts of interest. The authors declare no conflict of interest.

References:

- Mamdani S, Pathak D, Harrison M, Bhujel N. Macrodonia and double teeth: a review and case series. *Br Dent J* 2023;234(5):315–21.
- Jahanimoghadam F. Dental anomalies: an update. *Adv Hum Biol* 2016;6(3):112–8.
- Rohilla M, Rabi T. Etiology of various dental developmental anomalies-Review of literature. *J Dent Probl Solut* 2017;4(2):19–25.
- Masood F, Benavides E. Alterations in Tooth Structure and Associated Systemic Conditions. *Radiol Clin North Am* 2018;56(1):125–40.
- López VB, Tabash FR. Geminated teeth: a case report and review of literature. *Odovtos* 2013;15:75–80.
- Lakshmi V. Gemination of Primary Canine with Congenitally Missing Primary Central Incisors. *World J Dent* 2017;8(4):331–3.
- Rahman H, Chandra R, Gaur TK, Singh S, Tripathi S, Jain A. An Unusual Case of Gemination in Mandibular Second Premolar: A Case Report. *Research & Reviews: J Dent Sci* 2016;4(2):19–22.
- Sandeep S, Kumar GJ, Potdar S, Bhanot R, Vathare AS, Tiwari RVC, Harshitha B. Rare case of gemination of mandibular third molar—A case report. *J Family Med Prim Care* 2020;9(5):2577–9.
- Silva JR, Pacheco-Pereira C, Pereira JR, et al. Tooth Gemination: A Comprehensive Review. *J Contemp Dent Pract* 2018;19(7):887–93.
- Ben Salem M, Chouchene F, Masmoudi F, Baaziz A, Maatouk F, Ghedira H. Fusion or Gemination? Diagnosis and management in primary teeth: a report of two cases. *Case Rep Dent* 2021;2021:6661776.
- Aldhelai TA. Management of the Two Dental Developmental Anomalies in Two Maxillary Incisors for Improved Esthetic Appearance: A Case Report. *Open Dent J* 2021;15(1).
- Zyood AI, Alshdefat AB, Sharaiha MA, Aloun RM, Al Maaitah HA. Fusion of a maxillary central incisor with a supernumerary tooth. *Pak Oral Dental J* 2020;40(2):107–9.
- Mamdani S, Pathak D, Harrison M, Bhujel N. Macrodonia and double teeth: a review and case series. *Br Dent J* 2023;234(5):315–21.
- Phillips ELW, Irish JD, Antoine D. Ancient anomalies: Twinned and supernumerary incisors in a medieval Nubian. *Int J Osteoarchaeol* 2021;31(3):456–61.
- Nik-Hussein NN, Majid ZA. Dental anomalies in the primary dentition: distribution and correlation with the permanent dentition. *J Clin Pediatr Dent* 1996;21(1):15–9.

Geminacija gornjih inciziva u mlečnoj i stalnoj denticiji - prikaz slučaja

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Uvod. Varijacije u broju i obliku zuba mogu se javiti u mlečnoj i u stalnoj denticiji. Razvojne anomalije u obliku zuba mogu biti u vidu geminacija, fuzija, konkrescencija i „zuba blizanaca“. Cilj ovog rada je da se prikaže slučaj istovremene pojave geminacije u mlečnoj denticiji i prekobrojnog zuba u stalnoj denticiji u regiji gornjih inciziva.

Prikaz slučaja. Devetogodišnja devojčica, koja boluje od juvenilnog artritisa, upućena je na Kliniku za stomatologiju Vojvodine. Kliničkim pregledom i analizom ortopantomografskog snimka uočilo se prisustvo prekobrojnog zuba u regiji zuba 51, kao i prekobrojni zub u regiji zuba 11. Takođe, uočava se cista u predelu zuba 23, koja odgovara folikularnoj cisti. Plan terapije je uključivao ekstrakciju zuba 51 sa prekobrojnim zubom i zuba 52, kontrolni pregled tri meseca kasnije, i 3D radiografiju.

Zaključak. U dijagnostici i terapiji zuba kod dece, vrlo često je neophodna saradnja između dečijeg stomatologa, ortodonta i oralnog hirurga. Terapija treba da bude usmerena na uravnoteženje okluzije i postizanje što boljih estetskih rezultata. Značaj prikaza ovog slučaja leži u jasnijem razumevanju anomalije geminacije u oblasti stomatologije i nudi uvid u kliničke manifestacije, dijagnostički pristup i strategiju lečenja povezane sa retkom pojavom koja uključuje geminaciju maksilarnih sekutića u mlečnoj i stalnoj denticiji.

Ključne reči: zubi blizanci, dečija stomatologija, geminacija, varijacije