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Supernumerary Mandibular Premolar Developing In Late Stages During Orthodontic Treatment: A Case Report

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ABSTRACT

Supernumerary teeth represent one of the developmental anomalies observed in the jaws. While the precise etiology of supernumerary teeth remains incompletely understood, it is believed to arise from a combination of genetic and environmental factors. These additional teeth, which may appear singly or in multiples within both the maxilla and mandible, typically manifest without symptoms. Notably, supernumerary premolar teeth exhibit a greater prevalence in the mandible compared to other supernumerary types. Supernumerary premolar teeth, which are similar to premolar teeth in terms of morphology, tend to form at a later stage than the normal development period. Supernumerary teeth emerging during or subsequent to orthodontic treatment may occasionally be encountered. It is crucial to diagnose these teeth, typically detected incidentally during radiographic examinations, owing to the potential complications they may entail. In instances where these supernumerary teeth remain undiagnosed, complications such as cyst formation, root resorption, and dental crowding may arise, potentially compromising the stability of orthodontic treatment. Therefore, the decision regarding whether to extract or monitor the supernumerary tooth should be approached with caution, considering the balance between potential benefits and risks, in addition to a thorough evaluation through detailed radiographic examination. This case report presents an instance of a supernumerary tooth developing belatedly during orthodontic treatment in the mandibular right premolar region of a 15-year and 11-month-old female patient.

Ortodontik Tedavi Sırasında Geç Dönemde Gelişen Süpernumere Mandibular Premolar: Vaka Raporu

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ÖZET

Süpernumere dişler çenelerde görülen gelişimsel anomalilerden biridir. Süpernumere dişlerin etyolojisi tam olarak bilinmemekle beraber genetik ve çevresel faktörlerin birleşiminden kaynaklandığı düşünülmektedir. Hem maksilla hem de mandibulada tekli veya çoklu olarak görülebilen süpernumere dişler genellikle asemptomatiktir. Süpernumere premolar dişlere ise diğer süpernumere dişlerden farklı olarak daha çok mandibulada rastlanmaktadır. Morfoloji bakımından premolar dişlere benzerlik gösteren süpernumere premolar dişler normal gelişim döneminden daha geç bir dönemde oluşmaya eğilim göstermektedirler. Ortodontik tedavi esnasında veya sonrasında da geç dönemde gelişim gösteren süpernumere dişlere rastlanılabilmektedir. Genellikle radyografik muayene sırasında tesadüfen tespit edilen bu dişlerin neden olabileceği komplikasyonlar sebebiyle teşhisi önemlidir. Teşhis edilemediği durumlarda kist oluşumu, kök rezorpsiyonu, çapraşıklık gibi komplikasyonlar görülebilirken aynı zamanda ortodontik tedavinin stabilitesini de tehlikeye atabilir. Detaylı radyografik inceleme ile birlikte fayda/zarar ilişkisi göz önüne alınarak süpernumere dişin çekim veya takip kararı dikkatle verilmelidir. Bu vaka raporunda, 15 yıl 11 aylık kadın hastanın mandibular sağ premolar bölgesinde ortodontik tedavi sırasında geç dönemde gelişim gösteren süpernumere diş olgusu sunulmaktadır.

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INTRODUCTION

Supernumerary teeth, also known as hyperdontia or extra teeth, are additional teeth that develop in the jaws. The etiology of supernumerary teeth, considered a developmental anomaly, remains incompletely understood. While various theories have been proposed to elucidate this condition, it is generally assumed that both genetic and environmental factors contribute to its manifestation.[1–4]

Ethnicity is an important factor in the prevalence of supernumerary teeth. Various studies in the literature have reported that the prevalence of supernumerary teeth varies between 0.05% and 3.5% in different populations.[5] According to the results of a study conducted by Esenlik et al. [6] on 2599 patients with a mean age of 8.6 ± 0.23 years, the prevalence of supernumerary teeth in the Turkish population is 2.7%. In a study conducted by Çelikoğlu et al. [7] on 3491 patients aged between 12 and 25 years, the prevalence of supernumerary teeth in the Turkish population was found to be 1.2%.

The most prevalent type of supernumerary teeth is mesiodens, which is localized between the upper central incisors. In second place are distomolar teeth located distally to the third molar teeth. Less commonly, 'paramolar' and 'supernumerary premolars' located between two molar teeth can be seen.[2,8,9]

Supernumerary premolar teeth constitute 8% to 9.1% of all supernumerary teeth.[3,10–13] Found in higher rates in the mandible compared to the maxilla, these teeth bear resemblance to permanent premolars in terms of shape and morphology.[1,10]

Supernumerary teeth, typically asymptomatic, are usually detected incidentally during radiographic examinations. The treatment of diagnosed supernumerary teeth may vary depending on their position, number, and the risk of complications that may arise from surgical extraction.[14] In the presence of supernumerary teeth, complications such as the formation of dentigerous cysts, anomalies in the eruption of permanent teeth, crowding, and resorption of adjacent tooth roots may arise.[1–4,10,12,15,16] Furthermore, if not considered, supernumerary teeth could hinder the application of dental implants in dental treatments or the placement of mini implants during orthodontic treatment. They can also interfere with orthodontic space closure mechanics or root movements.[1,3,10] Additionally, ensuring stability in the outcomes is a crucial objective of orthodontic treatment, and a supernumerary tooth can significantly impede this stability.[3] Considering all these factors, supernumerary teeth should be approached as part of a comprehensive treatment plan. The ideal treatment option may not always be the extraction of the supernumerary tooth. In cases where an asymptomatic and unerupted supernumerary tooth has no adverse impact on dentition, monitoring rather than extraction may be preferred. In a study conducted by Ezirganlı et al. [5] it was determined that 39.32% of supernumerary teeth were extracted, while 60.68% were kept under observation.

In the literature, supernumerary premolar teeth that develop after the permanent dentition are termed 'late-developing supernumerary premolar teeth'. They typically emerge in the premolar region of both the upper and lower jaws. The decision regarding extraction or follow-up of late-developing supernumerary premolar teeth depends on numerous factors and should be carefully planned due to potential risks. Extraction of the tooth may be necessary due to potential complications it may cause,

while regular radiographic monitoring could be considered in cases where surgical intervention might jeopardize surrounding anatomical structures. Radiographic examination holds significant importance in both diagnosing and treating supernumerary teeth. Upon diagnosis, it is advisable to utilize advanced imaging techniques such as cone beam computed tomography (CBCT) or three-dimensional computed tomography (3D CT).[1,3,10,17,18]

CASE REPORT

A 15-year-11-month-old female patient, without any systemic disease, sought treatment at the Orthodontics Department of Usak University Faculty of Dentistry. In the cephalometric radiograph taken from the patient, the cervical vertebral maturation was examined, and the patient's growth development stage was determined to be CS5. The cephalometric measurements indicated that the patient had a skeletal Class I relationship (SNA: 80.5, SNB: 78, ANB: +2.5), with vertical dimension measurements within normal limits (GoGn-SN: 33.4). The inclinations of the upper and lower incisors were also found to be in a normal position relative to the cranial base (U1-NA: 22.3, L1-NB: 24.3). Following the radiographic assessment and intraoral examination, the patient was diagnosed with skeletal and dental Class I malocclusion (Figure 1). Both radiographic and clinical assessments revealed no missing or supernumerary teeth in the patient. The panoramic radiograph showed that all teeth, except the third molars, had erupted and no caries were present. It was observed that the third molars were developing in all four quadrants but had not yet erupted (Figure 2). A non-extraction treatment plan was devised for the patient, who exhibited dental crowding in both the upper and lower jaws. Orthodontic treatment using fixed appliances commenced, aiming to alleviate the crowding. During the treatment, a 0.22 inch slot MBT bracket system was used. The fixed orthodontic treatment, which began with levelling using a 0.014 inch NiTi wire, was completed with the use of a 0.019 x 0.025 inch SS wire, achieving the ideal torque and angulation values for the teeth. After 18 months of treatment, the crowding was successfully resolved, and the patient achieved an ideal occlusion with normal overbite and overjet (Figure 3). Subsequently, the fixed appliances were removed, and a retention protocol was initiated. Fixed retainers were applied to the canine-to-canine regions in both the upper and lower jaws. Additionally, the patient was provided with a removable retention appliance, specifically Essix retainers, and advised to use them full-time for the first 6 months and then only at night for the subsequent 6 months. However, in the panoramic radiograph taken at the treatment's conclusion, the presence of a supernumerary premolar between the lower right first and second premolars was noted (Figure 4). Since the orthodontic treatment had been completed, and all teeth were appropriately aligned, it was decided to surgically remove this supernumerary tooth. Then, the patient and her family were informed and informed consent was obtained. Localization of the supernumerary premolar was determined in three dimensions using cone beam computed tomography (CBCT) before the surgical intervention. The surgical procedure was carried out under local anaesthesia. Due to its position, the approach was made through a flap raised from the vestibule to access the impacted tooth. The supernumerary tooth germ was extracted without damaging the adjacent tooth roots, and the flap was then closed. (Figures 5, 6, and 7).

Figure1: Intraoral initial photographs.

Figure 2: Panoramic radiograph of a 15 -year-11-month-old patient before orthodontic treatment

Figure 3: Post-treatment intraoral photographs.

Figure 4: Panoramic radiograph taken after 18 months of treatment. Supernumerary tooth formation is observed in the lower right mandibular premolar region.

Figure 5: 3D view of the supernumerary premolar tooth with CBCT.

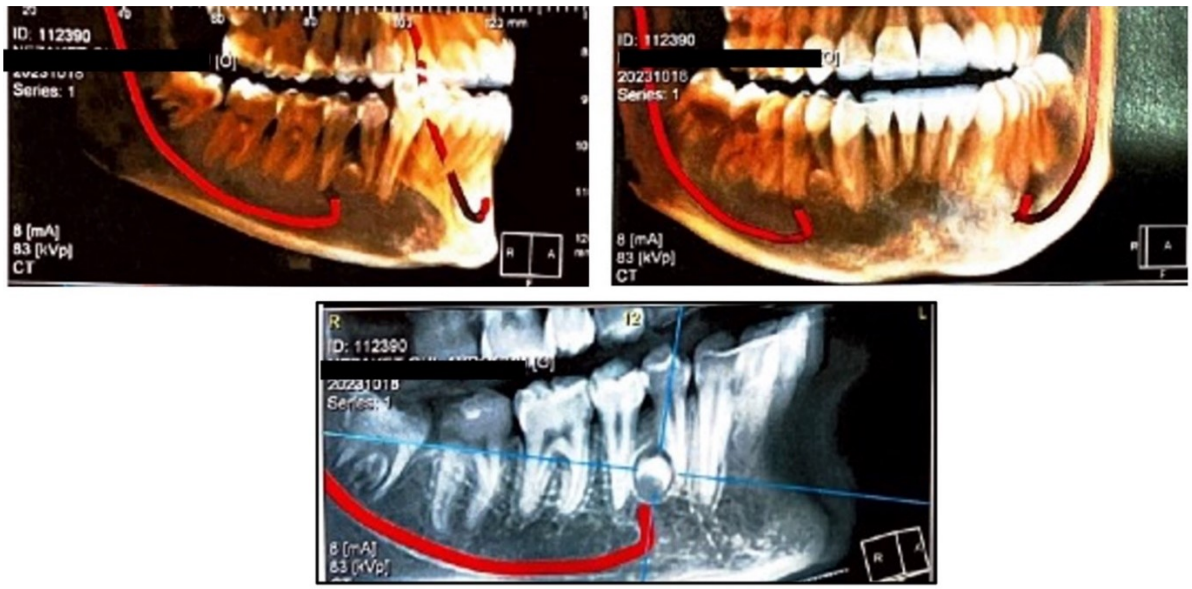

Figure 6: Surgical removal of supernumerary mandibular premolar.

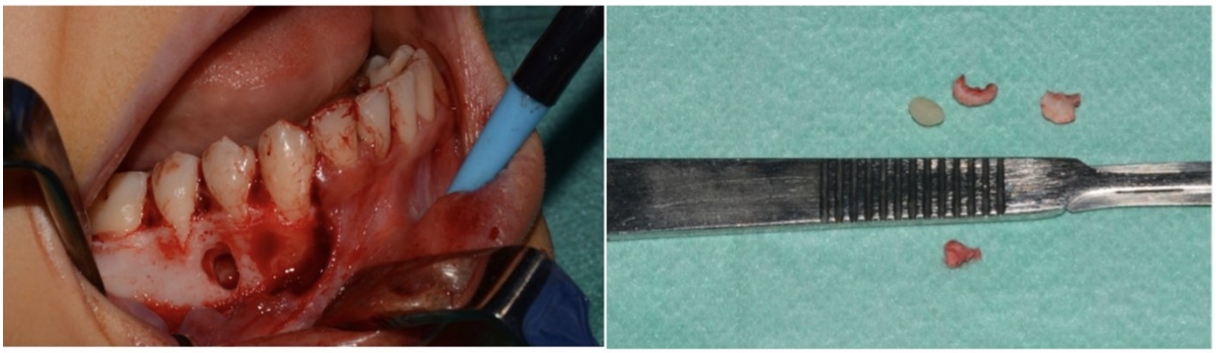

Figure 7: Panoramic radiograph taken after tooth extraction.

DISCUSSION

Supernumerary teeth can be seen singly or in multiples. While the likelihood of multiple supernumerary teeth being associated with various syndromes such as Gardner syndrome, Cleidocranial dysplasia, and Crouzon disease is higher, they can also occur non-syndromically.[1–4,9,10,13,16] It has been reported that supernumerary premolar teeth, unlike other supernumerary teeth, predominantly occur in the mandible and exhibit premolar tooth morphology. Additionally, these supernumerary teeth tend to develop later than the normal teeth in the area. It has been reported that premolar teeth typically begin to calcify around the age of 1,5 to 2,5 years but may not be detectable on radiographs until the age of 3 or 4. Late-developing supernumerary premolar teeth are reported to form around the age of 10 to 15.[1,3,10,13] Since this age range generally coincides with the young adult period, during which orthodontic treatments are frequently performed, it is important for orthodontists to conduct regular radiographic follow-ups.

Other instances of late-developing supernumerary premolar teeth have also been documented in the literature.[1,3,10–13,15,19] In the study by Suga et al. [13], the presence of multiple supernumerary premolar teeth, including those in the lower and upper jaw, has been detected at the age of 16 in a patient who underwent early orthodontic treatment and received orthognathic surgical planning after permanent dentition. Subsequently, the teeth have been removed. When the patient reached the age of 20, a panoramic radiograph taken before orthognathic surgery has revealed the presence of another late-developing supernumerary premolar in the mandibular premolar region. The authors have been emphasized that periodic radiographic follow-up is crucial for patients with a history of supernumerary teeth. In the another study of Paduano et al. [3], late-developed supernumerary premolar teeth have been found in 4 cases over the age of 14, and extraction or periodic follow-up has been performed, taking into account the benefit/harm relationship along with detailed radiographic examination. In the study by Öztürk et al. [1], a panoramic radiograph taken from an 11-year-8-month-old female patient prior to orthodontic treatment revealed no supernumerary tooth. However, a radiograph taken 10 months after the commencement of treatment incidentally showed the formation of a new tooth. As the patient was in the final stages of orthodontic treatment, and the supernumerary tooth was deemed to offer no aesthetic or functional benefit, the decision was made to extract the supernumerary tooth.

In our case, since orthodontic treatment was completed, the supernumerary tooth that appeared later had a recurrence effect on the treatment results. In addition, it was thought that if the extraction was postponed, its proximity to the mental nerve, as seen from the three-dimensional images, could cause greater complications in the future. The three-dimensional images obtained allowed the removal of this tooth without damaging both the teeth and the mental nerve.

CONCLUSION

Orthodontists should consider the possibility of late-developing supernumerary teeth after the completion of permanent dentition. If there is a delay or failure in the expected tooth movement during orthodontic treatment, or if placed mini implants fail, the presence of late-developing supernumerary teeth should be considered. In addition to optimum occlusion criteria, orthopantomographic examinations will be useful in annual routine controls after orthodontic treatment.

Ethical Approval

Since sources obtained from humans or animals were not used in this study, ethics *committee* approval was not obtained.

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Conflict of Interest

The authors deny any conflicts of interest related to this study.

Author Contributions

Design: ZB, Data collection and processing: ZB, Analysis and interpretation: ZB, İEG, Literature review: ZB, Writing: ZB.

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