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A CASE SERIES STUDY OF MESIODENS AMONG CHILDREN WHO PRESENTED TO ISTANBUL UNIVERSITY FACULTY OF DENTISTRY

İstanbul Üniversitesi Diş Hekimliği Fakültesine Başvuran Mesiodensi Olan Çocukların Vaka Serisi Çalışması

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ABSTRACT

Purpose: Supernumerary tooth is one of the developmental problems in children. Supernumerary tooth present in the midline of the maxilla is called "mesiodens". Mesiodens present classical oral complication such as impaction of adjacent teeth, crowding, diastema formation, rotation, displacement of teeth, and occlusal interference. The treatment modality is removal of mesiodens and further observation till the permanent incisors erupt. The aim of this study is to evaluate the epidemiological characteristics of mesiodens, with an analysis of the associated clinical-eruptive complications.

Materials and Methods: Thirty two patients with mesiodens were included in the present study. Radiological examination, age, sex distribution, number of mesiodens per patient, shape, size, direction of the eruption and the relationship with permanent incisors were documented.

Results: The results showed that males were affected approximately 3.5 times more than females; most of the mesiodens were conical in shape (67.56%) where as the rest the others were tuberculate (32.44%). Of the 32 children, 27 (84.37%) had one mesiodens and 5 (15.63%) had two mesiodens bilaterally to midline. 12 mesiodens out of 37 (32.44%) were fully impacted. The most common complication caused by mesiodens was delayed eruption of the permanent incisors and there were 14 cases (43.75%) in such condition.

Conclusion: Mesiodens as the most prevalent form of supernumerary teeth in permanent dentition is not a rare condition. Extraction of mesiodens in the early mixed dentition helps spontaneous alignment of the permanent dentition in childhood.

Keywords: *Supernumerary tooth, mesiodens, midline*

ÖZ

Amaç: Artı dişler çocuklarda gelişimsel bir problem olarak ortaya çıkmaktadır. Maksilla orta hat civarında bulunan artı dişler mesiodens olarak tanımlanır. Mesiodensin komplikasyonları arasında çevredeki daimi dişin gömülü olarak kalması ve/veya sürmemesi, diestema oluşumu, dişlerde rotasyon, yer değişikliği ve okluzyon problemleridir. Tedavisi mesiodensin çekimi ve daimi dişin sürmesine kadar takiptir. Bu çalışmanın amacı mesiodenslerin epidemiyolojik karakterlerinin değerlendirilmesidir.

Gereç ve Yöntem: Çalışmaya mesiodensi olan 32 çocuk hasta dahil edilmiştir. Radyolojik muayene, yaş, cinsiyet, hastalardaki mesiodens sayısı, şekli, boyutu, sürme yolu ve daimi kesici dişler ile ilişkileri kaydedilmiştir.

Bulgular: Çalışma sonuçlarına göre erkek çocuklarda mesiodens görülme sıklığı kız çocuklara oranla 3.5 kat daha fazladır. En sık görülen mesiodens şekli konik mesiodens (%67.56) olup diğer mesiodensler tüberkül şekillidir (%32.44). Çalışmaya dahil edilen 32 çocuğun 27'sinde (%84.37) bir mesiodens belirlenmiş, kalan 5 (%15.63) çocuk hastada ise bilateral 2 mesiodense rastlanmıştır. Çalışmadaki 37 mesiodensten 12'si (%32.44) tamamen gömüktür. Hastalar arasında en sık görülen komplikasyon, 14 vakada görülmüş olan daimi keser dişlerin sürme gecikmesidir.

Sonuç: Erken karışık dişlenme döneminde mesiodenslerin çekimi çocukluk dönemindeki daimi dişlerin sürme ve sıralanma problemlerini ortadan kaldırmaktadır.

Anahtar kelimeler: *Artı diş, mesiodens, orta hat*

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Introduction

Supernumerary teeth (ST) are defined as "developmental anomaly in the number characterized by the presence of teeth in addition to the normal series" (1). The prevalence of ST ranges between 0.45% and 3%, and is more frequent in females than in males (2:1) (2, 3). Although several theories have been submitted to explain their development, the precise etiology of ST is not clearly understood, but the most common view is that ST develop as a result of horizontal proliferation or hyperactivity of the dental lamina (4). While such teeth may be found in any region of the dental arch, they are more commonly located on the maxillary midline, where they are referred to as mesiodens, representing 80% of all supernumerary teeth (5, 6). Mesiodens can occur individually or as multiples (mesiodentes), may appear unilaterally or bilaterally (7, 8). Mesiodens is usually found to be impacted with a conical crown and a single root, and often in an inverted position (3) Panoramic, maxillary occlusal and periapical radiographs are indicated to assist in the diagnosis of mesiodentes (9). Mesiodens can significantly alter both occlusion and appearance by altering the eruption path and the position of the permanent incisors (8). In many instances, mesiodens is associated with disturbances in tooth eruption, midline diastema or axial rotation or inclination of erupted permanent incisors, or complications such as resorption of adjacent teeth and development of dentigerous cysts (3). Early diagnosis and treatment of patients with mesiodens is important as to prevent complications.

In this study we aimed to evaluate the epidemiological characteristics of mesiodens, with an analysis of the associated clinical-eruptive complications. In addition, radiological examination, age, sex distribution, number of mesiodens per patient, shape, size, direction of the eruption and the relationship with permanent incisors were documented.

Materials and Methods

The records of 37 mesiodens in 32 children who had visited Department of Oral and Maxillofacial Surgery Faculty of Dentistry Istanbul University between September 2010 and July 2012 were identified. For each patient we recorded demographic variables including the number of mesiodens, age, and sex. Following clinical-radiographical examination (orthopantomograph, cone beam computed tomography, periapical and occlusal x-rays) the characteristics of the mesiodens including location (palatial, labial, midline), position within the arch (vertical, horizontal), eruption status (erupted, impacted), shape (conical, tuberculate, other) and complications (delayed eruption of adjacent tooth, diastema, displacement, rotation, cystic formation or cystic change, root resorption of adjacent primary or permanent tooth and nasal eruption were documented. Additionly, treatment protocols were analyzed. Patients and his/her parents were informed about the procedure and their written consent was obtained according to the Declaration of Helsinki (most recently 59th WMA General Assembly, Seaul, Korea, October 2008). Mesiodens were surgically removed or extracted. All cases healed uneventful postoperatively.

Results

In the present study age distribution of the patients ranged from 6 to 12 years, with a mean of 9 years (Figure1).

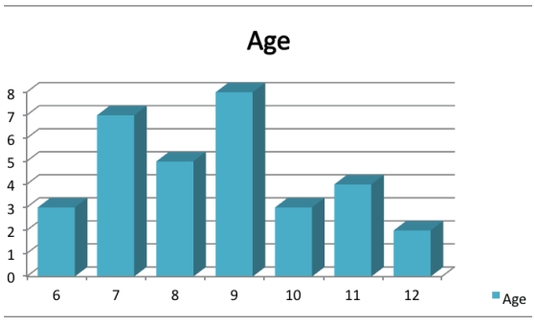

Figure 1. Age distribution of children.

Of the 32 patient, 25 (78.12%) were males and 7 (21.88%) were females. The results showed that males were affected approximately 3.5 times more than females in the present study. Among 32 children, 27 (84.37%) had one mesiodens and 5 (15.63%) had two mesiodens bilaterally to midline. Two out of the 32 patients were twins who had one mesiodens per each. Of 37 mesiodens, 25 (67.56%) were located palatally, 2 (5.42%) were located labially, and 10 (27.02%) were located in the midline (Figure 2).

Figure 2. Clinical view of a patient with mesiodens located palatally.

Most of the mesiodens were found in a vertical positon (91.89%), followed by those in a horizontal position 5.40% and in an inverted position 2.71% in the present study. 12 mesiodens out of the 37 (32.44%) were fully impacted and 25 (67.56%) were partially or fully erupted. Among 37 mesiodens, the conical shape was the most frequent in 25 cases (67.56%), followed by the tuberculate shape in 12 cases (32.44%). Of the 25 conical mesiodens, 6 (24%) were unerupted. Of the 12 tuberculted mesiodens, 6 (50%) were unerupted (Table 1).

Table 1. Number and percentage of mesiodens according to location, position and eruption status.

Clinical investigations	Number of Mesiodens (n=37)	%
LOCATION		
Labial	2	5.42
Palatal	25	67.56
Midline	10	27.02
POSITION		
Vertical	34	91.89
Horizontal	2	5.40
ınverted	1	2.71
ERUPTION STATUE		
Erupted	25	67.56
Impacted	12	32.44

In the present study, the most common complication caused by mesiodens was delayed eruption of the permanent incisors and there were 14 cases in such a condition (43.75%) (Figure 3).

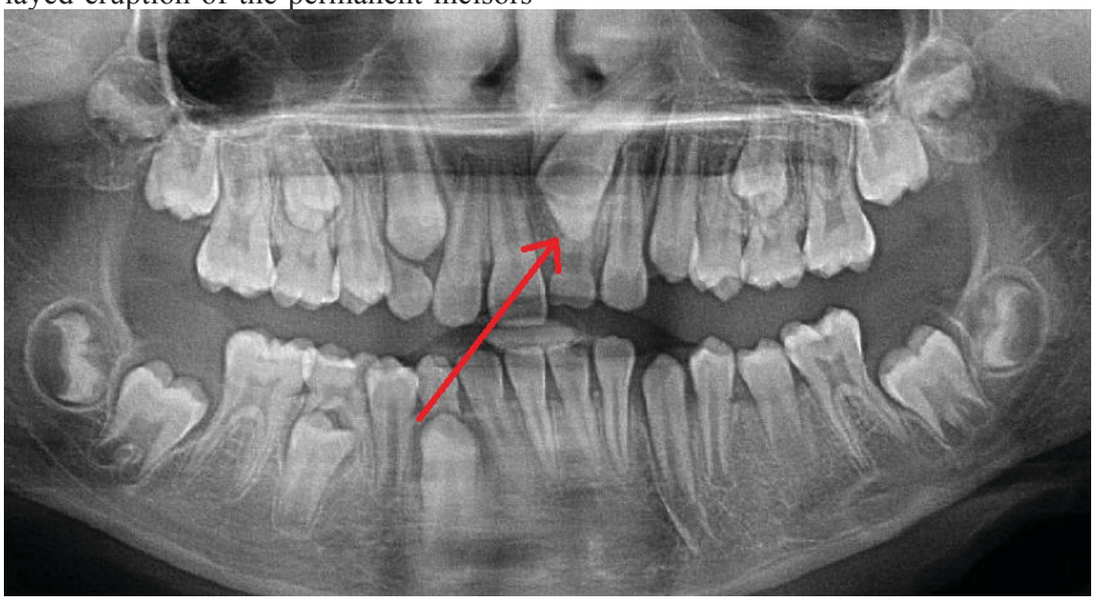

Figure 3. Panoramic radiograph of a patient with mesiodens resulting in delayed eruption of the central incisor (arrow).

Midline diastema constituted 21.87% of the complications and axial rotation or inclination of permanent incisors 31.25% of the complications. Four cases (12.50%) were asymptomatic (Table 2).

Table 2. Mesiodens related complications.

Mesiodens Related Complications	Number of individuals (n=22)	%
Delayed eruption of permanent incisors	14	43.75
Midline diastema	7*	21.87
Axial rotation or inclination of permanent incisors	10*	31.25
Asymptomatic	**4**	**12.50**

**Three cases have both midline diastema and axial rotation of permanent incisors.*

Discussion

The etiology of the supernumerary teeth is not completely understood. Evidence regarding the etiology of mesiodens indicates that genetic susceptibility together with environmental factors might increase the activity of the dental lamina leading to the formation of the extra tooth / teeth. The literature reports 3 theories concerning the cause of mesiodens but this subject remains controversial (8). It was originally postulated that mesiodens represented a phylogenetic relic of extinct ancestors who had 3 central incisors. A second theory known as dichotomy suggests that the tooth bud is split to create 2 teeth, one of which is the mesiodens (10, 11). The third theory, involving hyperactivity of the dental lamina is the most widely accepted (8). According to this theory, remnants of the dental lamina or palatal offshoots of active dental lamina are induced to develop into an extra tooth bud, which results in a supernumerary teeth (9).

Genetics are also thought to contribute to the development of mesiodens, as such teeth have been diagnosed in twins, siblings and sequential generations of a single family (12). In twins, unilateral mesiodens may present as mirror images, and the same number of supernumerary teeth are located in similar regions of the mouth (13). In our series two patients were twins and their mesiodens located in the same region of maxilla which corresponds well with the literature.

Mesiodens are known to occur more frequently in males than in females. The male/female ratio has been reported to range from 1.4 to 2.2. (14-16). In the present study, it has been shown that the male population was more likely to be affected than the female as the male/female ratio was 3.5, which is higher to that reported in past studies.

In this study, we pointed out the presence of mesiodens in children aged between 6 and 12 years. This means that our study involved only mixed or permanent dentition, in contrast to other studies, where the subjects also included much younger individuals (15, 17-18). The average age at which mesiodens was discovered in our series was 9 years, coinciding with the age at which mesiodens shows maximum prevalence (9 cases 28.12%). This is in line with Gündüz et al. (15) who reported that 47.0% of cases were found at age 6-9 years. This period coincides with the eruption time of the maxillary central incisors, and radiographic examination was performed as an aid to screening for congenitally missing teeth, supernumerary teeth, cysts and tumors, when delayed eruption or malposition of the maxillary central incisors was seen (3).

Mesiodens have been known not to cause any clinical signs in many cases; however, they can occasionally cause clinical com-

plications involving the adjacent tooth and tissue (19). Mesiodens frequently interfere with the eruption and alignment of the maxillary incisors (9, 20-21). They can delay or prevent eruption of central incisors, cause ectopic eruption, displacement or rotation of central incisors and labially displace incisors. Less common complications involving the permanent incisors include dilaceration of the developing roots, root resorption and loss of tooth vitality. In this study the most common complication was delayed eruption of the permanent teeth (43.75%). There were no root anomaly, cyst formation and intraoral infection in any cases in contrast to those in other studies (19, 22-24).

Malocclusion was one of the most common complications caused by mesiodens. If a malocclusion in the maxillary anterior region is diagnosed, the presence of any mesiodens should be checked before any treatment is planned (19). A mesiodens should be suspected when there is asymmetry in the eruption pattern of the maxillary incisors; the maxillary primary incisors are overretained, especially if the over-retention is asymmetric; or there is significant ectopic eruption of one or both permanent maxillary incisors (8). To prevent complications and for timely surgical intervention, radiographic examination on a regular basis is highly recommended for the early detection of a mesiodens, in addition to any other developmental anomalies (19). Panoramic, maxillary occlusal and periapical radiographs are recommended to assist the process of diagnosis of mesiodens. Although panoramic radiograph is the best screening tool, clarity in the midline region is sometimes limited for the diagnosis of mesiodens, specially in childhood. But in some cases, they do not provide all the information needed in order to situate them three-dimensionally in relation to the adjacent structures. Computed tomography and cone-beam computed tomography can be used to make decisions about therapeutic options (25-27).

Management of supernumerary teeth depends on the type and position of the tooth (25, 28-29). Hovewer, there can be confusion about when mesiodens should be surgically removed, or whether they should be retained and followed up instead of being treated via multidisiplinary aprroaches (15, 28, 30). Removal of mesiodens is indicated in the following situations; inhibition or delay of eruption, displacement of the adjacent tooth, interference with orthodontic appliances, presence of a pathological condition, or spontaneous eruption of the supernumerary tooth (25, 31-32).

There are two methods for extraction of mesiodens; early extraction before root formation of the permanent incisors and late extraction after root formation of the permanent incisors (33-34). Extraction of mesiodens in the early mixed dentition may help to facilitate spontaneous eruption and alignment of the incisors (25). In this case series the treatment of each case was planned immediately, after consideration of all clinical and radiological findings. If delayed extraction is choice of the treatment modality, more complex surgical and orthodontic treatment may be necessary.

Conclusion

Mesiodens in childhood is not a rare condition. Delayed, ectopic or asymmetric eruption of the central incisors should alert the clinician to the possibility of a mesiodens. To prevent complications and for timely surgical intervention, radiographic examination on a regular basis is highly recommended for the early detection of a mesiodens.

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