

Prevalence and Clinical Manifestation of Mesiodens

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Abstract: *Supernumerary teeth are rare orthodontic phenomenon. The most common observed supernumerary tooth is mesiodens. It develops between the maxillary central incisors and leads to severe disturbances. We found out that the prevalence of supernumerary teeth is 1.82% and the prevalence of mesiodens is 40.74% from all of the cases with supernumerary teeth. It is more often observed at an earlier age. Male gender is more affected of the problem than female gender. The presence of mesiodens is related with disorders like: open bite, diastema, impacted teeth, speech problems, malocclusion etc.*

Keywords: Supernumerary teeth, mesiodens, impacted teeth, speech problems.

1. Introduction

Supernumerary teeth are defined as a tooth in excess compared to the normal number of the teeth for the respective dentition (primary or permanent). We can classify the supernumerary teeth according to their morphology, position and number. As it concerns the shape of the crown they can be absolutely relevant to the other teeth, which they duplicate or they can be with specific shape. Most common observed is the peg-shaped (conical) supernumerary tooth, representative and most frequent is mesiodens.

The definition of Mesiodens according to Mosby's Medical Dictionary¹² is a supernumerary erupted or unerupted tooth that develops between two maxillary central incisors^[16]. Mesiodens is typically located in the midline of the premaxilla, which embryogenesis differs from the other facial bones. Therefore it is possible to have deviations in the premaxillary region, which are not common for the other parts of the maxilla and the mandible too. These deviations can lead to the development of additional teeth and other abnormalities.

2. Literature survey

In the literature it is said that the prevalence of supernumerary teeth is between 0.5% - 3.8% in the permanent dentition [2], [5], [8], [9], [13-17]. From the reviewed articles, we can say that mesiodens is more often observed in male gender than female approximately twice as much.

Celikoglu [3] reveals that supernumerary teeth were detected in 32 patients from 3491 (1.2%), the most commonly found supernumerary tooth was mesiodens (31.3%). Montenegro et al. [11] found that the most frequent supernumerary tooth was mesiodens (46.9%). Kim [10] presented that the incidence of mesiodens has been estimated at 0.15% to 1% of the population. It occurs more frequently in boys than in girls, with the ratio male/female 4/1. Ten (25%) out of the 40 patients had 2 mesiodens. In a study Gunduz [7] found that the prevalence of mesiodens in population is 0.3%. Colak [4] found out that mesiodens occurs in 15 patients (12 females, 3 males) out of 11256 subjects examined, thus the person prevalence was 0.13%. Ersin's [6] results showed that 24

patients had 34 mesiodens for an average of 1.42 mesiodens per person. Males were affected approximately 3 times more frequently in comparison to the females. Forty-two percent of the patients had bilateral mesiodens.

The problem – mesiodens is not widely discussed in the orthodontic literature, although it leads to severe disturbances in occlusion and functions like chewing, swallowing, speaking and aesthetics. The presence of mesiodens develops or underdevelops the premaxilla.

3. Aim

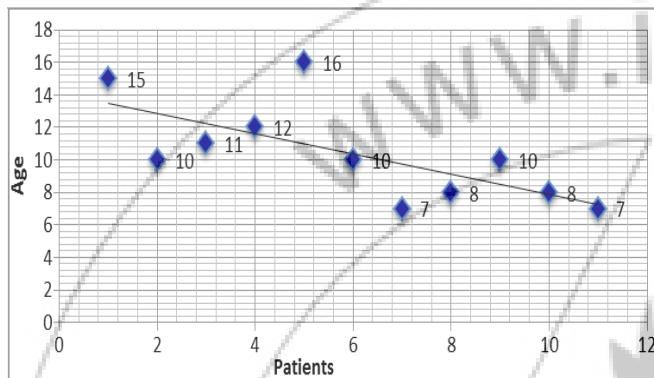
The aim of this survey is: to research the prevalence and the manifestation of mesiodens, to assess the related orthodontic abnormalities to describe the clinical status and functional disorders and to analyze the problems combined with the presence of mesiodens

4. Material and Methods

We made a retrospective research on X-rays of 1480 patients with orthodontic abnormalities treated by us in our clinic from 2004 to 2014. The survey includes patients from the age of 5 to 21. Male patients are 564 (38.1%) and female patients are 916 (61.9%). The survey doesn't include patients with facial deformities, as cleft-lip and palate and problems related with system diseases and syndromes like: cleidocranial dysplasia and Gardner syndrome. We made a report of each supernumerary tooth: it's position, age, gender of the patients, the related complications and the methods we used in their treatment. When we found that there are two or more supernumerary teeth in one case we classify the patient in a group with multiple hyperodontia. From the group of the patients with supernumerary teeth we separate and analyze the patients diagnosed with mesiodens. This group of patients we classify to subgroups depending of: the mesiodens has erupted or non-erupted, are there any related orthodontic abnormalities and except the extraction of the tooth is the patient orthodontic treated. The X-rays were examined and assessed by two independent researchers.

5. Results

We analyzed 1480 orthodontic treated cases, from them 27 (1.82%) were diagnosed with supernumerary teeth, 11 of them have mesiodens. Patients diagnosed with mesiodens are 40.74% of all the patients with supernumerary teeth. The prevalence of patients with mesiodens from all of the studied patients is 0.74%. The average patient age we found out the problem – mesiodens is 10.36 years, displayed from the age distribution of patients with this problem from 7 to 16 years old. Graph 1.



Graph 1: Distribution of the patients with mesiodens by age

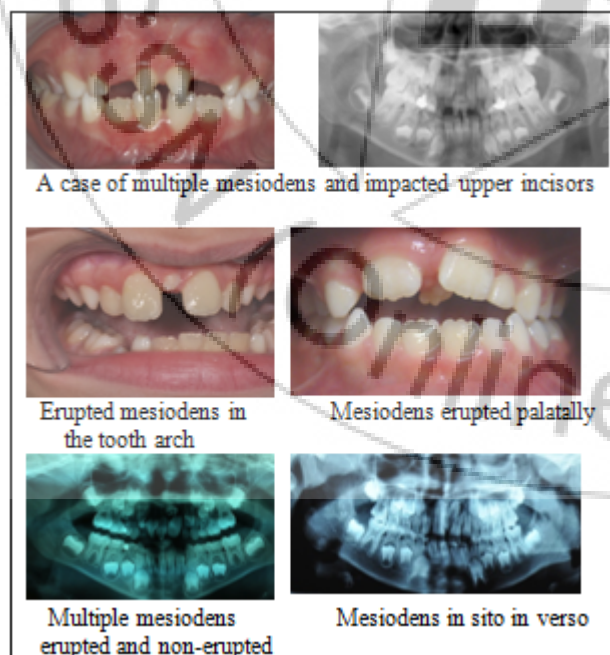
There is a statistical reliable relation between the gender and the prevalence of mesiodens. The relation is characterized by the higher level of supernumerary teeth - mesiodens among the male gender 10 (90.90%) compared to 1 patient from female gender (9.10%).

Only one patient is diagnosed with two erupted mesiodens, one patient with one erupted mesiodens and one impacted. The other cases were with single manifestation of mesiodens. (Graph.2) The ratio between single and multiple manifestation of the problem is 9/2 (81.8%/18.2%).

One of the cases was with palatal impacted mesiodens; behind the central incisors in position is *sito in verso*. Some of the patients with non-erupted mesiodens seek orthodontic treatment, because of: open-bite or overdeveloped frontal segment of the maxilla, which leads to II class malocclusion, diastema and crowding of the upper frontal teeth. Patients with erupted mesiodens seek orthodontic treatment because of: poor aesthetic, impaction of the permanent incisors or abnormal speech and other orthodontic abnormalities.

Table 1: The relation between Supernumerary teeth

Related orthodontic abnormalities	Number of patients with mesiodens	Mesiodens			
		Multiple manifestation	Single manifestation	Erupted	Non-erupted
Hypodontia 11	1		1	1	
Hyperdontia 12	1	2 mesiodens		1	1
Impacted central incisor	2		1	1	1
Diastema	3		1	1	2
Open-bite	2		1	1	1
II class malocclusion	3		1		3



Graph 2: A selection of clinical cases included in the survey and treated by us

From the distribution of the problems in Tabl.1 it becomes clear that there is significant relation between the problem mesiodens and malocclusions. The presence of a supernumerary tooth in the frontal segment leads to overdevelopment or under development in the three planes of this area. When the mesiodens is impacted, the surrounding bone overdevelops in sagittal and vertical direction and this change in the premaxilla is prerequisite to increased overjet and II class malocclusion. When the mesiodens erupts palatally, it irritates the tongue with its conical shape, which changes the position of the tongue during speech and swallowing. These new position is prerequisite for an open-bite and speech abnormalities.

There is a significant number of patients with diastema combined with mesiodens. The supernumerary tooth leads to overdevelopment of the tooth arch and leads to diastema, in which it is most often located. Mesiodens as a type of a hyperdontia is inextricably linked with the other types of supernumerary teeth, especially in the frontal segment and problems like hypodontia. This relation is determined by the genetic predisposition and the etiology of these phenomenons.

The treatment plan includes extraction of the supernumerary tooth-mesiodens, but the patients with related orthodontic abnormalities due to the presence of the tooth it is necessary to obtain a full orthodontic treatment for alignment of the teeth in the arch and normalizing the occlusion. Two of the cases are treated only with extraction of the mesiodens and monitoring of the development of the dentition until the eruption of all the permanent teeth. In the other 9 cases the mesiodens was extracted and subsequent orthodontic treatment was done. In the cases related with complicated impaction of the permanent incisors, extraction of the mesiodens was done, subsequent by a healing period and guided orthodontic traction of the impacted incisors.

6. Discussion

The cases diagnosed with mesiodens from all of the patients with supernumerary teeth are 40.74%, which is very close to the results that Montenegro[11] - 46.9%, V. Arikan[1] - 36.9% and M.Celikoglu[3] - 31.3% found out. In all of the literature surveys there is a higher level of number of the abnormalities related with the male gender rather than the female.

Patients with already erupted mesiodens are diagnosed in an earlier age compared to those with impacted mesiodens, which are diagnosed in later age combined with other orthodontic abnormalities.

The etiology of mesiodens and supernumerary teeth are not uniquely defined, as are most of the dental phenomena. Two are the main characteristics for this manifestation: genetics and influence of the surrounding factors during the development of the tooth germs. The genetic factor of development of a supernumerary tooth is displayed with the fact that is more often observed in male gender rather than the females –approximately twice as much.

Popular assumption is that supernumerary teeth are atavistic mark, reminding of the phylogenetic development of the human kind when the previous humanoid species had three teeth from a tooth group. Another theory to be mentioned is that the hyperactive dental lamina splits more and that leads to developing of an additional tooth germ from divided epithelial rests, from the main tooth germ [13].

7. Conclusion

The problem mesiodens is rarely observed, but leads to severe orthodontic deviations, which require long orthodontic treatment. When we diagnosed it in a later age the problems are more complicated. Mesiodens changes the development of the upper frontal segment and leads to poor aesthetics.

8. Future Scope

Knowing the clinical manifestation of that problem we can expect it when we observe: delayed eruption or impaction of the maxillary incisors, diastema with significant dimensions, severe crowding in the upper frontal segment and hyperodontia in another area. We recommend prophylactic

check-up for children in the early mixed dentition to be done mandatory with X-ray by the general practitioner.

References

- [1] Zhu JF, Marcushamer M, King DL, Henry RJ. Supernumerary and congenitally absent teeth: a literature review. *Journal of Clinical Pediatric Dentistry*. 1996; **20**: 87-95.
- [2] So LL. Unusual supernumerary teeth. *Angle Orthodontics*. 1990; **60**: 289-292.
- [3] Williams P. An unusual case of hyperdontia [corrected]. *British Dental Journal*. 1998; **184**: 371-372.
- [4] Bodin I, Julin P, Thomsson M. Hyperodontia. I. Frequency and distribution of supernumerary teeth among 21,609 patients. *DentoMaxilloFacial Radiology*. 1978; **7**: 15-17.
- [5] Celikoglu M., H. Kamak, H. Oktay, Prevalence and characteristics of supernumerary teeth in a non-syndrome Turkish population: Associated pathologies and proposed treatment, *Med Oral Patol Oral Cir Bucal*. 2010; **15** (4):e575-8.
- [6] Montenegro P., E. Castellón, L. Aytés, C. Escoda, Retrospective study of 145 supernumerary teeth, *Med Oral Patol Oral Cir Bucal* 2006;**11**: e339-44.
- [7] Kim SG, SH Lee, Mesiodens: a clinical and radiographic study, *Journal of Dentistry for Children*, 2003, **70**(1):58-60
- [8] Gunduz K., P. Celenk, Z. Zengin, P. Sumer, Mediodens: a radiographic study in children, *J. Oral Science*, 2008, **50**(3): 287-291
- [9] Colak H. et al., Investigation of prevalence and characteristics of mesiodens in a non-syndromic 11256 dental outpatients, *European Review for Medical and Pharmacological Sciences*, 2013; **17**: 2684-2689
- [10] Ersin N., U. Candan, A. Alpoz, C. Akay, Mesiodens in primary, mixed and permanent dentitions: a clinical and radiographic study, *Journal of Clinical Pediatric Dentistry*, 2004, **28**(4): 295-298
- [11] Diaz A., J. Orozco, M. Fonseca, Multiple hyperodontia: Report of a case with 17 supernumerary teeth with non syndromic association, *Med Oral Patol Oral Cir Bucal.*, 2009;**14** (5): E229-31
- [12] Karayilmaz H., Z. Kirzioğlu A.Saritekin, Characteristics of nonsyndromic supernumerary teeth in children and adolescents, *Turk J Med Sci* (2013) **43**: 1013-1018
- [13] Karla N., S. Chandhary, S. Sanchi, Non-syndrome multiple supplemental supernumerary teeth, *J. Indian Soc. Pedo Prev Dent*, 2005; **3**: 46-48
- [14] Rajab L D, M.Hamdan, Supernumerary teeth: review of the literature and a survey of 152 cases. *International Journal of Paediatric Dentistry*, 2002; **12**: 244-254
- [15] Scheiner, M.A. and Sampson, W.J. Supernumerary teeth: a review of the literature and four case reports. *Aust Dent J*. 1997; **42**: 160-165
- [16] Mosby's Medical Dictionary, 8th edition. © 2009, Elsevier.
- [17] Arikan V., B. Ozgul, F. Tulga, Prevalence and characteristics of supernumerary teeth in a child population from central Anatolia – Turkey, *OHDM*, 2013; **12** (4): 269-272

Author Profile



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