

DIFFICULTES IN FIRST INCISORS ERUPTION CAUSED BY MESIODENS

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Abstract

Supernumerary teeth are infrequent developmental anomaly that can appear in any area of the dental arch and can affect any dental organ. Hyperdontia is rare in population except if it is associated with other diseases or syndromes. Treatment of hyperdontia depends on the area where supernumerary teeth appear, their number and the presence of pathologic processes around the teeth. Mesiodens are the most common supernumerary teeth and the reason for their appearance is still not elucidated. Proliferation of dental lamina and genetic factors have been implicated. Mesiodens can cause delayed or ectopic eruption of the permanent incisors. Early diagnosis allows minimal invasive treatment, which may include surgical extraction. If permanent teeth do not erupt in a reasonable period after extraction, surgical exposure and orthodontic treatment may be required to ensure eruption and to create sufficient arch space before eruption and alignment of the incisor(s).

Key words: supernumerary teeth, mesiodens, treatment

Introduction

Hyperdontia is an oral condition characterized by having supernumerary teeth (more than 20 in deciduous dentition or temporary teeth and over 32 teeth in permanent dentition). They can appear in different position in dental arch and may affect any tooth. The definition of hyperdontia is "any tooth or odontogenic structure that is formed from tooth germ in excess of usual number for any given region of the dental arch." [1]. The supernumerary teeth can erupt far from the dental arch within the maxillary sinus and may also migrate to a different location after development [1].

Supernumerary teeth can be classified by shape and position. Classified by shape, they can be supplemental, tuberculate, conical and odontoma (compound and complex). Classified by position, a supernumerary tooth can be a mesiodens, a paramolar, or a distomolar. The most common supernumerary teeth are permanent, anterior incisors in maxilla (mesiodens). Fourth molars are the next most common as extra impacted wisdom teeth (distomolar). The prevalence of hyperdontia in permanent dentition is between 0.1 and 3.8% and its prevalence in the primary dentition is found to be 0.3-0.8%. Previous studies have reported that single supernumeraries occur in 76-86% of cases, double supernumeraries occur in 12-23% of cases, multiple supernumeraries occur in less than 1% and especially multiple supernumerary teeth occur very rarely without any syndromes and systemic diseases [2,3]. There is a considerable difference between males and females; hyperdontia is twice more common in males than in females. Multiple supernumerary teeth are often associated with a variety of conditions or syndromes such as cleidocranial dysplasia, Ehler-Danlos syndrome, Gardner syndrome, fabry disease and cleft and lip palate or they can be found in non-syndromic patients [4,5]. The cause of hyperdontia is not clear; a genetic factor consisting of an autosomal dominant trait with low penetrance can be one of the causes. Other possible causes are environmental factors and overactivity of the dental lamina during tooth development.

Supernumerary teeth may be detected by making two different dental X-rays at different angles (intra-oral, occlusal X-ray and panoramic radiograph). These X-rays are 2D and do not accurately portray the 3D view of the teeth [6].

Clinically, supernumerary teeth are able to cause dental and medical problems including movement and displacement of permanent teeth, retention of the primary tooth, delayed eruption of the permanent tooth, resorption of roots of adjacent teeth, follicular cysts, irregular facial appearance, speech and nutrition problems which require surgical or orthodontic intervention [7,8].

Patients with tooth number anomalies, especially anterior teeth, suffer from emotional, esthetic and functional problems and series treatment are required starting from adolescence

throughout adulthood to provide normal dental occlusion. Early detection of dental anomalies provides comprehensive treatment and prevents malocclusion. Since the majority (80-93%) of supernumerary teeth can cause clinical complications, their early diagnosis and orthodontical/surgical intervention are in reducing the clinical problems of adjacent permanent teeth and to provide occlusion [9,10].

The purpose of this study was to evaluate the clinical and radiographic characteristics of hyperdontia in mixed dentition.

CASE REPORT 1

A 10-year-old boy was reported with extracted one deciduous tooth, but still with persistence of another primary tooth and missing the permanent first incisors. The medical history was noncontributory, with no history of past dental treatment.

The intraoral periapical radiographic of maxillary anterior region revealed two supernumerary teeth in relation to unerupted permanent maxillary central incisors (Fig.1). The oral examination revealed the presence of the right primary first incisor and the absence of the permanent first maxillary incisors (Fig.2). Surgical treatment was performed. After the extraction of the primary first incisors, the two supernumerary teeth were pulled out to allow eruption of the permanent maxillary incisors (Fig.3). Controls were performed on the second and the seventh day after surgery, and the patient is now undergoing orthodontic treatment.

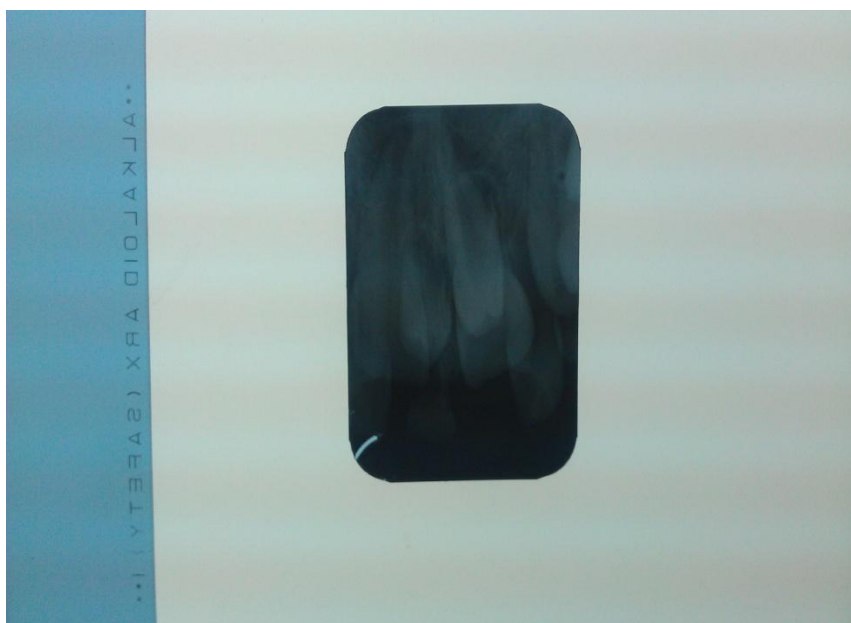


Figure 1. Intraoral periapical radiographic



Figure 2. Primary incisors



Figure 3. Permanent maxillary incisors

CASE REPORT 2

9-year-old boy was reported with supernumerary teeth in the maxillary anterior region. He had an insignificant medical history with no previous dental treatment.

Intraoral occlusal radiograph [Fig. 4] showed two supernumerary teeth with completely developed roots in relation to permanent maxillary central incisors. Oral examination revealed the presence of two supernumerary teeth in position in the middle of dental arch like normal teeth [Fig. 5 and 6]. Their presence resulted in anterior crowding and proclination of the permanent maxillary left central incisor and palatal lateral incisor. The right maxillary permanent incisor was unerrupted. Treatment included extraction of the supernumerary teeth. The regular check-ups were made on the second and the seventh day after extractions. Treatment is still ongoing, and at the same time the appearances of permanent incisors is being monitored.

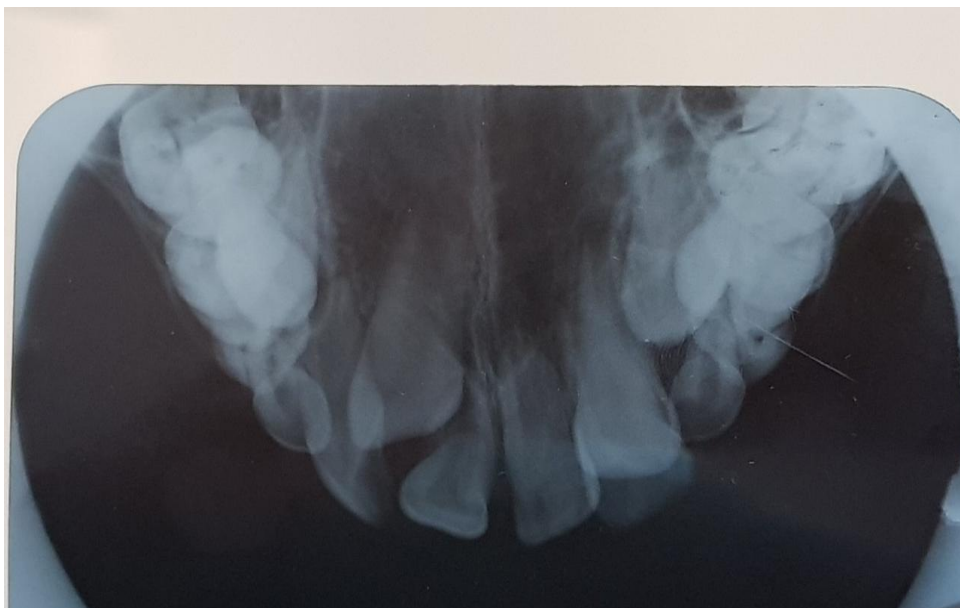


Figure 4. Intraoral occlusal radiograph



Figure 5. Supernumerary teeth



Figure 6. Supernumerary teeth

Discussion

The presence of supernumerary teeth in alveolar bone may cause disturbances to the developing teeth or to eruption of teeth into the oral cavity leading to functional and esthetic problems. Various studies have reported that supernumerary teeth are the most common anomaly in maxillary anterior region like mesiodens [11,12,3]. Mesiodens is seen commonly in pediatric populations and supernumerary teeth are frequent in maxillary posterior region in adults [13,14]. One to four supernumerary teeth appear frequently in maxillary anterior and molar regions, and five or more supernumerary teeth in mandibular premolar region [3,15,16]. Supernumerary teeth may be single or multiple, unilateral or bilateral, erupted or impacted and can appear in one or both jaws. The supernumerary teeth usually cannot erupt and remain impacted, but are discovered during routine radiographic examinations. When they are erupted and clinically evident, they can cause several pathologies such as delayed eruption, tooth displacement, crowding, root resorption of the adjacent tooth and cystic formations [3]. Supernumerary teeth are classified according to the morphology and location as conical, tuberculate, supplemental and odontome [17]. Conical teeth are most commonly present in the permanent dentition. The most common supplemental tooth is the permanent maxillary lateral incisor, but supplemental premolars and molars can also occur. Supernumerary teeth may appear in any part of the dental arches and may involve any tooth; they may be associated with some syndromes or can also be found in nonsyndromic populations [18].

According to Salcido-Garcia [18], the appearance of the supernumerary teeth is more frequent in the first three decades of life than in the elderly. In a study comprising adults, lower frequencies were found (between 0.4% and 1%), and maxilla being the more common location, although they were also found in the posterior sectors of the arch [19,20,21,14]. The location of the supernumerary teeth is the premaxillary zone (mesiodens) in children and the distomolar in adults. Mesiodens can occur individually or as multiples (mesiodentes); may appear unilaterally or bilaterally and often do not erupt [22]. Mesiodentes are frequently associated with various craniofacial anomalies, including cleft and palate lip, Garner's syndrome and cleidocranial dysostosis. They can be classified on the basis of their occurrence in the permanent dentition (rudimentary mesiodentes) or in the primary dentition (supplementary mesiodentes), or they can be classified according to their morphology (conical, tuberculate or molariform) [22,23]. Supplementary mesiodentes look like natural teeth in both size and shape, whereas rudimentary mesiodentes exhibit abnormal shape and smaller size [22]. Supernumerary primary teeth are most mesiodentes or supernumerary lateral incisors [24,25]. Conical mesiodentes usually occur singly, generally peg-shaped and are usually located palatally between the maxillary central incisors, tending to displace the erupting permanent central incisors [22,26,23]. Conical mesiodentes often have a completely formed root and can erupt into the oral cavity [22,27,28]. They may be inverted and occasionally erupted into the nasal cavity [29]. Tuberculate mesiodentes are barrel-shaped, with several tubercles or cusps and have incomplete or abnormal root formation. They rarely erupt themselves, but rather delay eruption of the permanent incisors [22,23]. A third, much rare type is molariform mesiodens which has a premolar-like crown and completely formed root [22].

A mesiodens should be suspected when there is asymmetry in eruption of the maxillary incisors [22,30,31]. Panoramic, maxillary occlusal and periapical radiographs are used to assist in the diagnosis of mesiodentes. Mesiodentes can frequently delay or prevent eruption of central incisors in 26% to 52% of cases, cause ectopic eruption, displacement or rotation of central incisor in 28% to 63% of cases and labially displace incisors in 82% of cases [22]. Less common complications include dilacerations of the developing roots, root resorption, loss tooth vitality, eruption of the mesiodens into the nasal cavity, development of the cyst in 4% to 9% of cases (27-29,32-36). Only 25% of all mesiodentes spontaneously erupt into the oral cavity.

Once a mesiodens has been diagnosed, the clinicians must decide on the treatment they would use. Extraction of supplementary mesiodens in the primary dentition is usually not recommended, because they often erupt into the oral cavity and surgical extraction of unerupted teeth may increase the risk of displacing or damaging the developing permanent incisors [37-39]. Extraction during the early mixed dentition stage allows normal eruptive forces to promote spontaneous eruption of the permanent central incisors after the extraction [34,38,40]. Extraction of mesiodens at the time

appropriate for promoting self-eruption in the early mixed dentition may result in better alignment of the teeth and may minimize the need of orthodontic treatment. Delayed treatment involves extraction of mesiodens when unerupted central incisor apex is almost mature, usually around the age of 10 [39]. If extraction of mesiodens happens later, the permanent teeth will not spontaneously erupt or will be malaligned when it does erupt. By this time the forces that caused normal eruption of incisors are diminished, and surgical exposure and orthodontic treatment are more frequently required [34,40]. Space loss and midline shift of the central incisors may have already occurred by this age, since lateral incisors will have erupted and may have drifted mesially into the central space [26]. Close monitoring of the dentition is required after the extraction of mesiodens. Approximately 6 months after extraction of mesiodens, clinical and radiographic reassessment is recommended to determine if the tooth has erupted. When there is insufficient arch space, additional space can be created orthodontically. If a tooth does not start erupting within 6 to 12 months after extraction of the mesiodens and sufficient arch space is available, surgical exposure and orthodontic eruption of the unerupted incisor are recommended.

Most authors have reported the most common mechanical accident to delayed eruption of the adjacent teeth [41,42].

Therapy includes removal of supernumerary teeth, surgical exposure of impacted teeth and orthodontic treatment. Orthodontic treatment is indicated to direct the eruption of the malposed and often impacted teeth. It is a clinical challenge because of the number of the teeth and the alterations in the shapes. Dental extraction should be done carefully to prevent osseous integrity of the maxilla and mandibula. There is no definite morphologic differentiation between supernumerary and permanent teeth. Most unerupted teeth have alterations of shape that pose difficulties in orthodontic treatment. Therapy should have multidisciplinary approach, where oral surgeon, orthodontist, periodontist and prosthodontist solve this medical and dental problem and they all are in search of obtaining an occlusion that will give the patient normal physiologic conditions and esthetic satisfaction.

Conclusion

Early diagnosis of a mesiodens is important in order to minimize the treatment required and to prevent development of associated problems. When clinicians notice supernumerary teeth during routine clinical and radiographic evaluation, then panoramic radiographs and periapical radiographs are indicated. If supernumerary teeth cause delay or non-eruption of the permanent teeth, displacement, root resorption and cystic formation, then extraction is recommended. Extraction of the mesiodens in early mixed dentition stage may facilitate spontaneous eruption and alignment of incisors while minimizing intervention, space and midline shift. The extraction of asymptomatic supernumerary teeth that does not affect dentition is not necessary, and hence, these teeth should be monitored by periodical examination.

References

1. Pathology of the Hard Dental Tissues.
2. Zhu JF, Marcushamer M, King DL, Henry RJ. Supernumerary and congenitally absent teeth: a literature review. *J Clin Pediatr Dent.* 1996;20:87-95.
3. Rajab LD, Hamdan MA. Supernumerary teeth: review of the literature and a survey of 152 cases. *Int J Paediatr Dent.* 2002;12:244-54.
4. Leko Berrocal MI, Martin Morales JF, Martinez Gonzalez JM. An observational study of the frequency of supernumerary teeth in population of 2000 patients. *Med Oral Patol Oral Cir Bucal.* 2007;12: 134-8.
5. Liu DG, Zhang WL, Zhang ZY, Wu YT, Ma XC. Three-dimensional evaluations of supernumerary teeth using cone-beam computed tomography for 487 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2007;103:403-11.
6. R.S. Omer RS, R.P. Anthonappa, N.M. King. Determination of the optimum time for surgical removal of unerupted anterior supernumerary teeth," *Pediatric Dentistry.* 2010, vol.32,(1), pp.14-20.
7. Ziberman Y, Malron M, Shteyer R. Assessment of 100 children in Jerusalem with supernumerary teeth in the premaxillary region. *J Dent Child.* 1992;59:44-7.

8. Dehdashti M, Gugny P. A propos des polyodonties, proposition d' une approche therapeutique. Rev Orthop Dento Faciale. 1990;24:465-71.
9. Neville B, Damm D, Allen C, Bouquot J. Oral and maxillofacial pathology ;Philadelphia: Saunders; 2002.pp.69-73.
10. Harris EF, Clark LL. An epidemiological study of hyperodontia in American black and whites. Angle Orthod. 2008;78 (3):460-5 .
11. Gabris K, Fabian G, Kaan M, Rozca N, Tarjan I. Prevalence of hypodontia and hyperdontia in paedodontic and orthodontic patient in Budapest. Community Dent Healt. 2006;23:80-2.
12. Fernandez Montenegro P, Valmaseda Castellon E, Berini Aytes L, Gay Escoda C. Retrospective study of 145 supernumerary teeth. Med Oral Patol Oral Cir Bucal. 2006;11:339.
13. Menardia-Pejuan V, Berini-aytes L, Gay-Escoda C. Supernumerary molars. A of 53 causes. Bull Group Int Rech Sci Stomatol Odontol. 2000;42:101-5.
14. Barrett AP, Waters BE, Griffiths CJ. A critical evaluation of panoramic radiography as a screening procedure in dental practice. Oral Surg Oral Med Oral Pathol. 1984;57:673-6.
15. Yusof WZ. Non-syndrome multiple supernumerary teeth: literature review. J Can Dent Assoc. 1990;56:147-9.
16. Acikgoz A, Acikgoz G, Tunga U, Otan F. Characteristics and prevalence of non-syndrome multiple supernumerary teeth: a retrospective study. Dentomaxillofac Radiol. 2006;35:185-90.
17. R Rajendran, B Sivapathasundharam editors, Shafer's textbook of Oral Pathology. 6th edition, Elsevier publications. 1975; p 46.
18. Salcido JF, Ledesma C, Hernandez F, Perez D, Garces M. Frecuencia de dientes supernumeraries en una poblacion Mexicana. Med Oral Patol Oral Cir Bucal 2004;9:403-9
19. Byrgess JO. Apanoramic radiographic. Analysis of Air Force basic trainees. Oral Surg Oral Med Oral Pathol 1985;60:113-21.
20. Langland OE, Langlais RP, Morris CR, Preece JW. Panoramic radiographic survey of dentist participating in ADA health programs 1976, 1977 and 1978. J Am Dent J. 1980;101:278-82.
21. Osborne GE, Hemmings KW. A survey of disease changes observed on dental panoramic tomographs taken of patients attending a periodontology clinic. Br Dent J .1992;173:166-8.
22. Primosch RE. Anterior supernumerary teeth-assessment and surgical intervention in children. Pediatr Dent. 1981;3(2):204-15.
23. Foster TD, Taylor GS. Characteristics of supernumerary teeth in the upper central incisor region. Dent Pract Dent Rec. 1969;20(1):8-12.
24. Luter JR. The prevalence of supernumerary teeth in primary and mixed dentitions. J Dent Child. 1967;34(5):346-53.
25. Ravn JJ. Aplasia, supernumerary teeth and fused teeth in the primary dentition. An epidemiologic study. Scand J Dent Res. 1971;79(1):1-6.
26. Hattab FN, Yassin OM, Rawachdeh MA. Supernumerary teeth: report of three causes and review of the literature. ASDC J Dent Child. 1994;61(5-6):382-93.
27. Thawley KL, LaFerriere KA. Supernumerary nasal tooth, Laryngoscope 1977;87(10pt1):1770-3
28. Di Biase DD. The effect of variations in tooth morphology and position on eruption. Dent Pract Dent Rec. 1971;22(3):95-108.
29. Atas M, Orguneser A. Impacted mesiodens: a case report. J Clin Pediatr. Dent. 1999;23(2):143-5.
30. Von Arx T. Anterior maxillary supernumerary teeth: a clinical and radiographic study. Aust Dent J. 1992;37(3):189-95.
31. Konchak PA, Lanigan DT. The management of impacted maxillary incisors secondary to supernumeraries. Oral Health. 1985;75(10):59-61.
32. Brook AH. A unifying aetiological explanation for anomalies of human tooth number and size. Arch Oral Biol. 1984;29(5):373-8.
33. Lustmann J, Bodner L. Dentigerous cysts associated with supernumerary teeth. Int J Oral Maxillofac Surg. 1988;17(2):100-2.
34. Tay F, Pang A, Yuen S. Unerrupted maxillary anterior supernumerary teeth report of 204 cases. ASDC J Dent Child. 1984;51(4):289-94.
35. Kessler HP, Kraut RA. Dentigerous cyst associated with an impacted mesiodens. Gen Dent. 1989;37(1):47-9.

36. Nazif MM, Ruffalo RC, Zullo T. Impacted supernumerary teeth: a survey of 50 cases: J An Dent Assoc. 1983;106(2):201-4.
37. Humerfelt D, Hurlen B, Humerfelt S. Hyperdontia in children below four years of age: a radiographic study. ASDC J Dent Child 1985;52(2):121-4.
38. Solares R. The complications of late diagnosis of anterior supernumerary teeth: case report. ASDC J Dent Child. 1990;57(3):209-11.
39. Henry RJ, Post AC. A labially positioned mesiodens: case report. Pediatr Dent 1989;11(1):59-63.
40. Witsenburg B, Boerig G. Eruption of impacted permanent upper incisors after removal of supernumerary teeth. Int J Oral Surg. 1981;10(6):423-31.
41. Gay C, Mateos M, Espana A, Gargallo J. Otras inclusiones dentarias: Mesiodens y otros dientes supernumerarios. Dientes temporales incluidos. En: Gay C, Berini L, eds. Cirugía Bucal. Madrid: Editorial Ergon, Madrid; 1999. p. 511-50.
42. Dauder D, Penarrocha M, Sanchis JM. Estudio retrospectivo de dientes supernumerarios de 1013 pacientes. Anales Odo.