Research Article

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CBCT Evaluation of Impacted Mesiodens

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ABSTRACT

Background: Aim of this paper is to analyze the 3D characteristics of impacted mesiodens using Cone-beam computed tomography (CBCT). A retrospective study conducted and only impacted mesiodens were analyzed for shape, size, and position and their effect on adjacent anatomical structures. As early diagnosis & management of impacted supernumerary tooth is important to prevent disorders associated with them like diastema, delayed eruption & odontogenic cysts or tumors. 10 cases of impacted mesiodens are reviewed through CBCT.

Keywords: CBCT, Mesiodens, radiology.

INTRODUCTION

An impacted tooth is one that is embedded in the alveolus, so that its eruption is prevented or the tooth is locked in position by bone or the adjacent teeth.[1] Mesiodens is a supernumerary tooth present between central incisors usually with maxilla and rarely with mandibular teeth.[2] A supernumerary tooth is that which is additional to the normal series and can be found in any region of the dental arch.[3] They can be single or multiple, unilateral or bilateral, impacted or erupted; their morphology can be altered or normal and both dentitions can be affected.[4] Mesiodens are often impacted & also frequently associated with various craniofacial anomalies, such as cleft lip and palate, as well as cleidocranial dysplasia or Gardner syndrome.[5]

Many published cases of supernumerary teeth, such as mesiodens mentioned recurrence within the same family[6]. Possibility of an autosomal dominant trait with lack of penetrance in some generations[7] & a combination of genetics and environmental factors[8] to explain the occurrence of supernumerary teeth has been explained as etiological factor. Cone Beam Computed Tomography is newer radiographic diagnostic tool which has revolutionized the dental diagnosis and treatment planning through better understanding of anatomical structures and evaluating the pathology and disease in three dimension.

MATERIAL & METHOD

The study consisted of 800 cases of CBCT taken from September 2012 to September 2014 for different diagnostic purposes like implant analysis, pathologies, trauma, Endodontic evaluation etc. Ten Mesiodens cases were included in the study. The 384 scans of anterior maxilla were selected. The field of view for each scan was 5cmmX5cmm except case number two where the field of view was 10cmmX5cmm. These scans were evaluated by two different maxillofacial radiologists for resorption, shape, size, position and effect of Mesiodens on the adjacent teeth was evaluated.

According to morphology mesiodens can be classified into 3 types; conical, supplemental and tuberculate type. Conical mesiodens are peg shaped, develops with root formation ahead of or at an equivalent stage to that of the central incisor. The

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Table 1: Description of number, orientation, position and morphology of impacted mesiodens.

Cases	***No. of Mesiodens***	***Orientation*** Vertical/ Inverted/ Horizontal	***Sagittal position*** Palatal/ On arch/ Buccal/ Oblique	***Size(mm)*** Width * Length	***Morphology*** Conical/ Tuberculate/ Supplemental
Case 01	01	Inverted	Palatal	04.2 * 09.0	Conical
Case 02	02	Horizontal	Palatal	i. 04.2 * 12.3 i. 05.1 * 10.9	Conical
Case 03	01	Vertical	Palatal	06.9 * 13.0	Tuberculate
Case 04	01	Inverted	Palatal	05.0 * 09.8	Conical
Case 05	01	Vertical	Palatal	05.1 * 14.5	Conical
Case 06	01	Vertical	Palatal	06.2 * 14.3	Conical
Case 07	01	Inverted	Palatal	04.1 * 10.6	Conical
Case 08	01	Vertical	Palatal	02.9 * 07.6	Conical
Case 09	01	Horizontal	Palatal	04.6 * 12.5	Conical
Case 10	01	Horizontal	Palatal	04.5 * 11.8	Conical

Tuberculate or multicusped Mesiodens are more common in permanent dentition and usually remain unerupted. Their root formation is delayed compared with that of the adjacent teeth. Tuberculate mesiodens often interferes with the eruption of incisors.[9] The other type of Mesiodens is called as Supplemental Mesiodens seen more frequent in primary dentition. It resembles the tooth of the normal series and rarely remains unerupted.[10]

The following factors were evaluated for individual cases. Orientation (Vertical/ inverted/ horizontal.), Sagittal position (Palatal /on arch/ buccal/oblique), Morphology like Conical, tuberculate, supplemental. Following outcome is generated as given in table number 1. The 3 dimensional view of the mesiodens is depicted from Figure 1 to Figure 10.

RESULTS

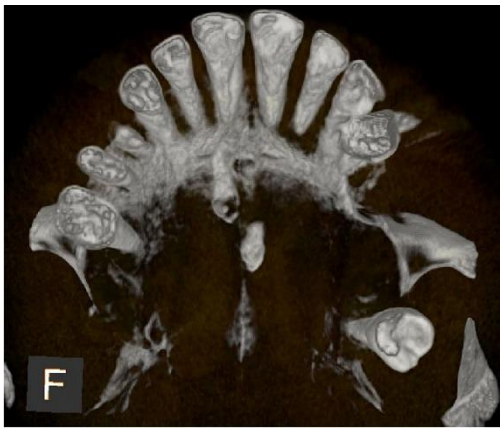
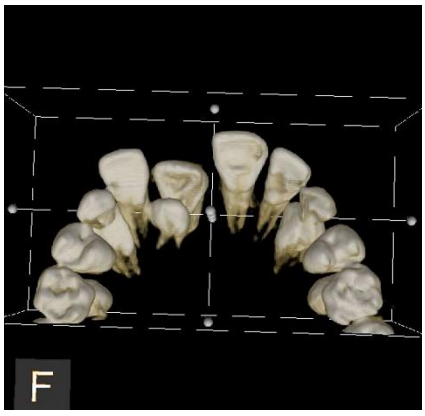
Machine factors FOV:

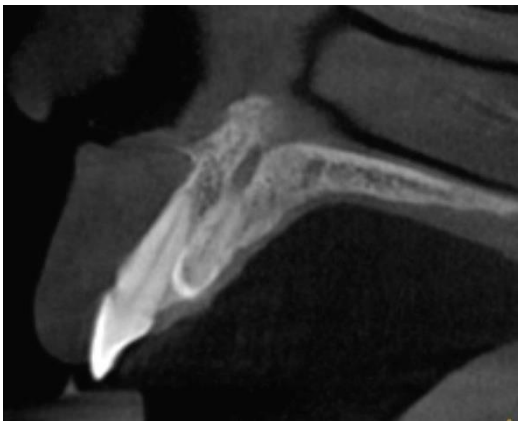
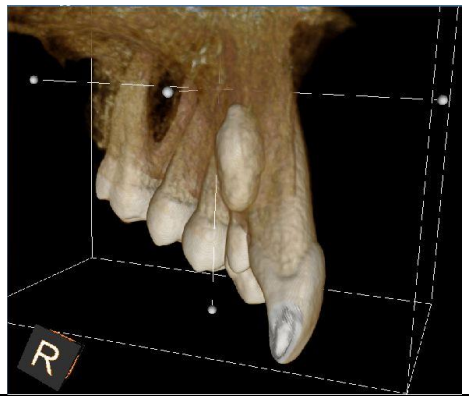
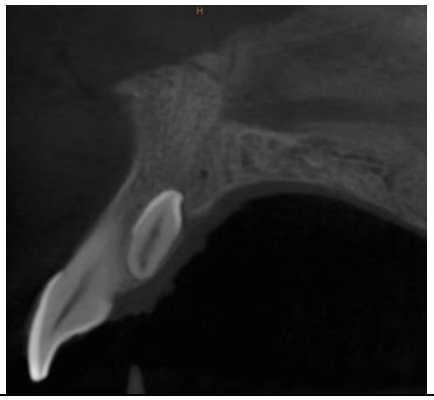
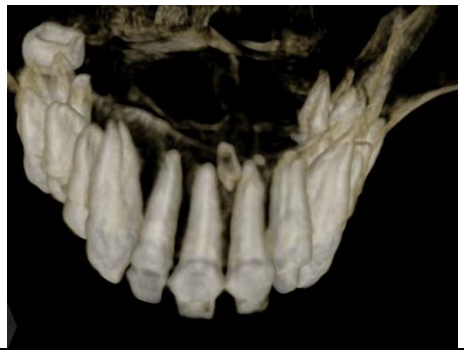
The machine used was ***Carestream CS 9300 fov***. During examination observers evaluated the position of the impacted mesiodens in all planes and in 3D volumetric views. Close observation made by both observers for any kind of effect like resorption of adjunct teeth, resorption of alveolar bone, displacement of drifting of adjacent tooth structures etc. Both the observers evaluated the findings separately and then after discussion on disagreements a final outcome given and reported into the data table (Table 1)

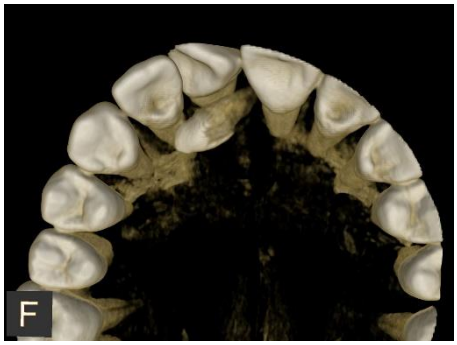
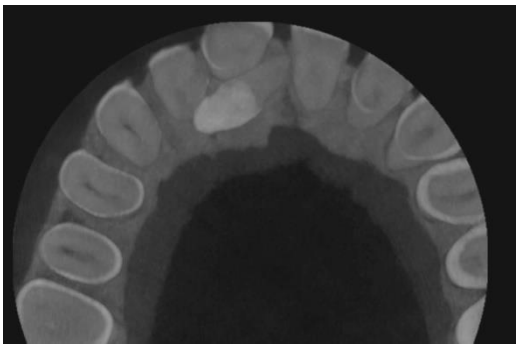
DISCUSSION

Supernumerary teeth are five times more common in permanent dentition. Among them mesiodens is most common, occurring in 0.15–1.9% of the general population.[11] A recent Indian study reported a higher prevalence of 3.18 %. The literature reports that upto 90% of all supernumerary teeth occur in the maxilla.[12] The etiology of supernumerary teeth is debatable. Many theories have been suggested initially it was thought that mesiodens represented a phylogenetic relic of extinct ancestors who had 3 central incisors,[13] known as phylogenetic reversion (atavism), has now been largely discarded by embryologists. Another theory known as dichotomy suggests that the tooth bud is split to create 2 teeth, one of which is the mesiodens.[14] It was assumed that dichotomy represents complete germination, which also occurs frequently in the anterior maxilla. The third and most acceptable theory, states that remnants of the dental lamina are induced to develop into an extra tooth bud, resulting in a supernumerary teeth.[15]

Heredity may also play a role in the occurrence of this anomaly, as supernumeraries are more common among family members than in the general population. However, the anomaly does not follow a simple Mendelian pattern.[16] Supernumerary teeth,

Case 1		
Case 2		
Case 3		
Case 4		

Case 5		
Case 6		
Case 7		
Case 8		

Case 9		
Case 10		

particularly in the pre-maxilla area are frequently pre-disposes to pathologies including tooth ectopic eruption, retention, late eruption, tip and torque alterations, rotation, cysts, and root resorption. Early diagnosis is important to prevent any these conditions.

Supernumerary teeth, particularly in the pre-maxilla area, frequently pre-dispose pathologies including tooth retention, late eruption, ectopic eruption, tip and torque alterations, rotation, cysts, and root resorption. These disorders are strictly determined by the space interference of supernumerary teeth on contiguous teeth during the stages of development.[17] Eduardo Kazuo Sannomiya reported 2 cases, the first describes an 8-year-old girl with dens invaginatus in a mesiodens; the second report describes a 16-year-old boy presenting with 2 mesiodens, both associated with dens invaginatus.[18] A case of dentigerous cyst with mesiodense has also been reported by many authors.[19,20]

An early diagnosis is clearly indispensable to prevent any worse consequences. This is the main reason why it is important to study in depth human anomalies tooth number and their genetic aetiology.

In our case series, all of the teeth are placed/impacted over the palatal aspect however very few case reports are published where the mesiodens are place on the labial aspect. Figure 1 to 11 depicts the position and location of the mesiodens through CBCT. Most of the supernumerary teeth lay palatal to the central incisors. Asaumi JI et al. evaluated 147 mesiodens and found that 89% were located palatally, 11% overlapped the dental arch and none were placed labially.[17] In our 10 cases described here 11 mesiodens were located palatally & only one was placed in between the central incisors. Other studies also supported the same findings.[18, 19]

In our case series the family history and familial pattern were not included as it was a retrospective study. As all of the patients reported for CBCT evaluation for various dental complaints, not

specifically for the mesiodens so the intraoral periapical views or OPG were not taken to differentiate the image quality and amount of information between the intraoral views, OPG and CBCT.

With the help of CBCT it was easy to exactly localize the position of the mesiodens over the palatal aspect, which helped the patient during the management. As given in Table 1, the exact size, location and its relation with the adjacent teeth can be viewed and evaluated with the help of CBCT. Although most of the impacted or erupted cases of mesiodens are vertically positioned followed by horizontal and very rarely inverted in position. CBCT is newer technology which has significantly helped in deciding the treatment plan management of the patients.

Panoramic radiography alone is not sufficient for determining the exact location of supernumerary and impacted teeth, due to the image superimposition.[21] CBCT seems to be a good tool for the evaluation, accurate diagnosis, and determination of the location of mesiodens and impacted teeth. The morphology of the mesiodens and exact 3D positioning of the impacted permanent teeth was better analyzed in CBCT analysis.[22,23]

CONCLUSION

CBCT is important in evaluation of the exact position, location, orientation and shape of the mesiodens. It also given better information of the effect of mesiodens on the adjacent teeth like root resorption, displacement and obstruction in eruption.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Dorland's' illustrated medical dictionary. 25thed. Philadelphia: WB Saunders; 1974. p. 767

2. Neeraja R, Kayalvizhi G and Muqueeth Baig: Mandibular mesiodens and maxillary mid-palatal Mesiodens: Rare occurrences.Pediatric Dental Journal 20(2): 186–188, 2010.

3. Garvey MT, Barry HJ, Blake AM. Supernumerary teeth- An overview of classification, diagnosis and Management. J Can Dent Assoc 1999; 65:612-6

4. FatihKazanci, MevlutCelikoglu, OzkanMilogl , Ismail Ceylan & Hasan Kamak: Frequency and distribution of developmental anomalies in the permanent teeth of a Turkish orthodontic patient population. Journal of Dental Sciences (2011) 6, 82e89

5. Takashi Nakamura, Satoshi Fukumoto: Genetics of supernumerary tooth formation. Journal of Oral Bio sciences 55(2013)180–183

6. C.M. Marya, B.R. Kumar, Familial occurrence of mesiodents with unusual findings: case reports, Quintessence Int. 29 (1998) 49e51.

7. H.O. Sedano, R.J. Gorlin, Familial occurrence of mesiodens, Oral Surg. Oral Med. Oral Pathol. (1969) 360e361

8. A.H. Brook, A unifying aetiological explanation for anomalies of human tooth number and size, Arch. Oral Biol. 29 (1984) 373e378.

9. Garvey MT, Barry HJ, Blake M. Supernumerary teeth -an overview of classification, diagnosis and management. J can Dent Assoc 1999;65:612-6

10. Mukhopadhyay S. Mesiodens: a clinical and radiographic study in children. J Indian SocPedodPrev Dent. 2011;1(29):34–8. pdf

11. Whittington BR, Durward CS. Survey of anomalies in primary teeth and their correlation with the permanent dentition. N Z Dent J 1996 Mar;92(407):4-8.

12. Rajab LD, Hamdan MA. Supernumerary teeth: review of the literature and a survey of 152 cases. Int J Paediatr Dent 2002 Jul;12(4):244-54.

13. Tay F, Pang A, Yuen S. Unerupted maxillary anterior supernumerary teeth: report of 204 cases. ASDC J Dent Child 1984 Jul-Aug;51(4):289-94.

14. Russell K, Folwarczna M. Mesiodens—diagnosis and management of a common supernumerary tooth. J Can Dent Assoc. 2003;69(6):362–6.

15. Khandelwal VN, Nayak AU, Naveen RB, et al. Prevalence of mesiodens among six-to seventeen year old school going children of indore. J Indian SocPedodPrev Dent. 2011;29(4): 288–93.

16. Can Dent Assoc 2003; 69(6):362–6, Mesiodens — Diagnosis and Management of a Common Supernumerary Tooth Kathleen A. Russell, Magdalena A. Folwarczna

17. Belleggia F, Ricci S, Cecchetti F, Gargari M, Arcuri C. Valutazione clinica e terapeutica dei denti soprannumerari. Ital Oral Surg 2006;5:31–4

18. Kazuo Sannomiya Eduardo, Asaumi Jun-Ichi, Kishi Kanji. Rare associations of dens invaginatus and mesiodens. Oral Surg Oral Med Oral Pathol Oral Radiol Endod . 2007;104: e41-e44

19. Dinkar AD, Dawasaz AA, Shenoy S. Dentigerous cyst associated with multiple mesiodens: A case report. J Indian Soc Pedod Prev Dent. 2007;25:56–9.

20. Vayapuri Ravi,B Sekar,Dominic Augustine,S Murali Dentigerous cyst involving an inverted mesiodens—a rare report with unusual findings.Indian Journal of Dentistry.2012;3(1)37

21. D. G. Liu, W. L. Zhang, Z. Y. Zhang, Y. T. Wu, and X. C. Ma, "Three-dimensional evaluations of supernumerary teeth using cone-beam computed tomography for 487 cases," Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontology, vol. 103, no. 3, pp. 403–411, 2007.

22. T. Sawamura, K. Minowa, and M. Nakamura, "Impacted teeth in the maxilla: usefulness of 3D Dental-CT for preoperative evaluation," European Journal of Radiology, vol. 47, no. 3, pp. 221–226, 2003.

23. Vecchione Gurgel C, Soares Cota AL, Yuriko Kobayashi T, Moura Bonifácio Silva S, Aparecida Andrade Moreira Machado M, Rios D, et al. Bilateral Mesiodens in Monozygotic Twins: 3D Diagnostic and Management. Case Rep Dent. 2013;2013:193614.