Case Report

Mesiodens: Orthodontic Management of a Commonly Occurring Supernumerary Tooth

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Abstract: A supernumerary tooth is the one present in addition to the normal series of deciduous or permanent dentition. It may occur anywhere in the mouth. Mesiodens are the most common supernumerary teeth in anterior maxilla, occurring in 0.15% to 1.9% of the population, more commonly seen in permanent dentition. Given its high frequency and role in maxillary anterior crowding, an orthodontist should be knowledgeable about the signs and symptoms of mesiodens and appropriate treatment. The cause of mesiodens is not fully understood, although proliferations of the dental lamina and genetic factors have been implicated. Mesiodens can cause delayed or ectopic eruption of the permanent incisors, which can further alter occlusion and appearance. It is therefore important for the clinician to diagnose a mesiodens early in development to allow for optimal yet minimal treatment. This case report shows successful treatment of a class I malocclusion with mild maxillary and mandibular anterior crowding and mesiodens present between 11 and 21. The treatment objectives were to achieve a pleasing profile and smile by correcting maxillary and mandibular anterior crowding and proclination after removal of mesiodens.

Keywords: Cleidocranial dysplasia; Maxilla; Orthodontics; Supernumerary tooth.

INTRODUCTION

Bolk in 1917 coined the term mesiodens to denote an accessory or supernumerary tooth situated in between the maxillary central incisors.[1] Mesiodens are the most common supernumerary teeth in anterior maxilla, occurring in 0.15% to 1.9% of the population, more commonly seen in permanent dentition.[2] Frequency of mesiodens in the pediatric population in Northern and Southern India has been reported to be 1.4% and 1.24% respectively.[3, 4]

A mesiodens is usually a small tooth with a cone or peg shaped crown and a short root. The presence of a mesiodens should be suspected if there is a delayed eruption of or impacted permanent maxillary incisors or if the central incisors are displaced, rotated or exhibiting an abnormal midline diastema. They can also be seen associated with maxillary anterior crowding, loss of tooth vitality due to root resorption, dentigerous cyst or with Cleidocranial dysplasia, Gardner's syndrome, cleft lip & palate etc.[5]

The etiology of mesiodens is not completely understood, although proliferations of the hyperactive dental lamina and genetic factors have been implicated. Early extraction of supernumerary tooth is advocated to reduce treatment time and complications.

CASE REPORT

A 17-year-old male patient reported to the department of Orthodontics with the chief complaint of irregularly placed upper and lower front teeth. No familial history of similar malocclusion was noted. On extraoral examination, no gross facial asymmetry was found. Patient had a Leptoproscopic facial form with convex facial profile and competent lips. The smile was complex and non-consonant.

Intraoral examination revealed permanent dentition with presence of a mesiodens in relation to 11 and 21, which had displaced 21, labially. Molars and canines were in a Class I relationship bilaterally. There was crowding in relation to maxillary and mandibular anterior region and mesial rotation in relation to 15. An overjet of 5mm and overbite of 4.5mm was present. The panoramic findings revealed presence of a mesiodens in relation to 11 and 21 with no associated pathology. The cephalometric findings a Skeletal Class I relationship (SNA 78°, SNB 76°, ANB 2°) with Average growth pattern (GoGn-SN 32°, FMA 26°). The upper incisors were proclined and forwardly placed (UI-NA 40°/9mm) and lower incisors were retroclined and

backwardly placed LI-NB 20°/4mm) (Table 1 (Fig 1 A,B).

TABLE 1: Comparison of pre and post treatment cephalometric variables.

Cephalometric variables	Pre-treatment values	Post-treatment values
SNA	77°	78°
SNB	75°	76°
ANB	2°	2°
SN-GoGn	32°	31°
FMA	26°	28°
Facial Convexity	2mm	1mm
UI-NA	40°/9mm	30°/6mm
LI-NB	20°/4mm	25°/5mm
Nasolabial angle	95°	101°
Upper lip to E plane	-1.0mm	-1mm
Lower lip to E plane	3mm	2mm

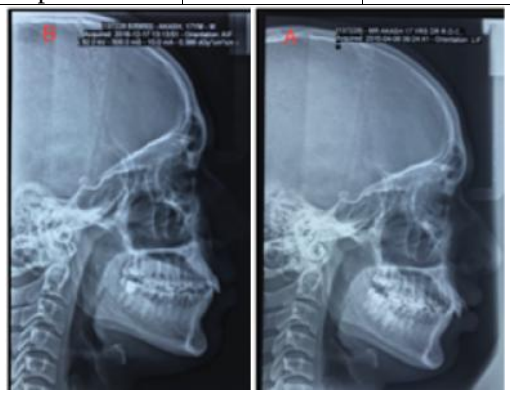

Figure 1: *Lateral Cephalogram showing Pre (A) and post (B) treatment skeletal and dental characteristics of the patient*

Study model analysis revealed spacing in maxillary arch by 2.62mm and tooth material excess in mandibular arch by 2.04mm.According to Bolton's analysis, there was 0.95mm of mandibular anterior excess and 1.6mm of maxillary overall excess. The patient was diagnosed to have a skeletal class I relationship with average growth pattern, Angle's class I malocclusion, Rickett's Class I canine relationship, proclined and crowded maxillary and mandibular anteriors, mesiodens present between 11 and 21, deep bite and increased overjet. The treatment objectives were to remove the supernumerary tooth (mesiodens), correct maxillary and mandibular anterior crowding and proclination, to close the midline diastema that appeared after mesiodens extraction, to attain proper overjet, overbite and an esthetic smile with pleasing soft tissue profile. Treatment plan included extraction of mesiodens wrt 11 and 21 followed by fixed mechanotherapy using preadjusted appliance with 0.022X0.028 MBT bracket setup. Transpalatal arch was planned in the upper arch for anchorage.

TREATMENT PROGRESS

The maxillary arch was prepared by banding 16 and 26 and placing a transpalatal arch for anchorage after the mesiodens was removed.Brackets were then bonded in the maxillary teeth and 0.014" NiTi archwire was placed. In the next appointment lower bonding was done and 0.016" NiTi was placed in both upper and lower arches followed by 0.016" SS, 0.018" NiTi, 0.018" SS 0.017x0.025"NiTi respectively in the subsequent appointments. Finally 0.017x0.025" SS archwire with toe in bends to correct rotation wrt 16 and open coil spring between 14 and 16 to obtain sufficient space for 15 to derotate into position was placed. Bite blocks were given. 1maxillary second premolar was banded initially with buttons welded on mesial and distal aspect. The teeth 13 to 26 were consolidated and a button was bonded on palatal aspect of 13. Couple force was applied using E-chain from 13 to 15 and 16 to 15. Force system was reactivated at consequent appointments until 15 was completely de-rotated. Following this, 15 was bracketed and 0.016" NiTi was placed in upper arch. 0.016", 0.018", 0.017x0.025" reverse curve NiTi respectively were placed in the upper arch in the subsequent appointments to correct the deep bite. Exaggerated curve of spee on 0.017x0.025" SS followed by 0.019"X0.025" SS stabilizing archwires were ligated in the upper arch.

Once the arches were fully aligned, finishing and detailing of teeth was done with 0.014" NiTi archwires. Following debonding, upper and lower Hawley retainers were used for retention. The patient was advised to wear the retainers full time for 6-8 months, and then nighttime use might be sufficient as long as he could. He was instructed for a quarterly follow up schedule. Post treatment

cephalometric values revealed improvement in the axial inclination and position of upper and lower incisors (UI-NA 30°/6mm, LI-NB 25°/5mm) (Table 1). An esthetic smile (Figure 2 A, B), a pleasing profile (Figure 3 A, B), Class I molar relation, corrected axial inclinations of maxillary and mandibular teeth (Figure 4 A, B), adequate overjet and overbite, were obtained at the end of the treatment.

Figure 2: Frontal smile photographs showing Pre (A) and post (B) treatment facial and smile characteristics of the patient.

Figure 3: *Profile photographs showing Pre (A) and post (B) treatment profile characteristics of the patient.*

Figure 4: *Intraoral frontal photographs showing Pre (A) and post (B) treatment changes in dental features of the patient after removal of mesiodens followed by orthodontic treatment.*

DISCUSSION

Mesiodens are the most common supernumerary teeth in anterior maxilla, occurring in 0.15% to 1.9% of the population, more commonly seen in permanent dentition.[2]Frequency of mesiodens in the pediatric population in Northern and Southern India has been reported to be 1.4% and 1.24% respectively.[3, 4] Interference with the eruption and alignment of the adjacent teeth, delayed or noneruption of maxillary incisors, radicular resorption and dentigerous cyst formationare commonly observed complications in relation with Mesiodens.

The case described above represents only one aspect of treatment of cases involving supernumerary teeth, Mesiodens in this case. It is essential to enumerate and identify the dentition clinically and radiographically or with the aid of a three dimensional Cone Beam Computed Tomography (CBCT) image[6] before a definitive diagnosis and treatment plan can be formulated. The presence of an undiscovered supernumerary tooth may obstruct orthodontic space closure. Treatment in cases with supernumerary teeth may vary from extraction alone or coupled with orthodontic correction to establish a good aesthetic as well as occlusion.[7]

In the present case, it was decided to extract the mesiodens for the proper alignment of the teeth. Not all situations lend themselves to ideal treatment results. Interceptive treatment, if timed properly following clinical detection of an abnormal eruption pattern may help negate the negative effect caused by the supernumerary tooth on the adjacent teeth as well as the occlusion overall. Hogstrum and Andersson[8]suggested two alternatives to interceptive treatment. First was removal of the supernumerary as soon as it has been diagnosed. This has been said to cause de-vitalization or deformation of adjacent teeth. Second alternative to this was to leave the tooth in position until root development of the adjacent teeth is complete. The potential disadvantages associated with this deferred surgical plan include; loss of eruptive force of adjacent teeth, loss of space and crowding of the affected arch, and possible midline shifts.

Gündüz et al.[9]reported that 38.8% of the 85 extracted mesiodens delayed eruption of permanent incisors, diastema in 17.6% cases, ectopically erupted incisor in 16.4% cases and root resorption of adjacent teeth in 4.7% cases. Spontaneous eruption following supernumerary removal is suggested to be in the range of 54% to 75%. [10,11] DiBiase[11]suggests that most teeth experiencing delayed eruption will spontaneously erupt within 18 months of supernumerary removal alone, providing the delayed tooth is not excessively displaced.

CONCLUSION: The above case report shows successful orthodontic management of the supernumerary tooth (mesiodens) simultaneously, while achieving a Class I molar relation, corrected axial inclinations of maxillary and mandibular teeth, adequate overjet and overbite resulting in a pleasing profile and esthetic smile. To summarize, it can be said that early diagnosis and appropriate management can minimize the potential complications caused by supernumerary tooth. Irrespective of the etiology, the practitioner should recognize the signs suggesting the presence of supernumerary tooth. Orthodontic intervention in time is immensely beneficial to patients from esthetic and functional point of view.

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