Innovative biomechanics for orthodontic correction of torsiversion of maxillary central incisor caused by twin mesiodens

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Abstract

Mesiodens is the most common type of supernumerary teeth found in the premaxilla between the two central incisors. Early and proper diagnosis and appropriate treatment plan is critical in eluding the extent of treatment needed. This case report presents the successful orthodontic and esthetic management of an unusual case of Indian origin with twin mesiodens in the maxillary arch causing torsiversion and attrition of mandibular incisors due to occlusal trauma.

Keywords: Mesiodens, supernumerary, torsiversion

Introduction

Tooth development involves a complex interaction of physiologic growth processes and morphologic stages to achieve tooth's final form and structure. Interference in the initiation stage may result in single or multiple supernumerary teeth. Prevalence of supernumerary teeth ranges from 0.1% to 3.6% of which mesiodens comprise one-third. Incidence of mesiodens of 1.6% and distribution of 87%, 12%, and 1% with one, two, and multiple supernumerary teeth respectively has been reported. Mesiodens may cause delayed or impaired eruption, displacement, rotation, dilacerations, root resorption, crowding, diastema, cyst formation, infection, or mesiodens pulpitis. Therefore, timely and appropriate management is essential to evade complex treatment procedures later.

Case Report

The case we present here is about a 15-year-old boy reported with the chief complaint of malaligned upper front teeth causing unesthetic appearance. There was no relevant family history. Patient had mesoprosopic face, potentially competent lips and convex profile. He had permanent dentition with a full complement of teeth until second molar in both arches and Angles' class I molar relation both sides. Two conical mesiodens were diagnosed one present in the midline and other present palatal to former. Right and left central incisor had 180° and 90° torsiversion, respectively [Figure 1]. Lower right central incisor had gingival recession may be due to occlusal trauma from mesiodens. Mild generalized fluorosis was present. Lateral cephalogram, orthopantomograph and maxillary occlusal radiographs were taken to evaluate the status of the mesiodens along with complete dentition [Figure 1, Table 1]. Radiographs showed two conical shaped mesidens in the midline with completely formed short roots and no associated root resorption or pathology. Model analysis showed 2 mm spacing in the maxillary arch and 2.5 mm of tooth material excess in the mandibular arch and Boltons discrepancy with 1 mm excess of tooth material in mandibular anterior region.

Treatment plan

After a detailed examination the decision was made to:
• Extract the two mesiodens to relieve the patient of his problems associated with speech and appearance
• Align upper and lower arches with fixed orthodontic appliance
• Management of Boltons discrepancy and lower crowding by proximal stripping of lower anteriors.

Treatment progress

Orthodontic treatment was carried out with fixed mechanotherapy using standard edgewise appliance (0.022” × 0.028”). Two lingual buttons were bonded on each central incisor and derotation was done initially with elastomeric chain [Figure 2a and b]. The initial derotation took 4 months. The final derotation was done with 0.016” stainless steel multi-loop wire ligated in the brackets bonded on central incisors [Figure 2c and d]. After complete
derotation spacing of 4.5 mm was present in the maxillary arch with 1 mm of overjet. To enable space consolidation bite opening was done with 0.018” stainless steel wire with second order bends and curve of spee and palatal root torquing of incisors was done in 0.019” × 0.025” stainless steel wire for 4 months followed by elastomeric chain from right first molar to left first molar. Proximal stripping was done (2.5 mm) in mandibular anterior region to relieve minimal crowding and eliminate Bolton discrepancy followed by finishing for 4 months. Finally, composite restoration was done on attrited left maxillary and mandibular central incisors to enhance esthetics. Supracrestal fiberotomy was done to prevent derotation. Fixed spiral space maintainer was bonded in both arches and case debonded after 1 year 8 months of active treatment [Figure 3].

Discussion

Management of supernumerary teeth depends on the type and position of the tooth requiring analysis of all the clinical and radiographic findings. In the clinical management of mesiodens very often there is confusion whether and when they can be extracted. If teeth are causing no complications and are not likely to interfere with orthodontic tooth movement they can be monitored with yearly radiographic review, but if associated with complications, it is usual to extract such teeth. In this particular case, considering the age of the patient as well as the problems associated with the mesiodens, extraction of the mesiodens was carried out, since both maxillary central incisors had totally erupted showing complete root formation according to delayed approach of extraction of mesiodens. An innovative mechanism of using reciprocal anchorage for correction of torsiversion in central incisors was used. Two anchor units were made by the figure of eight ligature and 0.018” sectional stainless steel wire from lateral incisor to molar on both sides. Lingual buttons were bonded on distopalatal and mesiobuccal surface of both central incisors. First elastomeric chain was given from distopalatal lingual button on right central incisor to right molar hook. Second elastomeric chain was given from mesiobuccal lingual button on left central

| Table 1: Cephalometric analysis |
|-------------------------------|
| Cephalometric analysis | Pre-treatment | Post-treatment |
| IMPA | 107° | 107° |
| FMA | 15.5° | 16.5° |
| ANB | 1° | 1° |

IMPA: Incisor mandibular plane angle; FMA: Frankfort mandibular plane angle; ANB: Point A-nasion-point B

Figure 2: Line diagram of biomechanics used. (a) Beginning of derotation with elastomeric chain. (b) Derotation in progress with elastomeric chain after repositioning of lingual buttons. (c) Derotation with 0.016” stainless steel multi-loop wire. (d) After complete derotation

Figure 1: Pre-treatment records
incisor to left molar hook. A third elastomeric chain was given from mesiobuccal lingual button on right central incisor to distopalatal lingual button on left central incisor [Figure 2a]. The difficulty encountered during this derotation was a need to reposition distopalatal lingual buttons of both central incisors for effective force application [Figure 2b] and hindrance from mandibular incisors. Glass ionomer cement blocks were given on posterior mandibular teeth to raise the bite and prevent hindrance from mandibular incisors during derotation. The case also had Bolton discrepancy of 1 mm which was managed by proximal stripping in mandibular anteriors because of increased mandibular tooth material and incisor mandibular plane angle. Therefore, the authors were successful in timely management of a case of twin mesiodens, which was of great esthetic concern to the parents and helped to prevent development of psychological trauma to the child and to eliminate complications due to mesiodens.

Conclusions

This paper reports an innovative orthodontic and esthetic management of a patient with erupted twin mesiodens, which had caused torsiversion of maxillary central incisors and attrition due to occlusal trauma.

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