

Orthodontic Management of Ectopically Erupted Maxillary Central Incisor: A Case Report

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ABSTRACT

Maxillary anterior teeth is often referred to as “social six”; if ectopically placed affects the quality of life of the patient. This article presents a case report of skeletal class II patient with Angle’s class II malocclusion and ectopically erupted right maxillary central incisor which is managed with fixed orthodontics. This highlights the importance of proper history taking, careful examination, and proper investigations in reaching the diagnosis and formulation of treatment plan. This case report also explains how the piggyback technique can be used for the traction of ectopically placed maxillary incisor and bring about satisfactory result and improve the confidence and self-esteem of the patient.

Keywords: Class II malocclusion; ectopic tooth; social six.

INTRODUCTION

An ectopic tooth erupts in a position that is not its normal position in the dental arch.¹ The prevalence of ectopic eruption is 5.6% while maxillary incisors can be ectopically erupted or be impacted in 2% of the population.² Since maxillary anterior teeth are displayed during maximum period during speech and smile, it is often referred to as “social six”. Thus this malocclusion affects oral health-related quality of life.³ This paper is unique as it reports a case with a severe ectopically erupted maxillary central incisor and how a piggyback technique in orthodontics can be used for its successful traction.

CASE REPORT

A 19-year female patient presented with the chief complaint of having an abnormal posited tooth in

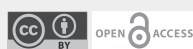
the upper front tooth region of the jaw. Medical history and family history were not significant. On clinical examination, the profile was convex, facial divergence posterior, obtuse nasolabial angle, competent lips, and shallow mentolabial sulcus. On intra-oral examination, number of teeth present clinically was 30, with unerupted 38 and 48. Maxillary arch was ovoid, asymmetrical, presence of crowding, ectopically erupted 11 in labial aspect, retroclined 12, 21, 22, distobuccal rotation of 13, and mesially tilted 21, 22, 12 (Figure 1). Mandibular arch was ovoid, asymmetrical, and with presence of crowding. Molar relation was Class II on right



Figure 1: Pre-treatment intra-oral frontal photograph.

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Figure 2: Pre-treatment extra-oral frontal photograph on smiling.



Figure 3: Pre-treatment lateral cephalogram.

side and end-on on left side, confirmed by study model which means the mandibular first molar was backwardly placed to maxillary first molar. Overjet was 3.5 mm and overbite 3.5 mm/ 41% height of lower central incisors. Facial midline coincided with lower dental midline and upper dental midline i.e contact point between 21 and 12 was shifted to right by 4 mm.

On smile analysis, lip line was suggestive of low lip line, non-consonant smile arc, complex smile style, and shape of upper central incisor was square with golden standard of 100% (Figure 2). On radiographic examination, an orthopantomogram (OPG) showed ectopic eruption of 11. Intra-oral periapical radiograph (IOPA) with respect to (w.r.t.) 11 and maxillary occlusal radiograph was also done to confirm its ectopic location. Lateral cephalogram showed Cervical Vertebrae Maturation (CVM) CS stage 5 (Figure 3) indicating that the growth of patient was almost completed. On cephalometric analysis, ANB angle was 5° (normal value is 2° to 4°) with SNA value 82° and SNB 77° suggestive of skeletal class II with normal maxilla and retrognathic mandible respectively. Frankfort mandibular plane angle (FMA) was 31° (normal value is 25°) suggestive of a vertical growth pattern. The upper and lower lips were placed 2.5 mm and 5.5 mm behind Steiner's S line respectively, suggestive of retrusive upper and lower lips as the normal lips are placed touching the S line which is drawn from the most anterior point of chin to the bisecting line

between subnasale and tip of nose. Thus, the skeletal diagnosis was skeletal class II with vertical growth pattern, and the dental diagnosis was Angle's class II division 2 malocclusion.

For the established diagnosis there were following two possible treatment options available:

- (1) Orthognathic surgery with mandibular advancement
- (2) Orthodontic camouflage with extraction of 14 and 24

The patient did not consented for orthognathic surgery because of the invasiveness and complications related to the surgery and also due to economic reasons, thus orthodontic camouflage was planned as an alternative treatment for the patient. MBT 0.022" bracket was used for the treatment. The main treatment objective was to correct the ectopically placed 11 and improve the smile of the patient. Absolute anchorage was planned on right side and maximum anchorage on left side of the upper arch. Due to economic reasons, temporary anchorage device was not used on maxillary right side of the arch, rather second molar banding as well as transpalatal arch (TPA) was placed to reinforce anchorage. 0.014" Nickel-Titanium (NiTi) then 0.016" NiTi and finally 0.017"x0.025" NiTi were used. Initially, no bonding was done w.r.t. 11. Open coil spring was placed between right lateral incisor and left central incisor to open space for 11 over the base archwire 0.018" Stainless Steel (SS). Piggyback



Figure 4: Piggyback archwire for traction of 11.



Figure 5: Intra-oral frontal photograph at the end of treatment.



Figure 6: Extra-oral frontal photograph on smiling post debond.

archwire (Figure 4) of 0.012" NiTi was used to bring 11 into the arch over the base archwire of 0.018" SS; so this technique is called piggyback technique. Two-stage retraction i.e. canine retraction initially followed by incisors' retraction was planned. 13 and 23 retractions were done in 0.018" SS archwire. Upper anterior retraction was done in 0.019"x0.025" SS archwire. In the end, elastics were used for settling posterior teeth. The fixed lingual bonded retainer was used as a retainer in both upper and lower arch. In the end, there was class II molar and class I canine relation on both sides. OPG and lateral cephalogram at the end of treatment showed parallel roots and normal inclination of anterior teeth respectively. The total duration of treatment was 27 months. The alignment of ectopically placed 11, correction of upper dental midline, and improvement smile of the patient was achieved (Figure 5, 6). The profile of the patient was maintained without further deterioration. An informed consent was obtained from patient for

publication of case report.

DISCUSSION

It is not uncommon for the children to present with variations in normal eruptive patterns of the maxillary incisors.² If the diagnosis can be made early, timely intervention treatment modalities can help in managing the ectopic eruption of the maxillary incisors.² However, this case was treated with corrective orthodontics because of the advanced stage of dentition when patient sought treatment. Ectopically erupted teeth have psychological impact on the life of an individual.³ Thus patients often seek orthodontic treatment to improve their smile and build confidence. Also ectopically erupted tooth may result in midline shift,⁴ root resorption of adjacent teeth,⁵ may lead to infection, cyst formation,⁶ abnormal growth of jaw, loss of arch length, and abnormal relationship with opposing dentition.⁷

As primary teeth have anatomic proximity to the permanent teeth, their trauma can lead to ectopic eruption or impaction of their successors.⁸ The local factors for the cause of ectopic eruption of teeth include supernumerary teeth, retained deciduous teeth, traumatic injury to the primary teeth, tooth size arch length discrepancy, congenital/developmental disturbance, e.g. cleft palate, and single-tooth macrodontia.⁷

The diagnosis of skeletal class II malocclusion was reached through cephalometric analysis on lateral cephalogram and Angle's class II malocclusion with ectopic eruption of 11 through OPG, and study model. Treatment options for ectopic tooth include observation for spontaneous correction after removal of the etiological agent or orthodontic intervention as soon as sufficient permanent teeth have erupted.⁶ Sometimes the ectopically erupted tooth can spontaneously get corrected after the removal of etiological agent,⁴ or orthodontics can also be used as a method of intervention for the treatment of ectopically erupted tooth if all the permanent teeth have erupted.⁹ In this case, there was a lack of space for 11 in the arch with eruption of all permanent teeth, thus corrective orthodontics was the only option left.

Although orthognathic surgery with mandibular advancement would have been a better option for this patient as maxilla was normal, mandible was retrognathic, and upper and lower lips were retrusive, the patient did not consented for orthognathic surgery because of the reasons mentioned earlier, thus orthodontic camouflage was planned as an alternative treatment for the patient with the extraction of upper first premolars, distalizing canines, creating space for ectopic 11 and then traction through the piggyback technique. Although piggyback technique was used in this case for traction of 11, a T-loop spring can also be used for the alignment of severe ectopic tooth.⁹ The use of a loop results in reduced stiffness and a greater range of activation because

of increased length of wire between brackets.⁹ Also segmental arch technique using cantilever and loops can be used for the management of ectopic tooth.¹⁰ Extraction of upper premolars was done in this case as space was required to bring 11 into the arch similar to Ferreira et al.⁹ For the anchorage control during retraction of anterior, TPA was used in this case which was similar to Ferreira et al,⁹ but different from Gebert et al,¹⁰ who used Hilgers appliance as a means of anchorage. Hilgers appliance uses a large Nance acrylic button along with 0.032" Titanium-Molybdenum Alloy springs, which can be used for distalization as well as for anchorage.¹⁰

At the end of treatment, 11 was brought into the arch, the smile of the patient was improved from non-consonant smile to consonant smile i.e. incisal edges of upper anterior teeth became parallel to the curvature of lower lip, and from low lip line to average lip line i.e. the exposure of the upper anterior teeth on smiling increased. The treatment duration was quite long because regular follow-up of the patient was not possible due COVID-19 lockdown. The patient was quite satisfied and confident as the desired treatment objectives were achieved. Small amount of root resorption was found in OPG at the end of treatment w.r.t. 11 which is one of the shortcomings of the case. This could be because of the heavy force applied during the traction of 11. Thus for prevention of root resorption, light force should be applied during traction.

SUMMARY

The orthodontic management of ectopically erupted maxillary central incisor can be satisfactorily carried out with proper diagnosis, treatment planning, and cooperation of the patient.

Conflict of Interest: None

NJHS

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