

Orthodontic management of a case involving extraction of maxillary central incisors: A rare approach

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ABSTRACT

Introduction: Orthodontic cases managed by extraction of maxillary central incisors are very uncommon, but certain conditions necessitate their extraction. This article reports a case of adolescent boy with a history of trauma to the maxillary incisors. The patient was treated with extraction of both the maxillary central incisors followed by space closure and lateral incisors substituting for central incisors.

Keywords: Maxillary central incisors extraction, Maxillary lateral incisors, Orthodontic replacement, Space closure

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INTRODUCTION

Orthodontic management involving extraction of both maxillary central incisors is very rare. However, extraction of these teeth might become the treatment of choice in certain conditions. These conditions include malformed, grossly displaced, dilacerated, ankylosed, fractured due to trauma, teeth with resorbed roots or associated with some local pathology [1, 2]. Depending upon the individual requirement, treatment could be either space maintenance for later prosthetic replacement [3], or space closure by substituting lateral incisors for central incisors [4–8]. The latter type of treatment plan can provide space to correct crowded or protrusive dentition without extracting other teeth as well as obviating the need for further prosthetic replacement. This article presents a case of class I malocclusion complicated by trauma and treated by extraction of both the maxillary central incisors.

CASE REPORT

A 14-year-old boy presented to our department with a chief complaint of irregular arrangement of upper and lower teeth. On extraoral examination patient had mesoprosopic, grossly symmetrical face, convex profile with incompetent lips (Figures 1 and 2). He had a history of trauma to upper anterior teeth at the age of 12 years. On intraoral examination he had Angle's Class-I molar relationship bilaterally with severe crowding in both upper and lower teeth. Both the maxillary central incisors had composite restorations and were severely discolored (Figures 1, 2). The periapical radiograph showed fractured crowns of both the maxillary central incisors with endodontic treatment of both and a faint fracture line in the apical third of right maxillary incisor (Figure 3). The fracture line was confirmed by taking another periapical radiograph at different tube angle. Although

clinically, maxillary central incisors were asymptomatic, but their long-term prognosis was questionable.

Treatment Objective

The primary objectives were to eliminate crowding, correction of excessive lip protrusion, maintenance of Class I molar relation and improvement of patient's facial appearance.

Treatment alternatives

Based on the objectives, two treatment options were proposed. The first option consisted of leaving the maxillary central incisors as such and extracting the four first premolars to relieve the crowding and dentoalveolar protrusion. The second option was to extract the maxillary central incisors and mandibular first premolars. This option seemed to be more reasonable as this would avoid extraction of two healthy maxillary premolars. Also this could possibly avoid the full coverage crowns for maxillary central incisors which would have been definitely required in case of first option. Moreover, because the lateral incisors of this patient were large mesiodistally as compared to normal by 1.5 mm, and they could easily be contoured as central incisors. The lateral incisors would be moved into the central incisor position, and composite build ups would transform the lateral incisors into central incisors. So the second treatment option was chosen and informed consent of the patient was taken. Treatment was started with extractions of both maxillary central incisors and mandibular first premolars.

Treatment progress

A 0.018" preadjusted edgewise appliance (Roth prescription) was used. During the initial alignment and leveling, prosthetic maxillary central incisors were attached to the arch wire at the extraction site (Figure 4A). These teeth were gradually reduced proximally so that by the end of alignment and leveling phase one artificial tooth was left, which was then removed. Space closure was done with 0.016x0.022 in stainless steel archwires and intramaxillary elastic chain (Figure 4B). The elastic chains were discontinued once well distributed spaces around the maxillary lateral incisors were achieved for later composite restoration of these teeth (Figure 4C). After that gingivectomy and composite restorations of the laterals were done to simulate them with the central incisors and the palatal surface and the cusp tip of canines was reduced to make it resemble lateral incisor (Figure 4D).

Treatment Results

By bringing the maxillary lateral incisors in place of central incisors and placing restoration on them with appropriate dimensions, the final result was esthetically and functionally acceptable (Figures 5, 6). All the treatment objectives were achieved and patient was pleased with the results.



Figure 1: Pretreatment extraoral and intraoral photographs.



Figure 2: Pretreatment lateral cephalogram and orthopantomogram.



Figure 3: Pretreatment intraoral periapical radiograph showing root canal treatment of both maxillary central incisors and fracture line in the apical third of right maxillary central incisor.

DISCUSSION

The orthodontic management of class I malocclusion with severe crowding is routinely carried out by extraction of four first premolars. However, the present case was treated with atypical extraction of maxillary central incisors instead of first premolars. Very few cases involving maxillary central incisors extraction are reported in the orthodontic literature [9–11]. Although acceptable esthetic outcome and occlusion could be achieved in this case, but definitely there were certain challenges with this type of treatment plan. First concern was to simulate maxillary lateral to central and maxillary canine to lateral incisors. For this, maxillary laterals and canines needed to be reshaped. The canine's labial surface as well as palatal surface was reduced to make

it flatter. The cusp tip was reduced to produce a flat incisal edge. Studies have shown that fairly extensive dental grinding can be performed without significant discomfort, and that with minor or no pulp and dentin reactions and long-term studies have confirmed that any unfavorable reactions are temporary [12, 13]. Besides certain modifications in the orthodontic appliance were done, like placing of maxillary central incisor brackets on maxillary laterals and maxillary lateral incisors brackets on maxillary canines. Also brackets were placed incisally on laterals and gingivally on canines and to intrude and extrude them respectively to level their gingival margins. Though esthetics was acceptable, long-term esthetics could be further improved with porcelain laminates or veneers.

CONCLUSION

Extraction of the maxillary central incisors might be a good alternative in some patients to preserve tooth structure and improve esthetics as long as the patient's diagnostic characteristics permit. However, additional restorative and periodontal procedures might be necessary to provide good esthetic results.

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Author Contributions

Sapna Singla – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Gurvanit Lehl – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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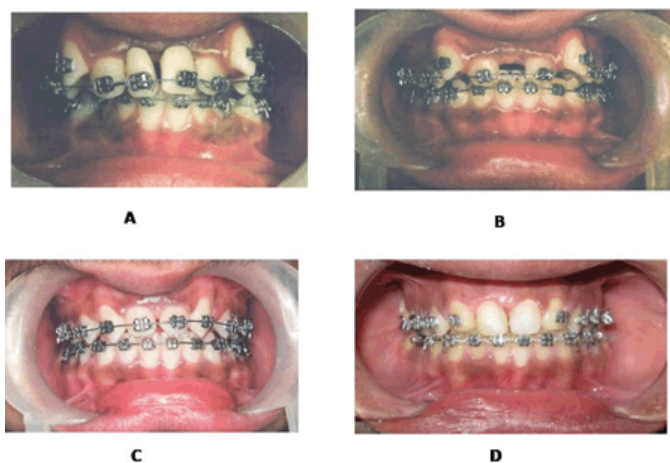


Figure 4 (A–D): Treatment progress photographs.



Figure 5: Post-treatment extraoral and intraoral photographs.

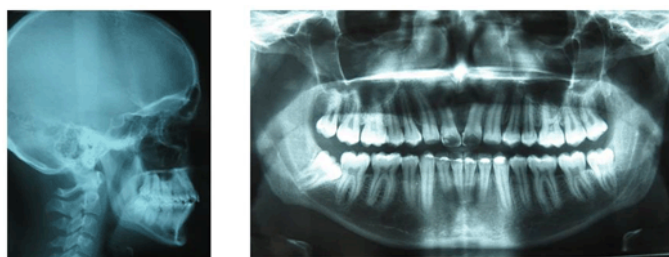


Figure 6: Post-treatment lateral cephalogram and orthopantomogram.

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