

Early Multidisciplinary Approach for the Management of Axioversion Permanent Maxillary Incisor: A Case Report

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ABSTRACT

Management of axioversion teeth poses a unique challenge to the clinician due to its position within the esthetic zone. This case report describes the management of an impacted maxillary central incisor with severe root axioversion. Surgical exploration was done and orthodontic treatment was planned. The axioversion incisor was aligned, optimal treatment outcome with esthetic and functional was well done.

Keywords: Axioversion, Orthodontic treatment, Impacted, Surgical exploration

BACKGROUND

Axioversion tooth is a developmental disturbance that is associated with a change in orientation of the root often in the labiolingual or mesiodistal direction. John Tomes in 1848 was the first person to report a central incisor with angulated root and coined it “Dilaceration” [1]. He considered it as a forcible separation of developed dentin from the developing dentin. Prevalence was reported to be 4.6%. The etiological factors for the impacted incisors can be because of trauma, mechanical obstruction by supernumerary teeth and developmental disturbances. Without early intervention, an axioversion tooth can easily develop into dilaceration tooth.

An 8-year-old boy reported to the Department of Orthodontic Dentistry with a complaint of a missing upper front tooth. History revealed that the patient had an injury to the front tooth region 4 years ago, due to a fall. Intraoral examination revealed a missing right central incisor without space loss (Figure 1A). CBCT revealed an impacted malformed central incisor which necessitated further investigations (Figures 1B and C). To assess the detailed three-dimensional positioning of the root in orthogonal and oblique planes, cone-beam computed tomography was advised, which revealed axioversion incisor and the crown directed toward the ANS (Figures 1B and C).

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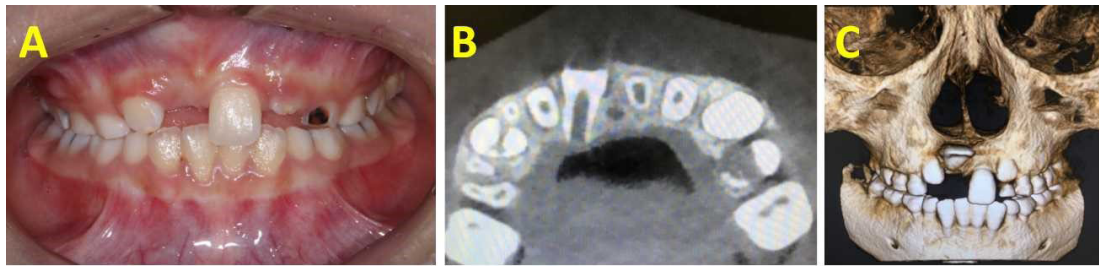
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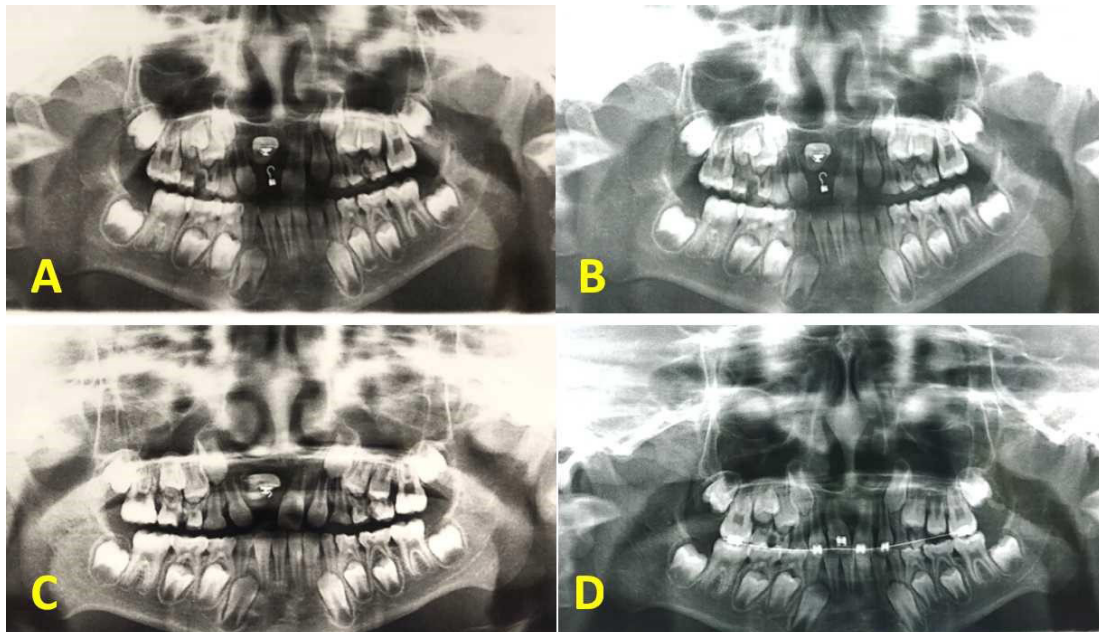
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Figures 1 A-C: (A) Intraoral photograph; (B and C) CBCT showing impacted axioversion central incisor.

The apical foramen of the impacted malformed central incisor was not closed, and guided eruption combined with surgical exploration was possible. The lingual button was bonded on the lingual side of the incisor during the surgical flap operation. The patient was recalled after 1 week and orthodontic traction was taken. A removable appliance

was used for 3 months. Interactive traction was used for 2 months. Fixed orthodontic treatment was planned to align the upper anterior teeth for 3 months (Figure 2). Lingual retainer was bonded from lateral incisor to lateral incisor (Figure 3).



Figures 2 A-D: Panoramic radiography showing the movement of impacted axioversion central incisor during orthodontic treatment.



Figures 3 A-C: (A) Intraoral photograph after treatment; (B to C) Panoramic radiography and CBCT showing the correct position of incisor.

DISCUSSION

Impaction of incisors is not a frequent event in dental practice. Most orthodontists believe that the primary etiological factor for dilacerated incisors is trauma [2,3]. However, other factors do exist and the exact cause may not be fully understood.

It is an arduous clinical task for the rehabilitation of axioversion impacted central incisor. Factors should be considered for successful treatment include Crown root alignment of the impacted tooth; Stage of root development; Deviated angle of dilaceration; Space present in the arch for aligning the impacted tooth.

Impacted central and lateral incisors can be managed in three divided phases. Pre-surgical orthodontic measures first create sufficient space for the unerupted tooth. Surgical uncovering of the impacted tooth is followed by gingivectomy or displaced flap [4]. Orthodontic traction and alignment in the post-surgical orthodontic phase complete the treatment.

For a better prognosis of orthodontic traction, the position of the axioversion tooth and its developmental stage plays a pivotal role. The positioning of the incisors was obtained by creating the eruptive space and aligning the un-erupted teeth with orthodontic treatment or after removing any obstacle or after their exposure to different surgical methods [5].

Without early intervention, axioversion tooth can easily develop into dilaceration tooth. In the present case report to appreciate these features, CBCT revealed that the dilaceration was more than 90° toward the crown, and the crown was directed toward the ANS. Previous studies stated that orthodontic traction of severely dilacerated teeth may result in ankylosis [6], periodontal attachment loss, root resorption, and exposure. However, the present analysis shows that the root of the impacted incisor could achieve better development if treated earlier [3]. We believed that light force traction is helpful for root shaping of apical unclosed teeth because no prosthetic solution is better than the tooth itself, as the volume of the alveolar bone is preserved [5].

A removable appliance was preferred firstly as it is easy to wear and maintain oral hygiene. After the crown eruption, lingual buttons were changed to the labial surface and bonded to establish a couple of forces with lower anterior teeth. In the occlusal adjustment stage, a fixed appliance was preferred as it minimizes patient discomfort, and reduces the need for patient compliance with increased control of tooth movements in all three directions of space.

CONCLUSION

In this case, surgical and orthodontic treatments were sequentially planned for optimal treatment outcomes with esthetic and functional well-being.

CLINICAL SIGNIFICANCE

Accurate assessment of the early symptoms of an affected tooth is crucial for proper diagnosis and for establishing a comprehensive treatment plan which minimizes future adverse effects. Guided eruption combined with surgical exploration was possible for anterior axioversion tooth with unclosed apical foramen.

SUPPORT

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