# *Impacted Maxillary Central Incisors: Surgical Exposure and Orthodontic Treatment: A Case Report*

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**ABSTRACT**

Maxillary central incisor impactions occur infrequently. Their origins include various local causes, such as odontoma, supernumerary teeth, and space loss. Supernumerary and ectopically impacted teeth are asymptomatic and found during routine clinical or radiological examinations. The surgical exposure and orthodontic traction of impacted right central incisor after removal of odontomas is presented in this report.

Key words : **Impacted teeth, maxillary central incisor, supernumerary teeth, odontoma**

## INTRUDUCTION

Impaction is the total or partial lack of eruption of a tooth well after the normal age of eruption1. The most commonly impacted maxillary tooth is the canine. Ericson and Kurol2 estimated the incidence at 1.17% . The frequency of maxillary central incisor impaction ranges from 0.06% to 0.2%3

The most common causes of impaction seem to be odontoma, supernumerary teeth, and loss of space. Impactions caused by disturbances in the eruption path related to crowding are somewhat less common4. Other causes are crown or root malformation of permanent incisors due to trauma transmitted from the primary predecessors and apical follicular cysts that prevent normal eruption.

The anterior maxilla is a highly demanding area from anesthetic point of view, and orthodontic treatment of impacted maxillary incisor requires a well synchronized and interdisciplinary approach to obtain an acceptable esthetic and functional result5.

This report presents the surgical and orthodontic treatment of a case with impacted maxillary right central incisor caused by Odontoma located in the eruption path of the impacted tooth.

## CASE PRESENTATION:

A 16 year old female patient reported to the Department of Orthodontics & Dentofacial Orthopedics at Dhaka Dental College & Hospital, Dhaka with the chief complaint of unpleasant look due to missing right upper central incisor. patient was physically healthy and had no history of medical and dental trauma. Her medical history showed no contraindications to orthodontic treatment .

Figure 1. Pretreatment extra oral photographs

Figure 2. Pretreatment intraoral photographs



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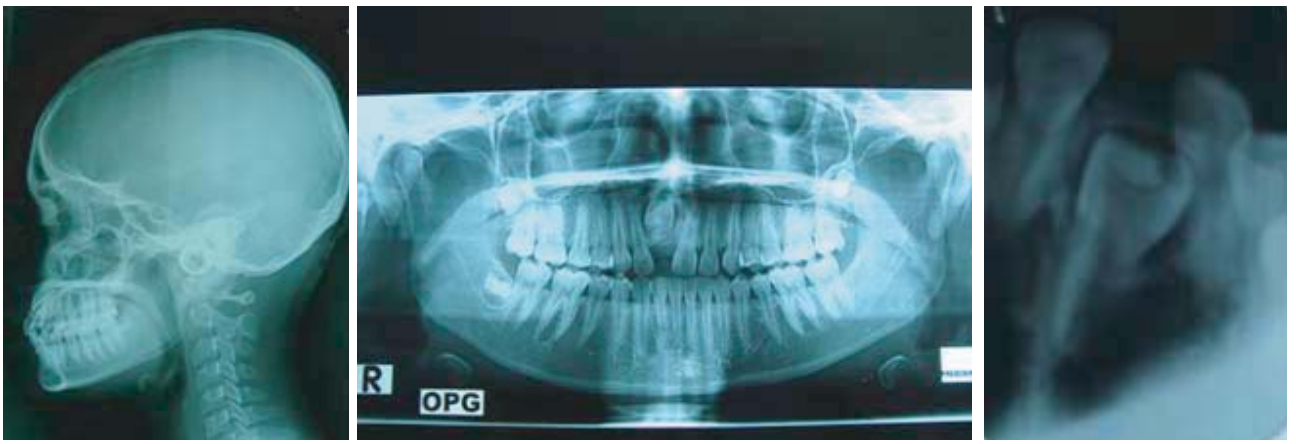



Figure 3. Pretreatment cephalogram and panoramic radiograph

**DIAGNOSIS AND ETIOLOGY:**

The patient had a balanced facial pattern. Intraoral examination showed she had an permanent dentition with good oral health, an Angle Class I molar relationship, 2 mm of overjet, and 3mm of overbite with missing right maxillary permanent central incisor and no apparent arch length discrepancy in maxillary & mandibular arch. Cephalometric analysis revealed a normodivergent skeletal Class I pattern (Figure 3)

The panoramic radiograph demonstrated right maxillary central incisor was impacted due to the presence of odontomas located in their eruption path. The impacted maxillary central incisor was positioned vertically. (Figure 3)

Treatment objectives:

1. Open the space for the impacted right maxillary permanent central incisor by the use of fixed edgewise appliances and an open coil spring.
2. Surgical removal of odontomas and exposure of the impacted right maxillary permanent central incisor, apply orthodontic traction with light forces, and align the maxillary dental arch
3. Establish ideal overbite and overjet.
4. Improve facial esthetics.

Treatment alternatives:

The following are three possible treatment alternatives:

1. Extraction of the impacted central incisor and restoration with a bridge or an implant.
2. Extraction of the impacted central incisor and closure of the space, substituting the lateral incisor for the central incisor with subsequent prosthetic restoration.
3. Surgical exposure and orthodontic traction of the impacted central incisor into proper position.

Treatment progress:

After realizing the possible treatment alternatives, the patient chose to try to save the tooth and bring it into proper position. Molar bands were placed on the maxillary first permanent molars, and the maxillary teeth were bonded with a edge wise appliance. After initial leveling and alignment with a 0.016-in nickel titanium wire, the patient was transferred to an oral surgeon for surgical removal of odontomas and exposure of the impacted tooth, and the closed eruption technique was used to extrude the tooth.

A full thickness mucoperiosteal flap was elevated, approximately two-thirds of the crown is exposed with appropriate bone removal by means of surgical burs. The tooth was isolated with haemostatic agent. A bracket was bonded on the labial surface of the incisor. The flap was returned to the same position and sutured, leaving a tied 0.010-in ligature wire protruding through the mucosa and attached to the bracket (Figure 4). After a week, a light force of 60 to 90 g was applied.

After the tooth has erupted into its position in dental arch. The single tooth torquing was placed to correct the root inclination. After debonding, removable howly retainer was given in the upper arch.

Figure 4. Progress intraoral photographs

Figure 5. Post treatment intraoral photographs

Figure 6. Post treatment facial photographs

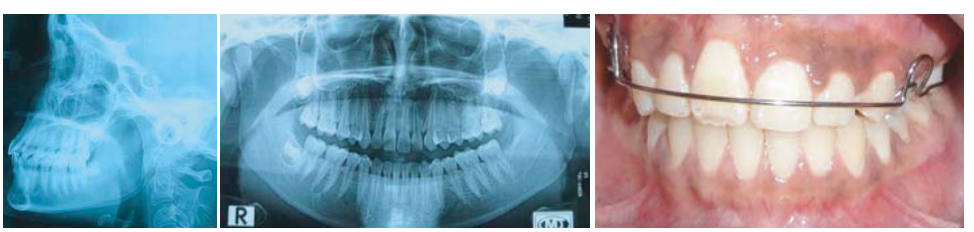


Figure 7. Post treatment Cephalogram, panoramic radiograph Begg Retainer

Treatment results:

The overall active treatment time was 10 months. The impacted permanent maxillary central incisor was successfully aligned in proper position. The post-treatment radiograph showed acceptable root parallelism and no apparent root resorption or periodontal bone loss. Periodontal evaluation showed acceptable gingival contour and adequate width of keratinized attached gingival tissue with good emergence profile of the central incisor. Ideal overjet and overbite were established. There was remarkable improvement of the patient's facial esthetics.

**DISCUSSION:**

Impacted teeth can cause serious dental and aesthetic difficulties as well as psychological problems especially in anterior regions. Although the impacted maxillary incisor occurs less frequently than the maxillary canine, it is of concern to parents during the early mixed dentition stage because of noneruption of the toot .6

Maxillary central incisor impactions occur infrequently; their origins include various local causes, such as odontoma, supernumerary teeth, space loss, and disturbances in the

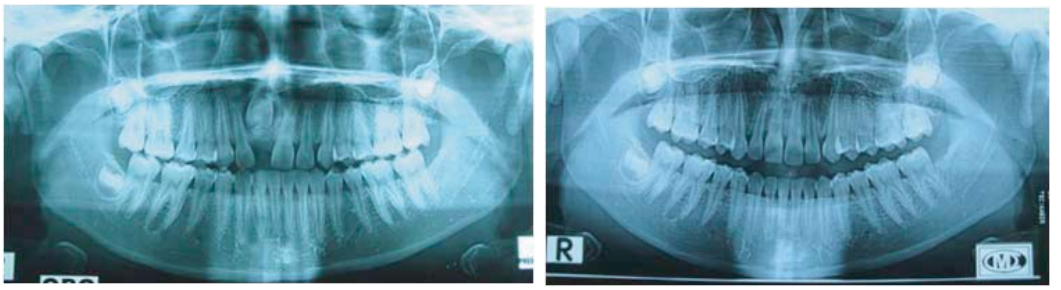
eruption path, also trauma and apical follicular cysts.4,7 In the patient treated here, the upper permanent central incisor was disrupted by odontom.

Impaction of maxillary anterior teeth can be a challenging orthodontic problem. Several reports have indicated an impacted tooth can be brought into proper alignment in the dental arch. 8-11 The following factors are used to determine whether successful alignment of an impacted tooth can take place: (1) the position and direction of the impacted tooth, (2) the degree of root completion, (3) the degree of dilacerations, and (4) the presence of space for the impacted tooth12. Holland has recommended the movement axis of the impacted tooth must be considered together with these factors.13

The treatment approach of impacted maxillary teeth requires the cooperation of dental specialties such as orthodontics, oral surgery, and prosthodontics. Several reports have demonstrated successfully treated impacted maxillary anterior teeth by proper crown exposure surgery and orthodontic traction. 9,14

Several techniques are commonly used to uncover maxillary labial impactions. One technique, the apically positioned flap, consists of apically repositioning a raised flap that incorporates attached gingiva overlying the impacted tooth. Another technique, the closed-eruption technique, involves raising a flap that incorporates attached gingiva over the

Pre and post treatment intraoral photographs




Pre and post treatment panoramic radiograph

impacted tooth, attaching an orthodontic bracket to the tooth, and then fully replacing the tissue over the tooth and bracket.

Each technique offers certain advantages during forced eruption of impacted teeth. The apically positioned flap technique permits ready reattachment of a bracket if unintended debonding occurs. However, the closed-eruption technique is believed to provide the most aesthetically pleasing result.15,16 In the present case, the closed eruption surgical technique was used. This technique is more reliable when aesthetic and periodontal health is considered. Vermette et al. recommended the usage of the closed eruption technique when the tooth is in the middle of the alveolus or high near the nasal spine15. In this case the periodontal status of the exposed incisor after orthodontic treatment revealed an acceptable gingival contour and attached gingiva. No further mucogingival surgery was recommended.

Pre treatment Facial photographs

**Post treatment Facial Photograph**

Pretreatment

<SNA:82, <SNB:80, <ANB:2

Post treatment

<SNA:83, <SNB:81, <ANB:2

Lateral Cephalo gram

Pre treatment model

Post treatment model

CONCLUSION:

Successful management of anterior impacted maxillary tooth can be challenging in a clinical practice. Proper diagnosis concerning the exact localization of the impacted tooth, an appropriate surgical technique, and a light orthodontic force system can be an effective approach to successfully bring the tooth into occlusion. The closed-eruption technique provided an esthetically pleasing result in this patient.

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