

## **Combined Orthodontic and Surgical Treatment of Impacted Maxillary Central Incisors allied with Impacted Supernumerary Tooth – A Case Report**

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Although impaction of the maxillary central incisors is reported less frequently than that of the third molars or the canines, early referral of patients in the mixed dentition is common due to concern of parents and pediatric dentists or general dentists regarding delayed eruption of the permanent maxillary central incisors<sup>1-3</sup>. Several contributing factors have been suggested that impede tooth eruption. These could be mesiodens or multiple supernumerary teeth in the anterior maxillary region<sup>4-5</sup>, odontogenic tumors such as odontomas or cysts<sup>6-7</sup>, alteration in the eruption path or formation of scar tissue due to trauma or premature loss of the primary incisors<sup>8</sup>, and abnormal root angulation or dilaceration<sup>9</sup>. Treatment of impacted teeth requires a combination of orthodontics and

surgery, both of which might cause damage to the teeth and the supporting structures.

Surgical exposure can be performed in 3 ways<sup>10</sup>:

- (1) Circular excision of the oral mucosa immediately overlying the impacted tooth,
- (2) Apically repositioning the raised flap that incorporates attached gingiva overlying the impacted tooth,
- (3) The closed-eruption technique in which the raised flap that incorporates attached gingiva is fully replaced in its former position, after an attachment has been bonded to the impacted tooth.

Vermette et al<sup>11</sup> compared the apically positioned flap with the closed eruption technique and found many superior results in terms of gingival, periodontal, and pulp status with the closed-eruption technique.

Adrian Becker et al<sup>12</sup> evaluated the post-orthodontic periodontal evaluation of closed eruption surgical technique and reported the quality of treatment outcome and demonstrated that overall good long-term esthetic results can be achieved by treating impacted maxillary incisors with a closed-eruption orthodontic surgical technique.

### **Case Presentation:**

An 11.5 year old female patient reported to the Department of Orthodontics & Dentofacial Orthopedics, with the chief complaint of missing permanent maxillary left central incisor. No previous history of trauma to the dental or facial region was reported. Patient was having Angle's class I molar relationship on both left and right side with all the permanent teeth erupted in maxilla and mandible except third molar and missing permanent left central incisor (Fig.1). Mild lower anterior crowding & deep bite.

### **Diagnosis & Treatment planning:**

The orthopantomogram and intraoral periapical radiograph of upper anterior region demonstrated a supernumerary tooth lying in the middle of the central incisors and an impacted permanent left central incisor. To confirm the position of supernumerary tooth, upper occlusal radiograph was taken which showed the presence of supernumerary & impacted left permanent central incisor tooth on the palatal side [Figure 2].

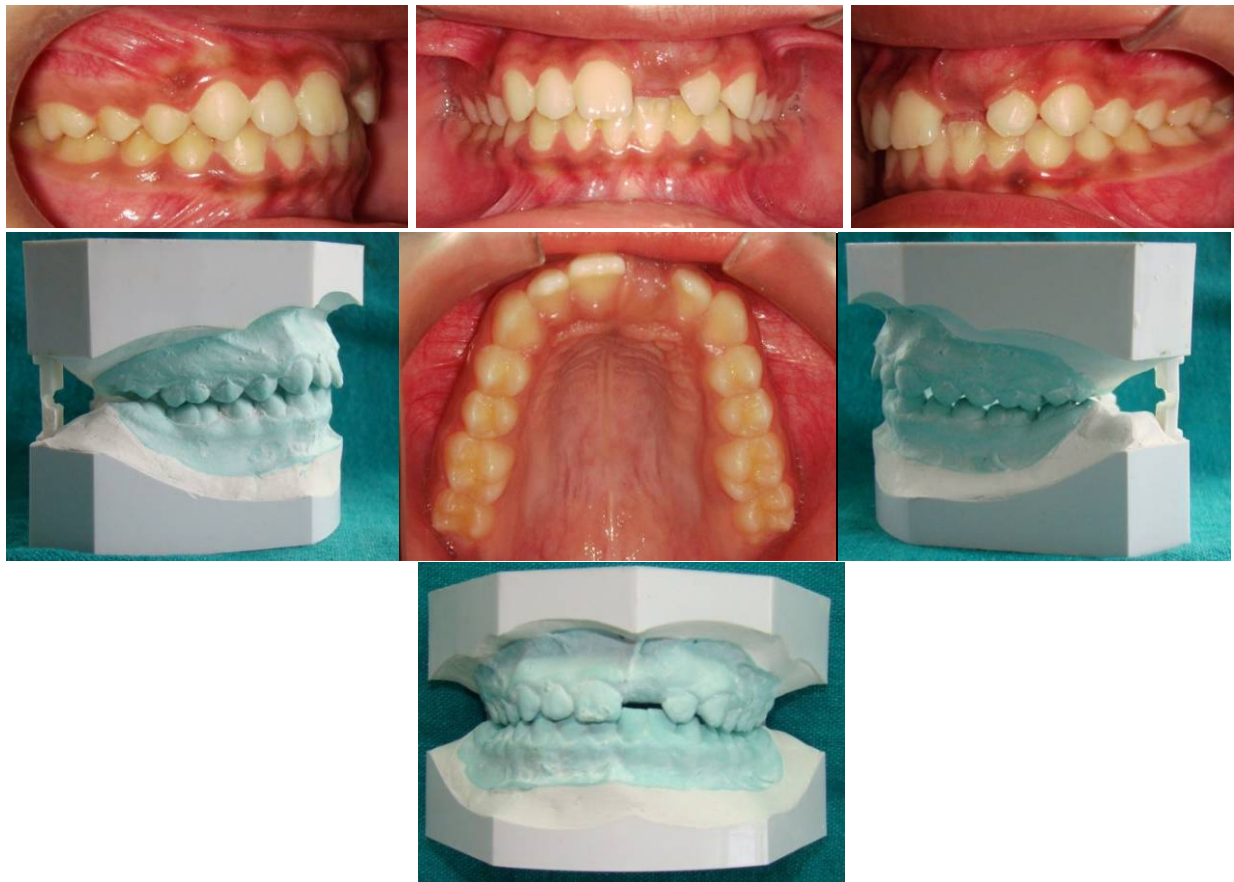
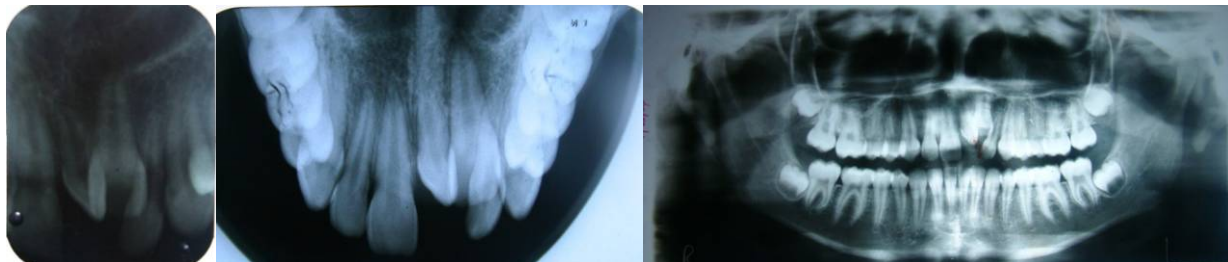


Fig. 1 pretreatment intraoral photograph & Models



(IOPA)

(Occlusal view Maxilla)

(O.P.G)

Fig. 2 Pretreatment Radiographs

For the treatment of impacted incisors different options were discussed. Out of which three treatment alternatives were explained to the patient and her parents.

1. Extraction of the impacted central incisor along with mesiodence and restoration with a bridge or an implant later when growth had ceased.
2. Surgical extraction of supernumerary teeth and wait for natural eruption of Central incisor.
3. The surgical extraction of supernumerary tooth followed by surgical exposure of impacted central incisor and alignment of the impacted incisor into the arch using fixed orthodontic treatment.

They agree with third option and the treatment was started with fixed mechano-therapy using 022" x 028" slot Roth Prescription (Pre - adjusted Edgewise Appliance)

### **Treatment Progress:**

Molar bands were placed on the maxillary & mandibular first permanent molars and brackets were placed on rest all permanent teeth in maxillary & mandibular arch. The initial leveling was

performed with 0.016 inch NiTi wire, followed by 0.018 inch stainless steel wire, the patient was transferred to the oral surgeon for exposure of the impacted incisor and extraction of supernumerary tooth. Bracket was bonded at the time of surgery to the labial surface of the crown. A 0.010-inch ligature wire ligated on it. The flap was reclosed and sutured, leaving a tied ligature wire with a hook protruding through the mucosa. The patient was recalled after 2 weeks and orthodontic traction was started.

0.020 inch stainless steel arch wire was ligated and ligature wire placed on bonded bracket of impacted tooth was tied with the arch wire. A light force of approximately 60 to 90 g was applied between the arch wire and the protruding ligature wire. As the tooth moved downward, the ligature wire was cut shorter to maintain the effective force until the impacted tooth became exposed to the oral environment.

The bracket was then rebonded to its correct position on incisor so that the tooth could be properly positioned. The final alignment was completed with 0.014 inch NiTi arch wire followed by 0.016 x 0.022 inch NiTi wire.

The finishing and detailing of the arches was done using full dimension arch-wire after proper positioning of incisors. This treatment was taken approximately 9 month to bring the incisor in proper position.

**Results:** The impacted left maxillary central incisor was successfully positioned into proper alignment through the crown exposure and the conventional ligature traction. The exposed incisor presented an acceptable gingival contour after treatment and sufficient amount of attached gingiva (Fig.3.) Radiographically, the newly positioned incisor reveals an intact straight root and no apparent root resorption (Fig 4)

## **Discussion**

Although the impacted maxillary incisor's occur less frequently than the maxillary canine, it concerns the parents in the early mixed dentition because of the non-eruption of the teeth<sup>13</sup>. Several clinicians have successfully treated impacted maxillary anterior teeth by proper crown exposure surgery and orthodontic traction and indicated that an impacted tooth can be brought to proper alignment in the dental arch<sup>14-16</sup>.

The current treatment modality instead of extraction has used the surgical crown exposure and orthodontic positioning of the tooth.



Fig. 3 Post-treatment intraoral photographs & Models

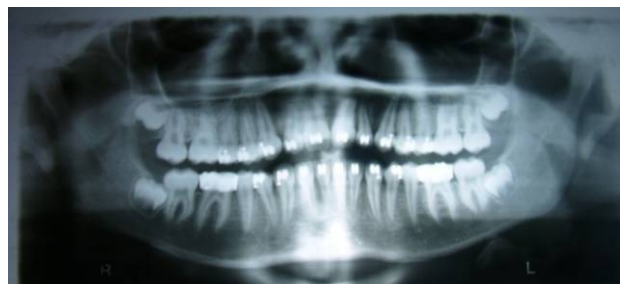


Fig. 4 Post-treatment panoramic radiograph

Factors considered for successful alignment of an impacted tooth are.

1. The position and the direction of impacted tooth.
2. The degree of root completion
3. The presence of space for the impacted tooth.

These factors were considered before planning treatment for this case. The present case was treated using the closed-eruption surgical technique as suggested by Vermette ME<sup>11</sup>. Which elevates a flap and returns it back to the original location after an attachment on the impacted tooth. The technique induced natural tooth eruption of the impacted tooth rather than conventional design of the apically positioned flap. Vermette et al<sup>11</sup> compared these two surgical techniques and found that the apically positioned flap technique had more negative esthetic effects such as increased crown length and gingival scars than the closed-eruption technique.

Consequently, it is strongly recommended that the closed-eruption technique be the treatment of choice when the tooth is impacted in the middle of alveolus or high near the nasal spine<sup>11</sup>.

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.

### **Conclusion**

Maxillary permanent impacted left central incisor was successfully positioned in the maxillary arch by surgical exposure and orthodontic traction and showed good stability.

But long term monitoring for the stability and periodontal health is very important after orthodontic traction.

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