

Managing morphologically atypical impacted teeth orthodontically

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Impactions with severely dilacerated root is seldom reported, especially the maxillary incisor. It is probably because of the high clinical difficulty of bringing the dilacerated tooth into position: most patients probably would choose extraction with replacement by prosthesis instead. However, the philosophy seems to have changed recently. We report two cases one in which an impacted central incisor was brought in the arch by orthodontic traction. In the second case the impacted premolar was brought into the arch and was shaped as a mandibular canine for achieving a good functional occlusion.

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INTRODUCTION

Impactions with severely dilacerated root is seldom reported, especially the maxillary incisor.^{1,2} It is probably because of the greater clinical difficulty of bringing the dilacerated tooth into position: most patients probably would choose extraction with replacement of prosthesis instead. However, the philosophy seems to have changed recently. Odegaard³ clearly showed a case with two horizontally impacted canines and indicated that a marked dilacerated root could be brought into correct position. Lin⁴ reported a dilacerated incisor brought into the arch in late mixed dentition. Lin concluded that the dilaceration of the root would not be a great obstacle if the case had carefully planned procedure and good compliance.

The problem of an impacted incisor with dilaceration, characterized by an angulation between crown and root, still poses a clinical dilemma because of the difficult position.^{5,9} The chances of failure could be due to ankylosis, external root resorption and root exposure after traction.¹⁰ Even the successful cases probably have an unaesthetic gingiva of the exposed incisor and need

to have periodontal surgery. Two cases are reported where teeth with dilacerated roots were brought into the arch by orthodontic traction.

CASE 1

Impacted maxillary dilacerated central incisor in horizontal position

A 12-year-old female reported to our OPD with a main concern of noneruption of the upper right central incisor (Figure 1). The child was physically healthy and had no history of medical and dental trauma. Examination of the oral cavity revealed it was generally healthy with the exception of talons cusp on the lateral incisors on both the sides (Figures 2, 3). The patient had a Class I malocclusion and a balanced facial pattern. Intraoral examination revealed an Angle's Class I molar relation. Occlusal radiographic showed a horizontally impacted incisor (Figure 4) Cephalometric examination revealed normal cephalometric values according to Indian norms. Clinical examination revealed a missing maxillary right central incisor and no apparent arch length discrepancy in both the maxillary and the mandibular arches. Inadequate space distribution of the maxillary incisors caused midline deviation due to drifting of the adjacent teeth into the available spaces. The OPG revealed an impacted maxillary right central incisor and the root appeared to be dilacerated. Treatment alternatives:

- 1) Extraction of central incisor and restoration with a bridge or implant.
- 2) Extraction of the central incisor followed by orthodontic space closure and prosthetic restoration of lateral incisor by central incisor.
- 3) Surgical exposure of the impacted incisor and orthodontic traction of the impacted dilacerated central incisor into proper position

The parents choose the third option

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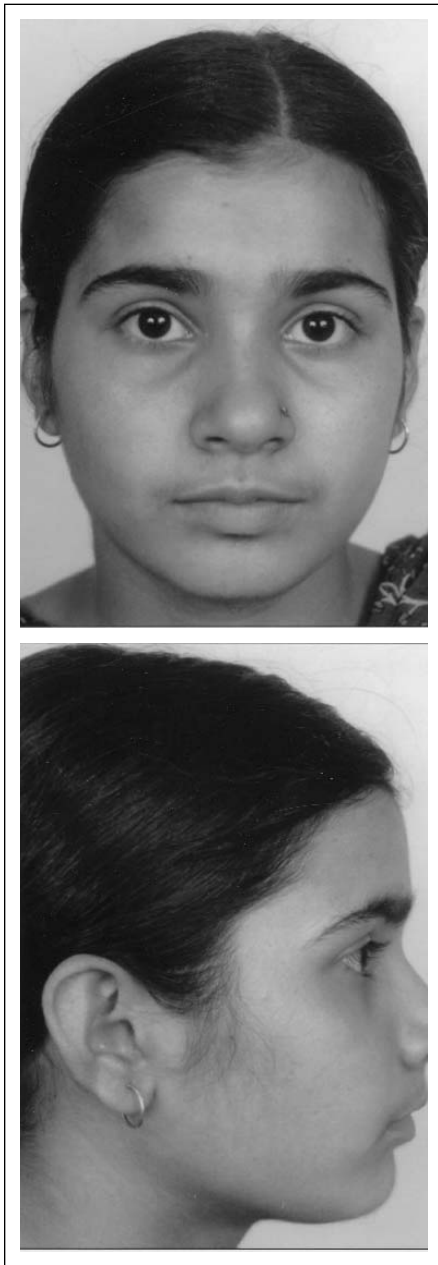


Figure 1. Extraoral front and profile view of patient 1.

The first step was the grinding of the talon cusps. However, no exposure occurred in this case and the ground area was restored with glass ionomer cement. Then surgical exposure was done and bonding with a Begg bracket was done on the lingual surface and an elastic attachment was put on the bracket (Figure 5). After achieving leveling and alignment and going into a heavy wire of the order of .019 X .025 orthodontic traction was applied. After the dilacerated tooth was palpable clinically, a second surgery was performed and a labial attachment was bonded. The same procedure of elastic traction continued until the tooth was



Figure 2. Intraoral photographs of the patient showing the talon cusps on both the lateral incisors and an impacted upper right central incisor.



Figure 3. Intraoral photograph showing the talon cusps from the occlusal view.



Figure 4. Occlusal radiograph showing the horizontally impacted incisor.



Figure 5. Intraoral photograph showing the surgical exposure and bonded with the Begg brackets.

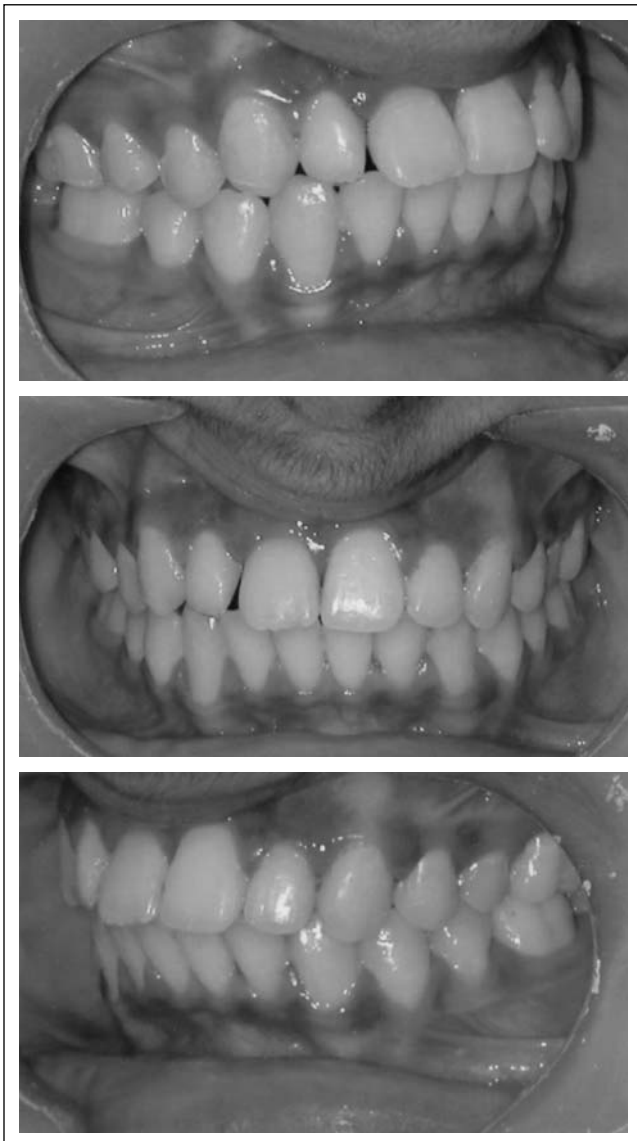


Figure 6. Post treatment intraoral photographs of the patient showing the impacted tooth placed into the arch.

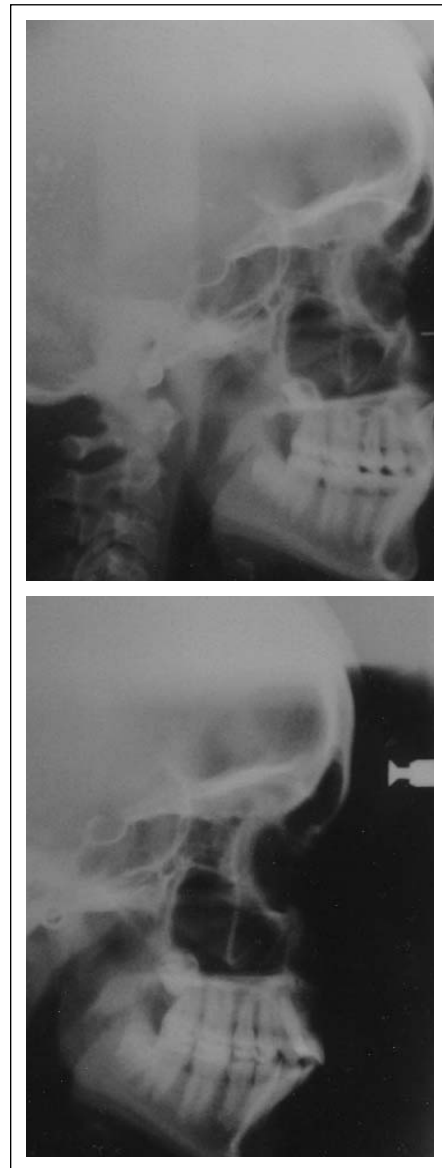


Figure 7. Pre and post treatment cephalograms of the patient 1. Note in the pretreatment radiograph that the incisor is almost at 120 degrees to the occlusal plane.



Figure 8. Pre and post treatment OPG of the patient 1.

exposed into the oral cavity. The final alignment was completed and an ideal overjet and overbite was achieved. The bands were removed and Begg type retainers were given. The impacted right central incisor was successfully positioned into proper alignment through the two stages of crown exposure and the elastic traction. Ideal overjet and overbite and acceptable gingival contour and attached gingiva was achieved (Figures 6 to 8).

CASE 2

Impacted mandibular canine and premolar

A 12 year old male patient (Figure 9) reported to our OPD with a very atypical dentition. The canine as well as

first premolars were missing on the left lower quadrant and a deciduous canine was retained (Figure 10). The cephalogram and OPG of the patient revealed an impacted canine and premolar (Figures 11, 12). The canine was nearly horizontally impacted and the premolar was overlapping it. Treatment alternatives:

- 1) Extraction of canine and premolar and prosthesis for canine after all the three remaining premolars would be extracted for proclination correction,
- 2) Extraction of canine and orthodontic traction of the premolar. Prosthetic recontouring of premolar to canine morphology,
- 3) Extraction of premolar and orthodontic traction on the canine.

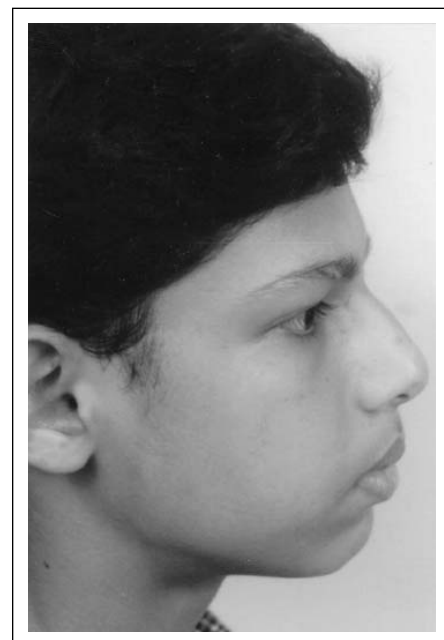
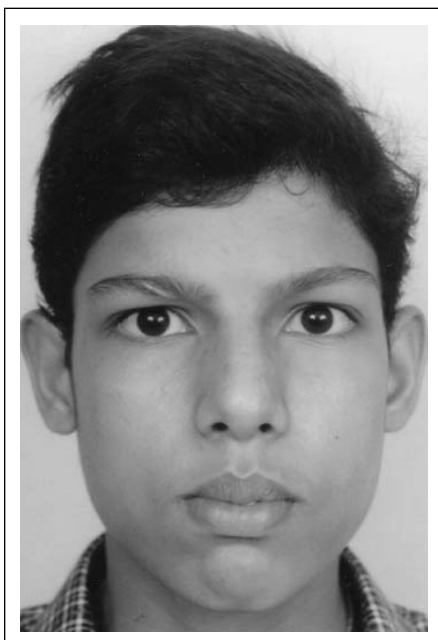


Figure 9. Pretreatment extraoral photographs of patient 2 showing midface convexity.



Figure 10. Pretreatment intraoral photographs of patient 2.

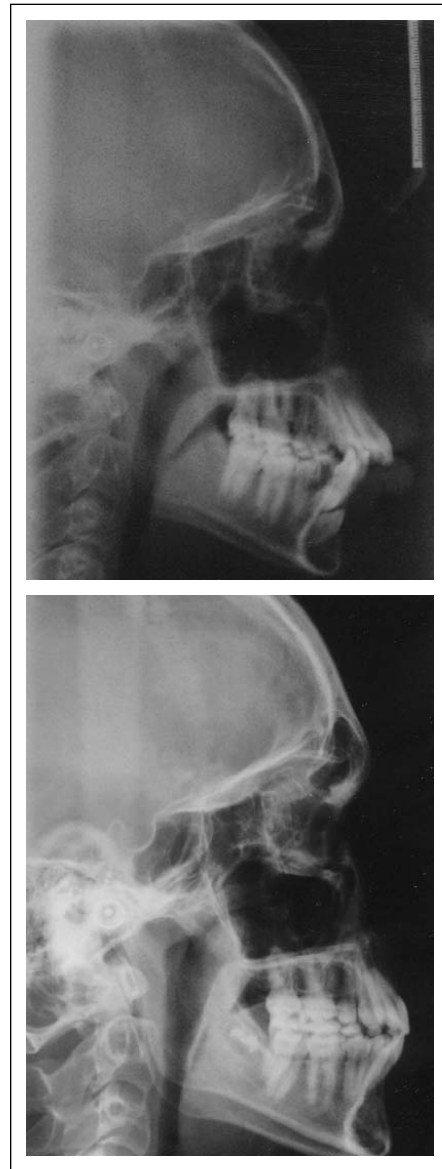


Figure 11. Pre and post treatment cephalograms of patient 2.

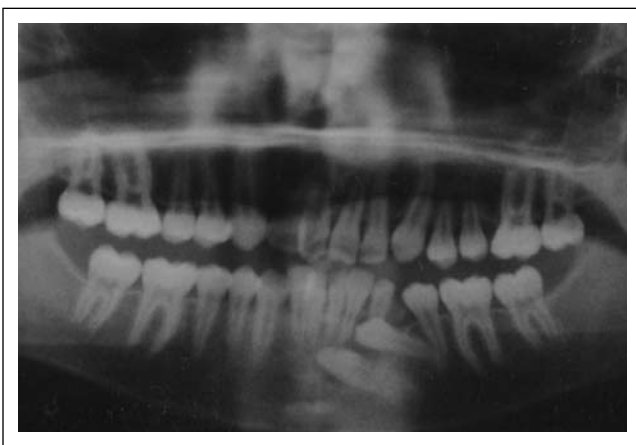


Figure 12. Pre and post treatment OPG'S of patient 2.

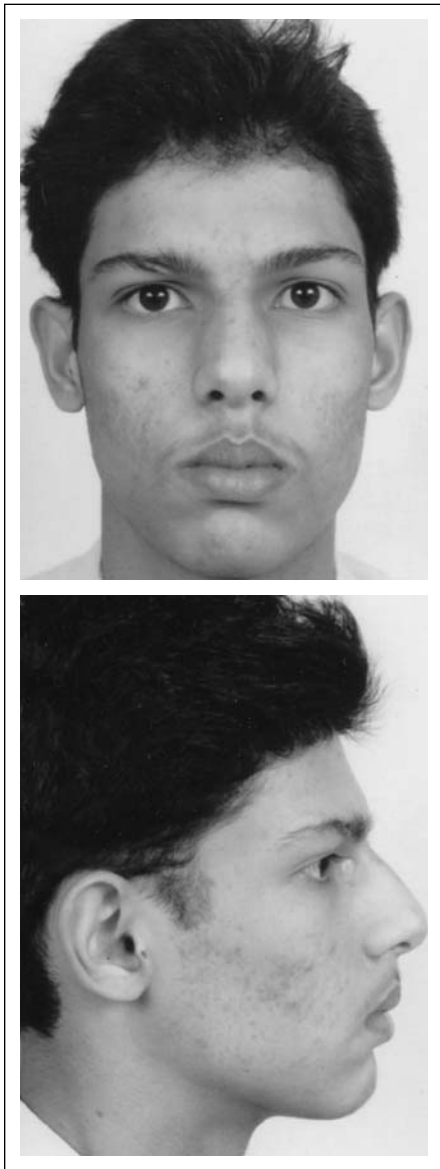


Figure 13. Post treatment extraoral front and profile views of patient 2.



Figure 14. Post treatment intraoral photographs of patient 2.

However, the decision whether to follow the second or third option would be made at the time of surgery. The patient was operated under general anesthesia and it was found that the canine was lying very close to the buccal cortex and was extracted. The orthodontic attachment was bonded onto the premolar crown. The first permanent premolars on the other three quadrants were also extracted. After banding and bonding leveling was achieved up to .021X .025 stainless steel wires and canine retraction was initiated on the three quadrants where the first permanent premolar had been extracted and traction on the impacted premolar was applied. The final alignment was achieved along with an ideal overbite and overjet. The case was debanded and upper lower retainers were delivered. The premolar crown was modified with composite into a

canine-like crown to give a good canine guidance during lateral excursions (Figures 13, 14).

DISCUSSION

The cause of incisor dilaceration has not yet been clearly understood. Smith and Winter¹¹ contributed the dilacerated permanent incisor to traumatic injury of the primary predecessor leading to root dilaceration. However, Stewart¹² concluded that the anomaly was most likely due to ectopic development of the tooth germ. The treatment approach of impacted teeth requires the cooperation of dental specialties such as orthodontics, oral surgery and prosthodontics. The current treatment modality, instead of extraction is to have surgical crown exposure with the placement of an auxiliary, followed by orthodontic positioning of the

tooth.¹³ A dilacerated root with an obtuse angle, lower down position and incomplete root formation of the tooth would have a better prognosis for orthodontic traction. Sometimes two stages may be required in order to avoid more bone destruction during the first phase of crown exposure,¹⁴ because the placement of the attachment on the labial surface of an acute angle of the dilacerated tooth could cause more bone reduction than on the lingual surface. Therefore, the attached auxiliaries needed to switch from the lingual surface to the labial surface of the dilacerated tooth in the second stage of crown exposure to facilitate elastic traction of the tooth. In reality the second stage of crown exposure would not be as complicated as the first stage and could be easily performed with the patient under local anesthesia. The close flap surgical approach is preferred. The technique induced natural tooth eruption of the impacted tooth rather than conventional design of the apically positioned flap. Vermette *et al.*¹⁵ compared these two surgical techniques and found that the apically positioned flap technique had more negative effects such as increased crown length and gingival scars than the closed eruption technique. It is recommended that the closed eruption technique should be the treatment of choice when teeth are impacted in the middle of the alveolus or high near the nasal spine. In this case the periodontal status of the exposed incisor revealed acceptable gingival contour and attached gingiva. No further mucogingival surgery was planned.

Treatment of the impacted dilacerated incisor is a clinical challenge. Long term monitoring of the stability and periodontal health of the dilacerated incisor is very important after orthodontic traction.

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