

Non-surgical treatment of mandibular deviation: a case report

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Background: Mandibular deviation due to premature contact of teeth in crossbite may be associated with facial asymmetry.

Aim: To describe the non-surgical treatment of mandibular deviation associated with a marked facial asymmetry.

Methods: A 13.5 year-old girl presented with a unilateral posterior crossbite, noticeable facial asymmetry, anterior crossbite and displacement of the mandible on closure. She had no history of head injury or significant medical problems and her parents rejected surgical correction. A removable appliance was used to correct the crossbite followed by fixed appliances to complete treatment.

Results: Treatment resulted in a marked improvement in facial symmetry and elimination of the mandibular displacement.

Conclusions: Early correction of a functional deviation associated with a unilateral facial asymmetry may avoid the need for surgery.

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Introduction

Mandibular deviation is the deviation of the mandible as it moves from a postural position into the intercuspal position. It may be due to intermediate or initial tooth contacts deflecting the mandible and it may be associated with a facial asymmetry, which may worsen if the cause of the deviation is left untreated. Congenital anomalies and environmental factors, such as condylar fracture, may lead to the development of facial asymmetry.^{1,2} Other causes are believed to be: internal derangements in the temporomandibular joint,³ rheumatoid arthritis,⁴ osteoarthritis,^{4–6} condylar hyperplasia or hypoplasia,^{7,8} temporomandibular ankylosis,⁹ tumours in the temporomandibular region¹⁰ and lateral crossbite.¹¹ Untreated fractures of the mandible can display varying degrees of facial asymmetry.² There have been several long-term studies of children with fractured mandibular condyles, and the consensus is that many fractured condyles are undiagnosed and regenerate spontaneously.^{12–14}

Children with a mandibular deviation due to premature tooth contacts should be treated as soon as convenient to avoid the development of a skeletal

asymmetry. Often orthodontic treatment to eliminate the crossbite is all that is required. We report treatment of a child with anterior and unilateral posterior crossbites, a mandibular deviation to the left side during closure of the jaws and a marked facial asymmetry.

Case report

Diagnosis

A 13.5 year-old girl with a unilateral posterior crossbite and noticeable facial asymmetry was referred to a private practice office for orthodontic treatment. Her parents gave no history of head injury or significant medical problems. At the time of examination she had a full permanent dentition, except for the third molars.

The extra-oral examination revealed that she had an obvious suborbital hypoplasia of the left side of her face (Figure 1). The mandible was displaced to the left side and the lower dental midline was displaced 6 mm to the left of the facial and upper dental midlines. During closure of the jaws into occlusion, initial contacts occurred between the upper right premolars and first molar and the opposing teeth. The buccal surface of the lower right first molar had wear



Figure 1. Pretreatment facial and intra-oral photographs. (a) Frontal view. (b) Frontal view with smile. (c) Intra-oral.

Table I. Cephalometric analysis.

	Pretreatment	Post-treatment
SNA (degrees)	81.1	78.7
SNB (degrees)	79.8	77.6
ANB (degrees)	1.3	1.1
U1 to MxPl (degrees)	122.0	128.0
L1 to MnPl (degrees)	102.0	101.0
Intercisal angle (degrees)	119.0	118.0
MMPA (degrees)	11.0	10.0
Facial proportion (per cent)	67.0	69.0
L1 to A-Pog line (mm)	3.2	2.4
SN to MxPl (degrees)	16.0	15.0

facets from contact with the palatal surface of the upper first molar. In the intercuspal position the upper right first and second premolars and the first molar were in buccal crossbite and the upper left central incisor, lateral incisor and canine were in palatal crossbite. On the right side the canine and molar relationships were Class III, but on the left side the molar relationship was Class I and the canine relationship was Class II (Figure 1). There was no evidence suggesting a fractured mandibular condyle and the patient and her parents could not recall an accident likely to result in a condylar fracture.

The pretreatment radiographs are shown in Figure 2. The posteroanterior cephalometric radiograph showed a conspicuous left side suborbital hypoplasia. The lateral cephalometric radiograph showed a skeletal Class III relationship and proclined upper and lower incisors (Table I).

Treatment objectives and alternatives

The treatment objectives were to eliminate the anterior and posterior crossbites and achieve a normal buccal occlusion with an ideal overbite and overjet. The treatment plan accepted by the patient and her parents was to extract the upper and lower right second premolars, correct the anterior crossbite with a removable appliance with a posterior bite plane, and then correct the unilateral posterior crossbite, align the teeth and close any residual extraction spaces with a fixed appliance. It was estimated that treatment would take 3 years. Alternative treatment plans using rapid maxillary expansion and miniscrews were rejected. The possibility of future surgery to correct the skeletal asymmetry was discussed with the patient's parents and rejected by them.

Treatment progress

The anterior crossbite was corrected with a removable appliance with a screw behind the upper left incisors

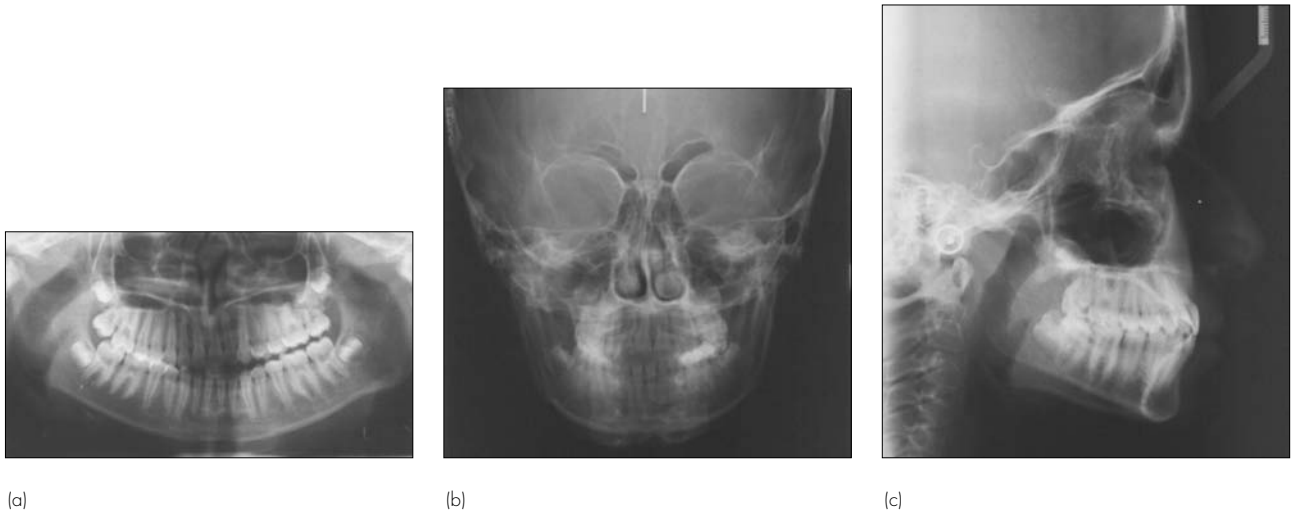


Figure 2. Pretreatment radiographs. (a) Panoramic radiograph. (b) Posteroanterior radiograph. (c) Lateral cephalometric radiograph.

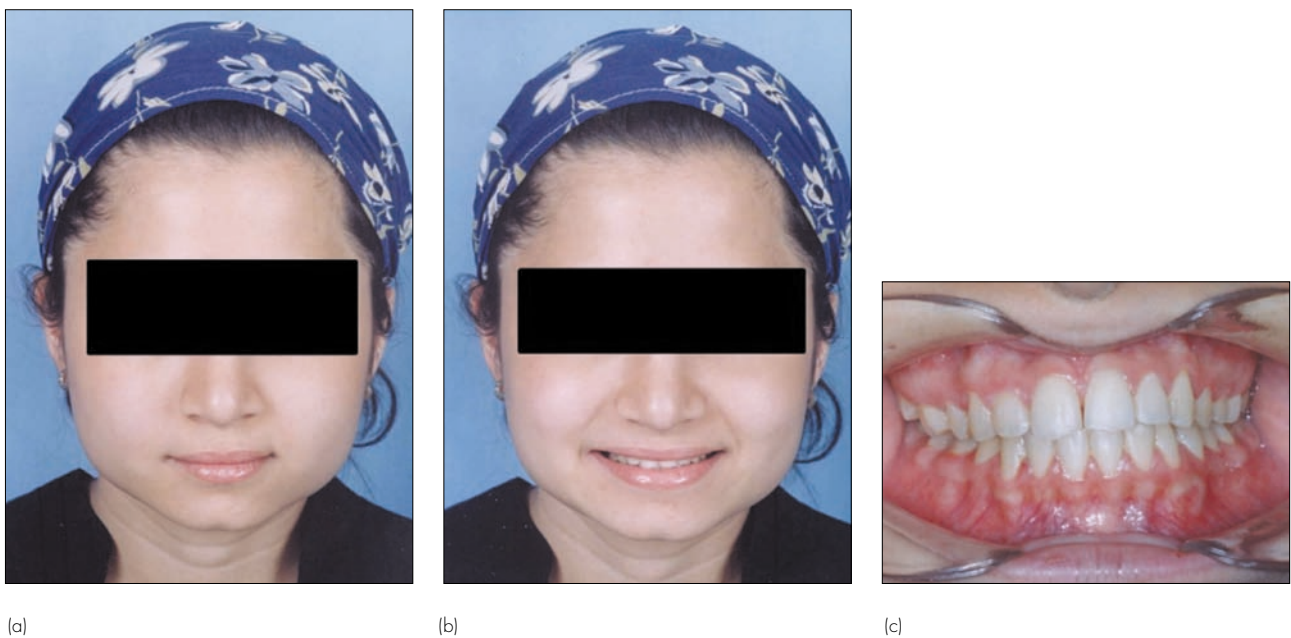


Figure 3. Posttreatment photographs. (a) Frontal view. (b) Frontal view with smile. (c) Intra-oral.

and canine and a posterior bite plane to disocclude the teeth in crossbite. This appliance was retained with Adams' clasps on the first molars and the first premolars and C-clasps on the upper canines and central incisors. The patient was instructed to wear the appliance full-time except for eating, contact sports and toothbrushing. The appliance corrected the anterior crossbite and was used for 6 months.

A standard 0.018 inch edgewise appliance was then placed (American Orthodontics, Sheboygan, WI, USA) and the teeth levelled and aligned with a 0.012 inch stainless steel wire and then a 0.016 inch stainless steel wire. The remaining extraction spaces were closed with stainless steel 0.016 inch round archwires. Three intermaxillary elastics were used for 16 months to correct the posterior crossbite, mandibular

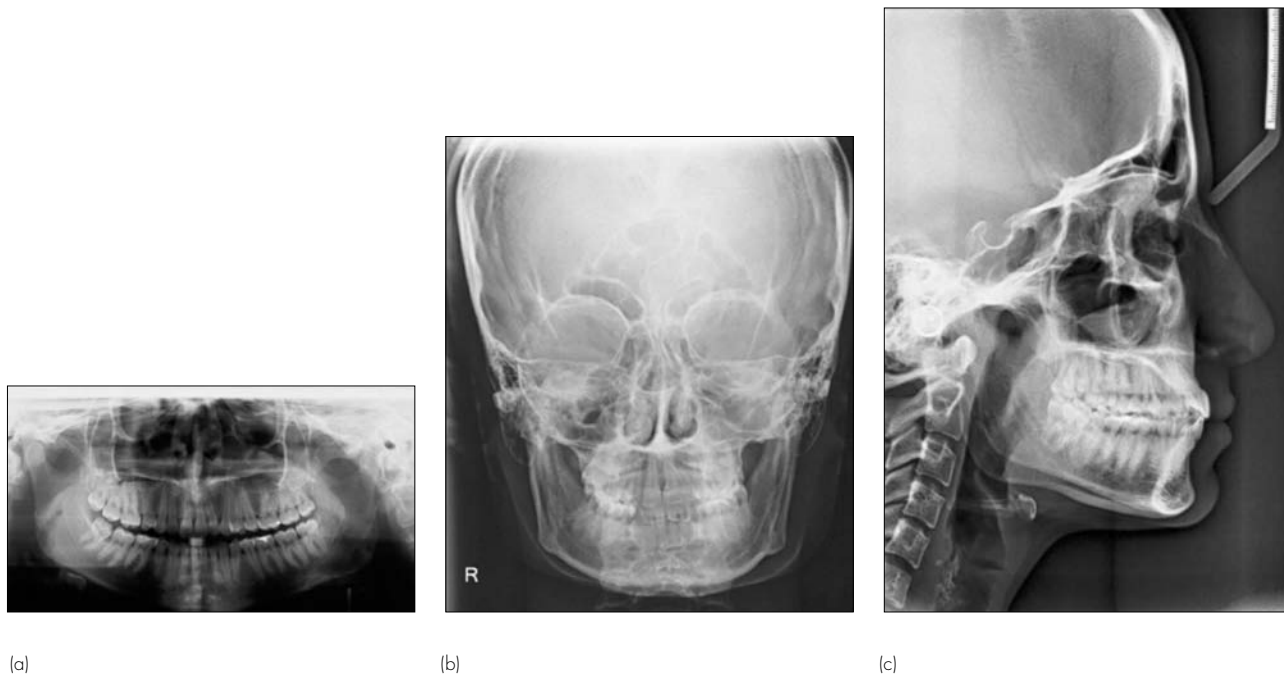


Figure 4. Post-treatment radiographs. (a) Panoramic radiograph. (b) Posteroanterior radiograph. (c) Lateral cephalometric radiograph.

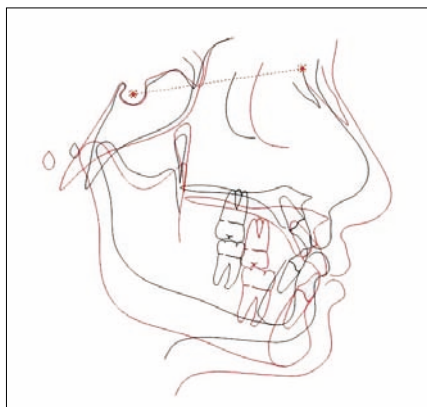


Figure 5. Pre- and post-treatment tracings superimposed on S-N, at sella.

deviation and the midlines: one diagonal elastic from the upper right canine to the lower left canine; one cross elastic from the buccal surface of the upper right first molar band to the lingual surface of the lower right first molar band; one cross elastic from the lingual surface of the upper left first molar band to the buccal surface of the lower left first molar band.

Following correction of the mandibular midline, a Class III elastic was used to correct the right molar and the canine relationships. After a good occlusal relationship was obtained, detailing and finishing

procedures were undertaken. The appliance was removed after 3 years and 4 months treatment and an upper Hawley retainer placed.

Treatment results

The extra-oral photographs show the patient has an improved facial profile and less marked facial asymmetry (Figure 3). The intra-oral photograph shows that the crossbites have been eliminated, the midlines are coincident and a normal occlusal relationship has been established. No root resorption was found on the post-treatment panoramic radiograph (Figure 4). At the end of treatment the upper and lower incisors were proclined (Figure 5, Table I).

Discussion

When our patient presented we were concerned about the obvious facial asymmetry and our first thoughts were that the asymmetry would eventually need surgical correction. The patient and her parents rejected a surgical solution, which led us to propose a more conservative line of treatment. We set out to correct the crossbites and midline discrepancy using a removable appliance followed by a fixed appliance. The treatment took longer than we anticipated because we asked the patient to remove the removable

appliance during eating and for some sporting activities, and it may have been left out of the mouth for longer periods than desirable. Furthermore, because we did not use a bite plane with the fixed appliance occlusal interferences slowed correction of the posterior crossbite.

After correction of the anterior crossbite the upper and lower right second premolars were extracted to enable the lower midline to be corrected and to establish Class I canine and molar relationships. At this stage a full fixed appliance with continuous archwires was placed and the removable appliance with the bite plane discontinued. On reflection, an upper removable appliance with posterior bite planes and fly-over clasps and waxed out over the upper right premolar and molars may have allowed the treatment to proceed more quickly because it would have prevented occlusal interferences from the right premolar and molar. Further correction and better interdigitation were achieved by the fixed appliances with the help of the diagonal and cross elastics. The mandibular deviation and midlines were corrected and normal overbite and overjet were achieved. The dental and facial aesthetics were improved to a great extent.

Facial asymmetry is a difficult deformity to correct. Orthognathic surgery along with orthodontics is the first treatment plan for severe mandibular deviation, especially in non-growing patients. It has also been reported that facial asymmetries in children are frequently due to undiagnosed fractured condyles and that the majority of the condyles regenerate spontaneously.¹²

Asymmetries can be classified according to the structures involved into dental, skeletal and functional. Dental asymmetries can be due to local factors such as early loss of deciduous teeth or thumb sucking. Skeletal asymmetries may involve the maxilla, mandible or both bones. Functional asymmetries arise when a malposed tooth deflects the mandible during closure into occlusion or by a constricted upper arch.²

Conclusion

A patient with mandibular deviation and marked facial asymmetry was successfully treated non-surgically. Early treatment of crossbites with an associated facial asymmetry may reduce the facial asymmetry.

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