

# Case Report: Treatment of dental asymmetry

The treatment of dental asymmetries often comprises several treatment alternatives. This case report describes the treatment alternatives for an asymmetry generated secondary to surgical removal of an odontoma that included the germ of the lower left lateral incisor. The opening of the space was chosen based on the patient's wish. The asymmetrical biomechanical force system used for the correction of the midline is presented as free-body diagram.

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When a tooth is lost, the adjacent teeth have a tendency to migrate toward the opening. When the loss is unilateral, the result is dental asymmetry. Only a very stable occlusion seems able to prevent these secondary migrations.

Alvali et al.<sup>1</sup> found that Class II subdivision resulted primarily from an asymmetrical molar position. The researchers did not, however, discriminate between dental and skeletal asymmetries.

Rose et al.<sup>2</sup> confirmed that asymmetries in Class II subdivision was, in most cases, caused by the mandibular molar being positioned more posteriorly on the Class II side than on the Class I side. Although all the patients studied had complete permanent dentition, the majority of the asymmetries were dental, and many could be ascribed to a history of early loss of a deciduous molar with mesial migration of the molars as a consequence.<sup>3,4</sup>

The etiology of an asymmetry is obvious in patients who can document the presence of an earlier symmetrical occlusion that

developed into an asymmetry following an extraction. Treatment for these patients should focus on restoring the original symmetry without further extractions.

Treating a dental asymmetry is often difficult because a side effect of the biomechanical correction may be new symptoms of malocclusion. Wertz<sup>5</sup> and Cheng<sup>6,7</sup> recommended asymmetrical extraction.

The present case report describes the biomechanics involved in the correction of a secondary asymmetry.

## Case history

A 24-year-old woman consulted one of the authors for advice (Figure 1). Years earlier, she had

**Figure 1A-C**  
Pretreatment photographs. Note how the lower lip is caught by the upper incisors.



Figure 1A



Figure 1B



Figure 1C

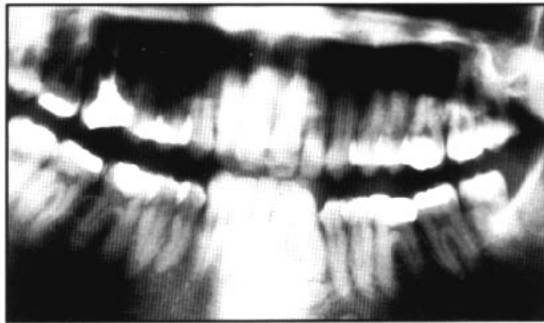


Figure 2A

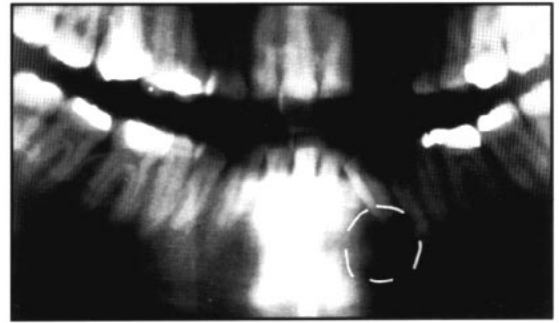


Figure 2B

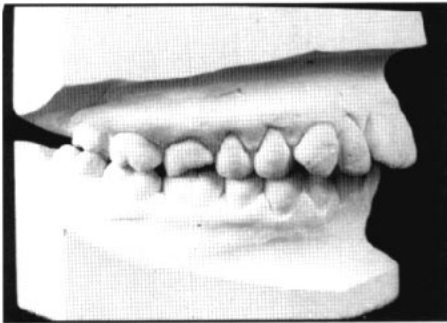


Figure 3A

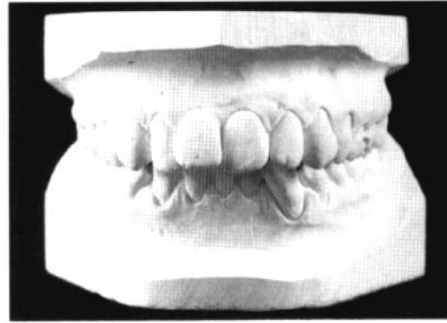


Figure 3B

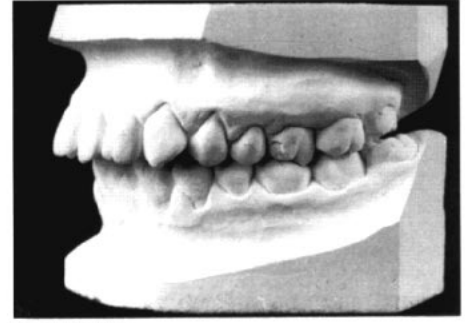


Figure 3C

**Figure 2A-B**

**A:** The initial panoramic radiograph revealed a large odontoma related to an ectopic mandibular lateral incisor.

**B:** Following removal of the odontoma, a cyst (outlined) developed in the region.

**Figure 3A-C**

**Pretreatment study casts.** Note the midline discrepancy, the collapse of the lower canine region, and, as a consequence, the increased overjet.

**Figure 4**

**Pretreatment tracing.**

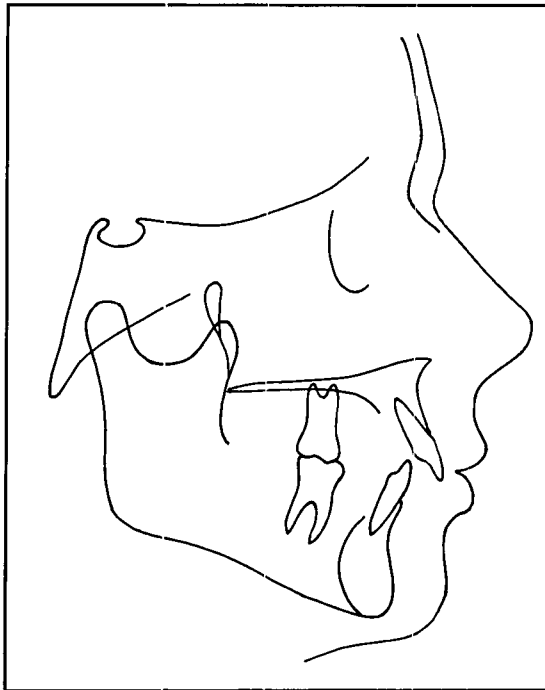


Figure 4

an odontoma in the apical region of 32 removed. The lateral incisor, which had been malformed and was part of the odontoma, was also removed during surgery, and the space of 32 closed spontaneously through tipping of the adjacent teeth when the deciduous tooth was lost. Following the surgery, a large cyst developed in the region, and the pulps of the adjacent teeth were found to be necrotic (Figure 2). New surgery and endodontic treatment were performed. The patient's chief complaint was the increased overjet. In addition, she was having increasing difficulty obtaining lip closure and suffered from the impingement of the maxillary incisors on the lower lip at swallowing.

**Clinical observation**

The patient had a slightly convex profile, a long, thin upper lip, and a pleasant smile line.

Based on the clinical examination, the problem list included the following: previous surgical removal of an odontoma in region 32; endodontic treatment of 16; large amalgam fillings in 16, 26, 46.

The occlusion was one-half cusp distal on the molars and canines on the right side and neutral on the left. The overjet was 11 mm and the overbite 5 mm. The maxillary midline was shifted 6 mm to the left. There was crowding in the lower jaw.

Dental irregularities included mesial rotations of 13 and 23, mesial tipping of 33, distal rotation of 43, and lingual tipping of 43 (Figure 3).



Figure 5A

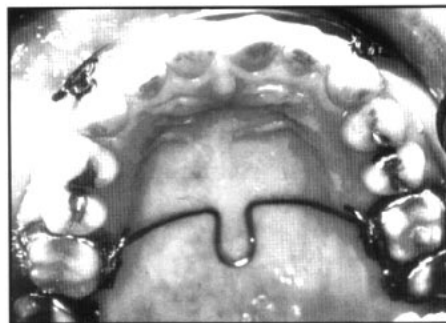


Figure 5B



Figure 5C

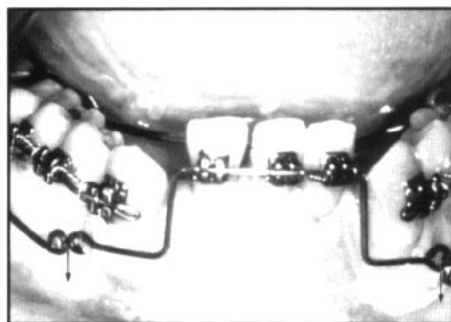


Figure 6

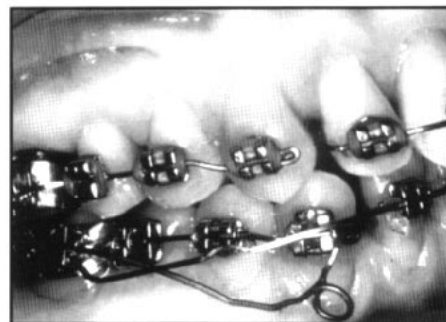


Figure 7

Cephalometric analysis revealed a brachycephalic facial skeleton with anteriorly inclined mandible and maxilla, low facial height, and an increased sagittal jaw relationship. The maxillary incisors were slightly proclined, and the mandibular incisors were retroclined. The lower lip was caught by the upper incisors (Figure 4).

On the basis of a composite of cephalogram and occlusogram, three possible treatment plans were discussed with the patient:

1. Extract three premolars, ending with a neutral molar relationship, and orthodontically substitute 33 for an incisor and 34 for a canine. This solution was rejected because it would cause the dentition to be retracted and, especially considering the long upper lip, the profile to suffer.

2. Open the space for 32 through proclination and, to a certain degree, lateral translation, and widen the collapsed canine region in the mandible. This could reduce the overjet. The overbite would be solved by intrusion followed by proclination of the lower incisors.

3. Extract three premolars, as in the first alternative, but reduce the overjet by bringing the lower jaw forward surgically. Close the maxillary space by protracting the side segments, thereby maintaining the maxilla for the upper lip.

Following a thorough explanation of the pros and cons of each treatment option, the patient chose the second alternative.

#### Figure 5A-C

**Appliance in the first phase of treatment.**

**A:** A reciprocal rectangular loop was used to rotate the maxillary canines distally. Note the difference in canine width in the maxilla and the mandible.

**B:** An occlusal view of the maxilla shows the transpalatal arch used to assure transverse stability during subsequent levelling.

**C:** Mandibular occlusal view at start of treatment. Note collapse of the incisor region. The estimated localization of the center of resistance of the three mandibular incisors is indicated with a star.

#### Figure 6

**Intrusion mechanics.** The point of force application is displaced distally in order to avoid excessive tipping (↓). Forces are delivered by two cantilevers.

#### Figure 7

**Appliance for the development of a controlled tipping.** A reverse torque arch is used to generate buccal root torque, while an expansion force is delivered by an archwire extending from the molars to the incisors.

#### Treatment

A careful plan for the biomechanics was performed, analyzing the effect of the appliance with respect to both the reactive and the active units in a free body diagram.

The treatment was conducted in two phases. During phase one, the mesially-related canines were corrected with a TMA .016 x .025 segment, bypassing the incisors and ending in a rectangular loop bilaterally (Figure 5). Next, the maxilla was leveled.

An appliance was placed in the lower jaw to correct the collapsed canines, which were tipped buccally and posteriorly. The appliance used two

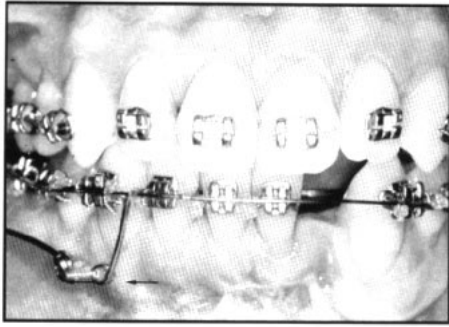


Figure 8A

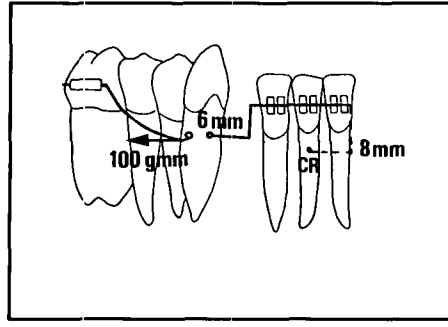


Figure 8B

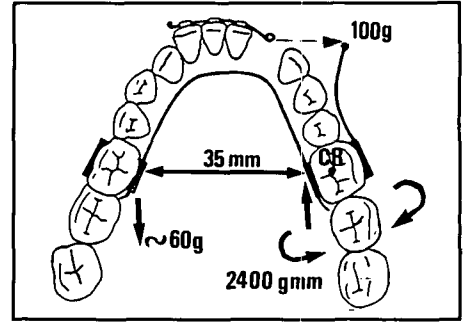


Figure 8C

**Figure 8A-C**  
Appliance used for midline correction.

**A:** Frontal view.

**B:** A cantilever delivered a force of 100 g at the level of the center of resistance in order to avoid tipping.

**C:** Occlusal view. Note that the lower lingual arch has been activated asymmetrically to neutralize the moment generated by the cantilever. The resulting sagittal forces are too few to displace the side segments.

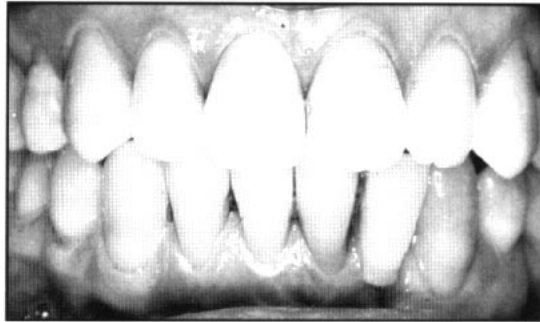


Figure 9A

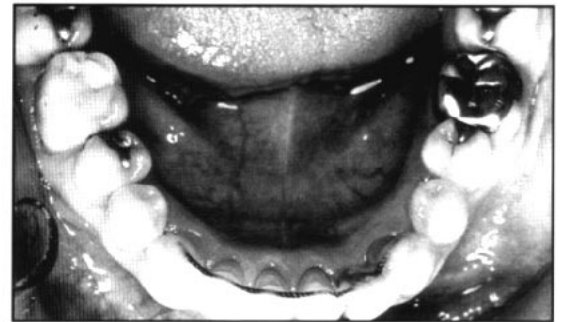


Figure 9B

**Figure 9A-D**

Posttreatment intra-oral photographs. A temporary replacement for the lateral incisor is part of the bonded lower retainer.



Figure 9C



Figure 9D

**Figure 10**

Treatment analysis with treatment result outlined. This corresponded to the treatment goal.

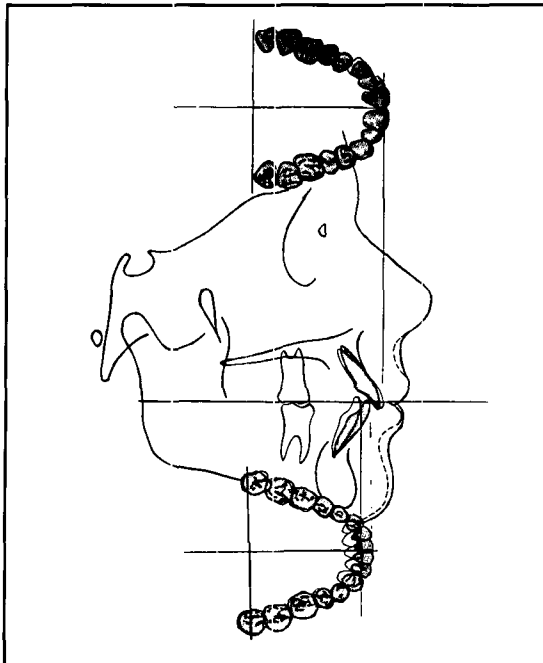


Figure 10

cantilevers extending from the passive segment, including 17, 16, 15, 14, 24, 25, 26, and 27, consolidated with a lower lingual arch (Figure 5C). When the mandibular arch width corresponded to the maxillary width, the canines were brought into the passive segment and intrusion of the mandibular incisors was initiated. This was done as a translation, i.e., with a statically determined system pulling through the center of resistance of the incisors by means of two cantilevers (Figure 6). This phase of treatment lasted 3.5 months.

Having achieved a vertical position that left a ~1 mm openbite in the incisor region, the optimal intrusion was completed in combination with a sagittal movement, i.e., an oblique forward and downward displacement of the three incisors. The appliance comprised a reversed torque arch delivering the necessary buccal root movement. An intrusional force component and a sagittal force developed from an archwire activated for sagittal expansion and tied to, but not

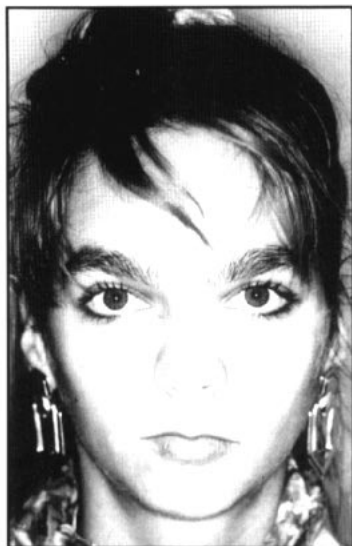


Figure 11A

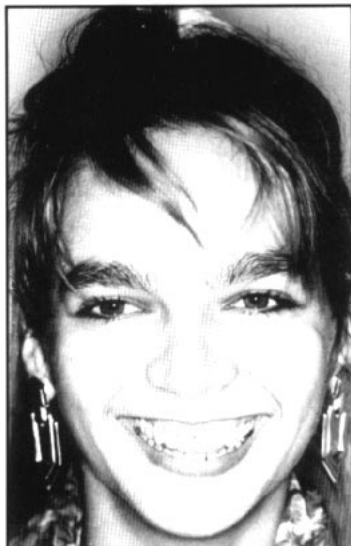


Figure 11B



Figure 11C

**Figure 11A-C**  
Posttreatment photographs. Sufficient lip closure has been obtained and the patient is very pleased with her smile line. Note the midline coincidence.

into, the brackets of the incisors (Figure 7).

The final step was to correct the midline. This was also done with a cantilever pulling through the center of resistance of the incisors in a lateral direction (Figure 8).

The maxillary and mandibular teeth were finished with a continuous arch. At the end of treatment, normal relationships were reestablished in all three planes of space.

Following orthodontic treatment, the patient was sent to her family dentist, who provided her with a bonded bridge replacing 32 (Figure 9-11).

#### Final evaluation

Overall, the patient had reached an acceptable solution. The treatment involved dentoalveolar compensation, including proclination of the lower incisors. This has often been associated with an increased risk for the development of dehiscences.<sup>8,9</sup>

In the present case the incisors were subject to light intrusive forces before proclination. The intention was to prepare the teeth to move with the bone by increasing bone turnover before proclination. Årtun et al.<sup>10,11</sup> showed that protrusion does not necessarily result in periodontal damage and that posttreatment crowding may be ascribed to incisor proclination. On the other hand, Geiger and Wassermann<sup>12</sup> and Shields et

al.,<sup>13</sup> in a 10-year follow-up study, demonstrated that the inclination at the end of treatment was not correlated with the posttreatment changes of the periodontium.

Another controversy in the treatment was the increase in lower intercanine width, which in this patient increased by 4 mm.<sup>14</sup> Intercanine width generally decreases with age, both in treated and untreated individuals.<sup>13,15,16</sup> Because the intercanine width was adapted to the maxillary canines, and because collapse of the mandible occurred as a consequence of the abnormal development of the mandibular incisor region, this widening was considered acceptable, especially given the permanent retention provided by abonded bridge.

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