Case Report HL

Closing a severe anterior open bite is a challenge in orthodontic treatment. In this issue of the Angle Orthodontist, we present one clinician's approach. We'll show similar cases treated in different ways in the next two issues. The differing approaches used by clinicians when planning treatment for these difficult cases should prove interesting.

By Eugene W. Supernaw, DDS, MSD

This 27-year-old male presented with a malocclusion characterized by a moderately severe open bite. His chief complaint revolved around his inability to incise food and his severely limited mastication. The only teeth in occlusion were the first and second molars.

Diagnostic findings

Clinical examination revealed a skeletal open bite which was masked by the overlying soft tissues.The existing Class I skeletal and dental relationship exhibited an acceptable balance between upper and lower face height. Transverse dental and skeletal relationships appeared to be satisfactory. The maxillary incisors were barely visible at the level of the upper lip.

Inspection of the dentition showed healthy teeth with no signs of periodontal disease. Few restorations were present although the patient did have a root canal on the maxillary left first molar. Occlusal wear was limited to the molars. Dental asymmetry was obvious; the maxillary and mandibular teeth on the left side were anterior to those on the right by nearly 4mm. The patient also had a maxillary midline diastema, possibly related to the prominent frenum. He also had a bilateral posterior crossbite and generalized tooth irregularity.

In summary, this patient had a Class I skeletal open bite associated with maxillary anterior and posterior hypoplasias, and moderate left and right dento-alveolar asymmetries.

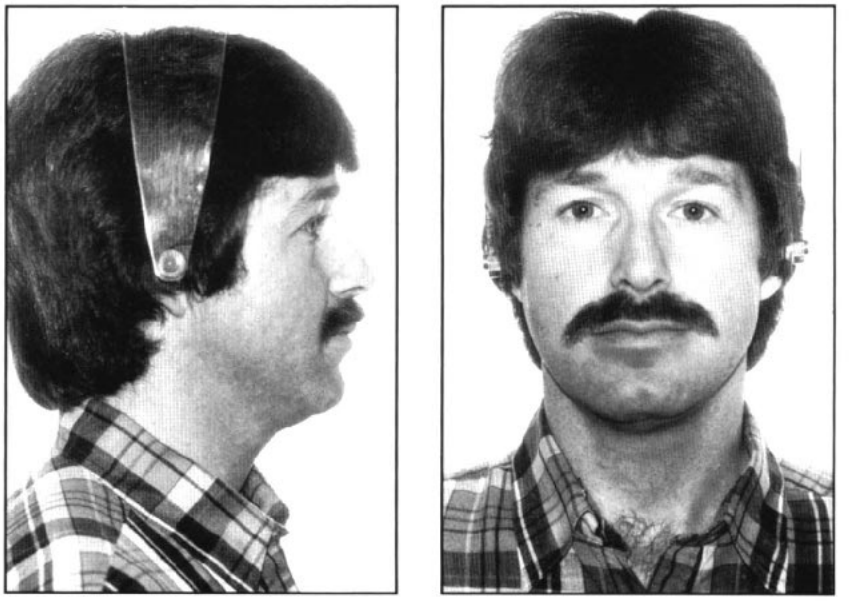
Treatment options

Two treatment options were considered:

1. Maxillary palatal expansion followed by the alignment of all teeth and bite closure with vertical elastics; occlusal equilibration and myofunctional therapy.
2. Alignment of all teeth followed by complete maxillary segmental osteotomies to rotate posterior segments into occlusion while simultaneously dropping the anterior portion of the maxilla to close the bite.

A diagnostic set-up was constructed on one side only of the study casts, to assess tooth size compatability and future equilibration needs

Figure1A-B Pretreatment facial photographs at 27 years 5 months



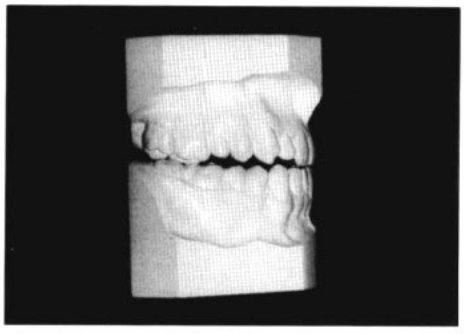


Figure 2A

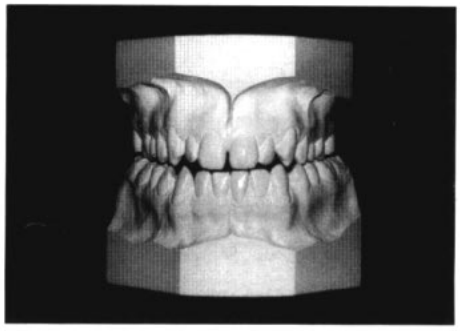


Figure 2B

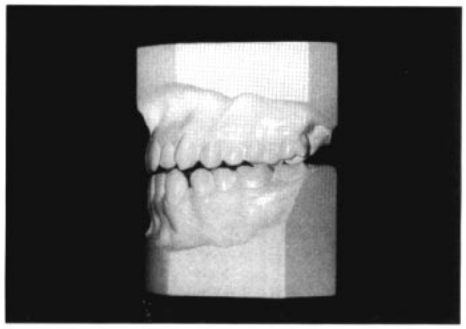


Figure 2C

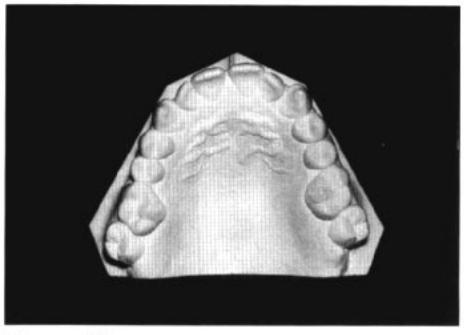


Figure 2D

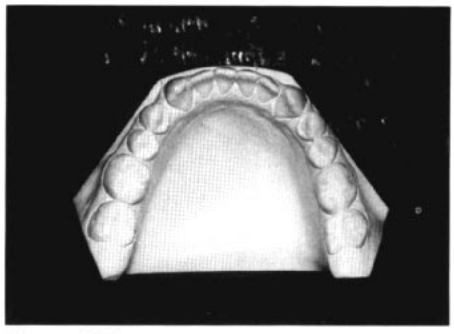


Figure 2E

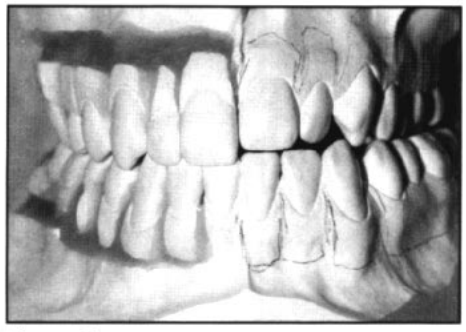


Figure 3

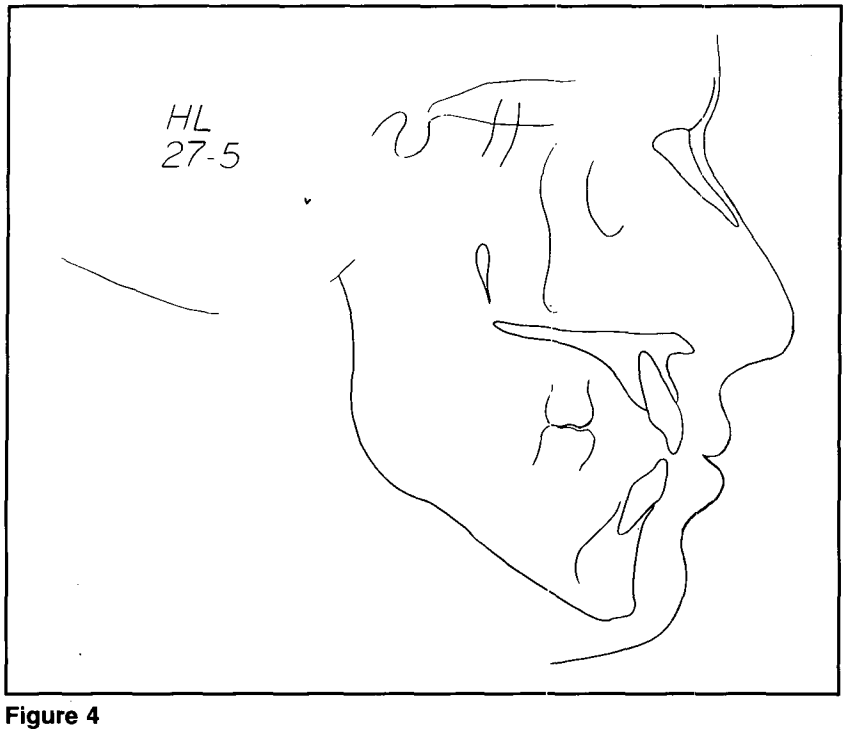


Figure 4

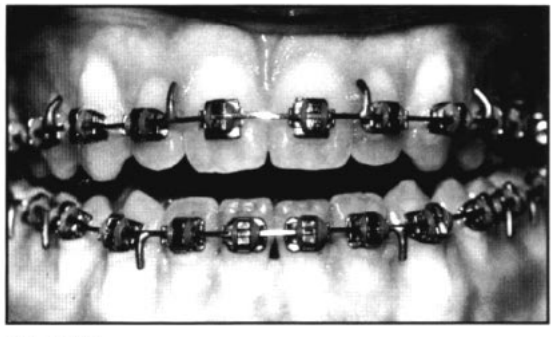


Figure 5

(Figure 3). The half set-up was also helpful in determining the amount of vertical positioning of the maxilla that would be required to achieve the desired dental and skeletal relationships. Although the patient's maxillary lateral incisors appeared to be narrow, anterior tooth size ratio proved to be nearly normal.

After consulting an oral and maxillofacial surgeon, it was decided to begin treatment with the surgical option, which included a horizontal maxillary osteotomy. According to the surgeon, "In this instance, rather than impacting the maxilla posteriorly to allow for counterclockwise autorotation of the mandible, I would anticipate dropping the maxilla anteriorly to bring the teeth into contact. Thus, the existing balance between upper and lower face height will be maintained and the maxillary incisors will be more visible." The oral surgeon also noted that a space would develop anteriorly as a result of the downward movement of the maxilla, and would require grafting.

Figure 2A-E
Pretreatment study casts

Figure 3
A diagnostic set-up was helpful in determining the tooth-size ratio was nearly normal.

Figure 4
Pretreatment cephalometric tracing. Note the pleasing balance between upper and lower face height.

Figure 5
Teeth were aligned and arches coordinated prior to surgery

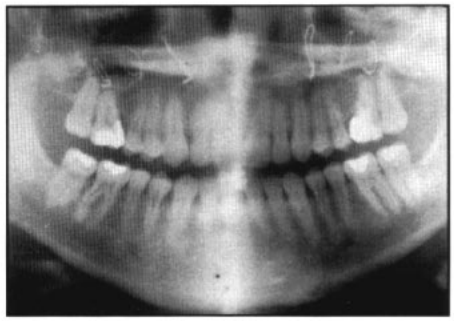


Figure 6

Figure 6
Posttreatment panoramic radiograph

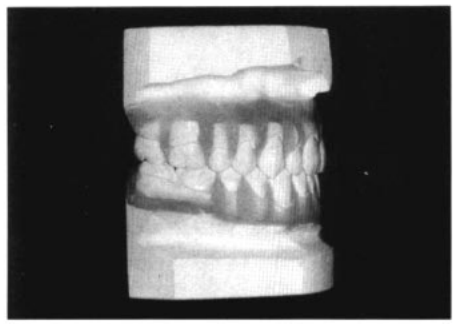


Figure 7

Figure 7
The original diagnostic set-up was modified to provide a model for fabricating a tooth positioner.

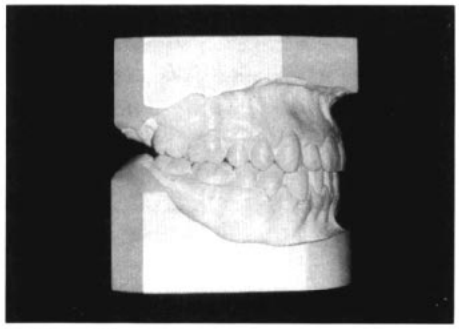


Figure 8A

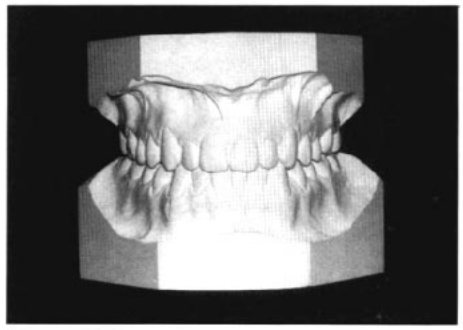


Figure 8B

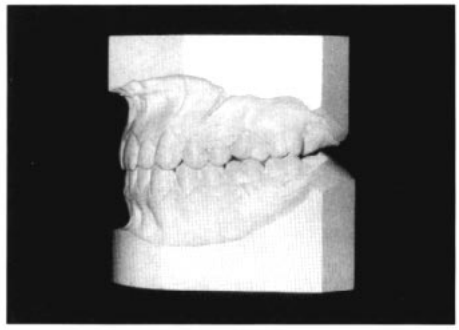


Figure 8C

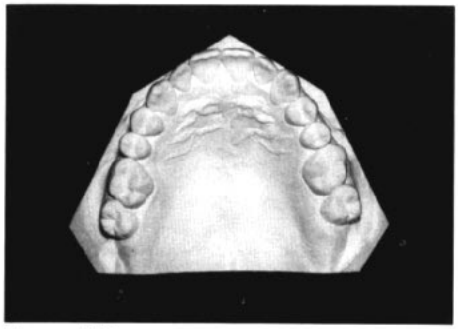


Figure 8D

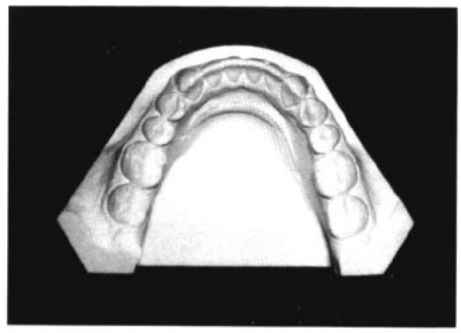


Figure 8E

Figure 8A-E
Posttreatment study casts

Figure 9
Superimposed tracings at 27 years 5 months and 29 years 10 months. Note the slight clockwise rotation of the maxilla, the autorotation of the mandible and the reduction in face height.

Treatment

During the first phase of treatment, fixed appliances were placed and the teeth were aligned and spaces closed. The arches were coordinated in preparation for the surgery. Model surgery dictated the segmental changes required to bring all teeth into occlusion. In the maxilla, posterior segments were moved buccally then rotated medially into occlusion. There was also a downward tipping of the anterior portion of the maxilla. A graft from the illiac crest was used to fill the anterior bony void. Rigid fixation was used as well as an intermaxillary acrylic splint. Elastics were used to relate the mandibular teeth to the splint. The splint was removed after six weeks.

Prior to appliance removal, the original diagnostic set-up was modified by resetting the remaining teeth to provide a model for fabricating a tooth positioner (Figure 7). This method of retention was selected anticipating a tendency for bite-opening from abnormal tongue function. Appliances were removed and the tooth positioner

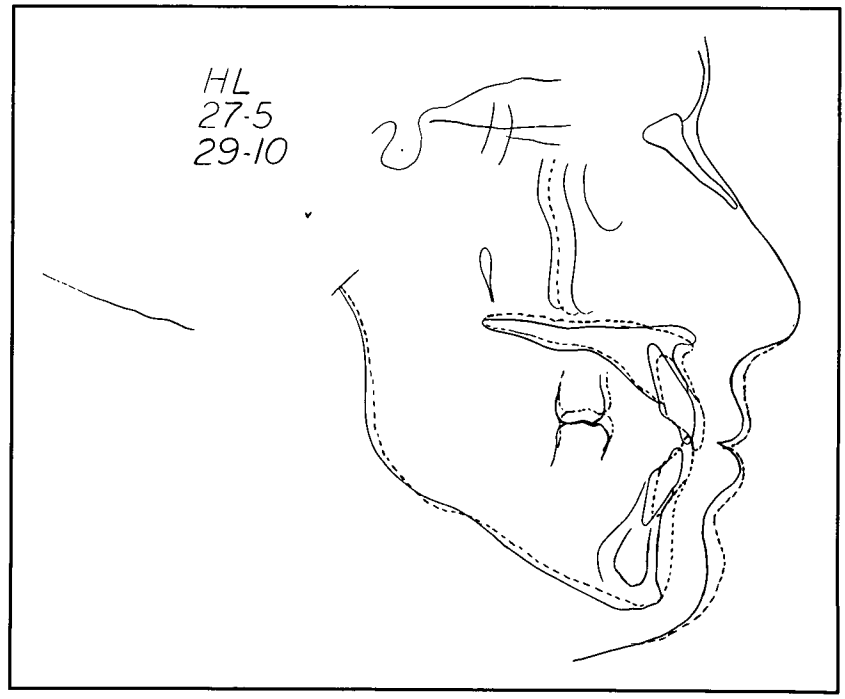


Figure 9

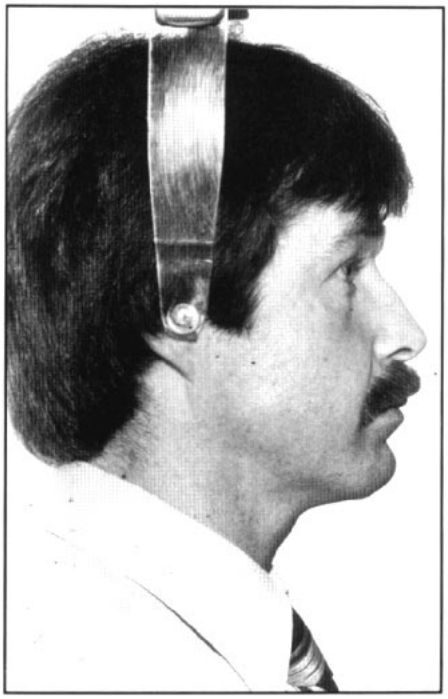


Figure 10A

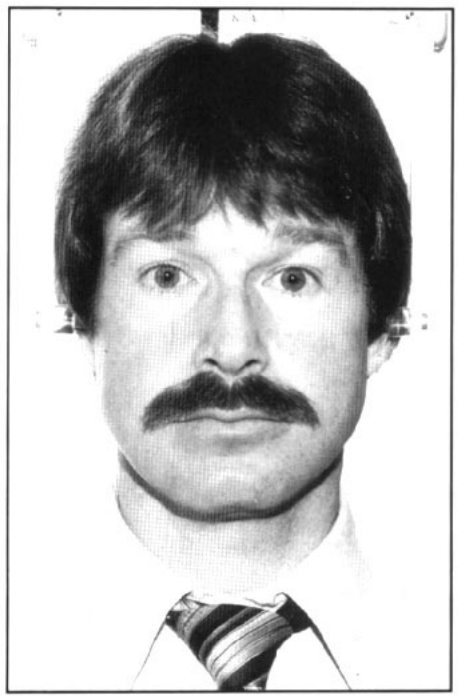


Figure 10B

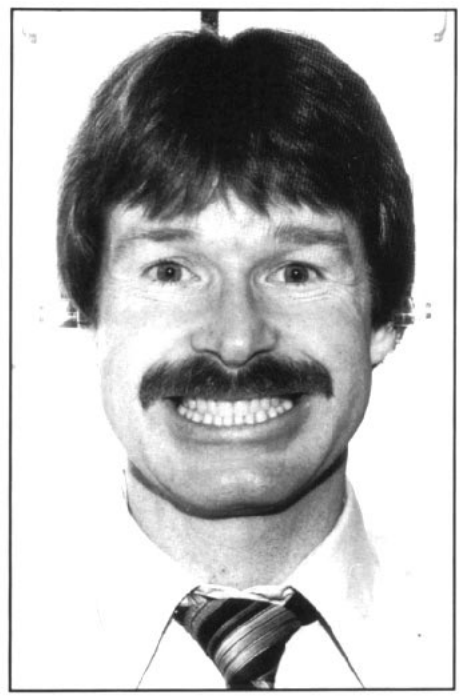


Figure 10C

Figures 10A-C Posttreatment facial photographs at 29 years 10 months. Maxillary anterior teeth are clearly visible when smiling.

placed at the same appointment, with instructions to wear it round-the-clock for 4 weeks. Equilibration of posterior teeth was done after 2 weeks, and in 4 weeks the teeth were in near-perfect occlusion and function. The positioner was then used only at night for another 4 weeks, after which it was discontinued. No further retaining appliances were needed, nor was myofunctional therapy required. Total treatment time was 17 months.

Results

The original treatment objectives were attained and the patient is satisfied with his ability to chew more easily. Facial esthetics were basically unchanged as a result of this approach to treatment and dental esthetics were improved. The most significant improvement was the anterior lip-to-tooth relationship when smiling. The patient's maxillary teeth are now more easily visible due to a downward rotation of the maxilla.

Occlusal function is now excellent. Following early use of a tooth positioner, all retention was discontinued. Six years later, the occlusion remains very stable with no loss of anterior function. This degree of stability may be an indication that the original diagnosis identifying the primary etiologic factor of the malocclusion as skeletal was accurate. The treatment was simplified by correcting only those structures not in harmony with the individual's otherwise balanced face.

If an alternative treatment plan which did not address the existing skeletal problem had been followed, one has to wonder what level of stability would have been achieved.

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