

# The Clinical Challenge

## Prognosis of Extreme Skeletal Discrepancies: A Case Report

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### THE CHALLENGE



**Figure 1.** Pretreatment lateral view of the patient's occlusion. Note incomplete overbite and labial inclination of the maxillary central incisors.

The timing of orthodontic treatment in children has always been a controversial issue. Variable degrees of adolescent maturation occur at the same chronologic age.<sup>1</sup> Traditionally, peak height velocity was used to identify the optimal time; however, it did not always coincide with the psychologic and emotional maturation and motivation of the patient. Generally, by age 4, the craniofacial skeleton has reached 60% of its adult size<sup>2</sup>; by age 12, 90% of its growth is completed. The most common component of Class II malocclusion is skeletal mandibular retrusion. The maxilla is usually in a neutral position or even more often in a retruded position.<sup>3</sup>

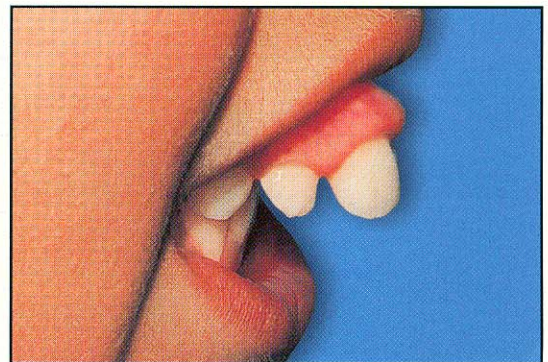
### CASE REPORT

A 10-year-old male patient presented with an enlarged overjet (13.5 mm), skeletal and dental Class II malocclusion, retrognathic mandible, constricted maxilla, posterior crossbite, mixed dentition, overeruption of mandibular central incisors, incomplete overbite, and dental midline shift. Grossly inadequate lips, a short upper lip, gummy smile, mouth breathing, and trapped lower lip with buccal inclination of the maxillary central incisors completed the maladjusted appearance of the patient (Figures 1 through 3). Cephalometric analysis was performed with the following results:

Slightly protrusive maxilla [SNA=85° (82°)]  
Retrognathic mandibula [SNB=73° (80°)]  
Major skeletal discrepancy [ANB=12° (2°)]  
Retrognathic chin [N-Pog/FH 81° (90°)]  
Short mandible [CO-Gn=107 mm (113 mm)]  
Average maxilla [Co-A=85 mm (87 mm)]

A decision had to be made of how to treat the patient, and the following questions had to be answered:

- Would you postpone treatment until the permanent dentition is established?
- Would you consider two-phase fixed appliance treatment?
- Would you combine orthodontic treatment with orthognathic surgery, postponing completion for 7 or 8 years?
- Would a functional appliance be stable if used by itself?



**Figure 2.** Pretreatment lateral view of the patient. Note retrognathic mandible and trapped lower lip.



**Figure 3.** Pretreatment clinical facial view. Note midline discrepancy and posterior crossbite.

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## THE SOLUTION

A decision was made to initiate the treatment immediately. A treatment plan was designed and included:

- Use of activator with expansion screw. Working bite was taken with edge-to-edge relationship between the maxillary and mandibular central incisors and correction of the midline shift.
- Daily lip muscle elongation exercises.
- Use of the activator as an eruption guidance appliance by selectively grinding acrylic support from erupting teeth.
- Fixed appliance for final occlusal adjustments.

### PROGRESS OF TREATMENT

The first phase, using an activator with expansion screw, lasted approximately 15 months, during which time the soft tissue profile and the cephalometric findings improved significantly. The cephalometric analysis revealed almost no change in the maxilla, but a significant change in the mandible. The appliance was worn 12 to 14 hours a day. Lip muscle elongation exercises were practiced daily, at least twice a day for 10-minute periods.

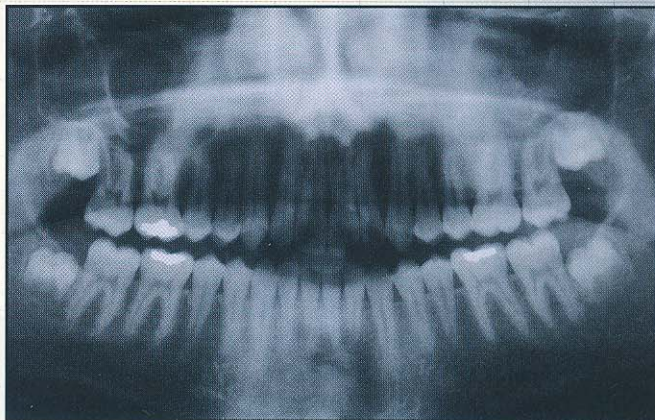
The second phase of eruption guidance appliance lasted approximately 15 months, during which selective posterior acrylic grinding was performed to allow eruption of the permanent teeth.

The third phase of fixed appliance lasted only 6 months. Retainers were worn at night only for another year. The total active treatment time was 36 months (3 years). Most of the time (30 months), the patient wore a removable functional appliance. The profile, the occlusion (Figures 4 and 5), and the soft tissue support improved dramatically, and the posttreatment x-ray at 3 years exhibits adequate parallelism (Figure 6).

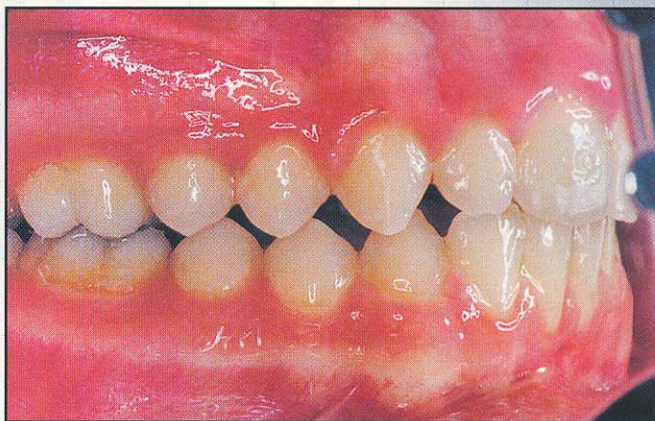
### DISCUSSION

Combination of a functional appliance and a fixed appliance at 1 or 2 phases has the benefit of achieving mandibular skeletal effects with controlled movement of the teeth.<sup>4</sup> The advantages of an early treatment (rapid cellular reaction of growing tissues, patient compliance, avoidance of damage to the proclined anterior maxillary incisors, and less need of dental or surgical compensations) exceed the possible disadvantages (eg, loss of readiness for the treatment, expensive and long treatment).

The case presented is an example of the tremendous difference the orthodontist can make in an early stage of the patient's childhood, not only in appearance, but also in social function.<sup>5</sup> The results achieved were due to the exceptionally favorable forward mandibular growth. Such growth may not always be achievable; however, the clinician must try as early as possible to solve such skeletal discrepancies. In case the functional treatment of the first phase fails, the dental and surgical options are still open.



**Figure 4.** Panoramic radiograph following 3 years in retention. Note excellent root parallelism.



**Figure 5.** Lateral view of the occlusion following 3 years in retention. Note slight Class II tendency with very small lateral open bite.



**Figure 6.** Facial view of the occlusion following 3 years in retention. Note correct midline discrepancy and broad maxillary and mandibular arches.

### REFERENCES

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