

# CASE REPORT

## *Nonextraction treatment of a high-angle Class II malocclusion: A case report*

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A Class II malocclusion in a growing patient with hyperdivergent skeletal pattern and excessive vertical facial height is presented. The malocclusion was treated following a nonextraction approach, by molar distalization in combination with a removable appliance with finger springs and a high-pull gear. The space gained was used to retract the premolars, canines, and incisors. (Am J Orthod Dentofacial Orthop 2000;117:721-7)

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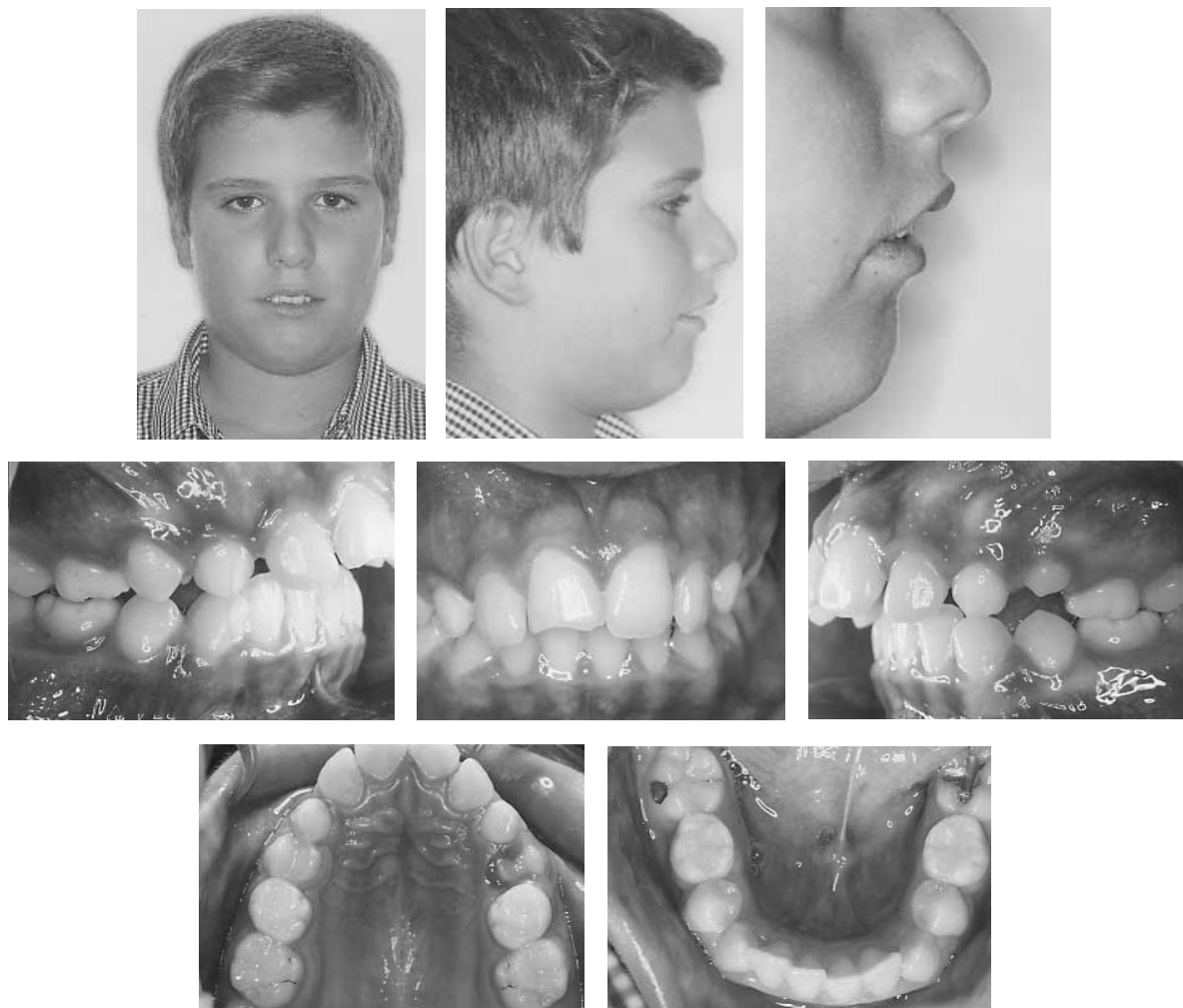
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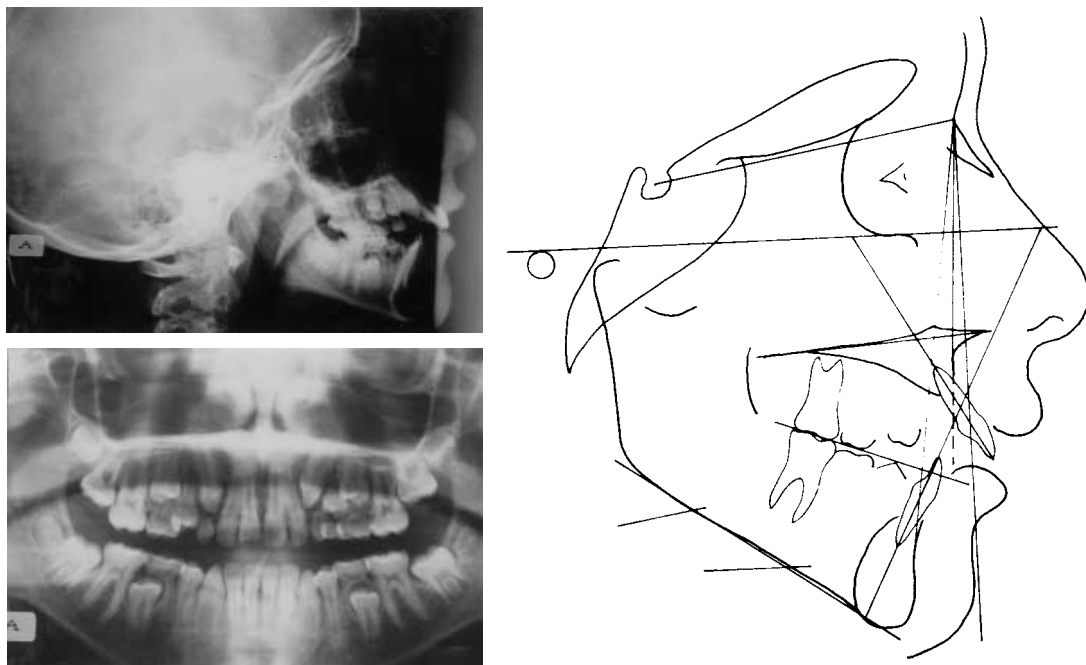
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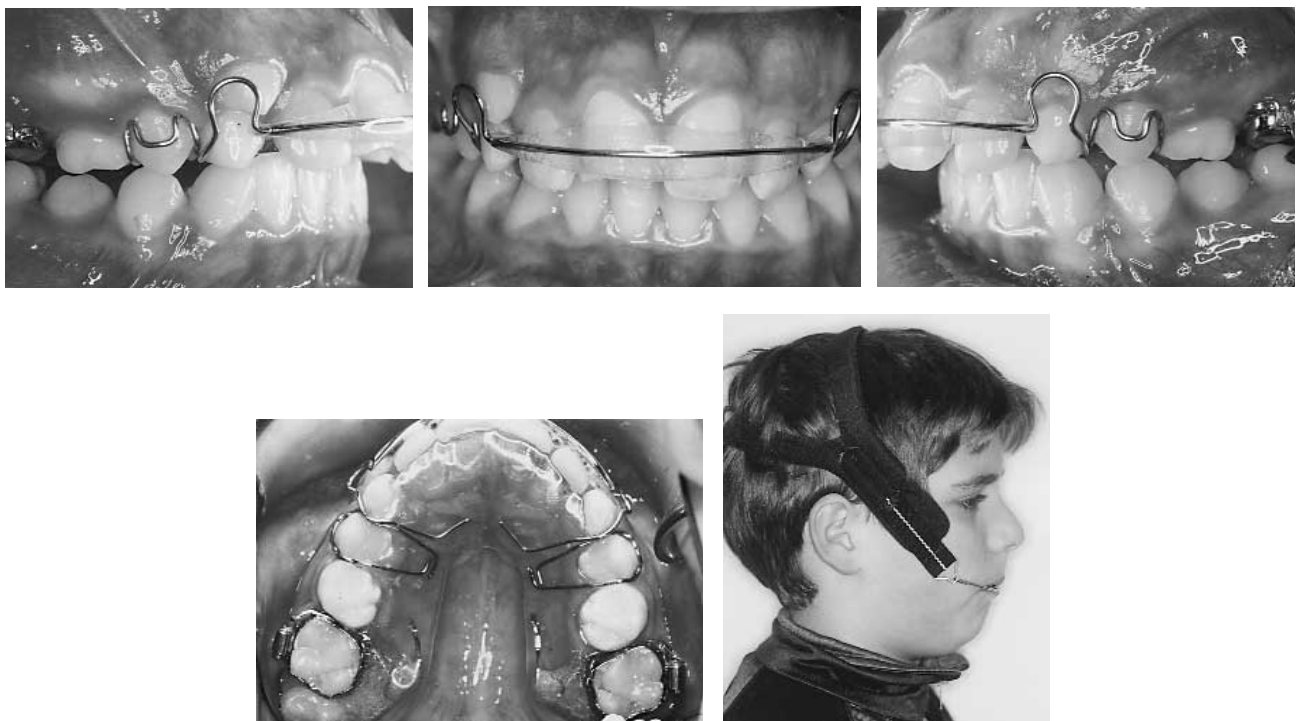
**T**he treatment of Class II malocclusions in growing patients can be accomplished by several different methods. One is to move the molars distally into a Class I relationship and use the space gained to retract the premolars, canines, and incisors.<sup>1-4</sup> A technique popularized by Cetlin<sup>1</sup> places a removable appliance with finger springs (AcCO) against the



**Fig 1.** Pretreatment facial and intraoral photographs.



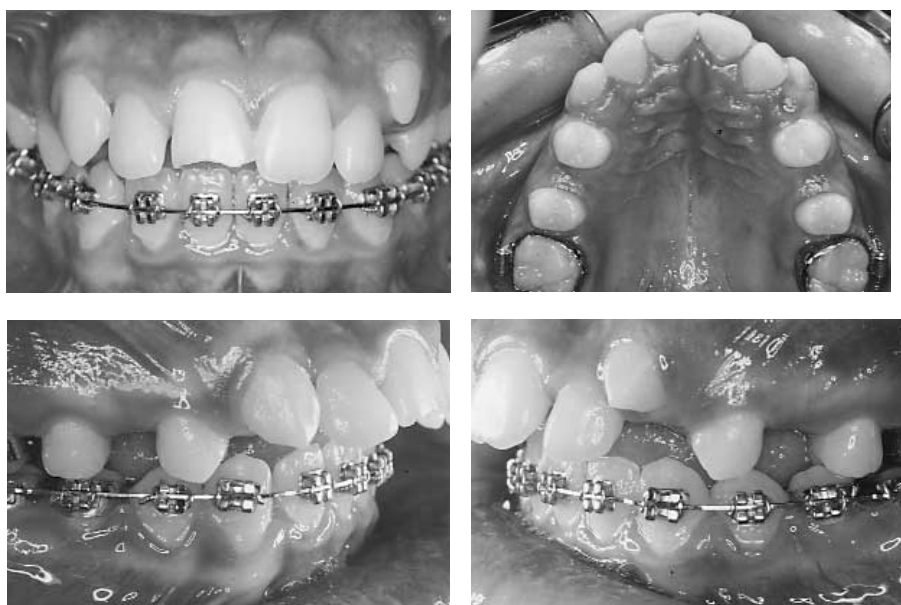
**Fig 2.** Pretreatment records and cephalometric tracing.



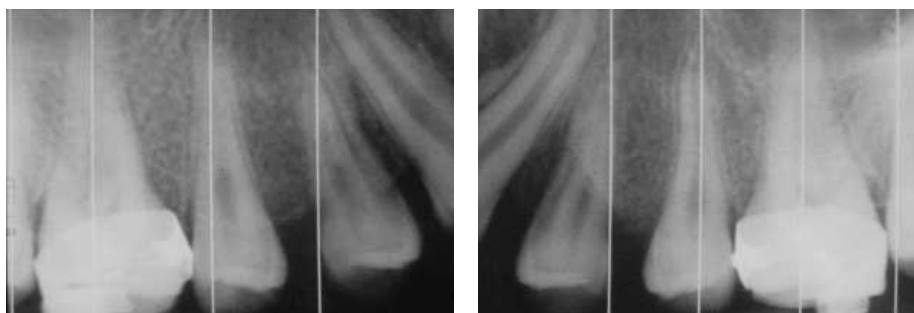
**Fig 3.** Removable appliance with finger springs and high-pull gear used for molars distalization.

crowns of the molars to move them distally, in conjunction with a cervical pull head gear. Although this gear is suitable for the majority of patients, a high-pull headgear is preferred for hyperdivergent

patients. The high-pull headgear, in addition to moving the roots distally along with the crowns, controls the vertical dimensions by preventing the molar extrusion commonly seen with the cervical gear. This



**Fig 4.** Class I molar relationship obtained after 6 months of treatment.



**Fig 5.** Radiographs suggest bodily distal movement.

**Table I.** Cephalometric summary (Steiner analysis)

Measurement	Initial	Final	Difference
SNA°	82°	82°	0
SNB°	75°	78°	+3°
ANB°	7°	4°	-3°
Pg to NB	0 mm	2 mm	+2 mm
Go/Gn to Sn	42°	41°	-1°
I to NA	7 mm	2 mm	-5 mm
I to NA°	26°	22°	-4°
I to NB	5 mm	5 mm	0
I to NB°	26°	26°	0
I to I	122°	124°	+2

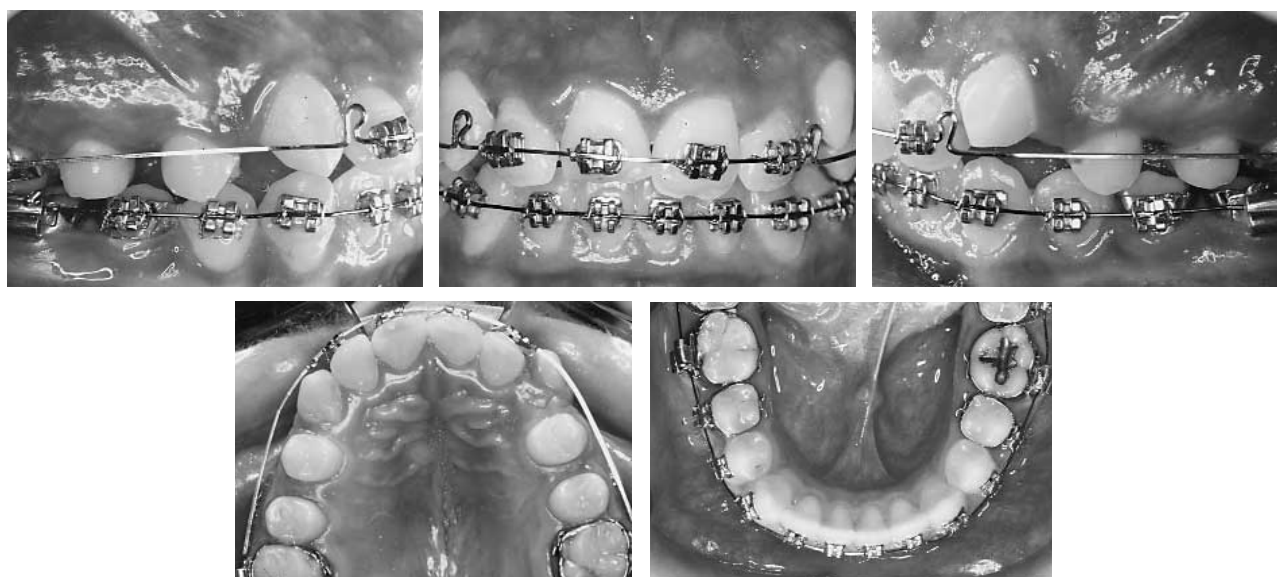
is particularly important for the hyperdivergent patient who is more sensitive to increases in the vertical dimension. Molar extrusion in these cases can cause downward and backward mandibular rotation

**Table II.** Facial height and soft tissue

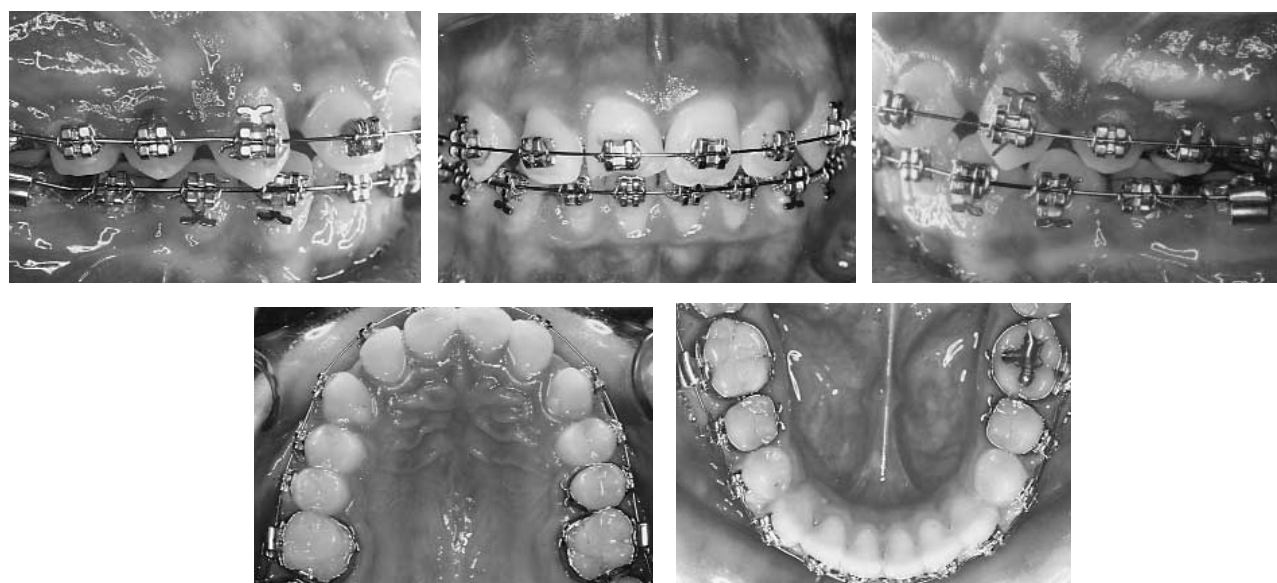
Measurement	Initial	Final	Difference
N-ANS/N-Me	40	42.3	+2.3
ANS-Me/N-Me	60	57.7	-2.3
NLA°	72°	90°	+18°

with a concomitant increase in face height and a worsening of the Class II malocclusion. Alternate treatment plans for hyperdivergent patients frequently involve extraction procedures in consideration of these vertical problems.

The intent of this article is to describe and demonstrate the nonextraction treatment of a growing patient with a Class II malocclusion complicated by a hyperdivergent facial pattern. The treatment involved the technique described above.



**Fig 6.** Distal drifting of second premolars after molar distalization.



**Fig 7.** Fixed appliance placed for dental alignment and canine retraction.

### History and Diagnosis

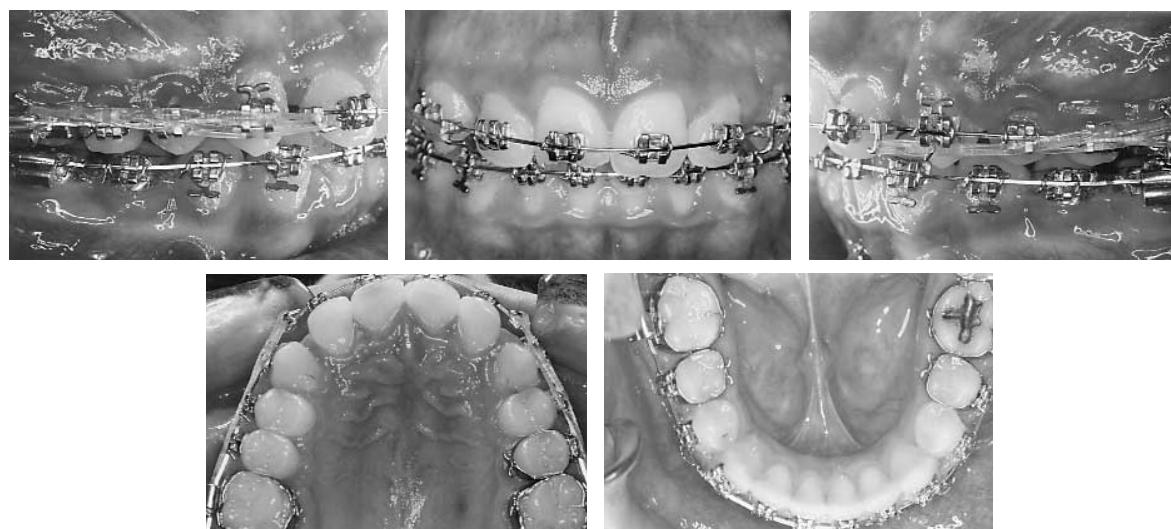
The patient was a 10 year old white male in the late mixed dentition (Figs 1 and 2). The medical history was negative. Dentally, he had a Class II malocclusion with a 10 mm overjet, a 10% overbite, and lack of lower incisors contact. There was minor crowding in both arches and a fracture of the maxillary right central incisor (Fig 1). The Steiner analysis described a retrognathic mandible with an ANB of 7° and a mandibular plane of 42° (Table I). In addition, lower face height was 60% of total face height, the nasolabial angle was 72°, and the lips were incompetent (Table II).

### TREATMENT OBJECTIVES

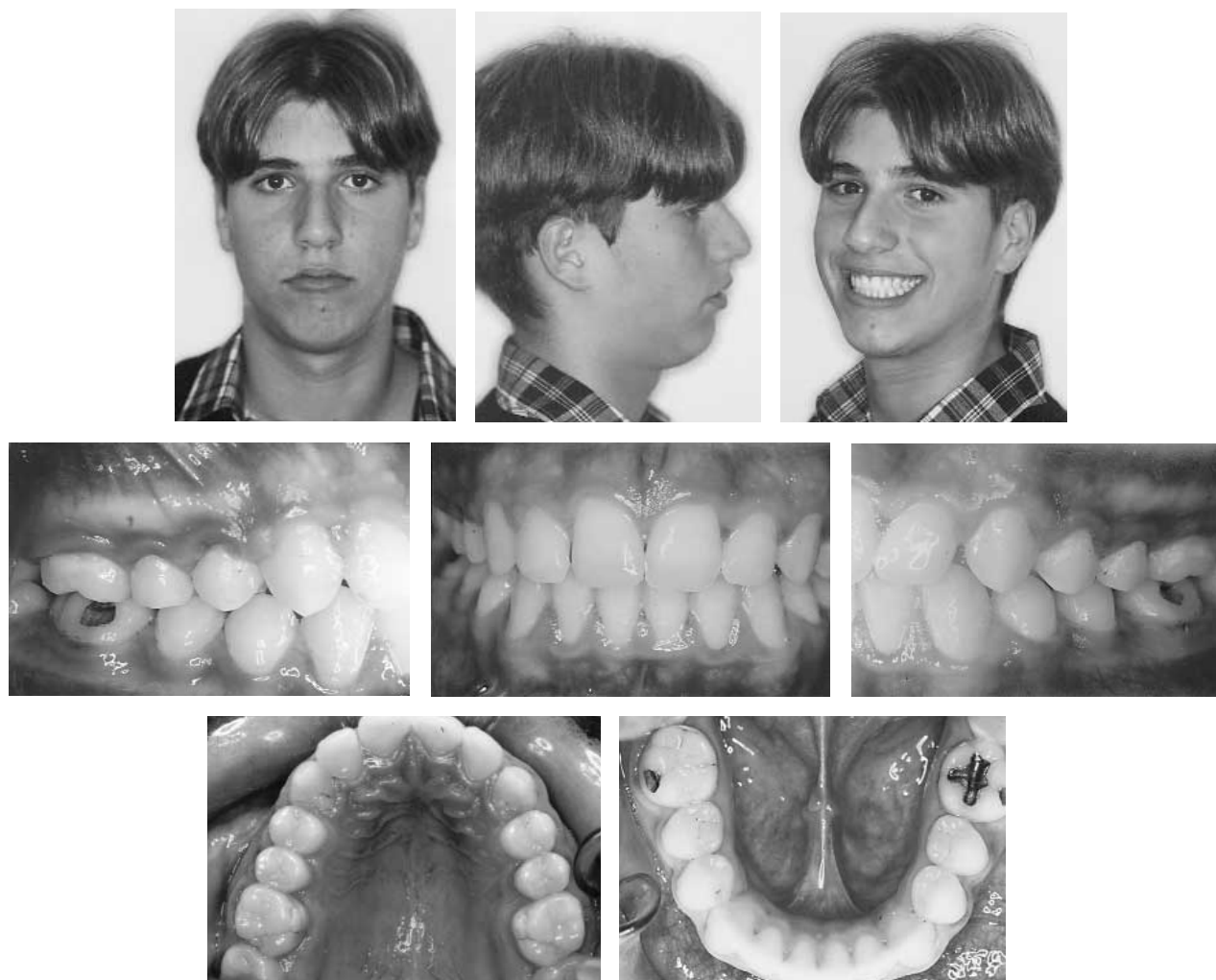
1. Correct the Class II malocclusion.
2. Prevent downward and backward mandibular rotation.
3. Improve the facial profile and lip competency.

### TREATMENT

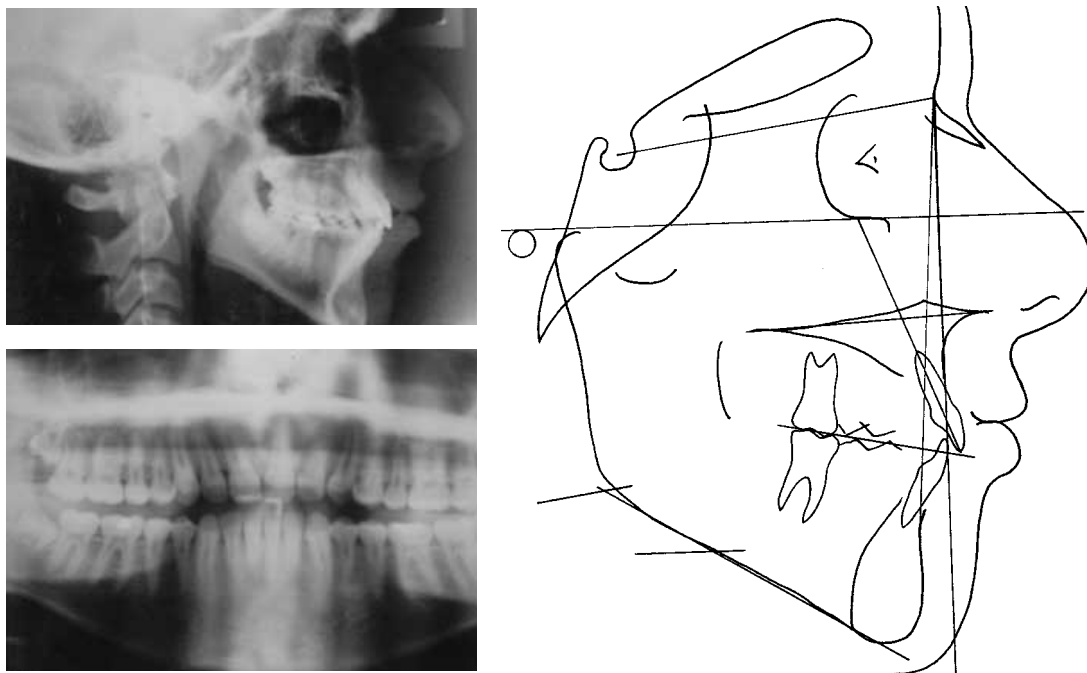
Molar bands and a high-pull headgear were placed in conjunction with the AcCO appliance to move the molars distally and control the vertical dimension (Fig 3). To review, the use of the high-pull gear was a critical aspect of treatment because any



**Fig 8.** Incisor retraction with Class I forces as described in the Bidimensional technique.



**Fig 9.** Posttreatment facial and intraoral photographs.



**Fig 10.** Posttreatment records and cephalometric tracing.

molar extrusion in this hyperdivergent patient could result in backward rotation of the mandible and a worsening of the malocclusion. The patient was instructed to wear the AcCO appliance 24 hours/day except when eating, and to wear the headgear 14 to 16 hours/day. The springs of the AcCO were made of  $0.016 \times 0.022$  wire and were activated approximately 2 mm to produce a force of 30 to 40 g. The molars were moved distally and a Class I molar relationship was achieved after 6 months (Figs 4 and 5).

To maintain the Class I molar position, the high-pull gear was continued 10 to 14 hours/day. In addition, a mandibular lip bumper functioned to maintain the "E" space and help to resolve the minor lower arch crowding. While the molar position was stabilized, the premolars drifted distally into a Class I occlusion (Fig 6), and the canines were retracted using light forces. Incisor retraction was done with Class I elastics and sliding mechanics as described in the Bidimensional technique<sup>5,6</sup> (Figs 7 and 8). The patient's cooperation was excellent, and treatment was completed in 30 months (Fig 9). The maxillary right central incisor was restored. Retention was accomplished with removable acrylic retainers.

## RESULTS

Treatment resulted in an improvement in facial esthetics with a notable change in lip posture and balance. The arches were well aligned, and a Class I

molar and canine relationship were achieved. There was a reduction of the overjet from 10 mm to 1.5 mm, and the overbite was corrected to normal standards (Fig 9).

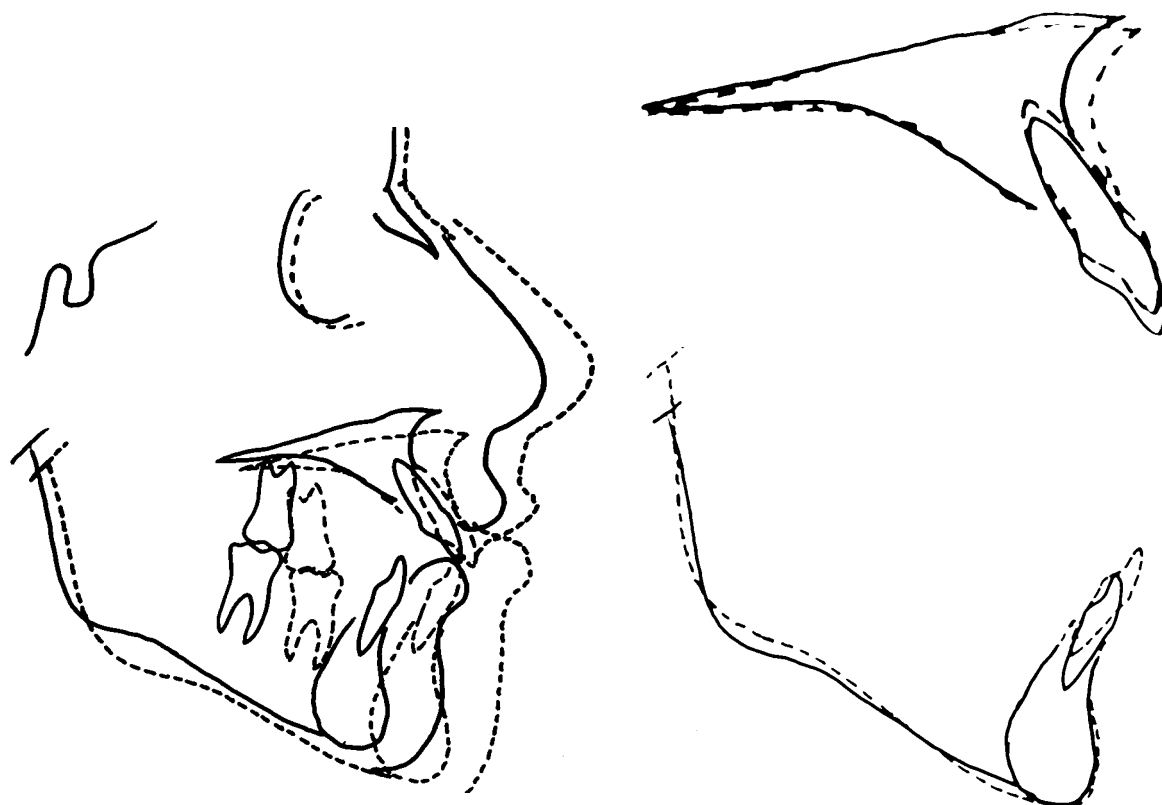
Cephalometrically, the ANB angle was reduced by  $3^\circ$ , reflecting an increase in the SNB angle. The mandibular plane closed  $1^\circ$ , and the maxillary incisors relative to NA were retracted 5 mm. Lower incisor position was unchanged (Table I). In addition, lower face height decreased from 60% to 57.7% of total height and the NLA (nasolabial angle) increased  $18^\circ$  to  $90^\circ$  (Table II).

## DISCUSSION AND CONCLUSIONS

In hyperdivergent patients, some clinicians recommend extraction treatment in order to control the vertical dimension because premolar extraction has been associated with closure of the mandibular plane angle.<sup>7-8</sup> This article demonstrates that nonextraction treatment can successfully treat a hyperdivergent patient by distal molar movement. Critical to this method is the utilization of a high-pull headgear for vertical control of the posterior aspect of the occlusal plane.

## REFERENCES

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**Fig 11.** Pretreatment (*solid lines*) and posttreatment (*dashed lines*) cephalometric superimposition.

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