

CASE REPORT

Nonsurgical Treatment of Severe Mandibular Prognathism

NOBORU DEMURA, DDS, PHD
NATSUKI SEGAMI, DDS, PHD

The following case report shows a nonsurgical approach to treatment of a preadolescent boy with severe mandibular prognathism, both maxillary canines missing, and a supernumerary tooth in the maxillary anterior region.

Diagnosis

The patient presented at age 11 years, 11 months, with the chief complaint of mandibular protrusion. His mother and two sisters had similar prognathisms.

Clinical examination revealed a concave profile and a full Class III malocclusion with an anterior crossbite, a -10mm overjet, and a 10mm overbite (Fig. 1). Both maxillary canines were missing, and there was a

supernumerary between the roots of the maxillary central incisors. The maxillary lateral incisors were abnormally small.

Cephalometric analysis

showed an ANB angle two standard deviations less than the norm for a 12-year-old Japanese male¹ (Table 1). As would be expected with a skeletal mandibular prognathism, there was a dental compensation involving labial inclination of the maxillary incisors and lingual inclination of the mandibular incisors.

Treatment Plan

The patient and parents were told that orthognathic surgery might be required. Since they wanted to avoid surgery, we proceeded with orthodontic

TABLE 1
CEPHALOMETRIC DATA (°)

	Pretreatment	Norm*	Post-Treatment	Norm*
Facial angle	89.2	83.1	90.2	84.7
SNA	81.5	81.6	82.1	81.5
SNB	81.8	77.2	83.4	78.2
ANB	-0.3	4.3	-1.3	3.2
FH-MP	26.8	30.6	27.8	28.0
Y-axis	60.0	66.3	60.4	66.1
$\bar{1}-\bar{1}$	131.6	122.2	113.5	124.2
SN- $\bar{1}$	106.8	105.0	126.4	106.0
$\bar{1}$ -FH	67.1	53.6	67.3	56.7
$\bar{1}$ -MP	86.1	95.7	84.9	95.2

*Norms for 12-year-old and adult Japanese males from Wada et al.¹



Dr. Demura



Dr. Segami

Dr. Demura is a faculty member, Department of Orthodontics, and Dr. Segami is Professor and Chairman, Department of Oral Surgery, and Chairman, Dental Division, Kanazawa Medical University, 1-1 Daigaku, Uchinada-machi, Kahoku-gun, Ishikawa-Pref., Japan 920-0293.

Nonsurgical Treatment of Severe Mandibular Prognathism

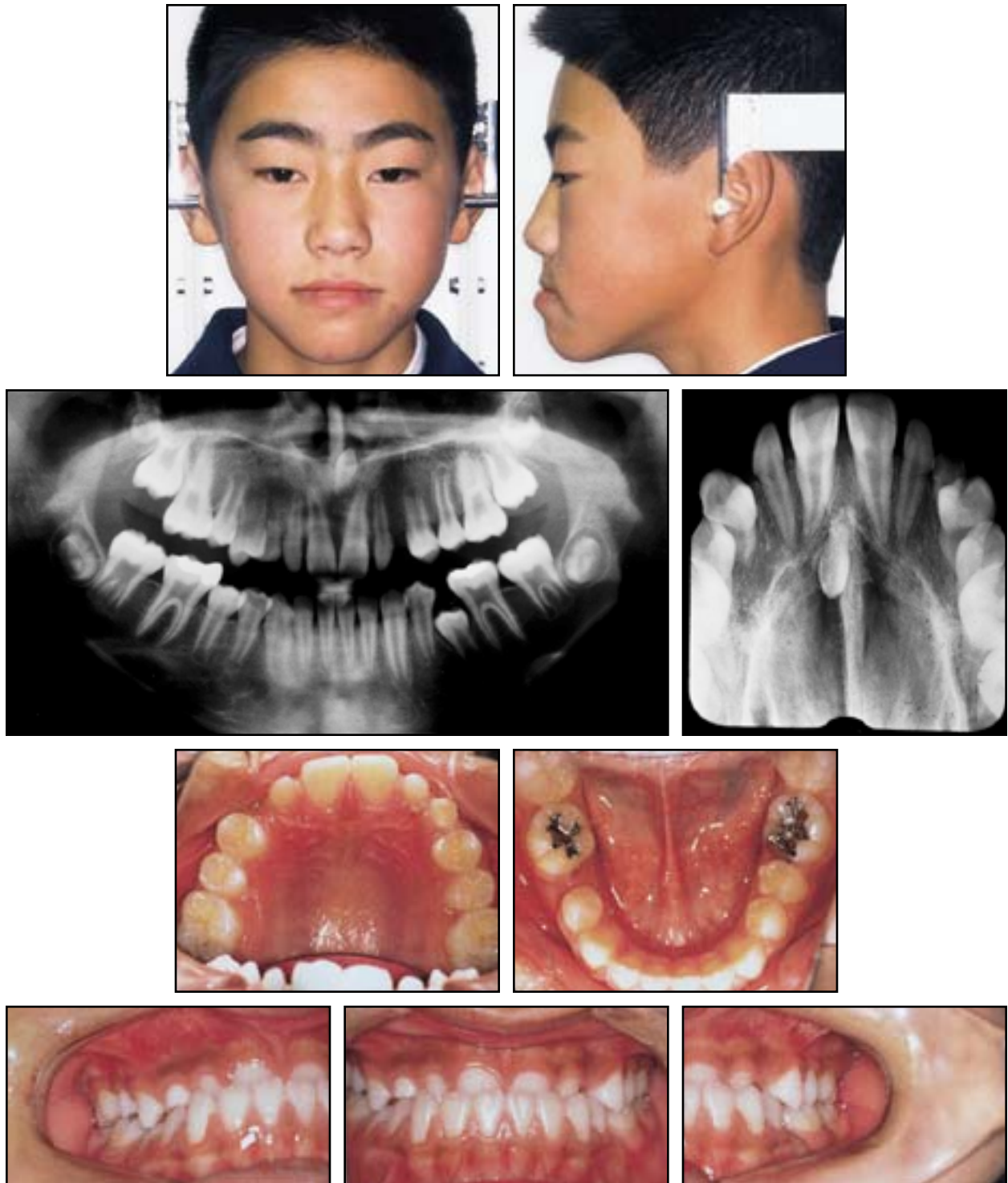
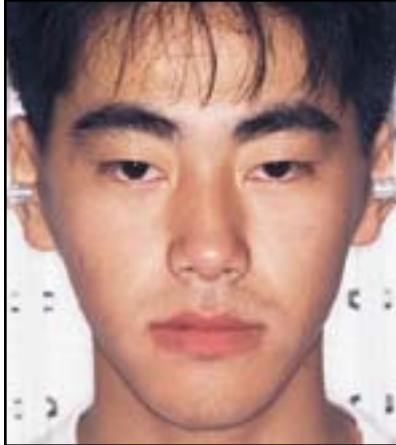


Fig. 1 11-year-old male with severe mandibular prognathism before treatment.



Fig. 2 Chin cup fitted to apply 500g of force.



treatment designed to:

1. Restrict further mandibular growth during puberty.
2. Align the dental arches by extracting the mandibular first premolars and moving the maxillary first premolars mesially to compensate for the missing canines.



Treatment Progress

A chin cup with 500g of force was used to restrict mandibular growth (Fig. 2). After extraction of the supernumerary, the maxillary incisors were moved labially with a lingual arch.

At age 14, the mandibular



Fig. 3 Patient after two years of wearing chin cup and lingual arch and 30 additional months of fixed appliance treatment.

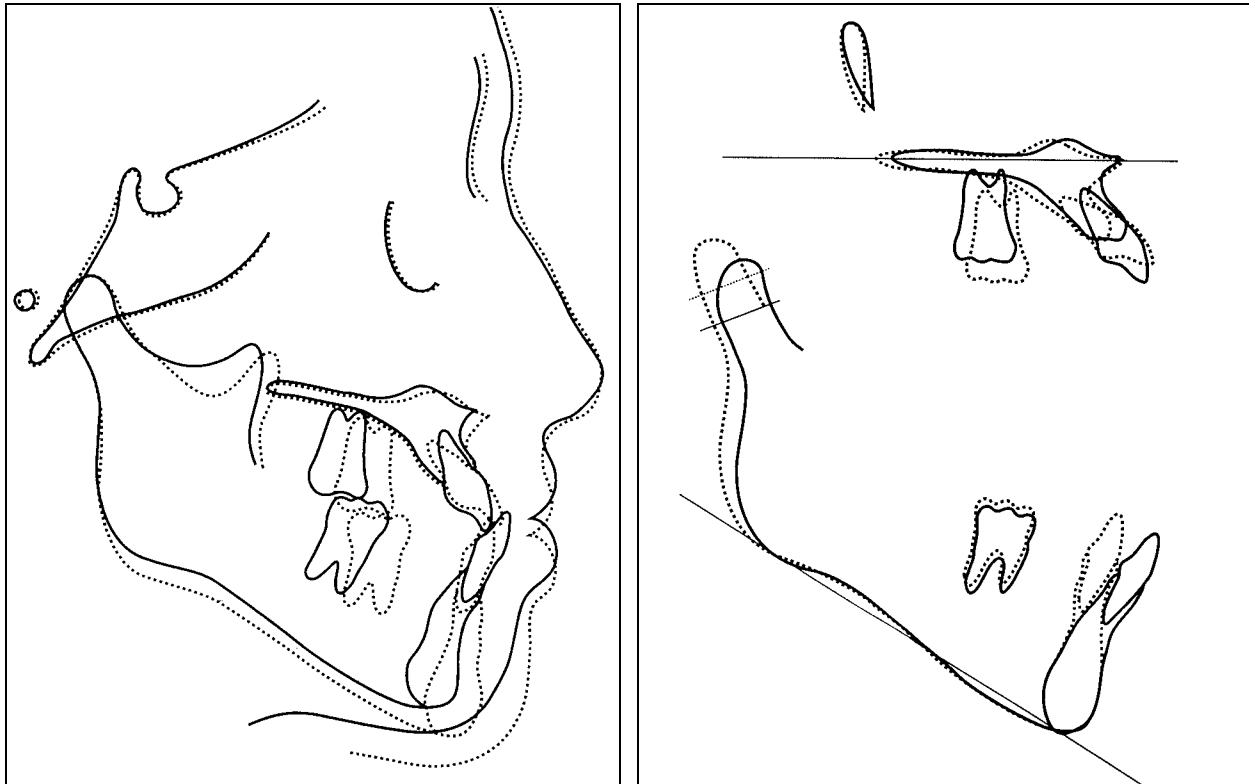


Fig. 4 Superimposition of cephalometric tracings before (solid line) and after (dashed line) treatment.

first premolars were extracted, and full fixed appliances were placed. A reverse-curve maxillary archwire was used, along with Class III elastics, to reduce the deep bite by extruding the maxillary first molars and moving the maxillary teeth mesially.

After 30 months of fixed appliance treatment, the patient was placed on retention (Fig. 3).

Discussion

The chin cup, which was worn for the entire five years of treatment, appeared to control

the amount and direction of mandibular growth without adverse effects on the TMJs.^{2,3} Superimposition of pre- and post-treatment cephalometric tracings indicated that the mandible was rotated downward and clockwise (Fig. 4). The maxillary incisors were moved labially, and the mandibular incisors lingually (Table 1).

Despite the severe skeletal prognathism, the missing maxillary canines, and the microdontia of the maxillary lateral incisors, this case was successfully treated without surgery.

REFERENCES

1. Wada, K.; Matsusita, K.; Shimazaki, S.; Miwa, Y.; Hasuike, Y.; and Susami, R.: An evaluation of a new case analysis of a lateral cephalometric roentgenogram, *J. Kanazawa Med. Univ.* 6:60-70, 1981.
2. Susami, R.; Akiyama, K.; Oonishi, K.; Yamano, C.; and Deguchi, T.: Cephalometric survey of reaction to orthodontic treatment in anterior cross-bite cases, Part III: Cases treated with chin cup, *J. Jap. Orthod. Soc.* 25:75-82, 1966.
3. Lundström, A.: *Introduction to Orthodontics*, McGraw-Hill, New York, 1958, pp. 229, 293.