

Category 5: Class II Division 1 malocclusion with a high mandibular plane angle

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This case report was submitted to the American Board of Orthodontics as part of the board-certification process. The summary of treatment and records are reprinted here much as they were submitted to the board. (*Am J Orthod Dentofacial Orthop* 2006;130:236-43)

SUMMARY OF TREATMENT

Category: #5

Patient's date of birth: 1/24/85

Age: 10 years 1 month

PRETREATMENT RECORDS

Date of records: 3/8/95 (Table, Figs 1-5)

Diagnosis

Class II Division 1 malocclusion with a high mandibular plane angle (SNa-Go-Gn = 40°).

Skeletal: Maxillary retrognathia, significant mandibular retrognathia, high mandibular plane angle (SNa-Go-Gn = 40°), skeletal age = 10 years.

Dental: Class II Division 1 malocclusion, maxillary incisor protrusion, severe overjet of 10 mm, mild crowding, lower dental midline 1 mm to right.

Facial: Lip incompetence, convex profile.

Treatment plan

Band and bond maxillary and mandibular arches with .022-in Andrews prescription edgewise appliances.

Level and align dental arches.

Begin high-pull facebow headgear, requesting wear of 12 to 14 hours per day to correct Class II malocclusion by controlling maxillary dentition and growth.

Mandibular correction appliance (MCA) to further aid in Class II correction.

Class II elastics as necessary to seat canines into Class I occlusion.

Obtain and maintain Class I, mutually protected occlusion.

Detail and finish.

Deband and retain with maxillary and mandibular removable Hawley retainers.

Refer to oral surgeon for removal of third molars.

Treatment

Banded and bonded both arches with .022-in Andrews prescription edgewise appliances.

Leveled and aligned dental arches.

Used high-pull facebow headgear to correct Class II malocclusion.

MCA was added to treatment to further aid in Class II correction.

Class II elastics were used to solidify correction and seat canines into Class I occlusion.

Obtained and maintained Class I, mutually protected occlusion.

Detailed and finished.

Debanded and retained orthodontic correction with maxillary wrap around and mandibular modified spring removable Hawley retainers.

Initiated treatment date: 5/25/95

Appliance removal date: 11/13/98

Active treatment time duration: 42 months

POSTTREATMENT RECORDS

Date of records: 11/24/98 (Figs 6-11)

Retention: Maxillary wrap around and mandibular modified spring removable Hawley retainers.

Retention completed date: 10/5/00

Retention duration: 23 months

HISTORY AND ETIOLOGY

The patient was a white girl aged 10 years 1 month. **Medical:** Good physical and emotional health. Patient snores and breathes through her mouth. Frequent sore throats.

Dental: Overall dental health within normal limits. The patient had history of bilateral pain and clicking of the jaw joints when chewing gum but did not demonstrate active temporomandibular symptomatology at the examination.

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Etiology: Primarily hereditary with a secondary component of mouth breathing during growth and development.

Chief complaint: "She is very self-conscious of her teeth."

DIAGNOSIS

Class II Division 1 malocclusion with a high mandibular plane angle (SNa Go-Gn = 40°).

Skeletal: Maxillary retrognathia, significant mandibular retrognathia, high mandibular plane angle (SNa Go-Gn = 40°), skeletal age = 10 years.

Dental: Class II Division 1 malocclusion, maxillary incisor protrusion, severe overjet of 10 mm, mild crowding, lower dental midline 1 mm to right.

TREATMENT PLAN

The patient and her mother were informed of the need for excellent cooperation with high-pull headgear and fixed appliances to achieve the best result. Lack of good cooperation or unfavorable growth could result in an extraction treatment plan of the maxillary first premolars. Risks and limitations of orthodontic treatment were reviewed. Handouts on allergies and mouth breathing were given to the patient and her parent. She was also referred to an allergist.

Band and bond both arches with .022-in Andrews prescription edgewise appliances.

Level and align dental arches.

Begin high-pull headgear requesting wear of 12 to 14 hours per day to correct Class II malocclusion by controlling maxillary dentition and growth.

MCA to further aid in Class II correction.

Class II elastics as necessary to seat canines into Class I occlusion.

Obtain and maintain Class I, mutually protected occlusion.

Detail and finish.

Deband and retain with maxillary and mandibular removable Hawley retainers.

Refer to oral surgeon for removal of third molars.

SPECIFIC OBJECTIVES OF TREATMENT

Maxilla

A-P: Control A-P, reduce and/or maintain SNA angle.

Mandible

A-P: Encourage mandibular anterior growth.

Vertical: Maintain vertical dimension and minimize clockwise rotation of the mandible.

Maxillary dentition

A-P: Maintain or distalize molars, reduce incisor protrusion and overjet.

Vertical: Maintain and minimize extrusion of the molars.

Inter-molar width: Expansion with Class II correction.

Mandibular dentition

A-P: Allow anterior movement with mandibular growth.

Vertical: Minimize extrusion.

Inter-molar/intercanine width: Maintain transverse dimensions.

Facial esthetics

Improve and close lip incompetence, reduce lower lip protrusion.

APPLIANCES

.022-in Andrews prescription edgewise appliances.

High-pull facebow headgear.

MCA

Class II elastics.

Maxillary wrap around and mandibular modified spring removable Hawley retainers.

TREATMENT PROGRESS

Both arches were fully bonded and banded. The arches were leveled and aligned initially with .016-in nickel-titanium archwires and sequentially increased to .019 × .025-in stainless steel archwires. High-pull facebow headgear was added to the treatment after the first 6 months of treatment to start Class II molar correction. Patient cooperation with headgear was good. The MCA was placed after 17 months of treatment when patient was in .019 × .025-in stainless steel archwires. Heavier stainless steel wires were necessary to better withstand the deflection forces from the MCA. The patient wore the MCA for 6 months combined with the high-pull headgear. During this 6-month period, the occlusal relationship went from end-on to Class I. Headgear and the MCA were then both discontinued. Light Class II elastics were used to better seat the canines into a Class I relationship during the last 3 months of treatment. During this time, the patient was only moderately cooperative. A mutually protected occlusion with appropriate canine and incisor guidance was established. The occlusion was detailed and finished. The patient was debanded and impressions made for retainers. The maxillary wrap around and mandibular modified spring removable Hawley retainers were delivered 11 days later.

RESULTS ACHIEVED**Maxilla**

A-P: Good orthopedic control, SNA angle reduced with headgear wear, incisor protrusion reduced.

Mandible

A-P: Good forward mandibular growth.

Vertical: Vertical mandibular growth with little or no clockwise rotation.

Maxillary dentition

A-P: Molar position maintained, incisor protrusion reduced, overjet reduced.

Vertical: Molar extrusion compensatory with facial growth.

Intermolar width: Slight expansion with Class II correction.

Mandibular dentition

A-P: Anterior change with mandibular growth.

Vertical: Molar extrusion compensatory with vertical mandibular growth.

Intermolar/intercanine width: Slight molar expansion, canine width maintained.

Facial esthetics

Improved facial balance as profile became less convex, lip incompetence improved.

RETENTION

Maxillary wrap around and mandibular modified spring removable Hawley retainers were delivered 11 days after debanding. The patient was instructed to wear the retainers 24 hours a day. After the retention period, she was instructed to wear the retainers at night indefinitely. The patient was referred to an oral surgeon, who removed the third molars.

FINAL EVALUATION OF TREATMENT

An excellent result was achieved with combined orthopedic and dental changes. Skeletal and dental treatment objectives were obtained through good mechanical control of the dentition and significant mandibular growth. Orthopedic control of the maxilla reduced its forward growth, whereas downward and forward growth of the mandible resulted in a net improvement, reducing the ANB angle by 2°. The facial profile became less convex, and lip incompetence improved through treatment. A good Class I occlusal relationship was established with proper overbite and overjet. A mutually protected occlusion was obtained. The posttreatment panoramic radiograph showed acceptable root parallelism, although the canines could have been better with the roots more mesial. Mild maxillary incisor root resorption was also evident. Temporomandibular joint function was within normal limits, and no symptoms were reported during treatment. The patient was a good headgear wearer, although cooperation with elastics waned near the end of treatment. The prognosis for stability is good with continued nighttime retainer wear.

Table. Cephalometric summary

<i>Area</i>	<i>Measurement</i>	<i>A¹</i>	<i>B</i>	<i>Difference A¹-B</i>
Maxilla to cranial base (°)	SNA angle	77	75	2
Mandible to cranial base (°)	SNB angle	73	73	0
	SN-Go-Gn	40	40	0
	FMA	26	26	0
Maxillomandibular (°)	ANB angle	4	2	2
Maxillary dentition (mm)	1 to NA	11	9	2
	1 to SN	121	104	17
	6-6 (casts)	44	46	2
Mandibular dentition (mm)	1 to NB	6	8	2
	1 to Go-Gn	96	101	5
	6-6 (casts)	39	41	2
	3-3 (casts)	28	28	0
Soft tissue	Esthetic plane	1	-2	3

A¹, Pretreatment records; *B*, Posttreatment records.



Fig 1. Pretreatment photographs.

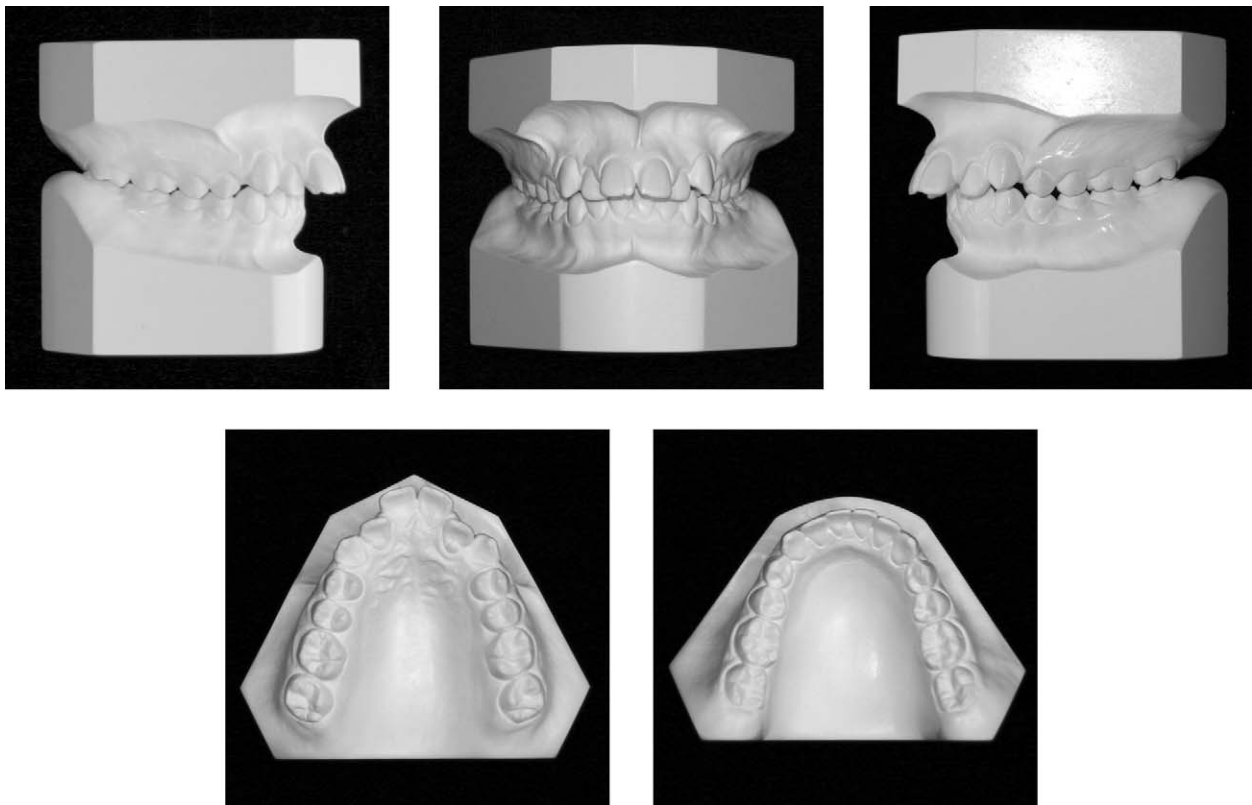


Fig 2. Pretreatment dental casts.

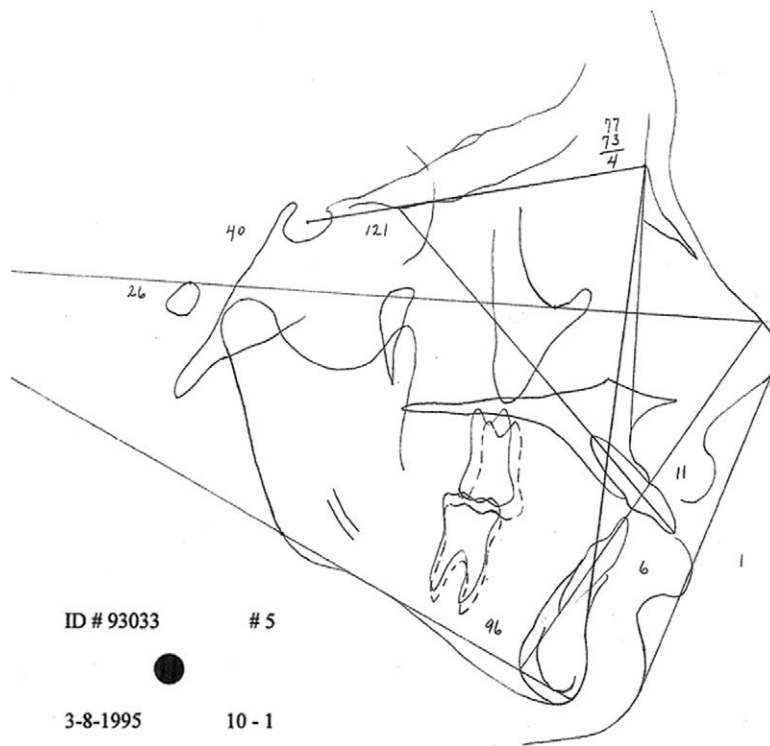


Fig 3. Pretreatment cephalometric tracing.



Fig 4. Cephalometric radiograph.



Fig 5. Pretreatment panoramic radiograph.



Fig 6. Posttreatment photographs.

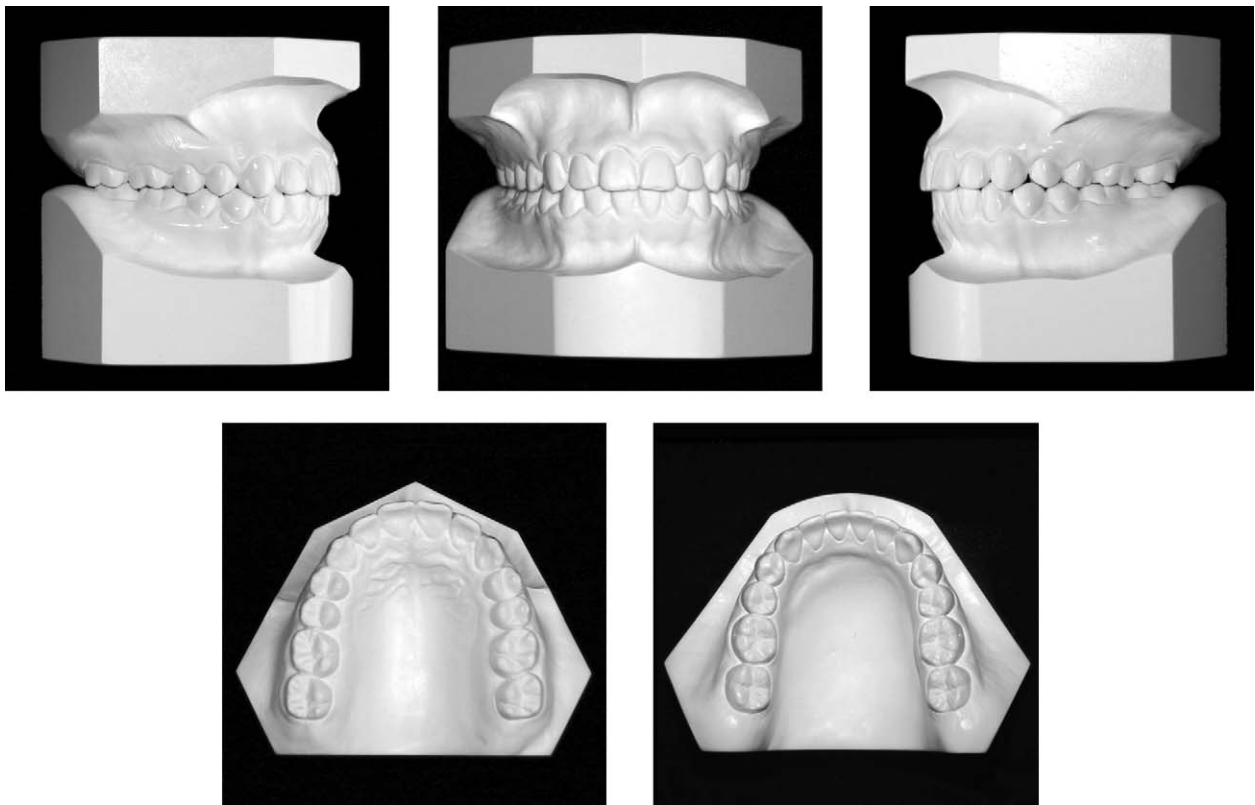


Fig 7. Posttreatment dental casts.

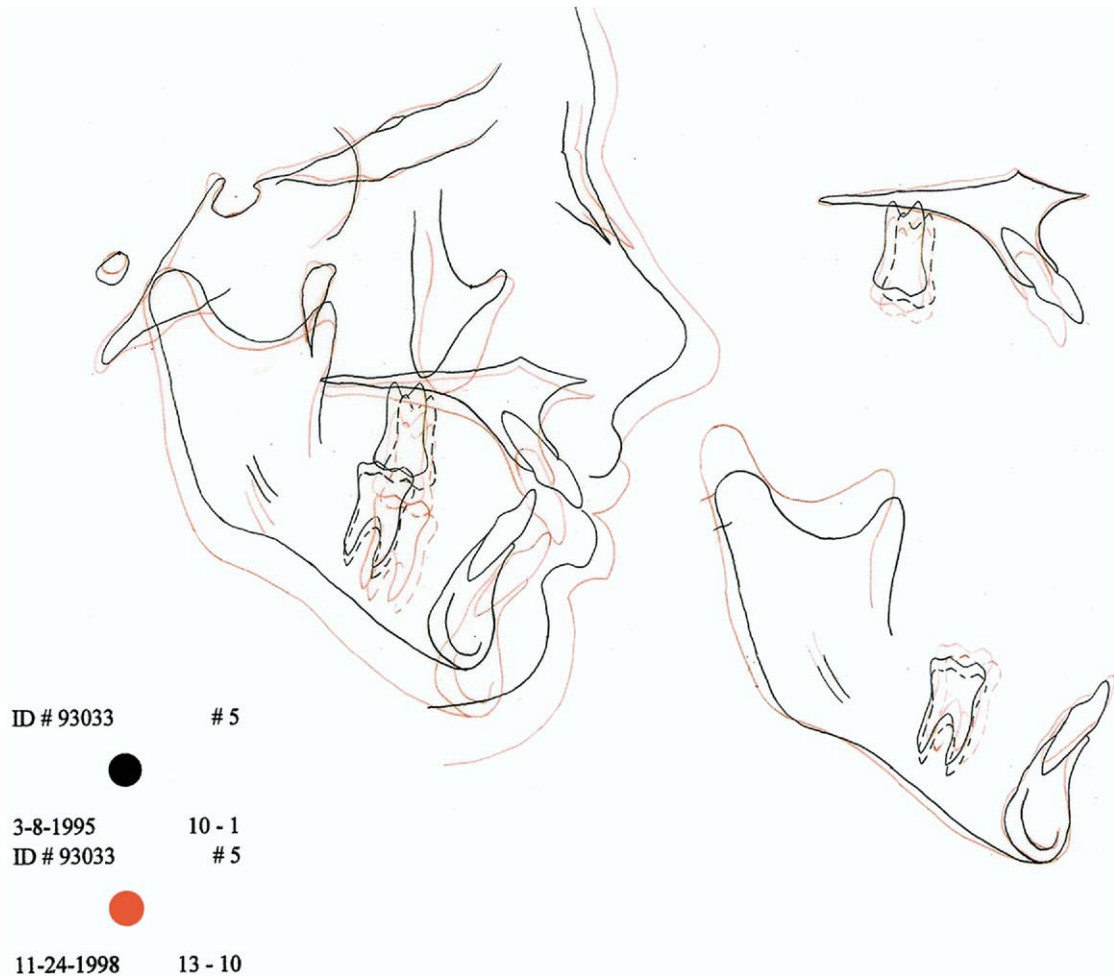


Fig 8. Superimposed cephalometric tracings.



Fig 9. Posttreatment cephalometric radiograph.



Fig 10. Posttreatment panoramic radiograph.

THE AMERICAN BOARD OF ORTHODONTICS
DISCREPANCY INDEX

CASE CATEGORY 5
TOTAL D.I. SCORE 25
CCRE SCORE 12

OVERJET

0 mm. (edge to edge) = 1 pt.
1 – 3 mm. = 0 pts.
3.1 – 5 mm. = 2 pts.
5.1 – 7 mm. = 3 pts.
7.1 – 9 mm. = 4 pts.
> 9 mm. = 5 pts.
Negative OJ (x-bite) 1 pt. per mm. per tooth =
Total = 5

OVERBITE

0 – 3 mm. = 0 pts.
3.1 – 5 mm. = 2 pts.
5.1 – 7 mm. = 3 pts.
Impinging (100%) = 5 pts.
Total = 5

ANTERIOR OPENBITE

0 mm. (edge to edge) = 1 pt.
then 2 pts. per mm. per tooth
Total = 0

LATERAL OPENBITE

2 pts. per mm. per tooth
Total = 0

CROWDING

0 – 3 mm. = 1 pt.
3.1 – 5 mm. = 2 pts.
5.1 – 7 mm. = 4 pts.
> 7 mm. = 7 pts.
Total = 1

(PLACE LABEL HERE)
DATE 2/22/2004
CANDIDATE # 93033
EXAMINERS _____

OCCLUSION

Class I to end on = 0 pts.
End on Class II or III = 2 pts. per side
Full Class II or III = 4 pts. per side
Beyond Class II or III = 1 pt. per mm.
Additional
Total = 8

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS

ANB > 5.5 or < -1.5 = 4 pts.
Each Additional Degree = 1 pt.
SN-GO-GN 27 deg. – 37 deg. = 0 pts.
SN-GO-GN > 37 deg. = 2 pts. per degree
SN-GO-GN < 27 deg. = 1 pt. per degree
IMPA > 98 deg. = 1 pt. per degree
Total = 6

OTHER 2 Points = 0
(See instructions)

INDICATE PROBLEM _____

Fig 11. Discrepancy index.