

CASE REPORT

Sequential Headgear Therapy with a Conventional Facebow and a Modified Asher Facebow

HIROSHI MIMURA, DDS, PHD

High-pull headgear is often used in the treatment of dolichofacial Class II patients because of a force system that can be described as follows: The center of resistance of the first molar is located at the furcation of its roots. When the maxillary dentition is tied to a continuous archwire, its center of resistance is located near the apices of the premolars, and that of the maxillary bone is at the zygomatic process.¹⁻³

The application of force to the maxillary first molar from a conventional Kloehn facebow with a medium-length outer bow provides maximum anchorage in an extraction case, with a concomitant distal tipping of the

molar. Because of the center of resistance at the premolar apices, however, the conventional facebow also produces a clockwise rotation of the entire maxillary arch, leading to an extrusion of the maxillary incisors and a gummy smile. In a growing patient, the net result is a downward drift of the maxilla, with a long face and undertorqued anterior teeth.

J-hook headgear, on the other hand, attaches to the anterior part of the maxillary arch, so that its force vector passes anteriorly and superiorly to the centers of resistance of both the maxillary dentition and the maxillary bone. Therefore, it is often used for direct cuspid retraction and incisor intrusion, and it can resist counterclockwise mandibular rotation in a dolichofacial patient.^{4,5}

Unfortunately, the J-hook headgear is so flexible that it often creates indentations on patients' cheeks, which can hinder cooperation, although Hickham modified the J-hook shape to avoid direct contact with the cheek.⁶ Furthermore, it is not recommended for use with nickel titanium archwires.

The Asher facebow* is sim-

ilar to the J-hook headgear, but is more rigid. Since the outer bow is held away from the cheeks, the headgear does not leave marks on the patient. It can be used with nickel titanium wires, and can be fabricated from a conventional facebow, reducing inventory requirements.

The following case report shows how a conventional facebow headgear was used for anchorage during the cuspid retraction phase, then converted to an Asher facebow for the anterior retraction phase.

Diagnosis

A 15-year-old Japanese female in the permanent dentition presented with a Class II malocclusion with moderate arch-length discrepancies in both arches (Fig. 1). She had an 8mm overjet, and the bite was so deep that the mandibular incisors contacted the palate. The profile was convex, with a deficient soft-tissue chin, and the lips were protrusive.

Cephalometric analysis indicated a Class II skeletal pat-



Dr. Mimura is in the private practice of orthodontics at 2-15-11-601, Yato-cho, Tanashi 188-0001, Tokyo, Japan.

*Ortho Arch Company, 711 E. Golf Road, Schaumburg, IL 60173.



Fig. 1 15-year-old female patient with dolichofacial Class II pattern before treatment.

tern: the maxilla was positioned downward, and the mandible was small, with a steep mandibular plane angle due to backward rotation.

Treatment Plan

Treatment objectives were to:

1. Maintain or improve the mandibular plane angle using

high-pull headgear.

2. Align both arches.

3. Retract the maxillary incisors to reduce the overjet.

4. Intrude the maxillary and mandibular incisors to reduce



Fig. 2 Patient at time of placement of modified Asher facebow.

the overbite.

The treatment plan was as follows:

1. Extract the maxillary first and mandibular second premolars.
2. Maximize anchorage with a high-pull, conventional facebow headgear during retraction of the maxillary cuspids.
3. Intrude the mandibular incisors with a cantilever for bite opening.
4. Convert the headgear to an Asher facebow for intrusion of the maxillary incisors.
5. Finish with $.016'' \times .022''$ edgewise appliances.
6. Deliver a maxillary wrap-around retainer with biteplane and a mandibular bonded 3-3 retainer.

Treatment Progress

The patient was banded and bonded with $.018''$ preadjusted appliances from second molar to second molar in both arches. A passive transpalatal arch was placed, and a high-pull headgear with conventional facebow was delivered.

A continuous, reverse-curve $.016''$ nickel titanium wire was placed in the maxillary arch to begin leveling and cuspid retraction. The same size wire was used in the mandibular arch, with an $.016'' \times .022''$ stainless steel cantilever overlaid to intrude the incisors. These archwires were followed by reverse-curve $.018''$ nickel titanium wires in both arches.

After the maxillary canines had been completely retracted, a continuous $.016'' \times .022''$ stainless steel retraction wire was placed in the maxillary arch. At this time, the conventional facebow was changed to the modified Asher facebow (Fig. 2).

Converting the Facebow

First, check the span between the maxillary lateral incisor brackets (Fig. 3A). Bend the inner bow mesially, and cut the ends of the bow to contact the archwire midway between the central and lateral incisor brackets (Fig. 3B). Grind down the ends of the inner bow.

Bend the ends of two $.036''$

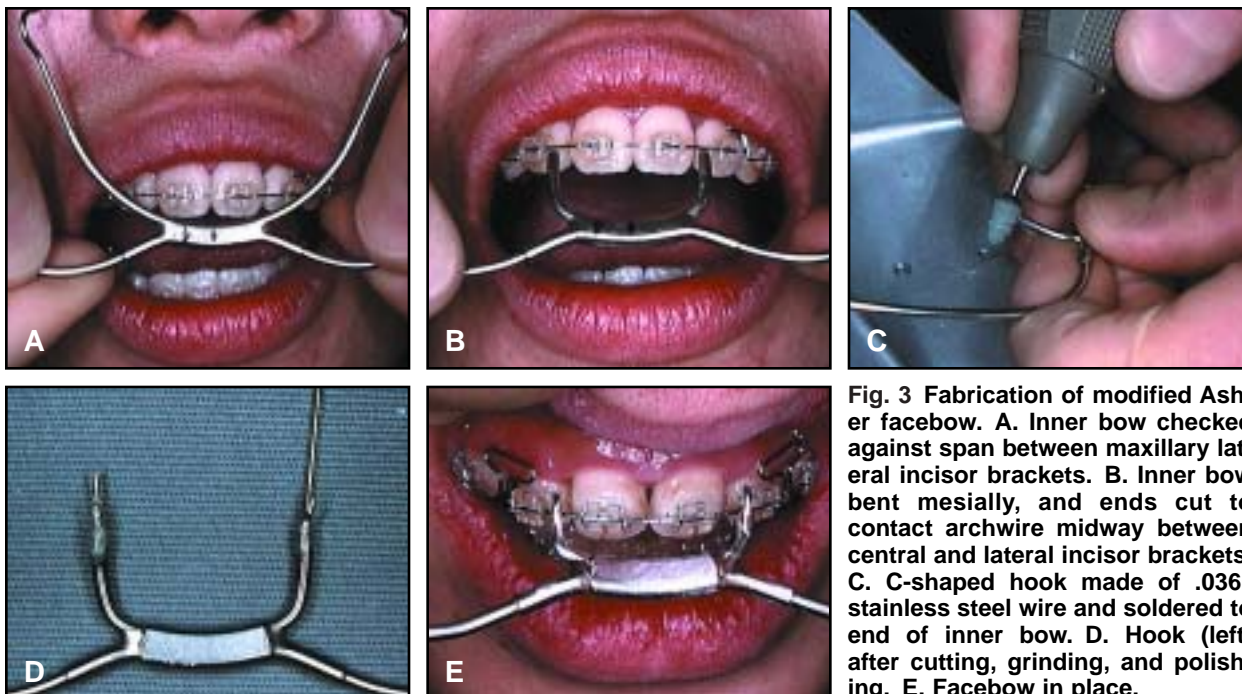


Fig. 3 Fabrication of modified Asher facebow. A. Inner bow checked against span between maxillary lateral incisor brackets. B. Inner bow bent mesially, and ends cut to contact archwire midway between central and lateral incisor brackets. C. C-shaped hook made of .036" stainless steel wire and soldered to end of inner bow. D. Hook (left) after cutting, grinding, and polishing. E. Facebow in place.

stainless steel wires into C-shaped hooks. Solder these hooks to the ends of the inner bow (Fig. 3C). Cut the hooks to the proper length, then grind and polish the ends (Fig. 3D).

The same headgear used for the conventional facebow can be used for the Asher facebow. In this case, the retraction force was adjusted to about 400-500g at the center of the facebow (Fig. 3E), providing about 100-125g of force per tooth for intrusion and retraction.

Treatment Results

After space closure, the case was finished with .016" × .022" stainless steel ideal archwires in both arches. Total treat-

ment time was 22 months. Retainers were delivered after debonding (Fig. 4).

Superimpositions of cephalometric tracings showed little change in the maxilla, with no clockwise rotation and SNA remaining at 77°. The maxillary dentition was well aligned. Intrusion of the maxillary incisors was successful, with no evidence of root resorption.

Although moderate mandibular growth occurred, ANB decreased from 8.5° to 8°, and the mandibular plane angle closed from 42.5° to 41°. The mandibular arch was also well aligned and the incisors intruded, but IMPA opened slightly due to alveolar growth. L1-APo was reduced, and the mandibular

incisor position seemed acceptable.

Class I molar and canine relationships were achieved, with a substantial opening of the deep bite. The lips were well balanced, and the soft-tissue contours were satisfactory.

Conclusion

The method shown here for treatment of dolichofacial Class II patients is more efficient biomechanically than when a conventional facebow headgear is used alone. The modified Asher facebow is simple to fabricate, and saves cost and chairtime compared to the J-hook headgear.

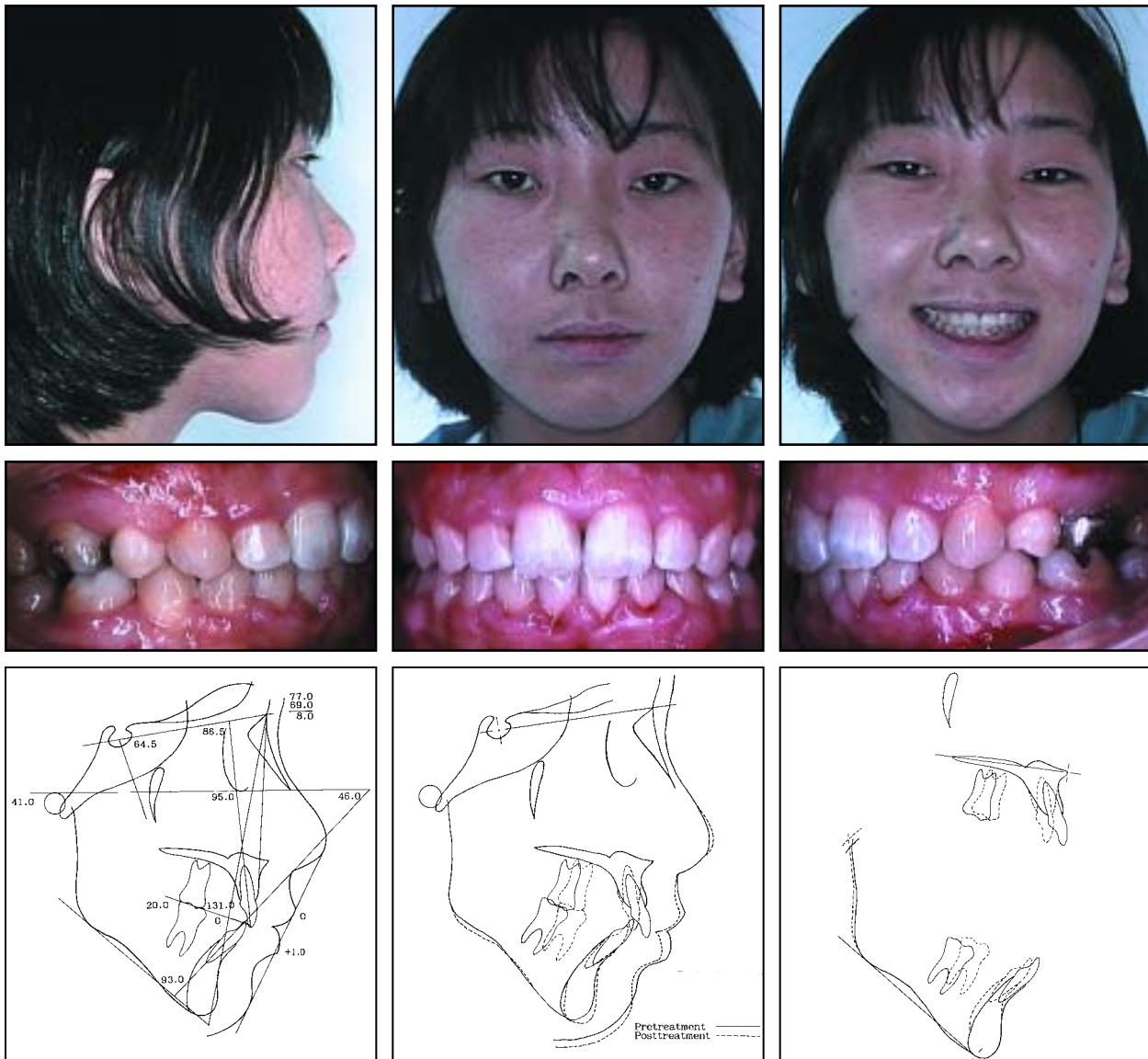


Fig. 4 Patient after 22 months of treatment.

REFERENCES

1. Stockli, P.W. and Teuscher, U.M.: Combined activator headgear orthopedics, in *Orthodontics: Current Principles and Techniques*, 2nd ed., ed. T.M. Graber and R.L. Vanarsdall, Jr., C.V. Mosby Co., St. Louis, 1994, pp. 437-506.
2. Braun, S.; Lee, K.G.; and Legan, H.L.: A reexamination of various extraoral appliances in light of recent research findings, *Angle Orthod.* 69:81-84, 1999.
3. Deguchi, T.: Skeletal, dental, and functional effects of headgear-activator therapy on Class II malocclusion in Japanese: A clinical case report, *Am. J. Orthod.* 100:274-85, 1991.
4. Ricketts, R.M.: Factors in headgear design and applications, in *An Orthodontic Philosophy*, ed. C.F. Gugino, Rocky Mountain Orthodontics, Denver, 1971, pp. 27-32.
5. Vaden, J.L.: Sequential directional forces treatment: Two Class II case reports, *Am. J. Orthod.* 99:491-504, 1991.
6. Hickham, J.H.: Directional edgewise orthodontic approach, Part I, *J. Clin. Orthod.* 8:617-633, 1974.