

Auxiliary Application Of The Kloehn-Type Facebow

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Since the facebow as used by Kloehn has such universal recognition, it seems that a discussion of this basic appliance might be redundant in the consideration of its possible auxiliary functions. Up to the present time the primary applications of this facebow have been as follows:

- (1) To provide a force to the maxillary first molars. The direction of this force is determined by the type of attachment used for traction, viz., cervical strap, high or low-pull head straps, etc. This energy may be utilized in various ways:
 - (a) to move teeth individually, or
 - (b) to restrict or inhibit the forward growth component of the body of the maxilla, or
 - (c) to provide support for the retraction of the anterior segments.
- (2) The anchorage provided by the extraoral traction may be utilized as a source for Class III mechanics.
- (3) Using elastic bands across the anterior arc of the inner bow, the maxillary incisors may be tipped lingually.
- (4) By using the Kahn spur on the anterior portion of the inner arch, the maxillary incisors may be depressed and the maxillary posterior segments extruded.

The purpose of this paper is to present ideas which will extend and refine

some of the already diverse functions of the facebow. Six specific problem areas will be considered.

The retraction of the maxillary cuspids in Class II, or double protrusion extraction cases.

In the treatment of severe Class II malocclusions or bimaxillary protrusions where bicuspid are extracted, it would often be ideal if the operator were able to utilize all of the extraction space to achieve maximum retraction of the anterior segments. This would mean that any mesial movement of the maxillary molars would be undesirable. When maximum patient cooperation can be relied upon during this period of retraction, the stability of the maxillary molars is assured. However, when the duration of facebow application is questionable, or as is generally the case, the patient refuses to wear the appliance for more than a given period of time, the successful treatment of this type of case becomes problematic. Whatever source of energy is used for the retraction of the maxillary cuspids, (whether it be coil springs or loops in a continuous arch, or loops in a segmented arch) this force is generally exerted on the cuspids continuously, whether extraoral anchorage is being supplied or not. As a result, it has been found that when extraoral anchorage is not adequate to compensate for the reciprocal forces being applied to the maxillary molars, they will move mesially. In order to eliminate this loss of molar anchorage, a segmental archwire which is activated only when the facebow is worn may be used. Of course, this means that the

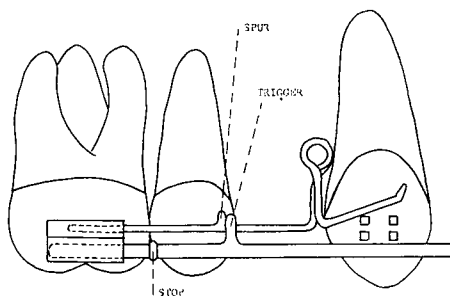


Fig. 1 Arch segment to retract cuspid — passive.

retraction of the cuspids is taking place only during the period of time that the facebow is being worn. The impact of this fact on the patient is favorable and seems to encourage more cooperation.

For simplicity of operation and to prevent excessive binding, the second bicuspids need not be banded if alignment would not be correct for free movement of the archwire. Since there is no anchorage strain placed on these teeth, this does not pose a problem. A simple segmental archwire is constructed extending from the cuspid first molar (Fig. 1). Rectangular wire should be used, light enough to avoid binding in the brackets and tube. A double helical retraction loop is placed immediately distal to the bracket of the cuspid. A vertical spur is soldered to the archwire far enough mesial to the tube of the maxillary molar to allow for sufficient activation to retract the cuspid the full distance. This segment is placed in position passively. The facebow is fabricated in the usual way and placed with stops into buccal tubes on the maxillary molars. By inspecting the relationships of the soldered spur on the segmental archwire to the inner wire of the facebow, the site for the trigger mechanism on the inner wire is selected. This trigger is merely a spur soldered to the inner archwire and bent medially so as to

come into contact with the spur on the segmental arch and activate the loop. Reactivation is accomplished by moving the trigger distally on the inner archwire as needed. This same procedure may be used to retract the maxillary anterior segment after the cuspids have been retracted.

Depression of maxillary anterior segments

The Kahn spur has been used widely in conjunction with a full archwire in order to depress the maxillary incisors or to generally tip the maxillary occlusal plane to effect an overbite reduction. An analysis of the forces being applied to the components of the maxillary anterior segment indicates that the depressing force, so applied, is transmitted to the central incisors before it can affect the lateral incisors or the cuspids. In order to have the depressing force act simultaneously on the entire maxillary anterior segment, it would seem more efficient to have three spurs instead of one. The additional two spurs would be placed mesial to both lateral incisors. However, even this does not satisfactorily solve the problem of depressing the maxillary anterior segment. Techniques have been advocated using various forms of horizontal loops mesial to the cuspids, activated in such a way as to depress the four incisors. However, the reciprocal effect of such a procedure is to elongate the cuspids and to tip the roots mesially. A more efficient way of accomplishing this depression would involve the use of two spurs on the inner archwire of the facebow in order to maintain a depressing force upon the cuspids during the depression of the four incisors. The spurs would be supplying a depressing force upon the archwire mesial to the cuspids to be in phase with the desired inclination of the cuspids. This procedure may be used simultaneously with the retraction of the maxillary anterior segment

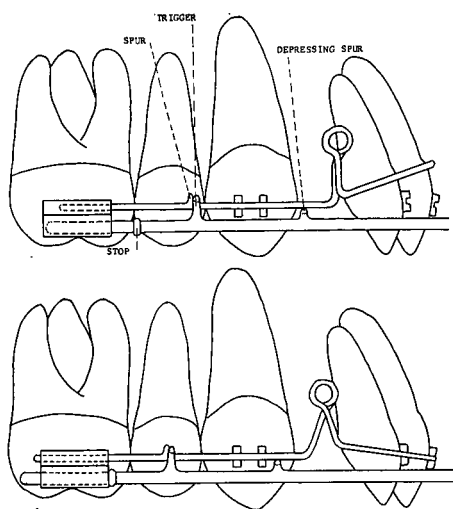


Fig. 2 Maxillary arch to retract and depress anterior segment. Above, passive; Below, activated by trigger on facebow. Note undistorted wire at cuspid.

using closing loops (Fig. 2), or after the retraction is completed, using horizontal loops.

The correction of midline discrepancies.

Midline discrepancies may be handled several different ways, depending, of course, upon the etiologic factors. This correction is either made within the individual arch, or by the use of intermaxillary elastics. In either case, the reciprocal effect of such correction may be undesirable. Here again, the facebow provides a source of energy which may be applied directly to the problem area without undue reciprocal effects. Let us assume that it is desirable to shift the maxillary four incisors to the left. A light arch is fabricated which will provide a minimum of binding for the movement of these four incisors. A sliding hook is placed on the archwire mesial to the right cuspid to receive an elastic band coming from the left. The other end of the elastic band extends to a hook soldered to the left side of the inner wire of the facebow. Open coil springs are placed between the right

lateral and central, between the two centrals, and between the left central and lateral (Fig. 3). Each of the three coil springs increases in its activation from right to left. If full-time facebow wear were not assured, anterior intermaxillary elastics could be used alternately.

Class III correction.

One of the major problems in the utilization of Class III mechanics is the extrusion of the maxillary molars and the mandibular anterior segment. This, of course, results in unsatisfactory changes of the occlusal plane angle and mandibular incisor inclination. By using the facebow to tubes on the mandibular molar bands, there is no need to utilize the mandibular anterior segment in the Class III mechanics. Hooks placed on the anterior segment of the facebow may receive the mesial ends of the Class III elastics. Simultaneously, elastics may be used from this same position to the maxillary anterior segment to effect a general forward and downward traction on the entire maxilla (Fig. 4).

Crossbite correction

The correction of posterior crossbites is generally accomplished by expanding

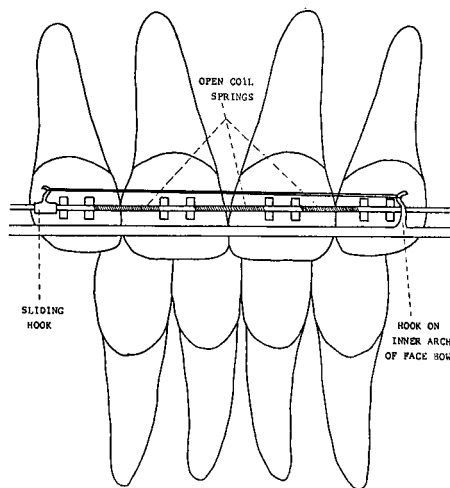


Fig. 3 Midline correction using facebow.

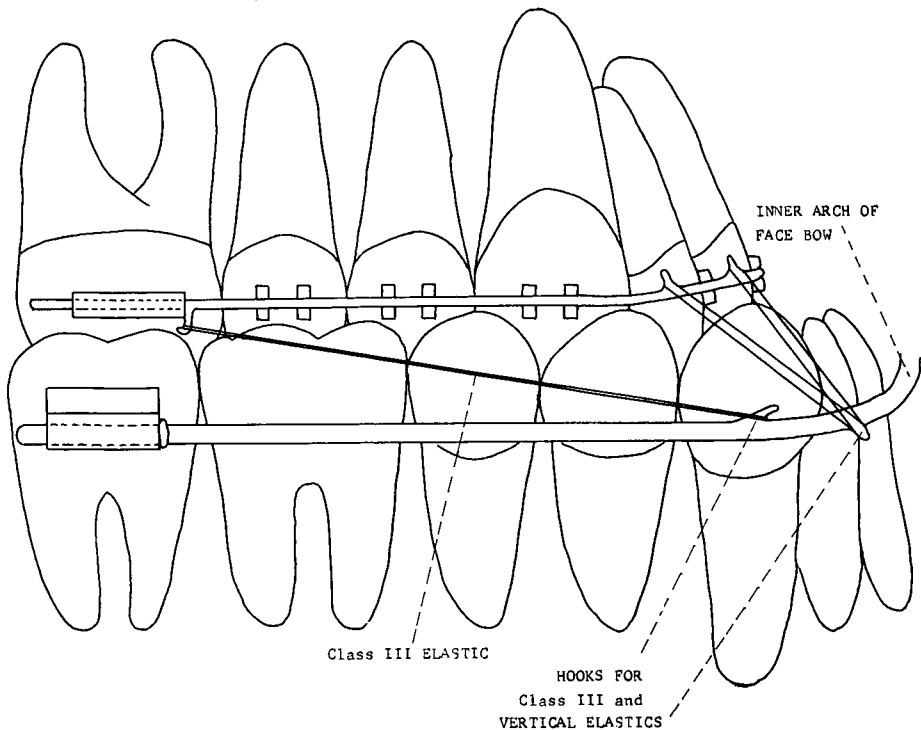


Fig. 4 Class III correction using the facebow.

or contracting forces within the arch in conjunction with criss-cross elastics. If the etiology of the crossbite is within one arch, the reciprocal effect of the correction may be undesirable. Specifically to be considered is the crossbite in which the maxillary component is buccal to the mandibular, with the maxillary arch form and width completely acceptable, and with a severe constriction of one or both mandibular posterior segments. This type of problem may best be resolved by placing lingual hooks on the bands of the mandibular buccal segments, and spurs at the appropriate sites on the inner arch of the facebow. This arrangement of criss-cross elastics will provide a means for correcting the occlusal relationship without disturbing the arch form or width of the maxilla,

Mesial movement of mandibular posterior segments

In Class II, four bicuspid extraction cases, it is often desirable to maintain the positions of the mandibular incisors, while permitting the mandibular posterior segments to come forward. Generally, this is accomplished with the use of Class II elastics. However, the reciprocal effect of this system of mechanics is generally antagonistic to the efforts being made to depress the maxillary incisors. This mesial movement of mandibular posterior segments is more readily achieved by using the anterior portion of the facebow as an attachment for the Class II elastics. This procedure will not only leave the maxillary anterior segments free, but will also provide a more horizontal mesial component of force to be transmitted to the mandibular molars.

DISCUSSION

It is, of course, true that there are many malocclusions which would not require posterior anchorage support. In these cases the auxiliary functions of the facebow would not be applicable. However, alternate mechanics could be utilized without the inclusion of posterior traction. For example, in the case of the buccal crossbite, if the facebow is not needed for posterior traction, a heavy labial arch comparable to the inner arch of the facebow may be used by itself. A mild expanding force would be incorporated in this archwire to compensate for the effect of the criss-cross elastics.

Only the facebow has been discussed in this paper. However, this should suggest the possibility of expanding the utilization of the appliances and techniques we have on hand, as well as increasing the efficiency of their applications.

SUMMARY

Auxiliary functions of the facebow have been discussed and the rationale for their application has been described and illustrated.

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