Obtaining Facial Balance in the Treatment of Class II, Division 1

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In treating the commonly encountered malocclusion which Angle designated as Class II, division 1, our objectives are to correct a mesiodistal malrelationship of the molars, bicuspids and cuspids amounting to the width of one bicuspid, bring to normal the overbite of anterior teeth which, at the beginning, may vary in different cases from a slight overbite to impingement of the lower incisors upon the palate, and to bring upper incisors lingually so that proper overjet as well as overbite may be established with the lower incisors. Without these changes good function and good esthetics are not possible. In undertaking such a process we hope for permanence of result, and a satisfactory relationship of each dental arch to its base so that one poor esthetic condition is not merely exchanged for another. All this is a large order, and orthodontists have not been uniformly successful in attaining their objectives.

Dr. Wilton M. Krogman,[1] reporting on a serial study of growing children at the University of Pennsylvania involving the age range from six to thirteen years, says that about five per cent of Class II, division 1 cases attain self-correction without orthodontic intervention. This is an interesting observation, for it almost seems that little better than five per cent of Class II, division 1 cases treated orthodontically (following the usual procedures which do not involve extraction of teeth, and which require the wearing of Class II elastics) arrive at a successful outcome.

What is the nature of the result in the other ninety-five per cent? Two conditions may result, neither desirable: the dual bite, and the double protrusion.

The dual bite is directly induced by the wearing of Class II elastics; the condition is deliberately sought by some orthodontists, while for others it occurs towards the end of active treatment and leads the orthodontist to conclude that the correction of the arch relationship has been attained through tooth movement alone, chiefly in the upper arch. In reality the patient is simply holding the mandible forward, maintaining good occlusion and a presentable profile so long as this advanced position of the mandible is held. Fortunately or unfortunately, however, in due time the patient is able to assume either of two jaw positions readily; generally the more retruded (or original) jaw position is the one in which function is carried out, although for an indefinite period the patient may be inclined to present the more attractive jaw relationship for the inspection of the orthodontist.

Most orthodontists will agree that a mandibular position maintained only when the patient thinks about it cannot be considered a successful result; some men continue to believe that such an advanced position may come to be a permanent and natural one, with changes in the structures of the temporo-mandibular joint which eventually make a reversion to the original position impossible. Whether it is stubbornness on my part, or simply a realistic point of view, I am not convinced that such a desirable transformation is so easily accomplished, and that kind of trusting optimism is not a part of my treatment planning.

There are many other orthodontists who share my skepticism and who do not look with favor on the dual bite; they generally seek to correct the arches by tooth movement alone, accepting the jaw relationships as they are. Rather than inducing the advancement of the mandible by the patient, they are on guard against it. With different procedures of anchorage preparation, they use the mandibular arch as a unit of anchorage with which they attempt to move the maxillary arch the required distance to achieve a Class I relationship of molars, bicuspids and cuspids. As said before, even in the hands of these men the dual bite is occasionally, although unintentionally, produced. Even when it is not, an equally undesirable end result is attained with the result that where a maxillary protrusion existed before, a *bimaxillary* protrusion has taken its place. Maxillary incisors are tipped lingually to some extent, with a certain improvement in the appearance of the patient, but not without a forward tipping of the mandibular teeth which have served as units of anchorage.

Since I am unaware of any practical way to single out the five per cent which can attain self-correction, and since I like neither the dual bite nor the double protrusion, I have adopted a plan of treatment in Class II, division 1 which avoids both. This procedure relies on tooth movement for the correction of the arch relationships, but it does not put such heavy demands upon anchorage.

In the first stage of treatment, the mandibular first bicuspids are extracted, and with the exception of the incisors, all the teeth of mandibular arch are banded, with buccal tubes on the second molars. A sectional steel arch (.0215 x .025″) is made for each buccal segment of the lower arch (see Fig. 1); in each there is incorporated

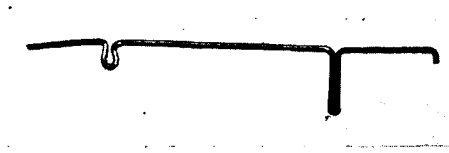


Fig. 1. A lower sectional arch with which this plan of treatment is started. Used bilaterally, this sectional arch has a closed loop at the space created by the extraction of the first bicuspid. The anterior end is bent gingivally to engage the mesial aspect of the cuspid bracket, and a tie-back loop is provided mesial to the molar tube.

a closed loop, situated midway in the space formerly occupied by the first bicuspid. The anterior of each sectional arch is bent gingivally so as to engage the mesial surface of the cuspid bracket, so that when the arch is activated this tooth will be moved distally. In order that the arch may be activated, a tie-back loop is bent, well forward of the tube on the second molar. When these arches are tied in, they should be activated sufficiently to open the loop one millimeter, but no more. At the initial adjustment, or prior to it, one should carefully note whether or not there is occlusal interference which would retard the distal movement of the lower cuspids. Where such interference exists, it should be eliminated by the placement of a bite-plate in the upper arch.

At intervals of three weeks these mandibular sectional arches are reactivated, until the cuspids have been moved distally a sufficient amount — enough to permit uprighting of the mandibular incisors, and to eliminate any rotations in these anterior teeth in the process. At this time one places bands on the mandibular incisors. A series of light round steel arches of increasing diameter should now be used to secure bracket engagement and leveling, until an .022″ round arch has been placed and used to correct all remaining rotations.

The bands should now be removed from the mandibular cuspids, and an

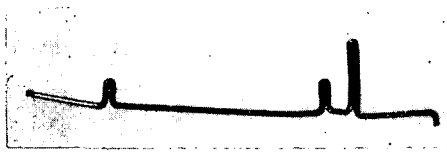


Fig. 2. The upper sectional arch. Note the hook for the mesial of the cuspid bracket, the loop at the extraction site, and the smaller loop behind to receive Class II elastics.

.0215 x .025″ continuous steel arch should be formed, with closed loops incorporated in it at each cuspid location. This arch is used to upright mandibular incisors over basal bone; the loops should stand free of the unbanded cuspids when the loops have been opened two millimeters. Activation is again accomplished by means of tie-backs mesial to the molar tubes.

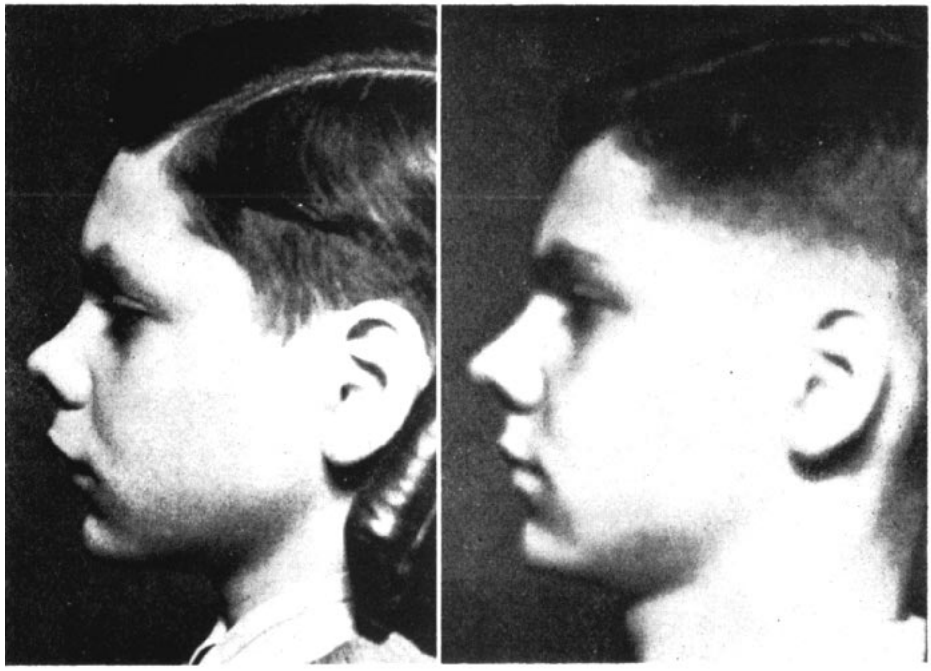
When the mandibular incisors have been carried to a satisfactory position by means of this archwire, the mandibular cuspid bands should be replaced and another .0215 x .025″ steel arch, this time without loops, fabricated. Tip-backs should be incorporated in this arch distal to the cuspids, and these tip-backs should be increased on subsequent visits until the teeth of the buccal segments are upright. This arch should be tied back.

At this time the maxillary first bicuspids are removed, and all of the maxillary teeth are banded except the incisors. In order to eliminate molar interference, a bite plate is made for the maxillary arch; it should be cut away in the region of the cuspids to permit distal movement of these teeth.

Sectional arches for the maxillary buccal segments (see Fig. 2) are now made; each arch has an anterior hook fashioned so as to bear against the anterior surface of the cuspid bracket, and mesial to the molar tube on each side is a small closed loop, located so that it will be a millimeter and a half anterior to the mesial end of the molar tube when the hook at the anterior of the sectional arch is in place against the mesial aspect of the cuspid bracket. As before, closed loops are incorporated in the arches for the purpose of retracting cuspids, and situated at the space created by the extraction of the first bicuspids. Just distal to this vertical spring loop is another small loop, similar to the one between the first and second molars and used for the tie-back. This small loop distal to the closing loop must be incorporated in the arch before the spring loop is formed; all loops are to be bent so that they lie gingival to the plane of the archwire.

When these maxillary sectional arches are tied and activated for the first time, the tie-back is drawn back until it is in contact with the mesial end of the molar tube. (Subsequent reactivation is accomplished by annealing the anterior end and readapting to the cuspid bracket.) At this same appointment the use of Class II elastics is begun, running from the tie-back loops of the mandibular archwire to the small loop bent in the maxillary sectional arches just distal to the closing loops. The use of this small loop as an attachment for the anterior end of the Class II elastics was suggested by Dr. William Houghton of Watertown, New York; this is much more satisfactory than using the closing loop itself for the attachment of the elastic, our former procedure.

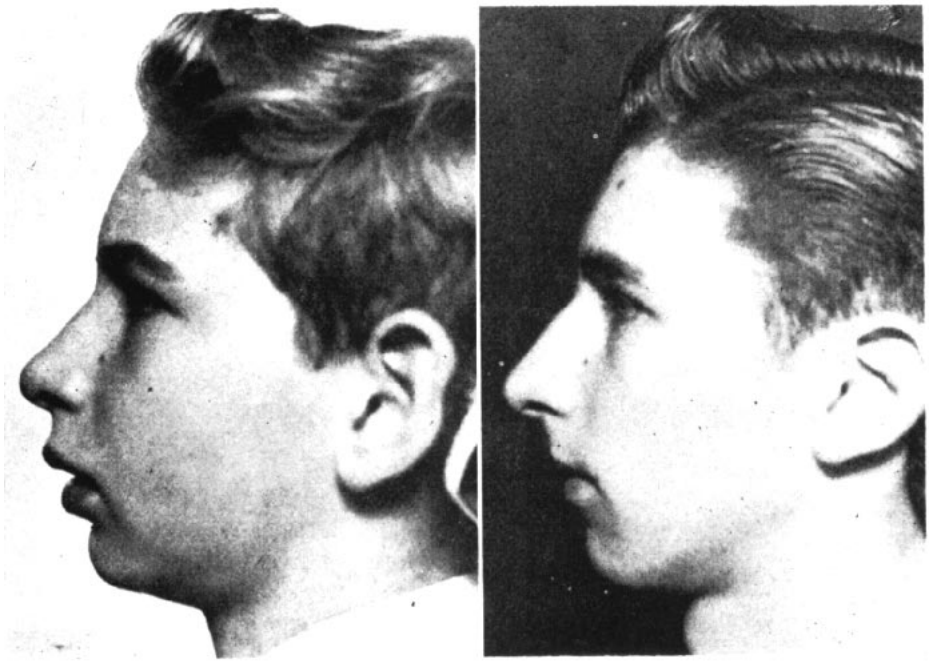
At the time these sectional arches are placed for the retraction of maxillary cuspids, a mandibular archwire of .0215 x 025″ steel is formed, a continuous arch which has incorporated in it closed spring loops. These loops are situated just distal to the cuspids; they are activated about two millimeters and serve to bring the mandibular molars and bicuspids forward. In this they are assisted by the force derived from the Class II elastics. This Class II force

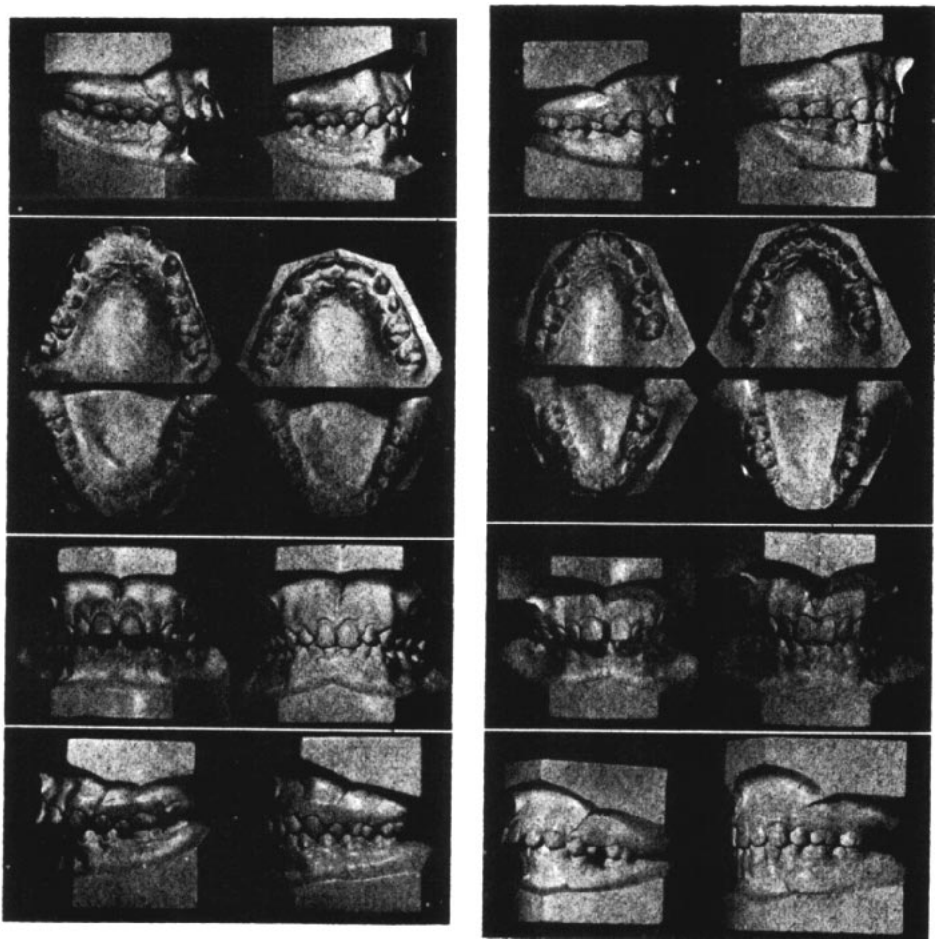


CASE 700

Photographs before (left) and after (right) treatment according to procedures described. Models are shown on the facing page.

CASE 795





CASE 700 CASE 795

Models, before and after treatment according to procedures described. In each instance the original model is on the left. Photographs of same are on facing page.

cannot cause the mandibular anteriors to move forward, since they are effectively restrained by the closing loops. In this way a Class I molar relationship will be attained; complete space closure in the mandibular arch should not be sought immediately, however. It is desirable at this time to have a slight amount of spacing between the mandibular second bicuspids and cuspids.

The bite plate should now be discarded and the maxillary incisors should be banded. With a series of light round steel arches, working up to an .022″ round arch, the brackets are engaged and levelled. With the .022″ arch all rotations in the maxillary arch should be corrected.

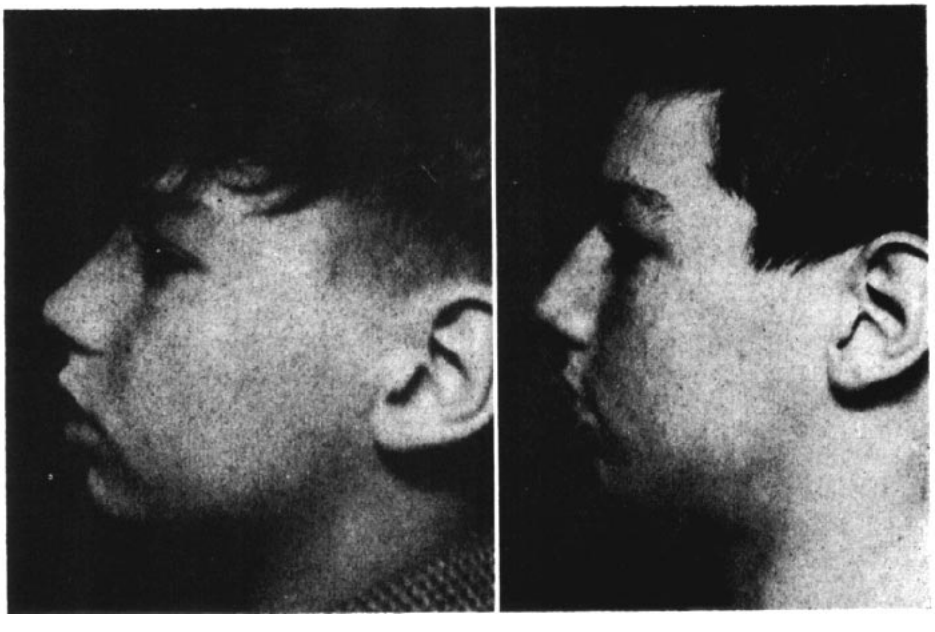
The case is now ready for another maxillary archwire of .0215 x .025″ steel; like the sectional arches previously used, there are incorporated in it small loops anterior to the molar tubes for the tie-backs, and the small loops for the attachment of Class II elastics. However, this arch is a con-

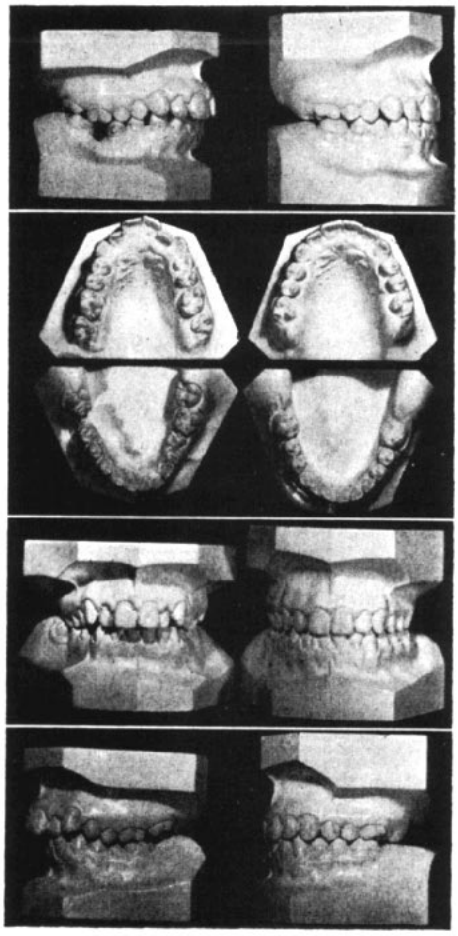
CASE 806

The girl portrayed above had had her mandibular right first permanent molar removed prior to her first visit to the orthodontist. Original photographs on the left.

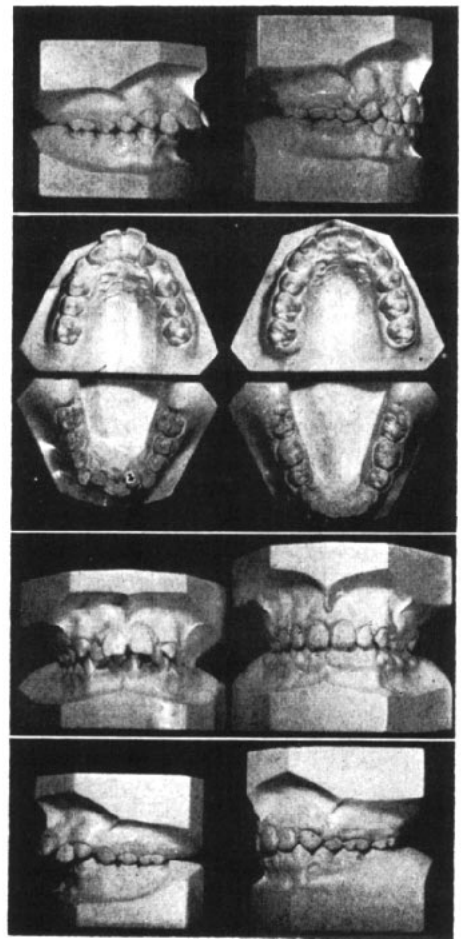
The boy below is a typical Class II, div. 1 case. Models of both cases on facing page.

CASE 812





CASE 806



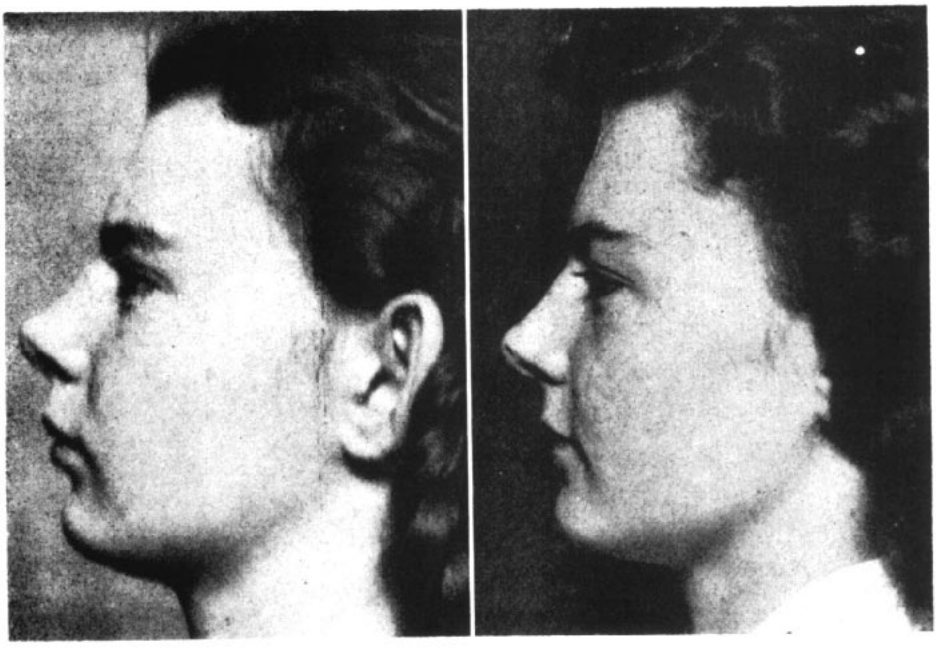
CASE 812

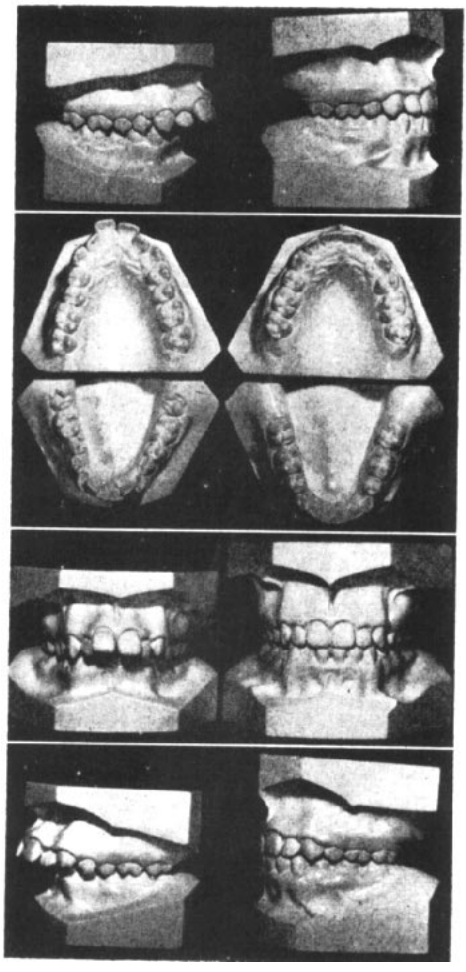
The remaining first permanent molars were removed to attain symmetry in case 806, and bicuspids and cuspids were retracted one at a time on each side. Photographs of both cases on facing page.

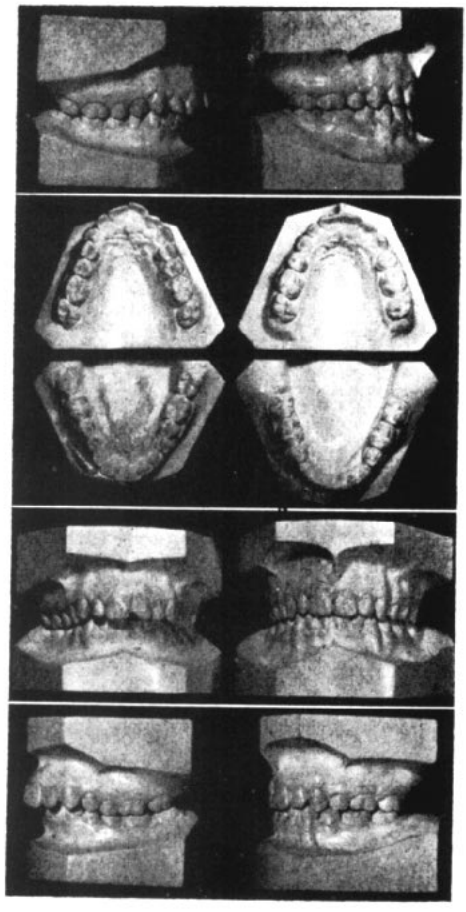
CASE 791

The case above presents a poor prognosis, with the face showing a short mandibular ramus and an obtuse gonial angle. Models of both cases on facing page.

CASE 779







CASE 791 CASE 779

Models of the two cases shown in facing photographs on the facing page. In each instance models prior to treatment are shown on the left.

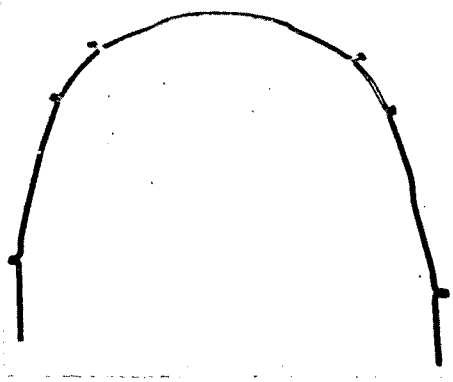


Fig. 3. The maxillary archwire used for retraction of anterior teeth. The amount of closure obtained at each adjustment is controlled by maintaining washers (each 1.5 mm. long) between molar tube and tie-back loops, removing a washer from each side at each adjustment.

tinuous arch, and while it carries vertical spring loops, these loops are now situated mesial to the cuspids, between these teeth and the lateral incisors. There should be tip-backs in the buccal segments.

In fabricating this arch, the tie-back loops should be placed as far forward as is possible in the embrasure between second and first molars (Fig. 3). The space between the molar tube and the tie-back loop is filled, before the arch is tied in, with washers cut from molar tubing, each washer one and one-half millimeters long. Just before seating the arch for activation, the last washer on each side is removed, so that when the archwire is put in place there is a space of one and one-half millimeters between the tube and the most distal washer.

In this way at the time of the first activation of the archwire, each loop is opened by one and one-half millimeters, and the most distal washer on each side is brought firmly against the molar tube. At each subsequent adjustment a washer is removed from each side, so that each time force is renewed the activation amounts to one and one-

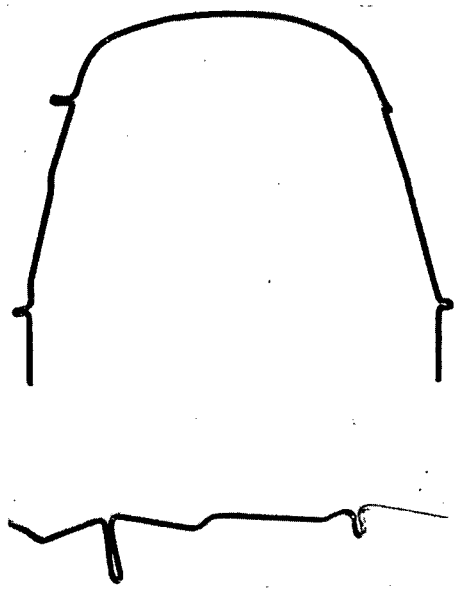


Fig. 4. The "gable-roof" arch used in the lower to parallel roots of cuspids and second bicuspids. As is shown in the upper figure, viewed from the gingival, it is a continuous arch. In the lower half of the figure the arch has been cut to permit photographing from the side. *It is not ever used as a sectional arch.*

half millimeters of loop opening. Class II elastics are continued in this phase of treatment, as previously described.

This procedure is continued until the maxillary anterior teeth are in their proper positions. It may be necessary to make two or more of these maxillary archwires carrying washers in order to attain the desired relationships of maxillary and mandibular incisors.

From this stage onward the case is completed as any other Class I extraction case; the gable-roof arch (see Fig. 4) may be used to parallel cuspid and second bicuspid roots, and torque should be incorporated in the maxillary archwire to carry the incisor roots lingually if after these teeth have been retracted they show an undesirable axial inclination.

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REFERENCE

1. KROGMAN, W. M. Observation stated at a meeting of the Hudson County Dental Society.