Force Control in the Movement of Dental Structure: A Technique Designed to Apply Its Principles*

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As a foreword, I should like to say that I have worked more or less independently during my fourteen years of practice, and what I have to say is a product of the convictions moulded from that experience. I do not pose as a scientist with a background of tangible or theoretical proof for my statements. Certain ideas, reactions and hypotheses become convictions when our daily experience produces a strong feeling of their factual significance. No one even desires to explain the sense of judgment we use every day in our clinical practice when we examine cases in a quick appraisal without diagnostic material. We know such things as the limitation of future bone growth, the difficulties of retention, the bone that will respond quickly to forces and the bone that will offer great resistance. We sense the fact that one patient will be highly sensitive to tooth movement and another will not be.

It would be better to have scientific proof of these convictions, but we have them as a result of our experiences and are very happy with them until cold, calculating science wrecks our innate dreams. I do not wish to attempt to convert or convince anyone of my accepted philosophies, but I only offer my ideas and convictions gathered from my experience for your evaluation, with the hope that it may be profitable in stimulating thought, if not directly useful in practical application to your mechanical therapy.

I have tried to use any appliance that I felt might have possibilities in treatment, although the great bulk of the work has been with the edgewise mechanism. I purposely have deviated from the accepted routine and technique, with the hope that I might find some better means for the treatment of malocclusion. I firmly believe that at the outset one must learn to be technically skillful with one type of appliance, which in itself will take a number of years, but I do not subscribe to the viewpoint that it is best to learn one accepted technique and stay with it without attempting to vary its application or incorporate innovations when it is evident that the technique is not always capable of producing the desired result. This is doubtless a safe way to practice orthodontics and involves the least confusion and effort, but is very dull and unimaginative. Usually the groove has been worn so deep by constant routine that when a new and better way is demonstrated, the mind partially closes to the advantages of a change and dwells upon the difficulties of making it, of breaking the peace and tranquility of a long-established philosophy and technique.

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Dr. Edward Angle was probably the greatest contributor to dentistry in this century and certainly the father of modern orthodontia. He was many years in advance of his time in his thinking and much of what he gave us is just now being appreciated, but it would certainly be a serious stalemate if progress in this field were to stop with Dr. Angle. He was constantly working to offer the profession the means of achieving a more nearly perfect treatment, and he encouraged his students to carry on the work. We, in the Angle Society have a great impetus through our association, exchange of thought and coordinated effort, to contribute towards progress in our field, but at the same time we are limiting our thinking by following too closely the pattern of our accepted philosophies. The men who are employing techniques which are at variance with our own are not all failures. There are some things that they do which might prove to be highly successful if incorporated into our own technique. For every individual operation we perform, it is quite possible that there is someone somewhere who is doing that same thing a little better. It is axiomatic that, as necessity is the mother of invention, tradition is the enemy.

When a body is observed to be changing its position it is under the action of force. In every case when this change occurs, it may be shown that it is due to the presence of another body. It is demonstrated in mechanics that the proper measure of this influence on the body which receives the influence is the product of the numerical value of its mass and the numerical value of the acceleration received. This is a principle with which we as orthodontists are constantly dealing in the mechanics of our treatment. The skill with which we utilize and control force is of great importance in the treatment period and the ultimate result of our effort to attain our objective.

Orthodontic aims and objectives vary greatly. There are no two operators who will have the same concept of a finished case for the same patient and there is likely to be a great difference in the manner of approach. We call our objective normal occlusion, which itself is an abstract term and to each of us portrays a different picture as applied to specific cases.

I am assuming that we all have our mental picture of this much discussed and widely written abstraction and will confine this paper chiefly to a method of approach to attain the objective. Here again there is likely to be a great difference in the manner of gradually converting the perverted structure before us into an architecturally balanced and harmoniously functioning organ. There are, however, fundamentals which cannot be bypassed no matter what devious routes are traveled on the road to final realization of our aims. We cannot violate or escape these without floundering. Specifically, these factors are application and control of force, and the biologic and physiologic entities. If the former is used with skill, care and discretion in its application to the dental tissues in the correction of malocclusion, it should violate the latter to a minimum.

The forces used in the treatment of malocclusion should be controlled and directed in such a manner that it will be possible to move the dental tissues with a minimum of discomfort and destruction to their most aesthetic and most favorable mechanically functioning positions. To do this there must be at the outset a definite plan of procedure. The mechanics should be selected so that force may be exerted and controlled in any direction and intelligently managed so that the motion proceeds whenever possible in a direction which offers the least mechanical resistance. It should embody a relatively fixed stationary anchorage unit from which to obtain the required power to accelerate the objective unit without serious loss of stability to the emanating force or anchorage body. Care should be taken to remove all forces antagonistic to the required direction of movement. Proper application of these principles will enable us to produce a more nearly perfect result with greater ease and efficiency, less discomfort to the patient, and to reduce the treatment time, and insure a more favorable retention.

There are many appliances now in use which embody these features. The edgewise mechanism possesses the necessary requirements although it is still far from mechanical perfection, and having used it for twelve years, I am more familiar and dexterous with its technical use, although the mechanics which I am about to describe may be adapted to other appliances as well.

Many principles have been employed for extending arches or increasing distances between two teeth or groups of teeth. Some of these are the locknut and friction sleeve of the ribbon arch, vertical loops, coiled springs, soldered spurs, ligatures, sliding hooks with extension abutting the molar tube and many others. When the teeth of one arch are moved distally, there is a definite reciprocal force of the same degree on the anchorage unit to accomplish this movement. Many operators first move the molars distally and then follow with the other buccal and anterior units. Wherever we are using a continuous unbroken arch, either round, square or rectangular, to accomplish distal movement, we are working with the brakes on in some part of the arch, or we are getting some undesirable tooth movement in one section to accomplish correct directive force in another. Atkinson demonstrated that the teeth in either the mandible or the maxilla must be moved distally without first expanding the arch or moving the lateral segments into the hard cancellous layer of bone.

Clinically this important demonstration is definitely substantiated. The attempt to move the lateral segments (molars, bicuspids, and cuspids) distally in section results in rotation of these sections, the molars moving lingually and the cuspids moving buccally, both against dense bone. This reaction has been rectified by using a lingual arch in conjunction and is an excellent means of distal movement without disturbing the anterior teeth, but lacks positive control of directive force. The lingual arch must be adjusted to the increasing width of the arch as it progresses distally or the posterior teeth will engage the dense bone area. Some operators use a continuous arch of predetermined ideal form which when applied starts expansion immediately and puts the brakes on; others make the first arch narrower and of smaller gauge in an attempt to overcome this resistance. It is of increasing importance that we move these teeth distally with as much freedom as possible because we have been indelibly impressed with the fact that unless we can move the teeth of both dental arches to their most advantageous mechanical and aesthetic position in the jaws, we will not be successful in our treatment.

The same thing is applied to arch units when blocked out cuspids or bicuspids must be placed in alignment. Generally the forces used to create the space and extend the arch segments incorporate antagonistic elements which result in inefficiency, tooth movement not indicated and unwarranted strain on the teeth adjacent to the required space, with possible damage to the tissues. I refer to the use of vertical loops, spurs and ligatures, springs. and a various assortment of mechanical armamentaria.

In the treatment of cases requiring distal movement of the maxillary teeth, after the mandibular stabilized anchorage unit has been set up, it is common practice to incorporate tip-back bends with a rectangular arch wire in all the maxillary bracket areas, including lingual tip-backs of the same degree in the incasal region. This results in tooth movement not indicated in the anterior region which must later be removed.

I refer to the labial root and lingual crown movement which will accompany the operation. With any rectangular or square arch wire seated in the brackets of the teeth comprising the lateral segments there is certain to be present some torque force which will impede the distal movement because if any torque force is present the motion is proceeding in two directions at right angles to each other. The use of a small round wire applied in the same manner is far better to effect this motion, but it has its disadvantages in that the tip-back bends, when seated in the brackets, tend to roll the crowns of the teeth buccally, the action increasing progressively from cuspid to molars. The ribbon arch mechanics allows control of the torque force in the molar region, but imposes a severe strain on the anterior teeth. The Johnson twin arch technique eliminates torque and expansion in distal movement, but it also imposes a strain on the anterior teeth and does not go far enough in that it lacks sufficient control for stabilized anchorage and ignores final axial positioning.

When appliances involving complete banding of all the teeth were given to the profession, they opened new avenues in treatment and enabled us to do things that were impossible before, but with them also came greater dangers and higher requirements in skill for their management. One of the worst features and effects of the new treatment was the abuse of the new-found power "sectional torque." This was responsible in part for the unnatural appearance of the anterior teeth following treatment, and the post treatment recession in the bicuspid and lower anterior region. This period of abuse is not yet over and many treated patients whose anterior teeth resemble the pickets on a fence are very much in evidence today.

Distal movement of the teeth will be most successfully accomplished by reducing to the barest minimum any degree of torque or apical root movement in the dental arch receiving the acceleration. Axial positioning of the teeth should take place after the distal crown movement has been accomplished. To attempt to synchronize the two results is unwarranted strain on the anchorage unit. To state it specifically, the force exerted by #6 elastic bands would have to be continued two or three times as long to effect the desired distal positioning. We use torque and as much as we can safely incorporate in our anchorage unit to prevent motion. We should then eliminate it from the unit we desire to put in motion. To carry this principle farther we can apply it to the treatment of bimaxillary protraction cases. To remove the lower teeth distally, we stabilize the upper arch using stationary anchorage and remove all torque from the lower arch and move these teeth distally. If this is done efficiently and with all antagonistic forces removed, it can be accomplished in such a short time that there will be very little mesial motion of the maxillary unit even without the aid of occipital anchorage, because the lowers will move distally much faster than the uppers will move mesially. By reversing this process and applying the brakes, i.e., stationary anchorage to the lower arch, the maxillary teeth are put in free-wheeling and moved distally. In this way both arches can be made to occupy distal position without the aid of occipital anchorage.

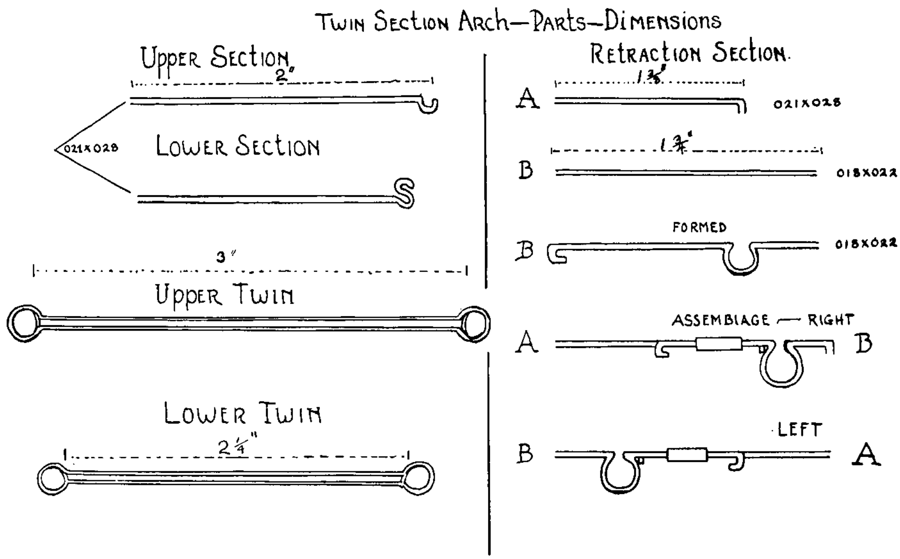
To attempt this accomplishment, I have, for the last seven years, used a simple mechanism which has helped me in these objectives. It is called a sliding twin section. The anterior portion of the arch is made of a double length of .012 tempered stainless steel three inches long. It is formed on a special jig so that each extremity is a double closed loop. Side sections are made of 1¾ inch lengths of 020 x 028 rectangular arch wire, one end of which is formed in a hook. The junction of the two side sections with the twin is accomplished by a friction sleeve formed by folding a piece of .150 x .004 S. S. band material around both the twin wire and each section just above the double closed loop at each end of the twin wire, cinching it tightly and welding it together at the seam and then welding it to the 028 surface of the side section. The twin wire will lie flat on the 021 surface of the side section ⅛ inch from the hook. The lower arch side sections measure 1½ inches and the twin wire 2 inches. The lower hook is formed like the letter S. The twin arch slides rigidly through the friction sleeve formed of the band material and a groove to receive a ligature is in the anterior border of its seam. Fig. 1A.

To adapt this mechanism to the dental arch, the twin wire section is formed to approximate contour of the arch, and buccal surface bends, occlusal curve bends, and slight tip back bends if desired are made in the side sections. It is then seated in the edgewise brackets and tied in, with the hooks just mesial to the cuspid brackets.

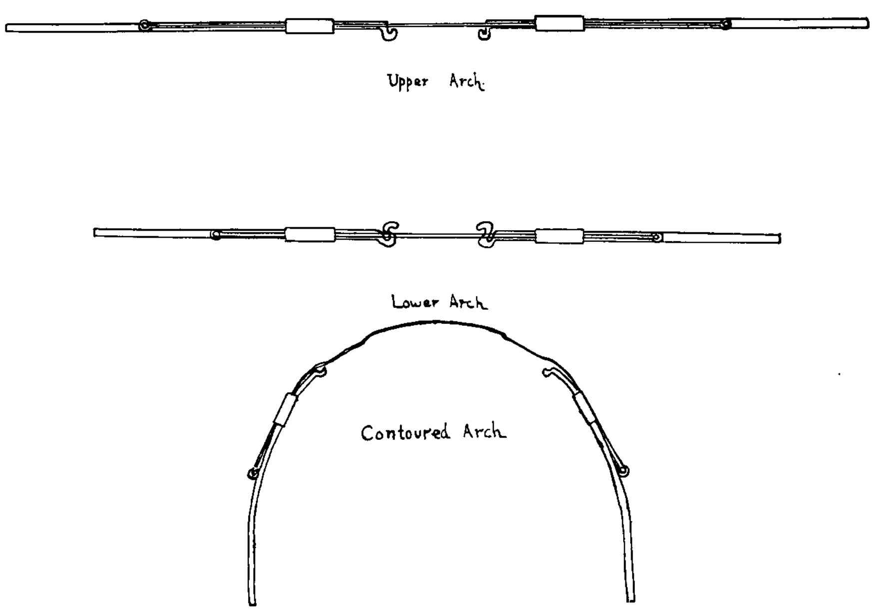
To illustrate its action and application in treatment we will use as an example a typical case and a very prevalent one, which exhibits a maxillary protraction and a normal or slightly retracted mandible in which the teeth have drifted forward and are in mesial inclination. We find cases in this treatment group in Class II, Division 1 and Class I malocclusion. The teeth of both arches must be carried distally before the final adjustment of jaw and arch relationship is established (Fig 2).

Bands are placed on all the teeth, excepting the centrals and laterals. These teeth are not banded until the distal movement of the lateral segments (cuspids, bicuspids and molars) has been completed. An arch of 018 round stainless steel is applied to the lower arch and tip-back bends placed in the bracket areas. The maxillary teeth are disturbed as little as possible and a section of 021 x 028 arch wire is placed passively in the brackets on each side with a stop mesial to the molar tube and another distal to the cuspid bracket. An upper impression is taken for the construction of an acrylic palatal stabilizing plate bearing an anterior flat plane to occlude with the lower incisors and a hook extension of 030 wire on each side passing through the cuspid-first bicuspid embrasure engaging the mesial of the bicuspid bracket.

After several weeks it will be time to start distal movement of the lower



A



B

Fig. 1, A.—Twin Section Arch-Parts and dimensions
B.—Upper and lower contoured arch.

teeth. The acrylic plate is placed in the upper arch and at the same appointment a twin section arch is adapted to the lower teeth and Class III intermaxillary rubbers are applied. Tip-back bends are placed in the bracket areas and the anterior portion of the twin wire is adjusted to lie just labial

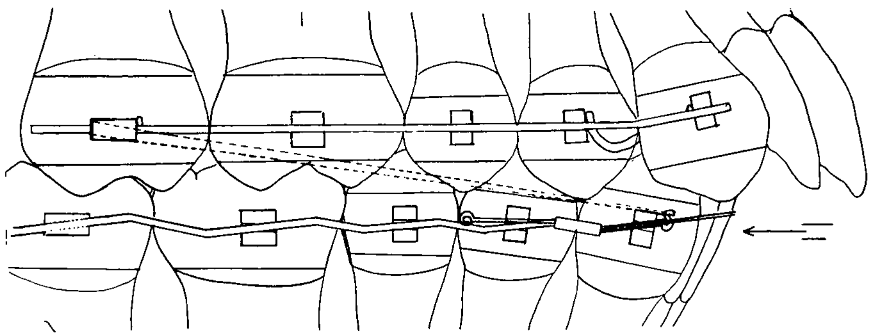


Fig. 2.—Retracting mandibular teeth.

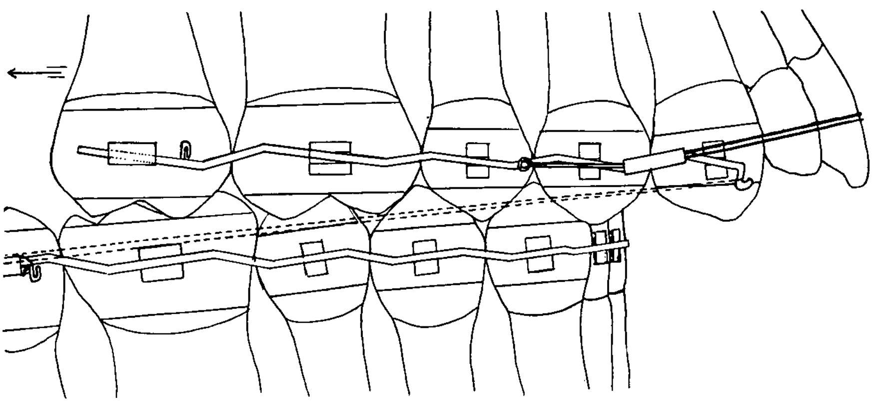


Fig. 3.—Stabilized mandibular arch and retraction of maxillary teeth.

to the anterior teeth. The distal movement of these teeth should be accomplished in six to eight weeks. When the intermaxillary force is applied, the bone tissue supporting the lower teeth having been disturbed for several weeks, free movement of these teeth is permitted, whereas in the maxillary arch it will be several weeks before the bone disturbance created by the force of the rubbers will permit extensive tooth movement. The plate acts as an auxiliary support and cuspal interference with the distal movement of the lower teeth is reduced by the limitation of occlusal contact of the posteriors.

When the lateral segments of the mandibular arch have moved distally, wide spacing and improved alignment of the centrals and laterals occurs. Bands are placed on these teeth and the arch is seated in the brackets. It is not necessary to remove the arch for this operation. A ligature is passed through the closed loop on each side and tied to the stop anterior to the molar which, in turn, is tied to the distal of the molar tube. This closes the spacing, retracts the anterior teeth and places them in alignment (Fig. 3). It is now ready for an 021 x 028 continuous arch wire with tip-back bends for stationary anchorage. Occipital anchorage can be used in conjunction if it is deemed advisable to have additional support.

The same procedure is used for the distal movement of the maxillary teeth, excepting that the mandibular anchorage consists of teeth which are

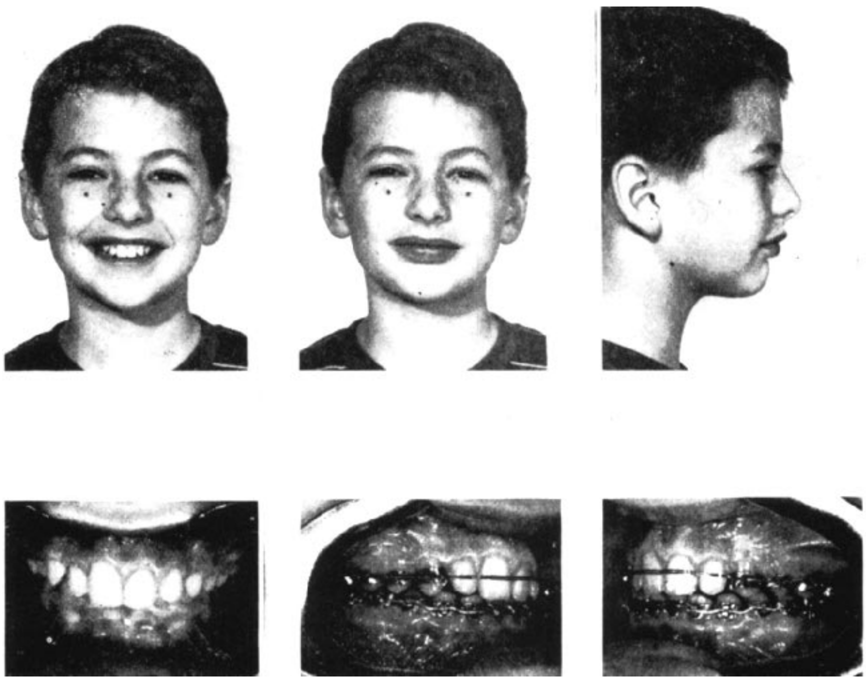


Fig. 4.—Case at conclusion of maxillary retraction.

well tipped distally as advocated by Tweed and stabilized to some extent by an 021 x 028 arch wire. The lower teeth will move mesially during this process, but the maxillary teeth will move distally so much faster, that the lowers will be theoretically in their planned positions at the conclusion of this treatment stage which should require six to eight weeks. The upper centrals and laterals are never banded until the last two months of treatment. At this time they are first retracted by the space-closing operation and then if further positioning is necessary, bands are placed for final correction.

It is sometimes necessary to place an 021 x 028 upper arch wire to complete the treatment, but doing so disturbs the incline plane relationship and often necessitates the use of vertical rubbers to correct and balance the errors of cuspal positioning resulting from this rigid control of all the teeth simultaneously. Occasionally some axial positioning is necessary, but it is surprising how very little torque or root movement is required in the maxilla. The apices of these teeth are all very close to their normal positions, but some buccal root torque in the lateral segments and lingual root torque in the anterior region occasionally is indicated to return these structures toward the positions from which they have moved in the tipping action required in the movement of the crown structure (Fig. 4).

By allowing the teeth the freedom to shift for themselves when they are back where they belong, the interdigitation of teeth and incline plane relationship is accomplished with the able assistance of the masticatory mechanism itself. In general, the more freedom we allow the upper anterior teeth in treatment the more aesthetic will be their appearance in the finished case. Sometimes they need to be depressed and occasionally their axial

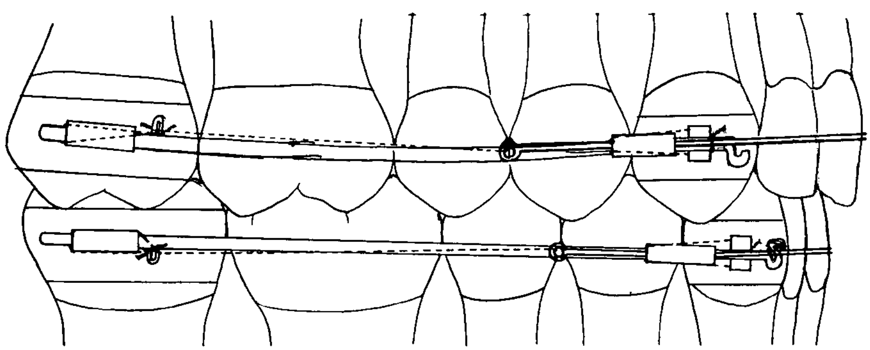


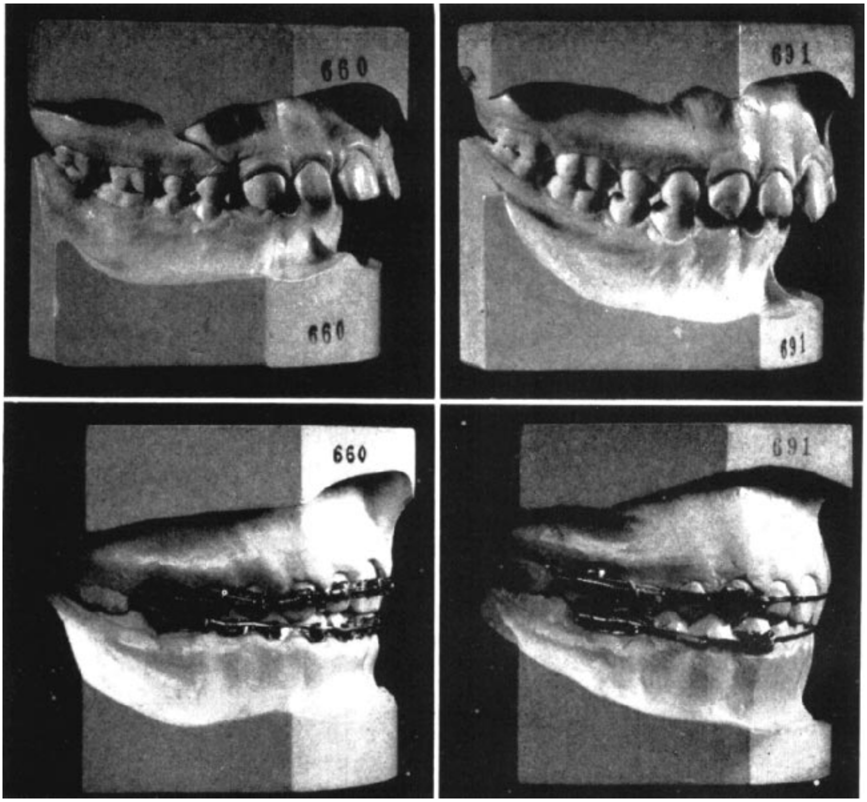
Fig. 5.—The space closing operation.

position corrected, but in the majority of cases, simple alignment only is indicated (Fig. 5).

Immediately following active treatment, bands are removed from all the teeth excepting cuspids and the last molars. The twin section arch used in treatment is replaced and adjusted so that the twin wire is in direct contact with all anterior teeth. A silk ligature is tied from the loop in the end of the twin wire to the molar tube on each side. The patient is instructed to return in one week for removal of the remaining bands. This space-closing operation will move the anterior teeth approximately 1/20th of an inch lingually and improve the appearance immensely. It allows settling of the cuspids into more favorable inclined plane relationship so that the placement of retaining devices will not serve to hold the teeth in malocclusion to the extent of that which is produced when this step is omitted (Fig. 6).

These sectional arches are made by the assistant so that an ample supply is always on hand. They are quickly adjusted to the patient with little or no discomfort during or after the operation.

The mechanics of the sliding twin section arch are especially adaptable to cases in which the maxillary cuspids are blocked out (Fig. 7). If the premaxilla shows a lack of forward development centrals and laterals are banded and a stop is placed on the twin arch distal to the lateral incisor brackets. Class II rubbers are used from the mandibular anchorage as the



A B

Fig. 5B.

A.—Extreme Class II, Division I case ready for brand removal.
B.—The space closing operation preliminary to retention.

power and as the posterior teeth are moved distally, a ligature is tied on each side from the closed loop at the extremity of the twin wire to the ligature slot just distal to the hooks. If the cuspid is not sufficiently exposed for banding, an eyelet is cemented to its surface and a silk ligature is tied from the eyelet to the free end of arch section anterior to the friction sleeve. This arch section which bears the intermaxillary hook may be bent occlusally as indicated by the position of the cuspid. As soon as possible the cuspid is banded and the arch section seated in its bracket. At no time in the total operation is it necessary to remove the arch for adjustment (Figs. 8, 9).

There is adequate power in the twin 012 wires to effect depressive action to the anterior teeth in Class II, Division II, cases. Central and lateral incisors are not banded until the last stage of treatment. The lingual inclination of the central incisors is utilized as additional resistance for anchorage with the acrylic bite plane in position. The plate relieves any occlusal stress on the brackets or arch wires of the mandibular appliance in these extremely deep bite cases, as the lower teeth are being tipped distally

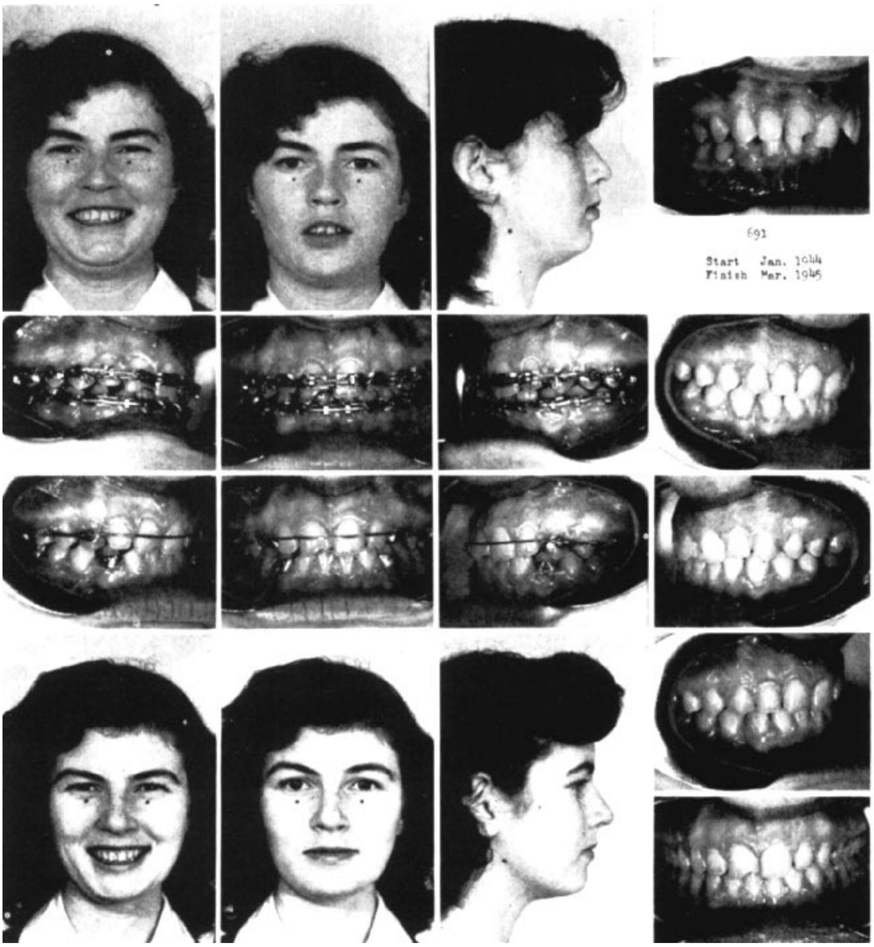


Fig. 6.—Case showing space closing operation at the conclusion of treatment.

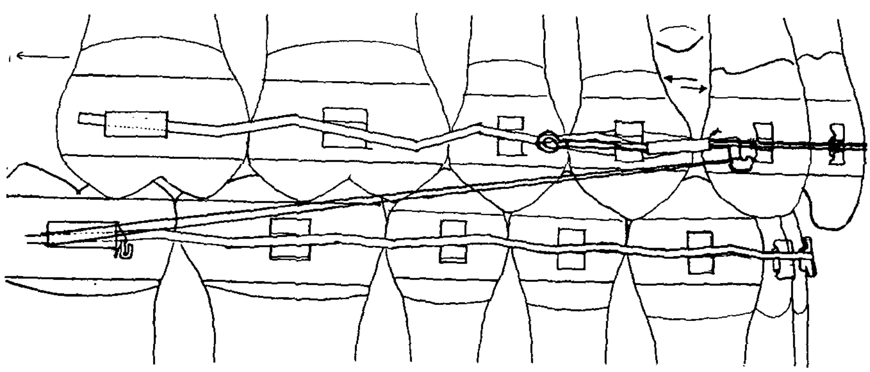


Fig. 7.—Opening space for blocked out cuspid.

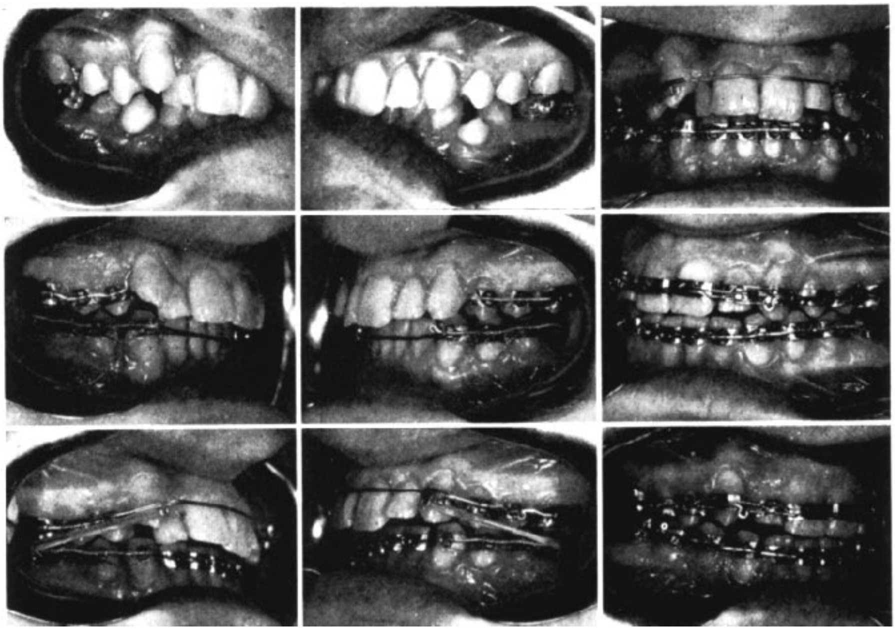


Fig. 8.—Showing treatment stages in case involving blocked out teeth.

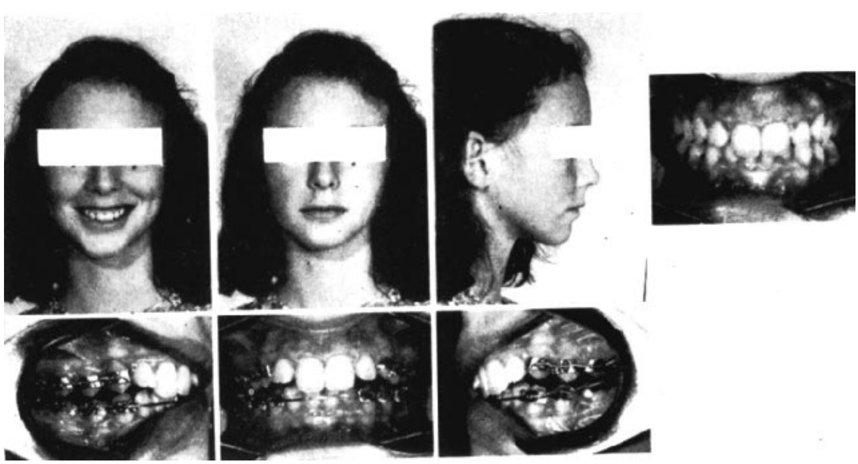


Fig. 9.—Stabilizing plate in place at beginning of treatment in Class II, Division II case.

preparatory to setting up mandibular stationary anchorage. At this stage the plate may be removed, the bite is open, and Class II intermaxillary anchorage is applied to the upper twin section. It may be necessary to complete the correction with an 021 x 028 maxillary arch in order to effect lingual root torque of the upper central incisors (Fig. 10).

In bimaxillary protraction cases in which the first bicuspids have been extracted in order to obtain complementary balance between tooth struc-

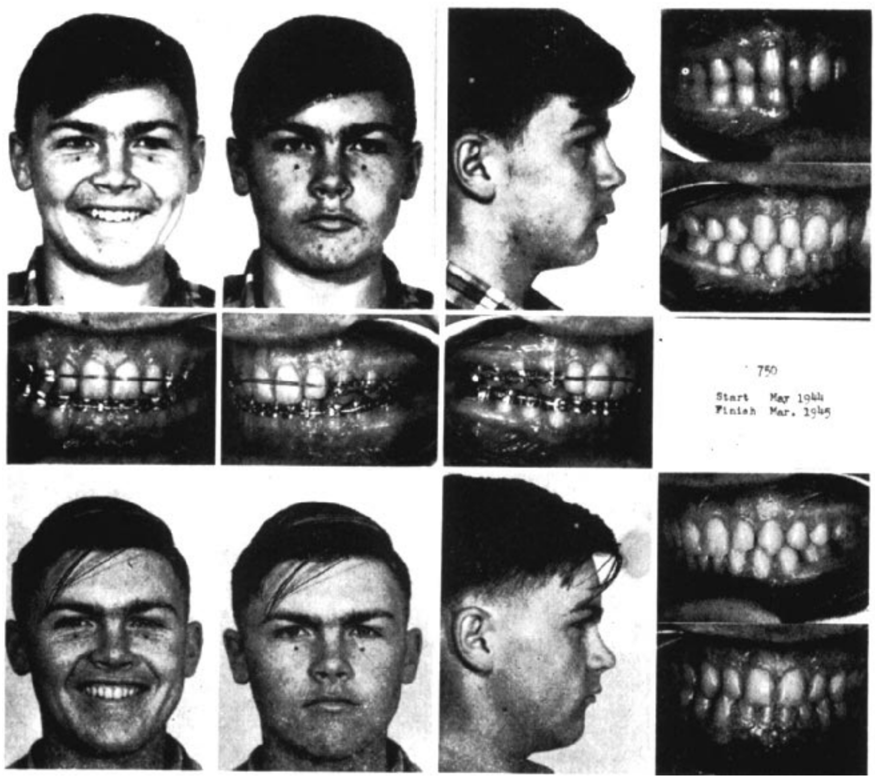


Fig. 10.—Appliance at conclusion of Class II, Division II case.

ture and bone, this mechanism may be used to advantage. The lower twin section arch is cut in its center, making two lateral halves, each bearing an arch section and one inch of twin wire. A 1/16 inch length of coiled spring to fit 022 wire is placed over the free ends of the twin wire and the free ends are soldered together, leaving a generous round ball of solder. The arch section is then placed in the brackets of the first and second molars and second bicuspids with tip-back bends. The friction sleeve lies just mesial to the second bicuspid bracket. The twin wire is seated in the cuspid bracket with the spring and the solder ball mesial to the bracket, contoured to the tooth surface to prevent extension into the tissues. A ligature tied from a stop on the arch wire mesial to the molar tube is passed around the distal of the tube and secured. Another ligature is tied from the closed loop to the stop.

This action starts distal movement of the cuspid. To prevent its rotation as it moves distally, an alignment wire of 018 stainless steel formed to lower arch contour is inserted in the lower wing of the cuspid brackets and lies just labial to the anterior teeth (Fig. 11). As the cuspid moves distally a gingival bend is made in the cuspid bracket area of the twin wire to start distal root movement. When the bicuspid spaces have been closed the central and lateral incisors are banded and a new complete arch is placed and these teeth retracted.

If more distal movement of both arches is indicated, the upper arch, which is usually completed first, may be stabilized with an 021 x 028 arch,

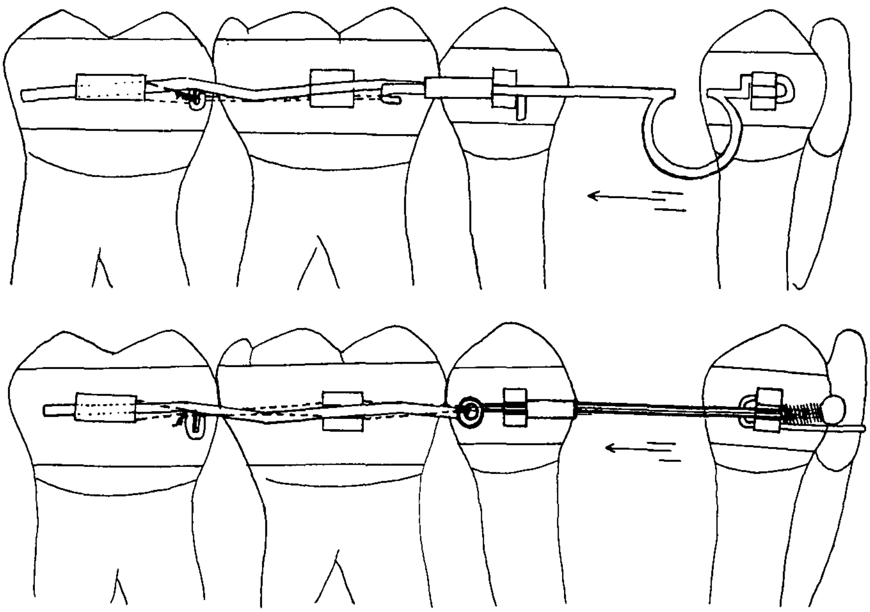


Fig. 11.—Space closing appliances in cases involving bicuspid extraction.

an acrylic stabilizing plate with cuspid hooks placed and Class III rubber elastic force used either before or after the new lower arch is placed. In the next step the lower arch is stabilized in the same manner and the upper twin section arch substituted until the distal movement is complete. Additional distal movement is rarely indicated, however, in these extraction cases when the anteriors are retracted in section. The posterior teeth offer sufficient anchorage for retraction of the anteriors to their required positions even without additional support in the form of occipital anchorage, excepting in the very extreme cases.

Using the same principle and combining it with the vertical loop, it is sometimes expedient to substitute a section of 022 x 018 arch wire in the friction sleeve, form a hook distal to the sleeve and a vertical loop distal to the cuspid. The anterior extremity of the 022 x 018 wire is bent in a step occlusally and then straightened out to lie in the upper wing of the cuspid bracket to prevent rotation in its movement distally. When the cuspid crown is in contact with the biscuspid, the stop is removed and the wire is seated in the brackets channel to effect distal root movement. The action with each mechanism is continuous, and it does not require that the arch slide through the bicuspid and molar brackets and thus demand frequent removal for adjustments (Fig. 11).

Some of the bicuspid extraction cases exhibit a poorly developed jaw following treatment (Fig. 12). These cases are generally maxillary and mandibular dental and alveolar protractions with mandibular retraction. By establishing the lower teeth definitely back on the bony foundation and fixing the anchorage unit they seem to improve if the intermaxillary anchor-

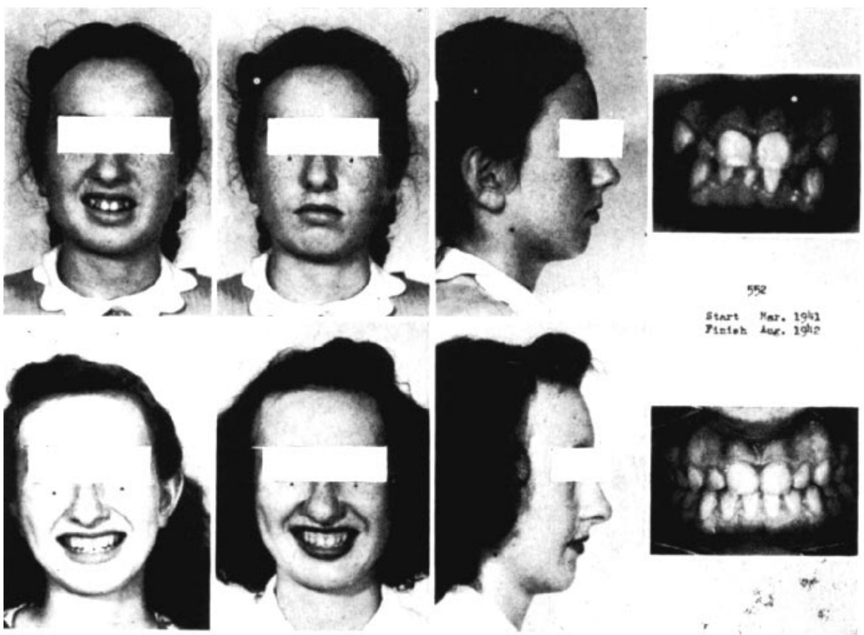


Fig. 12.—Poor facial harmony resulting from bicuspid extraction.

age is used for a longer period and a more rigid arch wire such as the rectangular involving stationary anchorage is applied to the maxillary unit (Fig. 13).

A study of the photographs in figure 14 reveals that the lower jaw is still in extreme retraction, but the maxillary teeth have been moved distally to meet it. The result is unpleasant. I am aware that this is assuming that mandibular development can be obtained by forward stimulation activated by the force of rubber bands, but I have a strong feeling from clinical evidence that it does often occur, although it is possible that the treatment may have been synchronized with a predetermined growth spurt in the lower part of the face (Fig. 15).

From the clinical material I have had the opportunity to study, I have come to the conclusion that the greatest opportunity for mandibular development lies in treatment in the primary or deciduous dentition stage,

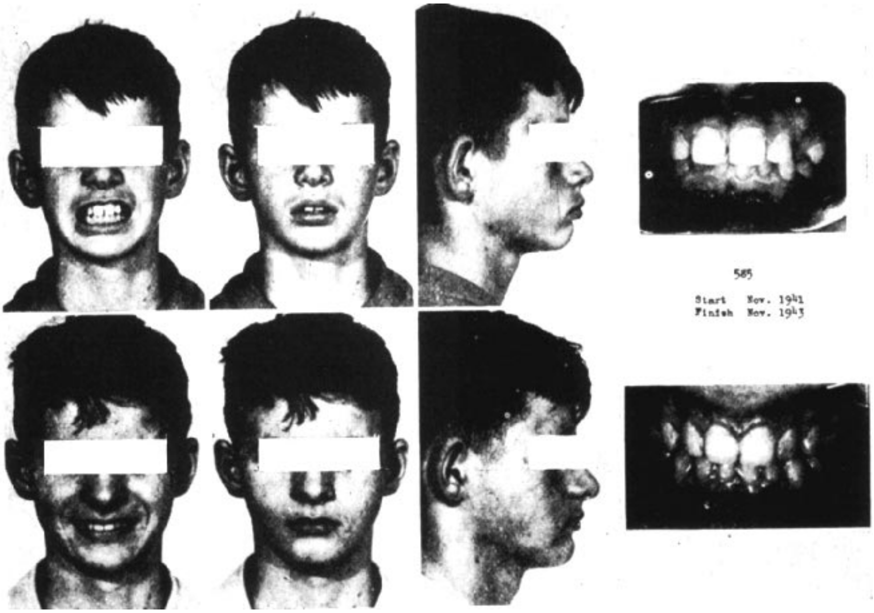


Fig. 13.—Improved facial balance resulting from bicuspid extraction.

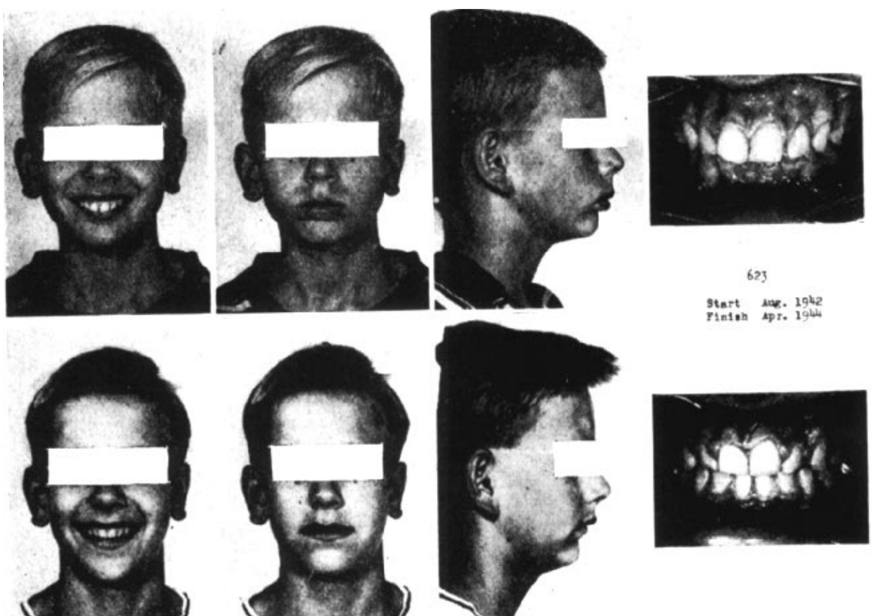


Fig. 14.—Poor facial balance resulting from treatment of Class II, Division I case.

Fig. 15.—Improved facial balance resulting from treatment of Class II, Division I case. Incomplete correction because of advanced stage of malocclusion.

although the management of this treatment and the preservation of the advantages gained is not often understood or appreciated by the profession (Fig. 16).

What we have done and accomplished in our treatment is of great importance to us and to the child and parents. We do not always have the same viewpoint in regard to the success of the case. I have examined finished cases which fell short of the treatment objectives to which I felt the profession of orthodontics should aspire, but was amazed to find the parents completely satisfied with the results. On the other hand, I have also seen cases which were beautifully treated with the most complete mechanisms, so far as cuspal relation was concerned, and found very sad parents. In the latter case, the appearance of the child had changed too much. It would have been better to have a few irregularities of the teeth than to have the teeth on an unbecoming axial plane and the arch dimension incompatible with the face. Fortunately for the orthodontist and the child as well, the teeth will not always remain in their false positions, but they will be there for a very important period in the lives of the child and the parents.

According to my conception of arch form, the arch width, as indicated by the Bonwill-Hawley chart for ideal arches, is too wide for most cases. There is a great tendency to place excessive width in the arches in effecting distal movement. We are only deceiving ourselves in doing this because, although the anteriors are in distal position, the buccal segments are too wide and the result is unaesthetic, unstable and conducive to post-treatment gingival recession (Fig. 17). This is a common fault of many operators who make a desperate attempt to position the anterior teeth well back on the bony ridge. It is safer to be on the narrow side in arch form so that when the anterior teeth appear to be well back on the ridge there are no illusions and future disappointments to be reckoned with when retention is discontinued and nature starts altering our pattern to conform the arch form to the true anatomic form determined by the intrinsic factors of basal bone dimension.

Routine photographic records will help a great deal to divert our treatment from too much accent on the mechanical consideration. It is true we do have the patient to look at, but do we really analyze what we have done? I have been surprised to discover faults in the aesthetics of my treated cases

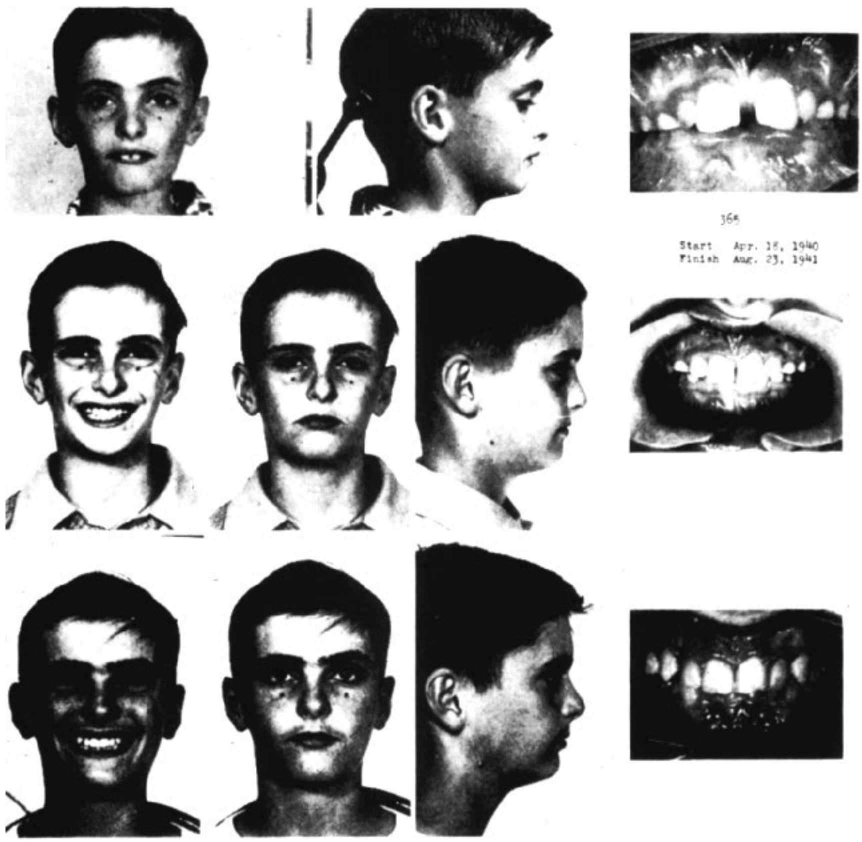


Fig. 16.—Above: Treatment of mixed dentition. Below: Three years later at beginning of secondary treatment. Early treatment in extreme cases makes more complete facial correction possible.

when I saw them out in their own social environment which I had not observed in the office.

It takes years of reading photographs before their full significance is revealed just as it takes a long time before the amateur photographer can capably judge a picture. Although it is very informative and leads to a consciousness of the aesthetic aspect, it is at the same time very disconcerting. If ever you become too inflated with your success you can be brought back very quickly by looking through the photographic evidence of your work. We are inclined to construct a mental image of our most successful

Fig. 17.—Poor facial balance resulting from too much arch width.

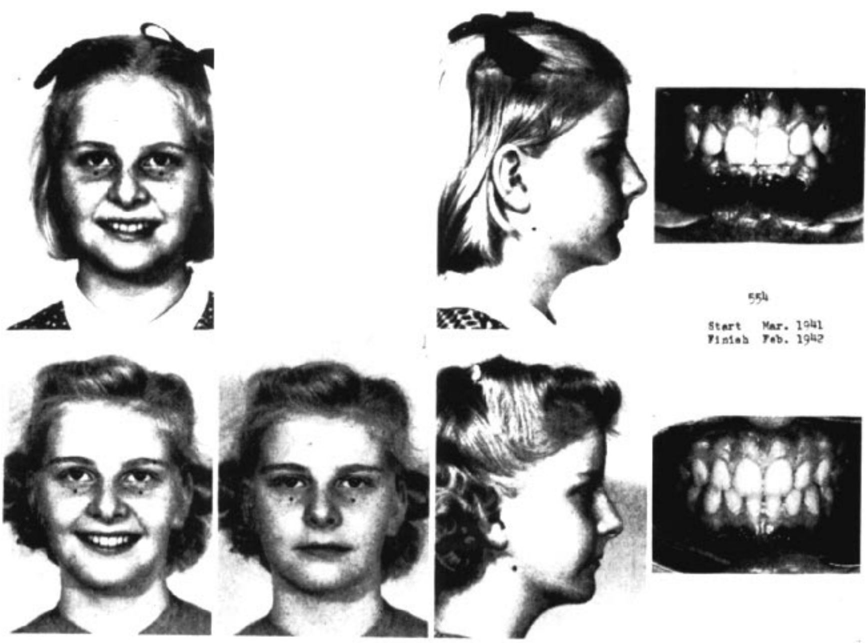


Fig. 18.—A well proportioned face. (Author's concept.)

cases as our standard product and it becomes more beautiful in retrospect. I feel that the photographs are helping a great deal to build up the aesthetic consideration. The twin section technique is making it possible to approach a closer realization of my aims in aesthetic positioning of the teeth according to my own concept.

The retention following treatment has become much simpler. The anterior teeth usually improve their alignment without bands to such a degree that cases are often finished without resorting to band placement on these teeth. This self-alignment often is retained by a simple palatal plate without a labial wire in both upper and lower arches when it is judged that the teeth have been positioned in good balanced relation.

With the assistance of this mechanism it is possible to gain an orthodontic objective which aspires toward our common goal which is normal occlusion with a considerable degree of facility by taking full advantage of the force used and directing it with precision and certainty.

This is not the final and triumphant solution in our search for the ultimate in mechanical therapy, but it may be of some value as a stepping stone on another channel of thought in our treatment philosophy.

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