Bimaxillary Protrusion*

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AS FAR as the writer has been able to determine, the term "bimaxillary protrusion" was first used, as early as 1897, by Dr. Calvin C. Case. In his textbook published in 1921 Dr. Case (1) devoted an entire chapter to bimaxillary protrusion and retrusion. "Probably no other dento-facial malocclusion," he states, "so often mars or deforms the human face as some gradation of these two characters, bimaxillary protrusion and retrusion." He describes bimaxillary protrusion as a condition in which the entire dentures of both jaws are protruded in relation to the mandible and other bones of the skull, and states that this deformity is always aggravated by a receding chin. He speculates somewhat on the possible influence of heredity in this condition, but leaves the question open. Dr. Case reports fifteen pronounced cases of bimaxillary protrusion, all amply illustrated, and describes his methods of treatment.

In 1926 Dr. Paul Simon (4), criticizing the previous classifications of dental anomalies, wrote in his book on gnathostatics: "Either they neglected the comprehensive morphological principle of dependent relationship between the teeth and other parts of the skull, or, though conscious of the principle, were unable to assimilate it in an accurate and intelligible manner." Simon's classification is based upon the relation between the normal denture in the three cranial planes—the median-raphe plane, the orbital plane, and the eye-ear plane. Whether or not we agree with Simon's gnathostatic method of diagnosis is beside the point. We must admit that he was among the first to recognize the morphological concept in orthodontics.

Simon uses the term "bimaxillary protraction," which is synonymous with protrusion. He added to Case's description by differentiating the various types of protrusions. He divides protraction into two groups: (1) Dental protraction, when the teeth are not in perpendicular or upright position because the crowns are tipped anteriorly, and (2) pure alveolar protraction, when the teeth may or may not be in an upright position but there is more or less prominence of the alveolar process and the lips are correspondingly prominent. He further divides protractions into such subgroups as alveolar protraction plus anterior dental protrusion and alveolar protraction plus anterior dental retaction, or retrusion.

Simon stated that in alveolar protraction plus anterior dental protrusion the orbital line usually passes considerably to the posterior because of the anterior alveolar deviation, whereas in alveolar protraction plus anterior dental retraction the orbital line may pass directly through the canine cusp, so that the saggital oblique position of the teeth, the roots of which

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are malposed anteriorly, permits us to conclude that an alveolar protraction presents itself.

Simon speaks of one other type of protraction, maxillary protraction, that is, a frontal deviation of the maxillary process, including the palatal process. He does not think that this form of protraction can be clearly demonstrated in the living person. However, if the teeth, especially the anterior teeth, are in an upright position, the dental arches are of approximately normal width and form, and the anterior position of the alveolar process presents a flattened appearance and does not bulge labially, we may be quite sure that we are dealing with a pure maxilalry protraction.

On page 295, Figures 156 to 158, Simon shows a case of bimaxillary total alveolar protraction plus bimaxillary anterior dental protraction. His profile photograph shows that the subnasion and chelium are anterior but that the gnathion is correct. It is interesting to note his comment—that, though contraction and dental protraction can be corrected with alignment wires in reciprocal fashion, the bimaxillary, total, alveolar protraction cannot be corrected without recourse to the surgical method of extracting the four first bicuspids. That is to say, Simon realized the limitations of mechanical treatment.

Simon, then, was really the first to present a comprehensive picture and description of bimaxillary protrusions from the morphologic point of view. It is a sad commentary that in the heat of argument and criticism of methodology most orthodontists have missed the real significance of Simon's contribution to the science of orthodontics. It is encouraging that the fruits of his labors are now beginning to be appreciated and understood.

In the interval between the publication of Simon's work and that of the paper of Dr. Charles H. Tweed (5) on "The Principles of the Edgewise Arch in the Treatment of Malocclusion" the subject of bimaxillary protrusion was almost ignored in orthodontic literature. In his paper Dr. Tweed wrote: "My experience has shown that the most unstable, and therefore the most difficult, patients to retain successfully are those in which both the maxillary and mandibulnar teeth are too far forward in relation to their respective bases, or are in double protrusion." At the time he wrote this paper Dr. Tweed had not read Case or Simon, but when his attention was drawn to their writings he hastened to give credit where it was due.

Tweed did not attempt to classify bimaxillary protrusions into categories, as Simon did. He looked upon the problem from a practical point of view and his immediate interest lay in the successful treatment of these cases in accordance with his interpretation of Angle's "Line of Occlusion." Though he believed that most so-called Class I malocclusions were in reality bimaxillary protrusions, or developing ones, and he did suggest classifying these cases in Class IV, he also knew from experience, his own and that of others, that many cases of true dental protrusions, not alveolar protrusions, were produced as a result of orthodontic interference. It would seem that herein lies a field of research in craniostatics that would yield beneficial results, and it is hoped that those who have some form of craniostatic apparatus at their command will soon give us a clearer and more accurate picture of this condition than we now have.

Treatment

In the treatment of bimaxillary protrusions two factors are of paramount importance, namely, aesthetic improvement of the dento-facial area and the establishment of a stable denture that embodies the requirements of the line of occlusion.

As early as 1880 Kingsley (2) said that in extensive deformities of inherited origin the extent of correction must be governed largely by the probable effect upon the external features, for there can be but little justification for creating a deformity of one feature in the process of correcting a deformity in features less exposed. Believing the articulation of the masticatory organs to be of much greater importance than their number and a limited number of teeth fully closed in occlusion to be of far greater usefulness than a mouthful of teeth with the articulation disturbed, Kingsley laid the foundation for a rationale of the treatment of bimaxillary protrusions.

Case, following Kingsley, stated that many or most orthodontists were reluctant to treat bimaxillary protrusions because the correction of such protrusions demanded the extraction of teeth and consequently broke down the ideal normal occlusion. As I have mentioned, he reported fifteen well-defined cases of bimaxillary protrusion and his method of treatment—that of extracting all four first biscuspids and retracting the anterior segment to close the space. Experience had taught him that to widen the dental arches and retrude the teeth, though it sometimes brought about a partial improvement of the facial outline, ended in a toothy look and an unstable denture.

In 1923 Lundstrom (3) published his paper on "Malocclusion of the Teeth Regarded as a Problem in Connection with the Apical Base." This paper was essentially an analysis of his own practice, comprising over 600 treated cases, most of them failures. In sum, he found that there was a definite relation between the teeth and the apical bone and that attempts at correcting malocclusion by mechanical means are not necessarily accompanied by a development of the apical base in harmony with the position of the teeth and that such methods do not maintain the teeth in occlusion. He further stated that the size of the apical base is not dependent upon masticatory function. This concept has led many of us, mistakenly, to produce normal cusp relation in the hope that Nature would build bone around these often misplaced teeth. However, Nature will not necessarily build bone around teeth that have been moved or tipped off the basal bone.

Lundstrom concludes by saying that the prognosis for the successful treatment of a case of malocclusion depends upon the state of the apical base: when the apical base is normal, or has a natural disposition to become so, the prognosis for the maintenance of occlusion is good; when it is not, and a spontaneous power of development neither exists nor shows any signs of appearing, a normal occlusion cannot be maintained without a permanent retainer. What he meant was that the object of orthodontic treatment should be the attainment of an occlusion in harmony with the given or potential apical base and having a functional and hygienic optimum. In other words, if you cannot maintain a full complement of

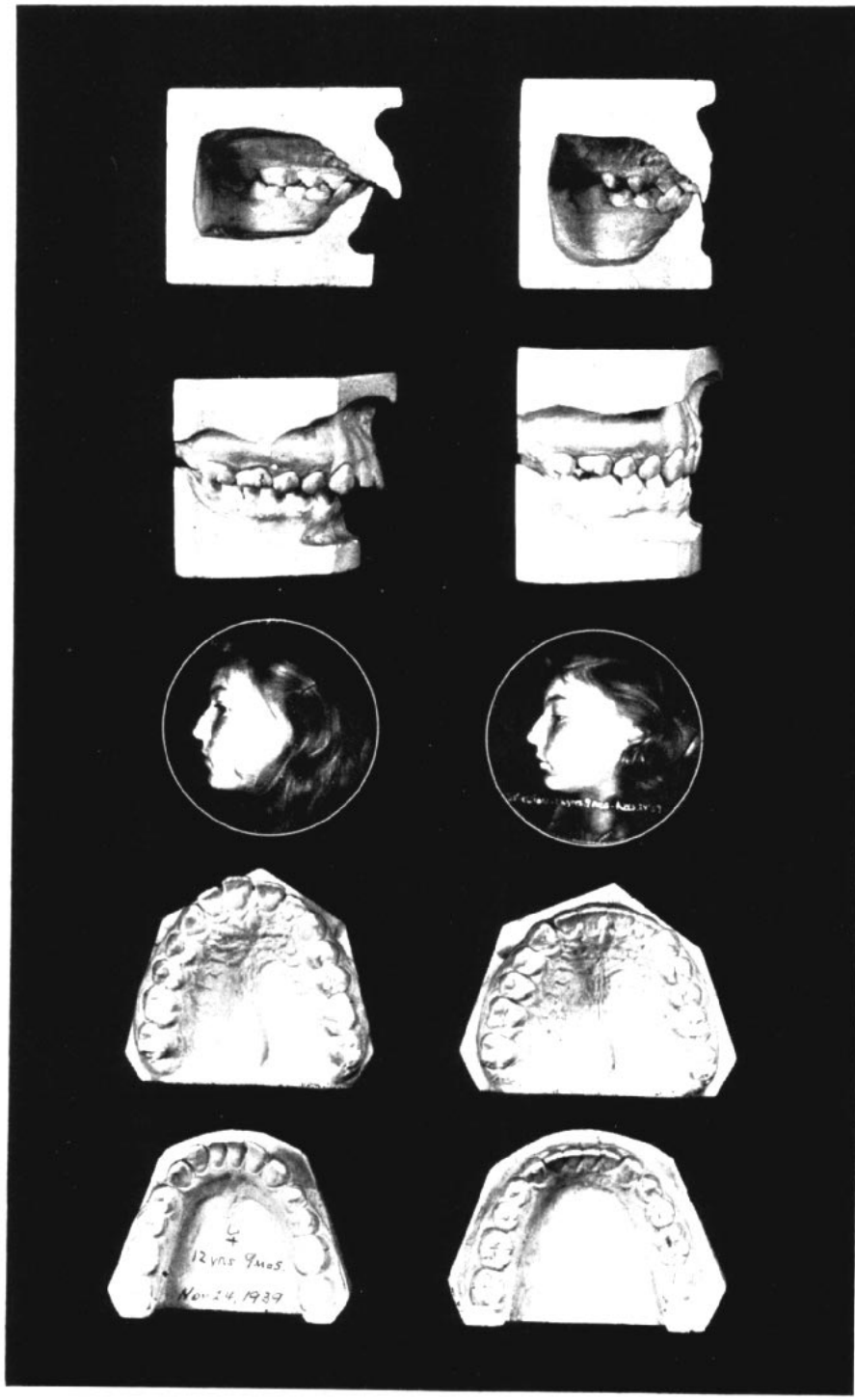

Fig. 1.—Bimaxillary Dental Protrusion Treated Without Extraction.

teeth on base, in keeping with the requirements of the line of occlusion, there is but one alternative—extraction. Critical examination of Lundstrom's reported cases shows that many of them did not retain permanently because orthodontic interference had brought about a condition of bimaxillary protrusion.

Simon, realizing the limitations of mechanical movement of teeth, and guided by his findings on gnathostatics, said that either the bimaxillary protraction should be left untreated or that the four first bicuspids should be extracted and the anterior segments moved posteriorly. He did not believe in the rationale of attempting to move the entire denture posteriorly, because when the third molars erupted they would have a tendency to shift the denture forward again. It would be well for all of us to re-read Simon's work in what Dr. Angle once called "an attitude of friendly hostility."

Tweed, who had been struggling for years to bring about normal occlusion in dentures that were, as he said, "in bimaxillary protrusion," only to fail to produce satisfactory results, either functionally or aesthetically, came to the conclusion that, confronted with a mechanical and physiological impossibility, and with a choice of retaining thirty-two teeth all out of the line of occlusion, thereby wreaking havoc to a face and possibly to a life, or of resorting to the removal of all four first bicuspids and placing the remaining twenty-eight teeth in the line of occlusion, it should not be difficult to decide the proper procedure to follow.

Since Tweed's philosophy or rationale of orthodontic treatment has become known the writer has given serious thought to the problem of bimaxillary protrusion. Though most of us have tended to regard bimaxillary protrusion as a condition in which the teeth of both jaws were too far forward in relation to their bony bases, we have not thought, or rather, have not realized, that, as Simon pointed out, we can have a bimaxillary protrusion in which the alveolar process, as well as the teeth themselves, was involved.

Though the mechanical treatment of all bimaxillary protrusions has for the most part been of one type—that of extracting the four first bicuspids and retracting the teeth of the anterior segments of both arches by pitting them against the teeth of the buccal segments—one must take into consideration also the many factors possibly involved in producing the protrusion.

If the bimaxillary protrusion is the result of improper application of mechanical principles and the teeth have been tipped too far forward on the basal bone, and the basal bone is of normal size, extraction of the first bicuspids is contraindicated. Figure 1 illustrates such a case, one of orthodontically produced bimaxillary protrusion with what seems to be a normal basal bone or area. The case was originally treated by an orthodontist for five years, with the results shown. In the belief that the apices of the roots of the anterior teeth were actually on the base or very near to their normal positions on the base, the orthodox type of treatment was followed in accordance with Tweed's technic. The denture is a stable one, and the facial appearance was certainly much improved.

However, if we have an orthodontically produced bimaxillary protrusion in which the basal bone seems too small to accommodate a full com-

Fig. 2.—Bimaxillary Dental Protusion Treated by Extracting the Four First Bicuspids and Retracting the Anterior Teeth.

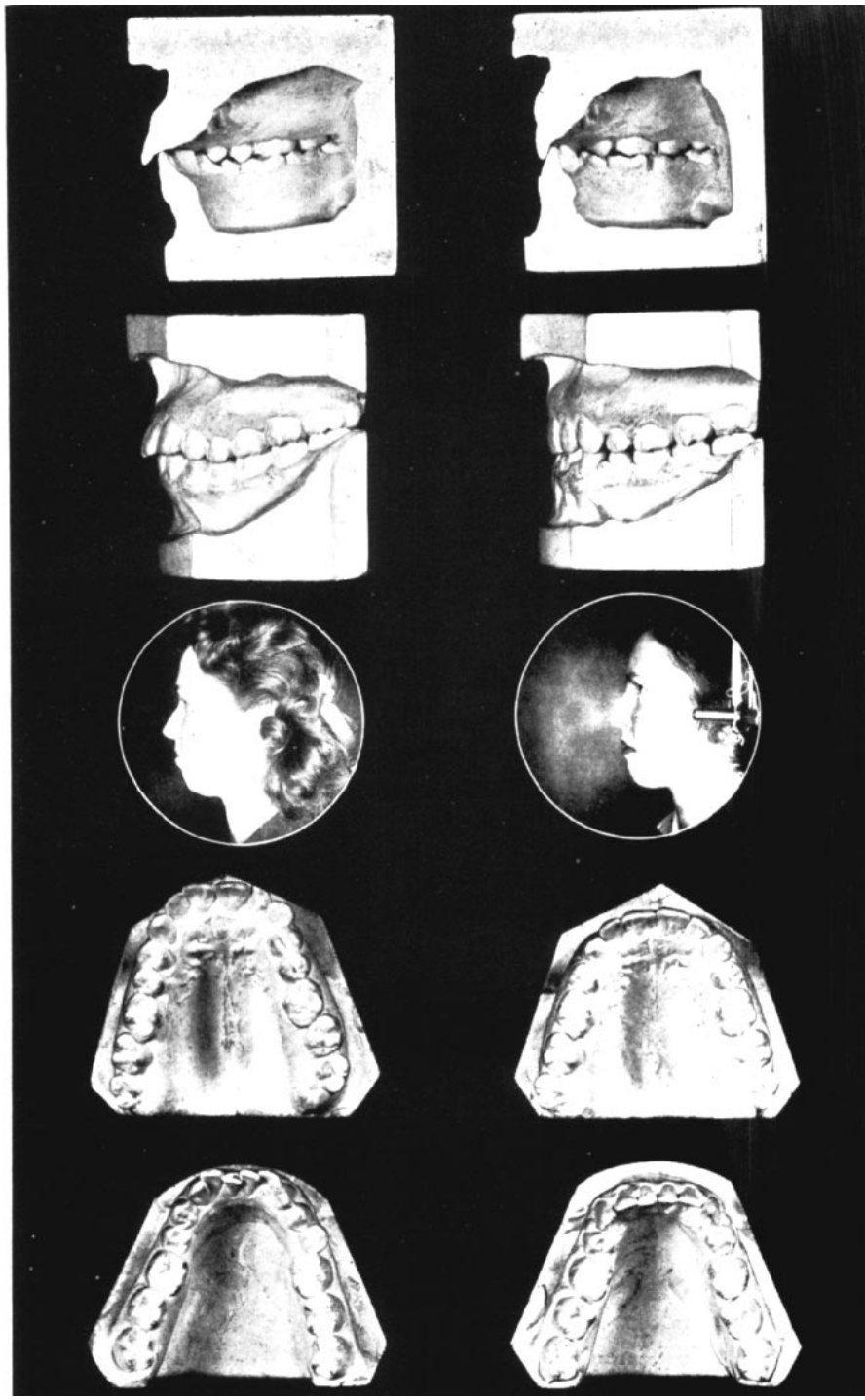

Fig. 3.—Bimaxillary Dental and Alveolar Protrusion Treated by Extracting the Four First Bicuspids.

plement of teeth—in this case there is usually a break in the lower incisor contacts—or the protrusion is of the type described by Simon as a bimaxillary alevolar protraction plus a dental protraction, then extraction of all the first bicuspids seems to be the only remedy. Figure 2 illustrates a case of this type.

There is still another type of bimaxillary protrusion in which, though partial improvement of the facial lines and occlusion may be effected, the results are far from as pleasing to the eye as in the former types. Figure

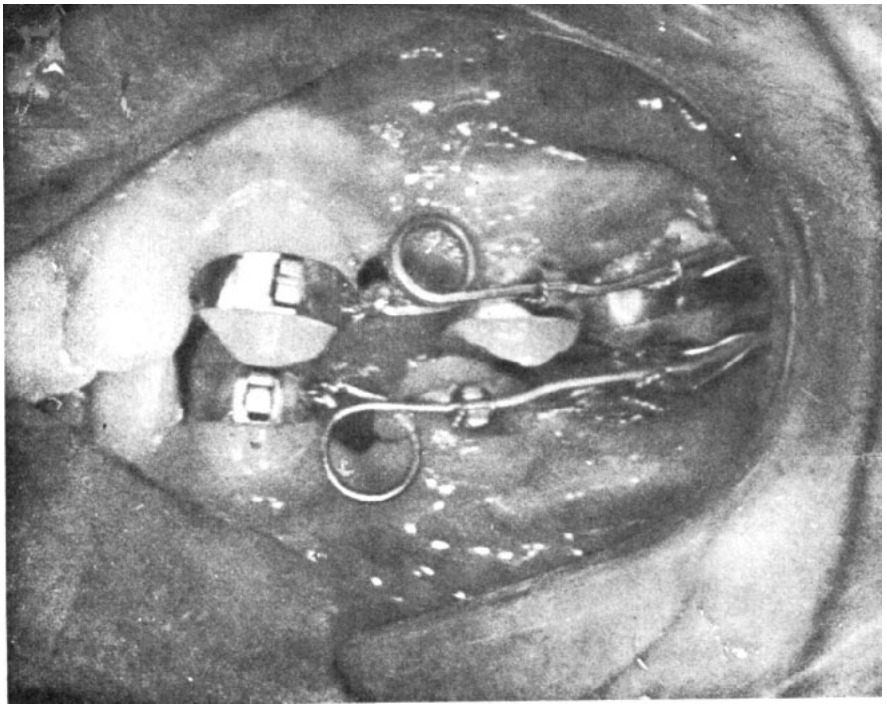

Fig. 4.—The Kesling Loop to move the Cuspids Distally.

3 illustrates such a case. This young woman was twenty-eight years old. She presented because she had difficulty in closing her lips and in pronouncing certain syllables, especially while singing. She complained also of a constant dryness in her mouth and throat, owing to the forced mouth breathing. One can readily see that no matter how many teeth were extracted there were limitations in treatment and that only a comparative improvement could be realized. Four first bicuspids were extracted and the anterior segments were moved posteriorly, with the result shown. The symptoms she described have all disappeared.

Time does not permit a detailed description of the treatment of bimaxillary protrusions in which bicuspids have been extracted. Moreover, many of these details are to be found in Tweed's paper. However, a few of the newer developments should be mentioned.

The importance of retracting the teeth of the anterior segments in such

a way as to eliminate the anterior movement of the buccal segments as far as possible and to close the space in order to prevent a V-shaped space between the cuspid and second bicuspid cannot be overemphasized. In such cases the cuspid teeth are first moved distally to some degree without disturbing the incisor teeth. This movement is accomplished by utilizing the teeth of the buccal segment as anchorage and starting movement of the cuspid tooth to break down resistance of this tooth to distal movement. It can best be accomplished with the loop introduced by Kesling (Figure 4). If the cuspid teeth are not lying or tipped too far forward, they should be moved approximately two thirds the distance by attaching the loop to the distal staple of the cuspid band, in order to eliminate the possibility of rotation. If the cuspid is leaning forward at a very abrupt angle it is well to move it distally with this loop approximately three quarters of the distance of the space before placing a complete arch. When this movement is accomplished a complete arch with two Kesling loops is incorporated to complete most of the rest of the distal movement required. The final closing of the space and the uprighting of the roots is accomplished with the edgewise arch without loops, utilizing the cinching principle.

One word of caution: If the apices of the roots of the anterior teeth are, or seem to be, in normal basal position, the incisal segment of the original complete arch should be rounded off. Otherwise there is danger of torquing the roots forward and displacing the teeth bodily off the basal bone. Once the spaces are properly closed, the regular rectangular arches are utilized to prepare anchorage, accomplish any *en masse* movement required, and attain artistic positioning of the teeth in accordance with the individual facial type.

In conclusion, it would seem to me that we should review all the evidence on the diagnosis and treatment of bimaxillary protrusion in the light of what past and present writers have presented on the subject, to the end that we and our patients may benefit from a greater unity of thought and action.

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