Facial esthetics in relation to orthodontic treatment

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Most patients seek the orthodontist for two reasons, namely, the presence of facial disharmony, or facial deformity and malalignment of the teeth, or both. More frequently, facial disharmony is the factor.

The point of view taken in this paper will be that of the clinician. His means of appraising the face will be oriented photographs, both profile and front views; taken according to Simon's[1] gnatho-photostatic procedures. In addition, the Frankfort-mandibular angle of Tweed[2] will be used, not only in evaluating the face, but also to indicate the extent of and possibilities for improvement of facial esthetics. Another of the devices used will be the incisal mandibular plane angle as described by Margolis[3] in explaining the minus 5, zero, and plus 5 as outlined by Tweed[4] in his presentations concerning the relationship of the lower incisor teeth to base in so-called normal or ideal occlusions.

The oriented profile photographs may be augmented by oriented lateral head X-rays showing soft tissue outlines. The Frankfort-mandibular plane angle is measured by the Frankfort-mandibular angulator, devised by the author[5] and may also be measured on cephalometric films (Fig. 2). To a useful degree, the incisal mandibular plane angle may be demonstrated on sectional models as shown by Samuel J. Lewis[7] or measured rather accurately, directly on the cephalometric films (Fig. 1).

Since this paper is concerned with facial esthetics in relation to orthodontic treatment, it would neither be wise nor desirable to pass over treatment too lightly, yet space will not allow for a consideration of mechanical therapy. Rather, we will concern ourselves with some of the goals desired in treatment and how the attainment of those aims directly affect the face favorably. On

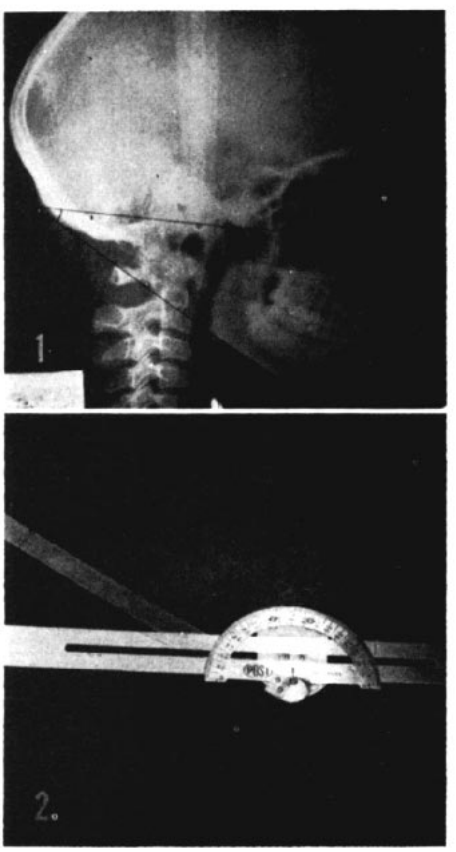

Fig. 1. Cephalometric x-ray showing Frankfort mandibular plane angle and incisal mandibular plane angle.

Fig. 2. Frankfort - mandibular angulator devised by author with protractor added by Dr. M. Savitz.[6]

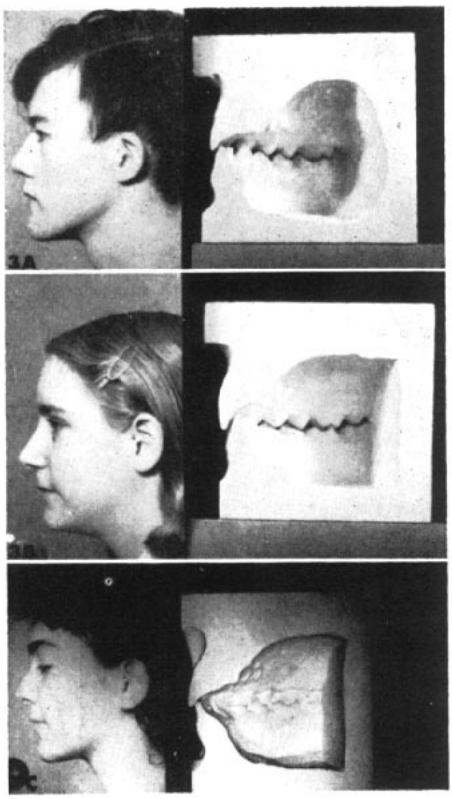

Fig. 3A. Representing -5
Fig. 3B. Representing 0
Fig. 3C. Representing +5

the other hand, we will attempt to show that other procedures may affect these aims adversely and may actually create disharmony or facial imbalance. We must, therefore, consider the fundamental basis for our treatment and show that, if these fundamentals are not followed, lack of improvement or even undesirable results may occur in facial esthetics.

Because the point of view taken is that of the clinician, we will describe the face as *in balance* when it is pleasing in appearance. It must be noted that this is the author's definition and requires elaboration and description. In such a face, the chin does not protrude or recede; the lips, either upper or lower, are not in protrusion nor obviously thick; the mental depression is not deep with a rolling forward lower lip and there is no tension in the triangularis muscle region. We have intentionally included only the lower third of the face (for in orthodontics, we affect only that region) and delegate to the facial plastic surgeon and to the ophthalomologist the fields that are theirs.

The writer realizes that we, as orthodontists, should not attempt to make all of our patients look alike, even if that could be done. We may dismiss the idea as unattainable. He also recognizes that the facial balance or facial harmony, in an esthetic sense, is a matter of individual opinion and appreciation. He feels, however, that if several hundred oriented photographs of individuals were critically examined by an orthodontic group, there would be an unanimity of opinion as to which were good or bad and, on those in between, there would be some differences in appraisal. Reference is here made to the work of Dr. Richard A. Riedel[8] tending to bear out this contention. The writer would go further and say that a group of intelligent laymen would have comparable opinions.

Probably the best means for developing the ability to appraise faces is to look at them critically and repeatedly. Oriented photographs would probably be the best means, for with them, not only may measurements and proportions be examined but this may be done at leisure.

We, therefore, present, at this time, a group of oriented photographs showing well balanced faces as described by Tweed as having minus 5, zero, and plus 5 positions of the lower incisors to base. We should define base, at this time, as being that portion of the mandible exclusive of the alveolar process. On these pictures (Figs. 3 A, B and C) we can point to some very definite relationships. The chin is forward and

Fig. 4A. Frankfort-mandibular plane angle, favorable 22°.
Fig. 4B. Frankfort-mandibular plane angle, unfavorable 47°.

in a line with subnasion in the vertical plane or with the junction of the upper lip and the lower midline portion of the nose. The lips, both upper and lower, are also on this line and the lips are protruded as the inclination of the lower incisors increases.

Having shown the well-balanced, harmonious or more ideal faces, we should now present the variations from, let us say, these harmonious types. They range from slight deviations to gross deformities and are influenced by:

(1) the degree of labial inclination of the lower incisors
(2) the size of the Frankfort-mandibular plane angle (the deformity increases as the angle increases, except in some large bodied mandibles)
(3) a combination of labially inclined incisors and large Frankfort mandibular plane angle.

If the inclination of the lower anterior teeth becomes marked definite areas of tension appear in the triangularis muscle region. This applies to either Class I or Class II cases; more frequently in the latter when lip closure is forced.

Wherever records were made, the Frankfort-mandibular plane angle is given with the illustrations used.

In malocclusions with a favorable Frankfort-mandibular plane angle up to 30° (as measured by the Frankfort-mandibular plane angulator), excellent facial changes may be expected and attained. In those from 30° - 35°, good facial changes may be attained and over 35°, from fair to no favorable changes may be expected and attained. The greater the Frankfort-mandibular plane angle, theoretically, the farther lingually must the lower incisors be inclined in treatment to improve the facial esthetics and all orthodontists should realize the limitations in this procedure.

At this point, we wish to present results of a case treated without regard to the inclination of the lower incisors. (Figs. 5 and 6).

In the writer's practice, similar results are multiplied many times but this was before a definite effort was made to upright lower incisors to base. Usually in this earlier treatment, the lower incisors were tipped labially and the buccal teeth were tipped laterally. At the end of treatment, frequently the lips were protrusive; the chin point appeared to be retruded, but this could be an optical illusion. If the lips had to be closed with effort, there was tension in the triangularis region. If the lips were parted, a prominent toothy denture presented itself.

More recently, treating according to the teachings of Tweed[9] or bending every effort toward uprighting the lower incisor teeth, even if that necessitated the removal of tooth units, the writer concluded, from the observation of clinical material, that better facial, esthetic results may be attained, and offers evidence to support this contention. (Note Figs. 7, 8, 9, 10 and 11.)

The writer has noted that, in the treatment of extraction cases, further improvement in facial esthetics frequently continues after all appliances have been removed and the facial soft tissues are allowed to adapt themselves to the new positions of the teeth. This may be evidence of further growth but, at the moment, we have no proof thereof. At times, however, the changes take place so quickly that it does not seem reasonable to attribute them to growth.

In those cases with crowded tooth arches, but with lower incisors well related to base, we may expect the faces to be well-balanced. This applies to locked-out cuspid cases, as well. Treatment procedures in these categories must be aimed at retaining the

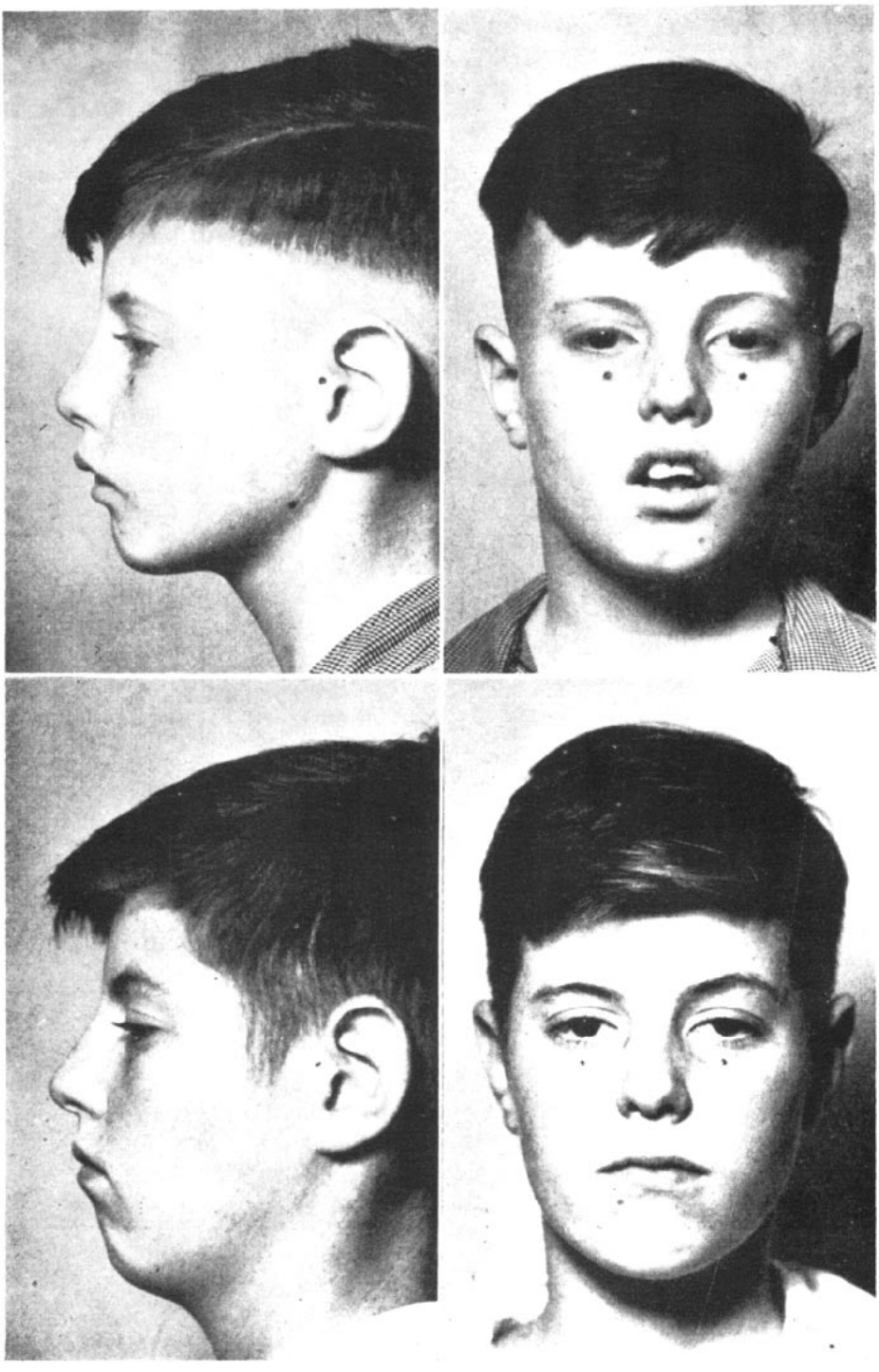

Fig. 5. Class I case. Protrusion, not reduced. Above: Before treatment. Below: After treatment.

Fig. 6. Class II case. Protrusion, not reduced, 34°. Above: Before treatment. Below: After treatment.

Fig. 7A, Class I extraction case, 26°, Above: Before treatment. Below: After treatment.

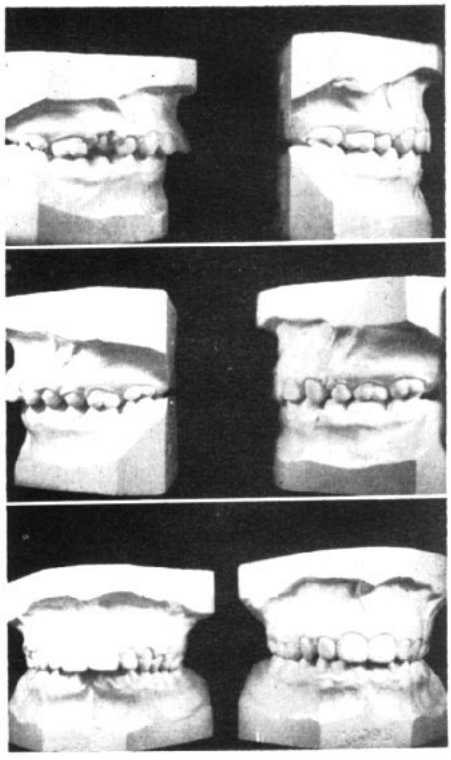

Fig. 7B. Above: Right lateral, Center: Left lateral, Below: Front.

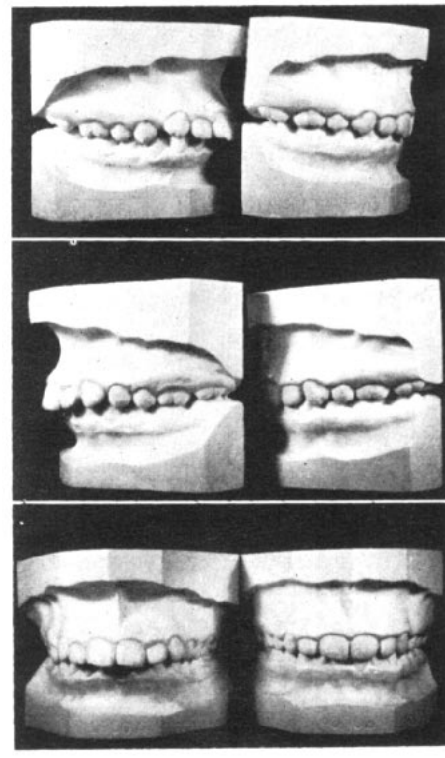

Fig. 8B. Above: Right lateral, Center: Left lateral, Below: Front.

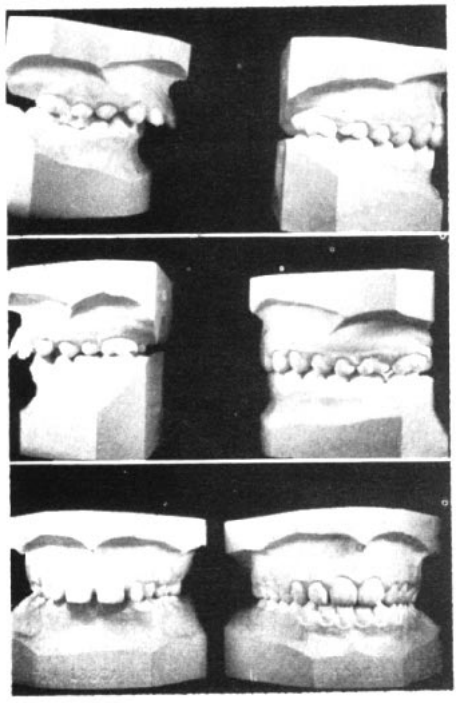

Fig. 9B. Above: Right lateral, Center: Left lateral, Below: Front.

desirable lower incisor positions as well as maintaining the buccal teeth over base. Failure to do so, but rather to expand either labially or laterally, or both, to make room for locked-out teeth frequently results in protrusion of the lips and poor facial esthetics.

It must be apparent that the removal of tooth units must be reckoned with in all crowded, as well as all protrusive dentures unless adequate spacings are present to allow for the uprighting of lower incisors and the placing of all other teeth into the line of occlusion without expansion.

This case (Fig. 12A) shows little or no facial change. That, of course, is our aim.

A group of photographs of cases prior to and following treatment are shown to present the results that may be attained in treatment predicated upon

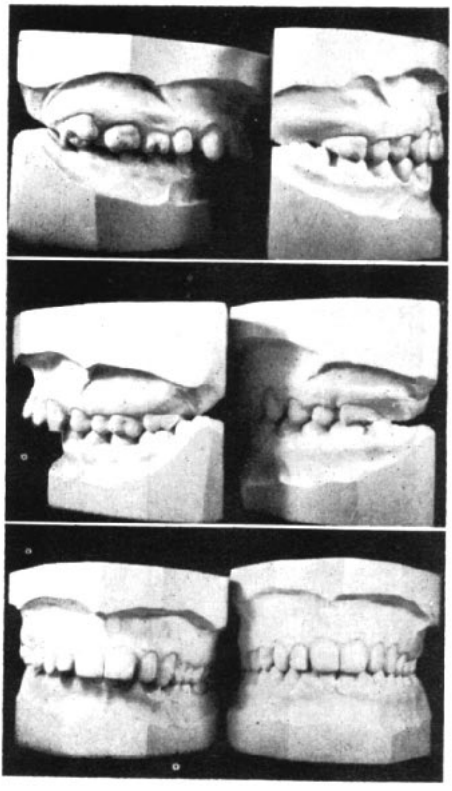

Fig. 10B. Above: Right lateral, Center: Left lateral, Below: Front.

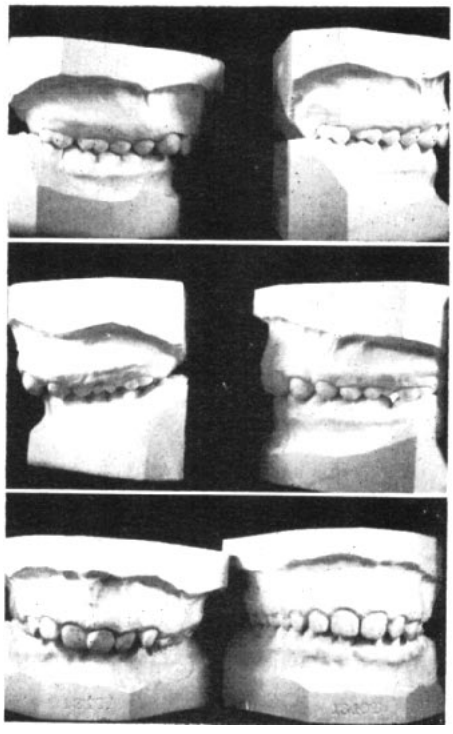

Fig. 11B. Above: Right lateral, Center: Left lateral, Below: Front.

the thesis of positioning lower incisors relatively upright to base. Attention must be called to the limitations of treatment as it affects facial balance favorably. Cases with large Frankfort-mandibular plane angles are usually not good subjects for obtaining good facial changes. Those cases with large incisal mandibular plane angles in which even the removal of four teeth does not give adequate room for all the teeth, may be improved facially but not as much as more favorable cases with less crowding. Development and maintenance of mandibular anchorage in treatment frequently become very important if facial harmony is to be enhanced.

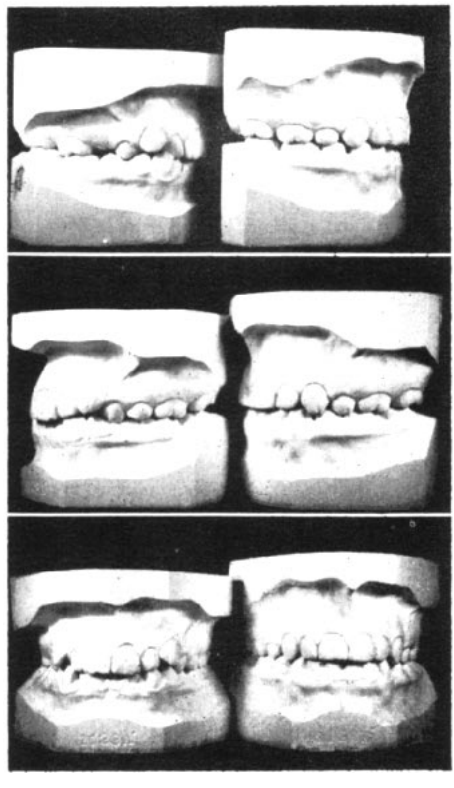

Fig. 12B. Above: Right lateral, Center: Left lateral, Below: Front.

An effort has been made to show definite landmarks or features to be examined in faces so that treatment may be planned accordingly with the thought in mind of not distorting favorable facial esthetics and of improving poorly balanced faces.

Not only may the orthodontist align teeth, but he can and does frequently improve the functional values of the denture, the health of the teeth and soft tissues and creates harmony of facial features where disharmony and imbalance previously existed. The role of the orthodontist is not that of a tooth straightener, but rather that of the dento-facial orthopedist.

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Fig. 8A. Double protrusion extraction case, 29°. Above: Before treatment. Below: After treatment.

Fig. 9A. Class II, Division 1, non-extraction case, 20°. Above: Before treatment, Below: After treatment.

Fig. 10A. Class II, Division 1, extraction case, 24°. Above: Before treatment, Below: After treatment.

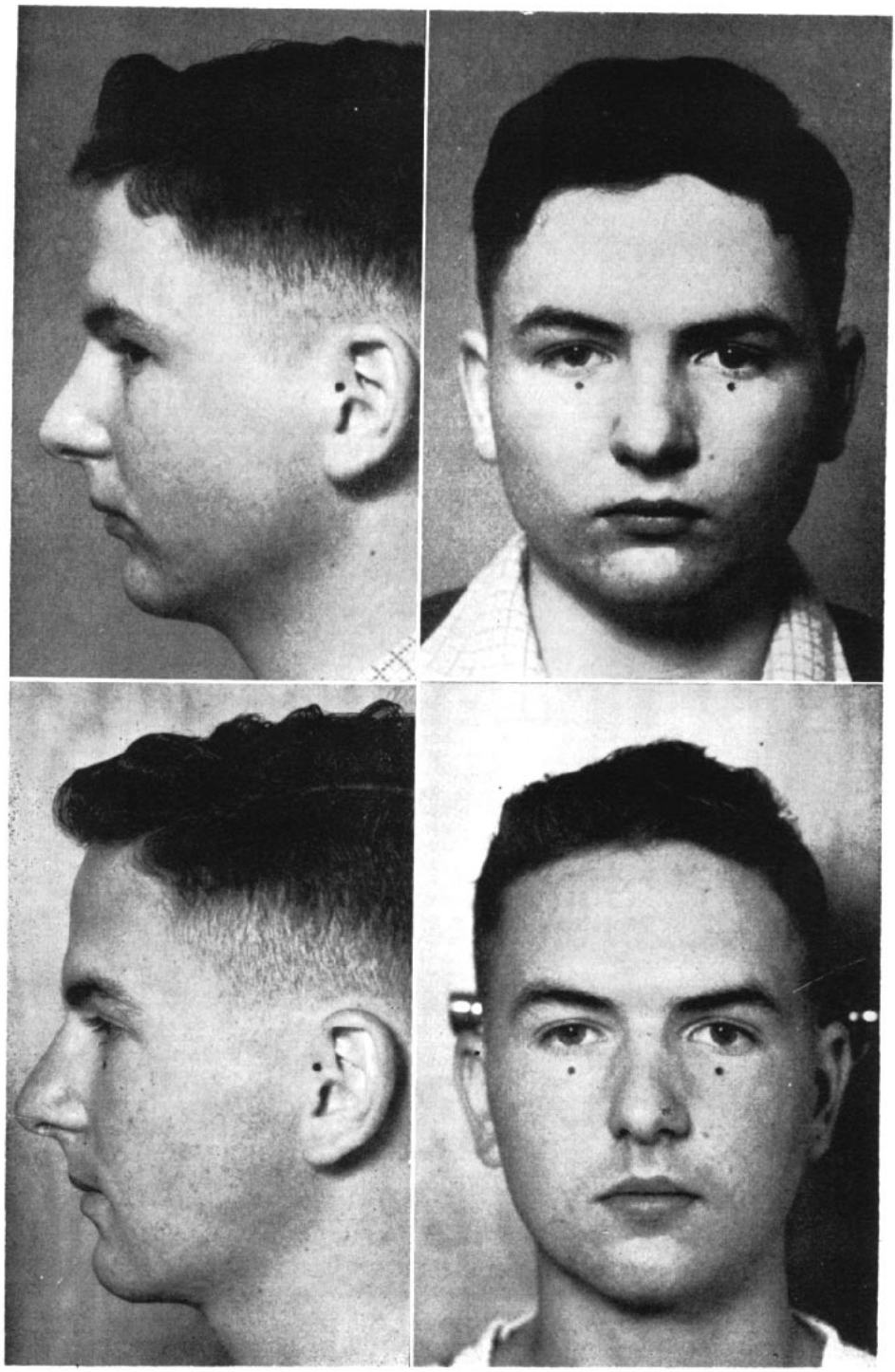

Fig. 11A. Class II, Division 2, non-extraction case, 27°. Above: Before treatment, Below: After treatment.

Fig. 12A. Class I case, crowded, extraction case, 29°. Above: Before treatment, Below: After treatment.

Fig. 13. Class II, Division 1, treated without extractions, 23°. Above: Before treatment, Below: After treatment.

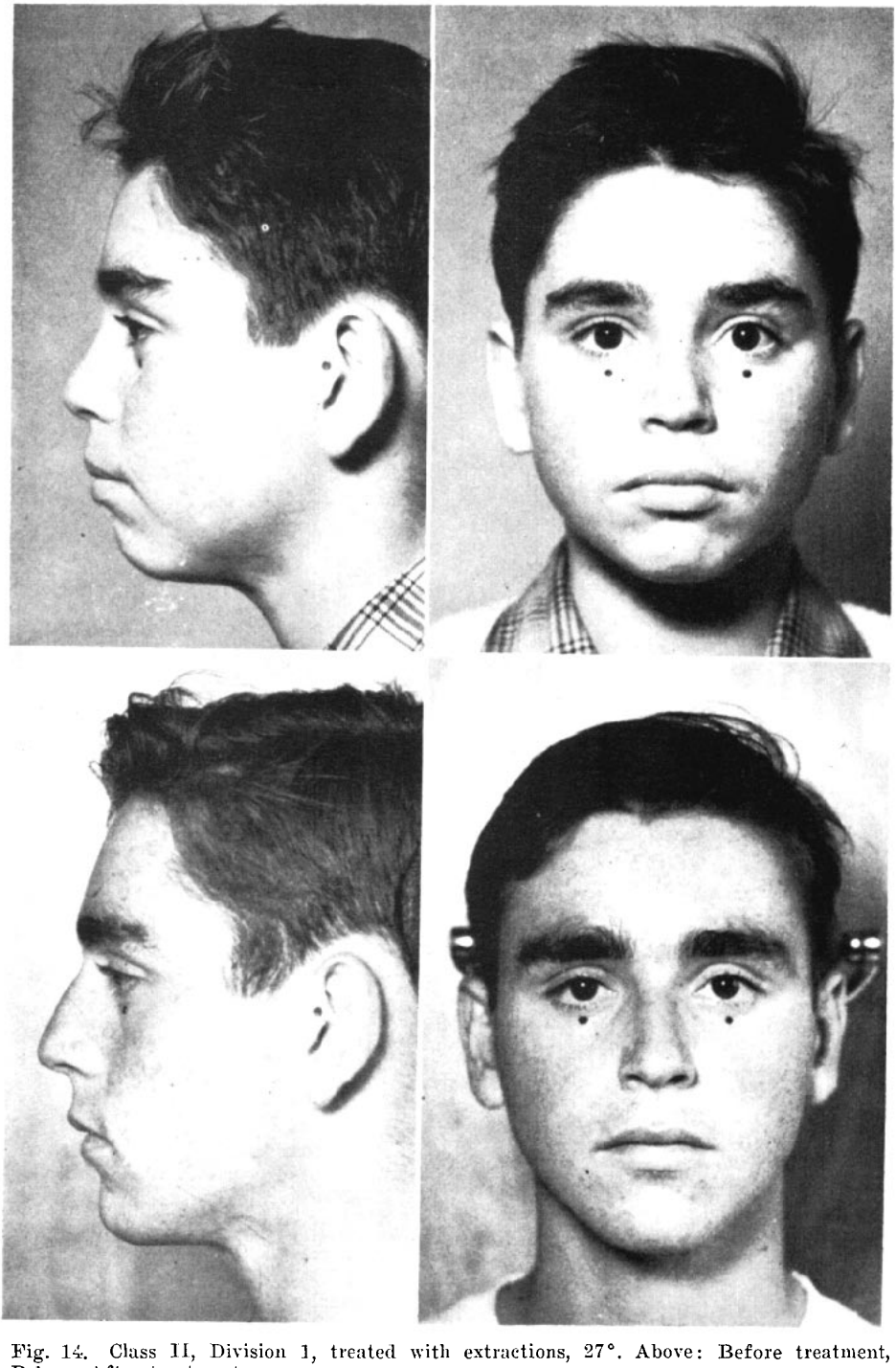

Fig. 14. Class II, Division 1, treated with extractions, 27°. Above: Before treatment, Below: After treatment.

Fig 15. Class II, Division 1, subdivision, treated with extractions, 28°. Above: Before treatment, Below: After treatment.

Fig. 16. Class I, crowded, treated with extractions and showing a well-balanced face, both at the beginning and end of treatment, 28°. Above: Before treatment, Below: After treatment.

Fig. 17. Class I, treated with extractions. Above; Before treatment, Below: After treatment.