The Class II Syndrome: Differential Diagnosis and Treatment

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In previous publications a new classification of facial types was presented.[1, 2] Two basic anteroposterior facial types were defined, Class II and Class III, and two basic vertical types, open bite and deep bite. From these four basic types were derived four additional combination types: these have been defined as Class III deep bite, Class III open bite, Class II deep bite and Class II open bite (Fig. 1).

The classification is based on the archial analysis which permits the evaluation of the anteroposterior position of the maxilla (ANS) and the mandible (Pog). The vertical balance is further described by two proportions

$$\frac{\text{ANS-Me}}{\text{Sor-ANS}} \text{ and } \frac{\text{S-Go}}{\text{Sor-Me}} \text{ (Fig. 2).}$$

DIFFERENTIAL DIAGNOSIS

Skeletal Variations in Skeletal Class II Syndrome

The diagnosis of maxillary protrusion as opposed to mandibular retrusion is derived from the archial analysis. The vertical assessment determines if the case is open bite or deep bite (Fig. 3). Then the combination of vertical and anteroposterior variations establishes four types: a) two types of Class II deep bites, one with mandibular retrusion and one with maxillary protrusion, b) two types of Class II open bite, one with mandibular retrusion and one with maxillary protrusion.

Growth Potential

As most skeletal changes that can be

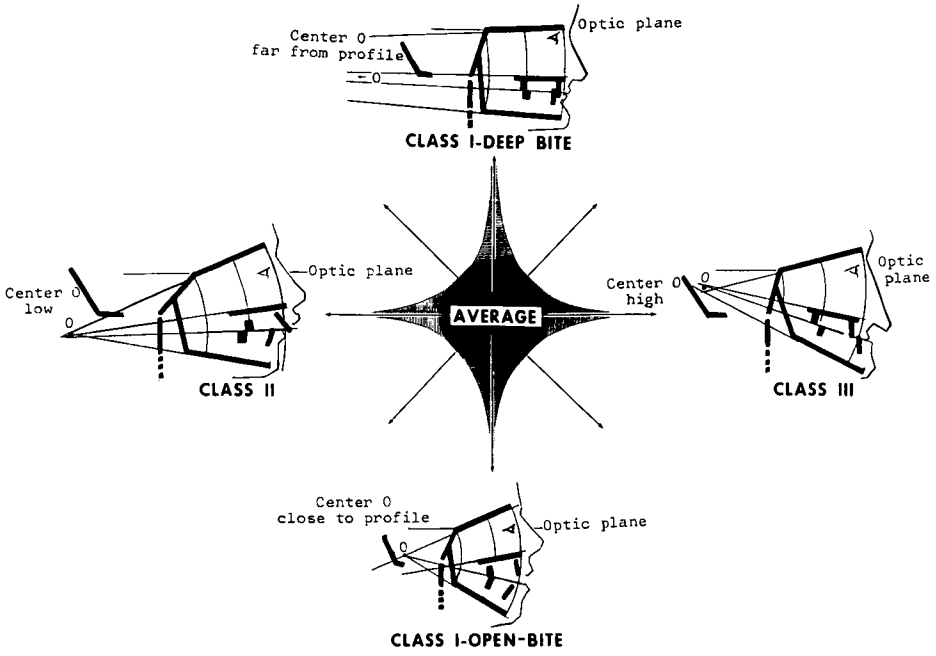


Fig. 1 Classification of facial types.

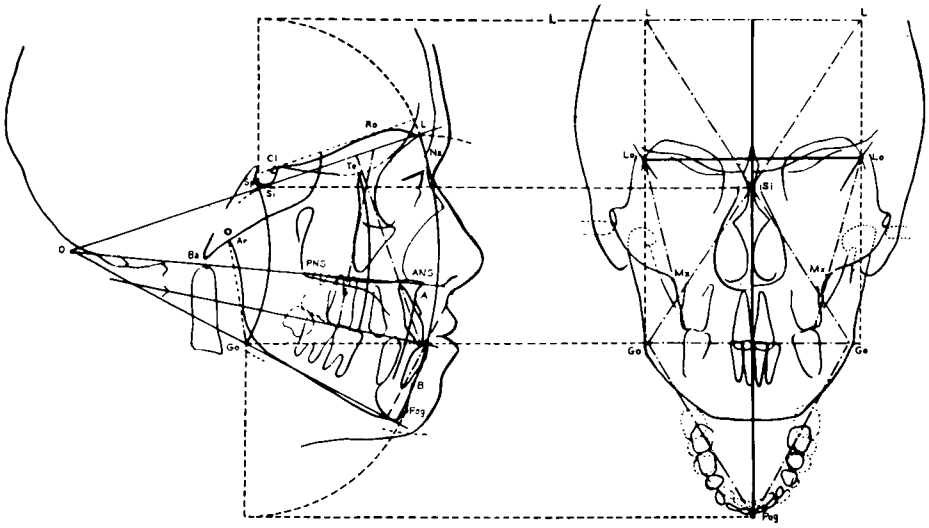


Fig. 2 Archial analysis.

obtained by orthopedic means depend on growth, the question is: What is the potential of growth of the patient? The answer to this question is derived from the skeletal age of the patient, the stature of the child and his parents, and the hereditary comparison of facial bones between child and parents. From these not only the potential growth, but also its timing and amount are estimated. Treatment is influenced by our evaluation that there is growth to be expected or that we are dealing with an "adult" (no growth).

Characteristics of Dental Malocclusion

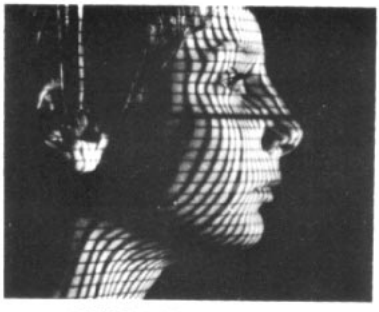
In order to reduce the number of categories let us first assume that in a Class II skeletal deviation it is unlikely to find a Class III dental malocclusion. There are two possible anteroposterior variations, Class I or Class II malocclusions. There are two classes of vertical malocclusions: open bite and deep bite and two classes transversally: crossbite or normal. Finally, within the dental arch two major situations may be present: crowding or spacing. These different characteristics influence the treatment objectives and the selection of the methods utilized for their correction. It is apparent from the previous description that there are 64 different situations in Class II deep bite and the same number in the Class II open bite, a total of 128 situations.

To make this clear we shall take two Class II cases: one is a skeletal open bite, the other a skeletal deep bite.

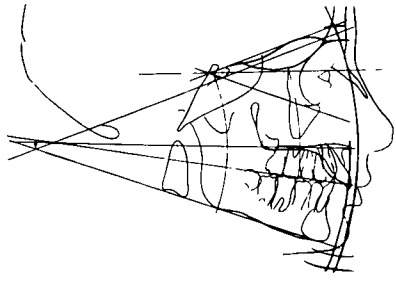
Differential Treatment Planning

The two cases that are presented here have Class II malocclusions. In both, the Class II is more apparent at the canine than the molar area. One is a Class II deep bite, the other a Class II open bite, dental and skeletal. In spite of the presence of Class II, the objectives of treatment in these two cases are diametrically opposed when the face and the teeth are taken into consideration.

The first case, a Class II open bite is that of a boy 12.6 years old (Fig. 4). A Class II malocclusion is present with a moderate degree of crowding and bidental protrusion. The intraoral examination shows an open bite with only



CLASS II-DEEP BITE



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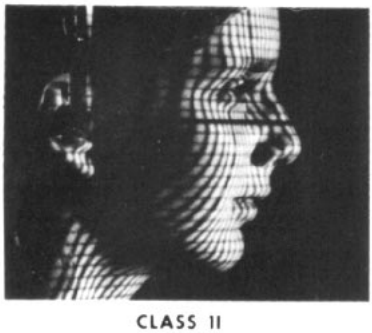

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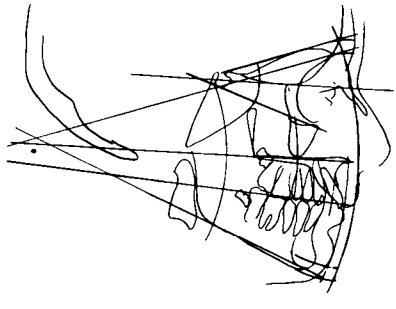

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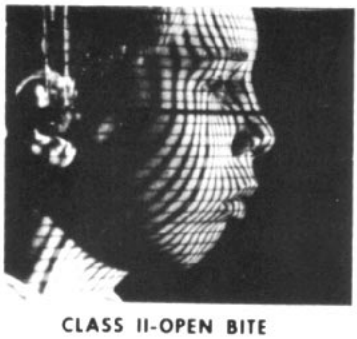
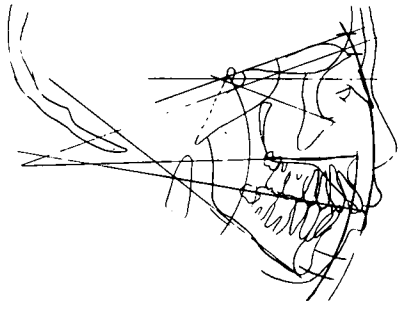


CLASS II-OPEN BITE



CLASS II-OPEN BITE

Fig. 3 Classification of Class II types.

the first and second molars in contact. The face is narrow and long as seen from the lateral and frontal photographs. The cephalometric film indicates a short ramus, an antegonial notch, a steep mandibular plane, and a large lower anterior face height. The skeletal age evaluation and hereditary analysis indicated an important growth potential.

The objectives of treatment dentally were to reduce the crowding, reduce the protrusion, correct the Class II malocclusion and mainly reduce the open bite. Skeletally, the major objectives were to reduce the lower anterior face height and guide the growth of the mandible forward rather than downward.

Because of the crowding, four bicuspids needed to be extracted. To further reduce the open bite, the maxillary first and mandibular second molars were extracted. The maxillary second molars were depressed with a vertical headcap, supported by a chincap to rotate the mandible in a closing direction. All the spaces were closed by intramaxillary forces; no Class II or Class III elastics were used in order to avoid bite opening.

The results of treatment are shown in Figure 5. During the two years of treatment the child grew six inches in height (15 centimeters), close to our prediction of his growth. In spite of this, no increase is seen in the lower facial height. One can say, therefore, that as the upper face grew vertically but not the lower face, that the vertical proportions were improved. The selective extraction of the teeth permitted an immediate closure of the open bite. The result would have been much better had the child been seen at nine or ten years of age when in mixed dentition with a greater potential of growth.

The second case, a Class II deep bite is that of a boy 12.4 years old (Fig. 6). A Class II, deep-bite malocclusion is present with no crowding in the dental arches. The skeletal pattern is that of a Class I deep bite. The objectives of treatment were to increase the lower facial height, open the bite vertically, bring the mandible forward and correct the Class II malocclusion. The skeletal age evaluation and hereditary analysis indicated an important growth potential.

All these objectives were accomplished by the use of an activator. No extractions should be done because they would deepen the bite and require the total retraction of maxillary teeth. What further led to this decision was the fact that there was little crowding.

After one and a half years of treatment the mandible has been brought forward with the mandibular dental arch while the maxilla has been held back. The bite has been opened and the lower face increased in height. The Class II deep-bite malocclusion has been corrected and the facial balance improved.

Discussion

One should notice that both patients had Class II malocclusions. However, what prompted such divergent treatment plans was primarily the vertical unbalance which lead to differential objectives of treatment. In the first case we wanted to *reduce* the lower face height and in the second case we wanted to *increase* the lower face height. Both of these objectives were accomplished by absolutely opposite methods of treatment.

It has to be stressed that had we utilized the activator in the first case, we would have made the open bite worse by increasing the lower face height. In the second case, also a Class II, had we utilized vertical headcap and and chincap we would have increased

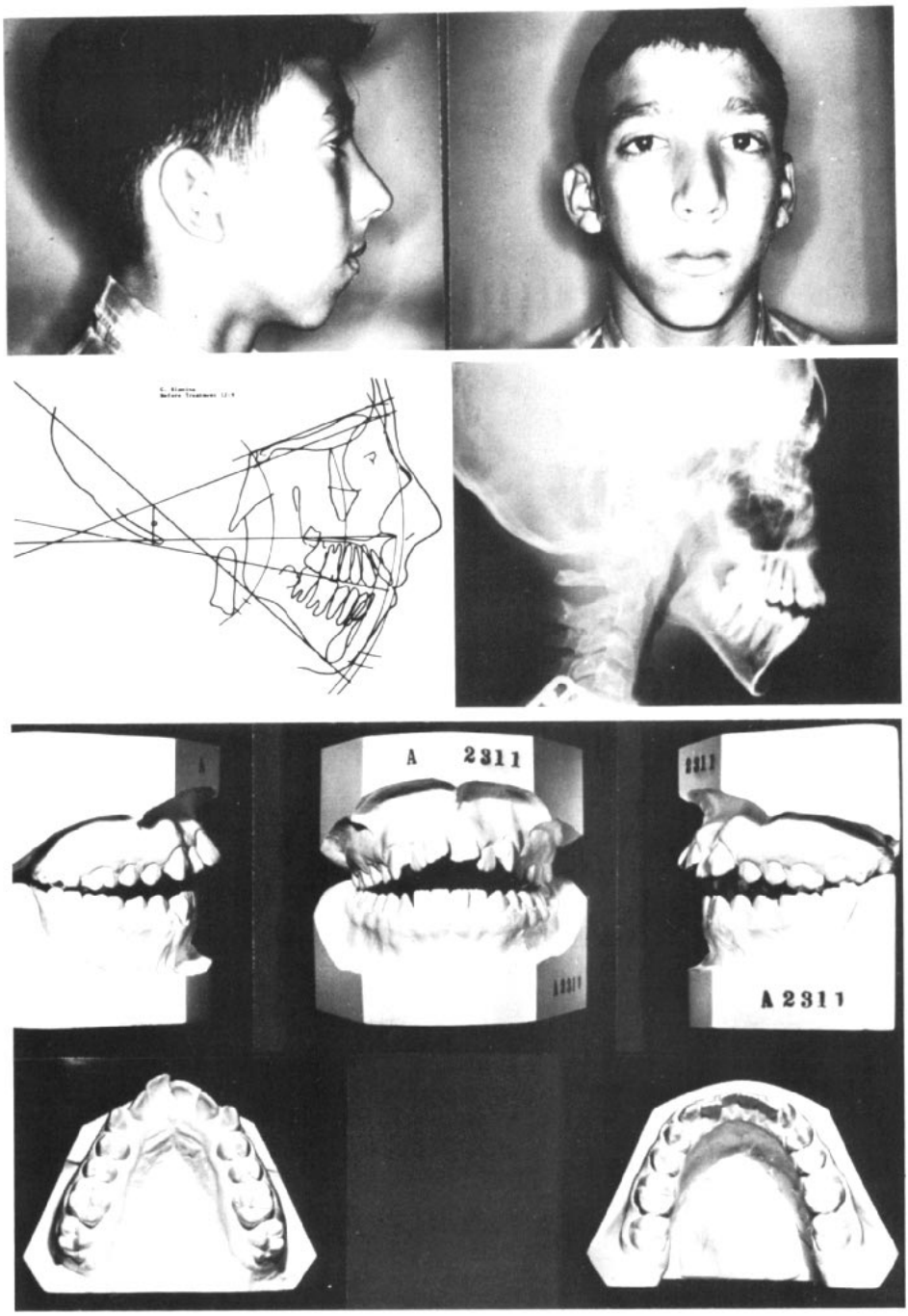


Fig. 4 C. S. Class II open bite, before treatment composite.

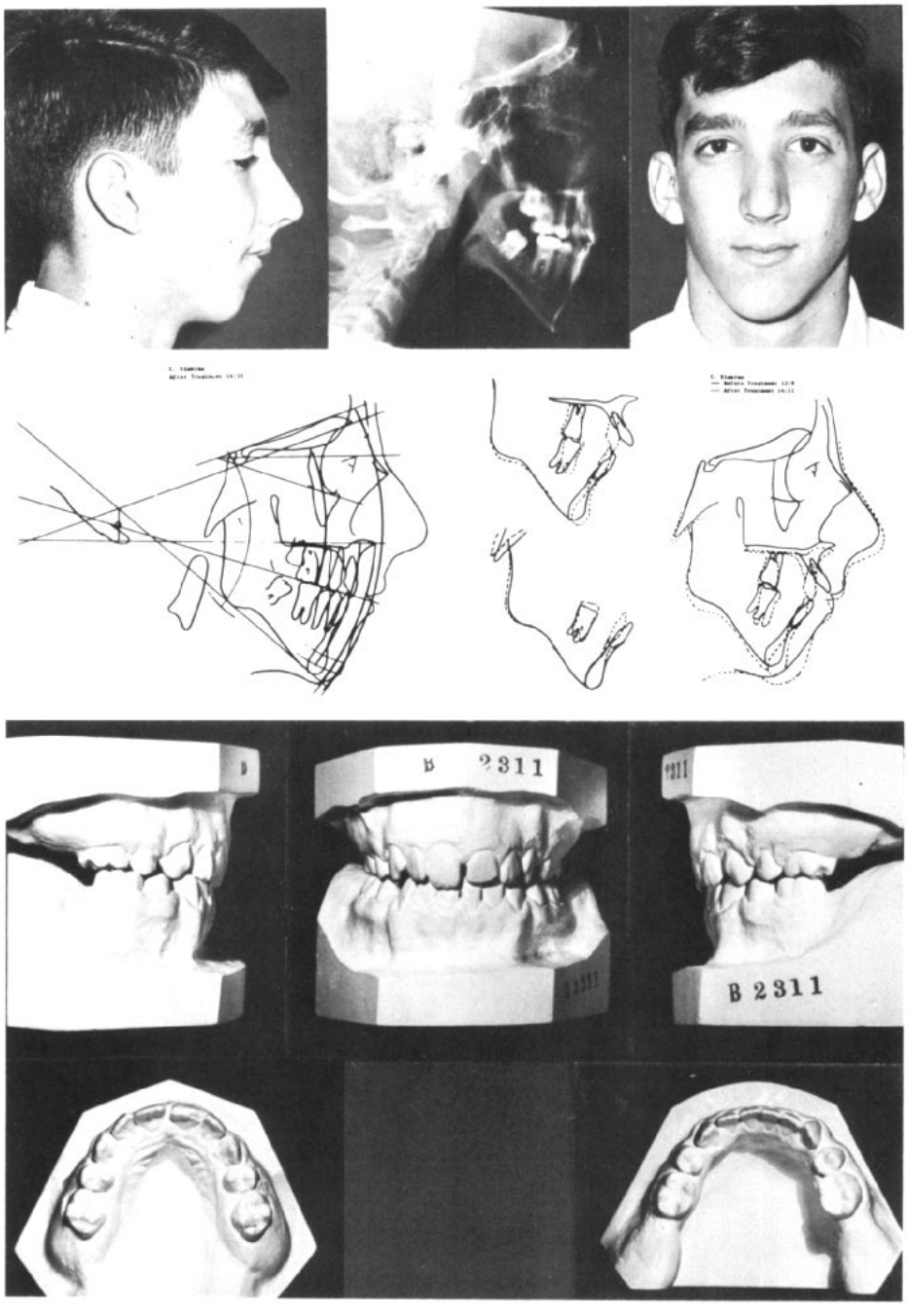


Fig. 5 C. S. Class II open bite, after treatment composite.

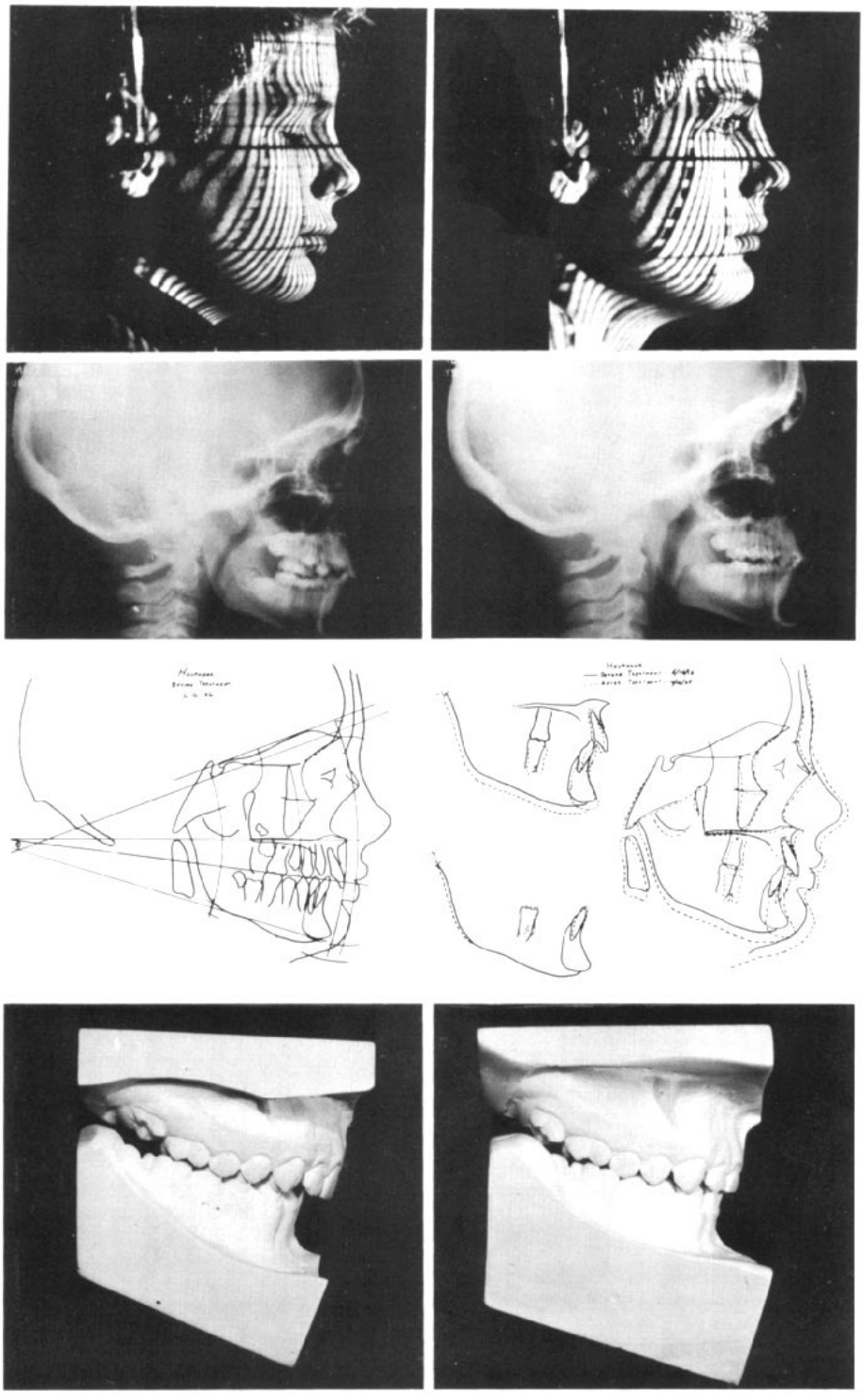


Fig. 6 M. H. Class II deep bite, before and after treatment.

the deep bite already present and would have reduced an already small lower face height.

Summary and Conclusions

Class II problems can be subdivided into 128 dentofacial Class II situations which logically call for 128 different treatment plans. Thus it becomes evident that describing Class II treatment in general terms is such an oversimplification as to be dangerous. In order to illustrate this classification of facial types, two cases were presented. It was stressed that it is critical to make a differential diagnosis of each of our cases. The differential treatment plan derived should permit us to reach the objectives in terms of dental correction and facial improvement.

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Bibliography

1. Sassouni, V., *The Face in Five Dimensions*, University of Pennsylvania, Growth Center publication, 317 p., Philadelphia, 1960.
2. ————, A Classification of Skeletal Facial Types, *Am. J. Ortho.* 55(2): 109-123, 1969.
3. ————, *Dento-facial orthopedics*, University of Pittsburgh printing, In press, Pittsburgh.
4. ————, Diagnosis and treatment planning via roentgenographic cephalometry, *Am. J. Ortho.* 44(6):433-463, 1958.