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A magazine established by the co-workers of Edward H. Angle, in his memory. . . . .

A Clinical Study of Cases of Malocclusion in Class II, Division 2*

Offered by the Eastern Component Group of the Edward H. Angle Society of Orthodontia

In reviewing the literature in an effort to find data concerning this type of malocclusion one is struck by the relatively small amount available. Dr. Angle's description of Class II, Division 2 malocclusion, as taken from the Seventh Edition of his Malocclusion of the Teeth, is as follows:

"In cases belonging to this division there is much similarity, although more variation than in the first division of this Class. The width of the arches is more nearly normal and there is less abnormal elevation of the lower incisors, probably on account of their better opportunity for performing their function. There is usually an abnormal overbite of the upper incisors, naturally resulting from their being tipped downward and inward from their normal outward incline, with the teeth of the lower arch quite even and regular as to arrangement.

"In the harmonizing of the anterior part of the upper arch with that of the lower, through lip pressure, the malarrangement of the incisors varies considerably, which, not infrequently, however, assumes one of two different and more or less constant types, as well illustrated in Figs. 27 and 35. (Malocclusion of the Teeth, 7th Edition, Angle.)

"The upper arch, unlike that in cases in Division 1, which is abnormally long and narrow, is shortened, with incisors bunched and overlapping, to approximately harmonize in size with the anterior part of the lower arch.

*Read before the Ninth Annual Meeting of the Edward H. Angle Society of Orthodontia, Chicago, Illinois, October 20th, 1933.

"The result of distal occlusion and recession of the jaw and chin, greatly mars the facial lines.

"Although these cases are often apparently more complicated than those of the first division, in reality, when we consider all of the various conditions, they are seen to be less so and more easily treated, for being free from pathological conditions of the nose, and with normal function of the lips, they are under our better control. Although the teeth in many instances are found to be greatly crowded, and all of them in malposition, yet with the plan of treatment now at our command, we can so perfectly control the distribution of force for their movement, both individually and collectively, as to make the operation of establishing normal occlusion not difficult, especially if undertaken in youth. We can also be assured of complete success and with much certainty predict the time in which the operation of tooth movement may be accomplished. And as the patients are normal breathers, naturally holding their jaws closed the requisite amount of time, after proper treatment the cusps of their teeth are locked for their mutual support, thus assisting the retaining devices and obviating the necessity for their being worn so long as is usually required in cases belonging to the first division of this class."

Thus it is seen that Dr. Angle draws a rather definite line between Class II, Division 1 and Class II, Division 2 and considers the treatment of these cases much easier and with better prognosis. He also speaks of two types of cases in this Class which we will mention later.

Dewey has the following to say in his text book concerning Class II, Division 2.

"This deformity is characterized by the distal relation of the lower arch to the same extent as in Division 1. The other characteristics are directly opposite. We have an upper arch which is nearly normal in width with retruding and bunched anterior teeth. The mandible is more nearly normally developed and the chin is not receding. We have normal pressure of the lips and cheeks and normal action of the tongue and normal breathing. The difference between Division 1, Class II and Division 2, Class II, is the difference between normal and abnormal muscular pressure."

McCoy's description is very similar to Dr. Angle's only less detailed.

Milo Hellman, in the International Journal of Orthodontia for February, 1931, gives considerable important data concerning these cases. In the course of this paper, we will analyze some of his statements, for certain of them seem at variance with the deductions noted in our symposical study.

Quoting from Hellman's paper we find the following paragraphs:

"The evidence from previous investigations, however, points to the fact that Class II malocclusal manifestations are not all alike. Angle has properly divided them in two divisions. The fact, however, that the occlusal relationship of the teeth is similar in both instances has mislead most of us into the belief that they are fundamentally the same, differing only in certain minor details, such as position of maxillary incisors and form of maxillary dental arch. The proof derived from the investigations previously mentioned supports the view that the two divisions of Class II also differ fundamentally."

He further states that "the face in Class II, Division 1 differs from that in Class II, Division 2 in that in the former the mandible is posterior in position, while in the latter it is equal to the normal."

"It has also been pointed out that in Class II, Division 1, the face as a whole is subnormal with reference to its anteroposterior dimension, the mandible being relatively still more so than the maxilla. In Class II, Division 2, on the contrary, the mandible approximates the normal in its anteroposterior dimension and in its position, the maxilla being more forward. (This is a statement that will bear discussion and attention will be called to it later.)

"The total face height in Class II, Division 2 is less. This, however, is mainly due to the shorter symphysial and dental heights, despite the fact that the upper face and nasal heights (from nasion to prostheon superior) are greater than in Class I and Class II, Division 1."

"The bigonial width is less in Class II, Division 2."

He then draws some important observations of a general metabolic nature.

"Girls who have dentitions in Class II, Division 1 malocclusion are retarded in the differentiation of these dentitions up to the time when the permanent second molars begin to erupt. When the second molars erupt, they become accelerated. On the other hand, girls who have Class II, Division 2 malocclusion are accelerated in the differentiation of their dentitions up to the beginning of eruption of the second molars, when they become retarded, lagging behind Class II, Division 1, Class I groups and the group as a whole."

Hellman found, in a study of girls with Class II malocclusion, that between the ages of 5 and 20 years the Division 1 cases were taller and heavier than the Division 2 cases. The latter grow spasmodically and very rapidly and at times seem to catch up to the Division 1 average.

His conclusions are:

"That in Class II, Division 1 and Class II, Division 2, differences in growth, differences in differentiation, differences in periods of acceleration and differences in periods of retardation make it possible to distinguish the one from the other, despite the fundamental similarity in the occlusal relationship of the teeth.

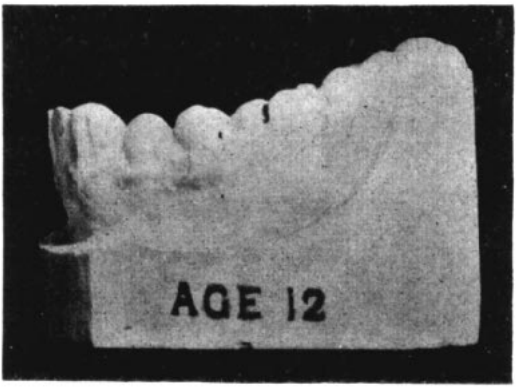

Figure 1
The mandibular denture of a Class II, Division 1, malocclusion.

Figure 2
The mandibular denture of a Class II, Division 2, malocclusion.

"That in Class II, Division 2, the mandible is narrower and longer than in Division 1 and is normal in its anteroposterior position, while the upper face is either normal or supernormal in height and width and more anterior than normal in its position. The dentition and alveolar arches, as a whole, remain subnormal in position."

Realizing that this group of cases was worthy of much more study and attention than had been given them up to date, the Eastern Component

elected to undertake this work as their contribution to this year's program. Our study is purely of a clinical nature and hence is unsatisfactory and incomplete in many ways for there are underlying factors that are worthy of the attention of the most devoted research workers. However, we offer you the results of our clinical study with the hope that some points may be enlightening and that it may also stimulate others to undertake a more scientific analysis of this most interesting group of cases.

We approached the problem with a series of questions compiled in the form of two questionnaires. While the answers to many of these questions varied considerably even to the extent of being diametrical, yet, when the analysis was made in open meeting, it was shown quite clearly that either the question was misinterpreted or the individual was in error as to his deductions when his answers varied radically from those of the other members. The various answers to these questions have been summarized, and we believe represent the consensus of opinion of the majority of our group.

Questionnaire I

Question No. 1.—What is the percentage of Class II, Division 2 cases in your practice? 3670 cases were examined and the average percentage was 7.65, but the actual percentages that were reported varied from 1 to 13. Hence it was quite evident that there was not a universal understanding as to what constituted Class II, Division 2. Therefore, in a subsequent meeting, we carefully discussed this factor and it was found that practically all of the classifications were made from models only. Very few had taken the photographs into consideration. Thus it became apparent, as we will later show, that many cases originally analysed as Class II, Division 2, were wrongly grouped. These being eliminated, it was evident that a percentage of 3 to 4 for Class II, Division 2 malocclusion was much more accurate than 7.65.

Question No. 2.—How does the mandibular denture and the size and form of the mandible differ in Class II, Division 1 from Class II, Division 2?

The mandibular denture in Class II, Division 1 is generally narrower, has an exaggerated Curve of Spee with the first molars in mesial axial perversion and the incisors in good alignment but in supraocclusion. It appears of good length anteroposteriorly but is in distal relationship to skull anatomy. (Fig. 1.)

The mandible in Class II, Division 2 is well grown buccolingually, or laterally, in the molar and premolar regions but tends toward narrowness across the canine areas with a resulting malalignment of the incisor teeth.

Anteroposteriorly the mandibular denture appears somewhat "stubby" owing to the lingual position of the incisor teeth which is quite characteristic. There is seldom any Curve of Spee. The molars and deciduous molars or premolars are arranged on a level in the horizontal plane with no

tendency toward a mesial tipping of the first permanent molars. The incisors are on a plane that is considerably and abruptly occlusally located to that on which the molars are arranged. (Fig. 2.)

The vertical growth of the mandible in the molar and premolar regions is decidedly lacking.

The mandibular denture is often more distally placed, in relation to the maxillary denture, than in Class II, Division 1. It has been the opinion of the writer, up to this time that this was due to a more exaggerated undergrowth in the body of the mandible whereby it was more distally located to skull anatomy than is the mandible of Class II, Division 1. The pro-

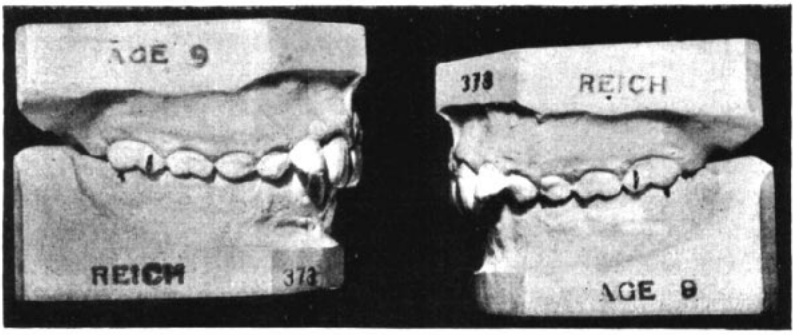

Figure 3
A Class I malocclusion simulating, in tooth alignment and overbite, a Class II, Division 2, malocclusion.

file photographs, however, seldom show any greater degree of disharmony in the facial lines than in Division 1. Of course, the hypertrophied condition of the mentales muscles covers up the disharmony to a considerable extent. Furthermore, we must also realize that, owing to the lack of vertical growth in the molar and premolar regions of the denture, there is an excessive closure of the mandible, which also tends to throw the mental protuberance forward of its natural position and this disguises the profile disharmony. It may be that in some of these cases of excessive mesiodistal malrelationship of the buccal sections of the two dentures that there has been some forward movement in the maxillary teeth, excluding, of course, the central incisors, in addition to the distal fixation of the body of the mandible. This is suggested by the perverted mesial axial inclination frequently found in the maxillary lateral incisors which cannot entirely be accounted for by a narrowing of the denture across the canine regions.

In these deductions relative to the mandibles in the two divisions of Class II, you will note we differ distinctly with the reported findings of Hellman, who states that the mandible in Class II, Division 2 approximates the normal in its anteroposterior position; that while the mandible in Class II, Division 1 "is posterior in position," that in Division 2 "it is equal to the normal." Later in the paper we will discuss this point and hope to offer a reasonable explanation as to the cause for such diametrical conclusions. In doing this we beileve we will also explain why Dr. Angle spoke of two types of cases in Class II, Division 2 and illustrated them in his text. (Figs. 27-25, Angle.) We believe there is but one true type of Class II, Division 2.

Question No. 3.—Give all the etiological factors that you have found associated with Class II, Division 2 cases.

(a) Perverted functional activity of the muscles of the lips effecting a backward driving force.

(b) Excessive action of the mentales muscles, either in a habit spasm or sucking action.

(c) Perversion of the swallowing function, especially the first stage, in the form of exaggerated sucking action.

(d) Premature loss of deciduous molars.

(e) Hypertoned, tense musculature of lips.

(f) Hypertrophy and overdevelopment of the musculature of the cheeks.

(g) Nervous, high strung temperament.

(h) Malnutrition in early infancy pointing to disturbance of calcium metabolism.

(i) Hypertrophy of the mentales muscles is almost universal in these cases.

(j) Distal pull by muscles attached to hyoid bone.

(k) Posture habit.

(l) Retarded forward growth of mandible due to muscular pressure, a constitutional condition or both.

These answers, you will note, are somewhat shotgun in character, but when analysed have more in common than one might hastily conclude. Practically all agree that there is an upset balance in the musculature about the anterior portion of the mouth. Several mentioned the mentales muscles as either being overactive or hypertrophied. The excessive sucking during swallowing also was noted and this, of course, involved the mentales and other sucking muscles. Faulty metabolism in early babyhood was popular in the answers.

In these answers, we believe that we have something to offer for your consideration. None of the writers, up to date, seem to have recognized the extreme perversion of the musculature that is present in these cases. They all speak of the muscles as acting normally. In reality they are hyperactive muscles.

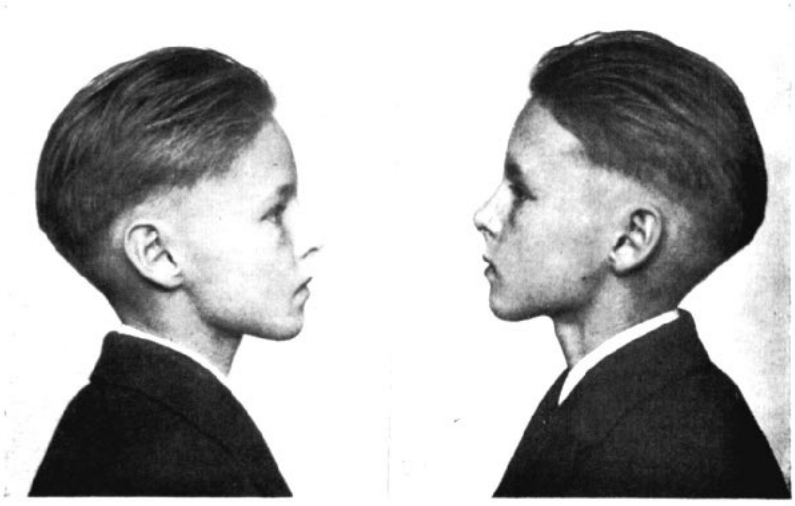

Figure 4

Photographs of patient whose casts appear in Figure 3. Note the relationship of the mandible to the skull anatomy.

Hypertrophy of the mentales muscles is almost always marked and the lower lip rolls over in a most characteristic way. Perverted swallowing is so frequently found as to be of significant bearing as an etiological factor. Some hidden constitutional unbalance, working through the growth mechanism, is quite evidently a causative influence and is probably the primary error, dating back, perhaps to the early months of babyhood.

Question No. 4.—What plan of treatment for Class II, Division 2 cases has proved most successful in your practice?

(a) Stationary anchorage on lower, including tip back bends. Carry distally the maxillary teeth up to and including the lateral incisors.

(b) Increase the growth across mandibular canines and premolars and align the incisors.

(c) Tip the maxillary central incisors labially and depress them.

(d) A bite plate is worn during active treatment to elevate the molars and premolars.

As you will note, this plan of treatment recognizes certain fundamental errors that must be corrected. These may be tabulated as follows:

(a) Distal position of the mandibular denture, corrected by establishing normal inclined plane relationship and normal functional forces.

(b) Narrowness in the mandibular denture across canines.

(c) Lack of vertical growth in the molar and premolar regions of the dentures.

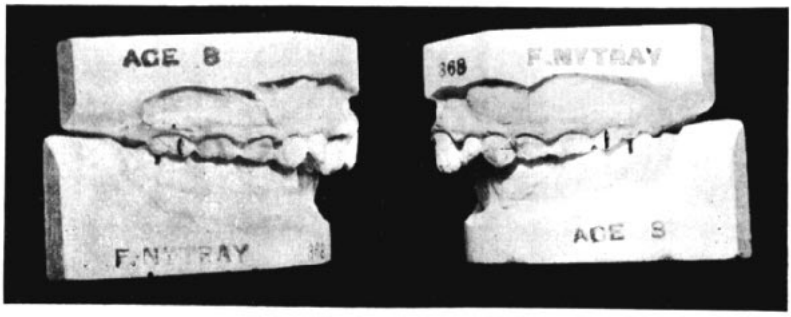

Figure 5
A Class II, Division 2, malocclusion.

(d) Elongation of maxillary central incisors.

Question No. 5.—What associated treatment do you require such as muscle exercises, dietary instructions and otherwise?

(A) Several replied in the negative.

(B) The other answers included the following:

(a) Select a well balanced diet including foods requiring mastication.

(b) One quart of milk daily if possible.

(c) Supplement diet with cod liver oil unless contraindicated by tests, and calcium phosphate in graduate doses.

(d) Biting exercises to strengthen muscles of mastication.

(e) Exercise in open air especially in sunshine.

(f) The use of passive swallowing exercises and exercises to relax the tension of lips.

(g) Massage of gums at tooth brushing times as an aid to bone growth.

Again these point to unbalanced muscles and metabolic disturbances as etiological factors which must be overcome.

Question No. 6.—From your results in the treatment of Class II, Division 2 cases of malocclusion, what would your prognosis be for these cases?

A summary of these answers would indicate a favorable prognosis in maintaining the mesiodistal relationship of the two arches but difficulty in holding the corrected overbite. Almost all seemed to realize a need for prolonged retention of this vertical growth.

Question No. 7.—What retention do you use for Class II, Division 2 cases of malocclusion?

(a) A maxillary plate retainer with a bite plane or anatomical bite groove, and with a labial wire, either attached to plate or soldered from one lateral incisor to the other, was used by all.

(b) On the mandibular denture, the canine-to-canine, lingual wire retainer with intermaxillary spurs or the molar-to-molar, lingual wire retainer, with canine bands and intermaxillary spurs, was quite universal.

Questionnaire 2

Question No. 1.—In what percentage of cases classified as Class II, Division 2, does the profile photograph indicate that the mandible is in distal relationship with the skull?

The answers varied from 40 to 80 per cent and all agreed that the frequency of the hypertrophy of the mentales muscles obscured the actual position of the mandible.

Question No. 2.—In what percentage of cases classified as Class II, Division 2, do the photographs indicate a lack of vertical growth below the nose?

In answering this the percentage ranged from 50 to 68 per cent. Several of the group, however, failed to return answers on this question and it is quite clearly indicated that we have not been paying as much attention to an analysis of the facial lines as we should.

Question No. 3.—Can you obtain a history of marked digestive upsets, nutritional complications or severe illness in the first two years of babyhood, in any of these cases?

The replies from five were yes, 40 per cent; yes, in the majority; and yes, in a good many; yes, but not enough to regard this as a real factor; and in about 75 per cent of these cases.

Question No. 4.—Can you detect a sucking habit, particularly associated with swallowing or a mentales habit, in these cases of Class II Division 2?

All but one, in answering the question, were of the belief that faulty swallowing with exaggerated sucking, accompanied this malocclusion.

Question No. 5.—Is there a history of retarded growth as a little child and up until puberty, followed by a sudden acceleration of growth about this time?

Several negatives appeared here and two answered yes in several of these cases.

Question No. 6.—Can you find any sleeping posture as a possible complication?

A unanimous No was the reply.

Question No. 7.—Are the mentales muscles hypertrophied in these cases?

Seven answers came back. Four were Yes. In contrast to this were the three negative answers.

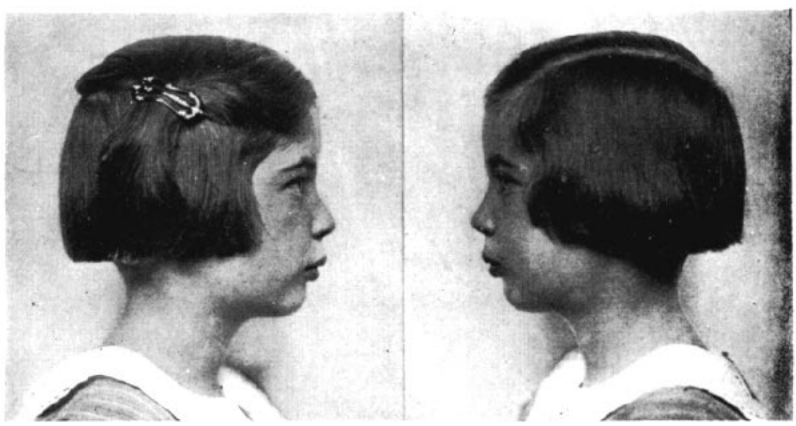

Figure 6

The photographs of the patient whose casts appear in Figure 5. Compare the position of this mandible to that seen in Figures 4 and 9.

Question No. 8.—Is the lower lip thick and does it tend to roll outward as if hypertrophied or overgrown?

The same seven men answered and naturally their answers were divided as in the preceding question.

From these questionnaires and from our round table discussions, we would evolve the following clinical material concerning these interesting cases.

It is clearly evident that there is a distinct difference between the forces at play upon the denture in Class II, Division 1 and Class II, Division 2. This Dr. Angle noted in his text. These forces are of three varieties: First, the muscular activities; second, the mechanical forces of occlusion; and, third the general metabolic forces. Let us analyse them.

In Class II, Division 1 there is little or no muscular pressure against the labial aspect of the anterior portion of the maxillary denture except upon the apical section of the maxillary incisor roots. The lingual surface of the incisors receive lip and tongue pressure. The mandibular incisors are frequently pressed lingually by the lower lip. On the other hand the buccal sections of both dentures receive considerable abnormal force in a

Figure 7
Front view of patient whose casts are seen in Figure 5. Note the lack of vertical growth manifested in the oral area of the face.

lingual direction. The bases of the two dentures are not acted upon by a muscular wedging effecting a forward thrust unless faulty swallowing is an etiological factor, which is rare. There is considerable backward pull upon the body of the mandible by the muscles attached to its mental spines.

In Class II, Division 2, there is marked muscular pressure upon the maxillary incisor teeth probably originating in those muscles especially active during the function of swallowing. The hypertrophied state of the mentales muscles would seem to be more than a coincidence as also does the thickened and rolled over lower lip. (Fig. 7.)

The mechanical forces of occlusion in Division 1 are perverted so as to produce a posterior thrust upon the mandibular denture and a forward

propelling force on the maxillary denture. The mandibular molars are usually found in exaggerated mesial axial inclination.

In Division 2, owing to the fact that the mandibular molars remain more upright, there seems to be less of a distal thrust upon the body of the mandible during function, although we do note that the maxillary molars practically always exhibit distal axial inclination often to a greater degree

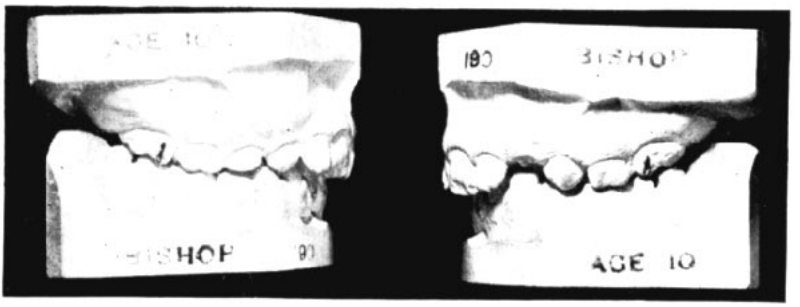

Figure 8
Another Class I malocclusion which appears to be a Class II, Division 2, subdivision deformity.

than in Division 1. The reason for this variation in the axial positions of the molars in the two divisions is not at all clear to the writer.

The effect of the metabolic forces is noted in the difference in the vertical growth manifested in the two divisions. Although both are attended with excessive overbite, that which presents in Division 1, apparently is not due to a lack of vertical growth in the buccal sections of the mandible, but rather is the result of an excessive Curve of Spee. The posterior sections of the molars remain on the line of occlusion and their mesial portions pass into slight infraocclusion as do also the premolars. The canines are little affected as to vertical height while the incisors are forced into supraocclusion.

In Division 2, the facial lines indicate a decided lack of vertical growth in the buccal sections of the denture. Hence the occlusal planes upon which the molars and deciduous molars are arranged in these two divisions is very characteristic. Division 1 shows a mesial axial perversion of the mandibular molars and an exaggerated Curve of Spee. (Fig. 1.) Division 2 exhibits mandibular molars that are quite upright and deciduous molars or premolars on the same horizontal plane. The incisors in Division 2 are distinctly and abruptly located on a plane that is a step higher occlusally. (Fig. 2.)

Division 2 is also frequently found in children who, after twelve years of age, take on unusual growth activities and often pass above the average in height. These are two clinical factors that point strongly toward some underlying metabolic condition as being of great etiological influence.

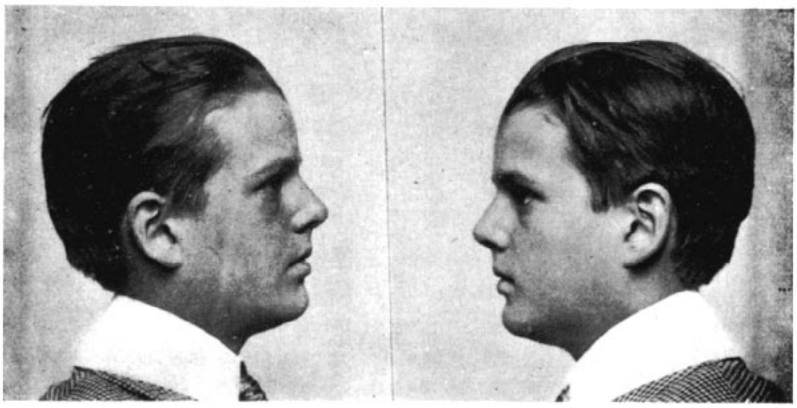

Figure 9
The photographs of the patient whose casts are seen in Figure 8.

As further proof of this general metabolic involvement in Division 2 we found a similar group of cases in Class I which were so identical in the appearance of the malocclusion as to have led all of us astray in our classifications and these cases were the cause of the great variation in the reports on the percentage of Class II, Division 2 malocclusion when first collected. No one, to our knowledge, has called attention to the similarity of these cases and we believe it is one of the most important factors that we have discovered. It seems quite certain that both Dr. Angle and Dr. Hellman have confused these two groups, the former in certain of his illustrations, Figs. 27 and 35, 7th Edition, and the latter in his statistical deductions. Consequently we will discuss this problem in detail.

To illustrate this point, we shall present the case shown in Figs. 3 and 4. Here is a typical Class II, Division 2, tooth malposition. A snap analysis would lead to such a classification. But let us examine the photographs and we note, at once, that there is no distal relationship of the mandible to skull anatomy. Hence we must classify this case as Class I. Contrast this case with the next one. Figs. 5 and 6. Again we note the typical arrangement of the malaligned teeth and the ever present overbite. Turning to the profile photographs we will see a great difference in the facial lines

of this patient when compared with those of the preceding case. This girl exhibits a mandible that is distinctly in distal relationship to the cranial anatomy and hence really is a Class II, Division 2 case. There is also a lack of vertical growth in the oral area of the face which is not mani-

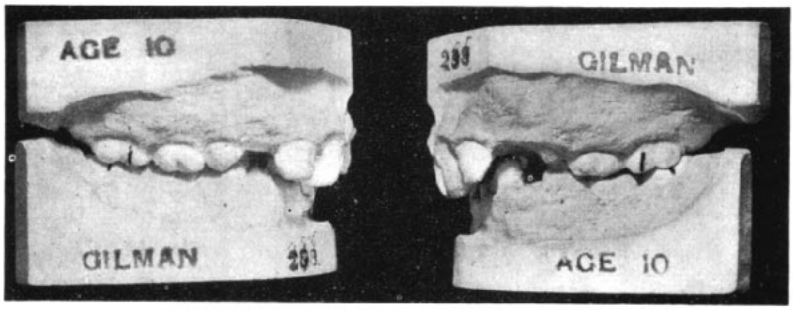

Figure 10
A Class II, Division 2, malocclusion.

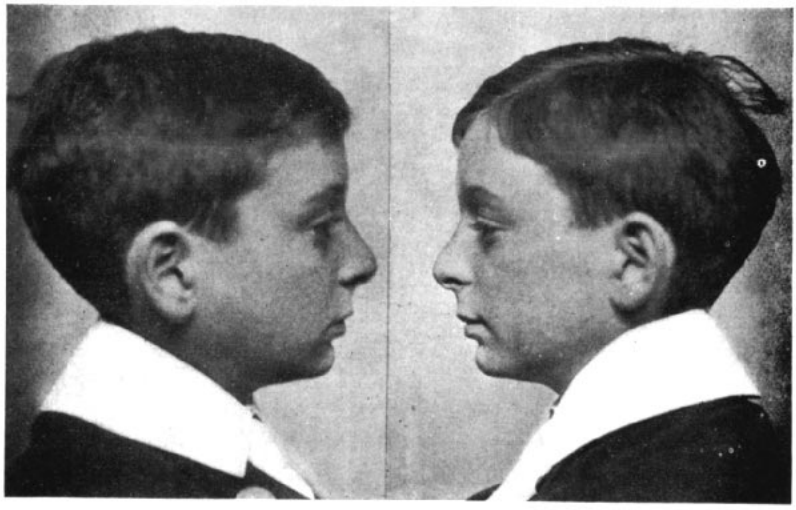

Figure 11
Photographs of the patient whose casts are seen in Figure 10.

fested in the previous case. Fig. 7. Let us examine more of these cases.

In Fig. 8-9, is another case which is, at first glance, a typical Class II, Division 2 case, as indicated by the inclined plane relationship on the right side. On the left side we find a more nearly correct adjustment of the

planes pointing to a subdivision. When we study the profile pictures, however, we see that the body of the mandible is in correct relationship with the cranial anatomy. The classification then is Class I with a forward position of the right buccal segment of the maxillary denture. Figures 10, 11, 12 and 13 illustrate typical Class II, Division 2 cases.

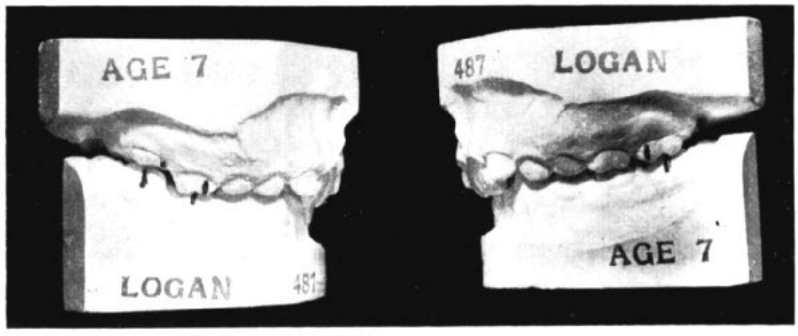

Figure 12
Another Class II, Division 2, malocclusion.

Hence it is quite evident we must always check ourselves in the analysis of these cases. No case is Class II unless we can demonstrate, satisfactorily, that the body of the mandible, with its superimposed denture, is in a posterior position to its normal relationship with skull anatomy. It makes no difference what the malalignment of the anterior teeth is, or how much overbite is present. *The position of the body of the mandible is the key to the situation.* Hence no Class II case can have a mandible that is in normal position, anteroposteriorly, as stated by Hellman. It would seem quite apparent that he has classified by inclined plane relationship only, and has mixed Class II, Division 2 cases with Class I cases having similar tooth malpositions because their maxillary teeth, with the exception of the central incisors, are forward in relation to skull anatomy, as illustrated in Figs. 3, 4, 8 and 9.

True Class II, Division 2 presents just as definite a clinical picture as the most typical Class II, Division 1 case. It is readily confounded with certain Class I cases and cannot safely be classified unless the photographs, as well as the models, be carefully studied.

In conclusion we would summarize the important factors in this clinical study as follows:

1. Class II, Division 2 malocclusion is of comparatively infrequent occurrence being present in about 3 to 4 per cent of cases.

2. The etiological factors that seem to be associated with these cases are, primarily, a failure in metabolic or developmental processes resulting in lack of vertical growth in the molar and premolar regions of the dentures and secondarily, a perversion of the sucking function which leads to an abnormal degree of growth and development of the sucking muscles particularly manifested in a hypertrophy of the mentales muscles. These hypertrophied and abnormally acting muscles produce distal pressure upon the

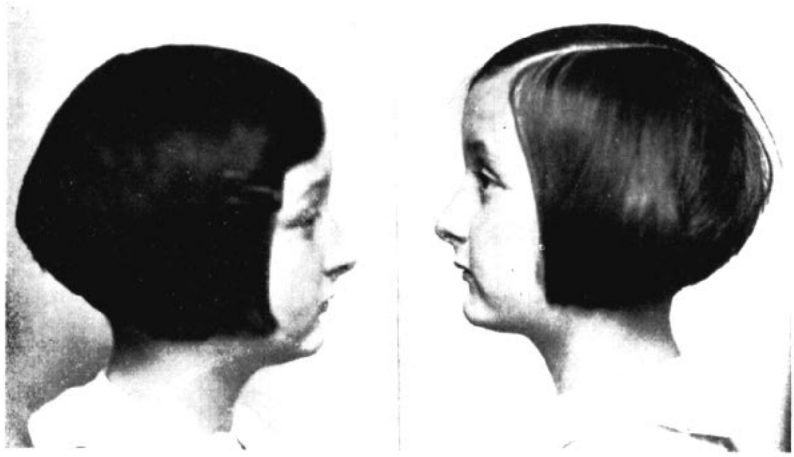

Figure 13
Photographs of patient whose casts are illustrated in Figure 12.

anterior portion of the body of the mandible and sufficient retardation of the forward growth to effect a distal locking of the mandibular molar teeth. From then on the forces of occlusion aid in checking the forward growth of the body of the mandible.

3. The prognosis is favorable for the correction and the maintainance of the mesiodistal relationship of the dentures; favorable for obtaining but unfavorable for retaining the reestablished vertical growth of the jaws without prolonged retention extending beyond the years of completed bodily growth.

4. The treatment apparently indicated is the establishment of correct vertical growth in the molar and premolar regions which should be done during active treatment and coincidentally with the correction of inclined plane relationship; the maintaining of stationary anchorage in the mandibular denture; the tipping distally of the maxillary teeth up to and including the lateral incisors; the labial tipping and depressing of the maxillary central

incisor teeth; correction of individual tooth malpositions; and the reestablishment of normal balance in the environmental muscular tissues.

5. The best retention mechanism consists of a bite plate in the maxillary denture with perhaps a lateral-to-lateral auxiliary device and either a plate on the mandibular denture or a lingual wire retainer of some form.

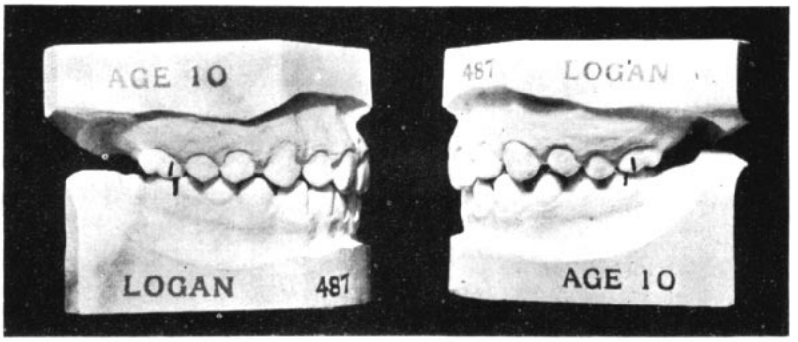

Figure 14
Casts showing the results of treatment of the case illustrated in Figures 12 and 13.

A bite plate must be worn, for part time at least, until the patient has completed the full period of body growth, otherwise there will be some recurrence of the overbite.

6. Class II, Division 2 is readily distinguished from Class II, Division 1, but is frequently confused with cases in Class I with similar malpositions of the teeth but with a normal position of the body of the mandible. This indicates that some of the etiological factors in these Class I cases are quite the same as those in Class II, Division 2, but that the perversion of the forces of occlusion have been less active in checking the forward growth in the body of the mandible in the former than in the latter group. The clinical picture points to a similar disturbance of metabolic factors but a dissimilar response in the neuro-motor mechanisms whereby muscular perversions are made of different form and action.

7. In no group of cases is the clinical picture more clear as to the influence of metabolic processes upon occlusion than in this Class II, Division 2 group. The child at 8 to 10 years is usually rather short of stature, the lips are full, especially the lower, the mentales muscles are enlarged. The chin is weak and tucked beneath the maxillary denture. The deformity from the profile view is covered very well by the enlarged mentales muscles; the malocclusion is readily recognized after proper analysis. If the case remains under observation up to the twelfth year, there is a rapid trans-

formation in body stature and many inches are added to the height within a relatively short period of time. During this period of accelerated growth the vertical growth of the jaws obtained by treatment is most unstable and the overbite will rapidly recur if not prevented mechanically from doing

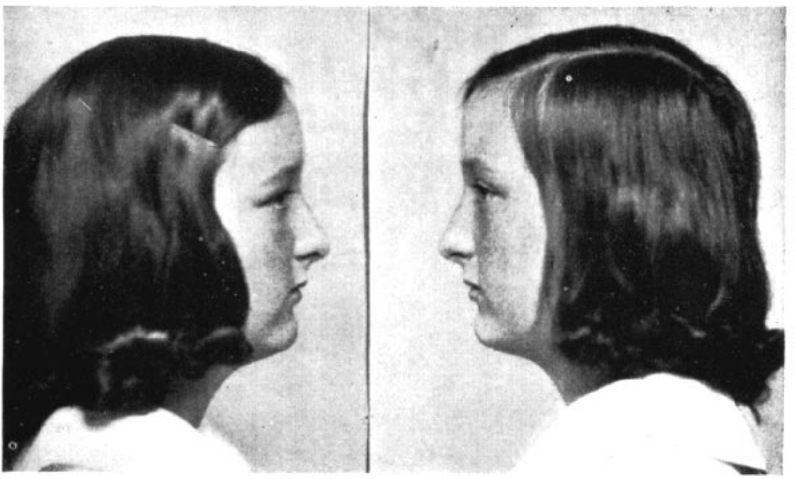

Figure 15

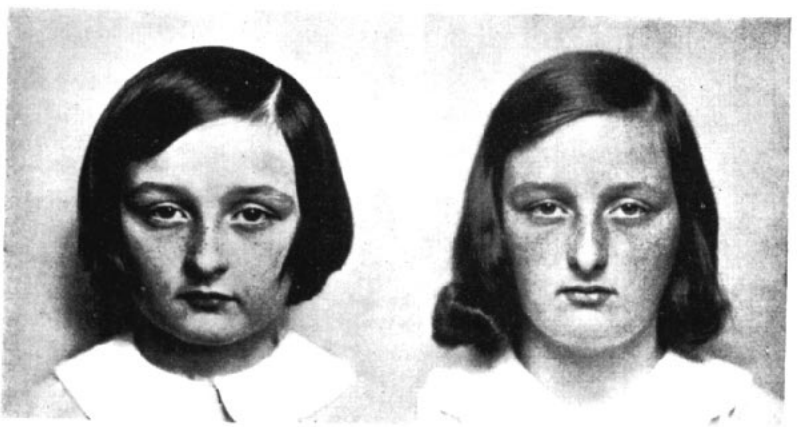

Figure 16
Before and after treatment photographs. Note the increase in vertical growth of the face.

so. When the activity of the long bones cease, the vertical stability of the jaws is about up to par. There is little difficulty at any time in maintain-

ing the corrected mesiodistal relationships thus indicating that there is very little posterior force exerted against the inclined plane mechanism of occlusion.

8. The problem of prevention in these cases is one of deep seated origin and associated with unbalanced biologic forces. Hence, until we understand such vital forces clearly and have a comprehensive knowledge of the growth mechanism, we can do little to abort the evolvement of Class II, Division 2 malocclusion. So we must turn to the research worker for aid in this important field and when he furnishes us with such established and proved facts as to make possible the successful checking of early errors that lead to the evolvement of cases in this group, it seems certain that we shall also have enough wisdom to eradicate practically all malocclusions.