Clinical Findings During Shifting And Raising Of The Bite With Activators

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All dental literature does not agree on the question of where tissue transformations are taking place which cause shifting and raising of the bite in jaw orthopedic treatment. It is not something new for even in letters from Angle to Oppenheim these transformations were discussed. Two tissues must be considered, the paradental tissues and those of the temporomandibular joint (T.M.J.).

There are some who assume that shifting of the bite is caused mainly by tooth movements in the alveolar process. In contrast, K. Haupl and his pupils are of the opinion that shifting of the bite is brought about mainly by movement of the mandible as a whole. These men rely principally on the animal experiments carried out by C. Breitner, K. Haupl, R. Psansky and H. Derichsweiler in which tissue transformations in the region of the jaw were histologically proven.

Recently, K. Haupl and his pupils have stressed the importance of structural changes in the T.M.J. by raising the bite. But other authors underline the significance of paradental tissue transformation for raising of the bite. In face of such entirely different concepts and the impossibility of proving, histologically, structural changes in the T.M. joint in man, as one obviously cannot remove a joint of a jaw from a jaw orthopedic patient for histological examination, the experiment seems to prove clinically the structural changes in the T.M. joint by examining a great number of patients.

Such examinations were carried out at the Jaw Orthopedic Department of the West German Jaw Clinic in Dusseldorf on more than 1,000 patients who were treated with activators and in whom raising or shifting of the bite or both took place in the course of jaw orthopedic treatment. During these examinations a great number of identical findings could be observed which indicate structural changes in the T.M.J.

Three of these repeatedly observed findings will be discussed in the following and illustrated by typical examples. Of course these three findings are only a selection. The first finding deals with the occurrence of disturbances in articulation and occlusion in the course of raising and shifting of the bite, the second one with cephalometric lateral radiographs and the third one with measurements on models of the upper jaw which concern the relationship of the cheek teeth to the transverse folds of the palate.

The first finding deals with the occasional occurrence of disturbances in articulation and occlusion during treatment with activators. Generally the raising and shifting of the bite during treatment with activators takes place so gradually that the articulation and occlusion at any time during treatment is completely unequivocal and secure. Occasionally the tissue transformations in different parts of the masticatory system do not take place perfectly coordinated, so that certain disturbances may occur which are, without exception, only of a temporary nature. Such

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rare disturbances are nonocclusions and double bite. Even if such happenings are undesirable they enable us to observe how a shifting or raising of the bite comes about because there one or the other tissue transformation appears clinically isolated.

We present an example of nonocclusion. It concerns a boy, aged 14 years, one month, at beginning of treatment where a close bite with overjet and postnormal position was present (Fig. 1 - left). After six months of treatment the close bite was already sufficiently corrected and the postnormal position diminished (Fig. 1 - center). But in both areas of the cheek teeth there existed a complete loss of contact between the antagonists, a nonocclusion. Even with the greatest effort the patient was unable to get his cheek teeth into contact. Even with the strongest pressure on the chin this was impossible to achieve. At the termination of treatment which lasted one year and nine months, there existed normal occlusion, normal overbite of the front teeth and perfect contact between the antagonists (Fig. 1-right).

The reason for the occurrence of this nonocclusion is, according to our interpretation, that a structural change in the T.M.J. had taken place by which the mandible was moved anteriorly and downwards. The structural changes took effect so quickly and so distinctly that the paradental tissue changes in the sense of an extrusion of the cheek teeth (and therefore in the sense of a preservation of the contact between the antagonists) could not keep pace.

Our second patient demonstrates a case of Class III of the deciduous dentition in a boy three years and eleven months old (Fig. 2 - left). In the course of treatment a passing nonocclusion in the whole region of the cheek teeth occurred as a sequel to the backward movement of the mandible. In Figure 2, left to right, the conditions at commencement of treatment, after two months, four months and eight months are to be seen.

Next, we have a crossbite with shifting of the mandible to the right in a female patient, eleven years, two months old, at beginning of treatment. A passing nonocclusion occurred in the area of the right cheek as a sequel to the swing of the mandible to the left. The total time of treatment was three

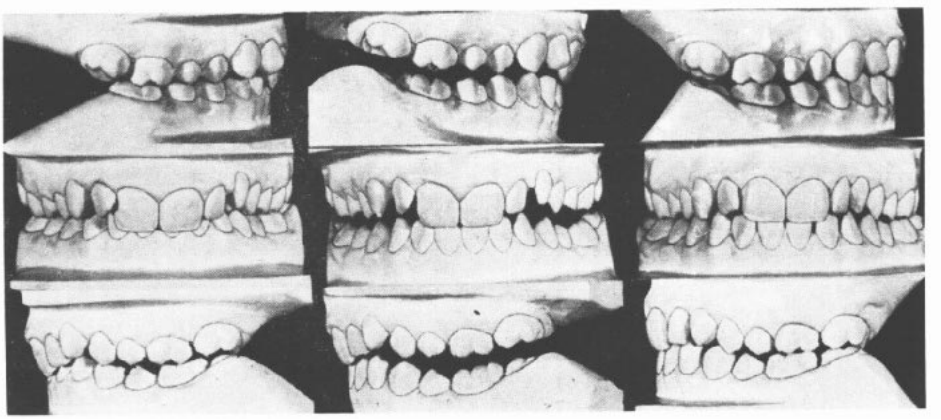

Fig. 1

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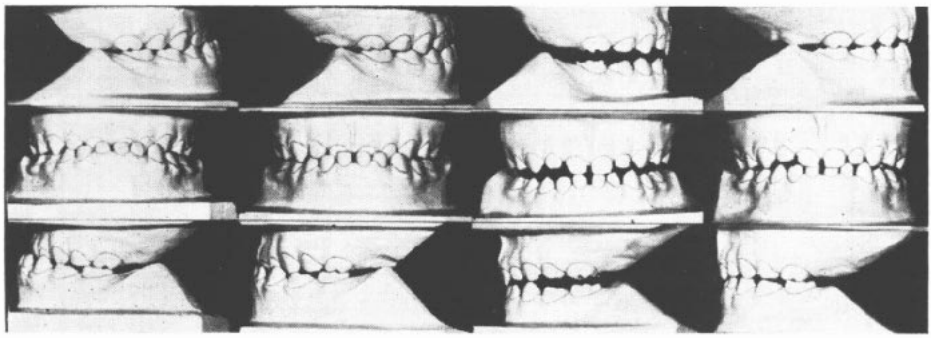

Fig. 2

years and four months. Figure 3 shows the conditions at commencement of treatment, eleven months later and at termination of treatment.

We would like now to demonstrate an example of a passing double bite. It concerns a boy twelve years, three months old, at beginning of treatment who had a postnormal position with close bite (Fig. 4 - left). During treatment a double bite developed which lasted for twelve months. Figures 4 left-center and right-center show both bite positions as they appeared one year and nine months after initiation of treatment. At the conclusion of treatment which lasted two years and three months, the occlusion was normal and there was a normal overbite of the front teeth. Besides this the double bite had been eliminated (Fig. 4 - right).

According to our interpretation the reason for this double bite was that the structural changes in the joint producing a forward movement of the mandible failed to develop at first. A change in function of the muscles took place which showed up in that the patient chewed habitually in normal occlusion as well as in postnormal position. The structural changes in the

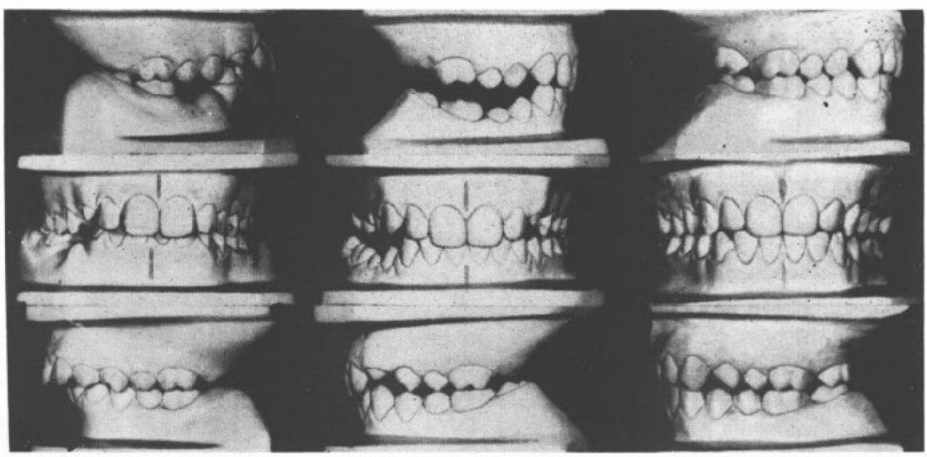

Fig. 3

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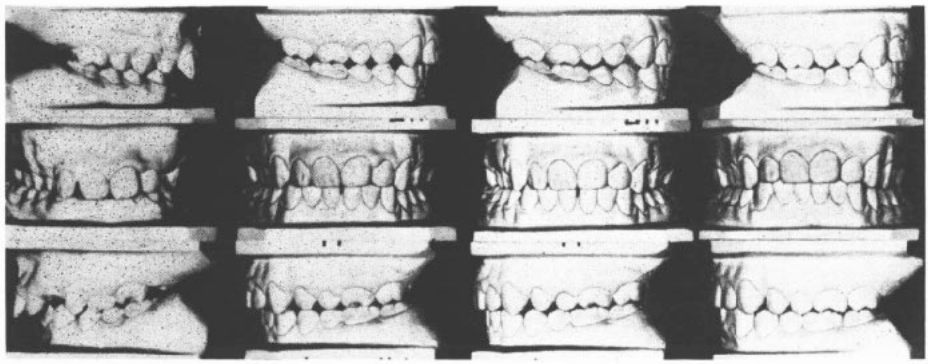

Fig. 4

joint developed slower than the adjustment of the muscles and only at the end of treatment had these structural changes in the joint reached a final osseous stage which consolidated the normal occlusion of the mandible. With the greatest effort the lower jaw could not be moved into a postnormal position, not even with the greatest pressure on the chin.

Let us now turn to the second finding. It concerns cephalometric lateral radiographs (C.L.R.). For faultless comparative examination of the skull before and after jaw orthopedic treatment these radiographs are only suitable if three demands are fulfilled.

Firstly, they must be taken under the same angulation. It is hardly possible to realize this first demand.

Secondly, the most important areas must be clearly and distinctly recognizable. In the region of the T.M.J. this is hardly ever the case due to superimposition of other parts of the skull. Apart from this, in a lateral exposure the condyle is only rarely drawn distinctly due to its cylindrical shape. It is nearly just as difficult to obtain clear conditions in the area of the teeth and of the contours of the mandible. This is only the case if the corresponding contours of teeth and mandible are perfectly projected on top of each other. For this, certain conditions must be given; foremost that no or only equal movements of the teeth on both sides of the jaw have taken place and that no asymmetry or swing of mandible in the joint exists. This happens rarely. This fact very seldom appears in publications on this subject as usually tracings of C.L.R. are presented where, in case of incongruous contours, only the mean value of the contours is drawn.

Thirdly, for comparative examinations which are to show unequivocally the changes due to jaw orthopedic treatment, only such cases are suitable in which changes due to growth can be excluded. This seldom happens in jaw orthopedic treatment as it generally extends over years with the exception of the few cases which are treated after termination of growth. But one can nearly achieve the fulfillment of this third demand if the pictures are taken in such short intervals that changes in growth can hardly have taken place or only in a very small amount. But then the changes by the treatment are so small, that they are not to be seen. In the material available to me all these demands rarely occur simultaneously. Therefore, it is most fortunate if a case is found in which all three de-

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mands are realized to a great extent.

I would like now to present such an exceptional case. It concerns a boy fifteen years, ten months old, at beginning of treatment with a close bite with overjet, postnormal position and retrusion of the upper central incisors. After three months of treatment an almost completely normal bite was established at the same time the bite was raised (Fig. 5). Even strong pressure by hand could not move the mandible backwards. The corresponding C.L.R.'s from beginning of treatment and after three months are shown in Figure 5-A. The contours of both

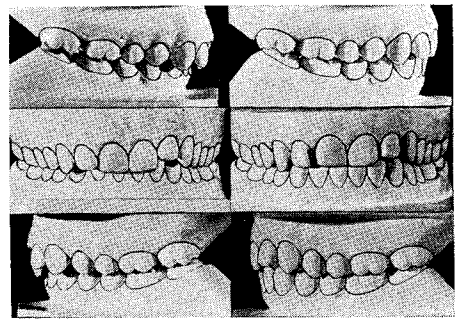

Fig. 5

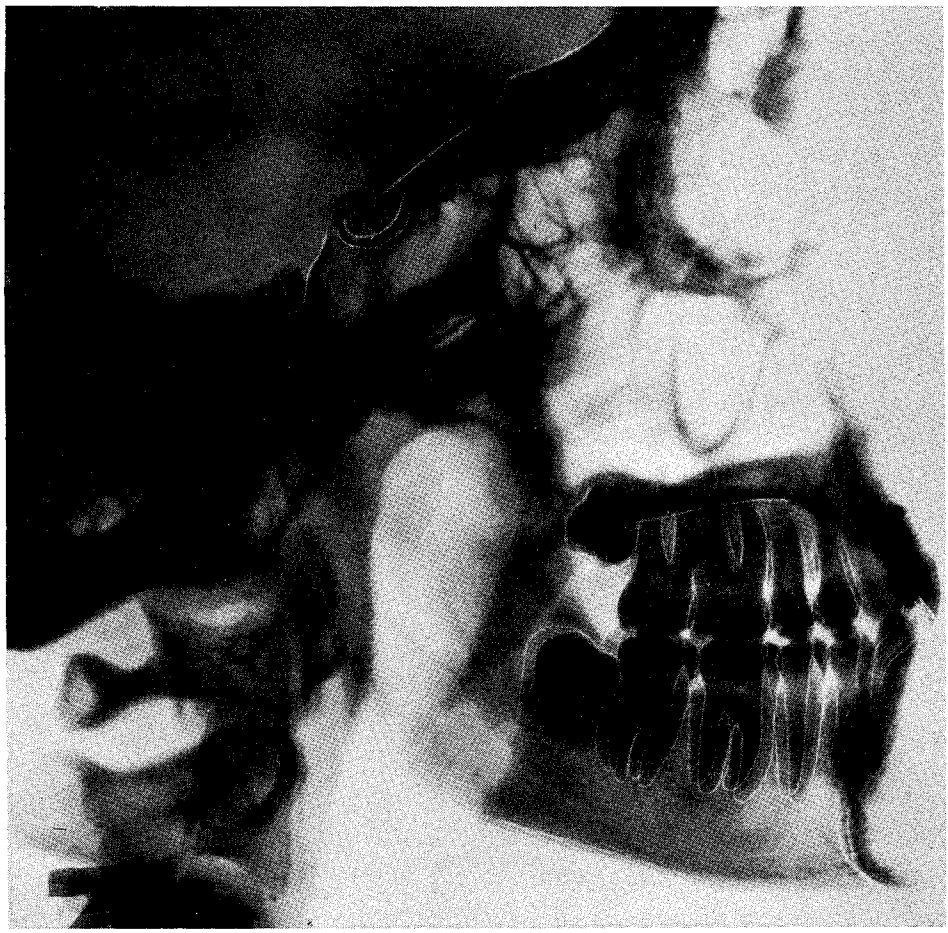

Fig. 5-A. C.L.R.'s at the beginning of treatment and three months later superimposed on the contours of the upper facial skeleton and the frontal bone. Upper cheek teeth of both pictures cover each other completely. Lower cheek teeth and anterior contour of the mandible from the second picture are projected 2 - 3 millimeters farther mesially.

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C.L.R.'s in the region of the upper facial skeleton and the frontal bone were completely congruous and did not show any changes or influence by growth. Therefore we were not forced to take only certain points or a certain line as fixed and unchanging, and to choose them as points or line of reference and to bring them to congruence. It was possible to superimpose these two C.L.R.'s directly for the purpose of evaluation. We chose this method of evaluation deliberately to exclude any sources of error and we desisted from tracings. Fig. 5-A shows both C.L.R.'s projected in such a way that the contours of the upper facial skeleton and the frontal bone are superimposed and congruous. It appears that the upper cheek teeth of both pictures cover each other completely and that therefore they have maintained their positions; only in the upper premolars a small amount of extrusion can be observed. On the other hand, all the lower cheek teeth from the second picture are projected two to three millimetres farther mesially. In the same way the anterior contour of the mandible from the second picture is projected forward the same amount. This shows with quite exceptional clarity that the development of the normal bite in this case was not caused by movement of the teeth but exclusively by movement of the whole lower jaw.

Briefly, I should like to introduce another relevant case, this time with backward movement of the mandible. In this case also the before-mentioned three demands are fulfilled to a great extent.

It deals with a female patient, eleven years, three months old, at beginning of treatment with Class III in all lower front teeth and in slight prenormal position (Fig. 6 - left). Within four weeks after getting the appliance a proper overbite of the front teeth was achieved and a normal bite established (Fig. 6 - center). Further treatment, however, was necessary. Altogether the treatment lasted one year, ten months (Fig. 6 - right). Fig. 6-A shows the C.L.R.'s on the day of getting the appliance and four weeks later when the overbite of the anterior teeth has been achieved. Fig. 6-A shows both C.L.R.'s projected upon each other in such a way that the contours of the frontal bone and the upper facial skeleton are congruous. The up-

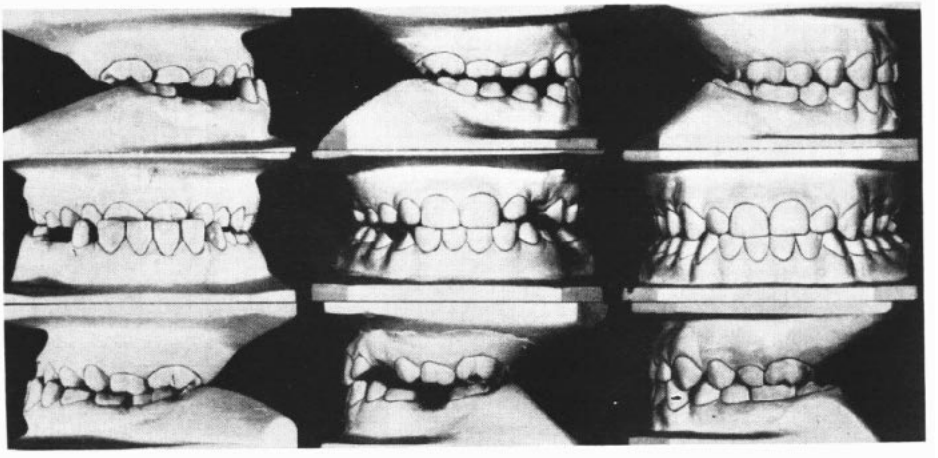

Fig. 6

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per cheek teeth of both pictures cover completely which means that they have not changed their positions in a sagittal direction during treatment. But the lower cheek teeth and the anterior contour of the mandible from the second picture were projected two to three millimetres farther posteriorly. Fig. 6-A shows the normal bite and the proper overbite of the front teeth were achieved mainly by the posterior movement of the whole lower jaw.

The third finding relates to measurements on models of the maxilla. According to research by E. Hausser the points where the transverse folds of the palate branch off from the raphe do not change their position in relation to the jaw during orthodontic movement of the teeth contrary to what their free ends do. This fact is the basis of the following method of research. The procedure is as follows: on the two models of the maxilla which are to be compared, an orthodontic symmetroscope, one at a time, is brought approximate-

Fig. 6-A. C.L.R.'s on the day of getting the appliance and four weeks later superimposed on the contours of the upper facial skeleton and the frontal bone. Upper cheek teeth of both pictures cover each other completely. Lower cheek teeth and anterior contour of the mandible from the second picture are projected 2 - 3 millimeters farther distally.

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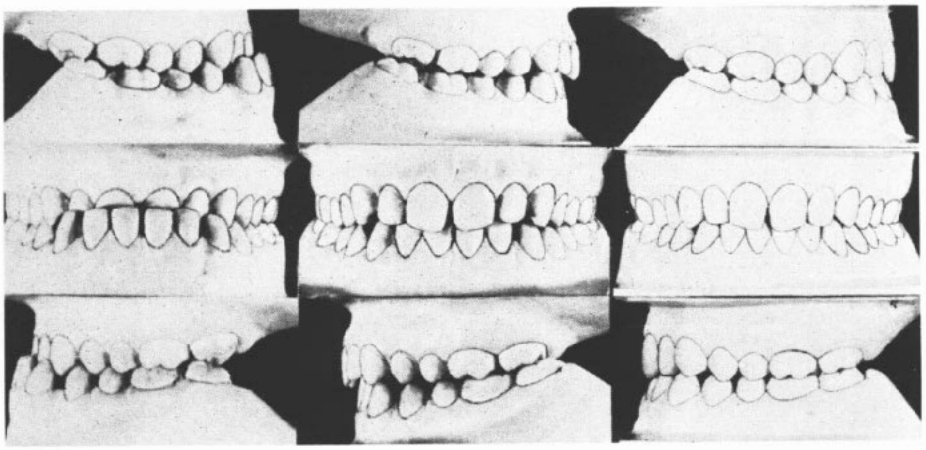

Fig. 7

ly into the same position. One can then easily take readings of any movements of the teeth within the maxilla.

Especially suitable for these investigations are patients whose secondary dentitions have been completed as then the movement of the teeth due to the change-over in the dentitions can be excluded. Up to now two hundred and fifty cases have been examined by this method to ascertain whether, after shifting of the bite, a sagittal movement of the first upper molars could be observed. In this connection there is no need to pay any attention to displacements in the anterior region which can occasionally be observed. In this investigation no movement of the first upper molars could be found which might have induced normal bite position. Cases in which a skeletal Class III activator (H. Wunderer) or an overjet activator which rests on the first upper molars has been applied must be regarded as exceptions. However, these movements are very slight and are caused mainly by the special features of the construction and method of resting of these activators. Based on personal investigations on the mobility of teeth in the upper and lower jaws, we can state with some probability that, in cases where no movement took place in the first upper molars, the first lower molars did not move either. The shifting of the bite in treatment with activators is therefore not generally the manifestation of

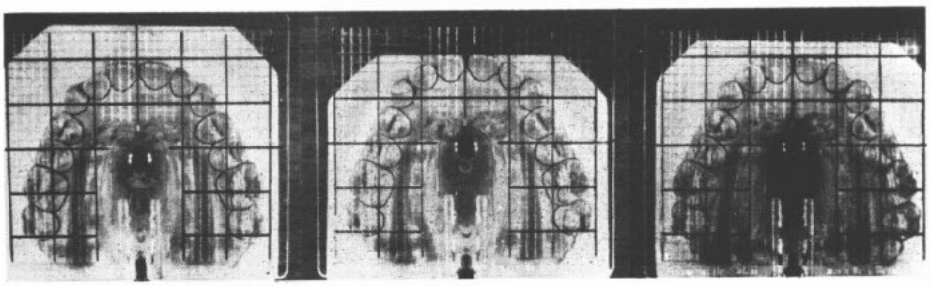

Fig. 7 a

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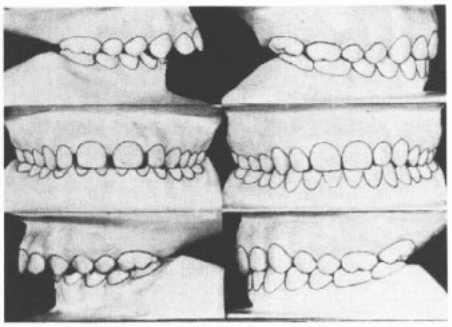

Fig. 8

paradental tissue transformation. The following is an example. It concerns a female patient, twelve years, five months old, at beginning of treatment who had a skeletal Class III in all anterior teeth with close bite and slight prenormal position (Fig. 7 - left). Five weeks after fitting of an activator a normal overbite of the front teeth was established. At this point a postnormal position existed which is to be regarded as a temporary condition (Fig. 7 - center). Two years, two months later an almost neutral bite had developed (Fig. 7 - right). The examination of the corresponding models of the jaw according to the method described before showed that the first molars had not changed their position in a sagittal direction. Figure 7-A shows the corresponding models of the upper jaw with the symmetroscopes in situ.

Figure 8 shows the models at the beginning and at the end of the treatment which lasted two years, one month for a girl, eleven years and nine months old. Figure 8-A shows the corresponding models of the upper jaw with the symmetroscopes in situ.

Another case concerns a boy, eleven years, six months old at the beginning of the treatment. Figure 9 shows the models at the beginning and at the end of the treatment which lasted two years and four months. Figure 9-A shows the corresponding models of the upper jaw with the symmetroscopes in situ.

It must be emphasized that the way jaw orthopedic treatment is carried out and especially the kind of system used has the greatest influence on the circumstances by which shifting of the bite and raising of the bite is achieved through structural changes either in the paradentium or in the joint. Mainly in this fact the reason may be found for the different opinions on the existence of structural changes in the joint due to jaw orthopedic treatment.

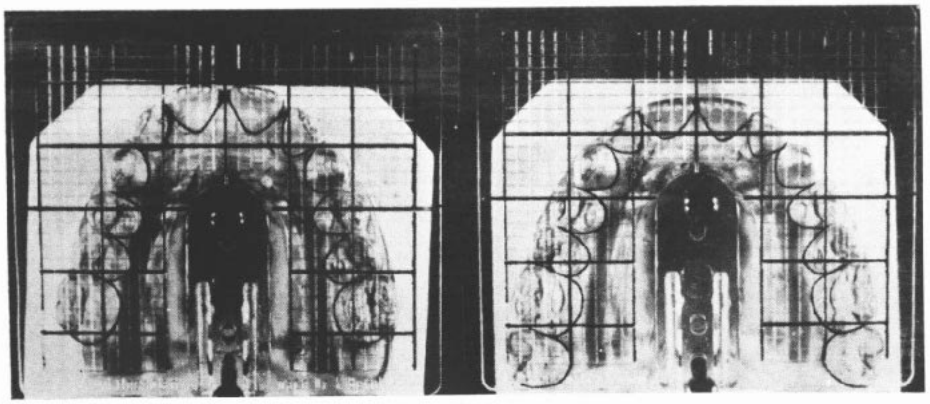

Fig. 8 a

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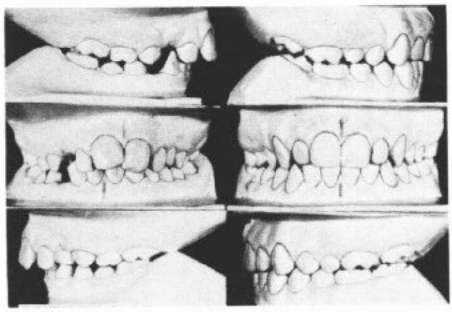

Fig. 9

For the same reason the cases demonstrated here can only show how shifting and raising of the bite are achieved by treatment with activators. This is accomplished mainly by tissue transformation in the region of the T.M.J. However, it is impossible to locate accurately these tissue transformations by clinical examination.

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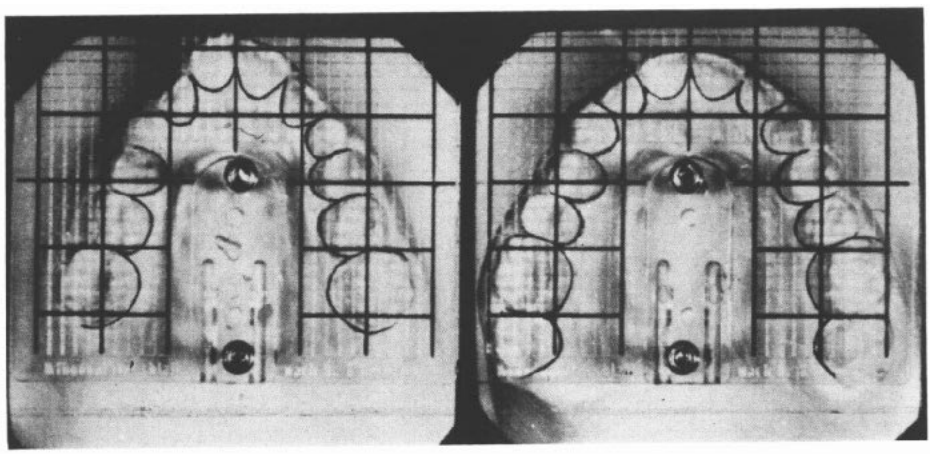

Fig. 9 a

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