

The Norwegian system of orthodontic treatment (with a description of the author's apparatus called protraction accommodator)

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In this discussion of the Norwegian System I propose to confine my remarks to an account of the construction of certain types of apparatus and their mechanical effect. I shall accompany the lecture by a number of cases taken from my own practice, whereby it will be possible to show the condition after a shorter or longer period of treatment. I must emphasise that the point here is not so much to demonstrate the final result of a gnatho-orthopaedic treatment, as to show a state in the treatment which best illustrates the mechanical effect of the apparatus' construction. Whilst it is, of course, impossible in a single lecture to pay regard to all the anomalies and details which occur in the system, I hope that the examples chosen will afford an adequate picture of the system's utility in practice.

It is, I imagine, generally known that the system has been worked out by Professor Viggo Andresen, formerly director of the Orthodontic Department of the Norwegian Dental High School in Oslo. Already in 1909 Andresen brought out a type of apparatus which in its main principle is the direct predecessor of the present apparatus used in the Norwegian system. Originally it was used as a functional retention apparatus in connection with the treatment which was usual at that time according to Angle's system. On the basis of later acquired experience and knowledge of the significance of function as a mechanical factor for transformation of the jaws, it has gradually superseded the fixed apparatuses, also as a therapeutic means.

Besides having the quality, as in the case of other types of apparatus, of acting on the individual teeth for correction of their position, and influencing the alveolar process and the jaws by means of a drag or pressure on the individual teeth or group of teeth, the apparatuses in the Norwegian system have other specific objects and modes of action. They aim, in addition, at exciting certain muscles, which we believe have great mechanical significance for the internal and external structure of the jaws and for maintaining the mechanical result obtained. I may mention the mimic muscles, lip and cheek muscles, tongue, the subhyoid muscle, the lower jaw's retracting or protracting muscles, and, more specifically, the chewing muscles. In the opposite direction, certain groups of the same muscles are blocked and relaxed, all according as the individual judgment of the sub-function or hyperfunction of the various groups of

muscles advise the one course or the other. By its mode of activating or relaxing in a reflex way certain groups of muscles, or changing the direction for the function of certain muscles, the apparatus is to be regarded as an indirect means of jaw transformation. But it can also directly act as a 'transformator'. It is specific for this type of apparatus that the soft parts, for example the soft parts of the palate which are covered by the rubber of the apparatus, may if desired be exposed to a direct functional influence. In function an apparatus constructed according to the Norwegian system acts as a passive transmitter of the activated muscles' function to the soft parts or teeth which are touched by the apparatus. The muscles represent thus the primary source of power. By the above-mentioned soft parts being exposed to functional pressure-effects, these are transplanted further in the form of intermediary jerks to the interior of the underlying jaw-part.

With regard to the doctrine of transformation and the theories connected with this, I may refer to Andresen and Häupl: 'Funktions-Kieferorthopädie', publisher Hermann Meusser, Germany, where the transformation processes in relation to the Norwegian system are described in greater detail. In the same connection, I should like to draw attention to Häupl's latest histological researches, which are published in *Fortschritte der Orthodontik*, 1938.

Clinically we have the opportunity of observing changes which find their natural explanation in the conclusion that a direct jaw-transformation must have occurred as a reaction to the influence of the apparatus. It is, according to the Norwegian system, not necessary in principle to allow the apparatus to touch the teeth themselves in that part of the jaw which it is desired to reform. We see this, for example, in expansion of the upper jaw, where there has occurred in a relatively short time an expansion of a half centimetre or more without any visible tipping of the crowns of the teeth. In this case the functional intermediary pressure-effects are chiefly caught by the soft parts of the palate and the primary alterations must have occurred directly in the jaw bone and the alveolar process, whereupon the teeth have followed in a secondary manner. Perhaps we see this still more clearly by the alterations of the jaw bone which are obtained, for instance, by influencing the middle jaw, where there is used a gutta-percha compress restricted to the middle jaw. This

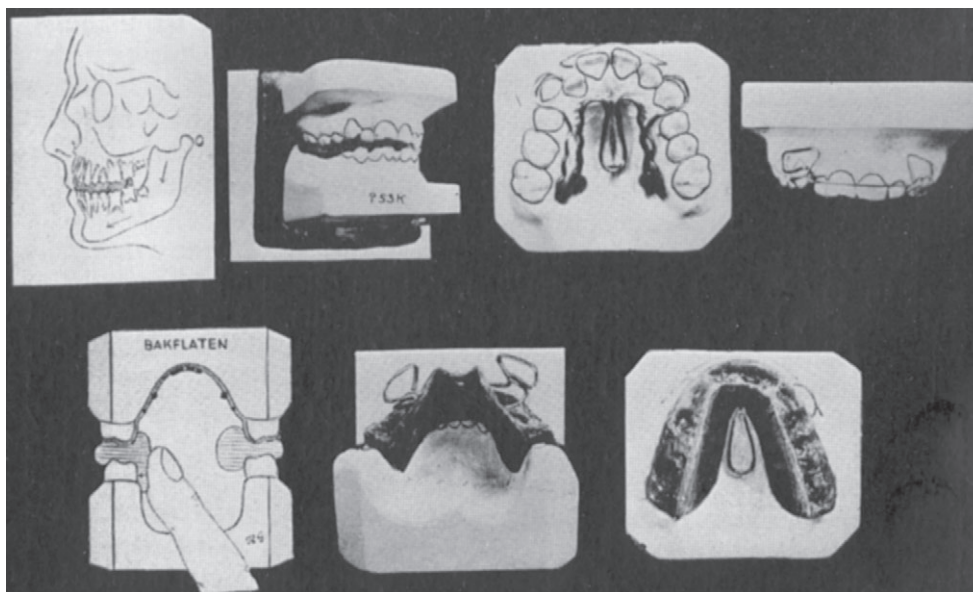


Figure 1 Various stages in the making of an activator with wings reaching down into the lower jaw – 'mandibular wings'. Top left: Illustration of the 'working bite' in position, the shaded part between the rows of teeth representing the wax mould. The patient has opened his teeth and protruded the lower jaw. The case is Angle Class II division 2. Further, the working bite is seen transferred to the models, which again are placed in the plastic impression-mass 'the fixator'. The following illustrations show a finished labial arch and Coffin spring looked at occlusally and the next illustration the labial arch seen from the front. Bottom left: The models looked at from the rear, to illustrate the wax impression of mandibular wings. The next illustration shows the finished apparatus placed on the lower jaw, and the last picture the apparatus placed on the upper jaw.

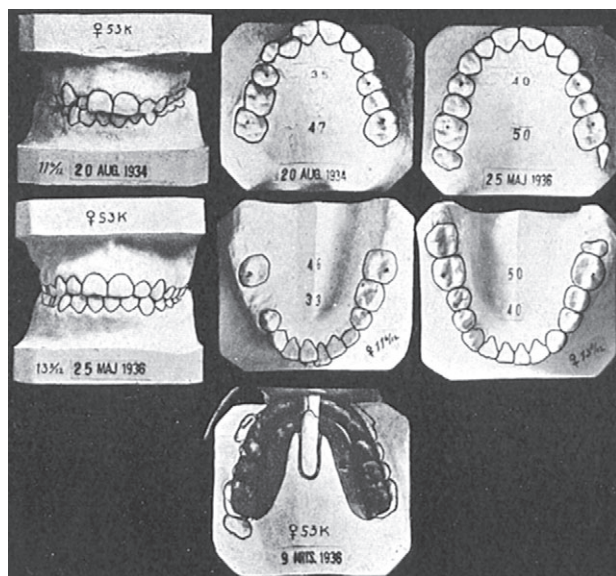


Figure 2 A girl 11½ years (Case 53K). Neutro-occlusion. Treated from August 1934 to May 1936. Apparatus used: Symmetry expansion activator. Local agent for 2+: Orange pins. Mechanical effect attained: Upper jaw widened by 5 mm in the premolar region and by 3 mm in the molar region. The lower jaw is widened by 7 and 4 mm, respectively.

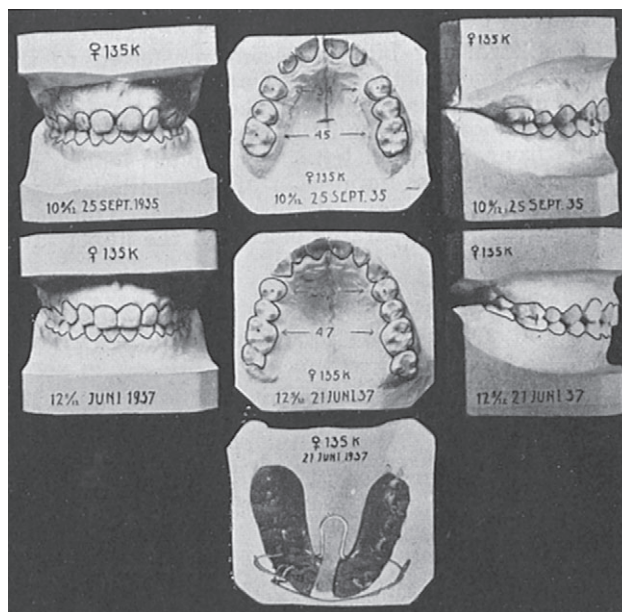


Figure 3 A girl 10 years 8 months (Case 135K). Neutro-occlusion, a slight forward aberration of the right premolars and molar of the upper jaw and a distal aberration of the lateral and central of the same side. Lack of space for 3+. The models show the condition in September 1935 and June 1937. Apparatus used: Symmetry expansion activator. Local agent for 2. 1+: A metal spring distally for 2+. Mechanical effect attained: About 2 mm expansion and mesio-distal opening of the space for 3+. The apparatus used, placed on a model of the lower jaw, is seen with the palate-side up.

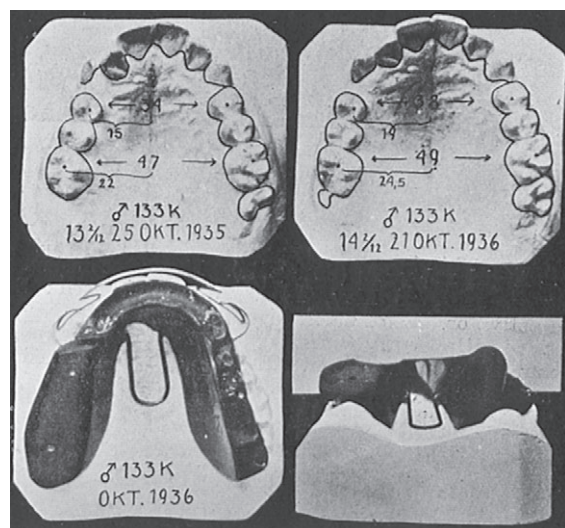


Figure 4 A boy 13 years 2 months (Case 133K). Unilateral maxilla compression. The models show the condition in October 1935 and October 1936. Apparatus used: Asymmetry expansion activator. The expansion of the right side attained (4 and 2.5 mm) is produced by the apparatus being furnished with a 'mandibular wing' the left side, this wing being omitted on the right side. The apparatus used is seen both occlusally and from the rear of the model. Observe that the apparatus is split in the region of the canine.

compress transfers the functional jerks immediately to the soft parts of the palate above this area. Similar gutta-percha compresses in the upper jaw are used in the case of retarded canine teeth to make possible and accelerate their emergence (cf. Andresen: 'Die Funktions-Kieferorthopädischen Behandlung retinierter Eckzähne', *Tijdschrift voor Tandheelkunde*, 1936).

I myself have had the opportunity of practising the Norwegian system for seven years, and the results I have observed during this period have been such that I very rarely have recourse to methods which work according to the principles usual for fixed apparatuses. Of course the extended use of this system to comprise the innumerable detailed problems which arise in a treatment have had the effect that the apparatus-constructions have, from year to year, been elaborated and are still not concluded, but in cases where the result has not been satisfactory this is, I think, due in the main to defective knowledge of the individual biology of the case and too great a reliance on the powers and lasting effect of the mechanical impulses than to the method itself. In connection with the above-mentioned elaboration of the system, I shall later mention my own little construction, an apparatus which at Andresen's suggestion I have called the 'protraction-accommodator'.

I should like to emphasise another specific peculiarity about the Norwegian system; it is that the apparatuses are not merely detachable but they must also be entirely loose. That is to say they must not in any way be fixed to the teeth by hooks or the like. It is an error in principle, by

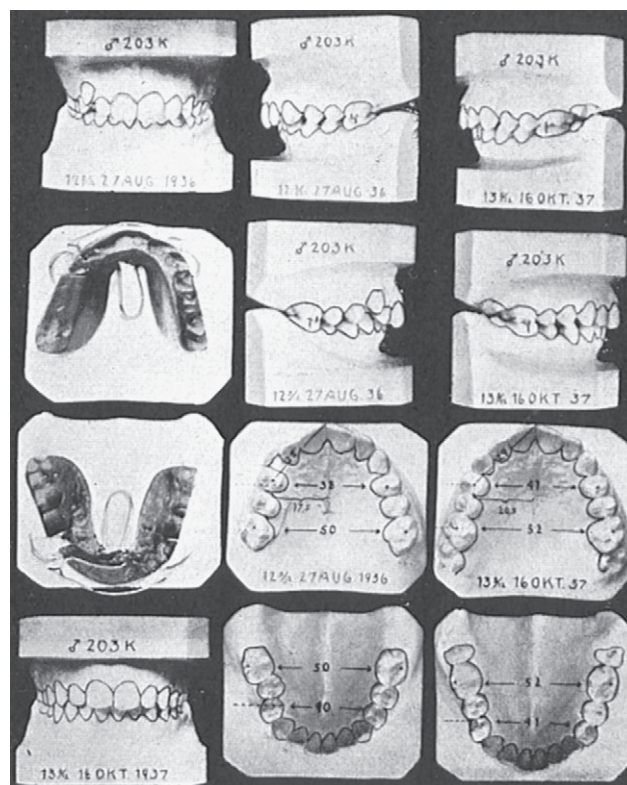


Figure 5 A boy 12 years 3 months (Case 203K). Slight degree of disto-occlusion and narrowing of the space for 3+ in consequence of unilateral compression and encroachments on both sides of the space. In the lower jaw lack of space for 5+. The models show the condition in August, 1936, and October, 1937. Apparatus used: Asymmetry expansion activator. Local agent: A spring for labio-medial guidance of 2,1+. Working bite taken in neutral occlusion. Mechanical effect: Expansion of the right side by 3 and 2 mm. Opening of the space for 3+. Neutral occlusion. The apparatus used is seen occlusally and from the palate side. Note the interesting by-effect, 5+ has acquired space, without the apparatus working directly down into the lower jaw on that side. The transformation of the upper jaw obtained by use of the apparatus at night has, under the influence of the occlusion in the day-time, automatically affected the lower jaw in the same direction.

means of arches or springs fastened to these apparatuses, to arrange or tighten them in such a way that the apparatus hangs fixed. To give an example, It is obvious that the apparatus as such will not be any irritant for reflexive functioning of the lip musculature or the tongue if it hangs firmly in the teeth of the upper or lower jaw. If we are treating a patient who breathes through his mouth he will be able to continue to breathe through his mouth unhindered by the apparatus if this is fixed to the teeth. With a loose apparatus on the other hand the patient himself must by the tongue and, if possible, by lips and teeth, from time to time 'suck' the apparatus into position in order to prevent it falling out of his mouth. An analogous function takes place, for instance, by the bad habit of sucking the thumb. In the same way as the sucking of the thumb is able to deform the jaws, the muscle functions which are similarly excited by the loose apparatus are able to reform. The difference is, however, that the apparatus can be arranged

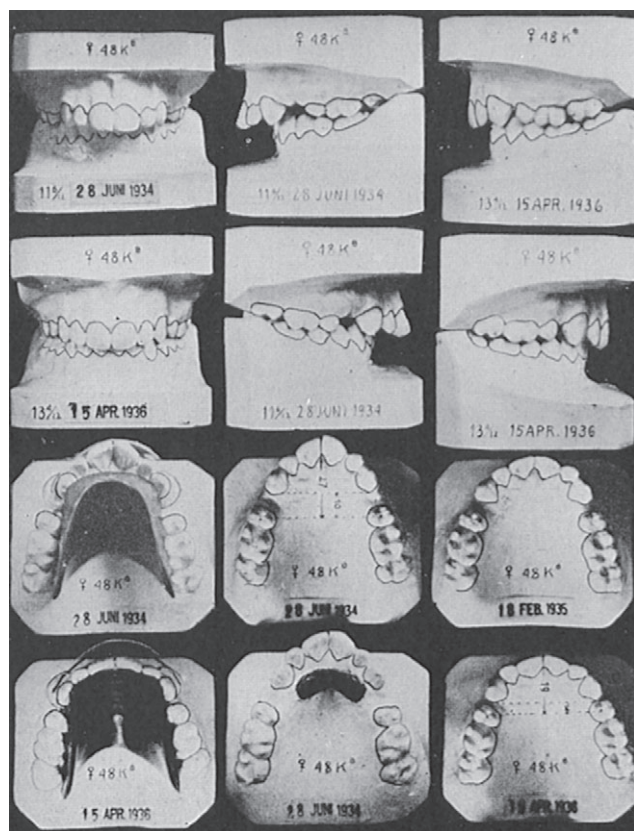


Figure 6 A girl 11½ years (Case 48Kb). Disto-occlusion and protrusion. Deep bite. 4+4 has been extracted. The models show the condition in June 1934 and April 1936. This case is demonstrated specially in order to show the applicability of the labial arch, and first and foremost the effect of the corner teeth hooks. Type of apparatus used: Extrusion-activator. In order that the vulcanite of the apparatus shall not hinder a sufficient drawing back of the front part of the palate, there is arranged a palatal reserve chamber. This is produced technically by placing a kidney-shaped projection above the part in question before the apparatus is made, which is illustrated on the centremost model in the bottom row. The apparatus used is seen both in the beginning model and finishing model in order to depict the degree of mechanical effect. Note the axial position of the canine before and after the treatment.

in such a manner that it works in a specific direction entirely dependent on its form and field of activity. By thus preoccupying the function of the lips and tongue the apparatus is to be regarded as a direct therapeutic agency for the exercise of nose-breathing.

From time to time the apparatus will slip from the upper jaw and fall down on to the lower jaw. Thereby the tongue and muscles of the lower jaw are excited into reflexive function, the patient getting into the habit of catching the apparatus up and biting together instead of spitting it out. In case of swallowing movements we can also count on the patient biting against the apparatus. I speak of reflexive function because the apparatus is, on principle, used during sleep. In this connection I may say that we can hardly compare the muscular powers which are unfolded during sleep with the powers which by the help of the will are able to exert a

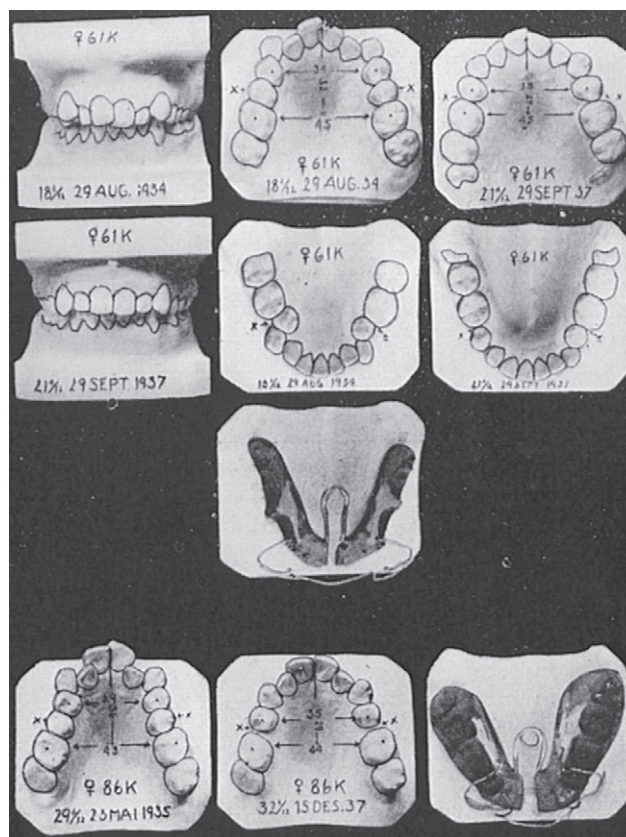


Figure 7 The labial arch is used, further, in order to impel the premolars distally. This is shown clearly in the two cases illustrated (Cases 61K and 86K), where 5+5 has been extracted. An interesting point here is also the age of the patients, especially in the latter case (86K) where the patient was at the commencement of the treatment nearly 30 years. The apparatuses used are seen with the palate side up.

force of many kilograms. Further, we can also count on psychically conditioned muscle contractions such as we presumably have for the most part to do in connection with the so-called teeth-pressing or teeth-cutting. That the patient in practice really chews on these apparatuses we see clearly by the deep marks of wear on the vulcanite from the cusps of the teeth when the apparatus has been in use for a time.

In the shaping of the apparatus, regard is paid to what group of muscles are to be activated in each case. Further, regard is paid to the fact that the activated muscles are to be used as a source of power. Next, the shaping will depend on which parts of the jaw or covering soft parts are to be directly affected, and further regard is paid to which teeth on the one hand shall transmit the muscular power and/or, on the other hand, shall make use of the reciprocal action of the apparatus. Finally, regard is paid to the question in what direction the individual teeth are to be affected. I have already mentioned that lips and tongue and, in part, the chewing muscles, are activated merely by the fact that the apparatus is loose, and that this leads further to the practice of nose-breathing.

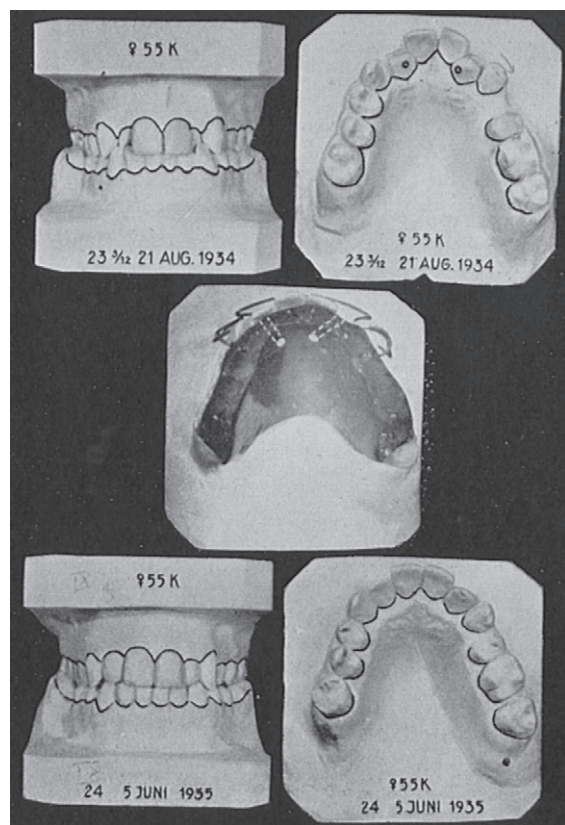


Figure 8 In this case (55K) the special use of the orange pins is illustrated. The left canine is first impelled distally by means of the canine hook, and 2+2 then directed labially by means of pins, the situation of which in the apparatus is indicated by the white dotted lines.

In passing now to a description of certain details in the construction of the apparatus I must first state what we understand by a 'working bite'. The prior condition for the technical execution of the apparatus according to the aforementioned principles is to register the most suitable working position for the jaws' mutual relation to each other. This is registered on the patient by allowing the latter to bite in wax and the bite-mould thus obtained is transferred to the models, which are then fixed with the rear surfaces in a so-called fixator of impression material. The bite-mould is called the working bite. Common to all types of apparatus is that the working bite registers a separation of the rows of teeth in such a way that it is possible more or less to cover the chewing surfaces of individual or several teeth for impressing the chewing plane into the vulcanite. Otherwise it is possible to register in the working bite any movement of the lower jaw to one of the sides, forwards or backwards, according to the effect on, or utilisation of, certain groups of muscles. If we wish, for instance, in the case of disto-occlusion to affect the protractor muscles, we allow the patient to protrude the lower jaw. On the other hand, in case of mesio-occlusion or so-called enforced bite, we allow the patient to draw the

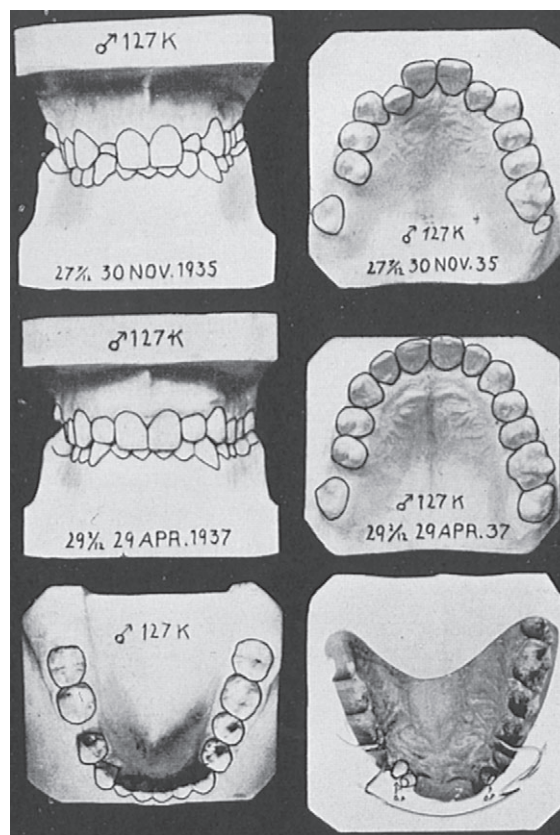


Figure 9 Case 127K. A similar case to the previous one, where orange pins likewise are used. The premolars of the right side are impelled distally by means of an extra spring, as appears from the apparatus shown, with the palate side up. The age of the patient was 27½ at the commencement of the treatment.

lower jaw as far back as possible in order to affect the retractor muscles.

Among the details in the technical shaping of an apparatus which is used in the treatment of disto-occlusion I may mention the mandibular offshoots in the form of lateral wings. Such wings of vulcanite which extend down across the lingual surfaces of the lower jaw teeth toward the tongue base, aim on the one hand at affecting the lower jaw by expansion. On the other hand they represent the specific device for influencing the protractor muscles. It is presumed then that the wings are shaped according to a working position between the models obtained by the patient having in the working bite protruded the lower jaw. If we allow our patient to put such an apparatus in his mouth we see that he is forced, owing to the wings which reach down into the lower jaw, to protrude the lower jaw in order to be able to bite together. When the closed-bite position has been reached the retractor muscles try to draw back the lower jaw together with the apparatus. The apparatus meets opposition in the upper jaw and transmits thus the distally directed drag of the retractor muscles to the upper jaw. Reciprocally the teeth of the lower jaw are

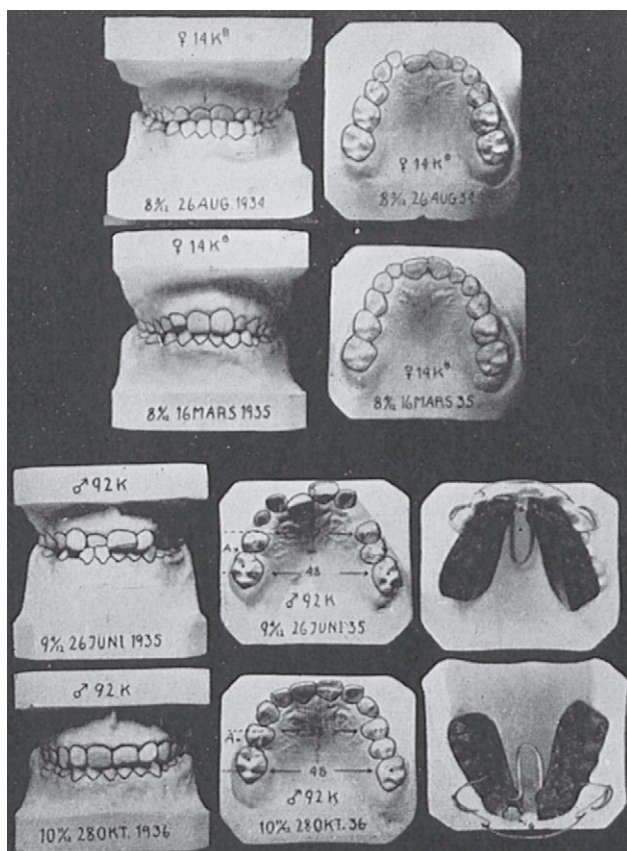


Figure 10 Case 14K^B and case 92K. Instead of orange pins hard plate gutta-percha may also be employed, as is shown in the two cases before us.

affected in a mesial direction. If the activated muscles are relaxed and the patient opens his mouth sufficiently to avoid disturbing the wings, the only result of this is that the loose apparatus by its own weight falls down into the lower jaw. The consequence of this again is that the tongue and closing muscles are excited and the patient bites reflexively together. We may imagine that this repeats itself again and again in the course of the night, and thus is obtained a functional intermittent effect on the whole jaw mechanism.

If we wish to treat a deep bite we form the vulcanite in such a way that the six front teeth of the lower jaw, if possible, bite against it, with or without an inclined plane effect, whilst the premolars and molars are left wholly or partly free. In the case of an open bite the reverse arrangement is made. In the latter case, we use vulcanised spikes of rust-free steel which turn towards the tip of the tongue in order to counteract an eventual pressure from the tongue.

In order to obtain a lateral expansion the inclined plane principle is used, a laterally directed inclined plane (directing grooves) being formed in the vulcanite for each single tooth which is to be expanded, or we make use

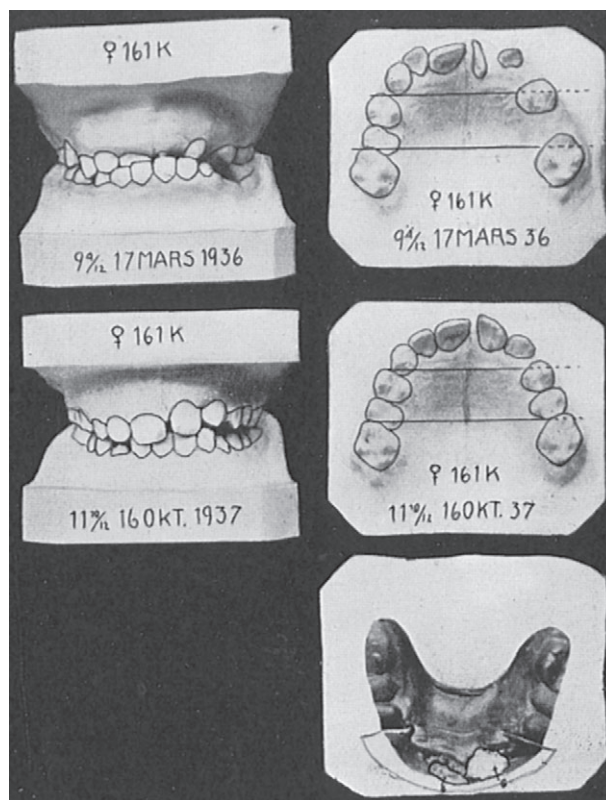


Figure 11 This case (161K) serves as an example of what may be attained by rotation in connection with an apparatus according to the Norwegian system. Here are used hard plate gutta-percha on the lingual side and a diagonal pressure by the labial arch on the labial side of +1. The tooth is rotated in the course of its emergence, and the conditions here are specially complicated, the tooth in its entirety being in oral occlusion. The apparatus used, the gutta-percha 'Compressor', is seen with the palate side up.

of the direct intermittent pressure of the apparatus on the soft parts of the palate or alveolar processes. If we wish to increase the expansion this is obtained by using a palate spring of rust-free steel, a so-called Coffin spring — the apparatus in such case being divided into two parts with a fretsaw.

Power-effects on the individual teeth (in addition to those already mentioned) are let loose in a mesio-distal direction by means of a mesio-distally directed inclined plane (directing grooves) in the vulcanite. For the same purpose is used the labial arch, which is also used for retraction of the front teeth. Further, I may mention that there are used various springs, orange sticks and hard plate gutta-percha in connection with our apparatus. The mechanical result of these devices will appear from my practical demonstration.

As a conclusion to this brief survey of the Norwegian system's principles and modes of working, I shall add a few explanatory remarks concerning my own construction — the protraction-accommodator. As the name indicates, this apparatus also is used for activation

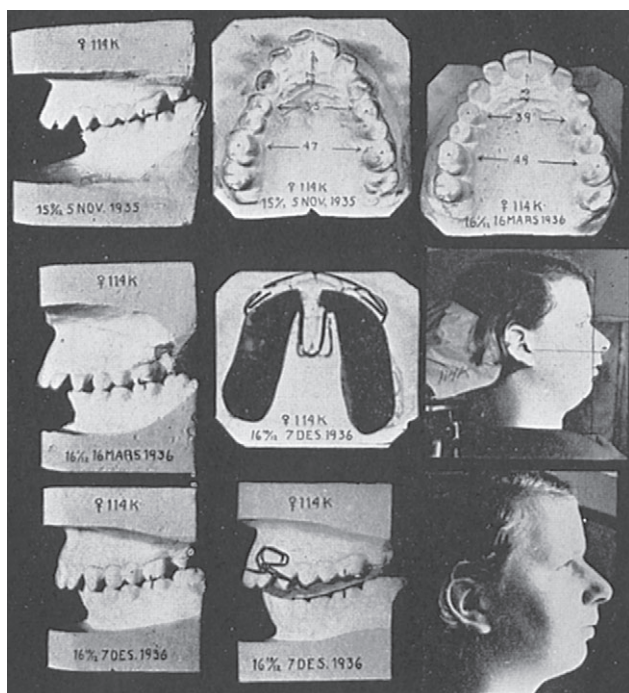


Figure 12 The use of the protraction accommodator mentioned in the sub-title of the lecture. A girl nearly 16 years of age (Case 114K). Disto-occlusion with protrusion. Maxillary compression. The working bite is taken in neutral occlusion. The models show the condition in November 1935, March 1936 and December 1936. The apparatus used is seen occlusally and on the left side. The profile photographs give an impression of the alteration which in the course of the said period has occurred both with regard to the profile relations, the lip-function and the sub-hyoid muscles.

of the protractor muscles, for example in cases of disto-occlusion, but contrary to the types of apparatus already mentioned in which mandibular wings are employed, the wings are omitted in this construction. In the first place I have found it most practical to omit the wings down into the lower jaw in those cases of disto-occlusion where it is only the upper jaw which needs an expansion. In the second place I have found that the lower jaw is affected in a less forcible manner in those cases where the lower jaw lies in extreme distal position. The mandibular wings which more forcibly hold the lower jaw in a protruded position were apt by large bite dislocations and corresponding luxation of the joint-head to cause an over-exertion and relaxation of the ligaments of the joint mechanism rather than a functional transformation. That which in my construction excites or invites the lower jaw to effect a mesial dislocation whilst chewing on the apparatus is the vulcanite plane which follows the cusps of the lower jaw teeth. Looked at sideways, this vulcanite plane describes a curve conforming with the curve of Spee of the lower jaw. When I mention that the working bite is taken here in the same way as previously described for disto-occlusion this will explain why the patient pushes the lower jaw forward along the artificially

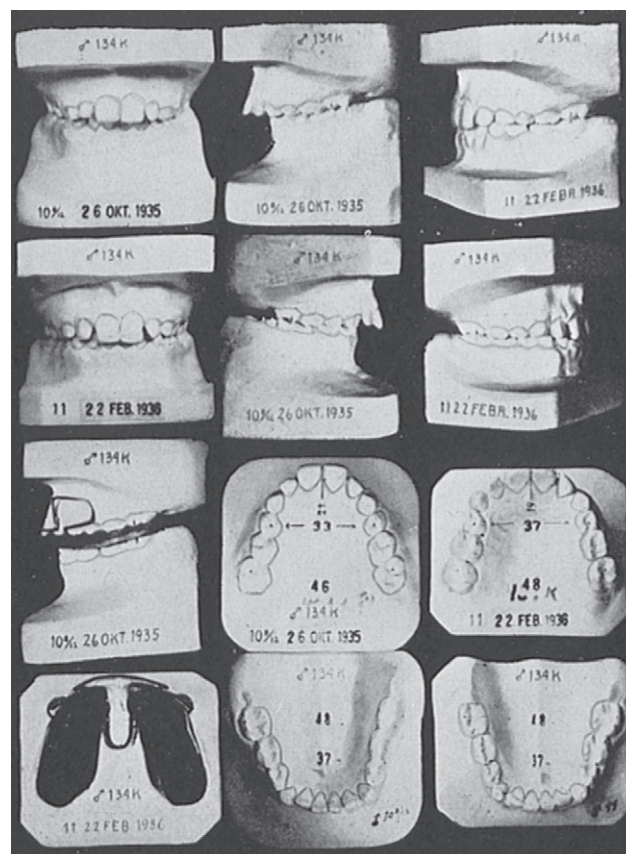


Figure 13 The apparatus here (Case 134K) is the same type as the two previous ones: protraction-accommodator. A boy 10 years 8 months. Disto-occlusion with protrusion. Maxillary compression. Deep bite. The models show the condition in October 1935, and February 1936. Mechanical effect: Expansion of the upper jaw by 4 and 2 mm. Retrusion by 2 mm. Neutral occlusion. The apparatus used is seen from the side and occlusally. Noteworthy is the short period of treatment (4-5 months). Retention of the result obtained and raising of the bite arc to be produced by an ordinary extrusion-activator (cf. Fig. 6).

imitated Spee curve conformably with the protrusion in the working bite. It is also my experience in practice that the majority of patients who use this type of apparatus really thrust their lower jaw forward in chewing on the apparatus. Excepted, of course, is the situation that the Spee curve of the lower jaw is related to the inclination of the joint cavity as a part of the same circle. On the other hand, there is nothing in this type of apparatus which, in use, prevents the lower jaw from taking up a rest-position in a more distal situation. The protrusion will be only occasional and exclusively on the initiative of the protruding muscles, and the jaw joint is affected in agreement with the principle of functional exercise and functional effect.

Discussion

Dr Sheldon Friel: I have listened with great interest to Dr Grude's paper on the 'Norwegian System of Orthodontic

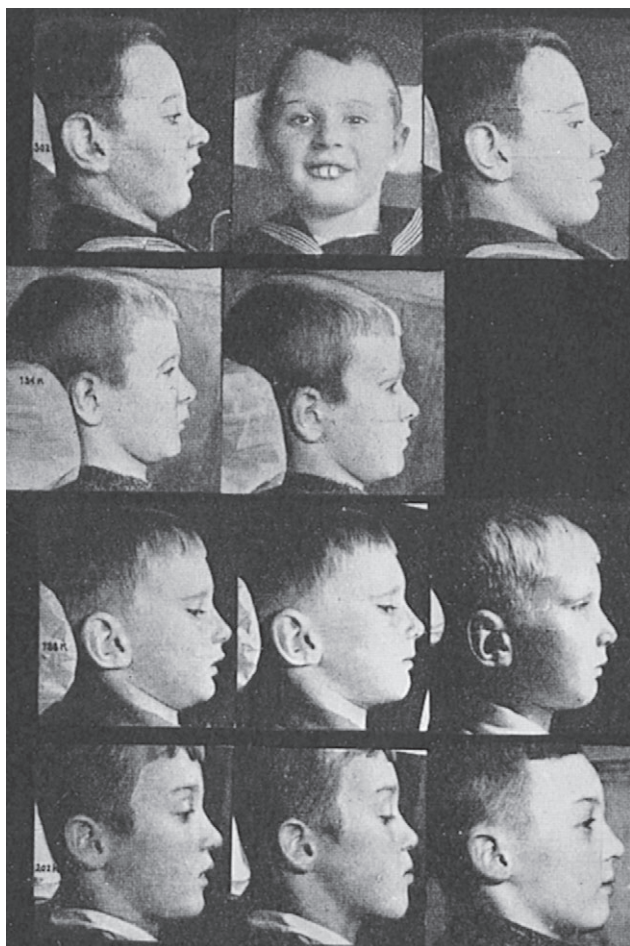


Figure 14 Profile photographs of four different cases of disto-occlusion with protrusion. The three pictures at the top are patient number 302K with and without working bite. The two first pictures show the facial proportions of the patient in individual occlusion. In the last photograph the patient has protruded the lower jaw and the teeth are opened. The next patient (134K) is likewise seen first in individual occlusion and then with the working bite in the mouth. The next patient (188K) is seen first in individual occlusion, then with the working bite in the mouth, and finally as he appears after a period of treatment with the protraction-accommodator. The last patient (202K) is seen likewise first in individual occlusion, then with the working bite in the mouth, and finally as he appears after a period of treatment.

Treatment' and I wondered whether it is correct for a system to assume a national title, as one would gather that it was universally used in the country whose name it bears. So far as I can gather this system is not at all universally used in Norway. The system was founded and taught in the dental school at Oslo by the former director of the orthodontic department, Dr. Andresen, and it would seem a much more correct and better term to call it the Andresen System, and then one could lay the blame or the credit at the feet of Dr Andresen and not the Norwegian nation. The author claims it is the only biological method of treatment. Is there any treatment that we can call a biological treatment? I do not think so. I think that when we put an appliance in a child's



Figure 15 Two cases of disto-occlusion with retrusion treated with the protraction-accommodator (81K and 88K), the next two cases (71K and 186K) are mesio-occlusion. The middle photograph of the last patient shows how far back the patient succeeded in retracting the lower jaw in the working bite. Models and apparatus for this case are seen in Figure 17.

mouth we must cause trauma to the tissues, and it is only a question of choosing an appliance that will cause the least amount of harm. An appliance that is capable of producing enormous pressure cannot be termed biological any more than one causing small pressure, even though done at night time and for long periods. Children vary very much: some are conscientious and will carry out to the last degree the instructions of their orthodontist. Some have very powerful jaw muscles. I have seen children who can exert a pressure on the first permanent molars up to 100 kilos. Some children clench their teeth at night time. Can we hand over to children with all these varying characteristics, an appliance that is capable of producing this enormous force? Personally I would not do it, and I would not recommend any other dental surgeon to do it. Several members have reviewed the Norwegian system of orthodontic treatment, and they have

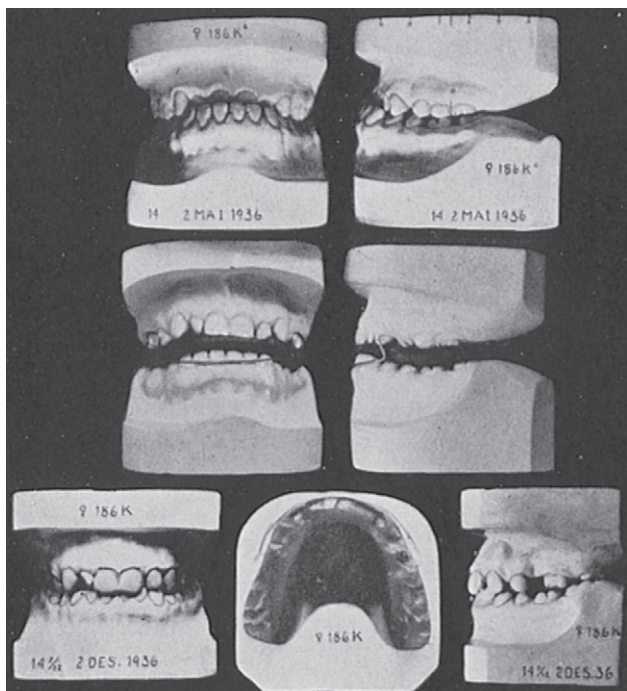


Figure 16 Girl 14 years (Case 186K). Mesio-occlusion. Apparatus used: Retraction-activator. The models show the condition in May 1936 and December 1936. The photograph of the patient is seen in Figure 14. The apparatus used is seen from the front, from the side and occlusally. Note that the labial arch interferes here with the six front teeth of the lower jaw.

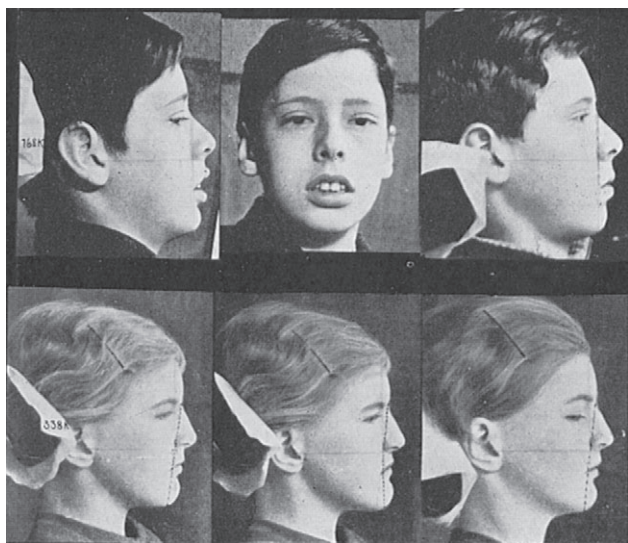


Figure 17 Top patient (Case 168K), a typical mouth-breather, serves as an example of the favourable effect the apparatus treatment has had on nose-breathing and lip function. Finally the next case (338K) serves as an example of the way in which the profile relations are estimated in a practical way by means of the working bite. The model-analysis gives as result Class II according to Angle. There is besides deep bite. The centre picture shows the profile relations with the working bite in the mouth, the patient having thrust the jaw forward to neutral occlusion. It appears from the proportions that the face is hereby given an aesthetically unsatisfactory result, wherefore an influencing of the lower jaw is rejected as a whole. The last picture shows the patient with the working bite which is to be used for the apparatus treatment.

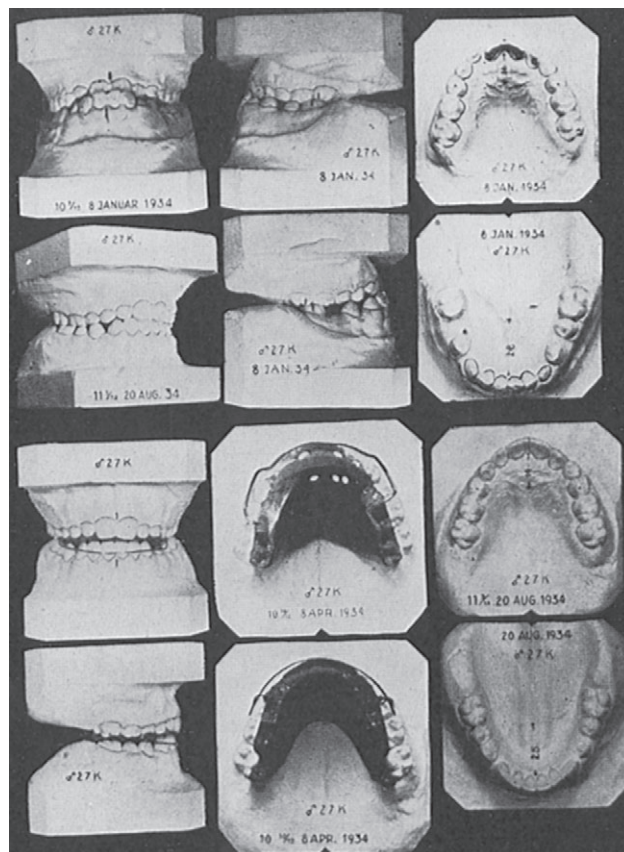


Figure 18 Like the previous case, there is shown here a treated case of mesio-occlusion. A boy 10 years 7 months (27K). Noteworthy here are the powerful interstices in the canine and premolar region of the lower jaw, which in my opinion are due here mainly to a powerful tongue which works one-sidedly in the lower jaw. Apparatus No. 1 used: Retraction activator. Local agent: Orange pins for 1+1, 2. Apparatus No. 1 was used from January 1934 to April 1934. Apparatus No. 2 (retention – activator) was used until August 20th, 1934. The models show the condition in January and August 1934.

shown its merits and demerits far better than I could, but there are a few points that strike me. The first is that it is controlled by the patient and not by the orthodontist: secondly, pressure exerted on the teeth will vary very much with each individual; thirdly, the length of time necessary to carry out treatment; and lastly, the types of malocclusion that have been shown are, on the whole, simple types of malocclusion which could have been treated more quickly and simply with other types of appliances. There is one other point. The direction of the muscles that activate this appliance are not in the direction that the appliance works. If you take a simple example, the chewing muscles, elevators of the mandible: they work up and down, whereas the force that is transmitted through the appliance is working at right angles to that. I do not think you could describe that as a physiological method. I do not deny the use of plates, but I do think that with any appliance put into a child's mouth, the orthodontist should control it and not the patient.

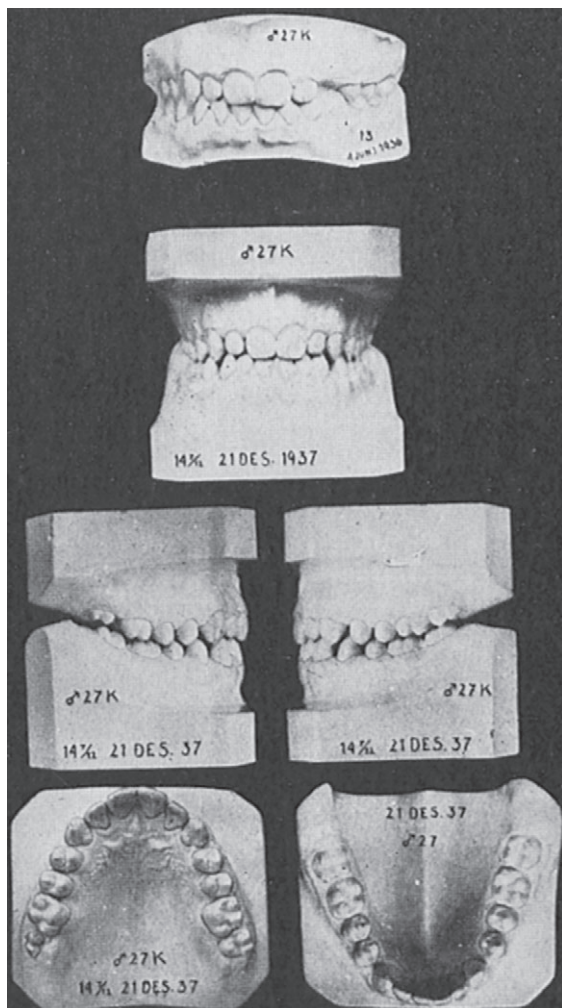


Figure 19 These models illustrate the previous case (27K), at the top two years after the conclusion of the treatment (facial impression). The next models are taken 3½ years after treatment. It is interesting to see that the last models show that there have arisen interstices again, not only in the premolar region of the lower jaw but also in the upper jaw, where before the treatment space was extremely crowded. This phenomenon shows in my opinion in the first place that we have to do here with an extremely energetic and powerful tongue, and in the second place that the apparatus according to its purpose must have directly acted on the tongue function and induced this also to work in the upper jaw.

Dr R Selmer-Olsen: Dr Grude has read a paper to-day about the method called 'Norwegian System'. I agree with Dr. Friel that it would be better to call it the 'Andresen

Plate', as the name has not been confirmed by the Norwegian Dental Association. Last year I had to give a brief review of the system as I did not think the theories upon which the system was founded were proved, nor did I find that the plate is built upon the principles expounded. It is good work that Professor Andresen brings forward a new method of treatment, but it would have been better for the method not to make use of propaganda, by belittling other appliances, until his theories were proved and his apparatus brought more in accordance with the theories. Andresen calls his system a functional therapy. I do not think that is quite correct. We may call it an artificial function. The plate is constructed in a manner which makes the natural use of the jaws impossible, and my opinion is that we get a better functional therapy where we make use of other appliances, active or inactive in themselves, which allow all the muscles to work without any hindrance, and at same time get the patient to make better use of his teeth in the natural manner. To get protruding incisors backward is not a typical function of the closing muscles, such as this method makes use of; on the contrary it is the work of other muscles which the plate does not make any use of at all, or puts out of function. I will put forward the thesis that the method is not characterised by natural chewing function but by periodic pressure (during night) achieved by the elasticity of the soft tissue and sometimes by the muscle contraction but often in atypical manner. I have seen good work done by Andresen's plate, but you may find other movable plates that work in a much better manner by muscle function, as *inter alia* shown by Dr O Henry at the European Odontological Society's meeting last year. After all, the question is not so much what kind of method we make use of as the relation between the force applied and the tissue reaction ability. This question I will discuss further in my paper later.

Mr Harold Chapman: In the treatment of Class II cases, after three years' treatment is the patient able to put the mandible in the distal occlusion in which it originally was? My experience is that when intermaxillary traction has been used continuously for three years that cannot be done. If I do not get that result I am practically certain that the child is not wearing the rubber bands all the time. I would like to know if, with this method of treatment, the mandible can go back into its old position.