

The Influence of Prognosis on Orthodontic Therapy*

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Although we cannot fully explain the reasons, it is an obvious clinical fact that the great majority of malocclusions, when treated according to the principles accepted by the Angle group, are thoroughly satisfactory in the end result. There exists, however, a small minority which may be classed as unsatisfactory, and with this small minority, and only these, is this discussion concerned.

These cases exist in every practice, varying in amount with the following factors:

- (a) The ability of the operator.
- (b) The degree of selectivity of the practice.
- (c) The willingness of the patient to undergo further treatment when unsuspected factors have caused relapse.

In the writer's experience, these unsatisfactory cases are associated with one or more of the following factors.

I. *PATHOLOGICAL CONDITIONS*, such as congenital syphilis, tuberculosis, hyperpituitarism, and alcoholism.

It is obviously difficult to elicit a history of syphilis, yet it is certain that some of our patients are the children of syphilitic parents. In one case in the writer's practice, it was felt that hypotonus of the oral muscles was contributing to the relapse. The services of an orthopedist were enlisted and a thorough course of medical treatment carried out. After all measures had failed, a history of syphilis was discovered. The medical opinion expressed was that the muscular tissues were incapable of responding adequately to the treatment. Tubercular children are notoriously bad subjects for orthodontic treatment, presenting instability of alveolar process and responding badly where increase in the mass of the basal bone is indicated.

Hyper-function of the pituitary gland may be found in varying degrees of intensity, and its effect upon the mandible sometimes becomes apparent at the most embarrassing time in the patient's life, as is illustrated in the following cases:

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1. A young man of eighteen years, whose mandible increased in all directions in eighteen months, so that every tooth, except one molar, was carried completely out of occlusion.

2. A boy of eleven years, Class I malocclusion, was treated and dismissed. He entered the Navy and returned at fifteen years of age with a Class III condition and an open bite. It was subsequently found that the father had a similar condition.

3. A child of ten years, the youngest daughter of an acromegalic father. The child has been under observation for five years. Mesio-distal relationship has been normal until recently, when the mandible commenced to lengthen and the teeth tended to assume Class III relationship.

In none of the above cases are enlarged tonsils or imitation believed to be a factor. Stockard has directed attention to the harmful effects of poisons, such as alcohol, upon the embryo, and it cannot be doubted that some of the stigmata, as expressed by malocclusion, have their origin in embryo.

II. *THE OCCURRENCE OF GENETIC VARIATIONS.* The idea that some malocclusions are the expression of a genetic variation may be said to be not new, but neglected. The recent mention of the hereditary factor, in a current text book, is however an indication that this prodigal child has returned to the orthodontic family.

In order to facilitate discussion, let us take, as a specific example, the diminutive mandible sometimes associated with Class II, Division 1, which fails to respond to the stimuli exerted by the forces of mastication of the orthodontically re-arranged teeth. Many of us have treated such a case twice or perhaps three times. Have we ever noted that there is almost invariably a similar condition in one or both parents, and occasionally in the grandparents?

Competent authorities consider that there are good grounds for the belief that the prevalence of Class II, Division 1, among the female members of the British aristocracy, may be accounted for, in part, by sexual selection. As an example of the popularity of this type in British communities, the writer mentions the case of a child of three years of age, who won a newspaper competition for the bonniest child in the Empire. It was a Melbourne child who won the prize and the writer's comment, when the photograph was published, was that she should have been rejected on account of the prominence of her teeth. Seven years later, this child appeared for consultation with a well developed Class II, Division 1, malocclusion. This same condition is not at all uncommon in girls in open competition for appearance on the screen.

It is significant that in the evolutionary reduction in the size of the jaws from primitive to modern man, the teeth and tooth bearing parts (the alveolar process) change the least, while the parts to which are attached the muscles (the basilar portion of the mandible) change to the greatest degree.

In cases where the diminutive size of the mandible is suspected as being a genetic variation, the writer heavily discounts the power of the trophic stimulus of function to overcome the anomaly.

Under the heading of genetic variation may also be considered the possibility of a disharmony in tooth size and basal bone. These are derived from different embryonic tissue, and are by no means correlated to the extent that some have stated. The absence of a high degree of correlation between deciduous and permanent teeth in Lewis' and Lehman's investigations is provocative of much thought in this connection. When we consider such physical disharmonies as deaf-mutism, brachydactylism, night blindness, oto-sclerosis, club foot, dwarfism and other conditions which are known Mendelian factors, are we on safe ground in denying the possibility of some malocclusions being in the same category?

Kadner has pointed out that there are three parts involved in the development of the denture—enamel organs, mandible and maxillae together, and premaxilla. The evidence is strongly in favour of an independent genetic factor for the premaxilla. Over-development of this bone is not limited to man, for horses, dogs, foxes, and sheep all exhibit the anomaly. Australian sheep breeders destroy all hog-jawed sheep and old squatters say that the deformity is not nearly so common as it was fifty years ago, the explanation being that it has gradually been eliminated by breeding. The writer's present state of mind on this question is somewhat befogged, but there emerges from the mist a suspicion that in certain cases of malocclusion there is a lack of correlation between (a) tooth diameter and basal bone perimeter, (b) the sizes of maxillae, mandible, and premaxilla.—these anomalies having been predetermined in embryo, and that in such cases the factors predetermining the anomaly will prevail, in varying degrees, over the functional forces of normal occlusion.

III. *HYPERTONUS AND HYPERTROPHY OF MUSCLES.* Our position in regard to the treatment of these conditions is that so far we have failed, but that we still have hopes. A large number of cases presenting mesial drift of buccal segments is explained by the operation of these factors but the writer would attribute some of these drifts at least, to a force which so far has received little recognition. This applies particularly to bi-maxillary prognathisms. Norman Bennett has recorded a case where the maxillary

first molars were in contact with the canines and the writer saw a similar case recently. Neither the musculature nor the anterior component force can be adjudged responsible in these cases; it seems probable that it is an exaggerated expression of the anterior movement of the teeth in their alveoli.

The current explanations of mesial drift of bixillary buccal segments are:

(a) Hypertonus and hypertrophy of the buccinator muscles.

(b) The operation of the anterior component force.

(c) The tendency of the roots to establish better axial positions by following the mesial drift of the crowns.

As regards "a" and "b," we may consider them as constant factors. "C," however, seems to be an unsatisfactory explanation, inasmuch as the roots of the mandibular teeth, under similar circumstances, behave entirely differently. Our ability to move bodily the maxillary buccal segments a distance equal to the width of one premolar, in a distal direction, without disturbing seriously the anterior teeth is still in doubt. The writer has seen no evidence of this ability in mature cases, (12 years), and he seriously questions the efficacy of such treatment where the factors of hypertrophied and hypertoned buccinator muscles are present.

There exists one type of case in which the prognosis is of a character different from the foregoing, and one here refers to the many cases of Class I which present with a rotation of the erupting incisors at about the age of 7-8 years. Kantorwicz, Korkhaus, and Lewis have all pointed out that many of these cases will improve without treatment, and experience has shown that many of them represent retarded development of the bony parts,—a condition which frequently is self correcting. In any event, the application of force to erupting teeth seems a somewhat doubtful procedure and, in the writer's practice, most of these cases are allowed to go untreated as regards appliances until about the age of 11 to 12 years. Those who have not tried this plan will be surprised at the amount of orthodontic treatment that has been spared to children in this category.

Having discussed the factors associated with these doubtful cases, we may now consider our course of action. We may either (a) reject those cases where a successful end result seems doubtful. This is known as 'selecting,' or (b) adhere to the ideal plan of treatment and cast the responsibility on the patient. As regards (a), commonly accepted professional standards would indicate that it would be ethically wrong to refuse such a case and allow a fellow practitioner to take the risk. As regards (b), the factor of co-operation on the part of the patient looms large. In view of the

complexity of co-operation, which now includes such things as muscle exercises, massage, alterations in diet, the re-education of parts of the central nervous system, and the psychic aspects of home environment, it is the writer's contention that the operator's duty is to form a precise estimation of the degree of success thought capable of attainment by the patient and then plan his treatment accordingly. To take a specific example, consider a case in Class I, with blocked out canines, where the arches have collapsed from excessive hypertonus of the oral musculature. Is it reasonable to expect parents to continue, for years, a doubtful assault upon this tissue, when the adaptation of the occlusion to the over-strong muscles may be quickly effected by the removal of four premolars?

The writer would suggest that while normal occlusion of the teeth is undoubtedly a great asset to an individual, there are other aspects of physical, mental, and social life which are equally important. He desires to state that this discussion is not to be interpreted as designed to lower the standards of treatment adopted by this group. On the other hand, it is his sincere belief that the intelligent and thoughtful use of the suggestions herein contained will materially aid in making our specialty more useful to the community and more satisfying to ourselves.

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