

The Role of Assumption in Orthodontics

HAROLD SCHWARTZ, D.D.S., M.S.D.

Chicago, Illinois

As we view the status of the science of orthodontics in mid-century, we see what appears on the surface as an encouraging picture. Never before has the orthodontist had it so good; he has developed mechanisms and techniques that enable him to perform the most complicated tooth movements with ease and speed; in diagnosis, mainly through the use of cephalometric methods of appraisal, he seems to have found a reliable guide through the complexities of diagnosis.

In his treatment he tries to realize the ideal which is for him a mental image. Perfection is his goal; he wants his finished cases to have ideal function, ideal esthetics, and ideal retention. As Riedel states it: "Though the ideal may never be attained, orthodontic procedure must always follow a path aimed at the attainment of this ideal."

But as the years pass and as he attempts more and more to achieve these goals, he begins to realize that the results he had been led to anticipate have not materialized. Working against him are many factors which impose limitations on treatment, such as inadequate basal bone, faulty growth pattern, imbalance of the parts, asymmetries, variations of response, muscle pressure due to habit—to mention but a few.

In his efforts to achieve the goals he has set for himself, he initiates extensive and prolonged tooth manipulations. These result all too frequently in tissues that look "beat up." In addition, gingi-

val irritation and hypertrophy are present; the alveolar crests have disappeared and the clinical crowns have lengthened perceptibly. Radiographic examination may show varying degrees of root absorption.

Having finally arrived at the retention period, can he promise the patient that the teeth will stay where he puts them? Or does he unconsciously hope that the parents will overlook the slipped contacts, the relapsed mesio-distal relations, the dished-in profiles, the open contacts, the deep overbites and overjets? Do his retainers retain or do they merely maintain the status quo until the child grows too old for re-treatment when, with the discarding of the retainers, partial relapse seems to be the fate of the majority of his cases?

The evidence for relapse is not found in models made at the time of retention which show nothing but a skillful mechanical dexterity. It can be found, however, in models made of cases seen many years after removal of all retention, which only too often show a distressing tendency of the teeth to return to the original configuration of the malocclusion as regards axial inclinations, specific rotations, depth of overbite and even mesio-distal relationships.

This was strikingly demonstrated in the exhibits of models of cases ten, twenty and thirty years after treatment shown by the late James Burrill of Chicago and Edward Mitchell of Indianapolis who demonstrated that much can be gained by the study of cases long out of retention.

In this connection, C. W. Carey sug-

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gests that college living groups such as sororities are excellent places to check on orthodontic results many years out of retention since a substantial majority of their members have had orthodontic treatment completed many years before. "It is an embarrassing fact" states Dr. Carey, "that a large portion of those treated have little to show for it."

What is the cause of this state of affairs? Why does not Nature take kindly to our efforts? Could it be that, due to preconceived notions of treatment objectives, we are imposing something on the patient's dentition that is injurious as well as unretainable?

Most of us believe that we could improve the quality of our service if we knew more about growth, more about the developmental pattern, more about tooth movement and tissue response—in short, more about the factors operating at the time of treatment.

Is it not a fact that we approach our cases with certain preconceptions about treatment objectives; and could it not be true that these assumptions govern the results we seek to achieve in any given case? A little reflection will easily convince one that there exist many assumptions underlying our operative procedures and unconsciously determining and influencing our actions. These assumptions are so firmly entrenched in the pattern of our orthodontic thinking that they are accepted as true and real; when in fact they are not only arbitrary but often are vestiges of the thinking of a bygone age.

Among these presuppositions can be found the assumption that a normal occlusion of teeth as defined by Angle and G. V. Black can be successfully imposed on every orthodontic case.

Another assumption is the belief that Nature is purposive and will develop a normal occlusion in a given individual

if allowed to operate unhampered on the morphogenetic pattern of that individual. A third assumption relates to esthetics. The principles upon which esthetics and the sense of beauty rests can be shown to be arbitrary in nature, culturally determined, and depend to a high degree on the subjective evaluations of the orthodontist.

Again, the notion that there exists a morphogenetic pattern which imposes limitations on our efforts is an assumption. This does not mean that the morphogenetic pattern is an assumption. On the contrary, it is a real entity which exists not only in space but also in time. It is a space-time concept, to borrow a term from physical science. What we mean is that the developing morphological pattern tends to resist change imposed externally and hence places limitations on our manipulative efforts.

The purpose of this paper is to call attention to the tentative arbitrary character of many of the concepts and basic principles which underly our thinking. The nature of assumptions is examined and the role of postulates in science developed.

The need to recognize the presence of these assumptions, to become aware of them in ourselves and in others, is stressed. The role of assumptive thinking in the implementation of a philosophy of orthodontics is indicated. Lastly some applications to certain clinical problems is made.

A typical act of science might consist of the following steps: observation, report of observations, statement of hypotheses, calculations, prediction and finally testing of predictions by further observation.

It is in the statement of the hypotheses that assumptions and presuppositions are introduced into science. They are ways of explaining the unknown in terms of what is known, in terms of

what has been observed.

In attempting to explain the behavior of his cases, the orthodontist uses assumptions and hypotheses. These are of two types. One type comes from his professional education. Among these may be mentioned the concept of basal bone, or the idea of the line of occlusion. The other type of assumptions is imposed by the culture and society in which the orthodontist lives. The concepts associated with esthetics are of this latter type.

To illustrate, an interesting example occurred when, in October of 1948, Downs published his system of determining cephalometrically the range of facial and dental pattern within which one may expect to find the normal. His work was enthusiastically received and its value widely proclaimed; subsequently the Downs' standards came into general use in cephalometric diagnosis.

Other methods, notably those of Wylie, Riedel, Tweed and Holdaway were later developed. All these methods purport to be scientifically oriented; they prefer the preciseness of quantitative measurements to the approximations of qualitative methods; and they seek to maintain scientific objectivity of approach.

Downs, for example, reported that he selected 20 individuals with excellent occlusions, secured headplates and measured the various angular relationships to obtain the range of variation of the normal. By this procedure, however, he did not define the normal. It was in his selection of the cases that he actually defined the normal.

He assumed the clinically excellent occlusion as the normal. Conceivably another investigator could have selected a different group of so-called normals and developed a different range of values. The apparent agreement between the standards of the various investigators is due to the agreement of

their subjective concept of what normal occlusions and excellent faces look like.

The fact is that the concept, normal occlusion, treated by many as a clinical entity, is in fact an assumption.

It is easy for the orthodontist to accept the notion that normal occlusion is Nature's plan. The textbooks describe this relationship rather fully. Black's anatomy is most specific; and Angle's seventh edition describes the inclined plane relationships in three or four pages of deadly prose as those of us who had to memorize it may remember. Dr. Angle speaks of the "dental mill" and introduces the teleological concept that this particular arrangement of the denture represents the fulfillment of Nature's plan.

Nature is a benevolent fairy, who, given half a chance, will arrange the teeth in the accepted pattern. Angle says that "the best the orthodontist can do is to secure normal relations of the teeth and correct the general form of the arch leaving the finer adjustment of individual typical form to be worked out by Nature through her forces which must, in any event, finally triumph."

In other words, if we arrange the teeth in normal relationships, Nature will somehow keep them fairly stable in their new positions. But the work of Case, Grieve and others showed clearly that there existed definite limitations in the treatment of severe Class 1 cases with marked crowding. These cases did not remain stable in their new relationships. As a consequence the assumptions of Angle had to be modified and the concept of extraction was introduced as a basis for the treatment of cases with basal bone inadequacies. In these cases the normal arrangement of the teeth had to be modified and the result could no longer be considered a normal occlusion.

Thus we see that the arrangement of teeth known as normal occlusion is an arbitrary arrangement, a spatial configuration which is imposed on the patient not because it fulfills Nature's plan, but because it satisfies certain principles of esthetics.

The patient who receives this orthodontic arrangement possesses, however, a morphogenetic pattern in which his denture has been developing since its inception. If this arbitrary array is compatible with the limitations of the patient's pattern, stability and harmony will result. Contrarily, if the arrangement is not compatible, collapse and consequent failure of the treatment will follow.

Turning now to the subject of esthetics, few of us realize that our concept of beauty is imposed on us by the culture in which we live. Through a lengthy conditioning process which begins in early childhood, we gradually assimilate ideas as to what constitutes the beautiful. The illustrations in our fairy-tale books show the good fairy with a straight profile while the ogre is depicted with protruding teeth and lips. He is the stereotype of ugliness.

Then, as we get older and attend the movies, the same conditioning process continues. It is Hollywood that now dictates a straight profile as the culturally conditioned type of beauty. We see the straight profile in the leading man and the beautiful heroine. Our idea of beauty is being fixed for us as a stereotyped pattern.

The same process continues in television. In the television commercial, one sees people, invariably with straight profiles, who are very happy at all times, who are perpetually smiling, showing even, regular teeth which our dental friends tell us are heavily jacketed. To us this is beauty; it is part of our culture. On the other hand, the Ubangi

woman deep in the African jungle thinks that a ring in the lip is the height of beauty and attractiveness.

We smile over this, not realizing that our concept of feminine beauty is similarly conditioned. We like to think that our women are attractive and beautiful—but if we stop to consider their strange clothes, their high heeled shoes, their pencilled eyebrows, their strange hairdos, their faces heavily rouged and powdered, we see they are anything but natural. But, nevertheless, to us they are the essence of natural beauty and grace.

Angle stated that the best balance, the best harmony, the best proportions came when the teeth were in normal occlusion. The assumptions on which this belief was based have, however, undergone modification since Angle's time. Nowadays a large number of men have postulated a straight profile as the desideratum in treatment.

Having become convinced that all faces should be thrown into this mold, they have extracted four bicuspids, uprighted lower incisors and pushed mightily on the dentition to make real their preconceptions. That there may be other types of faces, conceivably realizing goals of harmony and balance, does not occur to them.

This concern for the straight profile, however, is not shared by our patients, who in most cases are merely concerned with securing evenly aligned upper anterior teeth and the reduction of overjet. Basically these are the things we try to give them.

The saving grace for our profession is that the public does not see, or if it does see, does not care about relapsed contacts or recurrence of overbite as long as the upper anterior teeth hold their positions. Fortunately or not, this attitude covers much ineffectual treatment.

Realizing the assumptive character of our notions about esthetics we will, it is hoped, re-examine our position, and not insist too strongly on imposing a type of face not suited to the individual. Rather shall we try to give the patient what is suited to his pattern.

To recapitulate, it seems evident that the orthodontist is governed by basic assumptions which he formulates as theoretical guiding principles. These assumptions are tested out in experience by being used as a basis for a philosophy of treatment in the management of cases. Assumptions found to be unsuitable are modified or replaced by others. The process is continuous and never finished. It is the method of science.

As part of the philosophy of treatment the orthodontist should fashion a set of postulates to guide him in his work. For example, in the first place, he should postulate that above all things one must avoid injury to the tissues; in the second place, he should assert that stability of result would be one of his major objectives for which he would be constantly striving. In the third place, he should postulate the dominance of the morphogenetic pattern. Any configuration that is arbitrarily imposed on the dentition should be within the limitations of the individual's pattern. He should recognize these limitations and accept them.

Finally, until a better method is suggested, he should place the teeth so that the upper and lower first molars occlude in the Class I Angle position. Other details such as arch form, degree of overbite and overjet, axial inclinations, etc., would depend on his estimate of individual variation.

These are only some of the principles which might be incorporated in a basic philosophy.

In conclusion, the role that assumptions play in the formulation of a phi-

losophy for orthodontics has been indicated. Their relation to treatment goals, to esthetics and to concepts of the normal has been developed.

Another important point remains, perhaps the most important: we must become aware of our assumptions. We must learn to recognize when we are applying them to our work. This awareness will enable us to detect the operation of assumptions in others and teach us to be tolerant, as we realize only too often that statements advanced by others as being true and factual are merely assumptive. Then, too, awareness of assumptions will keep our thinking flexible because we will be less apt to cling tenaciously to an idea when we realize its tenuous nature.

Working thus on the foundations of our science, we will be helping to lay the groundwork for real growth toward the solution of our common problems. For it is in the imagination of man that the great ideas and discoveries first appear; and surely it was to the man of imagination that David Sarnoff was referring when he said recently, "Whatever the mind of man visualizes, the genius of modern science can turn into fact."

55 E. Washington St.