A Redefinition of the Principles of Orthodontic Education*

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The title of this paper implies a change in our concept of the meaning of the words "orthodontic education." Lexicographers report frequently that words become obsolete or that their meaning has changed. Even though the meaning of words remains the same, the meaning of the phrases in which they are used may be altered because of changes in usage or application. The word "orthodontics" and the word "education" have not changed in their meaning since they came into use, though our understanding of what is implied in the phrase "orthodontic education" has changed materially during the past decade, due to evolutionary changes in procedure and supplemental knowledge gained through research and clinical experience. There is some justification then, for redefining the principles of orthodontic education. The best approach is perhaps through a discussion of objectives and procedure.

A single objective in dental or orthodontic practice might well suffice, if we can but agree upon it. May I submit: A complete dentition, free from defects and deformities, functioning normally and with comfort throughout life for all people. If this be accepted by everyone concerned, then we should proceed toward this goal and our policies both in education and in practice should be established with this in mind.

Holding the conviction that dental schools are primarily responsible for the failure to reach this goal because they do not train their graduates adequately in the field of preventive dentistry, including orthodontics, and realizing that dental associations with their ever changing administrative personnel and policies are in no position to correct such conditions, I believe that it is the duty of dental faculties to take the initiative in redefining educational principles and making curricular changes in keeping with the new standards which will be developed as a result of our study. If we do so with the intention of training students well in the preventive field of dental practice, there should be no condemnation or adverse criticism of such a policy.

*Read before the tenth annual meeting of the Edward H. Angle Society of Orthodontia, Del Monte, California, April 7, 1936.

Society expects learned men who serve it to fulfill the legal and professional requirements in their respective fields. These are widely publicized, though less widely understood. Society also considers that graduation from a university is a mark of learning and presumes that, when the stamp of approval in the form of a diploma or a license to practice is awarded to a man, he is qualified in his sphere. All state dental laws permit the licentiate to practice every phase of dentistry as it is legally defined, regardless of the adequacy of his training. But the licensing examination in such an important field as orthodontics is no criterion in determining his fitness.

In a recently issued report of the Curriculum Survey Committee of the American Association of Dental Schools, A Course of Study in Dentistry, I find in Chapter III, "Dentistry and Its Responsibilities," a heading "The Treatment of Malocclusion of the Teeth" and beneath that in italics, "New Conceptions of Orthodontics and Their Implication." The heading definitely carries us back to the "Gay Nineties," when every dental student was instructed in the making of an appliance for tooth movement for the particular case he was to treat, and his clinical instruction was based entirely on the theory that the practice of orthodontics was limited to the correction of malocclusion by "straightening crooked teeth."

The science of orthodontics has progressed so rapidly during the last score of years that the regular dental practitioner, young or old, is in almost complete ignorance of its status and importance today. Even those most active in this field of practice have difficulty in keeping pace with its rapid growth. Think, for instance, of the inclusion of anthropology, anthropometry and biometry in our courses of study; of genetics and heredity, of gnathostatics, photognathostatics and photography, of endocrinology, of pediatrics and psychology, of the science of mechanics and of physics, and the development of orthodontic technic.

Through the biological sciences we have acquired a much better knowledge of the growth and development of man and, as might be expected in dentistry, we are applying our new knowledge as speedily as we can. A study of anthropology has given us an insight into the racial traits and characteristics which manifest themselves in certain types, as well as deformations and, through heredity, we learn of the effects of miscegenation. Biometry and anthropometry have provided a new appreciation of form and of deviations from racial norms. We have through these sciences developed a new measuring rod and thus methods of diagnosis have been improved materially and, in consequence, prognoses have been more carefully made. As a result, hopeless or doubtful cases of dentofacial deformities are rarely taken now and many failures in orthodontic treatment are thus avoided.

The physical sciences have presented new problems, as well as new methods of solving them. Even now some of the most widely accepted theories of slow movement of teeth are being challenged by international authorities.

There is, without question, a grave need for a change in our procedure in teaching orthodontics. Not only has our knowledge been vastly increased but reports from all parts of the country indicate that a larger number of children need guidance and service for the prevention and correction of dental defects than has been acknowledged heretofore. The recent report made by the St. Louis Dental Society, showing that more than fifty percent of all the school children in that city need orthodontic service, is but one of a number of these. An acknowledgment by dentists and dental schools that the subject of orthodontics is probably the most neglected in dentistry and in the dental curriculum, and an admission by some of them that it is undoubtedly the most important, warrants a challenge to the institutions for their negligence and indifference and their failure to provide adequate instruction.

In 1932,* the amount of time devoted to instruction in orthodontics ranged from 16 to 80 hours, the average being 43 hours out of a total of 5,120 hours of professional instruction (40 hours a week for 32 weeks in each of 4 years. The minimum time given to the subject represents .003 percent of the total time; the maximum represents .015 percent, and the average represents .008 percent of the total time in the four year professional course.

If these data give a reasonably accurate portrayal of the present status of orthodontic education, what are we going to do about it? Shall we redefine, as it were, our newer concept of this issue or shall we adopt an entirely new policy, looking toward more and better service for the children?

I believe that orthodontic education should be so planned and carried out that it will:

1. Recognize that child welfare is the most important human activity today;
2. Acknowledge that well formed features and a sound dentition are a part of every child's heritage;
3. Realize that dental schools are not training their graduates adequately for this service;
4. Plan research that will advance the cause of orthodontic science and aid the dentist in practice;
5. Place orthodontics in a position equal if not superior to the other

*A Course of Study in Dentistry. Report of the Curriculum Survey Committee of the American Association of Dental Schools, 1935, p. 230.

divisions of dentistry and stress the need for the prevention of disorders and deformities.

In what manner shall we proceed to accomplish these objectives?

First, begin at the source by leavening the faculties of our dental schools with a desire to render better service to children and to prevent rather than to treat dental diseases. With the heritage of mechano-therapy tinged slightly with an empirical knowledge of materia medica, which has dominated our dental schools, texts and organizations since their birth date, a difficult task lies before us, because many dentists, who make their living by following the old traditions in practice, fear the loss of income if changes are made. Again, hand-minded students who enter a dental school with a technical ideal of the practice of dentistry, are not receptive to any instruction that leads them away from the kind of thing they wish to do. (In their minds, the man who makes a beautiful bridge or set of dentures is a hero.)

Another difficulty we must contend with is the preponderance of opinion among dental teachers and practitioners against any change. In point of numbers, the orthodontic group in the United States stands in the ratio of one to seventy with general practitioners, and such odds are difficult to overcome, if there is opposition, especially when the minority is scattered and not too well organized.

Tradition and inertia are also obstacles to any change. While inertia is conceded to be the most powerful force in the world, I believe that tradition is perhaps the most difficult to overcome. The conversion of a faculty to the belief that child welfare is our most important activity means that certain of its members must yield to the implication that their instruction is of lesser importance. I have yet to see the successful dental teacher who will yield first position in dental education to any division other than his own, though I know of many who will admit that child welfare should be our first consideration.

The child's dental and facial characteristics, which I should like to envisage as being beautiful or handsome or harmonious, lie in part beyond our control, because of the influence of heredity. However, we can do no less than acknowledge that each child has, at least, the right to as fine features and dentition as his antecedents had, perhaps even better. By a careful study of cases, especially where there is more than one child in a family and likeness to the parents is evident, trends toward deformities may be recognized and successfully treated early in child life. I see no reason for deferring dental service for a child until he is ready to enter school, or orthodontic treatment until he is twelve years old, which some dentists recommend.

As previously stated, the most recent report on dental education indicates that, in general, the instruction in orthodontics is inadequate. Without deprecating the value or importance of instruction in prosthesis, which I believe should always be of the best quality, I feel that we must turn our attention definitely toward the prevention of dental disease and the best place to inaugurate such a program is in the dental schools.

If we are to train students in orthodontics as thoroughly as we now train students in prosthesis, there is but one method open to us, barring the extension of our professional curriculum for one year or more, and that is to permit students who desire to major in orthodontics to elect such a course in lieu of prosthesis. Such a curricular plan does not necessarily contemplate training students as specialists in orthodontics, since they should be required to complete all of the courses in the dental curriculum, except crown and bridge and denture prosthesis. Students who elect such a course are encouraged to establish a practice among young parents and their children and they are qualified to perform all the dental service which such a clientele requires, except the replacement of missing or lost teeth. If they render a good service in preventive dentistry and demand such cooperation from their patients as will reasonably insure the retention of the normal dentition there will be no need for replacement service.

Supplementing an educational program of this type, there must be a well conceived plan for research. Probably no phase of dental research is so involved and intricate as that which deals with the prevention of dental disease. We have no specific factor to contend with, such as may be determined in infectious diseases. General organic diseases, such as cardiac or renal diseases may exist with either a sound or a defective dentition, though renal disease may be accompanied by osteolytic lesions. So many factors enter into this question of the maintenance of health and we must not overlook any of them if we are to succeed. Not the least important of these, and the one about which we talk so much and know so little, is nutrition. We can make but little progress in our service to mankind, if we ignore this.

While research is not a part of teaching, it is without question a necessary concomitant of it and I believe you can render no greater service to yourselves, to your profession and to humanity, than by encouraging and endorsing sound research.

When the early leaders in orthodontic practice in America, Kingsley and Goddard, Case and Angle, Bogue and Jackson, began to develop their ideas and to teach, their instruction was based largely on a classification of types of cases and on the technical procedures in treatment. In many schools orthodontics was taught as a part of mechanical dentistry. The dental

schools had less contact with the divisions of biological science than they do now, so orthodontics grew up as a stepchild. Since it has reached full maturity it has been isolated, solely, I believe, because it has been widely recognized as a specialty.

With its development, which has been rapid, there developed concurrently an increased interest in the fields of operative and prosthetic dentistry and, since these by tradition were recognized as the major subjects in the curriculum, orthodontics was subordinated to a minor place and was frowned upon as a part of general practice, because the orthodontist's practice was built up largely from referred patients. Dentists in general frequently advised both patient and orthodontist as to the procedure to follow. Some continue to attempt to do so now.

This condition should no longer exist. There are many reasons why orthodontics should occupy a prominent place in dental education and practice, not the least of which is that it is in a position to render a greater and more valuable service to the younger generation than any other division of dentistry, unless it be mouth hygiene and prophylaxis. Both parents and members of the profession realize the importance of well formed features in children and recognize that preventive procedures or corrections, if any are to be made, must be undertaken early in the growth period.

I learn on inquiry that the larger percentage of patients in many an orthodontist's practice is now coming direct to him rather than by the circuitous route of the general practitioner's office. I believe that this is as it should be and I hope that the time is not far distant when the referred practice will be passing from the orthodontist and the dentist who are interested in young people, and who hope to carry them through life with their own dentitions, to the dentists whose greatest interest lies in the field of replacement and restoration, if and when this type of service becomes necessary.

One thing that this new type of dental education and practice will do is to fix the responsibility of the care of the mouth, the correction of defects and deformities and the conservation of the teeth on one dentist. There will be no division of responsibility and no opportunity to "pass the buck." Where two or more practitioners are involved in the care of a single person, the individuals do not always synchronize perfectly and, if anyone suffers because of this, it is usually the child. The proposed plan will obviate that, for a dentist trained for this kind of practice will assume full authority and render all service for this age group. In the course of time, such a dentist may find that his greatest interest lies in orthodontics rather than in general operative work, or the reverse. There is no reason why he cannot secure an assistant to aid him in providing the type of service he prefers to give

up, while it is still under his direction. Either of the persons in such an office would be able to absent himself on a vacation for business or pleasure without the least hazard to the clientele and with but minor reduction in income.

May I summarize in general terms: Orthodontic education today concerns itself only with the diagnosis and treatment of dental anomalies. The desired end results under such a plan, however, cannot be attained without giving consideration to the whole child. Persons interested in child welfare today do not limit themselves to parts of a child only. While a high degree of specialization has brought about an equally high degree of achievement, that achievement will have little value if other equally important factors are neglected. Thus, a perfectly aligned, carious dentition is valueless to the possessor. A division of labor, carried to the extreme, will not result in the same efficiency that it does in assembling the parts of an automobile. Belt line practice in the professions cannot be perfectly synchronized and the responsibility is neither equally divided or readily assumed in dentistry. Further, no two human beings are as like as are two motor cars and each individual must be treated as an integrated whole.

Since orthodontic education takes cognizance of the need for good training in the basic and preclinical sciences, why should it not recognize the need for equally good training in such technical and surgical methods as will conserve the teeth and keep them in a healthy condition? I believe that every dean of a dental school is willing to state under oath in behalf of his faculty that the graduates of his school are competent to practice dentistry. Are they willing to make a similar statement specifically about the practice of orthodontics? All licensing boards, under existing conditions, are equally willing to certify to the people of their respective states, that each licentiate is qualified to practice all forms of dental service. Are they equally willing to attest to the ability and competency of the dentist who practices orthodontics and children's dentistry?

There is an admitted need for improvement in orthodontic education. There is an acknowledged deficiency in our present system of orthodontic training and in practice both in volume and in its protection of the child. I believe that the major obstacle which confronts us is tradition. The children of the nation, the students and faculties in our dental schools, the practitioners engaged in rendering orthodontic and children's dental service in whole or in part are all involved in this problem. The dental schools are the only agencies which are in the key position to bring these groups together effectively in a conscientious effort to solve the problem for the benefit of all.

For these reasons, we have advocated a change in our plan of orthodontic education. Such a change contemplates the exclusion of all forms of replacement service, specificially crown and bridge and denture prosthesis, and it is actually in operation now. It includes as thorough a course in orthodontics and its ancillaries as is now offered in any of the other major fields in dental practice. It anticipates that those students who complete this curriculum will follow it in practice and will assume full responsibility for all the dental service needed by children and young adults. It recognizes that under existing conditions, children are the most deserving and the most neglected group in dental practice and it is our duty to alter this condition. It hopes that the licensing boards will soon recognize the importance of protecting these children by examining more carefully all the candidates who expect to engage in the practice of children's dentistry and orthodontics by modifying their licensing examinations. Its only motive is a better service to humanity.

First and Parnassus Avenues

Discussion

DR. FREDERICK B. NOYES: In a group like this we are accustomed to free discussion. First it is a small group. Second, we are all sincerely interested in a limited field. And finally, we are well enough acquainted and are good enough friends to allow free expression without offense. But because this discussion may be read by those outside the group, I want to begin by saying that there has been a tendency for the dental profession and the dental schools, and especially for the general practitioners of dentistry, to be critical of the statements of the orthodontist, and sometimes to take offense at them. Orthodontia must be considered as a part of dentistry. It is a fundamental axiom, moreover, that the whole is equal to the sum of its parts, and that one part can never be greater than the whole. Dentistry, therefore, has no reason to be jealous of any development of orthodontia, for it still adds to the total of dentistry. Dental educators have resented the statement that orthodontia cannot be successfully taught in the undergraduate curriculum. Sometime in the future it may be that orthodontia will be successfully taught in the undergraduate curriculum, but in the forty years I have observed the attempt to accomplish this, it has failed. This does not imply any comparison in relation to the superiority or inferiority of the two fields, but it does imply a difference. To teach or think in two such fundamentally different directions as orthodontia and general dentistry is very difficult, if not impossible. I have elaborated these fundamental differences in other places and will not take the time to do so here.

This discussion really centers about the question of whether or not orthodontia is an independent specialty of dentistry, and whether it should be so taught and practiced. Many papers have appeared on both sides of this question. My position is too well known to require restatement here. The failure of dental schools and dental educators to recognize orthodontia as a specialty of dentistry is the most unfortunate thing that has happened in dental education. It has resulted in great injury to both dentistry and orthodontia; it is inflicting enormous damage upon the public. The situation in the orthodontic care of the public is the most tragic thing in dentistry today.

I cannot go further without referring to the common objective in dental and orthodontic practice stated in Dr. Millberry's second paragraph: "A complete dentition, free from defects and deformities, functioning normally and with comfort throughout life, for all people." This is, indeed, a statement of a utopian paradise. The common objective of all human effort in any occupation might be summarized as "A world composed of physically and spiritually perfect individuals, living in happiness and comfort for the span of their days," but such a statement is of no value in determining the special preparation necessary to any occupation. Such slogans are of doubtful assistance. They do not lead to clarity of thought in the immediate conditions in which we work.

Most of the men here are too young to be acquainted with the background of the relationship between orthodontia and dental education. As I believe the present discussion cannot be intelligently continued without it, I may very briefly sketch in the background. My first contact with orthodontia was as a freshman in the Chicago College of Dental Surgery in the winter of 1889-90. At that time all of the orthodontia that was taught in any college of dentistry was given as a part of prosthetic dentistry. It consisted chiefly of technical instruction in the making of bands, plates, springs, the use of the draw plate and the screw plate, and the drawing of wires, the cutting of threads and the tapping of nuts. Dr. Calvin S. Case came over from Jackson, Michigan, for part of the term to give instruction. There was not a man in the world who limited himself to the practice of orthodontia until, at almost exactly the same time, Dr. Case gave up general practice in Jackson and moved to Chicago, and Dr. Angle, in Minneapolis, gave up general practice, and these two men limited themselves to the correction of irregularities of the teeth.

After attempting in at least three different dental schools to teach orthodontia, Dr. Angle became convinced that it could not be properly taught to all dental students for the same reason that orthodontic service cannot

be given to all people—they don't want it and are not interested in it. He therefore opened in St. Louis a school for the teaching of orthodontia to those who were sufficiently interested in it to wish to practice it exclusively. He taught in small groups always, training his students intensively for a short period. The remarkable thing about this effort was that, in its own atmosphere and in its intensity of application, many men got new concepts which they continued to develop throughout their lives. This is the essence of teaching.

This was the first serious attempt at orthodontic education and was the most influential effort realized. From 1900 to 1914 there was a period of rapid constructive growth in orthodontia as a science and an art. There was progressive clarification of principles and progressive improvement in techniques. By the end of this period there were successful practitioners of orthodontia in most of the principal cities of the United States.

In about 1914 a paper was presented at Indianapolis to the Association of Dental Teachers urging that orthodontia be taught as a specialty—that the undergraduate teaching of orthodontia be confined to the fundamentals of theory and technique, equally important to all phases of dentistry. The reaction was immediate in opposition. The two arguments advanced were, first, that orthodontia was a part of dentistry and should be taught in the dental schools, and second, that there was so much orthodontia to be done that the general practitioners would have to do it. Before 1900 orthodontic services were generally unsatisfactory, both to the public and to the operator. From 1900 to 1914 a considerable number of men were trained in the principles and techniques of orthodontia so that they were able to furnish to the public highly satisfactory results. This created a popular demand for orthodontic service. Because of this popular demand the dental schools after 1914 began to turn out more men trained neither in the fundamentals nor techniques of orthodontia who attempted to render orthodontic service. The result of this reaction of dental schools has led to the present disaster. Whenever the demand in a given field exceeds the supply of properly trained men, imperfectly trained men step into the vacancy.

As a result of this situation a large number of short courses sprang up primarily for profit, and dental schools attempted to supplement the deficiencies in undergraduate training by graduate and postgraduate courses, most of which were extensions and repetitions of undergraduate material. And the practice of orthodontia has reverted to the chaos which existed before the beginning of the century. By anyone acquainted with the facts who looks the situation squarely in the face, this must be accepted as a fair statement.

Dr. Millberry has very truly pointed out that tradition is a most difficult force to overcome, and that in every form of education we have to develop by evolution. But in evolution the sport, the individual who is different, must have the opportunity to develop or there can be no evolution. And tradition, that would like everything to remain as it has been, is the retarding influence. The combination of the dental schools to prevent the teaching of orthodontia as a specialty has retarded the progress of evolution in this field. If there is to be progress in education, there must be freedom for experimentation. The most hopeful thing in dental education at the present time is the variation which exists; the most dangerous, the tendency to interpret the report of the Curriculum Survey Commission in terms of perfect regimentation. There is nothing so dead as a perfect crystal. It is not only dead but fossilized. I feel sure that in the evolution of orthodontic education we are going to have to try various programs.

Everyone admits that the teaching of orthodontia in the undergraduate dental curriculum is unsatisfactory. Dr. Millberry points out, as did Dr. H. J. Noyes a year or two ago, that the amount of time given to orthodontia in the undergraduate curriculum is totally inadequate, and that in some institutions a man may even receive the D.D.S. degree without it.

The situation is complicated by the legal aspect, as the practice and education of the profession is governed by law. The law confers upon every licensed practitioner the right to practice the whole of his profession, or to restrict his practice to any part of it. This results in the totally inconsistent situation of a man licensed to practice, as a specialist if he prefers, in a phase of his profession in which he has received little or no instruction or training.

At the present time the development of education in the specialties and the legal control of their practice is a challenge to both medicine and dentistry. Medicine has made considerable progress in this direction, but I feel that dentistry's efforts are the more commendable. Medicine has formulated very definite standards of what constitutes adequate training for practice as a specialist. Schools and hospitals are using these standards in determining a man's fitness for positions on teaching and hospital staffs. But there is no law which states that a man must meet these standards before representing himself to the public as a qualified specialist. Any one may claim to be a specialist; the majority of the public are not capable of examining the validity of such claims. The public is unprotected.

Dentistry's attempt, as illustrated by the Illinois law which has been copied in several other states, is not so satisfactory in its definition of the qualifications of the specialist, but the law does make it illegal for any man

with no training in addition to his training for general practice to represent himself to the public as a specialist.

There are three thinkable programs for the training of men for the practice of orthodontia: First, that operative dentistry, prosthetic dentistry, surgery, orthodontia, and preventive dentistry or public health, be considered as equally important in the undergraduate curriculum, and that all men be prepared to practice in all fields equally well. After forty or fifty years of trial this program has produced nothing but chaos. Operative and prosthetic dentistry still constitute the basic service of the dentist, and the curriculum cannot be made to include adequate training in all of the newer fields that have been developed without damage to the training in the primary fields, or without the inordinate extension of the course. The time is past when the young dental graduate can think of himself as the last word in knowledge and skill in every phase of dentistry. The undergraduate curriculum must be planned to furnish the public with practitioners who are adequately trained in the fields which meet the greater part of popular need, and who are intelligent enough to give proper direction where special service becomes essential.

The second program is one which Dr. Angle held through most of his life: that orthodontists should be trained as a separate profession, that there should be a four-year curriculum preparing men for the practice of orthodontia but not dentistry, and four-year curriculum preparing men for the practice of dentistry but not orthodontia. This concept was the basis of the original Arizona law; if the law had not been revised, it would have failed in the courts, because there is no place in the world where such training may be received. The program was too violent a counter to tradition and evolution. I have never approved this program because I have always felt that it based specialization on too narrow an educational training. You cannot begin to make specialists at the educational level of the freshman in the dental or medical school. I believe orthodontia is a specialty of dentistry, rather than an independent profession, and that its successful practice requires a broad training and experience in dentistry.

The third program requires four years of training in dentistry, preferably with additional experience in general practice added to the experience of the undergraduate clinic, and additional graduate training for the practice of the specialty. In considering training for a specialty, all of the medical specialties have recognized three distinct factors:

1. Additional theoretical training.
2. Additional technical training.

3. The use of the theoretical and technical training in the practice of the specialty under competent guidance for a sufficient period.

These factors are fundamental and should never be lost sight of.

I have been amazed that the dental schools, acknowledging the unsatisfactoriness of the situation in the teaching and practice of orthodontia, have allowed it to go on for so long, and I think Dr. Millberry deserves very great credit for making an attempt to improve the situation. I do not approve his program, but I do approve his attempt.

First, the program cannot be classified under any of the three plans mentioned. In training men only in operative dentistry and orthodontia, and licensing them to practice all parts of dentistry, the situation is as illogical and must eventually be as unsatisfactory as the previous one.

Second, it begins specialization at a level too low in the educational program. There is a time factor and a maturity factor involved in the very fundamental ideas of education for specialists that is quite comparable to the same factors in the distinctions between undergraduate and graduate university training. I believe it is sound to say that the minimum educational basis for training in a specialty should be two years or more university preprofessional education and four years in a college of dentistry. To this it would be better to add some experience in general practice, but economic conditions often make this impossible.

Third, the program is properly planned neither for the practice of general dentistry nor for that of the specialties of children's dentistry or orthodontics. I would like to discuss the advisability of combining children's dentistry and orthodontics but can only briefly touch upon it. I am quite positive in the conviction that children's dentistry should be practiced as a specialty, but training for this practice should be quite different from training for orthodontics and should contain a much larger medical content, based primarily upon a background of physiological chemistry. Not until those practicing children's dentistry get the idea that the child with carious teeth is a sick child and must be treated not simply by repair, but by the correction of the condition, shall we have a children's dentistry which is worthy of the name of specialty—or will the preventive function which Dr. Millberry is so anxious to see be attained. There is the same objection to the combination of children's dentistry and orthodontics as there is to the combination of general practice and orthodontics. Neither will reach its proper development in combination.

Fourth, in the execution of the course students are given a so-called elective program: that is, they are presented with many methods and techniques with the idea that they will be able to recognize the advantages and

disadvantages of each and to select the one best suited to each case. The actual result is that they have mastered none and are more at sea in the selection of one or another in individual instances than they were before. Certainly one method must be mastered, its execution perfected, its difficulties and the means of conquering these difficulties discovered, before other techniques can even be evaluated.

The basic error in the dental concept of orthodontia lies precisely in the fact that in failure or unsatisfactory results dentists have always looked for a new mechanism instead of asking themselves, "In what way have my mechanics failed to harmonize with biologic reaction?" As Dr. Millberry says, human beings are not machines, and for that reason orthodontia will always remain a profession—will not become a trade. The same mechanical influence will not produce the same result in two apparently similar individuals, and mechanics must always be used to produce biologic reaction. For this reason the mastery of a technique must be absolute.

Fifth, the program is deceiving to the public, for while Dr. Millberry says, "Such a curricular plan does not necessarily contemplate training students as specialists in orthodontics," the course is so accepted by the public and is taken for this purpose by the student; as a result a partially trained general practitioner with a one-sided undergraduate curriculum is presented to the public by the university as a specialist in orthodontia.

In closing I would say that it has been almost twenty-five years since orthodontia appealed to dental education for recognition as a specialty which should be taught on the foundation of a full curriculum in dentistry. Dental education refused to accept the principle and insisted that orthodontia should be taught and practiced on the basis of undergraduate training. For twenty-five years conditions have been becoming worse and worse until at present everyone recognizes them as intolerable. Isn't it time for dental education to admit its mistake?