ical colleges will have to cut down their preliminary education to get men out into the world sooner to earn a livelihood.

He says many of the students in colleges in working their way through college have got to practice. The man who wants to acquire knowledge so badly that he works himself through college will also work himself through a postgraduate course. If you can get good, conscientious teachers, and this organization bears testimony to that fact, for an eight weeks' course in a private school, it seems to me you can get good teachers for a postgraduate course under university supervision.

FREE ATTACHMENTS

BY CARL O. ENGSTROM, D.D.S., SACRAMENTO, CALIF.

MECHANICAL ingenuity for many years past has invented a very great number of appliances for the correction of malocclusion of the teeth, and the claims made have been such as to create the idea that orthodontia is mainly the mechanics of an appliance. The mechanics of the appliance has been made quite distinct, for little attention has been given the mechanics of living tissue, although it is the most important. This has resulted in a misconception of orthodontia. It may be noted that of the interrelated subdivisions, the study of mechanics is but a part of the whole study of physiology. A most interesting part of these appliances has been the attachment (such as the connection of a band on a tooth to an arch wire), a part which has occupied a most prominent place in the consideration of appliances. It has seemed to be the aim to present an appliance with an attachment whereby every direction of movement of a tooth may be accomplished in the correction of malocclusion by the use of the one attachment. This, it seems, has led, no doubt inadvertently, to considerable disregard for the living tissues to which it was to be applied. It is not to be inferred that the attachment is the most important part of an orthodontic appliance nor that it stands alone in application to the principle to be mentioned; but that all parts are equally important and also enter into other physiologic factors in orthodontic treatment other than that stated herein. Neither should the thought be entertained that treatment should be made subordinate or in accord to the workings of an appliance, but rather that knowledge of living tissue should direct the use of an appliance which is merely an instrument in treatment.

To elucidate the subject, attachments are divided into two classes, free and fixed. While attachments have been considered mainly from the standpoint of moving an object through inert matter, the word "free" as used has little such mechanical significance, but rather refers to the phase of physiology to be presented. In this latter respect an attachment has an effect on the functions of tissues whether the tooth is being moved or not. Free attachment refers to any artificial means used to exert force to change or maintain the position of a tooth, which means does not prevent the movement of a tooth in the performance of its function, other than is necessary to the establishment or maintenance of its proper position. Free attachment is used in contradistinction to an attachment

wherein the tooth is interfered with in its function other than that which is necessary to its correction. This latter may be termed "fixed attachment." A ligature, properly applied, linking a tooth to an arch wire, and a wire in juxtaposition to a tooth are illustrations of free attachments; and a wire soldered to bands on two teeth illustrates a fixed attachment. Both free and fixed attachments have been extensively used. The last mentioned illustration can not be other than a fixed attachment, but a free attachment may easily become fixed when so adapted. The free attachment is one of mechanical simplicity, but it is often a very complex study to be considered as requiring the utmost knowledge, judgment and skill on the part of the operator.

Physiology should be the predominating factor in the consideration of an attachment; for fundamentally orthodontia is a study of physiology, particularly the physiology of all parts instrumental in mastication. Orthodontic treatment has for its object the improvement of function, the establishment of greater efficiency through structural changes. By structure, the orthodontist recognizes the physiology of the several parts. The activities of life, movement, and force in the one cell excite similar action in another cell. Cells live by functioning which when lost presages death. Health and efficiency of tissues are dependent on this interchange of forces. Force exerted on the crown of a tooth as in mastication excites force on the root of the tooth. This transmission of forces represents a function of the tooth. Of itself the tooth does not move, but is moved, and acts as a medium in the contraaction of forces. The form of the crown of the tooth and its many angles of resistance in the process of mastication are all reflected in the arrangement and movement of the fibers of the peridental membrane. The fibers of the peridental membrane allow for movement of the tooth in its bony alveolus. Function of the membrane is depicted in the arrangement of the fibers. This movement is the normal exercise of the membrane. If this is not to be considered in the function, then why this arrangement? Note the structure and it will be seen that this arrangement allows for movement of the tooth in many directions. By way of explanation, sixteen directions of movement of the tooth may be cited. The tooth may move bodily, mesially, distally, lingually, facially, in elevation, in depression, and in rotation on its long axis to the right and to the left. Considering the apex of the tooth as the axis, the tooth may move mesially, distally, lingually and facially; and with the crown as the axis the tooth may move in all of these directions. These directions, herein considered in the application of an attachment, also denote malpositions of teeth. As a rule combinations of these sixteen separate and distinct movements occur in mastication. It may readily be seen that a rigid or fixed attachment interfering with these movements would affect the health and efficiency of this membrane. The exercise of this membrane in the promotion of stimuli to the surrounding bone is important. The dependency of one function on another function is shown in the form of one structure and another. The function of this membrane is reflected in the surrounding bone and the character of the bone is reflected in the character of the attached muscle. Thus from a study of one part, the efficiency of other parts may be determined.

In the case of heavy mastication, all structures involved in the action

present formations in keeping with the great forces excited. There is a balance in the relationship of function and structure. Where all function is removed, as in the case of the removal of a tooth, those parts that possess no other function than that in conjunction with the tooth disappear and the structure of the remaining process reflects the change in use. If a tooth is held rigid as by a soldered attachment, in other words a fixed attachment, the surrounding structures will be altered just to the extent of the loss of function. As the function of one part affects the function of another, likewise, it is so of structure. The change in structure due to change in function may be noted in the case of a tooth that has been held stationary (it being understood that this state is not exactly obtainable in orthodontic practice) for some time and found loose upon removal of the appliance. Add to this loss of bony support that which occurs in the movement of a tooth by an orthodontic appliance, and is it not to be expected that the root of the tooth may be absorbed along with the surrounding bone? The proper function of cells is interfered with. The tooth by loss of function and being moved under the influence of a rigid attachment may be likened to a foreign body. Movement for correction under these conditions will result in more or less katabolic changes in the tissues. Often a tooth is presented wherein only one or two directions of force are required to place it in its proper position. Then why interfere with its fourteen functional movements? Such interference appears unscientific. Deciduous teeth may be moved by the use of free attachments with very little appreciable looseness.

While it is necessary to interfere with the normal movement of the tooth in the direction opposite to the direction of applied force, the aim should be to improve function with as little interference with the normal action of the parts as possible. The forces used in correction are less useful as the loss of function becomes responsible for a like condition of structure. In the correction of malposed teeth, they should be moved in the particular direction or directions necessary in the correction without needless interference with the functions of the tooth and of other tissues. This involves the application of the free attachment.

PRESIDENT'S ADDRESS BEFORE THE AMERICAN SOCIETY OF ORTHODONTISTS, SEPTEMBER 5, 1917

BY M. N. FEDERSPIEL, B.Sc., D.D.S., M.D., MILWAUKEE, WIS.

Professor of Oral Surgery in Marquette University.

PERMIT me at this time to express to you, the members of the American Society of Orthodontists, my deep appreciation of the high honor that you have conferred upon me in selecting me to preside over your deliberations. I would be happy indeed, but for the sense of unworthiness on my part to fill so high a position. I shall always esteem the presidency of our society, composed, as it is, of the leaders of orthodontic science and art in this and other countries, one of the highest honors conferred on me.