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ORIGINAL ARTICLES

A FEW CONSIDERATIONS FROM THE ORTHODONTIC STANDPOINT*

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SIR WILLIAM OSLER, a short time before his death, in his inaugural address as President of the British Classical Association, spoke as follows:—"The extraordinary development of modern science may be her undoing. Specialism, now a necessity, has fragmented the specialties themselves in a way that makes the outlook hazardous. The workers lose all sense of proportion in a maze of minutiae. Everywhere men are in small coterie intensely absorbed in subjects of deep interest but of limited scope."

Now I think that is the position in which we dentists are in great danger of finding ourselves—or worse yet, not finding ourselves,—not realizing we are in that position! We as a profession have forgotten the rest of the body and have "become intensely absorbed in a subject of deep interest but of limited scope," and that subject is largely the mechanical restoration of lost tooth-tissue. In recent years, the more general considerations of bodily well-being and the dental factors relating thereto have been forced on our attention by men both within and outside of our own ranks, as they have worked away at the problems of infection, focal and otherwise, nutrition with all that it implies, and growth and development in general.

Sir William's remarks, apropos of specialization, might be supposed to be peculiarly applicable to one who essays to further subdivide, and confines his attention to one branch of dentistry; which in turn, we often refer to as being in fact, if not in practice, a division of medicine. But I wish to submit that orthodontia, if properly comprehended, is not narrowing, but furnishes the means for a most broadening survey of all the activities of dental science. Dr. LeRoy Johnson, of Boston, said to the writer recently in effect as follows:—"I do not know of any subject in the dental curriculum that provides the teacher with

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such an opportunity for correlating the various subjects of the course." And having arrived at this point, and as a reminder that our idea is not so very new after all, I cannot refrain from a further quotation from Osler, in which this time he quotes Plato, who in insisting on the essential unity of all knowledge says as follows:—"Now when all these studies reach the point of intercommunion and connection with one another and come to be considered in their mutual affinities, then, I think, and not till then, will the pursuit of them have a value."

Johnson has defined orthodontia as "That branch of dentistry which treats of the forces controlling the form of the dental arch." Those forces are by no means understood as yet in their entirety, although some of them are quite obvious. But the important thing that I would wish to stress, is that of "forces in control"; not only forces that have controlled in the development of the arch, but forces actually in control every minute,—all the time. When once that idea is grasped, it is seen that the dental arch is not a fixed thing. Conklin, in his recent book "*Heredity and Environment*" says, "Living cells and organisms are not static structures that are fixed and stable in character, but they are systems that are undergoing continual change. They are like the river, or the whirlpool, or the flame, which are never at two consecutive moments composed of the same particles, but which nevertheless, maintain a constant general appearance; in short, they are complex systems in dynamic equilibrium." Those last two words to my mind, express the condition obtaining within the dental arch;—dynamic equilibrium.

Now any one who constantly has in mind this conception of dynamic equilibrium will be careful to do nothing that will tend to disturb or upset that condition. When tooth restorations are necessary, he will be careful to perform the operation, whatever the material employed, so that Nature's tooth form may be reproduced, to the end that proximal contact may be preserved, and the inclined planes of the cusps may function as was intended, and the pericemental attachment be shielded from injury. In doing this he will be definitely conserving three of the forces that enter into this dynamic equilibrium; for the preservation of proper *form* of proximal contact will insure that the *force* of proximal contact shall operate normally instead of abnormally; for operate it will. And the correct reproduction of cusp form will insure the normal functioning of the force of occlusion, which is one of the very important factors in the maintenance of arch form. And anyone who has so formed his restoration as to successfully provide for correct proximal contact and the correct inclined plane will, in all probability, have also attended to that other detail more frequently overlooked, and that is the proper sloping of that portion of the occlusal surface immediately adjacent to the point of proximal contact, so that under stress of mastication the food, with the exception of a negligible minimum, may be slid away from the interproximal space, rather than definitely and unavoidably into it, as is so often the case. In avoiding this latter condition he will be again conserving a factor in maintenance of arch form, and that is normal cell metabolism; the cell metabolism more especially of that tissue that normally fills the interproximal space. The other

side of this picture is of course, food packed into this space, with consequent inflammation and laceration, progressing rapidly toward resorption, and the probability of a well established pericemental infection.

And so another and very important result of this conception of the arch as a living thing, an assemblage of units, each one of which is not only accurately placed in relation to its fellows, but the whole acutely responsive to forces constantly at work, will be that one's minutest operation will always be done with a mental picture of its effect upon the whole, as a background, and it will be found that that whole will constantly enlarge, and the imagination will take in not only the dental arch but the entire organism.

If the loss of some part of a tooth is going to enlist the care outlined above in its restoration, we are surely going to look with dismay on the entire loss of the tooth. And right here, I wish that we might confine our attention to the deciduous teeth and the permanent teeth of children and young adults.

Added to the idea of dynamic equilibrium, which may quite accurately describe the condition of the established dental arch, we have in early life another influence present—that of growth. In considering this fact of growth, we can be a little more analytical than Topsy, who was quite sure that she “just grewed.” We can see that growth is stimulated by some things and inhibited by others. And one of the factors of prime importance in normal growth is mechanical stimulus, or perhaps better, dynamic stimulus—the suitable application of force. So great a factor is this in the growth of bone that one eminent anatomist has defined bone as “calcified lines of force.” In the case of the jaws this force is applied at least in two ways: first, through muscular attachment, and second through the functioning of the teeth. This does not exhaust dynamic stimulus, but probably accounts for most of it.

If all the teeth are present in early life and free from disease so that function is normal and pleasant, the dynamic stimulus, other things being equal, will be a powerful aid in the direction of symmetrical and vigorous growth. If teeth are diseased so that mastication is avoided because of the pain involved, with a consequent let up of muscular action, just so far will normal growth be prejudiced, to say nothing of the attendant damages of infection. And if teeth are actually lost, our condition of dynamic equilibrium is not only going to be sadly disrupted, but, the chances for symmetrical development are going to be greatly impaired. And we know that this applies to the deciduous teeth as well as to the permanent ones. There is no need for laboring this point, the truth of which we would all willingly subscribe to; and the writer is not so long removed from general dental practice that he is not fully aware that it is much easier to stand up and preach absolute conservation of all teeth than it is to actually carry it out, when it comes to office routine. Yet it surely does no harm to contemplate this ideal frequently.

Our next logical step would carry us further afield than the confines of this brief paper and would point to the consideration of prophylactic care

of the mouth and the enlightenment of the people in these important matters: preventive dentistry and popular dental education.

A well-known magazine writer recently said: "Form the habit of devoting a few minutes every day to thinking about your work in a large, broad, imaginative way. Try to see it for what it assuredly is—a vital necessity to yourself and a useful service to society." I would like to suggest in closing that if one gains the conception outlined above of the essential unity of all our apparently separate and often minute operations, there will be no need for the setting aside, artificially, by an act of will, the aforesaid "few minutes", but this will just naturally be the atmosphere in which we will work all the time.