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CHARLES C. BASS, M. D.

SOME FACTS WHICH PHYSICIANS SHOULD KNOW ABOUT MAINTENANCE OF DENTAL HEALTH

CHARLES C. BASS, M. D.

Dean and Professor of Experimental Medicine Emeritus of the School of Medicine

The two diseases—caries and periodontoclasia—from which almost all loss of teeth results, can be entirely prevented by following the right method of personal oral hygiene. They cannot be prevented in any other way now known. Not only is the initiation of lesions of these diseases preventable, but in most instances, further progress of lesions that already exist is also preventable. Only in instances of some far advanced lesions and under unusual circumstances, may the disease process continue to progress.

The purpose of this paper is to direct attention to the necessary personal oral hygiene for prevention of caries and periodontoclasia, and for maintaining personal oral cleanliness. This is the information that every physician in any field of medicine must know and follow in order to maintain his own dental health and oral cleanliness. He must have this information also if he wishes to promote the dental health welfare of others.

The physician who is not now maintaining his own teeth free from active disease is not in a position to advise his patients that they can and should maintain good dental health. Either he does not know how to keep his teeth free from these diseases or he is too neglectful of his own dental health and oral cleanliness to appreciate the benefits of effective personal oral hygiene.

Both caries and periodontoclasia are local diseases caused and promoted by conditions that exist at the locations where the lesions originate. Measures for successful prevention of these diseases must provide for recognition and effective prevention or minimizing of these etiological conditions. Correct information as to what these conditions are is necessary. The causative organisms are microscopic, the pathological processes originate and progress microscopically, the tissues involved are composed of microscopic elements and the lesions themselves, at first, are only microscopic in extent. Therefore correct information about the conditions must be obtained through microscopic research.

Information that has been established previously by the work of others, together with further information which I have secured through several years of intensive research on the subject, has enabled me to devise, formulate and specify a practical method of personal oral hygiene which not only meets the requirements indicated by the local microscopic conditions, but results in a high degree of prevention and control not attainable in any other way. My findings have been announced in a number of publications.¹⁻⁸ More will appear in other papers presently in process of publication or in preparation.

CARIES

The caries process consists first of partial decalcification of enamel resulting from the action of organic acids produced by bacterial breakdown of carbohydrate food material. The partially decalcified enamel appears white and becomes less resistant to physical force. It is frequently referred to as chalky enamel and the affected area as a

"white spot." It is less resistant to physical force and can be cut or dug into with a hard sharp instrument, as if it were a piece of chalk. This is the early stage of caries.

If the conditions causing this partial decalcification continue for a long period of time the process extends. Sooner or later the softened enamel breaks down and a cavity is formed. This is the advanced stage of caries. This cavity stage of the caries lesion is usually the first and only stage of the disease that is recognized by the individual. In general it is the only stage that is recognized by the dentist. When a person finds that he has a cavity he may seek advice and treatment by a dentist, who treats (fills) the lesion with varying degrees of success and durability. At best the tooth is impaired and its expectancy for usefulness is much reduced. How much better it would be for such a lesion to be prevented than to be treated, however successfully, after it developed! The time to prevent caries lesions is before they start.

Measures to prevent caries lesions must be applied to the locations where such lesions originate and must counteract or prevent the conditions there which would cause the disease. Caries lesions originate at locations on the tooth at which heavy bacterial film can grow and accumulate and where food material may be retained. These locations are mainly the embrasures between the teeth and in grooves and fissures on the occlusal surfaces of the grinders. The thick film pad in such areas (called dental plaque) consists of a pile of long rod and filamentous types of microorganisms, all having one characteristic in common, i.e., one end is attached to the tooth surface and the long stem or filament extends outwards toward the surface of the pad. All caries lesions develop beneath such thick bacterial film pads and never on exposed surfaces which are constantly or frequently cleaned by functional friction. It is necessary to reduce and prevent the accumulation and retention of the thick bacterial film pack at these caries-vulnerable areas, thereby maintaining conditions there similar to those that exist on areas where caries lesions do not occur.

Mechanical cleansing breaks off and removes the bulk of the long rod and filament organisms composing the thick film pack, but short stems and stubs of these organisms remain attached to the tooth. Many of these are viable and are able to grow to make long rods and filaments again, if allowed sufficient time.

If the long organisms attached to the tooth making up the film pad are removed (except for short stems) at night before retiring and any retained food material which could serve as culture media is removed at the same time, little growth of the remnants of bacteria takes place until food is taken the next day. There is not sufficient growth and retention of bacterial products during the day for harmful effects to result before time to clean the teeth again at night before retiring. It is a fact, although not generally known, that almost all caries damage occurs at night during sleep, when acids which are produced in retained carbohydrate food material attain greater concentration and remain in contact with the tooth for much longer time.

The statement that has often been repeated for more than fifty years, that "a clean tooth does not decay", is as correct today as ever. To maintain the necessary cleanliness to prevent caries the teeth must be cleaned effectively every night before retiring. Nothing less produces the desired result.

PERIODONTOCLASIA

Periodontoclasia consists of breaking down and destruction of the parodontal tissues—gum, periodontal membrane and alveolar bone. The disease process is usually of long duration. Lesions about different teeth and at different locations around a given tooth progress at variable rates. The lesion may extend only a short distance on one side of the tooth and far down towards the apex on the other, thus producing a deep “pyorrhoea pocket.” Or there may be a more uniformly deep lesion in which the parodontal tissues are gradually destroyed all the way around the tooth. The gum recedes exposing more and more of the tooth above the gum, and the bony socket which supports it becomes shallower and shallower, thus greatly reducing the functional stability and usefulness of the tooth. Finally, the lesion extends to the apical region and the tooth is exfoliated or it may be extracted.

The patient may recognize the advanced stage periodontoclasia lesion or lesions (“pyorrhoea”) but he does not recognize the early stage of the disease, as such. Neither is this early stage usually recognized and effectively combated by the dentist. However, to prevent this disease we must recognize the early stage and direct our preventive measures against the local conditions which cause the lesion to begin and increase. If we are to prevent further progress of lesions that already exist, our preventive measures must remove or minimize the local conditions which cause the disease to progress.

The earliest stage periodontoclasia lesion consists of irritation and inflammation at the margin of the gum. This is only microscopic at first but gradually increases in extent. Normally the gingival margin rests against the smooth, nonirritating enamel cuticle. If bacteria are allowed to grow and accumulate at the entrance to the gingival crevice and to advance into the crevice, then the gum there must rest against this bacterial material. Soon some condensation or calcification of the material produces hard concretion, microscopic at first, which is still more irritating to soft gum tissue resting against it. Inflammation occurs and pus cells migrate into the region.

From that time onward the bacterial film and foreign material on the tooth tend to advance farther into the crevice (lesion) making this area of the tooth now a foreign body upon which the inflamed and suppurating gum rests. Specimens of material taken from within the gingival crevice, when examined under the microscope, show large numbers of pus cells, diagnostic of inflammation and suppuration.

From this time henceforth, as the lesion progresses towards the apex, the condition consists of suppurating gum tissue on one side resting against a tooth covered with foreign material on the other. An abundance of pus cells are always present in the crevices or lesions around the teeth. Sometimes the amount of pus coming from the lesions can be recognized with the unaided eye, leading to the name “pyorrhoea” generally applied to the disease.

The most noticeable symptoms of the early stage of periodontoclasia lesions is “bleeding gums.” The inflamed and ulcerated gums tend to bleed easily from brushing or other mechanical irritation. Bleeding from the gingival crevice during functional use of the teeth, mostly unrecognized, continues throughout the course of the disease.

Periodontoclasia is practically a universal disease. Its prevalence is indicated by a survey which I made of the Senior students of our class

of 1943. Every tenth student on the printed class list was selected and carefully examined for the disease. Gross examination was made and also specimens were carefully taken from within the gingival crevices of all the teeth.

Lesions and some receding of periodontal tissues was found in every individual, varying from 2 to many. Material from such lesions contained abundant pus cells, establishing the diagnosis of active inflammation and suppuration. In my studies I have also examined a considerable number of other people in different walks of life. Active disease has always been found in all adults, around a part, and usually around all, of their teeth. These observations not only indicate the wide prevalence of this disease, but they also show that the different methods of personal oral hygiene now followed by people in the classes represented, do not prevent it.

Periodontoclasia does not occur about a clean tooth. The bacterial material which accumulates at the entrance to the gingival crevice and initiates the lesion there, is composed of the same type of microorganisms that make up the film pad under which caries lesions develop. If the tooth is cleaned at this location, of film and food material, at night before retiring, there follows a period of several hours of freedom from harmful irritation of the gum tissue by bacterial activity. The growth and accumulation, after food is taken the next day and before time to clean the teeth again, is not sufficient to cause the early stage disease process. To prevent the early stage of this disease therefore, the teeth must be cleaned effectively, at these locations where it originates, every night before retiring. Nothing less will suffice.

Measures to prevent further progress of lesions that have already been established must be applicable to the conditions that exist within the gingival crevice, now the periodontoclasia lesion. They must be designed to effectively remove and minimize the accumulation of foreign material on the tooth within the crevice, which causes and promotes the inflammation of the gum tissue resting against it.

The microflora in the anaerobic environment within the gingival crevice is quite different from that on the exposed part of the tooth. There is a thick pad of bacterial film consisting of a pile of long rod and filamentous type organisms, one end attached to the tooth or to calculus which is usually present, and extending outward to the surface of the pad within the crevice. At the surface the growing ends and fruiting heads of these rod and filament type organisms are constantly bathed with the ever present pus and inflammatory tissue exudate. This provides a favorable habitat for the more exacting anaerobic spirochetes,⁷ which are always present, and ameba (*Endameba buccalis*)⁸ which are usually present. The bacterial pad extends right down to the very bottom of the lesion and it is here that the spirochetes and ameba, which are dependent upon the other organisms, are most abundant.

Cleaning the bacterial film from the tooth within the gingival crevice is followed by rapid subsidence of the inflammation and healing of the ulcerated epithelial surface. If this is done at night before retiring not enough grows back and accumulates to be harmful, before time to clean the teeth again the next night. In this way further progress of the disease, in most instances, is prevented. It cannot be prevented any other way.

Since the foreign material on the tooth within the crevice extends to the very bottom of the lesion, then the tooth must be cleaned right

to the bottom of the gingival crevice. Methods of personal oral hygiene generally taught and practiced do not provide for this. In fact many believe it is important to be especially careful not to injure the gums, in whatever method they follow. Almost none know that they must clean their teeth within the gingival crevices to the very bottom of the space. If they knew it is desirable they could not do it with the tooth-brushes, dental floss and other articles which have been available to them heretofore.

Based upon accurate information as to the local conditions which cause and promote both caries and periodontoclasia, I have designed an effective method of personal oral hygiene which is adapted not only to cleaning the teeth within the gingival crevices, but also at other areas where caries originates.

We can state in one sentence the personal oral hygiene every person must know and follow in order to maintain dental health and cleanliness—"YOU MUST CLEAN YOUR TEETH RIGHT, WITH THE RIGHT KIND OF BOTH TOOTHBRUSH AND DENTAL FLOSS, EVERY NIGHT BEFORE RETIRING." Details of the method and specifications of the necessary toothbrush and dental floss have been published^{4,5,6} together with information upon which they are based.

The individual has not known how to clean his teeth right. He must be taught how to do it, and be shown the conditions by someone who does know.* An increasing number of practicing dentists are taking the desirable short period of post-graduate instruction to enable them to teach this method of personal oral hygiene to their patients. In at least two dental schools that I know about, members of the faculties are teaching their students this method. They will know how to maintain their own dental health and cleanliness and later will be prepared to teach their patients.

SUMMARY

The etiological conditions which must be combated at the locations where caries and periodontoclasia lesions originate and progress are pointed out.

Attention is directed to the necessary method of personal oral hygiene for preventing these diseases and for removing or minimizing the conditions which cause and promote them.

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*I wish the opportunity of instructing and advising in this regard, a still larger number of university personnel, faculty members, students and others.