The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. LXVII, No. 5

CHICAGO, ILLINOIS

JULY 29, 1916

THE CARE OF CHILDREN'S TEETH

THE MOST NEGLECTED FEATURE OF PEDI-
ATRIC MEDICINE*

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Modern medicine concerns itself very largely with the prevention of disease and deformity, and nowhere is there wider or more effective application of the principles of preventive practice than in childhood. Only in this period of life can developmental defects be successfully dealt with, and during this time occurs the greatest incidence of those diseases and infectious conditions which so largely determine the disabilities and deformities of later life.

Tuberculosis, it is now generally recognized, is essentially, at least in its inception, a disease of early life. Measles, scarlet fever, diphtheria and poliomyelitis, and adenoid, tonsil and dental infections, to which may be ascribed so many of the cardiovascular, renal, articular, nervous and other disorders of later years, all occur chiefly in childhood, and methods of control, if they are to avail anything, must be applied then.

Preventive medicine, then, it may fairly be said, is of prime importance to the pediatrician. Prophylactic measures not instituted in childhood are, in the majority of cases, too late.

In many respects the problems of preventive medicine in childhood are well formulated and intelligently appreciated, though in most localities the machinery to cope with them is still inadequate.

The problem of the care of the teeth, however, remains very generally neglected. Several of our larger cities have splendid systems of dental clinics, and more or less dental inspection is carried on in the schools of even many of the smaller communities; but in most places nothing is being done. Indifference to the subject pervades both the medical and dental professions. Many members of the latter, indeed, seem woefully ignorant of the importance of the conservation of children's teeth, and so commonly do dentists refuse to accept children as patients that there is often great difficulty in having necessary work done. It has been my frequent experience, in trying to save the deciduous premolars or even the first permanent molar, to have dentists decline to undertake the work on the ground that it was not worth while. Doubtless most children are difficult and trying dental patients, and perhaps few dentists possess the tact, patience, sympathy and insight into child nature essential to him

who would successfully deal with them; but I believe that ignorance is the chief obstacle. "The deciduous teeth are only intended to last a few years anyway and then be replaced, and what matters it if through early decay they are prematurely lost? Fillings to preserve them would fall out in a short time and have to be done over, so why bother with them? The permanent teeth will be crooked, of course, but then, they might be so anyway, and they can be straightened later if desired." Thus the voice of ignorance, and it doubtless salves many a conscience that should feel guilty.

For the purpose of our discussion we may consider the teeth in relation to developmental, nutritional and infectious disorders associated with them.

The most important developmental defects involve the bones of the jaws and face primarily, and are manifested by disturbances of dental structure, alignment and occlusal relations commonly leading to more or less interference with the functions of mastication, respiration and speech, and alterations in the esthetic appearance of the dental arches and facial expression. This syndrome is included, by the dental profession, in the term "malocclusion." The causes of malocclusion may originate in fetal life, dating back to the period of the differentiation of the dental lamina and tooth germs, or even beyond, and the bony deformities may, in some cases, be recognized before the eruption of the teeth and may vary from complete absence of certain bones, and defects such as cleft palate, to merely insignificant changes in relationships.

In other instances, a normal deciduous dentition may be ruined by neglect or misuse. Neglect of oral hygiene leads to early caries and loss of teeth, with consequent shrinkage and abnormalities of growth of the jaws, which force the oncoming permanent teeth out of their natural positions. Similar effects may follow misuse, which implies the failure to utilize the masticatory function of the teeth, and may be caused by an improper dietary, or by bad habits, such as bolting the food, or chewing on one side, or with the front teeth only, which may cause relatively disproportionate growth of different parts of the jaws; or caries or other painful conditions of the mouth and teeth may prevent proper mastication. Nasal deformities, adenoids and hypertrophied tonsils may induce changes in the normal palatal arch and dental alignment; and certain systemic disorders, as syphilis, rickets and malnutrition may profoundly affect the development of the jaws and teeth, as may also disorders of the endocrine organs, as dyspituitarism.

A correlation between dental malformations and certain other developmental defects has also been commonly observed. Deformities of the palate and dental arches are almost invariably found in the mentally defective, while cretins quite constantly exhibit irregu-

* Chairman's address, read before the Section on Diseases of Children at the Sixty-Seventh Annual Session of the American Medical Association, Detroit, June, 1916.

larities and abnormalities in the position, structure, eruption and shedding of the teeth. The deciduous teeth, for instance, may be retained to adult life, coexisting with the permanent teeth.

The development relationships between the jaws and other bones of the face are strikingly shown by the marvelous development of this region which occurs in the first two years of life, more marked than in any other part of the body. It is a favorite saying that "Beauty is skin deep"; but how false this is. Beauty, as applied to human beings, ordinarily refers to the aspect of the face, and here beauty is "bone deep." No matter how fine the complexion or texture of the skin, there is no beauty in overshot jaws, receding chins and crooked teeth, or in the vacuous expression of the habitual mouth breather. As we give so much thought to our personal appearance, and as we are so much judged by our appearance, and the impressions we create are to such an extent dependent on it, how important it is, then, that parents should very early be properly advised as to the care of their children's mouths, in relation to the development of their faces.

That malocclusion of the teeth may seriously interfere with one's esthetic appearance and with mastication, and even with speech, is evident even to the laity.

Respiratory disturbances result chiefly from encroachment of the narrowed high-arched palatal structures on the nasal cavity. The nasal passages are contracted, bowing of the septum still further reduces the air-space, and adenoid and tonsillar hypertrophy are usually associated. There occur then the manifestations of mental and physical impairment related to obstruction of nasal breathing, which, because of their notoriety, need not be discussed in detail here.

Nutritional disturbances associated with abnormal buccal conditions are common. The mouth is one of the important organs of digestion. Mastication of the food is an essential prelude to the processes which are to follow, and in respect to starchy foods, a considerable proportion of the digestive process should normally occur in the mouth. That a diseased organ cannot functionate normally is axiomatic. Moreover, digestive processes not properly instituted cannot be completed without entailing on other organs demands beyond their normal capacity. Thus children with bad teeth have commonly disturbances of other digestive organs, and impaired nutrition, which is of course accentuated by the associated toxemia due to absorption of bacterial products from the mouth. The swallowing of these, also, no doubt, plays a part in the derangement of gastric and intestinal digestion.

A proper selection of the dietary in young children is of much significance in the development of sound and normal teeth; but another member of the section is to discuss this phase of the subject, and I will not trespass on his topic.

Infections of the teeth and alveolar processes afford two of the commonest diseases to which man is subject, dental caries and pyorrhea. Interest in caries dates back to early times and it has been ascribed to a great variety of etiologic factors. In Hippocrates' time, disturbance of the humors of the body was assigned as a cause. In the middle ages, the worm theory prevailed. At one time, each tooth was supposed to act as the pole in a galvanic battery and electrical action was thought to account for the dissolution of the tooth. Later on, caries was supposed to be due to the presence in the mouth of abnormal chemical bodies, white decay being attributed to nitric acid, yel-

low decay to hydrochloric acid, and brown decay to sulphuric acid. With a knowledge of bacteriology came the septic theory, and then the chemicobacterial theory, which is now generally accepted. This theory assumes that certain of the mouth organisms, by the production of enzymes, induce fermentative processes in the carbohydrate food materials in the mouth, with resultant formation of acids, chiefly lactic, which cause dissolution of the inorganic substances in the teeth. Destruction of the harder portions of the tooth structure exposes the pulp to infection, in which may be also involved the peridental soft tissues or even the bone. Some authors have claimed that caries is endogenous rather than exogenous in origin, but this hypothesis finds little support.

Conditions constantly present in the mouth, free exposure to bacteria, and warmth and moisture to facilitate their growth, predispose to germ activity in this region, and liability to caries is enhanced, according to the theory, in the presence of lactic acid forming organisms, by undue retention of carbohydrate materials in proximity to the teeth. This may be due to the form or arrangement of the teeth, pits or crevices in the enamel, recession of the gums, or faulty positions of the teeth in relation to each other or to soft parts, tending to increase the liability to retention of food particles. An arrested or insufficient flow of saliva may also be a factor, but this is rare except during fevers. If prolonged, caries may be greatly aggravated by it. The most important factors, however, are probably the food itself and the dietetic habits of the individual. This cannot be gone into in detail, but in general it may be said that soft foods that require little mastication, which assists in the mechanical cleansing of the teeth, or sweet sticky syrupy foods that so often constitute the last part of a meal, seem to predispose to caries. That mushes, custards, puddings, soft bread-stuffs, bread and milk, potatoes, sweets, etc., form a large part of children's diets, is well known.

Dry, fibrous and acid foods, such as dry cereals, fresh vegetables and fruits, on the other hand, seem antagonistic to the development of caries. They are especially valuable, then, particularly if eaten at the close of a meal.

Dietetic habits, such as eating before retiring, or the eating of sweets at bedtime or between meals, or too frequent eating, which leaves a fresh and constantly replenished supply of carbohydrate material in the mouth, or bolting of food, may favor retention of carbohydrates and so predispose to caries.

The relative alkalinity and acidity of the saliva in relation to caries is at present a subject of great interest in the dental profession, largely induced by Pickering's work, in which he seemed to prove that by varying the stimuli applied to the salivary glands by foods or chemicals taken in the mouth, changes may be brought about in the reaction of the saliva, it being his theory that caries is dependent on acidity of the saliva. Critical review of his methods by other investigators, however, is said to have disclosed certain fallacies, and it would now appear that a tendency to caries depends perhaps not so much on the mere acidity or alkalinity of the saliva, as such, but rather on the difference in reaction between the so-called resting saliva and the saliva activated by the taking of food or chewing. This difference is called the salivary factor.

It is well known that the reaction of a culture medium may ordinarily be altered but little without affecting the growth of organisms in it, slight changes

perhaps inhibiting entirely the growth of certain bacteria. It would seem, according to observations on which this theory is founded, that wide variations in the reaction of the resting as compared to the activated saliva favors immunity to caries, by producing conditions unsuitable for the excessive proliferation of acid-forming organisms in the mouth. The influence of foods and chemicals on the process is still unsettled.

Pyorrhea, also, has of late attained a great prominence in medical literature because of the investigations into the causative relationship of the *Endamoeba gingivalis* to this condition, which have aroused considerable interest and some controversy.

We are concerned, however, with the more general aspect of these very common infectious diseases.

Almost invariably associated with suppurative conditions in the mouth we find infections of the tonsils and other pharyngeal and nasal structures. Sinus disease, middle ear inflammations, inflammatory eye disturbances from direct extension of infection, and toxic changes in the iris, choroid, retina or optic nerve have been frequently reported.

Tubercle bacilli have been isolated from the cavities of carious teeth unassociated with apparent tuberculous disease in the individual other than cervical lymphadenitis; but dental caries so profoundly affects the subject's general nutrition as to constitute a grave predisposing factor in tuberculosis, whether or not we regard the teeth as possible direct portals of infection with the bacillus. Simple and suppurative lymphadenitis resulting from caries is a common phenomenon.

During the last several years, the subject of focal infections has occupied perhaps the foremost place in medical thought. It is unnecessary here to rehearse the many conditions included in the category of infections of buccal origin, because they are familiar to all by reason of the vast literature on focal infection. If it is true, as Billings has said, that, barring skin and venereal disorders, the largest percentage of human diseases have their origin in the mouth and nasopharyngeal area; or if all nontraumatic joint inflammations are evidence of infection elsewhere, most commonly in this same region, it would seem that the importance of my subject can hardly be exaggerated.

What is to be done about it? The problem is appalling by reason of the vastness of the personnel involved and the time required for adequate dental treatment. Every dental patient demands hours of actual work, and by whom and when and where is this to be done? Wise men, leaders of the dental profession all over the country, see the need and are striving to devise means of relief. The medical profession, largely through the impetus of the "focal infection" propaganda, realizes a new significance in decaying teeth and septic mouths. The public is being aroused to the importance of oral hygiene. Philanthropy is interested. The age incidence of many dental defects makes the problem of peculiar concern to the pediatrician. I have therefore ventured to bring the subject to your attention today in the hope of stimulating your further interest in it, and enlisting your aid in helping to promote its consideration in your several communities.

Cooperation between the dental and medical professions must be fostered. Both they and the public must be educated to the need by those who already realize it. The rank and file of the dentists must learn that they are not merely artisans and mechanics, but that

they are workers in one of the great fields of medicine, in which they have to do with matters which may determine the whole future health and usefulness of the individual; and that children, instead of being avoided, are to be regarded as their most important patients, because much of their work can be effective only in children.

Parents must be made to appreciate the tremendous importance of conserving the deciduous teeth and of correcting orthodontic defects and deformities early; and those who are able to pay must be taught that the work is worth paying for, that it may be attractive to high-class scientific men and women.

Time does not permit a discussion of details of organization of the forces concerned in the problem. I want to say, however, that a children's clinic which lacks a dental department as an inherent part of its organization is defective.

Federal Realty Building.

THE PROGNOSIS IN INFANTILE PARALYSIS *

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Despite the great advances in recent years in our knowledge concerning the etiology and pathology of acute myelo-encephalitis, and notwithstanding the numerous excellent papers recently published on the early treatment of this disease and its effect on the outcome of the paralysis, few diseases of such serious nature are so little understood by the medical profession at large as this one. We have been powerless to prevent the spread of epidemics; unable to make the correct diagnosis until after the advent of a frank paralysis. Treatment both prophylactic and curative has been futile, and the correct outlook as to the future progress of a given case is rarely foretold. Is there any wonder, therefore, that so many patients fall into the hands of quacks and irregular practitioners?

This at least has been the writer's experience in the recent epidemic of infantile paralysis in Ohio. He has seen many patients, improperly managed as to treatment and functional use, grow worse and lose what little muscle strength was left in the afflicted muscle groups, because of the false prognosis as to the duration and the course of the treatment and the final outcome as to function. One has only to consult the recent publications of Lovett and Buchholz to realize the possibilities for partial recovery of function and the tremendous importance of properly graduated muscle treatment and the baneful effects of overstimulation, excessive use and overexertion.

It is of vital importance that the physician in charge in the acute stage of this disease should be conversant with the true course of the recovery of muscle function. In the inability to diagnose and specifically treat the beginning stages of infantile paralysis, very little additional harm is done in the present state of our knowledge; but with a promise of a perfect cure the seed is sown for a lack of appreciation for a good

* Read before the Section on Orthopedic Surgery at the Sixty-Seventh Annual Session of the American Medical Association, Detroit, June, 1916.