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THE PREVENTION OF MALOCCLUSION

By Emmett J. Scott, B.S., D.M.D.

THE SUBJECT, "The Prevention of Malocclusion" is admittedly too expansive in its ramifications to permit of adequate treatment in a short space of time. It is also beyond our ken to handle it thoroughly, since even now it is a field offering great opportunity for expeditionary research.

However, it is possible to do our share in stimulating interest in the particular branch of dentistry involved. This is done with the hope in view of preventing the evolution of dentures of poor mechanical efficiency and, therefore, of impaired biological and functional benefit.

For the past decade or more the perfection of intricate operative and laboratory technics has taken precedence over biological research and the rendering of services essential to the development of the organism. Without question the perfection of these technics increases the efficiency of the type of service rendered and the pecuniary remuneration received by the operator.

However we may look upon it, our responsibility is not of an entirely technical nature. The function of dentistry is entwined in an effort to render health service to humanity through the promotion of oral health, and, to serve as a remunerative vocation, profession if you will, to its practitioners.

Malocclusion, while possible of development in adults of various ages, develops from its incipencies during early life. Hence, our primary concern is with children and adolescents.

Three divisions of dentistry are directly responsible for the younger patients: the pedodontist, the orthodontist and the general practitioner. The orthodontist is an avowed specialist whose duties are usually limited to the correction of malocclusion and, at times, to the prevention of it.

The greatest opportunity for the prevention of malocclusion rests within the grasps of the pedodontist and the general practitioner.

The practice of pedodontia is relatively an infant. The word itself is derived from the Greek "pais"—a child, and "odous"—a tooth, literally "a child's tooth." Freely translated into dental parlance it means "the science and art of promotion of oral health in the child."

Thus far the numerical quota of pedodontists has not become large, in fact, it is far from being large enough to compete with the inroads of caries upon the teeth of the children of the world. It is our contention,

in finality, that until children are handled exclusively by specialists the greatest opportunity to prevent malocclusion, and therefore the greatest responsibility, is resident in the general practitioner.

Of course this can only apply to those children who can be reached. The problem dealing with those who have not been reached is largely educational in nature, and, its solution requires assistance from sources outside the profession.

In making an effort to define normal occlusion, one encounters various difficulties.

Occlusion is defined by Angle as "the normal relationship of the occlusal inclined planes of the teeth when the jaws are closed."

Normal occlusion, as defined by Dewey, is "the relationship of the inclined planes of the teeth as intended by nature." The word "normal" is defined as "according to an established rule or principle."

Immediately one is confronted with the idea that no two individuals are exactly alike. Can one expect an established pattern—a stereotyped or ideal occlusion—to be suitable, or even adaptable, to all persons? Obviously not! Yet, we must have an established ideal as our visual image in conceiving an harmonious occlusion. This we have, according to certain relatively secure landmarks, and we are able to determine a normal occlusion for a single individual by that occlusion which is at one and the same time innocuous, harmonious, esthetic and functional for the individual in question.

Normal occlusion must not be conceived as a constant, but as a variable conforming to the aforementioned ideals.

Malocclusion is defined by Angle, as "a perversion of the normal relations of the teeth," and, by Dewey, as a "deviation from normal to such an extent as to interfere with the functions of the teeth."

An intimate appreciation of the etiology of malocclusion is most certainly a necessity in endeavoring to prevent or abort it. It is possible at this time to give only a condensed outline of some of the elements of its evolution.

From a classical viewpoint the causative factors in malocclusion are local and general. They are classified according to the period of inception as inherited, congenital and acquired. Some dispute arises frequently when one refers to a characteristic as being inherited or congenital. For brevity let us agree that inherited and congenital characteristics appear before birth, while those of an acquired nature appear after birth.

The etiological factors of a general nature partake largely of constitutional aspects. By far the most outstanding among these are the diseases of early childhood, particularly those of the exanthematous variety. Measles, scarlet fever, syphilis, tuberculosis, rickets and chicken pox usually affect occlusion by producing aberrant changes in the enamel organ, influencing the exfoliation of the deciduous teeth and the eruption of the succedaneous, or permanent, teeth, and, by affecting the general growth and development of the individual.

Malocclusions of an obscure nature, macro- and micromaxillary, (as well as macro- and micromandibular) changes are possibly influenced by endocrine disturbances, although little is known concerning this.

Recent investigations on the influence of diet upon growth and calcification by Howe and Hatch, Mellanby, McCollum and others indicate that there is little doubt concerning its role in the production of malocclusion. In fact Howe states: "Numerous theories have been offered to explain irregularity of the teeth, such as mouthbreathing, thumb-sucking, premature extraction and heredity. The latter two undoubtedly play a part.

Possibly mouthbreathing and thumb-sucking are also factors in this condition. The most common cause, judging from experimental evidence, has to do with growth and calcification of the maxillary bones and muscular development. Should bone growth and calcification lag behind muscular growth, the too plastic bone is narrowed and distorted by the strain of muscular stress. The narrow, high arch follows, and, owing to lack of space, the teeth erupt irregularly and the nasal passage is often changed."

The agencies usually classified as local are: caries, premature extractions, prolonged retention of deciduous teeth, habits and faulty operative procedures.

Acquired causes of malocclusion are:

1. Early loss of deciduous teeth.
2. Tardy eruption of the permanent teeth.
3. Early loss of the permanent teeth.
4. Loss of mesio-distal diameter of the teeth and co-incidental retardation of the antero-posterior development of the jaw.
5. Improper restoration of lost tissue.
6. Mouth-breathing.
7. Habits.

During the various periods of development and changes due to growth, and finally to senility, the human mandible assumes different shapes and the human face reflects the influences of growth and functional changes. Likewise, there may be a reflection of perverted influences.

At birth the mandible is a bone which lies in an almost unbroken horizontal plane. As the molars erupt the angle and ramus are formed and the angle assumes an obtuse form. Later, as adult life is approached, the teeth proceed occlusally, the alveolar processes develop, the face assumes a greater perpendicular dimension, the antero-posterior diameter of the jaw becomes greater and the angle of the mandible approaches a right angle.

As old age approaches, the alveolar processes and the teeth are frequently lost, the mandible showing a marked tendency to return to its horizontal proportions.

The newly born child presents a head the cranial portion of which is far in advance of the face developmentally. According to Piersol there is a certain ratio between the facial and cranial parts of the head which varies according to certain age levels. The table follows:

In the infant	The face	:	Cranium—I	: 8
At two years	“ “	:	“ —I	: 6
At five years	“ “	:	“ —I	: 4
At ten years	“ “	:	“ —I	: 3
In adults (men)	“ “	:	“ —I	: 2.5
(women)	“ “	:	“ —I	: 2

It seems to be indisputable that the dentist has an opportunity, with his well controlled patients, to influence the proper development of the face by exercising the means at his disposal, to foresee and to prevent the occurrence of certain deviations from the normal, and, to serve in an advisory capacity until this period of growth is safely navigated.

It is easy to place the wrong construction upon what one is trying to do. McCoy offers a very rational check upon one's efforts by the following: "It is a mistake to assume that the end results of growth and development under present day conditions of modern life, even with all conditions apparently favorable, will be a perfect example of occlusion if judged by the standard of the ideal. All organisms and their parts are subject to variations. The teeth and jaws and their mutual arrangement, which we term occlusion, are not exempt from this phase of growth but vary as do other parts of the body.

These variations occur around a certain mean which we call the "normal." This is a standard of a functional as well as an anatomical nature and is not rigidly fixed. It has different degrees of perfection, but is rarely perfect. Normal occlusion and ideal occlusion are not necessarily the same."

It is our contention that by careful supervision of our child patients it is possible to preserve that "average mean," or "normal occlusion," and, in a large number of instances to prevent a perversion of that mean. This may be facilitated by attention to the following features:

(a) Premature extraction of deciduous teeth.

By "premature extraction" we mean extraction before the normal exfoliation time of a tooth. For example, if a deciduous incisor is extracted for any reason before its normal exfoliation time there is a tendency for the space to close, by mesial or distal drifting of the adjacent teeth.

Closure of the space occasioned by the extraction of a deciduous incisor results in the production of a space too narrow for the successful normal eruption of the succeeding permanent incisor. Consequently this tooth erupts either labially or lingually to its proper position.

If the tooth removed happens to be a deciduous molar, the closure of the space results in the buccal or lingual displacement of the bicuspid. This is brought about by the loss of the eruptive force of the first molar as a developmental factor. Instead the erupting tooth pushes the next anterior tooth forward, thus closing the space.

According to Angle, "this malposition of the teeth causes their inclined planes to direct teeth into malocclusion, or by permitting contraction of the space normally occupied, permits the other teeth to assume a position in a contracted arch with a consequent displacement buccolingually of teeth which would align themselves under different conditions in a normal position. Once established the lips, cheek and tongue maintain the disharmony."

(b) Prolonged retention of the teeth.

By this we mean maintenance in the mouth of a deciduous tooth when its exfoliation time has passed.

Under certain circumstances the maintenance of a healthy deciduous tooth is desirable, e. g., when there is no permanent successor (as may occur when there is a missing tooth germ for any reason). In such a case the procedure is dependent upon the Roentgenographic findings and the clinical examination.

Otherwise, their prolonged retention may result in the eruption of their successors in positions of malocclusion, or the partial or complete impaction of the succeeding tooth. In either case it is wise to postpone a decision until the Roentgenograph is made, in order to locate the missing tooth.

(c) Extraction of the permanent teeth, without adequate restoration, permits of a shifting of the teeth, accompanied by a tipping of certain of them in an effort to compensate the space produced. The result is an unbalanced occlusion.

(d) Space maintenance.

Before discussing the various types of mechanical space maintainers it cannot be too greatly emphasized that natural teeth are the best space maintainers. That is to say, one should exhaust every legitimate means of saving the tooth in question before extracting it and resorting to mechanical contrivances.

Space maintainers are indicated:

- (a) Where deciduous teeth have been lost prematurely, and,
- (b) Where permanent teeth are lost too early in life to permit of immediate prosthetic restoration.

It may be seen, therefore, that a space maintainer is an appliance designed to retain (or maintain) a space created by the loss of a tooth. In the ordinary application of the term it may preserve the space until the eruption of a succeeding tooth, or until it is deemed advisable to restore the missing organ, as the case may be.

Ordinarily a space maintainer may be varied to conform to the demands of the case or the likes of the operator. Fundamentally, it consists of a band for the teeth proximal to and distal to the space connected by a wire, or bar, which may be soldered to both bands or soldered to one and united by a so-called "broken joint" to the other.

Some operators prefer to connect the bands by a single bar across the space. Such a bar is usually soldered so that it crosses the middle (buccolingually) of the space, in which case the eruption of the succeeding tooth must be closely watched to prevent its deflection. Others use a double bar, one to either side of the space, so adjusted that no interference with eruption is occasioned.

It is not altogether unheard of for an operator to construct a miniature prosthetic denture where teeth have been lost. This has the advantage of maintaining occlusal relations as well as the mesio-distal diameters of the areas involved. It is necessary to say that these cases must be "con-

trolled," and, therefore, are of the private practice class rather than clinical and consequently "uncontrolled" cases.

From the point of view of operative dentistry one may prevent space closures of a different type by carefully contouring fillings and restoring contact points. Should an unfilled cavity exist, an undercontoured filling be inserted or a contact point not be restored, it is assured that the proximating tooth will drift into this small space. Although the change in relationships is small it is frequently sufficient to alter the relationship between the inclined planes of the teeth and the jaws.

It is advisable likewise, when treating deciduous central incisors by disking them to wedge shape (as advocated by Black), to avoid destroying the cervical third in order to prevent a similar change in mesio-distal relationships to that described above.

Dr. Walter McFall of Macon, Ga., in thousands of examinations of school children, has made this observation: "I think that one of the most frequent and fruitful causes of malocclusion for future periodontal disease in adult life comes from too early loss of the deciduous teeth without the use of space maintainers. I have observed that of children having the first or second deciduous molars extracted on one side, both sides, or in the jaws, from three to eight years of age, at least 75 per cent need space maintainers or orthodontic treatment because of these early extractions. As regards those children with teeth maintained in a healthy, restored, comfortable and usable condition, until time for normal replacement by succeeding permanent teeth, I have found that about 17 per cent from three to eight years of age also need orthodontic treatment because of other etiologic factors."

(e) Habits.

There are certain habits which are almost characteristic of childhood; at least they are from the viewpoint that they usually originate early in life. Invariably they are persisted in until they are factors to which we commonly attribute certain interferences with the occlusal relationships of the teeth, and, with the symmetrical proportions of the face.

Some of the habits are:

- | | |
|------------------|---|
| 1. Thumb-sucking | 4. Lip-sucking |
| 2. "Pillowing" | 5. Mouth-breathing, and, |
| 3. Lip-biting | 6. "Gritting" the teeth,
(Bruxomania). |

With the exception of the mouth-breathing, these habits permit of correction in two ways. In young children the performance of the habit may be made distasteful by some measure, or impossible, by the use of such contrivances as splints, bandages, mittens, etc. In older cases, and in the more precocious younger cases, it is possible to obtain very satisfactory results by appealing, in a very forceful manner, to the child's intelligence, vanity, hero-worship, etc.

Mouth-breathing is usually a forced habit, although it may be acquired. It is produced most commonly as an accompaniment of obstruction of the respiratory passages (the nose, naso-pharynx, and oropharynx), by enlarged adenoids and tonsils. It may be induced by a deviated nasal septum, nasal polypi, etc. Removal of the cause and an appeal to the patient for co-operation usually results in the disappearance of the habit. If not, heroic measures must be the last resort.

Most of these habits produce their deleterious effects by exerting a perverted stress (muscular or otherwise), thereby influencing the positions of the teeth and jaws.

In conclusion, permit me to state that the major premise of this article is that most child patients reach the specialist by reference. One feels inclined to the belief that the general practitioner is in a strategic position to render the important service of prevention.

Prevention is far more important than cure.

Preventive medicine proves its benefits by preserving and insuring the health of the masses against pestilence, and, by the postponement of death.

Preventive dentistry, a virgin field, must receive its due share of attention. It means the insurance of oral health and the postponement of an edentulous state.

“If you would understand anything, observe its beginnings and its development.”—*Aristotle*.