

ORTHODONTICS IN RELATION TO OTHER FIELDS*

JOHN B. MOFFATT, B.D.Sc.

Goldstein(1) has said "each field of dentistry is dependent upon an allied one and the neglect of one field, whichever it might be, will cause the health of the patient to suffer. We must impress the various specialists of dentistry and the general practitioner that we must be concerned with the whole patient and not our own special field of interest."

Consequently, I should like briefly to review orthodontics in relation to operative dentistry, pedodontics, periodontics, prosthodontia, and oral surgery.

OPERATIVE DENTISTRY

Discussion in this section will be under the following headings—caries, faulty dental restorations, and treatment of cases where one or more permanent teeth are absent.

Dental caries is the chief cause of the early loss of deciduous and permanent teeth with the result that adjacent teeth drift, abcess fistulas form and teeth erupted and erupting assume almost grotesque positions of malocclusion. Also, loss of the approximal contacts and portions of the occlusal surfaces result in a disturbance of the balance of the forces of occlusion. If the occlusal surfaces of the teeth are involved, this will affect the forces of the inclined plane, and further, if the approximal surfaces are affected, this in turn will break the continuity of the approximal contacts.

Faulty dental restorations can also contribute towards a malocclusion for the relationship of the inclined planes may be affected if the contours of the teeth are not restored with precision. Also, in approximal fillings it is desirable that the original size and form of the tooth be restored in order that the approximal contact may be maintained.

In considering the treatment of cases where one or more of the permanent teeth are absent, McCoy(2) has written "when confronted with the necessity of deciding whether the best interests of the patient will be served by replacing the absent teeth by artificial means, or by moving the others in a manner to compen-

sate at least partially for the missing ones, our decision should be based upon several factors, such as the age of the patient, the number and character of the missing teeth, and the end results judged from a physiological, occlusal and esthetic standpoint."

Oliver(3) has said "if a tooth is missing, orthodontic assistance can often be utilized to great advantage prior to supplying the missing teeth. A difficult case may often be changed into one more simple for bridge replacement. When dentists speak of orthodontic assistance, altogether too many of them are prone still to think of only the child patient. Experience has taught us, however, that a considerable improvement can be made for older individuals, at least for those not beyond their thirties. Modern dentistry, in truth, is coming to see a vast number of indications for orthodontics in the everyday practice of general restorative work with adult patients."

Replacement of the absent tooth, or teeth, by bridgework

In those cases where teeth have migrated after the loss of neighbouring teeth, and where bridgework is indicated, simple movement of teeth is often desirable in order to secure the best result. In the construction of such bridgework, the restoration must conform with the maintenance of the health of the bone supporting the remaining teeth. Thus, such a restoration must be constructed in a manner to conform with the forces of occlusion as manifest in the natural dentition, and failure to conform to these conditions will result in destruction of bone about each tooth as it will be subjected to forces contrary to the growth of bone.

The closure of spaces by missing teeth

If the upper or lower central incisor is missing, compensation for this can only be by means of an artificial substitute.

*Presented on the Clinical Day of the Australian Society of Orthodontists, Queensland Branch, 4th October, 1968.

When the upper permanent lateral incisors are absent, the permanent cuspids may be moved mesially until they contact the centrals, while the upper bicuspid and molars may be carried forward the width of one bicuspid on either side. The cuspids may then be trimmed to resemble lateral incisors. For esthetic reasons, an alternative to trimming is the construction of porcelain jacket crowns for the cuspids.

Where one or both of the lower laterals are absent, the space may be closed by moving the lower cuspids on the side of the missing tooth or teeth into the space created by the missing tooth or teeth. The lower teeth posterior to the cuspid may then be moved mesially into the space created by the cuspid or cuspids. An alternative to this movement of teeth, is restoration by bridgework.

The absence of the lower second bicuspid is frequently observed. Where these are missing it is desirable that the lower molars be moved mesially for the purpose of filling the space intended for the second bicuspid. The occlusal relationship of the lower molars and the teeth in the opposing jaw is not normal under these conditions and only a reasonable function will exist. Alternately, the upper second bicuspid may be extracted and the upper and lower molars be moved mesially into the space. This alternative method would provide better functional relationship of the teeth.

The loss of the first molar at about 10 or 12 years of age will bring about a mesial eruption of the second molar, which will have a reasonable occlusal relationship with the opposing tooth. The loss of this tooth will invariably be felt later in life when a mesial tipping of the second molar may occur, resulting in a very unsatisfactory occlusal relationship with the opposing tooth.

If the loss of a first molar is necessary, probably the best time for its loss is just prior to the eruption of the second molar.

Where the first permanent molars have been lost, the second molars may be moved mesially to close the first molar space, provided the radiographs reveal the presence of the third molar which will subsequently erupt into the space previously occupied by the second molars. The upper third molars usually erupt without complication, but, on occasions the lower third molars tilt forward during eruption thus necessitating later orthodontic intervention to establish the correct occlusal relationship.

If, however, the third molar is congenitally absent, it is not desirable to move the second molar mesially.

Where both the first molar and the second bicuspid are missing, and, provided the third molar is present, the second molar may be moved mesially to occupy the space of the first molar. No attempt being made to close the entire space. The remaining space between the first bicuspid and the second molar may then be closed by artificial means. Alternatively, the entire space can be closed by a prosthetic appliance.

If one bicuspid is missing on each side, either in the maxilla or the mandible, the spaces should be closed by moving the molars forward. In the case where three bicuspid are missing, the remaining bicuspid should be removed and the spaces closed. Exception to this policy should be made where the reduction of the dental arches would probably cause a serious interference with esthetics.

Where more than one tooth is absent from each side of the dental arch, it is not a good policy to attempt to close the spaces. Rather it is advisable to establish the remaining teeth in normal relationship and insert an artificial substitute.

PEDODONTICS

The close relationship between pedodontics and orthodontics cannot be too strongly stressed for observation of developing occlusion through its various stages is just as important as watching for the appearance of carious lesions and the correction of malocclusion.

Preventive orthodontics is largely within the province of general dentist practice, however, the dental practitioner often calls upon the orthodontist for a decision regarding the following:

The abnormal maxillary fraenum labii.

Ectopic eruption.

Correction of the incisal cross bite.

The premature loss and over-retention of deciduous teeth.

The loss of permanent teeth.

Congenitally missing teeth.

Space maintainers — when and when not, required.

Inharmony in size of teeth and jaws.

Ankylosed teeth.

Abnormal condition of the glands of internal secretion.

Habits.

PERIODONTICS

The relationship between orthodontics and periodontia has been epitomised by Glickman⁽⁴⁾ who writes "Orthodontic procedures are often required as adjuncts in comprehensive periodontal therapy. Conversely, tissue changes in the periodontium are basic considerations in orthodontic therapy. A close inter-relation therefore exists between periodontal and orthodontic procedures."

Dummett⁽⁵⁾ has discussed this close relationship also and he divides the treatment of periodontal disease into three phases in which orthodontics can assist, viz. the removal of the responsible factors, the elimination of symptoms and the institution of measures for the preservation of oral health. It is the first and second of these phases, however, where the orthodontist can be of especially great assistance to the periodontist.

Conditions contributing towards the periodontal disturbances which may be corrected by orthodontic aid, include:

Correction of migration and the closing of minute space to preclude food impaction - this may be accomplished by any of the following methods:

The grass line ligature - a twisted silk cord acting as a temporary splint for ligation of movable teeth to firmly anchored teeth.

The Hawley appliance with a spring arm.

The banding techniques.

However, whichever method is used, retention with fixation is usually necessary in these cases as there is a tendency for the teeth to migrate back to their original position.

With respect to crowding of the lower incisors associated with periodontal disease, and periodontal disturbances as a result of deep overbites, I understand Mr. Goodrick will be speaking on these later. My comment here being that in treating cases such as these it must be kept in mind that the acute periodontal disturbance must receive proper attention, and throughout the whole course of treatment supporting tissues must be carefully checked and maintained in good health. If careful treatment is not carried out, further periodontal disease will probably result.

PROSTHODONTIA

Orthodontics can be of valuable aid to prosthodontia for many problems which confront

the prosthodontist may perhaps be best treated by orthodontic means. Most particularly does this appertain to patients below the age of twenty, but orthodontic assistance is not solely confined to patients in that age group.

Schweitzer⁽⁶⁾ has said "Mouth rehabilitation by means of complete occlusal reconstruction is a comparatively new science. It may be divided into many phases. It has a medical as well as a dental approach, the common meeting place between the two professions being the temporo-mandibular articulation. It is of special interest to the prosthodontist inasmuch as it involves rebuilding of adult mouths. It is of equal interest to the orthodontist, who, due to his study of growth and of occlusal abnormalities, often is able to see and prevent the destruction of the teeth and even later on, in the adult mouth, is able to work hand in hand with the prosthodontist in effective correction."

Orthodontic assistance becomes necessary often in cases of accident, extraction, or where teeth are congenitally missing. In young patients treatment may be carried out in three phases:

First, construction of an orthodontic appliance to correct malalignment of the teeth and incorporating an artificial tooth or teeth for esthetic reasons during tooth movement.

Second, construction of a temporary partial denture to act as a space maintainer.

Thirdly, construction of a permanent bridge when the patient reaches a suitable age for its insertion.

A difficulty which often confronts the prosthodontist is the patient who presents with a lower six year old molar missing and the corresponding molar in the opposing jaw extruded into the space previously occupied by the missing molar. Often an attempt is made to establish the normal plane of occlusion by grinding the extruding molar, with the result that the occlusal anatomy is destroyed, the tooth becomes very sensitive, and quite frequently the pulp becomes involved. This extruding molar may be moved back to the normal plane of occlusion by orthodontic aid and a bridge inserted to replace the missing six year old molar for the patient in such a case has usually reached an age where bridgework is indicated.

Prior to insertion of a bridge, tipping of the adjacent teeth will need correction, for it is usually found in cases such as this, that the

permanent second molar has tipped mesially and rotated towards the lingual, while the second bicuspid has tipped towards the space created by the loss of the molar.

Another case which presents a problem for prosthetic treatment is that in which the teeth are in poor axial inclination. If a prosthetic appliance is inserted under these conditions, it will tend to aggravate such axial inclinations and eventually cause the loss of other teeth. Correction of the axial inclination of the teeth prior to prosthesis, would prevent such further loss of teeth.

A missing permanent anterior tooth is a further problem, especially in a young patient, but this has been mentioned previously.

Further, orthodontic aid can be given in cases where certain teeth are protruding or are out of the line of occlusion. Movement of these teeth will assist prosthesis in producing a better esthetic result. Also, aid can be given where there is a spreading of the lower anterior teeth due to the absence of the posterior teeth. These teeth may be re-aligned before the insertion of the prosthetic appliance.

ORAL SURGERY

The co-operation of the orthodontist and the oral or plastic surgeon is desirable in many cases of deformed occlusion and disfigured faces. On occasions, patients presenting with fractured jaws may require orthodontic assistance in order to establish the proper position of the displaced fragments.

Wright(7) has demonstrated this co-operation and has shown cases from his own practice which "were treated in co-operation with associates in dental and general surgery. They are only a few of the many treated and include a simple complete transverse fracture of the maxilla, and a complete multiple mandibular and maxillary fracture." While Wright has used the edgewise arch mechanism exclusively, he wishes it understood that he holds no brief in the matter of appliances so long as the operator adheres to the principle of occlusion and employs a mechanism which possesses the necessary control.

On the other hand, the assistance of the oral surgeon may be necessary in order to maintain maximum response to mechanotherapy. This is so in the case of supernumerary teeth and the surgical exposure of unerupted teeth is often all that is required

to enable these teeth to erupt. No orthodontic aid then being necessary. However, if these teeth fail to erupt, this surgical intervention assists in providing access to them for the purpose of making attachments in order that such teeth may be moved into their correct positions. The teeth most commonly requiring such orthodontic aid are the upper cuspids, although any tooth may require such assistance.

Another factor of great importance is the removal of foci of infection. This may be manifest in the oral cavity or in the nasopharynx and the removal of such foci makes conditions more favourable for orthodontic treatment.

The close co-operation between the orthodontist and the oral surgeon is further demonstrated in cases of mandibular protrusions or true Class III malocclusion faces. The extreme Class III face, or "ultraprognathous" mandible as described by Lifton (8) is usually far from pleasing to the eye, and mastication for the patient is far from satisfactory. Both surgical and orthodontic treatment is necessary in these cases in order to secure the desired result. As will be realised the various surgical operations are not within the scope of this talk, but surgical removal of portions of the mandible is required in these cases, and planning of the procedure requires the co-operation between the oral surgeon and the orthodontist in order to improve the post-operative occlusion. Goldstein (9) has shown many successfully completed cases of this nature. He reports "a group of seven cases, representative of a sample of more than twenty cases of Class III malocclusion treated by combined surgical-orthodontic methods." Some of his conclusions being:—

Evidence supports the fact that the condylar cut is most successful.

The Edgewise mechanism is favourable in the treatment of such cases.

Occlusal function was good after treatment.

If a permanent result is to be expected, the operation should be performed only on an adult, where growth is complete.

In most cases post-operative orthodontic treatment is necessary in order to achieve the best results.

Improvement in facial lines is evident in most cases.

Co-operation between the orthodontist and the oral surgeon in the treatment planning of repairs to cleft palates is also indicated in certain cases. Lifton (10) says "from an orthodontic viewpoint the problem is concerned primarily with post-operative care." He further maintains "operations for repair of cleft lip (harelip) and cleft palate should be supplemented with orthodontic treatment for better masticatory function and improved esthetic appearance and also combined with an obturator, where indicated, to facilitate speech correction."

From the foregoing, therefore, it is concluded that consultation between the orthodontist and the oral surgeon is often desirable in order to achieve occlusal function and a more pleasing result.

Further, in relationship to all fields of dentistry which have been discussed, sound judgment by the orthodontist is essential, for the aim should be a good, esthetically-pleasing

functional occlusion, rather than the so-called ideal occlusion.

Queensland Insurance Building
371 Queen Street
BRISBANE 4000

REFERENCES:

- (1) GOLDSTEIN, Marvin: "Adult Orthodontics." Am. J.O. 39:1953:p.421.
- (2) McCOY: Applied Orthodontics. 6th Ed. p.311.
- (3) OLIVER, Oren A.: "Orthodontics as Supplement to Restorative Dentistry. Am.J.O.&O.S. 26:1940:p.323.
- (4) GLICKMAN: "Clinical Periodontology." W. B. Saunders Co., Phil.&Lond. p.929.
- (5) DUMMETT, Clifton: "Orthodontics and Periodontal Disease." J. Periodont 22:34:1951.
- (6) SCHWEITZER: Mouth Rehabilitation. p. 1015. The C. V. Mosby Co., 1951.
- (7) WRIGHT, Chester F.: "Occlusal Reduction in Jaw Fracture Management." Angle Ortho. 7:1937:67-80.
- (8) LIFTON, Jacob C.: "Orthodontic Procedures in Gross Dento-Facial Malformations." 33:1947: pp.325-362. A.J.O. & O.S.
- (9) GOLDSTEIN, A.: "Appraisal Results of Surgical Correction of Class III Malocclusion." Angle Ortho. 17:59:1947.
- (10) LIFTON, Jacob C.: "Orthodontic Treatment of Cleft Palate." Am.J.O.&O.S. 27:1941:p.453.