

Australian Society
of Orthodontists



University of Sydney

Orthodontic-Periodontal Interrelationships



Creating Brighter Futures

Orthodontic–Periodontal Interrelationships

Introduction

The outcome of orthodontic treatment is influenced by the patient's periodontal status before, during and after active treatment. Patients with periodontal problems considering orthodontic treatment should be assessed in an interdisciplinary fashion with the restorative dentist, orthodontist and periodontist contributing to a comprehensive treatment plan.

Treatment Planning Considerations

Every patient for whom orthodontic treatment is planned requires a periodontal assessment. For most younger patients this will be carried out by the patient's dentist and orthodontist and apart from focusing on oral hygiene issues it will identify those few patients who have a periodontal defect or problem that may require more specific periodontal procedures or surgery. For older patients the assessment procedure is more likely to also involve a periodontist to assess current periodontal disease, tooth mobility, gingival biotype, tobacco use and relevant systemic disorders. This is important as active orthodontic treatment in the presence of active periodontal disease may lead to accelerated and extensive bone loss.

Periodontally compromised patients that are to undergo orthodontic treatment must have appropriate periodontal treatment and maintenance. If pre-orthodontic periodontal therapy is required, a period of 4-6 months between the completion of such therapy and the start of fixed appliance treatment is advisable so as to ensure healthy tissues and to allow assessment of oral hygiene efficiency and motivation. If a healthy periodontium is achieved and maintained, orthodontic treatment can then

proceed, even if there is reduced periodontal support, without an increased risk of further attachment loss (Boyd et. al., 1989). For the periodontally compromised patient, regular appointments with the patient's dentist, dental hygienist and periodontist may be required on a three monthly basis during active orthodontic care.

Periodontal Considerations during Orthodontic Therapy

Pathogens associated with periodontal disease tend to increase in number during fixed orthodontic treatment. Orthodontic mechanics using light forces and bonded brackets rather than bands are recommended if there are concerns with oral hygiene or if there is reduced periodontal attachment. Appliance design should be as simple as possible with orthodontic appliances chosen that will collect less plaque and not irritate gingival tissues. Occasionally, orthodontic treatment needs to be suspended, or the treatment plan altered, if the periodontal response is unfavourable during the course of the treatment.

Periodontal Surgery for the Orthodontic Patient

1. Pericision–Circumferential Supracrestal Fiberotomy

Relapse of severely rotated teeth due to rebound of elastic fibres in the supracrestal tissues can be reduced by pericision. The most common technique is the circumferential supracrestal fiberotomy (CSF) (Edwards, 1970). This technique consists of inserting a surgical

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Erosion - this generation's challenge

During the planning, treatment and retention stages of orthodontic treatment it is important to be aware of the growing incidence of tooth enamel erosion. Dental erosion is when tooth structure is dissolved by strong acids found in some food and beverages, or from refluxed stomach acids. Erosion is unrelated to plaque and tooth decay.

This growing incidence of erosion in the teen and early twenties age group is attributed to the ever increasing consumption of soft drinks, particularly the black cola and sports drinks. These drinks are no longer a "special occasion" beverage and are consumed in vast quantities on a daily basis. For some young people they are their main source of hydration.

Another contributing factor in the development of erosion is the quality and quantity of the saliva. Saliva is 99% water and is important for buffering and remineralising tooth enamel. An individual's saliva can be directly and detrimentally affected and inhibited by these beverages.

Signs of an erosion problem to watch for are the "bowl" shape of the occlusal surface of the lower first molars, and the loss of natural morphology of the pits and fissures. The area is shiny and more yellow due to the proximity of the underlying dentine. In addition, in the case of consistent gastric acid reflux, the palatal surfaces of the upper incisors can also be shiny and more yellow, with a "flattening" of tooth shape.

The first step in "treatment" is to educate the patient and their family about these drinks and the devastating effects of erosion on the teeth. In future issues we will cover why these drinks cause these devastating effects along with the role saliva plays in both erosion and decalcification.





blade into the gingival sulcus and severing the epithelial attachment surrounding the involved teeth. The blade also transects the transseptal fibers by interdentially entering the periodontal ligament space. No surgical dressings are required and clinical healing usually is complete in 7 to 10 days. The CSF procedure is more successful for upper anterior teeth. It is not recommended during active tooth movement or where gingival inflammation is present due to unpredictable regeneration of the epithelial attachment in such situations. To avoid possible gingival recession, incising the epithelial attachment is not recommended in the midlabial region of any tooth with a narrow zone of attached gingiva or thin cortical bone. Other pericision techniques include the central papilla incision, reverse bevel CSF and electro-surgery techniques.

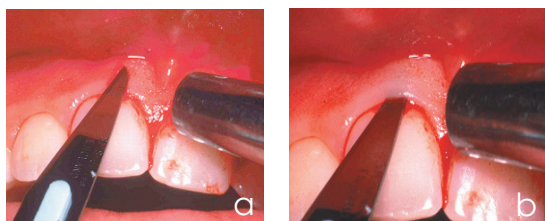


Figure 1: Pericision a. crest of alveolar ridge identified. b. incision to alveolar crest.

2. Frenectomy

A maxillary midline frenectomy may be indicated to enhance post-treatment stability, particularly if there is a diastema with a large or broad frenum. It should be noted that a prominent labial frenum in the mixed dentition will often recede during growth to become clinically insignificant. A mandibular frenectomy may also be considered if associated with a muco-gingival problem. Generally, a frenectomy procedure should be delayed until after alignment and space closure so as to prevent formation of scar tissue which can make space closure more difficult. A frenectomy can however be considered prior to space closure should the tissue prevent space closure, becomes painful or is traumatised (Edwards, 1977). Frenectomy, as described by Edwards, involves apical repositioning of the frenum with denudation of alveolar bone, destruction of the transseptal fibers, and gingivoplasty or recontouring of the labial or palatal gingival papilla in cases of excessive tissue accumulation. A simple incision is often used to allow access to the interdental area with the interdental fibrous tissue connection to the bone then removed. The frenum is then sutured at a higher level. Other techniques include simple excision, Z-plasty and laser removal.

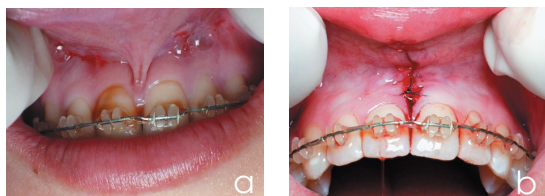


Figure 2: Frenectomy a. pre-surgery b. post-surgery

3. Mucogingival considerations

Recession like defects may be seen in the maturing dentition and may be mistaken for recession. In such

instances there is no cementum exposed and no connective tissue loss even though there may be an increased clinical crown height relative to neighbouring teeth. Recession like defects are usually noted in the mixed dentition and are most often located in the lower anterior segment. With time, recession like defects gain more attached gingiva (Andlin-Soboiki, 1993). Crossbites, particularly of the anterior dentition, can result in gingival recession. However early correction of these problems often leads to a positive gingival response (Fig 3).

It must be remembered that there is a biologic and genetically determined envelope for bone and mucogingival margin position, hence there is potential for gingival recession when teeth are moved outside this envelope. This movement can be as a result of anterior or posterior over expansion. Treatment planning must take into account the possibility of recession, connective tissue loss and the implications regarding stability.

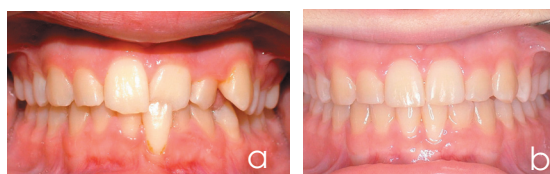


Figure 3: Gingivae a. before and b. after crossbite correction.

4. Gingival Grafting

It has been claimed that more pronounced and clinically recognisable inflammation occurs in regions where there is a lack of attached gingiva. Pre-orthodontic gingival grafting has in the past been recommended in such instances, however in a number of cases it is more appropriate to defer gingival grafting until completion of orthodontic treatment, particularly if the exposed or prominent root can be orthodontically positioned more favourably within alveolar bone.

Mucogingival surgery may be indicated in situations where a tooth which is planned for orthodontic movement has thin facial gingiva. By increasing the thickness of the covering tissue, the risk of gingival recession during or following orthodontic therapy should be reduced. Numerous grafting techniques have been advocated including free gingival grafts and inter-positional pedicle grafts (Lindhe, 1992). The free gingival graft (FGG) provides increased thickness of tissue and increased width of keratinised tissue. However the aesthetic result with the FGG technique is poor. Root coverage with the FGG is unpredictable although this can be addressed via a second surgical procedure involving coronal repositioning of the augmented tissue. Pedicle grafts (laterally repositioned flap LRF and coronally repositioned flap CRF) are dependant on the presence of an adequate width of keratinized tissue either adjacent or apical to the defect. Both the LRF and CRF provide acceptable results in terms of tissue augmentation, aesthetics and root coverage. There is a risk however of induced gingival recession at the donor site with the LRF procedure.

The soft tissue grafting technique of choice for the last 10-15 years has been the sub-epithelial connective tissue (CT) graft (Fig 4). This provides an increase in tissue thickness, more predictable root coverage and acceptable aesthetics. However, a CT graft may not result in an





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increased width of keratinized tissue. With any muco-gingival surgical technique, more than one surgical procedure may be required depending on the desired treatment outcome.



Figure 4: CT graft. a. area of gingival recession. b. removal of graft from palate. c. suturing of graft. d. healing

Summary

The orthodontic patient may have a number of periodontal issues that require consideration as part of a comprehensive and well-formulated treatment plan. Some of these have been covered in this issue of Brighter Futures with additional procedures to be covered in future issues. These include tooth extrusion, intrusion to convert horizontal bone loss into treatable vertical defects using bone induction procedures, exposure of impacted teeth, overbite reduction, implants and reduction of bone defects by uprighting and strategic tooth movement.

The maintenance of healthy periodontal tissues throughout active orthodontic treatment is of paramount importance with non-surgical and surgical periodontal techniques often required to ensure that a healthy and aesthetic periodontium is achieved. Commonly such patients require care from a number of clinicians and hence interdisciplinary treatment planning is crucial in ensuring the best outcome for patients.

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