

ORTHODONTIC MANAGEMENT OF PERIODONTALLY INVOLVED PATIENTS : A REVIEW

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ABSTRACT:

Co-operation, coordination, and interaction between different specialties in dentistry are extremely important in instituting diagnosis and treatment planning. Collaboration between the different disciplines is necessary and in some cases it is crucial in facilitating coordinated dental therapy. The interrelationship between orthodontics and periodontics often resembles symbiosis. In many cases, periodontal health is improved by orthodontic tooth movement, whereas orthodontic tooth movement is often facilitated by periodontal therapy. The present article describes the literature about preventive management of periodontitis with orthodontic treatment modality

Keywords: Periodontitis, Orthodontic treatment, Adult treatment.



INTRODUCTION:

Prior to 1970's orthodontic treatment often less recommended to "preventing periodontal diseases". Crowded teeth which are difficult to clean, can result in plaque accumulation and gingivitis which may lead to periodontal diseases.^[1,2]

Orthodontic treatment can promote periodontal health and may prevent periodontal diseases.^[2,3]

With an increasing number of adult patients now seeking orthodontic treatment, the problems of a dentition affected by chronic periodontitis are more likely to be encountered. Adult patients present a challenge to

orthodontists because they have high esthetic demands and they often have dental conditions that may complicate treatment, such as tooth wear, poorly contoured restorations, and periodontal disease. Orthodontic appliances have become smaller, less noticeable and easier to maintain during orthodontic therapy. And also if these individuals have underlying gingival or periodontal defects, these defects often can be improved during orthodontic therapy if orthodontist is aware of situation and plan the appropriate tooth movement accordingly.

BENEFITS OF ORTHODONTICS TREATMENT FOR A PERIODONTAL PATIENT

The primary objective of orthodontic treatment is to maintain a functionally sound occlusion supported by a healthy periodontium. A compromised periodontium is a determinant to be considered when a treatment plan is formulated, and only after examining this aspect should dentist initiate the orthodontic therapy.

Orthodontic therapy can provide several benefits to the adult patient with periodontal problems.^[4] The following six factors should be considered:-

1. Aligning crowded or malposed maxillary or mandibular anterior teeth permit the adult patient better access to adequately clean all surfaces of their teeth. This could be a tremendous advantage for patients who are susceptible to alveolar bone loss or for those who do not have the dexterity to adequately maintain their oral hygiene.
2. Vertical orthodontic tooth repositioning can improve certain types of osseous defects in periodontal patients. Often, the tooth movement eliminates the need for resective osseous surgery.
3. Orthodontic treatment can improve the esthetic relationship of the maxillary gingival margin levels before restorative dentistry.
4. In patient who has suffered a severe fracture of a maxillary anterior tooth, which requires forced eruption to permit adequate restoration of the root. In this situation, extruding the tooth allows the crown preparation to have sufficient resistance form and retention for the final restoration.
5. Orthodontic treatment allows open gingival embrasures to be corrected to regain lost papilla. If these open gingival embrasures are located in the maxillary anterior region, they can be unaesthetic. In most patients, these areas can be corrected with a combination of orthodontic root movement, tooth reshaping, and/or restoring.
6. Orthodontic treatment could improve adjacent tooth position before implant placement or tooth replacement. This is especially true for the patients having missing teeth for several years and drifted adjacent teeth in the edentulous space.

ORTHODONTIC PROCEDURES FOR THE ENHANCEMENT OF PERIODONTAL CONDITION

Various malocclusions like crowding, tipping, bucco-version, labioversion have

the potential to contribute to periodontal diseases, as they restrict the ability to maintain oral hygiene. Plaque forms a thin film over the tooth surface and carries in it various bacterial pathogens, which are the primary cause for gingival and periodontal infections.^[5] Though regular professional periodontal care can restrict the progress of periodontal disease, it is vital to correct the cause rather than managing the effect. This requires placing the teeth in alignment over the basal bone in harmony with the periodontal structures so that proper periodontal care is maintained by the patient himself.^[6] The orthodontist plays the major role by positioning teeth so that necessary oral hygiene can be maintained. The following are some of the procedures routinely carried out to enhance periodontal conditions:

Alignment of crowded teeth: One of the contributing factors to periodontal diseases is crowded teeth. The gingiva around the teeth in labial version is often attached apical to that compared to the adjacent teeth. On teeth in lingual version, the labial gingiva is often enlarged and attracts irritating plaque and debris, due to the inability to maintain oral hygiene [fig1]. Orthodontic correction of malposed teeth creates gingival contours that are more conducive to periodontal health.^[4,6]

Uprighting tilted molars: When a molar is tilted there is increased probing depth on the tilted side and hence plaque removal is compromised.^[4] Uprighting a

mesially inclined molar will not only facilitate better plaque control, but will also enhance axial loading, thereby reducing traumatic occlusion and bone destruction [Fig 2].

Extrusion: Extrusion of teeth is the least hazardous type of movement to solve osseous morphologic defects on individual teeth created by periodontal disease or tooth fractures. Extrusion helps in reducing the pocket depth, thereby helping in better plaque control and even helps in the formation of new bone at the alveolar crest [4]. Extrusion of anterior segment in skeletal open bite patterns has shown shortening of roots [fig 3].

Intrusion: Conflicting evidence has been reported regarding the benefits of intrusion of individual teeth. It requires careful control of force magnitude. Light force is advocated because the force is concentrated in a small area at the tooth apex. A light continuous force, such as that obtained in the light wire technique, has proved favorable for intrusion in young patients. If bone of the apical region is fairly compact, a light interrupted force is preferred. It can also be a very hazardous type of movement because the force is concentrated at the apex and also there are chances of root resorption. Unlike extrusion, relapse does not usually occur, partly because the free gingival fiber bundles become slightly relaxed. An intruding movement may therefore cause formation of new bone spicules in the marginal region.^[7]

EFFECTIVE PREVENTIVE PROGRAM FOR ORTHODONTIC PATIENTS WITH FIXED APPLIANCES

Before Orthodontic Treatment

The following steps need to be followed before any orthodontic treatment is rendered to minimize periodontal damage during treatment as well as to encourage patients to maintain proper dental hygiene.

1. Initial diagnosis and referral for treatment to control active periodontal disease and caries
2. Informed consent of the risks during orthodontic treatment and responsibilities of the patients and clinician
3. All general dental and periodontal treatment completed before orthodontic treatment (request a letter from the general dentist or the periodontist stating that the patient is ready for the orthodontic phase)

During Orthodontic Treatment

Once the orthodontic appliances are placed, the patient needs to be instructed in how to manage the new oral environment and how to maintain the health of the dental and periodontal structures. [8-10]

1. Provide the patient with initial brushing instructions with either a conventional toothbrush or a powered toothbrush when the appliances are first placed. The patient should use fluoride

toothpaste with the American Dental Association (ADA) seal on it that also has an antigingivitis effect. If plaque removal is ineffective after 3 to 4 visits with a conventional toothbrush, the patient should be instructed to use a powered toothbrush.

2. Check plaque removal effectiveness at the beginning of every nonemergency visit by giving the patients a mirror to jointly determine if plaque removal is effective. Have the patient brush until the appliances are clean. This increases the length of the visit for poor compliance patients, which acts as a form of negative reinforcement.
3. Record plaque removal effectiveness in the patient's chart.
4. Use a positive reinforcement approach (praise) and avoid criticism.
5. Introduce additional methods to improve oral hygiene such as flossing only when success is established with simple brushing.
6. Check to see if the patient has had routine dental examinations and record the information in the patient's chart. These examinations are usually performed every 6 months unless the patient has poor plaque control or periodontal disease. Then the examinations and prophylaxis should be more frequent.
7. If poor compliance persists (more often in adolescents), the following steps may be considered:

a. Schedule more frequent orthodontic visits (every 3 to 4 weeks) when the assistant can spend more time with the patient. Consider adding a contingency fee and alert parents of the increased professional time needed to manage the child's case.

b. Schedule the patient with an auxiliary who has the best motivational skills.

c. Send a letter describing the problems to the patient or parents as well as the general dentist.

d. If all this fails, consider the use of a chlorhexidine rinse treatment for 12 weeks. Let the patient know and send a letter to the patient and parents indicating that this is the final effort by the clinician before appliance removal.

e. Check carefully the progress of periodontal disease and decalcification.

f. Refer back to the general dentist for more frequent examinations and prophylaxis.

After Orthodontic Treatment

At the completion of orthodontic treatment the clinician should encourage the patient to maintain proper oral hygiene habits.

1. Make sure all children and adolescents are using fluoride toothpaste with an ADA seal of approval at least twice daily to promote remineralization.

2. Make sure that the patient has resumed routine dental care with the general dentist.

3. Send a posttreatment report to the patient and to the general dentist. Outline future responsibilities and how well the goals of treatment have been achieved.

PERIODONTAL CARE OF ADULT ORTHODONTIC PATIENTS

The number of adults seeking orthodontic therapy is increasing. In recent years, it has been estimated that up to 40% of all orthodontic patients are adults. Adult patients present a challenge to orthodontics because they have high esthetic demands and they often have dental conditions that may complicate treatment, such as tooth wear, poorly contoured restoration and periodontal disease.^[11-14]

There is no contraindication to treating adult patients who have periodontal disease, as long as the disease has been brought under control. Progression of untreated periodontal breakdown must be anticipated, however, and the periodontal situation must receive major attention in planning and executing orthodontic treatment for all adults.

Periodontal disease progression is episodic, not continuous, and likely to affect some but not all areas within the same mouth. There appear to be at least three risk groups. It is obviously important to identify high-risk patients and high-risk sites. At present, persistent

bleeding on probing is the best indicator of active and presumably progressive disease. New diagnostic procedures to evaluate subgingival plaque and crevicular fluids for the presence of indicator bacteria, enzymes, or other chemical mediators show promise and are likely to be clinically useful in the near future.

They appear to be at least three risk groups in the population ^[11,13] : those with rapid progression (about 10%). those with moderate progression (the great majority, about 80%). and those with no progression despite the presence of gingival inflammation (about 10%).

Minimal periodontal involvement

Any patient undergoing orthodontic treatment must take extra care to clean the teeth, but this is even more important for adults. Bacterial plaque is the main etiologic factor in periodontal breakdown, and plaque-induced gingivitis is the first step in the disease process. The difficult area for orthodontic patients to clean is the area of each tooth between the brackets and the gingival margin. Because of the greater length of the clinical crown in adults, however, it is at least easier for adult patients to approach these areas. Hygiene aids such as rubber interdental stimulators and proximal brushes to reach between teeth are often needed, and there is some evidence that careful use of modern powered rotary brushes is helpful. ^[11]

The periodontal evaluation of a potential adult orthodontic patient must include not only the response to periodontal probing, but also the level and condition of the attached gingiva. Labial movement of incisors in some patients can be followed by gingival recession and loss of attachment. The risk is greatest when irregular teeth are aligned by expanding the dental arch.

For adult orthodontic patients, it is much better to prevent gingival recession than to try to correct it later. The protective effect of a gingival graft may be due more to the greater gingival thickness than a wider zone of attached tissue. Nevertheless, a gingival graft must be considered in many patients, particularly those for whom moderate arch expansion will be used to align incisors and those who will have surgical mandibular advancement or genioplasty.

Moderate periodontal involvement

Disease Control-

Before orthodontic treatment is attempted for patients who have moderate preexisting periodontal problems, dental and periodontal disease must be brought under control. Unless a patient can maintain periodontal health after initial therapy, orthodontic treatment is potentially damaging rather than beneficial. A period of observation following preliminary periodontal treatment to make sure that the patient is adequately controlled and to allow healing after the

periodontal therapy should precede comprehensive orthodontics. [11,13]

Preliminary periodontal therapy can include all aspects of periodontal treatment except osseous surgery. It is important to remove all calculus and other irritants from periodontal pockets before any tooth movement is attempted, and it is often wise to use surgical flaps to expose these areas to ensure the best possible scaling. Treatment procedures to facilitate the patient's long-term maintenance, like osseous recontouring are best deferred until the final occlusal relationships have been established.

Disease control also requires endodontic treatment of any pulpally involved teeth. There is no contraindication to the orthodontic movement of an endodontically treated tooth, so root canal therapy before orthodontics will cause no problems. Attempting to move a pulpally involved tooth, however, is likely to cause a flare-up of the periapical condition.

Amalgam is the preferred temporary restorative material while orthodontics is being carried out. Cast restorations should be delayed until after the final occlusal relationships have been established by orthodontic treatment.

Periodontal Maintenance-

Because the margins of bands can make periodontal maintenance more difficult, it usually is better to use a fully bonded orthodontic appliance for periodontally

involved adults. Steel ligatures or self ligating brackets rather than elastomeric rings to retain orthodontic arch wires also are preferred for periodontally involved patients, because patients with elastomeric rings have higher levels of microorganisms in gingival plaque.

During comprehensive orthodontics, a patient with moderate periodontal problems must be on a maintenance schedule, with the frequency of cleaning and scaling depending on the severity of the periodontal disease.

Severe periodontal involvement

The general approach to treatment for patients with severe periodontal involvement [12,14] is the same as that outlined earlier, but the treatment itself must be modified in two ways:

(1) periodontal maintenance should be scheduled at more frequent intervals, with the patient being seen as frequently for periodontal maintenance as for orthodontic appliance adjustments in many instances (i.e., every 3 or 4 weeks): and

(2) Orthodontic treatment goals and mechanics must be modified to keep orthodontic forces to an absolute minimum, because the reduced area of the periodontal ligament (PDL) after significant bone loss means higher pressure in the PDL from any force. Sometimes it is helpful to temporarily retain a tooth that is hopelessly involved periodontally, using it to help support an

orthodontic appliance that will contribute to saving other teeth.

CONCLUSION:

Periodontitis can be challenging to treat; it needs a precise diagnosis and a comprehensive treatment plan,

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FIGURES:

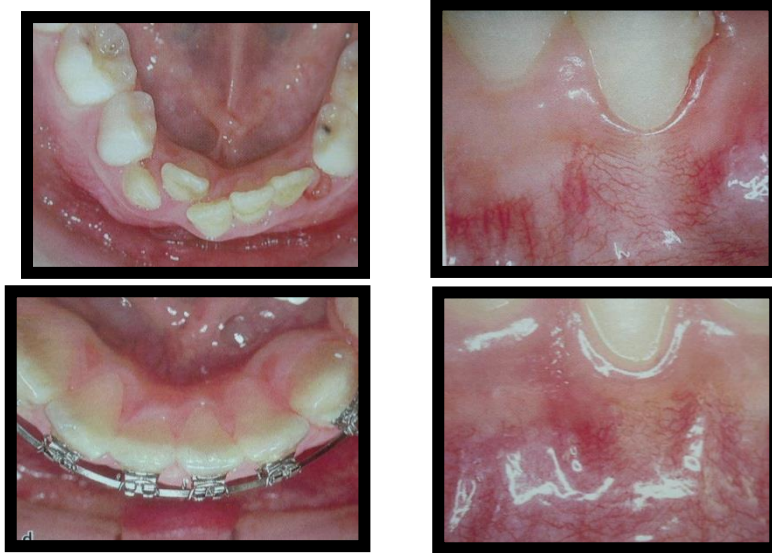


Figure 1: Orthodontic correction of malposed teeth creates gingival contours that are more conducive to periodontal health

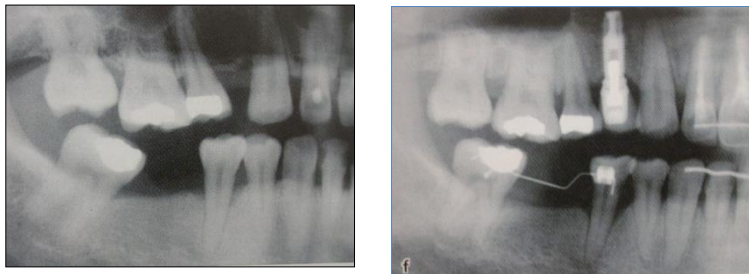


Figure 2: Up righting a mesially inclined molar will not only facilitate better plaque control, but will also enhance axial loading thereby reducing traumatic occlusion and bone destruction.



Figure 3: Extrusion helps in reducing the pocket depth, thereby helping in better plaque control and even helps in the formation of new bone at the alveolar crest.



Figure 4: An intruding movement may cause formation of new bone spicules in the marginal region