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Review Article

Ortho-Perio interrelationship - A review

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ABSTRACT

For better diagnosis and treatment planning, co-operation, coordination and interaction between different specialties in dentistry are utmost important. Interaction between the different disciplines is necessary and in some cases it is crucial in facilitating coordinated dental therapy. The interrelationship between Orthodontics and Periodontics is many times symbiotic. In many instances, periodontal health is improved by orthodontic tooth movement, whereas orthodontic tooth movement is often facilitated by periodontal therapy. Prior to 1970's orthodontic treatment not so often recommended to prevent periodontal diseases. Crowded teeth result in plaque accumulation because of difficulty in cleaning. Gingivitis may lead to periodontal diseases. Orthodontic treatment can foster periodontal health and it may also prevent periodontal diseases.

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1. Introduction

For better diagnosis and treatment planning, co-operation, coordination and interaction between different specialties in dentistry are utmost important. Interaction between the different disciplines is necessary and in some cases it is crucial in facilitating coordinated dental therapy. The interrelationship between Orthodontics and Periodontics is many times symbiotic. In many instances, periodontal health is improved by orthodontic tooth movement, whereas orthodontic tooth movement is often facilitated by periodontal therapy.

Prior to 1970's orthodontic treatment not so often recommended to prevent periodontal diseases. Crowded teeth result in plaque accumulation because of difficulty in cleaning. Gingivitis may lead to periodontal diseases. Orthodontic treatment can foster periodontal health and

it may also prevent periodontal diseases. The number of adult patients opting for orthodontic treatment is increasing day by day. This may lead to problems of a dentition affected by chronic periodontitis. Adult patients are enigma to orthodontists because their esthetic demands are high and they usually have dental conditions that may complicate treatment, like tooth wear, improperly contoured restorations and periodontal disease. Orthodontic appliances have become smaller in size and thus less noticeable and easier to maintain during orthodontic therapy in due course of time. It is seen that orthodontic treatment improves the periodontal disease status in patients with gingivitis and periodontitis. But awareness by orthodontist and meticulous planning should be taken care of.

New treatment philosophies with improved clinical techniques and changes in patient's awareness of malocclusion have resulted in increased demand for orthodontic treatment. The primary motivating factor is to enhance esthetics and desire to improve facial appearance.

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The success of orthodontic treatment outcome is mainly influenced by the patient's periodontal status before, during and after active treatment. Patients with periodontal disease in need of orthodontic treatment have to be carefully assessed by orthodontist and periodontist both. After assessing the case the comprehensive treatment plan should be planned for functional occlusion. It prevents any further progress of the periodontal disease and also to meet patient's functional and esthetic demands. In such patients anatomical structures and tissue response to the treatment must be thought before starting the treatment. It is well established fact that the patients undergoing orthodontic treatment have a high susceptibility to plaque accumulation on their teeth because of the presence of brackets, wires and/or other orthodontic parts on the teeth surfaces due to which the oral hygiene procedures might become difficult. The considerable variance of the design and the material characteristics of orthodontic elements may also play an important role in this field. The orthodontic treatment is a double-action procedure, regarding the periodontal tissues, which may be sometimes very meaningful in increasing the periodontal health status, and may be sometimes a harmful procedure which can be followed by several types of periodontal complications, namely: gingival recessions, bone dehiscences, gingival invaginations and/or the formation of gingival pockets.

In adult patients, pathologic migration of tooth or group of teeth is commonly seen due to loss of periodontal support or loss of teeth. This results in median diastema formation and/or generalised spacing between the teeth with or without incisal proclination, rotation or tipping of bicuspids and molars resulting in collapse of the posterior bite and decreasing vertical height. Orthodontic treatment can often correct these problems, or at least prevent them from progressing. Moreover orthodontic treatment is effective in management of restorative and aesthetic problems like excessive spacing, insufficient pontic space, fractured teeth, tipped abutment teeth, malformed teeth and diastema. Orthodontic treatment seems to improve periodontal health in these cases but at the same it may result in harming the periodontal tissues. Thus, orthodontic treatment can be referred to as a two-edge sword. However, this issue seems to be debatable.

Orthodontic-periodontic interactions are mutually beneficial. The integrated approach can improve the periodontal health and dentofacial aesthetics both in most of the situations. The periodontal therapy is aimed to restore and maintain healthy attachment apparatus surrounding the teeth. The main purpose of any orthodontic treatment is to provide aesthetic and functional occlusion with adequate movements of teeth. So the orthodontic and periodontic treatments always go hand in hand.

2. Benefits of Orthodontics Treatment for a Periodontal Patient:

The foremost objective of orthodontic treatment is to support a functionally sound occlusion surrounded by healthy periodontium. Whenever the orthodontic treatment is to be considered, a careful examination of periodontium is utmost important. Because compromised periodontium may change the orthodontic treatment outcome.

Orthodontic treatment can provide satisfactory results to the adult patient with periodontal diseases.

The following six factors should be considered

1. Alignment of crowded or malaligned anterior teeth enable the adult patients to clean all the teeth surfaces in a better way. This will help patients who are susceptible for alveolar bone loss to maintain their hygiene and also for those who do not have dexterity to maintain oral hygiene.
2. Tipping or bodily orthodontic tooth movement results in improvement of certain types of osseous defects in periodontal patients. Sometimes the need for resective osseous surgery is eliminated.
3. Before planning the restorative treatment for esthetic relationship of gingival margin levels, orthodontic treatment can be considered for its correction. With aligning the gingival margins orthodontically eliminate the need for gingival recontouring. Recontouring may require bone removal and root exposure.
4. In patient with severely mutilated maxillary anterior tooth requires forced eruption to allow sufficient restoration of the root. This allows the crown preparation to have proper resistance form and retention form in the final restoration.
5. Open gingival embrasure in maxillary anterior region is highly unaesthetic in patient's perspective. Orthodontic treatment helps to regain lost papilla. Open gingival embrasure can be corrected by combination of orthodontic tooth movement, tooth reshaping, and/or restoration.
6. Orthodontic treatment helps in uprighting adjacent tooth before placement of implant or tooth replacement. Drifting of adjacent teeth takes place in edentulous space if the missing tooth/teeth are not replaced in time.

Ngom¹ from his study concluded that there is correlation between malocclusion and periodontal health. He also suggested that malocclusion can be a risk marker for periodontal diseases. But actual cause effect relationship between these two conditions were not possible in this study.

Van Gastel² conducted a review of literature which showed contradictory results of the effect of malocclusion and orthodontic appliances on periodontal health, since very few studies showed loss of attachment during orthodontic

treatment. This contradiction may be due to employment of different research methods and different material selection.³

All evidence-based literature regarding the orthodontic-periodontic relationships shows that a quality orthodontic treatment of patients, who maintain good oral hygiene and do not show any periodontal breakdown, is a beneficial treatment for the periodontium. When the oral hygiene is not maintained properly and periodontal support is weak then it is seen that orthodontic treatment in such patients can be threatening to the periodontium.^{4,5}

In modern dental practice beside some systemic variables, genetic predisposition, age, comprehensive diagnosis with good execution of treatment the good oral hygiene plays very important role for the success of any kind of orthodontic treatment.⁶ Many literatures have shown this correlation clearly.

3. Contribution of Periodontics to Orthodontic Therapy

On many instances, a stable and esthetically acceptable result with orthodontic treatment cannot be attained without supporting periodontal treatments. In case of a high labial frenum attachment, it results in midline diastema. Frenectomy is recommended in such cases. During orthodontic treatment these fibres are thought to prevent the mesial migration of the central incisors. However, the question here is the timing of periodontal intervention and it is much debatable.⁷ According to Vanarsd all⁸ surgical removal of a maxillary labial frenum should be delayed until after orthodontic treatment unless and until the high frenum prevents space closure or becomes painful and traumatized. Forced eruption of a labially or palatally impacted tooth is very common orthodontic treatment procedure. Utmost care should be taken to expose the impacted tooth while preserving the surrounding keratinised tissue. Periodontist has the expertise to do this. To prevent the loss of attachment the keratinised tissue should be preserved. The best surgical procedure to achieve this is an apically or laterally positioned pedicle graft.⁹

Retention of orthodontically positioned tooth is very important in any orthodontic treatment. This poses a problem to every orthodontist around the corner. Circumferential supracrestal fiberotomy (CSF) is the treatment of choice for better retention of tooth position. Mucogingival surgeries may be necessary during the entire orthodontic treatment to maintain adequate width of attached gingiva.¹⁰ Some cases have short clinical crowns. In such cases crown lengthening can facilitate the easy placement of orthodontic brackets. This procedure can also help in smile designing.¹¹ Alveolar ridge augmentation and dental implants are the other periodontal treatments undertaken to achieve orthodontic treatment goals.¹² Panwar et al.¹³ in 2010 presented a case report on combined periodontal and orthodontic treatment of pathologic

migration of anterior teeth. Proper orthodontic treatment was planned and initiated with pre-adjusted edgewise appliances using very light force. This light force resulted in optimal biological response. To reduce the trauma from lower anterior teeth anterior bite plate was given which allowed the eruption of posterior teeth. The improvement in periodontal health was seen at the moment trauma was relieved. Periodontal supportive therapy was planned to maintain patient's oral hygiene post orthodontic treatment.

Michael et al. in 2009 came up with different treatment modality for evident midline diastema. Periodontal tissues were treated with gingivoplasty and crown lengthening once the prosthetic intervention was complete. This resulted in acceptable esthetic, functional, and biologic properties of dentition.¹⁴

4. Orthodontic Treatment in Periodontally Susceptible or Compromised Patients

Under proper control against dental biofilm formation and elimination of periodontal pockets, patients with compromised periodontal support can be taken for orthodontic treatment.^{15,16} Moreover, the orthodontic treatment allows maintenance of the stable periodontal health.^{17–20} Necessarily there is no correlation between malocclusion and periodontal disease. The literature doesn't describe the effects of orthodontic treatment on the improvement of periodontal health.

Common contributions of orthodontics in the field of periodontics are as follows:

1. Good orthodontic treatment allows better oral hygiene by the patient as malocclusion is eliminated and well-shaped dental arches are easy to maintain.
2. It allows paralleling of the long axes of the teeth. Therefore, whatever force is applied it is distributed uniformly all over the dentition as it works as one single unit.
3. Prosthetic rehabilitation and normal vertical dimension both can be achieved.
4. With forced tooth eruption adequate crown root ratio is achieved without further bone loss in some cases.
5. Vertical bone defects can be corrected by uprighting the tilted tooth.
6. It improves the positioning of pontic teeth in fixed partial prostheses and also the teeth adjacent to osseointegrated implants.
7. It negates the effects of bruxism during the orthodontic therapy as it reduces muscle pain and spasm.
8. With proper diagnosis and correct execution of treatment plan with all newer technologies, it allows precise and efficient orthodontic treatment with light forces.

To summarize the orthodontic treatment is indicated when the periodontal disease is controlled and oral hygiene

is maintained throughout the treatment. However, in patients with active periodontal disease minor orthodontic movements can also result in attachment loss and bone loss. In severe periodontal cases, further periodontal collapse and extraction of teeth can happen. So in such cases in orthodontic treatment should be avoided.

5. Conclusion

Orthodontic and periodontic management of adult patients with periodontal disease is very important as many adult patients are opting for orthodontic treatment. The fundamental for the success of treatment in such cases is proper diagnosis and assessment of risk before starting the treatment. There should be close collaboration between Orthodontist and Periodontist time to time during whole treatment. The main objective of any orthodontic treatment is achieved only when physiologic forces are used, periodontal inflammation is controlled and better oral hygiene is maintained throughout the orthodontic treatment. Specific periodontal problems can be treated by adjunctive orthodontic treatment but strict compliance of good oral hygiene is necessary during treatment. Ortho-perio problems can be treated in a better way by amalgamation of treatment by general dentist, orthodontist and Periodontist. Most of the patients undergoing orthodontic treatment face problem in maintaining their oral hygiene. So the satisfactory outcome of the orthodontic treatment is dependent on patient's compliance and absence of any inflammation. Role of Periodontist is very important to manage ortho-perio problems and also for prevention of relapse in orthodontic treatment.

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7. Conflict of Interest

None.

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