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# ORTHODONTICS AND PERIODONTICS:AN INTERDISCIPLINARY APPROACH

**Orthodontics**

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## ABSTRACT

In todays' world an increasing number of adults are opting for orthodontic treatment. This makes the interdisciplinary approach of an orthodontist and a periodontist, unavoidable and of immense significance. Adjunctive therapy, being orthodontics as an adjunct to periodontics and/or periodontics as an adjunct to orthodontics is critical in the final outcome of the treatment. Orthodontic tooth movements happen along with modification in the periodontium and thus, there stands a requirement in the modification of the treatment and the retention when a treatment plan for periodontally affected patient is fabricated. Several cases ranging from lower anterior crowding and frenal attachments require orthodontic as well as periodontal treatment. Orthodontic treatment makes maintaining oral hygiene a little challenging but with proper care, the effects can be minimized. In periodontally compromised patients, orthodontic corrections help in order to correct a few conditions pertaining to the gingiva as well as numerous osseous conditions. The purpose of this article is to comprehend the conditions, requirements. effects, challenges and the end result of the interdisciplinary approach of orthodontics and periodontics.

## KEYWORDS

Orthodontics, Periodontics, Interdisciplinary.

### 1.1 INTRODUCTION

A interdisciplinary approach would encompass choosing precisely from numerous disciplines to rectify problems outside usual parameters and produce answers based on a new enlightenment of tangled conditions.

***Kingsley***[1] stated that age is hardly a constraining factor as far as tooth movement is discussed about. But even then, for numerous decades, orthodontists limited their services to children and adolescents. Adult population was hardly deemed appropriate for orthodontic treatments. An alteration is this trend was seen in the late 19lh century when more and more adults opted and were considered appropriate for orthodontic treatments.

There are numerous reasons why adults are advised orthodontic treatments. Some adults cite their prime reason as aesthetics involving maligned teeth and/or diastema closure. Gingival discrepancies with lack of gingival papillae or uneven gingival margins can also be a prime reason for treatment.

Middle aged people also require therapy to treat osseous defects e.g. Hemiseptal bone defects; advanced horizontal bone loss; furcation defects.

### 1.2 Mucogingival Effects In Orthodontic Treatements

In an appropriate manner and measured levels, orthodontic forces do not hamper the mucogingival conditions. However, ***Lang and Loe***[2] have suggested that 2mm of keratinized gingiva is required for maintaining gingival conditions. In cases where attached gingiva is less than that required, there can be mucogingival compromises.

Batenhorst concluded from his experiment on monkeys that facial tipping, extrusion, and bodily movements of incisors results in apical shift of labial gingival margin and loss of attachment.

However, a study on humans failed to mimic the same. And it is now evident that an improper alveolar bone housing can be of grave consequences and can lead to gingival recession.

### 1.3 Periodontal Effects Of Orthodontic Treatments

**Pressure Tension Theory**

Sandstedt (1904); Oppenheim (1911), Schwarz Changes in blood flow in the periodontal ligament by an alteration in chemical messengers causes the changes required for tooth movement. There is loss of bone at the pressure side and deposition of bone on the tension side. But if forces exceeded the capillary bed blood pressure (20-25 g/cm$^2$ of root surface) then the chances of tissue necrosis are on the rise.

**Bone Bending Theory ( Farrar 1888)**

When active forces are applied to the tooth, the forces are transmitted to all the tissues in the vicinity. Bone bends with a comparative ease since it is more elastic than other tissues. Shear compression strain causes bone apposition whereas shear tensional strain causes bone resorption.

**Frontal Resorption**

It is accomplished by light orthodontic forces and does least damage to the periodontium and causes minimum pain to the patient.

Light pressure causes constriction of blood vessels and a continuous light force causes osteoclast to resorb lamina dura from side of the periodontal ligament. The first set of osteoclasts arrive from the periodontal ligament itself and a larger set arise from distant site via blood flow.

**Undermining Resorption**

It is caused by heavy orthodontic forces and damages the periodontium accompanied by pain to the patient.

Continuous heavy force completely cuts off blood flow to the compressed periodontal ligament area and leads to cell death. ***A few days later there is cell differentiaton in adjacent marrow spaces and the beginning of undermining resorption***[3]

### 1.4 Prevention Of Breakdown During Orthodontic Treatment

In 1960's it was found that there was a generalized rise in salivary bacterial counts,a special entity being lactobacillus, following orthodontic band placement.[4] It is generally seen that placement of orthodontic bands, brackets etc make it challenging to maintain a proper oral hygiene. Even after repeated oral hygiene instructions, demonstration of authentic brushing techniques and mouthwash uses, maintaining an effective oral hygiene still poses a challenge. The

patient can be advised to use sonic or ultrasonic toothbrushes. According to ***Hannah***[3], oral hygiene can be improved in orthodontic patients by using a sanguinaria-containing toothpaste and oral rinse.

### 1.5 Protective Role Of Orthodontic Treatment Against Periodontal Breakdown

***The number of periodontal pathogens in the anterior crowded teeth compared to the aligned teeth is more***[5] Periodontal breakdown can be corrected by orthodontic treatment of this condition. During orthodontic treatment all the components of tooth including osseous structure, periodontal ligament and the soft tissue move together with the tooth. After initiating orthodontic therapy at a mesially tipped molar; there is reduction in pocket depth at upright molar. Moreover, less plaque accumulation and improved gingival architecture on the upright molar may be noticed

Prevention of biofilm formation is quintessential along with the prevention of periodontal pocket formation. Severe caution needs to be maintained in these conditions. By treating crowding of teeth and tipping, specially of molars, periodontal status of the patient can be improved markedly. A satisfactory crown root ratio can be achieved by extrusion of tooth using orthodontic forces without hindering the surrounding bone structure. Orthodontic treatment also manages the occlusal forces and makes them parallel to the tooth's long axis.

### 1.6 Orthodontics As Adjunct To Periodontics

There are several cases in which orthodontic treatment can be used as an adjunct to periodontal treatment. However, it should be done with immense care so as to not cause any adverse damage. It is suggested that tooth movement can be undertaken 6 months after completion of active periodontal treatment if there is sufficient evidence of ***complete resolution of inflammation.***[6] ***Sanders***[7] has fabricated a three-step protocol to be considered before, during, and after adjunctive orthodontic treatment.

Pathological tooth migration which is commonly seen in die anterior region needs to be combated since it can help improve oral function and any periodontal damage. This can be corrected by using orthodontic forces such as rotation and intrusion.

***Deepa***[8]has suggested the use of orthodontic soft aligners in repositioning periodontically affected tooth/teeth. By using forces which are light and intermittent, we can improve the regeneration of the tissues in the vicinity when there is movement of the tooth.

There are several gingival conditions which can be corrected with this approach such as gingival margins can be modified till they are even.

Patients with a habit of bruxism usually have abraded and overeruptcd teeth, this condition can be corrected. Either by performing a crown lengthening procedure and ensuring that the flap is placed apically or the second line of treatment is that intrusion forces are used thus, leading to apical margins of the gingiva.

In patients lacking gingival papillae and haring open gingival embrasures:this condition is sensitive citing the fact that adults feel that their smiles aren't aesthetically appealing especially if the papillae are lacking between maxillary central incisors.

**Osseous Defects which can be treated by Orthodontic Therapy**
**Hemiseptal defects:**

In case the teeth are tipped mesialiy, upnghting of the tooth helps in correcting the bony defect. In case the tooth is supraerupted, intrusion of the tooth along with alignment of the adjacent cementoenamel junction marks the way to combat the osseous defects.

**Advanced horizontal bone loss:**

When a patient shows an advanced horizontal bone loss, decreasing the clinical croen length of these teeth can be deemed appropriate[9]

### 1.7 Periodontics Vs An Adjunct To Orthodontics

In midline diastema cases there arc great chances that there is a high frenal attachment which needs to be corrected in order to achieve an accurate result. In eases when frenectomy is not performed, the results vary to a large extent and sometimes, the results may be temporary.

Labially or palatally impacted teeth are brought into occlusion by reflecting the flap and then providing exposure to the impacted tooth. This is then followed by application of orthodontic forces. However, care needs to be taken that keratinised tissue is not damaged so as to prevent loss of attachment.

Circumferential supracrcstal fibrotomy, when performed shows a marked rise in stability of post treatment results***. It doesn't have any adverse effects on the periodontium.***[10]

Crown lengthening procedures and several mucogingival surgeries become important when performing several orthodontic procedures.

### 1.8 Orthodontics In Adults

When patient inflow is analyzed, it becomes evident that a greater number of adults being converted as orthodontic patients. Age is not inversely proportional to the rate of orthodontic treatment success.

In cases of adult's mobilization of cells and the collagen fibre turnover rate is slower as compared to the growing age group. This poses as a slight hinderance but as soon as the hyalinization area has been cleared we can see tooth movement.

When treating adults there needs to be light on the fact that Temporomandibular Joint is more prone to damage and roots are more susceptible to resorption. Along with this, adults have very limited growth potential, Lindhe (1989) has suggested an that an interrupted force of 20-30g in required in adults, during initial treatment procedures. It can then be altered to 50-80 g bodily force and 30-50g tipping force per 0.5-1 mm per month.[11]

### 1.9 Retention Problems And Solutions

Patients with a high grade of periodontal damage need modifications in therapy including the process of retention. A damaged periodontium is unable to counteract the unbalanced forces of lip and tongue unlike the manner in which it is balanced in a normal or mildly damaged periodontal condition. Offering great results, is the flexible spiral wire which when placed on the lingual aspect of teeth, provides an adequate retention in order to maintain an adequate stability when it comes to retention. It can act in a multifunctional manner i.e. It acts as an orthodontic retainer and also plays a role as a periodontal splint. The bifunctional speciality is of immense importance in periodontally compromised cases.

## CONCLUSIONS

A proper diagnosis periodontically as well as orthodontically, assesement of treatment outcome, proper treatment plan, proper ortho-perio follow up,good information for the patient and with good patient cooperation during treatment and after treatment are some important factors for good clinical outcome and will establish proper balance of the peridontium,oral and facial aesthetics and surrounding tissues in addition to comprehensive health care of patient.

There are high number of articles published on ortho-perio, but still there is a lack of good evidence about many of the treatments including both orthodontics and periodontal therapy. Well-designed clinical studies evaluating the interaction between these only apparently distant specialties must be encouraged in the dental community. Evaluating patient care from just one specialty eye may limit the possibilities of treatment when compared to a coordinated view of each particular condition. A good perspective can only exist with two points of view.

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