Review Article

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2016;5:1:211-215.

Periodontal Health and Orthodontics: A Review

Harikrishna V[1] Gopinath V[2*] Lubna Siddiqui[3] Meenakshi Boddun[4] Karthik Krishna Munagala[5] Lumbini Pathivada[6]

[1]Professor, Department of Orthodontics and Dentofacial Orthopaedics, Chhattisgarh Dental College and Research Institute, Rajnandgaon, India.
[2]Professor, Department of Periodontology, Chhattisgarh Dental College and Research Institute, Rajnandgaon, India.
[3]Post Graduate Student, Department of Periodontology, Chhattisgarh Dental College and Research Institute, Rajnandgaon, India.
[4]Senior Lecturer, Department of Periodontology, Chhattisgarh Dental College and Research Institute, Rajnandgaon, India.
[5]Professor, Department of Periodontology, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, India.
[6]Senior Lecturer, Department of Pedodontics, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, India.

ABSTRACT

Background: Interdisciplinary therapy deals with coming together of various branches in dentistry exhibiting their skill in different aspect. The success or failure of orthodontic treatment procedures depend a lot on the periodontal condition of the patient. A number of periodontal problems can be benefited with orthodontic treatment and vice-versa. The benefit of orthodontic and adjunctive periodontal therapy are being highlighted. Good periodontal health maintenance should be mandatory for the success of orthodontic treatment.

Keywords: Interdisciplinary therapy, Orthodontic tooth movement, Oral hygiene.

INTRODUCTION

An interdisciplinary dentofacial therapy is the effective and efficient utilization of the expertise and skills in the various disciplines of dentistry. It is the combination of diagnosis treatment planning and therapeutic procedures with extensive communication among the team members. An interdisciplinary approach to the management of complex dentofacial problems produces consistent optimal results. By providing solutions to a variety of problems, an interdisciplinary treatment,simplifies and idealizes the treatment plan that improves the overall treatment prognosis and enhances the treatment results[1].

The primary objective of periodontal therapy is to restore and maintain the health and integrity of the attachment apparatus of teeth. In adults ,the loss of teeth or periodontal support can result in pathological tooth migration involving either a single teeth or group of teeth. This may result in development of midline diastema or general spacing of teeth with or without incisal proclination ,rotation or tipping of bicuspids and molars with the collapse of the posterior occlusion and decrease in vertical dimension. Adjunctive orthodontic therapy is necessary to resolve these problems. Additionally, orthodontic therapy can facilitate management of several restorative and esthetic problems/difficulties relating to fractured teeth,tipped abutment teeth,excess spacing ,inadequate pontic space, malformed teeth, and diastema[2].

Indications and contraindications to orthodontic tooth movement[3]

1. Adverse gingival topography,root proximity,embrasure space,open contacts,lack of parallelism, and poor distribution of abutments.
2. Flared anterior teeth,lip incompetency,lack of incisal guidance.
3. Severe curve of spee and locked in occlusal scheme with occlusal trauma or restorative needs.
4. Severely tipped teeth

Received: May. 11, 2015: **Accepted**: June. 18, 2015
***Correspondence Dr. Gopinath V.**
Department of Periodontology, Chhattisgarh Dental College and Research Institute, Rajnandgaon, India.
Email: Not Disclosed

pISSN 2278-0076
eISSN 2321-9270

5. Occlusal trauma with pseudo class III anterior crossbite,posterior cross bite,primary contact in centric relation
6. Improvement in gingival and osseous defects,poor crown-to-root ratio,unlevel between the teeth.
7. Anterior deep bites and occlusal trauma with gingival trauma,retrograde wear,locked bites.
8. Severe occlusal trauma/excessive mobility,muscle spasm,severe retruded contact position,maximum intercuspal position discrepancy,need to establish vertical dimension,need for selective grinding.

Contraindications

1. Lack of inflammatory control prior too or lack of maintanence of periodontal health during tooth movement.
2. Lack of occlusal health(occlusal traumatism, parafunctional habits) for periodontally susceptible individuals.
3. Short roots or idiopathic root resorption.
4. Inability to retain individual teeth following movement or to secure restorative commitment in case of mutilation,severe skeletal dysplasias or muscular habit problems.

Orthodontic treatment and oral hygiene

Oral hygiene is essential for patients undergoing orthodontic treatment. In absence of good oral hygiene,plaque accumulates around the orthodontics appliance causing gingivitis and in some cases periodontal breakdown. To avoid such problems plaque control methods should be advised to the patient at routine visits to monitor effectiveness of the oral hygiene.[4] It is essential that orthodontist should motivate the patient to maintain a satisfactory standard of oral hygiene during orthodontic treatment. Manual tooth brushing remains the basic method for establishing proper oral hygiene and plaque control[5].

Chlorhexidine mouth washes as an adjunct to tooth brushing is effective in control of gingival inflammation[6] , although prolonged use may cause staining in margins of composites. Flouride mouth rinses significantly reduces the extent of enamel decalcification and gingival inflammation during orthodontic treatment.[7]

Periodontal tissue and orthodontics

Periodontal tissue response to orthodontics forces Tooth movement during orthodontic therapy is the result of placing controlled forces on teeth. Removable appliances place intermittent tipping forces on teeth while fixed appliances bring about continuous multidirectional forces to create torquing ,intrusive,extrusive,rotational and bodily movement.[8,9]

Bone surrounding the tooth is subjected to a force and responds in the following manner: Resorption occurs where there is pressure and new bone forms where there is tension. When pressure is applied to the tooth ,there is an initial period of movement for six to eight days as the periodontal ligament is compressed. Compression of periodontal ligament results in blood supply being cut off to an area of the periodontal ligament and this produces an avascular cell free zone by a process termed hyalinization. When hyalinization occurs ,tooth stops moving.Once the hyalinised zone is removed ,tooth movement can occur again.[9,10].Regeneration of the periodontal ligament does not occur when inflammation is present in the periodontal tissues,hence inflammation needs to be controlled through periodontal treatment.[11]

Benefits of orthodontics for periodontal patient

Orthodontic therapy can provide several benefits to the adult periodontal patient. The following six factors should be considered[12].

1. Aligning crowded or malposed maxillary or mandibular anterior teeth permits the adult patient better access to clean all surfaces of their teeth adequately.This could be a tremendous advantage for patients who are susceptible to periodontal bone loss or do not have the dexterity to maintain their oral hygiene.

2. Vertical orthodontic tooth repositioning (Intrusion) 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.Aligning the gingival margins orthodontically avoids gingival

recontouring,which could require bone removal and exposure of the roots of the teeth.

4. Orthodontic therapy also benefits the patient with a severe fracture of a maxillary anterior tooth that requires forced eruption to permit adequate restoration of the root. Eruption of the root 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 this open gingival embrasures are located in the maxillary anterior region they can be unaesthetic. In most patient this areas can be corrected with a combination of orthodontic root movement,tooth reshaping and restoration.

6. Orthodontic treatment could improve adjacent tooth position before implant placement or tooth replacement. This is especially true for the patient who had been missing teeth for several years and has drifting and tipping of the adjacent dentition.

Adverse effects associated with orthodontic treatment[13]

1. In the presence of plaque orthodontic forces can cause angular bony defects and attachment loss,especially with tipping and intrusive movements. Orthodontic therapy when performed in patients with active periodontal disease can accelerate attachment loss because of greater difficulty in removing plaque due to the presence of an orthodontic appliance.

2. Gingivitis and gingival enlargement is observed soon after placement of a fixed appliance. However it rapidly improves within 48 hours of appliance removal. Increasing probing depth during orthodontic treatment has been attributed to gingival enlargement.

3. Generarised increase in salivary bacterial counts is seen after orthodontic placement.

4. Uncontrolled intrusive forces may result in root resorption,pulp disorders,alveolar bone resorption and concentrated stress within the apical part of the ligament. Intrusion when attempted in poor oral hygiene conditions may result in the formation of intrabony defects and loss of connective attachment,as intrusive forces displace supragingival plaque apically.

5. Gingival invaginations occur during orthodontic treatment with extraction space closure.this may become sites where dental plaque can get embedded,thus acting as a risk factor for the occurrence of periodontal disorders during orthodontic treatment.

Timing of orthodontic procedures in periodontal treatment

It is generally recommended that orthodontics is preceded by periodontal therapy based on the belief that orthodontics in the presence of inflammation can lead to rapid and irreversible breakdown of periodontium[14] .scaling, root planning (if necessary by open flap debridement procedures for access) and gingival augmentation should be performed as appropriate before any tooth movement.[15,16,17]

The corrective phase of periodontal therapy i.e osseous or pocket reduction /elimination surgery ought to be delayed until the end of orthodontic therapy, because tooth movement may modify gingival and osseous morphology[18].

An adult orthodontic patient may be susceptible to periodontal disease,therefore close monitoring of marginal periodontal status during the active phase of orthodontic therapy is mandatory and appropriate supportive periodontal treatment instituted.

Specific microbiology and orthodontics

Naranjo et al [19]observed transformation of microorganisms populating the subgingival plaque after positioning of brackets and a considerable increase in test group. The level of Porphyromonas Gingivalis,Prevotella Intermedia,Tannarella Forsythia and Fusobacterium species increased after the bracket positioning in patients treated ,compared to that observed in non-treated control group.Superinfectant microorganisms such as Enterobacter Cloacae ,Klebsiella Pneumonia and Serratia Marcescens were detected in the treated group.

Implants and orthodontics

By providing temporary skeletal anchorage, orthodontic implants have several applications[20]. These devices can be employed to allow corrections in

a. Vertical dimension: molar intrusion in anterior open bite cases, lower molar intrusion in high angle patients, incisor intrusion in deep bite with gingival display and undesirable occlusal plane angulation.

b. Anteroposterior dimension: full step class II malocclusions associated with unpleasant profile, by protrusive patients which are unwilling to cooperate with head gear or intermaxillary mechanics, cases where full canine anterior movement is necessary in order to substitute a missing lateral incisor(agenesis),and molars; premolars protraction cases and also indicated when great space closure is necessary.

c. Prosthetic cases which need single tooth movement, without a complete fixed appliance.

CONCLUSION

Periodontal health is essential for any form of dental treatment. Adult patients must undergo regular oral hygiene instruction and periodontal maintanence in order to maintain healthy gingival tissue during active orthodontic treatment. Close monitoring of adults with reduced periodontal support is mandatory. Adult orthodontic tooth movement can be performed on both healthy and diseased periodontium with few detrimental effects (root resorption) provided physiological forces are used, periodontal inflammation is controlled and meticulous oral hygiene is maintained throughout active therapy.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Pocket dentistry; fastest insight clinical dentistry engine; Interdisciplinary orthodontics; Jan2005

2. Marlaine A Ong. Hom Lay Wang and Fredick N smith;Interrelationship of periodontics and adult orthodontics;journal of clinical periodontology;1998;25;271-277

3. Robert L Vanarsdall.Orthodontics and Periodontal therapy.Periodontology 2000;vol 9;1995;132-149.

4. Mourad Sebbar,Zouhair Abidine,Narijisse Laslami and Zakaria Bentahar;Periodontal health and Orthodontics;Emerging trends in oral health sciences and dentistry;2015

5. Jackson CL.Comparison between electric tooth brushing and manual tooth brushing ,with and without oral irrigation ,for oral hygiene for orthodontic patients.Am J Orthod Dentofacial Orthop;1991;99(1);15-20.

6. Brightman LJ,Telezhalmy GT,Greenwell H,Jacobs M,Enlow DH.the effects of a 0.12% chlorhexidine gluconate mouthrinse on orthodontic patients aged 11 through 17 with established gingivitis. Am J Orthod Dentofacial Orthop.1991;100(4);324-9.

7. Denes J,Gabris K.results of a 3 year oral hygiene programme,including amine fluoride products in patients treated with fixed orthodontic appliances.Eur J Orthod.1991;13(2);129-33.

8. Lindhe J.Textbook of clinical periodontology 2nd edition .copenhagen:munksgaard.p563-589.

9. Proffit WR,fields HW.contemporary orthodontics.2nd edition.St Louis:CV Mosby;1993.

10. Reitan K.biomechanical principles and reactions. In:Graber X,Swain BF,editors.Current orthodontic concepts and techniques.st Louis :CV Mosby;1985.p-101-92

11. Ericsson I, Thilander B,Lindhe J and Okamoto,H.the effect of orthodontic tilting movements on the periodontal tissues of infected and non-infected dentitions in dogs.journal of clinical periodontology; 1977;4;278-93

12. Micheal G newman,henry H. Takei,perry R klolkevold,fermin A,Carranza.Textbook of Clinical Periodontology;11th edition ;volume II;729-30

13. Nidhi Rathore , Asavari Desai,Mridula Trehan,Vikas Jharwal,Lakshmi Puzhankara, Anand Marya;Newyork State Dental Journal;Aug-Sep 2015;42-47

14. Lindhe J and Svanberg G;Influence of trauma from occlusion o progression of experimental

periodontitis in the beagle dog. Journal of clinical periodontology;1;3-14

15. Glickman I;Clinical Periodontology;3rd edition ;1964;820-833

16. Prichard J.F;Advanced periodontal disease:Surgical and prosthetic management;1965;1st edition;457

17. Proffit,W.R and fields H.W contemporary orthodontics;1993d;2nd edition;558

18. Goldman H and CohenD.W;Periodontal therapy;1968;4th edition;518-567

19. Naranjo AA, Trivino ML, Jaramillo A, Berancourth M, Botero JE.Changes in the subgingival microbiota and periodontal parameters before and 3 months after bracket placement.Am J Orthod Dentofacial orthop.;2006;sep;130(3);275.e17-22

20. Carlos Nelson Elias,Antonio Calos De Oliveira Ruellas and Jogaib Fernandes;Orthodontic Implants:Concepts for orthodontic practitioner;International Journal of Dentistry;vol2012.