PERIO – ORTHO INTERRELATIONSHIPS – "TWO-EDGE SWORD": A REVIEW OF LITERATURE

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ABSTRACT :

Periodontal disease (PD) is very prevailing, in some countries reaching up to five hundredth of the population. Chronic periodontal disease has been listed be the sixth most prevailing disease within the international burden of oral conditions. Periodontal inflammation is initiated as a consequence of the imbalance of dysbiotic oral microbiota and therefore the host that is followed by periodontic tissue destruction. Moderate and severe PD usually ends up in teeth malpositioning and occlusal trauma, inflicting malocclusions with progressive attachment loss. Orthodontic treatment is very suggested to be done once subsiding of inflammation in periodontal conditions. A healing amount (up to six months) is suggested following periodontal treatment before the initiation of tooth movement. Amix ofperiodontic and orthodontic treatments ought to be thought-about within the planned treatment strategy and rehabilitation of the occlusion in patients with PD.

KEYWORDS: Periodontics and orthodontics; malocclusion; pathologic migration.

AIM:

The aim of this study is to provide an overview of the perio - ortho interrelationships.

MATERIALS AND METHODS:

An extensive literature search of the Medline, Cochrane, and EMBASE databases on July 19, 2020 was done using the medical subject heading term "Periodontics and Orthodontics interrelationship". There were no limits on date, language, age of participants or publication type.

INTRODUCTION:

Symbiosis exhibits between orthodontics and periodontics as an interdisciplinary approach. Restoration and maintenance of the health and integrity of the attachment apparatus of teeth are the primary goal of periodontal therapy. Pathological tooth migration may occur due to compromised periodontal support. In order to overcome this problem, orthodontic treatment is preferred, which not only prevents further progressing, but it also holds some potential for harm to the periodontal tissues[1]. In areas of increased over jet, there will be reduced alveolar bone height. Crowding and gingivitis are usually correlated; i.e. in areas ofcrowding there will be increased levels of bacteria as compared with ideal sites in the same patient[2].

ORTHODONTIC TOOTH MOVEMENT AND PERIODONTAL RESPONSE: EXTRUSION:

The partial displacement of the tooth out of the socket is known as extrusion. It is the least hazardous kind of tooth movement as far as periodontium is considered. There is an reduction in infrabony defects and periodontal pockets followed by extrusion and equilibration of the clinical crown[3].

INTRUSION:

When a tooth is moved partially into the socket, it is known intrusion. Intrusion results in deepening of infrabony pockets, root resorption and bone defects[4].

UNCONTROLLED TIPPING:

It causes heavy forces at the alveolar crest resulting in severe destruction of the epithelial attachment and

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crestal bone loss. It also produces high forces in the periodontal ligament as the fulcrum shifts more and more apically with increasing amounts of bone loss. Researchers suggested that by the use of injudicious tipping movements a gingival lesion can be converted into a periodontal lesion[5].

BODILY MOVEMENT:

When all points on the tooth move an equal distance in the same direction, it is known as bodily movement or translation. There was noticeable improvement in the periodontal defect when the tooth was bodily moved into the defect. Many authors suggested that it is only an illusion since it results in an improved connective tissue attachment and worsens the bony defect. Authors suggested that it is only an illusion since it results in an improved connective tissue attachment and worsens the bony defect[5].

MICROBIOLOGY AROUND ORTHODONTIC BANDS:

The development of gingival inflammation during orthodontic mechanotherapy is associated with specific bacterial types. Huser et al studied microbial flora in plaque of patients undergoing orthodontic treatment and found a definite increase in plaque scores and probing depth when compared with controls[2]. The bacterial plaque was composed mainly of spirochetes and motile rods. Other authors reported increased levels of bacteroids and streptococcus species after orthodontic banding. There was increase in Lactobacillus, Prevotella intermedia and some motile organisms.[2,6,7,8]

ROOT RESORPTION AND ORTHODONTIC TOOTH MOVEMENT:

Normally, cementum does not undergo appreciable resorption. Orthodontic force application can sometimes evoke excessive resorption of root cementum, preceding into the dentin, eventually shortening the root length, a process called root resorption. Ketcham (1927) was the first to report severe root resorption associated with orthodontic tooth movement[9]. Of the various orthodontic tooth movements, intrusion and torqueing make a tooth root more prone to resorption.

BENEFITS OF ORTHODONTICS FOR A PERIODONTAL PATIENT:

Aligning crowded or malposed teeth permit the adult patient better access to clean all surfaces of their teeth adequately. 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. Certain types of osseous defects in periodontal patients can be improved by vertical orthodontic tooth repositioning. The need for resective osseous surgery can be often eliminated by the tooth movement. Orthodontic treatment can improve the esthetic relationship of the maxillary gingival margin levels before restorative dentistry[10]. Orthodontic treatment allows open gingival embrasures to be corrected to regain lost papilla. Orthodontic treatment could improve adjacent tooth position before implant placement or tooth replacement. This is especially true for the patient who has been missing teeth for several years and has drifting and tipping of the adjacent dentition.

ORTHODONTIC TREATMENT OF OSSEOUS DEFECTS:

OSSEOUS CRATERS:

Interproximal, two-wall defect does not improve with orthodontic treatment. Some shallow craters (4 to 5 mm pocket) may be maintainable nonsurgically during orthodontic treatment. If surgical correction is needed this type of osseous lesion can be eliminated by reshaping the defect and reducing probing depth, which may result in enhancingtheability to maintain these interproximal areas during orthodontic treatment[11].

THREE WALL INTRABONY DEFECT:

Three-wall defects are amenable to pocket reduction with regenerative periodontal therapy. Bone grafts using either autogenous bone or allografts along with the use of resorbable membranes have been successful in filling three-wall defects. If the result of periodontal therapy is stable 3 to 6 months after periodontal surgery, orthodontic treatment may be initiated[4].

HEMISEPTAL DEFECTS:

Hemiseptal defects are one- or two-wall osseous defects that often are found around mesially tipped teeth or teeth that have supra erupted. More often with the appropriate orthodontic treatment, these defects can be eliminated. In the case of the tipped tooth, uprighting and eruption of the tooth levels the bony defect. If the tooth is supra erupted, intrusion and levelling of the adjacent cemento-enamel junctions can help level the osseous defect[4].

ADVANCED HORIZONTAL BONE LOSS:

In a patient with advanced horizontal bone loss, the bone level may have receded several mm from the CEJ and the crown-to- root ratio becomes less favorable. Aligning the crowns may perpetuate tooth mobility and significant bone discrepancies. Crowns of these teeth may require considerable equilibration in this condition[12]. The motto of equilibration and creative bracket placement is to provide a more favorable bony architecture and an ideal crown to root ratio.

FURCATION DEFECTS:

Furcation lesions require special consideration since it is the most difficult lesions to maintain and it can worsen during orthodontic therapy. The molars require bands with tubes and other attachments that impede the patient's access to the buccal furcation for home care and instrumentation at the time of recall[12]. If orthodontic treatment is being done on a patient with a class lll furcation defect, then a possible method for treating the furcation is to eliminate it by hemisecting the crown and root of the tooth

HOPELESS TEETH MAINTAINED FOR ORTHODONTIC ANCHORAGE:

Patients with advanced periodontal disease may have specific teeth diagnosed as hopeless, which would be extracted before orthodontics. However, these teeth can be useful for orthodontic anchorage if the periodontal inflammation can be controlled[13].

ORTHODONTIC TREATMENT OF GINGIVAL-DISCREPANCIES:

Ideal orthodontic treatment must contribute to the following factors such that the gingival margins of the two central incisors should be at the same level. The gingival margins of the central incisors should be positioned more apically than the lateral incisors & at the same level as the canines[13]. The contour of the labial gingival margins should mimic the CEJs of the teeth. A papilla should exist between each tooth, and the height of the tip of the papilla is usually halfway between the incisal edge and the labial gingival height of contour over the center of each anterior tooth.

OPEN GINGIVAL EMBRASURES:

A key esthetic factor in any individual is the presence of a papilla between the maxillary central incisors[14]. This open space is usually due to one of three causes such as tooth shape, root angulation, or periodontal bone loss. The interproximal contact between the maxillary central incisors consists of 2 parts- tooth contact, the papilla for which the ratio of papilla to contact must be 1:1.

PERIODONTAL SURGERY FOR THE ORTHODONTIC PATIENT : PERICISION:

It is known as circumferential supracrestal fiberotomy, which was founded by Edwards in 1970[15]. Severely rotated teeth may relapse due to the rebounding of elastic fibers in the supracrestal tissues which can be reduced by pericision. It involves inserting a surgical blade into the gingival sulcus and severing the epithelial attachment surrounding the involved teeth. The blade also transects the transseptal fibers by interdentally entering the periodontal ligament space.

FRENECTOMY / FRENOTOMY:

The probability for diastema in the long run is the same whether frenectomy is preformed or not[16]. Frenectomy extending into palatal surface was advocated earlier, but this lead to the loss of interdental papilla between upper central incisors. So, frenotomy which represents a more gentle operation, with only partial removal of frenum and with the purpose of relocating the attachment in an apical direction was introduced[17].

REMOVAL OF GINGIVAL INVAGINATION (CLEFTS):

Incomplete adaptation of supporting structures during orthodontic closure of extraction spaces results in infolding or invagination of the gingiva. The clinical appearance of such invagination ranges from a

minor one surface crease to deep clefts that extend across the interdental papilla. There is general trend toward some resolution of these defects with time, but many invaginations persist for 5 years, or more after completion of orthodontic therapy. Simple removal of only the excess gingiva in the buccal and lingual area of approximated teeth would be sufficient to alleviate the tendency for the teeth to separate after orthodontic movement[18].

GINGIVECTOMY :

If a gingival margin discrepancy is present, but the patients lip does not move upward to expose the discrepancy upon smiling, it does not require correction. If the gingival discrepancy is apparent, however, one of four different techniques may be used such as intrusion and incisal restoration or porcelain laminate veneer , extrusion along with fiberotomy and porcelain crown and surgical crown lengthening by flap procedure and ostectomy/ osteoplasty[19].

PERIODONTALLY ACCELERATED OSTEOGENIC ORTHODONTICS (PAOO) :

Wilcko et al 2001 reported a revised corticotomy facilitated technique (PAOO) which is a combination of a selective decortication dependent orthodontic technique and alveolar augmentation. With this technique, one tooth can be moved 2-3 times furtherinonethirdoronefourthofthetimerequiredfortra ditionalorthodontictherapy. Wilcko and coworkers reported that in a surface computed tomographic (CT) scan evaluation of selectively decorticated patients was that the rapid tooth movement was not the result of bony block movement[20]. But rather it was a transient localized demineralization-remineralization phenomenon in the bony alveolar housing consistent with the wound healing pattern of the Regional Acceleratory Phenomenon (RAP).

CONCLUSION :

A magnificent orthodontic treatment can be destroyed by poor periodontal support. Hence, evaluation and maintenance of periodontal health before, during and after treatment is very important.

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