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Relationship between adult orthodontics and periodontics

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ABSTRACT:-

The purpose of this review article is to give dental professionals a better knowledge of how adult orthodontics and periodontics interact. The effects of orthodontic bands on the periodontium, how periodontal tissue responds to orthodontic forces, the impact of tooth movement on the periodontium, the effectiveness of circumferential supracrestal fiberotomy in preventing orthodontic relapse, the specific microbiology connected to orthodontic bands, mucogingival considerations, and the timing of orthodontic and periodontal therapy are some of the specific topics covered. Also covered will be the connection between orthodontics and implant restorations (such as using dental implants as anchors for braces). The fundamental goal of periodontal therapy is to improve and preserve the strength and health of the teeth's attachment system. Adults may experience pathological tooth migration involving a single tooth or a group of teeth as a result of tooth loss or periodontal support. As a result of the posterior occlusion collapsing and the vertical dimension shrinking, this may lead to the formation of a median diastema or general spacing of the teeth with or without incisal proclination, rotation, or tilting of bicuspids and molars. To resolve these issues, adjunctive orthodontic therapy is required. Additionally, as listed in Table 1, orthodontic therapy can help with the management of a number of restorative and aesthetic issues involving shattered teeth, tipped abutment teeth, excessive spacing, insufficient pontic space, misshapen teeth, hypererupted incisors, and diastema/frena. This article's goal is to review periodontics and adult orthodontics-related topics.

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INTRODUCTION: -

Response of Periodontal Tissue to Orthodontic Forces Controlled forces applied to teeth during orthodontic therapy cause tooth movement. While fixed appliances can generate continuous multidirectional forces to produce torquing, invasive, extrusive, rotational, and physical movement, removable appliances intermittently apply tipping forces to teeth (Lindhe 1989, Proffit 1993a) . Age alone does not preclude receiving orthodontic care. Cellular activity declines with ageing and tissue collagen content increases (Reitan 1985). The tissue response to orthodontic stresses, including cell mobilisation and collagen fibre conversion, is substantially slower in the elderly than in children and teenagers (Reitan 1985). Orthodontic therapy is not prohibited by age alone. The tissue gets more collagen-rich as one ages and cellular activity declines (Reitan 1985). Compared to adolescents and teenagers, the elderly have a substantially slower tissue reaction to orthodontic stresses, including cell mobilisation and collagen fibre conversion (Reitan 1985).

Table 1: Use of orthodontics as an adjunct to overall treatment

Serial No.	
1.	Uprighting or repositioning teeth to improve parallelism of abutment teeth (e.g., tipped abutment teeth)
2.	Improving future pontic spaces (e.g., inadequate space)
3.	Correcting cross-bites
4.	Extruding teeth (e.g., fractured teeth)/Intruding teeth (e.g., hypererupted teeth)
5.	Correcting crowding of teeth
6.	Achieving adequate embrasure space and proper root position
7.	Repositioning teeth for placement of implants
8.	Restoring lost vertical dimension
9.	Increasing or decreasing overjet/ overbite
10.	Closure of diastemas

Root resorption is far more likely to develop when stronger orthodontic forces are used, such as those required for intrusive movements and extended continuous body movements (Proffit 1993a). The bulk of resorption lacunae are tiny and often develop in the middle and peripheral thirds of the root, towards the edge of the PDL hyalinized zone. These are quickly fixed by cellular cementum adheringApical root resorption, in contrast, causes the root to

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permanently shorten and is an irreversible lesion (Proffit 1993a). Thus, anchored teeth that experience significant loads on a regular basis are at risk for developing root resorption (Lindhe 1989).

Endodontically treated teeth are capable of orthodontic movement because the PDL's response, not the pulp's, is what drives this movement (Wickwire et al. 1974Light interrupted forces should be applied because research suggests that these teeth are somewhat more likely to have root resorption during orthodontic treatment than teeth with normal vitality (Wickwire et al. 1974).

Periodontium and Tooth Movement: Effects

Orthodontically shifting teeth involves moving the complete periodontal attachment system, which includes the osseous structure, PDL, and soft tissue components (Berglundh 1991). In four patients, Brown (1973) examined the effects of uprighting teeth on the periodontium. The associated pocketing at uprighted molars exhibited a 2.5 mm larger reduction in pocket depth than the one control tooth seven months after the start of treatment. Additionally, the gingival architecture had improved, and the uprighted teeth had reduced plaque buildup. After an average of 3.5 years, a follow-up investigation on 22 patients with uprighted mandibular molars found that the pockets on the mesial surfaces of the uprighted teeth were shallower than those of the control teeth (Kraal et al. 1980). In some case reports, it has also been stated that intrabony abnormalities caused by extruded teeth can be treated with less intrusive probing depths (Ingber 1974, Ingber 1976). Additionally, incidences of localised juvenile periodontitis have been documented, in which the eruption of teeth decreased probing depths (Everett & Baer 1964; Goldstein & Fritz 1976). The advantages of forced vertical eruption in exposing tooth structure to enable prosthetic treatment in healthy periodontium have also been discussed by others (Guilford et al. 1984). Animal studies on the application of extrusive and intrusive pressures in healthy periodontium have produced positive outcomes when dental hygiene is practised (Melsen 1986). If oral hygiene is maintained and tissues are in good health, it has also been demonstrated that the combination of orthodontic intrusion and periodontal treatment can ameliorate reduced periodontal problems in animals (Melsen et al. 1988Adult individuals with minimal bone loss and a deep overbite have been described as having incisor intrusion, with root resorption ranging from 1 to 3 mm. According to Melsen et al. (1989), intrusion is carried out most effectively when mild forces (5–15 g/tooth) are used and the gingiva are in good health. Circumferential Supracrestal Fiberotomy's (CSF) role in preventing orthodontic regression

Although tooth rotation is easy to perform, it is challenging to keep up. After orthodontic tooth movement, collagenous fibres, elastic fibres, and the PDL are reorganised to accommodate the new tooth placements. The teeth must be kept for a long time to ensure adequate repositioning of the supporting tissues of the teeth and to avoid an orthodontic relapse (Proffit 1993b). For the first three to four months after receiving fixed orthodontic appliances to treat intraarch abnormalities, it is advised that patients wear their retainers full-

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time (Proffit 1993b). Reitan (1959) noted that even after a retention period of 4 to 6 months, Sharpey's fibres of the newly created bundle bone as well as the major fibres of the PDL (supraalveolar and transseptal fibres) undergo rearrangement. Therefore, the retention period should continue on a part-time basis for at least 12 months to provide these periodontal tissue fibres time to reconstruct (Proffit 1993b).

It is advised to "overadjust" the orthodontically shifted teeth in kids and teenagers to account for potential relapse (Lindhe 1989). Such overcorrections in adult orthodontics might not be advised, especially in dentitions with less periodontal tissue support (Lindhe 1989). Edwards (1970) used circumferential supracrestal fiberotomy to successfully treat 12 post-orthodontically rotated teeth (CSF). A long-term prospective evaluation of the CSF procedure's effectiveness in reducing dental relapse after orthodontic treatment was subsequently published by him (Edwards 1988). At roughly 4 and 6 years after active therapy, and again at 12 and 14 years following active treatment, 320 consecutively treated control and CSF cases were reported.

At both time intervals, there were highly significant statistical differences between the mean relapses of the control group and the CSF cases. The mean relapse was decreased by about 30% with the CSF treatment. On the labial or lingual surfaces of the CSF group of teeth, no discernible gingival recession was found.

Orthodontic Bands' Effects on the Periodontium Others have linked this growth to the rise in probing depth during orthodontic treatment (Zachrisson & Zachrisson 1972, Kloehn & Pfeifer 1974, Alexander 1991). Given that patients with good oral hygiene also experience this gingival expansion, mechanical irritation brought on by the band or cement in addition to trapped plaque must be considered (Zachrisson & Zachrisson 1972; Boyd & Baumrind 1992). The risk of losing attachment can be predicted when such iatrogenic irritations are unavoidable (Alexander 1991).

Gingivitis has specific iUlicrobioiogy around orthodontic bands as one of its main etiologic factors (Loe et al. 1965). It should be anticipated that the orthodontic patient's inability to properly clean will play a role in the emergence of gingival inflammation. In addition, it has been demonstrated that the installation of orthodontic bands causes a generalised increase in salivary bacterial counts, particularly Lactobacillus (Bloom & Brown 1964).

Similar to Leggott et al. (1984), additional researchers (Diamanti-Kipioti et al. 1987, Huser et al. 1990) showed early increases in anaerobes and Prevotella intermedia and a decrease in facultative anaerobes at sites 6 months after appliance insertion. According to Table 4, the subgingival microbiota has changed to a periopathogenic community, which is comparable to the microbiome at periodontally diseased locations (Listgarten & Hellden 1978).

According to research (Leggott et al. 1984; Boyd et al. 1989) comparing the microbiological and periodontal reactions in adolescents and adults, adults do not appear to be at a higher risk than teenagers of later acquiring periodontal disease as a result of orthodontic treatment.

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Orthodontic and Periodontal Therapy Time Relationship

Periodontal therapy is typically advised before orthodontic treatment because it is thought that orthodontic treatment in an inflammatory state can hasten and irreversibly damage periodontium (Lindhe et al. 1974). Before any tooth movement, scaling, root planing (if required, by open flap debridement techniques for access), and gingival augmentation should be carried out as necessary (Glickman 1964, Prichard 1965, Profflt 1993d). Because tooth movement may alter gingival and osseous morphology, the corrective phase of periodontal therapy, which involves osseous or pocket reduction/elimination surgery, should be postponed until the conclusion of orthodontic treatment (Goldman & Cohen 1968). Periodontal disease may be a risk for an adult orthodontic patient.

Therefore, throughout the active phase of orthodontic therapy, close monitoring of marginal periodontal condition is required, and appropriate supporting periodontal treatment is implemented.

Orthodontics and Impiants

Recently, the prosthodontic benefits of utilising implants as orthodontic anchoring were discovered (Wehrbein et al. 1993, 1994, 1996). The potential of implants for orthodontic anchorage in preprosthetic tooth alignment has been demonstrated in studies on animals and people (Roberts et al. 1984, Roberts et al. 1989, Higuchi & Slack 1991, Prosterman et al. 1995). It has been successfully used to retract and realign teeth (Odman et al. 1988, Arbuckle et al. 1991, Block & Hoffman 1995), close edentulous spaces (Shapiro & Kokich 1988, Roberts et al. 1989, Roberts et al. 1994), and treat other clinical conditions, Correcting intruding and/or extruding teeth (Odman et al. 1988, Haanaes et al. 1991, Salama & Salama 1993, Southard et al. 1995), restoring proper anteroposterior and mediolateral positions for malpositioned molar abutments (Arbuckle et al. 1991, Haanaes et al. 1991), and correcting midline and anterior tooth the protracting of one arch or the entire dentition (Higuchi & Slack 1991), the correction of a reverse occlusal relationship (Shapiro & Kokich 1988, Van Roekel 1989, Higuchi & Slack 1991), the correction of an anterior open occlusal relationship (Roberts et al. 1984), and the stabilisation of teeth with insufficient bone support (Odman et al. 1988).

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