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PERIODONTAL AND GINGIVA ALTERATIONS DURING ORTHODONTIC THERAPY

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Abstract
The aim of the present review was to describe the most commonly observed changes of periodontal and gingiva changes happened because of orthodontic treatment in order to facilitate collaboration between periodontal diseases and orthodontic treatment. An electric data base used to carried out by using google scholar abstract and citation data base and bibliographic material. In this review we discussed the effect of orthodontic treatment on soft tissues. In the conclusion, the importance of maintenance on the health of the patients' gingiva was a priority during orthodontic treatment

Keywords: orthodontic appliance, orthodontic treatment, soft tissue changes, periodontal disease.

Periodontal and gingival changes

Orthodontic treatment could indeed be introduced to enhance dental aesthetic not just by realigning the jaws and addressing dental malformations, but also by supporting conditions that will lead to better gingival health. because interdental papillae height was missed, a number of adult patients with periodontal disease who have recently experienced symptoms typically appear with "black triangles.". Orthodontics can be used to realign teeth and enhance the appearance of soft tissues. Orthodontic tooth approximation might change the topography of interproximal alveolar crest level and improve the interdental papilla's position (Harshita et al., 2018), despite the fact that while treating crowding, additionally, black triangles may also develop as a result of tooth bruxism (excessive teeth grinding) (Covani et al., 2012) hypothesized that the location of the contact point in relation to the position of the bone crest could be used to identify whether the interdental gap would be filled by the papilla. When orthodontic teeth are being approximated, tooth reshaping may helping in moving the contact points more apically, which may aid to obtain good cosmetic results in the interdental space.

The delicate periodontal tissue may experience some negative effects from OTM, it should be remembered. In orthodontic extraction situations, (GO), (GR), and (GI) are the soft tissue abnormalities that occur most frequently.

In the orthodontic patient, gingival overgrowth , which can cause pseudo-pocketing with or without attachment loss as a result of increased gingiva, is a relatively prevalent issue. It may have an effect on the quality of life connected to dental health when it affects the anterior region(Tiwari et al., 2015). Originally, GO was thought of as an inflammation following the development of bacterial plaque (Armitage & Xenoudi, 2016). Other variables have been proposed to explain the pathophysiology of GO, such as chemical irritation caused by banding materials, band irritation mechanically, and food impaction (Adhikari, 2022).

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When the extraction space is closed, the interdental papillae may grow and gingival tissue may assemble if compressive or retraction stresses are applied.. First or second premolars are typically the teeth that need to be extracted for orthodontic therapy. Closing extraction sites with orthodontics may cause gum invagination or may cause buildup of gingival tissues.

According to Robertson et al. , gingival ingrowth is described as a linear interproximal tissues invagination associated with a distal and mesial orientation and an intra gingival probing depth of at least 1mm. GI has been shown when occur frequently and may be seen more frequently in lower jaw. Because of its placement, the GI could make it difficult to effectively regulate plaque, perhaps causing gingival and periodontal diseases. In addition, the connection between the time of OTM and gingival cleft. When space closure and the start of orthodontic therapy were put off following tooth extraction, significantly more GIs were noted; Consequently, effective communication between specialists is crucial. There is a lot of variation in gingival ingrowth, from a small, superficial wrinkle in the gingiva to severe abnormalities that completely penetrate the alveolar ridge, approximate 25%t of all clefts. Treatment plans can differ depending on how severe the GI problem is. When GI is solely present in soft tissues, it can treat with either an electric cautery or a cold blade, with little to no difference between the two gingivectomy methods (Gorbunkova et al., 2016). Due to the low level of post operation pain associated with the use of these devices, soft tissue diode laser therapy may offer some benefits in the treatment of mucogingival issues. GBR can use used in the post-extraction area to prevent GI development during OTM; however, the ideal time to begin tooth apposition following surgery is still being debated (Gorbunkova et al., 2016).

Gingival recession, which can result in unattractive aesthetics, root sensitivity, increased susceptibility to caries, tooth abrasion, and subsequent difficulty in maintaining oral hygiene, has been extensively discussed in both orthodontic and periodontal reviews. OTM may enhance soft tissue conditions or encourage GR development. Up to 10–12% of patients with orthodontic treatment developed gingival recessions (Gebistorf et al., 2018). Continuous mechanical trauma from a toothbrush is thought to be one of the primary causes of GR development(Chatzopoulou & Johal, 2015), but other researchers (Seong et al., 2018) concluded that there was insufficient data to conclude a causal relationship between using a toothbrush and developing non-inflammatory GR. Numerous anatomical and morphological feature was put out as potential contributors to the establishment of GR. When the roots of teeth were pass across the alveolar cortical bone during OTM, alveolar bone dehiscence may happen (Akbulut & Bayrak, 2022). Patients who have a narrow alveolar process, thin buccal or lingual bone plats, eccentrically positioned teeth, a basally expanded maxillary sinus, and progressive alveolar bone loss are more likely to undergo this sort of movement (Fuhrmann, 1996). It should be emphasized that the danger of negative side effects on the marginal soft tissue is limited if the tooth is relocated only within limits of the alveolar bone. Soft tissues may be affected by the way that orthodontic forces are administered. Some studies claimed that if orthodontic individuals practice good dental hygiene, regulated proclination of mandibular incisors might be performed without running the risk of periodontal damage (Mandelaris et al., 2017). Pro inclination orthodontic movement may be strongly linked to decrease in the width of the keratinized tissue, according to recent studies (Rasperini et al.,

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2015). These findings are in agreement with other research that suggests labial tooth movement may lessen buccolingual tissue thickness and lower the hight of the free gingiva, enabling GR. However, lingual tooth movement could have the opposite result (Gkantidis et al., 2010). The development of GR may also be influenced by periodontal biotype, according to some theories. In terms of GR depth and keratinized tissue width, a significant link between thin biotype and proclination orthodontic movement was discovered. Patients who had a thin-scalloped gingival biotype are thought to be at risk as opposed to those who had a thick biotype.

Ethical policy and institutional review board statemen

No applicable

Patient declaration of consent

No applicable

List of abbreviation

Gingival recession (GR)
Gingival overgrowth (GO)
Gingival invagination (GI)
Orthodontic tooth movement OTM
Guided bone regeneration (GBR)

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