

Review

Management of Adult Orthodontics with Periodontal Disease

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Abstract

It is the responsibility of orthodontists to diagnose periodontal issues and address the multidisciplinary therapy of various periodontal issues needing orthodontic therapy. Adults can be quickly and effectively screened for periodontal disorders using the periodontal screening and recording technique. It condenses the information into the basic essential paperwork. An orthopantomograph which is useful for basic scanning, is used by most orthodontists. Plaque, subgingival calculus, and occlusal trauma are some of the etiologic variables that are the focus of preorthodontic periodontal therapy. A customized home-care program is part of the initial phase of periodontal treatment. Before beginning orthodontic therapy, the periodontist should assess sites of minimally attached gingiva. Grafting may be necessary for teeth with gingiva less than 2 mm thick. The conventional techniques for root covering were gingival and pedicle grafting. The type of defect, such as a crater, hemiseptal defect, three-walled defect, and/or furcation lesion, will determine the amount of the osseous repair. The bone level may have moved back several millimeters from the cemento-enamel junction in a patient who has experienced extensive horizontal bone loss. To correct the disparities, periodontal surgery might be necessary. The patient must continue on a three-month periodontal maintenance program once orthodontic treatment is finished. After the release of the band, it may take up to six months for appropriate bone remodeling, the termination of mobility, and the constriction of the periodontal ligaments to occur.

Keywords: *adult orthodontics, periodontal disease, maintenance program, periodontal surgery, orthodontic therapy*

Introduction

Adult patients are being seen by orthodontists more frequently now (1). In some orthodontic clinics, more than 40% of patients are adults. Numerous individuals have inherent periodontal conditions that might deteriorate as a result of orthodontic treatment. It is crucial for orthodontists to recognize periodontal issues prior to orthodontic therapy, come up with the best course of action to address them, and effectively order the orthodontic and periodontal therapies to improve the client's periodontal wellbeing (2). Consequently, it is the responsibility of orthodontists to diagnose periodontal issues and address the multidisciplinary therapy of various periodontal issues needing orthodontic therapy. Prior to beginning orthodontic therapy, they must actively participate in the diagnosis of periodontal issues (2). The initial meeting with the patient ought to include a quick 5-minute periodontal evaluation from the orthodontist. It is only a quick screening test. If issues are found, a periodontist should be consulted for a more thorough diagnostic evaluation. Primarily indicated teeth are probed during the screening test, attached gingiva is assessed, and the required imaging is studied. In this review, we aim to address management protocols that can be carried in case a periodontal disease was discovered prior to treatment.

Methodology

This study is based on a comprehensive literature search conducted on October 29, 2022, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google Scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed the information about management of adult orthodontics with periodontal disease. There were no restrictions on date, language, participant age, or type of publication.

Discussion

Adults can be quickly and effectively screened for periodontal disorders using the periodontal screening and recording technique (3). It condenses the information into the basic essential paperwork. Each sextant is evaluated using a unique little plastic probe. Each component receives a score, and a summary table will assist the examiner in deciding whether additional periodontal testing and care are required. PSR is a highly

sensitive approach for spotting changes from periodontal health and is simple to use and comprehend. Without adding to session duration, it is easily integrated into regular dental check-ups. Using a typical periodontal probe is another way to find periodontitis (4). The Marquis probe and the Michigan "O" are both narrow, making it simple to view and log measurements. Adults who have crowding are more likely to have periodontal disease in the lower canine/lateral area, buccal furcations, and maxillary molar interproximities (5). The interproximal osseous defect's extent must be determined, and correct probe angulation makes this possible. Additionally, radiographic images can aid in defining the regions that the probe should be used to examine.

One of two easy methods are available to quickly assess regions with very little gingiva. To define the mucogingival junction, a periodontal probe can be positioned horizontally in the vestibule and gradually lifted gingivally. A probe can be used to assess gingiva thickness. The periodontist will need to perform additional testing on areas that have under 2 mm of gingiva (6). Another method of determining the measurement of gingiva is to lightly contact the mucosal membrane in the vestibule and ruffle it to determine the mucogingival junction and the amount of gingiva.

An orthopantomograph which is useful for basic scanning, is used by most orthodontists. However, when evaluating periodontal osseous diseases, orthopantomographs are not as effective as a vertical bitewing. Interproximal craters among maxillary molars, infrabony deficiencies on the mesial of the maxillary first premolar, and defects near the mandibular incisors go frequently undetected on the orthopantomographs (7). The diagnostic usefulness of routine bitewings in adult patients with intermediate or severe periodontal disease is low. The crestal bone can be seen more clearly with a vertical bitewing, which is more diagnostic.

It is crucial for the orthodontist to recognize adult patients who may clench or grind their teeth. It is crucial to perform a quick assessment of advanced mobility. When receiving orthodontic treatment, clenched and bruxers can seriously damage the osseous structure (8). While receiving active orthodontic treatment, these patients may require a biteplate appliance (nightguard). Plaque, subgingival calculus, and occlusal trauma are some of the etiologic variables that are the focus of

preorthodontic periodontal therapy. A customized home-care program is part of the initial phase of periodontal treatment. When a patient's capacity to manage themselves at home is hampered, using an automatic toothbrush may be advised. To lessen swelling, bleeding, and suppuration, root planing and subgingival debridement are done. Typically, the first three months of treatment are the longest. Sometimes, particularly in more recalcitrant periodontal infections, an antimicrobial is administered. A few months following this initial debridement, the patient is reviewed, and the tissue healing is evaluated. The severity of the illness is assessed. Usually, bleeding, suppuration, and pocket depth will significantly reduce (9); The periodontist will decide whether the patient is periodontally healthy enough to continue with orthodontic therapy. Before beginning orthodontic therapy, some mouth regions may need periodontal surgery treatment.

Preorthodontic gingival surgery

Before beginning orthodontic therapy, the periodontist should assess sites of minimally attached gingiva. Grafting may be necessary for teeth with gingiva less than 2 mm thick. Yet, there are some elements that must be taken into account when taking this choice (10). To determine the attachment and bone level in these regions of thin, restricted gingiva, the dentist may "sound" them. Regions of recession and root exposure can be reliably addressed with a variety of grafting procedures in situations of gingival recession and root covering (11). The conventional techniques for root covering were gingival and pedicle grafting. Currently, the connective tissue transplant is the preferred method of treating denuded roots (12). In comparison to traditional gingival grafting, the connective tissue graft provides more root coverage, is more aesthetically pleasing, and is less painful. When doing grafting operations for cosmetic purposes, it is advisable to wait until orthodontic treatment is finished. However, the surgery may be performed prior to or concurrently with orthodontic treatment if the area has recession and insufficient gingiva.

The type of defect, be it a crater, hemiseptal defect, three-walled defect, and/or furcation lesion, will determine the amount of the osseous repair. The wise therapist will be aware of which flaws can be corrected with orthodontic care and which ones need preorthodontic periodontal surgery. Osseous craters are two-wall interproximal defect which do not usually get better with orthodontic care. It might be possible to sustain some shallow craters

(4 to 5 mm pocket) without surgery. Nonetheless, if the periodontist thinks surgery is required to fix the issue, this kind of osseous lesion can be quickly removed by contouring the deficiency and decreasing the length of the pocket (13, 14). Regenerative periodontal therapy allows for pocket reduction in three-wall abnormalities (15). Three-wall defects can be filled with great efficiency utilizing bone grafts that combine autogenous bone from the surgical field or allografts with resorbable or nonresorbable films (9). Reflection of the buccal and lingual flaps and debridement of the osseous gap. A suitable substance, such as citric acid, ethylene diaminetetraacetic acid (EDTA), or tetracycline, is used to treat the root. The gap is filled with bone graft, the area is covered with a membrane, and the flaps are placed back where they belong. A nonresorbable membrane should be detached after four to six weeks if it is utilized. One to two wall osseous flaws make up hemiseptal defects. These are frequently discovered near teeth with mesially pointed or teeth that have supererupted. With the right orthodontic care, these flaws are frequently eliminated. In the case of the pointed tooth, the osseous defect will be leveled by the tooth's uprighting and eruption (16, 17). The neighboring cemento-enamel junctions (CEJs) can be penetrated and leveled to help smooth the osseous defect in the instance of the supererupted tooth. Prior to receiving orthodontic work, periodontal infection must be under check. Preliminary debridement is typically sufficient to do this, and preorthodontic surgery is infrequently necessary. There are three levels of furcation imperfections: incipient (Class I), moderate (Class II), and advanced (Class III). When a patient is receiving orthodontic therapy, these lesions need specific care. The accessibility of the patient to the buccal furcation for self-care and instrumentation at the time of recall is sometimes hampered by the need for bands with tubes and other attachments on the molars.

Class I faults have a good prognosis for bony surgical repair. Grafting and regeneration therapy using barrier membranes are effective treatments for Class II furcation problems. Treatment for Class III furcation defects is more challenging, and the outcomes of using grafts and membranes in these defects are unpredictable. Therapeutic options for Class III furcation defects in the mandibular arch include hemisection, exodontia, and implant replacement. Open-flap curettage can be used to produce a through-and-through furcation for simpler cleansing (12). When performing periodontal upkeep, the patient may find it challenging to clean areas that are close to roots (18). When interproximal regions are

required to be rehabilitated, they are likewise exceedingly challenging to prepare. Because of accessibility and the smaller buccolingual dimensions of the alveolar ridge, teeth anteriorly are typically easier to retain with a close vicinity to the root. It is more challenging to sustain a root proximity issue in the maxillary molar region. These locations are more vulnerable to osseous collapse due to accessibility for self-care and a larger buccolingual dimension.

Orthodontic treatment of periodontal defects

The placement of the bands and brackets on the teeth after treatment has been arranged is one of the most crucial elements that affects how well orthodontic therapy works. The architecture of the tooth's crown typically dictates the location of the bracket in a person with healthy periodontal tissues. However, evaluating the architecture of the crown to decide bracket placement is incorrect if a patient has considerable alveolar loss around some teeth and underlying periodontal issues.

The bone level may have moved back several millimeters from the cemento-enamel junction in a patient who has experienced extensive horizontal bone loss. The crown to root proportion will deteriorate as a result of this. By keeping an undesirable crown to root ratio, the physician may prolong tooth mobility by aligning the patients' dental crowns (19). Additionally, there will be notable bone differences between healthy and periodontally unhealthy roots when teeth are aligned while the bone level is ignored. To correct the disparities, periodontal surgery might be necessary.

The posterior teeth of the periodontally healthy individual have orthodontic brackets placed on them according to the marginal ridges and cusps. However, before receiving orthodontic work, some adult patients could have marginal ridge differences brought on by unequal tooth eruption. The location of the bracket or band is chosen by the orthodontist regardless of the tooth's anatomy when there are marginal ridge inconsistencies. In these circumstances, it is crucial for the orthodontist to evaluate biting wing or periapical radiographs of these teeth to establish the interproximal bone position. If the marginal ridge disparity and the bone level are aligned in the same direction, then leveling the marginal ridges will level the bone (19). However, orthodontic treatment to repair the marginal ridge discrepancy will result in a hemiseptal defect in the bone if the bone level is flat between adjacent teeth and the marginal ridges are at considerably different levels. A periodontal pocket between the two teeth could result

from this. The orthodontist shouldn't straighten the marginal ridges if the bone is smooth and there is a disagreement in them. It might be necessary to balance the tooth's crown in certain circumstances. Class I and II furcations have benefited from regenerative therapy employing polytetrafluorethylene membranes and/or bone grafting. Nevertheless, the use of membranes in Class III furcations has not always led to desirable outcomes. For this reason, orthodontic clients with Class III furcations in the lower arch require a different type of therapy. The removal of the furcation by hemisecting the tooth's crown and root is one potential therapeutic option for a person with a Class III furcation defect who will be receiving orthodontic care. Nevertheless, endodontic, periodontal, and restorative treatment will be necessary for this operation (19).

The capacity to preserve periodontal health and the access for restoration of these neighboring teeth could be limited whenever the roots of posterior teeth are near together. The roots can be driven apart, and bone will form between the nearby roots, if the patient is receiving orthodontic treatment (19). This will improve the patient's accessibility to the interproximal area, expose the embrasure below the tooth contact, and add more bone stability. This normally enhances the region's periodontal wellbeing. The orthodontist should be informed of the plan before bracket insertion if orthodontic therapy will be employed to shift roots apart.

Certain teeth that are considered hopeless and would often be extracted before orthodontics may be present in patients with mild to advanced periodontitis. However, if the periodontal inflammation can be managed, these teeth may be beneficial as anchors for braces (19). Around the tooth that is beyond saving, periodontal surgery may be required in mild to severe situations. The preservation of the bone's health on the nearby teeth is crucial. During this approach, a strict three-month periodontal recall is essential.

Periodontal postorthodontic therapy

The patient must continue on a three-month periodontal maintenance program once orthodontic treatment is finished (20). After the release of the band, appropriate bone remodeling, the termination of mobility, and the constriction of the periodontal ligaments all need at least six months to occur. It is advised to take another pair of periapical radiographic images at this time. In order to determine the patient's additional periodontal demands, a reassessment appointment with the periodontist is arranged. Possible nominees for osseous rectification at

this stage includes sites with borderline pocket depth that should have been preserved during orthodontic therapy. Additionally, during orthodontic therapy, some regions of marginally connected gingiva may become thinner. Tissue grafting may be necessary in such regions. To perfect the occlusion and reduce any fremitus from interferences laterally, adjustments in occlusion are beneficial.

Conclusion

Due of their tremendous motivation and commitment, adults are ideal orthodontic patients. In order to effectively treat adult patients with prevailing periodontal abnormalities, orthodontics and periodontics must be combined. The cornerstone to addressing these patients is open communication before orthodontic therapy as well as discourse throughout orthodontic treatment. The constraints of orthodontic therapy should be made apparent because there may be great expectations. Although tooth movement can be delayed at first, therapy often lasts a similar amount of time since adolescents and adults adjust mentally well. Prior to starting treatment, forces must be minimal and periodontal condition should be controlled. Orthodontists should be conscious that a multidisciplinary treatment plan is customary, and that restorative treatment alone might yield speedier effects.

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Data that support the findings of this study are embedded within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

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