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Orthodontic treatment in patients with aggressive periodontitis

Cássio Volponi Carvalho,[a] Luciana Saraiva,[a] Flávio Paim Falcão Bauer,[b] Rui Yoshio Kimura,[a] Maria Luisa Silveira Souto,[a] Carlos Cheque Bernardo,[a] Cláudio Mendes Pannuti,[a] Giuseppe Alexandre Romito,[a] and Francisco Emílio Pustiglioni[a]
São Paulo, Brazil

Introduction: Aggressive periodontitis (AP) is a condition that promotes breakdown of the periodontal tissues in a short time. In severe cases, pathologic migration of teeth and tooth loss can occur, producing esthetic and functional problems for the patient. Orthodontic treatment may be recommended to restore esthetics and masticatory function. We assessed the effects of orthodontic movement in the periodontal tissues of treated patients with AP. **Methods:** Ten subjects (ages 25.0 ± 5.22 years) with AP received periodontal treatment followed by orthodontic treatment. Maintenance sessions were performed monthly under a strict dental biofilm control. They were compared with 10 periodontally healthy subjects (ages 22.9 ± 5.23 years) who received orthodontic treatment. Probing pocket depth, clinical attachment level, bleeding on probing, and dental plaque index were measured at baseline, after orthodontic treatment, and after 4 months. **Results:** Statistical analysis showed improvement in all clinical parameters between baseline and 4 months after orthodontic treatment: probing pocket depth (0.29 mm), clinical attachment level (0.38 mm), bleeding on probing (4.0%), and dental plaque index (11%). **Conclusions:** The periodontal parameters of the AP patients remained stable during orthodontic treatment under strict biofilm control. (Am J Orthod Dentofacial Orthop 2018;153:550-7)

Aggressive periodontitis (AP) is a condition that can occur in 2 forms: localized and generalized aggressive periodontitis. Each has unique clinical and laboratorial characteristics that can be easily identified. According to the consensus report of the 1999 International Workshop for the Classification of Periodontal Diseases and Conditions, common characteristics of both forms include rapid attachment loss and bone destruction, presence of amounts of microbial deposits inconsistent with the severity of the periodontal tissue destruction, and familial aggregation.[1] Subgingival sites of compromised teeth can show higher levels of *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis*, *Treponema denticola*, and *Tannerella forsythia* among others.[2]

Some studies have observed higher prevalences of AP (1%-5%) in African populations and their descendants.[3] The prevalence in white people is between 0.15% and 0.5%. In North America, AP affects approximately 0.1% to 0.2% of white people, 0.5 to 1.05% of Hispanic people, and 2.6% of African descendants.[4] In Asian populations, the prevalence is between 0.2% and 1.0%.[4,5] In Brazil, the prevalence varies between 0.3% and 5.5%.[5-8]

Due to extensive bone loss, AP can lead to premature tooth loss.[9] This fact, combined with pathologic migration and tooth malpositions, makes prosthetic rehabilitation of these patients difficult. Pathologic migration is defined as a change in tooth position resulting from disruption of the forces that maintain the teeth in a normal position, with reference to the skull.[10] The clinical manifestations of this condition are diastema, rotation, extrusion, and proclination, which are found in 30% to 50% of patients with moderate to severe periodontitis.[11,12] Moreover, many patients seek treatment because of tooth migration. Its treatment needs a team approach that starts with periodontal treatment and can be combined with orthodontic movements.[13]

Orthodontic treatment can be used as an adjunct in the therapeutic arsenal of AP.[14-20] When properly used, orthodontic treatment can improve tooth positions, creating access for oral hygiene and altering occlusal factors.[21] On the other hand, it can lead to additional attachment loss with plaque and gingival inflammation.[22] Additional attachment loss can be prevented

[a]Division of Periodontics, School of Dentistry, University of São Paulo, São Paulo, Brazil.
[b]Private practice, São Paulo, Brazil.
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Address correspondence to: Luciana Saraiva, Division of Periodontics, University of São Paulo, Prof. Lineu Prestes Avenue, 2227, São Paulo 05508-000, SP, Brazil; e-mail, lusaraiva@usp.br.
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in orthodontic patients with previous periodontal disease. Strict biofilm control and periodontal maintenance are essential in the active phase of orthodontic treatment, both aiming to maintain the gingival tissues free of inflammation.[19,23] Also, orthodontic forces must be carefully applied in teeth with a reduced periodontium.[21,24]

Earlier reports stated that only teeth without alveolar bone loss could be orthodontically moved to correct the spaces left by extractions.[25,26] However, some authors have shown that even teeth with more than 50% of bone loss can be orthodontically treated after nonsurgical periodontal treatment if strict monitoring and control of risk factors, including dental biofilm, are performed.[14,16,23]

The literature regarding orthodontic treatment in subjects with periodontal disease is represented mostly by clinical cases in which the subjects had chronic periodontitis.[27-31] Few studies have assessed the feasibility and security of orthodontic treatment in subjects with AP.[14,16-18,32,33] Therefore, the aim of our study was to investigate the effect of orthodontic treatment on the clinical parameters of AP subjects.

MATERIAL AND METHODS

The study was approved by the institutional review board of the University of São Paulo, São Paulo, Brazil (protocol 161/05). Subjects with AP were selected from patients who participated in a previous study and were interested in correct pathologic tooth migration with orthodontic treatment.[34] AP was defined according to the clinical criteria established by the 1999 International Workshop for the Classification of Periodontal Diseases and Conditions.[35] The AP subjects were compared with 10 periodontally healthy subjects (control group), according to the following criteria: sites with probing pocket depth (PPD) and clinical attachment level (CAL) measurements less than 3 mm, less then 10% of sites exhibiting bleeding on probing (BoP), no extensive caries lesions or restorations, and at least 24 permanent teeth. The control group's participants were consecutively selected from periodontally healthy patients who were treated at School of Dentistry, University of São Paulo, São Paulo, Brazil and desired orthodontic treatment. We selected control patients who needed the same orthodontic movement as did the AP patients (intrusion and alignment).

The exclusion criteria for all groups included pregnant or nursing women, smokers, and patients with systemic diseases or using medications that could affect the periodontium.

Before orthodontic treatment, all AP patients received periodontal mechanical debridement (6-8 sessions of scaling, root planing, and oral hygiene instructions). Forty-five days after the nonsurgical periodontal treatment, the patients were reevaluated, and subgingival debridement with an ultrasonic device was performed. In this second phase, adjunctive antibiotics (250 mg of metronidazole and 500 mg of amoxicillin, 3 times daily for 7 days) were prescribed.[34] Surgical complementation (open full-thickness flap) was done according to individual needs, aiming to reduce deep periodontal pockets and gain access to infrabony defects. No regenerative procedures were performed. All AP patients were in a strict periodontal maintenance program before orthodontic treatment.

In the control group, the subjects did not have periodontal disease. Thus, they received supragingival scaling, oral prophylaxis, and oral hygiene instructions.

For the periodontal examination, periapical radiographs were taken, and bone loss was calculated. Plaque index (PI),[36] BoP (0/1),[37] PPD, and CAL were measured at 6 sites per tooth in all teeth (excluding third molars) (Florida Probe System; Florida Probe, Gainesville, Fla). Variables were assessed after the periodontal treatment and before the orthodontic treatment (baseline, T0), immediately after the orthodontic treatment (T1), and 4 months after the end of orthodontic treatment (T2). A trained examiner (C.C.B.) made all measurements. Examiner training and alignment were performed before and during the study. Measurement reproducibility was calculated by intraclass correlation coefficients for the following variables: distance from the cementoenamel junction to the gingival margin (CEJ-GM) and PPD in 2 examinations in 6 volunteers. A total of 810 sites were examined twice. The intraclass correlation coefficient values for PPD and CEJ-GM were 0.928 and 0.975 before the study and 0.746 and 0.949 during the study.

After the periodontal phase, orthodontic treatment was carried out for intrusion and alignment of teeth. Orthodontic treatment objectives for both groups were to improve masticatory function and esthetics by intruding, realigning, and closing diastemas of the teeth.

Standard edgewise appliances with a 0.022-in slot were placed. After placement of the brackets, an initial nickel-titanium orthodontic wire (0.014 in) was inserted and attached to the brackets by means of elastomeric ligatures, followed by a 0.016-in nickel-titanium reverse-curve archwire. By the third month, the incisors were already leveled with a 0.016-in round stainless steel archwire. The alignment proceeded until a 0.016 $\times$ 0.022-in rectangular archwire was placed to close the spaces. A vacuum-formed retainer (1 mm) used during the night was prescribed.

During the orthodontic treatment, the patients of both groups received periodontal maintenance monthly