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# Decision making in the treatment of patients with malocclusion and chronic periodontitis: Scientific evidence and clinical experience

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**With a marked increase in the number of adult patients seeking corrective orthodontic care and the high prevalence of destructive periodontal diseases in the adult population in the United States, the importance of addressing inflammatory periodontal diseases in patients receiving treatment for malocclusion is critical and timely. Control of initiating etiologic factors should be a preface to corrective orthodontic treatment of patients with inflammatory periodontal disease. Once these factors have been controlled, the progression of treatment should be based upon the stability of the periodontal attachment apparatus, the severity and bony morphology associated with destructive periodontal disease, and the nature of the orthodontic tooth movement inform the treatment sequence for patients with malocclusion and concomitant periodontal disease. In the presence of horizontal bone loss, elimination of periodontal pockets and other clinical signs of inflammation would allow for immediate progression to corrective orthodontic therapy. Reevaluation of periodontal conditions after orthodontic tooth movement may then be followed by definitive periodontal care based upon clinical findings. Pre-orthodontic surgical periodontal therapy is appropriate to control periodontal inflammation and/or address deep periodontal defects that may compromise periodontal stability during orthodontic intervention. Periodontal maintenance therapy during active orthodontic treatment and post-treatment is critical to long-term maintenance of orthodontic results and periodontal health. A staged, interdisciplinary approach can most adequately treat patients to achieve optimal esthetics, function, and oral health. (Semin Orthod 2014; 20:170–176.) © 2014 Elsevier Inc. All rights reserved.**

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*Findings: The severity and morphology of periodontal attachment loss as well as the nature of the orthodontic tooth movement should be considered when determining the proper treatment sequence and procedures to be performed for patients with both malocclusion and periodontal diseases.*

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## Background

With recent evidence indicating that up to 50% of American adults have chronic periodontitis<sup>1</sup> and an increasing demand for orthodontic treatment in esthetic-conscious adults,<sup>2,3</sup> it is important to identify and properly treat patients with periodontitis who are undergoing orthodontic therapy. Previous reports have indicated that in the presence of plaque and gingival inflammation, orthodontic tooth movement can result in further periodontal disease progression and attachment loss.<sup>4,5</sup> Much evidence supports the need for treatment of active periodontal disease prior to initiation of orthodontic tooth movement<sup>6,7</sup> and the control of plaque levels during orthodontic

therapy in periodontally susceptible patients.<sup>8</sup> The adjunctive use of orthodontic tooth movement to correct periodontal infrabony defects has been demonstrated<sup>9,10</sup> but may not be applicable in all cases. It is thus of critical importance to select a predictable treatment sequence for the adult perio-ortho patient to allow for treatment and resolution of periodontal inflammation while minimizing treatment time and surgical intervention and optimizing oral health and esthetics. A careful evaluation of the following factors is necessary: (1) patient's overall health status and periodontal susceptibility, (2) periodontal diagnosis, (3) malocclusion classification, (4) periodontal bone loss pattern, (5) periodontal biotype, and (6) oral hygiene levels.

### **Factors affecting orthodontic and periodontal treatment outcomes**

In clinical practice, achieving optimal oral health and esthetic results is dependent upon many patient and treatment factors.

#### ***Periodontal conditions***

In patients without periodontal disease who demonstrate good oral hygiene, including patients with a reduced but healthy periodontium, proper orthodontic treatment caused no significant long-term effects on periodontal attachment levels and bone levels.<sup>4,11-14</sup> Conversely, in patients with clinical signs of active periodontal disease (i.e., deep PD, BoP, and presence of subgingival plaque), orthodontic tooth movements can accelerate the disease process, even in the presence of good oral hygiene.<sup>6,13,14</sup> It has also been well established that certain systemic conditions and findings are risk factors for disease progression, including: psychosocial stress,<sup>15</sup> tobacco use,<sup>15-17</sup> systemic immune deficiencies,<sup>18</sup> diabetes mellitus,<sup>19</sup> osteoporosis,<sup>20</sup> certain autoimmune disorders,<sup>21,22</sup> and the presence of putative periodontal pathogens.<sup>23-25</sup>

#### ***Periodontal disease severity***

Periodontal disease progresses very differently in individual patients. Even in the absence of dental care, patients demonstrate various patterns and rapidity of bone loss.<sup>26</sup> In addition, individual tooth sites may be more at risk for attachment loss based upon clinical findings and anatomical

considerations,<sup>27</sup> and tooth mortality is associated with clinical attachment loss, tooth type, and overall periodontal health of the dentition.<sup>28,29</sup>

#### ***Malocclusion***

Depending on the diagnosed malocclusion, differing orthodontic strategies can be utilized to achieve optimal results. Teeth that have periodontal bone loss have a more apical center of resistance than those with a healthy periodontium. Furthermore, the distance between the center of resistance and the alveolar bone crest is smaller than that of a tooth with a healthy periodontium. Therefore, teeth with periodontal bone loss are more prone to tipping than bodily movement, and the moment-to-force values at the bracket level should be increased in order to achieve translation.<sup>30,31</sup> Extraction of severely periodontally involved teeth and tooth movement to treat crowding can yield vast improvements in oral hygiene.<sup>10</sup> Crowding alone has been reported to increase the risk for gingivitis, independently from plaque levels.<sup>32</sup> In addition, while tooth rotation can be accomplished fairly easily, it can be difficult to maintain due to the slower turnover of the supra-alveolar periodontal and gingival fiber bundles as compared to the periodontal ligament (PDL) fibers.<sup>33,34</sup> Severing these fibers to allow for rearrangement has been accomplished with supracrestal fiberotomy procedures, which have demonstrated a greater reduction in pure rotational relapse in the maxilla than in the mandible.<sup>35</sup> As definitive periodontal surgery would also sever these fibers, this may be an additional adjunctive benefit of surgical treatment performed after orthodontic tooth movement.

#### ***Periodontal bone loss pattern***

Orthodontic movement of teeth into plaque-induced infrabony pockets has been demonstrated to be possible if the active periodontal disease has been arrested.<sup>13</sup> In addition, extrusive tooth movement can be used to yield coronal positioning of connective tissue attachment and shallowing of one- and two-walled infrabony defects.<sup>36-38</sup> On the other hand, intrusion has been shown to improve the periodontal condition of healthy reduced periodontal tissues when oral hygiene and the orthodontic forces are optimal.<sup>39,40</sup> Therefore, definitive guided tissue regeneration and/or osseous surgery in areas with vertical defects may be best treated after

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