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**Jesús Israel Rodríguez-Pulido**  
Graduate Periodontics Program,  
School of Dentistry, Universidad  
Autónoma de Nuevo León,  
Monterrey, Nuevo León, México

**Minerva Olga Villarreal-Guerra**  
Graduate Periodontics Program,  
School of Dentistry, Universidad  
Autónoma de Nuevo León,  
Monterrey, Nuevo León, México

**Gloria Martínez-Sandoval**  
Graduate Periodontics Program,  
School of Dentistry, Universidad  
Autónoma de Nuevo León,  
Monterrey, Nuevo León, México

**Marianela Garza-Enríquez**  
Graduate Periodontics Program,  
School of Dentistry, Universidad  
Autónoma de Nuevo León,  
Monterrey, Nuevo León, México

**María Argelia Akemi Nakagoshi-Cepeda**  
Histology Department, School of  
Dentistry, Universidad  
Autónoma de Nuevo León,  
Monterrey, Nuevo León, México

#### Correspondence

**Jesús Israel Rodríguez-Pulido**  
Graduate Periodontics Program,  
School of Dentistry, Universidad  
Autónoma de Nuevo León,  
Monterrey, Nuevo León, México  
Jaipur, Rajasthan, India

## Orthodontic treatment in the periodontally compromised patient: A case report

**Jesús Israel Rodríguez-Pulido, Minerva Olga Villarreal-Guerra, Gloria Martínez-Sandoval, Marianela Garza-Enríquez and María Argelia Akemi Nakagoshi-Cepeda**

### Abstract

The orthodontic treatment provides beneficial changes in the bone topography, since moving a tooth towards an intraosseous defect helps its elimination, it can also intrude and reposition pathologically migrated teeth.

**Case report:** A 49-year-old female patient diagnosed with generalized moderate chronic periodontitis, secondary occlusal trauma and pathological migration, treated with non-surgical and surgical periodontal therapy and orthodontic treatment, obtaining a gain of clinical attachment level and remission of the periodontal pockets.

**Conclusion:** The interdisciplinary relationship between periodontics and orthodontics is necessary in cases where the periodontally compromised patient presents malocclusion and occlusal trauma, where the treatment of one discipline facilitates the work of the other, benefiting the patient's oral conditions. It is important that orthodontic planning be carried out prior to periodontal therapy to get a long-term successful treatment.

**Keywords:** Periodontitis, orthodontics, periodontal treatment, periodontal maintenance

### 1. Introduction

Periodontal disease is a multifactorial inflammatory disease of supporting periodontal tissues, caused by the extension of bacterial infection into the subgingival space [1].

The intention of periodontal therapy consists in the reduction or elimination of the bacterial load, by removing dentobacterial plaque and calculus, being the most effective treatment mechanical debridement by non-surgical methods [2].

However, it has been proven that periodontal scaling and root planning alone may not be enough to eliminate subgingival flora located in inaccessible areas and areas that are difficult to clean by non-surgical methods [3], so surgical periodontal treatment is necessary when periodontal pockets persist [4].

One of the objectives of orthodontic treatment is to contribute to a better oral hygiene, correcting dental irregularities and removing dental trauma [5]. Orthodontic treatment provides beneficial changes in bone topography since moving a tooth towards an intraosseous defect helps its elimination, and it can also intrude and reposition pathologically migrated teeth [6].

The purpose of this report was to describe an approach to diagnose and effectively treat a patient with generalized moderate chronic periodontitis, secondary occlusal trauma and pathological migration, treated with non-surgical and surgical periodontal therapy and orthodontic treatment.

### 2. Case Report

A 49-year-old female patient attended at Graduate Periodontics Program, School of Dentistry, Universidad Autónoma de Nuevo León, with the main complaint: "I have a tooth that has been moving". In the clinical history, the patient reported not being under any medical treatment; however, she mentions being allergic to amoxicillin, which is why it was classified as ASA II [7].

In her dental history, the patient presents amalgam and resin fillings in the posterior segment of both arches and mentions the extraction of 2.5 and 3.7 approximately three years ago. In the intraoral clinical examination the patient presented dentobacterial plaque and calculus, gingival inflammation, probing depth (PD) of 5 to 7 mm located in the posterior segment of both arches with bleeding on probing and periodontal pockets of 7 mm in mesial of piece 1.2

With exudate purulent. She also presented dental caries and fracture in 1.7, malocclusion and extrusion of 2.7 and lower premolars (Fig. 1).

In the radiographic analysis, generalized moderate horizontal bone loss was found and advanced in 1.7, and also a vertical defect in 1.2, furcation involvement in 3.6 and 4.6, and the presence of 2.8 above the apex of 2.7 (Fig. 2). Due to the clinical and radiographic findings, it was diagnosed as generalized moderate chronic periodontitis and advanced localized in 1.7, mucogingival deformities around teeth: Miller's Class I gingival recession in 2.2 and 2.3, and Class IV in 2.4, periodontal abscess in 1.2 with pathological migration, and the presence of secondary occlusal trauma<sup>[8]</sup>.

After the diagnosis, the hygienic phase was carried out, which consisted in scaling and root planning, with the instruction of oral physiotherapy with soft bristle brush (modified Stillman technique), dental floss and interproximal brush. Due to the periodontal abscess, 500 mg azithromycin was prescribed every 24 hours for three days. During this phase the dental extraction of 1.7 and 1.8 was indicated, in addition a consultation was made with maxillofacial surgery department, where extraction of 2.7 and 2.8 was indicated, however the patient did not accept the extraction, so they were preserved.

Subsequently, the patient was re-evaluated four weeks later, where loss of clinical attachment level (CAL) and PD  $\geq 6$  mm generalized in the posterior area of both arches was found, and also the presence of calculus in the lower incisors, so scaling was performed and oral physiotherapy was reinforced. Due to the presence of periodontal defects, an open flap debridement (OFD) were indicated, and also scaling and root planning of 1.2 was repeated to see if the periodontal pockets were removed to avoid losing CAL in that area with a OFD (Fig. 3).

The OFDs were made by intrasulcular incisions and reflected to full thickness, it was debrided and performed scaling and root planning, rinsed with sterile saline and then sutures were placed with 4-0 black silk. The flap was made from a distal line angle of 2.7 to the mesial line angle of 2.6 with distal wedge, where external horizontal mattress sutures were placed (Fig. 4), in quadrant III from distal line angle of 3.6 was made up to mesial line angle of 3.4 with distal wedge, where it was sutured with vertical and horizontal external mattress sutures (Fig. 5), and in quadrant IV it was made from distal line angle of 4.7 to mesial line angle of 4.3, where due to bone defects osteoplasty was performed and sutured with external horizontal mattresses (Fig. 6).

Four weeks later, the patient was re-evaluated, where remission of the periodontal pockets was found, so the consultation with orthodontics was made to align and improve the occlusion and maintain the space of 2.5 for the placement of a dental implant at the end of the orthodontic treatment. Because the patient presented dental hypersensitivity and also during planning the orthodontic movements, the upper incisors will be vestibularized, it was decided to perform a coronal advanced flap with connective tissue graft (CAF + CTG) to treat recessions of 2.2 and 2.3 using the surgical papilla technique<sup>[9]</sup>. Prior to the incisions, scaling and root planning were performed, then intrasulcular incisions from distal line angle of 2.3 were made up to the mesial line angle of 2.1, the flap was reflected to partial thickness, and the papillae were de-epithelialized, a 10x7 mm graft was placed in the recipient site and sutured by simple sutures with 5-0 chromic catgut, the flap was sutured coronally by suspensory sutures with 4-0 vicryl (Fig. 7).

Six weeks later, a CAL gain was seen in 2.2 and 2.3 and

stability in PD and dentobacterial plaque control was found, so it was indicated to place the orthodontic treatment (Fig. 8).

### 2.1 Postoperative indications

During the OFD and CAF + CTG, 400 mg of ibuprofen was prescribed every 6 hours for 5 days and 0.12% chlorhexidine gluconate twice a day for two weeks. In OFD sutures were removed after seven days, and in CAF + CTG after fifteen days.

Periodontal maintenance was performed every three months, where stability in periodontal parameters was found 12 months later (Fig. 9).

### 3. Discussion

It has been suggested that in periodontally compromised patient who will undergo orthodontic treatment, bone surgery should not be performed during the surgical phase to conserve bone tissue as possible, however it is acceptable to perform osteoplasty and osteotomy if the periodontal defects require it<sup>[10]</sup>.

Pathological migration is defined as a change in tooth position, resulting from the interruption of forces that keep the teeth in a normal position with reference to the skull, which has a prevalence of 45.09% in the lateral incisors<sup>[11]</sup>, so orthodontic treatment has been recommended as corrective therapy, since the formation of new cement and the insertion of collagen during orthodontic intrusion have been observed, if good oral hygiene is maintained<sup>[12]</sup>.

Orthodontic treatment has been related to gingival recessions, especially in situations where there is no keratinized gingiva or when during the treatment an expansion of the arch is made or the teeth are vestibularized<sup>[13]</sup>. In the present case, the decision was made to perform a CAF + CTG in 2.2 and 2.3 because the orthodontic treatment plan, and also some authors have indicated a CAF when the patient has dental hypersensitivity caused by a gingival recession<sup>[14, 15]</sup>.

Dentobacterial plaque control is the key in the success of oral health that is why it should be aware in the orthodontic patient about periodontal health through a good brushing technique<sup>[16]</sup>. The effect of the techniques of horizontal brushing, modified Stillman technique and Bass technique in the orthodontic patient was evaluated, where in a period of 9 months improvement in plaque index and gingival index was found, however the technique of Bass showed a significant reduction in the gingival index<sup>[17]</sup>.

### 3.1 Figures



Fig 1: Initial Clinical Photographs.

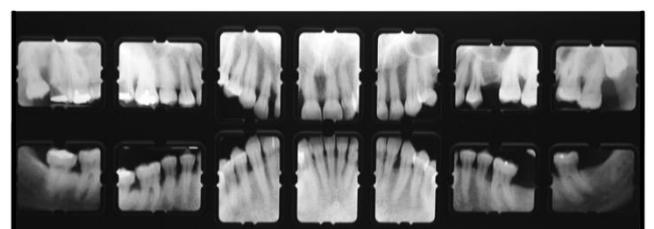
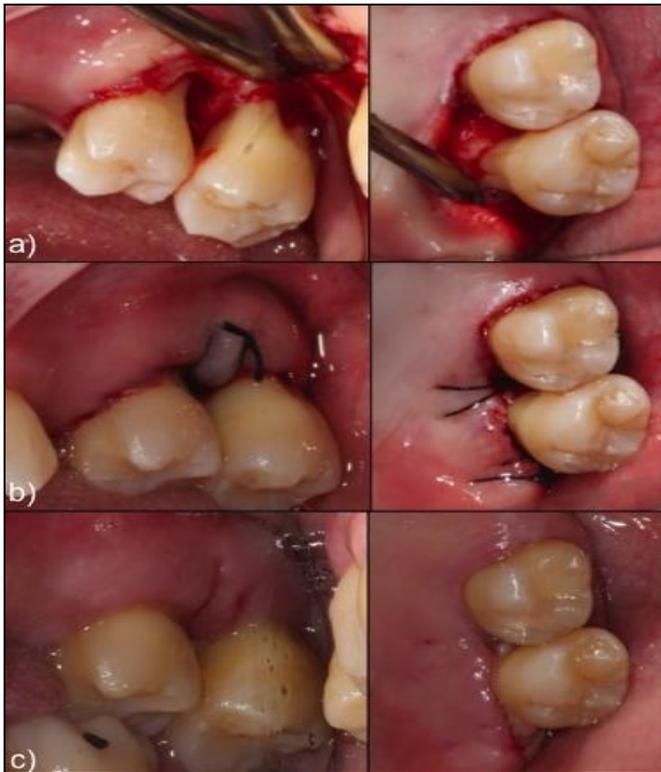


Fig 2: Periapical radiographs.



**Fig 3:** Reevaluation four weeks after the hygienic phase.



**Fig 4:** OFD of 2.6 and 2.7. a) Debridement, b) External horizontal mattress sutures, c) Healing after 7 days.



**Fig 5:** OFD of quadrant III. a) Incisions, b) Debridement, c) Sutures with external vertical and horizontal mattresses.



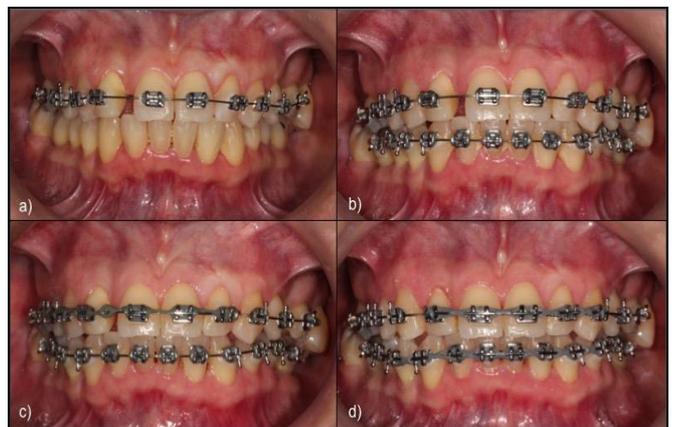
**Fig 6:** OFD of quadrant IV. a) Debridement, b) Osteoplasty, c) External horizontal mattress sutures.



**Fig 7:** CAF + ITC of 2.2 and 2.3. a) Incisions, b) De-epithelialized of papillae, c) Graft sutured, d) Suture of the pedicle.



**Fig 8:** Reevaluation six weeks after the surgical phase.



**Fig 9:** Periodontal maintenance phase. a) 3 months, b) 6 months, c) 9 months, d) 12 months.

#### 4. Conclusions

The interaction between the different specialties in dentistry is very important, especially in establishing diagnosis and treatment planning. Certainly, the interdisciplinary relationship between periodontics and orthodontics is necessary in cases where the periodontally compromised patient presents malocclusion and occlusal trauma, where the treatment of one discipline facilitates the work of the other, benefiting the patient's oral conditions. The success of the treatment is based on the constant communication between the periodontist and the orthodontist, as well as the active cooperation of the patient.

#### 5. Acknowledgments

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