



# Accelerated orthodontic treatment in a patient with reduced periodontal tissue. Case report

## *Tratamiento de ortodoncia acelerada en paciente con tejidos periodontales reducidos. Caso clínico*

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### ABSTRACT

Orthodontic treatment in a patient that suffered periodontitis and as a result has a reduced periodontium often requires a combination of several surgical techniques as well as interdisciplinary treatments aimed at achieving optimum results. **Objective:** To present a treatment with accelerated orthodontics in a patient with severe malocclusion, periodontitis and reduced periodontium to achieve orthodontic treatment success in lesser time and with minimum alteration of periodontal tissues. **Methodology:** 41 year old female patient, dolichofacial, with a skeletal class II malocclusion, molar class II, canine class II, spacing, convex profile, incompetent lips, gummy smile, and advanced periodontal loss. Initial orthodontic-periodontal treatment was followed by corticotomy. Periodontal treatment consisted in root planning and scaling as well as oral hygiene instructions. 0.018-slot Roth prescription fixed appliances were placed in both arches without extractions. **Results:** At the end of treatment esthetic, occlusal and functional results were achieved. **Conclusions:** Periodontally compromised patients can be successfully treated by correcting malocclusion when an interdisciplinary approach is used.

**Key words:** Accelerated orthodontics, reduced periodontal tissue.  
**Palabras clave:** Ortodoncia acelerada, periodonto reducido.

### RESUMEN

El tratamiento de ortodoncia en un paciente con periodontitis y periodonto reducido, generalmente requiere la combinación de distintas técnicas quirúrgicas y tratamientos interdisciplinarios con el fin de obtener resultados óptimos. **Objetivo:** Presentar el tratamiento de ortodoncia acelerada en paciente con maloclusión severa, periodontitis y periodonto reducido para el éxito en el tratamiento ortodóncico, en un menor tiempo y con mínima alteración en los tejidos periodontales. **Metodología:** Paciente femenina de 41 años de edad, dolicocefalica, que presenta maloclusión clase II esquelética, clase II molar y clase II canina, diastemas, perfil convexo, incompetencia labial, sonrisa gingival y tejidos periodontales disminuidos. El tratamiento inicial fue ortodóncico-periodontal, seguido por corticotomías. El tratamiento periodontal consistió en raspado y alisado radicular e instrucciones de higiene. Colocación de aparatología fija prescripción Roth, slot .018 en ambas arcos sin extracciones. **Resultados:** Al término del tratamiento se lograron resultados estéticos, oclusales y funcionales. **Conclusiones:** Los pacientes comprometidos periodontalmente pueden tratarse satisfactoriamente corrigiendo la maloclusión cuando se utiliza un enfoque interdisciplinario.

### INTRODUCTION

The need to speed up orthodontic treatment to fulfill the patient's expectations resulted in the combination of orthodontic treatment with a surgical procedure. Corticotomy was introduced as a supplementary technique for orthodontic therapy to achieve accelerated tooth movements with minimal surgical intervention. It reduces treatment time by eliminating the resistance offered by dense cortical bone to traditional orthodontic movement and decreases root resorption and damage to the periodontal ligament.<sup>1,2</sup>

Conventionally, periodontal therapy in adult patients with reduced periodontium and orthodontic involvement translates into prolonged treatments or may involve a financial commitment that the patient is not able to afford. Additionally treatment results

are unpredictable because the bone behavior may vary, and cause a failure or a relative success which causes the patients to be reluctant to accept long-term treatments. An alternative to orthodontic treatment in patients with a reduced or a healthy periodontium is orthodontic microsurgery or corticotomy.<sup>3,4</sup>

Corticotomy for orthodontic treatment may be considered as an intermediate therapy between orthognathic surgery and conventional orthodontics<sup>5</sup>

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which is characterized by a biological mechanism based on the regional acceleration phenomenon or RAP by its acronym. In 1983, frost showed that harmful regional stimuli of sufficient magnitude may give rise to a sharply accelerated activity and reorganization in the bony and soft tissue. He called this cascade of physiological healing processes RAP. This phenomenon is characterized by an activation of the localized remodeling process which accelerates healing especially after surgery with damage to cortical bone. This surgical injury is a factor of reinforcement for the induction of RAP.<sup>6</sup>

The surgical techniques for accelerated orthodontics are divided into corticotomy or decortication and osteotomy. Corticotomy is a surgical technique in which only the cortical bone is cut, drilled, or mechanically altered until bone marrow is reached and remains intact. On the contrary, an osteotomy consists in performing surgical incisions through the cortical up until bone marrow and is usually the formation or separation of a new bone segment.<sup>7</sup>

The benefits of corticotomy in comparison with conventional orthodontics are:

1. Wider application in the treatment of malocclusions (reduction of the limits of dental movement and less need for extractions).
2. Decrease in treatment time.
3. Increase in alveolar volume and more maintenance of the periodontal structures (correction of preexisting bone fenestrations and dehiscences, with the use of bone grafts).
4. Alveolar remodeling for the improvement of the patient's profile when required.
5. Simultaneous use with other procedures (impacted teeth).<sup>8</sup>

## MATERIALS AND METHODS

### Case report

Female patient of 41 years of age, systemically sane referred of the Department of Periodontics DEPEL of FO UNAM with diagnosis of widespread severe chronic periodontitis. The reason for the query is «I want to see if I can do without my teeth». There was a clinical assessment (*Figure 1*) and requested diagnostic aids including study



**Figure 1.**

Pre-treatment photographs.

models (Figure 2), panoramic X-ray and lateral skull (Figure 3).

### DIAGNOSIS

Female patient, 41 years of age, dolichofacial, convex profile, skeletal class II, bilateral molar and canine class II, proclination and protrusion of upper incisors, spacing, lip incompetence, gingival smile, and periodontal involvement.



Figure 2. Initial models.

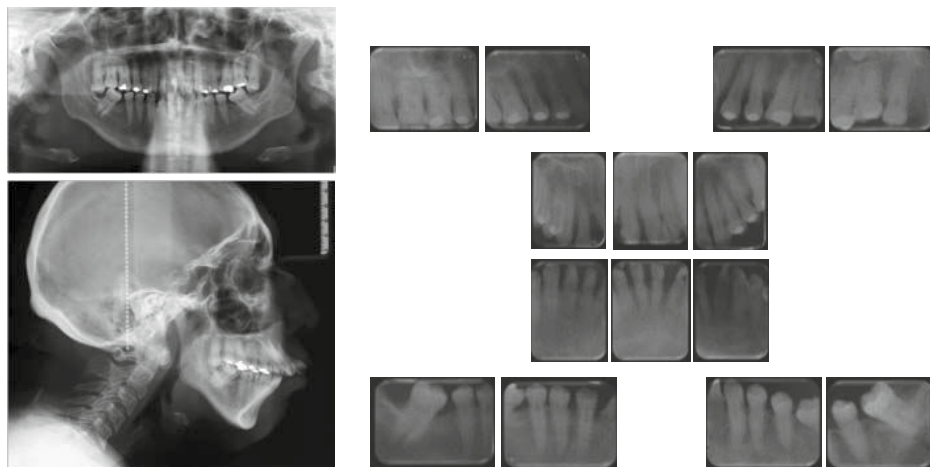


Figure 3.

Initial radiographs.

### TREATMENT PLAN

Orthodontic treatment with accelerated corticotomy, no extractions and 0.018" Roth fixed appliances was suggested.

Interconsultation with the Department of Periodontics was conducted and conventional phase I periodontal treatment that included personal plaque control, elimination of calculus, dental polishing, root scaling and planning of the periodontally involved teeth and extractions of dental organs number 18 and 28 was carried out. Once periodontal reassessment was performed the surgery was scheduled.

Corticotomy was then performed with a piezoelectric scalpel in D.O. #17-27 and two weeks later, it was performed in the lower arch, in dental organs #37-47 (Figure 4). Prior to the corticotomy 0.018" Roth fixed appliances were placed in the lower teeth.

- Phase I: alignment and leveling.  
0.012" NiTi to 0.016" SS
- Phase II: coordination 2nd and 3rd order movements.  
0.016" x 0.016" NiTi to 0.016" x .022" NiTi



Figure 4.

Corticotomies.

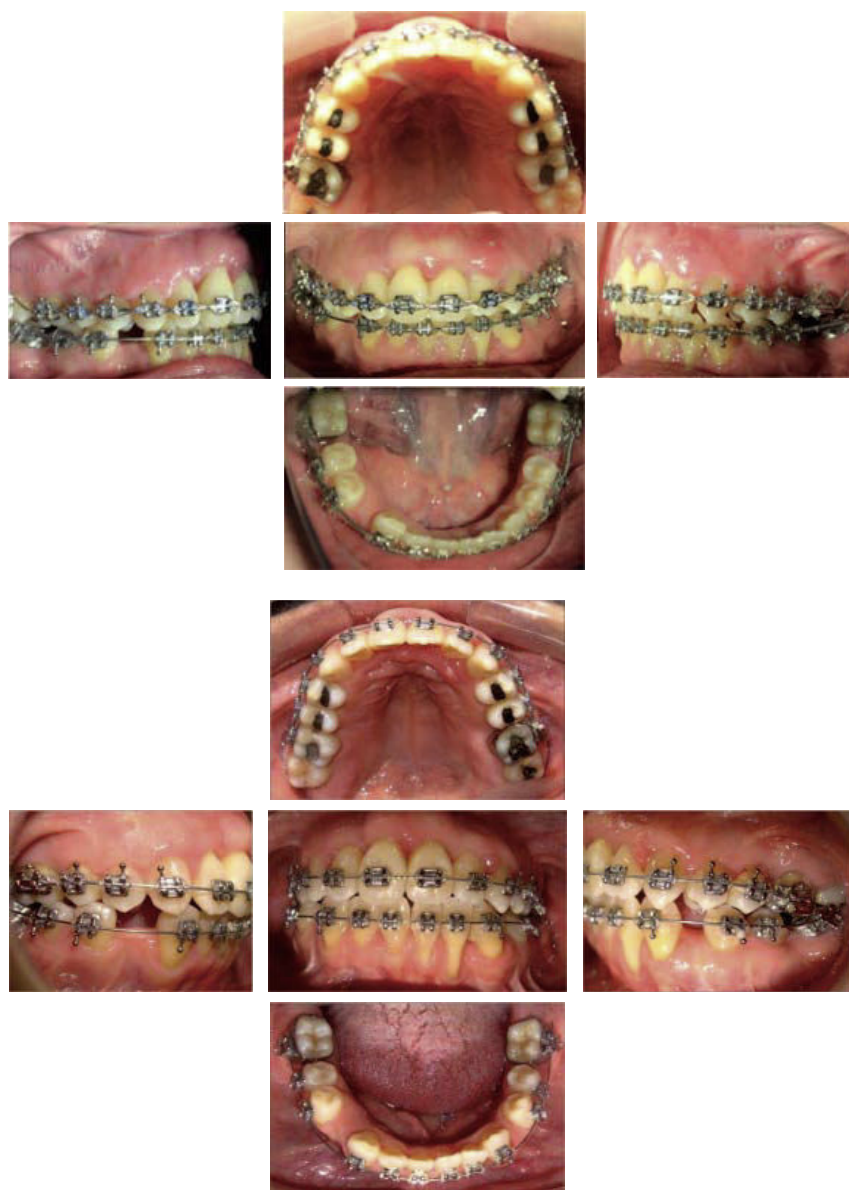


Figure 5.

Treatment.

- Phase III: consolidation and stabilization.  
0.016" x 0.022" SS
- Retention.

### TREATMENT

In accordance with the arch sequence established in the treatment plan, orthodontic treatment was carried out. For space closure open coils, elastic thread and closed and intermediate elastic chains were used. Contraction loops and 1/4" medium class II elastics were also used (Figure 5). Treatment time was 41 months and finally labial upper and lower fixed retainers were placed and lingual with 0.014" SS wire (Figure 6).

### RESULTS

At the end of the treatment, aesthetic, functional and occlusal results were achieved (Figures 7 to 10). The patient did not refer any TMJ symptomatology. Emphasis was made on the importance of continuing follow-up appointments at the Department of Periodontics to ensure periodontal health and orthodontic treatment stability with the necessary care of the retainers.

### DISCUSSION

Vercellotti in 2007 suggested piezoelectric corticotomy.<sup>4,9</sup> In 2009 Dibart published a less



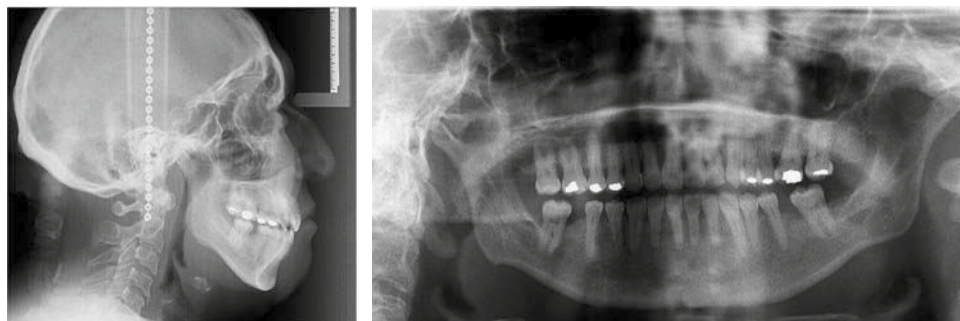


**Figure 6.**

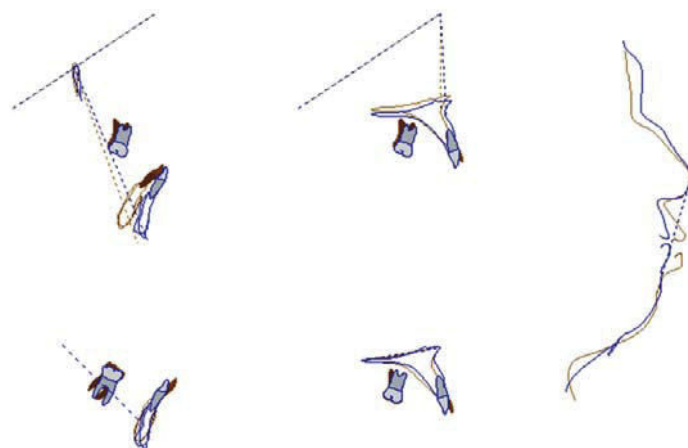
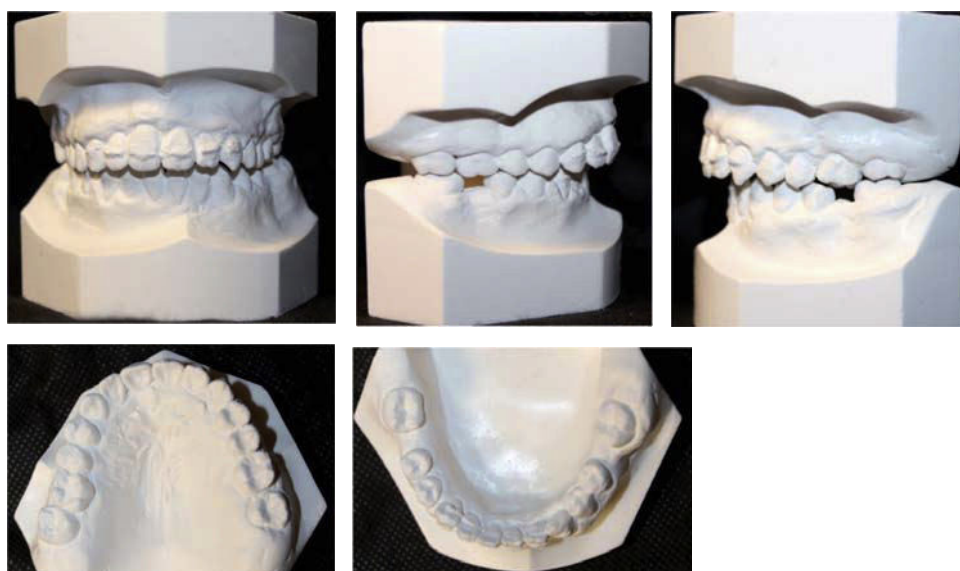
Fixed retainers.



**Figure 7.** Final photographs.

**Figure 8.**

Final radiographs.

**Figure 9.**

Final models and superimposition.

invasive transmucosal corticotomy technique called Piezocision.<sup>10</sup> The authors mentioned a 60 to 70% treatment time reduction in comparison with traditional orthodontics. It is a physiological treatment based on the regional acceleration phenomenon and the maintenance of an adequate blood supply which is essential. This procedure is an alternative for adult

patients with reduced periodontium and/or young patients with a complete periodontium.<sup>11</sup>

### CONCLUSIONS

Periodontally compromised patients can be treated successfully correcting their malocclusion when an

**Figure 10.**

Initial and final photographs.



interdisciplinary approach is used. The corticotomy procedure in this case reduced orthodontic treatment time with minimal trauma to the tissues despite the fact that the periodontium was reduced. The results obtained in this case indicate that there are no adverse effects in the periodontium and this is clinically evident. Corticotomies provided efficiency and stability in orthodontic movements thus significantly avoiding root resorption.

## REFERENCES

1. Labanca M, Azzola F, Vinci R, Rodella LF. Piezoelectric surgery: twenty years of use British. *Journal of Oral and Maxillofacial Surgery*. 2008; 46: 265-269.
2. Sohn D, Ahn M, Lee W, Yeo D, Lim S. Piezoelectric osteotomy for intraoral harvesting of bone blocks. *J Periodontics Restorative Dent*. 2007; 27: 127-131.
3. Zachrisson BU. *Tooth movements in the periodontally compromised patient*. In: Lindhe J, Karring T, Lang NP, editors. *Clinical periodontology and implant dentistry*. 5th edition. Oxford: Blackwell Munksgaard; 2008: pp. 1241-1279.
4. Vercellotti T, Podesta A. Orthodontic microsurgery: a new surgically guided techniques for dental movement. *Int J Periodontics Restorative Dent*. 2007; 27: 325-331.
5. Köle H. Surgical operations on the alveolar ridge to correct occlusal abnormalities. *Oral Surgery Oral Medicine and Oral Pathology*. 1959; 12: 515-529.
6. Gantes B, Rathbun E, Anholm M. Effects on the periodontium following corticotomy facilitated orthodontics. Case reports. *J Periodontol*. 1990; 61: 234-238.
7. Kim S, Park Y, Kang S. Effects of cortisone on periodontal remodeling in orthodontic tooth movement. *Angle Orthod*. 2009; 79: 284-291.
8. Roblee RD, Bolding SL, Landers JM. Surgically facilitated orthodontic therapy: a new tool for optimal interdisciplinary results. *Compend Contin Educ Dent*. 2009; 30 (5): 264-275.
9. Wilcko MT, Wilcko WM, Pulver JJ, Bissada NF, Bouquot JE. Accelerated osteogenic orthodontics technique: a 1 stage surgically facilitated rapid orthodontic technique with alveolar augmentation American Association of Oral and Maxillofacial Surgeons. *J Oral Maxillofac Surg*. 2009; 67: 2149-2159.
10. Dibart S, Sebaoun JD, Surmenian J. Piezocision: a minimally invasive periodontally accelerated orthodontic tooth movement procedure. *Compend Contin Educ Dent*. 2009; 30 (6): 342-344, 346, 348-3450.
11. Horton JE, Tarpley TM, Jacoway JR. Clinical applications of ultrasonic instrumentation in the surgical removal of bone. *J Oral Surg*. 1981; 51 (13): 236-242.

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