

Case Report

Posterior Maxillary Segmental Osteotomy for Prosthetic Rehabilitation

Alecsandro Moura Silva, MSD*¹, Milagros Del Valle Abras Anka, DDS², Sarina Maciel Braga Pereira¹, César Dalmolin Bergoli, PhD³, Lafayette Nogueira Junior, PhD⁴

¹PhD Student in Prosthodontics at Post-graduation Program of Restorative Dentistry, Institute of Science and Technology, São José dos Campos, Univ Estadual Paulista (UNESP), São Paulo, Brazil

²MSD student in Oral Biopathology, Institute of Science and Technology, São José dos Campos, Univ Estadual Paulista (UNESP), São Paulo, Brazil

³Adjunct professor of Prosthodontics, Faculty of Dentistry, Pelotas Federal University, Rio Grande do Sul, Brazil

⁴Adjunct professor of Prosthodontics, Faculty of Dentistry, Institute of Science and Technology, São José dos Campos, Univ Estadual Paulista (UNESP), São Paulo, Brazil

*Corresponding author: Alecsandro de Moura Silva, University/Organization: Univ. Est. Paulista "Julio de Mesquita Filho" Institute of Science Technologic ICT/UNESP, av. Tivoli 567 apto 63 – V. Bethania - São Jose dos Campos-SP CEP 12245-230, Brazil, Tel: 55.12.98119-04876; Email: alecsms@yahoo.com.br

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Abstract

A patient with a significant posterior maxillary extrusion and no residual occlusal space for prosthodontics rehabilitation sought for treatment. After clinical examination was decided, in accordance with the patient, performed a posterior maxillary segmental osteotomy and prosthodontics rehabilitation with a removable partial denture. The surgery and the removable partial denture were planned with the use of a semi adjustable articulator. The maxillary segment was then fixed with the use of L-shape titanium miniplates, mini screws and steel wires. The removable partial denture was inserted concomitantly with the surgery. This treatment appears to be a safe and cheaper rehabilitation option for patients with maxillary extrusion.

Keywords: Surgery; Prosthodontics; Maxillofacial; Dentistry; Rehabilitation Prosthetic; Osteotomy

Introduction

Premature loss of mandibular molars and pre-molars with no prosthodontic replacement leads to gradual extrusion of the opposing maxillary posterior teeth due to the absence of the antagonistic contacts. Furthermore, the maxillary alveolar ridge is subject to greater stress during masticatory function, thereby leading to its hypertrophy. Consequently, the inter-arch distance decreases and the occlusal space needed for prosthodontic rehabilitation is obliterated [1].

The prosthodontic rehabilitation of patients with reduced inter-arch distance can be achieved either by the extraction of the extruded teeth followed by an alveoloplasty or by endodontic treatment followed the confection of unitary crowns. However, the use of a multi-segmental maxillary surgery could be an interesting

option that can facilitate further prosthodontic treatment, as it is faster than the other methods and also improves the patient's facial appearance [1,2].

Maxillary segmental osteotomy involves many risks such as tooth and periodontal tissue injury, delayed wound healing, reduced blood supply, and avascular necrosis of the segments³. On another hand, with refined skills and greater knowledge of the surgeon, the incidence of such post-surgical complications reduces considerably; they are either absent or are reduced in their severity when the basic principles of surgery are applied and the correct treatment plan is carried out⁶; This is corroborated by the papers that report the success of this technique [1,4].

The post-surgical management of the patient is as critical to the success of the treatment as the surgery itself. It is

important that the surgeon ensures an adequate occlusal relationship between the arches after the surgery. Therefore, good prosthodontic planning and the use of occlusal registers and guides are necessary [5].

The aim of this paper is to describe a case of posterior maxillary extrusion that was treated using posterior maxillary segmental osteotomy and prosthodontic rehabilitation.

Case Report

A 24-year-old woman visited the Faculty of Dentistry of São Paulo State University (UNESP) at São José dos Campos, Brazil, seeking treatment for her oral condition. Clinical examination revealed the absence of the right posterior mandibular teeth and, consequently, the extrusion of the opposing maxillary dento-alveolar complex (Figure 1). The right maxillary posterior teeth were vital and showed no signs of mobility. After discussing the treatment alternatives with the patient, based on the clinical condition observed, a maxillary segmental osteotomy with prosthodontic rehabilitation using a removable partial denture was planned.



Figure 1. Initial condition.

Initially, silicone impression of both arches were obtained (Express XT, 3M ESPE, St Paul, MN), and maxillary and mandibular models of type IV gypsum stone were obtained (Elite Rock, Zhermack, Badia Polesine, RO, Italy). An inter-occlusal registration procedure was performed and the models were mounted on a semi-adjustable articulator (Articulator A7 Plus, Bio-Art, São Carlos, SP, Brazil). With the models attached to the articulator, a detailed plan for the maxillary segmental osteotomy was drawn.

The height of the maxillary alveolar ridge, at the model, was measured with a digital caliper. A mock surgery was performed on the maxillary model, and a removable partial denture was fabricated with wax on the mandibular model (Figure 2). Further, both models were articulated, reestablishing the vertical dimension and occlusal contacts of the teeth (Figure 3). Thereafter, the height of maxillary model was measured again. The difference in the

values thus obtained was used to arrive at the extent of ridge reduction to be performed during the surgery. The removable partial denture was fabricated and another occlusal register was obtained to assist in occlusal stabilization during the surgery (figure 4).



Figure 2. Osteotomy planned.



Figure 3. Arches articulated.



Figure 4. Partial removable denture confectioned.

The surgery was performed in a hospital environment under general anesthesia. After extra- and intra-oral asepsis, an incision was made 5 mm below the mucogingival junction, from the mesial end of the first premolar to the distal end

of the first molar. Thereafter, the mucoperiosteal flap was reflected to expose the bone tissue. Vertical and horizontal osteotomy cuts of the pre-determined dimensions were performed, in accordance with the detailed plan, with the use of a reciprocating saw and chisel. The maxillary segment was then fixed with the use of L-shape titanium miniplates (W Lorenz, Jacksonville, FL) (figure 5). The removable partial denture and the new occlusal register were positioned, the arches were occluded, and a maxillo-mandibular block was realized with the use of mini screws (W Lorenz) and steel wires (Morelli, Sorocaba, SP, Brazil) (Figure 6). Finally, the tissues were sutured with an absorbable synthetic suture (Vicryl 4.0, Johnson & Johnson, New Brunswick, NJ). The patient was monitored weekly after the surgery, showing no complications.

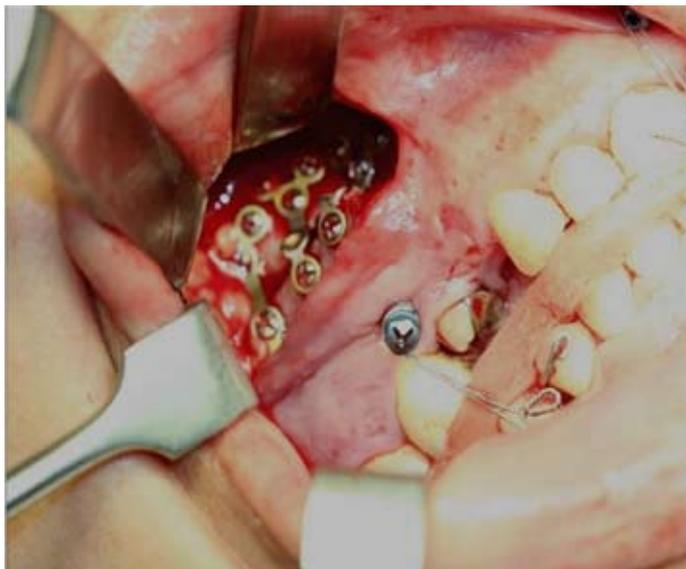


Figure 5. Maxillary fixed with titanium plaques.



Figure 6. Immediately condition after suture.

Discussion

The principal indication for a maxillary segmental osteotomy is the reestablishment of the posterior maxillary vertical dimension, the curve of Spee, and the space for placement of the prosthodontic appliance. This

indication is further substantiated when the clinician uses removable partial dentures for prosthodontic rehabilitation [6]. The biggest advantage of this technique is that it maintains the vitality of the remaining teeth, not subjecting them to endodontic or restorative procedures, and permitting the patient to choose a posterior rehabilitation with dental implants in the area corresponding to the removable partial dental prosthesis, in the future. The principal indication of the maxillary partial segmentation is the reestablishing of the posterior maxillary vertical dimension, adapting the Spee curve and the prosthetic space. Its indication is reinforced when the clinician will use removable partial dentures for prosthetic rehabilitation [6]. Besides that the most advantage of this technique is keep the vitality of the remaining teeth, not submitting them to endodontic or restorative procedures.

On the other hand, the commitment of the maxillary blood support is the primary concern of the surgeon. Problems in maxillary vascularization could result in loss of the bone segment [7], an inflammatory response in tissues adjacent to the osteotomy site [8], and loss of pulp vitality [9]. Therefore, the surgeon's skills and knowledge are essential in avoiding such post-surgical complications. When the basic principles are adhered to, the occurrence of these complications are considerably reduced. In addition, well-planned prosthodontic procedures and correct occlusal stabilization during the surgery are fundamental to ensuring a satisfactory clinical outcome [10].

Conclusion

The surgical approach used in this article should be an interesting alternative to prosthetic rehabilitation of patients with no occlusal space between arches.

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