

CLINICAL REPORT

Intrusion of maxillary molar using mini-implants: A clinical report and follow-up at 5 years



Célia Regina Maio Pinzan-Vercelino, DDS, MSc, PhD,^a Fausto Silva Bramante, DDS, MSc, PhD,^b
Júlio de Araújo Gurgel, DDS, MSc, PhD,^c Eliane Cristina Carrera Eleres Vergani, DDS,^d and
Rosyane de Souza Gregório, DDS^e

The loss of mandibular permanent molars in the adult population is still a reality.¹ Given this situation, extrusion of the antagonist teeth and their alveolar processes often occurs,² leading to periodontal alterations and occlusal interference^{3,4} that may compromise or limit prosthetic rehabilitation.⁵⁻⁷ In the absence of mandible molars, approximately 24% of patients show an average maxillary molar supereruption of 2 mm.²

When maxillary molars are extruded, orthodontic intrusion is one treatment option. Intrusion of molars is perhaps the most difficult orthodontic movement to obtain due to the greater root volume of these teeth. Until recently, the available options for orthodontic intrusion were not well accepted by patients because the treatment usually involved the use of complete arch fixed appliances that may be associated with removable appliances, such as high-pull headgear,⁸ vertical chin cups, or biteblocks,⁹ which depend on the patient's cooperation. Thus, many patients decline this treatment option, preferring restoration of the mandibular occlusion with a shortened arch length or selecting a treatment plan with extensive reduction of the supererupted maxillary molar, requiring endodontic treatment, periodontal surgery and crown restoration, or even surgical impaction of the extruded teeth.

ABSTRACT

This clinical report describes a straightforward alternative treatment for adult patients with extruded maxillary molars, who are reluctant to use fixed appliances and complex mechanics. The maxillary molar supereruption of a 57-year-old woman was treated using buttons bonded to the buccal and palatal surfaces of the molars, 2 mini-implants, and elastomeric chains. The intrusion was achieved in 5 months. The treatment stability was observed for 5 years after treatment. (*J Prosthet Dent* 2017;118:1-4)

With the advent of mini-implants, the intrusion of one or more extruded teeth can be planned using this anchoring device, benefiting the patient in several ways by simplifying this tooth movement without compromising esthetics.¹⁰⁻¹⁶

The purpose of this clinical report was to describe the direct use of orthodontic mini-implants for maxillary molar intrusion, and to demonstrate the occlusal stability of the treatment 5 years after completion.

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A 57-year-old woman was evaluated for prosthetic rehabilitation of the edentulous space corresponding to the first mandible left molar. However, the initial clinical examination showed extrusion of the first maxillary left molar, making it impossible to perform prosthesis-implant rehabilitation in the mandibular arch (*Fig. 1*).

Clinical examination showed more occlusal problems, including class II anteroposterior relationship and spaces in both arches and some misaligned teeth, but her goal

^aAssistant Professor, Division of Orthodontics, University Ceuma, Maranhão, Brazil.

^bAssistant Professor, Division of Orthodontics, University Ceuma, Maranhão, Brazil.

^cAssistant Professor, State University of São Paulo, São Paulo, Brazil.

^dGraduate student, University Ceuma, Maranhão, Brazil.

^eGraduate student, University Ceuma, Maranhão, Brazil.

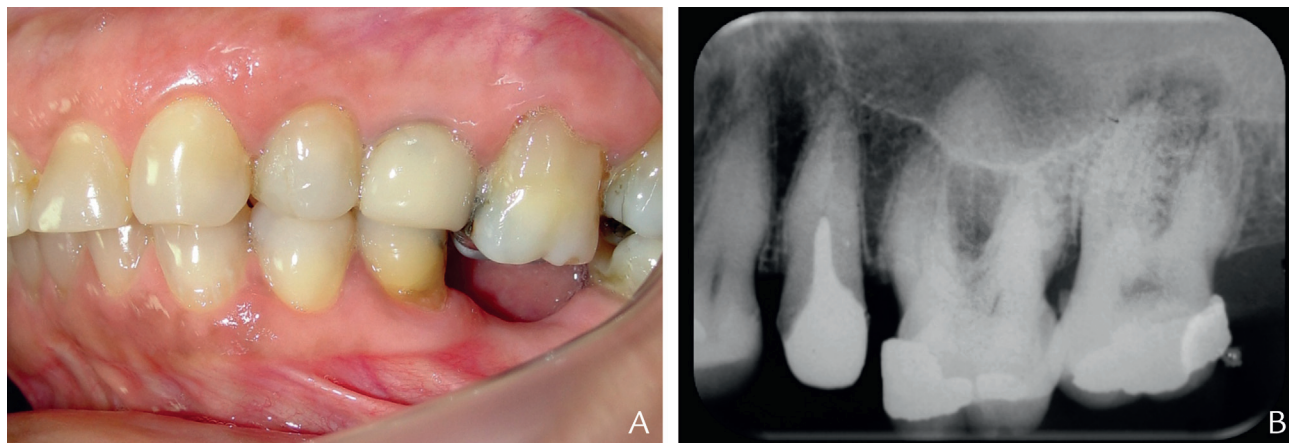


Figure 1. Pretreatment. A, Lateral view. B, Periapical radiograph.

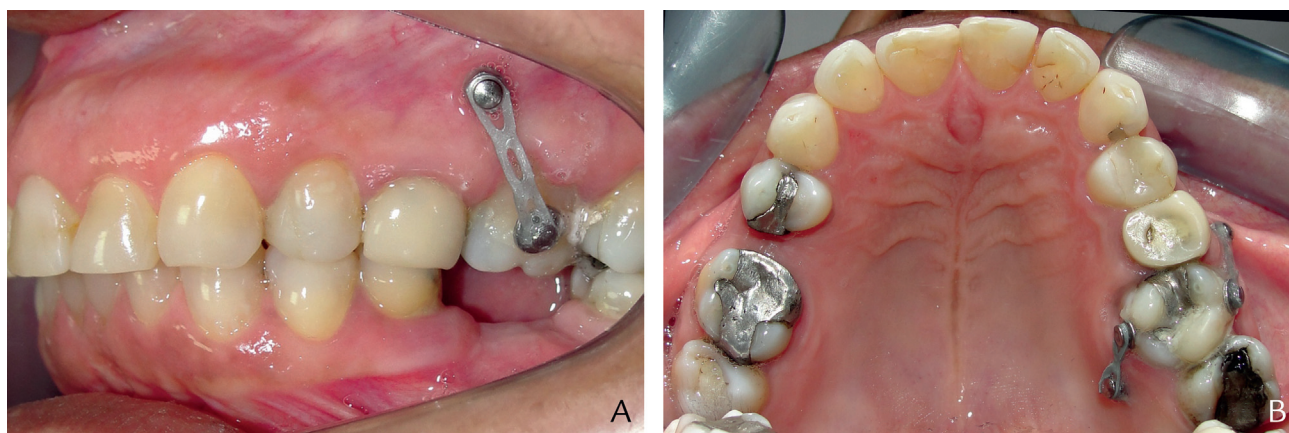


Figure 2. Mechanics used for intrusion. Intrusive force exerted from mini-implants directly to extruded molar using elastomeric chains. A, Buccal view of mini-implant inserted between premolar and first molar. B, Occlusal view showing mini-implant inserted between first and second maxillary molars on palatal side.

was only correction of the supererupted maxillary molar to allow proper restoration of her previously extracted mandibular molar. She declined extensive treatment of the extruded tooth or to use fixed appliances for the intrusion of the supererupted molar. Therefore, undergoing intrusion with mini-implants prior to the rehabilitation treatment was proposed.

Orthodontic buttons (Bonding lingual button 30.10.205; Morelli) were bonded to the buccal and palatal surfaces of the extruded maxillary molar. Two mini-implants (Orthodontic skeletal anchorage system 1.6×9 mm; Dewimed) were inserted, one installed from the buccal surface onto the mesial surface of the first maxillary left molar and the other from the palatal surface onto the distal surface of the same tooth (Fig. 2). The surgical planning of the mini-implants was based on the initial periapical radiograph (Fig. 1B), considering the shape and location of the roots and the adequate bone depth to avoid penetration of the sinus. The mini-implants were placed 8-mm apical to the cemento-enamel junction. This

distance allowed creation of an adequate vertical force to promote molar intrusion, provided sufficient inter-radicular space, and prevented injuries to the neurovascular bundle.¹⁷ A periodontal probe was used to standardize the depth and also to establish the mini-implants' site marks on the buccal and palatal sides. The mini-implants were installed using a manual screwdriver at the buccal side and using a contra-angle screwdriver at palatal surface. In addition, the mini-implants were positioned at an angle of 90 degrees to the alveolar process bone surface, not only to help the screw avoid tooth roots but also to increase the contact between the mini-implant and cortical bone.¹⁸ The mini-implants were seated with approximately 15 Ncm of final insertion torque.¹⁹

An intrusive force of 2 N on each side, measured using a dynamometer (Correx), was directly applied to the extruded elements using elastomeric chains (Continuos Chains Bobbin; 3M Unitek). The patient was examined every 4 weeks for replacement of the

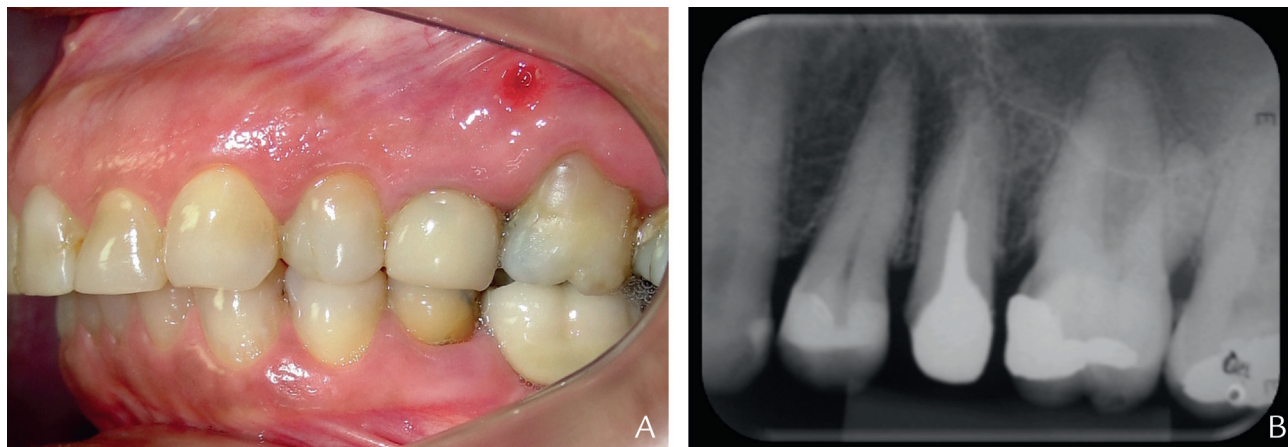


Figure 3. A, Prosthetic rehabilitation after intrusion. B, Periapical radiograph.

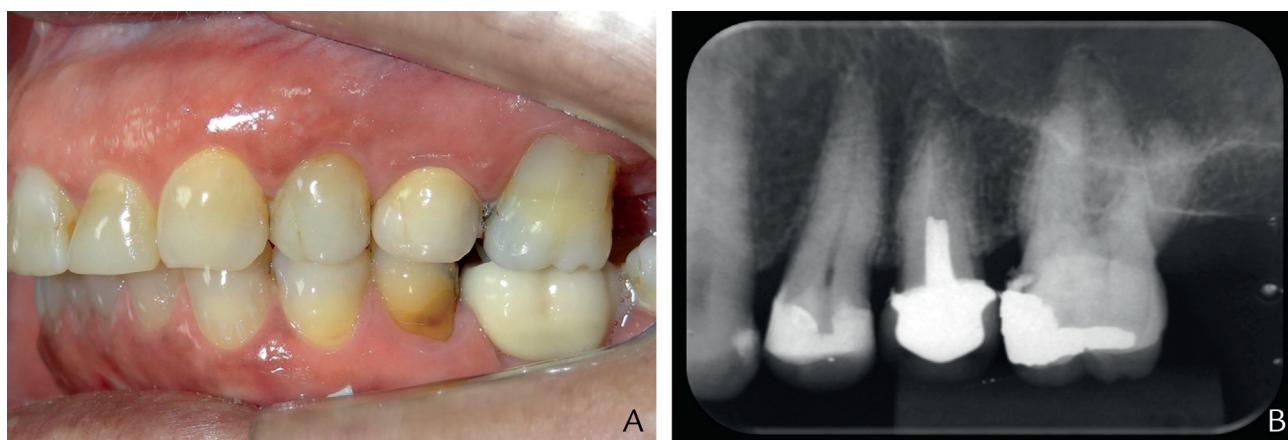


Figure 4. A, At 5 years' follow-up. B, Periapical radiograph.

elastomeric chains and observation of treatment progress. Periapical radiographs were made during the treatment for follow-up of molar roots and to control intrusion.

Five months after the initiation of treatment, an intrusion of 4 mm was observed, and the patient was referred for prosthetic implant rehabilitation in the region of the first mandible left molar. After the interim crown had been placed, the mini-implants were removed (Fig. 3). Figure 4 documents the patient 5 years after treatment. A stable and acceptable occlusal relationship was observed.

DISCUSSION

This patient's treatment demonstrated the efficacy of the direct use of orthodontic mini-implants for the correction of extruded maxillary first molars, which confirms previous reports.^{10,11} The intrusive force was exerted directly on the extruded molars by using only bonding buttons, mini-implants, and elastomeric chains. The intrusion method

described in this clinical report is more straightforward than that in previous reports¹¹⁻¹³ using mini-implants for intrusion, which benefits the patient. The advantages of this treatment approach include greater predictability of results,^{6,7,10,14,15} as it does not depend on patient cooperation; no esthetic compromise; ease of installation of devices involved in the correction; low cost; and the high possibility of eliminating the need for pulp devitalization, periodontal surgery, and more invasive approaches such as surgical intrusion. The main disadvantage of the approach is the need for adequate intraradicular space for the installation of mini-implants. The activation was performed by applying force simultaneously to the buccal and palatal surfaces because, according to publications,^{1,5,11,14} this is the most effective method for dental intrusion, as applying only apical forces to the buccal region has a greater tendency to lead to tilting.

An intrusion of 4 mm was obtained after 5 months of treatment. Treatment length varies^{10,11,13,16} because the amount of intrusion is different for each patient, depending on the individual clinical needs, number of

roots, root volume, patient age, and form of activation. The activation used with the present patient, synthetic elastics, may have increased the treatment time due to degradation of the force that occurs in this type of material.²⁰

Patients' increasing demand for different dental treatment methods with minimal complications, as well as rapid and comfortable solutions, have guided dentists to expand their clinical options. Mini-implants have been found to be an effective method of treatment for molar intrusion, with relatively simple installation and removal. Due to their small size, mini-implants can be inserted in various locations, enabling numerous other clinical applications.¹²

SUMMARY

Orthodontic intrusion by direct use of mini-implants as anchorage was an effective method, enabling the correction of tooth extrusion in a manner that was straightforward and that did not adversely affect esthetics. Although orthodontic intrusion increases the treatment time, there are benefits for the patient with this conservative approach.

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Corresponding author:

Dr Célia Regina Maio Pinzan-Vercelino
Division of Orthodontics
University Ceuma, São Luís, Maranhão
Rua Josué Montello, 1, Odontologia, Renascença II
65.075-120 São Luís, MA
BRAZIL
Email: cepinzan@hotmail.com

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