

Clinical Evaluation of a Direct Method for the Intrusion of Supraerupted Maxillary Molars: A Preliminary Study

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Purpose: This study aimed to evaluate the use of orthodontic mini-implants for the intrusion of supraerupted maxillary molars. **Materials and Methods:** Nine patients were treated using buttons bonded on dental surfaces and mini-implants inserted on the buccal and palatal sides. The intrusion was evaluated by comparing radiographs obtained at the start of treatment and at the end of intrusion. The *t* test was used to compare the teeth positions. **Results:** There was statistically significant intrusion using this method (mean: 2.4 mm; minimum: 1.2 mm; and maximum: 4.5 mm; *P* = .00). **Conclusion:** The direct use of orthodontic mini-implants was effective for the intrusion of maxillary molars. *Int J Prosthodont* 2015;28:610–611. doi: 10.11607/ijp.4224

The correction of tooth extrusions of maxillary molars due to the absence of an antagonist has been discussed in the literature because this change in tooth position can cause occlusal interference and difficulties in restoring missing teeth.¹ There are several possibilities for treatment in these cases, including the use of mini-implants.^{2,3}

Different methods have been reported in the literature for achieving intrusion; however, these are usually complex and involve partial mounting braces. The present study proposed to test the following null hypothesis: A direct method for the intrusion of supraerupted maxillary molars using mini-implants does not increase the interocclusal space needed for rehabilitation treatment.

Materials and Methods

A convenience sample of 9 patients (7 women and 2 men; mean age 37.17 years, minimum 28.5, and maximum 46.41) were selected. The following inclusion criteria were adopted: adult patients (25 years of age or older); extruded first maxillary molars due to the absence of antagonists; the presence of a bony gap

between the first molars and adjacent teeth, confirmed using periapical radiographs; no active periodontal disease; and suitable mesiodistal space for intrusion.

Orthodontic buttons were bonded onto the buccal and palatal surfaces of the extruded molars. Two 1.6 × 9-mm mini-implants were inserted, one on the buccal side between the first and second maxillary molars and the other on the palatal side between the roots of the second premolar and the first maxillary molar. Intrusive force (200 g) was exerted from the mini-implants directly to the extruded molars using elastomeric chains (Figs 1a and 1b). The patients were examined every 4 weeks.

Following intrusion, the patients were referred for prosthetic rehabilitation. After temporary crowns were made, the mini-implants were removed (Fig 2).

Lateral radiographs were taken at the start of the treatment and at the end of molar intrusion.

The anatomic tracing and dentoskeletal landmarks were manually performed by a single investigator and then digitized and analyzed using the Dentofacial Planner software (Dentofacial Software).

To measure the molar intrusion, a line perpendicular to the palatal plane was traced, and the linear distance between the tip of the mesial cusp of the molar and the palatal plane was calculated.

To evaluate the reliability of the data, 12 radiographs in the sample were selected at random and were re-traced, redigitized, and remeasured. The systematic and casual errors were calculated using the dependent *t* test and the Dahlberg formula ($S_2 = \sum d^2/2N$), respectively.

A one-sample Kolmogorov-Smirnov test was applied to determine the normality of the data. To evaluate molar intrusion, a one-sample *t* test was used.

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Results

No systematic and no casual error were detected.

The null hypothesis was rejected. The maxillary molars were significantly intruded using orthodontic mini-implants (mean: 2.4 mm; maximum: 4.5 mm; minimum: 1.2 mm; $P = .00$). The mean time of the intrusion treatment was 9.03 ± 4.04 months (minimum: 3.16 months; maximum: 16.23 months).

Fig 3 shows the superimposition of pre- and postintrusion tracing, along the sella-nasion line.

Discussion

The mean value of molar intrusion has varied in the literature according to the clinical need. In this study, a mean value of 2.4 mm was achieved, which is consistent with the results of longitudinal studies.^{4,5} The mean time to achieve intrusion was 9.03 months, which is similar to the times reported by Heravi et al⁴ (7.7 months) and Lee et al⁵ (11.9 months). The main difference between the present study and the previous^{4,5} is the mechanism to achieve the intrusion. The method evaluated in the present study is simpler and more direct when compared with those previously published. The methods previously reported include more technical procedures.

The results of the present study indicated that there is a simple alternative for adult patients with supraerupted maxillary molars who are reluctant to use fixed appliances and complex mechanics. Although orthodontic intrusion increases the rehabilitation treatment time, there are benefits for the patient with this more conservative approach. However, this mechanotherapy might be indicated only in cases in which it is unnecessary to individualize the tooth position.

Conclusion

Orthodontic intrusion using direct anchorage of mini-implants was an effective method, enabling the correction of upper molar extrusion in a manner that allowed for simple activation and easy force control.



Fig 1 Molar intrusion. (a) Buccal view: mini-implant inserted between the first and second molars. (b) Occlusal view: mini-implant inserted between the second premolar and the first molar on the palatal side.



Fig 2 Prosthetic rehabilitation after intrusion.

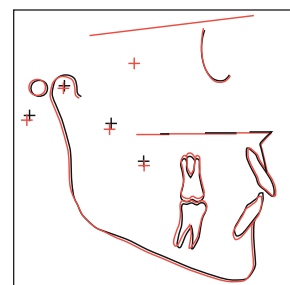


Fig 3 Superimposition of preintrusion (T_1) and postintrusion (T_2) tracing. Black: pretreatment; Red: posttreatment.

Acknowledgments

The authors reported no conflicts of interest related to this study.

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