

Maxillary Molar Intrusion with the Molar Intrusion Arch

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We have developed a new appliance for maxillary molar intrusion, the Molar Intrusion Arch (MIA), as shown in this article.

Appliance Construction and Placement

The most critical factor in the intrusion of maxillary molars is the point of force application. To pass through the center of resistance, the force must be simultaneously applied both buccally and lingually to the molar crown. Therefore, the MIA traction hooks and buttons are placed in the center of the buccal and lingual crown surfaces (Fig. 1).

For sufficient anchorage, the appliance should be rigid and should include as many of

the maxillary teeth as possible. Cross-palatal wires are made of rigid .036" stainless steel, soldered together at their intersections and attached to bonded mesh bases on the lingual surfaces of the anchor teeth (Fig. 2).

Elastics can provide 50g of force on each side, which is usually enough for molar intrusion. The MIA produces about 1mm of maxillary molar intrusion per month.

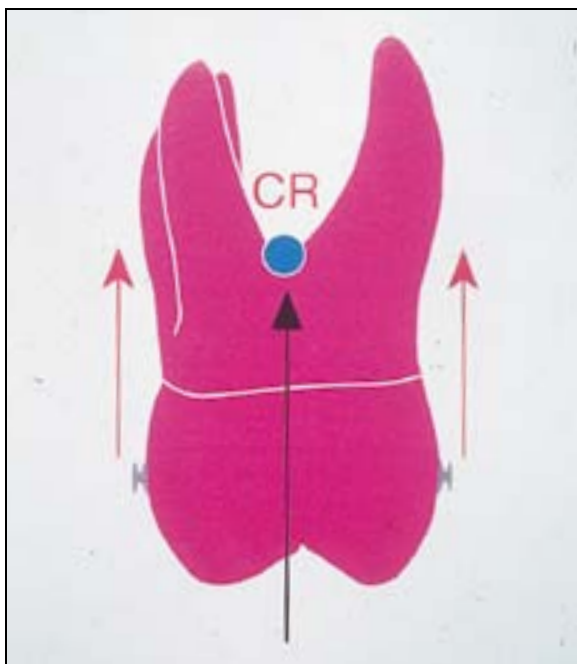


Fig. 1 Buttons on buccal and lingual surfaces of maxillary molar crown deliver force through center of resistance for pure intrusion.

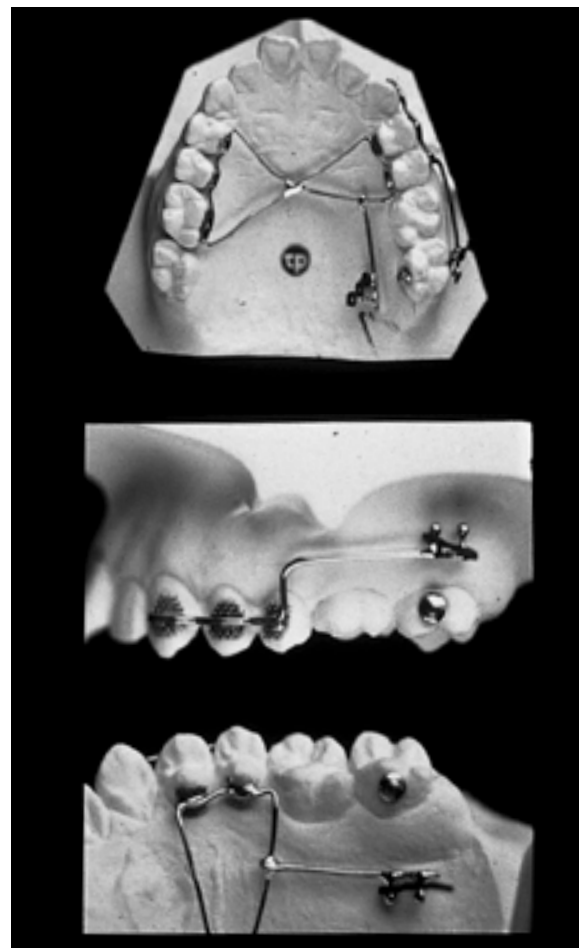


Fig. 2 Molar Intrusion Arch.

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Case Report

A 14-year-old male presented with an overerupted maxillary left second molar caused by impaction of the mandibular left second molar. The maxillary second molar had erupted beyond the adjacent first molar by about 3mm on the palatal cusp, 2mm on the buccal cusp, and 2mm on the marginal ridge (Fig. 3).

The aim of treatment was to establish an ideal occlusion through intrusion of the maxillary second molar and uprighting of the mandibular second molar.

An MIA, with elastics on both the buccal

and lingual sides of the maxillary second molar, was used for intrusion (Fig. 4). In this case, we did not include the adjacent maxillary first molar in the anchorage unit because we wanted to determine the exact amount of pure intrusion achieved by the appliance.

Over the next 10 weeks, the second molar was intruded enough to create a reverse marginal ridge step (Fig. 5A). The overcorrection was intended to avoid interference during the uprighting of the mandibular second molar. A tipping force was applied to upright the mandibular second molar, while the maxillary molar correction was retained by ligature wiring to the upper MIA



Fig. 3 A. 14-year-old male with overerupted maxillary left second molar due to impaction of mandibular left second molar. B. Comparison between overerupted second molar and adjacent first molar.



Fig. 4 MIA, with anchorage unit connecting premolar, canine, and first molar of opposite side.

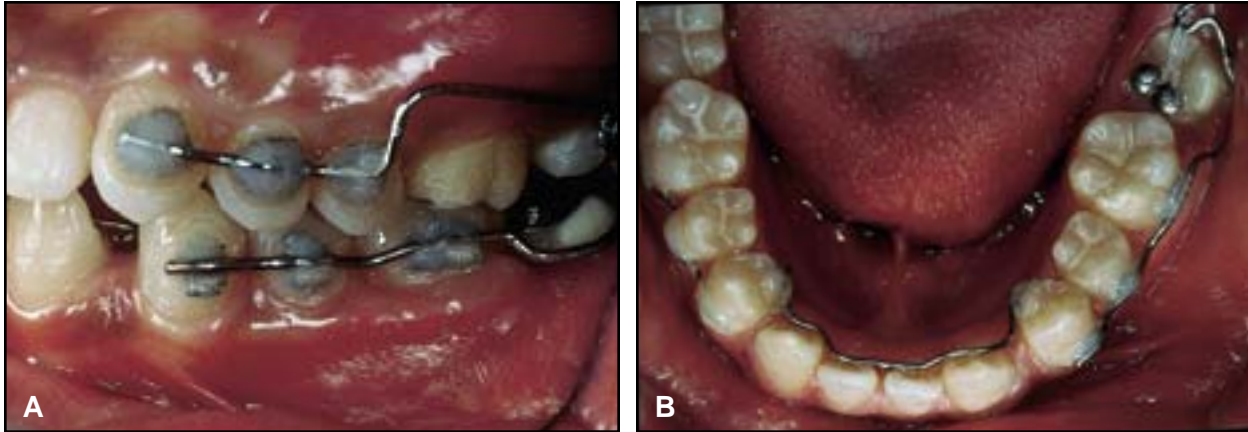


Fig. 5 A. Overcorrection of maxillary left second molar in 10 weeks. B. Mandibular appliance with bonded button used to upright mandibular left second molar.

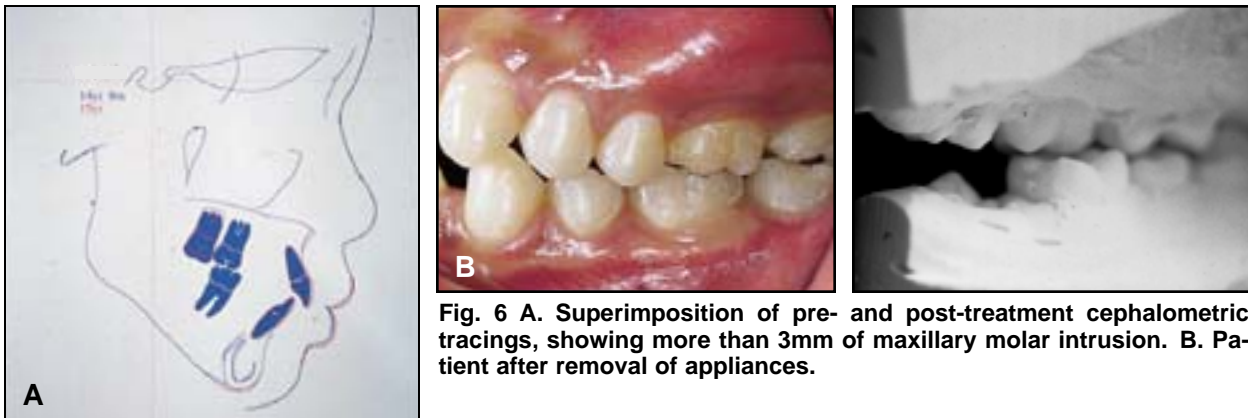


Fig. 6 A. Superimposition of pre- and post-treatment cephalometric tracings, showing more than 3mm of maxillary molar intrusion. B. Patient after removal of appliances.

(Fig. 5B).

After 17 more weeks, an uprighting spring and sectional archwire were added for torque control of the mandibular left second molar. Post-treatment cephalometric superimposition showed 3mm of maxillary second molar intrusion (Fig. 6). Because of the short treatment period, this can be considered pure intrusion, even in a growing patient.

Discussion

Orthodontic intrusion has been thought impossible to achieve with a force application on one side of the tooth.¹⁻⁶ The MIA, however,

applies force on both the buccal and lingual sides, enabling the force to pass through the center of resistance. It is a simple bonded appliance that is comfortable for the patient.

Nickel titanium coil springs or power chain can be used instead of elastics, but they are more difficult to control, and the force of power chain decays rapidly. The 50g of force per side produced by elastics is considered sufficient to intrude a multirooted maxillary molar. If the elastic force becomes excessive, the anchorage unit can be adjusted by including more teeth.

In a case of multiple overerupted teeth, the intrusion must be carried out one tooth at a time. The patient's periodontal health plays a signifi-

cant role in the success of the MIA and should be carefully evaluated before beginning treatment.^{7,8} The MIA should be used only with caution in cases of bone resorption, and is contraindicated in the presence of severe periodontal problems such as furcation involvement.^{9,10} In such patients, crown reduction is preferable to orthodontic intrusion.

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