
A Rapid Molar Intruder for 'Non-Compliance' Treatment

ALDO CARANO, DO, MS
WILLIAM C. MACHATA, DDS

New mechanics and clinical techniques that do not require special patient compliance have achieved control of the maxillary arch in two dimensions—sagittal and transverse. One important orthodontic movement is still missing, however—molar intrusion for vertical control.

Several authors have demonstrated the possibility of intruding an elongated molar, although the reported amounts of true intrusion have generally been modest. It has been shown conclusively that a force of 25g is sufficient for the intrusion of a single tooth, that the tooth can be intruded into bone with significant gain of attachment, and that the maxillary sinus is not an obstacle to tooth movement.¹

Some authors would prefer to grind the crown before performing a full-coverage reconstruction² or would recommend a subapical osteotomy to avoid unwanted side effects of intrusive mechanics.³ Others have illustrated cases in which molar intrusion was achieved with full-coverage splints and fixed appliances,^{1,4} with labiolingual intramaxillary mechanics,^{1,5,6} with the force exerted by the tongue on transpalatal arches,^{7,8} or with removable appliances.⁹ None of these mechanics has been proposed for treatment of vertical excess during growth, however, suggesting that they are not effective when more than one molar needs to be intruded or when

bilateral action is necessary.

The posterior maxilla is the most important area in which to control vertical growth,^{10,11} as shown in stable results demonstrated with superior surgical repositioning of the posterior maxilla.¹²⁻¹⁵ As little as 1/2-1/3mm of posterior maxillary eruption will produce a 1mm increase in anterior face height if no other compensations are made. Long faces tend to elongate further with treatment because there is less anchorage available than with orthognathic or brachycephalic types. Conversely, if the molars can be intruded, then the chin will appear to translate forward, giving the same profile effect as mandibular growth.

Since Schudy underlined the role of vertical excess in the development of sagittal discrepancies,¹⁰ several methods have been proposed for the correction of overerupted molars. Initially, directional forces were used to control vertical excess and increase the effective mandibular length. The combination of high-pull headgear and functional appliances has shown impressive results,¹⁶⁻²⁰ but it requires a high level of patient cooperation for a long period.

More recently, magnets have been proposed for the correction of vertical skeletal problems.²¹⁻²⁷ In animal and clinical studies comparing magnetic and non-magnetic blocks, openbite corrections were more pronounced when

Dr. Carano is in the private practice of orthodontics at Lungomare 15, 74100 Taranto, Italy; e-mail: a.carano@libero.it. He has a financial interest in the appliance described here. Dr. Machata is Director of Clinical Applications, American Orthodontics, Sheboygan, WI.



Dr. Carano



Dr. Machata

magnets were used, but relapse tendencies were also greater. Three-dimensional control is difficult to achieve when repelling magnets with forces approaching 1,500g are used, because when the magnets deviate from completely centered contact, they tend to push each other in the direction of the deviation.²⁷ Crossbites have sometimes occurred during treatment because of this lack of guidance.

Removable appliances leave the orthodontist totally dependent on the patient, and bonded functional appliances present hygiene and clean-up problems. The need is for a fixed appliance that takes responsibility from the patient and places control of the case in the orthodontist’s

hands. This article illustrates such an approach to molar intrusion.

Appliance Design

The Rapid Molar Intruder* is a modification of the Jasper Jumper,* an auxiliary capable of producing rapid change in occlusal relationships. A flexible, fixed appliance that delivers light, continuous force, the RMI can be used to move single teeth, units of teeth, or an entire arch. It can deliver functional, bite-jumping forces, headgear-like forces, elastic-like forces, or a combination of these.²⁸

The elements of the RMI are basically the same as those of the Jasper Jumper, except that

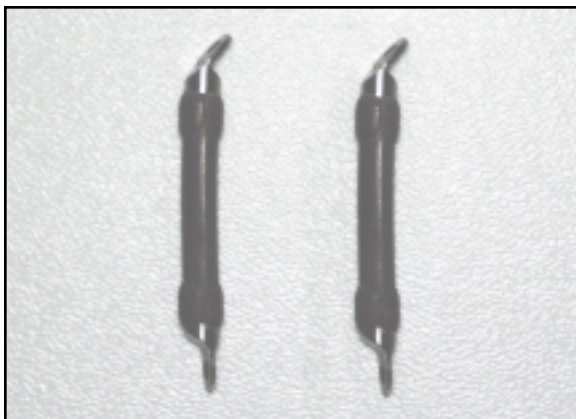


Fig. 1 Rapid Molar Intruder can have one or two modules. Identical right and left modules are shorter than regular Jasper Jumper modules.



Fig. 2 Terminal ends of modules secured to molar tubes with L-shaped pins.

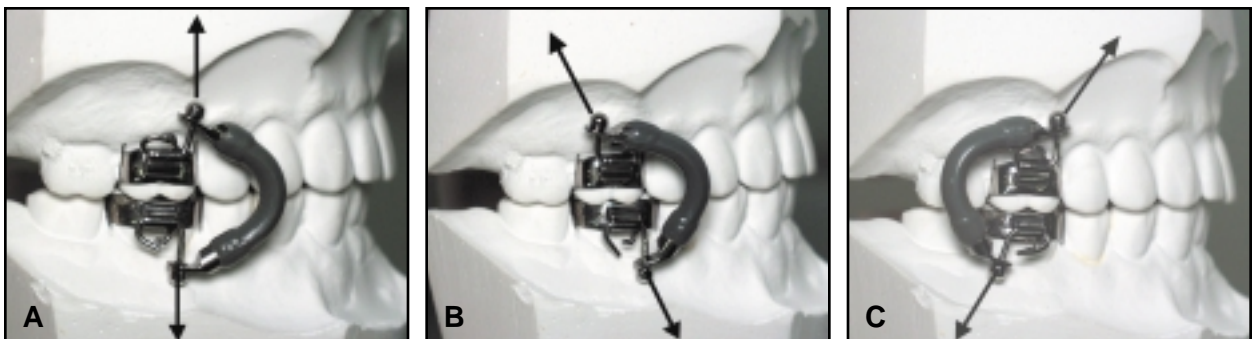


Fig. 3 Changing location of insertion into molar tubes provides more directional control for sagittal correction. A. Vertical control. B. Vertical control and Class II correction. C. Vertical control and Class III correction.

*American Orthodontics, 1714 Cambridge Ave., Sheboygan, WI 53082.

the modules are shorter than the regular modules for the Jumper, and their ends are angulated differently (Fig. 1). The terminal ends of the modules are secured to the molar tubes with L-shaped pins; the straight ends go into the upper tubes, the angulated ends into the lower tubes (Fig. 2). These pins automatically guide the modules into positions parallel to the occlusal plane.

When the patient closes, the modules are flexed to deliver an intrusive force of 900g against the upper and lower molars. If a sagittal correction is required, more directional control can be achieved simply by changing the location of insertion into the molar tubes (Fig. 3).

The RMI generates a favorable biomechanical equilibrium in which the only adverse movement to control is the buccal crown tipping caused by forces directed laterally to the center of resistance of the molars (Fig. 4). To control this tendency, the RMI should always be applied in combination with upper and lower lingual arches.

The RMI can be easily placed, activated, and removed. It does not interfere with extraction or nonextraction treatment or with space consolidation, and it enhances mandibular leveling.

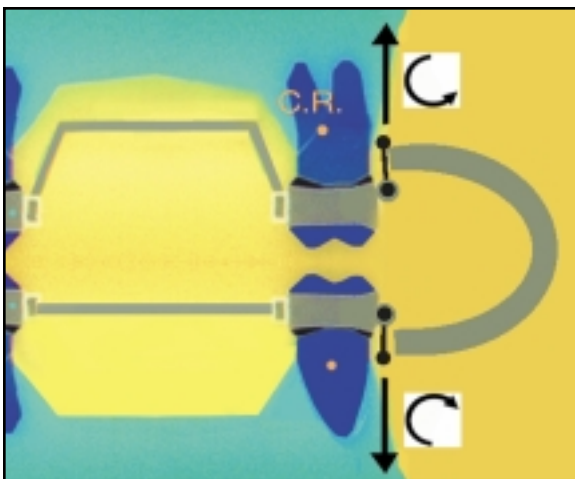


Fig. 4 Because intrusive forces on labial side of molars generate moments that tip crowns buccally, RMI should always be combined with upper and lower lingual arches.

Patient acceptance is excellent because the patient's only responsibility is to keep the appliance clean and avoid breakage. The RMI's flexibility makes oral hygiene easy, and since the appliance curves away from the occlusal table on closing, it does not interfere with chewing.

Case Report

An 11-year-old male in the mixed dentition presented with the chief complaints of anterior open bite and difficulty in closing his lips. Clinical examination showed a long face and lip incompetence at rest (Fig. 5). The patient had a Class I malocclusion with a severe open bite of 5mm and a bilateral posterior crossbite. He had extensive cavities on the deciduous molars and on the upper right first molar.

Cephalometric analysis revealed a straight skeletal profile and a mandible that was severely rotated clockwise. The maxilla was positioned downward and the mandibular plane angle was two standard deviations above normal, suggesting a vertical growth pattern.

Treatment objectives were to expand the upper arch and correct the dental and skeletal open bite without the need for special patient compliance.

The upper arch was treated with a Spring Jet* palatal expander.³⁰ The lower arch was prepared as anchorage using a simple, soldered lingual arch. RPI modules were then extended bilaterally from the buccal tubes of the upper molar bands to the buccal tubes of the lower molar bands (Fig. 6).

Although the forces produced by this appliance tended to create a mesiobuccal inclination of the molars, this was controlled by the stabilizing palatal and lingual arches, and only minor rotation occurred (Fig. 7). Molar intrusion and a significant counterclockwise rotation of the mandible were achieved in less than six months.

Discussion

Vertical intrusion of the molars is often a treatment objective in preprosthetic treatment of

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Fig. 5 11-year-old male with anterior open bite and lip incompetence.

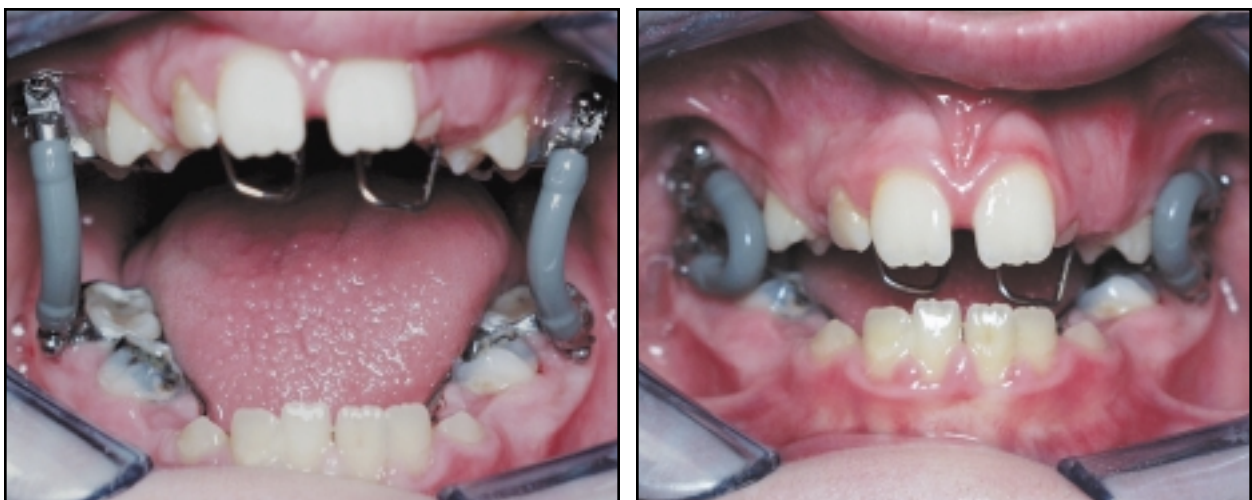


Fig. 6 RPI modules extended bilaterally from buccal tubes of upper molar bands to buccal tubes of lower molar bands.

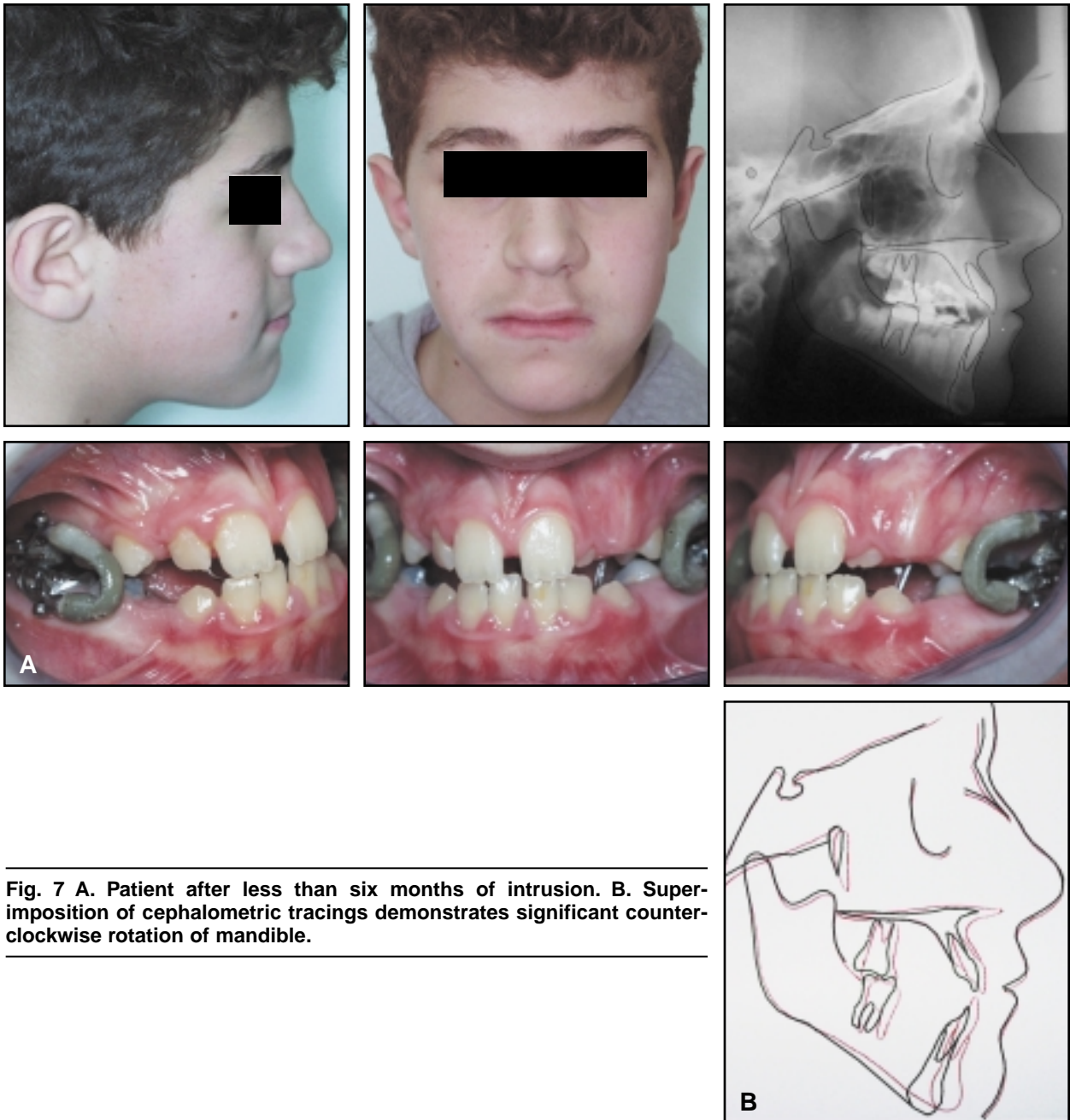


Fig. 7 A. Patient after less than six months of intrusion. **B.** Superimposition of cephalometric tracings demonstrates significant counter-clockwise rotation of mandible.

patients with excessive skeletal vertical height. In cases in which a single molar needs to be intruded for a correct prosthetic rehabilitation, the opposite arch is used as anchorage, with a lin-

gual arch soldered to two bands on one side and one band on the other. If intrusion of both upper and lower molars is indicated, anchorage is enhanced by the use of palatal and lingual arch-

es. Oral implants are another potential source of anchorage.

Initial clinical experience with the RMI has been promising. Although a more structured research project is needed to conclusively demonstrate its efficiency, we believe this "non-compliance" appliance for molar intrusion opens new possibilities in the complex treatment of vertical excess.

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