

Intrusion of Overerupted Upper Second Molars with a Modified Lingual Arch

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Overerupted upper second molars can be a critical problem in presurgical orthodontic treatment of a skeletal Class III malocclusion. When unilateral traction is applied for molar intrusion, it usually causes buccal or lingual tipping of the tooth, along with other adverse side effects such as extrusion of the anchor teeth and subsequent clockwise rotation of the mandible.

Alternative approaches have included grinding of the molar crowns,¹ alveolar osteotomy² or corticotomy³ of the molar areas, and the use of miniscrews⁴ or miniplates for anchorage.⁵ Because these procedures are more expensive and involve pulpectomy or surgical intervention, however, they are generally unacceptable to both patients and clinicians.

Bilateral orthodontic traction of the overerupted molar would allow the force to be delivered close to the center of resistance, resulting in pure intrusion.^{6,7} The present report describes a new and effective method for intruding upper second molars by applying a bilateral force with

a modified lingual arch.

Case 1

An 18-year-old female was referred by her general dentist with a severe skeletal Class III malocclusion, accompanied by crossbite and moderate crowding in the anterior regions. The upper left second molar was occluding with the lower left third molar, having erupted beyond the adjacent first molar by about 2.5mm on the buccal cusp, 3mm on the palatal cusp, and 2.5mm on the marginal ridge (Fig. 1). The periodontal condition of the overerupted molar was healthy, with pocket depths of less than 3mm (Table 1).

Presurgical intrusion of the upper left second molar was required to avoid shifting the occlusal plane when it was leveled. First, the upper left third molar was extracted. A lingual arch was then modified by soldering long hooks to the buccal and lingual surfaces of the upper left first molar band (Fig. 2A). The appliance was

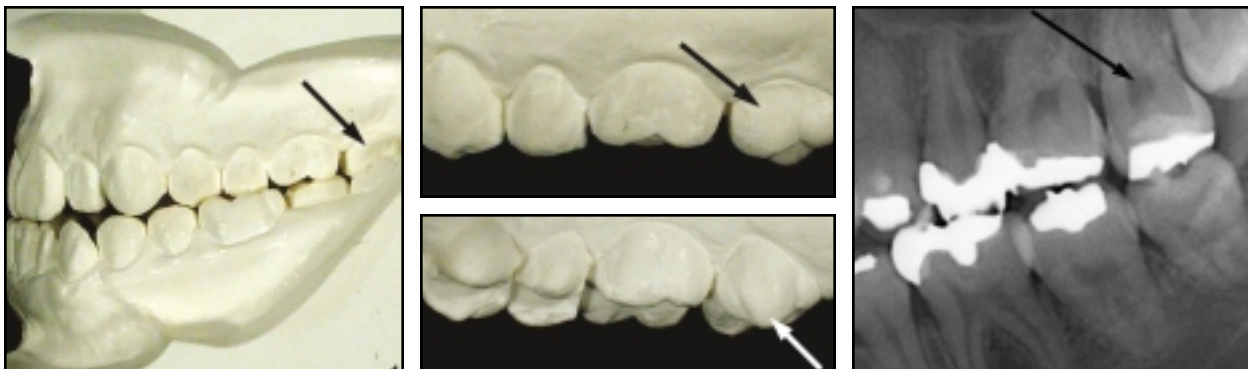


Fig. 1 Case 1. 18-year-old female patient with skeletal Class III malocclusion. Upper left second molar (arrows) has overerupted to occlude with lower left third molar.



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cemented to both upper first molars, and buttons were bonded to the buccal and lingual surfaces of the upper left second molar. Power chain with an initial force of 100g was then applied on each side to intrude the molar (Fig. 2B).

After four weeks, the power chains were

replaced. A month later, the second molar displayed substantial intrusion (Fig. 3), while the upper right first molar showed moderate mobility. No change was observed in the marginal ridge levels between the upper left first molar and second premolar.

**TABLE 1
CASE 1
POCKET DEPTHS (MM)**

	Pre-tmt.	Post-tmt.
<i>Upper left second molar</i>		
Mesiobuccal	2.0	2.5
Buccal	1.5	2.0
Distobuccal	2.0	2.0
Mesiolingual	2.0	2.0
Lingual	1.5	1.5
Distolingual	2.0	2.0

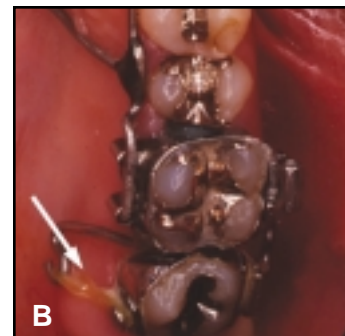


Fig. 2 Case 1. A. Modified lingual arch with long hooks soldered to both sides of upper left first molar band. B. Power chains attached between hooks on lingual arch and buttons bonded to both sides of overerupted second molar (arrow).



Fig. 3 Case 1. Intrusion of upper left second molar (arrows) in two months, with no sign of root resorption.

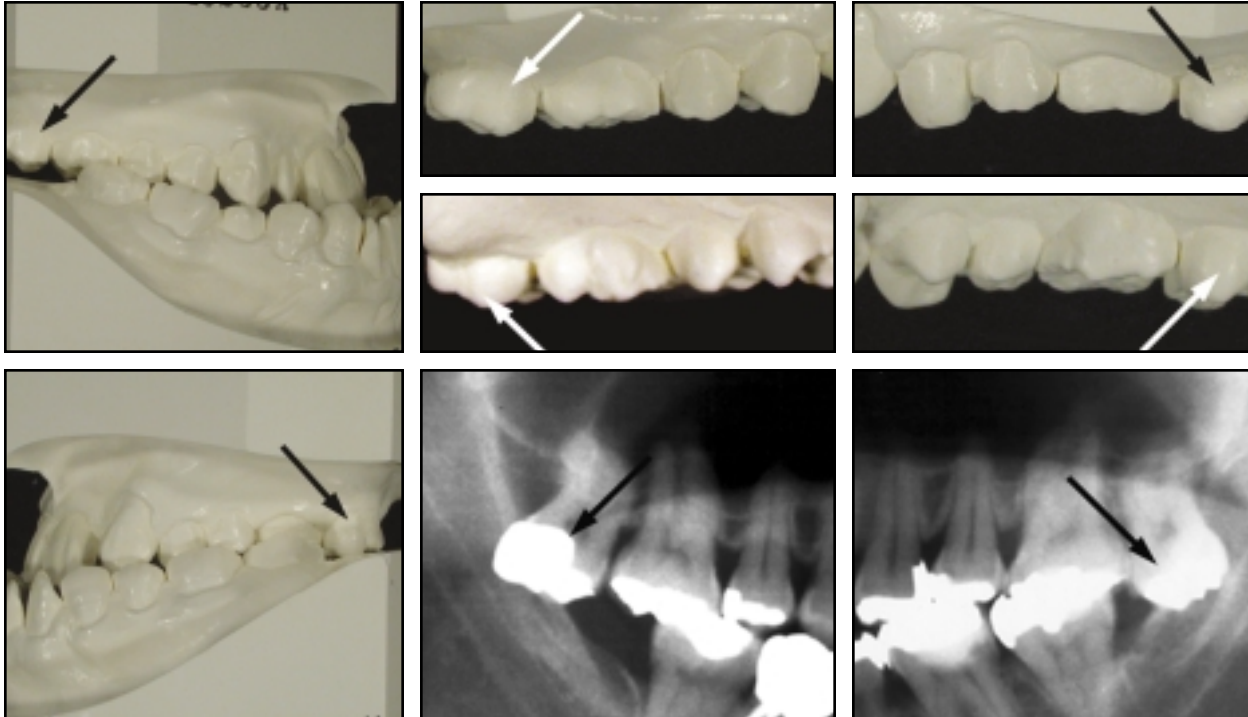


Fig. 4 Case 2. 32-year-old male patient with skeletal Class III malocclusion. Both upper second molars have overerupted (arrows).

The power chains were removed, and the correction was retained by passively ligating the hooks of the lingual arch to the buttons on the second molar. The upper left first molar was stable within a month, and the patient was ready for a multibracketed appliance.

The patient's gingival status remained healthy, with the pocket depths of the intruded molar almost unchanged (Table 1). The mesial and distal marginal alveolar bone levels also appeared to be unaltered, and no root resorption was observed.

Case 2

A 32-year-old male presented with a total crossbite and moderate crowding in both arches. The upper first molars were occluding with the lower second molars in a severe Class III relationship, and both upper second molars had overerupted because of the absence of antago-

nists (Fig. 4). The upper right second molar had erupted beyond the adjacent first molar by about 1.5mm on the buccal cusp, 1.5mm on the lingual cusp, and 1.5mm on the marginal ridge; the upper left second molar had erupted beyond the adja-



Fig. 5 Case 2. Modified lingual arch cemented to upper first molars, and power chains applied bilaterally to both upper second molars (arrows).

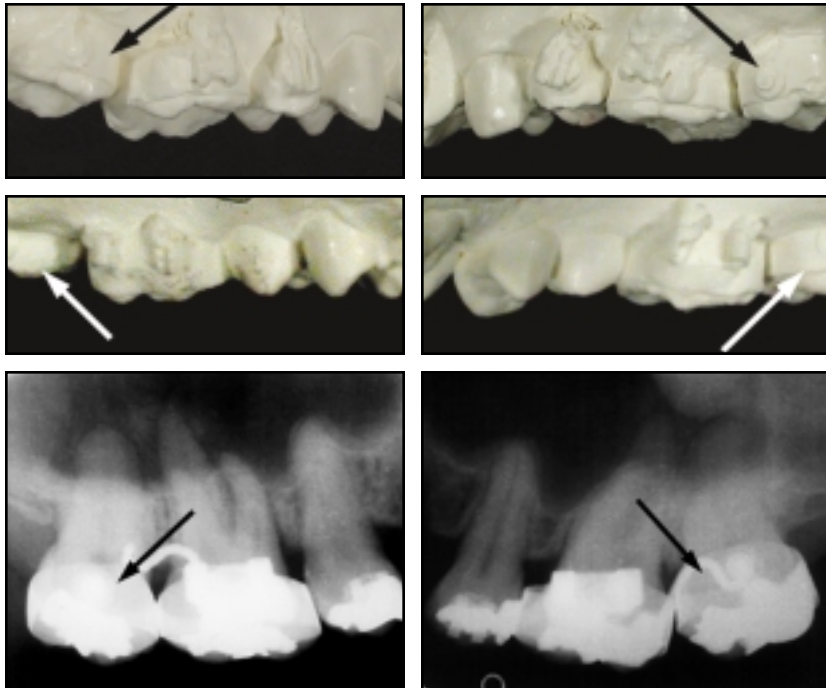


TABLE 2
CASE 2
POCKET DEPTHS (MM)

	Pre-tmt.	Post-Tmt.
<i>Upper left second molar</i>		
Mesiobuccal	2.0	2.5
Buccal	1.0	1.5
Distobuccal	2.5	2.0
Mesiolingual	2.0	2.5
Lingual	2.0	2.0
Distolingual	3.0	3.0
<i>Upper right second molar</i>		
Mesiobuccal	2.5	2.5
Buccal	2.0	2.0
Distobuccal	1.5	2.0
Mesiolingual	3.0	3.0
Lingual	2.0	2.0
Distolingual	2.5	2.0

Fig. 6 Case 2. Intrusion of both upper second molars in two months (arrows). Radiographs show no root resorption, and marginal alveolar bone levels appear to have approximated cemento-enamel junctions.

cent first molar by about 3.5mm on the buccal cusp, 3mm on the lingual cusp, and 3mm on the marginal ridge, and was contacting the alveolar mucosa of the mandible. The patient's periodontal health was good, with pocket depths of 3mm or less for both molars (Table 2).

A lingual arch modified with hooks to intrude both upper second molars was cemented to the upper first molars (Fig. 5). Buttons were bonded to the buccal and lingual surfaces of the upper second molars, and power chains were attached on both sides to intrude the teeth.

After two months, both upper second molars were intruded (Fig. 6), and both upper first molars displayed moderate mobility. No change was evident in the marginal ridge levels between the upper first molars and second premolars.

The power chains were removed, the buttons and hooks were passively ligated for retention, and a month later, both upper first molars

were stable enough for fixed appliance placement.

The periodontal condition of the intruded molars remained healthy, and the pocket depths were almost unchanged (Table 2). Their marginal alveolar bone levels appeared to have approximated the cemento-enamel junctions, with no sign of root resorption.

Discussion

In the cases shown here, significant amounts of pure intrusion—about 3mm for each upper second molar—were achieved within a few months. The upper first molars were inevitably mobilized as a reaction to the application of intrusive force on the second molars, but they were firmly stabilized less than a month after the intrusion, and their marginal ridge levels were unaltered. Apparently, a stable occlusal contact between the upper first and lower first or

second molars is enough to prevent first molar extrusion.

This method may also increase the alveolar bone height of the intruded second molars and thus enhance their support. In the second case, the marginal alveolar bone levels seemed to have approximated the cemento-enamel junctions, although these features are difficult to distinguish on the radiographs.

Gingival inflammation was minimized with proper oral hygiene, indicating that a healthy periodontium is a prerequisite for successful intrusion. Although root resorption has been associated with intrusion of incisors,⁸ none was observed in these cases. This is probably due to the difference in the morphology of the roots and the mechanics of tooth movement.⁸

Conclusion

The method presented here offers a useful alternative for effective intrusion of upper second molars without unwanted side effects. It is simple, safe, reliable, and cost-effective, and can be applied to other overerupted teeth as long as the anchor teeth are firmly supported by the periodontal tissues.

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