

Modifications of the Distal Jet

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The Distal Jet is a fixed lingual appliance that can produce unilateral or bilateral molar distalization and rotation correction, typically in four to nine months, without relying on patient compliance (Fig. 1). Advantages of the Distal Jet include improved esthetics and comfort, simple insertion and activation, and ease of conversion to a Nance holding arch to maintain the distalized molar positions.¹ The Distal Jet also permits the simultaneous use of full bonded appliances, possibly avoiding the need for two phases of treatment.²

This article describes several modifications to the original appliance that I have found useful.

Conversion to Nance Holding Arch

Upon completion of molar distalization, the Distal Jet is converted to a Nance holding arch to prevent further distal movement and consequent anchorage loss. One way to stop movement of the bayonet wire through the tube is to flow a light-cured acrylic around the coil spring, over the distal bayonet bend, and over the activation collar to produce a solid extension from the molar bands to the acrylic button.¹

An alternative method is to wrap an .014" stainless steel ligature wire around the end of the doubled-back wire (extending distally from the lingual sheath on the first molar band) and tie it around the tube just mesial to the activation collar (Fig. 2). The coil spring should be compressed completely and the set screw tightened to prevent mesial movement of the molars. The tube can also be crimped around the mesial portion of the bayonet wire, but this might weaken it enough to cause fracture.

Double-Set-Screw Distal Jet

A modification of the Distal Jet incorporating two set screws into the activation collar permits an easier, cleaner, and more reliable conversion to a molar Nance holding arch.

The mesial set screw is still used during active distalization (Fig. 3). Upon completion of distal movement, the activation collar is slid and locked mesially to gain access to the coil spring (Fig. 4). The spring is removed by grasping a free end of the coil with a plier and peeling the spring outward from the bayonet wire. The distal end of the tube, where the bayonet wire enters, can then be seen. The double-set-screw collar is slid back to this junction, the mesial screw is set on the tube, and the distal screw is set on the bayonet wire, locking the two pieces together to prevent molar movement (Fig. 5).

The premolar supporting wires are sectioned where they enter the acrylic button, using a high-speed handpiece and diamond bur (Fig. 6). The premolar bands can later be replaced without the lingual support wires.

The lingual sheath on the first molar may be crimped with a utility plier to reduce any play of the doubled-back wire inserted into it and thus prevent rotation of the acrylic button away from the palate (Fig. 7). The bayonet wire or tube can be bent with a three-prong plier to adjust the pressure of the acrylic button against the palate (Fig. 8).

Molar Rotation

Distal rotation of the maxillary molars is a common treatment goal in the correction of Class II malocclusion.³⁻⁵ Simple helical loops in the bayonet wires of the Distal Jet can be used to produce distal molar rotation, or to upright mesially tipped maxillary molars (Fig. 9). These loops are activated with a utility plier before seating the appliance (Fig. 10). Elastomeric chain is extended from attachments on the bicuspid bands to the molar bands to hold them in position during insertion of the preactivated appliance (Fig. 11).

Maxillary Expansion

Although maxillary expansion is often a prerequisite for Class II correction,^{4,5} no provision for active expansion is included in the Distal Jet design. It has been my experience that unless a posterior crossbite is present before treatment, Distal Jet therapy requires no active palatal expansion. In cases where significant expansion is required, a rapid palatal expander should be placed prior to molar distalization, or a Pendulum-type appliance should be considered.⁵

To produce limited maxillary expansion during treatment with the Distal Jet, jackscrews can be embedded in the Nance palatal button (Fig. 12).

Modified Mandibular Distal Jet

The mandibular Distal Jet was designed to upright mesially tipped mandibular first molars⁶ (Fig. 13). When the original design is applied to the mandibular second molars, the distal bayonet bend often impinges on the soft tissue in the buccal vestibule. Altering the appliance to reduce its extension into the vestibule (Fig. 14) permits the use of either a molar band with button attachment or a direct-bonded button, in cases of partial tissue impaction (Fig. 15).

Distal Jet Hex Key Handle

The tiny Allen wrench used to activate Distal Jet appliances is difficult to handle, and aspiration is a concern. An autoclavable hex key handle, borrowed from the hobby industry, makes the key easier to use (Fig. 16). The handle also allows quick replacement of the keys as they wear out. □

FIGURES

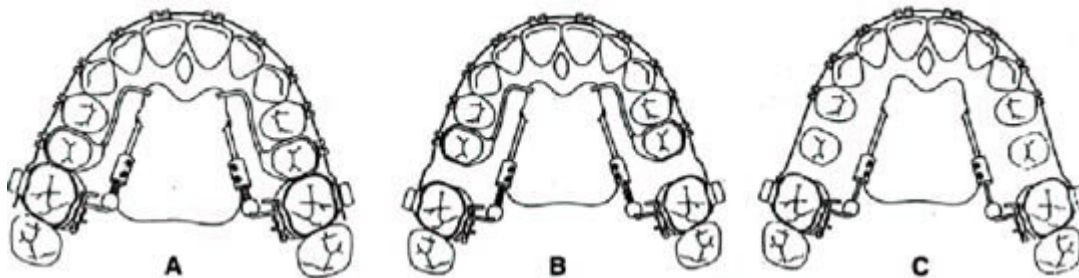


Fig. 1 A. Distal Jet for maxillary molar distalization can be used with full fixed appliances. Activation collars are slid and locked distally, compressing superelastic coils. Modified Nance palatal button provides anchorage. B. Completion of molar distalization. C. Conversion to Nance holding arch to maintain molar positions.

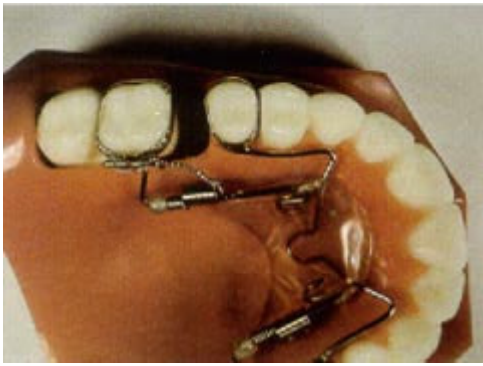


Fig. 2 Alternative method of conversion: tie stainless steel ligature from doubled-back wire (extending distally from lingual molar sheath) to tube mesial to activation collar.



Fig. 3 Double-set-screw modification of Distal Jet.

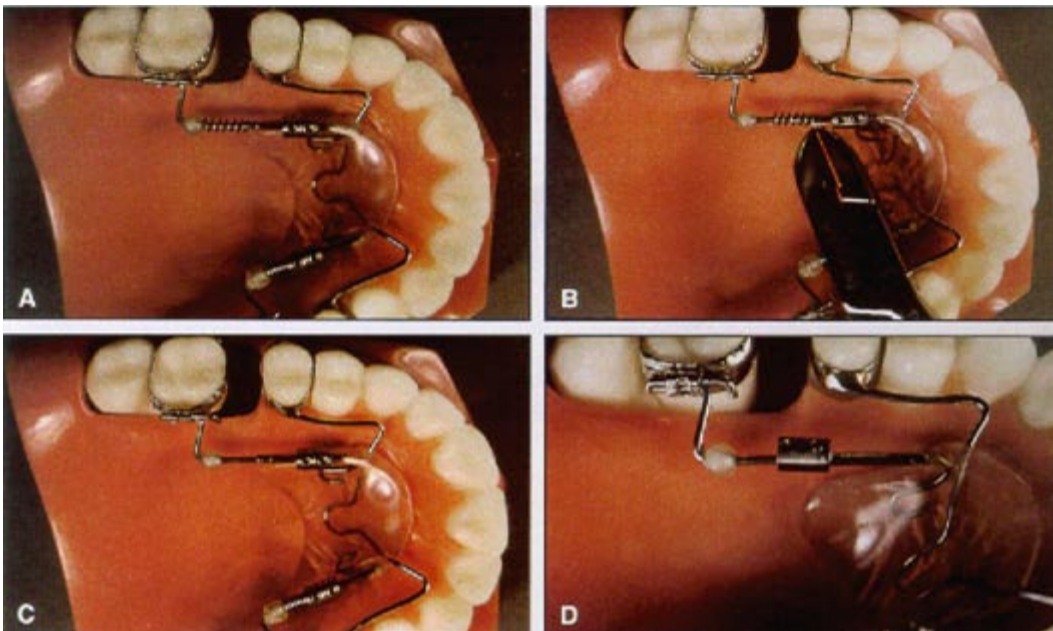


Fig. 4 Conversion of double-set-screw Distal Jet to Nance holding arch. A. Upon completion of molar distalization, double-set-screw activation collar is slid mesially to gain access to coil spring. B. Free end of coil spring is grasped with plier. Coil spring is removed by peeling it away from bayonet wire. C. Distal end of tube, where bayonet wire enters, can now be seen. D. Double-set-screw collar is slid back to this junction, mesial set screw is locked on tube, and distal screw is set on bayonet

wire, locking two sections together.

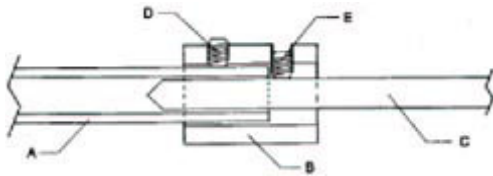


Fig. 5 Cross-section: Locking bayonet wire and tube together using double-set-screw Distal Jet. A. Tube (extends mesially into palatal acrylic). B. Activation collar. C. Distalizing bayonet wire (extends to lingual sheath on molar band). D. Mesial set screw used for active distalization. E. Distal set screw locked on bayonet wire adjacent to tube to prevent mesial movement. Both set screws are locked to convert Distal Jet to rigid Nance holding arch. Note difference in profile height of two screws.



Fig. 6 Premolar supporting wires sectioned with diamond bur in high-speed handpiece and bands removed to complete conversion of Distal Jet to Nance holding arch.



Fig. 7 Lingual molar sheath crimped with utility plier to reduce play of doubled-back wire and unwanted rotation of Nance holding arch away from palate.



Fig. 8 Three-prong plier used to adjust pressure of Distal Jet button against palate.

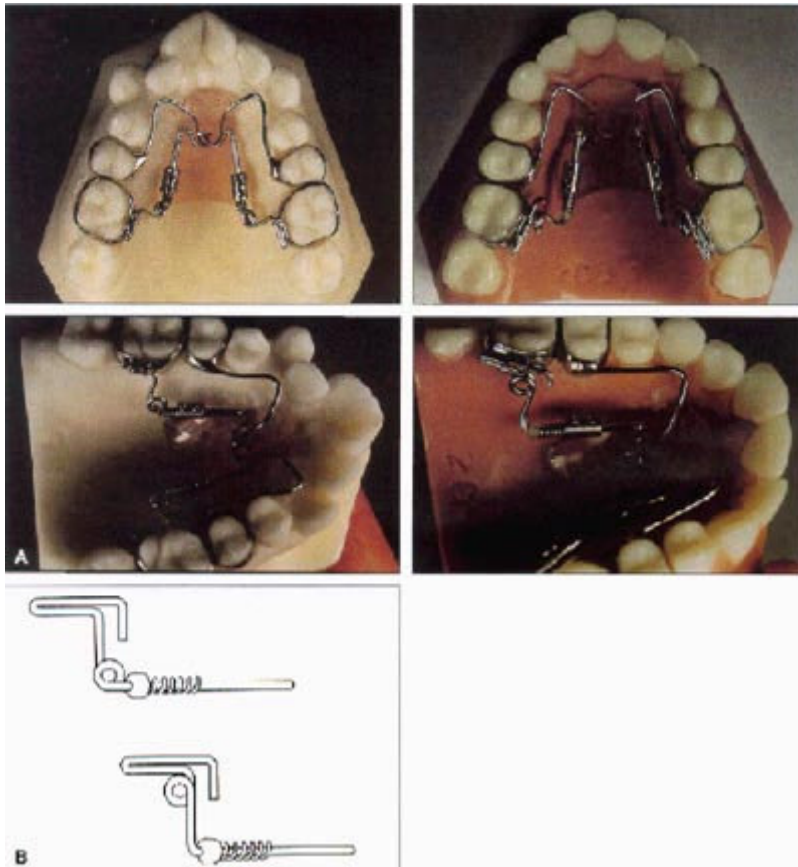


Fig. 9 Alternatives in modifying Distal Jet for molar rotation or uprighting. A. Helical loops incorporated into bayonet wire. B. Optional bayonet wires for molar rotation or uprighting.

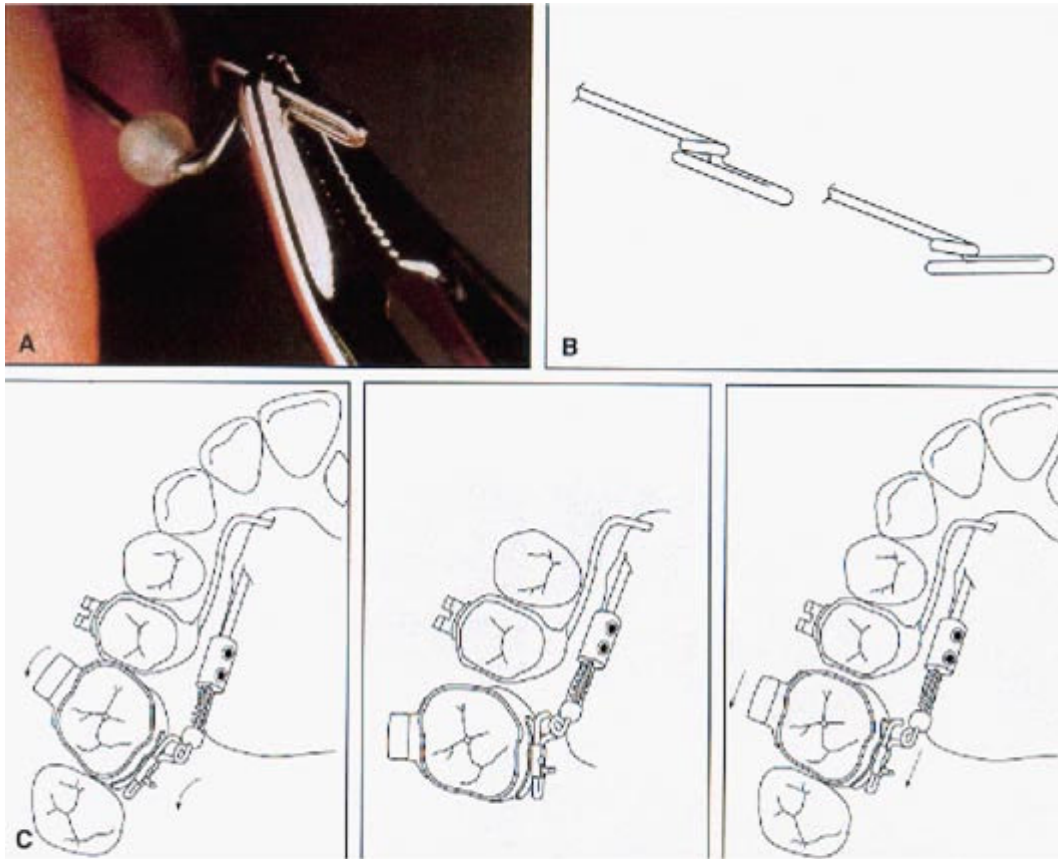


Fig. 10 A. Activation of rotational bayonet wire with utility plier prior to its insertion into lingual molar sheath. B. Activation of rotational bayonet by bending doubled-back portion. C. Forces involved in rotation and distalization of maxillary first molar using Distal Jet modified for molar rotation.

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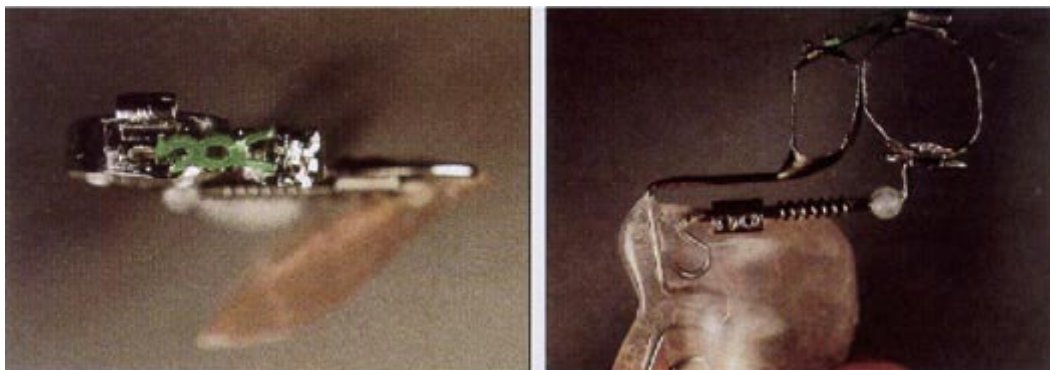


Fig. 11 Elastomeric chain used to hold bands in position during seating of preactivated Distal Jet for molar rotation.

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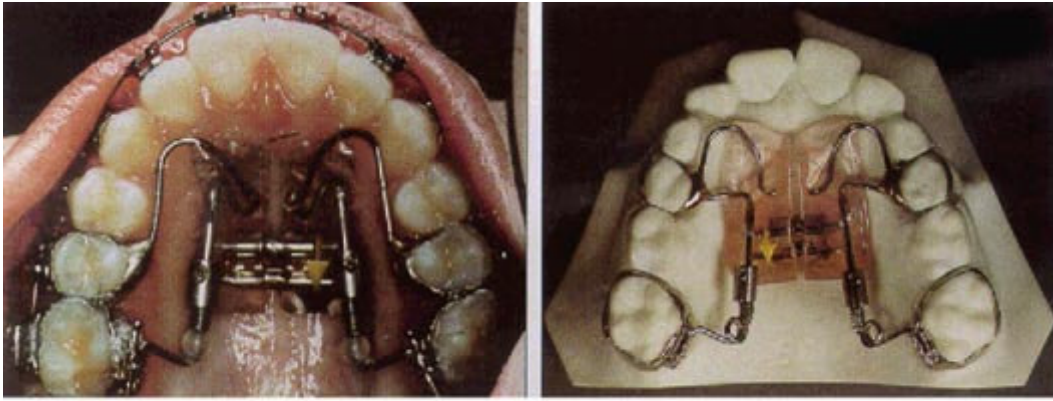


Fig. 12 Modification of Distal Jet for limited maxillary expansion, with jackscrews embedded in palatal acrylic.

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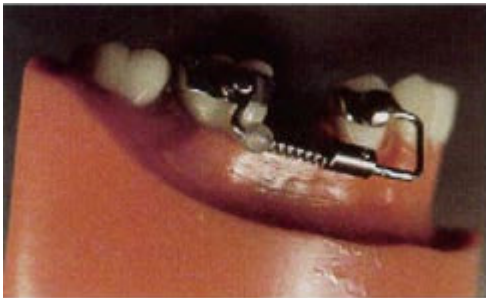


Fig. 13 Original Distal Jet for mandibular molar uprighting.

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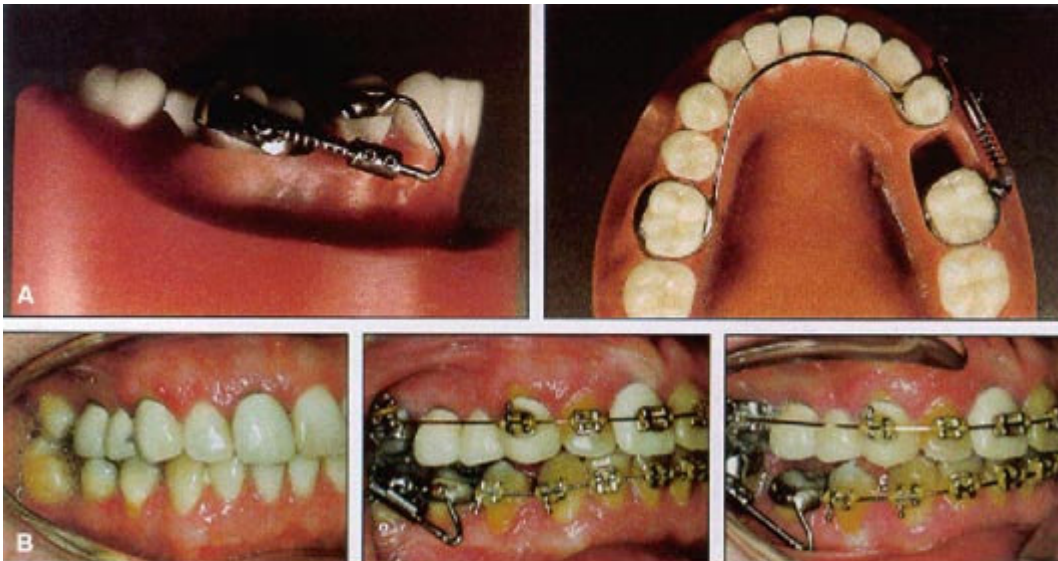


Fig. 14 A. Modification of Distal Jet for mandibular molar uprighting, with bayonet redesigned to avoid tissue impingement in buccal vestibule. B. Mandibular molar uprighted in four months with Distal Jet.

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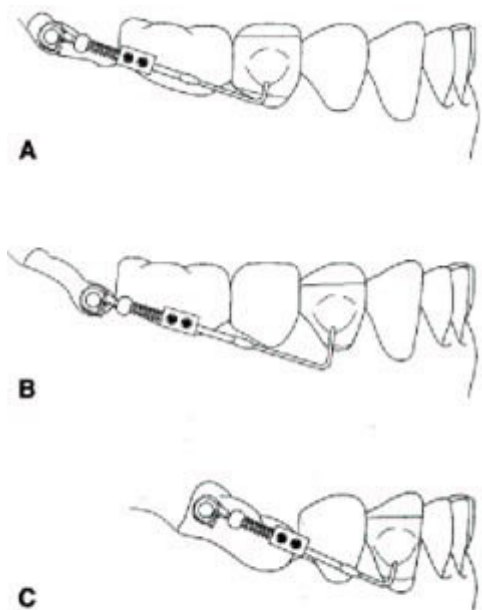


Fig. 15 Modifications of mandibular Distal Jet using banded or bonded buttons. A. Uprighting bayonet soldered to second premolar, with bonded button on distobuccal surface of second molar. B. Uprighting bayonet soldered to first premolar with bonded button on mesiobuccal surface of second molar. C. Alternative design of Distal Jet for uprighting first molars.

Fig. 15 Modifications of mandibular Distal Jet using banded or bonded buttons. A. Uprighting bayonet soldered to second premolar, with bonded button on distobuccal surface of second molar. B. Uprighting bayonet soldered to first premolar with bonded button on mesiobuccal surface of second molar. C. Alternative design of Distal Jet for uprighting first molars.

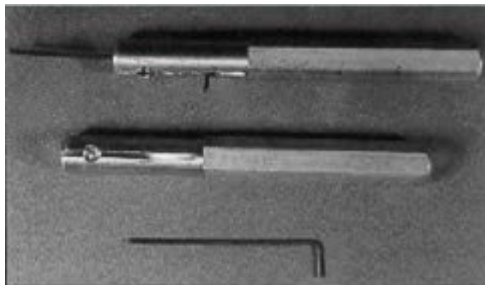


Fig. 16 Hex key handles with replaceable keys.

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