

The Distal Jet Simplified and Updated

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Since we introduced the Distal Jet* to the profession more than six years ago, it has achieved worldwide acceptance as an esthetic fixed appliance that can produce consistently reliable distal molar movement without the need for unusual patient compliance.¹⁻²²

Our experience with hundreds of Distal Jet cases has helped us identify key components of the appliance that could possibly be upgraded and modified. These observations were confirmed by a number of other clinicians. The most frequently encountered problems have been:

- Inadequate visibility of the screw.
- Difficulty in accessing the hex-head opening.
- Stripping of the screw, activation wrench, or both during treatment.
- Inability to obtain positive engagement of the lock on the tube to fully compress the spring.
- A feeling of “looseness” of the appliance in the retention phase.

With this information, we set out to make the Distal Jet an even more effective and practical tool for orthodontists.

Changes to the Appliance

The locking mechanism of the Distal Jet, which plays the central role in both molar distal-

ization and retention, consists of three interacting components—lock, screw, and activation wrench. Because the Distal Jet is contained entirely within the palatal vault, space availability and patient comfort were the primary considerations in its original design. The screw and its activation wrench had to be small enough to accommodate the dimensions of the lock. Our own analysis and that of others, however, was that the screw and wrench were just too small and delicate for precise, positive control of the appliance, and that they were prone to failure in some situations.

To address these concerns, we changed the manufacture of the lock from a machining process to a casting process using Metal Injection Molding technology. This allowed us to completely redesign the lock for better functionality and efficiency (Fig. 1). The screw and activation wrench are now much larger and more durable, and they have less tolerance between them to improve security and minimize stripping.

The return to a single-screw design, which was used in the original appliance, simplifies chairside procedures by eliminating any confu-

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Fig. 1 A. Side-by-side comparison of current (left) and new (right) Distal Jet components. B. Single screw in new lock (top) compared to twin screws in present lock. C. New Distal Jet (patient's left side) with stainless steel distal stop, compared to old Distal Jet in same patient.

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sion over which screw to activate (Fig. 2A). The screw is placed more mesially than in the previous lock, making access easier. The horizontal barrel of the lock has been extended by 7mm, extending the working range of the appliance and simplifying activation and conversion.

The new barrel has also been made much narrower to improve patient comfort, to allow more precise positioning of the tube (bayonet director) and piston (bayonet), and to make fabrication easier, especially in patients with small, narrow palates.

The vertical component of the lock serves a dual purpose: it not only orients the screw in a more accessible and visible position, both mesially and occlusally, but it also can be used as a tieback post for appliance delivery and for stabilization of the Distal Jet when converting it from active appliance to retainer.

A minor, but important, change has been made in the tiny distal stop that provides resistance to the spring for compression. Unlike the present plastic ball stop, the new stop, which is made of stainless steel tubing, will not deform under pressure. It provides better resistance for more consistent and positive spring compression

and force delivery during distalization. In addition, this metal stop has a tighter tolerance to prevent “creep” on the wire; its diameter (.5mm narrower than the present stop) and profile match up with the new lock to form a seamless junction of parts.

The net result of these changes is that the Distal Jet has a more streamlined look and feel that, in addition to its other benefits, allow oral hygiene to be more easily maintained.

Appliance Activation

1. After the Distal Jet has been tried in and cemented, squeeze the lingual sheath around the doubled-back wire. This tightens the connection of the molar to the bayonet wire for more precise control during distalization. Alternatively, either a stainless steel ligature wire or a separating elastic may be used to tie the sheath and wire together. Separating elastics have the advantage of providing a cushion effect for patient comfort, but must be checked at each appointment and replaced when necessary.

2. Insert the activation wrench into the recess in the .050" hex-screw head (Fig. 2B). Using the



Fig. 2 A. Single-screw design avoids confusion over which screw to activate. **B.** Activation wrench inserted into hex screw, lock slid back to compress spring completely, and screw tightened.



Fig. 3 A. Patient before treatment. B. Distal Jet used as transpalatal bar to correct and control rotations during molar distalization. C. Appliance modified for retention.

wrench as a guide, slide the lock back to compress the spring completely, and tighten the screw.

The patient should be seen monthly during molar distalization. To reactivate the Distal Jet, insert the wrench, loosen the screw, compress the spring completely, and tighten the screw.

Molar Rotation Correction

A unique feature of the Distal Jet is its ability to be used as a transpalatal bar to correct and control molar rotations (Fig. 3). The terminal ends of the Distal Jet bayonet wires are similar to transpalatal bars in shape and function. Therefore, rotational bends can easily be placed in the doubled-back wire sections of the Distal Jet, just as they would be with a transpalatal bar. The longer barrel of the new lock greatly facilitates such adjustments.

Any corrective bends should be made before the appliance is cemented in the mouth—either during appliance construction in the lab, or at chairside when the appliance is delivered. Rotations should be corrected before activating the appliance to distalize the molars.

Conversion to a Retainer

After molar distalization has been completed, the Distal Jet is converted to a passive appliance to retain the molars in their new positions. The steps are simple:

1. Open the screw, and decompress the coil

spring (Fig. 4A,B).

2. Peel the spring from the bayonet wire (piston) by grabbing the mesial end with a slim-nosed Weingart or other appropriate plier and pulling in one continuous motion.

3. Slide the lock firmly against the stainless steel stop, and tighten the screw (Fig. 4C). The locking mechanism has been designed to accommodate as much as 7.5mm of distalization—the mesiodistal width of a bicuspid.

4. Squeeze the terminal end of the lock tightly onto the bayonet wire to lock the unit together and keep the bayonet from moving out of the palate (Fig. 4D,E). The same result can be achieved by tying a stainless steel or elastomeric ligature from the vertical leg of the bayonet wire to the vertical arm of the lock (Fig. 4F,G), or both techniques can be used together for maximum security.

5. Cut the arms connecting the palatal acrylic to the premolars (Fig. 3C).

Conclusion

The modifications presented here will reduce chairtime, improve patient comfort, and enhance treatment efficiency and reliability without changing the biomechanical foundation or core philosophy of the Distal Jet.

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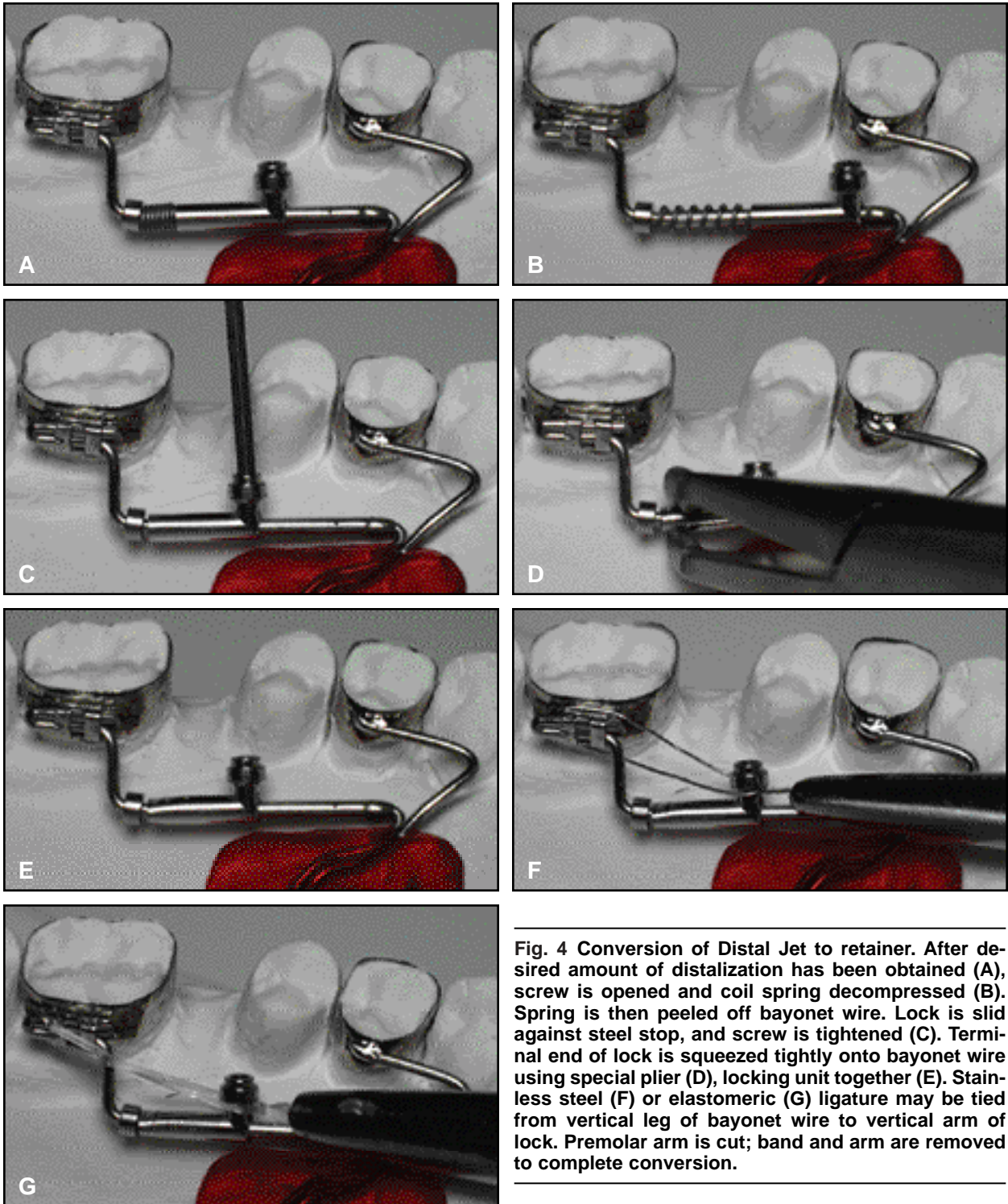


Fig. 4 Conversion of Distal Jet to retainer. After desired amount of distalization has been obtained (A), screw is opened and coil spring decompressed (B). Spring is then peeled off bayonet wire. Lock is slid against steel stop, and screw is tightened (C). Terminal end of lock is squeezed tightly onto bayonet wire using special plier (D), locking unit together (E). Stainless steel (F) or elastomeric (G) ligature may be tied from vertical leg of bayonet wire to vertical arm of lock. Premolar arm is cut; band and arm are removed to complete conversion.

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