The .018" Nickel Titanium Stop for Prevention of Archwire Crawl

JOHN J. BACCELLI, DDS, MSD

Nickel titanium wires, with their extreme flexibility, high shape memory, resistance to distortion, and virtually friction-free surfaces, have greatly alleviated the problems of initial archwire placement long faced by orthodontists. Superelastic copper alloys, which are even more flexible because of their temperature sensitivity, now allow initial wires to be placed without complicated bends, even in cases with severely malposed teeth.

Unfortunately, once these nickel titanium archwires are ligated in place, they have a tendency to crawl or ratchet around the arch. This tendency, which is especially noticeable in patients with missing teeth or wide spaces, seems to be aggravated by vigorous chewing.

At one time, most of my emergency visits were due to soft-tissue damage that occurred at the distal ends of the arch after a nickel titanium archwire migrated far beyond the terminal buccal tubes. I found that annealing the ends with a Rocky Mountain Welder* produced a dead-soft wire that could be bent back distal to the molar tubes. Although this greatly reduced my emergencies, there were still patients who inadvertently managed to extend the archwires beyond their limits.

Nickel Titanium Archwire Stops

At least one manufacturer** has produced nickel titanium archwires with small omega midline bends that help prevent archwire crawl with varying degrees of success (Fig. 1). My own attempts to bend stops in nickel titanium wires, or to glue on small acrylic stops, were fruitless. Electrowelding wire segments to the archwires only created loci for distortion or breakage.

A fishing trip solved my dilemma. I noticed a flyfisherman in a nearby stream who was weighing down his line with small, split-round lead shot. This kind of small shot, I thought, might work as an archwire stop.

Lead, of course, was out of the question, and other metals with the necessary softness and malleability were either too expensive or unavailable. I finally found some 5mm rectangular nickel-alloy tubes that I had used for laboratory procedures during my orthodontic education (Fig. 2). I cut several of these down to 2.5mm, crimped them onto a nickel titanium archwire in

*RMO, Inc., P.O. Box 17085, Denver, CO 80217.

**WonderWire Corporation, P.O. Box 6499, Wyomissing, PA 19610.

Fig. 1 Midline bend in nickel titanium archwire helps reduce archwire crawl.

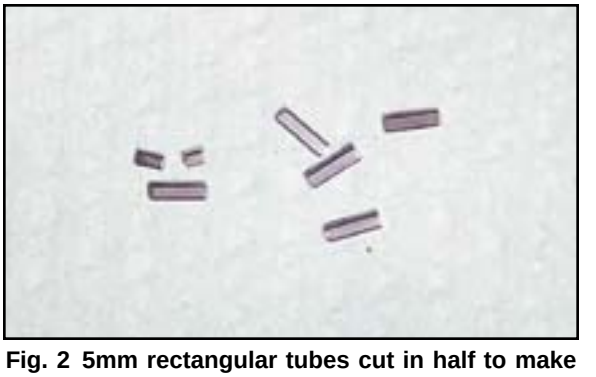
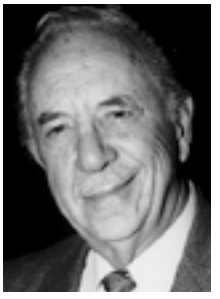


Fig. 2 5mm rectangular tubes cut in half to make 2.5mm stops.



Dr. Baccelli is in the private practice of orthodontics at 38050 Martha Ave., Fremont, CA 94536.

the appropriate places, and thereby produced immovable stops that prevented any archwire crawl (Fig. 3).

My supply of 5mm rectangular tubes soon dried up, but I discovered a 1.75mm rectangular .018" nickel titanium tube sold by American Orthodontics.*** Placing two of these stops on the archwire—mesial *and* distal to any bracket—almost always eliminated unwanted wire movement.

After some experimentation, I decided to use only one stop, placed between the wings of a single central incisor bracket. Unfortunately, the 1.75mm tubes were too long, and an inordinate amount of time was needed to grind them down to the right length. Todd Remmel, an engineer at American Orthodontics, solved the problem by reprogramming the company's cutting and polishing tools to produce 1.25mm .018" tubes, which fit perfectly between the wings of a central incisor bracket (Fig. 4).

Clinical Procedures

If necessary, a stop can be moved along the archwire to a new location. The archwire is grasped near the stop with a birdbeak or similar plier, and the cutting edges of a ligature cutter are slipped between the birdbeak and the stop. The stop can then be ratcheted along the archwire to the desired location and crimped in place (Fig. 5).

Occasionally, a case has nearly reached an ideal occlusion, but one buccal segment is still 1-2mm from a good, tight Class I. A nickel titanium open-coil spring between the first and second molars, combined with Class II elastics, can easily move the second molar distally. However, if the coil spring is advanced to between the first molar and second bicuspid, the second molar

Fig. 3 Stops crimped on nickel titanium archwire distal to central incisor brackets.

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

Fig. 4 1.25mm stop placed between tie wings of left central incisor bracket.

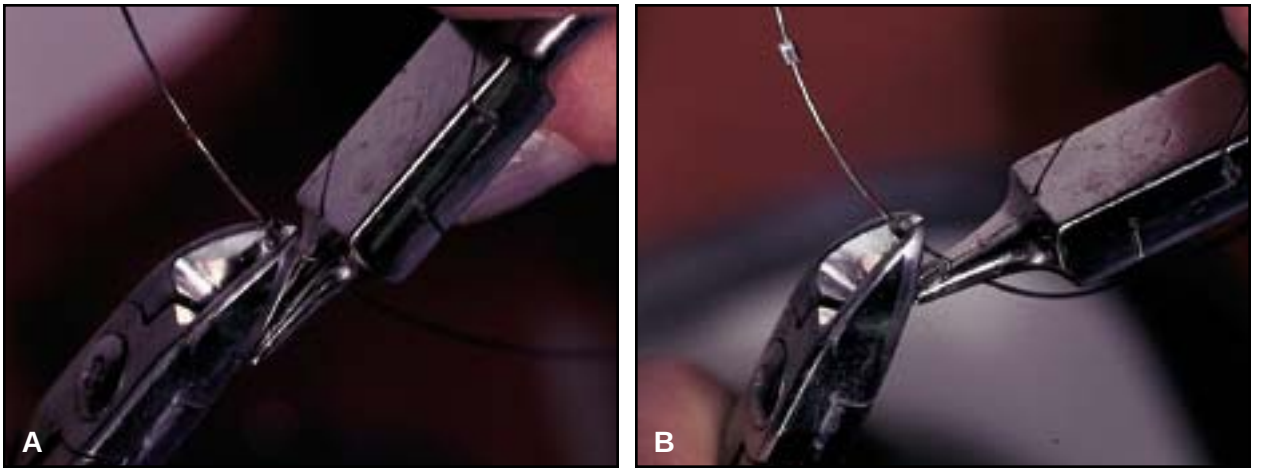


Fig. 5 Moving nickel titanium stop to new location on archwire. A. Archwire grasped with birdbeak plier; stop grasped with ligature cutter. B. Stop moved along archwire.

invariably migrates back mesially. To prevent this, we simply squeeze another rectangular stop onto the archwire, against the second molar tube. The superelasticity of the .018" nickel titanium wire allows the stop to be placed by removing only one or two ligatures (Fig. 6). The coil spring between the first molar and second bicuspid and the Class II elastics will then move the first molar distally into the tight Class I position desired (Fig. 7).

I have found these simple .018" nickel titanium stops to be useful in a variety of situations, whether moving individual teeth or preventing mesial migration of distalized molars, without archwire crawl. ❑

Fig. 6 Posterior stop placed on archwire adjacent to second molar tube.

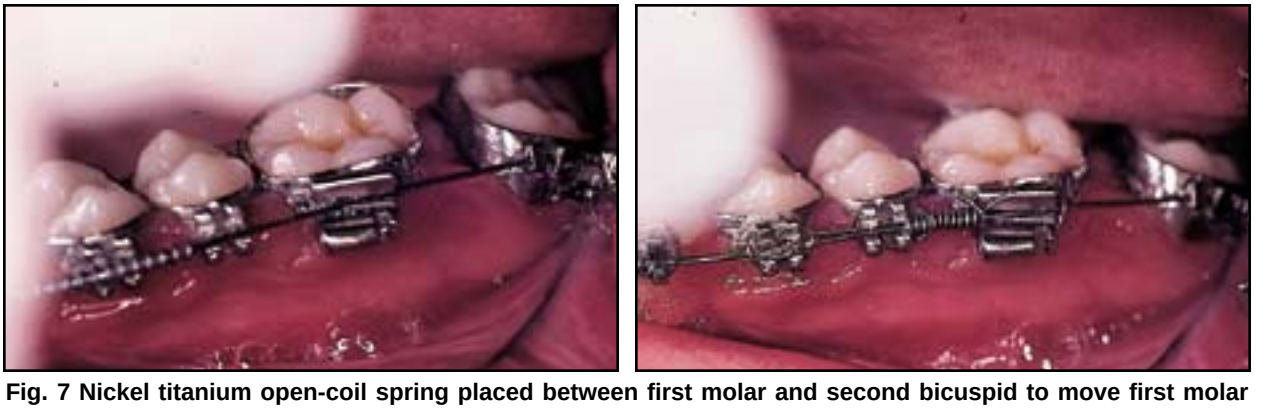


Fig. 7 Nickel titanium open-coil spring placed between first molar and second bicuspid to move first molar distally.