

A New Technique for Forced Eruption of Impacted Teeth

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Various methods have been proposed for the forced eruption of impacted teeth.¹⁻⁸ Elastics, elastomeric chain, and elastic thread usually require frequent reactivation. Cantilever springs are highly elastic and exert relatively long-lasting forces, but tend to break easily and can be uncomfortable for patients. To address these problems, my practice developed the Easy-Way-Coil (EWC) system, which is more robust and comfortable than cantilevers and meets our criteria for effective alignment of impacted incisors, canines, and premolars: a long activation distance, variable force direction, precise force delivery, and simple reactivation.

Appliance Design

The EWC system consists of a Remanium* closed-coil stainless steel spring, an .010" ligature wire, and a bondable lingual button (Fig. 1). The spring has an outer diameter of .047" and an inner diameter of .030". Each 1mm activation generates an average force of .158N or 16.1g.

To assemble the system, cut a 1" length of spring with a ligature cutter. At one end, carefully bend the last few coils of the spring at a 45° angle to make an eyelet about 1mm in length (Fig. 2A). Attach the eyelet to the lingual button with the .010" ligature wire (Fig. 2B). After twisting and trimming

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the ligature wire to a length of 1.5mm, firmly press the end against the stem of the button with a band adapter (Fig. 2C). It is important to ensure that the attachment can still be turned for subsequent activation.



Fig. 1 Easy-Way-Coil (EWC) system.



Fig. 2 A. Eyelet bent at end of closed-coil spring. B. Eyelet attached to lingual button with ligature wire. C. Wire ends pressed against button with band adapter.

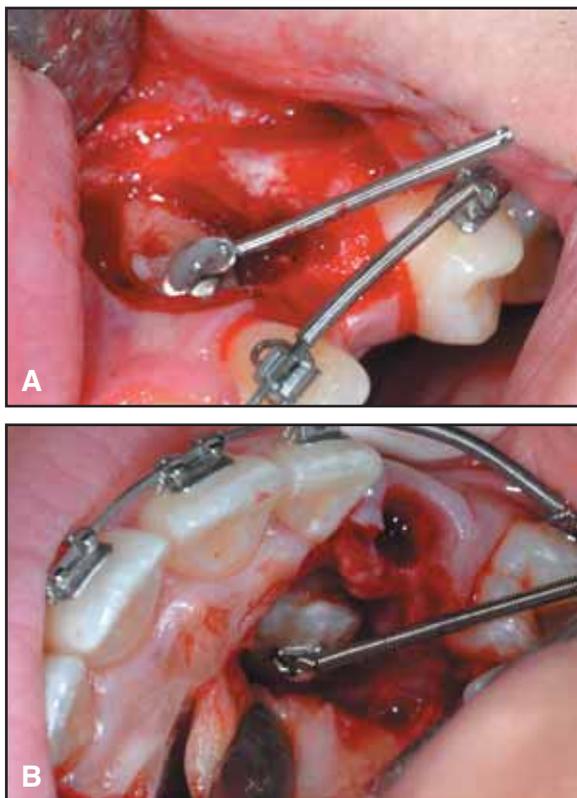


Fig. 3 A. EWC bonded buccally to buccally impacted canine. B. EWC bonded palatally to palatally impacted canine.

Before the spring is placed, sufficient space must be gained for alignment of the impacted tooth. A space holder fabricated from a piece of the Remanium spring can then be slid onto the archwire and fit exactly into the gap.

After preparing a mucoperiosteal flap, expose the crown of the impacted tooth from either the buccal or the palatal side. Etch the crown surface, then bond the EWC (Fig. 3). Suture the flap back over the spring. Temporarily attach the end of the spring passively to the archwire with suture thread.

Remove the suture eight days after exposure of the impacted tooth. The same activation procedure is followed regardless of the tooth (incisor, canine, or premolar) and the arch involved. Carefully position a ligature cutter at the desired point of attachment on the space holder that was placed on the archwire, and partially close it to cre-

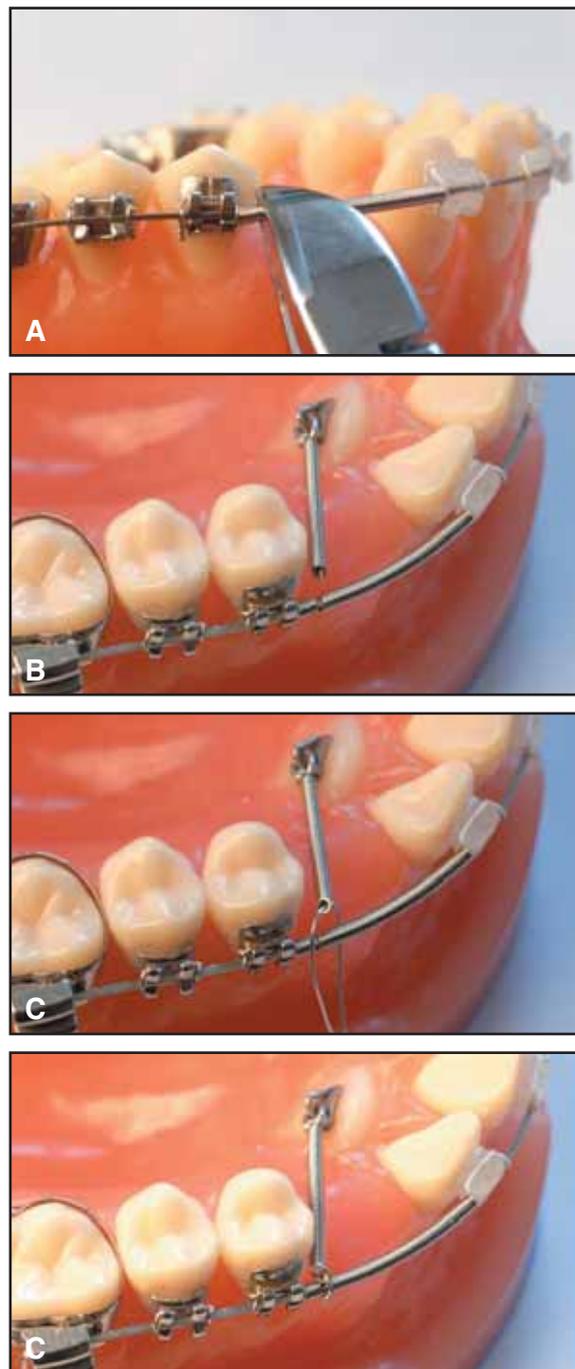


Fig. 4 Activation steps illustrated on typodont. A. Ligature cutter placed at desired attachment point on space-holder spring. B. Free end of EWC spring cut 2mm from attachment point. C. New eyelet attached to archwire with ligature wire.



Fig. 5 EWC spring at minimum length after reactivations.



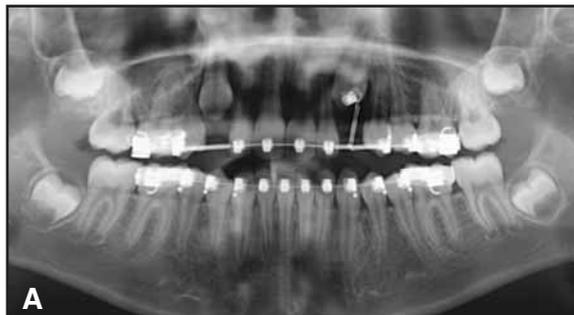
Fig. 6 Additional eruption with power tube replacing spring.



Fig. 7 "Piggyback" wire segment used for derotation and further extrusion.

ate a groove in the coil for the ligature wire (Fig. 4A). Cut the free end of the EWC spring at a distance of 2mm from the groove (Fig. 4B). Bend a new eyelet into that end of the spring as described above, and attach it to the archwire with a ligature wire (Fig. 4C).

The spring should be reactivated at four-week intervals to maintain a constant force. Remove the ligature wire attaching the spring to the arch-



A



B

Fig. 8 A. Patient with high impacted maxillary left canine. B. EWC spring force applied in disto-incisal direction.

wire, trim off the eyelet, recut the spring 2mm from the point of attachment, bend a new eyelet, and ligate the spring to the archwire at the same point. Additional reactivations are performed until the spring cannot be shortened further (Fig. 5). At this point, the spring can be replaced with a length of power tube for additional eruption (Fig. 6). If necessary, the direction of force can easily be made more mesial or distal by placing a new attachment groove in the space-holder spring.

After another four weeks, the crown will have emerged enough to remove the lingual button and place a bracket on the tooth. Further alignment can be accomplished with a "piggyback" arch segment (Fig. 7).

Clinical Experience

Unlike springs made of other materials, such as nickel titanium, the stainless steel spring can be accurately formed into a sturdy eyelet, with no introduction of torque. I have found that an .016" × .022" stainless steel main archwire provides



Fig. 9 A. Patient with palatally impacted maxillary left canine. B. EWC spring force applied in disto-buccal direction.



Fig. 10 A. Patient with impacted mandibular left second premolar. B. EWC spring force applied in mesio-lingual direction.



Fig. 11 A. 14-year-old male patient with impacted maxillary left canine before treatment. B. After 18 months of treatment with EWC, showing canine in proper axial alignment. Case was finished with 25 months of fixed labial appliances. C. Patient 22 months after debonding.

adequate anchorage for an .018" appliance.

Over the past 10 years, I have successfully treated 98 patients with impacted incisors, canines, and premolars using the EWC in a variety of configurations, including:

1. High impaction of the maxillary left canine, with the spring force applied in a distoincisor direction (Fig. 8).
2. Palatal impaction of the maxillary left canine,

with the spring force applied in a distobuccal direction (Fig. 9).

3. Impaction of the mandibular left second premolar, with the spring force applied in a mesio-gingival direction (Fig. 10).

Of these 98 cases, 41 patients with unilateral palatally impacted canines and Class I occlusal relationships were treated without extractions (Fig. 11). The length of treatment ranged from 13 to 39 months in the entire sample, with an average of 26.6 months. No infectious reactions in the oral mucosa were observed in any of the patients, nor was there any loosening of the bonded EWC attachment.

Conclusion

The EWC system allows the constant application of force throughout the eruption of impacted teeth. It can be applied either unilaterally or bilaterally, with secure anchorage and no undesirable side effects. This new technique is versatile, efficient, inexpensive, and easy to perform.

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