

TECHNIQUE CLINIC Nickel Titanium Closed-Coil Spring for Extrusion of Impacted Canines

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Many methods have been described for recovery of impacted canines.¹⁻⁶ It is generally accepted that the most efficient and least damaging procedure is forced eruption in the same direction in which the canine is tending to erupt. For example, a palatally impacted canine usually requires an eruptive force palatal to the main archwire, such as an Extrusion Spring Arm⁵ or a palatal arch.⁶

In many cases, the eruptive force can be attached directly from the main archwire to a button or chain bonded to the impacted tooth. I have found a nickel titanium closed-coil spring without end loops to be effective in such patients. The end loops are eliminated because they reduce the effective amount of spring activation by 2-3mm, and there is often only 3-4mm between the stepped archwire and the canine attachment.

Procedure

1. Cut a 16mm Jones Jig spring in half. Pull out one end slightly to form a small hook (Fig. A).
2. Slip the hook through the link of elastomeric chain (from the impacted canine) nearest the gingiva, and twist it a couple of times (Fig. B).
3. Activate the spring, and wrap several links around a stable rectangular archwire with an occlusal step (Fig. C). Be sure to leave a "tail" of chain for reactivation.
4. At the next visit, unwrap, reactivate, and rewrap the spring (Fig. D). This will take only a few minutes.

Discussion

You can experiment with different wire diameters and coil lumens to produce different amounts of force. I usually prefer this .009" × .041" spring, which provides 80g of force when stretched to twice its resting length (Table 1).

Unlike elastomeric thread, which shows a rapid decay of force, the nickel titanium spring delivers a light and continuous force over a longer period of time. An impacted canine can be extruded enough to bond an attachment within six weeks (Fig. E). □

FIGURES



Fig. A



Fig. B



Fig. C



Fig. D



Fig. E

TABLES

TABLE 1
FORCE DELIVERY (G) VS. SPRING DEFLECTION*

Deflection	Loading Force	Unloading Force
1mm	20	16
2mm	30	27
3mm	38	36
4mm	46	43
5mm	56	54
6mm	62	60
7mm	72	69
8mm	80	78
9mm	86	84
10mm	94	93
11mm	101	99
12mm	110	NA

*8mm segment of .009" x .041" nickel titanium closed-coil spring.

Table. 1

REFERENCES

- 1 Doleac, P.C. and Manga, R.K.: Technique Clinic: Multiple eyelet chain for impacted teeth, J. Clin. Orthod. 25:322, 1991.
- 2 Ziegler, T.F.: A modified technique for ligating impacted canines, Am. J. Orthod. 72:665-670, 1977.
- 3 Gange, R.J.: Technique Clinic: Attachment of elastomeric thread to a palatally impacted cuspid, J. Clin. Orthod. 28:458, 1994.
- 4 Darendeliler, M.A. and Friedli, J.M.: Case Report: Treatment of an impacted canine with magnets, J. Clin. Orthod. 28:639-643, 1994.
- 5 Terry, S.J. and Thompson, M.E.: Treatment of palatally impacted cuspids with the Extrusion Spring Arm, J. Clin. Orthod. 29:709-712, 1995.
- 6 Shapira, Y. and Kuftinec, M.: Orthodontic management of the palatally impacted tooth, J. Clin. Orthod. 15:810-813, 1981.

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FOOTNOTES

- 1 American Orthodontics, 1714 Cambridge Ave., P.O. Box 1048, Sheboygan, WI 53082.