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## Clinical Innovation

# Modified 'S' shape ring for reactivation of open coil spring: A clinical pearl

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### ABSTRACT

Ni-Ti open coil springs are often used for opening spaces for crowded or for distalization of the molar teeth. Predetermining the length of open coil spring required to open up the exact amount of space is rather difficult, and sometimes, the length of the open coil spring falls short to open up the entire space required. Open coil spring usually requires reactivation to gain enough space in the arch or between two adjacent teeth. This paper highlights the chairside method of reactivation of NiTi open coil spring with the use of modified 'S' shape ring without removing the base archwire.

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## 1. Introduction

In literature various methods are there to open spaces in orthodontics like interproximal reduction or slicing the tooth but they are having drawbacks of long term sensitivity and caries susceptibility to the patient. Expansion is another method to gain space in arch but the appliance which require producing expansion having disadvantages like rigidity of appliance, hygiene maintenance, and material cost is high. Distalization is also another method to open spaces but they are having a more patient comfort and appliance rigidity in arches. Derotations of posterior teeth and up righting of molars are also other methods to regain spaces in arches.

Open coil springs are commonly used auxiliaries in fixed orthodontic appliance therapy. The Nickel-Titanium (NiTi) open coil spring are often used for opening spaces for crowded or for distalization of the molar teeth. Inserting an open coil spring is a cumbersome procedure; the coil spring needs to be compressed between two teeth and often requires assistance to hold one of its ends with a wire

tucker to firmly ligate the adjacent teeth. Failure to ligate the teeth properly can lead to rotation of teeth. Open coil spring usually requires reactivation to gain enough space in the arch or between two adjacent teeth. Although open coil springs have long been used to open spaces within dental arches, they are difficult to reactivate and tend to cause unwanted reciprocal movement of adjacent teeth.<sup>1</sup>

Previously published methods for reactivation have included placing crimpable stops or sections of split tubing on the archwire, which require additional procedure to prevent the piece of tubing from accidentally falling to the back of mouth before it is attached. To prevent that placement of piece of dental gauze or napkin behind the area of the spring.<sup>2,3</sup> Pre-positioning additional wire segments between neighbouring teeth and spreading apart the coils of the spring,<sup>4</sup> C-rings fabricated from stainless steel rectangular arch wires this cut section of C-shaped from end of wire having very small in size to grasp or hold in any plier.<sup>5</sup> and composite stop placement on archwire which is cumbersome procedure require special technique of bonding and needs more chair side time to place a stop on archwire.<sup>6</sup> By considering all this drawbacks

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and disadvantages of previously published methods for reactivation of open coil spring. We have devised a simple and efficient method for chairside reactivation of an open-coil spring using stainless steel archwire.

#### Technique

1. Bend the end of 21 gauge round stainless-steel wire or .016 × .022 rectangular stainless-steel wire in a half 'S' shape, around the round beak of bird beak plier.(Figure 1)
2. Then complete the 'S' shape with an addition of helix in the lower part of 'S' shape ring.(Figure 2)
3. Expose the archwire by pushing the open coil spring to one side using wire tucker.(Figure 3) Place the 'S' shape ring over the archwire and crimp it to secure the archwire and cut the remaining portion of the stainless-steel wire. (Figures 4 and 5)



Fig. 3:



Fig. 1:



Fig. 4:



Fig. 2:



Fig. 5:



Fig. 6:



Fig. 7:

## 2. Discussion

Coil spring is used in orthodontics to deliver forces to move teeth. Ryan S. Lubinsky<sup>7</sup> conducted a study to evaluate the deactivation force characteristics of nickel titanium open coil spring after varying levels of activation. Results showed that when activated 20% of original length, the force values at 3 mm compression upon deactivation were only 53-73% of the force level when activated to 80% of original length. When activated to 40% of original length, the force values at 3 mm compression upon deactivation were 65-91% of the force level when activated to 80% of original length.<sup>7</sup> NiTi coil springs were found to produce light continuous force through a long range of activation although the force produced were slightly below the optimum 75-100 g range.<sup>8</sup>

As with previously published technique, the modified 'S' shape ring does not require archwire removal and thus reduces chairside time. Main advantage of this ring is that it does not require protection of airway or no risk of slippage of the ring and can be crimped easily on the archwire so

patient compliance is more by using 'S' shape ring. Another advantage is that working range is more by addition of helix in the ring to reduce the slippage chances of the ring. This ring is easy to fabricate by using stainless steel wires which are easily available in any practice. An addition to this when clinician requires more activation of coil spring then we can add two or three S shape ring according to need of activation.

Another application of the modified 'S' shape ring is to reactivate the Forsus fatigue resistance device. To activate the forsus asymmetrically for midline correction, one or more 'S' shape ring can be crimped onto the push rod distal to stopper while compressing the spring as needed. Another use of the modified 'S' shape ring is that it can be used in lingual fixed orthodontic treatment where there need of an open coil spring.

## 3. Conclusion

1. The modified 'S' shape ring does not require archwire removal and thus reduces chairside time to reactivate open coil spring. easy to fabricate by using stainless steel wires which are easily available in any practice.
2. To reactivate the Forsus fatigue resistance device.
3. It can be used in lingual fixed orthodontic treatment where there is need of an open coil spring.

## 4. Conflict of Interest

The authors declare no relevant conflicts of interest.

## 5. Source of Funding

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