

CLINICAL
SECTION

Clinical pearl: a method of controlled movement of teeth using open and closed coil spring

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A method of controlled movement of teeth using open and closed coil spring. A 'clinical pearl' describing an original clinical technique to prevent uncontrolled tooth movement while using an active coil spring on the archwire.

Key words: Coil spring, active coil spring, closed coil spring, tooth movement

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Opening space or moving teeth using an active coil spring on the archwire is a common procedure during fixed appliance treatment.

Despite its routine use this technique has some disadvantages. Teeth adjacent to the active coil spring are subjected to a force which can result in several unwanted effects:

- rotation;
- tipping;
- disengagement of the brackets off the archwire on either side of the active coil spring;
- increased friction.

A common way to lessen these unwanted effects is to tie the neighbouring brackets to the active coil spring tightly onto the archwire with stainless steel ligatures. As the teeth are pushed by the coil spring they tend to tip and rotate causing friction and reducing tooth movement

(Figure 1). Although the rotations could be dealt with when dropping back to a flexible archwire to pick up a displaced tooth (such as in Figure 1) the increased friction slows progress. If the ligatures fail, a tooth is pushed off the archwire resulting in increased treatment time.

If the force could be 'broken' and divided between more teeth then less unwanted movement might occur.

This can be achieved by using closed coil spring as a 'brake'.

Each time an active coil spring is placed a segment of closed coil spring can be inserted between the adjacent inter bracket spaces over the archwire. This coil spring needs to fit closely to the edges of the brackets so no movement of the two brackets on either side is possible. The closed coil can be offered up to the inter bracket space with serrated college tweezers and then cut to length and threaded onto the archwire. It is a simple and quick procedure that the author uses routinely (Figure 2).

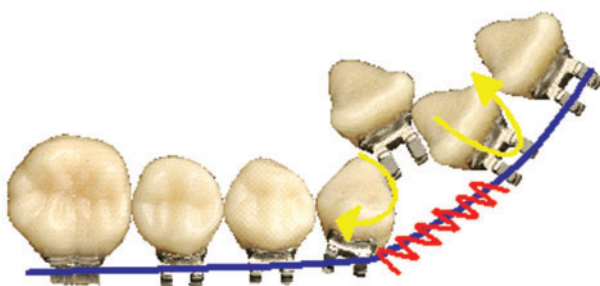


Figure 1 Coil spring causing unwanted reciprocal rotation

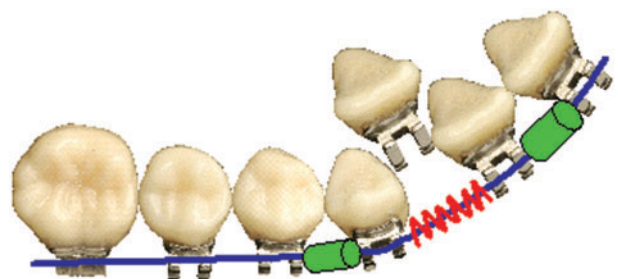


Figure 2 Closed coil spring inserted either side of the active coil spring to prevent unwanted reciprocal movement

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Figure 3 Opening space for a crowded lateral incisor



Figure 4 Space opening after six weeks

Closed coil spring would only be utilized where reciprocal movement of teeth along the archwire is not needed by the active coil.

Some tipping can still occur but rotation is virtually eliminated. As the teeth and brackets are now more fixed in their position the archwire is left free to slide with reduced friction (Figures 3 and 4).



Figure 6 Space opening for lingual LR2 to prevent reciprocal movement

Even if a ligature is lost on the brackets either side of the active coil spring the closed coils usually prevent the tooth spinning off the archwire.

When opening a space for a tooth that is completely excluded from the arch greater force may be needed. More closed coil spring brakes can then be placed to distribute the force more evenly across several teeth (Figures 5–7).

Closed coil spring within a group of teeth to be moved allows for stronger forces to be used on the active coil without the tooth adjacent to the spring being pushed off the archwire. This is demonstrated in Figure 8 (a,b) by the translation of the left canines from a Class II to a Class I relationship.

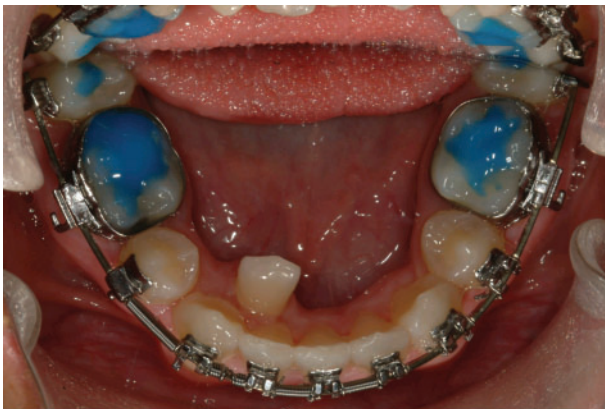
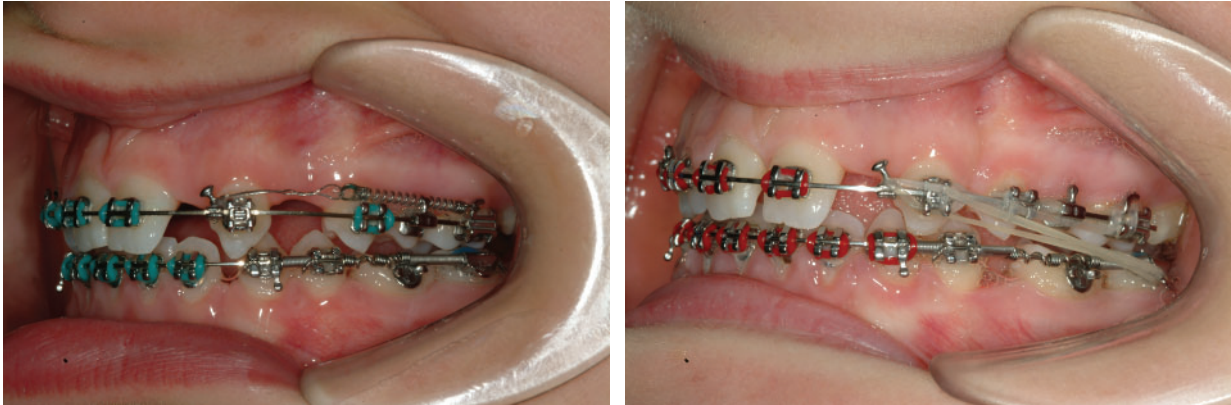


Figure 5 Three closed coil springs in place



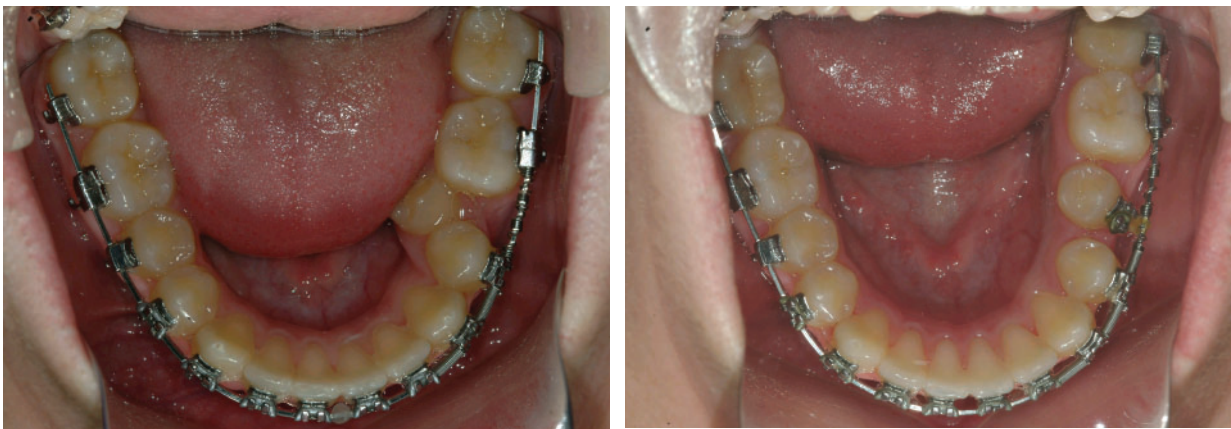
Figure 7 Aligned lower incisor



(a)

(b)

Figure 8 (a,b) Closed coil spring between lower left canine and first premolar to 'break' force from active coil in lower left second premolar space



(a)

(b)

Figure 9 (a,b) Two closed coil springs braking force from active coil in lower left second premolar region

Space opening proceeds quickly with no unwanted tooth movements. Teeth receiving reciprocal force from active coil spring remain in place (Figure 9a,b).

Conclusion

Closed coil spring is an effective adjunct to active coil spring to prevent friction and unwanted tooth movement. Although difficult to verify in a scientific

study due to different rates of tooth movement between patients it is the author's anecdotal observation that space opens more rapidly using this technique.

Acknowledgements

To the best of the author's knowledge, having shown this idea to orthodontists both in the UK and the USA, this is an original idea by the author.