

Case Report

Reverse-M-Zadake spring – A novel design for the management of root divergence

ABSTRACT

The main reason to seek Orthodontic treatment is esthetics. Black triangles after lower incisor extraction are one of the commonly occurring malocclusion which causes esthetic compromises. Relapse is unavoidable while treating such cases. This relapse can be controlled only when there is translatory root movement in the mesial direction. Very little literature is available for the correction of black triangles. In this article, a spring is fabricated by using 0.018 A J Wilcock stainless steel special plus wire containing three helices. This Trihelical spring is a simple, effective, esthetic, and biologically compatible device with excellent root control for the treatment of root divergence.

Keywords: Black triangles, root divergence, translatory root movement, trihelical spring

INTRODUCTION

The interdental papilla plays a key role in anterior esthetics. With the loss of supporting alveolar bone, connective tissue and epithelial attachment are compromised. Multidisciplinary strategies are available for the prevention and management of black triangles. These spaces have a negative impact on esthetics, function, phonetics, and facilitate food retention affecting periodontal health.^[1] Black triangles are the embrasures cervical to the interproximal contact which are not filled by gingival tissue. The prevalence of posttreatment open gingival embrasures in an average adult orthodontic population is about 38%.^[2,3] Uribe *et al.* showed that more than two-thirds of the patients who had a mandibular incisor extracted had a black triangle embrasure at the end of treatment.^[4]

ARMAMENTARIUM

- 0.018-inch A J Wilcock special plus stainless steel wire
- 0.010-inch Ligature wire
- Bird beak plier
- Pin and ligature cutter [Figure 1].

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METHOD OF FABRICATION

- Reverse-M-Zadake (RMZ) spring consist of three coils, each of 3 mm in diameter, one at the center and two at the periphery giving it an appearance of the alphabet 'W' [Figure 2]
- Two arms emerge from respective helices with anti-tip bends of 35°
- RMZ spring is then placed in such a way that it should lie away from gingival soft tissue [Figure 3]
- Ends of these two arms are engaged into brackets of the respective tooth and ligated with ligature wire and cinched back. RVG was taken in the same position [Figure 4]
- It will deliver a force of 50 gm
- Pre- and post-treatment comparative photographs [Figure 5].

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ACTIVATION

There are two ways to activate the RMZ spring,

- Opening of two peripheral helices by 0.5 mm
- Closing of one middle helix by 0.5 mm.

Root uprighting was achieved within 3 months with 0.5 mm activation per month [Figure 6] and again RVG (Radiovisiograph) was taken to check for root resorption [Figure 7].



Figure 1: Armamentarium



Figure 3: Reverse-M-Zadake spring ligated with ligature wire



Figure 5: Pre- and post-treatment comparative photographs

MECHANISM OF ACTION

Round wire will cause a root uprighting and free tipping of incisors in the distal direction. The roots of

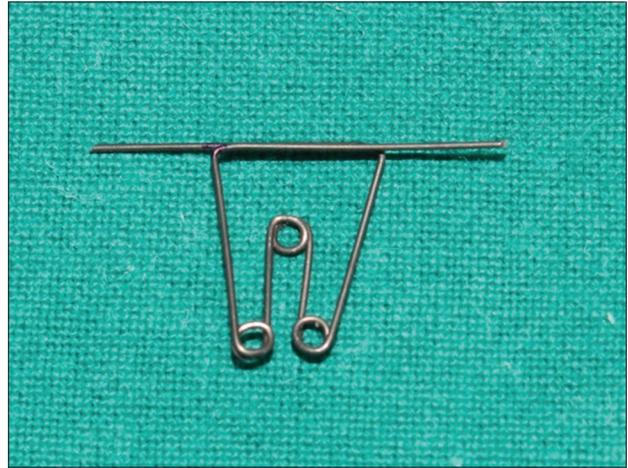


Figure 2: Design of Reverse-M-Zadakes spring

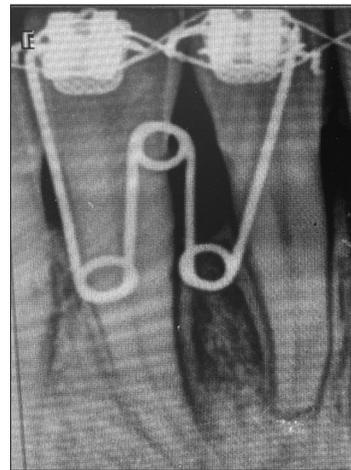


Figure 4: RVG after placement of Reverse-M-Zadake spring



Figure 6: Root uprighting with Reverse-M-Zadake spring

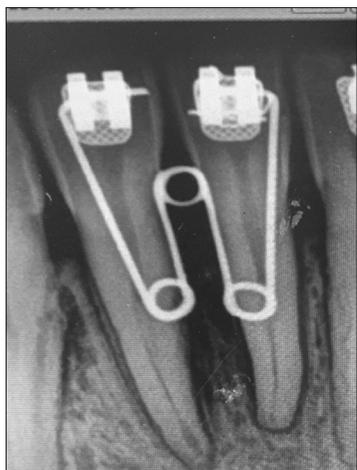


Figure 7: RVG after root uprighting

the incisors will be convergent at the end of tipping. 0.019 × 0.025" segmented stainless steel archwire was tightly ligated for a month to achieve better torque control [Figure 8a and b].

CONCLUSION

RMZ spring is a novel design fabricated by using 0.018-inch A J Wilcock special plus wire for the management of root divergence following lower incisor extraction.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

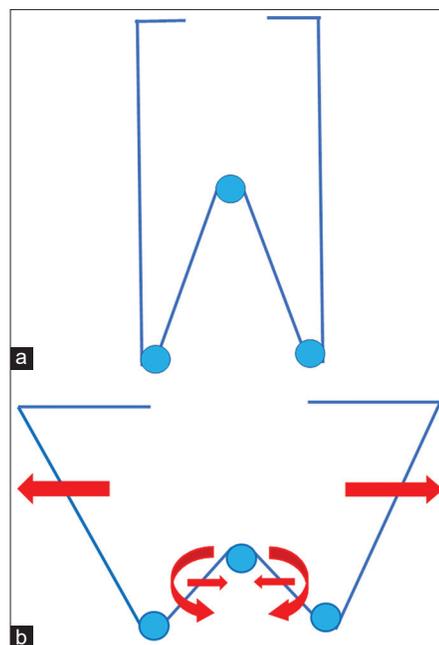


Figure 8: (a) Activated Reverse-M-Zadake spring. (b) Forces generated after engagement in brackets

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