Simultaneous torquing, aligning and retraction spring: A three-dimensional approach for blocked out canines

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Abstract

Orthodontic management of a buccally blocked-out canine requires a substantial amount of bodily movement, which is difficult to perform because of its long and bulbous root. Even when orthodontic forces are applied in a desired direction, large hyalinized areas are created which impede the root movement. Palatal root torque is needed for the canine to increase the buccal bone thickness, decrease the risk of bone dehiscence and gingival recession. Closing loops generate a distal force along with an extrusive component which retracts the canine into the extraction space but lacks control on the torque of the canine. To overcome this limitation, this simultaneous torquing, aligning, and retraction spring was designed. It can be easily fabricated, activated at chairside for either simultaneous or sequential controlled three-dimensional tooth movements.

Key words: Aligning, ectopic canine, retraction, spring, torquing

INTRODUCTION

Orthodontic management of a buccally blocked-out canine requires a substantial amount of bodily movement which is difficult to perform because of its long and bulbous root. Even when orthodontic forces are applied in a desired direction, large hyalinized areas are created which impede the root movement. In order to produce efficient canine root movement, very light orthodontic forces are required. This can be achieved by sectional wire with frictionless mechanic coupled with slight activation during canine retraction stage, and using long span of wire (with increased interbracket width and increased flexibility) by differential bonding of the teeth during alignment stage.[1] Cantilever springs are preferred than the continuous wires to avoid the adverse effects on the adjacent teeth such as flattening of the arch which might require even more time for correction.[2] Closing loops generate a distal force along with an extrusive component which retracts the canine into the extraction space but without any control on the torque. Since the canine root has a close proximity to the cortical bone, palatal root torque is needed for the canine during retraction to increase the buccal bone thickness thereby decreasing the risk of cortical anchorage, root resorption, bone dehiscence, gingival recession, and hindered tooth movement.[1] To overcome this limitation, simultaneous torquing, aligning, and retraction (S-TAR) spring [Figure 1] was designed to maintain the torque of the canine in addition to retraction and extrusion of the canine into the extraction space. The steps to fabricate this spring are as follows:

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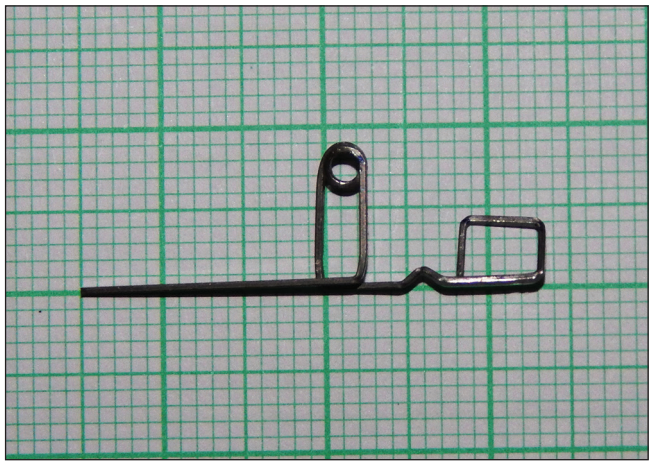

Figure 1: The simultaneous torquing, aligning and retraction spring design

Figure 3: The simultaneous torquing, aligning and retraction spring engaged and activated by 2 mm

Figure 5: Post alignment frontal view of maxillary canine in occlusion

1. A closing loop of 9 mm in height is bent in a 17″ × 25″ TMA wire with the distance between the legs of the loop kept at 2 mm. This loop will aid in retraction of the canine.
2. A V bend is given just distal to the canine in the anterior segment of the wire. The V bend is to localize the torque to the anterior segment of the spring.

Figure 2: Case of a buccally placed right maxillary canine

Figure 4: Postalignment buccal view of maxillary canine in occlusion

3. Next, a box is fabricated in the anterior to the V bend at the level of the bracket of the canine. The height of the box should be 3-4 mm to help in torquing the canine. The box will help in maintaining the tip and torque of the canine during retraction.
4. Posteriorly enough wire should be left free to enter the auxiliary tube on the molar band.
5. Before inserting the spring, preactivation lingual root torque of 15° is given anterior to the V bend of the spring.
6. Final activation of the spring is done by activating the closing loop by 2 mm.

Figure 2 presents a case with buccally blocked out canine on the right side of the upper arch. Anchorage was prepared using a transpalatal arch along with a base archwire of 19 × 25 stainless steel wire. The S-TAR spring was inserted in the auxiliary tube of the molar and engaged to the canine on that side. Figure 3 shows the spring was in activated state. The canine was brought into occlusion without any adverse effects on the molar [Figures 4 and 5].

The spring shown here can be easily fabricated and activated at chairside for either simultaneous or sequential movement in all three planes of space. The uniqueness of this spring lies in the efficient and controlled torquing moments achieved along with the retraction of the canine into the extraction space.

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Conflicts of interest

There are no conflicts of interest.

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