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TMA - An Ally Alloy for Cuspid Rotation

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Abstract: ***Dental anomalies usually lead to complicated decisions having to be made in terms of the orthodontic treatment of permanent dentition; tooth rotation is the most common of these irregularities. Typically, during leveling and alignment, rotated canines are corrected using round NiTi wires. When the traditional methods are ineffective, an alternative biomechanical strategy may be used. This article explains how to use TMA wire to fix a rotated canine.***

Keywords: Rotated canine, box loop, TMA (Titanium Molybdenum Alloy), de - rotation, cuspid

1. Introduction

When it comes to the orthodontic treatment of permanent teeth, dental irregularities typically need difficult considerations. [(1)] Developmental variations of these irregularities are a crucial component of dental morphologic variations. The etiology of these dental malformations is produced by hereditary and environmental variables. [(2)]

While developmental disruption at the morphological differentiation stage leads to abnormalities in tooth shape, number, and structure, developmental disruption in the pattern of permanent tooth eruption leads to abnormalities in tooth position. Disparities in the tooth position are a factor in rotation, impaction, and ectopic eruption. [(3)]

The permanent canines are the teeth that exhibit eruption disturbances the most frequently due to a variety of variables, including the longest time of development, the most challenging and prolonged course of the eruption, and environmental and genetic factors. [(4, 5)]

A NiTi round archwire can usually correct mild rotations, but in circumstances where the canine is excessively rotated, a different strategy must be used. The article emphasizes the segmental correction of a rotated canine utilizing a Box loop constructed of TMA (Titanium Molybdenum Alloy) wire.

2. Technique

A 20 - year - old female patient reported a chief complaint of irregularly placed teeth in the upper and lower arches. The canine relationship was not established on either side with the right mandibular canine rotated distobuccally [Figure 1]. MBT (0.022 × 0.028 slots) bracket was bonded onto the upper and lower arches. Segmental mechanics was used because round NiTi wire alone was unable to rectify the lower right mandibular canine's rotation.

Figure 1

A box loopwas bent from 0.017”x 0.025" beta titanium wire and was engaged between the canine bracket and the molar tube on the adjacent first molar on the right side of the lower arch. When canine rotation is corrected with TMA wires, the tooth is subjected to controlled force application, which has the added benefit of obtaining the desired outcome quickly. [(7, 8)]

Design of the loop

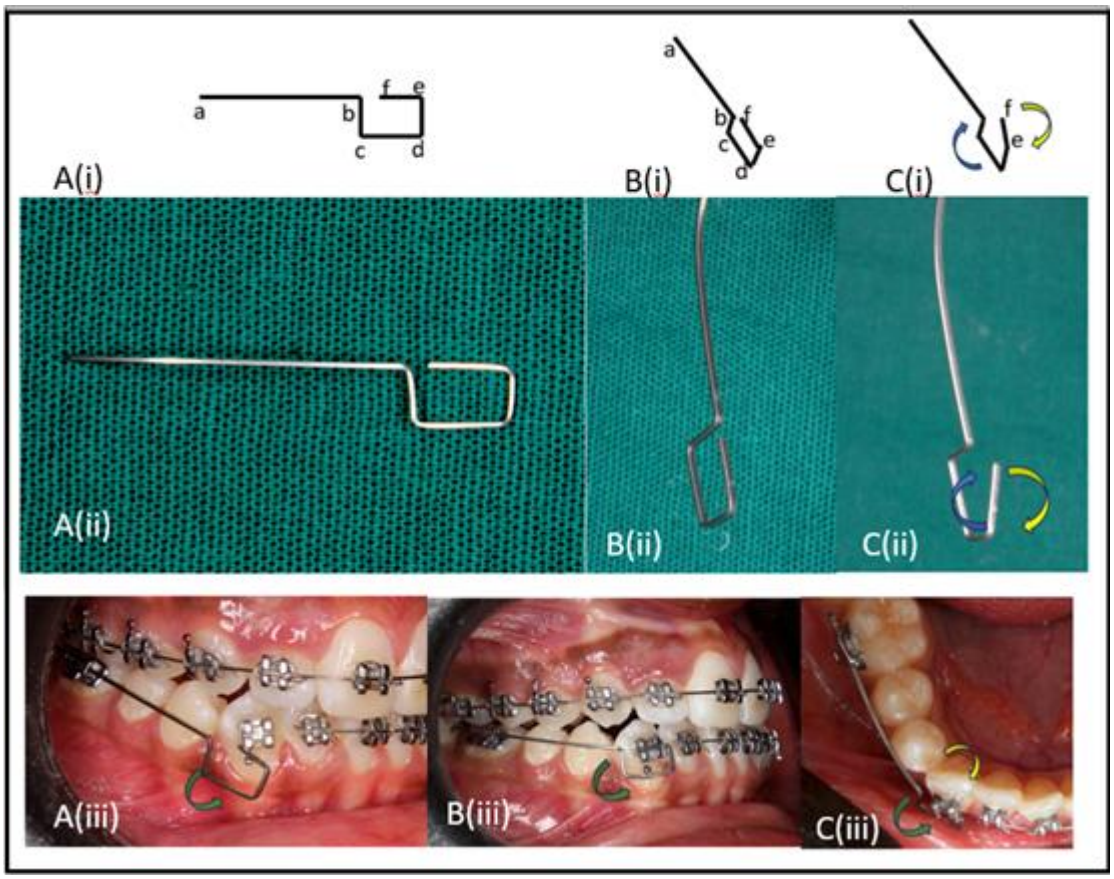

Figure 3

The box loop is made of 0.017"x 0.025" beta titanium wire as shown in the above image [A (i)] with the "a" segment engaged into the molar tube of the right mandibular first molar. [A (ii)]. The loop is away from the mesial aspect of the distobuccally rotated canine as it is passively inserted into the tube [A (iii)].

The "ef" portion of the wire will be inserted into the canine bracket's slot. The blue arrow in the figure above [B (iii)] indicates how to bend the "ef" distolingually, while the yellow arrows indicate how the canine will de - rotate.

The TMA wire is forcefully engaged into the bracket slot as shown in the image [B (ii)].

The SS ligature ties secure the wire in the bracket slot, which generates a mesiobuccal rotational force (yellow arrow in the image [C (iii)]and pushes the distal aspect lingually.

After the activation of the loop, we can observe the canine's de - rotation observed in two months. [figure 4, 5&6].

Anchorage was conserved considering the surface area of the root of the molar was greater than that of the canine.

Figure 4

Figure 5

Figure 6

Advantages of box loop

The box loop has more wire between the brackets than any other loop, resulting in a greater capacity for force reduction and a wider range of motion.

The deflection in the occlusogingival plane depends on the length of wire in horizontal planes and bending at the corners of the box

Applied to teeth that have been badly misaligned, such as canines that are palatally positioned and teeth that are out of alignment with the arch. [8]

3. Conclusion

It can be concluded that each case requires the selection of an appropriate appliance and an assessment. When utilizing traditional methods to straighten rotated teeth is difficult or takes a long time, loops can be employed. Every case should be meticulously prepared and the best biomechanics should be used to achieve therapeutic objectives faster and in the best interest of the patient.

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