Research Article

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2019;9:1:278-280.

Evaluation and Comparison of Different Types of Wires in Anterior Retraction: A Comparative Study

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ABSTRACT

Background: Different types of wires can be used for retraction in orthodontic tooth movement.

Aim & objectives: To assess the effectiveness of TMA & CNA wire.

Material & methods: 10 patients undergoing orthodontic treatment were divided in two groups and orthodontic retraction using TMA wire was done in group 1 and CNA wire was used in group 2.

Results: CNA wire using anterior en mass retraction produces better results.

Conclusion: anterior retraction was faster with CNA wires.

Keywords: CNA wire, TMA wire, T loop.

INTRODUCTION

Fixed orthodontic treatment has three phase's namely levelling and aligning, retraction or space closure, and finishing and detailing. All three phases are important and have got their own significance[910]. In Indian subcontinent the chief complain of the patients revolves around forwardly placed upper front teeth. This can be mainly corrected in the second phase of treatment. In pre adjusted edge wise technique retraction is achieved either with friction or frictionless mechanics. Friction mechanics has widely developed by MBT technique. It has own advantages and disadvantage. As name suggest it produces friction. While another mechanics is frictionless. As name suggest it doesn't produces friction. Friction depends on nature of wire (size and material) and nature of design of loop used in the retraction.

MATERIAL AND METHODS

10 patients undergoing treatment in the dental hospital were chosen for the study. Informed consent was obtained from all the patients. All patients were bonded with 0.022"x0.028" pre-adjusted edge wise appliance used for fixed orthodontic treatment.

Subjects were divided in two groups: group I and group II. In group I en mass retraction was done with 0.017" x0.025" TMA wire, incorporating the continuous T loop design. Group II en mass retraction was done with 0.017" x0.025" CNA wire, incorporating the continuous T loop design. Both types of loop were given at 40 degree beta and 20 degree alpha activation to develop the differential movement for group A anchorage.

On passive insertion, each closing loop was activated 5mm. activation level of the spring were confirmed with caliper. An observation period of 5 weeks was planned to allow full expression of the force.

Recording technique: All lateral cephalographs were taken and compared. Linear measurements were made using tooth position locating device.

Received: Sept. 1, 2018**:** **Accepted**: Oct. 20, 2018
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Statistical analysis: Descriptive statistics of mean standard deviation and range were computed for horizontal, vertical and angular dental changes with SPSS version 15.

RESULTS

Data for bilateral molar and canine movements were combined so that a total of 20 observation of each variable were assessed among the sample of 10 subjects.

DISCUSSION

Orthodontic space closure should be specially tailored based on the individual cases. Well-designed closing loops promote a more continuous type of tooth movement by eliminating the intermittent force delivery as seen in sliding mechanics. CJ Burstone in his "Segmented Arch technique" had segmented the dental arch into an "active unit/segment" and a "reactive unit/ segment". The active and reactive segments are joined by specialized spring. The advantage of this technique is that it delivers known force systems, which are statically determinate, and the type of movement of teeth can be controlled by the clinician[4,5,6,7].

The rationale for using a continuous wire spring is more typical of conventional clinical practice than the segment.

Space closure requiring precise anchorage, needs appropriate bio- mechanical strategies to be incorporated into the appliance design. The key feature is differential M/F ratios, which can be achieved either by differential forces or differential moments. Firstly, differential forces cannot be simply produced by a spring, elastic or chain elastic in an intra arch appliance, because the retraction force applied to the anterior teeth is reciprocally applied to the posterior teeth. To deliver unequal forces, external or extra-arch mechanisms must be included. Headgear and intermaxillary elastics are probably the two most common means of generating there additional forces. Unfortunately, this approach depends on patient compliance for success[5,6,7].

The important criteria to be considered for the use of closing loops are 1. Loop position, 2. Loop pre-activation or gabling and 3. Loop design. Length of the loop, the height of the loop, the diameter of bend, or, by adding helices[1,2,3,4].

The results of this study showed mean anterior retraction with the T loop made of TMA was 1.52 mm while the CNA wire showed an equal mean retraction of 2.0mm. Thus, there was more mean retraction of anterior segment with CNA wires as compared to TMA wires with T-loop design. While loss of anchorage is more in CNA wires compare than TMA wires.

SUMMARY AND CONCLUSION

10 subjects were selected and divided into 2 groups, first one has en-mass retracted with TMA wire, while other group was retracted with CNA wire. Linear, vertical and angular movement has been measured in both canine and molar teeth. Differential moment force systems for Group A anchorage were applied by placing activation bends of 20º and 40º as alpha and beta moments respectively on a continuous arch. The changes were evaluated cephalometric ally.

1. Anterior retraction was faster with CNA wires as compared to TMA wires.
2. Anchorage control was better in TMA wires compared to CNA wires.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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