



ORTHODONTIC TREATMENT USING SEGMENTAL T LOOP TECHNIQUE: A CASE REPORT

Orthopaedics

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ABSTRACT

A 21 year-old female patient reported to the department of orthodontics with the chief complain of irregularly placed teeth in upper and lower anterior region with Class I canine and molar relation and convex profile. After detailed diagnosis her treatment was planned wherein all first premolars were extracted in all four quadrants for correction of crowding and upper and lower teeth inclination. Titanium Molybdenum segmental T loop were used in all four quadrants to retract canines individually. For retraction of four anterior teeth elastic traction was used. We concluded by rewarding the patient with well balanced occlusion having class I molar and canine relationship and a beautiful smile.

KEYWORDS

T loop, Segmental arch, crowding

INTRODUCTION

The method of retraction of anterior teeth plays a significant role in the outcome of orthodontic treatment. Retraction of anterior teeth is considered to be an important phase of fixed orthodontic appliance treatment. It is important to have three-dimensional control during retraction and the adverse effects of these forces have to be taken into consideration. Adequate control of anterior teeth movement and its correct positioning is necessary for the maintenance of function, esthetics and stability of treatment.^[1,2]

This can be achieved either by sliding mechanics or loop mechanics. Both methods have their pros and cons. In sliding mechanics, the archwire slides through brackets causing friction hence it is also called frictional mechanics. In this type of mechanics adverse rotational movements are observed along with decreased rate of tooth movement.^[3,4]

In Loop mechanics also called Frictionless mechanics, anterior retraction is carried out with either segmental or continuous loops. The major advantage of this mechanics is absence of friction along with application of continuous low forces. However, it is time consuming and technique sensitive.

CASE REPORT

A 21-year-old female patient presented with chief complaint of irregularly placed upper and lower front teeth. The patient had Angle's class I molar relation and had mild convex profile. Cephalometric analysis indicated prognathic maxilla & orthognathic mandible on skeletal class II jaw bases with average growth pattern. She had proclined upper and lower anterior teeth, crowding in upper and lower arches with overjet of 1mm and overbite of 5mm. The mandibular midline was shifted 1mm towards left. Arch length tooth material analysis revealed that tooth material was excess by 6mm in maxilla and 10mm in mandible.



Fig.1 Pre treatment extraoral photographs



Fig.2 Pre treatment intraoral photographs



Fig.3 Pre treatment OPG



Fig.4 Lateral Cephalogram

TREATMENT PLAN

Following comprehensive clinical and database analysis, a treatment plan was devised involving extraction of upper and lower first premolars. The anchorage requirement was Group A so to preserve anchorage Transpalatal arch was planned in upper arch and Lingual arch in lower dentition to prevent mesial movement of molars and to achieve enough space for crowding correction and reduce proclination. There was mild crowding in upper anterior region and severe crowding in lower arch so it was decided to go for individual canine retraction with segmental T loop in all four quadrants.

The first phase of treatment included individual canine retraction with segmental T loop, second phase included closure of spaces and levelling aligning and third phase includes finishing and detailing.

TREATMENT PROGRESS

Segmental arch mechanics with sectional T loops were employed for individual canine retraction. MBT appliance with 0.022×0.028 " slot was used. Initially bonding was done only on canines and T loops were given after extraction of first premolars. Segmented 0.017×0.025 " titanium molybdenum alloy (TMA) T-loop were employed for individual canine retraction. T loops were activated 3mm at subsequent appointments by pulling the distal arm of loop and cinching it posterior to molar tubes. The complete retraction of individual canine was completed in 5 months.

After complete canine retraction, canine is included in posterior anchorage unit by consolidating from molar to canine with figure eight ligature wire. Levelling and alignment of upper and lower teeth was accomplished with the help of following wire sequence:

- 0.016 Heat activated nickel-titanium wire
- 0.018 Heat activated nickel-titanium wire
- 0.017×0.025 " Heat activated nickel-titanium wire
- 0.019×0.025 " Nickel-titanium wire
- 0.019×0.025 " stainless steel archwire with active tie back for closure of remaining spaces
- 0.016×0.022 " braided nickel-titanium wire with settling elastics



Fig.5 With T loop



Fig.6 Post T loop



Fig.7 After levelling and aligning and closure of remaining spaces

TREATMENT RESULTS

The post treatment results showed improvement in smile and profile. The maxillary and mandibular arch showed improvement in alignment

and proclination of teeth was corrected. There was maintenance of buccal occlusion and Class I molar and canine relation was also maintained. Midline correction along with ideal overjet and overbite was achieved. There was correction of midline and ideal overjet and overbite was achieved. Post treatment panoramic radiograph revealed adequate root parallelism. OPG was reviewed was root parallelism

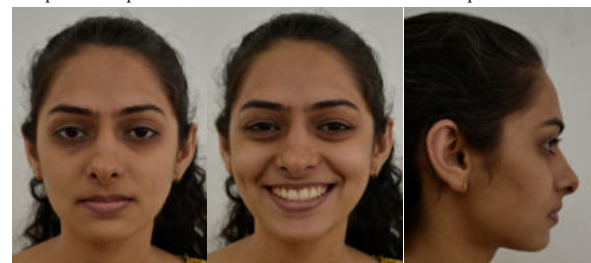


Fig. 8 Post treatment extraoral photographs



Fig.9 Post treatment Intraoral photographs



Fig.10 Post treatment Lateral Cephalogram



Fig. 11 Post treatment OPG

DISCUSSION

Burstone's segmental T-loop if made precisely proves to be effective and efficient in retraction of canine. Desired tooth movement can be achieved by T-loop by differential moments in anterior and posterior segments. The use of titanium molybdenum wire and increasing the wire incorporation in T-loop leads to decrease in load-deflection rate. There is minimal sliding and the friction is reduced. This leads to anchorage preservation and increased rate of tooth movement.^[5]

The type and material of wire used also affects the tooth movement. The amount of friction depends on the material of wire used for retraction. Cacciafesta et al evaluated the amount of friction and compared different wires during retraction. It was concluded that TMA wires presented higher frictional resistance than SS and NiTi.^[6]

The Transpalatal arch and Lingual arch are used for preservation of anchorage. When canine is retracted with T-loop, the force passes buccal to the centre of resistance of molars which may lead to rotation of the anchor tooth. To prevent this TPA is given in maxillary arch and Lingual arch is given in mandibular arch. It can be seen in the photographs that during retraction of canine, the crowding in lower anterior section starts to resolve and teeth start to drift distally (Fig.6). This also helps in anchorage control as less force is exerted on the anchor teeth during levelling and aligning. This is termed as 'Physiologic drift'. Transseptal fibres which are embedded in cementum and extend to adjacent teeth play an important part in Physiologic drift. Kusters^[7] and Murphy^[8] found that transseptal fibres undergo self-repair and reconnects adjacent teeth after the periodontal ligament destruction or extraction. This generates periodontal pull which leads to decrowding after extraction of first premolar.

CONCLUSION

The use of Segmental mechanics is effective and it helps reducing unwanted effects of continuous arch mechanics. Individual canine retraction in this case report helped in distalization of canine along with decrowding of lower anterior teeth. A precisely made T-loop has adequate tooth control in all three dimensions. Hence, use of segmental T-loop for individual canine retraction proves to be effective and efficient method in treatment of crowding and proclination.

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