Case Report

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Torque Addition During Final Detailing by a New Torqueing Spring Design

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ABSTRACT

Background: Expression of proper torque to each tooth increases its proper placement in the dental arch by providing enough space and treatment stability by giving proper cusp fossa relationship. But torque loss during retraction and in alignment of impacted teeth is a common clinical problem. Here a simple but effective method for torquing a tooth is presented. This technique will save from relapse and increase retention of orthodontic cases by giving effective torque without secondary effects.

Keywords: Torque, spring design, dentistry.

INTRODUCTION

Innovation of edgewise system enabled three dimensional control of tooth movement. Its principles and applications are same as those introduced by Angle[1] in 1928, when a rectangular wire is engaged in to a bracket with a rectangular slot, enabling three-dimensional movements. Straight wire appliance introduction nearly diminished the need of individual tooth root torque. With judicious treatment planning Orthodontist can reduce need for individual tooth's torque requirements. But clinical scenario changes with every patient. Loss of torque due to bracket slot and archwire play is still a challenge in many cases.[2] Different malpositions of individual teeth demand for different faciolingual angulations, like in impacted teeth, bucally or lingually erupted teeth. Individual tooth torquing would require frequent reactivation of the base archwires, which is tedious, time consuming and also uncomfortable for the patient.[3] Many torquing auxillaries are documented in the literature to torque the incisor roots and posterior multirooted teeth as required but they have inherent disadvantages such as excessive torque expression and lingual displacement of the tooth if their attachment to main archwire breaks.[4] A new technique of torquing has been developed which is easy to fabricate, easy to place and effective in its role (Fig 1 a, b and c). This spring can be applied to anterior teeth as well as posterior teeth.

DESIGN AND FABRICATION STEPS

This spring (Fig 1 a, b and c) is made from 012/ 014 special plus A.J. Wilcock Wires. It is made according to the tooth as morphologically each tooth differs. Accordingly there will be difference in the distance from the bracket to either the incisal edge or the gingival margin of the tooth. The coil diameter is made according to main arch wire into which it will be threaded. It can be positioned to any tooth in the arch attached with archwire to apply labial root torque (fig 2) or lingual root torque. This auxillary can be given with Preadjusted Edgewise Appliance (PEA) or Begg's appliance. It involves adjacent teeth of the tooth to be given torque. This design increases stability and prevents reactionary forces if any breakages of archwire occur. Reverse torque can also be incorporated in the adjacent teeth. The firm and sturdy design allows incorporating torque in the molars without

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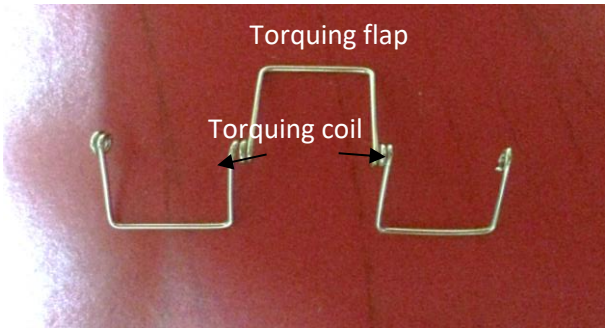

Fig 1a: basic design of torquing spring presented here. Horizontal arms are torquing flaps. Coils joining adjacent alternate facing flaps are torquing coils.

Fig 1b: Basic design of torquing spring presented here. Inner part of spring facing teeth surface.

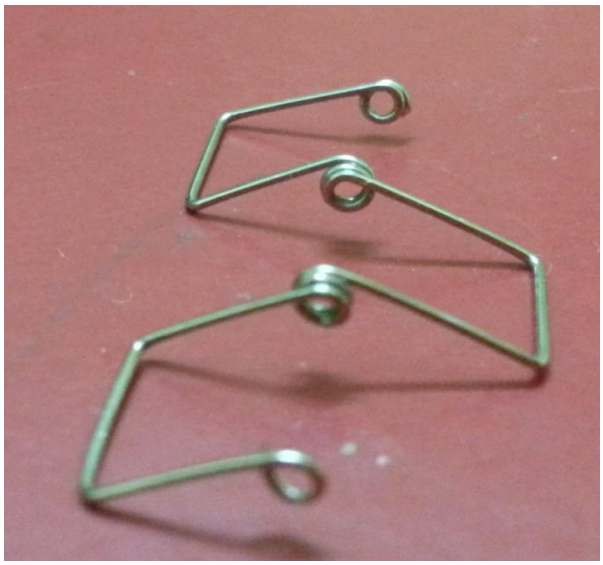

Fig 1c: Basic design of torquing spring presented here. Outer part of spring facing buccal area.

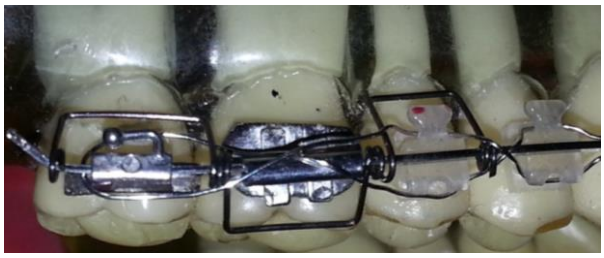

Fig 2: Spring applying buccal root torque to correct palatal hanging cusp of maxillary first molar.

Fig 3: Spring applying buccal root torque to left lower lateral incisor.

changing the archwire. Lingually rolled molars, hanging palatal cusps are mischievous malpositions to respond to the different correcting techniques.

1. Choose the wire of desired size based on slot size and alignment. Place the wire into the bracket slots and mark the wire mesial and distal to the tooth or teeth to be torqued. Do the same marking for adjacent teeth.

2. Bend a piece of 012 or 014 A. J. Wilcock Special Plus wire as shown in the figure. Consider the distance from the bracket to either the incisal edge or the gingival margin of the tooth according the lingual or labial torquing flap to be made. Fabricate alternate facing torquing flaps for the tooth to be torque and two adjacent teeth.

3. Each torquing flap will end with 2-3 coils. These coils will keep the flaps at an angulation to each other, making the torque efficient. (fig 1a)

4. This torquing spring design comprises basic spring design we generally see in clips. If more torque is to be given then the angulation between the flaps should be reduced (upto 90

degrees). For lesser expression of torque this angulation can be kept obtuse (more than 90 degrees).

5. Remove the arch wire and slide the spring onto the wire on the marks previously made in the horizontal plane of the wire.

6. Crimp the spring on the mesial and distal sides of each flap. Make sure that the 1-2 coils closest to the middle torquing flap are not crimped.

7. Place the wire back into the bracket slots making sure the horizontal bar of each flap is touching the incisal or gingival portion of the tooth (refer to fig 2 and 3). Make the middle flap active by closing the coil for the tooth to be given torque. Adjacent flaps will remain passively touching to the tooth surface. The spring will then be positioned either above or below the bracket. Torquing auxillary touching above the bracket in the maxillary dentition and below the bracket in the mandibular dentition creates lingual or palatal root torque. For labial root torque the flaps should touch below the bracket in the maxillary dentition and above the bracket in the mandibular dentition. All the three flaps can be activated simultaneously if the clinical condition demands.

8. When torquing an incisor you must involve adjacent incisors or cuspid to take anchorage from and be sure about the force generated. When torquing a cuspid you must involve 1st bicuspid and lateral incisor. When torquing a molar you must involve adjacent teeth. This will hold the crown of the tooth to be torque firmly into place while the root is moving.

9. Cinch the wire back placing and tying the wire into place. This will prevent the spring from moving the archwire forward and diminishing the force of the spring.

10. See the patient at 4-6 week intervals. If you have given labial root torque for a previously lingually positioned lateral incisor for example, check the labial cortical plate prominence over root of the tooth. Once that is palpated, hold that position for 2-3 weeks.

11. Check progress is with a follow up radiograph. For anteriors a cephalogram will work. For posteriors compare study model casts.

DISCUSSION

Third order detailing is done in later stages of Orthodontic treatment. Less expression of torque might create some problems for finishing up the case. Suboptimal torque of the incisors can take away the space from dental arch[5], while suboptimal torque of the posterior teeth may prevent appropriate cusp-to-fossa relationships between the maxillary and mandibular teeth[6]

Torque prescription of a bracket is the angle between the occlusal and gingival slot walls make with the plane of the bracket base. Torque value is different for each tooth in the upper and lower arch. For all teeth, the desired torque prescription calculations are based on the slot play of the final archwire. Ideally, the final finishing archwire should bring each tooth to its desired faciolingual angulations. To nullify slot play the clinician must choose a torque prescription and wire size combination that will provide desired crown inclination. Johnson E. advocated use of custom chosen torque prescription brackets for different clinical conditions to bring tooth movement at the desired crown inclination.[7] But applying different torque bracket increases the inventory of an Orthodontist. Rather application of torquing auxillaries to the base archwire is easy. There are different torquing auxillaries in the literature like, Two-Spur, Four-Spur, Mollenhauer aligning auxiliary (MAA), Reciprocal Lateral Torque by Kesling, spec auxillary, Jenner auxillary, mouse trap auxillary for anterior torque correction. Boot auxillary and modified double back auxillaries are for posterior teeth. Comparison between 4 types of torquing auxillaries by Pancherz H in 2001 showed spec auxillary to be efficient than others.[8] The torquing spring given above is efficient to torque single rooted as well as multirooted teeth without reactionary forces on the remaining teeth in the arch. The design blends well with the orthodontic brackets. Care must be taken to prevent the incisors from flaring when root correction is done. This can be achieved by cinching the archwires or lacing together the entire arch. The clinician must also be aware of the rowboat effect that is generated with

root correction.[9] Here's hoping the new spring will create more stability in the retention phase of orthodontic cases.

CONCLUSION

New design in the torquing auxiliary is simple to derive forces built in it. Selective application of torque is possible without deleterious effects on the complete arch. Design is well acceptable from patients. Better oral hygiene maintenance is possible with this kind of design.

CONFLICT OF INTEREST

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

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