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CASE STUDY

EFFECTIVE AND EFFICIENT WAY OF UPRIGHTING MOLAR – A CASE REPORT

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ABSTRACT

Missing first molars are a common intra oral finding in adult orthodontic patients. It is usually due to either caries or compromised periodontal conditions. It's appropriate treatment possess a very challenging situation for the orthodontist. Impacted or lingually tilted molars require uprighting. There are several approaches by which molar uprighting can be accomplished, like Australian uprighting spring, cantilever spring, push spring appliance, NiTi coil spring, Mini implant, forced eruption by elastics, traction from removable appliances, surgical uprighting etc. This is a case report of uprighting of a mesioangular mandibular right permanent second molar. Though various treatment options are available, uprighting with segmental T loop along with second order bend was chosen.

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INTRODUCTION

Edward H. Angle (Roberts *et al*., 1982), called the first molar the "key to occlusion." Certainly, this tooth is very important in maintaining the stability of the dentition, as can be seen by the complications that result when it is prematurely lost.When the first molar is lost, the second molar usually tips mesially, the second premolar drifts distally, and the alveolar ridge becomes narrower. The second molar is particularly susceptible to abnormal stresses and bony breakdown, and pocket formation may occur mesial to the inclined molar (Weiland *et al*., 1992). Therefore, this condition needs treatment as early as possible. Treatment options not onlydepend on degree oftooth inclination but also on desired type of tooth movement. There are several alternatives in treating the missing mandibular first molar such as springs, implants etc. For example, the helical spring appliance is used to upright a single terminal molar by exerting a combination of distally and occlusally directed forces (Tuncay *et al*., 1980). The abovementioned springs is not indicated for correction of commonly occurring positions of molars; therefore, this case report describes the use of other spring design that incorporate a single T-loop for uprighting molars. The "T-loop" spring incorporates design considerations intended to provide optimum mechanical systems during space closure. The segmentation of the arch into anterior and posterior portions creates the equivalent of a two tooth system, allowing it to become a statically determinate system (Capelluto *et al*., 1997). The present case is an attempt to focus on a very simple yet efficient and effective way ofuprighting a lower molar using the sectional T loop, which can be easily employed in conjunction with routine orthodontic treatment procedures.

Case Report

The patient was a 17 year old female who presented with the chief complaint of forwardly placed upper front teeth.Extraoral examination revealed convex profile, acute nasolabial angle, recessive chin and a steep mandibular plane angle.Intraorally patient presented with missing first molar on right side, class II molar relation on left side and an overjet of 10mm. An informed written consent was taken from the patient. There were crowding in upper and lower anteriorsteeth (Figure 1).

Cephalometrically, patient was found to have skeletal class II jaw bases with vertical growth pattern, proclined upper and proclined lower incisors and an acute nasolabial angle with an upper lip strain of 2 mm. OPG revealed mesially angulated mandibular second molar in missing first molar space.

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Figure 1. Intra oral photograph

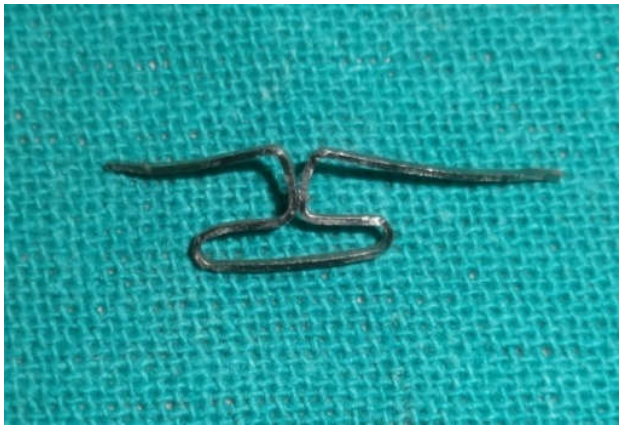

Figure 2. T- loop spring in 0.0 17" x 0.025" SS wire, showing the wire bending before inserting it into the molar tube that is necessary to upright a single tipped molar

Fig.(3). lf a T- loop is activated by pulling the distal of the wire through the molar tube and bending it, the tooth cannot move distally. This generates a moment that results in molar uprighting by mesial root movement with space closure

Fig.(4) Uprighted molar after treatment

The treatment plan chosen included

Characteristics of the Orthodontic Appliance

For adjunctive treatment, the 22-slot pre adjusted edgewise appliance was used. Initial leveling and alignment was done with sequential round and rectangular NiTi and SS wires from 0.014" to 0.017 X 0.025" dimension wires. The present case was aimed at uprighting the second molar and simultaneously closing the missing first molar space. Therefore, a segmental T loop was made up of 0.017" X 0.025" Stainless Steel (SS) wire (Figure 2) and adapted to fit passively into the brackets on anchor teeth i.e. on first premolar, second premolar and first molar. Rest of the arch was tied as a single unit with 0.017" X 0.025" SS wire. The treatment plan included closing of the lower missing right first molar space along with uprighting of thelower second molar , so, the distal end of the archwirewas pulled distally through the molar tube, opening the T-loop by 1 to 2 mm, and then bent sharply gingivally to maintain this opening. This activation provided a mesial force on the lower second molar that counteracts distal crown tipping while the tooth uprights (Figure 3).

DISCUSSION

Molar uprighting usually presents difficulty in managing the unwanted reactionary force vectors associated, which if not taken care can produce deleterious effects on areas of dentition employed for anchorage (Hyo-sang park *et al*., 2002). This case report describes a method using segmental T loop (to deliver the desired M/F to an individual tooth) foruprighting molars which is simple, efficient and less time consuming.It is friction-free; when activated, the arch wire loops distort from their original configuration; as the tooth (or teeth) moves, the loop gradually returns to its undistorted (preactivated) position, delivering the energy stored at the time of activation. Brackets are not sliding along the arch wire during the process. Groups of teeth can therefore be moved with more accurately defined force systems for more precise anchorage control to achieve treatment goals more readily than methods in which friction plays a role (Shellhart *et al*., 1999). If the T loop is given in a continuous wire then it will have insufficient inherent M/F,it is clinically difficult to apply with sufficient accuracy to achieve desired goals.[6]Also, if the molar is severely tipped as in this case, a continuous wire that uprights the molar will also tip the second premolar distally, which is undesirable (Frank *et al*., 2000). Therefore, to carry out the uprighting, a sectional uprightingT loop spring was used. The 0.022" rectangular bracket slot was used which permit the control of buccolingual axial inclinations, the wide bracket helps control undesirable rotations and tipping, and the larger slot size allows the use of stabilizing wires that are somewhat stiffer than other lesser dimension wires (Frank, 2000). Thus, T-loop molar uprighting springs, fabricated from 0.017" x 0.025"SS rectangular wire, achieve the desired results efficiently and provide adequate control in three planes of space (Figure 4). Uprighting tipped molars can benefit patients functionally and periodontally. The specific benefits to be gained depend on the directions in which the molar moves, both in the vertical and mesio-distal planes of space (Hassan *et al*., 1995 and Kraal *et al*., 1980). Thus, before initiating the treatment procedure both through

scaling and root planning and removal of occlusal interferences were done. The present simple technique has a few advantages over other molar uprighting techniques: firstly time saved as this method is employed in conjunction with regular orthodontic treatment mechanics. Secondly, since the force vector is vertical, it can be considered more physiologic as it is in the direction of normal eruptive path. For over correction second order bend was given to sustain the molar uprighting till full treatment is completed.

Conclusion

After considering the biomechanical aspects as demanded by the clinical situation, employing the best of the various treatment options available for molar uprighting gives desired treatments results. Simple method of uprighting like the one described in this case that is Segmental uprighting arch wire with T-loop are easy to fabricate, is quite effective, offer excellent controlled movements of teeth in three planes of space; acceptance by the patient is favorable; and treatment time, depending on the amount of tooth movement required, is rapid and varies between 8 to 16 weeks and can be used along with regular treatment mechanics.

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