

Molar Uprighting using a Simplified Technique (MUST)



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Abstract

The effectiveness of the mechanics presented in the orthodontic literature for uprighting a mesially tipped last molar is swinging between either simple but incompetent techniques of leveling arch wires and open coil springs to the more sophisticated handy craft but successful techniques of uprighting springs and peculiar loop designs. Unfortunately, the issue of molar uprighting is further complicated by the absence of a more distal molar. The technique described here within this article adds one more tool for molar uprighting. It comprises the simple use of double tubes bonded to the last molars and flexible archwires to upright tipped last molars with minimal maneuver, no sophisticated loop designs and a non-technique sensitive procedure.

Keywords

Orthodontics, biomechanics, molar uprighting, double tubes, superflexible archwires

INTRODUCTION

Uprighting the last molar is of considerable interest to the orthodontic community; indeed, the literature describes many different techniques for uprighting the most distal molars. These methods range from the simple but inefficient techniques of levelling arch wires^{1,2,3} and open coil springs, to the more efficient, but labour-intensive and time-consuming techniques of uprighting springs^{1,4-10} piggybacking^{12,13} and unusual loop designs¹⁴⁻¹⁷. Recently, although uprighting on temporary anchorage devices (TADs) was shown to be efficient and satisfactory¹⁸⁻²¹, it incurs additional cost, requires a considerable inventory, is technique sensitive, and TAD insertion is sometimes complicated by the thick and flabby soft tissues in the retromolar region.

Moreover, the orthodontic mechanics for uprighting a tipped last molar are complicated by the absence of a more distal anchor tooth. The lack of control over the arch wire posterior to the tooth to be uprighted is a problem. Furthermore, the reaction forces resulting from the various uprighting techniques, such as extrusion of the uprighted molar, intrusion of the anterior segment and protraction of the dental segment mesial to the tipped molar, further complicate the mechanics and force system.

OBJECTIVES

This article describes a simple, yet efficient method for uprighting and aligning severely tipped last molars. The technique is expected to overcome the problem of the absence of a more distal anchor tooth or the presence of a third molar in close proximity.

MATERIALS AND METHODS

The technique consists of bonding a double tube to the tipped last molar, a single tube to the first molar, and the use of a super-elastic levelling arch wire. The arch wire emerging at the distal end of the second molar tube is looped back again through the distal opening of the auxiliary tube of the second molar, and then back into the premolars to be ligated (Fig. 1).

The use of a super-elastic levelling arch wire is fundamental to maintain

the arch wire's flexibility and elasticity despite the sharp distal bend. The size of the initial arch wire will vary according to the degree of molar tilting and the angle at which the molar tube was bonded. Usually, 0.012 or 0.014-inch super-elastic arch wires are suitable for severely tipped molars. The wire should be changed (activated) frequently (every 1-3 weeks) because the sharp bend might cause permanent wire deformation.

For more control over the free wire and hence the tipped molar, the first molar could be bonded or banded with a double tube. The flexible levelling arch wire is inserted into the main tubes of the first and second molars, and then looped back through the distal opening of the second and first molars' auxiliary tubes. This modification reduces the free wire span between the second molar and the first premolar, which in turn increases the deflection of the wire, and hence produces a better couple effect on the tipped molar (Fig. 2).

The direction of wire engagement into the double tubes of the first and then the second molars (the main tube of the first molar and then into the main tube of the second molar versus the main tube of the first molar and then the auxiliary tube of the second molar) alters the deflection angle of the wire and accordingly changes the magnitude of the couple delivered.

In some cases, a distal molar starts to erupt in a mesial tipping direction at the end of treatment, while in others, the uprighting in the middle of treatment of a mandibular last molar is planned. In such cases, the orthodontist needs to sustain a rigid arch wire on the rest of the arch for other mechanics (space closure, inter-arch elastics, etc.). The technique proposed in this article is efficient provided that the first molar is bonded or banded with a double tube, with the main rigid arch wire occupying the main tube. An overlay flexible arch wire starts at the premolars, is inserted into the auxiliary tube of the first molar and then into the auxiliary tube of the second molar, and then looped back into the main tube of the second molar, bypassing the first molar, and is finally ligated over the premolar brackets (Fig. 3). An additional strength of this technique is the possibility of distalizing the tipped molar with space opening as

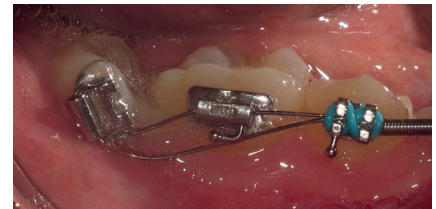


Figure 1: The basic technique: wire spanning the single tube on the first molar and the double tube is bonded to the tipped molar.

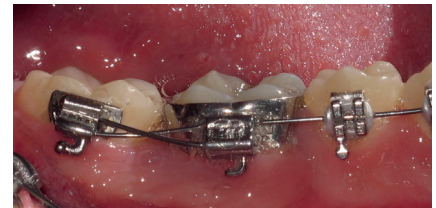


Figure 2: Flexible arch wire inserted into the double tubes of both molars.



Figure 3: The main arch wire occupies the main tube of the first molar, while a flexible arch wire spans the auxiliary tube of the first molar and the double tubes of the tipping molar.

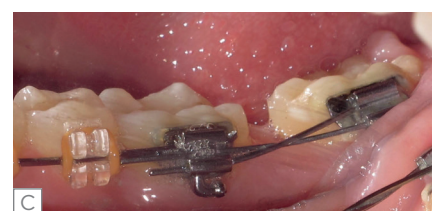
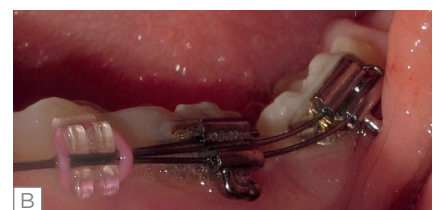


Figure 4: The wire is looped at a distance from the distal end of the tipped tooth to allow for uprighting and distalization: (A) installation, (B) uprighting in progress, (C) uprighting with distalization.

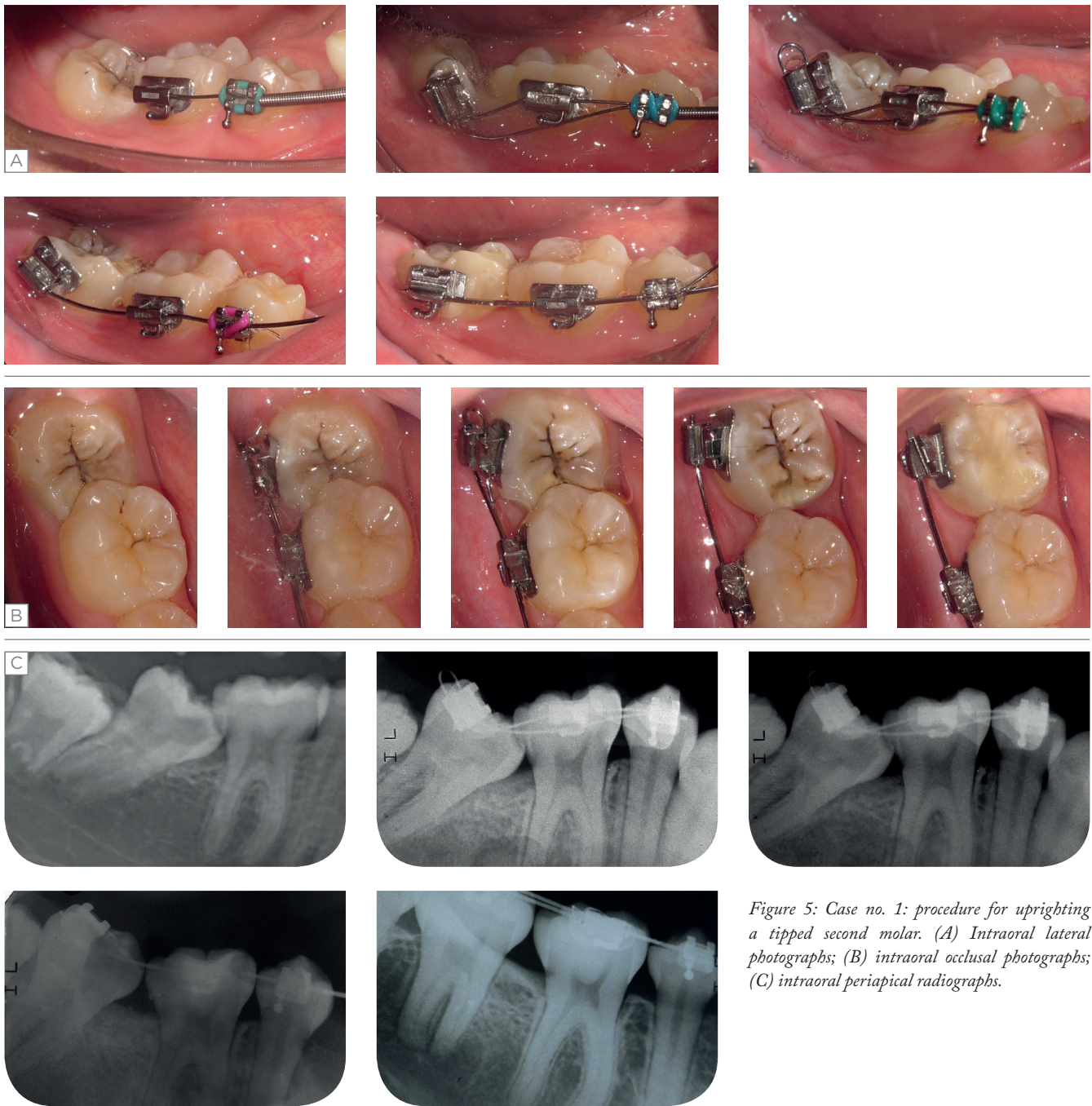


Figure 5: Case no. 1: procedure for uprighting a tipped second molar. (A) Intraoral lateral photographs; (B) intraoral occlusal photographs; (C) intraoral periapical radiographs.

required. In such cases, the wire is looped at a distance from the distal end of the tube of the tipped tooth. This allows for uprighting at the expense of distal crown movement, and results in space opening (distalization), with roots upright and parallel to the mesial tooth (Fig. 4a-c).

DISCUSSION

The technique described in this article allows efficient uprighting of tipped

lower molars with no observable extrusion, and with the possibility of distalization as needed. The use of levelling arch wires allows simultaneous levelling and uprighting of mesially tipped molars.

The versatility and ease of application of this technique in a wide range of clinical situations with mesially tipped molars adds to its merits. Using levelling arch wires to upright tipped distal molars simultaneously with

anterior and posterior levelling and alignment might save a considerable amount of treatment time. In addition, an extra procedure for uprighting the molars is not required. The average time required for uprighting tipped molars using this technique varies considerably depending on the degree of molar tilting. The least time required for uprighting the molars shown in the figures was around 2 months. Springs, loops and TADs are not

needed in this technique, thereby reducing both patient discomfort and costs. Moreover, it avoids dependence on the presence of a more distal anchor tooth to achieve efficient molar uprighting. It is not technique sensitive but does have the drawback of the tiresome looping back of the wire in the tipped molar's tubes. The three cases in *Figs. 5-7* show the clinical application of this technique.

CONCLUSION

The technique described here provides another tool for molar uprighting. It comprises the simple use of double tubes bonded to the last molars and flexible arch wires to upright tipped last molars without extrusion. It is not sensitive to technique, requires minimal manoeuvres, and does not need sophisticated loop designs.

LEARNING POINTS

- We use simple mechanics to upright a mesially tipped last molar.
- The only devices needed are bondable double tubes and flexible arch wires.
- No side effects on the adjacent teeth were seen.
- The technique can be manipulated to achieve distalization of the tipped molar.



Figure 6: Case no. 2: procedure for uprighting a tipped second molar. (A) Intraoral lateral photographs; (B) intraoral occlusal photographs; (C) intraoral periapical radiographs.