Removable molar power arm

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Abstract

Attachment of force elements from the gingival hook of maxillary molar tubes during the retraction of the anterior teeth is very common in orthodontic practice. As the line of force passes below the center of resistance (CR) of molar, it results its mesial tipping and also anchorage loss. To overcome this problem, the line of force should pass along the CR of molar. This article highlights a method to overcome this problem by attaching a removable power arm to the headgear tube of molar tube during the retraction of the anterior teeth.

Keywords: Biomechanics, molar power arm, orthodontics

Introduction

Upright position of the upper molars during retraction of anterior teeth in maximum anchorage cases is very critical in orthodontics.[1] In day to day clinical practice retraction force is usually applied from the power arm attached between maxillary lateral incisor and canine to the gingival hook of maxillary molar tube[2] [Figure 1]. As the force is applied below the center of resistance (CR) of maxillary molars, they tend to tip mesially during the space closure and uprighting of molars is often required during the finishing stage.[3] Also it leads to anchorage loss. Thus to overcome these problems, the force on molars should be applied at their CR, which is at the trifurcation areas.[4,5] Recently, in a case report Vibhute designed molar stabilizing power arm made up of rectangular stainless steel wire to be engaged in the miniscrew implant head slot and in the auxillary molar tube for optimizing anterior en mass retraction.[6,7] Here in this clinical tip, we have presented a method to prepare a removable power arm that can be attached to the headgear tube of molar tube during the retraction of anterior teeth.

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Fabrication Steps

- Take an approximately 3.5 cm of 21 gauge hard stainless steel wire.
- Then make a "C" shaped hook at its one end and then give 90° bend approximately 6-8 mm below the neck of "C" shaped hook [Figure 2].
- Then do the stress relieving heat treatment and now the power arm is ready for use.

Clinical Application

- First insert the horizontal arm of the power arm in the round tube of the headgear tube from distal aspect [Figure 3a] and then keeping the vertical arm upright, place a 90° bend to horizontal arm at the mesial end of headgear tube [Figure 3b] so that the mesial and distal arms are parallel to each other and care should be taken that the height of the mesial vertical arm of the power arm is slightly above the gingival hook of the molar tube.

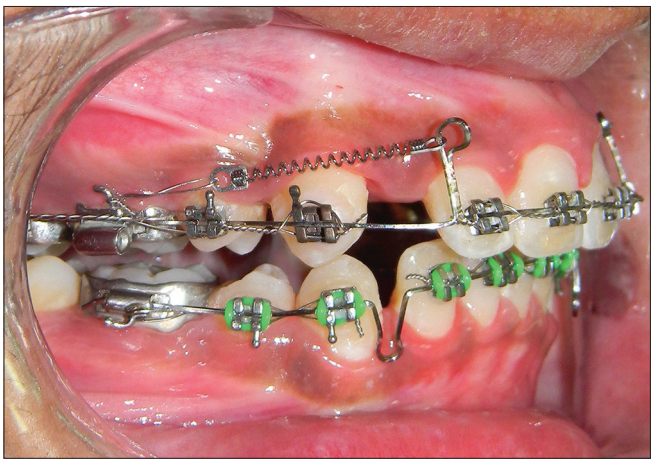

Figure 1: Use of conventional retraction force from the power arm attached between maxillary lateral incisor and canine to the gingival hook of maxillary molar tube

Figure 2: The PGI removable power arm

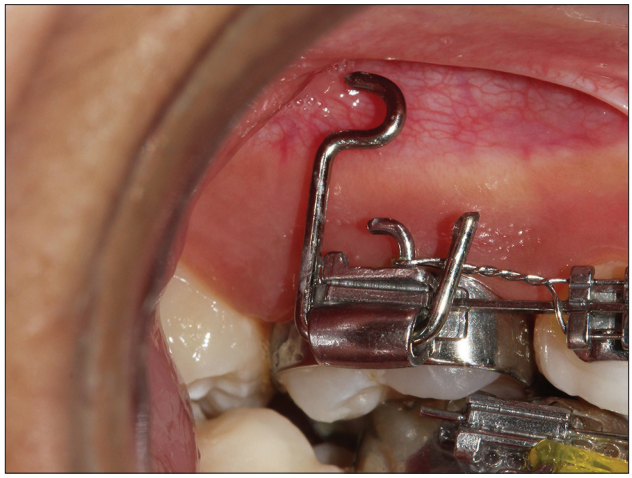

Figure 3b: A 90° bend in the horizontal arm at the mesial end of headgear tube. Note both mesial and distal arms of the power arms are parallel to each other and the level of mesial vertical arm is above the level of gingival hook of the molar tube

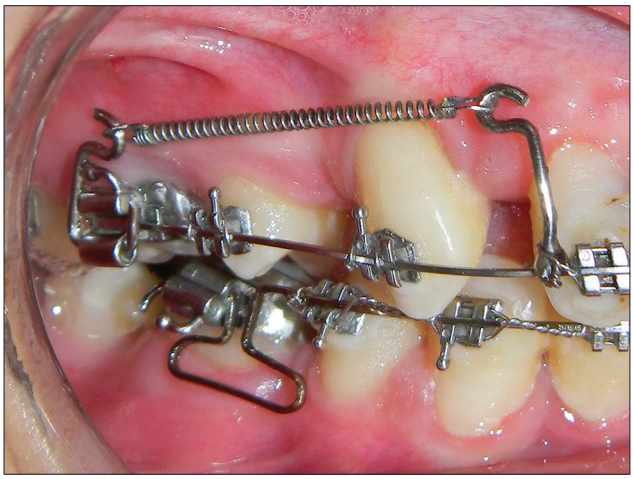

Figure 3d: Application of retraction force from the intermaxillary hook to the power arm. Note the line of force is along or near to the center of resistance of molar

Figure 3a: Insertion of horizontal arm of the power arm in the round tube (headgear tube) from distal aspect

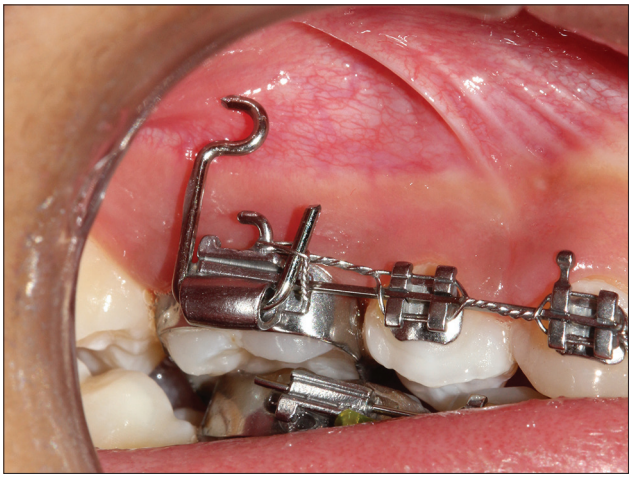

Figure 3c: Ligation of the mesial vertical arm of the power arm to the gingival hook of the molar tube

- Then ligate the mesial vertical arm of the power arm with the gingival hook of the molar tube by ligature wire [Figure 3c].
- Now force can be applied from the power arm to the intermaxillary hook for the retraction of anterior teeth [Figure 3d].

Advantages

- Easy to fabricate and use in busy clinical practice
- Height of power arm can be adjusted depending on the requirement in individual cases. For example distal movement of the molar crown (uprighting) can be done by keeping the height of power arm above the CR of molars during retraction of anterior teeth
- No special armamentarium is required for its fabrication
- Can be prepared and stocked.

Limitation

- Can cause irritation in the sulcus when either the sulcus depth is less or the height of power arm is very high.

Conclusion

The fabrication and clinical use of this power arm in maxillary first molars during the retraction of anterior teeth is very promising in routine orthodontic practice.

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