

Distalization of Mandibular Molar Using Modified Mandibular Molar Distalizer Appliance

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Abstract

Intraoral molar distalization appliances that require little or no patient compliance as an alternative to extraoral appliances. This article presents a simple, effective, alternative method for distalization of mandibular molar that allows correction of malocclusion. Patient was selected with mesially tipped mandibular molar with the age of 12 years. Modified mandibular molar distalizer made up of acrylic button incorporating wire components and open coil NiTi spring. Modified mandibular molar distalizer appliance contributes in correction of mesially tipped mandibular first molar by uprighting and distal movement of molar without proclination of lower anteriors. Modified mandibular molar distalizer appliance's versatility, effectiveness, ease of fabrication with minimum cost and compliance free. Three dimensional molar controls achieved throughout distalization therapy and maximum anchorage preservation throughout treatment. Appliance was effective in producing distalization of mandibular first molar with bodily movement increasing arch length and stabilized distalized molar with minimum patient co operation.

Key words: *Distalization, Modified Mandibular Molar, Distalizer Appliance*

Article History : Date of submission : 18/04/2016 • Date of peer review : 01/05/2016 • Date of acceptance : 22/06/2016

Introduction

Distal molar movement is often part of equations for correction of the problems. The reciprocal forces which are the easiest and most predictable for our use can be employed. Molar distalization, in recent years has evolved as an alternative method of gaining space to conventional methods. Distal movement of lower molar is more difficult, however true molar distalization in lower arch with conventional mechanics is tough task. Recently some authors made uprighting of lower molar and their bodily movement possible with new innovations.

Distalization is procedure, aimed at pushing the teeth in a distal direction so as to gain space in dental arches having mild discrepancy for alignment of teeth or to achieve class I molar relation. In Contemporary orthodontics recent advance in mechanotherapy and changes in treatment concepts and philosophies now minimize the need for extraction. Use of intra oral distalization method have gained popularity over the extra oral methods because of the comfort and patient acceptability and decreased compliance need from the patient.¹⁻⁴

Space is easier to gain in the maxillary arch than in the mandible because of increased trabecular structure of supporting bone and spongy bone⁵. It is because the compact bone and the oblique ridge of mandible do not allow bodily movement of roots of molars. Hence most of the distalizing appliances available today produce adverse effects, like molar tipping and rotation, incisor proclination and lack of anchorage control. This new

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device modified mandibular molar distalizer was developed to address these problems by achieving bodily mandibular molar distalization without drawback of other appliances.

Appliance design

The modified mandibular molar distalizer consist of acrylic button positioned lingual and inferior to mandibular anterior teeth extending from right canine to left canine incorporating wire components such that mucosal trauma should be avoided and reactive forces dissipated properly exerted by distalizing assembly⁶. It acts as anchorage unit. Rests are made on canines and premolars with 0.028" to 0.032" stainless steel wire. For additional anchorage support stainless steel wire is passed in between canine and premolar of other side adapted over premolar as a clasp. Tube between first premolar and first molar receives active components. Posterior unit is active unit i.e. distalizing unit incorporating open coil Nickel Titanium spring about 16 to 22 mm in length as per requirement of distalization applying 80 to 100 gm of force.

A straight wire is passed through lingual sheath of molar band and other end of wire is through corresponding tube of anchorage unit. After compressing open coil Nickel Titanium spring is inserted between these two ends. Thus active part of appliance runs lingually and closer to centre of resistance of molar producing pure bodily movement.

Case Report

A female patient, age 14 years presented with class I relationship on right and left sides and deep bite with retro positioned mandible. Mandibular second premolar on left side was blocked out because of mesial tipping of first molar on left side (Fig. 1 & 2). A two phase treatment was planned using modified mandibular molar distalizer in mandible followed by fixed orthodontics (Fig. 3). In 40 weeks this modified mandibular molar distalizer created a space for eruption of second premolar and uprighted mandibular first molar which is tipped mesially on left side (Fig. 4 & 5). Pre treatment orthopantomogram showing blocked out mandibular premolar and on left side and post treatment orthopantomogram showing upright mandibular first molar created space for second premolar on left side after treatment (Fig. 6 & 7). Complete set of post treatment pictures showing complete opening of space for blocked out premolar with distalization of mandibular first molar (Fig. 8 & 9).

In the second phase fixed appliance were worn and active treatment were started for further correction of

malocclusion. Fixed appliance holds the mandibular molar is newly moved position.



Fig.1: Pretreatment Intraoral Lateral Photograph



Fig.2: Pretreatment Intraoral Lower Occlusal Photograph



Fig.3: Intraoral Lower Occlusal Photograph With Appliance



Fig.4: Intraoral Lateral Photograph After Appliance Removal



Fig.5: Intraoral Occlusal Photograph After Appliance Removal



Fig.6: Pretreatment Opg



Fig.7: Posttreatment Opg



Fig.8: Posttreatment Intraoral Lateral Photograph



Fig.9: Posttreatment Intraoral Lower Occlusal Photograph

Discussion

The non compliance intraoral distalization method has been excellent compromise for the patients who are unwilling to wear headgear. Modified mandibular molar distalizer appliance's versatility, effectiveness, ease of fabrication with minimum cost makes it appliance of choice in appropriate cases. The appliance is fabricated such that desired therapeutic force is delivered on one side without simultaneous generation of forces on other side⁷. The use of the modified mandibular molar distalizer appliance provide constant distal force near to the centre of resistance of molar and thus reducing the moment of force.^{8,9} The appliance distalizes molar bodily. Distalization

of molar has occurred with minimum amount of anchor loss in this case. It may be due to support taken from the wide acrylic button and inclusion of premolars on other side along with canine and premolar rest. The mesially directed force and the mesiobuccal moment acting on anchor molar are both the undesirable side effects that must be absorbed by anchor units. Modified mandibular molar distalizer appliance has additional stability due to inclusion of premolar on other side.

Modified mandibular molar distalizer appliance allows controlled uprighting and distalization of lower molar on left side. Because appliance cannot be removed it ensures uninterrupted forces of against the target molar without relying on special patient compliance. During distalization phase, mandibular molars were moved distally with no proclination of lower incisors as a result of mesially directed force of modified mandibular molar distalizer.¹⁰ Considering the sagittal plane, molar distalization has occurred without any proclination of lower anteriors due to reciprocal mesial forces, it would have been favourable in cases of increased Incisor Mandibular Plane Angle without any anchorage loss. In vertical plane this appliance extrudes the mandibular molar thus increasing mandibular plane angle with downward and backward rotation of mandible.¹¹ In transverse plane rotation occurred is very less.

Modified mandibular molar distalizer appliance is independent of alignment or other orthodontic mechanichs, saving treatment time and helping to conserve anchorage same as traction arch¹². Minor inflammation of lingual mucosa was determined after removal of appliance. This is prevented by maintaining proper oral hygiene. We found that modified mandibular molar distalizer appliance effective, patient friendly causing no functional impediment and no discomfort as it needs no special patient compliance.

The appliance distalizes molar bodily since the force is delivered close to the centre of resistance and 4 mm of distalization is noted¹³. It has been designed to distal drive mandibular molars using light forces in a predetermined direction, with good molar control during distalization and anchorage control. This appliance also eliminates the need to construct new nance appliance to stabilize the molars in their new positions after distalization. The modified mandibular molar distalizer appliance uses light continous force system to achieve efficient and predictable molar movement with desired moment to force ratio for bodily movement of first molars¹⁴. Three dimensional molar controls achieved throughout distalization therapy and

maximum anchorage preservation throughout treatment. Molar distalization if done on careful selected cases with critically planned biomechanics can correct molar relation and provide some useful arch length in mild to moderate discrepancy.¹⁵

Conclusion

In the case shown here modified mandibular molar distalizer appliance was effective in producing distalization of mandibular first molar with bodily movement. Modified mandibular molar distalizer appliance was effective in space discrepancy problems present in buccal segment. This appliance is easy to fabricate, economic, produce constant and parallel forces. It has a three dimensional control on molar producing bodily movement with little or no tipping. The modified mandibular molar distalizer appliance has proven to be effective even in presence of fully erupted second molar with minimum patient co operation. While appliance show promise as a method of increasing arch length, further study is going on to evaluate its average dental and skeletal effects as well as long term stability of distalized molar.

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How to cite this article: Mani SA, Mani A, Mote N, Pawar KD. Distalization of Mandibular Molar Using Modified Mandibular Molar Distalizer Appliance. *Int J Edu Res Health Sci* 2016;2(2):28-31