Original Article

Class II Correction By Maxillary Molar Distalization With Modified TPA- A Case Report

Farhan Hussain[1] , Shipra Nagar[2] , Ashutosh Wadhwan[3] , Ashish Kumar[4] , Mansi Singh[5]

[1]Post Graduate Student (3rd year), Department of Orthodontics and Dentofacial Orthopedics, Kalka Dental College, Meerut
farhanhussain661@gmail.com
[2]Professor and HOD, Department of Orthodontics and Dentofacial Orthopedics, Kalka Dental College , Meerut
shipray@yahoo.com,
[3]Professor, Department of Orthodontics and Dentofacial Orthopedics, Kalka Dental College, Meerut
dtashutosh798@gmail.com
[4]Senior lecturer, Department of Orthodontics and Dentofacial Orthopedics, Kalka Dental College, Meerut
ashish.idst@gmail.com
[5]Senior lecturer, Department of Orthodontics and Dentofacial Orthopedics, Kalka Dental College, Meerut
manshi.singh1996@gmail.com
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Abstract

One of the most frequent malocclusion encountered is class II and distalization is considered as a conservative way of treatment. Maxillary molar distalization has been used successfull since long time in orthodontics to correct class II malocclusion. This technique can be used to treat crowding, regain lost arch length, correct deep overbite and correct maxillo-mandibular relationship. Numbers of techniques have been developed to distalize the molars with or without the need of extraction. As a result of over retained deciduous second molars in maxilla the permanent first molars and premolars errupt in a distal position resulting in a class II molar premolar and canine relation.A 13 years old post pubertal male patient having named B_ reported to department of orthodontics and dentofacial orthopaedics with chief complaint of irregularly placed upper & lower front teeth, who was diagnosed with class II subdivision ,having class I molar on left side & class II molar relation on right side and class I canine relation on both side with overjet of 3mm and overbite of 4 mm, crowding of 8mm in upper & 7mm in lower arch, Upper midline is coinciding with lower arch having straight facial profile , 115° nasolabial angle ,incompetent lips.

Treatment was started with .022 MBT bracket system. Initially levelling and aligning were started with .014 Niti. The modified TPA was placed to start correction from the initial levelling phase. By light coupling force from the modified TPA to the band ensures correction of rotation and correction of crossbite. Two lingual button were place at the palatal surface of the right premolars to derotate them using elastics. A nickel titanium open coil spring was placed between right lateral and first premolar to provide space for the highy placed canine to align. It was necessary to prevent the loss of anchorage, Temporary Anchorage Device were used to control the inclination of upper anteriors.For attainment of molar distalization modified TPA appliance was found to be efficient, non-invasive and non-compliant appliance where 5 mm of distalization was achieved in 3 months and occlusion was settled with class I molar and class I canine relation.

Keywords: distalization, TPA, temporary anchorage device

Case report

Class II malocclusions are some of the most typical ones to be found, and distalization is thought of as a conservative course of action. Maxillary molar distalization has been successfully utilised in orthodontics for a long period to treat class II malocclusion. Using this method, using this method crowding can be correcting, arch length can be restored, deep bite can be fixed and maxilla and mandible can be aligned. Numbers of techniques have been developed to distalize the molars with or without the need of extraction. As a result of over retained deciduous second molars in maxilla the permanent first molars and premolars errupt in a distal position resulting in a class II molar premolar and canine relation.

Goshgarian[2] in 1972 was the first to introduce the Transpalatal Arch (TPA) in the orthodontics. Concept of unilateral TPA i.e. when it is activated it affects on one side and other side remain unaffected was given by Cetlin and Ten Hoeve. McNamara[3] and Burdon have also indicated that the subsequent activation would generate a distal force on one side and rotation on other side.

Ahmet Keles[4] introduced TPA for rapid derotation and distalization of molars bilaterally fabricated by 0.032" X 0.032" TMA wire and it had a long range of action.

Modified TPA Fabrication Technique

The modified TPA was fabricated with 19 gauge round stainless steel wire. Keeping the wire 2 mm away from the soft tissue with a helix away from marginal gingiva was incorporated at an internal diameter of 2mm unilaterally at the right side where distalization of molar was required. The wire was extended distally and then doubled to make tab. The TPA was checked on study model and ensured that it was passive. Pre welded bands were selected for upper and lower 1st molars were banded bilaterally with lingual sheath on both sides. Confirmation was done by placing the TPA in the patients mouth that it was not touching the palatal tissues.

Passive stage

Active stage

Case Report

A 13 year old male patient named B. Kumar who post pubertal presented to the Department of Orthodontics and Dentofacial Orthopaedics with the chief complaint of irregularly positioned upper & lower front teeth. He was diagnosed with class II subdivision, having a class I molar on the left side and a class II molar relation on the right side,as well as a class I canine relation on both side with an overjet of 3mm and overbite of 4 mm, crowding of 8mm in upper & 7mm in lower arch, Upper midline was not coincident with lower dental midline having straight facial profile , 115° nasolabial angle ,incompetent lips(Fig 1 and Table 1)

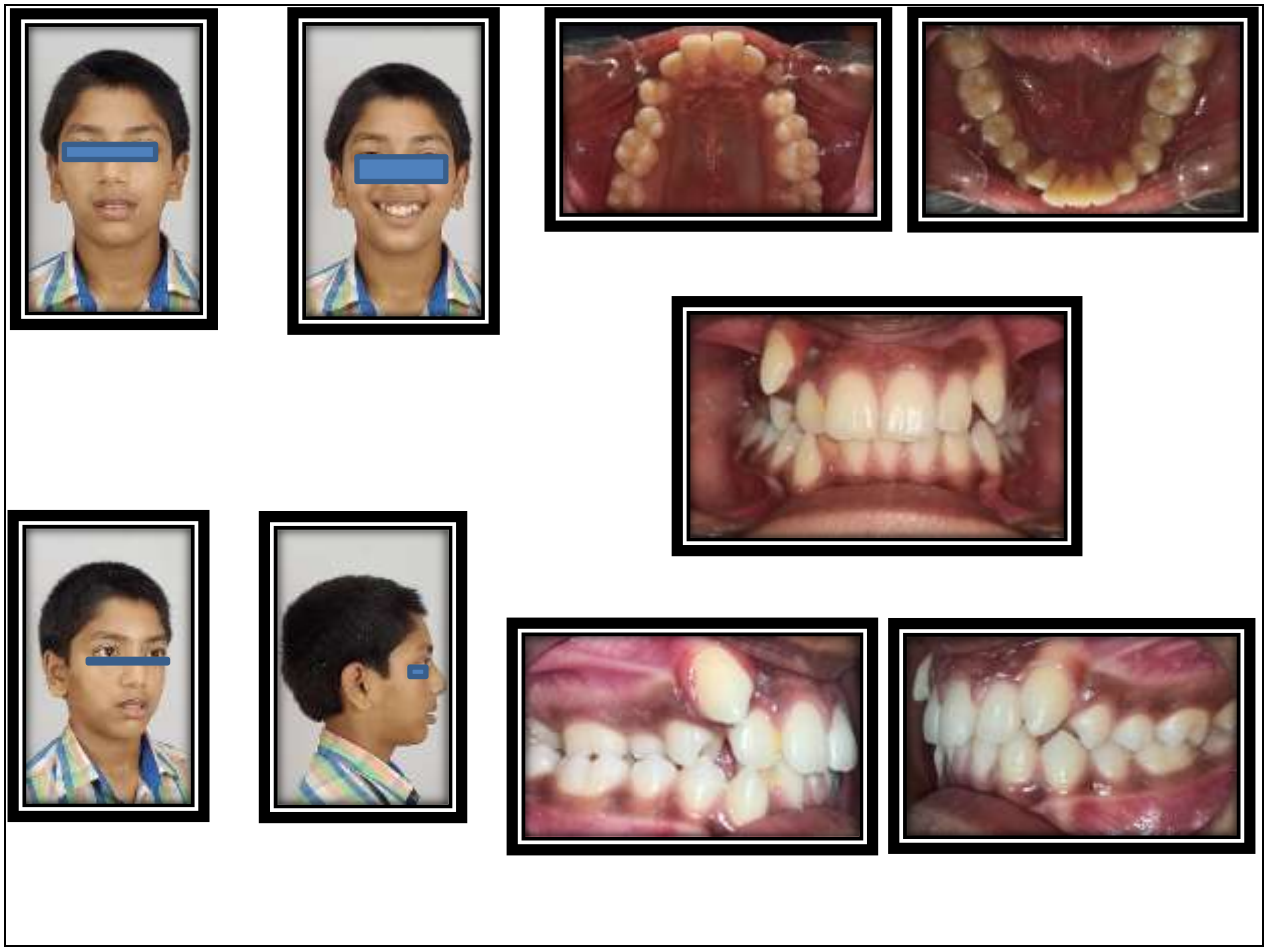

Fig1:Pre Treatment Intra and Extra oral Photographs

Fig: Pre-treatment record

Measurements	Mean values	Pre treatment	Current status
SNA	82^0	76^0	75^0
SNB	80^0	73^0	72^0
ANB	2^0	3^0	2^0
SN-(Go-Gn)	32^0	35^0	33^0

U1-NA angular	22^0	30^0	33^0
U1-NA linear	4mm	6mm	8mm
L1–NB angular	25^0	28^0	32^0
L1-NB linear	4mm	5mm	7mm
Interincisal angle	131^0	121^0	110^0
S line to U lip	0 mm	1mm	1mm
S line to L lip	0 mm	1mm	1mm
Nasolabial angle	$102^0 \pm 4^0$	115^0	105^0

Table 1: Comparative cephalometric analysis

The treatment objective was to correct the crossbite, achieve class I molar and canine relation and correct the crossbite. Molar distalization by modified TPA was planned to achieve dentoalveolar correction.

Treatment progress

Treatment was started with .022 slot MBT prescription. Initial levelling and alignment were started with .014 NiTi. The modified TPA was placed to start correction from the initial levelling phase. By light coupling force from the modified TPA to the band ensures correction of rotation and correction of crossbite (Fig 2). Two lingual button were place at the palatal surface of the right premolars to derotate them using elastics. A Nickel Titanium open coil spring was placed between right lateral and first premolar to provide or gain space for the highy placed canine to align. It was necessary to prevent the loss of anchorage, Temporary Anchorage Device were used to prevent proclination of upper/maxillary anteriors.

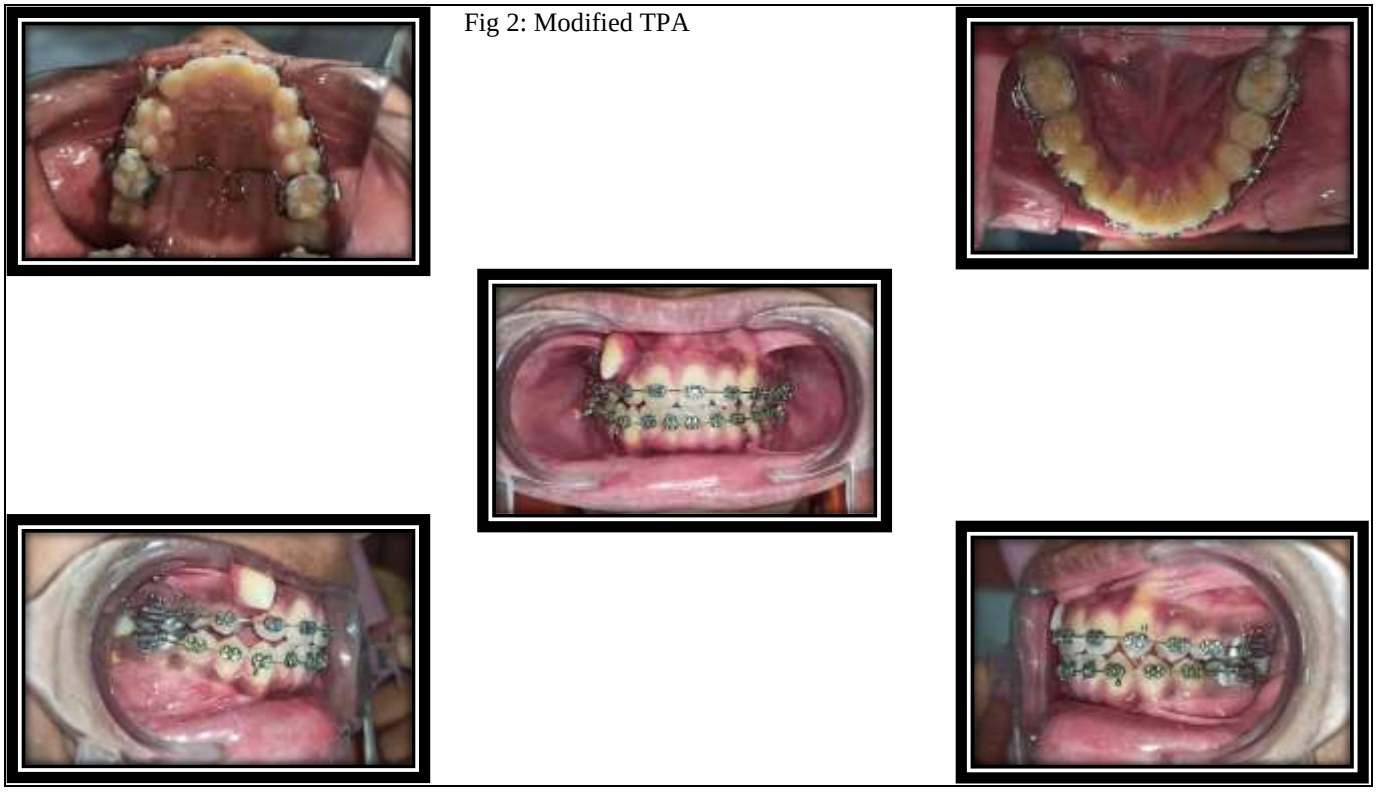

Fig 2: Modified TPA

Titanium implants of size 0.8 mm in diameter and 11 mm in length were inserted between first and second molar in upper arch. Stainless steel ligature wire (0.010" diameter) was tied to first premolar brackets to prevent mesial movement of premolars (Fig .3).

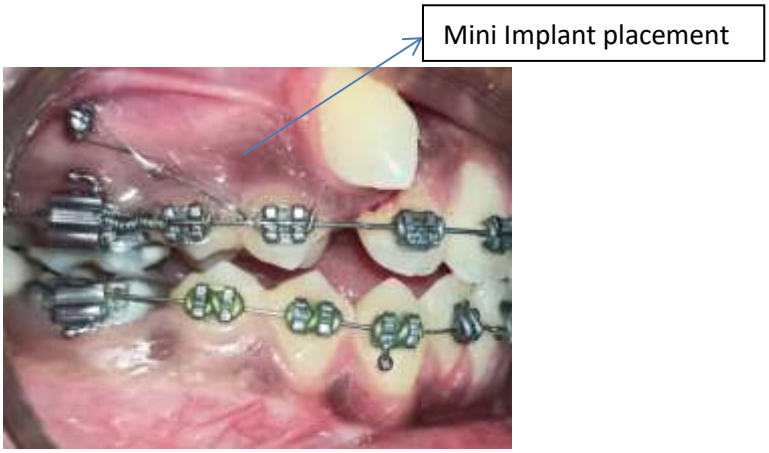

Fig: Mini implant placement

A Nickel Titanium open coil spring was positioned between the first molar and second premolar to give the distalizing force. The modified TPA was then placed and activated and within a month there was distalization of 2 mm and within 3 months of TPA placement there was distalization of 5 mm. The rest of the maxillary arch was retracted with elastic chains that were attached directly to the implants after the molars were distalized .

The remaining spaces were closed, and the occlusion was finally settled .It took 15 months to complete the process.

Treatment effects

As planned earlier by non-extraction approach a proper full cusp class I molar and canine relation was achieved. The profile was maintained and by the use of mini implant flaring/proclination of anterior teeth were avoided.

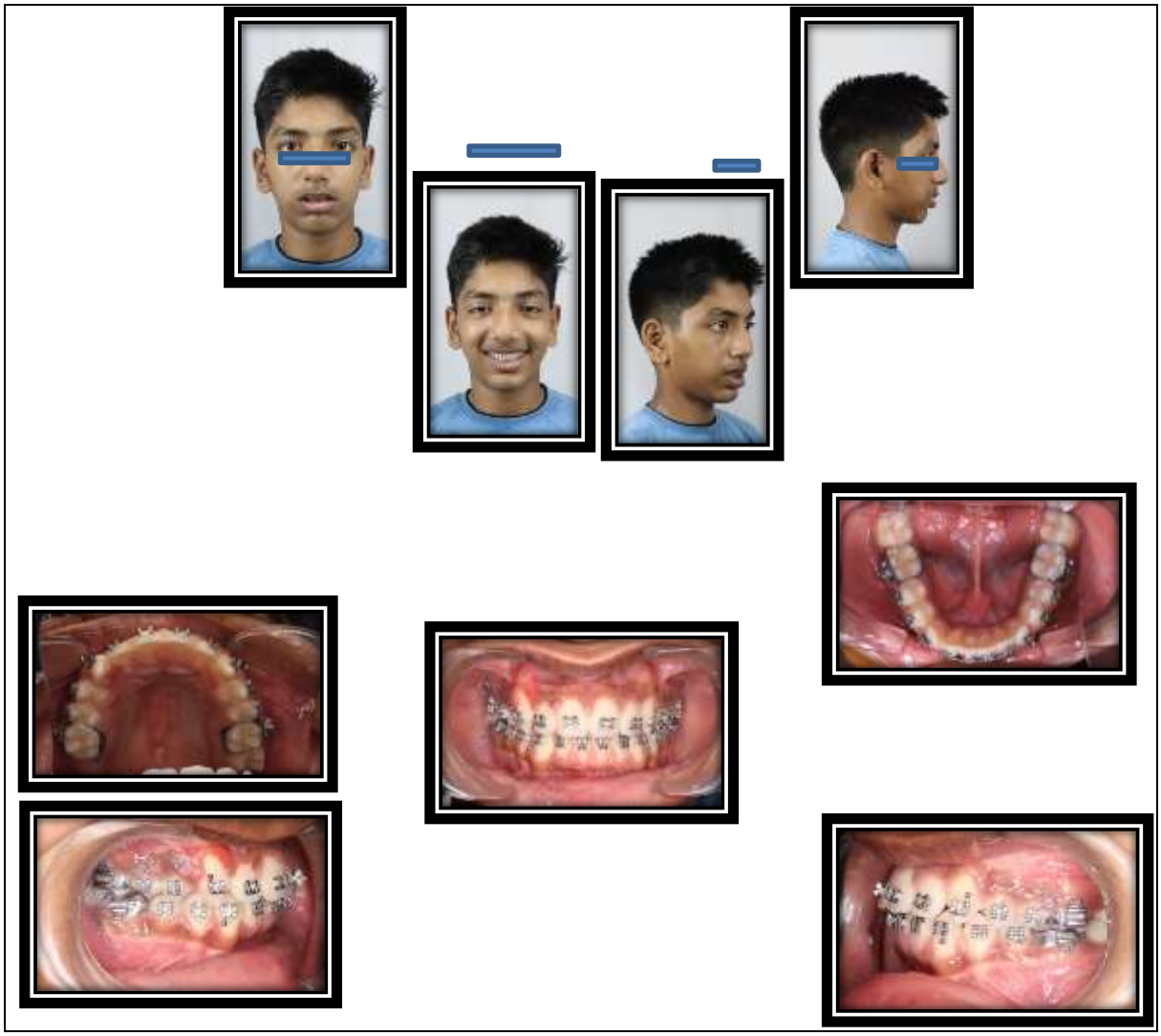

Fig3: Present stage Records

Discussion

The majority of borderline non-extraction cases have been managed with molar distalization techniques.Modified TPA appliance was used to successfully treat a unilateral class II molar. Unilateral distalization had the advantage of stronger anchorage because the contralateral side was utilized as an anchorage unit. The modified TPA appliance is the preference of choice because of its advantage over conventional TPA, ability to correct rotated molar, vertical control on molars bilaterally, unilateral distalization and prevention of canting of occlusal plane. To prevent side effects on the premolar and incisor regions many modifications have been made to yield optimal clinical results. Due to reciprocal mesial force , molar distalization occurred in the saggital plane at the expense of the slight proclination of the maxillary anterior teeth,leading to anchorage loss[5]. The mesial rotation brought on by the application of palatal stress and the extrusion, which is similar to but less than with double distalization ,are side effects on distalized molars[6]. Influence of second molar on the distal movement of the first molar remains a matter of debate. Presence of second molars increases treatment duration, produces more tipping of molars, and more anterior anchorage loss as reported by Gianelly AA[7] and Bondemark L[8].

Conclusion

For attainment of molar distalization modified TPA appliance was found to be efficient, non-invasive and non-compliant appliance where 5 mm of distalization was achieved in 3 months and occlusion was settled with class I molar and class I canine relation.

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