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INNOVATIONS

MOLAR DISTALIZATION WITH MODIFIED PALATAL DISTALIZER

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ABSTRACT

The aim of the study was to introduce a modified palatal molar distalizer and evaluate its dental effects. 20 Adolescent and post adolescent patients (6 boys, 14 girls) with crowded upper arch and class II canine relationship were included in this study. The skeletal pattern of these patients was class I, II or bimaxillary hypoplasia. This study analyzed the maxillary first molar distalization with intervention device-The Modified Palatal Distalizer, its effects on the anchor teeth as well as on the maxillary second molars. The appliance was composed of four premolar bands, two first molar bands, wider Nance and 15mm Ni-Ti coil springs (0.012x0.032) applied on the palatal surface delivering 240gms of force. The period of appliance wear was 7.7months.

Maxillary first molars were distalized bodily with minimal anchorage loss (11.1%) compared to 88.9% molar distal movement. An average of 5.39mm bodily distalization of the maxillary first molars was attained. The distal movement of maxillary second molars was recorded 4.35mm. Numerical data was statistically analyzed using paired t-test (SPSS version 12).

The modified palatal distalizer is an effective and reliable device producing bodily molar distalization, besides being cost effective.

Key words: *Molar distalization, Palatal distalizer, bodily movement, anchorage loss.*

INTRODUCTION

Non-extraction class II malocclusion with moderate space deficiency in the maxillary arch and relatively well aligned mandibular dental arch can be treated by distalizing maxillary first molars in order to gain space in the lateral segments for resolving crowding of the anterior teeth'. A number of methods have been introduced for molar distalization. The most traditional ones are extra oral traction and combination appliance like Cetlin's removable plate in conjunction with head gear[2]. Both these techniques being patient dependent, may affect the desired results. The more recent mechanics is intra oral fixed distalizers which being independent of the patient's compliance is an effective and reliable method of molar distalization, without inducing skeletal effects. Various methods have been devised by the clinicians over the years. Wilson and Wilson[3] developed maxillary 3D bimetric distalizing arch and 3D mandibular lingual arch for class II elastics. This method partially relied on patient's

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co-operation. Gianelly AA' distalized molars with repelling magnets and later with super elastic Ni-Ti[5] and reported 8°distal tip of the distalized molars and 20% anchorage loss. Jones RD and White JM[6] distalized maxillary molars with open coil jig. Ghosh J, Nanda RS' reported successful molar distalization with Pendulum spring incorporating one time activation. Erverdi N[8] conducted a simultaneous comparative study between Ni-Ti coil spring and repelling magnets and concluded that Ni-Ti coils were more effective. Disadvantages of the magnets were their cost, bulky appearance and weekly activations. All the above mentioned methods, however reported distal tip of the distalized maxillary first molars and anchorage loss of the anchor teeth.

Carano A, Testa M[9] introduced distal jet appliance and reported bodily distal movement without any anchorage loss. An advantage of this appliance was that it could be easily converted into passive Nance for stabilizing the distalized molars.

Keles A, Sayinsu K[1] attained bodily distalization of the maxillary first molars with square sectioned TMA spring incorporated in intra-oral bodily distalizer. Greater anchorage loss was however reported with this appliance.

Ijaz A, Keles A10 conducted a comparative study between two molar distalizers, an intra-oral bodily distalizer IBMD and a combination appliance, ACCO (Acrylic cervical occipital). Bodily distalization was reported with both these devices. Period of appliance wear was reported lesser with IBMD (7.2 months) than that ofACCO (11 months). Anchorage loss however was greater with IBMD. With ACCO patient's compliance was found to be a must.

Fortini A, Lupoli M, Parri Mil introduced First class rapid molar distalizer involving 109 patients and claimed bodily molar distalization without tipping effect. Anchorage loss or changes in vertical dimension were not reported. The appliance could be converted into passive Nance on completion of distalization.

Ijaz A1[02] introduced modified palatal distalizer and reported 5.5mm distal movement of maxillary first molars with negative anchorage loss. The same appliance is used in the current study which is a modification of the first class rapid molar distalizer. The appliance is designed according to our own requirements considering efficacy, cost, and availability of accessories and ease of fabrication.

MATERIAL AND METHODS

This intervention study included 20 adolescent and post adolescent patients, 6 boys and 14 girls, age ranging from 12-18 with the mean age of 14 years.

Inclusion Criteria

The inclusion criteria of this study comprised

1. All patients in permanent dentition
2. Skeletal I, mild II or Bi-maxillary hypoplasia
3. Crowding of the upper dental arch
4. Relatively well aligned mandibular dental arch
5. Class II canine relation
6. Molar relation class II or class I
7. Maxillary second molar in occlusion
8. Horizontal or normal growth pattern

Exclusion Criteria

The exclusion criteria of this study included

1. Severe class II malocclusion
2. Mixed dentition
3. High angle cases

Cephalometric Method

The wire markers embedded in acrylic caps were used to differentiate right side molars and premolars from the left side ones on the cephalogram **(Fig 1).** On the right side the markers were bent along the mesial surface and terminated into mesial helix. While on the left side the markers were oriented along the distal surface terminating into distal helix.

Cephalometric Analysis

The linear and angular measurements were used for the cephalometric analysis. The linear measurements were recorded from the true vertical for molar distalization and anchorage loss whereas extrusion or intrusion movements were measured from the true horizontal **(Fig. 2).** The angular measurements were attained from the true horizontal **(Fig. 3),** making an anterior angle between the vertical arms of the wire markers and the true horizontal.

Statistical Analysis

Statistical analysis was carried out with a commercial statistical package SPSS 12.0.

Fig 1. Acrylic caps with wire markers

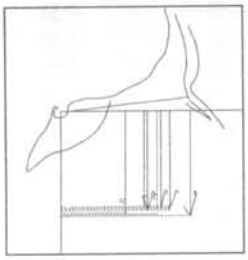

Fig 2. Linear measurements

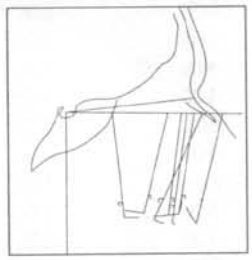

Fig 3. Angular measurements

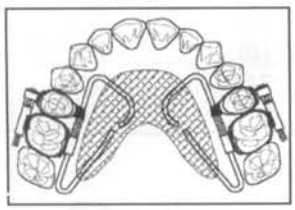

Fig 4. The First Class Appliance

Fig 5. Modified Palatal distalizer

Fig 6. Appliance in situ

Fig 7. Application on Buccal segment

Fig 8. Post Distalization Occlusal View

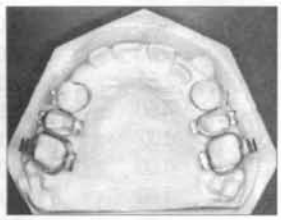

Fig 9. Casts with soldered bands

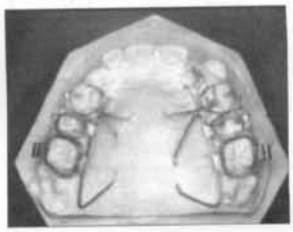

Fig 10. Cast with wire frame work

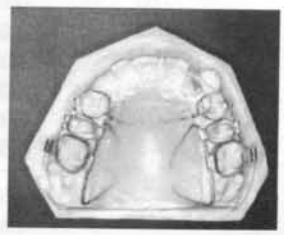

Fig 11. Appliance fabricated in acrylic

APPLIANCE FABRICATION

Idea for this innovation was borrowed from First Class Rapid Molar Distalizer designed by Fortini A and Lupoli M **(Fig. 4).** In that appliance the distalization force was applied on the buccal surface by opening the screw quarter a turn per day. On the palatal side NiTi coil delivering 200 grams force was incorporated to counteract the reaction of this force.

The modified palatal distalizer **(Fig. 5)** used in this study comprises bands on the first premolars in addition to 2nd premolar bands for anchorage reinforcement. 15 mm NiTi coil spring (0.012 x 0.032) is applied generating 240 grams of distalizing force. The wider Nance works as an active appliance **(Fig. 6)**

The force system in our device works like distal jet appliance. Reaction of the distalizing force is distobuccal rotation of the maxillary first molar. After 2-3 mm of distal movement 15 mm NiTi coil spring compressed on 0.017x 0.022" SS is applied on the buccal segments to counter the reaction of distalizing force **(Fig. 7).**

STEPS OF FABRICATION

Two casts are poured, one cast with first premolar bands and the other one with second premolar bands and first molar bands. Head gear tubes are soldered to the first molar and second premolar bands. The soldered bands are then fitted in original position on the cast one **(Fig. 9).**

For the wire framework proximal bending of the 0.9 mm SS wire is done mesial to the second premolar tooth, terminating in the apical region. Posteriorly the wire is bent distal to the second molar curving anteriorly and terminating in the apical region of the first molar tooth. The wire segments of the same gauge (0.9 mm) are then bent and soldered to the first premolar bands **(Fig. 10).** On completion of the wire work the appliance is fabricated in acrylic **(Fig. 11).** The NiTi coil spring is applied between second premolar and first molar that can otherwise be applied during the wire work before curving the posterior arm.

RESULTS

Cephalometric results of the study are given in table 1, 2, 3 and 4 with the post distalization occlusal

TABLE 1: PRE AND POST-DISTALIZATION CEPHALOMETRIC ANALYSIS, THE LINEAR MEASUREMENTS IN MILLIMETERS FROM THE TRUE VERTICAL, DISTAL MOVEMENT (+), MESIAL MOVEMENT (-)

Patient	Max. right 1st molar	Max. left 1st molar	Max. right 2nd premolar	Max. left 2nd premolar	Max. right 1st premolar	Max. left 1st premolar	Max. right central incisor
Sabeen1st	5.00	2.001st	-11st0	-2.00	-1.00	-2.00	-1.00
Afshan	11.00	3.00	0.00	-2.00	0.00	-2.00	0.00
Hina	2.00	8.00	2.00	3.00	2.00	3.00	2.00
Zara	3.00	4.00	-3.00	-4.00	-4.00	-2.00	-1.00
Amina	3.00	6.00	-1.00	0.00	-4.00	-2.00	-1.00
Sharafat	8.00	6.00	0.00	0.00	0.00	-0.50	-0.50
Taha	6.00	6.67	-2.50	-0.50	-6.00	-2.50	-0.50
Ayesha	6.50	2.00	-0.50	-1.00	-0.50	1.00	1.00
Rehana	5.00	5.50	-3.50	-1.00	-1.00	-2.50	0.00
Komal	6.00	5.50	2.00	0.00	1.00	0.00	1.00
Nida	4.00	6.50	-1.00	-1.00	-1.00	-2.00	0.00
Khurram	4.00	5.00	-3.00	2.00	1.00	-2.00	-0.50
A. Hashmat	6.00	5.50	1.00	-3.00	-2.00	-2.00	-1.00
Fiza	5.00	6.00	-1.00	-1.00	-2.00	1.00	0.00
Asad	5.00	6.50	1.00	2.00	-2.00	-2.00	-1.00
Sehar	6.00	5.00	-2.00	-1.00	-1.00	-0.50	0.00
Nadia	6.00	5.50	1.00	-1.00	-2.00	-0.50	-0.50
Hassan	6.00	6.50	-1.50	-1.00	-1.50	-1.00	0.00
Shafaq	5.00	6.00	1.00	1.00	-1.50	1.00	-0.50
Ahmad	5.50	6.50	1.00	-1.00	-1.00	-1.50	-1.00
	5.40	5.38	-0.55	-0.58	-1.33	-0.95	-0.23
Right	5.40		-0.65		-1.10		
Left	5.38		-0.58		-0.95		
Mean	5.39		-0.56		-1.14		-0.23

TABLE 2: PRE AND POST-DISTALIZATION CEPHALOMETRIC ANALYSIS, THE LINEAR MEASUREMENTS IN MILLIMETERS FROM THE TRUE HORIZONTAL, EXTRUSION (-), INTRUSION (+)

Sr. No	Patient	Max. right 1st molar	Max. left 1st molar	Max. right 2nd premolar	Max. left 2nd premolar	Max. right 1st premolar	Max. left 1st premolar	Max. right central incisor
1	Sabeen	-4.00	1.00	-1.00	-1.00	-2.00	-1.00	0.00
2	Afshan	3.00	1.00	0.00	0.00	-1.00	-2.00	-2.00
3	Hina	3.00	1.00	3.00	-1.00	1.00	-1.00	-1.00
4	Zara	-4.00	-2.00	-4.00	-3.00	-4.00	-3.00	-1.00
5	Amina	-3.00	0.00	-2.00	-1.00	-4.00	-3.00	0.00
6	Sharafat	2.00	-1.00	-3.50	-4.50	-5.00	-5.50	-3.00
7	Taha	-2.00	-2.00	-1.50	-4.00	-4.00	-2.50	-2.00
8	Ayesha	3.50	1.00	3.00	2.50	-1.00	1.50	2.00
9	Rehana	-2.50	-2.00	-2.50	-4.00	-3.50	-3.50	-2.50
10	Komal .	.00	1.50	0.50	0.00	0.00	0.50	1.00
11	Nida	-0.50	1.00	1.00	-1.00	-2.00	-2.00	1.00
12	Khurram	-1.00	-2.00	-2.00	-1.00	1.00	-2.00	1.00
13	Hashmat	1.00	0.00	0.50	-2.00	-2.00	-2.00	-3.00
14	Fiza	-2.00	-3.00	-3.00	-1.00	-2.00	-3.00	-3.00
15	Asad	0.00	1.50	-3.00	1.00	-3.00	1.00	-3.00
16	Sehar	-2.00	-1.00	0.50	-1.00	-2.00	0.50	1.00
17	Nadia	-1.50	-0.50	-1.00	0.50	-1.00	-0.50	0.50
18	Hassan	-0.50	-1.50	1.00	-0.50	1.00	-1.00	-0.50
19	Shafaq	-1.00	-1.50	0.50	1.50	-1.00	-0.50	-1.00
2320	Ahmad	-1.50	0.00	-2.00	-1.00	2.00	1.00	0.50
Mean		-0.55	-0.43	-0.78	-1.03	-1.63	-1.40	-0.75
Right		-0.55		-0.78		-1.63		
Left		-0.43		-1.03		-1.40		
Mean		-0.49		-0.90		-1.51		-0.75

TABLE 3: PRE AND POST-DISTALIZATION CEPHALOMETRIC ANALYSIS, THE ANGULAR MEASUREMENTS ARE IN DEGREES FROM THE TRUE HORIZONTAL, DISTAL TIP (-), MESIAL TIP (+)

Sr. No.	Patient	Max. right 1st molar	Max. left 1st molar	Max. right 2nd ° premolar	Max. left 2nd ° premolar	Max. right 1st ' premolar	Max. left 1st ' premolar	Max. right central incisor
1	Sabeen	-3.00	5.00	10.00	-1.00	-2.00	-1.00	0.00
2	Afshan	3.00	14.00	-9.00	6.00	-2.00	-5.00	2.00
3	Hina	-6.00	-5.00	-6.00	-15.00	-4.00	-3.00	-12.00
4	Zara	-6.00	-7.00	5.00	4.00	1.00	-2.00	1.00
5	Amina	0.00	15.00	-4.00	-11.00	22.00	7.00	0.00
6	Sharafat	-8.50	-7.50	-5.50	-3.50	2.00	-8.50	7.50
7	Taha	7.00	-2.50	-13.00	-1.50	-2.00	14.00	-1.50
8	Ayesha	-2.00	1.00	1.00	16.00	10.50	0.00	-2.50
9	Rehana	4.00	5.50	-5.00	2.50	-6.00	-3.00	4.00
10	Komal	-2.00	-3.00	14.00	12.00	10.00	8.00	2.00
11	Nida	-0.50	-1.00	0.50	0.50	4.00	5.00	0.00
12	Khurram	-1.00	1.00	-2.00	1.00	0.00	0.00	-2.00
13	Hashmat	0.00	0.50	-1.50	0.00	-5.00	-5.00	1.50
14	Fiza	-0.50	0.50	1.00	-2.00	-5.00	-3.50	0.50
15	Asad	1.00	0.00	0.50	1.00	0.00	-5.00	-2.00
16	Sehar	-1.00	0.50	-1.50	0.00	0.00	0.00	-1.50
17	Nadia	-0.30	-1.50	6.00	-3.00	5.00	2.00	3.00
18	Hassan	-1.00	-3.00	5.00	2.00	-0.50	-0.50	1.00
19	Shafaq	mesialized	-1.00	1.00	1.50	0.50	3.00	0.50
20	Ahmad	1.50	-2.00	1.00	2.00	-0.50	3.50	1.00
Mean		-0.82	0.48	-0.13	0.58	1.40	0.30	0.13
Right		-0.82		-0.13		1.40		
Left		0.48		0.58		0.30		
Mean		-0.17		023		0.85		0.13

TABLE 4: PRE AND POST-DISTALIZATION CEPHALOMETRIC ANALYSIS, DENTAL EFFECTS ON MAXILLARY SECOND MOLARS, THE LINEAR MEASUREMENTS IN MILLIMETERS FROM THE TRUE VERTICAL, DISTAL MOVEMENT (+), MESIAL MOVEMENT (-) THE LINEAR MEASUREMENTS IN MILLIMETERS FROM THE TRUE HORIZONTAL, EXTRUSION (-), INTRUSION (+) THE ANGULAR MEASUREMENTS ARE IN DEGREES FROM THE TRUE HORIZONTAL DISTAL TIP (-), MESIAL TIP (+)

Sr. No.	Patient	Distalization	Vertical move1stt	Angulation
1	Sabeen	3.00	1stt.0	1s00
2	Afshan2nd	10.00	-3.0	-7.00
3	2 nd2nd	3.00	0.0	-8.00
41st	Zara	31st	-2.0	-10.1st
lst	Aminalst	3.00	2.0	-3.00
6	Sharafat	4.50	0.0	-10.00
7	Taha	2.00	1.5	6.00
8	Ayesha	4.00	-4.0	-13.00
9	Rehana	5.50	-1.0	-12.00
10	Komal	5.00	2.0	3.00
11	Nida	4.00	-3.0	-5.00
12	Khurram	3.00	0.0	-2.00
13	A. Hashmat	4.00	0.5	-2.00
14	Fiza	3.00	-1.5	-2.00
15	Asad	3.50	-1.0	-5.00
16	Sehar	4.00	-3.0	-2.00
17	Nadia	5.00	-1.0	-1.50
18	Hassan	5.50	-2.0	-2.00
19	Shafaq	6.00	-1.5	-6.00
20	Ahmad	6.00	-2.0	-3.00
Mean		4.35	-1.0	-4.18

view in **figure 8.** With the modified palatal distalizer the maxillary first molars were distalized bodily on an average of 5.39mm. The average distalization period was calculated to be 7.7 months. Maxillary first molar extrusion was observed but it was negligible (0.5mm).The distal tip of the first molar found was of minimum value being 0.17°. The distal movement of the maxillary second molars was calculated 4.35mm, with negligible extrusion of 1.0mm and a distal tip of 4.18°. The maxillary second premolars mesialized (anchorage loss) on an average of 0.56 mm, tipped mesially 0.23° and showed an extrusion of 0.9 mm. The maxillary first premolars mesializ4d (anchorage loss) an average of 1.14mm, tipped mesially on an average of 0.85° and showed an average extrusion of 1.5mm. The maxillary central incisors protruded an average of 0.23mm, proclined (Mesial t1st 0.13° and extruded 0.75mm. The collective anchorage loss was calculated to be 11.1 % compared to 88.9% distal movement of the maxillary first molars.

The numerical data for sagittal, vertical and angular movement of the teeth including maxillary second molars, first molars, second premolars, first premolars and central incisors was statistically analyzed using paired t-test (SPSS version 12) for the paired variables

TABLE 5: STATISTICAL ANALYSIS PAIRED SAMPLES TEST

		Paired Differences						df	Sig. (2-tailed)	Significance
		Mean	Std. deviation	Std. error mean	95% Confiden1stinterval of the difference					
					Lower	Upper				
Pair 1	max 2nd molar dist Pll - max 2nd molar dist Pll	4.35000	1.75544	.39253	3.52843	5.17157	11.082	19	.000	Ir..
Pair 2	max lst molar dist Pll - max 1st molar dist Pll	5.39000	.94234	.21071	4.87897	5.76103	25248	19	.000	
Pair 3	max 2nd pmolar Mes PI - 2nd pmolar Mes Pll	-.56500	1.35890	.30386	-120098	.07098	-1.859	19	.079	N S
Pair 4	max 1st pmolar Mes PI - max 1st pmolar Mes Pll	-1.14000	1.44127	.32228	-1.81454	-46546	-3.537	19	.002	
Pair 5	max central incisor Mes PI - max central incisor Mes Pll	-.23000	.80255	.17945	-.60060	.15060	-1.254	19	.225	N S
Pair 6	max 2nd molar Vert PI - max 2nd molar Vert PI I	-1.0000	2.20287	.49258	-123097	.83097	-.406	19	.689	N S
Pair 7	max 1st molar Vert PI - max 1st molar Vert Pll	-.49000	1.62749	.36392	-127669	.24669	-1.415	19	.173	N S
Pair 8	max 2nd pmolar Vert PI - max 2nd pmolar Vert Pll	-.90500	1.68413	.37658	-1.69320	-.11680	-2.403	19	.027	N S
Pair 9	max 1st pmolar Vert PI - max 1st pmolar Vert Pll	-1.51500	1.67843	.37531	-2.30053	-.72947	-4.037	19	.001	*1e*
Pair 10	max central incisor Vert PI - max central incisor Vert PI I	-.75000	1.631st	.36545	-1.51489	.01489	-2.052	19	.054	N S
Pair 11	max 2nd molar Angu PI - max 2nd molar Angu Pll	-4.18000	4.86468	1.08778	-6.45174	-1.89826	-3.838	19	.001	**
Pair 12	max lst molar Angu PI - max 1st molar Angu Pll	-.17000	4.01215	.89714	-2.02775	1.72775	-.167	19	.869	N S
Pair 13	max 2nd pmolar Angu max 2nd pmolar Angu Pll	23000	5.39772	1.20697	-2.80621	2.24621	-.232	19	.819	N S
Pair 14	max 1st pmolar Angu PI - max 1st pmolar Angu PI I	85000	5.04772	1.12870	-1.51241	3.21241	.753	19	.461	N S
Pair 15	max central incisor Angu PI - max central incisor Angu Pll	.13000	3.68094	.82308	-1.59773	1.84773	.152	19	.881	N S

P< 0.05 Significant*, P< 0.01 Highly Significant **, P< 0.001 very highly Significant ***, NS not significant

of the pre-treatment and post-treatment position of the teeth **(Table 5).** Th***stal movement of second molars and first molars was found to be very highly significant showing the desirable distal movement. The maxillary first molars moved distally 5.39mm on average with standard deviation of 0.94mm and P-value 0.000. The mean distal movement of second molars was calculated 4.35mm with standard deviation of 1.75mm and P-

Value 0.000. The mesial movement of maxillary first premolar also showed highly significant mean mesial movement of 1.14mm with standard deviation of 1.44mm and P-value 0.002 and very highly significant vertical movement (P value 0.000). The measurements of rest of the variables were found statistically not significant.

DISCUSSION

This intervention study on 20 patients analyzed clinical dental effects of modified palatal distalizer. The maxillary first molars were distalized bodily (5.39mm, P-value 0.000) with negligible distal tip and extrusion. An average period of appliance wear was 7.7 months. The maxillary second molars also showed a distal movement of4.35 mm (P-value 0.000); extrusion (1.0mm +2.2mm) and a distal tip of 4.18°+ 4.86. Anchorage loss of the anchor teeth was quite less (11.1%). The maxillary central incisor showed negligible sagittal and vertical changes. The anchorage loss and vertical change of second premolar was greater than that of central incisor. Maxillary first premolar however showed greatest mesial movement, tip and extrusion. This may possibly be because the first premolar was retained in acrylic Nance by means of separate wire segment.

Comparing our results with the earlier mentioned studies, the distalized molars showed a distal tip of varying degree and anchorage loss of about 20 % in those studies. Whereas in our study molars distalized bodily with a minimum anchorage loss. Effects of this appliance on maxillary first molars are more or less similar to the distal jet appliance of Carano A[9], IBMD of Keles A[1]. and first class appliance1110. Similar findings were reported by Ijaz A in the comparative study°. Anchorage loss however was not reported by Fortini11 and Carano, whereas Keles reported greater anchorage loss of about 40% that got relapsed during stabilization period of the distalized molars. The current study on the other hand showed very small amount of anchorage loss (11.1%).

Ngantung V, Nanda RS and Bowman SJ[13] evaluated the effects of distal jet delivering 240gm force, on maxillary molars, anchor teeth and the outcome at completion of the orthodontic treatment. The appliance was found to be an effective method of molar distalization. Reciprocal anchorage loss in the premolars and incisors was reported like other similar devices such as Jones jigs and pendulum appliance etc. This distal jet also showed less tipping of the maxillary first molars (3.3 degree) and better bodily movement of molars 2.1 + 1.8mm as the force was applied closer to the centre of resistance. The maxillary second molars however moved distally 2.6 + 1.9mm with distal tip of 11.8° + 7.2°. In our study the first molars distalized bodily a greater distance of 5.39 + 0.94mm, with negligible distal tip of 0.17 + 4.0 degree (p-value 0.869) and lesser anchorage loss of 11.1%. The second molars in our study also showed a greater distalization of 4.35 + 1.7mm and lesser distal tip of 4.18 + 4.86 compared to distal jet appliance. The negative anchorage loss reported by Ijaz A1[02] was thought to be the reaction of excessive force. Fortini A, Lupoli M, Guintoli F and Franchi L[14] conducted a review study to evaluate treatment effects of first class rapid molar distalizer. The appliance was found to be an efficient and reliable device. The maxillary first molar distalization contributed 70% of the space created anterior to the first molar whereas reciprocal anchorage loss was 30%. Distal tip of maxillary first molar was reported 4.6 degree. The results of this study differed from the Fortini's earlier study, where bodily distal movement was claimed without any anchorage loss and distal tip of the first molars. The findings of the current study are more or less similar to Fortini's earlier study.

The custom made Modified Palatal Distalizer is found to be an efficient and reliable device which is independent of patient's compliance. It incorporates one time activation and can be easily converted into passive Nance. The involvement of first premolars and increased acrylic part to widen the Nance reinforced the anchorage.

CONCLUSIONS

On the basis of results of this study conducted on 20 patients, the following conclusions may be drawn: The Modified Palatal Distalizer produces bodily distalization of the maxillary first molars. The appliance also distalizes second molars with a distal tip. It can be used in grown up patients (late teens). It is cost effective.

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