



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

*International Journal of Recent Scientific Research*  
Vol. 10, Issue, 04(B), pp. 31723-31726, April, 2019

**International Journal of  
Recent Scientific  
Research**

DOI: 10.24327/IJRSR

## Research Article

# COMPARISON OF MAXILLARY ANTERIOR TEETH INTRUSION WITH IMPLANTS AND UTILITY ARCH-A RETROSPECTIVE CEPHALOMETRIC STUDY

**Amit Nilgar\*and Keluskar K.M**

Department of Orthodontics and Dentofacial Orthopaedics, K.L.E V.K Institute of Dental Sciences, Belgaum, Karnataka, India

DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1004.3323>

### ARTICLE INFO

#### Article History:

Received 12<sup>th</sup> January, 2019

Received in revised form 23<sup>rd</sup>

February, 2019

Accepted 7<sup>th</sup> March, 2019

Published online 28<sup>th</sup> April, 2019

#### Key Words:

Intrusion, utility arch, implants, cephalometric, deep bite, anterior maxillary teeth.

### ABSTRACT

**Aim:** Deepbite is one of the most common malocclusion seen in treatment of orthodontic cases. Aim of the present study was to compare the effects of intrusion of maxillary anterior teeth by two different methods in two groups by implants and intrusion utility arch respectively and if any side effects seen in the molars.

**Methods:** 24 samples were taken and divided into two groups of 12 each. Implants were used in the first group and intrusion utility arch used in second group. Two conventional lateral cephalometric headfilms of the patients, one at beginning of treatment (T1) and other at end of treatment (T2), were obtained. 16 landmarks were located and 13 measurements were made on the cephalometric tracings.

**Results:** There was no statistical significance seen in intrusion of anterior maxillary teeth in between both groups. Side effect in intrusion utility arch group which was mesial movement of molar was statistically significant. There was no such side effect seen in implant group.

**Conclusions:** There is no difference in intrusion of anterior teeth between intrusion utility arch and implants. The side effect seen in intrusion utility arch is mesial movement of maxillary first molar. There is no such effect in implant group

**Copyright © Amit Nilgar and Keluskar K.M, 2019**, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

## INTRODUCTION

An increase in overbite is seen with almost all malocclusions, regardless of the growth pattern. Treatment of deep bite is one of the priorities of the orthodontist. they can cause negative effects on the teeth and their supporting periodontal tissues. It can be corrected by extruding the posteriors or by intruding the anteriors or both. The treatment of choice depends on a variety of factors such as smile line, incisor display and vertical dimension.<sup>1</sup>

The aim of this study is to compare the cephalometric changes of incisor intrusion obtained with the aid of implant and utility arches.

## MATERIALS AND METHODS

### Location and Duration of study

The present study was conducted at the Department of Orthodontics and Dentofacial Orthopaedics, K.L.E V.K Institute of Dental Sciences, Belgaum, Karnataka for a period of one year.

### Experimental design

The present study is a retrospective cephalometric study for which completed records of 24 patients (age: 15 to 28) with deep bite were taken from the department of orthodontics.

### Grouping

The records were grouped as follows

**Study group I:** 12 implant intrusion (intrusion done with niti coil springs from implant)

**Study group II:** 12 utility arch intrusion (intrusion done with intrusion utility arch)

### Procedures

Study included patients who had deep bite (4-7mm) requiring intrusion of anterior incisors, with extractions done of upper 1<sup>st</sup> premolars and canine retractions done using elastomeric chains from first molar to crimpable hook mesial to canine bracket with anchorage units consisting of first molar, 2<sup>nd</sup> premolar and canine. Patients had to be treated by fixed mechanotherapy only to be included. Complete records of the patients were also necessary so as to be included in the study.

\*Corresponding author: **Amit Nilgar**

Department of Orthodontics and Dentofacial Orthopaedics, K.L.E V.K Institute of Dental Sciences, Belgaum, Karnataka, India

Patients with missing anterior teeth or maxillary 1<sup>st</sup> molars, syndromic patients or patients having cleft lip and palate were excluded from the study. Two conventional lateral cephalometric headfilms of the patients, one at the beginning of treatment (T1) and the other at the end of treatment (T2), were obtained. All cephalograms were traced by the same investigator using a 0.5-mm lead pencil. 16 landmarks were located and 13 measurements were made on the cephalometric tracings. Two vertical reference planes were constructed for measurement confirmation of the dental movements. The first reference was the pterygoid vertical (PTV) drawn perpendicular to the sella-nasion (SN) plane, and the second was drawn perpendicular to the constructed horizontal plane (7° to the SN plane) from the point of intersection of the anterior wall of sella turcica and the anterior clinoid process (VR).

**Statistical Analysis**

A paired t test was performed for the assessment of treatment changes within the groups, and an independent t test was used for the evaluation of changes between the groups. A significance value of 0.05 was predetermined.

**RESULTS**

There were thirteen parameters that were measured for this study, namely the SNA angle, GoGn angle, U6-SN, U6-VR, U6-PTV, U1-VR, U1-PTV, Ls-E plane, U1-PP angle, U1-PP (fig 1), overjet and overbite (fig 2). Of these thirteen parameters, two parameters showed statistical significance i.e. U6-PTV and U6-VR, implying mesial movement of molar in utility arch group (Table 1).

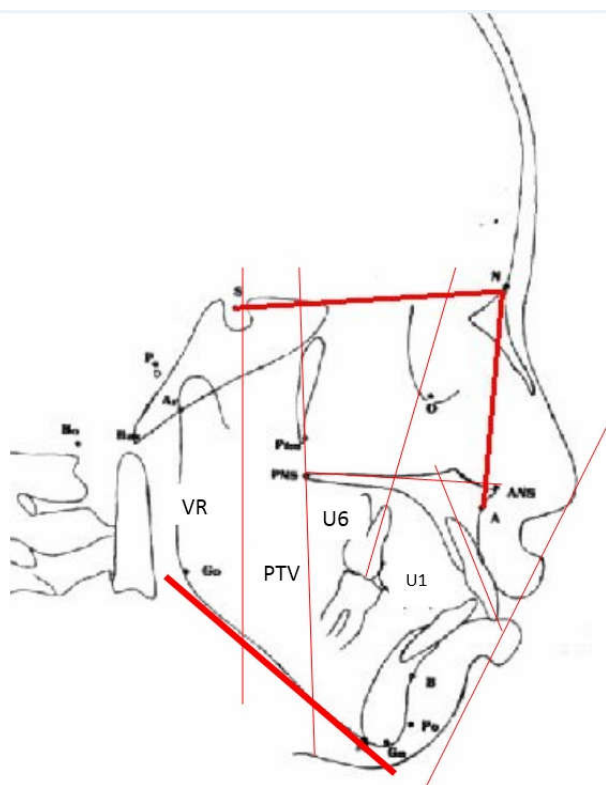


Figure 1 Parameters measured

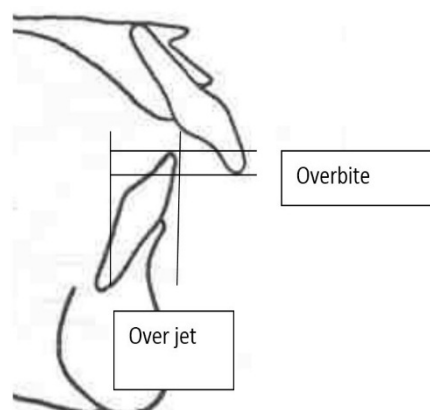


Figure 2 Overjet and overbite

Table 1 Comparison of mean difference of pre and post treatment cephalometric parameters between implant and utility arch treatment groups

	Group	N	Mean	Std. Deviation	t-value	p-value
SNA	Implant	12	1.08	1.78	0.46	0.65
	Utility arches	12	0.75	1.76		
GoGnSN	Implant	12	0.33	3.98	0.91	0.38
	Utility arches	12	-0.92	2.64		
GoGn PP	Implant	12	0.83	2.823	0.798	0.433
	Utility arches	12	0.08	1.621		
U6SN	Implant	12	-0.50	2.54	0.29	0.77
	Utility arches	12	-0.83	3.04		
U6VR	Implant	12	-0.33	1.92	2.33	0.028*
	Utility arches	12	-2.42	2.43		
U6PTV	Implant	12	-0.16	1.27	2.40	0.025*
	Utility arches	12	-2.16	2.59		
U1VR	Implant	12	4.33	4.19	-0.91	0.37
	Utility arches	12	6.08	5.21		
U1PTV	Implant	12	3.83	3.93	-1.00	0.33
	Utility arches	12	5.58	4.60		
Ls E plane	Implant	12	1.25	1.42	0.53	0.60
	Utility arches	12	0.92	1.68		
U1PP°	Implant	12	6.33	6.19	-0.83	0.415
	Utility arches	12	8.58	7.08		
U1PP mm	Implant	12	2.75	1.06	0.18	0.86
	Utility arches	12	2.67	1.23		
Overjet	Implant	12	3.08	3.50	-1.00	0.33
	Utility arches	12	4.50	3.42		
Overbite	Implant	12	2.00	2.66	-0.16	0.88
	Utility arches	12	2.17	2.59		

**DISCUSSION**

Deep bite malocclusion is one of the most common entity seen in treatment of orthodontic cases<sup>1</sup>. Deepbite can be treated orthodontically by intrusion or flaring of the incisors, extrusion or passive eruption of the buccal segments, or a combination of these. The treatment of choice depends on a variety of factors such as smile line, upper lip length, incisor display, and vertical dimension. For instance, in subjects with a normal vertical

dimension, intrusion of the anterior teeth is recommended. Conventional methods for incisor intrusion usually involve 2 × 4 appliances or reverse curved arches<sup>1,2,3</sup>.

Orthodontic intrusion of the anterior dentition is indicated for the management of a deep overbite, especially in subjects where bite opening with eruption of posterior teeth is contraindicated.

Anchorage control is an important aspect to successful orthodontic treatment. There is always an action-reaction force acting in orthodontic tooth movement in anchorage control. Extra oral anchorage can be used to direct forces not possible with intra oral anchorage but has its own limitations that it requires absolute patient cooperation<sup>4</sup>. For this reason numerous temporary skeletal anchorage devices were introduced. They were designed to be used as anchorage to support orthodontic tooth movement.

In the present study we had included subjects who had fixed mechanotherapy because the patients eventually undergo fixed mechanotherapy. So understanding the effects which takes place after intrusion and fixed mechanotherapy would give us an idea as to how the mechanics affect the final result in the patient with deep bite malocclusion.

The amount of incisor intrusion (U1-PP) with utility arch was 2.67mm and with the implants it was 2.75mm.though the intrusion with the miniscrews was more, the results were statistically insignificant. Bjork said that there is a decrease in overbite through adolescence<sup>5</sup>. Bergersen in his study also found decreases in overbite between ages 12 and 18 years<sup>6</sup>. Sinclair and Little found that the overbite increases from ages 8 to 13 and decreases from 13 to 20 for untreated normal growing subjects<sup>7</sup>. The amount of increase in overbite during the transition from the mixed dentition to the permanent dentition was 0.40 mm, and during the maturation of the permanent dentition from 13 to 20 years it was reduced by 0.59 mm. The decrease in overbite expected during growth would be beneficial for both overbite reduction and the retention of patients in the utility arch group. Various studies have reported overbite changes between 2 and 6 mm and intrusion rates from 1 to 3 mm with conventional mechanics. But the orthodontic literature includes few case reports of maxillary incisor intrusion with miniscrews<sup>8,9,10</sup>. Kanomi reported intrusion of 6 mm in 4 months for the mandibular incisors<sup>10</sup>. Using a mini-implant placed between the maxillary central incisors Ohnishi *et al* obtained 3.5 mm of incisor intrusion relative to the maxillary incisor tip<sup>8</sup>. Kim *et al* applied a segmental intrusive force between the maxillary central incisors<sup>9</sup>.

The angulation of the molar did not show any statistical significance between the groups. In a similar study by Polat Olsky the intrusive force was given with a tip-back bend in the utility arch, the maxillary first molars were tipped by 6.82° distally<sup>11</sup>. This was not seen in this study because the intrusion was followed by the fixed mechanotherapy which would have uprighted the molars. This risk of distal molar tipping is best counteracted by reinforcement of the posterior segment in intrusion mechanics. De Vincenzo and Winn used a Nance appliance with intrusion arches and minimized the amount of molar movement<sup>12</sup>. Burrstone advised that to counteract the distal tipping and maintain anchorage In segmented arch mechanics, the posterior anchorage unit is stabilized by using

heavy stainless steel arch wires to counteract the moments produced during incisor intrusion<sup>13</sup>.in the implant group they did not see any statistically significant change in angulation of the molars because the molars were not included in the setup for intrusion.

The mesial movement of the molars was seen in the utility arch group i.e. with reference to the VR (p=0.028) and PTV (P=0.025) and they were statistically significant. There is distal crown movement and mesial movement of the root in usage of the utility arch because of the tip back bend. So the bone remodelling is already taking place around the first molar. When the force is applied to retract the anterior teeth after intrusion, there is mesial movement of the crown but the root position does not change because the root offers more resistance to movement than the crown<sup>13</sup>. This is probably the cause of the mesial movement of the maxillary teeth in the utility arch group, where as in the implant group there is no tip back bend which would cause the movement of the crown and root, so the movement of the molar is less. Therefore, there was no mesial movement of the molars seen in the implant group.

The upper incisors showed no proclination in both the groups after the treatment. As said before the conventional intrusion mechanics show correction of deep bite by intrusion and labial flaring of the teeth. In the study by Polat Olsky the upper incisors showed an increase in the proclination of the upper incisors i.e. 13.55° increase in proclination was seen<sup>11</sup>. The minimum amount of protrusion shown in the literature was by Weiland *et al* who found 2.35° of protrusion using intrusion base arches<sup>3</sup>. However, Van Steenberg *et al* found about 8° of incisor protrusion using the same arch<sup>15</sup>. The main reason for this difference lies in the resultant force vector in the miniscrew group and the intrusion arch group.

Clinicians use the implants sparsely because it is considered invasive however the introduction of the miniscrews has made the orthodontic mechanics simpler and can help reduce the time needed for treatment by reducing the unwanted tooth movements and round tripping and anchorage loss. The side effects seen are minimal and the patient acceptance of the miniscrew is also positive. According to the present study the side effects of the implant group were minimal. Long term follow up should be done to ensure the corrections made are stable.

## CONCLUSION

There was no statistically significant difference in intrusion of the maxillary anterior teeth between the intrusion utility arch group and the implant group.

There is mesial movement of maxillary first molar as a side effect of utility arch and there is no such side effect in the implant group.

## References

1. Polat-Ozsoy O, Arman-Ozcirpici A, Veziroglu F. Miniscrews for upper incisor intrusion. *Eur J Orthod* 2009;31:412-6.
2. Hans MG, Kishiyama C, Parker SH, Wolf GR, Noachtar R. Cephalometric evaluation of two treatment strategies for deep overbite correction. *Angle Orthod* 1994;64:265-74

3. Weiland FJ, Bantleon HP, Droschl H. Evaluation of continuous arch and segmented arch leveling techniques in adult patients—a clinical study. *Am J Orthod Dentofacial Orthop* 1996;110:647-52.
4. Favero L, Brollo P, Bressan E, Orthodontic anchorage with specific fixtures: related study analysis. *Am J Orthod Dentofacial Orthop* 2002;122:84-94
5. Bjork A. Variability and age changes in overjet and overbite. *Am J Orthod* 1953;39:779-801.
6. Bergerson EO. A longitudinal study of anterior vertical overbite from eight to twenty years of age. *Angle Orthod* 1988;58:237-56.
7. Sinclair pm, little rm. Maturation of untreated normal occlusion. *Am J Orthod*.1983;83:114-23
8. Ohnishi H, Yagi T, Yasuda Y, Takada K. A mini-implant for orthodontic anchorage in a deep overbite case. *Angle Orthod* 2005;75: 444-52.
9. Kim TW, Kim H, Lee SJ. Correction of deep overbite and gummy smile by using a mini-implant with a segmented wire in a growing Class II Division 2 patient. *Am J Orthod Dentofacial Orthop* 2006;130:676-85.
10. Kanomi R. Mini implant for orthodontic anchorage. *J Clin orthod* 1997;31:763-7.
11. Omur Polat- Ozsoy,a Ayc,a Arman-Ozc , ırpıcı,b Firdevs Veziro\_glu,c and Alev C, etins ,ahin. Comparison of the intrusive effects of miniscrews and utility arches; *American Journal of Orthodontics and Dentofacial Orthopedics*; April 2011 Vol 139 Issue 4
12. DeVincenzo JP, Winn MW. Maxillary incisor intrusion and facial growth. *Angle Orthod* 1987;57:279-89.
13. Matsuis, Caputo AA, Chaconas SJ, Kiyomura H. Centre of resistance of anterior arch segment. *Am J Orthod Dentofacial Orthop* 2000;118:171-8.
14. Richard J Smith, Charles J Burrstone, Mechanics of tooth movement. *American journal of orthodontics* volume 85,issue 4.april 1984,pages 294-307.
15. Van Steenberg E, Burstone CJ, Prahl-Andersen, Aartman IHA.Influence of buccal segment size on prevention of side effects from incisor intrusion. *Am J Orthod Dentofacial Orthop* 2006;129:658-65.

**How to cite this article:**

Amit Nilgar and Keluskar K.M., 2019, Comparison of Maxillary Anterior Teeth Intrusion with Implants and Utility Arch-A Retrospective Cephalometric Study. *Int J Recent Sci Res.* 10(04), pp. 31723-31726.  
DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1004.3323>

\*\*\*\*\*