Evaluation of Change in Dento-Skeletal Vertical Dimensions using Two Retraction Methods: A Comparative Study

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ABSTRACT

Introduction: The goal of Orthodontic treatment is to improve the patient's life through enhancement of Dentofacial functions and esthetics. Paradigms have started to shift in Orthodontic world since the introduction of mini-implants in the anchorage armamentarium. So the present study was undertaken to analyse and compare the amount of Intrusion in maxillary anterior teeth segment using one and two miniscrews, while paying an utmost attention to patients comfort and esthetics during the treatment.

Material and Methods: The sample consisted of 20 subjects with deep overbite and complete root formation with increased incisor show. Lateral cephlogram and P.A Cephalogram were recorded before placement of implant. Sample was further divided in to two groups, Group I (Implant group one implant is placed between maxillary central incisors and two implants placed between second premolar and first molar) and Group II (Implant Group with Power arms, one implant is placed between maxillary central incisor and power arms fabricated on first molar bilaterally). Clinical evaluation of intrusion was recorded on every six weeks.

Results: The mean intrusion achieved is 0.28mm per 6 weeks interval of time in both groups suggesting there is no difference in amount of intrusion achieved in both groups with p value of 0.697 which is statistically non-significant. Change in Frankfort mandibular plane angle was observed with Group I and Group II.

Conclusion: On the base of study it was concluded that implant and power arm is better choice for intrusion in maxillary anterior segment for correction of deep overbite and correction of gummy smile with minimal effect on posterior segment

Keywords: Intrusion, Mini-Screw Implant, Overbite

INTRODUCTION

In numerous orthodontic treatments, adequate anchorage planning is paramount for a successful therapy. Tooth Intrusion, be it aimed at correcting an exaggerated overbite or excessive gingival display due to vertical maxillary excess, or be it for correcting extruded teeth due to missing antagonist, poses a considerable mechanical challenge, given the difficulty in controlling undesirable movements of the anchorage unit.[1,2]

The requirement for faster and efficient orthodontic treatment has been increasing in recent years. Control of anterior tooth movement is essential for the orthodontists to execute an individualized treatment plan. The need of power arms attached to the arch wire enables to achieve controlled movement of anterior teeth. Many studies have been done which shows that placement of power arm to the arch wire between lateral incisor and canine enables orthodontists to maintain better control of anterior teeth movement.[3]

Creekmore and Eklund (1983) were the pioneers to perform intrusion in maxillary anterior segment using two mini implants, with elastic threads tied from the mini implant to main archwire and got the excellent results with no compromised anchorage[4] and Telma and Mauro in 2008 demonstrated the use of single mini implant placed between the two maxillary central incisors to intrude the maxillary anterior segment by 3 mm in deep overbite subjects with the module of force being elastomeric chain.[5]

Recently, great emphasis has been placed on the mini-screw type of Temporary anchorage device (TAD). Mini-screw emerge as an excellent alternative that has enabled efficient anchorage, requiring no tooth support and with no esthetic compromise whatsoever. Additionally no patient cooperation is required while simplifying orthodontic mechanics with more of predictable results.[2]

Therefore, to account for the beneficial results with the use of TADS and looking into aspect of patient convenience, the present study is undertaken to analyse and compare the amount of Intrusion in maxillary anterior teeth segment using one and two miniscrews, while paying an utmost attention to patients comfort and esthetics during the treatment.

MATERIAL AND METHODS

Study Design

This Randomized control trial was done on untreated Orthodontic patients, selected from the subjects who visited to the OPD at Department of the college and by screening the general population by conducting free camps in various schools and colleges of Rishikesh. The ethical clearance was taken from the Institutional Review Board and informed written consent was obtained from all participants.

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Study Population

Sample of 20 subjects those were having permanent dentition with complete root formation, having Class I and Class II malocclusions with Deepbite was selected and further, they were randomly divided into two groups based upon the method of En-mass retraction using Implants and Power arms in upper arch.

Sample Size

The sample of 20 was estimated with the help of G power 3.1.9.2 software, where effect size was 0.3, alpha error-0.05, power of the study was 85%.

Group I (Implant Group)

Sites: (1 Anterior + 2 Posterior Implants)

- Intrusion and Retraction
- Two Crimpable post on main arch wire between lateral and canine bilaterally.
- One Implant between central Incisors.

Group II (Implant Group with Power arms)

Sites: (1 Anterior + 2 Posterior Power arms)

- Intrusion and Retraction
- Two Crimpable post on main arch wire between lateral and canine bilaterally.
- One Implant between central Incisors.
- Two power arms soldered on 1st molar bilaterally

Initially clinical examination of the 40 subjects was conducted to evaluate the amount of Overbite, overjet, incisal exposure (normal and on smiling), upper, middle and lower facial height, gingival display (normal and on smiling), upper and lower lip length and nasolabial angle.

Further, 30 subjects with short upper lip (Stms) length, increased overbite, increased incisal and gingival exposure were selected for cephalometric investigation. Lateral cephalograms were obtained and evaluated for overjet, overbite, U1 to PP, U6 to PP, Stms-U1, occlusal plane angle, nasolabial angle and U1 to FH and PA Cephalogram were obtained to evaluate Ans – ISF (Incisal Superior Frontale), J-J' to ISF (Incisal Superior Frontale) and to evaluate Implant to wire relationship.

Cephalometric investigation was done to assess whether the intrusion was required in the anterior maxillary segment. Implant site to wire relation was obtained to assess the amount of intrusion achieved by measurement method. On the base of the intrusion requirement, 20 subjects were finally selected for the study purpose.

Inclusion criteria

- Permanent dentition with complete root formation of teeth in Maxillary anterior teeth region.
- Subjects with increased incisal and gingival exposure.
- Subjects with short upper lip.
- Angles Class I malocclusion with Deepbite.
- Angles Class II malocclusion with Deepbite.

Exclusion criteria

- History of Orthodontic treatment.
- Periodontally compromised dentition such as bony defects and alveolar bone loss.
- History of any Orthognathic surgery.
- History of major trauma to anterior teeth region.
- Any periapical cyst or abscess in maxillary anterior teeth region.

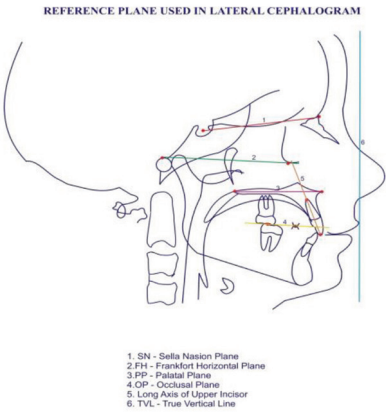
Methodology

Selected sample of 20 patients were started with fixed mechnotherapy using M.B.T prescription with slot size of .022".Levelling and alignment was completed with .016" NiTi and .017"X.025" NiTi .019X.025 NiTi. Extraction was done on the treatment requirement of case. Rigid .019X.025 S.S wire with cinch back was placed in upper arch. Pre Intrusion records were taken before insertion of implants.

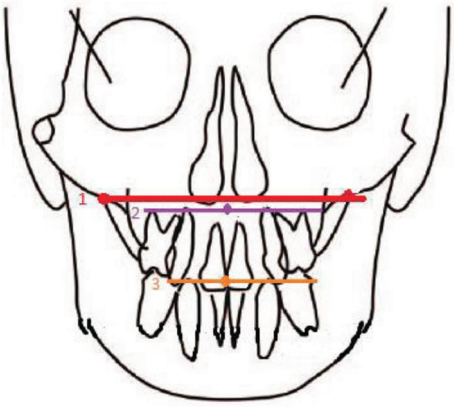
Pre intrusion records include:-

1. Cephalogram- All cephalograms were taken using Kodak 8000C Panoramic cephalometric unit at Tube voltage of 60-90kVp, Digital censor CCD with 1360X1840 Pixels and magnification of 1:1%. The cephalometric analysis was carried out on both lateral cephalograms and PA cephalograms using.

Lateral cephalogram: The Lateral Cephalogram of the selected 20 subjects were taken and evaluated for Overjet, Overbite, U1 to PP (Angular and Liner), U6 to PP, UL(STMS)-U1, Mandibular plane angle, Post. to Ant. Face PFH:AFH (Jarabak Ratio) Nasolabial angle and U1 to FH.



P.A cephalogram: P.A Cephalogram were obtained to evaluate cephalometric measurement of ANS –ISF, J-J' to ISF (Incisal Superior frontale).



2. Photograph

Frontal: Pre-treatment frontal photographs (normal and

smiling) were clicked to compare and evaluate the changes after intrusion. All digital cephalometric radiographs were taken using a standardized technique with patient in his/her Natural head position, jaws in centric relation, teeth in occlusion with lips relaxed.

3. Clinical examination as per protocol sheet

4. Tracing technique

The lateral cephalograms and P.A cephalogram obtained were traced on fine acetate matte tracing paper measuring 8X10-inch and 0.003-inch in thickness using a trans-illuminator. To trace the landmarks, the room was kept dark and the area was restricted on the view box.

The Hard Tissue Landmarks

- Sella (S): The midpoint of the Hypophyseal fossa
- Nasion (N): The most anterior point on Nasofrontal suture in the median plane
- Orbitale(Or): Lowermost point of the orbit in the radiograph.
- Porion (Po): The superior point of the external auditory meatus
- ANS: Tip of bony anterior nasal spine, in the median plane.
- PNS: The constructed point, the intersection of a continuation of the anterior wall of the pterygopalatine fossa and the floor of the nose
- U1: Incisal edge of upper incisor
- L1: incisal edge of lower incisor
- Stms: most inferior point on StomionSuperius (Stms)
- J point: bilateral point on jugal process at the intersection of outline of the tuberosity of maxilla and zygomatic buttress.

Overbite is evaluated for comparison between pre intrusion and post intrusion changes in vertical plane of upper and lower incisor relation.

Relation between Stomion Superius (Stms) to upper incisor (STMS-U1) was also taken to assess the changes in vertical plane after intrusion.

Angular measurement of U1- PP, U6- PP, U1- FH was done to assess the angular changes in horizontal plane after intrusion.

Occlusal plane angle and nasolabial angle were evaluated to appreciate the facial changes after intrusion.

Implant placement

For implant (1.2X6 mm and 1.2X8 mm Deticon) placement all the measures of sterilisation and disinfection were taken for both patient and instruments. mucosa was anesthetised using topical anaesthetic aerosol spray. Implant was placed at the junction of attached and free gingiva. Implant site was mark with a punch in the gingiva prior to the implant placement. IOPA radiograph were recorded to assess the bone conditions in between the root of adjacent teeth. Implant was placed manually using implant driver. Before application of intrusive force, segmental ligation from canine to canine is done using .009" SS ligature wire in figure of '8'. Intrusive force of 100 gm was applied using elastomeric chains ligated between implant to the arch wire. Intrusion was measured on every 6th week using vernier caliper.

Method Error

To avoid fatigue the sample were divided in equal number of 6 sets i.e. 10 cephalometric tracing each day and analysis were performed by the same observer.

To assess intra-observer and inter-observer error 20 lateral cephalogram were selected randomly and retraced by the same observer and two different observers at the time interval of 10 days to eliminate the method errors calculated as recommended by Intraclass Correlation Test and it was came to be 0.8 (80% agreement) for all variables in both cases intra-class and inter-class.

For evaluation of clinical reading 10 samples were selected randomly from both Group 1 and Group 2. On every follow up reading was recorded three time by observer 1 and three times by observer 2 most frequent related reading between self and another observer was recorded.

STATISTICAL METHODS

The collected data was compiled, entered into excel sheets and transferred to SPSS software, Version 21 for analyses. F tests was applied to find interclass correlation coefficient and student t test was applied to find out whether the differences between the groups were statistically significant. A significance level of 5% was fixed.

RESULTS

The present clinical study was done on 20 subjects aged between 15-25 years, with deep bite and increased incisal show at rest and on smiling. Various parameters were used to evaluate change in maxillary anterior dentition after intrusion with mini implants. Sample was divided into two Groups, Group I (Implant Group) and Group II (Implant Group with Power arms)

Result data were divided into two main categories:-

A. Cephalometric analysis
B. Clinical evaluation

Cephalometric measurements were further divided into two classes-

1. Lateral cephalometric data
2. P.A cephalometric data

Two-way mixed effects model where people effects are random and measures effects are mixed.

Table 1 depicts the intra-class correlation agreement between T1 and T2 the difference between all parameters was found to be highly significant with p=0.0

Two-way mixed effects model where people effects are random and measures effects are fixed.

Table 2 shows the intra-class correlation agreement between O1 and O2 the difference between all parameters was found to be highly significant with p=0.0

Table 3 depicts the comparison of intrusion achieved by group 1 and group 2 during their first, second and third visit and every time comparison was statistically non-significant.

Table 4 depicts the pre and post cephalomatric analysis of group 1 and it was found to be statistically significant

Group	Intraclass Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
U1-PP	.947	.922	.967	242.236	16	16	.000
U1-PP(A)	.968	.943	.988	243.246	16	16	.000
U6-PP	.970	.945	.990	246.346	16	16	.000
U1-STMS	.933	.908	.953	245.346	16	16	.000
FMA	.940	.915	.960	248.346	16	16	.000
NLA	.916	.910	.955	243.128	16	16	.000
U1-FH	.953	.928	.973	244.346	16	16	.000
ANS-ISF	.957	.932	.977	251.346	16	16	.000
JJ-ISF	.927	.902	.947	252.346	16	16	.000
Jaraback ratio	.923	.898	.943	250.346	16	16	.000

Table-1: Intraclass Correlation Agreement Between T1 and T2

Group	Intraclass Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
U1-PP	.967	.942	.987	242.236	16	16	.000
U1-PP (L)	.988	.963	1.008	243.246	16	16	.000
U1-STMS	.953	.928	.997	245.346	16	16	.000
FMA	.966	.941	.986	248.346	16	16	.000
NLA	.984	.959	1.004	243.128	16	16	.000
U1-FH	.973	.948	.993	244.346	16	16	.000
ANS-ISF	.936	.911	.956	251.346	16	16	.000
JJ-ISF	.943	.918	.963	252.346	16	16	.000
Jaraback ratio	.960	.935	.980	250.346	16	16	.000

Table-2: Interclass Correlation Coefficient of Agreement Between O1 and O2

	Group	N	Mean	Std. Deviation	t	df	P Value
First visit	Group I	15	10.47	0.97	-0.397	28	0.697
	Group 2	15	10.67	1.12			
Second visit	Group I	15	10.12	0.83	-0.519	28	0.611
	Group 2	15	10.38	1.15			
Third visit	Group I	15	9.69	0.84	-0.39	28	0.443
	Group 2	15	10.07	1.14			

Table-3: Comparison of Intrusion Achieved by Group I and Group 2

	Para -meters	Mean	N	Std. Deviation	Mean Diff.	t	Df	P Value
1	U1 PP Pre	122.38	15	4.84	6.50	7.884	14	0.001
	U1-PP Post	115.88	15	8.46				
2	U6-PP Pre	21.25	15	2.25	2.25	4.987	14	0.003
	U6-PP Post	19.00	15	2.27				
3	UL-U1 Pre	12.11	15	1.51	2.13	0.008	14	0.008
	UL-U1 Post	10.50	15	1.31				
4	FMA Pre	26.50	15	7.46	3.63	0.009	14	0.009
	FMA Post	22.88	15	7.55				
5	NLA Pre	98.88	15	10.93	7.38	5.190	14	0.005
	NLA Post	91.50	15	12.54				
6	U1-FH Pre	125.13	15	7.26	5.13	4.587	14	0.007
	U1-FH Post	120.00	15	10.07				
7	ANS-ISF Pre	17.88	15	3.91	2.13333	4.394	14	0.044
	ANS-ISF Post	15.75	15	3.69				
8	JJ-ISF Pre	29.88	15	8.43	2.88	4.109	14	0.002
	JJ-ISF Post	27.00	15	8.50				
9	U1-PP-L Pre	32.75	15	2.43	2.25	3.468	14	0.008
	U1-PP-L Post	30.50	15	2.67				
10	Jarabak ratio pre	65.71	15	6.25	3.43	4.579	14	0.014
	Jarabak ratio post	62.28	15	5.89				

Table-4: Group I Comparison of Pre and Post Cephalometric Analysis

	Para -meters	Mean	N	Std. Deviation	Mean Diff.	t	Df	P Value
1	U1 PP Pre	121.44	15	3.47	3.89	4.460	14	0.001
	U1-PP Post	117.56	15	3.68				
2	U6-PP Pre	20.11	15	2.71	1.33	2.034	14	0.036
	U6-PP Post	18.78	15	2.49				
3	UL-U1 Pre	11.67	15	1.32	1.11	2.397	14	0.043
	UL-U1 Post	10.56	15	1.42				
4	FMA Pre	25.44	15	3.50	2.44	2.381	14	0.039
	FMA Post	23.00	15	2.96				
5	NLA Pre	98.56	15	11.14	2.33	3.060	14	0.013
	NLA Post	96.22	15	11.79				
6	U1-FH Pre	123.11	15	3.62	2.89	2.737	14	0.042
	U1-FH Post	120.22	15	3.96				
7	ANS-ISF Pre	17.00	15	3.50	1.22	2.487	14	0.033
	ANS-ISF Post	15.78	15	3.53				
8	JJ-ISF Pre	29.67	15	5.29	1.67	3.062	14	0.019
	JJ-ISF Post	28.00	15	4.90				
9	U1-PP-L Pre	29.44	15	1.42	1.44	2.316	14	0.045
	U1-PP-L Post	28.00	15	1.73				
10	Jarabak ratio pre	65.71	15	6.25	-0.29	-0.110	14	0.914
	Jarabak ratio post	62.28	15	5.89				

Table-5: Group II Comparison of Pre and Post Cephalometric Analysis

	Para -meters	Mean	N	Std. Deviation	Mean Diff.	t	Df	P Value
1	U1 PP Pre	122.38	15	4.84	0.93	0.460	14	0.652
	U1-PP Post	115.88	15	8.46				
2	U6-PP Pre	21.25	15	2.25	2.25	4.987	14	0.003
	U6-PP Post	19.00	15	2.27				
3	UL-U1 Pre	12.11	15	1.51	2.13	0.008	14	0.008
	UL-U1 Post	10.50	15	1.31				
4	FMA Pre	26.50	15	7.46	3.63	0.009	14	0.009
	FMA Post	22.88	15	7.55				
5	NLA Pre	98.88	15	10.93	7.38	5.190	14	0.005
	NLA Post	91.50	15	12.54				
6	U1-FH Pre	125.13	15	7.26	5.13	4.587	14	0.007
	U1-FH Post	120.00	15	10.07				
7	ANS-ISF Pre	17.88	15	3.91	2.13333	4.394	14	0.044
	ANS-ISF Post	15.75	15	3.69				
8	JJ-ISF Pre	29.88	15	8.43	2.88	4.109	14	0.002
	JJ-ISF Post	27.00	15	8.50				
9	U1-PP-L Pre	32.75	15	2.43	2.25	3.468	14	0.008
	U1-PP-L Post	30.50	15	2.67				
10	JARABAK Ratio Pre	65.71	15	6.25	3.43	4.579	14	0.014
	JARABAK Ratio Post	62.28	15	5.89				

Table-6: Group I and Group II Comparison of Pre and Post Cephalometric analysis

between all the factors.

Table 5 depicts the pre and post cephalomatric analysis of group 2 and it was found to be statistically significant between almost all the factors whereas in case Jarabak ratio pre and post difference was found to be statistically non-significant with p=0.91.

Table 6 depicts the pre and post cephalomatric analysis of both the groups and it was found to be statistically significant between almost all the factors whereas in case U1 PP pre and post difference was found to be statistically non-significant with p=0.65.

B. Clinical evaluation

The mean value of intrusion in Group I in Ist IInd and IIIrd visit was 10.47 ± 0.97mm, 10.12±0.83, 9.69±0.84 mm respectively and it was found to be statistically significant with a p = 0.009 and the mean value of intrusion in Group II in I st IInd and IIIrd visit was 10.67±1.12, 10.38±1.15, 10.07±1.14 respectively and it was ffound to be statistically significant with a p = <0.011 which shows highly significant difference. The mean intrusion increased significantly in Group I and Group II from Pre to Post-treatment.

DISCUSSION

Deep bite is one of the frequently seen malocclusions next to crowding. It can occur along with other associated malocclusions.[6] It is said to be one of the most perpetuating and damaging malocclusions. It may jeopardize the periodontal support, occlusion itself or TMJ.

Graber has defined 'Deep bite' as a condition of excessive overbite, where the vertical measurement between the maxillary and mandibular incisal margins is excessive when the mandible is brought into habitual or centric occlusion.[7] The management of this problem demands a careful diagnostic analysis, treatment plan, and selection of appropriate treatment therapy.

In present clinical study, cephalometric as well as clinical evaluation of 20 subjects was undertaken to assess the etiology of deep overbite so that the appropriate treatment modality can be planned to correct the malocclusion. Lateral Cephalograms and PA Cephalograms were taken by making the subjects to stand in physiological rest position assisted by TVL.

Orthodontic treatment with mini-screw skeletal anchorage has become increasingly popular, and temporary anchorage devices (TADs) have been successfully used to reduce excessive deep overbite while maintaining patient comfort and aesthetics even during the treatment period.[8]

Power arm is simple, stable, precise and effective in cases where anterior teeth need to be simultaneously retracted and intruded. The power arm works efficiently with the molar being stabilized in all three planes of space. The resultant force vector is directed more apically toward the center of resistance of the anchor unit, which resulted in the treatment outcome of retraction and intrusion of the anterior teeth and correction of the accentuated overjet and deep bite.[9]

The need for apical mini-screws near the center of resistance of the posterior teeth is eliminated, thus reducing the treatment cost. The hooked vertical end of the power arm can be adjusted in the buccopalatal direction away from the gingiva in molar region and the buccal mucosa, so that curvature of the archwire will not result in soft tissue impingement by the retraction spring or elastics. The force vectors in all the three planes can be adjusted simply by adjusting or replacing the power arm, without having to reposition the miniscrew.[10]

Clinical evaluation of Maxillary anterior dental intrusion was assessed by measuring the clinical crown length at every 6 weeks intervals till the desirable intrusion was accomplished. Further cephalograms were taken before treatment and repeated after completion of intrusion to assess the changes radiographically and Cephalometry is widely available, easily performed and much less expensive than CT Scanning and MRI with least radiation exposure to the subjects. Anatomical landmarks and assessment of numerous linear and angular parameters, as measured by lateral cephalograms and PA Cephalograms, were highly correlated with measurements using 3D - CT scan, with 92% accuracy in predictability.[11]

Intrusion of maxillary anterior dentition was observed with decrease in the linear distance between palatal plane and maxillary central incisal edge in both Group I and Group II, however in Group I the changes were slightly more than that found in Group II but comparison between the two Groups was found statistically not significant as shown in Table no.6. This is in contrast to Mulligan et al deep bite increases with retraction because of bowing effect of retraction wire.[12] U6-PP values of Group I and Group II shows statistically not significant difference. This could be attributed to the fact that force distribution in Group I has its effect on the entire maxillary dentition unlike Group II in which less changes were found in relation to U6 and palatal plane. This could be attributed to the fact that space for intruded molars was achieved by retraction of maxillary anterior dentition. The placement of mini screw implants was justified by the study conducted by **Lue et al** who observed that the intrusive forces have capability to shift the line of action of force i.e. Centre of resistance of anterior maxillary dentition to distal aspect.[13]

Nasolabial angle is the determinant of soft tissue changes which was statistically not significant with intrusion of maxillary anterior dentition in either Groups. This was in accordance with the study done by Aimaan Saman who conducted a study on 37 adolescent female subjects and found no change in soft tissues on intrusion of maxillary anterior dentition with mini screw implants.[14]

Intrusion of maxillary anterior dentition was observed with decrease in the ANS-ISF and J'J-ISF in both Group I and Group II, however in Group I the changes were slightly more than that found in Group II but comparison between the two Groups was found statistically not significant as shown in Table no.6. This method of assessing intrusion was used by Jain et al and Esen et al who showed the intrusion of maxillary anterior dentition with mini screws placed between two maxillary central incisors and forces applied with the help of elastomeric chains.[15,16]

Clinical assessment

Clinical assessment of intrusion with mini screw implants was done by measuring the clinical height of the central incisor crown at three different time intervals. Changing E-chains after 6 weeks will allow favourable bone remodelling during intrusion so that desirable intrusion can be achieved and retained without any root resorption. This was in accordance with the studies done by Dayanne et al and Singh et al[17,18]

Elastomeric chains include the property of elastic memory and biocompatibility, comfort for patient, easy cleaning. Consequently, the application of greater initial forces is often recommended in order to remedy such force reduction during the continous use of elastic as per Bishara et al.[19] Thus 100 grams of force with E-chains was applied so that favourable and adequate forces that are required for intrusion of maxillary anterior dentition could be maintained and was measured with dontrix gauze. This was in accordance with the study done by Nanda et al[20] who advocated 30-40 grams of force as the optimal force required for intrusion. In contrast to Nanda, Burstone, however recommend 20 grams of force

adequate for intrusion.[20,21] Since E-chains have been used as a source of force application for intrusion in present study, it was important to keep in mind the amount of force decay of 30-50% during first few hours which gradually becomes 20-30% within a week as per Bishara.[19] Therefore force levels for intrusion suggested by Nanda et al were followed.[21] The rate of intrusion was found to be slightly more in group II implant but comparison between the two Groups was not found to be statistically significant.

CONCLUSION

A sample of 20 patient with Angle's Class I and Class II malocclusion with deep overbite were treated to correct deep overbite using mini screw implants in two groups (Group I:Single Implant and Group II: (Implant Group with Power arms) for comparison of amount of intrusion in both groups. After throughout study made on two groups, it is concluded that intrusion of maxillary anterior dentition for correction of deep bite can be better achieved with implant placed in between two maxillary incisors and two implants placed between second premolar and first molar
bilaterally.

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