



## RESEARCH ARTICLE

### EFFECT OF GINGIVAL RETRACTION IN THIN GINGIVAL BIOTYPE – A PILOT STUDY

\*Dr. Ravi Rakesh Dev. J., Dr. Phani Krishna, G., Dr. Sri Harsha. S. and Dr. Aiswarya Suggala

Department of Prosthodontics and Crown & Bridge, SIBAR Institute of Dental Sciences, Guntur

#### ARTICLE INFO

##### Article History:

Received 21<sup>st</sup> February, 2017  
Received in revised form  
15<sup>th</sup> March, 2017  
Accepted 20<sup>th</sup> April, 2017  
Published online 23<sup>rd</sup> May, 2017

##### Key words:

Gingival retraction,  
Biotype,  
Retraction cord,  
Retraction paste,  
Bleeding on probing,  
Clinical attachment level.

#### ABSTRACT

**Aim:** The aim of this study is to evaluate the effect of gingival retraction systems on thin gingival biotype.

##### Objectives:

- To compare and analyse the effect of gingival retraction on bleeding on probing using impregnated cord and retraction paste systems.
- To compare and analyse the effect of gingival retraction on clinical attachment level using impregnated cord and retraction paste systems.

**Materials and Methodology:** The study was conducted on unprepared mandibular first molars in 30 selected human participants. They were divided into two groups and gingival retraction was done using impregnated retraction cord in one group and retraction paste system was used in another group. Periodontal indices were recorded prior to retraction procedure and a follow up for 15 days was done and the readings were compared and analysed statistically.

**Results:** The Mann-Whitney U test showed that there is no significant increase in the bleeding on probing (BOP) and clinical attachment level (CAL) of post gingival retraction visits compared with baseline. Significant increase in BOP was seen at day 1 following gingival retraction in the retraction cord group when compared to retraction paste system group.

**Conclusion:** The injury associated with the use of gingival retraction cords to the periodontium is only temporary and usually heals within a weeks' time. The use of paste system is more advocated in gingival retraction procedure as it has added advantages over the regular gingival retraction cord system.

Copyright©2017, Dr. Ravi Rakesh Dev et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Dr. Ravi Rakesh Dev. J., Dr. Phani Krishna, G., Dr. Sri Harsha. S. and Dr. Aiswarya Suggala, 2017. Effect of gingival retraction in thin gingival biotype", *International Journal of Current Research*, 9, (05), 50479-50482.

## INTRODUCTION

Indirect restorations are one of the widely proposed treatment options for rehabilitation of partially edentulous conditions. This includes effective management of soft tissues such as gingiva for ensuring promising aesthetic outcome. Appropriate gingival displacement facilitates in making an accurate final impression. This records the prepared finish line and some unprepared tooth structure apical to the finish line. Before attempting to perform any gingival displacement technique, it is important to assess the periodontal health of the tooth or teeth involved and also to identify the type of tissue being manipulated. Periodontal biotypes were first described by Ochsenein and Ross in 1969. (Ochsenein and Ross, 1969) The term periodontal biotype introduced by Seibert and Lindhe categorized the gingiva into "thick-flat" and "thin-scalloped" biotypes. (Seibert and Lindhe, 1989) Thick gingival biotype usually depicts broad zone of keratinized tissue with flat gingival contour indicating a thick underlying bony

architecture and is more resilient to any inflammation or trauma. Thin gingival biotype is fragile with less amount of attached gingiva and a thin bony architecture which is more sensitive to any inflammation or trauma. Hence the following study was aimed at knowing the effect of gingival retraction procedure on periodontium in thin gingival biotype cases by measuring the periodontal indices which includes, bleeding on probing (BOP) and clinical attachment level (CAL).

## MATERIALS AND METHODS

The study was conducted in the Department of Prosthodontics and Crown & Bridge, Sibar Institute of Dental Sciences, Guntur, Andhra Pradesh, to evaluate and compare the effect of gingival retraction on periodontal indices which includes, BOP and CAL in thin gingival biotype.

### Selection of Participants

A total of 30 participants with the following inclusion and exclusion criteria were selected for the study.

\*Corresponding author: Dr. Ravi Rakesh Dev. J.  
Department of Prosthodontics and Crown & Bridge, SIBAR Institute of Dental Sciences, Guntur

## Inclusion Criteria

- Age range of 20-30 years (Male/ Female).
- Full complement of teeth with no edentulous space/ spacing in between the teeth (third molar may/may not be present).
- Optimum periodontal health.
- No signs of gingival inflammation.
- No bleeding on probing.
- Presence of stippling with normal colour, contour and consistency.
- Participants with no significant difference between the sulcus depth at the transitional line angles and midbuccal areas were included in the study.
- Thin gingival biotype.

## Exclusion criteria

- Participants with gingival inflammation, bleeding on probing, periodontal pockets, cervical caries, cervical abrasions, gingival recession.
- Participants with gingival bleeding during / after the gingival retraction procedure.

All of these participants were thoroughly informed about the nature of the study and informed consent was obtained.

## Materials

The materials and armamentarium used in this study are, Nummit lidocaine topical anaesthetic spray (ICPA, India), Knit-Pak+ Impregnated knitted cord with Aluminium Chloride ( $\text{AlCl}_3 \cdot 6\text{H}_2\text{O}$  0.5mg± 0.1mg/inch) of 000 size (Premier, USA), Expasyl Retraction Paste System (Acteon, France), 15 UNC (University of North Carolina) Probe (Hu-Friedy, USA), 113 serrated gingival cord packer (Hu-Friedy, USA).

## Methodology

This study was conducted on unprepared mandibular first molars in 30 selected human participants. The sample size of this study includes 60 teeth. They were divided into two groups (Group A and Group B), 30 teeth per group.

**Control group (Baseline):** Periodontal indices of Group A and Group B prior to retraction.

**Group A:** Gingival retraction done using the  $\text{AlCl}_3$  impregnated cord

**Group B:** Gingival retraction done using retraction paste system

All the participants underwent oral prophylaxis a week prior to recording the periodontal indices. Initial periodontal indices were recorded on teeth of both the groups. The BOP was measured using UNC 15 probe. The probe was inserted into the gingival sulcus at the base of the papilla on the mesial aspect, and then moved coronal to the papilla tip. This has been repeated on the distal aspect of the papilla. The intensity of bleeding was recorded using the ainamo and bay's bleeding index (1975) (Newbrun, 1996) which is based on a dichotomous evaluation. CAL was measured from the cemento-enamel junction (CEJ) to the depth of the sulcus. The CEJ was detected by sudden dip of the probe when inserted into the base of the sulcus. The depth was calculated based on the markings seen on the probe. The values were measured thrice and averaged. Gingival retraction procedure was done to retract the gingival sulcus on buccal side of the right and left mandibular first molars. Retraction cord impregnated with  $\text{AlCl}_3$  was used on right quadrant and retraction paste system was used in left quadrant. The retraction procedure was performed by the same expert prosthodontist to minimize the inter-examiner error. Periodontal indices measurements were made after removal of the cord on 1st, 3rd, 7th, and 14th day

**Table I: Mean comparison readings of BOP between Group A and Group B with respective to baseline readings**

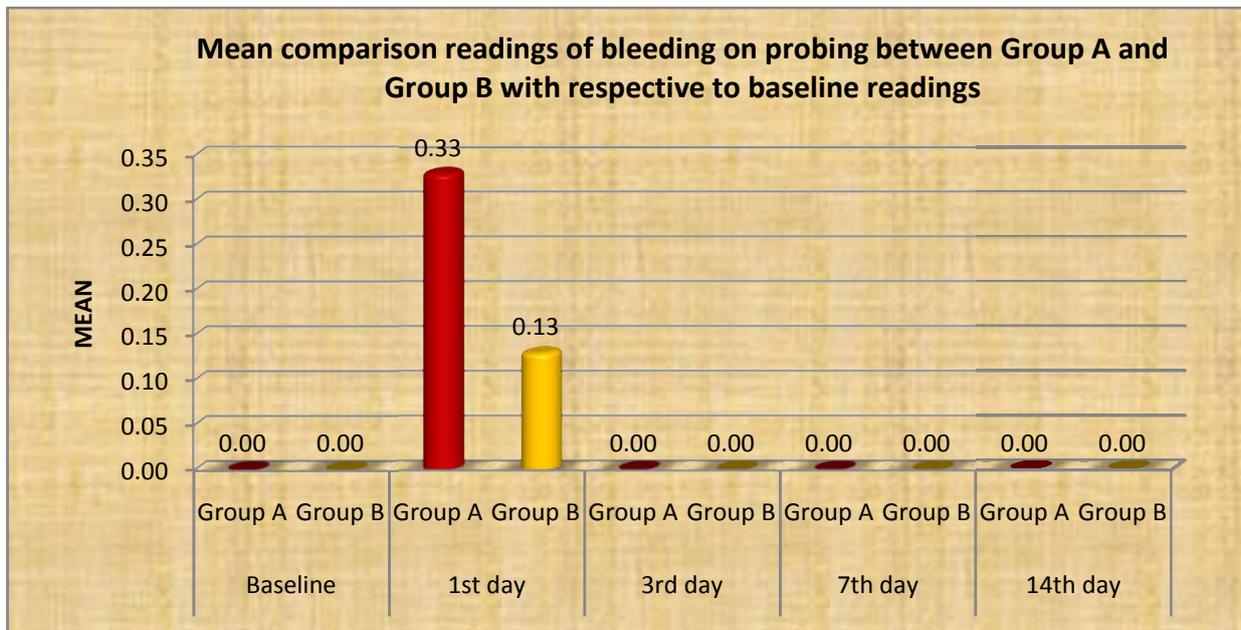
Periodic follow up	Group	Tooth Number	MEAN	SD	Difference	P Value
Baseline	Group A	36	0.00	0.00	0.00±0.00	1.000
	Group B	46	0.00	0.00		NS
1st day	Group A	36	0.33	0.48	0.20±0.13	0.069
	Group B	46	0.13	0.35		NS
3rd day	Group A	36	0.00	0.00	0.00±0.00	1.000
	Group B	46	0.00	0.00		NS
7th day	Group A	36	0.00	0.00	0.00±0.00	1.000
	Group B	46	0.00	0.00		NS
14th day	Group A	36	0.00	0.00	0.00±0.00	1.000
	Group B	46	0.00	0.00		NS

Statistical Analysis: Mann-Whitney U test. Statistically significant if  $P < 0.05$

**Table II: Mean comparison readings of clinical attachment level between Group A and Group B with respective to baseline readings**

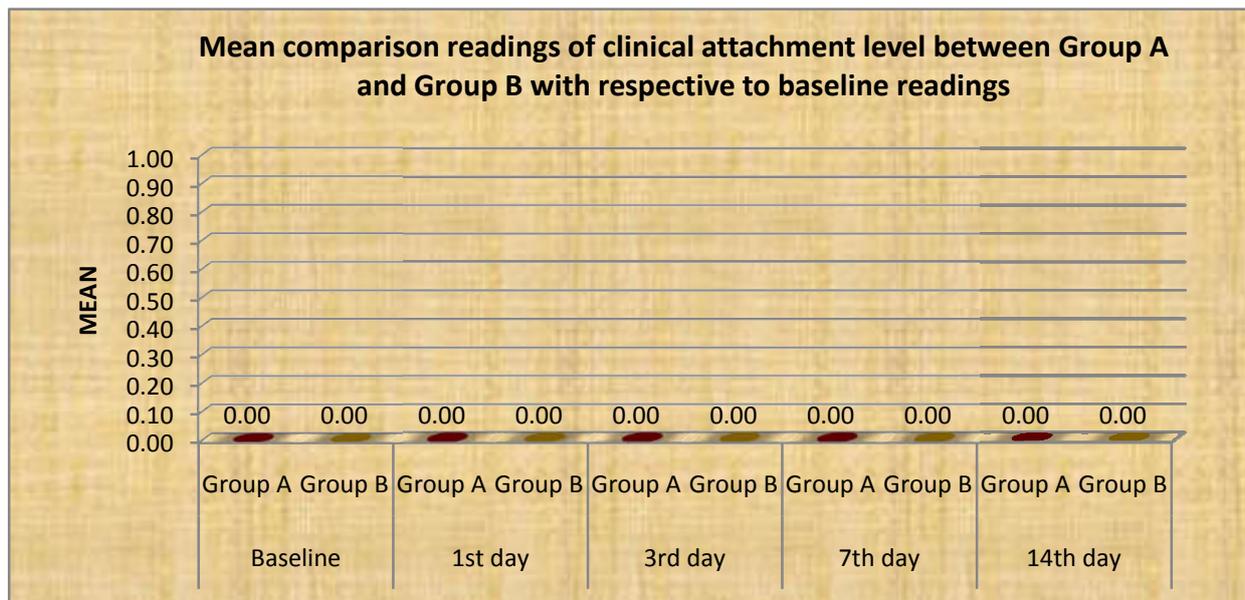
Periodic follow up	Group	Tooth Number	MEAN	SD	Difference	P Value
Baseline	Group A	36	0.00	0.00	0.00±0.00	1.000
	Group B	46	0.00	0.00		
1st day	Group A	36	0.00	0.00	0.00±0.00	1.000
	Group B	46	0.00	0.00		
3rd day	Group A	36	0.00	0.00	0.00±0.00	1.000
	Group B	46	0.00	0.00		
7th day	Group A	36	0.00	0.00	0.00±0.00	1.000
	Group B	46	0.00	0.00		
14th day	Group A	36	0.00	0.00	0.00±0.00	1.000
	Group B	46	0.00	0.00		

Statistical Analysis: Mann-Whitney U test. Statistically significant if  $P < 0.05$



Represents that bleeding on probing was present in group A and group B teeth examined on day 1 following gingival retraction procedure

**Graph I:** Bar diagram representation of Mann-Whitney U test. The obtained values of group A and group B with respect to baseline readings are plotted for BOP



Represents that there is no change in clinical attachment level after gingival retraction in both the groups.

**Graph II:** Bar diagram representation of Mann-Whitney U test. The obtained values of group A and group B with respect to baseline readings are plotted for CAL

following gingival retraction. The readings of Group A and Group B are compared with each other and statistically analysed using Mann-Whitney U test.

## RESULTS

The effects of retraction procedures upon the BOP are presented in Table 1 and CAL in Table 2. Specifically, significant increase in BOP was seen at day 1 following gingival retraction (Table 1). CAL did not differ from pre and post retraction phases (Table 2). Both the groups did not show significant changes over the experimental period. The Mann-Whitney U test showed that there is no significant increase in the BOP and CAL of post gingival retraction visits compared with baseline (Graph 1 and 2). Group B has a less significant affect on BOP compared to group A (Graph 1). Where as CAL was insignificant in both the groups (Graph 2).

## DISCUSSION

A tailor-made treatment plan is the one that satisfies the patient requirements as well as operator's criterion such as performance and longevity. Fixed prosthetics caters to the above needs and it has become a popular type of prosthesis in most of the partially edentulous cases. Mankind has witnessed revolutionary changes in many walks of life paving way for expectations that are set on new bar. Therefore, the prosthesis delivered should have strength and appearance closely mimicking the natural tooth. To deliver such a prosthesis, shrewd planning must be done from diagnosis stage to the meticulous execution of clinical and laboratory steps. Dental restoration has a periodontal dimension which plays an important role in long-term prognostic of the respective tooth. An unjustified extension of the restoration margins may induce detrimental effects on the gingival sulcus. Therefore, gingival

retraction is a milestone during impression making as it helps in visualising the finish line as well as transferring those intricate details to the cast. Improper execution of this step will result in damage to soft tissues such as gingiva and periodontium. For preserving the gingival health during prosthetic procedures, evaluation of gingival biotype at an early stage is the key to success. Various methodologies have been documented for measurement of the gingival tissue form. This includes various invasive and non invasive like visual inspection, ultrasonic devices, trans gingival probing and Cone beam computerized tomography Imaging, measurement of crown length/width ratio, papillary height, probe transparency etc. (Vinaya Bhat and Sonali Shetty, 2013; Terakura, 1986) In a study conducted by Kan *et al.*, they have stated a simple method to differentiate between the gingival biotypes, based on the transparency of the periodontal probe through the gingival margin. (Kan *et al.*, 2003). In this present study, subjects with thin gingival biotype were chosen by following the transparency test as it was most user friendly and with minimal inter-operator bias. In the thin gingival biotype, there may be recession present in the absence of any unplanned dental restorations. (Nadim *et al.*, 2014) This pilot study was conducted to know the effect of gingival retraction on thin gingival biotype both of which are important requiring expertise. For a prosthesis to be functionally as well as aesthetically sound, periodontal health has to occupy a place in the strategic treatment plan. There are various indices present to assess the periodontal status in an individual. Of these indices, bleeding on probing and clinical attachment levels were chosen as study parameters.

Bleeding on probing is an indicator of gingival health. It was recorded by using Ainamo and Bay's index. (Newbrun, 1996) It was found that BOP was present in group A and group B on day 1 following gingival retraction. Whereas the paste system caused BOP comparatively in less no of subjects indicating that it was more tissue friendly. Either of the systems used for gingival retraction in this study showed statistically insignificant BOP values indicating that gingival retraction has no adverse affect on the gingival health when a proper procedure is followed. Another important parameter to assess periodontal destruction is loss of connective tissue attachment to the tooth root surface. The Cementoenamel junction (CEJ) acts as a static landmark to measure CAL or periodontal destruction. (Preshaw *et al.*, 1999) CAL values were found to be insignificant in the present study showing that retraction did not influence periodontium. Feng *et al* have reported that gingival retraction resulted in elevation of pro-inflammatory cytokines in crevicular fluid that might caused gingival recession even after clinical healing has occurred. (Jian Feng *et al.*, 2006) Within the limitations of the above study, gingival retraction did not effect the periodontium on long term basis. Yet, paste system was the least harmful out of the methods used. Further studies have to be conducted on large scale to standardize the results along with including other parameters like probing depth, plaque index, oral hygiene index, etc. which might be influenced by the gingival retraction procedures.

## Conclusion

The following conclusions were drawn within the limitations of this study.

- The BOP was statistically not significant in both the groups but, on day 1 following gingival retraction procedure, the BOP in group B is present comparatively in less number of subjects than in group A. This shows that gingival retraction with paste system effectively helps in minimising bleeding during the gingival retraction procedure.
- There was no change in clinical attachment level after gingival retraction in both the groups which is statistically insignificant. This shows that gingival retraction procedure does not alter the periodontium when proper procedure and technique is followed.

The injury associated with the use of gingival retraction cords to the periodontium is only temporary and usually heals within a weeks' time. The use of paste system is more advocated in gingival retraction procedure as it has added advantages over the regular gingival retraction cord system. Large scale studies have to be conducted in order to support this research. An act of kindness in dealing the soft tissues around the teeth pays off in delivering a satisfactory prosthesis for now and also in future.

## REFERENCES

- Jian Feng *et al.* 2006. The Effect of Gingival Retraction Procedures on Periodontal Indices and Crevicular Fluid Cytokine Levels: A Pilot Study. *J Prosthodont.*, 15:108-11.
- Kan JY, Rungcharassaeng K, Umezu K, Kois JC. 2003. Dimensions of peri implant mucosa: An evaluation of maxillary anterior single implants in humans. *J Periodontol.*, 74:557-62.
- Nadim Z. Baba, Charles J. Goodacre, Rami Jekki, John Won. 2014. Gingival Displacement for Definitive Impression *Dent Clin N Am.*, 58:45-68.
- Newbrun E. 1996. Indices to Measure Gingival Bleeding. *J Periodontol.*, 67:555-561.
- Ochsenbein C. and Ross S. 1969. A reevaluation of osseous surgery. *Dent Clin North Am.*, 13(1):87-102.
- Preshaw PM, Kupp L, Hefti AF, Mariotti A. 1999. Measurement of clinical attachment levels using a constantforce periodontal probe modified to detect the cemento enamel junction. *J Clin Periodontol.*, 26:434-40.
- Seibert JL. and Lindhe J. 1989. Textbook of Clinical Periodontology. 2nd ed. Copenhagen, Denmark: Munksgaard; Aesthetics and periodontal therapy. In: Lindhe J, ed; pp. 477-514.
- Terakura T. 1986. [Non-invasive measurement of the thickness of oral soft tissues]. *Nihon Hotetsu Shika Gakkai Zasshi.* 30(6):1402-1411.
- Vinaya Bhat and Sonali Shetty. 2013. Prevalence of different gingival biotypes in individuals with varying forms of maxillary central incisors: A survey. *Journal of Dental Implants*, 3(2):116-121.

\*\*\*\*\*