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Evaluation of Gingival retraction techniques on lateral gingival displacement: A prospective clinical study

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Abstract

Introduction: Gingival Retraction is a deflection of the marginal gingiva away from the tooth.Different types and various methods are available currents with newer techniques. Retraction cords of various thicknesses from several manufactures are far by the most commonly used methods for gingival retraction. Hence the aim of the study was to compare the efficacy of new retraction cords with conventional retraction cord on lateral gingival displacement.

Materials and methods: In the present study, ten patients were selected who were seeking three unit fixed prosthesis. These subjects were not subjected to any additional invasive procedure. After tooth preparation done, the allotted gingival retraction cord (Ultrapak or Roeko Stay-Put) was used for each abutment. The cords were removed from both side of the same arch and standardized protocol was followed for impression making. A total of twenty sectioned dies were examined under a stereo microscope for quantitative measurement of

retracted gingival sulcus. Both groups were compared and statistically evaluated.

Results: The Stay-Put system showed 0.5120 mm of retracted sulcus width whereas Ultrapak demonstrated 0.4360 mm. Both retraction systems were effective, yet the difference between two groups was not significant statistically as the p value is more than 0.05. Mean gingival retraction in Stay-Put system was higher as compared to that in Ultrapak system.

Conclusion: The presence of a braided retraction cord with the adaptability of a fine metal filament seems to provide more lateral displacement of gingival than other conventional methods. Thus, this newly innovated Stay-Put retraction cord could provide better retraction then conventional retraction cord.

Key words: Gingival Retraction, Ultrapak, Lateral Displacement, Stereomicroscope

Introduction

In the recent era, newer advancements are increasing as a part of our dentistry. As well patients are even more concerned about their dental treatments especially during an esthetical part in surgical procedures and fixed prosthesis treatments. Dentists have to be trained according to the patients' needs by updating with the newer advanced methods for the befit of the patient and treatment. Esthetical restorative procedures had more focus in dentistry than conventional prosthesis.

Over the past years, dentistry has developed with tremendous progress in the procedure of making Impression in prosthodontics. During these procedures gingival tissues are to be recorded in a fine manner to record gingival finish lines. Procedure for fixed partial dentures requires adequate duplication for prepared tooth and the finish line. When impressions are made finish lines are considered to be placed below the gingival margins at the level of crest. Gingival retraction or displacement is the deflection of the marginal gingiva way from the tooth. Gingival retraction is a process of exposing margins when making an impression of prepared teeth. In a study conducted by Ferrari et al.3 in 1996, concluded that before making impression effective gingival management is necessary to restore a suitable emergence profile with well adapted and smooth gingival margins for a healthy periodontium. There are different types of gingival deflection techniques classified as mechanical, chemicomechanical, electrosurgical and rotary curettage, or a combination. 4 Retraction cords are of various thickness available from several manufactures is by far the most commonly used method for gingival retraction. A number of studies have reported that there are conventional methods of gingival displacement.

For adequate flow of low viscosity impression material into the sulcus, lateral displacement of gingiva is required for gingival retraction for capturing of prepared finish line. During cementation and for easy removal of excess cement without tissue damage gingival retraction method is useful and also for better

Gingival retraction is needed for adequate lateral displacement of gingiva, for adequate flow of low viscosity impression material into the sulcus and for accurate capturing of prepared finish line and a portion of apical uncut tooth structure.4,5 Gingival retraction is also helpful during cementation for easy removal of excess cement without tissue damage and also in assessing the marginal fit and caries if present. Apart from this gingival retraction is also needed to extend the restoration below the gingival margin to enhance retention 6.

Aim and Objectives

The aim of the study was to compare the efficacy of new retraction cord (stay put, coltene) with conventional retraction cord (ultadent products) on lateral gingival displacement. Objectives include to determine the amount

of gingival retraction produced by cords and to determine the amount of gingival retraction produced by the coltene, stay-put, to compare the amount of gingival retraction produced by the ultrapek, ultradent.

Methodology

The present study was conducted with a treatment protocol of the patient's fixed partial dental prosthesis. A prospective clinical study was conducted to compare the efficacy of a new retraction cord with a conventional retraction cord on lateral gingival displacement.

Ethical review: Convenience sampling technique was used for the selection of the patient. Approval to conduct the study was obtained from the college authorities & Head of the Dept. of Prosthodontics & Ethical Review Committee. Patients attending the New Horizon Dental College and Research Institute, Chhattisgarh, department of prosthodontics for three-unit fixed partial prostheses were employed. A total of ten patients, who satisfied the inclusion criteria were included in the study.

Inclusion criteria

- Adults aged 30-35yrs
- Absence of periapical or any other intraoral infectio
- Individual with healthy gingiva and periodontal status including no bleeding on probing.
- Patients with no relevant medical history; non-smoker or have quit smoking for at least 6 months prior to the study.

Exclusion criteria

- Pregnancy
- Individuals with uncontrolled diabetes and other systemic diseases that could influence the clinical outcome of the study. Prior to the study, each subject was explained about the procedures and consent was obtained.

Armamentarium used

- Mouth mirror, periodontal probe (William's), and tweezers
- Surgical gloves, mouth mask
- Cotton rolls
- Dappen dish
- Scissors - straight and angle
- Cord packer (Hu-Friedy,USA)
- Ultrapak, Ultradent,
- Roeko Stay-Put
- Cheek retractor

Clinical procedure

In the present study, a total of ten patients who were seeking fixed prosthesis were selected and explained about the procedure. Once the tooth selection is done for the prosthesis, he abutment tooth were divided i.e. premolar and 1st molar. They were not subjected to any invasive procedure. The abutment tooth was divided into two selective procedures which include premolar with Ultrapak and molar with Roeko Stay-Put. Later tooth preparation was done, the allotted gingival retraction cords were placed in the gingival sulcus with the use of a cord packer, and left in situ for 10 min before making the impression. Theses retraction cords were not immersed in any kind of solutions or medicaments prior before the insertion. During the procedure, pain analogue test was also assessed by Campbell WI et al.6Lateral gingival displacement was measured at mesiobuccal, midbuccal, and distobuccal regions of the prepared tooth. Post gingival displacement impression was used to measure lateral gingival retraction. Gingiva mucosal condition was evaluated by using Apse at al. subjective visualization. The cords were removed from both side of the same arch was followed by impression making. A standardized protocol was followed for making an impression. A double mix putty wash technique of impression making

was followed. Type IV gypsum was used to pour the cast. Undamaged retrieved casts were sawed out, buccolingually with the help of die cutter. Stereo microscope (Praj Metallurgical Lab, Kothrud, and Pune-38) was used for the measurement of the width (mm) of the retracted gingival sulcus. The obtained data were entered in Microsoft Excel & processed and analyzed using the SPSS software version 23result of continous measurement are present as means ±SD (Mini – Max) and results of categorical measurements are presented as number (%). Significance is assessed at a 5 % level of significance at 95% confidence interval. Tests used to assess the statistically significant difference are the Chi-Square test.

Figure 1: Tooth Preparation Done With Different Procedures

Figure 2: Impression Taken After Tooth Preparation for Cast Preparation

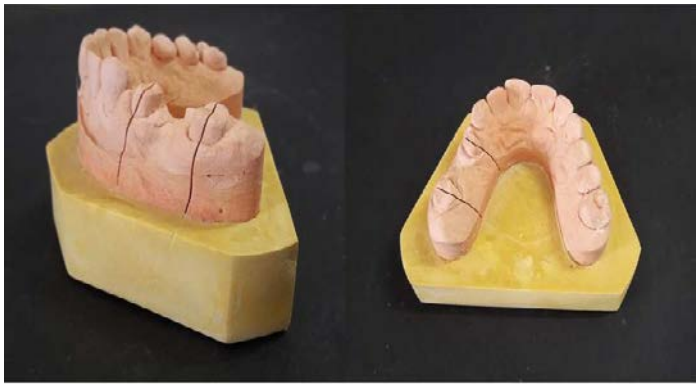

Figure 3: Cast Prepared and Die Cutting Done For Analysis

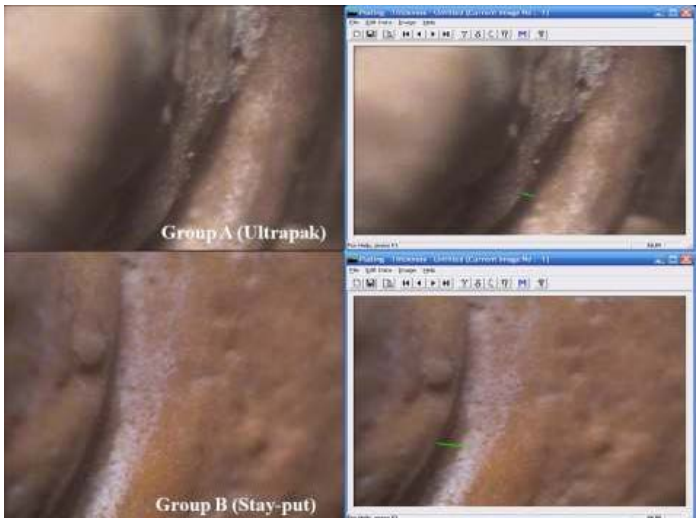

Figure 4: Measurement of the Width (Mm) Of the Retracted Gingival Sulcus under a Stereo Microscope

Results

The data were subjected for descriptive analysis for mean and std. deviation. A total of twenty sectioned dies were examined under a stereomicroscope for quantitative measurement of the retracted gingival sulcus. Results according to the retraction of gingival sulcus by two different retraction systems are presented in Table 1. Both groups were compared and statistically evaluated.

The Stay-Put system showed 0.5120 mm of retracted sulcus width whereas Ultrapak demonstrated 0.4360 mm. Both retraction systems were effective, yet the difference between the two groups was not significant statistically as the p-value is more than 0.05. Mean gingival retraction in the Stay-Put system was higher as compared to that in the Ultrapak system.

Table 1: Gingival retraction width by two different retraction systems.

Subjects	Ultrapak (in millimeter)	Stay-Put (in millimeter)
1	0.39	0.73
2	0.36	0.51
3	0.49	0.54
4	0.4	0.44
5	0.6	0.7
6	0.5	0.4
7	0.38	0.4
8	0.45	0.46
9	0.4	0.54
10	0.39	0.4

Graph 1: Gingival retraction width by two different retraction systems

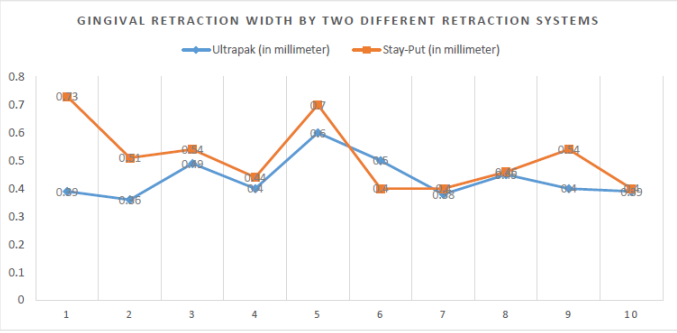

Table 2: Mean value of gingival retraction in two methods

	Subjects	Ultrapak (in millimeter)	Stay-Put (in millimeter)
Total number	10	10	10
Mean	5.500	.4360	.5120
Median	5.500	.4000	.4850
Std. Deviation	3.0277	.07442	.12017

Table 3: One-Sample Test for two different procedures

Groups	N	Mean	Std. Deviation
Group A (Ultrapak)	10	.4360	.07442
Group B (Stay-put)	10	.5120	.12017
t- value (t-test for Equality of Means)	-1.700		
Significance "p value"	0.106		

Discussion

The study was conducted in ten patients attending the New Horizon Dental College and Research Institute, Chhattisgarh, department of prosthodontics for a three-unit fixed partial prosthesis. The abutment teeth were divided with two selective procedures which include premolar with Ultrapak and molar with Roeko Stay-Put. The recommended technique of retraction cord application was strictly followed according to manufacturer's instructions. After preparation of abutments double mix puttyand- wash impression technique was used. Measurements were recorded after retraction from the supragingival finishing line to the crest of the free gingival margin. Results showed that 0.5120 mm of retraction with stay-put whereas Ultrapak demonstrated 0.4360 mm. Mean gingival retraction in stay put was higher as compared with the Ultrapak system. This could be due to provision of thin copper wire within Stay-Put retraction cord which rendered retentive ability in sulcus. The collected data were analyzed using a paired sample t-test to test the characteristics of the data. P-value Baharav et al. conducted a study to guage the perfect time required to realize gingival retraction. The cord was left within the sulcus for two, 4, 6, and 8 min. The authors observed that there was no difference in the gingival retraction done for

4, 6, and 8 min. They concluded that the cord should remain in the gingival crevice for an optimum time of 4 min prior to impression making which was in accordance with our study.3 Laufer et al. checked the time required for closure of the gingival crevice following gingival retraction. The chemo-mechanical retraction method was advocated for the displacement of the gingival crevice. The closure rate at the transitional line angle area was significantly faster than that of the mid buccal area during the primary 90 s.

Conclusion

During an impression making soft tissue management plays a indispensable role in gingival retraction.

The choice of the technique, procedure and materials to be used should be judged based on the criteria and clinical situation by the clinician. The presence of ultrathin copper wire in retraction cord seems to provide more stability in the sulcus after placement than other conventional retraction cord. Thus, this newly innovated Stay-Put retraction cord could provide better retraction then conventional retraction cord.

Limitation: Within the limitation of the study, sample size could be increased

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