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LIGHT CURED RESIN- AN AESTHETIC AND BIOCOMPATIBLE ALTERNATIVE TO CONVENTIONAL DRESSING: A CLINICAL STUDY

Clinical Study

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ABSTRACT:

Introduction: Periodontal dressings, also known as periodontal packs, have been employed over centuries for the purpose of protection of surgical sites. Many modifications have been made to improve their physical and therapeutic properties. Hence this study was designed to compare and evaluate the clinical efficacy of light cured periodontal dressing to most widely used non-eugenol pack.

Materials and method: Ten patients suffering from generalized chronic periodontitis, requiring periodontal flap surgeries on contralateral sides of the arch were selected and randomly divided into two groups: Group I (Control group) and Group II (Test group). In Group I, non-eugenol periodontal dressing and in Group II light cured periodontal dressing was applied at the surgical sites. Clinical parameters that were assessed on day 7 after the removal of the pack are debris index, plaque scores and gingival index. Patients were also be assessed for acceptance and compliance of the material. All the data recorded was then statistically analysed.

Result: Group II showed better results when compared with the control group on debris index, plaque scores and gingival index, though the differences were found to be statistically insignificant. Group II also showed better results in terms of esthetics, associated mucosal problems, retention of the dressing and over all patient satisfaction.

Conclusion: Light cured periodontal dressing showed better patient acceptability and compliance and could be considered to be a clinically efficient and alternative to the non-eugenol pack as the periodontal dressing.

Key words:
periodontal dressing,
light cured dressing,
non-eugenol pack

Source of support : Nil
Conflict of interest: None

INTRODUCTION : Periodontal surgery often results in pain as its most common undesirable outcome. Certain authors advocate the use of some form of protection that could be applied over the surgically traumatized tissue to keep it shielded from masticatory insult. This is offered by application of periodontal dressings or packs that cover and protect wounds from post-operative irritation, trauma, salivary contamination, and food stagnation.[1]

Dr. A. W. Ward (1923)2 introduced the concept of periodontal dressings with the invention of a packing material, Wondrpak, and advocated its use around teeth following periodontal surgeries. The purpose of the application of the dressing was not only to act as a protective barrier over the surgical site against mechanical trauma but also to reduce the risk of post-operative infection and haemorrhage and minimise post-surgical discomfort to the patient.

Periodontal dressings can broadly be classified into 3 groups namely: (i) zinc oxide eugenol based system, (ii) non-eugenol dressings and (iii) systems containing neither zinc oxide nor eugenol. A number of side-effects were observed post-application of eugenol based dressings and these led the path for newer formulations of the periodontal dressing. [3] A non-eugenol dressing widely accepted is Coe-Pak (GC America, Inc. Alsip, IL 60803 U.S.A.) which is a standard for comparison of other dressing materials. Certain

disadvantages such as poor appearance, prolonged setting time and inadequate flow during manipulation were observed with Coe-pak.[4]

A polyether urethane dimethacrylate resin based visible light-cured periodontal dressing, commercially marketed as Barricaid (Dentsply International Inc. Milford, DE 19963-0359, U.S.A.) with its superior physical properties like ease of manipulation, better surface smoothness, interdental retention, and mechanical stability was formulated as an advanced concept in the protection of periodontal wound sites.[5] Its esthetically pleasing translucent pink colour is claimed to favour its clinical application.

MATERIALS AND METHODS : Source of data: The research project was initiated after the approval of institutional ethics committee. The subjects were chosen from Department of Periodontology, suffering from Chronic Periodontitis requiring periodontal flap surgery and an informed consent letter was taken in their local regional language.

Method of collection of data: Ten patients presenting similar periodontal involvement bilaterally as determined by clinical and radiographic assessment and fulfilling the following criteria were selected: Systemically healthy subjects (ASA I & II) aged between 20-60 years (both male and female) suffering from moderate to severe periodontitis showing acceptable oral hygiene during phase I therapy, should be non-smokers and non-tobacco users, should have negative history of any systemic problems that contradict the periodontal surgery, exclusion of pregnant and lactating females and patients with haematological disorders was made.

The selected quadrants were then randomly divided into two groups namely: Group I i.e. the control group wherein Coe-pak (non-eugenol) dressing was placed and Group II wherein Barricaid (light cured) dressing was placed post surgically.

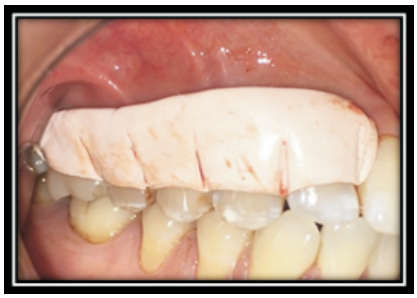
Study Design (Methodology):

i. Pre-surgical Therapy:

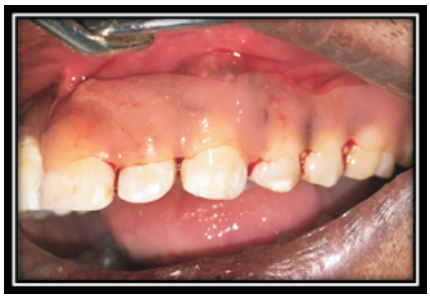
All subjects received a full diagnostic work up that included clinical examination, case history recording. Phase I therapy was performed for all the subjects. Clinical parameters namely Debris index (OHI, Greene and Vermillion, 1960), Plaque index (Silness and Loe, 1964)6 and Modified Gingival index (Lobene RR, 1986)7 were recorded at baseline (day 0) i.e. on the day of surgery. A single examiner who was blinded for the surgical procedures and pack applications recorded these parameters.

ii. Surgical therapy:

Under local anaesthesia following aseptic measures, periodontal flap surgeries were performed. In Group I, a full thickness flap was reflected after an initial crevicular incision. After a thorough debridement and root planing the surgical site, the flap was repositioned and sutured using a 3-0 mersilk suture. The surgical site was gauze-dried and Coe-pak was applied over the site as the periodontal dressing. (Figure 1)



In Group II, following the similar surgical steps, Barricaid was applied as the dressing of the choice. (Figure 2)



The light-cured dressing was applied at the juncture of the cervical one-third of the teeth and the margin of the surgical site. It was then photocured to a visible light-curing unit for 10 seconds per site per tooth until the entire dressing was cured. Same procedure was repeated for the lingual side. Occlusal clearance of the dressing was achieved.

iii. Post-operative assessment:

The patients were recalled on 7th day post-surgery for the removal of the dressings. The examiner who assessed the pre-operative parameters recorded the same pameters post-operatively. A post-operative assessment was also done in which the patients were asked about appearance, associated mucosal problems, retention and their satisfaction and preferance regarding the materials used.

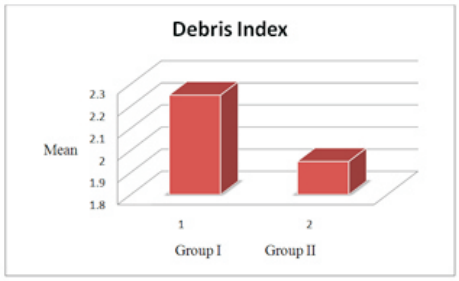
RESULTS: The collected data was statistically analysed using a SPSS software version 17.0. and were summarized as Mean ± SD (standard deviation). The groups were compared by independent Student's t test. A two-tailed p value less than 0.05 ($p<0.05$) was considered statistically significant.

The mean increase in the debris index score of Group I was

2.25 ± 0.35 while in Group II it was 1.95 ± 0.43. Comparing the mean increase in the debris index score of two groups, showed significantly different and lower debris index score of Group II as compared to Group I. (Table 1 and Graph 1)

Table 1: Comparison between group I and group II for increase in mean debris index scores

Group I	Group II	T value	P value
2.25 ± 0.35	1.95 ± 0.43	1.69	> 0.05

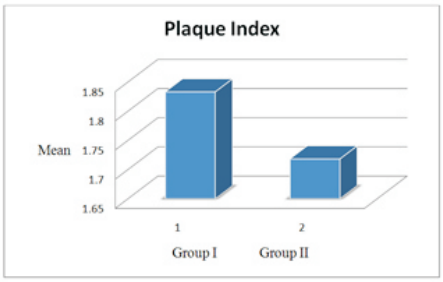


Graph 1: Comparison between group I and group II for increase in mean debris index scores

The mean increase in plaque index score of Group I was 1.83 ± 0.13 while in Group II it was 1.71 ± 0.17. Comparing the mean plaque index score of two groups, showed significantly different and lower plaque index score of Group II as compared to Group I.(Table 2 and Graph 2)

Table 2: Comparison between group I and group II for increase in mean plaque index scores

Group I	Group II	T value	P value
1.83 ± 0.13	1.71 ± 0.17	1.71	>0.05

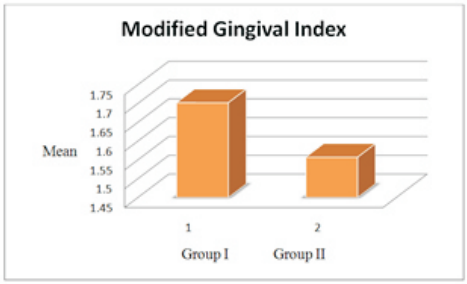


Graph 2: Comparison between group I and group II for increase in mean plaque index scores

The mean increase in modified gingival index score of Group I was 1.70 ± 0.20 while in Group II was 1.56 ± 0.16. Comparing the mean modified gingival index score of two groups, showed significantly different and lower modified gingival index score of Group II as compared to Group I. (Table 3 and Graph 3)

Table 3: Comparison between group I and group II for increase in mean modified gingival index scores

Group I	Group II	T value	P value
1.70 ± 1.20	1.56 ± 0.16	1.73	>0.05



Graph 3: Comparison between group I and group II for increase in mean debris index scores

On comparison amongst both the groups the post-operative assessment, Group II showed better results in terms of esthetics, any associated mucosal problems, retention of the dressing and over all patient satisfaction. (Table 4)

Table 4: Table depicting assessment of the dressings by the subjects in group I and group II

	GROUP I	GROUP II
Esthetic appearance	2/10(20%)	8/10(80%)
Mucosal problems	4/10(40%)	1/10(10%)
Retention	4/10(40%)	6/10(60%)
Patient satisfaction	1/10(10%)	9/10(90%)

DISCUSSION: Periodontal dressing materials has always remained a topic of debate as every school of thought has its own reasoning to support their claims. Coe-pak being one of the most widely used non-eugenol dressings is offers a standard, to which other dressings can be compared. While new dressing materials with claims of superior properties develop, it is the need of the hour to assess their clinical performance and compare them with established products.

Commercially available 'Barricaid" is a visible light-cured periodontal dressing, based on a polyether urethane dimethacrylate resin that is said to possess an aesthetically pleasing translucent pink color, and easily controlled rate of curing by illumination with visible light.8 Histologic studies

conducted by Alpar et al. (1999)9 and Cilbert et al. (1994)10 have shown that extracts and solid specimens of polymerized Barricaid are exceedingly biocompatible. Hence the present was carried out to aesthetic acceptance and biocompatibility of the light cured dressing material.

Debris index by Greene and Vermillion (1960) was assessed pre- and postoperatively and an increase was noted. On comparing, the mean increase in Group II (Barricaid) was found to be slightly less in comparison with Group I (Coe-pak) due to better retentive properties of Barricaid and the tendency of Coe-pak to form slough beneath the dressing.

Modified gingival index of Lobene et al.[7] was assessed pre?.and post? operatively to observe the effects of light? cured dressing on soft tissue during healing period, and an increase was observed that could be attributed to the normal inflammatory response after surgical manipulation or to the tissue reaction to the silk sutures. This was found to be in accordance with Leknes et al. (2005)[11], Abi Rached et al. (1992)12. No other soft tissue findings viz ulceration, erythema, or any untoward reaction was observed in either of the groups

Periodontal dressings are generally associated with increased plaque accumulation and hence to test this property of the material plaque index of Sillness and Loe was evaluated. On comparing, though the mean increase in plaque score in Group II (Barricaid) was found to be less as compared to Group I (Coe? pak) from baseline to day 7, this difference was found to be statistically non? significant. These results obtained are in harmony with the results obtained by Heaney and Appleton (1976)13, Pluss et al. (1975)14, Newman and Addy (1982)15,Sachs et al. (1984)16 who reported accumulation of plaque beneath the periodontal dressings but not to a detrimental level to retard the healing process.

Alpar B et al (1999)17 in a study showed that Barricaid did not inhibit growth of human primary gingival fibroblasts, while Coe-Pak reduced their proliferation. Schmalz G and Bindslev AD (2009)18 found that light-cured periodontal dressings were not cytotoxic in cell cultures and different cell types. Madan E et al (2013)5 in their study concluded that Barricaid is easily applied and offers a perfect colour match; hence the patient is not hesitant to carry out his routine activities.

CONCLUSION: From the result of this study, It may be concluded than visible light-cured periodontal dressing is easily applied, offers a perfect color match with no unpleasant taste or smell, is biocompatible, offers good retentivity, and has great patient compliance. With due consideration to the above, it could be said that light cured dressing proves to be a better alternative to non-eugenol pack as a dressing material, as it overcomes the limitations of non-eugenol periodontal dressing. It is important to emphasize that a larger number of subjects has to be taken up to compare the efficacy of these dressings.

REFERENCES:

1. Fraunhofr JA, Argyropoulos DC. Properties of periodontal dressings. Dent Mater 1990;6:51?5.
2. Ward AW. Postoperative care in the treatment of pyorrhea. J Am Dent Assoc 1929;16635?40.
3. Rubinoff CH, Greener EH, Robinson PJ. Physical properties of periodontal dressing materials. J Oral Rehabil 1986;13:575?86.
4. Cheshire PD, Griffiths GS, Griffiths BM, Newman HN. Evaluation of the healing response following placement of Coe?pak and an experimental pack after periodontal flap surgery. J Clin Periodontol 1996;23:188?93.
5. Madan E, Bharti V, Chaubey KK, Arora VK, Thakur RK, Nirwal A. Light-cured resin "Barricaid" - An aesthetic and biocompatible dressing: A step ahead. J Indian Soc Periodontol 2013;17:753-6.
6. Silness J, Loe H. Periodontal disease in pregnancy. II. Correlation between oral hygiene and periodontal condition. Acta Odontol Scand 1964; 22:121-35
7. Lobene RR, Weatherford T, Ross NM, Lamm RA, Menaker L. A modified gingival index for use in clinical trials. Clin Prev Dent 1986;8:3?6.
8. Thorstensen AE, Duguid R, Lloyd CH. The effects of adding chloxhexidene and polyhexamethylenebisguanide to a light cured periodontal dressing material. J Oral Rehab 1996;23:729?37.
9. Alpar B, Gunay H, Geurtsen W, Leyhausen G. Cytocompatibility of periodontal dressing materials in fibroblast and primary human osteoblast like cultures. Clin Oral Invest 1999;3:41?4.
10. Cilbert AD, Lloyd CH, Scrigeour SN. The effect of a lightcured periodontal dressing material on HeLa cells and fibroblast in?vitro. J Periodontol 1994;65;324?9.
11. Leknes KN, Roynstrand IT, Selvig KA. Human gingival tissue reactions to silk and expanded polytetrafluoroethylene sutures. J Periondontol 2005;76:34?42.
12. Abi Rached RS, de Toledo BE, Okamoto T, Marcantonio Júnior E, Sampaio JE, Orrico SR, et al. Reaction of the human gingival tissue to different suture materials used in periodontal surgery. Braz Dent J 1992;2:103?13.

13. Heaney TG, Appleton J. The effect of periodontal dressings on healthy periodontium. J Clin Periodontol 1976;3:66?76.
14. Pluss EM, Engelbergler PR, Ratchieshak KH. Effect of chlorhexidine on dental plaque formation under periodontal pack. J Clin Periodontol 1975;2:136?42.
15. Newman PS, Addy M. Comparison of hypertonic saline and chlorhexidine mouth rinses after inverse bevel flap procedures.J Periodontol 1982;53:315?8.
16. Sachs HA, Farnoush A, Checchi L, Joseph CE. Current status of periodontal dressings. J Periodontol 1984;55:689?96.
17. Alpar B, Glinay H, Geurtsen W, Leyhausen G. Cytocompatibility of periodontal dressing materials in fibroblast and primary human osteoblast-like cultures. J Clin Oral Invest 1999;3:41-48.
18. Schmalz G, Arenholt-Bindslev D. Biocompatibility of dental materials. Berlin: Springer; 2009.

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