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Reso Pac™ - A Novel Periodontal Dressing in Comparison with Coe-Pak: A Clinical Study

Abstract

Background and Objectives: Several studies have shown that placement of periodontal pack results in more plaque accumulation and could result in a pronounced inflammation post-surgically and delay the healing of the flap tissues. The bulky periodontal dressing could result in considerable patient discomfort. ResoPac™ is the commercially available cellulose based dressing material. It is hydrophilic in nature and has been claimed to have adhesive properties to the oral tissues.

Thus the aim of the study was to compare the early wound healing in periodontitis patients undergoing flap surgery after ResoPac™ placement with the conventional Coe- Pak; and also to assess patient comfort as evaluated by a VAS questionnaire in the two groups. **Materials and Methods:** Cases indicated for periodontal flap surgery were randomly allotted to either groups and a split mouth study design was followed. **Results:** A higher trend for mean pain scores and swelling of face was reported in Coe-pak group compared to ResoPac™. Clinical evaluation after one week revealed more pronounced swelling and color changes of the gingiva in patients with Coe- Pak dressing. Also, the mean percentage increase of GCF flow from baseline to 2 weeks was found to be higher with the same. **Conclusion:** Based on the results of our study, we can conclude that periodontal dressing with Coe- Pak results in more inflammation immediate post-surgically which can in turn delay the wound healing response as compared to patients with a Reso- Pac.

Key Words

Coe- Pak; ResoPac™; gcf; periodontal flap surgery; wound healing; periotron

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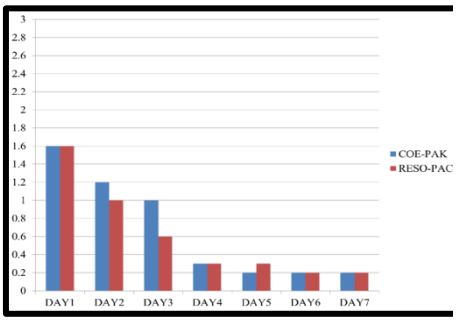
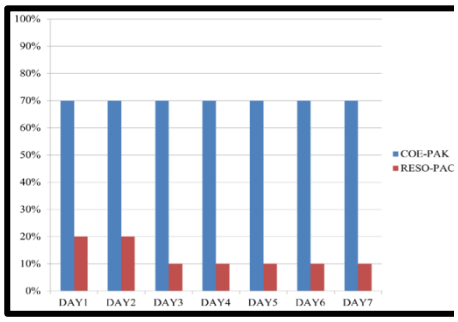
INTRODUCTION

Wounds in the oral cavity feature extremely good healing capacities, however, some situations require the isolation of wounds from the oral milieu, ranging from extractions to flap surgeries. Periodontal surgical procedures are routinely carried out for the management of diseased periodontal tissues. Several factors contribute to uneventful and healthy post-operative healing.[1,2] Wound healing following periodontal flap surgery is influenced by the factors like bacterial contamination, innate wound-healing potential, local site characteristics, surgical procedure/technique and systemic and environmental factors (e.g. diabetes & smoking).

The inhibitory effect of bacterial contamination and infection on post-surgical wound healing has been well documented. Following surgery, the healing process develops by an initial inflammatory response and in turn the inflammation promotes the rapid formation of biofilm. Periodontal wounds appear to heal faster in sites with fewer plaque score. In fact the First European Workshop stated that post operative plaque control is the determining factor for the successful outcome of flap surgery. As early as 1920, Ward advocated the use of periodontal dressing for routine periodontal surgical procedures in order to reduce pain, infection, root sensitivity & minimizecaseous deposits within the



Graph 1



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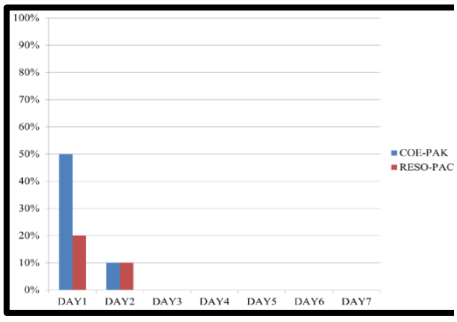

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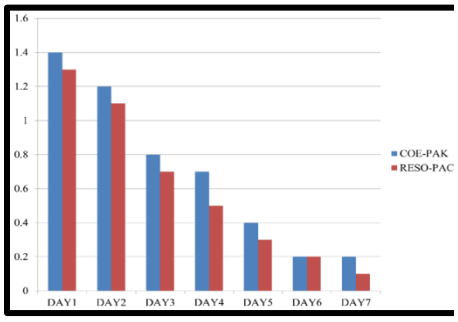

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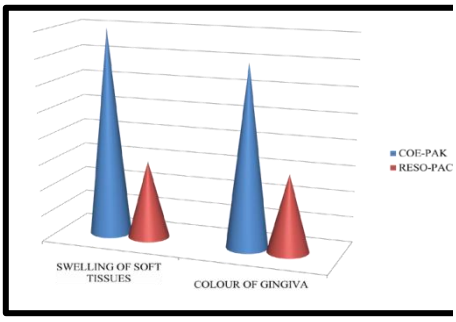
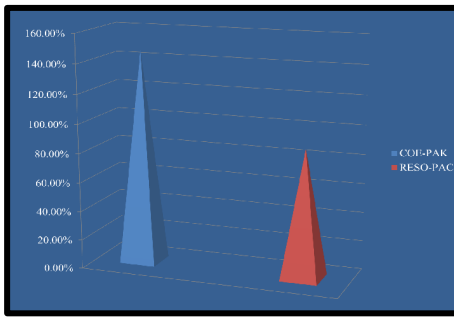


Graph 5



Graph 6

wound site. But studies using split mouth design have demonstrated surgical sites with dressing resulted in more amount of plaque accumulation compared to sites without a dressing and concluded that dressing aids little to the healing process. Also, Addy *et al.*, found advantage in using 0.2% CHX rinse when compared to periodontal dressing.[3-7] Three categories of the most common periodontal dressings in the dental market are classified as solid and non-soluble, soft and non-soluble, and soft and soluble materials. The most common and widely used non-soluble dressing is the non-eugenol dressing in the coe-pak (Coe laboratories, GC international Inc, UK) which is supplied as two pastes or as an auto-mixing system contained in a syringe. ResoPac™ is the commercially available cellulose based dressing material which falls under the category of soft and soluble materials. It is hydrophilic in nature and has adhesive properties to the oral tissues. It need not be mixed and when applied adheres to the tissues and slowly gets dissolved over a period of 2-3 days without leaving any residues (long enough to attain a solid fibrin layer in the wound).It remains elastic throughout, so pressure ulcers do not develop. It also contains myrrh featuring disinfectant, astringent and hemostatic properties. Only care that needs to be taken is to advise patients who have been treated with ResoPac™ to refrain from consuming hot food or drinks to avoid the dissolution of the gel. GCF flow is an important determinant in the ecology of periodontal pocket or sulcus. It creates a flushing action and an isolation effect. In addition, it probably determines the growth level of subgingival microorganisms and is a potential marker for periodontal disease activity. GCF flow (or flow rate) is the process of fluid moving into and out of the gingival crevice or pocket. It is a small stream, usually only a few microliters per hour. It is approximately 10.2 µl/hr in health and in advanced periodontitis; it is as high as 137 µl/hr. 5-24 ml of GCF is secreted daily. The gingival flow however, is expected to increase dramatically as inflammation becomes more severe and vascular permeability

increases. It has also been stated that increase in GCF flow is one of the first change occurring as inflammation progresses before any other visible signs of inflammation could be seen and that its value is more correlated to the status of the underlying gingival tissues than any other signs or indices of gingival inflammation. Various studies have shown that GCF flow consistently increases following surgery till 2-3 weeks, decreasing to baseline or lower values following then in 6 weeks or so and that the percentage increase is directly proportional to the inflammatory component of the underlying healing tissues. Griffiths and Sterne *et al*., found that while the initial volume of GCF showed no association with any clinical measurement, there was an association between flow rate of GCF and gingival colour. The volume of GCF collected in the final, 5th sample was associated with the Gingival Index. The sample site strongly influenced all measures of GCF volume. It is proposed that the flow rate of GCF may be a better indicator of gingival inflammation, as it precisely reflects the changes in tissue permeability.[8-10] Greensmith Al *et al*., studied the differences between undressed or dressed (Coe-pak) wound after reverse bevel flap procedures. The results showed that in the gingival fluid level there was no difference between the 2 sides. At 7 days, the undressed side had a lower gingival Index but at 14 and 28days the situation was reversed. At 7days the undressed part showed more bleeding and sensitivity. At 14 days, most patients were free of symptoms except from sensitivity, which tended to persist on the undressed side. At 28 days, it was found that 45% of patients preferred no closure of the wound by periodontal dressing, while 37.5% had no preferences and 16.6% preferred a dressing. Jones TM *et al*., compared clinical and histological results after access flap surgery with and without non-eugenol dressing and evaluated fluid Index, inflammatory index, pocket depth and patient comfort upto 16 weeks postoperatively. Results showed no difference in these parameters between quadrants where periodontal dressings were used or not used following surgery. The patients reported severe pain and discomfort postoperatively when the dressing was used. The results of this study suggest that a surgical dressing serves no useful purpose following a periodontal flap surgery.[6] Thus the aim of this study was:

1. To assess the early wound healing outcomes of patients with a periodontal dressing and to compare with the new commercially available dressing.
2. To assess patient comfort as evaluated by the patient assessment questionnaire.

MATERIALS AND METHODS

This is a randomized case controlled clinical trial with split mouth design study which was conducted on patients reporting to the Department of Periodontics, The Oxford Dental College and Hospital, Bangalore. Patients who were systemically healthy, non-smokers, not under any medication, diagnosed with either chronic generalized or aggressive periodontitis, indicated for periodontal flap surgery were included in the study. It was made clear that participation is entirely voluntary. Patients were explained about the nature of the study, the need for surgery and the outcome of it, following which a verbal & written consent was obtained. The patients satisfying the above mentioned criteria were recruited for the study A total number of 10 patients having at least 2 sextan.ts indicated for surgery were randomly allotted to either Group A (Coe-Pak) or Group B (Reso-Pac™) and a split mouth stuy design was followed. Access flap surgery was done and patients were given dressing following the surgery. The patients satisfying the above mentioned criteria were recruited for the study. Comprehensive medical and dental history was recorded. The patients were then given an explanation of the study and an informed consent was obtained and were also asked to fill a self-reported questionnaire. The patients were advised blood investigations which included total count, differential count, hemoglobin percent, bleeding time and clotting time, random blood sugar levels. Oral hygiene instructions were given and scaling and root planing was performed under local anesthesia. Periodontal evaluation was performed 4 weeks after Phase I therapy to confirm the suitability of sites for periodontal surgery. Persistence of ≥5mm pocket depth and attachment loss of ≥4mm in at least 3 teeth in a sextant with radiographic evidence of bone loss was considered for flap surgery. On the day of surgery (baseline) Periotron™ score was recorded at the deepest site of the selected area for surgery. All periodontal surgical procedures were performed on an outpatient basis under aseptic conditions. The patients were asked to rinse the mouth with 10 ml of 0.2% chlorhexidine digluconate solution (Clohex™) for 60 seconds as a pre-procedural rinse. After administration of local anaesthesia, intrasulcular

incisions were placed and a full thickness buccal and palatal/lingual flaps were elevated using a periosteal elevator. Granulation tissue was removed using curettes to provide access and visibility to the root surfaces. Remaining plaque and calculus was gently removed with ultrasonic scalers and root planing was done using curettes, to achieve a clean smooth surface. The flaps were approximated to the original level and secured with sutures. Post-operative instructions were given. Patients were prescribed NSAIDs for post-operative pain management. Post-surgical oral hygiene maintenance was done by asking the patient to abstain from mechanical oral hygiene measures in the operated area for 7 to 10 days and to rinse with 0.2% Chlorhexidine (CHX) solution for 1 minute twice a day. Removal of sutures was done after 7 days and patients were instructed to establish their manual oral hygiene measures after 7 to 10 days post operatively. All subjects answered a questionnaire (pain, bleeding, swelling of face and mucosa and mean number of analgesics taken post-operatively) at each day following surgery till one week, which was provided to them as a VAS chart, to evaluate post-operative symptoms. All the patients were subjected to evaluation of swelling of soft tissues and colour of gingiva at one week after surgery. Volumetric measurement of GCF were done at baseline (at the day of surgery), two, three and six weeks following surgery by using filter paper strips which was subjected to quantitative analysis using Periotron 8000™.

RESULTS

Graph 1: Pain-Post operative pain experience (0= no pain, 1= mild pain, 2= moderate pain, 3= severe pain) noticed at each day following surgery till one week. Results in our study reveal that both the groups show similar mean pain score on all the 7 days, however with slight and insignificant rise in the Coe-pak during 2nd and 3rd day. Graph 2: Swelling Of Face- Post- operative swelling of face (YES/NO) noticed at each day following surgery till one week. Our study revealed that in 70% of the cases swelling of face was reported by the patient in all the 7 days following the placement of the Coe-pak; however, with ResoPac™ patients experienced minimal swelling. Graph 3: Bleeding post-operatively-post-operative oozing of blood (YES/ NO) noticed at each day following surgery till one week. Post- operative oozing of blood following the procedure was seen in both the groups for the first two days; the coe-pak group demonstrating higher mean score on the first day (60% in Coe pak group versus 20% in ResoPac™ group). Graph 4: Mean number of analgesics taken- Number of analgesics taken every day following surgery till one week is noted in the two groups. Results indicated a trend towards similar number of mean analgesics taken in both the groups in the following 7 days after surgery with the Coe- pak group showing higher but insignificant difference. Graph 5: Clinical evaluation at one week- Swelling of soft tissues and colour of gingiva was evaluated after one week as absent (0), moderate (1) or pronounced (2) in the two groups. Swelling of soft tissues and the gingival colour changes seen in our current study was significantly higher in the Coe-pak group (Mean 1.6 and 1.4 respectively) as compared to the ResoPac™ group (Mean 0.6 and 0.6 respectively). Graph 6: GCF Flow- Measured at baseline (on the day of surgery) and 2 weeks and the percentage rise in GCF flow was noted in the two groups.

The GCF flow consistently increased at the 2nd week in all the patients in our study; however the Coe-pak group showed very high mean percentage increase in GCF flow (143%) compared to the ResoPac™ group (84%).

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DISCUSSION

Reso-Pac is completely different from conventional periodontal preparations. The reason for this is the hydrophilic nature of the material that has excellent adhesion properties to the oral tissue. The base material consists of cellulose and contains extracts of myrrh, an aromatic resin derived from wood *Commiphoramyrrha*, and has antiseptic, astringent and haemostatic properties. Allergic reactions are not known. Ready to use and easy handling, requires no mixing of the ingredients, which makes this material unique. With the help of wet gloves or a spatula a ball needs to be modeled from the material, which is to be pressed onto the wound area. After about 3 minutes the material becomes gelatinous in consistency. The bandage is completely elastic and doesn't change its consistency even after the application to the oral tissue, which prevents the occurrence of mechanical injury or ulceration. It adheres to the oral tissues, even on wet and bloody surfaces and remains on the surface for more than 30 hours, ensuring complete protection of the area. The healing process is accelerated because it is not impeded by the movement of the tongue and food residues. It adheres well to the teeth, bone surfaces, prosthetic

restorations and sutures. There is no need to remove it as it resolves within three days, depending on exposure, without leaving any residue on the tissue (it doesn't stick to the sutures). In clinical practice usually one single application of the material is sufficient to cover the wound with a fibrin. In complicated cases, where the period of the healing is too short, it is necessary to repeat the application with a new bandage. ResoPac™ can be used as a carrier for the medication (antiseptic, antibiotic, haemostatic preparations and fluoride). Smeekens JP *et al*., studied the histological evaluation of tissue response 7 days after surgery using dressing materials like Barricaid, Ward's wonder pak and corboxyl methyl cellulose and control. No significant differences between the 2 different dressings were observed. The control areas showed an overall lesser degree of inflammation. After 14 days, no difference between test and control were noted. Allen DR *et al*., in 1983, studied the clinical effects of a periodontal dressing after Modified Widman flap surgery. The patients were studied for 2 months after surgery (at 2 weeks, 1 month, and 2 months) with respect to gingival crevicular fluid, gingival inflammation, attachment level and pocket depth. The patients were also given a questionnaire. Results showed no significant differences between the dressed and undressed sites.[5,11,12] However, in our study results indicated a higher trend for mean pain scores and swelling of face as assessed by patients in Coe-pak group compared to ResoPac™group during the 7-day postoperative period. This can be attributed to the hardness on setting, non-adhesiveness and non-solubility of the Coe-Pak dressing as compared to the ResoPac™, which has a better adaptability with oral tissues and doesn't harden on setting and it is soluble, although it mainly depends on the nature and duration of surgical procedure. Mild post-procedural oozing of blood was found to be more in patients with the Coe-Pak as compared to the ResoPac™due its better hemostatic properties. Clinical evaluation after one week revealed more pronounced swelling and colour changes of the gingiva in patients with Coe-Pak dressing. Also, the mean percentage increase of GCF flow from baseline to 2 weeks was found to be higher with the same. These differences could be attributed due to the higher amount of plaque accumulation and hence high inflammation seen underneath Coe-Pak as compared to ResoPac™.

Patients with dressing frequently experienced eating difficulty and most of them preferred the usage of ResoPac™(60%), although few of them (20%) reported certain uneasiness due to the leaching of the dressing in the mouth over a period of time and the rest had no preference (20%).

CONCLUSION

At this time, there is a great deal of debate over the value and usefulness of periodontal dressings. Experimental evidence has not fully resolved this issue. Based on the results of our study, we can conclude that periodontal dressing with Coe-Pak results in more inflammation immediate post-surgically which can in turn delay the wound healing response as compared to patients with ResoPac™. ResoPac™ seems to serve the ideal role of protecting the wound immediately after the surgery, dissolving slowly over 2 -3 days, thereby permitting the cellular oxidation and exchange of tissue fluids which are essential for the events in wound healing process.

CLINICAL SIGNIFICANCE

This randomized clinical trial proposes the use of periodontal dressing following open flap debridement in the treatment of periodontitis. A commercially available cellulose based dressing Reso-pac has been compared with the Coe-pak. The various properties of the dressings have been discussed in-lieu of their better wound healing potential as well as patient comfort.

REFERENCES

1. Burke JF. Effects of inflammation on wound repair. Journal of Dental Research 1971;50:296-301.
2. Flores de, Jacoby L, Mengel R. Conventional surgical procedures. Periodontology 2000 1995;9:38-54.
3. Sandalli P, Wade AB. Alterations in crevicular fluid flow during healing following gingivcctomy and flap procedures. J Periodontol Res 1969;4:314-8.
4. Stahl SS, Witkin G, Heller A, Brown R. Gingival Healing III. The effects of periodontal dressings on gingivectomy repair. J Periodontol 1969;40:34-7.
5. Allen DR, Caffesse RG. Comparison of results following modified Widman flap surgery with and without surgical dressing. J Periodontol 1983;54:470-5.
6. Jones TM, Cassingham RJ. Comparison of healing following periodontal surgery with and

without dressing in humans. J Periodontol 1979;50:387-93.
7. Checchi L, Trombelli L. Postoperative pain and discomfort with and without periodontal dressing in conjunction with 0.2% chlorhexidine mouthwash after apically positioned flap procedure. J Periodontol 1993;64(12):1238-42.
8. Arnold R, Lunstad G, Bissada N. Alteration in crevicular fluid flowduring healing following gingival surgery. J Periodont Res 1966;1:303-8.
9. Griffiths GS, Sterne JAC. Association between volume and flow rate of GCF and clinical measurements of gingival inflammation in a population of British male adolescents. J Clin Periodontol 1992;19:464-70.
10. 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.
11. Eber RM, Shuler CF, Buchanan W, Beck FM, Horton JE. Effects of periodontal dressings on human gingival fibroblasts in vitro. J Periodontol 1989;60:429-34.
12. Smeekens JP, Maltha JC, Renggli HH. Histological evaluation of surgically treated oral tissues after application of a photocuring periodontal dressing material. An animal study. J ClinPeriodontol 1992;19(9):641-5.