Connective Tissue Response to Periodontal Dressings

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THE EFFECTS OF three periodontal dressings (Coe-Pak, PPC, Perio Putty) upon subcutaneous tissues in 26 Sprague-Dawley rats were investigated. The three dressings, and a control (Teflon), were placed into polyethylene tubes. Two tubes per animal were implanted on either side of the dorsal midline area. After 14 days the specimens were retrieved and prepared for histological examination. Three methods of scoring were utilized for evaluation. First, a system evaluating the overall number of inflammatory cells, connective tissue capsule thickness, and the vascular changes produced; second, an inflammatory cell count, the Inflammatory Index (I.I.), computing the inflammatory cells in a particular field of view for each material; and third, a Reaction Spread Index (R.S.I.) comparing the distance of the spread of the inflammatory reaction into the connective tissues. Statistical analysis of the data was carried out utilizing the Chi-square test and analysis of variance. While the three scoring systems utilized did result in some comparative variation in reactions, the overall order of decreasing severity was always PPC, Coe-Pak, Perio Putty, and Teflon.

Since the introduction of the first practical periodontal dressing by Ward,[1] numerous investigations on all aspects of the effects, as well as the development of such materials have been conducted. Numerous differences exist between the results reported in the literature.

Currently, dressings may be generally divided into two main classifications, those containing eugenol, and those without eugenol. Healing studies are few in number, due to the relative degree of difficulty in controlling variables.[2-6] Other more numerous investigations using *in vitro*, and implantation methods, have been questioned as to the relevance of their results to clinical applications.[7,8] Variations exist between many of the results reported. In view of these uncertainties, the choice of dressings often has been relegated to the personal preferences of the operators.

Periodontal dressings containing eugenol, have been found to irritate oral mucosal tissues,[9,10] induce allergic reactions,[11-13] and present difficulties in manipulation.[14] Others[10,15] have reported extensive destruction observed histologically in tissues adjacent to such materials. However, the continued use of periodontal dressings containing eugenol is probably due to the general feeling that eugenol is capable of obtunding pain and rendering tissues less sensitive.[16] Reports have been published concluding that eugenol-containing dressings facilitated healing processes,[2] and have favorable antimicrobial properties.[17]

Non-eugenol-containing dressings tend to produce more favorable responses as concluded in numerous published reports.[18-23] Lack of substantial evidence regarding detrimental effects of the non-eugenol type dressings are strikingly absent in the literature, as opposed to the eugenol types. Non-eugenol dressings have been reported to vary in antimicrobial activity.[21,24] Still others have concluded they may have but little influence on the healing processes.[25] The value of non-eugenol periodontal dressings may lie in their physical properties,[24] and their apparent fulfillment of the purposes for dressing placement, while producing no serious harmful effects to the adjacent tissues, as opposed to dressings containing eugenol.

Today, authorities[19,26-28] agree that no periodontal dressing is able to directly affect and promote the healing processes. Their main purposes are to aid healing indirectly by protecting the healing tissues from further injury, and to provide postoperative comfort to the patient.

The purpose of the present *in vivo* study was to investigate the connective tissue reaction to three periodontal dressings when implanted in rats, in order to compare the differences between the responses elicited by eugenol and non-eugenol containing dressings, and also, to determine if a newly introduced non-eugenol type of periodontal dressing is less irritating to the tissues, than one commonly used at the present time.

MATERIALS AND METHODS

Procedure

Twenty-six Sprague-Dawley white rats, approximately 90 days old, and of similar size and weight were used for this study. A total of 49 polyethylene tubes, 12 mm in

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length, with an inner diameter of 2.15 mm were utilized for the implantation. The three periodontal dressings evaluated included Coe-Pak,* Professional Products Company dressing (PPC),† and Perio Putty.‡ All dressings were prepared in a standardized method, by weight, and according to the manufacturers recommended mixing instructions.

Coe-Pak

Accelerator	Base
Wt. = 1.4730 gm	Wt. = 2.4532 gm
Mixing time = 45 seconds	

Perio Putty

Accelerator	Base
Wt. = 2.5342 gm	3.7072 gm
Mixing time = 60 seconds	

PPC

Liquid	Powder
0.15 cc	2.39 G.
Mixing time = 3 minutes, 30 seconds	

Each of the dressings was placed into one end of 24 tubes. Additionally, solid Teflon tubing was cut into 5 mm tapered sections and placed into one end of 26 of the tubes, as controls. The animals were then anesthetized with ether. The dorsal implantation area was shaved and washed with alcohol. Under sterile conditions, the tubes were placed, in a randomized order, through semilunar incisions (approximately 15 mm long), made equidistant from the midline, towards the lower dorsal aspect of each animal (Table 1). The tubes were oriented and placed into the subcutaneous layers in a lateral cranial direction, two per animal. The wounds were closed subcutaneously with catgut, and superficially with black silk sutures, and the animals were returned to their individual cages. All animals experienced uneventful recoveries from the anesthesia within a few minutes. On the 7th day postoperatively, the skin sutures were removed without anesthesia, and healing was excellent. Fourteen days postoperatively, all animals were alive and functioning well, the incision sites were difficult to distinguish, and all tubes were detectable. The animals were then sacrificed, and the implantation area again shaved. The tubes and surrounding connective tissues were dissected from the animal. The caudal end of the specimen was marked with a dot of India ink for orientation. The specimens were then halved, the tubes were removed, and each section was placed into a separate bottle containing 10% neutral buffered formalin for 48 hours. The specimens were then prepared for histological examination, and stained with hematoxylin and eosin. Figure 1 illustrates different steps of the technical procedure.

Table 1
Random Distribution of Dressing Placement

DRESSINGS	UP LEFT	UP RT.	L. LEFT	L. RT.	TOTAL
COE-PAK = CP	5	7	6	6	24
PROFESSIONAL PRODUCTS CO. = PPC	7	4	7	6	24
PERIO PUTTY = PP	4	7	6	7	24
TEFLON CONTROL = TC	10	8	6	8	26

* Animal viewed from the dorsal surface with its head up.

Methods of Scoring

Each of the three materials used for comparison (CP-PPC-TC) were selected to provide a variety of reactions with which the test material (PP) could be adequately compared.

Three systems of scoring were used in evaluating the data: I. The scoring system utilized by Haugen and Mjör (HM). II. An inflammatory cell count system referred to as The Inflammatory Index (I.I.). III. A measurement of the extent of the reaction referred to as the Reaction Spread Index (R.S.I.). Haugen and Mjör's[29] system is based on three factors: The number of inflammatory cells, thickness of the connective tissue capsule, and vascularity. A slight reaction was indicated when only a sparse number of inflammatory cells were detected, a slight vascular reaction, and the capsule thickness at the tube opening was similar to that along the sides of the tubes. For our purposes a count of one (1) was assigned to this category.

A moderate reaction exhibited a distinctly greater inflammatory reaction, and increased vascularity in the loose connective tissue at the tube opening, as well as a capsule, more distinct than that along the sides of the tubes. This category was assigned a count of two (2).

A severe reaction with a dense infiltration of inflammatory cells, as well as an excessive vascular response was found, even some distance from the tube opening. The capsule in this area was often thicker, but also more difficult to detect due to the profound inflammatory cell infiltration. A count of three (3) was assigned to this category.

As all materials appeared to exhibit some reaction at the tube opening, the category of no reaction, as used by Haugen and Mjör,[29] was eliminated.

Evaluations were made according to all three scoring systems, on at least four, but no more than ten sections, for each implant. The mean value for each implant was then determined. All evaluations for the HM system were performed under 25 × magnification, using a Carl Zeiss Binocular Photo Microscope.§

* Coe Laboratories, Chicago, IL.
† Professional Products Company, San Diego, CA.
‡ Cadco Dental Products, Los Angeles, CA.

§ Obekochen, West Germany.

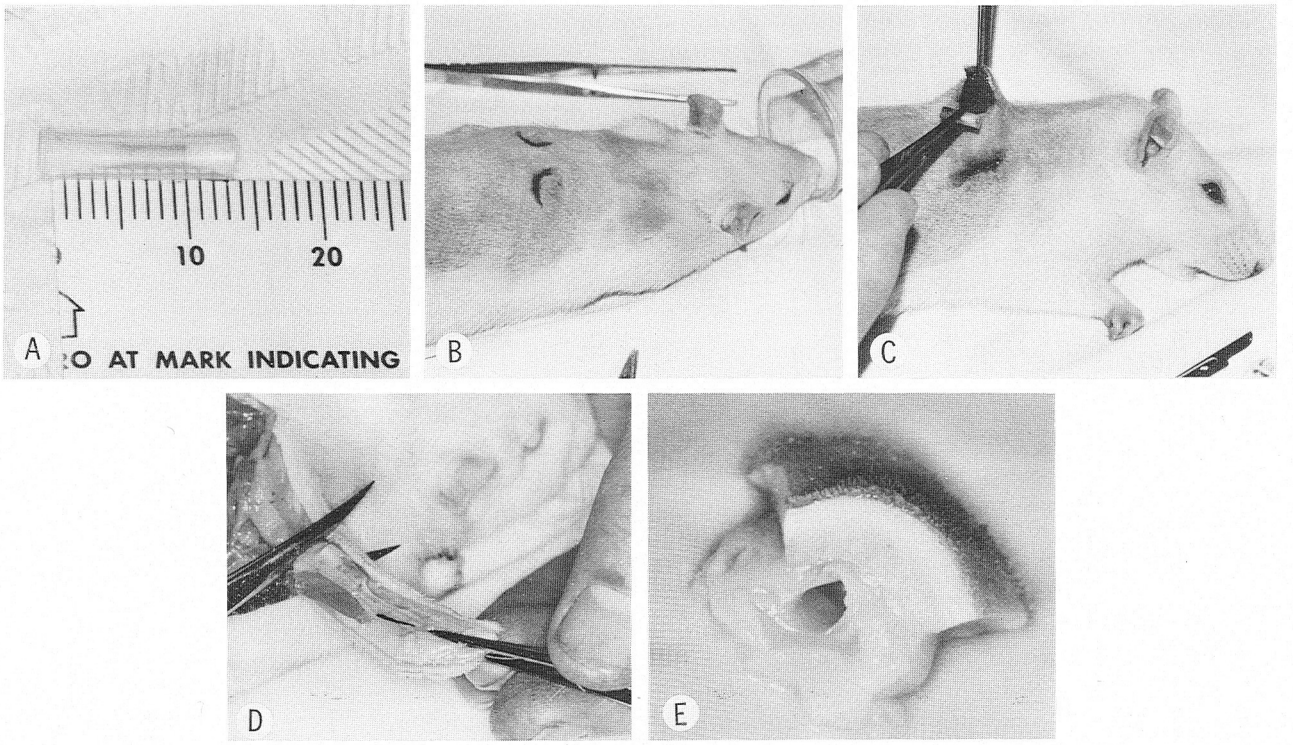


Figure 1. *Steps in the clinical procedure:* **A.** *Dimension of tube in millimeters prior to implantation. Tube contains the Teflon Control.* **B.** *Semilunar incision sites prior to implantation.* **C.** *Method of tube placement through semilunar incisions.* **D.** *Retrieval of tube with surrounding tissues. India Ink stain for orientation.* **E.** *Cross section of surrounding tissue with tube removed indicating an encapsulated space.*

Cell Counting System

The cell counting system used in this study, referred to as the Inflammatory Index (I.I.), was used to determine the total number of inflammatory cells in a designated microscopic field. This was equivalent to the total area of the field of view on the Zeiss Binocular Photo Microscope. This field represented at 100 × magnification, a rectangle of 100 × 69 μm, which when corrected for the 8× ocular, resulted in a field of 5520 μm.

The zone to be counted was determined by placing the field along the edge of the reaction area, adjacent to the tube opening at its mid-point (Fig. 2). This projected the field of view over the midmost part of the reaction area. Within the field of view, all inflammatory cells were counted and the numbers recorded using a Veeder hand tally counter.* Up to ten sections were counted for each implant, and the mean value for the individual implant determined.

Reaction Spread

The third scoring system used was referred to as the Reaction Spread Index (RSI). This was designed to measure the relative size or depth of the area of reaction adjacent to the test material, and intended to provide a more objective manner of evaluation, based upon the overall response.

A Filar Micrometer Eyepiece† which was attached to the Zeiss Photo Microscope, was used for the measuring procedures. This device has a numbered lined stage with a fine movable measuring line, controlled by a screw knob. The fine measuring line (FML) can be moved through the field, and is parallel to the numbered equidistant stage lines. This instrument allows readings to 0.01 mm, and estimates to 0.001 mm between the numbered lines.

Due to mechanical requirements of the lens, the manufacturer suggested that a calibration factor (CF) be determined for each magnification used. This was accomplished using a stage micrometer‡ as per manufacturers instructions. For the 10 × magnification used for viewing, the CF was calculated to be 0.0101 mm.

To record the data, the approximate midpoint of the area was determined along the tube opening-reaction surface interface. At this point, the micrometer stage was aligned so that one of the numbered lines was parallel to, and directly adjacent to the interface. The main fixed line, which runs the length of the field and is perpendicular to the numbered lines, was positioned so that it bisected the reaction area. To begin measuring, the FML was placed atop the line at, and parallel to the interface, and moved over the reaction area until it reached a point of no observable reaction along the main field bisecting line (Fig. 3). The total distance of the spread of the reaction was determined by counting how many numbered line divisions were passed, as well as reading the

* Veeder Root Vue, Hartford, CT.
† Kellner Type, Bausch & Lombe Co.
‡ Max Levy Co.

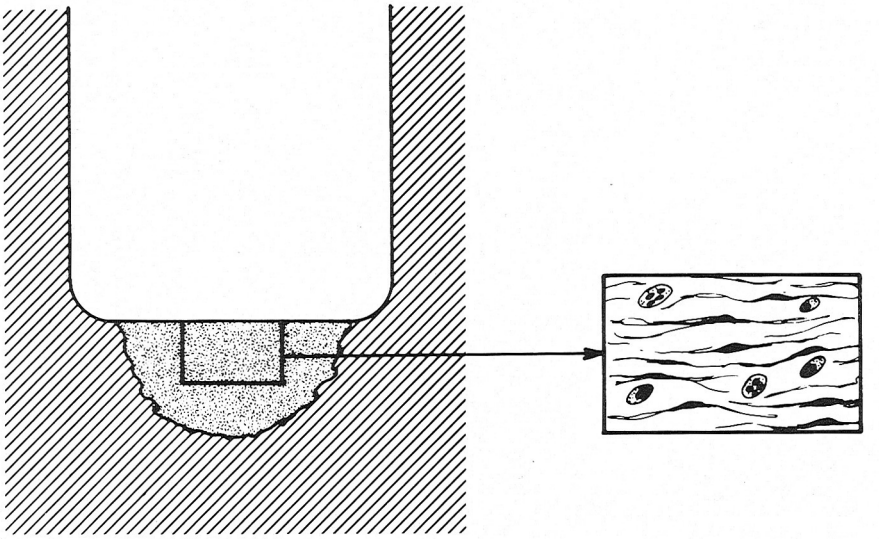


Figure 2. *Area utilized for determination of Inflammatory Index (I.I.).*

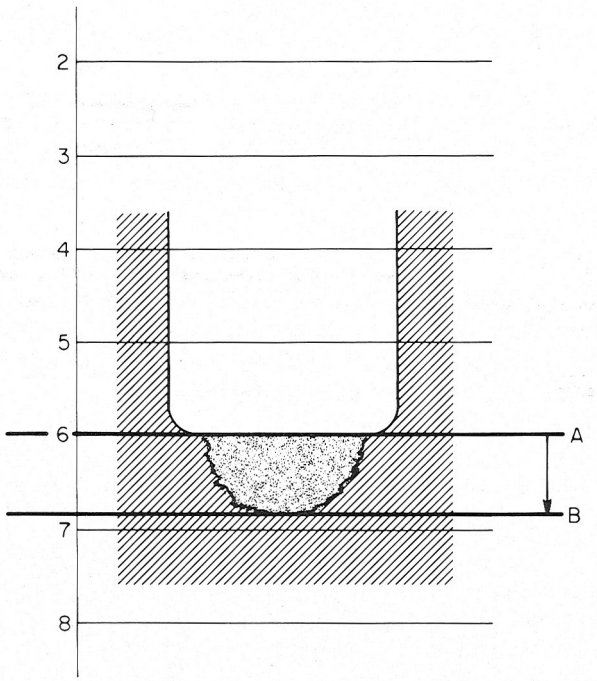


Figure 3. *View through microscope with Filar Micrometer Eyepiece attached showing method of determination of Reaction Spread Index (R.S.I.). Line* **A** *to* **B** *indicates distance fine measuring line (FML) has passed in measuring extent of reaction area.*

gauge on the screw knob. This measurement was recorded for each histological section. The mean of the sections for each implant was determined, to provide a reaction spread value for each implant recovered.

Statistical analysis of the data was carried out utilizing the Chi-Square Test, and Analysis of Variance.

RESULTS

Haugen Mjör Scoring System

Table 2 shows the results of the Chi-Square Test evaluating the Haugen Mjör Scoring Index. It shows

Table 2
Tissue Reaction According to the Haugen Mjör Scoring System
Frequency and Row Percent Table, Chi-Square Analysis

	Inflammatory Reaction							
Dressing	Slight		Moderate		Severe		Total	
	#	%	#	%	#	%	#	%
CP	2	(8.3)	21	(87.5)	1	(4.2)	24	(100)
PPC	0	(0.0)	1	(4.2)	23	(95.8)	24	(100)
PP	3	(12.5)	21	(87.5)	0	(0.0)	24	(100)
TC	13	(81.3)	3	(18.8)	0	(0.0)	16	(100)
TOTAL	18	(20.0)	46	(53.0)	24	(27.0)	88	(100)

Chi-Square = 118.719
D.F. = 6
P = 0.0000

there is a significant difference between the test materials, as to the type of inflammatory reaction they tend to produce.

The PPC elicited a severe reaction in 95.8% of the implants, and produced no reactions that were only slight in nature. This dressing produced by far, the largest number of implants in the severe reaction category. The CP elicited a moderate reaction in 87.5% of the implants. Some variability in tissue response with this dressing is evident as both slight (8.3%) and severe reactions (4.2%) were also elicited. The Teflon control (TC) produced slight reactions in 81.3% of the implants, with the remaining reactions, 18.8%, in the moderate category. This control material, produced the greatest number of implants, by far with only a slight reaction, and no severe reactions. The test dressing PP, produced a moderate reaction in 87.5% of the implants, being very similar to the results obtained with CP. There was less variability

with the PP, however, as all the remaining implants (12.5%) elicited only a slight reaction. The PP also yielded results similar to the control, in that no severe reactions were produced.

A connective tissue capsule formed along the sides of all the tubes, regardless of the type of dressing implanted. The capsule was well demarcated, with a very minimal if any inflammatory infiltrate (Fig. 4). The width of the capsule was slightly less when the tube was observed to have been implanted within adipose tissue. Figure 4 shows typical histological reactions observed with the different implants.

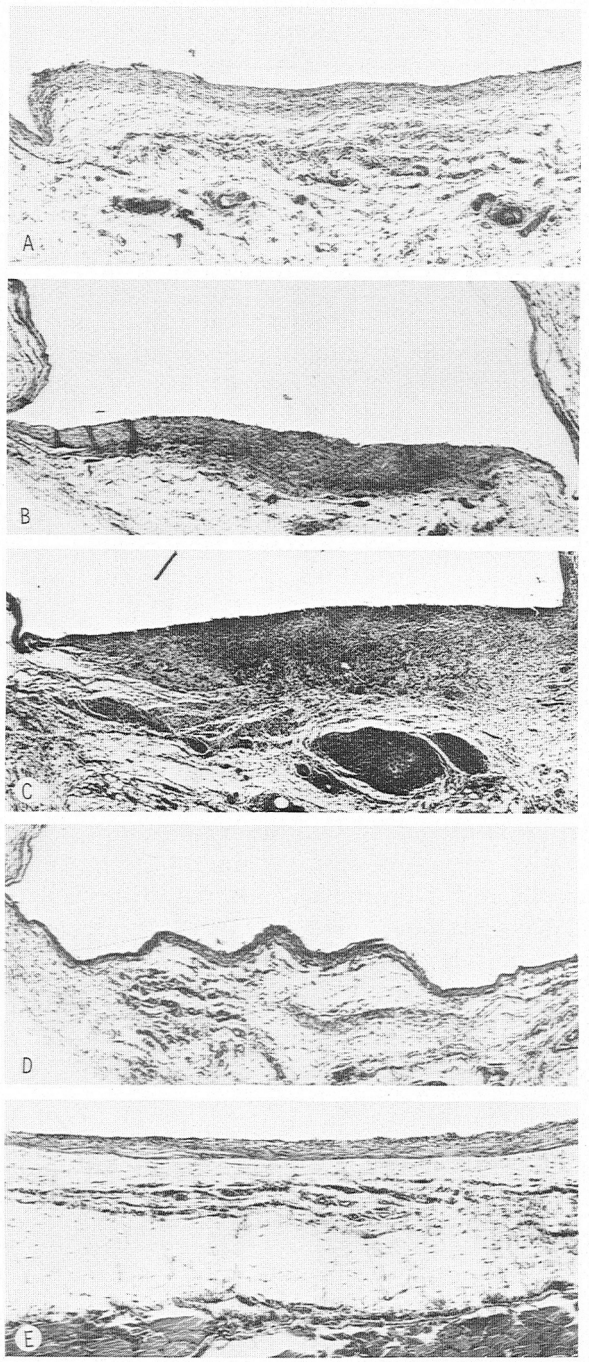


Figure 4A. *Slight tissue reaction. Perio Putty Dressing. Slight inflammatory cell infiltrate is seen associated with connective tissue cells, which are arranged parallel to the tube opening, forming an apparent "pseudo capsule." A similar reaction is seen along the side of the tube (Magnification, × 25).* **B.** *Moderate tissue reaction. Coe-Pak Dressing. Moderate acute inflammatory infiltrate invading the connective tissues adjacent to the tube opening. The connective tissue cells are unidentifiable due to the inflammatory infiltrate, represented mainly by PMN's. Minimal vascular dilation is also evident. This reaction is totally different from that observed alongside the tube (Magnification, × 25).* **C.** *Severe tissue reaction. PPC Dressing. The severity and spread of the reaction is more significant than that observed in Figure 2b. Severe acute inflammation is seen, with PMN's and dilated and engorged blood vessels, intermingled with the connective tissue cells that are bordering the opening of the tube. Although the spread of the inflammatory reaction is severe, the tissue compatibility alongside the tube is similar to that observed with other implants (Magnification, × 25).* **D.** *Slight reaction to Teflon Control material at end of tube showing very minimal inflammatory infiltrate and a connective tissue response not much different from that along the sides of the capsule.* **E.** *Top of the photomicrograph, shows minimal inflammatory response and a well defined connective tissue capsule which compares to the middle third area alongside the tube.*

Inflammatory Index

Table 3 shows the results of the analysis of variance comparing the Inflammatory Indices obtained for the four experimental groups. A statistically significant difference among the four materials tested at the 95% confidence level ($P < 0.05$) is evident.

Scheffe's method of multiple comparisons was used to test each of the pairwise differences in the Inflammatory Indices at the 5% level of significance. The difference in

Table 3
Comparison of Inflammatory Indices for Different Periodontal Dressings by Analysis of Variance

Dressing	N	Mean	STD Dev
CP	24	23.513	8.9756
PPC	24	63.222	13.106
PP	24	26.147	11.586
TC	16	12.694	2.3420
Grand	88	33.094	21.650

P = 0.0000

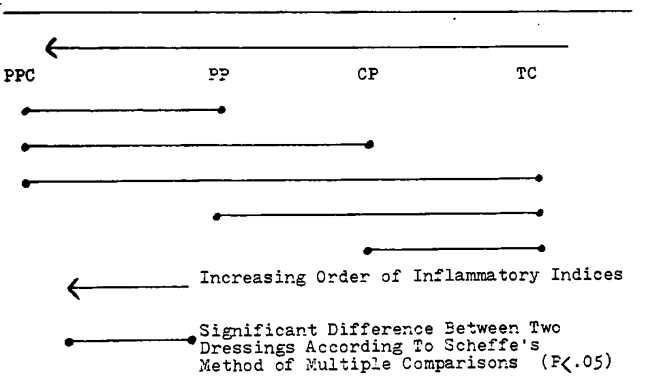
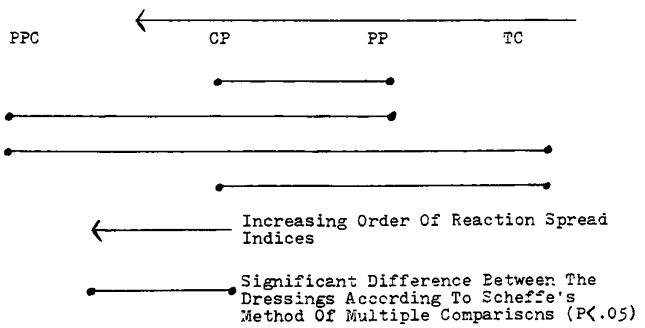


Table 4
Comparison of Reaction Spread Indices for Different Periodontal Dressings by Analysis of Variance

Dressing	N	Mean	STD Dev
CP	24	4.2392	2.2257
PPC	24	4.7150	2.0061
PP	24	2.0462	1.0977
TC	15	1.0273	.34522
Grand	87	3.2117	2.2089

P = 0.0000



reaction observed between CP and PP is not statistically significant. However, the difference is significant between PP, and PPC, as well as between PP and the TC. CP also differs significantly from PPC. Both PPC and CP also differ significantly from the reaction observed with the control. Therefore, both CP and PP elicit similar reactions according to the Inflammatory Index scoring system. However, the control material differs significantly from all three dressings tested.

Reaction Spread Index

Table 4 shows the results of the analysis of variance comparing the mean values obtained with the Reaction Spread Index for the four experimental groups. A statistically significant difference was found at the 95% confidence level ($P < 0.05$).

Scheffe's method of multiple comparisons showed that the difference in reaction spread into the tissue between PP and CP, and PP and PPC was statistically significant, with PP eliciting a more favorable response. The TC produced the most favorable reaction of all four materials. Both CP and PPC elicited similar extensive reactions, and these differed significantly from those produced by the TC. There was no significant difference between the responses produced by PP and the TC. Therefore, when the Reaction Spread Index was used for evaluation, PP produced more favorable responses than either the CP or the PPC. The response from PP was so mild, that a significant difference could not be determined between it and the TC, which produced the mildest reaction.

DISCUSSION

Surgical techniques in periodontics have been developed stressing careful attention to detail, and meticulous handling and placement of soft tissues. Stimulation of an inflammatory reaction is the normal anticipated sequella following such procedures. However, the effect of periodontal dressings on tissues undergoing healing is still uncertain. Although Bernier and Kaplan[2] concluded that the use of a dressing following periodontal surgery facilitated healing, the majority of the few human studies published generally agree that the use of a dressing does not influence the healing processes.[3, 4, 6, 30, 31] These data seem to support the current concept that a dressing functions primarily by assisting healing indirectly, through protection of the wound from further injury, and secondarily, by providing patient comfort.[19, 26, 28, 32] There is a lack of conclusive evidence in the literature that periodontal dressings exert a positive effect on the dynamics of healing following periodontal surgery. A greater amount of attention apparently has been directed towards the potential detrimental effects of such materials.

Currently, periodontal dressings appear to be classified into two general categories, those containing eugenol, and those without eugenol. Dressings containing eugenol have been reported to cause the greatest amount of tissue destruction,[15, 33–38] although other investigators have reported conflicting results.[39–41]

Part of this variability in results may have originated in the preparation of the materials themselves, or in the design of the experiment. This study used carefully weighed out duplicate amounts of all materials, since Milanezi et al.[42] reported that an increase in the liquid portion of a eugenol dressing produced a corresponding increase in the intensity of the inflammatory reaction. Likewise, meticulous care was given to obtain an exact exposure area of the dressing material to the connective tissue, as well as to the placement of the tubes themselves, and the complete suturing of the entrance wounds. These factors may all have allowed for rapid healing of the incision site, while minimizing the influence of surgical trauma on the results.[39, 43–45] These factors may also have resulted in the ability to distinguish definite differences between the responses to the test materials, observable at the reaction sites after a 14-day implantation period. These findings do not support the conclusion of Haugen and Mjör[29] that short term implantation studies do not allow for a fine distinction between responses to subcutaneously implanted materials. In fact, because of the definite differences found, the rationale for doing a 10 day or even a 7 day implant study seems well substantiated. A 7 day implant study would provide a closer correlation to the effects expected during routine clinical application of such dressings.

This study was designed to evaluate the inflammatory reaction following subcutaneous implantation of perio-

dontal dressings using three different parameters, so as to provide a more thorough data evaluation than has been reported previously. The results of this tend to confirm that a eugenol containing periodontal dressing (PPC), is capable of producing far greater tissue destruction, with greater inflammatory cell infiltration and connective tissue response, involving a much wider reaction area in the adjacent tissues, than either of the two non-eugenol dressings (Coe-Pak or Perio Putty) tested.

However, a question still remaining following this study and those of Haugen and Mjör[29] and Roydhouse[38] is whether the observed reactions are due to an initial strong reaction, followed by a relatively innocuous state, or whether they are due to a continually irritating effect. Haugen and Hensten-Pettersen[34] reported some variability with time, in cytotoxicity of periodontal dressings, and this seems to be affected by the solubility of the leachable toxic substances. A eugenol dressing was reported low in solubility of its toxic substances, while a non-eugenol type displayed a higher solubility rate, which may explain some difference in the spread of the response, yet both eventually produced similar cytotoxic results.[34] The present results did not however, confirm this assumption, since the reaction spread found was more severe with PPC than with the non-eugenol dressings. Nevertheless, no significant difference was found with Coe-Pak. Molnar[22] has reported free eugenol to always be present even in small amounts in zinc oxide eugenol compounds. Kozam and Mantell[10] showed that a topical application of free eugenol to rat mucosa caused tissue destruction including epithelial degeneration and necrosis within 15 minutes to 6 hours. In the present study it was impossible to evaluate this initial response since all specimens were retrieved at 14 days. Evidence seems to support the theory of a strong initial inflammatory reaction, at least with dressings containing eugenol. Therefore, while the longevity of any type of periodontal dressing adjacent to healing tissues may eventually result in similar harmful responses, our results indicate long observation periods are not essential, and even shorter implantation periods with careful and standardized techniques may be quite practical. This may depend on the particular materials tested, as well as on the use of an adequate control.

The results further suggest that Perio Putty compares very favorably with the commonly used dressing, Coe-Pak. In fact, it always produced responses similar to, or of less severity than Coe-Pak. A wide margin of difference existed between Perio Putty and the eugenol-containing dressing (PPC). It produced far less severe reactions in all three parameters tested, suggesting it was a significantly less irritating product to connective tissues. The clinical significance of these results are still uncertain. However, this may be of greater importance depending on the type of surgery utilized, such as gingivectomy, gingivoplasty, or mucogingival corrective procedures, where the dressing may come into intimate contact with exposed connective tissues, as opposed to more conservative procedures, such as the modified Widman flap operation. While some have indicated the choice of dressings may be left to the operator,[4, 46] the large differences in results found in this study are difficult to ignore.

While manufacturers are reluctant to divulge information regarding exact product content, Perio Putty is known to contain no eugenol, to have a reported low water solubility, and also to contain povidone-iodine.[47] The latter ingredient has been reported to have prolonged germicidal action,[48, 49] as well as minimal risk of sensitization, and irritation.[48] Other investigators have reported on the value of povidone-iodine as an antimicrobial agent,[50, 51, 58] although some controversy regarding its true efficacy exists.[52–54] Without a proper control to test the effects of the dressing with or without povidone-iodine, the value of the povidone-iodine alone, could not be conclusively established from this investigation. However, bacterial growth has been reported under periodontal dressings,[46, 55, 56] and clinically, part of the action of povidone-iodine in the dressing may be similar to that of chlorhexidine. Plüss[57] reported significantly less plaque formed under periodontal packs with chlorhexidine powder, than in those controls without it, and recommended its use for the reduction of microbial plaque. Such a reduction may also be advantageous since less interference with the healing processes from bacterial activity may occur.

The results of this investigation also definitely indicated a fairly constant order of decreasing severity in the inflammatory reaction produced by the dressings, beginning with PPC followed by Coe-Pak and Perio Putty. This order of decreasing severity was the same for all three scoring systems utilized. Consequently, although this study provided a much wider range of evaluation, than previously reported, all the data tended to correlate with the overall results. However, it must be emphasized that this study was performed in a closed, bacterial free environment. As a consequence, the results are not fully applicable to a clinical situation in the presence of bacterial plaque.

Some variations in the inflammatory reactions were observed with each of the three dressings used, and these were unpredictable. This emphasized the importance of utilizing a large enough sample size (twenty-four for each dressing in this study), so that the effect of the variability on the overall results is minimized. The relative magnitude of variation, however, tended to follow the same order of decreasing severity as previously mentioned.

In evaluating the Teflon control variation (81.2% slight, and 18.8% moderate) consideration was given to the possibility of the effect of the dressing in the opposite end of the tube. No consistent pattern of inflammatory

reaction could be established, as a moderate reaction score was found when the Teflon was implanted with each of the three dressings tested. Likewise, in the animal in which the Teflon control was placed in all four of the tube ends, a similar slight inflammatory reaction was observed for each response. This supported the value of Teflon as a suitable control material. However, the moderate response found in some of the implants with the Teflon could not be attributed to one particular dressing. Therefore, the differences observed might be due to some other factor, such as individual host response variation. This suggests that while a certain type of tissue reaction to each of the three dressings tested can be expected, variations may occur. It emphasises the importance of not leaving any type of periodontal dressing over operated areas for needlessly extended time periods.

The fact that different investigators have reported conflicting results in comparing periodontal dressings has done little to resolve the controversy surrounding their use. In their recent review article, Watts and Combe[23] concluded that there is a definite place for periodontal dressings, but that further knowledge is required to enable development of optimal properties in such materials. While many feel periodontal dressings may do little to promote healing directly, the potential detrimental effects of such present or future materials should be considered, and thoroughly evaluated. This project has attempted to provide a method of evaluation, utilizing adequate controls, standardized techniques, and a more encompassing range of easily applied assessments, than previously reported.

CONCLUSIONS

Within the limits of the investigation, the following conclusions were made:

1. Perio Putty gave a more favorable response than either Coe-Pak or PPC with regards to spread and severity of the inflammatory reaction elicited by a 14 day implantation of the materials into rat connective tissue.

2. The eugenol-containing periodontal dressing, PPC, produced the most severe inflammatory reactions according to three different scoring systems.

3. Coe-Pak generally produced less severe inflammatory reactions than PPC according to the same three scoring systems.

4. The variability in the severity of the reaction to all three dressings was unpredictable, but was always greatest with PPC, and least with Perio Putty.

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4TH ANNUAL FOOD, NUTRITION AND HEALTH CONFERENCE

DATE: October 1–3, 1980

PLACE: American Dental Association Headquarters, Chicago, Illinois

TOPICS: Among topics to be discussed at the two-day conference will be models for cariogenicity testing, epidemiology of dietary habits and dental disease, and behavioral technologies for dietary and dental health modification.

SPEAKERS: Speakers will include Dr. Dorothy Geddes of University of Glasgow, Scotland, who will discuss research relating clinical indices of dental disease with dental plaque characteristics including acidity, and Dr. Robert Glass of the Forsyth Dental Center, Boston, who will discuss secular trends in dental caries.

For further information: Contact Miss Joan Sayers at the ADA, 211 East Chicago Avenue, Chicago, Illinois 60611; Telephone: (312)440-2530.