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# Effect of Baking Soda-Peroxide Dentifrice on Post-Surgical Wound Healing

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# Effect of a baking soda-peroxide dentifrice on post-surgical wound healing

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**ABSTRACT:** *Purpose:* To investigate the effect of a baking soda-hydrogen peroxide (0.75%) dentifrice on wound healing, plaque formation, gingival inflammation, wound healing, patient comfort, probing depth, and clinical attachment level following gingival flap surgery. *Materials and Methods:* A randomized, double-blind crossover study involving 25 patients requiring bilateral maxillary gingival flap surgery was completed. The effects of twice daily brushing with a baking soda-hydrogen peroxide dentifrice (Mentadent) or a placebo dentifrice (Crest) were observed over a 28-day post-surgical period. Gingival index (GI), plaque index (PI), probing depth (PD), clinical attachment level (CAL) and gingival bleeding index (BI) were recorded pre-surgically and at day 28 for each surgical sextant. At days 7 and 14, soft tissue appearance/wound healing (STA) was assessed based on color and edema, PI's were determined and patient comfort was ascertained by report. *Results:* Post-surgical wound healing was statistically significantly improved at day 7 with the trend continuing to day 14 when Mentadent dentifrice was used as compared to Crest dentifrice. However, there was no statistical difference in the PI values between the test and control dentifrice throughout the study. Use of Mentadent may be an effective aid in the early phase of healing following gingival flap surgery. (*Am J Dent* 1995; 8: 125-127).

**CLINICAL SIGNIFICANCE:** Use of Mentadent dentifrice may be an effective aid in the early phase of healing following gingival flap surgery.

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## Introduction

Several studies have shown that optimal plaque control for the first few weeks following gingival surgery dramatically enhances wound healing and clinical results.<sup>1-3</sup>

Antibacterials have been shown to reduce plaque formation, oral debris and inflammation, as well as to improve healing and patient comfort when used after gingival surgery.<sup>4-6</sup> Some of these agents, including peroxides, have been shown in several clinical studies to reduce plaque formation and gingival inflammation when used alone or as an adjunct to other oral hygiene procedures.<sup>7-9</sup> Similarly, several authors have noted that tissues do as well or better, without standard periodontal dressings following surgery.<sup>10-11</sup> When dressings are not used, however, manual oral hygiene during this immediate post-surgical period may be difficult and painful, thereby jeopardizing the clinical result.

In this regard, an effective antimicrobial dentifrice used during the initial post-surgical healing period may provide some clinical benefit. The objective of this study was to evaluate the effect of a baking soda-hydrogen peroxide (0.75%) dentifrice on wound healing, plaque formation and patient comfort following gingival flap surgery.

## Materials and Methods

This double blind study utilized a crossover design to assess the post-surgical wound healing, plaque formation and patient comfort associated with a fluoride-containing baking-soda-hydrogen peroxide antiseptic dentifrice (Mentadent<sup>a</sup>)

versus a placebo dentifrice (Crest<sup>b</sup>). To qualify, subjects had to be healthy adults (27-71 years; mean age 43.7 years) not taking systemic medications (*e.g.* NSAID's, antibiotics) which are known to affect or alter the parameters under investigation. Informed consent was obtained from 26 healthy patients (12 male and 14 female) requiring periodontal flap surgery in both maxillary posterior sextants with a minimum of three adjacent teeth, and where the surgical treatment in both sextants was similar. All subjects qualifying for the study had to undergo pre-surgical preparations consisting of oral hygiene instruction, prophylaxis, and bilateral scaling and root planing. The surgical procedure used was a modified Widman flap with a major goal of primary wound closure and flap margin contact with the tooth post-surgically.<sup>12</sup>

If necessary, acetaminophen with 1/2 gm of codeine was prescribed as an analgesic (unless contraindicated). A diary of analgesic use, including evaluation of pain and frequency of use, was kept by each subject. Mentadent (a 0.75% baking soda-hydrogen peroxide dentifrice) or Crest control dentifrice were supplied to patients for unsupervised home use. Each subject was also given a soft nylon toothbrush to use for a period of 28 days following each surgical procedure, and the dentifrices were dispensed at this time in coded tubes by the project coordinator, who was not involved with the evaluations. The investigation was designed with at least a 2-week washout period between the first and second surgical procedure in each patient. Two periodontists were calibrated to the indices being used in the study, as well as the surgical approach prior to the start of the study, and each examiner scored the indices and performed surgery on the same sub-

jects throughout the study. Each surgitized segment was selected by a predetermined, randomized code as active or placebo dentifrice.

Clinical measurements of the GI, PI, PD, CAL and BI were obtained by the examiner in the sextant immediately prior to surgery and at 28 days after surgery. Gingivitis was scored using the Loe-Silness gingival index for each involved tooth.<sup>13</sup> Plaque area was scored pre-surgically at 7, 14 and 28 days by the Silness-Loe index.<sup>13</sup> These measurements were made at each examination since excess plaque formation can delay wound healing or cause wound infection. PD and CAL measurements were made at six points around each tooth. Gingival bleeding on probing was determined as previously described.<sup>14</sup> Soft tissue appearance, *i.e.* wound healing, was evaluated, rather than GI, at the first two post-operative visits (7 and 14 days) by color [pink (0), mixed (1) or red (2)] and by edema [normal (0), mild (1), moderate to severe (2)].<sup>5</sup> Patient assessment of pain/discomfort was also ascertained at days 7 and 14 post-surgically and recorded as none (0), mild (1), moderate (2) or severe (3).<sup>5</sup> The order of examination was always soft tissue appearance or GI, PI, PD, CAL, BI and patient discomfort.

The assigned dentifrice and toothbrush was to be used twice daily for 2 minutes each time starting the day following surgery, except during the washout period where the patient was instructed to return to using their own commercially available dentifrice and brush. At 7 days, the sutures were removed and the surgical area gently lavaged with water, prior to the evaluation by the study examiner. Patients continued routine oral hygiene procedures including brushing with the assigned dentifrice for another 21 days.

At the time of the second surgical procedure, all measurements were performed in the surgical sextant as described at the initiation of the study. Additionally, at the end of the study, patients were asked to indicate their dentifrice preference.

## Results

Twenty-five subjects completed this double-blind cross-over study. Data from one subject was not available since the subject could not keep all scheduled evaluation appointments. The results of this study are presented in Tables 1-4 for each examination period. The baseline data in Table 1 confirm that the two dentifrice groups were evenly matched at the start of the study with regard to the clinical parameters being measured, with no significant differences in the GI, PI, PD, CAL or BI. One week post-surgically there was a significant difference in soft tissue appearance as measured by color (Table 2) with the surgical site cleaned with Mentadent showing less redness (0.36 vs. 0.76, paired *t*-test;  $P=0.05$ ). This was consistent with the finding that soft tissue appearance as measured by edema also favored Mentadent, but this reached statistical significance only at the  $P=0.10$  level. On average, patients reported mild pain 1 week post-surgically regardless of the dentifrice used. The difference in gingival color was less marked by day 14 (Table 3), but the Mentadent quadrant still showed a more favorable healing response in this regard (0.29 vs. 0.40). The edema and PI

Table 1. Clinical parameters measured pre-surgically (n=25).

Parameter	Crest dentifrice	Mentadent dentifrice
PI	0.99 (0.45)	0.95 (0.34)
GI	1.18 (0.37)	1.17 (0.39)
BI	0.84 (0.61)	0.80 (0.60)
PD	3.64 (0.82)	3.66 (0.57)
AL	3.84 (0.95)	3.94 (0.74)

Numbers represent mean values (standard deviation).

Table 2. Clinical parameters measured 7 days post-surgically (n=25).

Parameter	Crest dentifrice	Mentadent dentifrice
PI	0.71 (0.49)	0.67 (0.47)
Color	0.76 (0.52)	0.36 (0.57)*
Edema	1.16 (0.69)	0.96 (0.54)**
Pain	1.19 (1.15)	1.12 (0.88)

Numbers represent mean values (standard deviation).

\* Significant at the  $P=0.05$  level, paired *t*-test.

\*\* Significant at the  $P=0.10$  level, paired *t*-test.

Table 3. Clinical parameters measured 14 days post-surgically (n=25).

Parameter	Crest dentifrice	Mentadent dentifrice
PI	0.52 (0.39)	0.50 (0.42)
Color	0.40 (0.50)	0.29 (0.46)
Edema	0.64 (0.70)	0.60 (0.53)
Pain	0.10 (0.32)	0.08 (0.29)

Numbers represent mean values (standard deviation).

Table 4. Clinical parameters measured 28 days post-surgically (n=25).

Parameter	Crest dentifrice	Mentadent dentifrice
PI	0.67 (0.46)	0.62 (0.44)
GI	0.99 (0.59)	0.80 (0.50)
BI	0.82 (0.63)	0.74 (0.63)
PD change	-1.04 (0.80)	-1.11 (0.63)
AL gain	0.64 (0.81)	0.51 (0.81)

Numbers represent mean values (standard deviation).

assessments at this time were nearly equivalent and patients were reporting little to no pain. Table 4 shows that at day 28 there were no significant differences in the measured parameters, however, the GI score did favor Mentadent when compared to the placebo dentifrice (0.80 vs. 0.99). At the end of the study patients were asked to indicate their dentifrice preference and 75% of the participants preferred Mentadent over the placebo.

## Discussion

During the initial week following periodontal surgery, patient oral hygiene is important for proper healing and an optimal clinical result. In cases where primary wound closure is achieved at the completion of surgery, periodontists may choose to bypass the use of a periodontal dressing, because patients do as well or better without such a post-surgical dressing. For these patients, manual oral hygiene during this immediate post-operative period may be difficult, and painful, thereby jeopardizing the clinical result. In these cases, an antiseptic dentifrice which can retard plaque formation and/or enhance patient compliance with post-surgical

oral hygiene measures would certainly benefit the patient and clinician during the early stage of wound healing.

Results of this study showed a clinical reduction in supragingival plaque and gingival edema, as well as a statistically significant reduction in gingival redness during the first week after surgery when patients brushed for 2 minutes twice daily with Mentadent as opposed to the conventional fluoride dentifrice. Early wound healing, as assessed by the soft tissue appearance, consistently favored the Mentadent quadrant, and this tendency carried over through day 28 where the Mentadent quadrant showed a reduced GI. The use of this fluoride containing baking soda-hydrogen peroxide dentifrice was preferred for brushing over the placebo dentifrice by 75% of the subjects in this study, and the improvements seen in the clinical parameters during the initial phase of wound healing may be attributable to the antiseptic properties of the dentifrice, better patient compliance or a combination of these two factors.

Although previous studies have reported a decrease in plaque formation with the use of antimicrobials post-surgically when compared to placebo, no significant difference in PI was observed in this study. This may be partly due to the low concentration of the antimicrobial, the low starting values for the PI's, the index used, and/or the study design which, as expected, noted the PI values drop steadily over the first 14 days as the patients' ability to carry out oral hygiene procedures improved. At the 28-day time point, similar probing depth reduction (-1.04 mm vs. -1.11 mm) and gain in clinical attachment level (0.64 mm vs. 0.51 mm) was seen in control and test dentifrice groups, respectively. These findings indicate that neither dentifrice had adverse effects on these parameters.

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