

Short Term Results of Three Modalities of Periodontal Treatment*

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IN THE EVALUATION of different treatment modalities for chronic, inflammatory periodontal disease, by far the most important criteria of success are elimination of the disease and preservation of the teeth. Long term data regarding the fate of the teeth of treated patients thus constitute the most reliable index for therapeutic effectiveness. Claim of short term success however, is widely based on elimination of inflammation and periodontal pockets. Another parameter, though seldom reported, involves the change (gain or loss) in attachment level¹ coincident with, or after treatment.

The purpose of this study is to examine the short term (4–6 weeks) results of three common types of periodontal therapy as to percentage of pocket elimination, pocket depth reduction, and change in attachment levels. The present report represents a part of an ongoing, longitudinal study of periodontal therapy being done at The University of Michigan.^{2–5}

REVIEW OF LITERATURE

Short term pocket reduction may be achieved by a wide variety of treatment modalities including subgingival curettage,^{6–8} gingivectomy^{7, 8, 10, 11} interdental resection,⁶ reverse bevel flap procedure with lingual gingivectomy,^{9, 12} and reverse bevel flap procedure with or without osseous contouring.¹³ When procedures have been compared, interdental resection following subgingival curettage resulted in more pocket reduction than subgingival curettage alone,⁶ and gingivectomy reduced pocket depths more than subgingival curettage.^{7, 8} Reverse bevel flap procedures reduced mean pocket depth similarly with or without osseous surgery.¹³

When changes in attachment levels were considered, a significant apical shift of the attachment occurred

following reverse bevel flap procedures with and without osseous contouring.¹³ A significant amount of bone loss as measured at reentry occurred following reverse bevel flap procedure.^{9, 13}

METHODS

The complete experimental methodology for the Michigan studies has been published previously^{3, 4} and will be mentioned only briefly. All patients underwent an initial oral examination, complete radiographic examination, and scoring of the periodontal status. The most important part of the scoring insofar as the present paper is concerned, is accurate determination of pocket depth and of the distance from the cemento-enamel junction to the attachment as registered by a thin, calibrated probe. Repeated calibration tests have verified that the differences within and between the examiners in measuring pockets and attachment levels would not influence the results significantly. The standard error at a recent calibration test was 0.035 mm to 0.06 mm for pockets and 0.04 mm to 0.07 mm for attachment levels.

After presurgical mouth preparation including scaling, root planing, instructions in oral hygiene, and occlusal adjustment, each half of the patient's dentition (separated vertically by the midline) was assigned on a random number basis to one of three treatment modalities. The three treatment modalities were:

1. *Subgingival Curettage (SGC)* in which the teeth were meticulously planed to a smooth, hard surface, and the lining of each pocket was thoroughly curetted to eliminate chronic inflammatory tissue and all of the crevicular epithelium. Care was taken to maintain the buccolingual continuity of the interproximal tissue. However, when this was not possible because of soft tissue craters or very narrow interproximal spaces, sutures were used to approximate the buccal and lingual portions of the papilla after the curettage.

2. *Pocket Elimination Surgery (PES)* including reverse bevel flap procedures with bone contouring and apical positioning or gingivectomy when no bone removal was needed for pocket elimination and ample attached gingiva was present. Again, careful thorough root planing was done. Of the 108 quadrants treated by pocket elimination surgery, 78 received reverse bevel flap procedures and osseous surgery, 13 were done with a combination of reverse bevel flap procedures and gingivectomy, and 17 were done with gingivectomy only.

3. *Modified Widman Flap Surgery (MWF)*¹⁴ which is a reverse bevel flap procedure without intentional apical positioning of the flaps, and essentially without bone removal. Meticulous root planing was carried out prior to suturing.

Periodontal dressings were used for 1 to 2 weeks following each surgical procedure.

Four to 6 weeks following completion of periodontal

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treatment, rescoring was done by the original examiner. Previous scores were not available for the examiner to see at the reexamination. The patients being reported here included all patients treated between, 1967, when the short term reexamination was introduced, and 1972.

RESULTS

Data from 74 patients (40 males and 34 females) with an average age of 41 years are included in this report. Initially the patients had an average interproximal pocket depth of 3.9 mm and an average interproximal loss of attachment of 3.2 mm. There were no significant differences between the three treatment groups as to any of the experimental variables before treatment. The number of patients in each treatment group were respectively, 44 with subgingival curettage, 54 with pocket elimination surgery, and 50 with the modified Widman flap procedure.

Percentage of Pocket Elimination

Mean pocket depths fail to relate the fate of individual pockets of various depths. Tables, I, II and III give the individual initial and resultant pocket measurements using a depth of 4 mm or more to indicate pocket. When the number of pockets are compared before and after treatment, subgingival curettage resulted in elimination of 62% of the pockets, and modified Widman flap procedure resulted in 79% elimination, whereas with pocket elimination surgery, 88% of the pockets were eliminated 6 weeks after surgery.

When pockets related to the various surfaces of the teeth are considered, it appears that initially there were most pockets interproximally and least on the buccal

TABLE I. *Elimination of Pockets by Subgingival Curettage*

| | Initial | Resultant | Elimination % |
|----------------|------------|-----------|------------------|
| All surfaces | | | |
| Pockets 4-6 mm | 719 | 305 | 58.0 |
| Pockets > 6 mm | <u>142</u> | <u>24</u> | <u>83.0</u> |
| Total | 861 | 329 | 62.0 |
| Mesial | | | |
| Pockets 4-6 mm | 223 | 74 | 67.0 |
| Pockets > 6 mm | <u>46</u> | <u>4</u> | <u>91.0</u> |
| Total | 269 | 78 | 71.0 |
| Distal | | | |
| Pockets 4-6 mm | 236 | 106 | 55.0 |
| Pockets > 6 mm | <u>56</u> | <u>7</u> | <u>87.5</u> |
| Total | 292 | 113 | 61.0 |
| Facial | | | |
| Pockets 4-6 mm | 78 | 34 | 56.0 |
| Pockets > 6 mm | <u>14</u> | <u>3</u> | <u>79.0</u> |
| Total | 92 | 37 | 60.0 |
| Lingual | | | |
| Pockets 4-6 mm | 182 | 91 | 50.0 |
| Pockets > 6 mm | <u>26</u> | <u>10</u> | <u>62.0</u> |
| Total | 208 | 101 | 51.0 |

TABLE II. *Elimination of Pockets by Pocket Elimination Surgery*

| | Initial | Resultant | Elimination % |
|----------------|------------|-----------|------------------|
| All surfaces | | | |
| Pockets 4-6 mm | 931 | 120 | 87.0 |
| Pockets > 6 mm | <u>154</u> | <u>8</u> | <u>95.0</u> |
| Total | 1085 | 128 | 88.0 |
| Mesial | | | |
| Pockets 4-6 mm | 301 | 20 | 93.0 |
| Pockets > 6 mm | <u>42</u> | <u>4</u> | <u>90.0</u> |
| Total | 343 | 24 | 93.0 |
| Distal | | | |
| Pockets 4-6 mm | 321 | 34 | 89.0 |
| Pockets > 6 mm | <u>62</u> | <u>2</u> | <u>97.0</u> |
| Total | 383 | 36 | 91.0 |
| Facial | | | |
| Pockets 4-6 mm | 80 | 34 | 58.5 |
| Pockets > 6 mm | <u>20</u> | <u>1</u> | <u>95.0</u> |
| Total | 100 | 35 | 65.0 |
| Lingual | | | |
| Pockets 4-6 mm | 229 | 32 | 86.0 |
| Pockets > 6 mm | <u>30</u> | <u>1</u> | <u>97.0</u> |
| Total | 259 | 33 | 87.0 |

TABLE III. *Elimination of Pockets by the Modified Widman Flap Procedure*

| | Initial | Resultant | Elimination % |
|----------------|------------|-----------|------------------|
| All surfaces | | | |
| Pockets 4-6 mm | 827 | 196 | 76.0 |
| Pockets > 6 mm | <u>150</u> | <u>11</u> | <u>93.0</u> |
| Total | 977 | 207 | 79.0 |
| Mesial | | | |
| Pockets 4-6 mm | 259 | 46 | 82.0 |
| Pockets > 6 mm | <u>43</u> | <u>0</u> | <u>100.0</u> |
| Total | 302 | 46 | 85.0 |
| Distal | | | |
| Pockets 4-6 mm | 269 | 59 | 78.0 |
| Pockets > 6 mm | <u>69</u> | <u>5</u> | <u>93.0</u> |
| Total | 338 | 64 | 81.0 |
| Facial | | | |
| Pockets 4-6 mm | 101 | 30 | 70.0 |
| Pockets > 6 mm | <u>13</u> | <u>2</u> | <u>85.0</u> |
| Total | 114 | 32 | 72.0 |
| Lingual | | | |
| Pockets 4-6 mm | 198 | 61 | 69.0 |
| Pockets > 6 mm | <u>25</u> | <u>4</u> | <u>84.0</u> |
| Total | 223 | 65 | 71.0 |

surfaces. The effectiveness of each treatment procedure does not appear to be related to specific tooth surfaces.

Mean Pocket Depths

When the short term data are evaluated as to mean pocket depth by patient, all three treatment modalities

significantly reduce pocket depths (Fig. 1). Mean pocket depth reductions are significant when examined by tooth surface i.e. interproximal, buccal and lingual, for each of the three treatment modalities as well.

Mean pocket depth reductions achieved interproximally are significantly greater both with pocket elimination surgery and with the modified Widman flap procedure than with subgingival curettage, whereas the differences between the modified Widman flap procedure and pocket elimination surgery are not significant. For buccal pocket reduction, pocket elimination surgery is significantly more effective than subgingival curettage. For the lingual surface, pocket elimination surgery is significantly more effective than either subgingival curettage or the modified Widman flap procedure at reducing mean pocket depth (Fig. 3).

Attachment Levels

Evaluation of the results of the various treatment procedures as to change in attachment levels was done for each of the tooth surfaces, (Fig. 2). Subgingival curettage resulted in a mean gain of attachment of 0.30

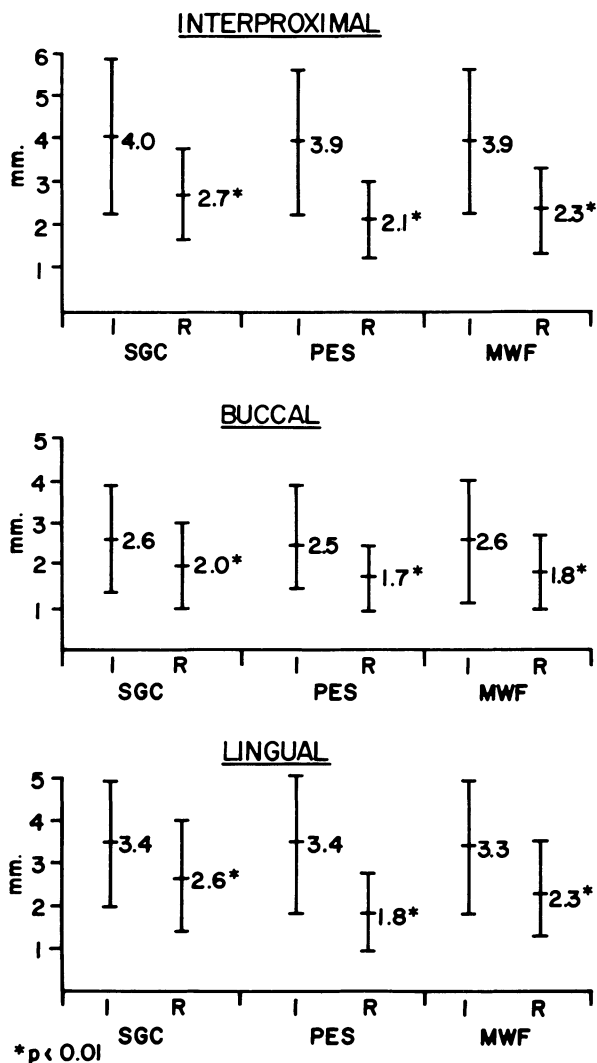


FIGURE 1. Mean initial and resultant pocket depths.

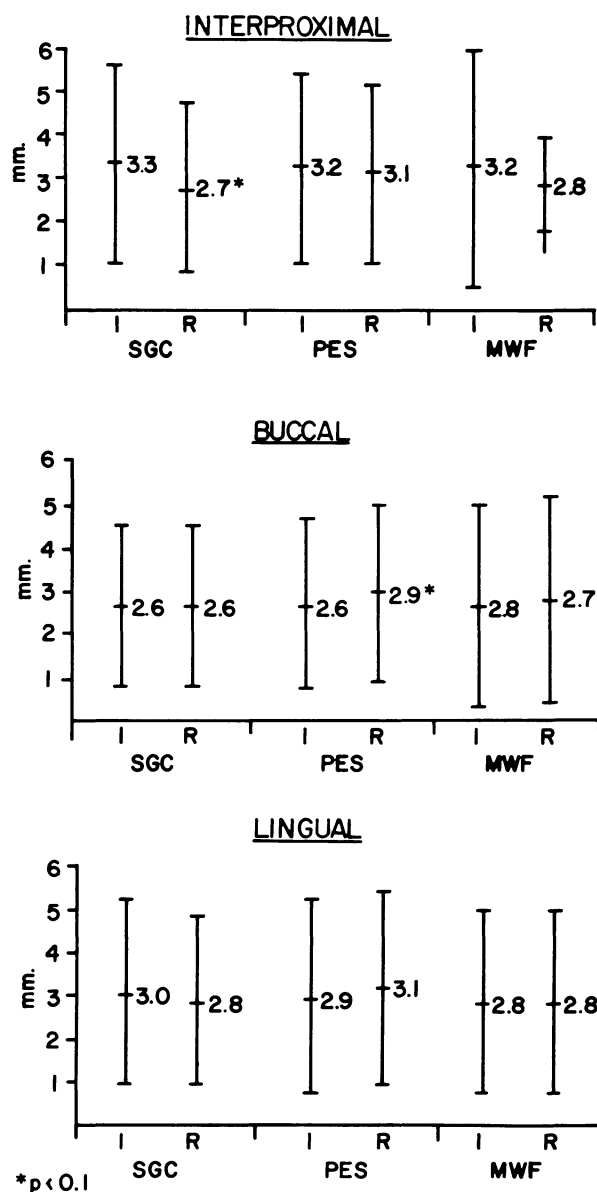
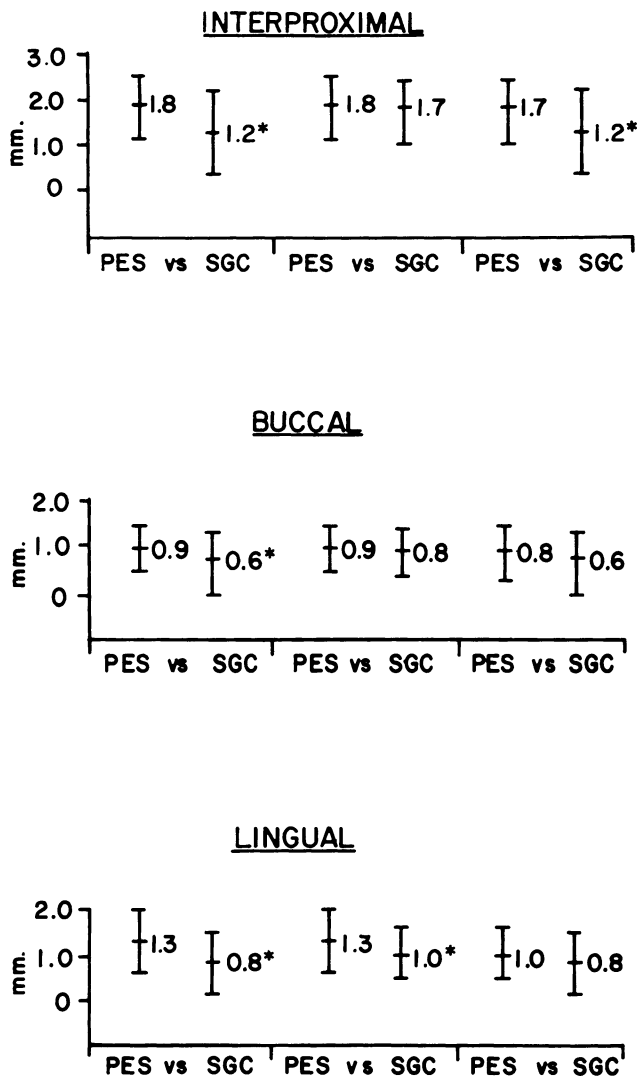


FIGURE 2. Mean initial and resultant attachment levels.

mm for each interproximal tooth surface, a gain of 0.20 mm for the lingual surface, with the buccal levels remaining essentially the same. Both the lingual and the interproximal gains are statistically significant ($P < 0.01$). Pocket elimination surgery resulted in the attachment level staying essentially the same interproximally as before treatment, but with a 0.38 mm loss on the buccal, and a 0.09 mm loss on the lingual side. The buccal loss of attachment is significant statistically ($P < 0.01$). The modified Widman flap procedure resulted in a gain of 0.22 mm of attachment for each interproximal surface, a loss of 0.17 mm for the buccal, with the lingual attachment level staying essentially at the pre-surgical level. None of the differences for the modified Widman flap are significant statistically.

In comparison between procedures, subgingival curettage resulted in significantly more attachment for the



*Scheffe Allowances Significance Level > 0.95

FIGURE 3. Differences between procedures reduction in pocket depth.

interproximal, the buccal, and the lingual than pocket elimination surgery (SAL > 0.95).* The differences between the modified Widman flap procedure and subgingival curettage, and between the modified Widman flap procedure and pocket elimination surgery are not significant.

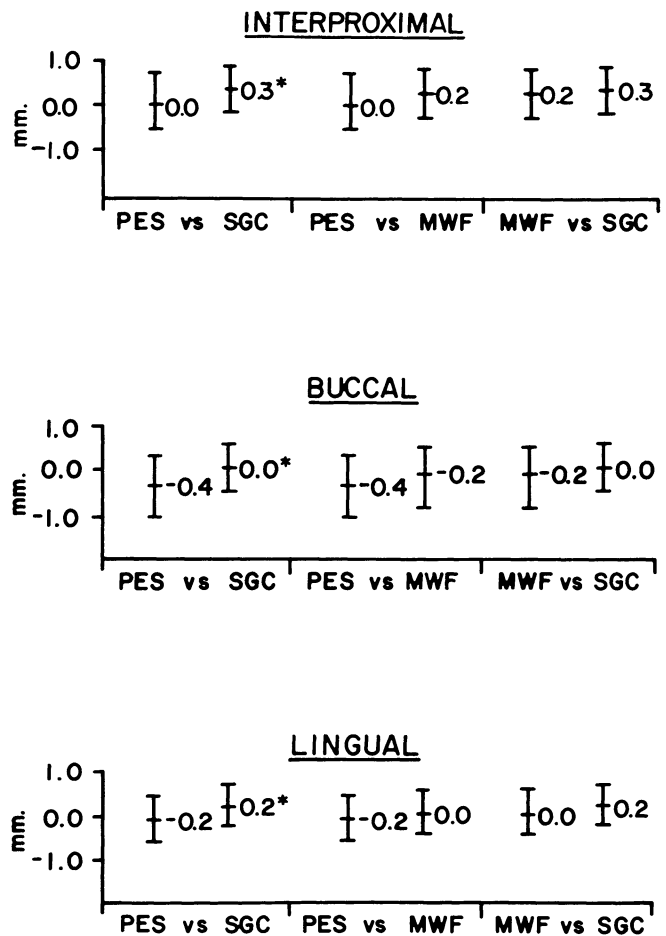
DISCUSSION

There is a great need both for short and long term data regarding proof of effectiveness of current therapeutic measures. Retrospective studies of selected patients are of questionable value in this regard and in fact may be dangerous from a legal viewpoint since data from selected patients for whom treatment provided a cure, do not provide reliable information regarding what can be expected from treatment for a sample of the population.

* Differences between the procedures were greater than the Scheffe allowances significance level of 0.95.

The ultimate goal of periodontal therapy is to establish a state of periodontal health evidenced by absence of inflammation, absence of periodontal pockets, and a potential for the patient to maintain the health in addition to comfort, function, and good esthetics. Insofar as pockets are concerned, there is no question that to regain the attachment level and osseous support for the teeth that were lost through the ravishes of periodontal disease would be the most desirable result of the treatment. Ideally then, treatment should result in establishment of a state of periodontal health with complete recovery of the periodontium.

The reported data provide documentation for the short term results of three surgical approaches; subgingival curettage maximizes the potential for repair of the periodontium with least effectiveness in pocket reduction, pocket elimination results in the greatest reduction of pockets but with significant loss of attachment concomittant with the treatment, the modified Widman flap reduces pockets more than subgingival curettage and has a more favorable attachment level re-



*Scheffe Allowances Significance Level > 0.95

FIGURE 4. Differences between procedures change in attachment levels.

sponse than pocket elimination surgery; thus representing a compromise between the other two methods.

There was no provision in this study for replacement of lost teeth. Teeth were maintained which at the initiation of the treatment had a guarded prognosis. This may be part of the reason why a few pockets remained after pocket elimination surgery. Eighty percent of the pockets that were residual following pocket elimination surgery were on molar teeth.

SUMMARY AND CONCLUSIONS

Short term data were obtained from 74 patients who received comprehensive periodontal treatment using a split mouth approach to test three variables; subgingival curettage, pocket elimination surgery, and modified Widman flap procedure. The patients initially had an average interproximal loss of attachment of 3.2 mm and an average interproximal pocket depth of 3.9 mm.

Evaluation of the data indicate that after 4 to 6 weeks:

1. All three surgical procedures reduce pocket depths. In order of effectiveness they are: pocket elimination surgery, modified Widman flap, and subgingival curettage.

2. Pocket elimination surgery reduces pockets more than subgingival curettage on the buccal, lingual and interproximal, and more than the modified Widman flap on the lingual. The modified Widman flap procedure reduces pockets more interproximally than subgingival curettage.

3. Subgingival curettage results in a gain of attachment interproximally, and on the lingual side, while the modified Widman flap resulted in a gain of attachment interproximally only.

4. Pocket elimination surgery resulted in a loss of attachment buccally.

5. Subgingival curettage results in a more favorable

postoperative attachment level on all surfaces than did pocket elimination surgery.

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Announcements

TEMPLE UNIVERSITY SCHOOL OF DENTISTRY

Temple University School of Dentistry announces the following Continuing Education course:

TITLE: Participation Course in Basic Periodontal Therapy (1 day per week for 6 weeks)

DATES: March 16, 23, 30, April 6, 13, 20, 1977

FACULTY: D. LITWACK, D.D.S., I. ABRAMS, D.D.S. and Staff, Department of Periodontology, Temple University

In addition to the introduction of startling new theories on periodontal regeneration, pocket control, and periodontal surgical procedures, there will be a full day of lecture, lab, and practical application of occlusal principles. Doctor will treat a selected patient in initial therapy and basic surgery.

For further information contact: (Mrs.) Peg Schmidt, Program

Coordinator, Continuing Education, Temple University School of Dentistry, 3223 N. Broad St., Philadelphia, PA 19140.

COLLEGE OF DENTISTRY OF THE UNIVERSITY OF ILLINOIS

The College of Dentistry of the University of Illinois at the Medical Center will host an International Conference-Workshop on Research in the Biology of Periodontal Disease in Chicago June 12-15.

While most of the participants will be invited, a limited number of applications will be accepted from individuals working in research fields related to periodontal tissues and periodontal diseases. For further information write Bennett Klavan, D.D.S., Department of Periodontics, 801 S. Paulina St., Chicago, Ill 60612.