

# Treatment of Localized Gingival Recessions

## Part I. Lateral Sliding Flap

by

EMILIO A. GUINARD, D.D.S., M.S.\*

RAUL G. CAFFESSE, D.D.S., M.S., DR.

ODONT.†

A LOCALIZED GINGIVAL recession constitutes a special therapeutic problem that often requires some form of mucogingival surgery. In 1956, Grupe and Warren<sup>1</sup> introduced the lateral sliding flap operation to gain attached gingiva and to cover areas with localized gingival recession. They reported that the lateral sliding flap provided a satisfactory solution to the problem of denuded root surfaces.<sup>1</sup> However, one of the essential features of the technique is the raising of a flap involving the entire marginal gingiva. Consequently denudation of the bone at the donor site is part of the operation. This may create permanent bone loss and consequently, gingival recession. In order to avoid these problems many modifications to the original procedure, as well as new techniques have been proposed.<sup>2-14</sup> Among these Bernimoulin described a combination of a free gingival graft and a coronally repositioned flap, with good clinical results.<sup>15, 16</sup>

Very few studies have been done to evaluate the clinical changes that occur on the recipient tooth as well as on the donor tooth after performing a lateral sliding or a coronally repositioned flap procedure.<sup>15-18, 20</sup>

The present study was undertaken to evaluate biometrically the changes that occur on the recipient site as well as on its neighboring tooth with regard to gingival recession, sulcus depth and width of keratinized gingiva after performing a lateral sliding flap according to the original technique or a coronally repositioned flap. In the present communication only the results obtained with the lateral sliding flap will be reported.

### MATERIALS AND METHODS

A total of 23 patients (with ages ranging from 19 to 68 years, mean 35 years) with 28 teeth showing localized gingival recessions were selected for this study.

The teeth were thoroughly scaled and root planed to remove all supragingival and subgingival plaque, calcu-

lus and root surface roughness. The subjects were given oral hygiene instruction including toothbrushing and dental flossing techniques. An appointment for the surgical procedure generally was arranged 7 to 10 days after this initial procedure.

At that time the following measurements were recorded (Fig. 1): (1) From the cemento-enamel junction (or apical margin of a restoration) to the gingival margin; (2) the crevice or pocket depth; (3) the width of keratinized gingiva (including the free and attached gingiva) from the gingival margin to the mucogingival line; and (4) the width of the gingival recession at the cemento-enamel junction. Measurements 1, 2, and 3 also were recorded at the neighboring tooth. The tooth adjacent to the area of recession with the lesser clinical recession was selected as a donor or control site. The measurements always were taken at the midline of the facial aspect of the tooth. A Marquis M-1\* periodontal probe, calibrated in four color coded segments was used. The same measurements were repeated at 1, 3 and 6 months after surgery. Photographs also were taken pre- and postoperatively (Fig. 2).

The treatment modality for each gingival recession was randomly selected. At the time the patient was screened, a sequential number was given to each selected gingival recession. When two localized recessions were selected for treatment the first corresponding number was assigned to that on the left quadrants and the next one to that on the right quadrants. No patient presented more than two localized gingival recessions, or two recessions on the same side. Teeth assigned with even numbers were treated by a lateral sliding flap and teeth assigned with odd numbers were treated by a coronally repositioned flap. As a result 14 recessions were treated with a lateral sliding flap and 14 with a coronally repositioned flap.

Basically the lateral sliding flap technique as described by Grupe and Warren<sup>1</sup> was used. Following application of local anesthesia, two vertical bevelled incisions were made on each side of the defect, extending apically straight to a level slightly below the base of the recession. These two vertical incisions were then connected by a curved one at the base of the recession (U-shaped incision), permitting removal of the collar of gingiva bordering the recession. Another vertical bevelled incision was then made one tooth away from the area of recession including the entire papilla, and extended apically into the alveolar mucosa. This vertical incision was then extended in the alveolar mucosa by an oblique releasing incision facing the recession to provide adequate mobility to the flap. Using an intracrevicular incision, that vertical bevelled incision was connected to the one previously made around the area of gingival recession. A full thickness flap, being split thickness at its more apical region, was then reflected and laterally positioned over the

\*Department of Periodontics, The University of Michigan School of Dentistry, Ann Arbor, Mich 48109 U.S.A. Present Address: Apartado 6183, Panama 5 R.P. Panama.

† Professor, Department of Periodontics, The University of Michigan School of Dentistry, Ann Arbor, Mich 48109 U.S.A. For reprints, please write to Dr. R. G. Caffesse.

\* Marquis Dental Manufacturing Company, Denver, Colorado.

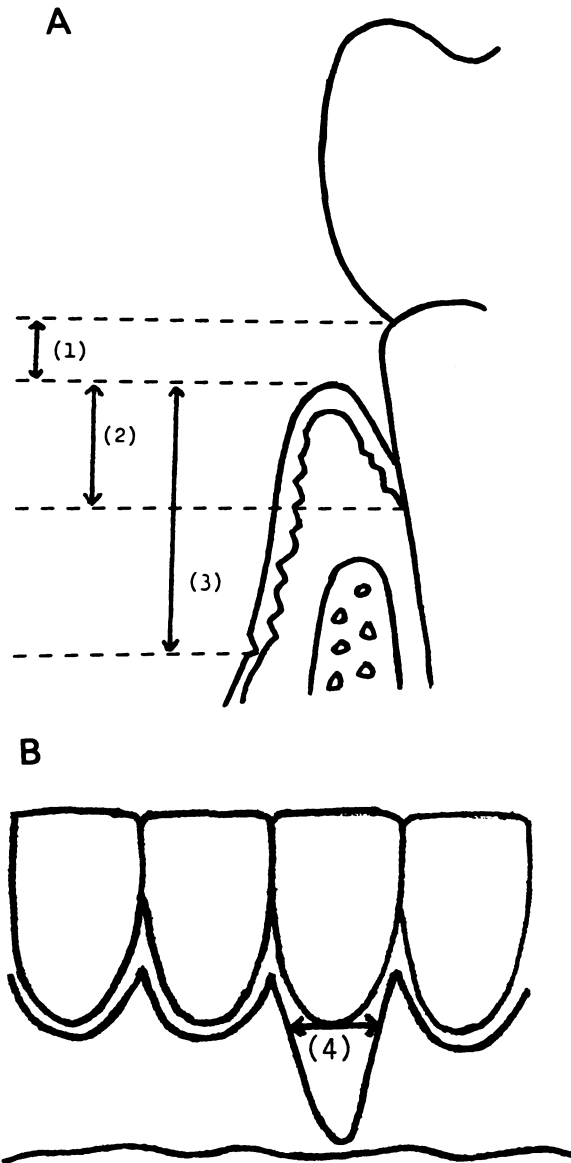


FIGURE 1A and B. Clinical measurements recorded: (1) cemento-enamel junction to gingival margin; (2) crevice or pocket depth; (3) width of keratinized gingiva (free and attached); (4) width of the gingival recession at the cemento-enamel junction.

denuded root surface which was scaled and planed thoroughly to obtain a smooth cementum or dentin surface. The flap was laid flat and firm over the denuded root surface without excessive tension on its base and was fixed at the cemento-enamel junction with sutures. A suspensory suture was made around the involved tooth to prevent the flap from slipping apically. Pressure was applied against the flap. Achromycin ointment 3% (tetracycline HCL) was placed over the sutures, the flap and the donor area. A piece of dryfoil was placed over the flap and sutures. The area was covered with a periodontal dressing. The periodontal dressing and sutures were removed after 1 week. The periodontal dressing was replaced and removed again after the 2nd week. The tooth was polished and the patient was instructed in oral hygiene.

All data obtained were analyzed statistically using a

paired *t* test to determine the significance of the results after the use of the lateral sliding flap. The hypothesis was rejected if the probability ratio (*P*-value) was less than 0.05.

## RESULTS

The 14 recessions treated using a lateral sliding flap showed the following distribution: eight mandibular incisors, four mandibular canines and two mandibular bicuspids.

Table 1 shows the changes that occurred on the recipient tooth at 30, 90 and 180 days after performing a lateral sliding flap. The mean recession decreased significantly after the surgical intervention ( $P \leq 0.001$ ). No significant changes occurred after 30 days. A 69.16% coverage of soft tissue over denuded roots was found at 180 days after performing the lateral sliding flap. A decrease in sulcus depth occurred on the recipient tooth. However, this change was not statistically significant ( $P > 0.05$ ) at any given time. The width of keratinized gingiva increased on the recipient tooth at 30, 90 and 180 days. However, this change was only statistically significant ( $P \leq 0.001$ ) at 30 days.

Table 2 shows the changes that occurred on the donor tooth. The mean recession was increased by 1.10 mm at 180 days which was statistically significant ( $P \leq 0.001$ ). The sulcus depth was significantly reduced ( $P \leq 0.001$ ) at 30 days. However, the sulcus depth increased at 90 and 180 days, making the difference from the initial measurements at these time intervals less significant ( $P \leq 0.01$ ). The mean width of keratinized gingiva decreased immediately after surgery. The difference was statistically significant ( $P \leq 0.001$ ). No significant changes ( $P > 0.05$ ) occurred after 30 days.

Figure 3 shows a diagrammatic representation of the results obtained with the lateral sliding flap.

## DISCUSSION

### Evaluation of Present Results

#### Changes on the Recipient Tooth

The results obtained in the present study show that areas of *gingival recession* are significantly reduced by the lateral sliding flap. A mean gain of 2.69 mm of soft tissue coverage was found 6 months after the surgical procedure. The values of soft tissue coverage remained stable after 30 days. This stability of results after 30 days was observed both on the recipient as well as on the donor tooth, for all the variables tested, including sulcus depth and width of keratinized gingiva. Therefore, the 1-month postoperative results permit an evaluation of the long term results for the lateral sliding flap.

A significant increase ( $P \leq 0.001$ ) in the *width of keratinized gingiva* occurred with the lateral sliding flap. The mean gain in width of keratinized gingiva averaged 3.15 mm 6 months after the lateral sliding flap.

A slight decrease in *sulcus depth* occurred on the recipient tooth after performing the lateral sliding flap.

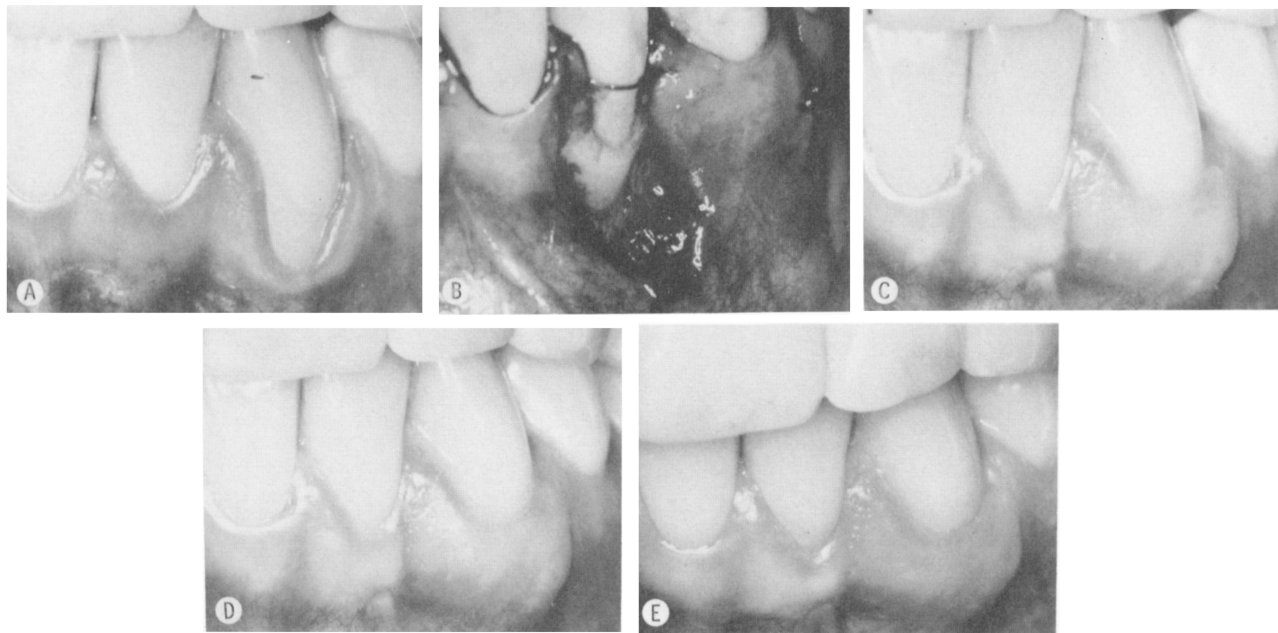


FIGURE 2. Localized gingival recession treated by a lateral sliding flap. (A) pre-operative; (B) flap sutured in position; (C) 1 month postoperative; (D) 3 months; (E) 6 months.

TABLE 1. Mean Changes on Recipient Teeth After Lateral Sliding Flap Procedure

	<u>Initial</u>	<u>30 days</u>	<u>90 days</u>	<u>180 days</u>
Cemento-enamel junction gingival margin	3.89 mm	1.07 mm*	1.28 mm*	1.20 mm*
Sulcus depth	2.0 mm	1.64 mm	1.89 mm	1.57 mm
Gingival margin-mucogingival line	1.35 mm	4.42 mm*	4.46 mm*	4.50 mm*

\* Statistically significant,  $P \leq 0.001$ .

TABLE 2. Mean Changes on Donor Teeth After Lateral Sliding Flap Procedure

	<u>Initial</u>	<u>30 days</u>	<u>90 days</u>	<u>180 days</u>
Cemento-enamel junction gingival margin	0.32 mm	1.62 mm*	1.42 mm*	1.42 mm*
Sulcus depth	1.53 mm	0.63 mm*	0.96 mm**	0.96 mm**
Gingival margin-mucogingival line	4.71 mm	3.39 mm*	3.28 mm*	3.46 mm*

\* Statistically significant,  $P \leq 0.001$ .

\*\* Statistically significant,  $P \leq 0.01$ .

However, this change was not significant ( $P > 0.05$ ) throughout the study.

#### Changes on the Donor Tooth

Significant changes occurred on the donor tooth after performing a lateral sliding flap.

An average gingival recession of 1.30 mm and 1.10 mm was produced on the donor tooth at 30 and 180 days postoperatively respectively. These results indicate that with the technique employed some degree of gingival recession is created on the donor tooth after performing

a lateral sliding flap.

The sulcus depth was significantly reduced ( $P \leq 0.001$ ) at 30 days after performing a lateral sliding flap. An average reduction of 0.90 mm was obtained. However, the pocket depth increased at 90 and 180 days, making the difference with the initial measurement at these time intervals less significant ( $P \leq 0.01$ ).

Significant negative changes ( $P \leq 0.001$ ) also occurred in the width of keratinized gingiva of the donor tooth after surgery. An average loss of 1.32 mm and 1.25 mm was obtained after 30 and 180 days respectively.

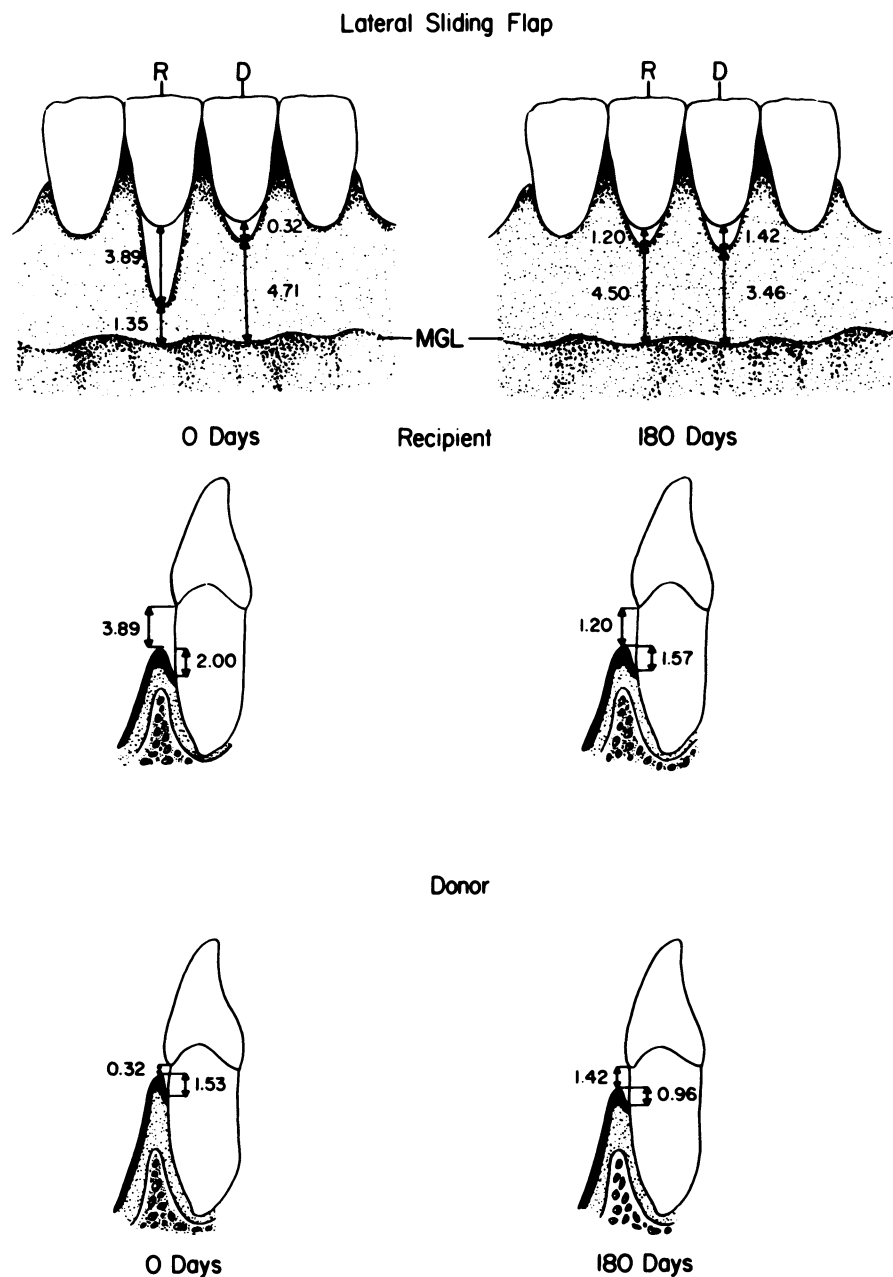


FIGURE 3. Diagrammatic representation of the results obtained with a lateral sliding flap.

The slight reduction of the amount of gingival recession, accompanied by a slight increase in sulcus depth and in the width of keratinized gingiva on the donor site after 30 days, might be attributed to the continuous tissue maturation after clinical healing is complete in an area of bone denudation. This will produce a so-called "creeping reattachment," the histologic nature of which remains unknown.

#### Comparison of Results of the Present Study With Those From Other Reports

Very few biometric studies have been done in order to evaluate the clinical changes that occur on the recipient tooth as well as on the donor tooth after performing a lateral sliding flap.

The present study found that the initial gingival recession

present on the recipient tooth was significantly reduced (69%) 6 months postoperatively.

These results coincide with the clinical findings obtained by Albano et al.<sup>17</sup> who found 61% of recession reduction 3 months postoperatively. Smukler<sup>18</sup> in a recent study reported 72.42% of root coverage 9 months after treatment of 21 localized gingival recessions. These biometric results are also in agreement with the histologic findings obtained by Wilderman and Wentz<sup>19</sup> in dogs. They found 50% of recession reduction.

In an abstract, Sullivan et al.<sup>20</sup> reported new soft tissue coverage over the denuded root surfaces averaging 3.50 mm. The mean of the preoperative recessions was omitted. In the present study, 2.69 mm of soft tissue coverage was obtained 6 months postoperatively. This amount of tissue coverage represents a 69% reduction of

the original gingival recession.

Albano et al.<sup>17</sup> found that the *sulcus depth* on the recipient tooth was significantly reduced after 3 months. However, in the present biometric study, the sulcus depth was not significantly reduced after any given time. This discrepancy could be attributed to the fact that in the present project the teeth were scaled and planed prior to the initial experimental measurements. Consequently the sulcus depth was initially reduced.

The *donor tooth* is commonly overlooked by periodontists when judging the results obtained with the lateral sliding flap. The present investigation found that the amount of *gingival recession* increased at least 1 mm on the donor site after performing a lateral sliding flap. These results coincide with those obtained by Albano et al.<sup>17</sup> and Sullivan et al.<sup>20</sup> The results of these three biometric studies clearly indicate that there is always an increase in gingival recession at the donor site when a lateral sliding flap is performed. In the present biometric evaluation the *sulcus depth* was dramatically reduced at the donor site at 30 days. However, a slight increase in sulcus depth was observed after 30 days. Although this increase is less significant ( $P \leq 0.01$ ), it is associated with the slight increase in the width of the keratinized gingiva observed after 180 days. Albano et al.<sup>17</sup> found that the pocket depth reduction was significant 90 days postoperatively. The sulcus depth was not measured at 30 days so as not to disturb the healing.

The minimal fluctuation in the width of the keratinized gingiva at different postoperative intervals could be attributed either to the process of healing and tissue maturation or to insignificant variations in the clinical measurements.

In the present study the amount of loss of radicular bone on the donor tooth was not measured. However, Sullivan et al.<sup>20</sup> found 0.5 mm of bone loss on the donor tooth after 7 months. Similar findings have been reported by Costich and Ramfjord<sup>21</sup> after exposure of periosteum and labial bone. The amount of bone loss is influenced by the thickness and structure of the labial or buccal bone.

In regards to the type of attachment obtained, conclusions cannot be based on the clinical measurements taken in the present study. However, the results obtained constitute a good example of clinical reattachment. Histological studies<sup>22</sup> done in humans have shown epithelial and connective tissue attachment of the replaced tissues to the previous denuded root surfaces. In some instances, a long epithelial attachment with apparently no connective tissue reattachment was obtained.<sup>22, 23</sup>

#### SUMMARY

This study was undertaken to evaluate biometrically the changes that occur on the recipient as well as on the donor tooth with regard to gingival recession, sulcus depth and width of keratinized gingiva after performing a lateral sliding flap in the treatment of localized de-

nuded roots.<sup>1</sup>

Fourteen teeth with gingival recession were treated using a lateral sliding flap. Measurements were recorded preoperatively and 1, 3 and 6 months after surgery.

A mean gain of 2.69 mm of soft tissue coverage over the denuded root was found 6 months postoperatively which represents 69% of coverage. The mean gain in width of keratinized gingiva averaged 3.15 mm. On the donor tooth an average gingival recession of 1.10 mm was found after 6 months, and the width of keratinized gingiva decreased an average of 1.25 mm. Results remained stable after 30 days postsurgery.

#### CONCLUSIONS

Within the limits of this biometric study, it can be concluded that:

1. The lateral sliding flap provides a satisfactory solution in the treatment of localized gingival recession.
2. One millimeter of gingival recession is likely to occur on the donor tooth after performing a lateral sliding flap.
3. The 1-month postoperative results permit an evaluation of the surgical procedure, since results remain stable afterwards.

#### REFERENCES

1. Grupe, H., and Warren, R.: Repair of gingival defects by a sliding flap operation. *J Periodontol* 27: 92, 1956.
2. Grupe, H.: Modified technique for the sliding flap operation. *J Periodontol* 37: 491, 1966.
3. Bjorn, H.: Coverage of denuded root surfaces with a lateral sliding flap. Use of free gingival grafts. *Odontol Revy* 22: 37, 1971.
4. Friedman, N., and Levine, H.: Mucogingival surgery. *Dent Clin North Am* p 63, March 1964.
5. Staffileno, H.: Management of gingival recession and root exposure problems associated with periodontal disease. *Dent Clin North Am* p 111, March, 1964.
6. Ariaudo, A.: Problems in treating a denuded lateral root surface of a lower incisor. *J Periodontol* 37: 274, 1966.
7. Knowles, J., and Ramfjord, S.: *The Lateral Sliding Flap With a Free Gingival Graft*. University of Michigan Dental School, Video Cassette, 1971.
8. Robinson, R.: Utilizing an edentulous area as a donor site in the lateral repositioned flap. *Periodontics* 2: 79, 1964.
9. Corn, H.: Edentulous area pedicle grafts in mucogingival surgery. *Periodontics* 2: 220, 1964.
10. Irwin, R.: Combined use of the gingival graft and rotated pedicle procedures. Case Reports. *J Periodontol* 48: 38, 1977.
11. Patur, B.: The rotation flap for covering denuded root surfaces. A closed wound technique. *J Periodontol* 48: 41, 1977.
12. Cohen, D., and Ross, S.: The double papillae flap in periodontal therapy. *J Periodontol* 39: 65, 1968.
13. Pennel, B., Higgason, J., Falder, J., Townner, J., King, and Fritz, B.: Oblique rotated flap. *J Periodontol* 36: 305, 1965.
14. Hattler, A.: Mucogingival surgery. Utilization of interdental gingiva as attached gingiva by surgical displacement. *Periodontics* 5: 126, 1967.
15. Bernimoulin, J.: Deckung gingivaler rezessionen mit koronaler verschiebungsplastik. *Deut Zahnaertl Zeitschr* 28: 1222, 1973.
16. Bernimoulin, J.: Coronally repositioned periodontal flap. Clinical evaluation after one year. *J Clin Periodont* 2: 1, 1975.

17. Albano, E., Caffesse, R., and Carranza, F.: Estudio biometrico de colgajos desplazados lateralmente. *Rev Asoc Odontol Argentina* 61: 12, 1973.

18. Smukler, H.: Laterally positioned mucoperiosteal pedicle grafts in the treatment of denuded roots. *J Periodontol* 47: 590, 1976.

19. Wilderman, M., and Wentz, F.: Repair of a dentogingival defect with a pedicle flap. *J Periodontol* 35: 218, 1965.

20. Sullivan, H., Dinner, D., and Carman, D.: Clinical evaluation of the laterally positioned flap. I.A.D.R. Abstr. No.

466, 1971.

21. Costich, E. and Ramfjord, S.: Healing after exposure of periosteum and labial bone in periodontal surgery. I.A.D.R. Abstr. No. 12, 1964.

22. Pfeifer, J., and Heller, R.: Histologic evaluation of full and partial thickness lateral repositioned flaps. A pilot study. *J Periodontol* 42: 331, 1971.

23. Sugarman, E.: A clinical and histological study of the attachment of grafted tissue to bone and teeth. *J Periodontol* 40: 381, 1969.

## Announcement

### TUFTS UNIVERSITY DENTAL SCHOOL AND AMERICAN ACADEMY OF DENTAL GROUP PRACTICE

The Continuing Education Office of Tufts University Dental School and the American Academy of Dental Group Practice announce the following course:

**TITLE:** Accreditation of the Private Practice of Dentistry, Tufts University, Boston, MA  
**DATES:** November 18 and 19, 1978  
**FACULTY:** DR. WILLIAM MARSHALL, Health Center, University of Connecticut, Farmington, CT 06032  
 DR. RICHARD CERAMI, Plaza Dental Health Services, Erie, PA  
 DR. CHARLES JERGE, Winston-Salem, NC  
 DR. JED BOUDREAU, Pennsylvania Dental Associates, Philadelphia, PA

A "How to" presentation explaining details from initial applications to final results. The reviewing and site visitation are actually consultations by ones' peers for ways of improvement of the practice against a set of standards created by practicing dentists.

More information available from: Tufts and Dr. Sumner Hirshberg, Director of Continuing Education, Tufts University, Kneeland Street, Boston, MA 02111.

### PHILADELPHIA SOCIETY OF PERIODONTOLOGY

The Philadelphia Society of Periodontology announces the election of its officers for 1978-79:

President—ROBERT S. SCHOOR, D.D.S.  
 President Elect—LOUIS F. ROSE, D.D.S., M.D.  
 Secretary/Treasurer—JEFFREY S. INGBER, D.D.S.

### BOSTON UNIVERSITY SCHOOL OF GRADUATE DENTISTRY, DIVISION OF CONTINUING EDUCATION

Course Offerings in PERIODONTICS for Fall/1978

PERIODONTICS FOR THE GENERAL PRACTITIONER; Henry M. Goldman, D.M.D., Dean Emeritus of the School

1. Understanding Periodontal Disease and its Treatment; March, 1979, FEE: \$160

2. Preparation of a Case for Treatment; May, 1979, FEE: \$160
3. Definitive Periodontal Therapy; September, 1979, FEE: \$240
4. Therapy of the Occlusal Traumatic Lesion; December, 1979, FEE: \$160
5. Management of the Advanced Periodontal Disease Case; March, 1980, FEE: \$160
6. Participation Course in Periodontal Therapy; May, 1980, FEE: \$200, Limit: 10

BIOLOGIC FOUNDATIONS OF PERIODONTAL PRACTICE; August 14-18, 1978, MORRIS P. RUBEN, D.D.S., FEE: \$400

PERIODONTAL PREPARATION OF THE DENTITION FOR RESTORATIVE AND PROSTHETIC DENTISTRY; September 21, 1978, MARVIN ROSENBERG, D.D.S., FEE: \$80

LABORATORY EXERCISE FOR FABRICATION OF APPLICANCES FOR TOOTH MOVEMENT IN PERIODONTAL THERAPY AND PROSTHODONTICS; October 4, 1978, HENRY M. GOLDMAN, D.M.D., ANTHONY A. GIANELLI, D.M.D., M.D., Ph.D., FEE: \$80

PERIODONTAL SURGERY; November 2-3, 1978, GERALD A. ISENBERG, D.D.S. ALAN M. SHUMAN, D.M.D., FEE: \$160

CLINICAL SOLUTIONS FOR THE TREATMENT OF ENDODONTIC-PERIODONTIC RELATED PROBLEMS; November 16-17, 1978, HERBERT SCHILDER, D.D.S., GERALD A. ISENBERG, D.D.S., FEE: \$160

CLINICAL PERIODONTAL SURGERY; November 30-December 2, 1978 (Filled); May 3-5, 1979 (Filled); December 6-8, 1979, (Filled); May 1-3, 1980; GERALD M. KRAMER, D.M.D.; J. DAVID KOHN, D.D.S., FEE: \$265, Limit: 12

ADVANCED PERIODONTAL PROSTHEIS; December 4-5, 1978, GERALD M. KRAMER, D.M.D., MYRON NEVINS, D.D.S., HOWARD M. SKURROW, D.D.S., FEE: \$175, Limit: 12

SPLINTING IN ADVANCED PERIODONTAL DISEASE, PROS, CONS. AND ALTERNATIVE METHODS; December 6, 1978; RALPH P. POLLACK, D.M.D., M.Sc.D; PAUL M. PONTE, D.D.S., HYMAN SMUKLER, D.M.D., H.D.D., FEE: \$80

For further information, contact: Program Coordinator, Division of Continuing Education, Boston University School of Graduate Dentistry, 100 East Newton St., Rm. 304, Boston, Mass. 02118, (617) 247-6354