

Treatment of Localized Gingival Recessions

Part II. Coronally Repositioned Flap with a Free Gingival Graft

by

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

EMILIO A. GUINARD, D.D.S., M.S.†

IN 1926, NORBERG¹ introduced the coronally repositioned periosteal flap to solve esthetic problems as the result of the surgical treatment of periodontal disease, particularly on the labial aspect of the maxillary anterior teeth.

Kalmi et al.² also described a surgical procedure to solve esthetic problems in the treatment of periodontitis affecting the anterior teeth. This type of surgical procedure consisted of a combination of gingivectomy and coronally repositioned flap. However, Patur and Glickman³ showed that this plastic procedure was not an effective method for obtaining coverage of root surfaces denuded by chronic destructive periodontal disease.

Nordenram⁴ reported a coronally repositioned procedure after a gingivectomy was performed, showing successful results in 77% of the cases treated.

Harvey⁵ introduced a coronally repositioned flap procedure to cover denuded roots in cases of generalized marginal periodontitis. Brustein⁶ also described a similar procedure. Restrepo⁷ used a procedure similar to that described by Harvey to cover multiple gingival clefts without pocketing.

Sumner⁸ introduced the coronal (bridge) flap to cover a recession on a maxillary cuspid. A free gingival graft was placed on the alveolar mucosa to reduce tissue shrinkage during healing.

In all of the above procedures a sufficient zone of attached gingiva was available preoperatively. However, gingival recessions are usually associated with a minimal band or absence of attached gingiva, making impossible the use of these procedures. In order to avoid the problem associated with lack of attached gingiva, Bernimoulin⁹ introduced a new technique that is a combination of a free gingival graft and coronally repositioned flap. Basically it consisted of a free palatal mucosa graft placed apically to the recession in order to increase the width of the attached gingiva. Two months after grafting, a flap

was raised, repositioned coronally and sutured in the desired location.

Clinical studies done by Bernimoulin^{9,10} have shown that the coronally repositioned flap with a free gingival graft is a predictable procedure in covering denuded root surfaces.

The present study was undertaken to evaluate biometrically whether or not this procedure was satisfactory in covering localized gingival recessions. This is part of a clinical study evaluating the treatment of localized gingival recessions. The results obtained after using a lateral sliding flap are reported separately.¹¹

MATERIALS AND METHODS

The detailed methodology was described in a previous publication where the results obtained with the lateral sliding flap technique were reported.¹¹

A total of 14 teeth with localized gingival recessions were treated by a coronally repositioned flap.

The following measurements were recorded: (1) from the CEJ (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 recessions at the cemento-enamel junction.

Measurements 1, 2, and 3 were also recorded at a neighboring tooth. The tooth adjacent to the area of denudation with lesser clinical recession was selected as a control site.

All clinical measurements were taken at the following times: prior to surgery and at 1, 3 and 6 months after surgery. Photographs were also taken pre- and postoperatively (Figs. 1 and 2).

The surgical procedure was performed as follows:

Free Gingival Graft (first step procedure)

A free palatal mucosa graft was placed apically to the recession to increase the width of the attached gingiva following regular techniques.¹² Due to the postsurgical shrinkage expected¹³ the graft was one-third wider than the width of attached gingiva present on the teeth adjacent to the recession.

Coronally Repositioned Flap (second step procedure)

One month after grafting, following application of local anesthesia, two vertical bevelled incisions bordering and including the papillae adjacent to the recession were made. They were connected with a reverse bevel scalloped incision along the gingival margin. A full thickness flap was then reflected to expose the root surface and alveolar process. At this time, the tooth was scaled and root planed thoroughly to remove root surface roughness. To facilitate a coronal placement of the flap, the periosteum was severed at its base using an undermining incision which was made with Orban knives No. 1 and 2. The flap was then pulled coronally. It was usually

* 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.

† 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.

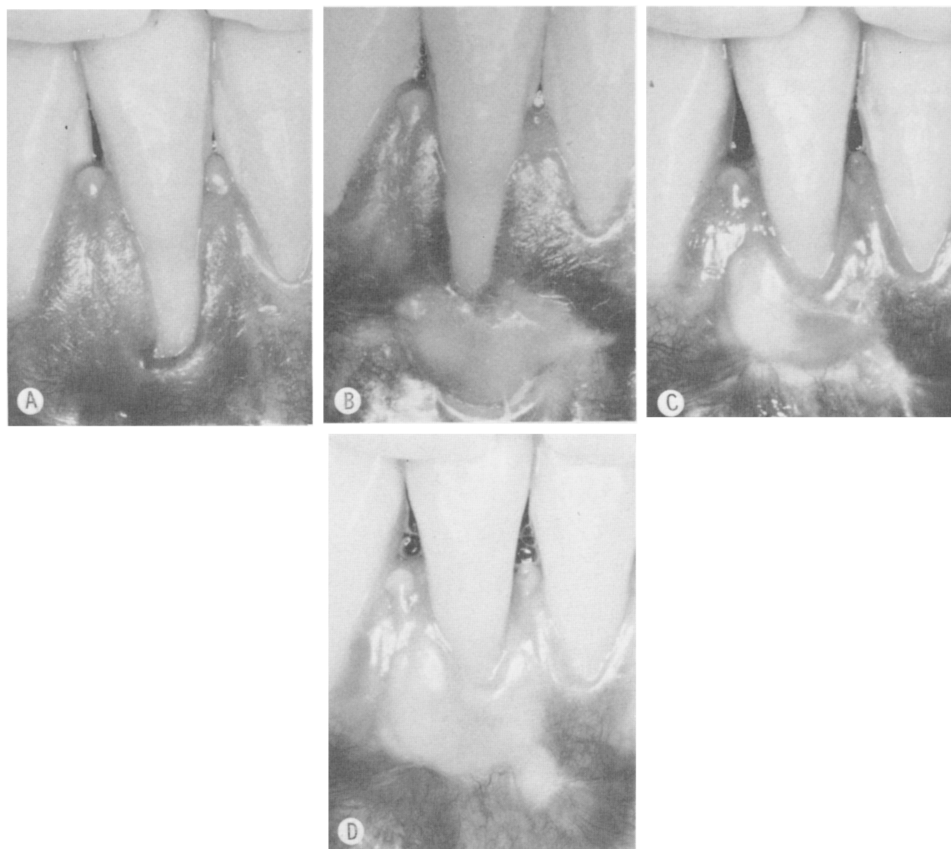


FIGURE 1. Localized gingival recession on tooth No. 25 treated by a coronally repositioned flap with a free gingival graft (A). Preoperative; (B) after grafting; (C) 3 months after performing the coronally repositioned flap; (D) 6 months.

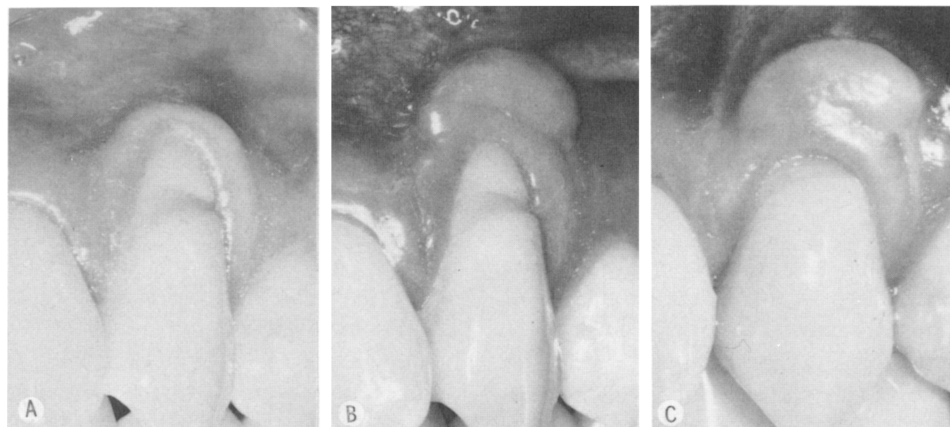


FIGURE 2. Localized gingival recession on tooth No. 11. (A) Preoperative; (B) free gingival graft in place; (C) 6 months after the coronally repositioned flap.

placed at the cemento-enamel junction. Using a Goldman-Fox scissors the papillae were trimmed to fit the new position. The flap was secured by means of two lateral sutures (mesial and distal) to the adjacent gingival tissues. A suspensory suture through the new papillae and surrounding the tooth was also placed. Ethicon 5-0 sutures* were always used. Pressure was applied over the flap to the root surface. Achromycin ointment 3% (tet-

racycline HCl) was placed over the sutures and the flap. A piece of dryfoam was also placed over the sutures and flap, and a periodontal dressing was applied. The periodontal dressing and the sutures were removed after 1 week. The periodontal dressing was then replaced and removed again after a 2nd week. The tooth was polished and the patient instructed in oral hygiene.

All data obtained were analyzed statistically using a paired *t* test to evaluate the behavior of the coronally repositioned flap with a free gingival graft technique in covering denuded roots.

* Johnson and Johnson, Dental Products Company, Somerville, NJ.

RESULTS

Table 1 shows the changes that occurred on the recipient tooth at 30, 90 and 180 days after performing a coronally repositioned flap. The mean recession decreased 2.73 mm after the surgical procedure. This difference is statistically significant ($P \leq 0.001$). No significant changes occurred from 30 to 180 days. A 64.24% soft tissue coverage was gained over denuded roots at 180 days after performing the coronally repositioned flap. Sulcus depth was reduced on the recipient tooth at 30, 90 and 180 days. However, this change was not statistically significant ($P > 0.05$). The width of keratinized gingiva increased on the recipient tooth. The change was statistically significant ($P \leq 0.001$). No significant changes ($P > 0.05$) occurred from 30 to 180 days.

Table 2 shows the changes that occurred on the control tooth after performing a coronally repositioned flap. No variations in the location of the free gingival margin were found at any given time interval. Similarly, no changes occurred either in the sulcus depth or in the width of keratinized gingiva on the control tooth since the teeth adjacent to the recession remained undisturbed.

Figure 3 gives a diagrammatic representation of the results obtained with the coronally repositioned flap.

DISCUSSION

The results obtained in the present study show that gingival recessions can be successfully treated by a coronally repositioned flap. A mean gain of 2.73 mm of soft tissue coverage resulted 6 months after the surgical procedure, which represented a 64% coverage of the recession. The values of soft tissue coverage remained stable after 30 days. Bernimoulin^{9,10} also reported no signifi-

cant variations in the amount of tissue coverage between 1 and 12 months.

A significant increase in the width of keratinized gingiva occurred with the coronally repositioned flap. The mean gain in width of keratinized gingiva averaged 3.27 mm 6 months postoperatively.

A slight decrease in sulcus depth occurred on the recipient tooth after performing the coronally repositioned flap. However, this change was not significant throughout the study.

No changes occurred in any of the variables evaluated on the teeth adjacent to the recession when a coronally repositioned flap was performed, since they remained undisturbed by the procedure.

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

In 1973, Bernimoulin⁹ introduced the coronally repositioned flap with a free gingival graft in the treatment of localized or multiple gingival recessions.

Later, Bernimoulin¹⁰ reported an average of approximately 75% soft tissue coverage of gingival recessions 1 year postoperatively.

In the present study, an average of 64% soft tissue coverage of gingival recessions was found 6 months postoperatively.

The findings obtained in both biometric studies show that with the coronally repositioned flap, the results are satisfactory.

The slight discrepancy in soft tissue coverage of the gingival recessions between these two biometric studies could be attributed to the fact that the mean gingival recession present prior to surgery was different. The mean initial gingival recession in Bernimoulin's study

TABLE 1. Mean Changes on Recipient Teeth After Coronally Repositioned Flap Procedure

	<u>Initial</u>	<u>30 days</u>	<u>90 days</u>	<u>180 days</u>
Cemento-enamel junction gingival margin	4.25 mm	1.60 mm*	1.75 mm*	1.52 mm*
Sulcus depth	1.64 mm	1.42 mm	1.21 mm	1.14 mm
Gingival margin-mucogingival line	0.87 mm	4.10 mm*	4.07 mm*	4.14 mm*

* Statistically significant, $P \leq 0.001$.

TABLE 2. Mean Changes on Control Teeth After Coronally Repositioned Flap Procedure

	<u>Initial</u>	<u>30 days</u>	<u>90 days</u>	<u>180 days</u>
Cemento-enamel junction gingival margin	0.96 mm	0.96 mm	0.89 mm	0.89 mm
Sulcus depth	1.28 mm	1.53 mm	1.53 mm	1.50 mm
Gingival margin-mucogingival line	3.96 mm	4.17 mm	4.17 mm	4.07 mm

* Statistically not significant, $P > 0.05$.

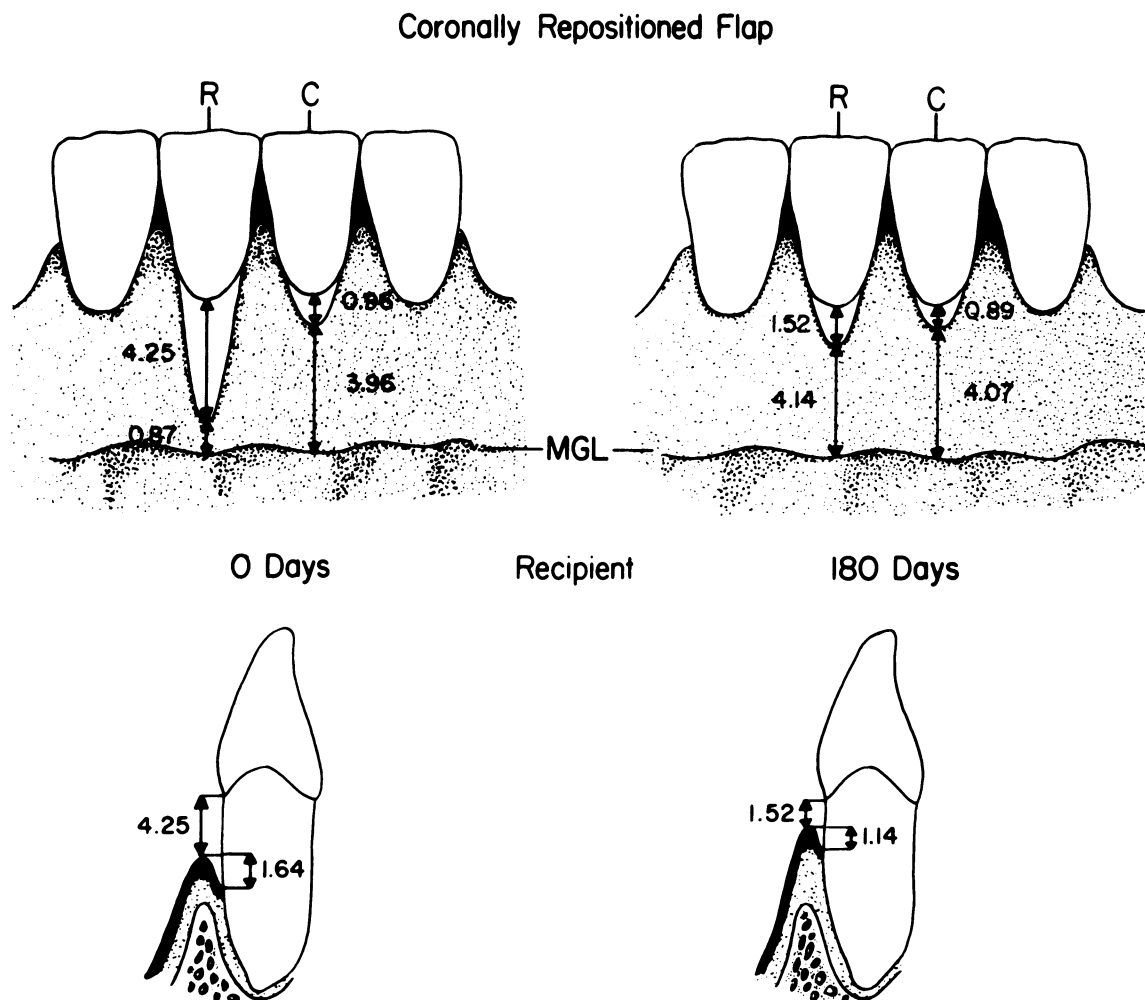


FIGURE 3. Diagrammatic representation of the results obtained with a coronally repositioned flap and a free gingival graft.

was 2.42 mm ranging from 1 mm to 6 mm, while in the present study it was 4.25 mm, ranging from 2.5 mm to 6 mm.

These two biometric studies also found that the sulcus depth on the recipient tooth is not significantly reduced after surgery. The insignificant pocket reduction after surgery could be due to the fact that in both studies the recipient teeth were scaled and planed prior to surgery. Consequently, the sulcus depth was initially reduced.

Harvey¹⁴ and Restrepo⁷ reported good clinical results in covering multiple recessions, with or without pocketing respectively, after performing a coronally repositioned flap without a free gingival graft. The procedure was done where a sufficient zone of attached gingiva was available preoperatively. The results of this technique have not been experimentally tested but its predictability does not seem to be that high in covering multiple gingival recessions associated with periodontal disease, due to the absence of interproximal bone to support the soft tissues.

SUMMARY

Fourteen teeth with localized gingival recessions were treated using a coronally repositioned flap with a free gingival graft (Bernimoulin, 1973). The second step of

the procedure was performed 1 month after the free gingival graft was done. Clinical measurements of the recession, sulcus depth and keratinized gingiva were taken preoperatively and at 30, 90 and 180 days after surgery.

A mean reduction in the recession of 2.73 mm was obtained after 6 months, which was equivalent to a 64% decrease of the original recession. A significant increase in the width of the keratinized gingiva, averaging 3.27 mm, was found after 6 months. All results remained stable after 30 days postoperatively.

The values for gingival recession, sulcus depth and width of keratinized gingiva on the teeth adjacent to the recessions remained unchanged, since they were undisturbed by the procedure.

CONCLUSIONS

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

1. The coronally repositioned flap with a free gingival graft provides a satisfactory solution in the treatment of localized gingival recessions.
2. The coronally repositioned flap will not produce any changes on the gingiva of the teeth neighboring the recession.

3. The 1-month postoperative results permit an evaluation of the coronally repositioned flap, since results remain stable afterwards.

REFERENCES

1. Norberg, O.: Ar en utlakning utan vavnadsforlust otankbar vid kirurgisk behandling av s. k. alveolarpyorrhoe? *Sven Tandlak Tidsskr* 19: 171, 1926.
2. Kalmi, J., Moscor, M., and Goranov, Z.: The solution of the aesthetic problem in the treatment of periodontal disease of anterior teeth: Gingivoplastic operation. *Paradentologie* 3: 53, 1949.
3. Patur, B., and Glickman, I.: Gingival pedicle flaps for covering root surfaces denuded by chronic destructive periodontal disease. A clinical experiment. *J Periodontol* 29: 51, 1958.
4. Nordenram, A., and Landt, H.: Evaluation of a surgical technique in the periodontal treatment of maxillary anterior teeth. *Acta Odontol Scand* 27: 283, 1969.
5. Harvey, P.: Management of advanced periodontitis. Part I. Preliminary report of a method of surgical reconstruction. *NZ Dent J* 61: 180, 1965.
6. Brustein, D.: Cosmetic periodontics. Coronally repositioned pedicle graft. *Dent Surv* 46: July, 22, 1970.

Abstracts

THE EFFECT OF CIGARETTE SMOKE ON HUMAN ORAL POLYMORPHONUCLEAR LEUCOCYTES

Kenney, E. B., Kraal, J. H., Saxe, S. R., and Jones, J.
J Periodont Res 12: 227, July, 1977.

Using a group of nine smokers and nine nonsmokers, saline mouth rinses were employed to extract the oral polymorphonuclear leucocytes (PMN) on three consecutive days using identical procedures throughout except that one cigarette was smoked on the second day immediately prior to rinsing. The results indicated that cigarette smoking can cause a 75% reduction in oral PMN phagocytosis of latex spheres. A 20% reduction in cell vitality was shown by a Tryptan blue dye exclusion test. Smoking only one cigarette, as on day 2, resulted in diminished PMN ability for phagocytosis and dye exclusion, indicating that only one cigarette had a lasting effect for at least 24 hours even on nonsmokers. This study strongly pointed to the fact that cigarette smoke exhibited a chronic impairment for oral polymorphonuclear leucocytes in their ability for proper function. *Department of Periodontics, College of Dentistry, University of Kentucky, Lexington, Kentucky 40506* Dr. Michael S. Dwyer

THE PROBLEMS OF PATIENTS WITH CARDIOVASCULAR DISEASE UNDERGOING DENTAL TREATMENT

Glasser, S. P.
J Am Dent Assoc 94: 1158, June, 1977.

Cardiovascular disease and its relationship to the dental practice was discussed in a series of questions and answers most commonly asked by the dentist to the cardiologist in the treatment of their patients. Contraindications to any dental procedure were acute or recent myocardial infarction, unstable angina pectoris, congestive heart failure, arrhythmia and uncontrolled hypertension. The anesthetics recommended were those that minimized apprehension and reduced the amount of endogenous epinephrine excretion. The use

of vasoconstrictor in local anesthesia was described as safe as long as it was administered carefully and aspirated frequently. Precautions needed in patients that have received anticoagulant therapy were described along with safeguards to minimize bleeding. Prophylactic coverage with antibiotics for those with structural lesions of the heart such as in rheumatic fever, congenital heart disease and nonfunctional heart murmurs was discussed. A list of the drugs important to the dentist which were described included sodium warfarin, antihypertensives, nitroglycerin, saliva inhibiting drugs, digitalis, and propranolol. Emergency symptoms include fainting, chest pain, persistent breathlessness, or prolonged unconsciousness. *Cardiac Non-invasive Laboratory, University of South Florida College of Medicine, Department of Internal Medicine, 13000 North 30th Street, Tampa, FL 33612*

VARIABLE ANTIGENICITY OF LYOPHILIZED ALLOGENIC AND LYOPHILIZED XENOGENEIC SKIN IN GUINEA PIGS

Yukna, R. A., Turner, D. W., and Robinson, L. J.
J Periodont Res 12: 197, May, 1977.

Suspensions of xenogenic human freeze dried skin (XFDS) and allogeneic freeze dried skin (AFDS) were administered to various groups of outbred female guinea pigs in order to evaluate the maximum host immunologic response. At 24 and 48 hours following intradermal testing with saline, appropriate FDS demonstrated positive skin reactions to the XFDS substances and no reaction to the AFDS substances, as measured with control results. The fact that in this study *in vitro* findings utilizing serological and migration inhibitor factor assays were similar to those of the skin tests indicates that seemingly biocompatible allogeneic FDS grafts appear to be immunologically preferable to the hostsensitive xenogenic FDS grafts for intraoral use. *Department of Periodontology, Louisiana State University, School of Dentistry, New Orleans, LA 70119*