

## Case Series

# Prevention of Gingival Recession Following Flap Debridement Surgery by Subepithelial Connective Tissue Graft: Consecutive Case Series

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**Background:** Surgical debridement with flap repositioning may result in significant gingival recession. This manuscript reports on a series of cases that were treated for deep periodontal pockets by flap debridement surgery combined with subepithelial connective tissue graft for the prevention of postoperative recession.

**Methods:** Fourteen patients (27 teeth) with deep periodontal pockets and bone loss in the mandibular central incisors area underwent flap debridement combined with subepithelial connective tissue graft. Probing depth, recession depth, and clinical attachment levels were recorded prior to surgery, 6 months post-surgery, and again 19 to 58 months post-surgery.

**Results:** Mean probing depth at baseline was 6.20 mm, while 6 months post-surgery it was 1.97 mm ( $P < 0.0001$ ), and 19 to 58 months after surgery it was 1.32 mm. Clinical attachment level measurements followed the same pattern (baseline 9.37 mm, 6 months 3.29 mm, final examination 2.00 mm). While the mean recession depth at baseline was 3.17 mm, 6 months post-surgery it was reduced to 1.30 mm ( $P < 0.0001$ ). Additional reduction in recession depth was recorded over time.

**Conclusion:** Within the limitations of a single group study, the results suggest that flap debridement combined with subepithelial connective tissue graft, followed by maintenance therapy, is an effective procedure for maintaining long-term periodontal health and for prevention of postoperative gingival recession in the mandibular anterior dentition. J Periodontol 2004;75: 757-761.

### KEY WORDS

Follow-up studies; gingival recession/prevention and control; grafts, connective tissue; grafts, subepithelial; periodontal diseases/prevention and control; surgical flaps.

Surgical debridement is a common procedure for teeth with deep periodontal pockets and horizontal bone loss. This procedure is indicated when pocket elimination is undesirable, particularly in the anterior dentition, due to esthetic considerations. However, surgical debridement with flap repositioning may also result in significant gingival recession.<sup>1</sup> This postoperative recession was found to correlate with initial probing depth; i.e., it was greater in sites with deeper periodontal pockets.<sup>2</sup> Several explanations were suggested for the postoperative recession including the lack of bone support for the flap, thin gingival tissue with limited blood supply, and postoperative shrinkage of the flap.<sup>2,3</sup> The postoperative recession may lead to teeth hypersensitivity and unesthetic results, and its prevention should be considered as one of the goals of flap debridement surgery.

Subepithelial connective tissue grafts have been used to treat buccal gingival recessions for many years. The main indications are insufficient keratinized tissue, esthetic considerations, root hypersensitivity, and shallow caries lesions involved the root surface. The results of subepithelial connective tissue graft in terms of root coverage<sup>4-6</sup> and clinical attachment gain<sup>7-9</sup> were found in clinical trials to be clinically significant. Histological evidence of new attachment was also reported after treating root recessions using connective tissue grafts by several investigators.<sup>6,10-12</sup> Based on the existing evidence, we hypothesized that use of subepithelial connective tissue graft under the buccal flap in the mandibular incisor region during flap debridement surgery may prevent postoperative recession.

The present manuscript reports on a series of cases in which flap debridement surgery of the mandibular anterior incisor region was combined with subepithelial connective tissue graft. The cases were treated for deep periodontal pockets with horizontal bone loss.

### MATERIALS AND METHODS

#### Patient Selection

All the patients were referred to our institution for periodontal treatment. The biographical and historical data of all patients were recorded, including age, gender, smoking history, history of previous periodontal treatment, and patient's complaints. All patients received oral

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hygiene instructions and scaling and root planing as part of their initial phase of periodontal treatment. During periodontal reevaluation, patients were selected for the surgical procedure if they had a clinical probing depth  $\geq 5$  mm in the mandibular incisors, presence of bleeding on probing, and radiographic bone loss. Fourteen patients

(27 teeth) underwent the procedure. The patients included nine females and five males, 19 to 46 years old, seven of whom were smokers (50%), and more than one tooth was operated in nine of the patients (64%). Patient age, gender, and smoking status are presented for the 14 consecutively treated patients (Table 1).

**Table 1.**

**Clinical Data at Baseline, 6 Months, and Final Examination**

Patient	Age	Gender	Smoker	Tooth	Before Treatment			6-Month Examination			Final Examination			Months
					PD	REC	CAL	PD	REC	CAL	PD	REC	CAL	
1	34	F	N	31	6	3	9	3	1	4	2	1	3	27
				41	5	2	7	3	1	4	1	1	2	27
2	45	F	Y	31	7	2	9	1	1	2	1	1	2	32
				41	7	3	10	1	0	1	1	0	1	32
3	39	F	Y	31	7	3	10	0	1	1	0	0	0	58
				41	5	3	8	1	1	2	0	1	1	58
4	33	M	N	31	5	4	9	2	2	4	2	1	3	46
				32	7	3	10	2	2	4	2	1	3	46
				41	6	3	9	3	2	5	2	1	3	46
5	27	F	Y	41	5	4	9	2	2	4	1	1	2	23
6	32	M	Y	31	7	4	11	3	2	5	2	1	3	29
				41	7	3	10	2	2	4	1	1	2	29
7	28	M	N	33	8	3	11	2	2	4	2	1	3	26
				32	6	2	8	2	1	3	1	0	1	26
8	42	F	N	43	6	4	10	2	1	3	1	1	2	22
9	23	F	Y	32	7	3	10	3	1	4	2	0	2	41
10	46	M	N	32	6	2	8	2	1	3	2	1	3	37
				31	7	2	9	3	1	4	2	1	3	37
				41	7	3	10	2	1	3	2	0	2	37
				42	6	2	8	2	1	3	1	0	1	37
11	25	F	N	43	6	4	10	2	1	3	1	0	1	19
				32	5	3	8	1	1	2	1	1	2	19
12	19	F	N	41	6	3	9	2	2	4	1	1	2	27
13	24	F	Y	32	5	4	9	2	1	3	1	1	2	30
				31	5	3	8	1	1	2	1	1	2	30
				41	6	3	9	2	2	4	2	1	3	30
14	35	M	Y	41	7	4	11	2	1	3	2	1	3	24

### Surgical Procedure

Following local anesthesia, an intrasulcular incision was made. A full thickness flap was reflected to the mucogingival junction, and continued with a partial thickness dissection. The granulation tissue was removed and the roots were carefully planed using curets. Connective tissue was harvested from the palate using the “trap door” technique,<sup>13</sup> shaped and positioned under the coronal part of the buccal flap, over the alveolar bone (Fig. 1). In some cases, the connective tissue extended coronally from the flap to cover exposed root surfaces. The flaps were repositioned (with no attempt to coronally position the gingival margins) and sutured.

The postoperative protocol emphasized wound stability and infection control, including the use of amoxicillin (1.5 gram per day for 1 week) and rinsing with 0.2% chlorhexidine solution (10 ml/min/b.i.d. for 2 weeks). Sutures were removed 2 weeks postsurgery. Mechanical plaque control in the surgical area was reinstituted after suture removal. Professional plaque

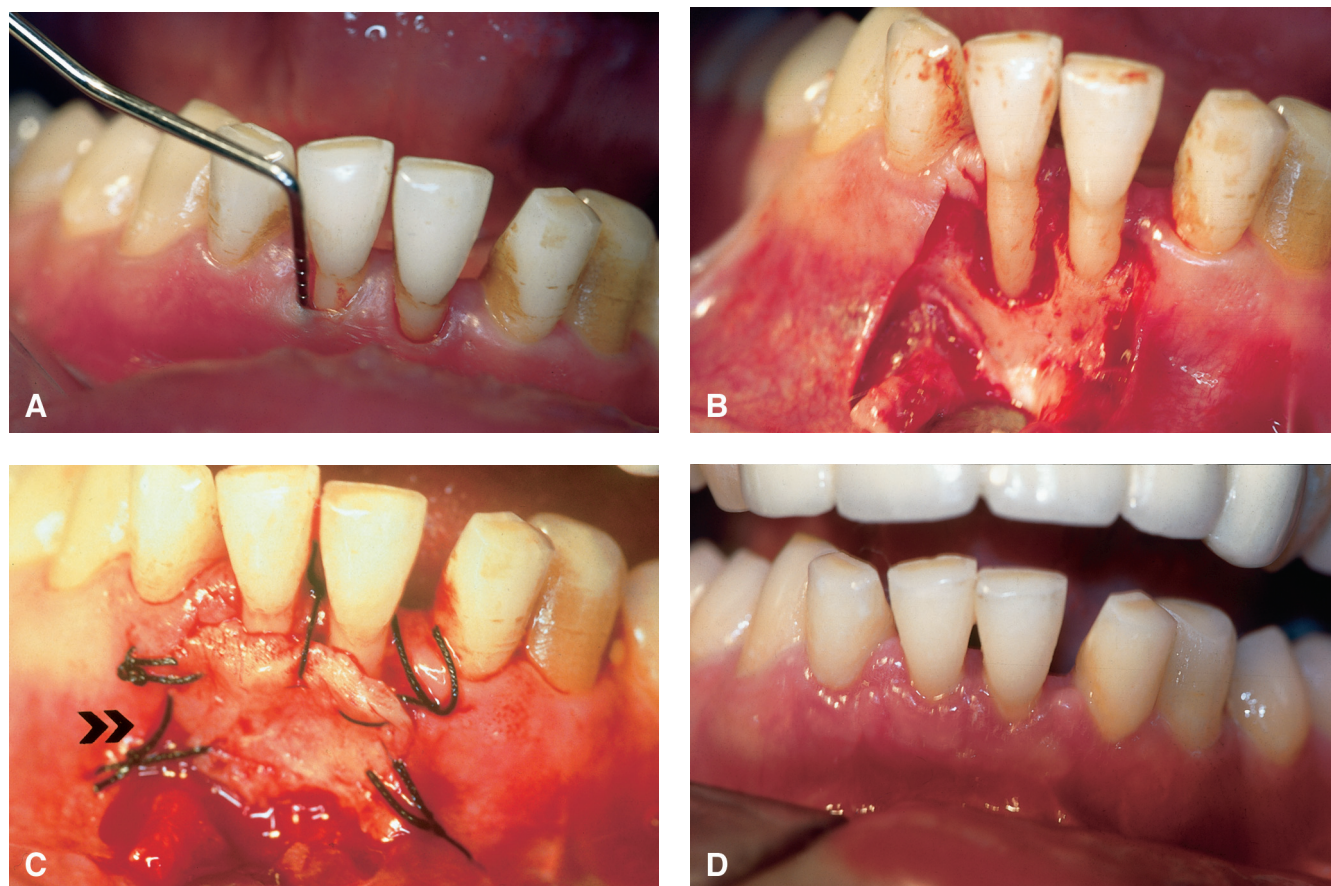
removal was carried out every 2 weeks during the first month, followed by 2-month intervals for the first year. After the first year, patients were placed on a 3-month maintenance schedule.

### Clinical Measurements

All the clinical measurements were carried out by one periodontist (not blinded to the procedure). Probing depth (PD), recession depth (REC), and clinical attachment (CAL) levels were recorded using a UNC 15 periodontal probe to the nearest millimeter. Measurements were taken at baseline (prior to surgery), 6 months postsurgery, and once again 19 to 58 months postsurgery.

### Statistical Analysis

Statistical analysis of the clinical parameters was carried out to compare the baseline values with the 6-month postoperative values, using paired Student *t* test, with the Bonferroni correction for multiple statistical tests. The patient was the unit of analysis. When



**Figure 1.**

A representative case from the study population. **A)** Clinical photograph demonstrating a 7 mm probing depth and 3 mm recession on mandibular central incisors. **B)** The flap was reflected and extensive bone resorption with a 2 mm intrabony defect was found adjacent to the left mandibular central incisor. **C)** A subepithelial connective tissue graft harvested from the palate was positioned to cover the bone defect. **D)** Clinical photograph 4 years post-surgery. A band of 5 mm of attached gingiva was clinically detectable, and 4 mm gain of clinical attachment was registered on the mandibular central incisors; a decrease of 3 mm in recession was also recorded.

more than one tooth was treated in a patient, the patient mean values were taken into the analysis.

## RESULTS

The individual results of the 27 consecutively treated teeth in 14 patients are summarized in Table 1. The mean results ( $\pm$  standard deviation) based on the patient as the unit of analysis are presented in Figure 2.

### Probing Depth

Mean probing depth at periodontal reevaluation (baseline) was  $6.20 \pm 0.71$  mm (range 5 to 8 mm), while 6 months post-surgery the mean probing depth was  $1.97 \pm 0.68$  mm (range 0 to 3 mm). The differences between the two measurements were found to be significant ( $P < 0.0001$ ).

The reduction in probing depth continued over time, but with a lower rate compared to the first 6 months. The final measurement, 19 to 58 months after the surgical treatment, was  $1.32 \pm 0.55$  mm (range 0 to 2 mm). As seen in Table 1, the results were consistent from patient to patient.

### Recession Depth

The mean recession depth at baseline measurements was  $3.17 \pm 0.60$  mm (range 2 to 4 mm). Six months post-surgery, the mean recession depth was reduced to  $1.30 \pm 0.50$  mm (range 0 to 2 mm,  $P < 0.0001$ ). Additional reduction in recession depth was recorded over time, and at the final measurements it improved to a mean of  $0.75 \pm 0.32$  mm (range 0 to 1 mm).

### Clinical Attachment Level

Similar improvement was observed in clinical attachment level values after the surgical therapy. At baseline,

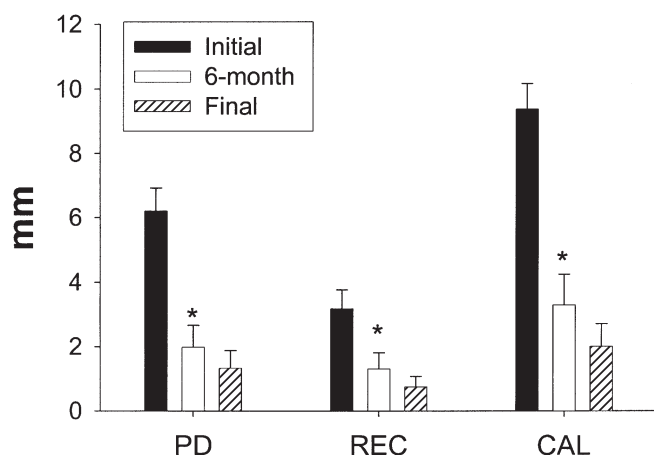
mean clinical attachment level was  $9.37 \pm 0.79$  mm (range 7 to 11 mm), while 6 months post-surgery it was  $3.29 \pm 0.95$  mm (range 1 to 5 mm,  $P < 0.0001$ ), and at the final examination, a mean of  $2.00 \pm 0.70$  mm was recorded (range 0 to 3 mm).

## DISCUSSION

The combination of flap debridement surgery with buccal subepithelial connective tissue grafts in the mandibular anterior dentition was found to be an effective method to prevent postoperative gingival recession. Several studies reported that periodontal surgical procedures resulted in postoperative recession. Isidor et al.<sup>14</sup> compared the clinical results of root planing to modified Widman flap and reverse beveled flap without osseous surgery. At the 3- and 6-month examinations, the surgical procedures showed statistically significant reduction in probing depth and clinical attachment level gain. However, the surgical procedures resulted in a significant recession compared to baseline (2.2 mm for modified Widman flap, 2.4 mm for osseous surgery, and 1.8 mm for root planing). Kaldahl et al.<sup>15</sup> also reported that statistically significant recession occurs for several surgical modalities, such as flap debridement, osseous surgery, and root planing (1.2 mm, 1.5 mm, and 0.8 mm, respectively). More recently, Becker et al.<sup>2</sup> in a longitudinal study compared the clinical outcomes of scaling, osseous surgery, and modified Widman procedures. After 5 years, they found a significant reduction in probing depth and improvement in clinical attachment level, but with a significant post-surgical recession (mean of 1.28 mm, 2.18 mm, and 1.70 mm for each modality respectively). In contrast, the procedure presented here reduced probing depth and improved clinical attachment recession levels.

The clinical outcome of the present case series confirmed the results of the previous studies that flap debridement induced substantial improvement in probing depth and clinical attachment level. However, the mean improvement in clinical attachment level was greater using the combination of flap debridement and subepithelial connective tissue graft, as compared to the previous studies that performed flap debridement surgery alone.<sup>16,17</sup> It is possible that the use of connective tissue graft improved the healing process by inducing new connective tissue attachment. Indeed, Nelson,<sup>18</sup> in a 9- to 13-year retrospective study, reported that the use of connective tissue graft as a barrier membrane for treating intraosseous defect improved the clinical attachment level of the treated teeth.

Most of the improvements in clinical parameters were achieved during the first 6 months after surgery. However, the reduction in the clinical parameters continued until 19 to 58 months post-surgery, although the rate of improvement was less than in the first 6 months. The additional improvement might be due



**Figure 2.**

Changes in mean probing depth, recession, and clinical attachment level over time. \*Six-month measurements are significantly different from baseline ( $P < 0.0001$ ).



to the maintenance treatment and the patients' good oral hygiene compliance.

In conclusion, the results of the present case series suggest that flap debridement combined with subepithelial connective tissue graft, followed by maintenance therapy, is an effective procedure for maintaining long-term periodontal health and prevention of postoperative gingival recession in the mandibular anterior dentition. However, one must realize that the present study was a single-arm study without a control group, and controlled clinical studies are needed to prove the superiority of this procedure over other surgical modalities.

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Accepted for publication October 6, 2003.