Case Series

A Novel Approach to Minimizing Gingival Recession in the Treatment of Vertical Bony Defects

Giovanni Zucchelli* and Massimo De Sanctis†

Background: *In ideal conditions, the gain in clinical attachment following regenerative therapy of infrabony defects should be equal to probing depth reduction; thus, gingival recession should not increase as a consequence of the treatment procedures. The goal of the study was to evaluate the effectiveness of a surgical technique for the treatment of intrabony defects aimed at minimizing gingival recession and increasing the potential for clinical periodontal regeneration.*

Methods: *Fifteen deep intrabony defects were treated with cause-related therapy aimed at eliminating bleeding on probing in the surgical area with minimal mechanical trauma to the root and the soft tissues. Four weeks later, a surgical technique combining the simplified papilla preservation approach at the level of the defect and the coronally advanced buccal flap at the adjacent teeth was performed. Enamel matrix protein was used in the intrabony defect. Soft tissue measurements were made before cause-related therapy, before and after surgery, and at the 1-, 6-, and 12-month follow-up visits. The clinical reevaluation was made 1 year after the surgery.*

Results: *No changes in the position of the buccal and interproximal soft tissues next to the defect area were observed before and after cause-related therapy or when comparing the baseline (before surgery) and 1-year follow-up visits. The clinical attachment gain (5.9 ± 1.4 mm), probing depth reduction (6.0 ± 0.8 mm), and radiographic bone level gain (5.0 ± 0.5 mm) were statistically and clinically significant, whereas no statistically significant increase in gingival recession (0.1 ± 1.0 mm) was noted during the observation period.*

Conclusions: *It is possible to avoid statistically and clinically significant changes in the position of the soft tissues when treating vertical bony defects. This can be accomplished by minimizing soft tissue trauma during cause-related therapy and by advancing the buccal flap coronally during the surgery.* J Periodontol 2008; 79:567-574.

KEY WORDS

Case series; defects; gingival recession; regeneration; surgery; surgical flaps.

* Department of Odontostomatology, Bologna University, Bologna, Italy.
† Department of Periodontology, Siena University, Siena, Italy.

The ultimate goal in periodontal therapy is the regeneration of tooth-supporting apparatus that has been destroyed as a result of periodontal disease.[1] Periodontal regeneration is defined histologically as regeneration of the tooth's supporting tissues, including alveolar bone, periodontal ligament, and cementum, over a previously diseased root surface.[2] Clinically, periodontal regeneration can be measured by calculating the difference between the baseline and the follow-up clinical attachment level (CAL) values. This difference is called CAL gain.[3]

In ideal conditions, the gain of clinical attachment following regenerative therapy of infrabony defects should be equal to probing depth (PD) reduction; thus, gingival recession should not increase as a consequence of the treatment procedures.

Furthermore, gingival recession represents the patient's main complaint when treating the anterior segments of the mouth. Therefore, minimizing gingival recession must be considered one of the principal goals, from biologic and clinical perspectives, when treating periodontal defects with regenerative potential. This objective holds true when performing periodontal surgery as well as during cause-related therapy when treating the soft tissues covering and next to the intrabony defect designated to undergo periodontal surgery. During cause-related therapy, the risk for traumatizing the soft tissues and causing gingival recession always must be taken into account.

The aim of the present study was to describe a surgical technique for the treatment of periodontal intrabony defects with the main goal of minimizing soft tissue recession.

MATERIALS AND METHODS

Fifteen subjects affected by severe chronic periodontitis[4] with at least one isolated vertical bony defect located in the interproximal area (radiographic intrabony component ≥4 mm) of the anterior segments (upper or lower) of the mouth were enrolled in the study. The participants were selected consecutively among patients seeking care for moderate to advanced

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periodontal disease at two private practices located in Florence and Bologna, Italy between February and June 2005. Subjects with systemic disease, those who were treated previously with periodontal surgical or non-surgical procedures, and those smoking >20 cigarettes/day were excluded from the study. All subjects gave informed consent to participate in this clinical trial.

After full-mouth cause-related therapy, the intrabony defects were treated with regenerative periodontal surgery, and the clinical outcomes were followed longitudinally for 1 year.

Radiographic Measurements

Commercially available film holders‡ and customized acrylic-made bite blocks were used to take standardized radiographs of all tooth regions included in the study. Periapical radiographs§ were taken immediately before surgery and at the 1-year follow-up visit.

Linear radiographic measurements included the depth of the intrabony component of the defect (DEPTH), measured as the vertical distance (in millimeters) from the bone crest to the most apical extension of the defect where the periodontal ligament space was considered having a normal width, and the vertical width of the defect (ANGLE), determined (in degrees) as the angle defined by the root surface and the vertical bony wall of the defect.[5]

Radiographic measurements were performed with 4× magnification lenses by a single calibrated examiner who was different from the operators. DEPTH measurements, made with a manual ruler, were rounded up to the nearest millimeter; ANGLE measurements, performed with a manual goniometer, were rounded up to the nearest degree.

Clinical Characterization of Subjects and Selected Sites

The full-mouth plaque score (FMPS) was recorded as the percentage of total surfaces (four aspects per tooth) with plaque.[6] BOP was assessed dichotomously at a force of 0.3 N with a pressure-sensitive manual periodontal probe.‖ The full-mouth bleeding score (FMBS) was recorded as the percentage of total surfaces (four aspects per tooth) with BOP.

The following clinical measurements were taken at the level of the tooth with the intrabony defect at the time of surgery (baseline data) and at the final examination that was performed 1 year after surgery: CAL, measured from the cemento-enamel (CEJ) junction to the tip of the probe; PD, measured from the gingival margin to the tip of the probe; and marginal gingival recession (REC), measured from the CEJ to the gingival margin.

CAL, PD, and REC measurements were performed at six sites around all teeth. However, this study reports only local measurements at the deepest interproximal point of the selected defects.

The following soft tissue measurements were performed before cause-related therapy; before and at the end of surgery; and 1, 6, and 12 months after surgery): the distance between the occlusal and the buccal gingival margin at the tooth with the intrabony defect (O-GMd); the distance between the occlusal and the buccal gingival margin at the tooth adjacent to the defect (O-GMa); and the distance between the occlusal margin and the tip of the interdental papilla at the tooth with the intrabony defect (O-P).

All measurements were performed by means of a manual pressure-sensitive probe and were rounded up to the nearest millimeter. The same single investigator, masked with respect to the treatments, performed the clinical measurements at baseline and at the various follow-up visits.

Clinical Measurements at the Time of Surgery

The following clinical measurements were taken at the time of the surgery immediately after debridement of the defects:[7] distance from the CEJ to the bottom of the defect (CEJ-BD) and distance from the CEJ to the most coronal extension of the bone crest (CEJ-BC). The intrabony component of the defects was defined as CEJ-BD – CEJ-BC.

Cause-Related Therapy

Cause-related therapy in the rest of the mouth. The rationale for the cause-related therapy in the rest of the mouth was to minimize periodontal infection in the subject's mouth before performing periodontal regenerative surgery at the level of the intrabony defect. Thus, the primary objectives were to reduce the subject's FMPS and FMBS to <20% and to decrease PD. These objectives were accomplished by supragingival and deep scaling and root planing; surgical therapy was performed in sites where these procedures were not successful in reducing deep PD. No regenerative surgical procedure was scheduled until the subject's FMPS and FMBS were <20%.

Cause-related therapy in the surgical area. The goal of cause-related therapy in the area scheduled for regenerative surgery (surgical area) was to eliminate inflammation and to minimize the shrinkage of the soft tissues covering and next to the intrabony defect. The extension of the surgical area varied in relation to the location of the intrabony defect. For defects located mesial/distal to the central incisors or mesial to the lateral incisors, the flaps were extended from canine to canine. For defects located distal to the lateral incisors (distal to the lateral incisor, mesial to the canine, distal to the canine, mesial to the first premolar, and so forth), the flaps were extended from the central incisor to the first molar.

‡ Rinn centering device, Dentsply, Weybridge, U.K.
§ DF-55, Eastman Kodak Company, Rochester, NY.
‖ Brodontic probe equipped with a PCP-UNC 15 tip, Hu-Friedy, Chicago, IL.

The objectives of cause-related therapy in the surgical area were to eliminate supragingival plaque and calculus deposits (plaque index = 0 in the surgical area) and to eliminate BOP in the defect area and the other sites next to the defect area.

The elimination of supra- and subgingival bacterial plaque and calculus was achieved by means of ultrasonic devices. Small and thin ultrasonic instruments¶ were used to debride the root surface. This point is thin, with rounded edges, and straight like the periodontal probe. It was designed specifically to reduce trauma to the root and soft tissues.

The primary objective of cause-related therapy in the defect area was to eliminate inflammation in the soft tissue extending from the tip of the interdental papilla to the bone crest (supracrestal soft tissues) without causing trauma to the interdental papilla covering the intrabony defect. Regenerative surgery was not scheduled until complete elimination of BOP was achieved. The regenerative surgery was scheduled 4 weeks after completing cause-related therapy in the surgical area.

Surgical Procedure (Fig. 1)

The surgical approach adopted to gain access to the intrabony defect was the simplified papilla preservation,[8] whereas the buccal flap was designed in a similar manner to the coronally advanced flap used for the treatment of multiple recession defects in soft tissue plastic surgery (Fig. 1A).[9] The rationale for the coronal advancement of the buccal flap was to reduce tension and minimize the risk for recession at the level of supracrestal soft tissue covering the intrabony defect.

An envelope-type flap was made at the buccal and the lingual/palatal aspects; the flaps were extended from the mesial aspect of the central incisor to the mesial surface of the first molar in the case of vertical bony defects located distal to the lateral incisors or from canine (distal aspect) to canine in the case of intrabony defects mesial to the lateral incisor or located between the central incisors. The extended dimension of the flap allows for an adequate coronal advancement of the buccal flap, without the need for vertical releasing incisions.[9] Some clinical and biologic advantages result from the use of the envelope-type flaps. Vertical releasing incisions are avoided so as not to damage the blood supply to the flap; this is of paramount importance in regenerative procedures in which the stability of the surgical margin is critical for the success of the surgery. Furthermore, vertical releasing incisions often result (after healing) in unesthetic visible white scars that can be even more unsatisfactory for the patient. A simplified papilla preservation approach[8] was used in the interproximal space of the vertical bony defect. The entire interproximal supracrestal soft tissue was elevated full thickness as part of the flap and was displaced palatally/lingually (Fig. 1B).

At the level of the other teeth included in the flap design, the incision was that used for treating multiple gingival recessions:[9] intrasulcular at the buccal surfaces and submarginal in the interdental areas. The buccal flap was raised by means of a split-full-split thickness approach in the coronal-apical direction (Fig. 1C). The interdental tissue (surgical papillae) was dissected split-thickness up to the level of the buccal bone crest; the buccal gingival tissue was elevated full-thickness to expose 3 to 5 mm of buccal bone, whereas the most apical portion of the flap was elevated split-thickness to facilitate the coronal displacement of the buccal flap. The remaining facial portion of the anatomic papillae was maintained in situ and disepithelized to create connective tissue beds to which the surgical papillae of the coronally advanced buccal flap were secured at the time of suturing.

In the lingual flap, the papillae mesial and distal to the defect area were dissected with submarginal split-thickness incisions, taking care to maintain the interdental soft tissue in situ. This tissue provided anchorage for the surgical papillae of the lingual flap at the time of suturing (Fig. 1D).

The lingual/palatal flap, together with the supracrestal soft tissue, was elevated full-thickness, exposing up to 3 to 5 mm of palatal/lingual bone. Flap (buccal and lingual) elevation was considered adequate when the entire vertical bone defect was accessible for instrumentation.

Following careful scaling and root planing, the exposed root surface was conditioned with a 24% EDTA gel for 2 minutes to remove the smear layer. Subsequently, the root was rinsed with saline. An enamel matrix protein (EMP)# gel was applied gently on the exposed root surface in the apical-coronal direction and left in place for 2 minutes (Fig. 1E). A blunt dissection into the vestibular lining mucosa was carried out to eliminate muscle tension and to permit coronal displacement of the buccal flap. Flap mobilization was considered adequate when the marginal portion of the flap was able to passively reach a level coronal to the CEJ and the surgical papillae were covering the disepithelized anatomic papillae. At the same time, the supracrestal soft tissue was repositioned, joining the buccal surgical papilla without any tension.

Single interrupted (7-0) sutures** were used to anchor the surgical papillae to the corresponding disepithelized anatomic papillae (Fig. 1F). Because of the absence of tension or muscle pull, the interrupted sutures were able to stabilize the flaps so effectively that there was no need for the internal mattress suture.[8] A

¶ PS point, Electro Medical Systems, Nyon, Switzerland.
# Emdogain, Biora, Straumann Group, Malmo, Sweden.
** Vicryl, Johnson & Johnson, Woluwe, Belgium.

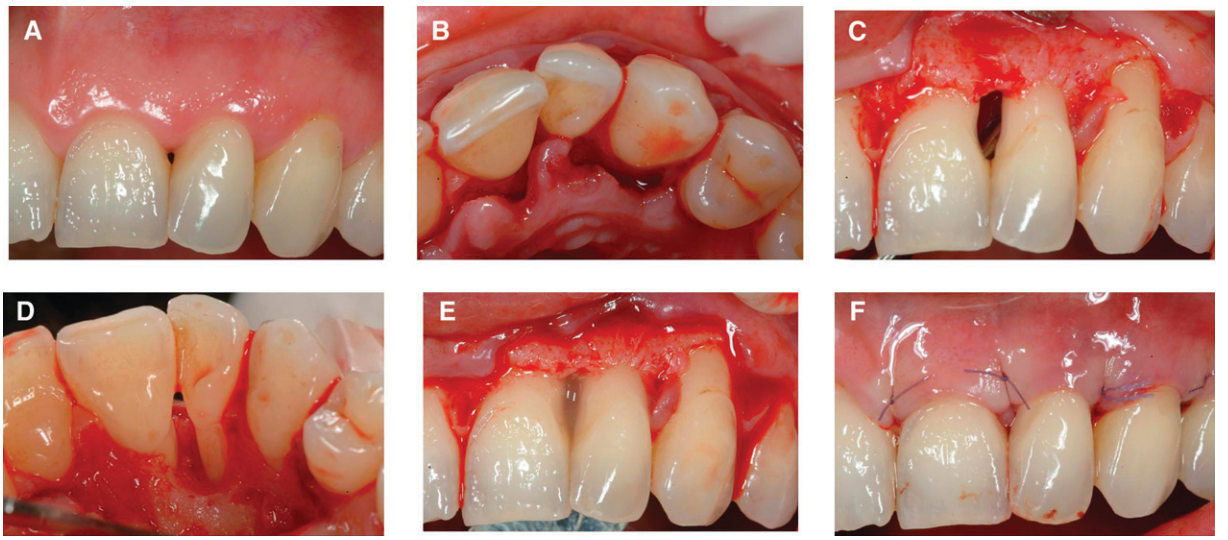

Figure 1.
Surgical procedure. ***A)*** *The buccal flap has been raised with a split-full-split approach already adopted in soft tissue plastic surgery.* ***B)*** *Simplified papilla preservation: the supracrestal soft tissue was moved palatally and elevated with the palatal flap.* ***C)*** *Buccal view of the intrabony defect after degranulation and root planing.* ***D)*** *Palatal view of the bony defect.* ***E)*** *EMP was applied to the detached root surfaces.* ***F)*** *Suture of the buccal flap.*

single interrupted suture was used to connect the supracrestal soft tissue to the buccal surgical papilla (Fig. 1F).

Infection Control

The subjects received systemic antibiotic therapy†† (amoxicillin plus clavulanic acid, 1 g/day) for 7 days, starting the day before the surgery. Sutures were removed 14 days following surgery.

All subjects were instructed to rinse the mouth with a 0.20% solution of chlorhexidine twice a day for 8 weeks; during this period, they were recalled once a week for professional tooth cleaning.

Plaque Control

When chlorhexidine was discontinued, full mechanical interproximal cleaning was reinstituted in the surgically treated area. Patients were recalled for professional tooth cleaning and reinforcement of self-performed oral hygiene measures at 1-month intervals for 1 year post-treatment. No attempt at probing or deep scaling was made before the 1-year follow-up.

Data Analysis

Statistical software‡‡ was used for the statistical analysis. Data were expressed as mean ± SD. The following outcome and predictor variables were defined: CAL gain = baseline CAL – 1-year CAL; DEPTH gain = baseline DEPTH – 1-year DEPTH; PD reduction = baseline PD – 1-year PD; and REC increase = 1-year REC – baseline REC.

The Student *t* test for paired data was used to compare baseline and 1-year clinical parameters (CAL, PD, REC, and DEPTH).

General linear models were fitted, and multiple regression analysis of variance (ANOVA) for repeated measures was used to evaluate any time-dependent variation in O-GMd, O-GMa, and O-P (before cause-related therapy, before surgery, at the time of suturing, and at 1, 6, and 12 months after surgery). The Fisher least-significant difference (LSD) procedure was used to discriminate between the means.

RESULTS

Experimental Population

The mean age of the subjects was 44.2 ± 5.3 years (range: 36 to 54 years); 10 subjects were female, and five were male. The tooth population consisted of six central incisors (four maxillary and two mandibular), four lateral incisors (three maxillary and one mandibular), three cuspids (two maxillary and one mandibular), and two first upper premolars. None of the treated subjects was a smoker.[10]

Baseline Oral Hygiene and Defect Characteristics

Baseline FMPS was 11.8 ± 2.5, whereas FMBS was 10.2 ± 2.2. No BOP was present at the level of the suprabony component of any of the treated defects before surgery.

The selected defects presented with a mean CAL of 10.4 ± 1.1 mm and a mean PD of 9.6 ± 0.7 mm. Baseline mean gingival recession was 0.8 ± 0.8 mm. The mean CEJ-BD was 11.1 ± 1.3 mm, the mean CEJ-BC was 4.2 ± 0.6 mm, and the mean intrabony

†† Augmentin, GlaxoSmithKline, Milan, Italy.
‡‡ SAS, version 6.09, SAS Institute, Cary, NC.

component was 6.9 ± 1.2 mm. The mean defect angle was 42.4° ± 10.3°.

Soft Tissue Measurements (Table 1; Fig. 2)
The results of fitting a general linear model showed a statistically significant relationship among the time-dependent variations of O-GMd (F = 14.9; P <0.01) and O-GMa (F = 16.1; P <0.01), whereas no difference was found concerning O-P (F = 0.75; not statistically significant) (Fig. 3). In particular, the Fisher LSD procedure demonstrated a significant difference between the post-surgical (time of suturing) values and all other time-considered O-GMd and O-GMa values.

Before cause-related therapy, the mean distance from the occlusal margin to the gingival margin at the buccal aspect of the tooth with the intrabony defect (O-GMd) and the adjacent tooth (O-GMa) was 11.1 ± 1.4 mm and 10.9 ± 1.7 mm, respectively, whereas the mean distance from the occlusal margin to the tip of the papilla (O-P) was 6.9 ± 1.5 mm. After cause-related therapy, at the time of the surgery (baseline values), O-GMd was 11.2 ± 1.4 mm, O-GMa was 11.0 ± 1.6 mm, and O-P was 7.1 ± 1.4 mm. No statistically significant difference was demonstrated before and after cause-related therapy for any of the considered clinical measurements.

At the end of the surgery (time of suturing), O-GMd was 9.6 ± 0.8 mm, O-GMa was 9.7 ± 1.2 mm, and O-P was 7.3 ± 0.9 mm. A statistically significant difference was demonstrated between the pre- and post-surgical O-GMd and O-GMa measurements, whereas the difference between the pre- and post-surgical O-P value was not statistically significant.

One month after surgery, O-GMd was 10.8 ± 1.3 mm, O-GMa was 10.6 ± 1.6 mm, and O-P was 7.3 ± 1.1 mm. A statistically significant difference was demonstrated between the post-surgical and 1-month O-GMd and O-GMa measurements, whereas the difference between the O-P values was not statistically significant. No statistically significant difference was found when comparing the GMd, O-GMa, and O-P values at 1, 6, and 12 months (Fig. 2).

Table 1.

Multiple Regression ANOVA for Repeated Measures Relating to the Clinical Measurements (mean ± SD)

	Before CRT	Presurgery	Post-Surgery	1 Month	6 Months	12 Months
O-GMd	11.1 ± 1.4	11.2 ± 1.4	9.6 ± 0.8*	10.8 ± 1.3	11.1 ± 1.2	11.2 ± 1.4
O-GMa	10.9 ± 1.7	11.0 ± 1.6	9.7 ± 1.2*	10.6 ± 1.6	10.8 ± 1.7	10.8 ± 1.7
O-P	6.9 ± 1.5	7.1 ± 1.4	7.3 ± 0.9	7.3 ± 1.1	7.2 ± 1.0	7.0 ± 1.2

CRT = cause-related therapy.
* Statistically significant (Fisher LSD test).

Clinical Outcome at 1 Year (Table 2; Figs. 2 and 4)
Mean CAL gain was 5.9 ± 1.4 mm. The difference between baseline (before surgery) and 1-year CAL was clinically and statistically significant (t = 13.6; P <0.01). Mean PD reduction was 6.0 ± 0.8 mm. The difference between baseline and 1-year PD was statistically significant (t = 23.0; P <0.01). Mean residual pocket at 1 year was 3.6 ± 0.5 mm. No statistically significant increase in gingival recession (0.1 ± 1.0 mm) was noted during the observation period.

Mean DEPTH gain was 5.0 ± 1.2 mm. The difference between baseline (before surgery) and 1-year DEPTH was clinically and statistically significant (t = 13.3; P <0.01).

DISCUSSION

A modified approach for the treatment of intrabony defects was adopted in the present study to minimize gingival recession and increase the potential for clinical attachment gain.

Cause-related therapy in the surgical area, aimed at eliminating BOP and minimizing soft tissue shrinkage, was carried out using specific atraumatic ultrasonic devices. Four weeks later, a surgical technique combining the simplified papilla preservation approach[8] at the level of the defect and the coronally advanced buccal flap[9] at the level of the adjacent teeth included in the surgical area was performed. The study demonstrated that highly successful results in terms of CAL and bone level gain can be achieved together with no increase in gingival recession.

Improved clinical outcomes after periodontal regenerative surgery have been accomplished when surgical techniques specifically designed to achieve and maintain soft tissue closure over the intrabony defect have been developed and used in clinical trials: the papilla preservation techniques.[8,11-13] A common characteristic of these surgical approaches is that the entire interproximal supracrestal soft tissue is elevated as part of the flap and displaced palatally/lingually to gain access to the bony defect. In the presence of a vertical bony defect, the supracrestal soft tissue is separated surgically from the granulation tissues and is used to cover the defect. The presence of thick, high, and wide supracrestal soft tissues facilitates flap management and suturing technique, improves the possibility of achieving and maintaining primary closure in the interdental area, and reduces the risk for soft tissue collapse into the bone defect, thus optimizing the space available for regeneration.[14]

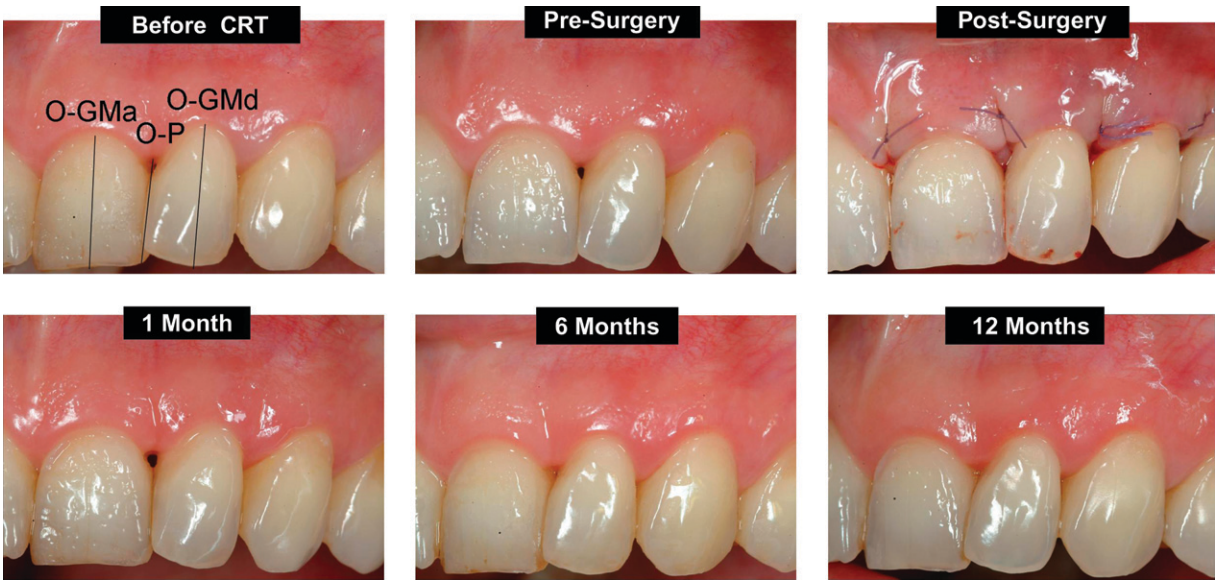

Figure 2.
Comparison of the clinical aspects of the soft tissues before cause-related therapy (CRT), presurgery, at the time of suture (post-surgery), and 1, 6, and 12 months after surgery. No gingival recession was demonstrable when comparing the baseline (presurgery) and the 1-year clinical outcome.

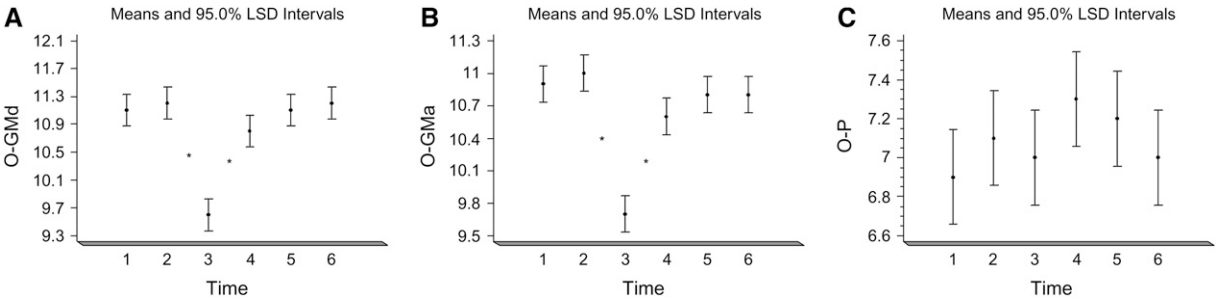

Figure 3.
Time-dependent variations of O-GMd ***(A)****, O-GMa* ***(B)****, and O-P* ***(C)****. 1 = before cause-related surgery; 2 = presurgery; 3 = time of suturing; 4 = 1 month after surgery; 5 = 6 months after surgery; 6 = 12 months after surgery. *P <0.01.*

The importance of supracrestal soft tissue preservation in regenerative procedures has been demonstrated for membrane-supported[8,11,15-17] and EMP-based[14,15,18] surgical procedures, and it was confirmed further by recent data[14,18] that indicated a significant positive correlation between CAL and bone level gains and the amount of interdental supracrestal soft tissues.

The amount of supracrestal soft tissue can be reduced when some gingival recession occurs at the level of the interdental papilla after cause-related therapy. Thus, during this phase of therapy, care must be taken not to traumatize the soft tissues. In the present study, small ultrasonic instruments were used to treat the root surface at the level of the intrabony defect.

Additionally, great care was taken to reduce bleeding and plaque scores in the rest of the mouth. Clinical[19] and microbiological[20] studies have demonstrated that the amount of clinical attachment gained with regenerative surgical procedures is influenced negatively by the overall inflammation scores and by the level of specific periodontopathic microorganisms in the rest of the mouth. For this reason, regenerative surgery of the intrabony defect was not scheduled until patients' plaque and bleeding scores were reduced to <20%.

The main modification of the surgical approach adopted in the present study was the use of a coronally advanced envelope-type buccal flap, which was performed to minimize gingival recession.

In the sites next to the interproximal area with the defect, the buccal flap was advanced coronally with the same design used for treating multiple gingival recessions in soft tissue plastic surgery described by

Table 2.

Multiple Regression ANOVA for Repeated Measures Relating to the Clinical Variables

	Baseline (presurgery)	1 Year	Change	*P* Value	*t**
REC	0.8 ± 0.8	0.9 ± 1.1	0.1 ± 1.0	NS	0.31
PD	9.6 ± 0.7	3.6 ± 0.5	6.0 ± 0.8	<0.01	23.0
CAL	10.4 ± 1.1	4.5 ± 1.1	5.9 ± 1.4	<0.01	13.6
DEPTH	6.8 ± 1.6	1.8 ± 1.0	5.0 ± 1.2	<0.01	13.3

* Student *t* test for paired data.

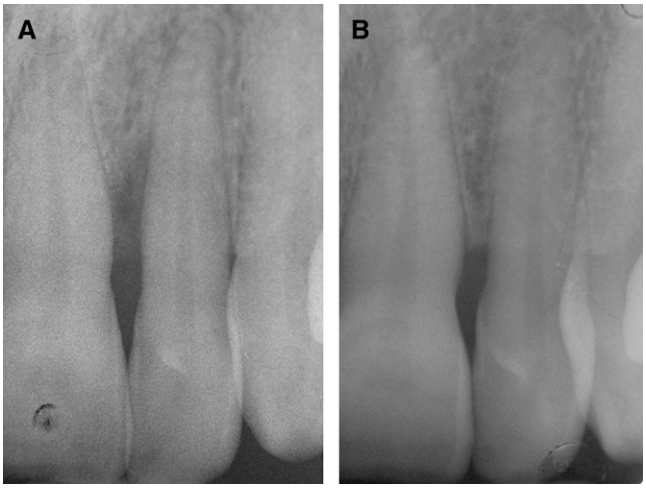

Figure 4.
*Baseline **(A)** and 1-year follow-up **(B)** radiographs: note that complete bone fill was achieved.*

Zucchelli and De Sanctis,[9] given that this is a very predictable technique in maintaining soft tissue height.[21]

The buccal flap, displaced coronally and anchored to the disepithelized papillae adjacent to the defect area, may reduce the risk for supracrestal soft tissue collapse inside the intrabony component of the defect and, thus, increase the space for regeneration.

Furthermore, the dissection of muscle insertions operated during the coronal advancement of the flap reduced the tension on the last interrupted suture closing the supracrestal soft tissue above the intrabony defect, thus reducing the risk for early exposure and contamination of the blood clot. Finally, by minimizing gingival recession, the coronal displacement of the buccal flap may improve the esthetic outcome of the regenerative procedure.

The results of the present study suggest that it is possible to avoid any statistically and clinically significant change in the position of marginal soft tissues when treating vertical bony defects (Fig. 2). This can be accomplished by minimizing soft tissue trauma during cause-related therapy and by advancing the buccal flap coronally during the surgery. In turn, the lack of an increase in gingival recession may increase the potential for clinical periodontal regeneration (CAL gain).

In the present study, the amount of PD reduction obtained with the use of EMP was similar to that reported in other studies[14,15,18] that successfully used the same regenerative material with papilla preservation surgical approaches. However, in this case series, the depth of the pocket was reduced almost completely by means of clinical attachment gain, without any increase in gingival recession.

A similar, minimal increase in gingival recession was reported in recent studies[22,23] that used a microsurgical approach and EMP for the treatment of vertical bony defects. Nevertheless, in these studies, data on the soft tissue recession before cause-related therapy were not reported; thus, it is not possible to speculate on the total increase in gingival recession as a consequence of the entire (presurgical and surgical) therapeutic approach.

Furthermore, data from the present study showed that successful outcomes in terms of CAL and bone level gains (Fig. 4) can be achieved in the treatment of wide defects (mean defect angle: 42°), even with the use of a non–space-maintaining material like the EMP gel solution. In fact, results in terms of CAL gain are comparable to those obtained with the use of rigid, space-maintaining regenerative materials, such as membranes,[15,16,24-26] bone substitutes,[18,24,25] or a combination of both.[24,25,27,28]

Within the limits of this case-series study, it can be speculated that such successful outcomes were due, at least in part, to the coronal advancement of the buccal flap, which, by minimizing the supracrestal soft tissue collapse inside the defect, might reduce the need for a space-maintaining material. Further randomized controlled studies are advocated to demonstrate the adjunctive effect of the coronal advancement of the buccal flap in regenerative periodontal surgery.

CONCLUSIONS

It is possible to avoid any statistically and clinically significant change in the position of the soft tissues next to and covering vertical bony defects when performing periodontal regenerative surgery. This can be accomplished by minimizing soft tissue trauma during cause-related therapy and by advancing the buccal flap coronally during the surgery. In turn, the lack of increase in gingival recession may increase the potential for clinical periodontal regeneration (CAL gain).

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The authors report no conflicts of interest related to this study.

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Correspondence: Dr. Giovanni Zucchelli, Department of Odontostomatology, Bologna University, Via S. Vitale 59, 40125 Bologna, Italy. Fax: 39-051-225208; e-mail: zucchell@alma.unibo.it.

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