

The Treatment of Gingival Recession Associated with Deep Corono-Radicular Abrasions (CEJ step) – a Case Series

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The present case series study illustrates two different mucogingival techniques for treating gingival recessions associated with deep dental abrasions. The therapeutic strategies depend on the depth of the abrasion measured at the mid most coronal point at the CEJ level (CEJ step). When the CEJ step was <1 mm, a connective tissue graft associated with an extremely positioned coronal flap was performed. In case of a CEJ step ≥ 1 mm, a double connective tissue graft with an extremely positioned coronal flap was used. The dental abrasions and/or CEJ were not mechanically treated in either situation. One year later, the results showed a recession reduction of 97.5%, with complete root coverage obtained in 82% of sites, and dental hypersensitivity reduction obtained in 5 out of the initial 7 sites. There were no new cases of dental hypersensitivity at the end of follow-up period as a consequence of the treatment. This case series report shows that optimal clinical results in terms of complete root coverage of gingival recessions associated with deep cervical abrasions can be achieved by performing an appropriate surgical procedure without removing dental tissue.

Key words: gingival recession, connective tissue graft, abrasion

Cervical dental caries and/or abrasions are often associated with gingival recessions. These lesions can be treated with either restorative or periodontal approaches. There are various periodontal approaches for treating gingival recessions associated with carious cervical lesions (Matter, 1979; Fourel, 1982; Miller, 1983; Pini Prato et al, 1992; Goldstein et al, 2002) that make it possible to achieve excellent clinical results both in terms of root coverage and cosmetic effects.

The literature, however, contains little information on periodontal treatment of gingival recessions associated with cervical dental lesions. The abrasions can involve the root, with deep steps at the cemento-enamel junction, or both the root cementum and the enamel. In this latter situation there are often marked steps at the CEJ level (Fig. 1). This is often associated with dental hypersensitivity which, along with cosmetic problems, is an indication for mucogingival surgery for root coverage (Wennström 1993, 1996). When using the surgical approach, the periodontist generally grinds

the abrasion, eliminating sharp edges and planes the CEJ in order to position the flap and/or graft, with maximum adaptability to the tooth surface preventing dead tracts underneath (Holbrook and Ochsenbein, 1983).

In any event, if the root coverage after treatment is incomplete, grinding the abrasion or planning the CEJ can lead to increased hypersensitivity. In order to prevent this further hypersensitivity and to avoid unnecessary removal of dental tissue, especially in patients who do not present initial dental hypersensitivity, it may be appropriate not to use mechanical techniques such as grinding on the abrasion or CEJ prior to mucogingival surgery for root coverage.

Bilaminar techniques have contributed to better prognoses in the treatment of gingival recessions. Furthermore, recent studies have reported the importance of some factors related to the surgical technique that are useful for achieving a better percentage of root coverage. In particular, the pedicle flaps used to cover the connective tissue

grafts must be very relaxed, that is without tension, thick, extremely coronally advanced and passively adapted to cover the CEJ completely (Pini Prato 1999, 2000; Baldi 1999). On the basis of this recently acquired knowledge, the aim of this case series is to present the surgical strategies applied to successfully treat gingival recession associated with deep cervical abrasions.

MATERIALS and METHODS

Study Population

Twelve patients aged between 26 and 40 years ($4.2 \pm$), 5 males and 7 females, of Caucasian race and of middle economic level were consecutively enrolled for this study. Seventeen sites were selected for treatment. One patient contributed 6 recession defects. Three subjects were smokers (>10 cigarettes per day). All the patients were selected among individuals referred from a private practice and treated by a single periodontist with over ten years of clinical experience. All the patients were informed about the study design and signed an appropriate consent form.

Inclusion Criteria

The following entry criteria were used to select the population and the sites: 1) non-compromised systemic health and no contraindications for periodontal surgery; 2) presence of maxillary buccal recessions (≥ 2 mm) classified as Miller's class I and II; 3) presence of deep abrasion (≥ 0.5 mm); 4) tooth vitality; 5) no periodontal surgical treatment of the involved sites during previous 24 months; 6) Full mouth plaque scores $<20\%$ and Full mouth bleeding score $<20\%$; and 7) absence of plaque and bleeding on probing at the selected sites.

Data Collection

Gender, age, smoking habits, type of tooth, Miller's class, and dental sensitivity (yes or no) were recorded for all patients. The measurements were taken using a periodontal probe¹ and 4X magnification lens.

- **At baseline (T_0)**, before surgery, the following variables were measured at the mid-buccal point of the involved tooth: deepest point of the cervical abrasion (CEJ step) (Fig. 2), recession depth (Rec_{T_0}), width of keratinized tissue (KT_{T_0}), probing depth (PD_{T_0}), distance between incisal margin and gingival margin ($IMGM_{T_0}$). Clinical attachment level was also calculated ($CAL_{T_0} = Rec_{T_0} + PD_{T_0}$).
- **Immediately after surgery (T_1)**: the distance between incisal margin and gingival margin ($IMGM_{T_1}$) was measured.
- **One year after surgery (T_2)**: recession depth (Rec_{T_2}), width of keratinized tissue (KT_{T_2}), probing depth (PD_{T_2}), distance between incisal margin and gingival margin ($IMGM_{T_2}$) were measured, clinical attachment level (CAL_{T_2}), recession reduction ($Rec\ Red = Rec_{T_0} - Rec_{T_2}$), percentage of root coverage ($\%RC = Rec\ Red / Rec_{T_0} \times 100$), complete root coverage (CRC), PD difference ($PD_{diff} = PD_{T_0} - PD_{T_2}$), CAL difference ($CAL_{diff} = CAL_{T_0} - CAL_{T_2}$), KT difference ($KT_{diff} = KT_{T_0} - KT_{T_2}$), were calculated. Root sensitivity ($Sens_{T_2}$) was also evaluated.

Surgical Procedures

All 17 recessions were treated by bilaminar technique (connective tissue graft+coronally advanced flap). Before surgery, all patients received oral hygiene instructions to eliminate habits related to the etiology of the recession. No root planing or grinding were performed in any case and the exposed root abrasion was only polished (Fig. 3). Under local anesthesia, an intrasulcular incision was made with a surgical blade² on the buccal aspect of the involved tooth. This incision was horizontally extended mesio-distally to dissect the buccal aspect of the adjacent papillae avoiding the gingival margin of the adjacent teeth. Two oblique releasing incisions were made from the mesial and distal extremities of the horizontal incisions beyond the mucogingival junction. A full-thickness flap was raised with a periosteal elevator³ towards the mucogingival junction. Then a partial-thickness dissection was done apically toward the marginal bone crest, leaving the underlying periosteum in place. A mesio-distal and apical dis-

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² B.P. 15c, Hu-Friedy, Chicago, IL.

³ P24G, Hu-Friedy, Chicago, IL.



Fig. 1 A gingival recession associated with deep cervical abrasion.



Fig. 2 The cervical abrasion is measured with a periodontal probe at the deepest mid-coronal point.



Fig. 3 Before surgical treatment the abrasion was treated by means prophylactic paste. No scaling and root planing of the root were ever performed.

section parallel to the vestibular lining mucosa was performed to release residual muscle tension and facilitate the passive coronal displacement of the flap. The papillae adjacent to the involved tooth were de-epithelialized.

Two different techniques were used according to the depth of the step:

- a. *Step <1 mm*: the connective tissue graft was positioned and sutured with resorbable sutures to cover the entire exposed root, and extended laterally over the de-epithelialized connective tissue. The coronally advanced flap was released to eliminate tension and sutured over the cemento-enamel junction, covering the underlying connective tissue graft (Figs. 4–9).
- b. *Step ≥1 mm*: two connective grafts were used to compensate the severe abrasion. The first was positioned to cover the abrasion completely without extending laterally, and without being sutured. The second graft was positioned on top of the first and was extended laterally to reach the adjacent connective tissue. This graft was sutured to the periosteum with resorbable sutures. In this case too, the coronal-

ly advanced flap was released from tension and sutured over the cemento-enamel junction, covering the underlying connective tissue grafts (Figs. 10–18).

No periodontal dressings were applied in either case.

Post-surgical Care

Immediately following surgery, use of ice packs was recommended for 3 hours. All patients were instructed to discontinue tooth-brushing, avoid trauma around the surgical site and reduce smoking. A 0.12% chlorhexidine digluconate rinse was prescribed (4 x 60 seconds) daily for the first 10 days, and nimesulide (100 mg twice daily) was recommended for pain.

The sutures were removed after 10 days. All the patients were instructed to clean the surgical sites with a cotton pellet soaked in a 0.12% chlorhexidine digluconate, 4 times daily for 10 days. Three weeks after surgery, the patients were instructed to resume mechanical tooth cleaning of the treated areas using a soft toothbrush and a careful roll



Fig. 4 Technique A. Patient #4 Gingival recession associated with deep abrasion (<1 mm) on left maxillary cuspid.



Fig. 5 The connective tissue graft is positioned and sutured.



Fig. 6 The extremely relaxed flap is easily displaced coronally, reaching the cemento-enamel junction (CEJ).



Fig. 7 The coronally advanced flap is sutured coronally to the CEJ, covering the connective tissue graft.



Fig. 8 Healing after 1 year: the gingival margin lies in correspondence of CEJ and complete root coverage was achieved.



Fig. 9 Same case as figure 3 before (a) and after treatment (b). Note the optimal aesthetic result.

technique. All patients were recalled for control and prophylaxis after 1, 2, 3 and 4 weeks and, subsequently, once a month, until the final examination (1 year) (Figs. 8–9 and 17–18).

RESULTS

The results are reported in Table 1 and 2. Twelve patients, 3 of whom were smokers, with 17 recessions on 11 canines, 4 premolars and 2 molars – all upper teeth – were included in this study. Twelve recessions that presented an abrasion with a depth of <1 mm were treated with a coronally advanced flap with connective tissue graft (Technique A), while 5 recessions with abrasions of ≥ 1 mm were treated with coronally advanced flap and double connective tissue grafts (Technique B). At baseline, 7 teeth were reported



Fig. 10 Technique B. Patient #10. Deep cervical abrasion (1.5 mm) on left first maxillary molar. The coronal margin of the abrasion is located coronally to the CEJ extending within the enamel. Severe dental hypersensitivity was present in this case.



Fig. 11 A full-split thickness flap was elevated.



Fig. 12 The primary connective tissue graft harvested from the palate was positioned to fill completely the deep abrasion. No suture was used.

Table 1 Individual patient data at baseline

Patient	Gender	Age	Smoke	Tooth	Miller's cl	Sens _{T0}	REC _{T0}	PD _{T0}	CAL _{T0}	KT _{T0}	IMGM _{T0}	IMCEJ	CEJ Step
1	M	29	NO	23	2	NO	5.0	0.5	5.5	1.0	19.0	14.0	1
2	M	34	NO	13	1	NO	3.0	0.5	3.5	1.0	17.0	14.0	0.5
3	F	26	NO	13	2	Yes	3.0	1.0	4.0	4.0	13.0	10.0	0.5
4	F	35	Yes	23	2	Yes	4.0	1.0	5.0	3.0	14.0	10.0	1
5	M	40	Yes	13	2	NO	6.0	0.5	6.5	1.0	19.0	13.0	0.5
6	F	35	Yes	13	1	Yes	4.0	0.5	4.5	4.0	14.0	10.0	0.5
7	F	38	NO	24	1	Yes	2.5	1.5	4.0	2.0	10.0	7.5	0.5
8	F	39	NO	25	1	Yes	2.5	1.0	3.5	3.0	10.0	7.5	0.5
9	M	36	NO	23	2	NO	6.0	2.0	8.0	2.0	15.0	9.0	1
10	M	30	NO	16	2	NO	3.0	1.0	4.0	4.0	10.0	7.0	1.5
				15	1	NO	3.0	2.0	5.0	4.0	11.0	8.0	1.5
				13	1	NO	4.0	1.0	5.0	4.0	15.0	11.0	1.5
				26	1	NO	3.0	1.0	4.0	5.0	10.0	7.0	2
				25	1	NO	3.0	1.0	4.0	3.0	10.0	7.0	1.5
				23	1	NO	2.5	1.0	3.0	5.0	13.5	11.0	1
11	F	27	NO	23	2	Yes	3.0	1.0	4.0	5.0	15.0	12.0	1
12	F	33	NO	23	1	Yes	4.0	1.0	5.0	3.0	15.0	11.0	0.5
Mean		33.5					3.6	1.0	4.6	3.2	13.6	9.9	
S.D.		4.2					1.1	0.4	1.2	1.4	3.1	2.4	

Sens_{T0}: dental sensitivity; Rec_{T0}: recession depth measured at the mid-point of buccal surface; PD_{T0}: probing depth measured at the mid-point of buccal surface; CAL_{T0}: clinical attachment level calculated as Rec_{T0}+PD_{T0}; KT_{T0}: keratinized tissue measured as distance between gingival margin and mucogingival junction; IMGM_{T0}: distance between incisal margin and gingival margin; CEJ step: depth of abrasion measured at the deepest mid-point of buccal surface.

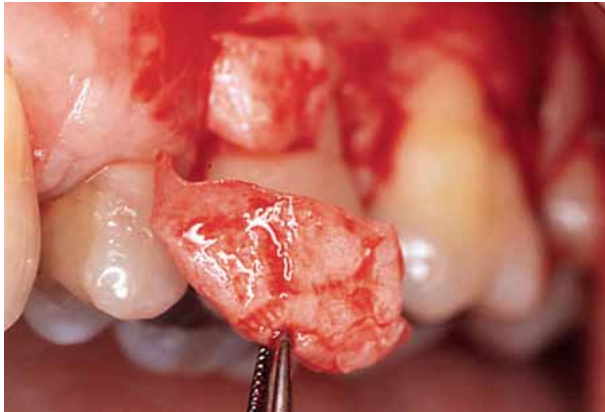


Fig. 13 The secondary connective tissue graft was prepared.



Fig. 14 The secondary connective tissue graft is positioned and covers the primary graft.

Table 2 Individual patient data immediately after surgery (T1) and after 1 year (T2) data at baseline

Patient	CTG	IMGM _{T1}	GM ₁	SENS _{T2}	REC _{T2}	PD _{T2}	CAL _{T2}	KT _{T2}	IMGM _{T2}	% RC
1	1	12.5	1.5	NO	0.5	1.0	1.5	1.5	14.5	90
2	1	13.0	1.0	NO	0.0	0.5	0.5	1.0	14.0	100
3	1	9.0	1.0	NO	0.0	1.0	1.0	4.0	10.0	100
4	1	9.0	1.0	NO	0.0	0.5	0.5	3.0	10.0	100
5	1	12.0	1.0	NO	0.5	1.0	1.5	3.0	13.0	83
6	1	9.0	1.0	13	0.0	1.0	1.0	4.0	10.0	100
7	1	6.0	1.5	NO	0.0	1.0	1.0	2.0	7.5	100
8	1	5.0	2.5	NO	0.5	0.5	1.0	2.0	8.0	100
9	1	7.5	1.5	NO	0.0	3.0	3.0	2.0	9.0	100
10	2	6.0	1.0	NO	0.0	1.5	1.5	4.0	7.0	100
	2	7.0	1.0	NO	0.0	1.5	1.5	5.0	7.0	100
	2	9.0	2.0	NO	0.0	1.0	1.0	4.0	11.0	100
	2	6.0	1.0	NO	0.0	1.5	1.5	5.0	6.0	100
	2	6.0	1.0	NO	0.0	2.0	2.0	4.5	7.0	100
	1	10.0	1.0	NO	0.0	1.0	1.0	4.0	11.0	100
11	1	11.0	1.0	NO	0.0	0.5	0.5	4.0	12.0	100
12	1	10.0	1.0	Yes	1.0	0.5	1.5	4.0	11.0	75
Mean				0.1	1.1	1.3	3.3	9.9		
S.D.				0.3	0.6	0.6	1.2	2.6		

CTG: number of layers of connective tissue graft used for the bilaminar technique; IMGM_{T1}: distance between incisal margin and gingival margin immediately after surgery; GM₁.

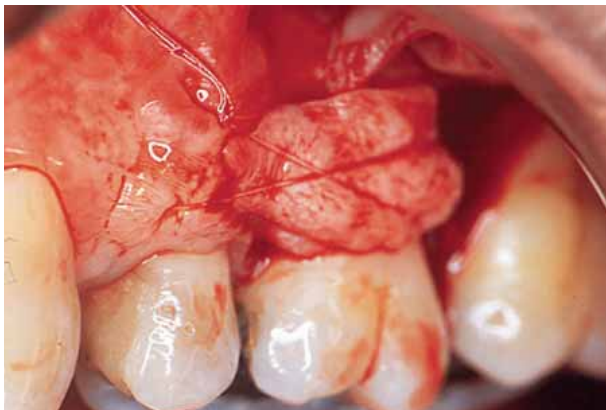


Fig. 15 A resorbable suture was used to stabilize the two grafts.



Fig. 16 The flap is sutured coronally to the most coronal margin of the abrasion.



Fig. 17 Healing 1 year after: the gingival recession associated with the deep abrasion was completely covered.

as hypersensitive.

At the conclusion of the procedure, the flaps were always sutured to the CEJ, coronally or in any event, more coronally with respect to the coronal margin of the abrasion. One year after surgery, the mean initial recession was reduced from 3.6 ± 1.1 mm to 0.1 ± 0.3 mm; probing depth from 1.0 ± 0.4 mm to 1.1 ± 0.6 mm; CAL from 4.6 ± 1.2 mm to 1.3 ± 0.6 mm; and KT from 3.2 ± 1.4 mm to 3.3 ± 1.2 mm. Mean root coverage was 97.5%. Complete root coverage was achieved in 14 out of 17 sites.

Tooth sensitivity was reduced from 7 to 2 teeth. After 1 year there were no reports of new sensitivity developing in any of the treated teeth. Descriptive statistical analyses with the individual patient data at baseline (T0), after surgery (T1), and 1 year after surgery (T2), are shown in Tables 1 and 2.

DISCUSSION

Gingival recessions are often associated with dental abrasions at the cervical level of varying magnitude creating a step between the enamel and cementum. In these cases, in order to adapt the coronally advanced flap to the tooth surface or to the underlying connective tissue graft (when using the bilaminar approach), and to cover the CEJ, practitioners tend to grind and eliminate the abrasion. This, however, further diminishes the dental tissue, and if root coverage is incomplete leads to the onset/increase of dental hypersensitivity. The aim of this study is to propose two strategies for treating gingival recession associated with dental abrasions without having to remove dental tissue using bilaminar mucogingival techniques. The choice of the technique is based on the as-



Fig. 18 Same case as figure 10 before (a) and after treatment (b). Notice the optimal aesthetic result. Dental hypersensitivity disappeared.

assessment of the abrasion depth (CEJ step).

For steps with a depth of <1 mm, the technique was to apply a connective tissue graft over the abrasion, extending laterally and apically over the recipient site, associated with a pedicle flap positioned as coronally as possible. Recent studies have shown that the further the flap is coronally advanced, the greater the root coverage (Pini Prato 1999).

For steps with a depth of ≥ 1 mm, the procedure consisted of two connective tissue grafts covered by a coronally advanced flap. The first (primary) graft served to fill the abrasion, while the second (secondary graft) placed over the primary, was extended into the adjacent receiving site. This strategy makes it possible to adapt the secondary graft perfectly to the tooth surface, avoiding dead tracts under the secondary graft, and above all does away with the need to remove dental tissue to eliminate the existing abrasion.

Both techniques proved effective in the treatment of gingival recessions associated with dental abrasions. In fact, the mean recession was decreased from 3.6 ± 1.1 mm to 0.1 ± 0.3 mm, with a mean reduction of 97.5%, and complete coverage was obtained in 14 sites (82%). At 1 year dental hypersensitivity was reduced from 7 to 2 teeth and it is important to note that, after 1 year, there was

not a single case of new hypersensitivity.

In conclusion, the present case series illustrates that it is indeed possible to treat gingival recessions associated with severe dental abrasions and achieve excellent clinical results with two appropriate strategies, and without having to eliminate additional dental tissue.

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