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Use of a New Collagen Matrix (Mucograft) for the Treatment of Multiple Gingival Recessions: Case Reports



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The aim of this case report study was to demonstrate the use of a new collagen matrix as an alternative to the connective tissue graft for the treatment of multiple gingival recessions. Three women showing 11 maxillary gingival recessions were treated by means of the envelope flap technique associated with a novel collagen matrix as a substitute for the connective tissue graft. At 1 year, complete root coverage was achieved in 9 treated sites, with a mean keratinized tissue width of 3.1 mm, complete resolution of dental hypersensitivity, and a high level of esthetic satisfaction. (Int J Periodontics Restorative Dent 2012;32:413–419.)

A recent survey revealed that 88% of individuals 65 years of age and older and 50% of those 18 to 64 years of age have one or more sites with recession and that the presence and extent of gingival recession increased with age.¹ Today, because of the increasing importance of esthetics in modern society, patients perceive the presence of gingival recessions as a serious esthetic problem,² and root coverage treatments are requested more frequently. Because of their mainly traumatic etiology, multiple recessions are even more frequent, and for this reason, specific surgical techniques have been proposed to treat such lesions.^{3,4}

Zucchelli and De Sanctis⁵ published an approach consisting of a split-full-split-thickness envelope flap with or without vertical releasing incisions and with or without the use of a connective tissue graft (CTG). Data from short- and long-term follow-up studies showed successful results in terms of complete root coverage and optimal esthetic integration with the adjacent tissues.^{6–8} A recent 5-year follow-up

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study⁸ showed that a coronally advanced envelope flap (CAF) with a CTG provided greater stability of the gingival margin over time than a CAF alone in the treatment of multiple gingival recessions.

The bilaminar technique needs an additional surgical area, which may cause patient discomfort during and after surgery. With regard to patient morbidity, problems may arise when a greater amount of connective tissue is needed to cover multiple adjacent defects, which results in an extremely large surgical area. On the other hand, a small palatal wound to harvest a reduced amount of connective tissue needed to treat a single recession does not seem to be perceived as a problem by the patient.⁹ In some cases, harvesting connective tissue may be difficult in the presence of a flat palatal profile or if the thickness of the masticatory mucosa appears too thin. The additional chair time must also be considered and compared with that needed to perform a CAF alone.

Therefore, the availability of soft tissue substitutes appears useful for the treatment of these conditions. In fact, over the past decade, several biomaterials, such as biologic modifiers and barrier membranes, have been investigated,¹⁰⁻¹³ but none of them revealed the same effectiveness of a CAF + CTG.³ More recently, a new two-layer xenogenic collagen matrix (Mucograft, Geistlich) has been proposed as a graft substitute used in combination with a CAF to treat single gingival recessions.¹⁴ The re-

sults of that study in terms of complete root coverage and recession reduction seemed to indicate that the use of the new collagen matrix was a viable alternative to a CTG, with significantly lower patient morbidity.

The aim of this case report study was to describe the use of a new collagen matrix as an alternative to the CTG in association with a CAF for the treatment of multiple gingival recessions.

Method and materials

Three nonsmoking women (age range, 35 to 48 years) with 11 maxillary gingival recessions and complaints about an unesthetic smile associated with moderate dental hypersensitivity were treated in a private practice by means of the envelope flap technique⁵ associated with the novel collagen matrix as a substitute for the CTG. Before treatment, all patients signed a consent form approved by the local authority.

At baseline, the following data and measurements were recorded: age, sex, tooth, recession class,¹⁵ recession depth (Rec), pocket depth (PD), keratinized tissue width (KT), dental surface discrepancy class,¹⁶ and presence/absence of dental hypersensitivity. In particular, the adopted classification of gingival recessions is based on the presence/absence of an adequate amount (2 mm) of keratinized tissue, noncarious cervical lesions, and interproximal attachment loss.

Regarding the dental surface discrepancy classification, it is based on the presence/absence of an identifiable cemento-enamel junction with or without step formation at the cervical level.

All measurements were performed using a periodontal probe (PCP-UNC 15, Hu-Friedy).

Surgical technique

Three months after modification of oral hygiene procedures, patients underwent mucogingival surgery. An envelope flap technique associated with Mucograft was performed to cover the exposed roots, increase the reduced width and thickness of keratinized tissue, and reduce patient morbidity by avoiding a second surgical site. After administration of local anesthesia with lidocaine + 1:50,000 epinephrine, a linear intrasulcular/interdental partial-thickness flap was performed. The oblique interdental incisions were inverted in correspondence with the middle axis of the flap. A full-thickness flap was then raised to the mucogingival junction. The exposed root areas were adequately debrided, and the papillae were completely de-epithelialized. Afterward, the flap was separated from the periosteum and from the inner muscle insertions by means of a split-thickness flap. The collagen matrix was trimmed and adapted to the area and held into place with 6-0 resorbable vertical crossing mattress sutures. Since the sutures did not pass through the matrix, the

aim of the suturing technique was only to maintain the matrix in the area, with particular attention paid to avoid suture compression on the grafted material that would be embedded by blood flow. The flap was positioned coronally and sutured to cover the underlying material completely using sling sutures passing through the interdental papilla.

In patient 2, the surgical technique was slightly modified since both maxillary central incisors showed gingival recession defects and a prosthetic crown was present on the left first premolar. Deep abrasions were also present on the exposed roots, thus making it difficult to locate the gingival margin in a proper position. A tunnel technique was performed in correspondence with the maxillary central incisors without interproximal paramarginal incisions involving the interdental papilla; a distal vertical incision was also carried out to release the flap, avoiding involvement of the prosthetic crown at the left first premolar. The Mucograft matrix was then positioned to cover the concave root surfaces, compensate for the abraded root structure, and allow for adequate positioning of the flap. In this case, a single interrupted periosteal suture was performed at the interdental area between the two central incisors to maintain the flap in a more coronal position. Sling sutures passing through the interdental papilla were also performed.

Postoperative instructions and follow-up

After 2 weeks, the sutures were removed and a first questionnaire was administered to the patients asking about the discomfort level, if any, in terms of pain, swelling, bleeding, chewing activity, and quality of daily life perceived during the first healing period. Scores ranged between 0 (no discomfort) and 10 (high discomfort). During the first 3 weeks, the patients did not perform any mechanical tooth cleaning, and a 0.12% chlorhexidine mouthrinse was prescribed twice a day.

After 3 weeks, patients started to brush the treated teeth by means of a soft-bristle toothbrush using the roll technique. At 3, 6, and 12 months, the patients were recalled for follow-up visits. The same measurements taken at baseline were repeated at 1 year.

At the 1-year recall, a second questionnaire was administered to the patients regarding the esthetic results. Scores ranged between 0 (bad esthetic outcome) and 10 (optimal esthetic outcome).

Table 1 Descriptive statistics at baseline and 1 year after surgery

Patient	Sex	Age (y)	Tooth no.*	Baseline						1 y			
				Recession class ¹⁵	DSD class ¹⁶	Rec (mm)	KT (mm)	PD (mm)	DH	Rec (mm)	KT (mm)	PD (mm)	DH
1	F	38	15	ABA	B+	2	3	2	Yes	0	3	1	No
			14	BBA	B+	3	1	2		0	3	1	
			13	ABA	B+	4	3	1		0	3	1	
			12	ABA	B+	3	3	2		0	3	1	
2	F	45	11	AAA	A-	1	3	2	Yes	0	3	1	No
			21	AAA	A-	3	4	2		0	4	1	
			22	AAA	A-	3	4	2		0	3	1	
			23	BBA	B+	5	1	1		0	4	1	
3	F	32	23	AAA	A-	2	2	2	Yes	0	3	1	No
			24	BBA	B-	3	1	1		1	2	1	
			24	ABA	B-	3	2	2		2	3	1	

*FDI tooth-numbering system.

DSD = dental surface defect; Rec = recession depth; KT = keratinized tissue width; PD = pocket depth; DH = dental hypersensitivity.

Results

Baseline and 1-year measurements are reported in Table 1. At baseline, the 11 recessions showed a mean Rec of 2.9 mm (range, 1 to 5 mm), with a KT of 2.45 mm (range, 1 to 4 mm), and mean PD of 1.73 mm (range, 1 to 2 mm). According to the recent classification of gingival recessions,¹⁵ the considered gingival recessions belonged to the following classes: AAA, ABA, and BBA. Considering the condition of the dental tissues in the area of the gingival recessions, the following classes¹⁶ were identified: A-, B-, and B+. Dental hypersensitivity was present in all three patients.

At 1 year, complete root coverage was achieved in 9 of 11 treated sites. The mean KT was 3.1 mm (range, 2 to 4 mm), and all patients noted complete resolution of the dental hypersensitivity.

The first questionnaire recorded at 2 weeks revealed that the patients reported slight discomfort during the initial postoperative phase, with a mean score of 4 (range, 3 to 5). After 1 year, in the second questionnaire, the patients reported a high level of esthetic satisfaction (mean score, 9.33; range, 9 to 10).

The three cases are illustrated in Figs 1 to 3.



Fig 1a Patient 1. Gingival recessions were noted from the maxillary left lateral incisor to the second premolar.



Fig 1b Flap raised according to the envelope technique for multiple recessions.



Fig 1c Trimmed collagen matrix positioned at the affected sites.



Fig 1d (left) Sling sutures were performed.

Fig 1e (right) Clinical results after 1 year showed complete resolution of the defects with an optimal esthetic result.



Fig 2a Patient 2. Gingival recessions involved the maxillary right central incisor to the left canine. Note the associated deep abrasion on the left canine.



Fig 2b A flap was raised according to the envelope technique for multiple recessions at the left lateral incisor and canine sites, while a tunnel approach was performed at the central incisors.



Fig 2c Trimmed collagen matrix positioned at the affected sites.



Fig 2d (left) Flap sutured.

Fig 2e (right) Clinical results after 1 year showed complete resolution of the defects (including the deep abrasion at the left canine) with an optimal esthetic result.





Fig 3a Patient 3. Gingival recessions were present at the maxillary left canine and first and second premolars.



Fig 3b Envelope flap raised with the trimmed collagen matrix positioned in place.



Fig 3c After 1 year, complete root coverage was obtained at the left canine, while partial root coverage resulted at the first and second premolars.

Discussion

Gingival recessions are frequent lesions in modern society, and treatment is often requested by patients. Specific mucogingival surgical techniques, such as an envelope flap with or without a CTG, have been proposed to treat multiple recessions, showing successful results in terms of complete root coverage, recession reduction, and optimal esthetic integration with the adjacent tissues.^{3,4} Data from the periodontal literature show that a combined approach using a CAF with a CTG is able to obtain stable results over time. In fact, a comparative clinical trial⁸ dealing with the treatment of multiple recessions demonstrated

that coronal displacement of the gingival margin was observed in CAF + CTG-treated sites, while apical relapse of the gingival margin was noted in CAF-treated sites between the 6-month and 5-year follow-up visits.

On the other hand, harvesting a graft from the palate increases patient morbidity and surgical chair time and requires adequate surgical skill to overcome the presence of potential difficulties such as a flat palatal profile, thin palatal masticatory mucosa, and the need for a great amount of connective tissue. Other potential alternatives to grafting (ie, barrier membrane, enamel matrix derivative, acellular dermal matrix,

living tissue-engineered human fibroblast-derived dermal substitute, platelet concentrate graft) have been suggested and used to overcome these problems,¹⁰⁻¹³ but none of them revealed the same effectiveness as a CAF + CTG.³

More recently, a new collagen matrix (Mucograft) has been proposed as a graft substitute to treat single gingival recession defects in combination with a CAF procedure.¹⁴ No information on the use of this material for the treatment of multiple recessions is available at this moment. Therefore, the aim of this study was to report the use of this new collagen matrix as an alternative material to the conventional CTG for the treatment

of multiple gingival recessions. In this case report study, Mucograft was used in three patients showing multiple gingival recessions (11 defects) associated with a reduced amount of keratinized tissue. To treat these patients and to try to obtain optimal outcomes, a large amount of connective tissue would have been necessary, thus creating discomfort for the patients in a second surgical area. These problems were avoided by using Mucograft. This material was very useful, particularly in patient 2, where a flat palate was present, in avoiding surgical difficulties to harvest the CTG. This patient also showed recessions associated with deep noncarious cervical lesions. The collagen matrix was fixed on the root surfaces to compensate for the hard tissue discrepancies and to adapt the gingival margin of the flap in a proper position.

Advances were also achieved with the use of Mucograft in treating patient 1, who presented with a reduced thickness of the masticatory palatal mucosa. In this situation, the removal of a sufficient amount of connective tissue would have been difficult.

The overall results showed complete root coverage in 9 of 11 recessions, with an increased amount of keratinized tissue and optimal tissue integration of the grafted material. It is interesting to note that all patients were very satisfied with either the absence of postsurgical discomfort at 2 weeks or the achieved esthetic outcome 1 year after treatment.

Conclusions

The use of Mucograft matrix as an alternative to a CTG associated with a CAF resulted in successful treatment of multiple recessions and was perceived as a pleasant approach by the patients. However, because of the methodologic limitations of the present study, such as the reduced number of patients and lack of comparison with other standard approaches (CAF with or without CTG), further multicentric randomized controlled clinical trials should be performed to evaluate the efficacy of the procedure.

References

1. Kassab MM, Cohen RE. The etiology and prevalence of gingival recession. *J Am Dent Assoc* 2003;134:220–225.
2. Zaher CA, Hachem J, Puhan MA, Mombelli A. Interest in periodontology and preferences for treatment of localized gingival recessions. *J Clin Periodontol* 2005;32:375–382.
3. Chambrone L, Sukekava F, Araújo MG, Pustigliani FE, Chambrone LA, Lima LA. Root coverage procedures for the treatment of localised recession-type defects. *Cochrane Database Syst Rev* 2009;(2):CD007161.
4. Chambrone L, Lima LA, Pustigliani FE, Chambrone LA. Systematic review of periodontal plastic surgery in the treatment of multiple recession-type defects. *J Can Dent Assoc* 2009;75:203a–203f.
5. Zucchelli G, De Sanctis M. Treatment of multiple recession-type defects in patients with esthetic demands. *J Periodontol* 2000;71:1506–1514.
6. Zucchelli G, Mele M, Mazzotti C, Marzadori M, Montebugnoli L, De Sanctis M. Coronally advanced flap with and without vertical releasing incisions for the treatment of multiple gingival recessions: A comparative controlled randomized clinical trial. *J Periodontol* 2009;80:1083–1094.
7. Zucchelli G, De Sanctis M. Long-term outcome following treatment of multiple Miller class I and II recession defects in esthetic areas of the mouth. *J Periodontol* 2005;76:2286–2292.
8. Pini-Prato GP, Cairo F, Nieri M, Franceschi D, Rotundo R, Cortellini P. Coronally advanced flap versus connective tissue graft in the treatment of multiple gingival recessions: A split-mouth study with a 5-year follow-up. *J Clin Periodontol* 2010;37:644–650.
9. Cortellini P, Tonetti M, Baldi C, et al. Does placement of a connective tissue graft improve the outcomes of coronally advanced flap for coverage of single gingival recessions in upper anterior teeth? A multi-centre, randomized, double-blind, clinical trial. *J Clin Periodontol* 2009;36:68–79.
10. McGuire MK, Nunn M. Evaluation of human recession defects treated with coronally advanced flaps and either enamel matrix derivative or connective tissue. Part 1: Comparison of clinical parameters. *J Periodontol* 2003;74:1110–1125.
11. Wilson TG Jr, McGuire MK, Nunn ME. Evaluation of the safety and efficacy of periodontal applications of a living tissue-engineered human fibroblast-derived dermal substitute. II. Comparison to the subepithelial connective tissue graft: A randomized controlled feasibility study. *J Periodontol* 2005;76:881–889.
12. Aichelmann-Reidy ME, Yukna RA, Evans GH, Nasr HF, Mayer ET. Clinical evaluation of acellular allograft dermis for the treatment of human gingival recession. *J Periodontol* 2001;72:998–1005.
13. McGuire MK, Scheyer ET, Schupbac P. Growth factor-mediated treatment of recession defects: A randomized controlled trial and histologic and microcomputed tomography examination. *J Periodontol* 2009;80:550–564.
14. McGuire MK, Scheyer ET. Xenogeneic collagen matrix with coronally advanced flap compared to connective tissue with coronally advanced flap for the treatment of dehiscence-type recession defects. *J Periodontol* 2010;81:1108–1117.
15. Rotundo R, Mori M, Bonaccini D, Baldi C. Intra- and inter-rater agreement of a new classification system of gingival recession defects. *Eur J Oral Implantol* 2011;4:127–133.
16. Pini-Prato G, Franceschi D, Cairo F, Nieri M, Rotundo R. Classification of dental surface defects in areas of gingival recession. *J Periodontol* 2010;81:885–890.