



Xenogeneic Matrices in Peri-Implant Soft Tissue Regeneration: Case Series



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Introduction

The role of keratinized tissue in the longevity of dental implants is still controversial. (1-6) Recent studies, reinforce the importance of having a circumferential sealing effect from dense connective tissue, as a prerequisite for the long-term success of dental implant. (3) An adequate band of keratinized tissue width might be important for plaque control and maintenance of peri-implant soft tissue health. (7-8) The use of collagen matrices (CM) has been described as an alternative to autogenous soft tissue grafts in order to improve morbidity and apply less invasive procedures. (4)

Aim

The purpose of this work is to report demonstrative clinical cases using xenogeneic collagen matrices (XCM) in a monotherapy or combined with a strip free gingival graft (SFGG) and, additionally, to present a systematized literature review about clinical efficacy of collagen matrices for peri-implant soft tissue augmentation.

Material and Methods

I) Case series

- **Patient 1** was a 49-year-old systemically healthy, non-smoking female. After implant osseointegration, lack of keratinized tissue (2mm) surrounding the buccal surface of the implant that could compromise the fixed prosthetic rehabilitation long-term success. A xenogeneic dermal matrix (Mucoderm) was applied in combination with an apically positioned flap.

- **Patient 2** was a 60-year-old systemically healthy, non-smoking female with inadequate attached and keratinized tissue (< 2mm) and lower vestibule. The patient had a single implant 31 with a pontic 41 that presented severe soft tissue recession. The patient referred poor esthetics and major difficulties on maintenance of basic oral hygiene procedures. The surgical technique applied included a combination of XCM (Mucoderm) with an apical strip free gingival graft harvested from the palate.

II) Systematic review

The present systematic review was structured according to the PRISMA statement. A PICOT question was established: "What is the efficacy of combined grafting technique compared with other surgical techniques for the reconstruction of peri-implant soft tissues defects with a minimum follow-up of 3 months?".

Clinical Cases

Patient 1:



1. Preoperative view 2. Surgical bed 3. XDM sutured over the recipient site



4. Two weeks postoperatively 5. Nine weeks postoperatively 6. Healing abutment placement



7. Five months postoperatively with provisional crown 8. Twelve months postoperatively with definitive crown

Patient 2:



1. Preoperative view 2. Surgical bed 3. FGG application



4. FGG + XCM sutured 5. One week postoperatively 6. Two weeks postoperatively



7. Four weeks postoperatively 8. Three months postoperatively

Results

None of the patients experienced postoperative complications, such as intense pain, infection or bleeding. All treated sites exhibited an increased gain of KTW. In **case 1**, at 9 weeks postoperatively, there was a mean gain of 1mm of keratinized tissue compared with baseline. In **case 2**, the area corresponding to the strip graft showed slight different consistency and color match compared to the neighboring tissues, although good esthetic appearance was achieved. Xenogeneic collagen matrix presented some shrinkage. After a 3-month period, the patient was satisfied with the overall treatment result. We observed mean gain of KTW of 4mm in 41 and 5mm in 31.

Six articles were included (3 RCT, 3 Case series). Significant heterogeneity of the studies was associated with relevant risk of bias. Significant better outcomes were obtained for apically positioned flap plus a free gingival or subepithelial connective tissue graft. (9) Autogenous grafts achieved better volume and esthetic integration. (10-14) For surgery time and patient morbidity more favorable results were achieved for collagen matrices, despite less keratinization and higher tissue contraction (more than 50%). The application of CM is associated with high variability of gain in KTW (between 1.5 and 10 mm). (5,15-18)

Table 1. Systematic Review: included studies

Author/Year	Study design	Duration	Test group	Control group	Initial KTW (mm [mean ± SD])	Final KTW (mm [mean ± SD])
Park (2006)	Case series	6 months	ADM		1.62 ± 0.09	6.24 ± 0.9
Lorenzo et al. (2012)	RCT	6 months	XCM	SCTG	0.5 ± 0.52 0.42 ± 0.51	2.8 ± 0.42 2.75 ± 1.55
Basegmez et al. (2013)	RCT	6 months	ADM	FGG	0.89 ± 0.31 1.01 ± 0.34	2.47 ± 0.32 3.58 ± 0.40
Schmitt et al. (2013)	Case series	3 months	XCM	FGG	0.97 ± 0.64 0.88 ± 0.65	10.32 ± 3.15 9.81 ± 2.45
Buyukozdemir et al. (2013)	RCT	6 months	FGG	Maintenance No treatment	0.35 ± 0.48 0.60 ± 0.50	4.40 ± 1.50 0.60 ± 0.50
Urban et al. (2015)	Case series	12 months	FGG + XCM		0.00	6.33 ± 2.16

Discussion/Conclusion

All techniques showed efficacy in improving peri-implant KTW, nevertheless limited level of evidence prevents definitive guidelines. Apically positioned flap plus autogenous grafts seems to favor better outcomes related to gain in KTW and volume. Comparatively, XCM demonstrated less gain in KTW and higher volume contraction, yet can be an alternative in specific indications due to less patient morbidity and surgery time. The association with a SFGG seems to diminish tissue shrinkage. However, this positive results should be considered carefully and must be tested in well-designed clinical trials.

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