

Free gingival graft using a modified technique: a case series

Vítor Marques Sapata¹
Vanessa Camillo de Almeida¹
Ronald E. Jung²
Giuseppe Alexandre Romito¹
João Batista César Neto¹

1) Universidade de São Paulo, Disciplina de Periodontia
(São Paulo/SP, Brazil).

2) University of Zurich, Center of Dental Medicine, Clinic of Fixed
and Removable Prosthodontics and Dental Material Science
(Zurich, Switzerland).

Introduction: Although the free gingival graft technique (FGG) presents a high predictability to increase keratinized tissue (KT), the graft contraction rate is significant. **Objectives:** This case report describes a modified FGG technique with the aim to reduce the graft shrinkage. **Methods:** Two patients presented chief complaints of sensitivity during tooth brushing on lower incisors and another patient in the region of an implant-supported resto-

ration of tooth #46. In all cases, patients showed difficulty in maintaining proper oral hygiene. These regions were treated with the modified FGG technique, in which the split-thickness flap performed to create the receptor bed is used to additionally stabilize the graft, instead of being removed. **Results:** In all cases, the patients' complaints were solved. Width of keratinized mucosa increased and graft shrinkage ranged between 10 to 13%. Moreover,

the keratinized tissue remained stable over time, presenting a highly satisfactory color compared to adjacent areas. **Conclusion:** The modified FGG technique can be successfully used to treat cases with lack of KT in teeth and implants. In addition, less graft shrinkage was observed compared to others studies. **Keywords:** Gingival recession. Wound healing. Reconstructive surgical procedures. Autologous transplantation.

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Contact address: João Batista César Neto – Av. Professor Lineu Prestes, 2227
Cidade Universitária - São Paulo/SP - CEP: 05.508-000 – E-mail: jbcarneto@usp.br

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» Patients displayed in this article previously approved the use of their facial and intraoral photographs.

INTRODUCTION

The lack of keratinized tissue (KT), associated or not with additional factors, can interfere with the patient's oral hygiene and, consequently, may be associated with clinical attachment loss.¹⁻³ Furthermore, Lang & Loe⁴ found that areas with less than 2 mm of attached gingiva presented inflammation and exudate. These findings were corroborated by subsequent studies that suggested the need of a minimum amount of keratinized tissue to maintain gingival health.^{5,6} In addition, a recent study has demonstrated that a minimum of 2 mm of KT is also needed to maintain tissue health around implants.⁷

Since it was developed, the free gingival graft technique (FGG) was used to improve the keratinized tissue band around the affected region. The most common indications were cases presenting shallow vestibule, high muscle attachment and frenal pull, mobility of the gingival margin, inadequate plaque control and orthodontic treatment.⁸⁻¹⁰

However, the FGG technique, described by Sullivan & Atkins,¹¹ presents an important limitation. The graft shrinkage during healing period can range from 17% to 44%.¹²⁻¹⁴ This fact demands larger grafts to compensate the contraction. In order to decrease FGG shrinkage, Duarte & Castro¹⁵ proposed a modified technique where the graft was stabilized and then covered by the split-thickness flap on the receptor site. According to the authors, this technique can promote less shrinkage and results in a color match of the FGG that is more compatible with the surrounding tissues.

Thus, the aim of the present case series is to illustrate the surgical steps of the modified technique around teeth and implants and evaluate its behavior in a long-term basis.

METHODS

Cases Presentation

Three patients were referred to a private practice in Sorocaba, Brazil. The first case was a 42-year-old female, systemically healthy, treated in November 2011. Her major complaints were discomfort during tooth brushing and exposure of an implant shoulder. After clinical examination, the diagnosis established was lack of KT.

The second case was treated in June 2012. A 51-year-old female, systemically healthy, presented with major complaints of pain during tooth brushing and extreme difficulty in maintaining the region between 31 and 41 free of plaque. The third case started also in June 2012, a 49-year-old female, systemically healthy, presented the same complaints of the second case. Both cases were diagnosed as gingival recession associated with a lack of KT.

Cases Management

The technique performed was the same for all the cases, the only modifications were related to anesthesia and particular anatomic structures of each region.

Treatments were initiated with oral hygiene instructions and plaque control. Surgical procedure began with local anesthesia, with 2% lidocaine with 1:100,000 epinephrine (Alphacaina[®], DFL, Rio de Janeiro/RJ, Brazil). Incisions were made with a 15c blade (SurgiBlade[®], Sunshine International, Miami, FL, EUA). The recipient site was delimited by two vertical release incisions connected by an intrasulcular incision involving the affected region (Fig 1). Then, a split-thickness flap was reflected, exposing a firm, smooth layer of connective tissue over the periosteum (Fig 2). A moistened gauze was placed on the recipient area while the graft was taken from the donor area.

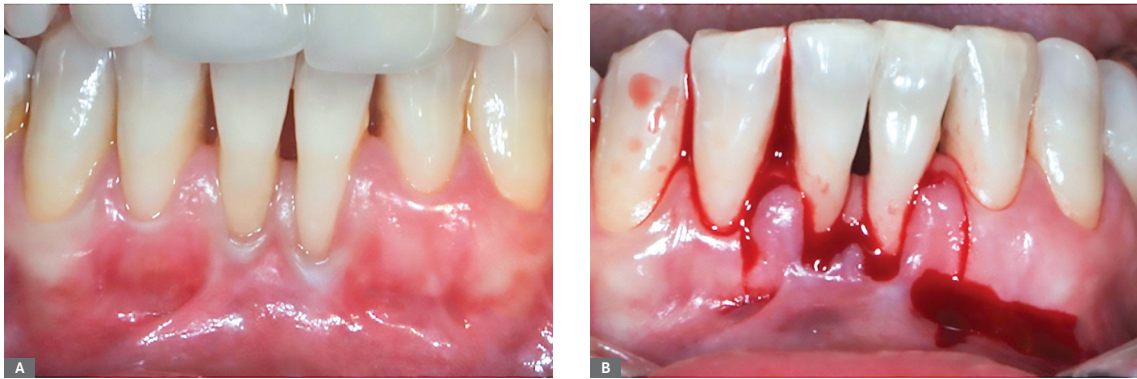


Figure 1: A) Initial aspect of affected region (A). Intrasulcular incision and two vertical releasing incisions involving affected region (B).



Figure 2: Partial thickness flap reflected, exposing a firm, smooth layer of connective tissue over the periosteum.

On the donor site, anesthesia was conducted through the infiltrative technique with 2% lidocaine with 1:100,000 epinephrine (Alphacaina®, DFL, Rio de Janeiro/RJ, Brazil). Incisions with 15c blades (SurgiBlade®, Sunshine International, Miami, FL, EUA) were made approximately 1.5 mm depth. The graft was carefully dissected and separated from the donor site. The excess of adipose tissue and irregularities of the connective tissue were removed. An “X” suture was performed anchored in the buccal side of adjacent teeth with Mononylon 5.0 (Ethicon®, Johnson & Johnson, São Paulo/SP, Brazil) to contain the clot (Fig 3). A collagen sponge was used to additionally protect the palatal wound.

The graft was sutured in the recipient bed through simple interrupted sutures in the extremities and one simple interrupted suture in each interdental papillae (Vicryl 5.0, Ethicon®, Johnson & Johnson, São Paulo/SP, Brazil) (Fig 4). Then, the flap was repositioned over the graft and sutured with suspensory Mononylon 5.0 sutures (Ethicon®, Johnson & Johnson, São Paulo/SP, Brazil) (Fig 5), leaving the FGG submerged.

Post-operative care included Paracetamol 750mg prescription, qid, for three days and mouthwash with 0.12% chlorhexidine solution for

one minute, tid, for two weeks. Patients were also instructed to avoid tooth brushing and flossing in the graft area for 3 weeks. Sutures were removed after 15 days.

Second Intervention

Forty days after graft surgery, it was necessary on the first and second case to perform a slightly superficial debridement to remove tissue adherences that can happen after healing (Fig. 6).

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Figure 3: An “X” and simple interrupted sutures anchored in the vestibular of adjacent teeth and adjacent soft tissues to contain the clot and protect the donor site.



Figure 4: Graft stabilized with a simple suture in each of its edges in contact with the releasing incisions and papillae.



Figure 5: Flap repositioned over the graft and sutured with suspensory suture and Mononylon 5.0.



Figure 6: Superficial pocket that may form after healing (A). Region after a slightly superficial debridement removing the excess of tissue (B).

RESULTS

Clinical Outcomes

Revaluations were made after surgery, with 6, 12, 36 and 53 months for the first case (Fig 7), 10, 12 and 42 months for the second case (Fig 8) and 22 months for the third case (Fig 9). In all cases, the patients' complaints were solved. There was a gain of keratinized mucosa. The images of the graft during the surgery and

the final result were superimposed (Photoshop CS6, Adobe Systems, San Jose, CA) and the shrinkage rate was measured through an image analysis software (ImageJ, Image J64, National Institute of Health, USA). The graft shrinkage ranged between 10 to 13%. Moreover, the keratinized tissue remained stable over time, presenting a highly satisfactory color compared to adjacent area.

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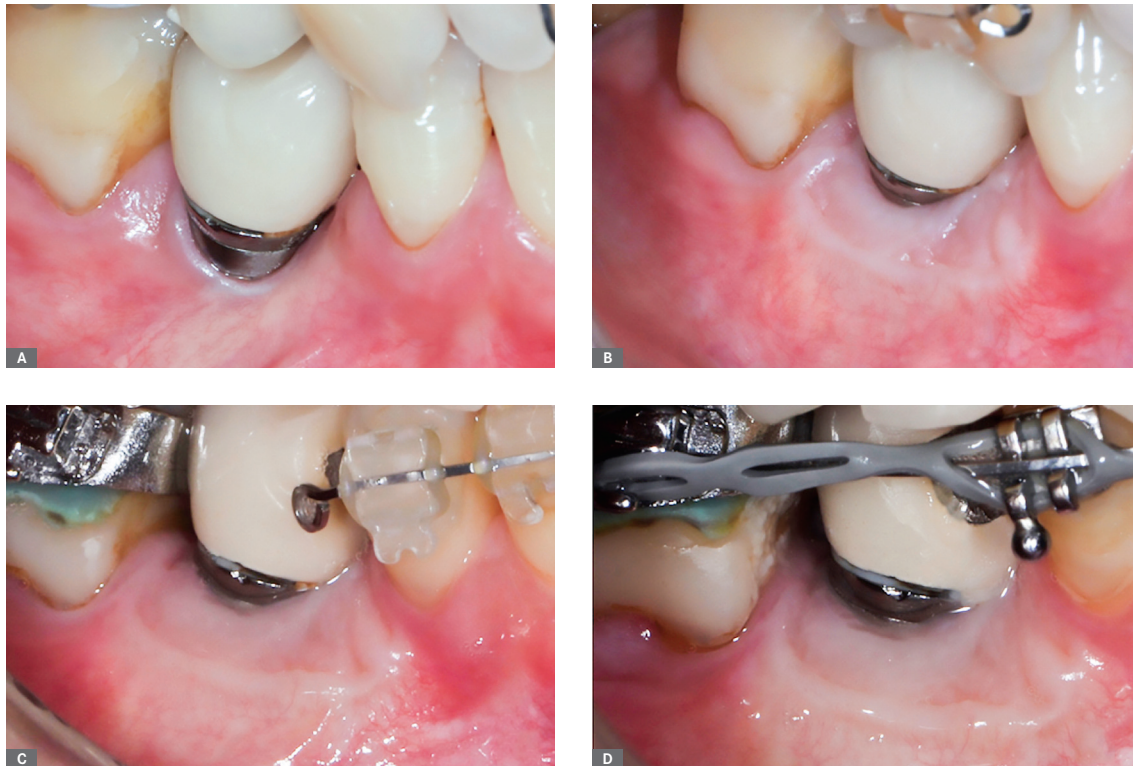


Figure 7: Initial aspect of the case around lower posterior implant (A). Twelve months' follow-up (B). Thirty-six months' follow-up (C). Fifty-three months' follow-up (D).



Figure 8: Initial aspect of the case in lower anterior region (A). Ten months' follow-up (B). Twelve months' follow-up (lateral view) (C). Forty-two months' follow-up (D).

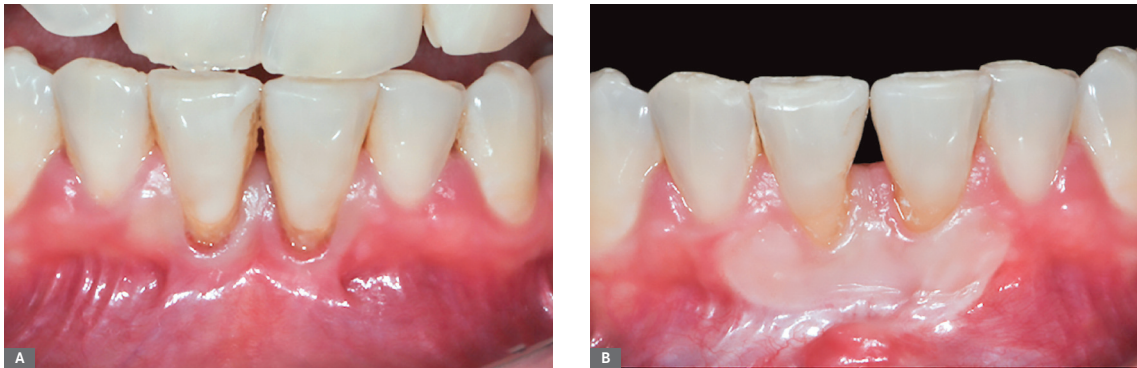


Figure 9: Initial aspect of the case in lower anterior region (A). Twenty-two months' follow-up (B).

DISCUSSION

The modified technique differs from the classic one due to the recipient bed. The split-thickness flap, that is performed to create the recipient site, is used to additionally stabilize the graft, covering it instead of being removed. This procedure makes the modified technique easier and faster compared to the original one. The “X” suture usually employed in the original technique and, sometimes difficult to perform, is not necessary in the modified one. Depending on the case, the “X” suture is not possible to be performed because of the fragility of the periosteum used to anchor it. In such cases, the modified technique may be indicated.

Although covering the epithelial tissue of FGG may raise some questions, the studies evaluating the processes of FGG healing shows that an extensive epithelial necrosis is observed within the first 3 days after surgery. Our cases have demonstrated that the split-thickness flap on top of this graft may, at least, partially integrate to the FGG. All cases demonstrated an integration in the apical region of the FGG, close to gingival mucosa.

The results are very promising, and the cases presented in this report have demonstrated a graft shrinkage of about 10% up to 53 months of follow-up. Considering the recent literature, graft shrinkage during healing period can range from 17% to 44%¹²⁻¹⁴. It can be speculated that the better stabilization and the increased blood supply from the flap on the border and on top of the graft could lead to favorable results of the present study. Such technique may be especially important in situations with risk of FGG loss, e.g. areas of prominent roots, regions with buccal bone dehiscence or fenestrations, regions with bone concavities in interproximal sites, concave or curved recipient beds, or any other conditions that can jeopardize the FGG adaptation to the subjacent recipient site.

The need for harvesting smaller grafts to achieve the same gain of keratinized tissue may result in less post-operative morbidity for the patients. Smaller and shallower grafts should reduce the pain and discomfort in the palatal region, one of the most common complaint after soft tissue grafts. These advantages could also reduce the risks of arterial damage and hemorrhage, since smaller grafts are needed to achieve successful clinical results. Clinically, the modified technique seems to result in an improved graft color compared to the adjacent tissues. A possible explanation for this characteristic would be that cells from the flap’s connective tissue may integrated to the top of FGG and produce a less intense keratinization. Further studies are necessary to confirm both clinical findings and rationale hypothesis.

One possible disadvantage of the modified technique is the need of a complementary surgical step. In some cases, the flap can partially adhere to the FGG and form a superficial pocket. Forty days after surgery a slight debridement on the graft area under infiltrative anesthesia could be necessary. Most of the times sutures are not needed.

Finally, we can infer that the modified technique presents great clinical potential, mainly in challenging situations like shallow palate, regions presenting difficulties to perform the surgery, difficulty to stabilize the FGG or any other clinical conditions that might negatively affect the FGG adaptation to the recipient site and consecutively its integration.

CONCLUSION

The modified technique of FGG can be successfully used to treat cases with lack of KT in teeth and implants. In addition, less graft shrinkage was observed compared to others studies.

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