

**Free Gingival Graft to Increase Keratinized Mucosa around Dental Implant-A Case Series**

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**Type of Publication:** Case Report

**Conflicts of Interest:** Nil

**Abstract**

A successful reconstruction of edentulous site by implant is predicted on two fundamental components: the reproduction of the natural tooth characteristics on the implant crown and the establishment of soft tissue housing that will simulate a healthy periodontium. To improve prognosis of implant, soft tissue conditions should be carefully evaluated. For long term maintenance of implant, a zone of keratinized tissue is favourable. The presence or reconstruction of keratinized mucosa around dental implant can facilitate prosthetic procedure and allow the maintenance of an oral hygiene measures without irritation or discomfort to surrounding soft tissue around implant. Insufficient keratinized tissue can be

increased surgically by free gingival grafting. The aim of the present study is to enhance the inadequate width of attached gingiva around dental implants with Free Gingival Graft (FGG).

**Keywords:** Dental Implant, Free Gingival Graft, Keratinized Mucosa, Peri-implant tissue, Oral Hygiene, Periodontal health

**Key Messages**

**Clinical Significance:** The free gingival graft is an effective treatment in increasing the width of keratinized mucosa on the buccal side and provided an improvement in maintaining the health of peri-implant tissues which allows for better hygiene in order to increase the longevity of the prosthesis.

## Introduction

Fixed implant-supported prosthesis is an alternative treatment for rehabilitation of missing teeth.<sup>[1]</sup> The soft tissue healing following implant surgery may result in the establishment of a border tissue composed of either keratinized or non-keratinized mucosa.

However, the maintenance and health of the peri-implant soft tissue is necessary for the longevity of dental implants and the prosthesis. The sealing ability of the peri-implant non-keratinized tissue and the role of plaque control in some of the patients are the main arguments for justifying a free gingival graft at the implant site.<sup>[2]</sup> Several clinical and experimental investigations have shown that the absence of the attached keratinized tissue is compatible with the maintenance of the periodontal health. Furthermore, many authors have reported no correlation between the implant success rate and the presence of keratinized tissue in the peri-implant soft tissue.<sup>[3],[4],[5]</sup> On the other hand, some reports have also suggested that a lack of keratinized tissue may contribute to implant failure as the mobile mucosa can disrupt the implant-epithelial attachment zone and contribute to an increased risk of inflammation due to the accumulation of plaque in that area.

There are different surgical techniques that have been introduced to obtain adequate amounts of keratinized tissue around dental implants, including the gingival autograft, apically positioned flap (APF), coronally positioned palatal sliding flap, and acellular dermal matrix graft (ADM).<sup>[6],[7],[8]</sup> Performing a free gingival graft (FGG) prior to implant surgery has been suggested when there is minimal keratinized tissue over the edentulous ridge and APF and FGG can be combined in shallow vestibules with minimal keratinized tissue. Thus, the aim of the present clinical case series is to describe an oral rehabilitation procedure of partially edentulous patients

with absence of keratinized mucosa in the mandibular buccal region, using a free gingival graft around dental implants.

## Case History

**Case 1:** A 45-year-old male patient reported to the Department of Periodontology with chief complaint of loose teeth in lower front jaw region. On examination patient was diagnosed with localized periodontitis irt 31,32,41,42 along with grade III mobility. Immediate implant placement was planned irt 32 & 42. Due to inadequate amount of keratinized gingiva around dental implants, gingival augmentation using free gingival graft was planned after 4 months of implant placement before prosthetic loading.



Figure 1: Inadequate keratinized tissue around implants at 32, 42

The patient was anesthetized locally with lignocaine 2% associated with epinephrine 1:80,000. A releasing incision was given at the level of mucogingival junction. A partial-thickness flap was then reflected as close to the periosteum as possible to create the bed preparation and the keratinized tissue was de-epithelialized (Figure 2). A sterile paper was used to make a template with the same size of the recipient bed, which was transferred to the palate in order to harvest 1.5 mm thick free gingival graft (Figure 3).



Figure 2: Preparation of the recipient site around implant

A free gingival graft [FGG] was obtained from the palate, approximately 2 mm apical to the gingival margin. Absorbable sutures were placed to position the raised partial-thickness flap apically and to secure it to the periosteum. The graft was placed covering the surgical area and fixed by compression sutures using absorbable thread (Vicryl–Ethicon, Johnson & Johnson do Brasil, São José dos Campos, Brazil) to remain stable and in close contact with the periosteal bed (Figure 4) followed by Coe-pak placement at the surgical site (Figure 5).

The palatal donor site was packed with a gel foam and a palatal stent was placed over it to promote hemostasis and clot stabilization.

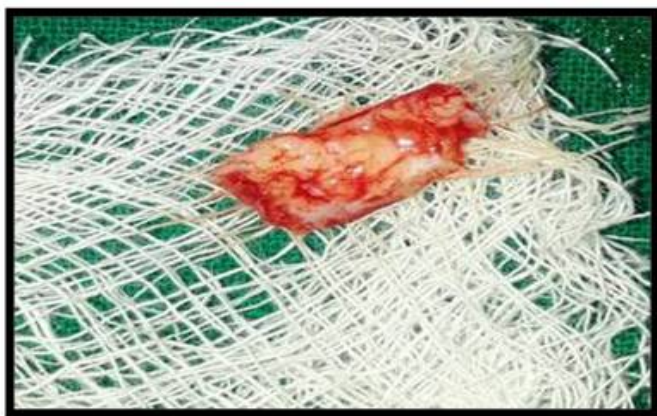


Figure 3: Free gingival graft harvested from the donor site

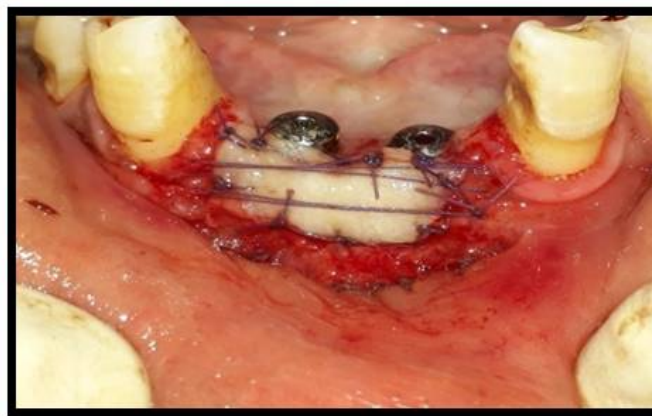


Figure 4: The graft is placed on the recipient bed and sutured



Figure 5: Coe-pak placed at surgical site



Figure 6: Post-operative, increased zone of keratinized tissue around the implants irt 32, 42

**Case 2:** A 34-year-old male patient was referred from the Department of Prosthodontics to the Department of Periodontics, Sardar Patel Post Graduate Institute of Dental and medical Sciences, Lucknow, for evaluation of soft tissue around dental implants. Clinical examination with roll test performed with periodontal probe revealed inadequate keratinized tissue around the implant placed in



the region of 44 (Figure 7) which was evident by bunching up of the alveolar mucosa.



Figure 7: Inadequate keratinized tissue around implants at 44

The patient was anesthetized locally with lignocaine 2% associated with epinephrine 1 : 80,000. A releasing incision was performed and a partial-thickness flap was made on the buccal side of the foraminal area around the dental implant at the level of mucogingival junction. A partial-thickness flap was then reflected as close to the periosteum as possible to create the bed preparation and the keratinized tissue was de-epithelialised (Figure 8). A sterile paper was used to make a template with the same size of the recipient bed, which was transferred to the palate in order to harvest 1.5 mm thick free gingival graft (Figure 9).

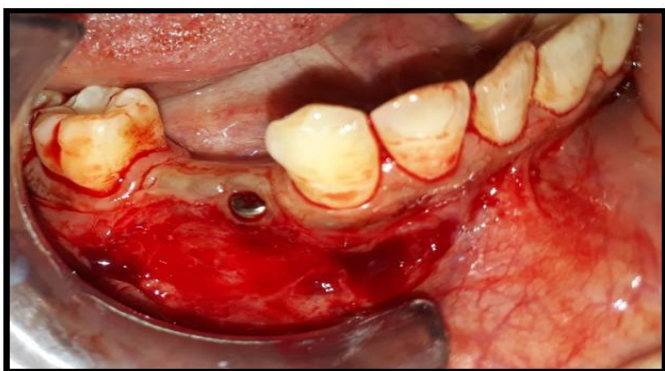


Figure 8: Preparation of the recipient site around implant  
A free gingival graft [FGG] was obtained from the palate, approximately 2 mm apical to the gingival margin.

Absorbable sutures were placed to position the raised partial-thickness flap apically and to secure it to the periosteum. The graft was placed covering the surgical area and was fixed by compression sutures using absorbable thread (Vicryl–Ethicon, Johnson & Johnson do Brasil, São José dos Campos, Brazil) to remain stable and in close contact with the periosteal bed (Figure 10).

The palatal donor site was packed with gel foam and a palatal stent was placed over it to promote hemostasis and clot stabilization. Coe-pak placed at the surgical site. (Figure 11)

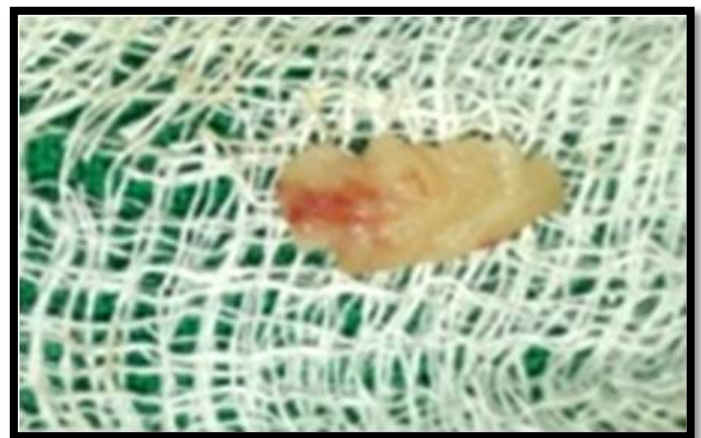


Figure 9: Free gingival graft harvested from the donor site

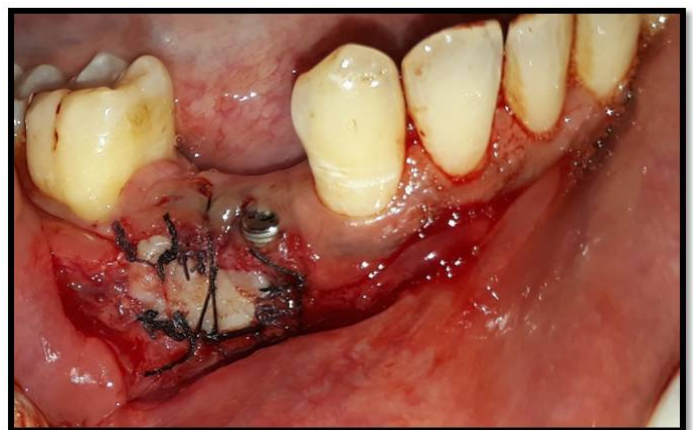


Figure 10: The graft is placed on the recipient bed and sutured



Figure 11: Coe-pak placed at surgical site



Figure 12: Post-operative, increased zone of keratinized tissue around the implant placed at the site 44 after prosthesis placement.

Patients were prescribed with antibiotic therapy, i.e. Cap Amoxicillin 500 mg, thrice a day and analgesic, i.e., Tab Ibuprofen 400 mg twice a day for 5 days. Tooth brushing was discontinued for the first 2 weeks at the surgical site and 0.2% chlorhexidine mouth rinse was instructed until 2 weeks after surgery. Coe Pak was replaced every week for 4 weeks after the surgical procedure. Healing was uneventful with minimal postoperative discomfort to the patients. Patients were recalled at 3 months and 6 months post-op for follow-up.

### Discussion

The absence of keratinized mucosa, around the peri-implant tissue, could lead to an improper oral hygiene, plaque accumulation, peri mucosal inflammation, bleeding on probing, mucosal recession, and ultimately alveolar

bone loss that could negatively influence the long-term maintenance of dental implants and prosthesis. Several surgical procedures have been used to increase keratinized mucosa around implant including free gingival grafts, connective tissue grafts, pedicle grafts, and apically positioned flaps.

Free gingival graft is one of the successful and predictable techniques described that could prevent hard and soft tissue problems developed after implant rehabilitation. Free gingival graft procedure can be performed before implant placement, during the second stage surgery in implants or after placement of the final prosthesis.<sup>[9]</sup> Free gingival graft previous to implant placement or during the second stage surgery can result in a greater waiting time for realization of rehabilitation treatment.

Furthermore, the pain and difficulty during hygienisation of the prosthesis could lead to plaque accumulation around the peri-implant tissues and cause discomfort to the patient and mucosal inflammation. An adequate width of keratinized tissue around implants could provide favorable environment to facilitate precise prosthetic procedures, and allow proper oral hygiene measures by the patient, which would help to prevent gingival recession. In addition, wider zones of keratinized mucosa can offer more resistance to the forces of mastication and frictional contact that occur during oral hygiene procedures.

One limitation of this technique is that it involves two surgical sites, causing morbidity in both. However, with adequate medication, stabilization of the periodontal dressing and a good follow-up during the first 15 days of healing, we can minimize this limitation. In addition, some percentage of shrinkage should be expected and periodical controls must be performed.<sup>[10]</sup>

In present clinical case reports, patients experienced discomfort, restriction during oral hygiene procedures, and plaque accumulation after 30 days of use of the final

prosthesis due to lack of keratinized mucosa, requiring a free gingival graft. The free gingival graft was performed after implant placement, and the adjacent dentition allowed the stability of the periodontal dressing along with protection of recipient bed, and immovability of the graft. Considering the patient's age and health, the use of a free gingival graft was considered a viable and satisfactory treatment option with good outcomes during 6- and 12-month period of follow-ups.

### Conclusion

When planning for implant restorations, a preoperative assessment of the thickness and width of keratinized tissue around dental implants is an important step. When necessary, keratinized tissue augmentation should be done prior to implant placement or at the second stage. Using Free Gingival Graft is a predictable and safe method to increase KT, thus allowing for better oral hygiene for the patient. However, long-term clinical trials are needed for better assessment of these surgical procedures.

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