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Peri-implant phenotype modification with autologous graft: Case report

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Abstract

In the present clinical case, the gain of keratinized mucosa by means of creeping is observed, even with the loss of the graft at the surgical site. The patient was asymptomatic at the time of consultation, but upon clinical observation, he would be more prone to developing peri-implantitis due to the difficulty in maintaining good hygiene at the site. The main diagnosis was the absence of peri-implant keratinized mucosa in area 4.6, giving the treatment plan the placement of a free gingival graft with the aim of modifying the peri-implant phenotype. The results were the gain of keratinized mucosa by means of creeping/cellular induction, having lost the graft. It is concluded that there may be a gain of keratinized tissue by means of cellular induction, although if the graft had been integrated, the gain would have been significantly greater, covering even more dental organs.

Keywords: Phenotype, keratinized mucosa, dental implants, periimplantitis

Introduction

Throughout the history of dental implants, the importance of peri-implant soft tissues has been studied, both for aesthetic and functional reasons. In the latest consensus of the American Academy of Periodontology in 2017, evidence was presented on the negative effect that its absence had: as mucositis or peri-implantitis, in the worst cases ^[1].

The peri-implant phenotype can be described as the morphological and dimensional characteristics that characterize the tissues surrounding osseointegrated implants, formed by the bone component, which is given by the bone crest. In addition to the gingival component that is made up of: keratinized mucosa, gingival thickness and height of the supracrestal tissues ^[2].

The keratinized gingiva is located from the peri-implant gingival margin to the oral mucosa or mobile lining mucosa. ≥ 2 mm is required to prevent recessions, bone resorption and facilitate hygiene ^[3]. Having at least 2 mm of keratinized gingiva ensures a disease protection factor for implants ^[4].

Gingival thickness is the horizontal dimension of the peri-implant tissue that may or may not be keratinized, being thin when presenting < 2 mm and thick ≥ 2 mm ^[5]. This will have an impact on the predisposition to gingival recessions, which at the same time will protect the bone crest, which will promote greater stability in the tissues over time.

The height of the supracrestal tissue is located from the gingival margin to the bone crest. It consists of 3-4 mm in height, with 2 mm of epithelial insertion and 1-2 mm of connective tissue, so it would be expected based on human histological studies of 4-4.5 mm ^[6]. It is not attached to the implant, its main objective is to protect against marginal bone loss and improve the volume of the papillae, leading to better management of the interproximal tissues ^[2].

Regarding the bone component, it is expected to have ≥ 2 mm of thickness of the buccal plate. The authors speak of a minimum critical thickness to avoid future bone changes due to remodeling ^[2].

Currently, to obtain long-term peri-implant health, it is expected to meet the clinical parameters mentioned. In the case of absence of keratinized gingiva, the best option so far is autologous gingival grafts, with the free gingival graft being the most successful ^[7], because it

has shown greater keratinized gain and creeping in the implants [8]. In addition, it helps to reduce the probing depth, plaque index and probability of gingival recession occurring [9].

Other options are also: the use of autologous connective tissue grafts or biomaterials such as acellular dermal matrix. Significant gains have been found, but not with the capacity to increase keratinized gingiva as the free gingival graft does [10].

The objective of the present study is to report the diagnosis of a patient with absence of keratinized gingiva on an implant, reporting its clinical management by placing a free gingival graft.

Materials and Methods

Female patient, 63 years old, comes to the consultation due to sensitivity to brushing at a 4.6 dental organ site with the presence of an implant placed in August 2019. The patient has a medical history of osteopenia, for which she consumes Alendronic Acid, consuming 70 mg orally once a week and multivitamins. No medical consultation is carried out, since we are based on the latest data provided by the latest ITI consensus in 2023, in which they state that patients with a low dose of bisphosphonates are considered to be at low risk for developing osteonecrosis of the jaws, with Alendronate 70 mg/week being a low dose [11].

The clinical examination shows signs of inflammation, with the absence of keratinized mucosa and no bleeding on probing. The radiographic examination shows a stable implant.

The diagnostic methods used were: clinical analysis, photographic analysis, phenotype evaluation. It was carried out by the noninvasive method, which was described by Dr. Joseph Kan in 2003 [12], which is based on probing the vestibular area of the peri-implant mucosa and evaluating the transparency of the periodontal probe through the gingival margin. If the probe was observed, it would be determined as a thin phenotype, otherwise it would be thick. Finally, a radiographic evaluation resulted in a good prognosis.

The surgery was planned for free graft surgery covering tooth

4.7, implant in 4.6 and 4.5. Local anesthesia was infiltrated with 4% Articaine 3 cartridges using the Gow Gates technique and buccal nerve block. It was started with crestal and submarginal incisions 2 mm from the gingival margin of the adjacent teeth with an Ambiderm brand 15c scalpel blade. A partial thickness flap was raised crossing the mucogingival line approximately 4 mm below it. Anesthesia of the palate was continued by blocking the palatine nerve. A graft was taken from the palate with a 20x5mm 15c blade. The palate was sutured with 4-0 black silk. The graft was then placed in the recipient area; the mesial and distal ends were sutured with simple stitches using 6-0 vicryl, followed by lasso-type suspensory sutures to secure the graft to the graft bed. Pressure was applied. Periacyl was placed on the palate. The following were prescribed: clindamycin 300 mg every 8 hrs for 7 days. Ketorolac 30 mg sublingual, take 1 every 12 hrs the first day. Ibuprofen 400 mg every 6-8 hrs for 4 days, continue in case of pain. Chlorhexidine 0.12% rinse for 1 minute for 14 days.

Results

At 7 days, excellent evolution and healing were observed. The palate is observed healing excellently, sutures are removed. Based on the article by Dr. Tavelli *et al.* [13] in which, at 5 days, after surgery, an inflammatory infiltrate continues and also an active migration of the basal cells that gradually cause the closure of the palate by secondary intention healing, hoping that within the next 3-5 weeks it will be completely epithelialized. Clinically, at the graft site, a whitish layer is observed, waiting for the granulation to end. At 14 days after the graft, the patient comes to the consultation with the graft outside the surgical site, necrotic. The palate is observed with excellent evolution and healing. At 4 weeks, excellent evolution is observed in both sites. At 8 weeks, the prosthodontist is asked to place the crown due to the excellent evolution of both sites. At 9 months, creeping is observed at the graft site, a gain of 2 mm of keratinized mucosa is obtained at the implant site, the patient reports excellent progress and care of the surgical site.



Fig 1: Free gingival graft surgery on 4.6 implant in October 2023.



Fig 2: One week postop.



Fig 3: One month postop.



Fig 4: Three months postoperatively with excellent progress and healing of the palate.



Fig 5: Three months postoperatively, where a lateral view is observed in the upper image and an occlusal view in the lower images, with excellent evolution due to the gain of keratinized mucosa surrounding the implant site, even with graft necrosis.



Fig 6: Nine months postoperatively, we can see the lateral and occlusal views of the surgical site, where the rehabilitated implant is observed, with good hygiene, in addition to the clinical view of the keratinized mucosa.

Conflict of Interest

Not available

Financial Support

Not available

Discussion and Conclusion

Free gingival grafting is a predictable treatment with a high success rate in both teeth and implants. In this case, what happened was that at the time of suturing the graft, the corner portions were adhered to the adjacent teeth, which caused the graft not to epithelialize with the adjacent tissues. In addition to the presence of gingival recessions in the adjacent teeth, which also caused the graft to be positioned on the root without vascularity.

It has been shown that this procedure is the one that will give the greatest gain in keratinized mucosa, in addition to the increase in its thickness, providing more predictable results^[4]. It has been mentioned in articles, for example, by Dr. Tavelli *et al.* 2021, that, comparing autogenous and substitute grafts, the free graft is the only one that demonstrated gains in keratinized mucosa. Abou-Arraj *et al.*, in 2020, speak of the free gingival graft being considered the gold standard in increasing tissue thickness, and the procedure after implant placement is also indicated, prior to rehabilitation^[14]. Another factor they mention.

Regarding complications from taking the autologous graft, the incidence is usually low, although it has been found that most of the time what can occur is transoperative or postoperative bleeding in the palate. Another of the postoperative complications may be pain, but it is also very low, compared to other periodontal procedures^[15].

The most characteristic of this case is that it can be observed clinically that even with the necrosis of the free graft, a creeping was obtained over the months that provided the 2 mm of healthy keratinized mucosa and the increase in its thickness. The main lessons learned were the management of

the free graft technique in implants, the exact site or position where the graft should go, the stitches that adhere the graft to its bed and give the ability to immobilize it.

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