

# Masterclass in Clinical Practice

## Implant Dentistry with

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## The importance of keratinized tissue around dental implants



Scan to see video

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### Introduction

The long-term survival and success of dental implants depend on multiple factors. One of these factors is the soft tissue surrounding dental implants. To understand the anatomy of soft tissue around dental implants, it is worth revisiting the normal anatomy of soft tissue surrounding teeth.

The main role of the periodontium is to anchor a tooth to the jaw bone. The periodontium consists of the gingiva, periodontal ligament, root cementum and alveolar bone proper.<sup>1</sup> The periodontium also plays a major role in defence which contributes to its health in the natural dentition as well as around dental implants.<sup>1,2</sup> Three types of oral mucosa can be distinguished, namely the masticatory mucosa (gingiva and hard palate), specialized mucosa (dorsum of the tongue) and lining/alveolar mucosa. The gingiva covers the coronal alveolar process and cervical portion of teeth and consists of an epithelial layer and underlying connective tissue. The gingiva is always keratinized and consists of the attached gingiva and the free gingiva which terminates at the free gingival margin. Apically, the attached gingiva extends to the mucogingival junction, where it becomes continuous with the alveolar mucosa (Fig.1). The immobile attached gingiva is firmly attached to the underlying alveolar bone and cementum by connective tissue fibers (Sharpey's fibers). The alveolar mucosa on the other hand, is loosely bound to the underlying lamina propria and is therefore mobile.<sup>1</sup>

The width of the band of attached gingiva around teeth varies from site to site and the range of variation is between 1-9 mm. In the maxilla, the vestibular gingiva is usually widest at the incisors and narrowest at the premolars. In the mandible, the lingual gingiva is especially narrow at the incisors and wide at the molar sites (Fig. 2).<sup>1</sup> This explains why certain potential dental implant sites will naturally present with less attached gingiva after tooth extraction.

Although low trauma extraction techniques have been discussed in a previous Masterclass, it is relevant to emphasize the importance of not approximating the soft tissue margins over a tooth socket by suturing. Leaving the extraction socket open for healing to occur will create more attached gingiva at the future implant site (Fig. 3). This newly formed gingiva can then be moved buccally by placing the crestal incision more towards lingual during implant placement or exposure.

### Keratinized tissue around implants

Compared to natural teeth, the soft tissue around dental implants provides less of an anatomical barrier as it does not have inserting fibers attaching to the implant or abutment.<sup>2-4</sup> An implant has a transmucosal component (an abutment, neck of the implant, or implant restoration) that protrudes through the overlying mucosa/



Figure 1: Healthy soft tissue in the natural dentition. FG= free gingiva, AG=attached gingiva, AM=alveolar mucosa



Figure 2: Variation in the width of attached gingiva at different sites, with a clearly visible mucogingival junction.

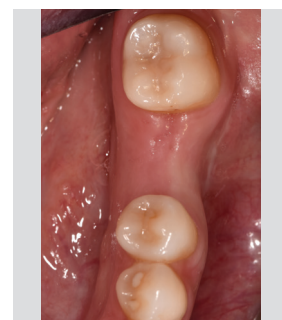


Figure 3: Healed extraction site 3-months after low trauma extraction, with adequate amount of attached keratinized tissue for implant placement.

gingiva, which heals and adapts around it without an inserting connective tissue attachment such as around teeth. Although some studies showed circular fibers present around the transmucosal part of implants<sup>4</sup>, it is well-known that the barrier function of the peri-implant tissue is less effective than that of natural teeth. The importance of having sufficient keratinized tissue around dental implants has been emphasized in recent studies.<sup>2-5</sup> Mobile alveolar mucosa is not able to provide an adequate seal between the oral environment and the implant body. In patients with inadequate plaque control, this may become even more crucial, as inflammation may distend the mucosa more readily and render the area more uncomfortable to oral hygiene efforts. This in turn may lead to more bone loss around the neck of the implant.<sup>2, 4, 6, 7</sup>

A reduced width of keratinized tissue around dental implants is associated with increased biofilm accumulation, soft-tissue inflammation, greater patient discomfort, mucosal recession, marginal bone loss and an increased prevalence of peri-implantitis.<sup>4, 7</sup> Free gingival autogenous grafts are considered the standard of care for surgical intervention to effectively increase the width of keratinized tissue around dental implants. The presence of a minimum width of at least

2-3mm of keratinized tissue around dental implants should therefore be assessed routinely in patients with implant supported restorations.<sup>7</sup> It should, however, be stressed that the keratinized tissue should have an attached component to protect the coronal bone around the implant to provide an effective seal. In recent studies the importance of adequate thickness of the keratinized tissue has also been emphasized.<sup>3</sup>

### Epithelial palatal transplant (EPT) to increase the width and thickness of keratinized tissue around implants

Grafting of soft tissue can be done at three different time periods: before implant placement (Figs 4a-c), at the same time (Figs 5a-c) or after implant placement (Figs 6a-c). Experienced clinicians may opt to perform an EPT simultaneously with implant placement as this saves multiple surgical procedures and is more cost effective. This is shown in Fig 5 and also in the video link provided. This is a complex procedure which should not be attempted by inexperienced clinicians. Grafting before the implant placement is the more predictable procedure and provides a better implant environment to place the implant.



Figure 4a: Pre-operative view showing alveolar mucosa almost to crest of ridge

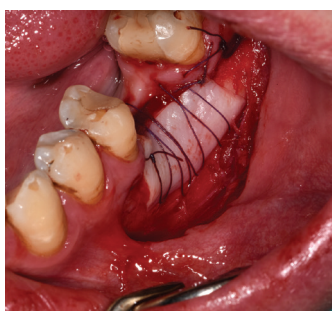


Figure 4b: Graft secured with sutures, vestibular deepening done as well



Figure 4c: Post-operative view showing graft healing after 8 weeks

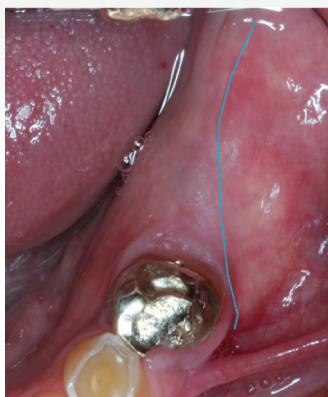


Figure 5a: Preoperative view with mucogingival line shown in blue

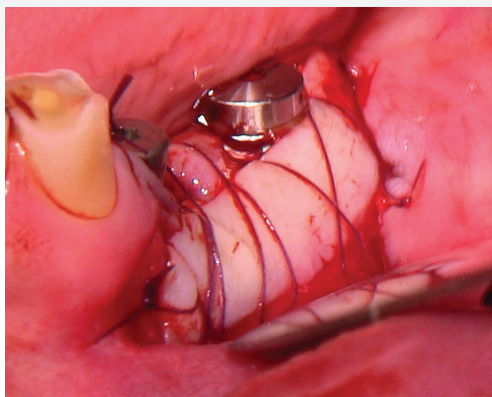


Figure 5b: Simultaneous implant placement and epithelial palatal transplant



Figure 5c: Postoperative view with crowns placed. Rugae can be seen but, as it is not an aesthetic area, this is of no consequence

## Conclusion:

Grafting of keratinized tissue is often neglected, with detrimental long-term results for the implant. The most common reason for neglecting this very important part of implant dentistry is because of the morbidity of a second surgical procedure. Performing the two procedures together solves the dilemma of having to do two procedures and is also more cost effective.

Patients need to be informed of the necessity, rather than ending up with peri-implantitis and regular interventions for the treatment thereof. An added benefit of doing the EPT, is the vestibuloplasty it gives that enables better plaque control.

## References

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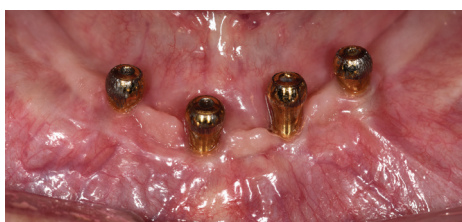


Figure 6a: Implants placed years before with peri-implantitis and no keratinized attached tissue buccal of implants.

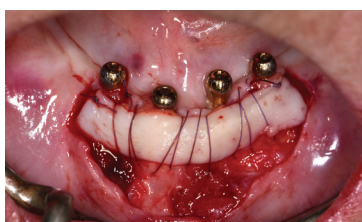


Figure 6b: Graft providing keratinized tissue as well as vestibuloplasty. Patient can wear prosthesis but it has to be eased to ensure no pressure on graft



Figure 6c: Postoperative view showing a stable attached peri-implant keratinized tissue and vestibular deepening giving better access for plaque control