

Significance of Peri-implant Keratinized Mucosa Width and Soft Tissue Thickness

The role of peri-implant soft tissue has emerged as a hot topic in implant therapy because of its ability to improve not only implant esthetics but also implant health and long-term stability. However, the need for a sufficient amount of keratinized tissue width to facilitate proper oral hygiene and long-term implant health remains controversial. The inconclusive results are likely due to the usage of a wide variety of implants. In the past, soft tissue-level implants were more frequently used, but recently, bone-level rough-surface implants are commonly used, often leading to construction of an implant prosthesis below the mucosa. Hence, a band of keratinized mucosa is likely to benefit a patient's ability to keep the implant clean and prevent further bacterial infection as long as the implant is properly placed. Rocuzzo et al found that mandibular posterior implants that lack keratinized mucosa required additional surgeries, antibiotic therapy, and procedures with free gingival graft in order to reduce discomfort and improve plaque control over a 10-year observational period.¹ In a 4-year follow-up study, Perussolo et al reported greater bleeding on probing, plaque accumulation, marginal bone loss, and brushing discomfort when peri-implant keratinized mucosa was < 2 mm.² A lack of keratinized mucosa impairs the surgical outcomes of peri-implantitis; thus, soft tissue augmentation prior to or during the corrective surgery should be recommended. Lastly, the absence of peri-implant keratinized mucosa has

been related to lower patient esthetic satisfaction, verifying the importance of the soft tissue component for implant esthetics.

The thickness of peri-implant soft tissue, however, is not necessarily related to the height of the keratinized tissue. Clinically, soft tissue thickness is measured at 1 to 1.5 mm apical to the soft tissue margin, as the horizontal dimension from the external soft tissues to the internal hard surfaces. Increasing the thickness of peri-implant soft tissue does not correspond to an increased width of keratinized mucosa. Rather, the soft tissue thickness corresponds to the soft tissue phenotype. Similar to natural teeth, a thin tissue phenotype at implant sites has been identified as a risk factor for mucosal recession. A thick soft-tissue phenotype can prevent gingival recessions around a natural tooth, but it does not automatically mean it will be thick enough to prevent a mucosal dehiscence around an implant. One could speculate that the connective tissue thickness in the transmucosal area should be at least thicker than the inflammatory infiltrate induced by subgingival plaque or toothbrushing trauma. As the inflammatory infiltrate occupies an area of approximately 1 to 2 mm, a minimum soft tissue thickness of 2 mm becomes advisable to prevent soft tissue dehiscence at the implant-supported crown. Vertical and horizontal mucosal thickness has been investigated as one of the factors affecting marginal bone loss. Linkevicius et al demonstrated that thin mucosal tissue

(measured vertically) around an implant is associated with more bone loss compared to the presence of a thick peri-implant tissue phenotype.³ Similarly, a thin buccal mucosa thickness (measured horizontally, on the midfacial aspect of an implant) was found to be related to greater mucosal recession and clinical attachment loss.⁴ Thus, it does not come as a surprise that many authors/clinicians have explored the possibility of using connective tissue grafts or substitutes, such as the xenogeneic collagen matrix or acellular dermal matrices. This serves to increase the peri-implant soft tissue thickness (both horizontally and vertically), which minimizes marginal bone loss, reduces midfacial mucosal recession, and enhances flap stabilization during implant wound healing.

In conclusion, one should advocate for soft tissue grafting at implant sites in order to correct alveolar ridge deficiencies, cover soft tissue dehiscence, and increase transmucosal soft tissue thickness. Furthermore, increasing keratinized mucosal width positively affects peri-implant health, while the thickness of peri-implant soft tissue plays a crucial role in preventing mucosal recession.

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