



Keratinized Tissue Assessment for Dental Implant Therapy

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Editorial

Although overall failure rates in implant dentistry are low,¹ peri-implant diseases have been recognized as a common biologic complication that can reduce the long-term success of dental implants.² A recent systematic review and meta-analysis reported prevalence of peri-implant mucositis and peri-implantitis to be at 65% and 47%, respectively.³ Peri-implant mucositis and peri-implantitis are biofilm-associated, inflammatory conditions of peri-implant tissues.⁴ There has been significant evidence implicating the role of bacterial plaque in the initiation of inflammatory responses in the gingiva of natural teeth as well as peri-implant mucosa.^{5,6} Peri-implant disease etiology is multi factorial in nature,⁷ and numerous factors may contribute to plaque accumulation and subsequent inflammation, playing a role as risk indicators for the development of peri-implant disease.^{2,8,9}

The anatomy and histology of the mucosal attachment around dental implants is considerably different from that around natural teeth.^{10,11} A direct anchorage of the connective tissue to the implant surface is not possible due the absence of periodontal ligament and cementum as seen in natural teeth. Instead, collagen fibers run parallel to the implant surface and the mechanical quality of this attachment is low.^{10,11} On a biologic level, it would be favorable to have a zone of keratinized tissue around dental implants. However, the need for keratinized tissue around implants is highly debated. There have been several studies which have documented positive associations between the presence of adequate keratinized mucosa around implants and improved soft tissue health.¹²⁻¹⁴ Further, the lack of keratinized tissue around implants has been demonstrated to make the peri-implant region more susceptible to plaque-induced tissue destruction.¹⁵ Painful oral hygiene has been reported due to the absence of the keratinized tissue surrounding

implants, and this has been attributed to the mechanical irritation caused by the mobility of the non keratinized tissue under function.^{14,16} Conversely, limited need for keratinized tissues around implants to maintain health and tissue stability has also been shown.¹⁷ However, it must be noted that the majority of systematic reviews have indicated a positive relation between presence of keratinized tissue around implants and clinical parameters such inflammation and plaque accumulation.¹⁸⁻²¹ Thus, available literature on the subject indicates that keratinized mucosa around implants may improve the predictability of implant based treatment. However, further evidence is needed to establish the role of keratinized tissue width and gingival phenotype in peri-implant disease.²²

Although there have been few publications on the importance of keratinized tissue around dental implants, and described techniques to augment this tissue²³⁻²⁵ the timing and sequencing of soft-tissue grafts has not been sufficiently addressed. After a thorough clinical assessment, if a major correction of soft tissue is necessary (more than 2mm of keratinized mucosa needs to be augmented at the proposed implant site), a soft tissue augmentation procedure needs to be performed first which may be carried out at the time of implant placement. Several systematic reviews have compared available soft tissue augmentation procedures,²³⁻²⁵ and all the compared techniques have provided adequate results, with no technique indicating substantial superiority over others. Free gingival grafts as well as connective tissue grafts in combination with an apically positioned flap/vestibuloplasty have established reliable results to increase the width of the keratinized gingiva,^{26,27} and they may be utilized when a soft tissue correction of more than 1mm is required. For minor soft tissue corrections (in which a total of less than 1mm of the soft tissue needs to be augmented), a sec-

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ond stage approach may be utilized at the time of implant uncovering. Techniques such as roll envelope flap can also be successfully used at second stage implant surgery for minor corrections.²⁶ Thus, at the time of clinical examination for implant placement, it is critical to identify whether adequate keratinized tissue is available at the implant site and treatment plan the necessary soft tissue augmentation procedure if it is insufficient.

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Conflict of Interest

The authors declare that there was no conflict of interest.

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