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“Monday Morning Pearls of Practice by Bobby Baig”

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Teeth Versus Implants: Mucogingival Considerations and Management of Soft Tissue Complications. Part II

Relevance of Keratinized Mucosa around Teeth

Introduction:

The keratinized gingiva extends from the gingival margin to the mucogingival junction (MGJ). It consists of both the free and attached gingiva (fig 1 and 2). The MGJ delineates the separation of the alveolar mucosa with the keratinized gingiva. In 1948, Orban described the MGJ as a scalloped line separating the gingiva from the lining mucosa.

MGJ and its Importance:

- Recognition of the MGJ is an important component in a thorough periodontal evaluation, as it is commonly used to determine the need for and type of periodontal procedures, as well as outcome assessment following gingival augmentation surgery.
- The MGJ can be determined visually with or without histo-chemical staining or functionally by moving the alveolar mucosa coronally toward the gingiva using a horizontally positioned periodontal probe (roll test). It has been determined that all of these methods are accurate in assessing the location of the MGJ.



Fig 1.



Fig 2.

Keratinized Gingiva and Optimal Health around Teeth:

- **Lang and Loe 1972:** The need for keratinized gingiva around teeth to establish and maintain health remains controversial. Lang and Loe examined the width of keratinized gingiva. They found persistent inflammation despite effective oral hygiene in areas with minimal to no keratinized gingiva. The authors suggest that a minimum of **2 mm** is needed to maintain gingival health.
- **Wennström 1987:** In this study, the entire zone of gingiva was surgically removed around 26 canines and premolars in the mandibular jaw of six patients. He found that with carefully supervised and controlled oral hygiene, the lack of attached gingiva did not lead to an increased incidence of soft tissue recession. Wennström also confirmed these findings and concluded that the thickness of the marginal soft tissue may be essential for the prevention of soft tissue recession during orthodontic therapy.
- **Schoo et al 1985:** Looking at the facial, gingival surfaces over cuspids and bicuspid in 20 patients, the study found that areas with minimal to no attached gingiva did not lead to more attachment loss when compared with sites that had 2 mm or more. However, many studies questioning the need for attached gingiva to maintain periodontal health can be criticized for using a small sample size, limited evaluation time, young healthy subjects, non-standardized probing or clinically unrealistic plaque control and maintenance protocols.
- **Kisch J et al 1986:** A split-mouth longitudinal study exhibited more recession around sites with inadequate attached gingiva when compared to the sites that were treated with free gingival grafts. This study suggests that with good plaque control, a lack of attached gingiva does not necessarily lead to additional attachment loss. However, sites with inadequate plaque control and inadequate attached gingiva do have an increased risk for additional attachment loss.
- **Kennedy JE 1985:** In another split-mouth study design, 58 teeth in 26 subjects were divided into groups based on the presence and absence of attached gingiva and subgingival full-coverage restorations. The study found no difference between sites with or without attached gingiva in agreement with previous studies, but did find an increase in inflammation around teeth with minimal zones of keratinized gingiva and sub gingival restorations.
- **Mehta and Lim:** Confirmed that the width of attached gingiva is not significant to maintain periodontal health in the presence of adequate oral hygiene. However, they did find that thin gingiva around teeth with restorations or undergoing labial orthodontic tooth movement is more susceptible to recession. Because a positive correlation exists between the thickness of gingival tissue and quantity of keratinized gingiva, it is logical to assume that gingival augmentation procedures to augment deficient sites are beneficial in clinical conditions with compromised home care or when teeth are to be restored or orthodontically moved.

Conclusion:

Despite the general consensus that periodontal stability can be maintained with proper plaque control without adequate keratinized gingiva. The clinical reality is that patients seldom perform adequate plaque control and also fail to maintain regular periodontal maintenance. Therefore, despite the scientific controversy, the clinical benefit of establishing an adequate zone of attached gingiva around teeth appears important in clinical practice.

Relevance of Keratinized Mucosa around Implants

Introduction:

The need for keratinized mucosa to maintain health around implants is also controversial. Adequate keratinized mucosa width was defined as > 2 mm. There was limited evidence to support the need for keratinized mucosa to maintain health around implants. (Fig 1 and 2)



Fig 1



Fig 2.

- **Frisch E et al 2013:** A long-term retrospective private practice study evaluated patients treated with connective tissue or free gingival grafts in order to increase the quantity of keratinized mucosa and implant health and were compared with patients who did not undergo any mucogingival surgery. The results of the study concluded that the lack of keratinized mucosa did not lead to a higher incidence of peri-implant disease with adequate plaque control and regular supportive therapy.
- **Esposito et al 2013:** A Cochrane Database Systematic Review agreed with these findings and concluded that there is limited weak evidence to suggest that an increase in keratinized mucosa around implants is beneficial.
- **Bengazi F 1996:** In a two-year prospective longitudinal study, 41 patients with 163 implants were followed. Although implant sites adjacent to mobile tissue showed a greater mean amount of recession than sites with a wide zone of attached tissue, the differences were not statistically significant.
- **Lin et al: 2013:** In contrast, a more recent systematic review by Lin and coworkers found that a lack of keratinized mucosa around implants was associated with more plaque accumulation, tissue inflammation, mucosal recession, and bone loss.
- **Brito et al 2013:** In yet another recent systematic review, the authors found that a reduced width of keratinized mucosa appears to be associated with clinical parameters indicative of inflammation and poor oral hygiene. However, the predictive value of keratinized mucosa on these parameters was limited.
- **Gobbato et al 2013:** A cross-sectional sectional study on 200 implants placed and restored at Case Western School of Dental Medicine in Cleveland reported less alveolar bone loss and improved clinical indices of soft tissue health when implants had ≥ 2 mm of keratinized tissue.
- **Bouri 2008:** In another cross-sectional study, found that less recession and bone loss occurs in areas with adequate keratinized mucosa but contradicted the finding that the clinical indices (gingival index, plaque index and pocket depth) were improved. This may be explained by better plaque control measures in one study over the other.
- **Kim BS 2009:** An increase in plaque accumulation, bleeding, inflammation and soft tissue recession was also reported around implants supporting fixed mandibular full-arch prostheses that had inadequate keratinized mucosa, despite regular implant maintenance and good oral hygiene habits by the patients. Similar findings were reported around implants with inadequate keratinized mucosa supporting over dentures.
- **Alibrad 2009:** Bone and soft tissue remodeling occurs with tooth loss. Therefore, implant reconstructions must often replace the missing teeth as well as the hard and soft tissues. Plaque control around implant-supported prosthetic reconstructions, especially when fixed in clinical situations with severe tissue loss can be very difficult. This is due to the often over-contoured shapes of the prostheses at the tissue-prosthesis interface, which are often cantilevered or extended for esthetics and phonetics. The studies cited suggest that an adequate zone of attached mucosa may facilitate plaque control around these challenging prosthetic reconstructions.

Conclusion:

It is commonly accepted that the presence or maintenance of interproximal papilla around dental implants is related to the height of the interproximal bone. It has also been reported that the presence of keratinized mucosa around implants is another important factor related to interproximal papilla maintenance. Therefore, an adequate

zone of keratinized mucosa may also benefit implant soft tissue esthetics. Similarly with natural teeth, it is a widely held clinical belief that the presence of keratinized mucosa around implants is also beneficial to maintaining long-term peri-implant tissue health and soft tissue esthetics. Therefore, mucogingival surgery to enhance the quality as well as quantity of keratinized mucosa is often needed in conjunction with implant treatment.

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