

# Soft Tissue Grafting Around Teeth and Implants



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## KEYWORDS

- Free gingival graft • Subepithelial connective tissue graft • Recession • Soft tissue defect • Allograft
- Xenograft

## KEY POINTS

- Esthetic appearance and functional longevity for teeth and implants often requires conversion of unfavorable soft tissue traits to more favorable ones.
- Improvement of tissue quality and quantity can be accomplished with many different techniques and materials, and largely depends on clinical presentation of the case and the familiarity of the clinician with the procedures and materials available.
- Identification of causal factors, selection of appropriate surgical technique, and evidence-based material selection lead to predictable success when improving soft tissue characteristics around teeth or implants.

## THE IDEAL CHARACTERISTICS OF THE SOFT TISSUE TOOTH/IMPLANT INTERFACE

The presence of healthy attached tissue at the tooth and implant soft tissue interface correlates with long-term success and stability in function and esthetics. Not only can a lack of keratinized tissue facilitate plaque aggregation around teeth and implants but it can also lead to recession of free soft tissue margin in the esthetic zone. The thicker periodontium is less prone to recession, because of the thickness of the cortical bone as well as the thickness of the surrounding gingiva.

Treatment of mucogingival deficiencies has become a large part of practices involving teeth and implants. The ramifications of not having an adequate keratinized tissue surrounding teeth have been studied extensively for decades,<sup>1,2</sup> and have also extended into implantology. The presence of gingiva is strongly correlated with

optimal soft and hard tissue health.<sup>3</sup> However, in patients maintaining proper plaque control, the absence of attached gingiva around teeth does not result in an increased incidence of soft tissue recession.<sup>1,4</sup> It has been shown in long-term studies that even minimal amounts of keratinized tissue can provide long-term stability of soft tissue margin in the presence of good plaque control.<sup>1</sup>

Early studies suggested that the recession of soft tissue margin around implants may be the result of the remodeling of the periimplant soft tissue barrier. Lack of masticatory mucosa and the mobility of periimplant soft tissue were related to more pronounced soft tissue recession around implants.<sup>5</sup> Plaque-induced inflammation has been shown to cause recession when mucosal margins, rather than gingiva, are surrounding implants.<sup>6</sup> Thicker keratinized tissue facilitates plaque removal around implants. Plaque has been found as the causal factor in periodontal diseases<sup>7</sup> as

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well as periimplant inflammation, and its removal is paramount in tooth and implant long-term health.

Facilitating plaque removal is not the only indication when considering improvement of soft tissue structure surrounding teeth or implants. Esthetic demands for implants have become as high as those for natural dentition. Exposed metal or any visible discrepancies in soft tissue volume or margins suggesting an implant-supported prosthesis in anterior regions have become largely unacceptable by patients. Implant-supported restorations and teeth restored side by side should be in harmony, not only when it comes to prosthetic suprastructures but also in levels of gingival margins, thickness, color, and contour of adjacent gingiva.

Several soft tissue grafting procedures have been developed to improve both the volume of keratinized tissue and the soft tissue contour around implants. Concepts for these surgical techniques have been drawn from procedures developed to enhance soft tissue support around teeth.

### DEVELOPMENT OF MUCOGINGIVAL DIAGNOSIS AND SURGERY

The term mucogingival surgery was first introduced by Friedman<sup>8</sup> in 1957 in reference to correcting relationships between mucosa and gingiva around teeth. In the following decades, that term has expanded to include numerous procedures used to correct and alter defects, position, thickness, and the width of keratinized tissue surrounding teeth. As implantology has expanded and esthetic demand for prosthetic replacements has grown, periodontal plastic surgery procedures have been developed around implants and edentulous ridges restored with pontics and removable prostheses. The term periodontal plastic surgery was introduced by Miller<sup>9</sup> in 1988 and presently includes procedures to prevent or correct oral soft tissue defects of anatomic, developmental, traumatic, and disease-related origin.

### GINGIVAL RECESSION AROUND TEETH AND IMPLANTS

The displacement of the soft tissue margin in an apical direction from the cementoenamel junction leads to exposure of the root surface of a tooth, and is referred to as a marginal soft tissue recession.<sup>10</sup> When the soft tissue margin recedes apically around an implant, it can lead to exposure of the abutment or implant body depending on the extent of displacement, as well as the design of the implant and its suprastructure. In both cases, the term soft tissue margin is inclusive of either mucosa or gingiva, whichever is present at the site.

When considering correction of recession it is important to identify the presence and the amount of gingiva as well as causal factors contributing to displacement of soft tissue margin. Causal factors of soft tissue recession around teeth include the quantity and quality of surrounding keratinized attached tissue, supporting alveolar bone, and the level of plaque control of the affected area. Causes of soft tissue defects surrounding implants include poor implant spatial positioning, incorrect abutment contour, excessive implant diameter, horizontal biologic width formation, and periodontal phenotype.<sup>11</sup>

### CLASSIFICATION OF RECESSION

Several classification systems have been developed to assess and quantify the amount of surrounding soft tissue and osseous components.

Sullivan and Atkins<sup>12</sup> introduced a classification system in 1968 to describe recession around teeth. This classification system was based on the width and length of recession. It was already established at that time that those parameters determined the amount of root coverage obtainable with soft tissue grafting procedures.

Miller<sup>13</sup> introduced his classification system in 1985 (**Box 1**). He related the extent of the soft tissue recession to the location of the mucogingival junction as well as the height of interproximal clinical attachment adjacent to the surface affected by the recession.

Miller's<sup>13</sup> classification is a helpful diagnostic tool in treatment planning and setting realistic expectations for both patients and clinicians. Root coverage can be predictably obtained in class I and II groups, only partially in class III, and not at all in class IV. Properly diagnosing the soft tissue recession is helpful in choosing a proper soft tissue grafting technique and setting expectations for surgical outcome.

In 1999, the International Workshop for Classification of Periodontal Diseases and Conditions formed by the American Academy of Periodontology agreed on a new classification system for periodontal diseases. Category VIII on developmental or acquired deformities and conditions was added to provide more comprehensive diagnostic tool for soft tissue characteristics around teeth and edentulous ridges (**Table 1**).<sup>14</sup>

### ESTHETIC CONSIDERATIONS

Loss of gingival symmetry is most notable on anterior teeth<sup>15</sup> and implants, especially with regard to the principles of gingival zenith positions and levels.

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