

Surgical and prosthetic considerations on dental implants as tooth substitutes

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Today tens of millions of patients have one or more oral implants. A major challenge in implant dentistry is to provide an esthetic, functional and long-lasting restoration. One of the key factors for the long-term success of oral implants from a functional and esthetic perspective is the maintenance of healthy and stable soft and hard tissue levels around osseointegrated implants.

Bone resorption has been regarded as a physiologic phenomenon: it has been reported that vertical bone loss of 1.0 to 1.5 mm before occlusal loading and less than 0.2 mm each subsequent year is within normal physiologic limits.

Several factors are hypothesized to play a role in marginal bone resorption/remodeling. Recently, factors determining the hard and soft tissue architecture had been reported and critically analyzed.

Possible factors can be categorized as follows.

- *Systemic factors*: Smoking, genetics, oral hygiene, diabetes.
- *Local factors*: Bone volume and quality, keratinized peri-implant mucosa (biotype), microbiologic factors, periodontitis, peri-implantitis.
- *Surgical factors*: Flap design, site preparation technique, immediate vs delayed vs late implant placement, misalignment of the implant.
- *Implant-related factors*: One- or two-piece implants, geometry and surface topography, submerged or non-submerged systems, implant material.

- *Biologic factors*: Biologic width – tissue architecture and tissue dimensions around implants, mucosal barrier.
- *Prosthetic factors*: Prosthesis type (fixed vs removable), crown contour and material, implant-abutment connection type, abutment removal and reconnection, timing of abutment connection, abutment geometry and material, abutment surface topography, excess of cement remnants.
- *Biomechanical factors*: Loading modalities, occlusal load, parafunction.

In the following sections, the review will focus on factors that play a role as possible determinants on the formation and preservation of peri-implant hard and soft tissue levels:

- The influence of surgical, biologic, and implant-related factors: scientific evidence and clinical observations.
- The influence of prosthetic and biomechanical factors.

References

1. Canullo L, Cocchetto R, Loi I. Peri-Implant Tissue Remodeling. Chicago: Quintessence Publishing, 2012.
2. Esposito M, Klinge B, Meyle J, et al. Treatment options for the maintenance of marginal bone around endosseous oral implants. Results of the Working Karolinska 2011 Group. Eur J Oral Implantol 2012;5(Suppl):S105–S106.