

Soft tissue health at novel two-piece anodized abutments: 1-year results from a prospective study

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Clinical Relevance

- Two-piece abutments enable “one abutment one time” approach without limiting the restorative flexibility.
- Abutment surface modifications impact soft tissue recovery and health maintenance.
- In this study, anodized abutment base placed on the day of surgery and never disconnected thereafter promoted excellent soft tissue health and esthetics as well as marginal bone level gain after initial remodeling.

Background and Aim

Robust formation of soft tissue adherence onto the abutment and restoration surfaces is crucial for long-term success of implant therapy and can be impacted by abutment surface modifications and abutment dis- and re-connection during the prosthetic phase.¹ To optimize tissue integration at every level, novel anodized implant and abutment surfaces were developed. The implant surface has a gradual change in topography designed to promote early osseointegration and support stable marginal bone, while the new surface at the tissue-level base promotes undisturbed mucointegration.² This study aims to evaluate the clinical performance of these new implant and abutment surfaces after 1 year of function.

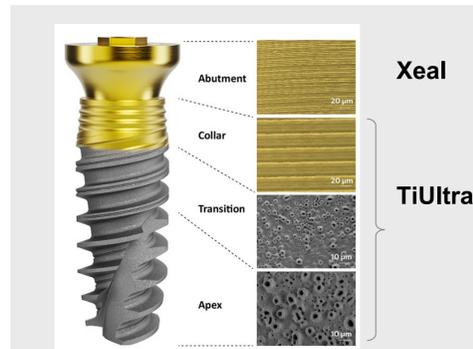


Figure 1. Implant system with the newly engineered Xael and TiUltra surfaces (left) and low magnification SEM images of the surfaces at indicated regions (right).

Methods and Materials

STUDY DESIGN

Prospective, single-center



Figure 2. Study flow-chart

Results

- Mean patient age was 51.4±12.6 years; 50.8% of patients were current or former smokers, 13.1% had parafunctional tendencies, and 9.8% had a history of periodontitis.
- Cumulative implant survival rate was 96.5% at 1 year.
- Marginal bone levels decreased from -0.04 mm at implant insertion to -1.12 mm at prosthetic delivery (PD) and -1.36 mm at 6 months, and increased to -1.08 mm at 12 months.

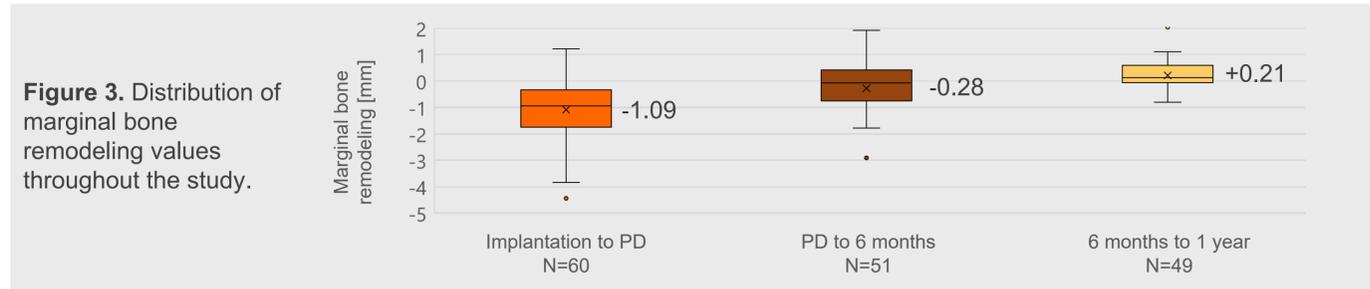


Figure 3. Distribution of marginal bone remodeling values throughout the study.

- Excellent soft tissue response:
 - Keratinized mucosa status improved from implant insertion to prosthetic delivery and remained stable thereafter. Mean keratinized mucosa height increased from 3.7 mm to 4.0 mm at 1 year. Bleeding index and Jemt’s papilla score improved, while gingival index remained stable from prosthetic delivery to 1 year.
 - Evaluation of IOS profile overlays showed coronal migration of the mucosal margin and increased tissue thickness from prosthetic delivery to the 6-month follow-up. Both outcome measures remained stable from 6 months to 1 year.

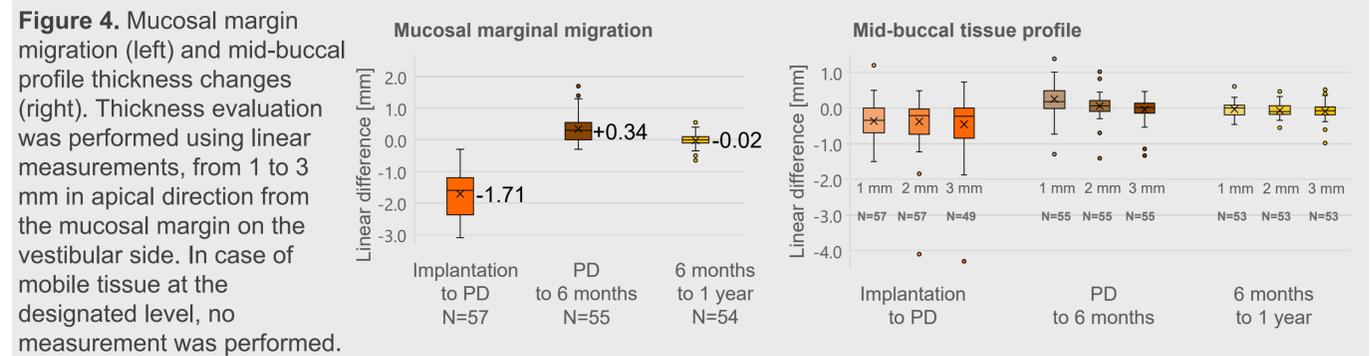


Figure 4. Mucosal margin migration (left) and mid-buccal tissue profile thickness changes (right). Thickness evaluation was performed using linear measurements, from 1 to 3 mm in apical direction from the mucosal margin on the vestibular side. In case of mobile tissue at the designated level, no measurement was performed.

Conclusion

Significant increase in tissue thickness, excellent soft tissue health and marginal bone level gain after the initial remodeling indicate that the novel anodized surfaces at implants and abutments combined with undisturbed soft tissue healing promote excellent peri-implant tissue response.

References

- On implant surfaces: a review of current knowledge and opinions. A Wennerberg, T Albrektsson. Int J Oral Maxillofac Implants. 2010;25:63-74.
- Rational design and in vitro characterization of novel dental implant and abutment surfaces for balancing clinical and biological needs. V Milleret, P S Lienemann, A Gasser, S Bauer, M Ehrbar, A Wennerberg. Clin Implant Dent Relat Res. 2019 Mar;21 Suppl 1:15-24.

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Clinical Case

A 52-year-old female patient, smoker (0-5 cigarettes per day), with a missing second molar tooth in the mandible (FDI position 47) received NobelActive TiUltra RP 4.3 x 10mm. Following the digital impression, an On1 Base Xael and an On1 healing cap were placed on top of the implant. The final prosthesis was delivered 2.7 months later and consisted of an On1 universal abutment and a NobelProcera full-contour zirconia crown.

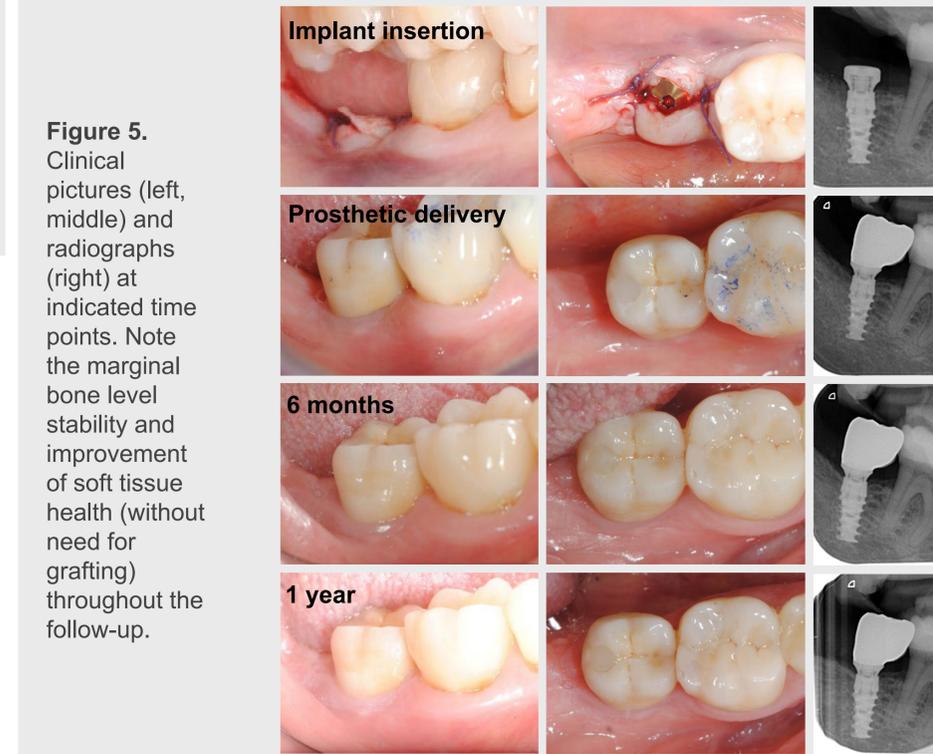


Figure 5. Clinical pictures (left, middle) and radiographs (right) at indicated time points. Note the marginal bone level stability and improvement of soft tissue health (without need for grafting) throughout the follow-up.

Mid-buccal tissue profile overlay

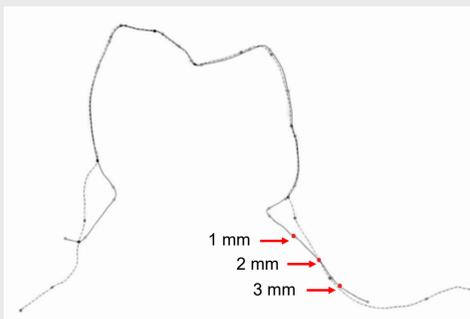


Figure 6. Overlay of mid-buccal tissue profile at prosthetic delivery (solid line) and the 1-year follow-up (dashed line) of the clinical case featured in Figure 5. Note the increased tissue thickness is particularly apparent at the 1 mm distance from the mucosal margin.