



SCIENTIFIC **HIGHLIGHTS**

Short overviews on recently
published scientific evidence.

Issue **6**/2024

Edited by Dr. Marcin Maj

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Osseointegration of Anodized vs. Sandblasted Implant Surfaces in a Guided Bone Regeneration Acute Dehiscence-Type Defect: An In Vivo Experimental Mandibular Minipig Model

(Shakeel Shahdad et al., 2024)

and

Mandibular overdenture retained by four one-piece titanium-zirconium mini implants: A 2-year follow-up on prosthodontic outcomes

(Jésio Rodrigues Silva et al., 2024)

Advances in osteoimmunomodulation of biomaterials after intrabone implantation: focus on surface hydrophilicity

(Xinpeng Wei et al., 2024)

EDITOR'S CHOICE

Clin Oral Implants Res. 2024 Oct 10

Osseointegration of Anodized vs. Sandblasted Implant Surfaces in a Guided Bone Regeneration Acute Dehiscence-Type Defect: An In Vivo Experimental Mandibular Minipig Model

Shakeel Shahdad, Simon Rawlinson, Nahal Razaghi, Anuya Patankar, Mital Patel, Mario Rocuzzo, Thomas Gill



STUDY OBJECTIVES AND METHODS

The purpose of this study was to analyze the effect of implant surface characteristics on osseointegration and crestal bone formation in a grafted dehiscence defect minipig model. A standardized 3 mm × 3 mm acute-type buccal dehiscence minipig model grafted with deproteinized bovine bone mineral and covered with a porcine collagen membrane after 2 and 8 weeks of healing was utilized. Crestal bone formation was analyzed histologically and histomorphometrically to compare three implant groups: (1) a novel, commercially available, gradient anodized (NGA) implant, to two custom-made geometric replicas of implant "1," (2) a superhydrophilic micro-rough large-grit sandblasted and acid-etched surface, and (3) a relatively hydrophobic micro-rough large-grit sandblasted and acid-etched surface.

RESULTS

- At 2 and 8 weeks, there was no difference between the amount and height of newly formed bone (NBH, new bone height; BATA, bone area to total area) for any of the groups ($p > 0.05$).
- First bone-to-implant contact (fBIC) and vertical bone creep (VBC) at 2 and 8 weeks were significantly increased for Groups 2 and 3 compared to Group 1 ($p < 0.05$).
- At 8 weeks, osseointegration in the dehiscence (dehiscence bone-implant-contact; dBIC) was significantly higher for Groups 2 and 3 compared to Group 1 ($p < 0.05$).

CONCLUSIONS

The amount of newly formed bone (BATA) and NBH was not influenced by surface type. However, moderately rough surfaces demonstrated significantly superior levels of osseointegration (dBIC) and coronal bone apposition (fBIC) in the dehiscence defect compared to the NGA surface at 2 and 8 weeks.

Adapted from S Shahdad et al., Clin Oral Implants Res. 2024 Oct 10, for more info about this publication click [HERE](#)

Int J Implant Dent. 2024 Nov 28;10(1):60

Reconstructive surgical treatment of peri-implantitis with use of a chitosan brush for decontamination- case series with 1-year follow-up

Gizem İnce Kuka, Hare Gürsoy



STUDY OBJECTIVES AND METHODS

The purpose of this study was to evaluate the clinical outcomes and radiographic bone fill of reconstructive surgical treatment using the oscillating chitosan brush for implant surface decontamination. Nine patients with 11 Class I and III peri-implantitis defects were included. Following implant surface decontamination performed with a chitosan brush, guided bone regeneration (GBR) was performed by means of a bovine derived cancellous bone graft and collagen membrane. Clinical parameters such as full mouth plaque score (FMPS), probing depth (PD), bleeding on probing (BoP), recession, and radiographic bone level (RBL) were recorded at baseline and 1 year following treatment.

RESULTS

- All evaluated parameters, including PD, BoP, recession, RBL, and full mouth plaque scores, revealed significant improvements at 1 year follow-up compared to baseline ($p < 0.05$).
- The mean PD values reduced from 7.30 ± 1.29 to 3.78 ± 0.65 ($p = 0.000$). RBL was detected 5.50 ± 1.31 and 1.38 ± 0.74 at baseline and 1-year, respectively ($p = 0.010$).

CONCLUSIONS

Reconstructive surgical treatment of Class I and III peri-implantitis defects with GBR may be an effective treatment protocol when an oscillating chitosan brush is used for surface decontamination.

Adapted from Gİ Kuka et al., Int J Implant Dent. 2024 Nov 28;10(1):60, for more info about this publication click [HERE](#)

J Dent. 2024 Oct;149:105266

Mandibular overdenture retained by four one-piece titanium-zirconium mini implants: A 2-year follow-up on prosthodontic outcomes

Jésio Rodrigues Silva, Thalita Fernandes Fleury Curado, Murali Srinivasan, Martin Schimmel, Gerald McKenna, Cláudio Rodrigues Leles

STUDY OBJECTIVES AND METHODS

The aim of this study was to report the incidence of prosthetic complications and maintenance events after treatment with mandibular overdenture retained by four mini implants opposed to a maxillary denture. Implant intervention included flapless or flapped surgery combined with immediate or delayed loading, as part of a randomized clinical trial. Four one-piece titanium-zirconium mini-implants (Straumann Mini Implant System) were inserted, and the retentive PEEK elements (Optiloc) were incorporated into the overdenture using chairside procedures. Prosthodontic complications and maintenance events were recorded over a 2-year follow-up, and the final outcome was defined according to standardized criteria. Data analysis included descriptive statistics, incidence and incidence density rates, and Kaplan-Meier survival.

RESULTS

- 73 out of 74 patients (64.9 % female), mean age of 64 (SD=8.2) years, completed the study follow-up (one withdrew after 9 months).
- Implant survival was 100 %. A total of 163 prosthodontic events occurred in 53 patients (72.6 %), and 20 patients had no clinical complaints or maintenance needs.
- The most common procedures were adjustment/repair of the overdenture base (47.0 %), replacement of retentive inserts (19.8 %), and laboratory relining (12.9 %).
- A high prosthodontic success rate was achieved (93.2 %), and all patients presented serviceable overdentures and continuous use after the resolution of prosthodontic complications.
- The incidences of matrix replacement and laboratory relines were low in the first year, while denture base adjustments were common within the first year, especially in the first 6 months.

CONCLUSIONS

The mini implant system showed high prosthodontic success rates. Minor adjustments/repairs during the initial follow-up were common. Relines and matrix replacements tend to occur after one year of overdenture use, and matrix replacements may occur as a consequence of the need for relining.

Adapted from J Rodrigues Silva et al., J Dent. 2024 Oct;149:105266, for more info about this publication, click [HERE](#)

J Oral Implantol. 2024 Oct 1;50(5):461-467

Implant Stability After Graftless Motor-Driven Crestal Sinus Elevation: A Cohort Study

Fawaz M Alzoubi, Hamad S AlRumaih, Abdulkareem A Alhumaida, Woroud Al-Sulimmani

STUDY OBJECTIVES AND METHODS

The aim of this study was to evaluate the stability of implants installed using this technique. Twenty-nine Straumann BLT (bone level tapered) implants in 29 patients were included in the sample. Average implant stability quotients (ISQ) were measured immediately after surgery (mean: 73.5 ± 9.2) and after a period of healing (mean: 77.1 ± 4.5) using resonance frequency analysis (RFA).

RESULTS

- There was a significant increase in implant stability after healing ($P = .035$). The healing duration did not significantly influence how implant stability increased ($P = .373$).
- The mean ISQ after healing was significantly higher than the clinically acceptable stability value of 65 ISQ ($P < .001$). Implant length and width were not significantly correlated with ISQ increase ($P = .764$ and $P = .085$, respectively).
- In addition, there were no significant differences in average ISQ values measured immediately postsurgery (at baseline) or after healing between implants with and without registered perforations during surgery ($P = .118$ and $P = .366$, respectively).
- The posthealing stability of 4 implants that did not achieve primary stability was not significantly less stable after the healing period than those that had achieved primary stability ($P = .086$).
- Moreover, the level of insertion torque significantly impacted implant stability immediately postsurgery ($P < .001$), but the ISQ values measured after healing were not significantly different based on the initial insertion torque values ($P = .131$).

CONCLUSIONS

This study suggests that implants installed using graftless motor-driven crestal sinus elevation may achieve clinically acceptable stability as measured by RFA.

Adapted from F M Alzoubi et al., J Oral Implantol. 2024 Oct 1;50(5):461-467, for more info about this publication, click [HERE](#)

J Prosthet Dent. 2024 Oct;132(4):801-808

Influence of implant diameter on accuracy of static implant guided surgery: An in vitro study

Prakan Thanasrisuebwong, Tharathip Kulchotirat, Liam J Hopfensperger, Sompop Bencharit

STUDY OBJECTIVES AND METHODS

The purpose of this study was to evaluate the influence of implant diameter on the angulation and 3-dimensional (3D) deviations of posterior single implant placement using static guided surgery. A polyurethane dental cast was made with an edentulous site at the maxillary right first molar position. Identical implant planning for each of 3 dental implant diameters 3.3, 4.1, and 4.8 mm (Straumann BLT) were made, and surgical guides for each implant diameters were fabricated by stereolithography. Fifteen implants of each diameter (N=45) were placed in simulated casts. A scan body was placed and the cast was scanned using an intraoral scanner. The positional discrepancies of implant placement, including angulation as well as 3D implant cervical and apex area deviations, were compared with the planned position. Linear ANOVA single factor analysis ($\alpha=.05$) was used, and box plots were made.

RESULTS

- The ranges of angulation deviations for 3.3-, 4.1-, and 4.8-mm implants were 3.6 degrees to 6.0 degrees, 3.7 degrees to 7.7 degrees, and 3.1 degrees to 6.7 degrees, respectively.
- The ranges of 3D implant entry deviations of 3.3-, 4.1-, and 4.8-mm implants were 0.96 to 1.4, 0.85 to 1.72, and 0.89 to 1.78 mm, respectively.
- The ranges of 3D implant apex of 3.3-, 4.1-, and 4.8-mm implants were 0.63 to 1.21, 0.64 to 1.48, and 0.48 to 1.27 mm, respectively.
- No statistically significant differences were found in any of the 3 measurements: $P=.67$ for deviation in angulation; $P=.27$ for 3D implant deviation of entry; and $P=.3$ for 3D implant deviation of the apex.

CONCLUSIONS

Implant diameters had no significant effect on placement deviations when a single posterior static guided surgery was used

Adapted from P Thanasrisuebwong et al., J Prosthet Dent. 2024 Oct;132(4):801-808, for more info about this publication, click [HERE](#)

J Prosthodont. 2024 Nov 3

Intraoral scanning for implant-supported complete-arch fixed dental prostheses (ISCFDPs): Four clinical reports

Toshiki Nagai, Weiqing Liu, Chao-Chieh Yang, Waldemar D Polido, Dean Morton, Wei-Shao Lin

STUDY OBJECTIVES AND METHODS

The purpose of this study was to summarize the indications, benefits, and limitations of the four systems. The information provided in this report about the digital prosthetic workflow of ISCFDPs aims to help clinicians make well-informed choices and improve treatment results. With digital technologies advancing, refining these tools and protocols, and validating research is crucial for continued evolution in the field.

Adapted from T Nagai et al., J Prosthodont. 2024 Nov 3, for more info about this publication, click [HERE](#)

J Mater Chem B. 2024 Nov 6;12(43):11089-11104.

Advances in osteoimmunomodulation of biomaterials after intrabone implantation: focus on surface hydrophilicity

Xinpeng Wei, Linshan Lei, Ling Luo, Ying Zhou, Zheng Zheng, Wenchuan Chen

STUDY OBJECTIVES AND METHODS

The aim of this review was to highlight recent advances in osteoimmunomodulation of biomaterials after intrabone implantation from a novel perspective—surface hydrophilicity, and summarizes the series of immune reactions and subsequent bone remodeling that occur in response to hydrophilic implants, focusing on protein adsorption, the behaviors of major immune cells, and osteoimmunomodulation-enhanced angiogenesis and osteogenesis. Hydrophilic biomaterials have the capacity to alter the surrounding immune microenvironment and accelerate the process of material-tissue bonding, thereby facilitating the successful integration of biomaterials with tissue. Collectively, the authors hope that this article provides strategies for modulating hydrophilicity to achieve osteoimmunomodulatory performance and further promotes the development of novel implantable biomaterials for orthopedic and dental applications.

Adapted from X Wei et al., J Mater Chem B. 2024 Nov 6;12(43):11089-11104., for more info about this publication, click [HERE](#)

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