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EDITOR'S CHOICE

Periodontol 2000. 2023 Sep 1

Osteoinduction and osteoimmunology: Emerging concepts.

Richard J Miron, Marc Bohner, Yufeng Zhang, Dieter D Bosshardt

FREE full text

STUDY OBJECTIVES

This review article serves as a guide highlighting advancements made in the field of osteoimmunology emphasizing the role of the osteoimmunomodulatory properties of biomaterials and their impact on osteoinduction. First, the various immune cell types involved in bone biomaterial integration are discussed, including the prominent role of osteal macrophages (OsteoMacs) during bone regeneration. Thereafter, key biomaterial properties, including topography, wettability, surface charge, and adsorption of cytokines, growth factors, ions, and other bioactive molecules, are discussed in terms of their impact on immune responses. These findings highlight and recognize the importance of the immune system and osteoimmunology, leading to a shift in the traditional models used to understand and evaluate biomaterials for bone regeneration.

Adapted from RJ Miron et al., Periodontol 2000. 2023 Sep 1, for more info about this publication click **HERE**

Int J Oral Maxillofac Implants. 2023 Oct 17;38(5):943-953

Clinical and Radiographic Outcomes of a New Fully Tapered Implant with the One-Abutment One-Time Approach: In-Line Clinical Case Series with a 1-Year Follow-up

Paula Andrea Ruiz Henao, Leticia Caneiro Queija, Susy Linder, Michel Dard, Antonio Liñares González, Juan Blanco Carrión

STUDY OBJECTIVES AND METHODS

The purpose of this study was to evaluate the bone level changes in a new implant design (fully tapered with platform switching) with the one-abutment one-time protocol after 1 year of loading. Thirty patients received 1 or 2 implants (6-, 8-, or 10-mm length and 3.5-, 3.75-, or 4.5-mm diameter, bone-level design) to replace one or multiple edentulous sites. Only the mesial implant was assessed. Radiographic, clinical, and esthetic results and the survival and success rates were evaluated 1 year after final loading.

RESULTS

- The overall survival and success rates after 1 year were 100%.
- At 1 year, no peri-implant bone loss was seen in any of the cases. Mean marginal crestal bone loss between surgery and crown placement was 0.19 ± 0.17 mm ($P < .0001$).
- Between surgery and the 1-year follow-up, the mean marginal crestal bone loss was 0.25 ± 0.24 mm ($P < .0001$).
- The difference in the modified Plaque Index between 1 year of follow-up and crown placement was significant for in the mesial (0.33 ± 0.54 mm; $P = .003$) and distal surfaces (0.5 ± 0.73 mm; $P = .001$).
- The probing pocket depth was statistically significantly deeper at 1 year than at crown placement at the mesial and distal aspects (average depth = 0.75 mm; $P < .0005$).
- No statistically significant differences were found for any other clinical or esthetic parameters.

CONCLUSIONS

The fully tapered, deep-thread, platform-switched implant design placed with the one-abutment one-time protocol demonstrated minimal marginal crestal bone loss and crestal bone stability at 1 year of follow-up.

Adapted from PA Ruiz Henano et al., Int J Oral Maxillofac Implants. 2023 Oct 17;38(5):943-953, for more info about this publication click **HERE**

Int J Oral Maxillofac Implants. 2023 Oct 17;38(5):907-917

Extra-Short 4-mm Implants Splinted to 10-mm Implants in the Posterior Maxilla: 3-year Results

Rok Gašperšič, Katja Povšič, Michel Dard, Susy Linder, Sonja Žarković Gjurin, Čedomir Oblak

STUDY OBJECTIVES AND METHODS

The purpose of this study was to evaluate the 3-year success and survival rates of fixed prostheses supported by 4-mm extra-short implants splinted to 10-mm implants in patients with shortened maxillary arches and low maxillary sinus floors. A total of 11 patients with reduced alveolar bone heights due to low maxillary sinus floors received two or three titanium-zirconium tissue-level implants: one or two extra-short (4 mm) implants, and one implant 10 mm in length. After 6 months, prosthetic rehabilitation with splinted crowns connecting the 4- and 10-mm implants was performed. Follow-up visits and maintenance protocols were implemented every 4 to 6 months.

RESULTS

- The 11 patients were treated with 11 10-mm implants and 17 4-mm implants. One extra-short implant failed and was removed before loading, and its planned design was modified from three splinted crowns to a bridge between the 10- and 4-mm implants.
- After 36 months, all (11/11) prosthetic rehabilitations connecting the 10-mm (11/11) and 4-mm (16/16) implants were functional.
- At the 10-mm implant sites, the median (interquartile range [IQR]) probing depth and marginal bone loss measured 2.9 mm (2.3 to 3.2) and 1.3 mm (1.0 to 1.5), respectively. At the 4-mm implant sites, the median (IQR) probing depth and marginal bone loss measured 2.9 mm (2.4 to 3.1) and 0.3 mm (0.1 to 0.5), respectively.

CONCLUSIONS

Prosthetic rehabilitation with splinted crowns connecting 4-mm and 10-mm implants showed promising outcomes in shortened maxillary dental arches after 3 years. Additional studies are needed to further validate these findings.

Adapted from R Gašperšičet al., Int J Oral Maxillofac Implants. 2023 Oct 17;38(5):907-917, for more info about this publication click **HERE**

Clin Oral Investig. 2023 Nov;27(11):6279-6290

Survival and success of zirconia compared with titanium implants: a systematic review and meta-analysis

Ninad Milind Padhye, Elena Calciolari, Anina Nives Zuercher, Sara Tagliaferri, Nikos Donos

STUDY OBJECTIVES AND METHODS

This systematic review assessed the available evidence on the survival and success rate of zirconia and titanium implants. As secondary outcomes, aesthetic, radiographic and clinical parameters, as well as biological and mechanical complications, were considered. A systematic search was performed up to March 2022 to identify CCTs/RCTs comparing zirconia and titanium implants with a minimum of 12 months of follow-up. Meta-analysis was performed when ≥ 2 articles with similar characteristics were retrieved.

RESULTS

- Four published articles with two RCTs (2 different patient populations) with 100 zirconia and 99 titanium implants that were followed up over 12-80 months were selected out of the 6040 articles.
- A non-statistically significant difference between zirconia and titanium implant survival at 12 months was suggested (P = 0.0938). The success rates were 57.5-93.3% and 57.1-100% for zirconia and titanium implants, respectively.
- The pink aesthetic score (PES) was higher for zirconia (10.33 ± 2.06 to 11.38 ± 0.92) compared to titanium implants (8.14 ± 3.58 to 11.56 ± 1.0).

CONCLUSIONS

Based on the 2 RCTs retrieved in the literature, similar survival rates were reported for zirconia and titanium implants in the short term (12 months of follow-up). Future RCTs are warranted to evaluate the long-term outcomes of zirconia implants. Zirconia implants may be the procedure of choice, particularly in the aesthetic zone, since they show a similar survival and success rate as titanium implants on a short-term follow-up.

Adapted from NM Padhye et al., Clin Oral Investig. 2023 Nov;27(11):6279-6290, for more info about this publication, click **HERE**

Clin Oral Implants Res. 2023 Sep:34 Suppl 26:125-142

The effect of different abutment materials on peri-implant tissues-A systematic review and meta-analysis

I Laleman, F Lambert, M Gahlert, M Bacevic, H Woelfler, S Roehling

STUDY OBJECTIVES AND METHODS

In patients with dental implants, what is the effect of transmucosal components made of materials other than titanium (alloys) compared to titanium (alloys) on the surrounding peri-implant tissues after at least 1 year? This systematic review included eligible randomized controlled trials identified through an electronic search (Medline, Embase and Web of Science) comparing alternative abutment materials versus titanium (alloy) abutments with a minimum follow-up of 1 year and including at least 10 patients/group. Primary outcomes were peri-implant marginal bone level (MBL) and probing depth (PD), these were evaluated based on meta-analyses. Abutment survival, biological and technical complications and aesthetic outcomes were the secondary outcomes.

RESULTS

- Concerning the primary outcomes (MBL and PD), no differences could be seen between titanium abutment and zirconia or alumina abutments, not after 1 year, nor after 5 years.
- Additionally, no differences were found concerning the biological complications and aesthetic outcomes.
- The most important technical finding was abutment fracture in the ceramic group and chipping of the veneering material.

CONCLUSIONS

Biologically, titanium and zirconia abutments seem to function equally up to 5 years after placement.

Adapted from I Laleman et al., Clin Oral Implants Res. 2023 Sep:34 Suppl 26:125-142, for more info about this publication, click **HERE**

Clin Oral Implants Res. 2023 Aug;34(8):872-880

Marginal bone level changes around dental implants with one or two adjacent teeth - A clinical and radiographic retrospective study with a follow-up of at least 10 years

Lucienne D Weigel, Angelina Scherrer, Lucas Schmid, Alexandra Stähli, Jean-Claude Imber, Andrea Roccuzzo, Giovanni E Salvi

FREE full text

STUDY OBJECTIVES AND METHODS

The purpose of this study was to compare mean bone level (mBL) changes around dental implants with one or two adjacent teeth after a function time of ≥10 years. One hundred thirty three periodontally compromised patients (PCPs) with 551 implants enrolled in supportive periodontal care (SPC) were screened. Implants were categorized either into group TIT (tooth-implant-tooth) or into group TIG (tooth-implant-gap). MBL changes from delivery of restoration (i.e., baseline) to follow-up were calculated in millimeters and compared between implants and adjacent teeth. Survival rates and the need for surgical interventions during SPC were recorded.

RESULTS

- Eighty seven patients with 142 implants were re-evaluated after a mean observation time of 14.5 ± 3.5 years.
- The mBL at mesial implant sites in the TIT group increased -0.07 ± 0.92 mm and decreased in the TIG group 0.52 ± 1.34 mm, respectively (95% CI: 0.04/1.14, p = .037).
- At distal implant sites, the mBL in the TIT group increased -0.08 ± 0.84 mm and decreased 0.03 ± 0.87 in the TIG group, respectively (95% CI: -0.20/0.42, p = .48).
- The overall implant loss rate was 3.5% (n = 5; 2 TIT, 3 TIG), without a statistically significant difference between the two groups (95% CI: 0.18/7.07, p = .892).
- Tooth loss rates (TIT: 12.3%, TIG: 12.3%) were not statistically significantly different (OR = 1.00, p = .989).

CONCLUSIONS

High tooth and implant survival rates were observed in PCPs. The presence of one or two adjacent teeth seemed to have no impact on marginal bone level changes.

Adapted from LD Weigel et al., Clin Oral Implants Res. 2023 Aug;34(8):872-880, for more info about this publication, click **HERE**

Int J Prosthodont. 2023 Sep 12;36(4):410-415

Three-Year Follow-up of a Randomized Clinical Trial on Screw-Retained Monolithic Zirconia Restorations on Ti-Base Abutments Based on Digital or Conventional Impression Techniques

Wiebe Derksen, Daniel Wismeijer

STUDY OBJECTIVES AND METHODS

The purpose of this study was to report on the follow-up of two previously published RCTs on the performance of screw-retained monolithic zirconia restorations on titanium (ti)-base abutments based on either digital scans through intraoral optical scanning (IOS) or conventional impressions. A total of 54 patients receiving 89 restorations (44 solitary crowns [SC], 21 splinted crowns [2-FDP], and 24 three-unit fixed partial dentures [3-FDP]) were included for the 1- to 3-year follow-up period. Restoration survival and technical complications were documented.

RESULTS

- In total, 50 patients with 84 restorations completed the 3-year follow-up. One 3-FDP from the digital group was lost. This resulted in a survival rate of 97.9% for the digital group and 100% for the conventional group and an overall survival rate of 98.8% for screw-retained monolithic zirconia restorations on implants after 3 years.
- There was no statistically significant survival difference between the digital and conventional restorations (P = .362). When evaluated separately, a 100% survival rate of SCs and 97.7% for 2-FDPs could be reported. One decementation and three screw loosenings occurred in the 1- to 3-year follow-up. The multiple-implant restorations showed higher (23.3%) complication rates at the restoration level than the SCs (4.9%) after 3 years of function (P = .026).

CONCLUSIONS

Screw-retained monolithic zirconia restorations on ti-base abutments show promising survival rates after 3 years of function. Restorative complications in screw-retained monolithic zirconia restorations on Ti-base abutments are more likely to happen in the first year of function and are more common in multiple-implant restorations than SCs. The impression type (digital or conventional) does not seem to influence these results.

Adapted from W Derksen et al., Int J Prosthodont. 2023 Sep 12;36(4):410-415, for more info about this publication, click **HERE**

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