



Scientific Highlights

SHORT OVERVIEWS ON RECENTLY PUBLISHED SCIENTIFIC EVIDENCE.

Issue 2/2022

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in this issue



EDITOR'S CHOICE

The zygoma anatomy-guided approach (ZAGA) for rehabilitation of the atrophic maxilla.

(C Aparicio et al. 2022)

and

Bone Damage during Dental Implant Insertion: A Pilot Study Combining Strain Gauge and Histologic Analysis.

(V Klär et al. 2022)

Surgical therapy of peri-implantitis with adjunctive hydroxyapatite and enamel matrix derivative: a 1-year retrospective case series.

(D Pilenza et al. 2022)

Immediate loading of a fully tapered implant with deep apical threads placed in healed alveolar ridges vs. immediate extraction sockets.

(D Hadaya et al. 2022)

Editor's choice

Clin Dent Rev. 2022, vol 6 (2)

The zygoma anatomy-guided approach (ZAGA) for rehabilitation of the atrophic maxilla

C Aparicio, A Olivo, V de Paz, D Kraus, M M Luque, E Crooke, P Simon, M Simon, J Ferreira, A S Serrano, J P Ilg, A Bilbao, A Fernandez, P Guitián, J Neugarten



Abstract

A protocol to perform a prosthetically driven minimally invasive zygomatic osteotomy, named zygoma anatomy-guided approach (ZAGA) is introduced. The ZAGA method aims at promoting a patient-specific therapy by adapting the osteotomy type to the patient's anatomy. In most cases, this method avoids the opening of a window or slot into the lateral wall of the maxillary sinus before implant placement. Instead, a mucoperiosteal flap, including the posterior maxillary wall and the superior zygomatic rim, is raised to allow visual control of the complete surgical field. The surgical management of the implant site is guided by the anatomy of the patient according to specific prosthetic, bio-mechanic, and anatomic criteria. The ZAGA Concept represents the logical evolution of the extra-sinus technique and ZAGA classification previously described by Aparicio. The results of using the combination of the ZAGA Concept together with the new ZAGA implant designs consistently show less traumatic osteotomy; better implant stability; improved bone to implant contact, and bone sealing around the implant neck. Additionally, the rate of late complications such as oral–sinus communication or soft tissue recession dramatically decreases when compared to the original technique.

Adapted from C Aparicio et al., *Clin Dent Rev. 2022, vol 6 (2).*, for more info about this publication click [HERE](#)

Appl. Sci. 2022, 12(1), 291; <https://doi.org/10.3390/app12010291>

Bone Damage during Dental Implant Insertion: A Pilot Study Combining Strain Gauge and Histologic Analysis

V Klär, M Karl, T Grobecker-Karl



Study objectives and methods

Besides alveolar bone quality, the drilling protocol applied in conjunction with the design of an implant are the major determinants of primary implant stability. Surgical trauma and bone compression resulting from implant insertion may constitute one cause for marginal bone resorption.

Inserting two current bone-level implant designs (Astra; Straumann; $n = 5$) in bovine ribs, primary stability, strain development on the buccal bone plate and histologic signs of bone damage were recorded. Besides comparing the implant designs (Welch t-tests), all measurement parameters were checked for potential correlations (Pearson product moment correlation coefficients) with the level of significance set at $\alpha = 0.05$. Considerable numbers of crack formation and plastic deformation of bone were observed after implant insertion.

Results

- Straumann implants showed slightly greater values for insertion torque ($p = 0.772$), strain development ($p = 0.893$) and implant stability ($p = 0.642$).
- Significantly greater bone to implant contact (cortical $p = 0.014$; trabecular $p = 0.016$) was observed in Straumann implants, while Astra implants caused a significantly greater number of microcracks in cortical bone ($p = 0.020$).
- In Straumann implants, insertion torque correlated with bone to implant contact in the cortical area ($p = 0.029$) and the number of macrocracks in trabecular bone correlated with bone to implant contact ($p = 0.029$).
- In Astra implants, insertion torque and bone to implant contact in the trabecular area correlated ($p = 0.007$) as well as the number of macrocracks in trabecular bone and implant stability ($p = 0.016$). Additionally, in the area of cortical bone, the number of macrocracks correlated with bone to implant contact ($p = 0.019$).

Conclusions

Implant placement results in bone damage of varying magnitude, which is governed by the drill protocol, implant macrodesign and bone quality.

Adapted from V Klär et al, *Appl. Sci.* 2022, 12(1), 291., for more info about this publication click [HERE](#)

Swiss Dent J. 2022 Jan 17;132

Surgical therapy of peri-implantitis with adjunctive hydroxyapatite and enamel matrix derivative: a 1-year retrospective case series

D Pilenza, A Filippi, C Walter, N U Zitzmann, M M Bornstein, S Kühl

Study objectives and methods

This case series retrospectively investigated the one-year surgical outcome of regenerative peri-implantitis therapy using a hydroxyapatite (HA) bone substitute material in combination with enamel matrix derivate (EMD) and collagen membrane for guided bone regeneration (GBR).

Data-sheets of patients were screened to detect patients who received identical regenerative peri implantitis-therapy with surface decontamination and GBR applying HA, EMD and a collagen membrane under broad- spectrum antibiotic regime. For inclusion, information on pre- and postoperative clinical and radiographic parameters (probing pocket depth (PPD), bleeding on probing (BOP), suppuration (SUPP) and the radiological bone level (RBL)) had to be available for statistical analysis.

Results

- Data of a total of 11 patients (20 implants) were extracted out of 202 (336).
- All implants were still in function after one year.
- Bone defects decreased by an average of 1.3 mm mesially and 0.9 mm distally, respectively.
- Mean PPD was reduced from 4.9 mm to 2.7 mm. BOP decreased from 90% to 20%.
- Suppuration decreased from 65% to 0%. Based on the success criteria applied, 15 of the 20 (75%) implants included were considered as successfully treated after 1 year.

Conclusions

Regenerative peri-implantitis therapy according to the presented concept showed promising clinical and radiographic outcomes after one year. To estimate the beneficial effects of the combined use of HA, EMD and collagen membranes, further long term investigations with a control group are needed.

Adapted from D Pilenza et al., Swiss Dent J. 2022 Jan 17;132, for more info about this publication click [HERE](#)

Clin Oral Implants Res. 2022 Feb 25. doi: 10.1111/clr.13910.

Immediate loading of a fully tapered implant with deep apical threads placed in healed alveolar ridges vs. immediate extraction sockets

D Hadaya, J Pi-Anfruns, B Bellon, B E Pippenger, T L Aghaloo

Study objectives and methods

Immediate implant placement and loading is a practice that continues to gain traction in implant dentistry because it reduces treatment time and improves satisfaction. Novel implant designs that facilitate increased primary stability, while not compromising osseointegration and long-term survival are important to offer immediate solutions for missing teeth. Here, we hypothesize that fully tapered implants can obtain successful osseointegration with high survival rates after immediate loading in fresh extraction sockets and healed sites.

A total of 13 swine with 73 implants were evaluated. Fully tapered or apically tapered implants were placed in extraction sockets and healed sites. Insertion torque and resonance frequency analysis were determined at placement and euthanasia. Animals were evaluated at: placement, and 1-week and 12-weeks after placement. Bone to Implant Contact (BIC), Bone Area/Total Area (BA/TA), and first BIC (fBIC) analyses were conducted.

Results

- The fully tapered implant achieved similar primary stability with lower insertion torque at placement.
- Apically and fully tapered implants had comparable BIC (50.1% vs 59.4%) and ISQ (82.5 vs 80.3) values by 12 weeks in healed sites.
- In extraction sockets, BIC and ISQ for the apically tapered implant was 35.8% and 73.2 and 37.8% and 79.2 for the fully tapered implants, respectively.

Conclusions

In this short-term study, immediately loaded fully tapered implants obtained high survival with similar osseointegration ability as apically tapered implants when placed in healed sites and fresh extraction sockets. Fully tapered implants show promise for use in immediate loading and immediate placement.

Adapted from D Hadaya, et al., J Oral Implantol. 2021 Dec 22., for more info about this publication click [HERE](#)

Int J Dent Hyg. 2022 Feb 10. doi: 10.1111/idh.12591

Flapless application of enamel matrix derivative in non-surgical periodontal treatment: A systematic review

G S Chatzopoulos, M Anastasopoulos, S Zarenti, A Doufexi, L Tsalikis

Study objectives and methods

To assess the effects of the flapless application of enamel matrix derivative (EMD) in combination with non-surgical periodontal treatment (NSPT) when compared to non-surgical periodontal treatment alone in adult patients.

An electronic literature search was conducted in MEDLINE, Scopus and Cochrane Library up to March 2021 complemented by a manual search. Human longitudinal studies of >5 participants and at least 3 months follow-up were eligible for inclusion in the review. Clinical outcomes were extracted and pooled. Meta-analysis of the included studies was not possible due to methodological differences.

Results

- A total of 1199 publications were identified and reviewed for eligibility.
- Nine of them fulfilled the inclusion criteria. Eight studies were randomized clinical trials.
- The clinical findings of the majority of the included studies demonstrated that the adjunctive use of EMD with NSPT could lead to significantly improved treatment outcomes including higher PPD reduction, more CAL gain, more robust BOP reduction, higher number of sites with PPD < 5 mm and more frequent pocket closure which reduces the need for further periodontal surgical treatment.
- Limited biological, microbiological and histological findings were reported.
- Minimal adverse events were observed.

Conclusions

The flapless application of EMD during NSPT leads to an improved clinical outcome in regards to CAL gain and PPD reduction when compared to conventional treatment alone. The potential effect on the biological and microbiological outcome is unclear.

Adapted from G S Chatzopoulos, *Clin Oral Implants Res.* 2021 Dec 18, for more info about this publication click [HERE](#)

Clin Oral Implants Res. 2022 Mar;33(3):231-277. doi: 10.1111/clr.13892.

Comparison of clinical outcomes of immediate versus delayed placement of dental implants: A systematic review and meta-analysis

R Garcia-Sanchez, J Dopico, Z Kalemaj, J Buti, G P Zamora, N Mardas

Study objectives and methods

Two focused questions were addressed: Focused question (Q1) 1) Are there any differences between immediate and delayed placement in terms of (i) survival rate, (ii) success rate, (iii) radiographic marginal bone levels, (iv) height/(v)thickness of buccal wall, (vi) peri-implant mucosal margin position, (vii) aesthetics outcomes and (viii) patient reported outcomes? Focused question 2 (Q2) What is the estimated effect size of immediate implant placement for all parameters included in Q1?

An electronic search (MEDLINE, EMBASE, The Cochrane Central Register of Controlled Trials and OpenGray) and hand search were conducted up to November 2019. Randomised controlled trials (RCT) with delayed implant placement as controls were eligible in the analysis for Q1. Immediate dental implant arms RCTs, controlled clinical trials (CCTs) and prospective case series of immediate implant placement were eligible in the analysis for Q2.

Results

- Six papers (RCTs) were included in the analysis for Q1 and 53 papers (22 RCTs, 11 CCTs and 20 case series) for Q2.
- Q1: Meta-analyses did not show any significant difference in implant survival, but it did for bone levels and PES scores at 1 year post-loading, favouring the immediate group.
- Q2: Meta-analyses showed that immediate implants had a high survival rate (97%) and presented high PES scores (range 10.36 to 11.25).
- Information regarding marginal bone loss and gingival/papillary recession varied among all included studies.

Conclusions

Similar survival rate was found between immediate and delayed implants. Immediate implants presented threefold early complications and twofold delayed complications. Success criteria should be reported more consistently, and the incidence/type of complications associated with immediate implants should be further explored.

Adapted from R Garcia-Sanchez et al. Clin Oral Implants Res.2022 Mar;33(3):231-277, for more info about this publication click [HERE](#)

Periodontol 2000. 2022 Feb;88(1):64-72. doi: 10.1111/prd.12411.

Reducing errors in guided implant surgery to optimize treatment outcomes

T Chackartchi, G E Romanos, L Parkanyi, F Schwarz, A Sculean

Abstract

Clinical considerations and treatment criteria in implant placement are constantly evolving. Prosthetically driven implant surgery has become the standard of care to improve short and long-term functional and esthetic outcomes. Therefore, implant position and angulation are planned according to the available bone, anatomical structures, and the requirements of the future prosthetic superstructure.

In parallel with these developments, significant progress has been made in data imaging and different software technologies to allow the integration of data within a digital file format. Digitalization in implant surgery enables optimal planning of implant position, as well as the ability to transfer this planning to the surgical field—a process defined as "computer-supported implant planning and guided surgery."

The aims of the present review are as follows:

- (a) to critically appraise the indications and potential "added value" of guided implant surgery, elaborating the main differences between dynamic and static guidance; and
- (b) to discuss the most important clinical considerations relevant for the different steps of the workflow that might influence the surgical outcome and to offer recommendations on how to avoid or reduce process errors in order to optimize treatment outcomes.

Adapted from T Chackartchi et al., *Periodontol 2000. 2022 Feb;88(1):64-72.*, for more info about this publication click [HERE](#)

Gels. 2022 Jan 4;8(1):31.doi: 10.3390/gels8010031.

Effect of Root Surface Biomodification on Multiple Recession Coverage with Modified Coronally Advanced Tunnel Technique and Subepithelial Connective Tissue Graft: A Retrospective Analysis

B Górski, M Szerszeń



Study objectives and methods

To improve treatment efficacy of gingival recessions (GR), chemical preparation of the exposed root surface was advocated. The aim of this study was to compare the additional influence of root biomodifications with 24% ethylenediaminetetraacetic acid (EDTA) alone or with enamel matrix derivative (EMD) on the 12 month outcomes of modified coronally advanced tunnel (MCAT) with subepithelial connective tissue graft in the treatment of multiple GR.

Average root coverage (ARC), complete root coverage (CRC), reduction in GR, reduction in recession width (RW), gain in clinical attachment level (CAL), increase in gingival thickness (GT), increase in keratinized tissue width (KTW) and changes in root coverage esthetic score (RES) were evaluated..

Results

- A total of 60 patients with 215 GR were enrolled.
- In 70, GR root surfaces were treated with EDTA + EMD, in other 72, with EDTA, while in the remaining 73 saline solution was applied.
- ARC was 94%, 89%, and 91% in the EDTA + EMD, the EDTA and the saline groups, respectively ($p = 0.8871$).
- Gains in clinical attachment level (CAL; 2.1 ± 1.1 mm) and RES values (9.6 ± 0.9) were significantly higher in the EDTA + EMD group, when compared with two other groups.
- The differences between other preoperative and postoperative parameters showed statistical significance only within but not between groups.

Conclusions

MCAT outcomes may benefit from adjunctive use of EDTA + EMD regarding 12 month CAL gain and professionally assessed esthetics using RES following treatment of GR.

Adapted from B Górski et al., Gels. 2022 Jan 4;8(1):31., for more info about this publication click [HERE](#)

References

C Aparicio et al., Clin Dent Rev. 2022, vol 6 (2)| V Klär.et al, Appl. Sci. 2022, 12(1), 291| D Pilenza et al., Swiss Dent J. 2022 Jan 17;132| D Hadaya, et al., J Oral Implantol. 2021 Dec 22| G S Chatzopoulos, Clin Oral Implants Res. 2021 Dec 18| R Garcia-Sanchez et al. Clin Oral Implants Res.2022 Mar;33(3):231-277| T Chackartchi et al., Periodontol 2000. 2022 Feb;88(1):64-72| B Górski et al., Gels. 2022 Jan 4;8(1):31| source: www.pubmed.gov | Dr Nair holds a position of Global Scientific Communications Manager at Institute Straumann in Basel, Switzerland.