Straumann Scientific Highlights

SHORT OVERVIEWS ON RECENTLY PUBLISHED SCIENTIFIC EVIDENCE.

April – June 2018

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EDITOR'S CHOICE

Int J Prosthodont. 2018 July/August;31(4):359–366

COMPARISON OF CEMENTED VS SCREW-RETAINED, CUSTOMIZED COMPUTER-AIDED DESIGN/COMPUTER-ASSISTED MANUFACTURE ZIRCONIA ABUTMENTS FOR ESTHETICALLY LOCATED SINGLE-TOOTH IMPLANTS: A 10-YEAR RANDOMIZED PROSPECTIVE STUDY.

Amorfini L, Storelli S, Mosca D, Scanferla M, Romeo E

Study objectives

The aim of this in vitro study was to compare the clinical outcomes of screw-retained vs cemented single crowns supported by customized zirconia abutments on implants. Thirty-two patients received implant-supported (Regular Neck, Tissue-Level, Straumann AG), single-tooth restorations with customized zirconia abutments in the anterior areas. Participants were randomly assigned to the screw-retained (full-crown abutment [FCA]) group or the cemented (zirconia crown [ZrC]) group and followed up over a 10-year period. Prosthetic and biologic complications, marginal bone level (MBL), mucosal recession, and pink and white esthetic scores (PES and WES, respectively) were evaluated.

Results and conclusions

- There were no implant failures during the study period; after 10 years, 94% of crowns were functional.
- Prosthetic complications were recorded in both groups (three FCA and two ZrC), and no significant difference was found (P = .65).
- Two cases of mucositis were recorded, one in each group.
- Esthetic outcomes were assessed using PES and WES scores. MBL was 0.95 mm in the ZrC group and 0.82 mm in the FCA group, with no significant difference between groups.
- These encouraging preliminary results need to be confirmed with long-term follow-up on larger study samples

Adapted from Amorfini L et al., Int J Prosthodont. 2018 July/August;31(4):359–366, for more info about this publication click HERE

Implant Dent. 2018 Jun 28

Osteotome Sinus Floor Elevation Without Grafting: A 10-Year Clinical and Cone-Beam Sinus Assessment.

Abi Najm S, Nurdin N, El Hage M, Bischof M, Nedir R

Study objectives

The aim of this study was to evaluate the thickness of the sinus membrane in contact with implants inserted 10 years before using an augmentation procedure without grafting material, and to identify adverse events correlated with implant protrusion in the sinus. Osteotome sinus floor elevations were performed without grafting material. The implants (Straumann AG, Basel, Switzerland) were placed simultaneously, all protruded into the sinus. Sinus health was assessed using cone-beam computed tomography and by the way of a questionnaire in which patients reported symptoms of sinusitis they might have had.

Results and conclusions

- Controlled implants (21 implants, 13 patients) were osseointegrated.
- The membrane thickness was <2 mm in 11 patients and 2 to 3 mm with flat thickening in 2 patients.
- No patients exhibited any clinical or radiographic signs of sinusitis.
- No sinus complications were observed after 10 years. The initial protrusion of implants into the sinus did not influence long-term sinus health.
- The maintenance of successful integration is thus the key to avoiding sinus complication.

Adapted from Abi Najm S et al., Implant Dent. 2018 Jun 28, for more info about this publication click HERE

J Mater Sci Mater Med. 2018 Jun 26;29(7):99

Unravelling the effect of macro and microscopic design of dental implants on osseointegration: a randomised clinical study in minipigs.

Ríos-Santos JV, Menjívar-Galán AM, Herrero-Climent M, Ríos-Carrasco B, Fernández-Palacín A, Perez RA, Gil FJ

Study objectives

The aim of this study was to assess the effects of the microscopic and macroscopic design of dental implants in the osseointegration by comparing three macroscopic designs (Straumann tissue level (STD), essential cone (ECD) and prototype design (PD)) and six surface treatments. A total of 96 implants were placed in 12 minipigs. The implant stability quotient (ISQ), was assessed at the time of implantation, as well as at 2, 4 and 8 weeks. Histomorphometric and statistical analyses were conducted at the different sacrifice times, being 2, 4 and 8 weeks, to analyse the bone to implant contact (BIC), the bone area density (BAT) and the density of bone outside the thread region (ROI).

Results and conclusions

- The macroscopic design results showed higher ISQ values for the ECD, whereas the histomorphometric analysis showed higher ossoeintegration values for the STD.
- Regarding the microscopic design, both Sandblasted plus acid etching (hydrochloric/sulphuric acid) in a nitrogen atmosphere (SLActive) and Shot-blasted or bombarded with alumina particles and posterior alkaline immersion and thermal treatment (ContacTi) showed superior results in terms of osseointegration and reduced the osseointegration times from 8 weeks to 4 weeks compared to the other analysed surfaces.
- In conclusion, each of the macroscopic and microscopic designs need to be taken into account when designing novel dental implants to enhance the osseointegration process.

Adapted from Ríos-Santos JV et al., J Mater Sci Mater Med. 2018 Jun 26;29(7):99, for more info about this publication click HERE

Int J Periodontics Restorative Dent. 2018 Jun 12

Esthetic Evaluation of Maxillary Single-Tooth Zirconia Implants in the Esthetic Zone.

Kniha K, Kniha H, Grunert I, Edelhoff D, Hölzle F, Modabber A

Study objectives

The aim of this study was to evaluate ceramic dental implants using different esthetic scores. A total of 53 ceramic dental implants were evaluated using the Pink Esthetic Score (PES), White Esthetic Score (WES), and Peri-Implant and Crown Index (PICI).

Results and conclusions

- The mean value of combined PES + WES was 17.4 points, and the PICI was 523.2 points. Orthodontists assessed a significantly lower result in both indices compared to all other assessor groups ($P \leq .05$).
- Patient satisfaction was very high.
  The esthetic scores around ceramic implants were considerably higher than the suggested threshold of clinical acceptability.

Adapted from Kniha K. et al., Int J Periodontics Restorative Dent. 2018 Jun 12, for more info about this publication click HERE

Biomater Sci. 2018 May 29;6(6):1312-1338

A review of nanostructured surfaces and materials for dental implants: surface coating, patterning and functionalization for improved performance.

Rasouli R, Barhoum A, Uludag H

Study objectives

This review is of an interdisciplinary nature, addressing the history and development of dental implants and the emerging area of nanotechnology in dental implants. An overview of different types of nanomaterials (i.e. metals, metal oxides, ceramics, polymers and hydrides) used in dental implant together with their unique properties, the influence of elemental compositions, and surface morphologies and possible applications are presented from a chemical point of view. In the core of this review, the dental implant materials, physical and chemical fabrication techniques and the role of nanotechnology in achieving ideal dental implants have been discussed. Finally, the critical parameters in dental implant design and available data on the current dental implant surfaces that use nanotopography in clinical dentistry have been discussed.

Adapted from Rasouli R. et al., Biomater Sci. 2018 May 29;6(6):1312-1338. 2018 Mar/Apr;33(2):e37-e44, for more info about this publication click HERE

J Surg Oncol. 2018 May 3.

Oral rehabilitation of the cancer patient: A formidable challenge.

Petrovic I, Rosen EB, Matros E, Huryn JM, Shah JP

Study objectives

Rehabilitation of oral functions following surgery on the jaws is a goal that is often difficult to achieve. Removable dentures supported by remaining teeth or gum are often unstable and seldom satisfactory. On the other hand, endosseous (dental) implants offer a mechanism to provide stability to the dentures. This review, discusses factors related to the tumor, patient, treatment, and physicians which impact upon the feasibility and success of dental implants in patients with oral cancer

Adapted from Petrovic I. et al., J Surg Oncol. 2018 May 3, for more info about this publication click HERE

J Oral Implantol. 2018 May 2.

Clinical and radiographic evaluation of short implants placed in the posterior mandible. A one-year pilot split-mouth study.

Haro Adanez M, Brezavšček M, Vach K, Fonseca M, Att W.

Study objectives

The aim of this study was to compare the clinical outcome between short implants (7 mm) and regular-length (≥10mm) implants placed in the posterior mandible after 1 year of prosthetic delivery. Ten patients received 4 implants in the posterior mandible. Two short implants were placed in one side and two regular-length implants were placed contra-laterally. Marginal bone loss (MBL) and soft-tissue parameters were compared.

Results and conclusions

- No implant failed. Both types of implants, showed success rates of 90% and survival rates of 100%.
- From prosthetic delivery to 1 year post-loading a bone gain of +0.29 mm for short implants and +0.19 mm for regular-length implants was present without showing any statistically significant differences in marginal bone loss (MBL) between the two implant types ($p>0.05$).
- Bleeding on probing, clinical attachment level, probing depth and crown-to-implant ratio did not show any statistically significant differences between the two implant lengths ($p>0.05$).
- One case of chipping occurred in the regular-length implant group, leading to a prosthetic survival rate of 95%.
- Short implants showed a prosthetic survival rate of 100%.
- After 1-year, short implants showed comparable clinical outcomes to that of regular-length implants making them a viable treatment option in the posterior mandible.

Adapted from Haro Adanez M et al., J Oral Implantol. 2018 May 2, for more info about this publication click HERE

Int J Implant Dent. 2018 Apr 26;4(1):13

In vitro surface characteristics and impurity analysis of five different commercially available dental zirconia implants.

Beger B, Goetz H, Morlock M, Schiegnitz E, Al-Nawas B

Study objectives

The aim of this study was to assess surface characteristics, element composition, and surface roughness of five different commercially available dental zirconia implants. Five zirconia implants (Bredent whiteSKY™ (I1), Straumann® PURE Ceramic (I2), ceramic.implant vitaclinical (I3), Zeramex® (I4), Ceralog Monobloc M10 (I5)) were evaluated. METHODS: The evaluation was performed by means of scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDX), and confocal laser scanning microscopy (CLSM).

Results and conclusions

- The semi-quantitative element composition showed no significant impurity of any implant tested.
- Both the machined and the rough areas of the investigated implants were predominated by zirconium, oxygen, and carbon. Roughness values (Sa) showed highest values for I2 and I5.
- The investigated zirconia implants showed surface characteristics and roughness values close to those of conventionally produced titanium implants, making them a promising alternative. However, zirconia implants have yet to prove themselves in clinical practice and clinical controlled trials.

Adapted from Beger B et al., Int J Implant Dent. 2018 Apr 26;4(1):13, for more info about this publication click HERE

J Periodontal Res. 2018 Apr 23

Pro-osteogenic properties of hydrophilic and hydrophobic titanium surfaces: Crosstalk between signalling pathways in in vivo models.

Calciolari E, Hamlet S, Ivanovski S, Donos N

Study objectives

The aim of this study was to combine gene and protein data from in vivo studies applying titanium hydrophobic (Sandblasting, Large-grit, Acid-etching, SLA) and hydrophilic (SLActive) surfaces to understand the molecular mechanisms responsible for the pro-osteogenic properties of these surfaces. The Kyoto Encyclopedia of Genes and Genomes (KEGG®) pathway database and the Ingenuity® Pathway Analysis (IPA®) software were applied to the genomic and proteomic data of previous in vivo studies applying SLA and SLActive surfaces, with the specific aim to focus on bone formation-related signalling pathways. Data were available for the 4, 7 and 14 days of healing periods.

Results and conclusions

- Both genomic and proteomic data showed that the osteogenesis process takes place mainly at 7 and 14 days of healing on both SLA and SLActive surfaces.
- Surface hydrophilicity enhances bone formation at multiple levels, by directly promoting an earlier expression of pathways involved in cell proliferation and osteoblast precursor differentiation (eg, mitogen-activated protein kinase, phosphoinositide-3 kinase-AKT, Wnt, Notch, transforming growth factor-β), but also by positively regulating angiogenesis, bone mineralization and bone remodelling.
- This study combined, for the first time, different 'omics' outputs to get new insights on the molecular mechanisms behind the influence of surface hydrophilicity on osseointegration/bone formation.

Adapted from Calciolari E et al., J Periodontal Res. 2018 Apr 23, for more info about this publication click HERE

J Adv Prosthodont. 2018 Apr;10(2):85-92

Hydroxyapatite-coated implant: Clinical prognosis assessment via a retrospective follow-up study for the average of 3 years.

Jung JH, Kim SY, Yi YJ, Lee B, Kim YK

Study objectives

This study evaluated clinical outcomes of two types of hydroxyapatite (HA)-coated implants: OT (Osstem TS III-HA, Osstem implant Co., Busan, Korea) and ZM (Zimmer TSV-HA, Zimmer dental, Carlsbad, USA). The research was conducted on 303 implants (89 of OT, 214 of ZM), which were placed from January 16, 2010 to December 20, 2012. The prognosis was evaluated in terms of success rates, survival rates, annual marginal bone loss, and implant stability quotients (ISQ). The samples were classified into immediate, early, conventional, and delayed groups according to the loading time.

Results and conclusions

- Overall, there were no significant differences between OT and ZM in success rates, survival rates, and annual marginal bone loss, except for the result of secondary stability. OT showed 77.83 ± 8.23 ISQ, which was marginally higher than 76.09 ± 6.90 ISQ of ZM ($P<.05$).
- In terms of healing periods, only immediate loading showed statistically significant differences ($P<.05$). Differences between OT and ZM were observed in terms of two indices, the annual marginal bone loss (0.17 ± 0.58 mm/year < 0.45 ± 0.80 mm/year) and secondary stability (84.36 ± 3.80 ISQ > 82.48 ± 3.69 ISQ) ($P<.05$).
- OT and ZM did not have any statistically significant differences in early, conventional, and delayed loading ($P>.05$).
- OT (97.75%) and ZM (98.50%) showed relatively good outcomes in terms of survival rates. In general, OT and ZM did not show statistically significant differences in most indices ($P>.05$), although OT performed marginally better than ZM in the immediate loading and 1-stage surgery ($P<.05$). DOI: 10.4047/jap.2018.10.2.85

Adapted from Jung JH et al., J Adv Prosthodont. 2018 Apr;10(2):85-92, for more info about this publication click HERE

J Periodontol. 2018 Jun;89 Suppl 1:S257-S266

Peri-implant mucositis

Heitz-Mayfield LJA, Salvi GE

Study objectives

This narrative review was prepared for the 2017 World Workshop of the American Academy of Periodontology and European Federation of Periodontology to address key questions related to the clinical condition of peri-implant mucositis, including:

1. the definition of peri-implant mucositis,
2. conversion of peri-implant health to the biofilm-induced peri-implant mucositis lesion,
3. reversibility of peri-implant mucositis,
4. the long-standing peri-implant mucositis lesion,
5. similarities and differences between peri-implant mucositis at implants and gingivitis at teeth,
6. risk indicators/factors for peri-implant mucositis.

Adapted from Heitz-Mayfield LJA et al., J Periodontol. 2018 Jun;89 Suppl 1:S257-S266, for more info about this publication click HERE

Biomed Res Int. 2018 May 16;2018:4246874

The Influence of the Crown-Implant Ratio on the Crestal Bone Level and Implant Secondary Stability: 36-Month Clinical Study.

Hadzik J, Krawiec M, Sławecki K, Kunert-Keil C, Dominiak M, Gedrange T

Study objectives

The aim of the study was to determine whether implant length and the crown-to-implant (C/I) ratio influence implant stability and the loss of the surrounding marginal bone and whether short implants can be used instead of sinus augmentation procedures. The patients participating in the study (n = 30) had one single tooth implant, a short (OsseoSpeed™ L6 Ø4 mm, Implants) or a regular implant (OsseoSpeed L11 and L13 Ø4 mm, DENTSPLY Implants), placed in the maxilla. The evaluation was based on clinical and radiological examination. The crown-to-implant ratio was determined by dividing the length of the crown together with the abutment by the length of the implant placed crestally.

Results and conclusions

- Positive results in terms of primary and secondary stability were achieved with both (short and conventional) implants.
- The MBL was low for short and conventional implants being 0.34 ± 0.24 mm and 0.22 ± 0.46 mm, respectively.
- No significant correlation was found between the C/I ratio and secondary stability as well as the C/I ratio and the marginal bone loss.
- Short implants can be successfully used to support single crowns. The study has revealed no significant differences in the clinical performance of prosthetic restorations supported by short implants.

Adapted from Hadzik J et al., Biomed Res Int. 2018 May 16;2018:4246874, for more info about this publication click HERE

J J Periodontol. 2018 Jun;89 Suppl 1:S313-S318

Peri-implant diseases and conditions: Consensus report of workgroup 4 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions.

Berglundh T, Armitage G, Araujo MG, Avila-Ortiz G, Blanco J, Camargo PM, Chen S, Cochran D, Derks J, Figuero E, Hämmerle CHF, Heitz-Mayfield LJA, Huynh-Ba G, Iacono V, Koo KT, Lambert F, McCauley L, Quirynen M, Renvert S, Salvi GE, Schwarz F, Tarnow D, Tomasi C, Wang HL, Zitzmann N

Study objectives

The objective of the present paper was to review factors and conditions that are associated with hard and soft-tissue deficiencies at implant sites. Hard- and soft-tissue deficiencies at dental implants are common clinical findings. They can lead to complications and compromise implant survival and, hence, may require therapeutic interventions. It is, therefore, important to understand the etiology of hard and soft-tissue deficiencies. Based on this understanding, strategies should be developed to correct hard and soft-tissue deficiencies with the aim of improving clinical outcomes of implant therapy.

Adapted from Berglundh T et al., J J Periodontol. 2018 Jun;89 Suppl 1:S313-S318, for more info about this publication click HERE

Int J Oral Maxillofac Implants. 2018 Jun 12.

Effects of Taper Angle and Sealant Agents on Bacterial Leakage Along the Implant-Abutment Interface: An In Vitro Study Under Loaded Conditions.

Ozdiler A, Bakir-Topcuoglu N, Kulekci G, Isik-Ozkol

Study objectives

The aim of this study was to compare the bacterial leakage of conical internal connection implants with different taper angles (5.4, 12, 45, and 60 degrees) and examine the efficiency of a disinfectant agent and a silicone sealant agent in the prevention of bacterial leakage under loaded conditions. Twenty-one implant-abutment connections were studied from each implant system (Ankylos Implants, Dentsply; Bego Semados S Implants, Bego; Trias Implants, Servo-Dental; DTI Implants, DTI), for a total of 84 implants. Each system's implants were divided into three groups as follows: unsealed (control), 2% chlorhexidine gel-sealed, or silicone-sealed (n = 7 for each group). A cyclic load of 50 N was applied for a total of 500,000 cycles at 1 Hz to the specimens. Following disconnection of dental implants and abutments, microbial samples were taken from the inner threaded surface of the implants, plated, and counted under appropriate conditions.

Results and conclusions

- There were no statistically significant differences in frequency of bacterial leakage and leaked bacterial counts among the four types of connections in all groups ($P > .05$).
- The statistically significant differences were found between sealant agents and control groups in four different connection types in terms of the amount of leaked bacteria ($P < .05$).
- There was no significant difference between the amount of leaked bacteria for four connection types when comparing the chlorhexidine and silicone sealant agents ($P > .05$).
- Differences in taper angles in the internal conical connections had no significant effect on leaked bacterial counts or the frequency of bacterial contamination under dynamic loading.
- The application of 2% chlorhexidine gel or a silicone sealant can reduce the leaked bacterial counts and reduce the frequency of bacterial leakage.

Adapted from Ozdiler A. et al., Int J Oral Maxillofac Implants. 2018 Jun 12, for more info about this publication click HERE

J Periodontol. 2018 Jun;89 Suppl 1:S267-S290

Peri-implantitis.

Schwarz F, Derks J, Monje A, Wang HL

Study objectives

This narrative review provides an evidence-based overview on peri-implantitis for the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. A literature review was conducted addressing the following topics:

1. definition of peri-implantitis;
2. conversion from peri-implant mucositis to peri-implantitis,
3. onset and pattern of disease progression,
4. characteristics of peri-implantitis,
5. risk factors/indicators for peri-implantitis
6. progressive crestal bone loss in the absence of soft tissue inflammation.

Adapted from Schwarz F et al., J Periodontol. 2018 Jun;89 Suppl 1:S267-S290, for more info about this publication click HERE

Clin Oral Implants Res. 2018 Jun 27.

Profilometric changes of peri-implant tissues over 5 years: A randomized controlled trial comparing a one- and two-piece implant system.

Sapata VM, Sanz-Martín I, Hämmerle CHF, Cesar Neto JB, Jung RE, Thoma DS

Study objectives

The aim of this study was to assess the profilometric changes of the buccal soft tissues between baseline and 5 years of loading using a one- and two-piece dental implant system. Sixty patients randomly received dental implants of either a two-piece type (BRA) or a one-piece type (STM). Casts were obtained at baseline (after crown insertion), at the 1-year and at the 5-year follow-up. Stereolithography files were obtained from the casts for digital superimposition. One implant and the contralateral natural tooth were selected for the analysis. Thirty-three patients (BRA = 16; STM = 17) were included. Measurements included changes for crown height (CH) and estimated soft tissue thickness, as well as the profilometric change at the implant and the tooth site. Nonparametric methods were applied for the statistical analyses and medians and quartiles presented.

Results and conclusions

- The BRA group lost -0.39 mm and the STM group lost -0.40 mm of volume between baseline and the 5-year follow-up at the implant site ($p > 0.05$). The tooth site lost -0.18 mm (BRA) and -0.12 mm (STM) ($p > 0.05$).
- Volume differences between implants and teeth amounted to -0.05 mm (baseline to 1 year) and -0.25 mm (baseline to 5 years) for BRA, while for STM, the values were 0.03 mm (baseline to 1 year) and -0.16 mm (baseline to 5 years).
- The changes for implant CH at 1 and 5 years of follow-up amounted 0.10 and 0.09 mm (BRA) and to 0.03 and 0.22 mm (STM). The changes in tissue thickness at 1 and 5 years in the BRA group amounted to -0.28 and -0.66 mm at 1 mm, -0.21 and -0.46 mm at 3 mm, and -0.32 and -0.45 mm at 5 mm, respectively. The changes in the STM group amounted to -0.15 and -0.54 mm at 1 mm, -0.24 and -0.48 mm at 3 mm, and -0.32 and -0.57 mm at 5 mm, respectively. No significantly different medians were observed.
- Minimal profilometric and linear changes occurred at implant sites between baseline and 5 years, between implant and tooth sites and between the two implant systems.

Adapted from Sapata VM et al., Clin Oral Implants Res. 2018 Jun 27, for more info about this publication click HERE

J Periodontol. 2018 Jun;89 Suppl 1:S291-S303

The etiology of hard- and soft-tissue deficiencies at dental implants: A narrative review.

Hämmerle CHF, Tarnow D

Study objectives

The objective of the present paper was to review factors and conditions that are associated with hard and soft-tissue deficiencies at implant sites. Hard- and soft-tissue deficiencies at dental implants are common clinical findings. They can lead to complications and compromise implant survival and, hence, may require therapeutic interventions. It is, therefore, important to understand the etiology of hard and soft-tissue deficiencies. Based on this understanding, strategies should be developed to correct hard and soft-tissue deficiencies with the aim of improving clinical outcomes of implant therapy.

Adapted from Hämmerle CHF et al., J Periodontol. 2018 Jun;89 Suppl 1:S291-S303, for more info about this publication click HERE

Clin Oral Implants Res. 2018 May 27

Immediate placement and provisionalization of implants in the aesthetic zone with or without a connective tissue graft: A 1-year randomized controlled trial and volumetric study.

van Nimwegen WG, Raghoebar GM, Zuiderveld EG, Jung RE, Meijer HJA, Mühlemann S

Study objectives

The aim of this study was to volumetrically compare peri-implant mid-facial soft tissue changes in immediately placed and provisionalized implants in the aesthetic zone, with or without a connective tissue graft. Sixty patients were included. All implants were placed immediately after extraction. After randomization, in one group, a connective tissue graft (test group, n = 30) was inserted at the buccal aspect of the implant. The other group (control group, n = 30) received no connective tissue graft.

Results and conclusions

- Twenty-five patients in each group were available for analysis at T12 . Volumetric change, transformed to a mean (±SD) change in thickness, was -0.68 ± 0.59 mm (test) and -0.49 ± 0.54 mm (control) with a non-significant difference between groups (p = .189).
- The mid-facial mucosa level was significantly different between both groups (p = .014), with a mean (±SD) change of +0.20 ± 0.70 mm (test) and -0.48 ± 1.13 mm (control).
- The Pink Esthetic Score was similar between both groups.
- The use of a CTG in immediately placed and provisionalized implants in the aesthetic zone did not result in less mucosal volume loss after 12 months, leading to the assumption that a CTG cannot fully compensate for the underlying facial bone loss, although a significantly more coronally located mid-facial mucosa level was found when a CTG was performed.

Adapted from van Nimwegen WG et al., Clin Oral Implants Res. 2018 May 27, for more info about this publication click HERE

Clin Oral Implants Res. 2018 Apr 24

Influence of the width of keratinized tissue on the development and resolution of experimental peri-implant mucositis lesions in humans.

Schwarz F, Becker J, Civale S, Sahin D, Iglhaut T, Iglhaut G

Study objectives

The aim of this study was to analyze the influence of the width of keratinized mucosa (KM) on the development and resolution of experimental peri-implant mucositis lesions at abutments with different microstructures in humans. In a randomized, controlled study, a total of 28 patients had received 28 target implants exhibiting a KM ≥2 mm. These were randomly connected with either partially microgrooved- (test) (n = 15) or machined (control) (n = 13) healing abutments. The study protocol included a wound healing period (WH) following implant placement (12 weeks), a plaque exposure phase (EP) of 21 days (EPd21) and a resolution phase (RP) including visits at 2, 4, and 16 weeks (RPw2; RPw4; RPw16) following plaque removal.

Results and conclusions

- Mean and median KM values (end of WH) were 5.9 ± 2.6 and 5.0 mm (min: 2 mm; max: 10 mm; interquartile range: 5 mm) at test- and 5.5 ± 2.6 and 4.0 mm (min: 3 mm; max: 11 mm interquartile range: 4 mm) at control abutments.
- The linear regression analysis revealed significant correlations between the width of KM and mPI (test: RPw2; control: RPw16), mGI (test: RPw16), BOP (both: RPw16), and PD (test: RPw16; control: EPd21, RPw2, RPw4, RPw16) scores.
- The width of KM (≥2 mm) had some effects on the development (i.e., at 21 days) and resolution of experimental peri-implant mucositis lesions at both abutment types.

Adapted from Schwarz F et al., Clin Oral Implants Res. 2018 Apr 24, for more info about this publication click HERE

Clin Oral Implants Res. 2018 Apr 16

Clinical characteristics of peri-implant mucositis and peri-implantitis.

Ramanauskaite A, Becker K, Schwarz F

Study objectives

The aim of this study was to evaluate and correlate clinical parameters associated with peri-implant diseases based on established case definitions. A total of 75 patients exhibiting 269 implants (healthy: 77; peri-implant mucositis: 77; peri-implantitis: 115) were included in this observational study. Clinical parameters included bleeding on probing (BOP), probing depths (PDs), and suppuration (Supp).

Results and conclusions

- Healthy sites were associated with the absence of BOP, while mean BOP in peri-implant mucositis and peri-implantitis patients amounted to 20.83% and 71.33%, corresponding to 43% and 86% at the implant level ($p < .001$), respectively.
- Peri-implantitis patients exhibited significantly higher mean PD values (4.46 mm) when compared with the peri-implant mucositis group (2.70 mm, $p < .001$). Supp was limited to peri-implantitis cases and detected in 30.16% of the patients (implant level: 17.39%).
- The regression model revealed a significant linear association between the number of BOP-positive sites around the implant (minimum 0, maximum 6) and mean PD values at peri-implant mucositis and peri-implantitis sites at both patient and implant levels.
- The clinical parameters investigated were shown to be associated with the severity of peri-implant diseases.

Adapted from Ramanauskaite A et al., Clin Oral Implants Res. 2018 Apr 16, for more info about this publication click HERE

J Esthet Restor Dent. 2018 May 15

Evaluation of the influence of implant placement timing on the esthetic outcomes of single tooth implant treatment in the anterior maxilla: A retrospective study.

Arora H, Ivanovski S

Study objectives

The aim of this study was to investigate the influence of implant placement timing on the esthetic outcomes for single implants in the anterior maxilla. One hundred and ten patients (48 males; 62 females) who received a single-tooth implant after extraction either immediately (Type 1); after 4-8 weeks (Type 2); after 8-16 weeks (Type 3); or more than 16 weeks (Type 4) were evaluated in terms of esthetic outcomes after a mean post-placement interval of 26.3 months (range 12-116). Esthetic outcomes were measured using the Pink and White Esthetic Score (PES; WES).

Results and conclusions

- No statistically significantly differences in PES were found between the various treatment modalities with Type 1 implants (n = 33) scoring 10.58 ± 1.65 (median: 11), followed by 10.36 ± 2.09 (median: 10.5), 9.68 ± 2.43 (median: 10), and 9.63 ± 2.21 (median: 10) for Type 2 (n = 14), Type 3 (n = 19), and Type 4 (n = 44), respectively.
- For immediate implants, a trend towards better esthetic outcomes was observed when implant placement was done flaplessly in cases with intact buccal bone (Type 1A, median PES 11) as compared to cases with partial/complete missing buccal plates where a flap was raised (Type 1B, median PES 10).
- Overall, the only parameter that influenced esthetic outcomes (as measured by PES) was gender, with females having significantly superior results.
- The median WES was 8 and 96% of the crowns were deemed esthetically acceptable, with crowns placed by specialist prosthodontists yielding higher scores than those placed by general practitioners.
- Single tooth implants in the anterior maxilla showed satisfactory outcomes when measured with objective esthetic criteria. Timing of implant placement did not significantly influence the esthetic outcomes, although a trend towards better outcomes was seen with immediate implant placement as observed by higher median PES values.
- Single tooth implant placement in the anterior maxilla is a predictable treatment modality for achieving acceptable esthetic outcomes regardless of the timing of placement.

Adapted from Arora H et al., J Esthet Restor Dent. 2018 May 15, for more info about this publication click HERE

J Clin Periodontol. 2018 Apr;45(4):471-483

Onset, progression and resolution of experimental peri-implant mucositis at different abutment surfaces: A randomized controlled two-centre study.

Schwarz F, Becker J, Civale S, Hazar D, Iglhaut T, Iglhaut G

Study objectives

The aim of this study was to assess the onset, progression and resolution of experimentally induced peri-implant mucositis lesions at abutments with different microstructures in humans. In a randomized, controlled, interventional two-centre study, a total of 28 patients had received 28 target implants and were randomly allocated to either partially microgrooved (test) or machined (control) healing abutments. The study was accomplished in three phases, including a wound healing period (WH) following implant placement (12 weeks), a plaque exposure phase (EP-21 days) and a resolution phase (RP-16 weeks). Clinical (e.g. bleeding on probing-BOP), immunological (MMP-8) and microbiological (DNA counts for 11 species) parameters were evaluated.

Results and conclusions

- The incidence of peri-implant mucositis at EPd21 was comparable in both test and control groups (60.0% versus 61.5%), but markedly lower at control abutments after a nonsurgical treatment and reconstitution of oral hygiene measures at RPw16 (46.7% versus 15.4%).
- At any follow-up visit (i.e. EP and RP), clinical parameters, MMP-8 levels and DNA counts of major bacterial species were not significantly different between both groups.
- The onset, progression and resolution of experimental peri-implant mucositis lesions were comparable in both groups.

Adapted from Schwarz F et al., J Clin Periodontol. 2018 Apr;45(4):471-483, for more info about this publication click HERE

Clin Oral Investig. 2018 May 19

Locator® versus ceramic/electroplated double-crown attachments: a prospective study on the intraindividual comparison of implant-supported mandibular prostheses.

Brandt S, Brandt J, Ketabi AR, Lauer HC, Kunzmann A

Study objectives

The aim of this in vitro study was an interindividual comparison of patient satisfaction with restorations retained by a prefabricated and thus inexpensive attachment system (Locator®) or with a technologically complex and thus expensive attachment system (ceramic/electroplated double crowns) with similar retentive performance. Twelve patients received a Locator and a double-crown prosthesis in a crossover study for test periods of 3 months each. The main target parameter was the patient's final decision in favor of one of the two prosthesis types.

Results and conclusions

- After completing both test phases, seven patients opted for the Locator prosthesis and five patients opted for the double-crown prosthesis.
- The results of the study show that the more cost-effective variant was comparable to the more expensive double-crown prosthesis under the conditions prevailing in the study.
- Depending on the indication, this may influence the decision-making process in daily clinical practice and support the clinician's patient information and consultation efforts

Adapted from Brandt S. et al., Clin Oral Investig. 2018 May 19, for more info about this publication click HERE

Implant Dent. 2018 Jun;27(3):303-310

Implant-Supported Fixed Partial Prostheses With Different Prosthetic Materials: A Three-Dimensional Finite Element Stress Analysis.

Arinc H

Study objectives

The aim pf this study was to evaluate the effects of prosthetic material on the degree of stress to the cortical bone, trabecular bone, framework, and implants using finite element analysis (FEA). Different prosthetic materials [cobalt-chromium-supported ceramic, zirconia-supported ceramic, and zirconia-reinforced polymethyl methacrylate (ZRPMMA)-supported resin] were used. FEA was used to evaluate stress under different loading conditions. Maximum principal (σmax), minimum principal (σmin), and von Mises (σvM) stress values were obtained.

Results and conclusions

- Similar σmax, σmin, and σvM values were observed in the cortical and trabecular bones and in implants under both loading conditions, with the exception of the ZRPMMA model, which showed the highest σmax, σmin, and σvM values in oblique loading.
- The ZRPMMA model had the lowest σvM value in the framework under both loading conditions.
- ZRPMMA had the lowest stress values in the framework, with increased stress values in the implants and bone tissue.
- Framework and veneering materials may influence stress values under different loading conditions.

Adapted from Arinc H et al., Implant Dent. 2018 Jun;27(3):303-310, for more info about this publication click HERE

Clin Implant Dent Relat Res. 2018 Apr;20(2):170-179.

Intraoral versus extraoral cementation of implant-supported single crowns: Clinical, biomarker, and microbiological comparisons.

Kıran B, Toman M, Buduneli N, Lappin DF, Toksavul S, Nizam N

Study objectives

Implant supported single metal-ceramic crowns cemented either extraorally or intraorally were comparatively evaluated by clinical, radiologic, biomarker, and microbiological parameters. Twelve patients with bilateral single tooth gap in the maxillary posterior region received two locking-taper implants; 4.5 mm width, 8 mm length. Selection of intraoral (IOC) or extraoral cementation (EOC) using screwless titanium abutments was done randomly. Peri-implant crevicular fluid (PICF), gingival crevicular fluid (GCF) samples were collected from the implants, adjacent teeth, and bleeding on probing, soft tissue thickness, keratinized tissue width were recorded before starting the prosthetic procedures (baseline) and 3, 6 months after implant loading. Crestal bone loss was measured on radiographs taken immediately and 6 months after cementation.

Results and conclusions

- Clinical findings were similar in the crowns cemented extraorally or intraorally at all times ($P < .05$).
- PICF and GCF data were similar. At 3 month, interleukin-17E and osteoprotegerin levels were lower in the intraorally cemented crowns.
- Extraorally and intraorally cemented crowns exhibited similar crestal bone loss after loading. Higher amount of osteoprotegerin at 3 month at the EOC than the IOC sites might bode well for good osseointegration.

Adapted from Kıran B et al., Clin Implant Dent Relat Res. 2018 Apr;20(2):170-179., for more info about this publication click HERE

J Dent. 2018 May 25

10-year randomized trial (RCT) of zirconia-ceramic and metal-ceramic fixed dental prostheses.

Sailer I, Balmer M, Hüsler J, Hämmerle CHF, Känel S, Thoma DS

Study objectives

The aim of this study was to monitor zirconia-ceramic (ZC) and metal-ceramic (MC) posterior FDPs with respect to survival and technical/biological complication rates. Technical outcomes were assessed using modified United States Public Health Service (USPHS) criteria. Biologic outcomes included probing depth, plaque, bleeding on probing and tooth vitality.

Results and conclusions

- Forty-four patients with 53 FDPs (29 ZC, 24 MC) were available for examination. The median observation period was 10.3 years (ZC) and 10.0 years (MC).
- The 10-year KM survival estimate of ZC FDPs was 91.3% (95%CI:69.5;97.8) and 100% of MC FDPs.
- Minor chipping of the veneering ceramic and occlusal wear were found to a similar extent at ZC and MC FDPs. ZC FDPs demonstrated a significantly higher rate of framework fracture, de-bonding, major fractures of the veneering ceramic and poor marginal adaption.
- Biological outcomes were similar in both groups and between abutment and control teeth. CONCLUSION: At 10 years, ZC and MC posterior FDPs resulted in similar outcomes for the majority of the outcome measures ($p > 0.05$)

Adapted from Sailer I et al., J Dent. 2018 May 25, for more info about this publication click HERE

Clin Implant Dent Relat Res. 2018 Apr;20(2):180-190

Surface characterization of titanium implant healing abutments before and after placement.

Wheelis SE, Wilson TG Jr, Valderrama P

Study objectives

The aim of this study was to characterize the surface of titanium healing abutments before and after clinical placement to understand the effects of the oral environment and time on the device surface. Ten regular Straumann IHA were subjected to characterization pre and postplacement to elucidate the effects of the oral environment on device surfaces. Changes in surface crystallinity, morphology, and elemental composition were monitored with Raman spectroscopy, scanning electron microscopy, optical microscopy, and x-ray photoelectron spectroscopy, respectively. In addition, corrosion rate and polarization resistance were obtained to assess electrochemical device stability after placement.

Results and conclusions

- Control analysis indicated the titanium oxide of IHAs was thicker than natural commercially pure titanium and had the structure of crystalline anatase. After removal, the abutments possessed large amounts of biological debris, visible scratches, and discoloration sparsely on the surface.
- Spectroscopic analysis revealed the titanium oxide on the surface of IHAs was structurally unchanged, with crystalline titanium dioxide still present on the surface. Electrochemical results revealed that implanted healing abutments possessed a significantly higher corrosion rate than controls
- Healing abutments were stable in the oral environment due to the chemical stability of the oxide, and were likely subjected to abrasions from unintentional loading and oral hygiene techniques.

Adapted from Wheelis SE et al., Clin Implant Dent Relat Res. 2018 Apr;20(2):180-190, for more info about this publication click HERE

J Oral Implantol. 2018 May 21

Guided bone regeneration and implant placement in association with a coronally positioned palatal sliding flap: a 17-year follow-up case report.

Maiorana C, Poli PP, Beretta M

Study objectives

The aim of the present case report was to show the 17-year hard and soft tissues stability of guided bone regeneration procedure associated with dental implants insertion. A 52-year-old male patient presented with a partial edentulism in the upper right maxilla. A graft consisting of deproteinized bovine bone mineral and autogenous bone stabilized by a non-resorbable expanded polytetrafluoroethylene membrane was used to reconstruct the missing bone applying the biological principles of guided bone regeneration.

Results and conclusions

- No complications occurred during the follow-up period.
- Clinical follow-up recalls were planned yearly, while radiological exams consisting of orthopantomographs and intra-oral radiographs were performed at 1 year, 8 years, 12 years, and 17 years after the implants insertion.
- The latest follow-up visit performed after 17 years from the bone augmentation procedure showed clinically stable gingival levels. No radiographic signs of peri-implantitis were observed.
- Mesial and distal marginal bone levels remained almost unchanged within the physiological threshold.
- This case report highlighted the effectiveness of the guided bone regeneration technique over a long-term follow-up.
- Interestingly, the use of a palatal sliding flap repositioned coronally provided sufficient amount of buccal keratinized mucosa.

Adapted from Maiorana C et al., J Oral Implantol. 2018 May 21, for more info about this publication click HERE

J Oral Implantol. 2018 Jun 5

Fifteen years of platelet rich fibrin (PRF) in dentistry and oromaxillofacial surgery: How high is the level of scientific evidence?

Ghanaati S, Herrera-Vizcaino C, Al-Maawi S, Lorenz J, Miron RJ, Nelson K, Schwarz F, Choukroun J, Sader R

Study objectives

Platelet-rich fibrin is a blood concentrate system used for soft tissue and bone tissue regeneration. In the last decade, platelet rich fibrin (PRF) has been widely used in different indication fields, particularly in oral and maxillofacial surgery. This review is aimed to investigate the level of scientific evidence of published articles related to the use of PRF for bone and soft tissue regeneration in dentistry and maxillofacial surgery.

Adapted from Ghanaati S et al., J Oral Implantol. 2018 Jun 5, for more info about this publication click HERE

Clin Oral Implants Res. 2018 May;29(5):499-507

Randomized controlled clinical study assessing two membranes for guided bone regeneration of peri-implant bone defects: 3-year results.

Basler T, Naenni N, Schneider D, Hämmerle CHF, Jung RE, Thoma DS.

Study objectives

The aim of this study was to assess two- and three-dimensional changes of the peri-implant tissues as well as clinical, biological, and radiological outcomes of implants having been treated with resorbable or nonresorbable membranes at 3 years. Twenty-three patients were re-examined after having received a single-tooth implant in the esthetic zone in conjunction with guided bone regeneration (GBR) using either a resorbable (RES) or a titanium-reinforced nonresorbable membrane (N-RES) and demineralized bovine bone mineral. Volumetric and linear as well as clinical and radiographic measurements were performed at crown insertion (baseline), at 1 year (FU-1) and 3 years (FU-3).

Results and conclusions

- Minor, but ongoing buccal volume loss was observed in both groups during the 3-year follow-up. A slightly higher volume loss was observed in group RES (-0.22 mm) compared to N-RES (-0.14 mm) at 1 year (FU-1), but aligned at 3 years (FU-3) RES (-0.30 mm) N-RES (-0.32 mm).
- All changes over time were statistically significantly different within ($p < .05$), but not between the groups ($p > .05$).
- Stable median interproximal bone levels after 3 years (FU-3); 0.26 mm (0.04; 0.36) (RES) and 0.14 mm (0.08; 0.20) (N-RES) and healthy tissues (BOP, PD) were obtained with both membranes.
- Both treatment modalities resulted in minor, but ongoing contour changes of the peri-implant tissues. Stable interproximal bone levels and healthy tissues can be obtained with membranes up to 3 years.

Adapted from Basler T et al., Clin Oral Implants Res. 2018 May;29(5):499-507, for more info about this publication click HERE

Int J Mol Sci. 2018 Apr 24;19(5)

Effect of Amelogenin Coating of a Nano-Modified Titanium Surface on Bioactivity.

Terada C, Komasa S, Kusumoto T, Kawazoe T, Okazaki J

Study objectives

The aim of this in vitro study was to develop new implant materials aiming at the regeneration of periodontal tissues as well as hard tissues by coating nano-modified titanium with amelogenin, which is one of the main proteins contained in Emdogain.

Results and conclusions

- In vitro evaluation using rat bone marrow and periodontal ligament cells revealed that the initial adhesion of both cell types and the induction of hard tissue differentiation such as cementum were improved by amelogenin coating.
- Additionally, the formation of new bone in implanted surrounding tissues was observed in in vivo evaluation using rat femurs.
- Together, these results suggest that this material may serve as a new implant material with the potential to play a major role in the advancement of clinical dentistry.

Adapted from Terada C et al., Int J Mol Sci. 2018 Apr 24;19(5), for more info about this publication click HERE

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