Scientific Highlights

SHORT OVERVIEWS ON RECENTLY PUBLISHED SCIENTIFIC EVIDENCE.

Issue 1/2021

Edited by Dr Pooja Nair

in this issue

EDITOR'S CHOICE

Survival Rate of 1008 Short Dental Implants with 21 Months of Average Follow-Up: A Retrospective Study
(J Caramês et al. 2020)

and

Assessment of the Chemical Composition in Different Dental Implant Types: An Analysis through EDX System
(F J Dias et al. 2020)

Survival Rates of 8-mm or Shorter Tissue-Level Implants in Function for Up to 228 Months
(P A Fugazzotto. 2020)

A completely digital workflow for the transition from a failed dentition to interim complete-arch fixed implant-supported prostheses: A clinical report
(M W M Negreiros et al. 2020)

Editor's choice

J Clin Med 2020 Dec 5;9(12):3943. doi: 10.3390/jcm9123943.

Survival Rate of 1008 Short Dental Implants with 21 Months of Average Follow-Up: A Retrospective Study

J Caramês, A C Pinto, G Caramês, H Francisco, J Fialho, D Marques

Study objectives and methods

This retrospective study evaluated the survival rate of short, sandblasted acid-etched surfaced implants with 6 and 8mm lengths with at least 120 days of follow-up.

Data concerning patient, implant and surgery characteristics were retrieved from clinical records. Sandblasted and acid-etched (SLA)-surfaced tissue-level 6 mm (TL6) or 8 mm (TL8) implants or bone-level tapered 8 mm (BLT8) implants were used. Absolute and relative frequency distributions were calculated for qualitative variables and mean values and standard deviations for quantitative variables. A Cox regression model was performed to verify whether type, length and/or width influence the implant survival. The cumulative implant survival rate was assessed by time-to-event analyses (Kaplan-Meier estimator).

Results

- In all, 513 patients with a mean age of 58.00 ± 12.44 years received 1008 dental implants with a mean follow-up of 21.57 ± 10.77 months.
- Most implants (78.17%) presented a 4.1 mm diameter, and the most frequent indication was a partially edentulous arch (44.15%).
- The most frequent locations were the posterior mandible (53.97%) and the posterior maxilla (31.55%).
- No significant differences were found in survival rates between groups of type, length and width of implant with the cumulative rate being 97.7% ± 0.5%.

Conclusions

Within the limitations of this study, the evaluated short implants are a predictable option with high survival rates during the follow-up without statistical differences between the appraised types, lengths and widths

Adapted from J Caramês et al., J Clin Med 2020 Dec 5;9(12):3943, for more info about this publication click HERE

Highlights

Coatings 2020, 10(9), 882; https://doi.org/10.3390/coatings10090882

Assessment of the Chemical Composition in Different Dental Implant Types: An Analysis through EDX System

F J Dias, R Fuentes, P Navarro, B Weber, E Borie

Study objectives and methods

The aim of this study was to evaluate the morphological analysis of the surface and chemical composition of different implant types through an energy-dispersive X-ray spectrometry (EDX) system.

Eight dental implant models from different manufacturers were analyzed using variable pressure scanning electron microscopy (VP-SEM) and EDX. The chemical composition and general characteristics of the structural morphology in different dental implant surfaces were analyzed randomly.

Results

- Nitrogen was identified in two samples, while zirconium was observed in only one model.
- Aluminium was identified in five samples ranging between 4% and 11% of its composition.
- Regarding the morphological characteristics, two samples from the same manufacturer had the most irregular surface designed to increase the contact surface, while the others revealed their surfaces with roughness at the micrometric level with no major irregularities.

Conclusions

In conclusion, despite the morphology of implants being similar in most of the analyzed samples, more than 50% of them, which are brands of implants available on the market, showed aluminium on the implant surface.

Finally, STR (Bone level, Roxolid), DENT (Superline) and NEO (Helix GM) could be considered, among the analyzed samples, the safest implants from the point of view that no aluminium was detected in their chemical composition.

Adapted from F J Dias et al, Coatings 2020, 10(9), 882; for more info about this publication click **HERE**

Int J Oral Maxillofac Implants:Nov/Dec 2020;35(6):1239-1247.doi: 10.11607/jomi.6997

Survival Rates of 8-mm or Shorter Tissue-Level Implants in Function for Up to 228 Months

P A Fugazzotto

Study objectives and methods

Advances in surface technology and the understanding of the capabilities of osseointegrating implants have led to the use of shorter implants in a variety of clinical situations. Such implant use offers a number of potential advantages in the posterior maxilla and mandible. The purpose of this retrospective study was to examine the success rates of shorter, tissue-level implants in function for at least 60 months.

A retrospective study was conducted of all patients treated between January 1, 1998, and December 31, 2012, who received tissue-level endosseous implants 8 mm or less in length, which were restored with abutments and single crowns. Patient age, sex, location of implants, and diameter of implants were examined. Time in function and stability of peri-implant crestal bone were assessed.

Results

- The retrospective analysis identified 4,251 tissue-level implants that were restored with single abutments and crowns.
- These implants were followed for up to 228 months in function, with a mean time in function of 127.2 months. Implant success was assessed using commonly utilized metrics combined with bone sounding on the mid-buccal and mid-lingual/palatal aspects of the implants.
- The cumulative success rate was 99.5% for all implants.
- In the posterior mandible, the success rate for regular-neck implants was 99.3% (n = 680, mean time in function: 136.5 months) and was 99.7% for wide neck implants (n = 2,320, mean time in function: 124.5 months).
- In the posterior maxilla, the success rate for regular-neck implants was 97.8% (n = 211, mean time in function: 169.1 months), and for wide-neck implants, it was 99.2% (n = 1,040, mean time in function: 127.8 months).

Conclusions

The use of shorter (8 mm or less in length) tissue-level implants in the maxilla and mandible, restored with single abutments and crowns, offers a viable treatment option, assuming specific criteria and protocols are followed.

Adapted from P A Fugazzotto, Int J Oral Maxillofac Implants:Nov/Dec 2020;35(6):1239-1247, for more info about this publication click **HERE**

J Prosthet Dent. 2020 Dec 30; S0022-3913(20)30698-3. doi: 10.1016/j.prosdent.2020.09.037.

A completely digital workflow for the transition from a failed dentition to interim complete-arch fixed implant-supported prostheses: A clinical report

M W M Negreiros, A Hamilton, G O Gallucci

Abstract

This clinical report describes a completely digital workflow for the rehabilitation of the maxillary and mandibular arches with implant-supported fixed interim prostheses.

Computer-assisted implant planning was used to fabricate a multifunctional surgical template for the guided placement of transitional and endosteal dental implants.

Advantages of this technique include the integration of a completely digital workflow into the production of a virtual diagnostic tooth arrangement for edentulous patients, the planning of implant placement as per a restorative-driven approach, and the delivery of implant-supported fixed interim prostheses.

Adapted from M W M Negreiros et al., J Prosthet Dent. 2020 Dec 30, for more info about this publication click HERE

Int J Oral Maxillofac Implants. Nov/Dec 2020;35(6):1248-1256.

The Clinical and Radiologic Outcomes of Early Loaded Implants After 5 Years of Service

E Kahramanoğlu, Y U Aslan, Y Özkan, Y Özkan

Study objectives and methods

To evaluate the 5-year results of the clinical and radiographic outcomes of three types of early loaded implants.

Seventy-five implants were placed in the posterior mandible or maxilla in 30 patients. Three types of implants (Straumann SLActive, Astra OsseoSpeed, and Thommen Implant System) were used. Definitive restorations were made after 8 weeks of implant placement.
The radiographs were taken at the placement of the prosthesis, at 6 months, and at 1- and 5-year follow-ups. Clinical and radiologic data were evaluated for all types of implants. The Wilcoxon signed rank test, least significant differences, and Mann-Whitney U were used to test for statistically significant differences ($P < .005$).

Results

- Twenty-four patients and 62 implants were evaluated after 5 years.
- The mean marginal bone loss was 0.20 ± 0.40 mm, 0.21 ± 0.05 mm, and 0.25 ± 0.36 mm after 1 year and 0.32 ± 0.22 mm, 0.31 ± 0.26 mm, and 0.42 ± 0.36 mm after 5 years for the Straumann, Astra, and Thommen groups, respectively.
- After 5 years, the mean peri-implant probing depth level was 1.75 ± 0.49 mm, 1.87 ± 0.48 mm, and 1.92 ± 0.57 mm for the Straumann, Astra, and Thommen groups, respectively.
- No peri-implantitis was detected after 5 years of loading.

Conclusions

- All groups of implants showed a stable peri-implant probing depth and marginal bone level.
- The survival rate was high and bone loss was low at 5 years; thus, early loading may be a useful procedure that allows reduction in treatment time.

Adapted from E Kahramanoğlu et al.,Int J Oral Maxillofac Implants.Nov/Dec 2020;35(6):1248-1256., for more info about this publication click **HERE**

Int J Implant Dent. 2020 Nov 23;6(1):77. doi: 10.1186/s40729-020-00271-1.

A fixed reconstruction of fully edentulous patients with immediate function using an apically tapered implant design: a retrospective clinical study

M A Eskan, G Uzel, S Yilmaz

FREE FULL TEXT

Study objectives and methods

Immediate function has become an accepted treatment modality for fixed restorations in completely edentulous jaws.
It is known that implant microtopography (surface) may enhance osseointegration, while implant macrotopography (macrodesign) plays an important role in primary stability in the patient requiring an immediate loading.
The aim of this retrospective study was to evaluate the clinical and radiographic outcomes of the edentulous subjects treated with narrow and/or regular diameter, which placed and loaded immediately.

Forty-two consecutive patients received 171 implants, including regular and narrow diameter implants (NDIs). Each jaw, 19 mandibles and 24 maxillae, was treated with a fixed-full arch prosthesis according to the Straumann® Pro Arch concept. The majority (95%) of the restorations were supported by four implants, of which the posterior two implants were tilted. A provisional functional acrylic prosthesis was delivered on the day of surgery. All patients were followed up to 55 months. Cumulative survival rate was determined using Kaplan-Meier analysis. Radiological measurement of marginal bone level was performed.

Results

- The overall follow-up time for survival rate was up to 55 months.
- Four implants (3 implants in maxilla, 1 implant in mandible) were lost, resulting in an overall cumulative implant survival rate of 97.7%.
- Implant survival rate in the axial and tilted implants was not statistically significant.
- The mean of interproximal marginal bone loss was 0.15 mm after 24 months.
- Good soft tissue health was observed in almost 99% of patients. The final prosthesis survival rate was 100%

Conclusions

- The results of this retrospective pilot study indicated that total edentulous patients requiring an immediate implant placement and loading can be successfully treated with this implant design.
- The improved mechanical properties of these implants might give a more conservative treatment option for the jaws showing a severe horizontal alveolar bone resorption.

Adapted from M A Eskan et al., Int J Implant Dent. 2020 Nov 23;6(1):77, for more info about this publication click **HERE**

J Periodontol. 2020 Dec 10.doi: 10.1002/JPER.20-0590.

Periodontal regenerative therapy in patients with type 2 diabetes using minimally invasive surgical technique with enamel matrix derivative under 3-year observation: A prospective cohort study

K Mizutani, H Shioyama, T Matsuura, R Mikami, K Takeda, Y Izum, A Aoki, T Iwata

Study objectives and methods

Information regarding periodontal regenerative therapy in patients with diabetes mellitus (DM) is limited. This pilot study compared the regenerative outcomes of minimally invasive periodontal surgery using enamel matrix derivative (EMD) between DM and non-DM patients.

This prospective study included deep intrabony defects in patients with or without type 2 DM. Minimally invasive surgical technique (MIST) or modified MIST (M-MIST) using EMD, without bone graft materials, was performed. Periodontal examination and intraoral radiography were performed at baseline, 6 months, and 1 and 3 years after surgery.

Results

- Ten sites of 10 subjects in the DM group, and 20 sites of 18 subjects in non-DM group were evaluated (mean age; 67.5 ± 7.6 and 63.1 ± 9.7, respectively).
- Probing depth significantly decreased from 7.1 ± 1.6 and 7.0 ± 1.3 mm to 2.2 ± 0.9 and 2.3 ± 1.1 mm at the 1-year examination in the DM and non-DM groups, respectively.
- Clinical attachment level (CAL) gain and radiographical defect fill at the 3-year examination were 3.8 ± 1.1 mm and 58.3% ± 10.4%, respectively, in the DM group, and 4.1 ± 1.1 mm and 65.5% ± 18.8%, respectively, in the non-DM group, showing no significant differences between the groups.
- Multiple regression analysis showed no significant association of CAL gain with DM or age after adjustments for relevant confounders.

Conclusions

- This is the first documented study of successful periodontal tissue regeneration in patients with DM.
- Minimally invasive surgery combined with EMD yielded significant clinical attachment gain and bone fill in the DM and non-DM groups at comparable levels.

Adapted from K Mizutani et al., J Periodontol. 2020 Dec 10, for more info about this publication click HERE

J Clin Periodontol. 2020 Dec 1. doi: 10.1111/jcpe.13409

Medium and Long-Term Clinical Benefits of Periodontal Regenerative/ Reconstructive Procedures in Intrabony Defects: Systematic Review and Network Meta-Analysis of Randomized Controlled Clinical Studies

A Stavropoulos, K Bertl, L M Spineli, A Sculean, P Cortellini, M Tonetti

Study objectives and methods

Systematic reviews have established the short-term improvements of periodontal regenerative/reconstructive procedures compared to conventional surgical treatment in intrabony defects. However, a hierarchy of periodontal regenerative/reconstructive procedures regarding the medium- to long-term results of treatment does not exist.

To systematically assess the literature to answer the focused question "In periodontitis patients with intrabony defects, what are the medium- and long-term benefits of periodontal regenerative/reconstructive procedures compared with open flap debridement (OFD), in terms of clinical and/or radiographic outcome parameters and tooth retention?"

Randomized controlled clinical trials (RCTs), reporting on clinical and/or radiographic outcome parameters of periodontal regenerative/reconstructive procedures ≥ 3 years post-operatively were systematically assessed. Clinical [residual probing pocket depth (PD) and clinical attachment level (CAL) gain, tooth loss] and radiographic [residual defect depth (RDD), bone gain (RBL)] outcome parameters, were assessed. Descriptive statistics were calculated and Bayesian random-effects network meta-analyses (NMA) were performed where possible.

Results

- Thirty RCTs, presenting data 3 to 20 years after treatment with grafting, GTR, EMD, as monotherapies, combinations thereof, and/or adjunctive use of blood derived growth factor constructs, or with OFD only, were included.
- NMA based on 21 RCTs showed that OFD was clearly the least efficacious treatment; regenerative/reconstructive treatments resulted in significantly shallower residual PD in 4 out 8 comparisons [range of mean differences (MD): -2.37 to -0.60 mm] and larger CAL gain in 6 out 8 comparisons (range of MD: 1.26 to 2.66 mm), and combination approaches appeared as the most efficacious.
- Tooth loss after regenerative/reconstructive treatment was less frequent (0.4%) compared to OFD (2.8%), but the evidence was sparse. There was only sparse radiographic data not allowing any relevant comparisons.

Conclusions

- Periodontal regenerative/reconstructive therapy in intrabony defects results, in general, in shallower residual PD and larger CAL gain compared with OFD, translating in high rates of tooth survival, on a medium (3-5 years) to long-term basis (5-20 years).
- Combination approaches appear, in general, more efficacious compared to monotherapy in terms of shallower residual PD and larger CAL gain. A clear hierarchy could, however, not be established due to limited evidence.

Adapted from A Stavropoulos et al., J Clin Periodontol. 2020 Dec 1, for more info about this publication click **HERE**

Implants International Magazine of Oral Implantology, Issue 3/2020.

New zygomatic implant design: Adapting to the anatomy

S Zarrine, C Aparicio, E Bedrossian

Abstract

This article introduces and explains the rationale for the two different designs of the Straumann zygomatic implant, which is the result of a collaboration between the authors and engineers over the last several years. It is based on many years of the application of evidence-based clinical principles and clinical outcomes using this zygomatic implant and on common fundamental values.

When fixed rehabilitation for completely edentulous patients cannot be achieved using conventional implants only owing to bone resorption, there are two surgical alternatives: grafting and a graftless solution. Bone grafting is a long process in cases of severe atrophy, and sometimes the intra-oral donor sites are not sufficient and an extra-oral donor site is needed. Moreover, grafted bone resorption is common and unpredictable. A graftless solution using zygomatic implants is an effective option in atrophic jaws, and according to substantial data, it is a safe option in the management of severely resorbed edentulous maxillae.

Each implant has been designed to adapt to the patient's anatomical situation, and each part of the implants has been designed to be effective and safe.

Adapted from S Zarrine et al., Implants International Magazine of Oral Implantology, Issue 3/2020, for more info about this publication click **HERE**

Clin Oral Implants Res. 2020 Dec; 31(12):1207-1222. doi: 10.1111/clr.13668.

Mandibular two-implant overdentures with CAD-CAM milled bars with distal extensions or retentive anchors: A randomized controlled trial

M Srinivasan, M Schimmel, R Buser, S Maniewicz, F R Herrmann, F Müller

Study objectives and methods

This randomized controlled trial (RCT) aimed to demonstrate the non-inferiority of mandibular 2-implant overdentures (IODs) on a CAD-CAM milled bar with long distal extensions (MBDE) against IODs on retentive anchors (RA).

Forty edentulous participants rehabilitated with a maxillary conventional denture and a mandibular 2-IOD participated in this trial. They were randomized into two groups [Control group (CG): RA + gold matrices; Experimental group (EG): MBDE + gold clip]. The outcomes included implant survival rate (ISR), chewing efficiency [quantitative (VoH) and subjective (SA) assessments], peri-implant marginal bone levels (PI-MBL), maximum bite force (MBF), and patient-reported outcomes [oral health impact profile (OHIP-EDENT), and denture satisfaction index (DSI)]. Outcomes were recorded at baseline (BL), two weeks (T0), 6 months (T1), and at 1 year (T2) after the intervention. Intra- and inter-group analyses were performed using regression models with α=0.05.

Results

- 38 participants completed the T2 visit (CG: n = 19, age = 74.7 ± 7.8 years; EG: n = 19, age = 70.3 ± 10.7 years).
- At T2, there was no implant loss in either of the groups (ISR = 100%).
- There were no significant differences between the groups for the PI-MBL changes (p = .754).
- Improvements occurred faster in the EG than in the CG, but over the observation time, there were no differences between the trial groups for VoH, MBF, OHIP-EDENT, and the DSI, except for SA being significantly better in the EG group (p = .022).

Conclusions

- The results of this RCT confirm that mandibular 2-IODs with a CAD-CAM milled bar with long distal extensions are not an inferior treatment to the conventional IODs on retentive anchors in the short term (1 year).

Adapted from M Srinivasan et al., Clin Oral Implants Res. 2020 Dec; 31(12):1207-1222, for more info about this publication click HERE

References

J Caramês et al., J Clin Med 2020 Dec 5;9(12):3943| **F J Dias et al,** Coatings 2020, 10(9), 882| **P A Fugazzotto**, Int J Oral Maxillofac Implants:Nov/Dec 2020;35(6):1239-1247 | **M W M Negreiros et al**., J Prosthet Dent. 2020 Dec 30 | **E Kahramanoğlu et al.,***Int J Oral Maxillofac Implants.Nov/Dec 2020;35(6):1248-1256* | **M A Eskan et al.,** Int J Implant Dent. 2020 Nov 23;6(1):77| **K Mizutani et al.,** J Periodontol. 2020 Dec 10| **A Stavropoulos et al.,** J Clin Periodontol. 2020 Dec 1| **S Zarrine et al.,** Implants International Magazine of Oral Implantology, Issue 3/2020 |**M Srinivasan et al.,** Clin Oral Implants Res. 2020 Dec; 31(12):1207-1222|

source: www.pubmed.gov| Dr Nair holds a position of Global Scientific Communications Manager at Institute Straumann in Basel, Switzerland.

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