



Scientific Highlights

SHORT OVERVIEWS ON RECENTLY PUBLISHED SCIENTIFIC EVIDENCE.

November – December 2019

Edited by Dr Pooja Nair

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Comparable survival of TiZr and Ti dental implants in smokers and non-smokers.

(Alshahaf A et al. 2019)

Computer-aided surgical template achieving more accurate implant placement than free-hand method.

(Chen S et al. 2019)

Less-demanding augmentation techniques for the placement of shorter implants.

(Misch CM et al. 2019)

Editor's choice

Clin Oral Investig. 2019 Nov 7

Clinical performance of titanium zirconium implants with a hydrophilic surface in patients with controlled type 2 diabetes mellitus: 2-year results from a prospective case-control clinical study.

Cabrera-Domínguez JJ, Castellanos-Cosano L, Torres-Lagares D, Pérez-Fierro M, Machuca-Portillo G

Study objectives and methods

The aim of this prospective case-control clinical study was to analyze the 2-year clinical performance of single-unit titanium-zirconium (TiZr) alloy narrow-diameter (3.3 mm) dental implants with a hydrophilic surface (Straumann® Roxolid®, SLActive®) in patients with controlled type 2 diabetes mellitus (T2DM), measured using the glycated hemoglobin A (HbA1c) concentration test, compared with results in individuals without T2DM.

The studied sample consisted of 28 patients, 14 with T2DM (study group) and 14 without (control group). The plaque index, bleeding on probing, probing depth, clinical attachment level, gingival biotype, and marginal bone loss (MBL) at the site of the implants were assessed. HbA1c levels were assessed in all patients during each checkup.

Results

- No statistically significant differences in MBL were found between the control and study groups ($p > 0.05$).
- Two years after implant placement and prosthetic restoration, no implant failures were reported in either group, resulting in 100% survival and success rates in both groups.

Conclusions

- Within the limitations of this study, it was concluded that reduced-diameter TiZr alloy implants with a hydrophilic surface represent a safe and predictable treatment option for patients with well-controlled T2DM.
- The clinical performance of reduced-diameter TiZr alloy implants in individuals with T2DM was comparable with that observed in individuals without T2DM in the medium term.

Adapted from Cabrera-Domínguez JJ et al., Clin Oral Investig. 2019 Nov 7, for more info about this publication click [HERE](#)

Chin J Dent Res. 2019;22(4):265-272

Survival of titanium-zirconium and titanium dental implants in cigarette-smokers and never-smokers: A 5-year follow-up.

Alсахhaf A, Alshagroud RS, Al-Aali KA, Alofi RS, Vohra F, Abduljabbar T



Study objectives and methods

The aim of this 5-year follow-up retrospective clinical study was to compare the peri-implant clinical and radiographic status around bone-level narrow-diameter titanium-zirconium (TiZr) implants and titanium (Ti) implants placed in cigarette-smokers (CS) and never-smokers (NS). Partially edentulous CS and NS rehabilitated with TiZr and Ti implants were included.

Participants were divided into four groups: Group 1, CS with TiZr implants; Group 2, NS with TiZr implants; Group 3, CS with Ti implants; and Group 4, NS with Ti implants. A total of 36, 30, 31 and 33 implants were placed in 24, 23, 24 and 25 male individuals in Groups 1, 2, 3 and 4, respectively. Peri-implant plaque index (PI), bleeding on probing (BOP), probing depth (PD) and mesial and distal crestal bone loss (CBL) were measured.

Results

- At the 3- and 5-year follow-ups, no statistically significant difference in the peri-implant PI, BOP, PD and CBL between individuals in all groups was observed.
- At the 5-year follow-up, both implant success and survival rates were 100%, respectively, in all groups,

Conclusions

- TiZr and Ti dental implants can remain clinically and radiographically stable in CS in a manner similar to NS.
- Routine oral hygiene maintenance plays an essential role in this regard.

Adapted from Alсахhaf A et al., *Chin J Dent Res.* 2019;22(4):265-272, for more info about this publication click [HERE](#)

Implant Dent. 2019 Dec;28(6):578-589

Comparison between a computer-aided surgical template and the free-hand method: A systematic review and meta-analysis.

Chen S, Ou Q, Lin X, Wang Y

Study objectives and methods

The aim of this meta-analysis was to assess the results of implantation with or without an implant template based on the accuracy, survival rate, and other considerations.

In January 2018, a systematic review was undertaken for randomized controlled trials and retrospective and prospective cohort studies with relevance to implant accuracy and the survival rate between the implant template and free-hand method. The odds ratios (ORs) of the survival rate and the mean difference of accuracy deviation from the selected papers were estimated by meta-analysis.

Results

- Of 362 screened articles, 6 studies were included in the meta-analysis.
- Comparison of the survival rate of implant surgery with or without an implant template revealed no significant differences (OR=1.71; 95% confidence interval [CI]: 0.65-4.51).
- Significant differences in accuracy were observed in angular (mean difference: -5.45 degrees; 95% CI: -0.66 to -4.24 degrees) and apical deviation (mean difference: -0.83 mm; 95% CI: -1.12 to -0.54), with higher accuracy being achieved using an implant template.

Conclusions

- With the technology of computer-aided surgical template, implant placement can be more accurate than free-hand method.
- No significant difference was observed in the survival rate between computer-guided surgical template and free-hand method.

Adapted from Chen S et al., *Implant Dent.* 2019 Dec;28(6):578-589, for more info about this publication click [HERE](#)

Int J Periodontics Restorative Dent. 2019 Nov/Dec;39(6):771-779

A "graft less" approach for dental implant placement in posterior edentulous sites.

Misch CM, Polido WD

Study objectives

This article discusses a "graft less" treatment philosophy that emphasizes the use of less-demanding augmentation techniques for the purpose of placing shorter implants in atrophic posterior sites, avoiding more complicated procedures for implant placement.

Key points

- In the posterior maxilla and mandible, the use of short implants (<8.0 mm) can reduce the need for vertical bone grafting.
- Patients often prefer this strategy over more complex procedures that can cause complications, increase morbidity, and require longer treatment times with higher costs.
- When there is inadequate available bone, less-demanding bone augmentation procedures may be performed for the purpose of placing shorter implants.
- These procedures are less demanding, less invasive, and more predictable compared to more complex procedures.

Adapted from Misch CM et al., *Int J Periodontics Restorative Dent.* 2019 Nov/Dec;39(6):771-779, for more info about this publication click [HERE](#)

J Clin Med. 2019 Dec 4;8(12)

A systematic review of survival rates of osseointegrated implants in fully and partially edentulous patients following immediate loading.

Del Fabbro M, Testori T, Kekovic V, Goker F, Tumedei M, Wang HL



Study objectives and methods

The aim of this systematic review was to evaluate the survival rates of immediately loaded implants after at least five years. Besides implant failure, the amount of marginal bone loss around implants and the complication type were assessed.

An electronic search was undertaken on Medline, Scopus, and Cochrane Central Register of Controlled Trials (last search on 15 February 2018). The main outcomes recorded for each study were: implant and prosthesis success and survival, marginal bone level change, incidence and type of complications. Kaplan-Meier analysis was used to estimate cumulative survival rates.

Results

- 4 prospective studies with at least 5-year follow-up, published between 2007 and 2017 were included.
- 5349 immediately loaded implants in 1738 patients were analyzed.
- Mean follow-up was 72.4 months (median: 60 months; 95% CI: 64.53 to 80.25 months; range: 60 to 147 months).
- Mean weighted implant survival was 97.4% (median: 98.15%; 95% CI: 96.29 to 98.54%; range: 83.80 to 100%).
- Cumulative survival rate of implants placed in the mandible was significantly higher than for implants placed in the maxilla ($p < 0.01$).
- No significant difference in failure rate was found among the types of prosthesis employed ($p = 0.27$).
- The mean peri-implant bone level change at the end of the follow-up in each study ranged from 0.3 to 1.7 mm.

Conclusions

- Immediate loading of implants appears to have long-term predictability and success rate under well-defined circumstances.

Adapted from Del Fabbro M et al., J Clin Med. 2019 Dec 4;8(12), for more info about this publication click [HERE](#)

Clin Oral Implants Res. 2019 Jun;30(6):531-541

Comparison of postoperative intraoral scan versus cone beam computerised tomography to measure accuracy of guided implant placement – A prospective clinical study.

Skjerven H, Olsen-Bergem H, Rønold HJ, Riis UH, Ellingsen JE.

Study objectives and methods

The aim of this prospective clinical study was to evaluate the accuracy of implant placement with a digitally planned guided implant procedure. Two methods for identifying the actual postoperative positioning of the implants were compared: CBCT and IO scanning.

In total 28 implants with a sandblasted and acid-etched surface were placed in 13 patients using tooth-supported surgical guides following a digital planning procedure. The implants were submerged for 12-15 weeks. New CBCT images were taken for identification of the implant position. After second stage surgery, scan bodies were mounted on the implants and scanned with an IO digital scanner. The recordings from the CBCT images and the IO scans were compared with respect to the identified positions of the implants.

Results

- No significant differences in the identified positioning of the implants were identified as measured by CBCT or IO, except for the apical deviations at the coronal and apical points.
- Angular difference between CBCT and IO scanning at the coronal point was $-0.011 (\pm 0.6)$ degrees, whereas the 3D deviation was $0.03 (\pm 0.17)$ mm.
- Distal deviation between CBCT and IO scanning was $0.01 (\pm 0.16)$ mm, and the vestibular deviation $0.033 (\pm 0.16)$ mm and the apical deviation difference was $0.09 (\pm 0.16)$ mm.
- 3D deviation at the apical point was $0.04 (\pm 0.22)$ mm.
- Distal deviation between CBCT and IO scanning was $0.06 (\pm 0.19)$ mm, and the vestibular deviation $0.032 (\pm 0.23)$ mm and the apical deviation difference was $0.09 (\pm 0.16)$ mm.

Conclusions

- Accuracy measurements using IO scanning was shown to yield comparable results to those obtained by CBCT.

Adapted from Skjerven H et al., *Clin Oral Implants Res.* 2019 Jun;30(6):531-541, for more info about this publication click [HERE](#)

J Clin Exp Dent. 2019 Oct 1 11(10):e850-e857

Short implants (5-8 mm) vs long implants (≥ 10 mm) with augmentation in atrophic posterior jaws: A meta-analysis of randomised controlled trials.

Chen S, Ou Q, Wang Y, Lin X



Study objectives and methods

The aim of this systematic review was to compare the survival rate, marginal bone loss changes and complications between short implants (5-8 mm) and long implants (≥ 10 mm) with a bone-augmented procedure in the posterior jaw.

An electronic search of the MEDLINE (PubMed), Embase and Cochrane Library databases through September 2018 was done to identify randomized controlled trials (RCT) assessing short implants and long implants with at least a 1-year follow-up period after loading. A quantitative meta-analysis was conducted on the survival rate, marginal bone loss changes and complications.

Results

- 10 RCTs met the inclusion criteria.
- No significant differences in the survival rate (risk ratio [RR]: 1.01; 95% CI: 0.99 to 1.03; $p=0.32$) and complications (RR: 0.48; 95% CI: 0.20 to 1.17; $p=0.11$) were observed between the two groups.
- Compared with the long implant group, the short implant group had a significantly lower marginal bone loss change (mean difference: -0.13; 95% CI: -0.20 to -0.06; $p<0.05$).

Conclusions

- No difference between the survival rates and complications of short implants (5-8 mm) and long implants (≥ 10 mm) was observed.
- Marginal bone loss changes in short implants were lower than those in long implants.

Adapted from Chen S et al., J Clin Exp Dent. 2019 Oct 1 11(10):e850-e857, for more info about this publication click [HERE](#)

Clin Implant Dent Relat Res. 2019 Dec;21(6):1116-1123

Incidence and prevalence of peri-implantitis and peri implant mucositis 17 to 23 (18.9) years postimplant placement.

Krebs M, Kesar N, Begić A, von Krockow N, Nentwig GH, Weigl P



Study objectives and methods

The aim of this retrospective clinical study was to evaluate the prevalence of peri-implantitis (PI) and peri-implant mucositis (PM) in a long-term follow-up with comparison among different PI and PM definitions, and to report on the incidence of PI.

In total 5 different PI and PM definitions were applied onto a population with 274 implants 17 to 23 years post-implant placement. Recommendations by the Eighth European Workshop on Periodontology (EWOP) were used as base reference. Clinical and radiological measurements were considered. Risk factors were evaluated in a regression analysis.

Results

- Prevalence: After an average observation period of 18.9 years, 40.1% of the implants were diagnosed with PM and 15.0% with PI (as per the Eighth EWOP definition).
- Incidence: PI incidence reached 7.9% on implant level and 13.2% on patient level.
- Implants diagnosed with PI and progressive bone loss displayed exclusively vertical bone defect configuration (BDC).
- Diabetes mellitus, smoking, regular maintenance, or a former periodontal infection did not show significant influence on the prevalence of peri-implant diseases.
- Patients with bruxism displayed significantly less PM and PI.

Conclusions

- Vertical BDC seems to correspond with active PI and may be an important defining factor.
- Diagnosis of PM and evaluation of probing pocket depths might lead to false-positive results and be only of descriptive interest.

Adapted from Krebs M et al., *Clin Implant Dent Relat Res.* 2019 Dec;21(6):1116-1123, for more info about this publication click [HERE](#)

J Prosthet Dent. 2019 Dec 17

A clinical comparison of 1-piece versus 2-piece implants: A systematic review and meta-analysis.

de Oliveira Limírio JPJ, Lemos CAA, de Luna Gomes JM, Minatel L, Alves Rezende MCR, Pellizzer EP

Study objectives and methods

The purpose of this systematic review and meta-analysis was to compare the use of 1-piece versus 2-piece implants in terms of marginal bone loss and implant survival rate.

A literature search was conducted in the PubMed/MEDLINE, Web of Science, and Cochrane Library databases for articles published up to May 2018. The population, intervention, comparison, outcome (PICO) question was, "Do patients who received 1-piece implants show similar marginal bone loss, survival rates, and complications as those who receive 2-piece implants?". The meta-analysis was based on the Mantel-Haenszel and inverse variance methods. Implant survival rate was analyzed by using a dichotomous outcome, measured according to risk ratio (RR) and marginal bone loss by continuously evaluating the outcomes according to the mean difference (MD), both with a corresponding 95% confidence interval (CI).

Results

- 5 studies were included, reporting on 270 participants receiving 434 dental implants.
- Mean follow-up period was 4 years.
- No significant differences between 1-piece versus 2-piece implants in relation to implant survival rate ($p=0.85$; RR: -0.89; 95% CI: -0.27 to 2.98) and marginal bone loss ($p=0.85$; MD: -0.43; 95% CI: -0.43 to -0.52) were observed.

Conclusions

- 1- and 2-piece implants demonstrated effectiveness in the rehabilitation of patients requiring dental implants.

Adapted from de Oliveira Limírio JPJ et al., *J Prosthet Dent.* 2019 Dec 17, for more info about this publication click [HERE](#)

J Clin Exp Dent. 2019 Oct 1 11(10):e850-e857

A one-stage procedure to achieve predictable implant placement and guided bone regeneration.

Miller RJ

Study objectives and methods

In this case report, simultaneous implant placement and guided bone regeneration using the Straumann® AlloGraft Ring was performed.

The patient's chief concern was a failing bridge in the upper left posterior sextant. The treatment plan included the extraction of tooth No. 13 and placement of dental implants in position Nos. 12 and 13. A Narrow Connection Straumann® Bone Level Tapered Implant was used in position No. 12 and a Regular Connection Straumann® Bone Level Tapered Implant in position No. 13, necessitating the use of a 7-mm diameter Straumann® AlloGraft Ring.

Results

- Healing was uneventful; 6 months were allowed for hard- and soft-tissue maturation.
- Good implant stability was noted for the grafted site.
- CBCT revealed that the implant in position No. 13 was well positioned and demonstrated complete regeneration of the buccal plate.

Conclusions

- The Straumann® AlloGraft Ring enhances the clinician's ability to place a dental implant in a restoratively driven fashion with simultaneous guided bone regeneration.

Adapted from Miller RJ et al., J Clin Exp Dent. 2019 Oct 1 11(10):e850-e857, for more info about this publication click [HERE](#)

References

Cabrera-Domínguez JJ et al., Clin Oral Investig. 2019 Nov 7 | Alsahhaf A et al., Chin J Dent Res. 2019;22(4):265-272 | Chen S et al., Implant Dent. 2019 Dec;28(6):578-589 | Misch CM et al., Int J Periodontics Restorative Dent. 2019 Nov/Dec;39(6):771-779 | Del Fabbro M et al., J Clin Med. 2019 Dec 4;8(12) | Skjerven H et al., Clin Oral Implants Res. 2019 Jun;30(6):531-541 | Chen S et al., J Clin Exp Dent. 2019 Oct 1 11(10):e850-e857 | Krebs M et al., Clin Implant Dent Relat Res. 2019 Dec;21(6):1116-1123 | de Oliveira Limírio JPJ et al., J Prosthet Dent. 2019 Dec 17 | Miller RJ, J Clin Exp Dent. 2019 Oct 1 11(10):e850-e857 | source: www.pubmed.gov | Dr Nair holds a position of Global Scientific Communications Manager at Institute Straumann in Basel, Switzerland.