

# Abstracts of articles published in important Implantology, Prosthodontics and Periodontics journals from around the world

## Is furcation involvement in maxillary molars a predictor for subsequent bone augmentation prior to implant placement? A pilot study

Walter C, Dagassan-Berndt DC, Kühl S, Weiger R, Lang NP, Zitzmann NU. *Clin Oral Implants Res.* 2013 Oct 21.

**Aim:** The aim of this pilot study was to analyze the interfurcal bone height in relation to the possible need for subsequent sinus floor elevation in patients with advanced periodontitis and furcation involvement of first and / or second maxillary molars. **Material and Methods:** Seventeen dentate patients, who received cone beam computed tomography (CBCT) for detailed preoperative diagnosis and planning of surgical interventions at periodontally involved maxillary molars (17 first and 15 second molars), were consecutively recruited for the study. The minimal bone height in the interfurcal region was measured from CBCT and related to furcation involvement, residual bone above the root tips, and the clinical probing pocket depth (PPD). **Results:** The minimal interfurcal bone height measured  $4.1 \pm 2.6$  mm on average with 75% of maxillary molars having  $\leq 6$  mm and almost 60% having only  $\leq 4$  mm bone height left below the sinus floor. A higher risk for reduced interfurcal bone height of  $\leq 4$  mm was given when residual PPD of  $\geq 6$  mm was remaining at two or more tooth sites (OR 0.10; 0.11). **Conclusions:** The majority of periodontally involved maxillary molars had a substantially reduced interfurcal bone height, particularly with at least two sites with residual PPD  $\geq 6$  mm. This was a predictor for a subsequent need for sinus floor elevation when tooth replacement with a dental implant is desired.

## Long-term results of implant-supported overdentures retained by double crowns: a practice-based retrospective study after minimally 10 years follow-up

Frisch E, Ziebolz D, Rinke S. *Clin Oral Implants Res.* 2013 Dec;24(12):1281-7.

**Background:** Different concepts regarding the number of implants and attachment systems for the preparation of implant-supported overdentures (IODs) have been discussed. Nonetheless, long-term results for double-crown-retained IODs with an observational period of more than 10 years are still rare in the literature. **Objective:** The aim of this practice-based study was to retrospectively evaluate the long-term clinical outcome (success / survival rates, technical / biological complications) of IODs retained by double crowns. **Material and Methods:** In a private practice, 36 non-smoking edentulous patients were restored between 1991 and 2002 with double-crown-retained IODs supported by 2-6 implants. For the retrospective evaluation of implant and prosthetic survival (in-situ criterion) and success (event-free observational period), only those patients were included who regularly (at least once a year) participated in a professional maintenance programme and who had a functional period for the restoration of more than 10 years. **Results:** Twenty-two patients (12 women / 10 men, mean age  $60.1 \pm 9.8$  years) with 89 implants supporting nine maxillary and 13 mandibular dentures (mean number of implants/prosthesis = 4) met the inclusion criteria. The mean follow-up period was  $14.1 \pm 2.8$  years. One implant failed after 4.9 years (cumulative-survival rate: 98.9%). Seven implants in two

patients showed peri-implantitis (prevalence: patient-based = 9.1% / implant-based = 8%). Five dentures were renewed (prosthetic-survival rate 77.3% Maintenance procedures (i.e. screw loosening or acrylic fractures) were required at a rate of 0.31 / year and patient. **Conclusion:** This study indicates that IODs retained with double crowns offer predictable long-term performance with a limited incidence of biological and technical complications.

### Implants of 6 mm vs. 11 mm lengths in the posterior maxilla and mandible: a 1-year multicenter randomized controlled trial

Guljé F, Abrahamsson I, Chen S, Stanford C, Zadeh H, Palmer R. *Clin Oral Implants Res.* 2013 Dec;24(12):1325-31.

**Background and Aim:** In cases with limited bone height, short implants could be a good alternative to augmentation procedures. The aim of this randomized controlled trial was to compare the clinical performance of implants of 6 mm or 11 mm in length in the posterior region. **Materials and Methods:** In this multicenter trial (six study sites), 95 subjects were included. Subjects were randomly allocated to receiving implants with lengths of either 6 or 11 mm both with a diameter of 4 mm (OsseoSpeed™ 4.0 S; Astra Tech AB; Mölndal, Sweden). In all cases, there had to be sufficient bone height to allow placement of an implant of at least 11 mm in length. Two or three implants were placed per subject using one-stage surgery with a 42-48 days' healing period before loading. They were restored with a screw-retained splinted fixed prosthesis. Clinical and radiographic examinations were performed preoperatively, post-surgery, at loading, and 6 and 12 months after prosthesis placement. **Results:** A total of 208 implants were inserted in 49 subjects receiving 6-mm implants (test) and in 46 subjects receiving 11 mm implants (control). Two 6-mm implants failed before loading and one 6 and 11 mm implants failed before 1-year evaluation. From loading to the 12 months' follow-up, a mean marginal bone gain of 0.06 mm in the 6 mm group and 0.02 mm in the 11 mm group was found ( $P = 0.478$ ). Soft tissue behavior was equal in both

groups (Bleeding and plaque [ $P = 1.0$ ] probing depth [ $P = 0.91$ ]). **Conclusion:** One-year data indicate that treatment with the 6 mm implants is as reliable as treatment with the 11 mm implants. This provides a good treatment option in situations with limited bone height in the premolar and molar regions. Whether or not short implants provide a predictable treatment alternative to bone augmentation procedures remains to be investigated in the future randomized controlled clinical trials.

### Quality assessment of systematic reviews on short dental implants

Elangovan S, Mawardi HH, Karimbux NY. *J Periodontol.* 2013 Jun;84(6):758-67.

**Background:** Critical analysis of published systematic reviews may help in understanding their strengths and weaknesses and identifying areas that need improvement. Short dental implants are becoming an important addition to the existing dental armamentarium. The aim of this overview is to analyze the quality of published systematic reviews focused on short dental implants using established checklists such as the assessment of multiple systematic reviews (AMSTAR). **Methods:** A search was conducted to retrieve reviews that used a systematic approach in article selection focusing on short dental implants in humans. Based on a set of inclusion and exclusion criteria, a total of 10 reviews were selected. Two independent reviewers appraised the quality of the selected reviews using AMSTAR and the checklist proposed by Glenny et al in 2003. Each article was given a total score based on the number of criteria that it fulfilled. **Results:** Six reviews satisfied  $\leq 4$  of the 11 AMSTAR items, and only two reviews satisfied nine of the 11 items. This study shows that published systematic reviews on short dental implants exhibit significant structural and methodological variability. Quality assessment using the Glenny checklist further confirmed the variability in the way systematic reviews were conducted and/or reported. A high correlation was observed between the two checklists' scores. **Conclusions:** Uniformity in the way systematic reviews are conducted and / or reported will increase the validity and clinical applicability of future reviews.

### Plasma rich in growth factors in human extraction sockets: a radiographic and histomorphometric study on early bone deposition

Farina R, Bressan E, Taut A, Cucchi A, Trombelli L. *Clin Oral Implants Res.* 2013 Dec;24(12):1360-8.

**Objectives:** To determine whether and to what extent the additional application of plasma rich in growth factors (PRGF) to an extraction socket may influence the early bone deposition, as assessed by micro-computed tomography (micro-CT) scan as well as histomorphometric markers. **Material and methods:** Twenty-eight patients (age range: 34-74 years) contributing 36 extraction sockets were included in the study. Sockets were either treated with PRGF (PRGF group; 18 sites in 11 patients) or left to spontaneous healing (control group; 18 sites in 17 patients). Radiographic and histomorphometric analysis was performed on bone cores trephined from each healing socket after 4-6 (T1) or 7-10 (T2) weeks of healing. **Results:** Patients treated with PRGF application showed (i) similar bone volume and tissue mineral content, (ii) a trend, although not statistically significant, toward a greater number of CD68+ cells (at T1 and T2) and vWV+ cells (at T1), and (iii) a similar OCN staining score throughout the study, when compared with control group. **Conclusions:** Plasma rich in growth factors-treated group did not show any enhancement in early (4 and 8 weeks) bone deposition compared with control group.

### Piezoelectric vs. conventional drilling in implant site preparation: pilot controlled randomized clinical trial with crossover design

Canullo L, Peñarrocha D, Peñarrocha M, Rocio AG, Penarrocha-Diago M. *Clin Oral Implants Res.* 2013 Oct 21.

**Objective:** To compare implant stability throughout osseointegration, peri-implant marginal bone loss, and success rates of implants placed with conventional and mixed drilling / piezoelectric osteotomy. **Materials and methods:** A pilot randomized-controlled trial was performed on 15 patients. Each patient received two implants in the mandibular molar region. All sites

were prepared with conventionally up to the 2.8 mm wide drill. Osteotomies were randomly finalized with a 3 mm diameter drill (control group) or with two consecutive ultrasonic tips (2.8 mm and 3 mm wide, respectively) (test group). Resonance frequency analysis measurements were taken at implant placement and after 1, 3, 8, and 12 weeks. Peri-implant marginal bone loss 12 months after loading was calculated using periapical radiographs. Wilcoxon test for related samples was used to study differences in implant stability and in peri-implant marginal bone loss between the two groups. **Results:** Twenty-nine of 30 implants osseointegrated successfully (one failure in the control group). Stability was significantly higher in the test group at the 8<sup>th</sup> week assessment; differences were non-significant at all other time-points. Longitudinally, differences were observed between the patterns of implant stability changes: in the test group stability increased more progressively, while in the control group an abrupt change occurred between the 8<sup>th</sup> and 12<sup>th</sup> weeks assessments. No difference was found in peri-implant marginal bone loss between the groups. All 29 implants were functionally successful at the 15-month visit. **Conclusions:** Within the limit of this pilot study (small sample size, short follow-up), data suggested that implant stability might develop slightly faster when implant site osteotomy is performed with a mixed drilling/ultrasonic technique.

### Analysis of occlusal stresses transmitted to the inferior alveolar nerve by multiple threaded implants

Sammartino G, Wang HL, Citarella R, Lepore M, Marenzi G. *J Periodontol.* 2013 Nov;84(11):1655-61.

**Background:** Potential nerve injury or loss of sensation can occur after mandibular implant placement or loading. To avoid this type of damage, it is critical to determine the proper distance from implants to the mandibular nerve. Hence, the purpose of this study is to use biomechanical analyses to determine the safe distance from multiple implants to the inferior alveolar nerve. **Methods:** Using the boundary element method, a numerical mandibular model was designed to simulate a mandibular segment containing multiple threaded fixtures. This model allows assessment of the pressure, as induced by occlusal loads, on the trigeminal nerve. Such pressure distribution was evaluated against different distances from the fixtures

to the mandibular canal, against the possible lack of the central fixture in a three-abutment configuration, and against different levels of implant osseointegration. All the simulations considered a canal that is orthogonal to the implant axis. **Results:** Nerve pressure increased quickly when the implant-canal distance decreased in the range studied. Lack of the central implant to support the central abutment caused major increases in nerve pressure. **Conclusions:** This study suggests a minimal implant-canal distance of 1 mm to prevent inferior alveolar nerve damage caused by three connected implants. For clinical safety, an additional 0.5 mm is recommended as a cushion, so a 1.5-mm minimal distance should be planned to avoid potential nerve injury.

### The frequency of peri-implant diseases: a systematic review and meta-analysis

*Atieh MA, Alsabeeha NH, Faggion CM Jr, Duncan WJ. J Periodontol. 2013 Nov;84(11):1586-98.*

**Background:** The peri-implant diseases, namely peri-implant mucositis and peri-implantitis, have been extensively studied. However, little is known about the true magnitude of the problem, owing mainly to the lack of consistent and definite diagnostic criteria used

to describe the condition. The objective of the present review is to systematically estimate the overall frequency of peri-implant diseases in general and high-risk patients. **Methods:** The systematic review is prepared according to the Meta-analysis of Observational Studies in Epidemiology statement. Studies were searched in four electronic databases, complemented by manual searching. The quality of the studies was assessed according to Strengthening the Reporting of Observational Studies in Epidemiology, and the data were analyzed using statistical software. **Results:** Of 504 studies identified, nine studies with 1,497 participants and 6,283 implants were included. The summary estimates for the frequency of peri-implant mucositis were 63.4% of participants and 30.7% of implants, and those of peri-implantitis were 18.8% of participants and 9.6% of implants. A higher frequency of occurrence of peri-implant diseases was recorded for smokers, with a summary estimate of 36.3%. Supportive periodontal therapy seemed to reduce the rate of occurrence of peri-implant diseases. **Conclusions:** Peri-implant diseases are not uncommon following implant therapy. Long-term maintenance care for high-risk groups is essential to reduce the risk of peri-implantitis. Informed consent for patients receiving implant treatment must include the need for such maintenance therapy.