Edentulous jaws rehabilitation with yttrium-stabilized zirconium dioxide implants: two years follow-up experience.

Borgonovo AE, Arnaboldi O, Censi R, Dolci M, Santoro G.

Abstract

AIM:
The aim of this study was to present authors’ two-year clinical experience with Yttrium-stabilized zirconium dioxide implants placed in native bone or regenerated bone.

METHODS:
Yttrium-stabilized zirconium dioxide implants made of brezirkon (whiteSKY, Bredent medical, Senden, Germany) were used for the treatment of edentulous ridge rehabilitation in the Dental Clinic of the University of Milan (Head of the Department, Prof. F. Santoro). Zirconium dioxide is a highly resistant ceramic material obtained by cleaning zirconium dioxide and zirconium silicate. The implant used in the clinical study featured a conical one piece implant with double cylindrical thread with a sandblasted rough surface. The prosthetic section was smooth.

RESULTS:
Forty-six implants have been inserted in 18 patients from January 2007 to January 2009, the follow-up period was comprised between 6 and 24 months. The overall success rate was 89%; the success rate in native bone was 97% and 74% in augmented bone. It can be stated that the success rate is comparable to titanium fixtures.

CONCLUSION:
It would be logical to use a ceramic material for the esthetic regions; zirconium dioxide is particularly suitable since it features tissue friendliness and resistance comparable to titanium. The good mechanical properties, possibility of easy fabrication of the prosthetic restoration and the good integration into the tissue and the esthetics provide perfect preconditions for yttrium-stabilized zirconium dioxide to become the most commonly used material in implant dentistry.
Are ceramic implants a viable alternative to titanium implants? A systematic literature

Andreiotelli M, Wenz HJ, Kohal RJ.

Abstract

AIM:

The aim of this systematic review was to screen the literature in order to locate animal and clinical data on bone-implant contact (BIC) and clinical survival/success that would help to answer the question 'Are ceramic implants a viable alternative to titanium implants?'

MATERIAL AND METHODS:

A literature search was performed in the following databases: (1) the Cochrane Oral Health Group's Trials Register, (2) the Cochrane Central Register of Controlled Trials (CENTRAL), (3) MEDLINE (Ovid), and (4) PubMed. To evaluate biocompatibility, animal investigations were scrutinized regarding the amount of BIC and to assess implant longevity clinical data were evaluated.

RESULTS:

The PubMed search yielded 349 titles and the Cochrane/MEDLINE search yielded 881 titles. Based upon abstract screening and discarding duplicates from both searches, 100 full-text articles were obtained and subjected to additional evaluation. A further publication was included based on the manual search. The selection process resulted in the final sample of 25 studies. No (randomized) controlled clinical trials regarding the outcome of zirconia and alumina ceramic implants could be found. The systematic review identified histological animal studies showing similar BIC between alumina, zirconia and titanium. Clinical investigations using different alumina oral implants up to 10 years showed survival/success rates in the range of 23 to 98% for different indications. The included zirconia implant studies presented a survival rate from 84% after 21 months to 98% after 1 year.

CONCLUSIONS:

No difference was found in the rate of osseointegration between the different implant materials in animal experiments. Only cohort investigations were located with questionable scientific value. Alumina implants did not perform satisfactorily and therefore, based on this review, are not a viable alternative to titanium implants. Currently, the scientific clinical data for ceramic implants in general and for zirconia implants in particular are not sufficient to recommend ceramic implants for routine clinical use. Zirconia, however, may have the potential to be a successful implant material, although this is as yet unsupported by clinical investigations.
One-year follow-up of first consecutive 100 zirconia dental implants in humans: a comparison of 2 different rough surfaces.

Oliva J, Oliva X, Oliva JD.


Abstract

PURPOSE:

The aim of this study was to evaluate the success rate of 100 consecutive zirconia dental implants with 2 different rough surfaces after 1 year of follow-up.

MATERIALS AND METHODS:

One-piece zirconia dental implants (CeraRoot, Barcelona, Spain) with 1 of 2 different roughened surfaces were designed and manufactured for this study. Five different implant designs were manufactured. Standard or flapless surgical procedures were used for implant placement. Simultaneous bone augmentation or sinus elevation were performed in the cases where bone height or width was insufficient. Implants in the anterior region (canine to canine) were immediately restored with provisional prostheses. Implants placed using less than 35 N torque were splinted with composite resin using an etched and bonded approach to the neighboring teeth or implants to minimize implant mobility and failure. Definitive all-ceramic restorations were placed 4 months after implant placement (8 months for implants where bone augmentation or sinus elevation was performed).

RESULTS:

The study included 36 patients with a mean age of 50 years. The overall implant success rate after 1 year of follow-up was 98% in both the coated and noncoated groups.

CONCLUSIONS:

From the preliminary results of this investigation, it can be concluded that zirconia dental implants with roughened surfaces might be a viable alternative for tooth replacement. Further follow-up is needed to evaluate the long-term success rates of the implant surfaces studied.

Vergleich der Überlebensrate von Zirkondioxid- und Titanimplantaten

Lambrich M, Iglhaut G.


Ceramic abutments and ceramic oral implants. An update.

Kohal RJ, Att W, Bächle M, Butz F.

Immediate occlusal versus non-occlusal loading of single zirconia implants. A multicentre pragmatic randomised clinical trial.

Cannizzaro G, Torchio C, Felice P, Leone M, Esposito M.


Abstract

PURPOSE:
To evaluate whether immediate non-occlusal loading of single zirconia implants could reduce early failures when compared to immediate occlusal loading.

MATERIALS AND METHODS:
Forty partially edentulous patients who received one single zirconia implant (Z-Systems) at least 10 mm long and 3.25 mm wide inserted with a torque of at least 35 Ncm were randomised to immediate occlusal or non-occlusal loading groups. All patients received provisional acrylic crowns the same day of implant placement. Provisional crowns were replaced after 4 to 5 months by definitive full ceramic crowns. Outcome measures were implant success, any complications and peri-implant marginal bone levels.

RESULTS:
One year after loading, no patients had dropped out. Five implants (12.5%) failed early: three occlusally loaded and two non-occlusally loaded. Three complications occurred, all after delivery of the definitive crowns: one crown fractured (occlusal loading), one had to be remade after debridement because of hyperplastic tissues (occlusal loading), and one crown decemented (nonocclusal loading). These differences were not statistically significant. Both groups gradually lost periimplant bone in a highly statistically significant way. One year after loading, patients subjected to non-occlusal loading lost an average of 0.7 mm of peri-implant bone versus 0.9 mm in the occlusal group. This difference in bone loss between groups was not statistically significant. There was an association between immediate post-extractive implants and implant failures (P=0.01). Four of the 10 immediate post-extractive implants (40%) failed versus one out of 30 delayed implants (3%).

CONCLUSIONS:
The results of this study do not provide a conclusive answer to whether immediate non-occlusal loading may decrease implant failures. Immediately loaded zirconia implants placed in post-extractive sites had high failure rates.
Immediate, non-submerged, root-analogue zirconia implants placed into single-rooted extraction sockets: 2-year follow-up of a clinical study.

Pirker W, Kocher A.


Abstract

This study evaluated non-submerged, root-analogue zirconia implants with two different surfaces for immediate single-rooted tooth replacement in 18 patients. After tooth extraction the root was laser scanned and one-piece root analogue zirconia dental implants with one of two different surfaces were manufactured. In group A (n=6) the implant surface was roughened by sandblasting only, in group B (n=12) additional macroretentions limited to the interdental space, to avoid fracture of the thin buccal cortex, were designed prior to laser scanning. Implants were placed in the socket 1-8 days after extraction by tapping and restored with a composite crown 3-5 months later. Implant survival, level of marginal bone and adverse soft tissue changes were recorded. No complications occurred during the healing period. In group A, all implants were lost within 2 months, with an unaltered extraction socket. In group B, overall survival rate was 92% for implants that were functional for 1-33 months. Excellent aesthetic and functional results were achieved with the composite crown with minimal bone resorption and soft tissue recession. Significant modifications, such as macroretentions seem to indicate that primary stability and excellent osseointegration of immediate root-analogue zirconia implants can be achieved, while preventing unaesthetic bone resorption.