
Weber HP, Kim DM, Ng MW, Hwang JW, Fiorellini JP.


Department of Restorative Dentistry and Biomaterial Science, Harvard School of Dental Medicine, Boston, MA 02115, USA. hpweber@hsdm.harvard.edu

Abstract

OBJECTIVE: The purpose of this prospective clinical study was to evaluate peri-implant soft-tissue conditions and esthetic fulfillment during a 3-year follow-up period following prosthetic rehabilitation.

MATERIAL AND METHODS: As part of a prospective multi-center study, 152 ITI dental implants were placed in 80 patients in the maxillary anterior region. Fifty-nine crowns (38.82%) were cement retained, while 93 (61.18%) crowns were screw retained. At loading and 3, 6, 12 and 36 months post-loading, modified plaque index (MPI), sulcus bleeding index (SBI), keratinized mucosa (KM), gingival level (GL), and esthetic fulfillment were recorded.

RESULTS: All patients completed the study and no complications were reported. While statistically not significant at all time points, cement-retained crowns seemed to present a worsening trend in MPI and SBI scores. Interestingly, screw-retained crowns seemed to present an opposite picture, their MPI and SBI scores improved over time. While plaque accumulation, prophylaxis and depth of crown margin significantly affected levels of sulcus bleeding, prophylaxis alone played a key role in reducing plaque accumulation. No soft tissue recession was observed in either cement- or screw-retained crowns up to 3 years post-loading. Esthetic fulfillment survey revealed that patients did not have a preference for crown types; however, dentists favored cement-retained over screw-retained crowns.

CONCLUSIONS: Peri-implant soft tissues responded more favorably to screw-retained crowns when compared with cement-retained crowns. However, no soft-tissue recession was observed in either type of crowns. Cement-retained crowns were preferred by dentists, while patients were equally satisfied with either type of crowns they received.
Cemented versus screw-retained implant-supported single-tooth crowns: a 4-year prospective clinical study.

Vigolo P, Givani A, Majzoub Z, Cordioli G.


Department of Periodontology, University of Padova, Institute of Clinical Dentistry, Padova, Italy. paolovigolo@virgilio.it

Abstract

PURPOSE: The purpose of this controlled prospective clinical study was to compare cemented and screw-retained implant-supported single-tooth crowns followed for 4 years following prosthetic rehabilitation with respect to peri-implant marginal bone levels, peri-implant soft tissue parameters, and prosthetic complications.

MATERIALS AND METHODS: Twelve consecutive patients were selected from a patient population attending the Implantology Department at the University of Padova. They all presented with single-tooth bilateral edentulous sites in the canine/premolar/molar region with adequate bone width, similar bone height at the implant sites, and an occlusal scheme that allowed for the establishment of identical occlusal cusp/fossa contacts. Each patient received 2 identical implants (1 in each edentulous site). One was randomly selected to be restored with a cemented implant-supported single-tooth crown, and the other was restored with a screw-retained implant-supported single-tooth crown. Data on peri-implant marginal bone levels and on soft tissue parameters were collected 4 years after implant placement and analyzed to determine whether there was a significant difference with respect to the method of retention (cemented versus screw-retained).

RESULTS: All patients completed the study. All 24 implants survived, resulting in a cumulative implant success rate of 100%. Statistical analysis revealed no significant differences between the 2 groups with respect to peri-implant marginal bone levels and soft tissue parameters.

DISCUSSION: The data obtained with this study suggested that the choice of cementation versus screw retention for single-tooth implant restorations is likely not based on clinical results but seems to be based primarily on the clinician’s preference.

CONCLUSIONS: Within the limitations of this study, the results indicate that there was no evidence of different behavior of the peri-implant marginal bone and of the peri-implant soft tissue when cemented or screw-retained single-tooth implant restorations were provided for this patient population.

Henriksson K, Jemt T.


The Brånemark Clinic, Public Dental Health, Göteborg, Sweden.

Abstract

PURPOSE: The aim of this study was to evaluate the clinical performance of customized ceramic single-implant abutments in combination with two different techniques for fabricating crowns.

MATERIALS AND METHODS: Twenty consecutive patients were provided with 24 single-implant restorations with customized ceramic abutments. The restorations were either cemented to the abutment (n = 13) or fabricated with the veneering material fused directly onto the ceramic abutment (n = 11). The patients were evaluated at 6 and 12 months with radiographs and clinical parameters for complications and soft tissue response.

RESULTS: All implants and restorations were still in function after 1 year. Few clinical problems were reported during the follow-up period. The interproximal soft tissue recovered to near normal size. The mean marginal bone loss was similar for both groups, reaching an average of 0.3 mm (SD 0.71) after 1 year in function.

CONCLUSION: The short-term results indicate that customized ceramic abutments are successful and have comparable function, regardless of fabrication method.

Cemented CeraOne and porcelain fused to TiAdapt abutment single-implant crown restorations: a 10-year comparative follow-up study.

Jemt T.


Department of Prosthetic Dentistry/Dental Material Science, Institute of Odontology, Sahlgrenska Academy at Göteborg University, Göteborg, Sweden. torsten.jemt@vgregion.se

Abstract

BACKGROUND: Long-term data comparing cemented and noncemented single-implant restorations has not been reported.

AIM: To compare clinical and radiographic performance of single-implant crown restorations made by either directly baked porcelain to custom-made TiAdapt titanium abutments (Nobel Biocare AB, Göteborg, Sweden) (test) or cement crowns onto CeraOne (Nobel Biocare AB) abutments (control) after 10 years in function.

MATERIALS AND METHODS: Altogether, 35 consecutive patients were provided with 41 turned single Brånemark System implants (Nobel Biocare AB) in the partially edentulous
upper jaw. By random, 15 and 20 patients were provided with 18 test and 23 control implant crowns, respectively. Thereafter, clinical and radiographic data were collected and compared between the two groups.

RESULTS: None of the implants were found loose during the follow-up period (100%). Few clinical problems were observed, and the overall average marginal bone loss was 0.26 mm (SD 0.64) during 10 years in function. After the final tightening of the crowns, no significant differences were observed between the test and control groups (p > .05). The head of the implants was placed on an average 6.3 mm (SD 2.24) below the cement/enamel junction of the adjacent teeth (range 2.5-10.0 mm). Implants with reported mechanical and/or mucosal problems or placed more apically in relation to the adjacent teeth did not present more bone loss as compared with implants with no problems or placed more coronally, respectively (p > .05).

CONCLUSIONS: There seems to be no obvious clinical or radiographic differences between the test and control single-implant restorations during 10 years of follow-up. Occasionally, some restorations presented loose abutment screws and/or fistulas during follow-up. This implies a certain need for maintenance where a one-piece single-implant protocol (test) allows both for a simple clinical procedure at placement without cementation problems, as well as for an easy and simple maintenance of installed single implant crowns in long-term function.

The Integrated Abutment Crownt, a screwless and cementless restoration for single-tooth implants: a report on a new technique.

Urdaneta RA, Marincola M.


Harvard School of Dental Medicine, Restorative Dentistry and Biomaterial Sciences and Concord Dental Associates, Faulkner Hospital, Implant Centre, Boston, MA, USA.

rainieru@yahoo.com

Abstract

A technique is presented for the restoration of single-tooth, implant-supported crowns where the abutment and the crown material are chemomechanically bonded; therefore, there is no need for cement, and the implant and implant-abutment are connected with a screwless locking-taper. The clinical and laboratory procedures involved in the fabrication and insertion of the restoration are described in detail. This restoration offers the restorative dentist some advantages: excellent marginal adaptation with a cementless interface, a bacterially sealed implant-abutment connection, a crown material with a similar wear rate and hardness values of human enamel, a simple laboratory technique, and a reduced number of prosthetic components. Due to the light-cured nature of the crown material, chairside modifications can be accomplished. The major drawbacks are: studies are necessary to assess the long-term performance of the Integrated Abutment Crown (IAC)'s in both anterior and posterior areas of the mouth. Resin materials have higher roughness values, accumulate plaque at a higher rate, and are more likely to stain than tooth structure and all-ceramic restorations.
A screwless and cementless technique for the restoration of single-tooth implants: a retrospective cohort study.


Urdaneta RA, Marincola M, Weed M, Chuang SK.

Private Practice, Implant Dentistry Centre, Boston, MA 02466, USA. ainieru@yahoo.com

Abstract

PURPOSE: The Integrated Abutment Crown (IAC) is a technique for the fabrication of single-tooth implant-supported crowns where the abutment and the crown are one unit. The abutment-crown complex is connected to the implant with a locking taper. This technique does not use cement to retain the crown or screws to retain the abutment. The purpose of this study was to evaluate the clinical outcome of screwless, cementless single implant-supported crowns (IACs) placed in a general dental practice.

MATERIALS AND METHODS: A retrospective cohort study was conducted between July 2001 and August 2003. Patients were recalled between January and March 2004. The restorations were evaluated following the modified United States Public Health Service (USPHS) criteria. Several other variables, such as anatomic form, occlusion, soft tissue health, and reconstructive procedures, were also recorded. Descriptive statistics, univariate and multivariate marginal Cox Proportional Hazards Regression models, adjusted for multiple implants in the same patient, were used.

RESULTS: During the chart review, 108 patients were identified. A cohort of 59 patients with a total of 151 IACs met the inclusion criteria. The Kaplan-Meier survival rate for IACs was 98.7%. Two IACs were removed, one due to implant failure; the other became loose several times and was replaced with a splinted restoration. Excellent marginal adaptation was observed with no clinically discernible interface between the veneer material and the abutment. Nine maxillary anterior IACs loosened on five patients; eight of them were reinserted and continued in function without further problems for the remainder of the study. An IAC located between a tooth and an implant was 2.65 times more likely to have postinsertion complications (p= 0.05). An IAC with incorrect anatomic form (overcontoured) was 3.26 times more likely to have postinsertion complications (p= 0.01). Maxillary anterior IACs adjacent to one tooth and one implant were 3.9 times more likely to come loose (p= 0.05).

CONCLUSIONS: The clinical outcome of this screwless and cementless system for single implant restorations compares favorably with the experience of screw- and cement-retained single implant restorations within the observation period.
Prosthetic management of implants in the esthetic zone.

Higginbottom F, Belser U, Jones JD, Keith SE.


Baylor College of Dentistry, Dallas, Texas, USA. bottom@dallasesthetics.com

Abstract

The purpose of this article is to review and project treatment procedures for areas of esthetic concern. The authors were participants in a consensus conference sponsored by ITI and held in August 2003 in Gstaad, Switzerland. This article deals with the basic prosthetic/restorative aspects in implant esthetics. It is based on a literature review performed by 16 participants from Group 2 (Buser et al) in this section of the Journal.

Outcome analysis of implant restorations located in the anterior maxilla: a review of the recent literature.

Belser UC, Schmid B, Higginbottom F, Buser D.


Department of Prosthodontics, School of Dental Medicine, University of Geneva, Switzerland. urs.belser@medecine.unige.ch

Abstract

PURPOSE: To document the literature regarding outcomes of implant restorations in the anterior maxilla to formulate consensus statements with regard to esthetics in implant dentistry, to provide guidelines to clinicians, and to articulate remaining questions in this area to be addressed by future research.

MATERIALS AND METHODS: The following areas of the recent literature were scrutinized: treatment outcomes of implant therapy for partial edentulism (including maxillary anterior tooth replacement); anterior maxillary single-tooth replacement; effect of implant design, diameter, and surface characteristics; soft tissue stability/contours around anterior implant restorations; ceramic abutments; influence of surgical techniques; and finally, evaluation of patient satisfaction.

RESULTS: The use of dental implants in the esthetic zone is well documented in the literature, and numerous controlled clinical trials show that the respective overall implant survival and success rates are similar to those reported for other segments of the jaws. However, most of the published studies do not include well-defined esthetic parameters. Currently, the literature regarding esthetic outcome is inconclusive for the routine implementation of certain surgical approaches, such as flapless surgery and immediate implant placement with or without immediate loading/restoration in the anterior maxilla. Considering anterior single-tooth replacement in sites without tissue deficiencies, predictable treatment outcomes, including esthetics, can be achieved because of tissue support provided by adjacent teeth. The replacement of multiple adjacent missing teeth in the anterior maxilla
with fixed implant restorations is poorly documented. In this context, esthetic restoration is not predictable, particularly regarding the contours of the interimplant soft tissue.

DISCUSSION AND CONCLUSIONS: This review has demonstrated that scientific documentation of esthetically relevant and reproducible parameters is rather scarce. Most of the reported outcome analyses primarily focus on implant survival. Elements of anterior implant success such as maintenance or reestablishment of harmoniously scalloped soft tissue lines and natural contours should be included in future studies.

Clinical outcome study of customized zirconia abutments for single-implant restorations.

Canullo L.


luigicanullo@yahoo.com

Abstract

PURPOSE: This study evaluated the clinical performance of cemented customized zirconia abutments. Additionally, the marginal fit between the selected implant components was measured and the clinical gingival response was monitored.

MATERIALS AND METHODS: Twenty-five patients were consecutively selected for a prospective study of 30 implant-supported single-tooth restorations. Customized titanium post and zirconia abutment complexes were prepared, and scanning electron microscopy (SEM) analysis was used to study bicomponent marginal gaps. The abutments were screwed onto the implants and restored with all-ceramic crowns. Plaque and gingival indices were recorded at 6 monthly intervals over a 36- to 44-month period.

RESULTS: SEM analysis showed mean marginal gaps of 10.161 microm (SD: 0.7) horizontally and 4.783 microm (SD: 0.67) vertically. Abutment fractures and screw loosening were neither reported nor observed throughout the clinical observation period. Mean Plaque Index scores were 0.57 (SD: 0.32) on abutments and 0.74 (SD: 0.34) on teeth, while mean Gingival Index scores were 0.54 (SD: 0.2) on abutments and 0.72 (SD: 0.3) on teeth.

CONCLUSIONS: These preliminary results suggest that metallic-zirconia abutments may be comparable to currently available esthetic implant abutments.

Preliminary laboratory evaluation of bicomponent customized zirconia abutments.

Canullo L, Morgia P, Marinotti F.


luigicanullo@yahoo.com
The purpose of this descriptive study was to analyze the behavior of a bicomponent custom-made zirconia abutment used with an internal connection implant system. The microscopic marginal fit and specific mechanical characteristics of 20 titanium platform and zirconia abutment complexes were evaluated. Scanning electron microscope analysis showed mean values of 10.03 microm for the horizontal gap and 4.419 microm for the vertical gap for the components. The traction test revealed a mean maximum load value of 190 N, whereas the bending test showed a mean maximum load value of 436 N.

Microgap between zirconia abutments and titanium implants.

Baixe S, Fauxpoint G, Amtz Y, Etienne O.


School of Dental Medicine, Department of Prosthodontics, Louis Pasteur University, Strasbourg, France.

Abstract

PURPOSE: The aim of this study was to evaluate in vitro the microgap between different zirconia abutments and their titanium implants.

MATERIALS AND METHODS: Four systems were evaluated: Procera zirconia (Nobel Biocare) (Nb), Cercon Balance Anterior (Dentsply Friadent) (Ba), ZirDesign (Astratech) (Zd), and Straumann Cares ceramic (Straumann) (Ca). Five assemblies were assessed for each system. The assemblies were embedded in epoxy, cut along their long axes, and polished. Scanning electron microscopic observations were made along the first 100 microm of the gap on each side at maximal magnification. Images were combined and gap measurements were made 10 microm apart. A two-way analysis of variance was performed on the data.

RESULTS: Scanning electron micrographs showed a mean marginal microgap of 0.89 microm (SD 1.67) for all assemblies. Significant differences (P < .001) were observed between mean (+/- SD) microgap measurements of the four tested systems: Ba = 0.38 +/- 0.28 microm; Zd = 0.55 +/- 0.23 microm; Nb = 1.83 +/- 3.21 microm; Ca = 0.90 +/- 0.59 microm. The mean microgap of the first 20 microm of the outer region (1.66 microm) was significantly (P < .001) larger than the mean microgap (0.56 microm) of the inner region (30 to 100 microm).

CONCLUSIONS: Within the limitations of this study, the mean microgap observed for all tested systems was less than 2 microm. For each system, the microgap decreased quickly from the outer region to the inner. The mean gap was larger for flat-to-flat connection systems, compared to internal-connection systems with a conical interface. These results demonstrate smaller microgaps compared to those described in the literature for titanium abutments. The precise fit of these abutments could lead to better biologic and biomechanical behavior.
The implant-abutment interface of alumina and zirconia abutments.

Yüzügüllü B, Avci M.


Department of Prosthodontics, Faculty of Dentistry, Hacettepe University, 06100 Sihhiye, Ankara, Turkey. bulemy@gmail.com

Abstract

BACKGROUND: Although ceramic and titanium abutments are widely used in clinical practice, the mechanical characterization of the implant-abutment interface for ceramic abutments has not been evaluated after the dynamic loading.

PURPOSE: The purpose of this study was to assess the implant-abutment interface after the dynamic loading of titanium, alumina, and zirconia abutments.

MATERIALS AND METHODS: Fifteen aluminum oxide, zirconium oxide, and titanium abutments were manufactured by the Procera System (Nobel Biocare AB, Göteborg, Sweden) and were connected to Ø 3.75 x 13-mm regular platform implants (MK III, Nobel Biocare AB) secured in a 30 degrees inclined plane. A mechanical testing machine applied compressive dynamic loading between 20 and 200 N at 1 Hz on a standard contact area of copings cemented on abutments for 47,250 cycles. The measurements of microgaps at the implant-abutment interface from the labial, palatinal, mesial, and distal surfaces of each specimen were undertaken by scanning electron microscope analyses prior to and after the experiments. The data of the microgaps before and after the dynamic loading were statistically assessed using the Wilcoxon signed rank test and the Kruskal-Wallis variance analysis (alpha = 0.05).

RESULTS: Coping fracture, abutment fracture, or abutment screw loosening or fracture was not detected in any specimen during the entire test period. After the dynamic loading, the titanium abutment control group revealed an increased microgap (3.47 microm) than zirconia (1.45 microm) and alumina (1.82 microm) groups at the palatinal site (p < .05). The mean measurement values at different measurement sites of specimens within and between each abutment group were similar (p > .05).

CONCLUSION: Owing to their comparable microgap values at the implant-abutment interface after the dynamic loading, ceramic abutments can withstand functional forces like conventional titanium abutments.
In vitro study of the influence of the type of connection on the fracture load of zirconia abutments with internal and external implant-abutment connections.

Sailer I, Sailer T, Stawarczyk B, Jung RE, Hämmerle CH.


Clinic for Fixed and Removable Prosthodontics and Dental Material Science, Center for Dental and Oral Medicine, University of Zurich, Switzerland. irena.sailer@zzmk.uzh.ch

Abstract

PURPOSE: To determine whether zirconia abutments with an internal connection exhibit similar fracture load as zirconia abutments with an external connection.

MATERIALS AND METHODS: The following zirconia abutments were divided into four groups of 20 each: StraumannCARES abutments on Straumann implants (group A), Procera abutments on Branemark implants (group B), Procera abutments on NobelReplace implants (group C), and Zirabut SynOcta prototype abutments on Straumann implants (group D). The abutments were fixed on their respective implants either internally via a secondary abutment (A) or a metallic coupling (C) (two-piece) or directly externally (B) and internally (D) (one-piece). In each group, 10 abutments were left unrestored (A1 to D1). Ten received glass-ceramic crowns (A2 to D2). Static loading was performed according to the ISO norm 14801 until failure. The bending moment was calculated for comparison of the groups and subjected to statistical analysis (Student t test).

RESULTS: The mean bending moments of the unrestored abutments were 371.5 +/- 142.3 Ncm (A1), 276.5 +/- 47.6 Ncm (B1), 434.9 +/- 124.8 Ncm (C1), and 182.5 +/- 136.5 Ncm (D1). Two-piece internally connected abutments exhibited higher bending moments than one-piece internally (C1 versus D1 P = .003, A1 versus D1 P = .03) or externally (C1 versus B1 P = .004) connected abutments. The groups with restorations did not show different bending moments than those without restorations. The mean bending moments of the restored abutments were 283.3 +/- 44.8 Ncm (A2), 291.5 +/- 31.7 Ncm (B2), 351.5 +/- 58 Ncm (C2), and 184.3 +/- 77.7 Ncm (D2). Group C2 exhibited the highest bending moment (P < .05). Internally connected one-piece abutments (D2) were weaker than all other groups (D2 versus A2 P = .002; D2 versus B2 P = .001; D2 versus C2 P = .0003).

CONCLUSIONS: The type of connection significantly influenced the strength of zirconia abutments. Superior strength was achieved by means of internal connection via a secondary metallic component.