Resistance to dislodgement of zirconia copings cemented onto titanium abutments of different heights.

Abbo B, Razzoog ME, Vivas J, Sierraalta M.


Abstract

STATEMENT OF PROBLEM:

For patients with limited interocclusal space, standard height implant abutments may not be usable. Shorter abutments may be desirable.

PURPOSE:

The purpose of this study was to determine the effect of the height of titanium abutments on the tensile strength required to dislodge zirconia copings.

MATERIAL AND METHODS:

Two experimental groups of abutments were prepared: (1) 4.3-mm platform width implant abutment with a 6.5-mm height (control), and (2) a 4.3-mm platform width implant abutment with a 5.5-mm height (shorter). Each abutment had 5 zirconia copings (custom designed) fabricated through a 3-dimensional computer-assisted design (3-D CAD) process by scanning an identical wax pattern. The zirconia copings were designed to have a 6-mm projection above the titanium abutment to accommodate a 2-mm hole. A wire was inserted through this hole to attach the zirconia coping to a universal testing machine. Each abutment was placed onto an implant embedded in a brass base designed to fit onto the universal testing machine. The zirconia copings were cemented onto the abutments with a provisional luting agent (Improv), and a tensile force was applied at a crosshead speed of 0.5 mm/min. The removal force was recorded for each specimen. An unpaired t test was used for the statistical analysis (alpha =.05).

RESULTS:

The mean force (SD) necessary to remove the zirconia copings (Newtons) from the 6.5-mm titanium abutment (198.09 (28.83)) was higher (P=.0078) than for the 5.5-mm abutment (124.89 (36.388)).

CONCLUSIONS:

By increasing the height of the abutment 1 mm and maintaining the diameter of the abutment, the resistance to tensile forces increased significantly between the 2 abutment dimensions evaluated.
Retention of zirconia ceramic copings bonded to titanium abutments.

Ebert A, Hedderich J, Kern M.


Abstract

PURPOSE:
The aim of this study was to evaluate the effect of 2 surface conditioning methods and 2 luting-gap sizes on the retention and durability of zirconia ceramic copings bonded to titanium abutments.

MATERIALS AND METHODS:
Zirconia ceramic copings (Camlog Biotechnologies, Winsheim, Germany) with a luting-gap size of either 30 microm or 60 microm were bonded to titanium abutments (Camlog Biotechnologies) using the composite resin cement Panavia F (Kuraray, Osaka, Japan). The bonding surfaces of the zirconia ceramic copings were either (a) pretreated with airborne particle abrasion and cleaned with alcohol or (b) just cleaned with alcohol, whereas the bonding surfaces of all titanium abutments had been abraded and cleaned. After the specimens had been stressed for either 1, 30, 60, or 150 days by water and thermal cycling, retention was measured.

RESULTS:
The surface conditioning method, luting-gap size, and storage time significantly (P = .001; 3-way analysis of variance [ANOVA]) influenced retention. Air abrasion increased the retention significantly. Failure modes were predominantly adhesive. Air-abraded copings bonded with 30-microm luting gap achieved significantly greater retention than those bonded with a 60-microm luting gap.

CONCLUSION:
Surface conditioning methods and the size of the luting gap have a significant influence on the retention of Camlog zirconia ceramic copings bonded to Camlog titanium abutments.
Marginal adaptation of all-ceramic crowns on implant abutments.

Att W, Hoischen T, Gerds T, Strub JR.


Abstract

BACKGROUND:
Studies focusing on the marginal accuracy of all-ceramic crowns on implant abutments are in short supply.

PURPOSE:
This study evaluated the marginal accuracy of all-ceramic crowns on different implant abutments.

MATERIALS AND METHODS:
Ninety-six standardized maxillary central incisor crowns (48 alumina and 48 zirconia) were fabricated for each of the six test groups (n = 16) (Ti1, titanium abutments-alumina crowns; Ti2, titanium abutments-zirconia crowns; Al1, alumina abutments-alumina crowns; Al2, alumina abutments-zirconia crowns; Zr1, zirconia abutments-alumina crowns; Zr2, zirconia abutments-zirconia crowns). The crowns were adhesively luted using a resin luting agent. The marginal gaps were examined on epoxy replicas before and after luting as well as after masticatory simulation at 200x magnification.

RESULTS:
The geometrical mean (95% confidence limits) marginal gap values before cementation, after cementation, and after masticatory simulation were group Ti1: 39(37-42), 57(53-62), and 49(46-53); group Ti2: 43(40-47), 71(67-76), and 64(59-69); group Al1: 57(54-61), 87(85-90), and 67(65-69); group Al2: 66(63-69), 96(90-101), and 75(72-78); group Zr1: 54(51-57), 79(76-82), and 65(63-67); and group Zr2: 64(60-68), 85(80-91), and 75(70-81). The comparison between non-cemented and cemented stages in each group demonstrated a significant increase in the marginal gap values after cementation in all groups (p < .001), while the comparison between cemented and aged stages in each group showed a significant decrease in the marginal gap values in groups Al1, Al2, and Zr1 (p < .0001). This reduction was not significant for groups Ti1, Ti2, and Zr2 (p > .05).

CONCLUSION:
The marginal accuracy of all tested restorations meets the requirements for clinical acceptance.
Retention of implant-supported zirconium oxide ceramic restorations using different luting agents.

Nejatidaneh F, Savabi O, Shahtoosi M.


Abstract

OBJECTIVE:
The aim of this study was to evaluate the retention value of implant-supported zirconium oxide ceramic copings using different luting agents.

METHOD AND MATERIALS:
Twenty ITI solid abutments of 5.5 mm height and ITI implant analogs were mounted vertically into autopolymerizing acrylic resin blocks. Ninety zirconium oxide copings (Cercon, Degudent) with a loop on the occlusal portion were made. All samples were airborne particle abraded with 110 µm Al(2) O(3) and luted using different types of luting agents: resin cements (Clearfil SA, Panavia F2.0, Fuji Plus), conventional cements (Fleck's, Poly F, Fuji I), and temporary cements (Temp Bond, GC free eugenol, TempSpan) with a load of 5 Kg. (N = 10) All copings were incubated at 37°C for 24 h and conditioned in artificial saliva for 1 week, and thermal cycled for 5000 cycles 5-55°C with a 30-s dwell time. The dislodging force of the copings along the long axis of the implant-abutment complex was recorded using universal testing machine with 5 mm/min crosshead speed. Data were subjected to Kruskal-Wallis (α = 0.05) and Mann-Whitney tests with Bonferroni step down correction (α = 0.001).

RESULTS:
There was significant difference between the mean rank retention values of different luting agents (P < 0.001). The resin cements showed the highest retention (Clearfil SA, 203.49 ± 52.86; Fuji Plus, 190.61 ± 48.00; Panavia F 2.0, 172.16 ± 70.76 N). The conventional cements had more retention than the temporary cements and glass ionomer cement (P < 0.001).

CONCLUSION:
The retention of zircona ceramic restorations, over ITI solid abutments may be influenced by the type of cement. The application of an MDP-containing resin and resin-modified glass ionomer luting agents increase the retentive value of implant-supported zirconium oxide restorations.
**Adhesion/cementation to zirconia and other non-silicate ceramics: where are we now?**

Thompson JY, Stoner BR, Piascik JR, Smith R.


**Abstract**

Non-silicate ceramics, especially zirconia, have become a topic of great interest in the field of prosthetic and implant dentistry. A clinical problem with use of zirconia-based components is the difficulty in achieving suitable adhesion with intended synthetic substrates or natural tissues. Traditional adhesive techniques used with silica-based ceramics do not work effectively with zirconia. Currently, several technologies are being utilized clinically to address this problem, and other approaches are under investigation. Most focus on surface modification of the inert surfaces of high strength ceramics. The ability to chemically functionalize the surface of zirconia appears to be critical in achieving adhesive bonding. This review will focus on currently available approaches as well as new advanced technologies to address this problem.

➤ Artikel frei einsebar:


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**Y-TZP ceramics: key concepts for clinical application.**

Cavalcanti AN, Foxton RM, Watson TF, Oliveira MT, Giannini M, Marchi GM.


**Abstract**

Compared to conventional ceramic systems, Yttrium-stabilized tetragonal zirconia (Y-TZP) ceramics have some superior mechanical properties, ensuring a broad application in dentistry. The current study aimed to present relevant information about Y-TZP ceramics gathered from peer-reviewed papers. A search of the English language peer-reviewed literature was conducted using the PubMed database between 1998 and 2008. Articles that did not focus exclusively on the clinical application of Y-TZP ceramic restorations were excluded from further evaluation. Selected papers describe the chief characteristics of zirconia ceramics and important clinical features, especially those related to cementation procedures. The literature shows that, although new substances and equipment for the surface preparation of zirconia ceramics are in development, the most promising luting protocol seems to be the use of air abrasion with aluminum oxide particles (silanated or not), followed by the application of resin cements or surface primers containing special reactive monomers. However, because zirconia ceramics have only recently been developed for dental applications, there is not enough clinical evidence to support any definitive cementation protocol.