1- **Fracture strength of all-ceramic crowns luted using two bonding methods**

Statement of problem: Excellent esthetic quality is one of the major advantages of all-ceramic restorations, however catastrophic fracture of such restorations is still among their disadvantages. Ceramic bonding systems utilizing ceramic primers without the use of hydrofluoric acid have been introduced, however data about the efficiency of these systems is lacking.

2- **Influence of cyclic loading and luting agents on the fracture load of two all-ceramic crown systems**

Statement of problem. Inherent mechanical properties, fabrication techniques, luting agents and intraoral conditions are primary factors attributing to longevity of all-ceramic crowns. Before time consuming and costly clinical studies, preclinical in vitro studies should be conducted to evaluate the durability of these crowns. Clinical implications Within the limitations of this in vitro study, the use of dentin-bonding agent and resin cements may improve longevity of all ceramic crowns. Adhesively cemented CAD-CAM crowns (ProCAD) may provide clinical performance similar to that of pressable crowns (Empress 2) with the advantage of less fabrication time.

3- **Evaluation of disinfected casts poured in gypsum with gum arabic and calcium hydroxide additives**

Statement of problem. Disinfection of stone casts is an important measure for the control of crosscontamination. Many approaches have been used to disinfect stone casts, but information regarding the accuracy of the resultant casts is limited.CLINICAL IMPLICATIONS

This in vitro study demonstrated that dental gypsum casts may be disinfected by incorporation of either sodium hypochlorite or povidone iodine at the time of mixing with no significant effect on the dimensional accuracy and reproducibility.

4- **Fracture load of composite resin and feldspathic all-ceramic CAD/CAM crowns**

Statement of problem. Various machinable materials are currently used with computer-aided design/computerassisted manufacturing (CAD/CAM)technologies for the chairside fabrication of restorations. However, properties of these new machinable materials, such as fracture load, wear, marginal deterioration, and color stability, should be investigated in vitro under replicated clinical conditions prior to time-consuming clinical studies.CLINICAL IMPLICATIONS

Regarding fracture loads, CAD/CAM crowns fabricated from millable composite resin blocks are an alternative to all-ceramic crowns fabricated from conventional feldspathic
Influence of surface treatment and cyclic loading on the durability of repaired all-ceramic crowns

Ahmed ATTIA

ABSTRACT

Influence of surface treatment and cyclic loading on the durability of repaired all-ceramic crowns

Ahmed ATTIA

1- MScD, Dr Med Dent, PhD, Associate Professor, Department of Conservative Dentistry and Fixed Prosthodontics, Faculty of Dentistry, Mansoura University, Egypt.

Corresponding address: Dr. Ahmed Attia - Department of Conservative Dentistry and Fixed Prosthodontics - Faculty of Dentistry - Mansoura University P C - 35516 - P O Box 40 - Mansoura - Egypt. - Fax: +2 050 2260173 - Phone: +2 050 2211440 - e-mail: aattia@mans.edu.eg

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Objective: This study investigated the durability of repaired all-ceramic crowns after cyclic loading. Material and methods: Eighty In-ceram zirconia crowns were fabricated to restore prepared maxillary premolars. Resin cement was used for cementation of crowns. Palatal cusps were removed to simulate fracture of veneering porcelain and divided into 4 groups (n = 20). Fracture site was treated before repair as follows: roughening with diamond bur, (DB); air abrasion using 50 µm Al2O3, (AA) and silica coating using Cojet system followed by silane application, (SC). Control group (CG) 20 specimens were left without fracture. Palatal cusps were repaired using composite resin. Specimens were stored in water bath at 37°C for one week. Ten specimens of each group were subjected to cyclic loading. Fracture load (N) was recorded for each specimen using a universal testing machine.

Two-way analysis of variance (ANOVA) and Tukey honestly significant difference (HSD) test (?=.05) were used for statistical analysis. Results: There was statistically significant difference between control and tested groups, (p < .05) HSD test showed that cyclic loading fatigue significantly decreased means fracture load of control and test groups as follows (CG, 950.4 ± 62.6 / 872.3 ± 87.4, P = 0.0004), (DB, 624.2 ± 38.7 / 425.5 ± 31.7, P < .0001), (AA, 788.7 ± 18.1 / 610.2 ± 25.2, P < .0001). HSD test showed increased fracture load of repaired crowns (p < .05) after chairside treatment of the fracture site by silica coating and silane application could improve longevity of repaired In-ceram zirconia crowns.

Influence of surface conditioning and cleaning methods on resin bonding to zirconia ceramic
Objectives. The purpose of this laboratory study was to evaluate the influence of different surface conditioning, new ceramic primers and cleaning methods on the bond strength of luting resin to zirconia ceramic (e.max ZirCAD).

Methods. A total of 96 zirconia ceramic discs were divided into six groups (n=16) according to surface conditioning, cleaning methods and ceramic primers. Zirconia ceramic discs were either air-abraded with 110 μm alumina particles or tribochemically silica-coated (Rocatec). Visible dust resulting from air-borne particle abrasion or silica coating was removed either by oil-free air stream or by ultrasonic cleaning in alcohol. Then either a conventional silane (Espe Sil) or a universal primer containing a silane and a phosphate monomer (Monobond Plus) were applied to the conditioned surface.

Transparent plastic tubes filled with composite resin were bonded to the zirconia ceramic discs using a luting resin (MultiLink Automix). The bonded specimens were stored in water at 37°C for 3 days and for 30 days with 7,500 thermal cycles between 5°C and 55°C prior to tensile test. Statistical analyses were conducted with three-, two- and one-way ANOVAs followed by comparison of means with Tukey’s HSD test.

Results. Tensile bond strength ranged from 31.5 to 45.2 MPa after 3 days and from 10.6 to 38.8 MPa after 30 days storage in water with thermal cycling. After artificial aging the decrease in bond strength was significant when the conventional silane was applied after silica coating or when the universal primer was used after air-borne particle abrasion without ultrasonic cleaning (P<.05). The decrease in bond strength was not significant (P>.05) when the universal primer was used after air-borne particle abrasion with ultrasonic cleaning or after silica coating. Significance. A new universal primer improved bonding to zirconia ceramic while the cleaning method had little or no effect.

7-

INFLUENCE OF GLAZING AND DIFFERENT POLISHING TECHNIQUES ON MECHANICAL PROPERTIES AND BIOFILM FORMATION OF LOW FUSING CERAMIC

Objectives. This in vitro study evaluated the influence of glazing and two polishing system on the fracture toughness and flexural strength of low fusing ceramic (LFC).

Methods. A total of 48 bare-shaped specimens and 24 disk-shaped specimens were
fabricated from LFC ceramic. 24 bars (204—1.5—1) were used for flexural strength test. The other 24 bars (204—3—1) were used for fracture toughness test. And 24 disks were used for the biofilm test. Each 24 bars were divided into 3 groups (n=8) according to surface treatment used as follow, autoglazed (AG), porcelain finishing stone (PFS), and finishing with PFS followed by polishing with pumice and tin oxide (PT). Statistical analyses were conducted with one-way analysis of variance (ANOVA) and Tukey’s HSD test. Results. Means ± SD of fracture toughness test were as follow: (AG, 4.30±0.1); (PFS, 4.40±0.07) and (PT, 4.40±0.09), while for flexural strength test were as follow (AG, 92.2±3.5); (PFS, 93.5±4.5) and (PT, 93.5±4.5). There was no statistically significant difference between test groups either for fracture toughness or flexural strength (P>0.05). Conclusions. Although the PFS exhibited the rougher surface which is confirmed by scanning electron microscopic examination, this made no effect on the mechanical properties and biofilm formation. The 3 surface treatments used had no significant effect on the mechanical properties and the biofilm formation of low fusing ceramic. After intraoral correction of occlusion, finishing the restoration with porcelain finishing stone could be enough method without affecting mechanical properties of the LFC restoration.

8-

**Bonding of pressable ceramic to desensitized dentin using self-cured resin cement.**

**SUMMARY**

Statement of problem: It is not uncommon for dental patients to present with dentin hypersensitivity after tooth preparation for intracoronal and extracoronal restorations. Desensitizing pastes, calcium hydroxide and dentin bonding agents are used to treat this dilemma. However the influence of these materials on bond strength of the restorations to dentin should be investigated.

Purpose: This in-vitro study investigated shear bond strength (SBS) of pressable ceramic to human dentin after treatment with different dentin desensitizing systems. Materials and Methods: Occlusal surface of forty sound human premolars were prepared to a flat dentin. Forty (IPS e-max Press) cylinders (4-mm in diameter and 6-mm long) were laboratory fabricated and divided into 4 groups (n = 10). Three desensitizing systems were used for treatment of the prepared dentin surface: MS Coat (MS), Unifil BOND (UF) and OptiBond FL (OB). Control group, dentin surface was treated using (Calcipex) water-based Ca (OH)2 past (CG). Ceramic bonding surface was etched using 4.9% HF acid followed by application of silane coupling agent. Superbond C&B adhesive resin cement was used for luting the IPS e-max Press cylinders to the treated dentin surface. One hour after cementation, specimens were stored in water for 6 months and thermalcycled for 10000 cycles. Shear force was applied to each specimen at the ceramic/dentin interface using a knife-edge rod at a cross head speed 2-mm/min in a universal testing machine. One-way Analysis of variance (ANOVA) and Tukey’s honestly significant difference (HSD) test at significance level (?.=05) were used for statistical analysis of the data. A stereomicroscope (Wild, Volkermarkt, Austria) was used to examine the debonding site for each specimen at 50 X magnification.

Results: Mean SBS strengths in Mpa were CG; 20.14±1, MS; 21.45±1 UF; 24.46.4±1, and OB; 27.77.9±1. There was no statically significant difference between mean (SBS) of test and control groups (P >.05).

Conclusion: The three desensitizing systems tested in the study didn’t significantly decrease shear bond strength of IPS e-max Press ceramic to human dentin.
Clinical implications: Before using Superbond C&B resin cement for luting IPS e-max Press all-ceramic restoration, using any of the desensitizing systems tested in the

9.

Durability of different repair techniques of fractured CAD-CAM all-ceramic crowns: An in vitro study

Abstract

Statement of problem. Different porcelain repair materials and techniques are used in the dental clinic. However, repair of a fractured all-ceramic restoration is still a challenging clinical situation.

Purpose of the study. This study investigated the durability of different repair techniques used clinically for repairing fractured CAD-CAM all-ceramic crown.

Methods and Materials. Forty CAD-CAM all-ceramic crowns were fabricated on human maxillary premolars from ProCAD machinable ceramic using the Cerec3 CAD-CAM system. Ten crowns served as controls. Thirty crowns were selected for removing the palatal cusps to simulate porcelain fracture and divided into 3 groups (n = 10) according to the repair technique, (repair using direct composite resin, (CR); repair using ProCAD, (PC) and repair using MZ 100 blocks, (MZ). Resin cement was used for cementation of crowns to their respective prepared teeth. Group PC & MZ, were repaired as follow, palatal cusps were machined respectively from ProCAD and MZ100 composite blocks using the Cerec 3 and bonded to the fractured crowns to restore the fractured palatal cusps. Group CR, palatal cusps were directly repaired using composite resin. After 45 days storage in water, specimens were thermal cycled for 10000 thermal cycles (58°C/4°C) with dwell time 60 seconds. All specimens were loaded in a universal testing machine with the compressive load (N) applied along the long axis of the specimen at a crosshead speed 1mm/min until fracture. Fracture load was recorded for each specimen. One-way analysis of variance (ANOVA) and Tukey’s honestly significant difference (HSD) test at significance level (? = 0.05) were used for statistical analysis.

Results. Mean fracture loads of control group (987.7 ±53 N) was significantly higher than mean fracture loads of all test groups (MZ, 716.3 ±57.1 N, P = 0.000); (PC, 739±62.4 N, P = 0.000) and (CR, 809.9 ±98 N, P = 0.000). Also mean fracture loads of CR group was significantly higher than mean fracture load of MZ group (P = 0.02); However, there was no statistically significant difference between means fracture loads of CR and PC groups (P = 0.07) and PC and MZ (P = 0.6).

Conclusions. Machinable ceramic could be used for direct repair of the fractured all-ceramic crowns instead of direct composite.

Clinical significance

Within the limitations of this in vitro study, CAD-CAM repair of fractured all-ceramic crowns from machinable ceramics could be an alternative for conventional repair technique, with the advantage of less wear and surface deterioration than direct composite resin.

10-

Microleakage of contemporary all-ceramic crowns

SUMMARY

Statement of problem: New dental materials and techniques have been introduced in the
past few years to fabricate all-ceramic crowns with improved strength, biocompatibility and better fit. However poor marginal fit is still considered a common disadvantage of these esthetic crowns.

Purpose: This study investigated the influence of different luting agents and thermal cycling on the microleakage of recently developed all-ceramic crowns.

Materials and Methods: A hundred twenty human maxillary premolars were prepared for all-ceramic crowns with the following preparation criteria: 6-degree axial taper, 1.5 mm shoulder finish line placed 0.5 mm occlusal to the CEJ, 2 mm occlusal reduction and occluso-gingival height of 5 mm. Prepared teeth were restored with Empress 2 all-ceramic crowns. Six luting agents [Superbond C&B; (SB), RelyX ARC; (RX), Mirage FLC; (MF), GC Fuji CEM; (FC), ProTec CEM; (PT) and Zinc phosphate cement; (ZP)] were used for cementation (n=20). After 1-week storage in water, half of the specimens of each group (n = 10) were thermal cycled for 70000 cycles. Specimens were then immersed in 50 wt % aqueous solution of silver nitrate for 2 hours. Each specimen was embedded in clear acrylic resin and sectioned mid mesiodistally and buccolingually using Isomet 1000 Precision Saw. For each section the degree of microleakage was graded 0, 1, 2, 3 or 4 starting from the cervical margin using a stereomicroscope at 150 X original magnification. The Kruskal-Wallis test was used first to detect overall significance, followed by Mann-Whitney U tests to identify which pairs of groups had significant differences (? = .05).

Results: Thermal cycling significantly increased the degree of microleakage for all test groups at tooth/cement (T/C) and ceramic/cement (C/C) interfaces as follow, ZP (T/C, P = 0.0002), (C/C, P = 0.0001); PT (T/C, P = 0.0003), (C/C, P = 0.004); FC, (T/C, P = 0.001), (C/C, P = 0.003); SB, (T/C, P = 0.002), (C/C, P = 0.001); RX, (T/C, P = 0.004), (C/C, P = 0.011) and MF, (T/C, P = 0.008), (C/C, P = 0.009). However adhesive resin cements and the paste form of hybrid glass ionomer cement significantly decreased the degree of microleakage compared to zinc phosphate cement (P < .05).

Conclusion: There was a significant increase in the degree of microleakage after thermal cycling for all test groups at both tooth/cement and ceramic/cement interfaces. Adhesive resin cements and the paste form of hybrid glass ionomer cement decreased the degree of microleakage.

Clinical implications
Within the limitations of this in vitro study, the use of adhesive resin cements with a compatible dentin bonding agent and the paste form of hybrid glass ionomer cement are preferred for cementation of Empress 2 all ceramic crowns. These luting agents could improve the longevity of Empress 2 all-ceramic crowns.

BOND STRENGTH OF ESTHETIC BRACKETS TO ESTHETIC SUBSTRATES

This study was carried out to compare the shear bond strength of esthetic brackets (composite and ceramic) to enamel surface and to two esthetic restorative materials (millable composite blocks (MZ 100) and machinable ceramic blocks (vita Mark II) using the Bistite 11 DC adhesive luting agent. This study was classified into three groups, two test groups (millable composite blocks (MZ 100, machinable ceramics (vita Mark II) and control group (natural teeth extracted upper first premolars) (n =16). The control group (upper first premolars) was extracted during routine orthodontic treatment. The teeth were washed then stored in 0.1 % thymol solution: Small area on the buccal sur
was ground flat then, polished with wet 400 and 600-grit silicon carbide abrasive paper. The second group was formed of sixteen blocks of mill able composite (MZ 100). In addition, the third group was formed of sixteen blocks of machinable ceramics (vita Mark 11). Each group was divided into two subgroups (A and B) according to the brackets type (composite or ceramic brackets) (n =8). Adhesive bonding agent (Bistite II DC) was used for bonding of brackets to different substrates of the main three groups. All specimens were stored in water bath at 37 C for 45 days followed by thermal cycling for 500 cycles.

Results: There was significant difference between composite brackets bonded to ceramic substrate and composite brackets bonded to composite substrate and vice versa, ceramic brackets bonded to ceramic substrate showed significant higher shear bond strength compared with ceramic brackets bonded to composite substrate. The clinical implication of this study is that the Bistite II DC adhesive can be used clinically for bonding esthetic brackets to esthetic substrates. Moreover, it is preferable to use ceramic brackets in case of ceramic restorations and composite brackets in case of composite restorations to get the highest shear bond strength regardless to the other characteristics of their designs.

Shear bond strength of metal brackets to enamel surface and two restorative esthetic materials

ABSTRACT
Orthodontist may be faced with the need to bond brackets to esthetic restorations. This as a result of increasing adults demands to orthodontic treatment. It was necessary to evaluate the bond strength of the orthodontic brackets to these esthetic restorative materials in comparison to the natural teeth. So, this in vitro study evaluated shear bond strength of metal orthodontic brackets to two restorative esthetic materials using a new luting cement used for bonding (compomer). Thirty six metal orthodontic brackets were bonded to prepared buccal surface of extracted premolars, millable composite blocks (MZ100) and machinable ceramics (Vita Mark II) using the same luting agent. All specimens were stored in water for 45 days then thermo-cycled for 500 cycles. The shear bond strength in Mpa was tested using a universal testing machine. One way ANOVA showed statistically significant difference between test and control groups P=0.0006. Mann-Whitney tests revealed statistically significant difference between (SBS) of control group and MZ100 composite group P = 0.0003, Also there was statistically significant difference between the two test groups MZ100 composite and Vita Mark II P = 0.02. However, there was no statistically significant difference between control group and Vita Mark II group P = 0.07. This study revealed that the median bond strength of metal brackets to the esthetic substrates was significantly lower compared to the natural teeth (9.9 MPa for NT) but at the same time it was lies within the acceptable clinical range (8 and 5.7) MPa. However, the bond strength of the metal brackets to the porcelain substrates showed no significance difference compared to that bonding to the natural ones P =( 0.07), While the bond strength to the composite group appeared within the clinical acceptance but with smaller value in comparison to the natural teeth adhesive strength.

Bond Strength of Contemporary Luting Agents to Human Dentin
Abstract

Purpose: This in-vitro study investigated the durability of shear bond strength (SBS) of recently introduced luting agents to human dentin. Materials and methods: One-hundred and twenty lower molars were stored in 1% thymol solution. The occlusal surface was prepared to a flat dentin surface. The molars were divided into six groups each of 20 specimens. Translucent plastic rings were filled with the following luting agents and luted to the prepared specimens, self-adhesive compomer luting cement, hybrid glass ionomer cement in past form and conventional glass ionomer. Bonding procedures were created according to the manufacturer instructions for each luting agent. One day after luting, 20 specimens of each luting agent were stored in water bath for 24 hours. The other 20 specimens of each luting agent were stored in water bath for 3 months and thermocycled for 10000 cycles. Shear force was applied to each specimen at the junction of the plastic ring/dentin interface using a knife-edge rod at a cross head speed of 0.5mm/min in a universal testing machine. The Kruskal-Wallis test was used first to detect overall significance, and Mann-Whitney U tests follow to identify which pairs of groups had the significant difference (? = .05).

Results: Medians (SBS) in MPa before and after thermalcycling are self-adhesive compomer luting cement, (CLC; 20.4, 13 MPa); hybrid glass ionomer cement, (HGI; 22, 14.6 MPa) and conventional glass ionomer cement, (CGI; 17.8, 8.7 MPa). There was no statistically significant difference in the median SBS of self-adhesive compomer luting cement and hybrid glass ionomer cement before and after storage in water and thermalcycling (P >.05), however median SBS of self-adhesive compomer luting cement and hybrid glass ionomer cement was significantly higher than median SBS of conventional glass ionomer cement before and after thermalcycling (P <.05). On the other hand long term storage in water and thermalcycling significantly decreased SBS of the 3 luting agents used to human dentin (P <.05). Clinical implication: Hybrid glass ionomer and self-adhesive compomer luting cements are preferred for luting indirect restorations.

14-

BOND STRENGTH BETWEEN PORCELAIN AND RECASTED NICKEL CHROMIUM ALLOY

This study investigated the planar shear bond strength between porcelain and recast nickel-chromium alloy. Thirty two specimens were fabricated and divided into four equal groups, (G1) was prepared from fresh Ni Cr alloy, (G2) was prepared from 50% by weight fresh and previously used alloy, (G3) was prepared from 100%, previously used alloy for one generation and (G4) was prepared from 100% previously used alloy for two generations. ANOVA followed by t-test were used for statistical analysis. The results of this study concluded that recasting of nickel chromium base metal alloys significantly reduced the planar shear bond strength with porcelain. Also, the use of fresh nickel chromium alloy or 50% by weight fresh and previously used alloys insignificantly affected the bond strength with porcelain.

15-

Bond strength of three luting agents to zirconia ceramic - influence of surface treatment and thermocycling

Abstract

The objective of this in vitro study was to evaluate the influence of different surface
treatment, 3 luting agents and thermal cycling on microtensile bond strength (µTBS) to zirconia ceramic. Material and Methods: A total of 18 blocks (5x5x4 mm) in dimension were fabricated from zirconia ceramic (ICE Zirkonia) and duplicated into composite blocks (Alpha. Dent). Ceramic blocks were divided into 3 groups (n=6) according to the following surface treatment; airborne-particle abrasion (AA), silica-coating, (SC) (CoJet) and silica coating followed by silane application, (SCSI) (ESPE Sil). Each group was divided into 3 subgroups (n=2) according to the 3 luting agents used. Resin-modified glass-ionomer cement (GI, Ketac Cem Plus), self adhesive resin cement (UN, RelyX Unicem) and adhesive resin cement (ML, MultiLinik Automix) were used for bonding composite and zirconia blocks. Each bonding assembly was cut into microbars 10 mm in length and 10.1±1 mm2. Seven specimens of each subgroup were stored in water bath at 37°C for one week. The other 7 specimens were stored in water bath at 37°C for 30 days then thermalcycled (TC) for 7500 cycles. µTBS values were recorded for each specimen using a universal testing machine. Statistical analyses were performed using a 3-way ANOVA model followed by serial 1-way ANOVAs. Comparison of means was performed with Tukey’s HSD test at (±=0.05). Results: µTBS ranged from 16.8 to 31.8 MPa after one week and from 7.3 to 16.4 MPa after 30 days storage in water and thermal cycling. Artificial aging significantly decreased µTBS (P

Key words: Zirconia ceramic. Surface treatment. Resin bonding.

16-

Long-term resin bonding to zirconia ceramic with a new universal primer

ABSTRACT

Statement of problem. Different surface conditioning, cleaning methods and ceramic primers are used to improve bonding to zirconia ceramic. However maintaining a durable bonding to zirconia ceramic under different clinical conditions remains a challenge.

Purpose. This in vitro study investigated durability of the bond strength of adhesive luting cement to zirconia ceramic after application of a new universal primer.

Material and methods. Ninety-six discs were fabricated from zirconia ceramic (e.max ZirCAD). Discs were conditioned either with airborne-particle abrasion using 110µm Al2O3 (AB) or silica-coated (SC). Thereafter discs were cleaned either with oil-free air (A) or by ultrasonic cleaning (U) in alcohol. A conventional silane (S) (EspeSil) or a universal primer (P) (Monobond Plus) was applied to the conditioned surface. A total of 6 groups (n=16) were tested: SC-A-S; SC-U-S; SC-A-P; SC-U-P; AB-A-P and AB-U-P. Transparent plastic tubes filled with composite resin were bonded to pretreated zirconia discs using adhesive luting cement (MultiLink Automix). Each main group was divided into 2 subgroups (n=8). Specimens were stored in 37°C water for 3 days or 150 days then thermal cycled (TC) for 37,500 cycles. TBS values were recorded using a universal testing machine. Statistical analyses were conducted with three-, two- and one-way ANOVAs and Tukey’s HSD test (0.05=±χ).

Results. Artificial aging significantly decreased the bond strength (P

Conclusion. A new universal primer significantly increased long-term resin bonding to zirconia ceramic compared to a conventional silane. Cleaning methods had little effect on long-term resin bonding to zirconia ceramic.

Clinical implications. Silica coating or airborne-particle abrasion and universal primer application improved long-term resin bonding to zirconia ceramics. Conditioning of
Effect of Cleaning Methods After Reduced-pressure Air Abrasion on Bonding to Zirconia Ceramic

Abstract

Purpose: To evaluate in vitro the influence of different cleaning methods after low-pressure air abrasion on the bond strength of a phosphate monomer-containing luting resin to zirconia ceramic. Materials and Methods: A total of 112 zirconia ceramic disks were divided into 7 groups (n = 16). In the test groups, disks were air abraded at low pressure (L) 0.05 MPa using 50-μm alumina particles. Prior to bonding, the disks were ultrasonically (U) cleaned either in isopropanol alcohol (AC), hydrofluoric acid (HF), demineralized water (DW), or tap water (TW), or they were used without ultrasonic cleaning. Disks air abraded at a high (H) pressure of 0.25 MPa and cleaned ultrasonically in isopropanol served as positive control; original (O) milled disks used without air abrasion served as the negative control group. Plexiglas tubes filled with composite resin were bonded with the adhesive luting resin Panavia 21 to the ceramic disks. Prior to testing tensile bond strength (TBS), each main group was further subdivided into 2 subgroups (n=8) which were stored in distilled water either at 37°C for 3 days or for 30 days with 7500 thermal cycles. Statistical analyses were conducted with two- and one-way analyses of variance (ANOVA) and Tukey’s HSD test. Results: Initial tensile bond strength (TBS) ranged from 32.6 to 42.8 MPa. After 30 days storage in water with thermocycling, TBS ranged from 21.9 to 36.3 MPa. Storage in water and thermocycling significantly decreased the TBS of test groups which were not air abraded (p = 0.05) or which were air abraded but cleaned in tap water (p = 0.002), but not the TBS of the other groups (p > 0.05). Also, the TBS of air-abraded groups were significantly higher than the TBS of the original milled (p < 0.01). Cleaning procedures did not significantly affect TBS either after 3 days or 30 days storage in water and thermocycling (p > 0.05). Conclusion: Air abrasion at 0.05 MPa and ultrasonic cleaning are important factors for improving bonding to zirconia ceramic.

Influence of treatment modalities of prepared teeth on retention of cast metal copings bonded with self-adhesive resin cements.

Abstract

OBJECTIVE:
To evaluate the influence of different conditioning methods of prepared teeth on the retention of cast metal copings bonded with two self-adhesive resin cements.

METHOD AND MATERIALS:
Mandibular first molars (n = 80) were prepared to receive metal copings. Sixteen molars were stored in water without interim copings as a control group (CG), while 64 molars were covered with interim copings. Eighty cast copings were laboratory fabricated from Ni-Cr alloy. Interim copings were removed, and 64 molars were cleaned and divided into four groups (n = 16) according to pretreatment methods of prepared molars: no pretreatment (T-NT) and conditioning with self-etching adhesive (T-SE), polyacrylic acid (T-PA), or ethylenediaminetetraacetic acid (EDTA) (T-ED). Each group was further
subdivided into two subgroups (n = 8) according to luting cements. RelyX Unicem and seT self-adhesive resin cements were used for cementation of copings. Specimens were stored in water at 37°C for 6 months and then cyclically loaded and thermal cycled. Retentive stress in N was recorded for each specimen. Statistical analyses were conducted with two- and one-way ANOVA and Tukey HSD test.

RESULTS: Retentive stress ranged from 526.7 to 692.9 N for RelyX Unicem and 339.8 to 492.3 N for seT. There were no statistically significant differences between the mean retentive stress of the CG, T-SE, and T-PA groups (P > .05). The mean retentive stress of group CG was significantly higher than mean retentive stress of groups T-NT and T-ED (P < .05). The mean retentive stress of the control and test groups bonded with RelyX Unicem was significantly higher than the mean retentive stress of the same groups bonded with seT.

CONCLUSION: Conditioning of prepared teeth using polyacrylic acid or self-etching adhesive significantly increased the retentive stress of cast metal copings.