Effects of different polishing techniques on the surface roughness of dental porcelains.

Sarikaya I, Güler AU.


Abstract

OBJECTIVE: The purpose of this study was to evaluate the effects of different polishing techniques on the surface roughness of dental porcelains.

MATERIAL AND METHODS: Fifty-five cylindrical specimens (15x2 mm) were prepared for each feldspathic (Vita VMK 95, Ceramco III) and low-fusing dental porcelain (Matchmaker). Fifty-five specimens of machinable feldspathic porcelain blocks (Vitablocs Mark II), (12x14x18 mm) were cut into 2-mm-thick slices (12x14 mm) with low speed saw. The prepared specimens were divided into 11 groups (n=5) representing different polishing techniques including control ((C) no surface treatment), glaze (G) and other 9 groups that were finished and polished with polishing discs (Sof-Lex) (Sl), two porcelain polishing kits (NTI (Pk), Dialite II (Di)), a diamond polishing paste (Sparkle) (Sp), a zirconium silicate based cleaning and polishing prophy paste (Zircate) (Zr), an aluminum oxide polishing paste (Prisma Gloss) (Pg), and combinations of them. The surface roughness of all groups was measured with a profilometer. The data were analyzed with a 2-way analysis of variance, and the mean values were compared by the Tukey Honestly Significant Difference test (alpha=0.05).

RESULTS: For all porcelain material groups, the lowest Ra values were observed in Group Gl, Group Sl, Group Pk, and Group Di, which were not significantly different from each other (p>0.05).When comparing the 4 different porcelain materials, the machinable feldspathic porcelain block group (Mark II) demonstrated statistically significantly less Ra values than the other porcelain materials tested (p<0.05). No significant difference was observed between the VMK 95 and Ceramco III porcelain groups (p=0.919), also these groups demonstrated the highest Ra values.

CONCLUSION: Subjected to surface roughness, the surfaces obtained with polishing and/or cleaning-prophy paste materials used alone were rougher compared to the surfaces finished using Sof-lex, Dialite, and NTI polishing kit. Polishing kits and discs were found more effective than the polishing pastes used alone or combined use with Sof-lex discs, thus improving surface smoothness.

⇒ Artikel frei einsehbar:
Polishing methods of an alumina-reinforced feldspar ceramic.

Bottino MC, Valandro LF, Kantorski KZ, Bressiani JC, Bottino MA.


Abstract

The purpose of this study was to test the hypothesis that mechanical polishing methods of ceramic surfaces allow similar superficial roughness to that of glazed surfaces. Twenty-five Vitadur Alpha ceramic discs (5 mm x 2 mm) were prepared according to the manufacturer's specifications. All specimens were glazed and randomly assigned to 5 groups (n=5), according to finishing and polishing protocols: G1: glazed (control); G2: diamond bur finishing; G3: G2 + silicon rubber tip polishing; G4: G3 + felt disc/diamond polishing paste; G5: G3 + felt disc impregnated with fine-particle diamond paste. Next, surface roughness means (Ra - microm) were calculated. Qualitative analysis was made by scanning electron microscopy. Surface roughness data were submitted to ANOVA and Tukey's test at 5% significance level. G1 and G4 were statistically similar (p>0.05). G2 presented the highest roughness means (p<0.05) followed by groups G3, G5, G4 and G1 in a decreasing order. The hypothesis was partially confirmed as only the mechanical polishing (G4) produced similar superficial roughness to that of surface glazing, although finishing and polishing are technically critical procedures.

 Effects of six surface treatment methods on the surface roughness of a low-fusing and an ultra low-fusing feldspathic ceramic material.

Dalkiz M, Sipahi C, Beydemir B.


Abstract

PURPOSE: The purpose of this in vitro study was to determine the effects of six surface treatment methods on the surface roughness of two feldspathic ceramic materials.

MATERIALS AND METHODS: One hundred twenty metal discs were cast (Remanium CS). A low-fusing feldspathic ceramic (Vita Omega 900) was fired onto 60 metal discs, and an ultra low-fusing feldspathic ceramic (Finesse) was fired onto the other 60 metal discs. Six surface treatment methods were selected: (1) autoglazing (AUG), (2) overglazing (OVG), (3) polishing (POL), (4) fine diamond disc grinding + polishing + autoglazing (FDPA), (5) coarse diamond disc grinding + polishing + autoglazing (CDPA), (6) polishing + autoglazing (PA). Omega specimens were assigned to six experimental groups representing six surface treatment methods (Om-AUG, Om-OVG, Om-POL, Om-FDPA, Om-CDPA, Om-PA) (n = 10). Finesse specimens were also assigned to six experimental groups (Fn-AUG, Fn-OVG, Fn-
POL, Fn-FDPA, Fn-CDPA, Fn-PA) (n = 10). Treated ceramic surfaces were examined by means of profilometry and transmission electron microscopy.

RESULTS: In Omega groups mean roughness values ranged as follows: group Om-AUG = Om-POL > Om-OVG > Om-CDPA = Om-FDPA > Om-PA (p < 0.001). No significant difference was found between groups Om-AUG/Om-POL and Om-CDPA/Om-FDPA (p > 0.05). In Finesse groups mean roughness values ranged as follows: Fn-CDPA > Fn-FDPA = Fn-AUG = Fn-POL = Fn-OVG > Fn-PA (p < 0.001). No significant difference was found between Fn-FDPA, Fn-AUG, Fn-POL and Fn-OVG (p > 0.05).

CONCLUSIONS: For both ceramic types, the smoothest surfaces were obtained with polishing prior to autoglazing. Diamond disc grinding prior to polishing and autoglazing (Fn-FDPA, Fn-CDPA) displayed the roughest surfaces in ultra low-fusing ceramic (Finesse). Autoglazing alone and polishing displayed the roughest surfaces in low-fusing ceramic material (Om-AUG, Om-POL).

The effects of porcelain polishing systems on the color and surface texture of feldspathic porcelain.

Sarac D, Sarac YS, Yuzbasioglu E, Bal S.


Abstract

STATEMENT OF PROBLEM: After the adjustment of glazed porcelain surfaces, the surfaces are roughened and must be reglazed or polished with different porcelain polishing systems to improve the esthetic appearance and strength of the porcelain restorations.

PURPOSE: The purpose of this in vitro study was to compare the effect of different porcelain polishing methods on the color and surface texture of a feldspathic ceramic.

MATERIAL AND METHODS: Ninety porcelain (Vitadur Alpha) discs (10 x 2 mm) were fabricated in a silicone mold and divided into 9 groups (n=10). A medium-grit diamond rotary cutting instrument was used to remove the glaze layer, and then the surface was polished using 1 of the 4 following polishing systems or a combination thereof: polishing paste (Ultra II), polishing stick (Diamond Stick), polishing wheel (CeraMaster), or an adjustment kit (Porcelain Adjustment Kit). No surface treatments were applied to the control group. Color measurements were made using a colorimeter (Minolta CR-321 ChromaMeter) according to the CIE L( *)a( *)b( *) color system. Color differences (DeltaE) between the control group and experimental groups were calculated. The acceptable level was chosen as 3.3 DeltaE units. Then the surface roughness (Ra) (microm) of the same specimens was evaluated using a profilometer. The data were statistically analyzed by 1-way analysis of variance and Tukey HSD tests (alpha=.05). To evaluate the effects of the polishing systems on the ceramic surfaces at a microscopic level, an additional 9 feldspathic ceramic specimens were prepared and polished to represent each of the 9 groups. These specimens were examined under a scanning electron microscope (SEM).

RESULTS: Polishing techniques significantly affected the color of the feldspathic ceramic (P<.001). The DeltaE values ranged from 1.03 to 3.36. No significant differences were found...
within the adjustment kit groups or within the polishing wheel groups. All specimens polished with the various techniques showed significantly different Ra values than the control specimens (P<.001), except for the groups polished using the adjustment kit. The highest Ra and DeltaE values were obtained with the use of polishing paste and polishing stick alone (P<.001). The SEM observations demonstrated that the polishing techniques affected the smoothness of the porcelain surface.

CONCLUSIONS: The evaluation of the polishing techniques showed that the use of an adjustment kit alone or preceding polishing paste or polishing stick application created surfaces as smooth as glazed specimens. The use of polishing paste alone did not improve the smoothness of the porcelain surface. The color differences of all groups were found to be at the acceptable level.

**Surface roughness of a dental ceramic after polishing with different vehicles and diamond pastes.**

Camacho GB, Vinha D, Panzeri H, Nonaka T, Gonçalves M.


**Abstract**

During fabrication of bonded ceramic restorations, cervical adaptation, occlusal adjustment and final finishing/polishing are procedures to be performed at the dental office after adhesive cementation. Final adjustments may result in loss of ceramic glaze, which requires new polishing of the ceramic surface, with special attention for selection of adequate materials and instruments. The purpose of this study was to evaluate the efficiency of different vehicles associated with diamond pastes indicated for dental ceramic polishing. Two polishing pastes (Crystar Paste and Diamond Excell) associated with four vehicles (rubber cup, Robinson bristle brush, felt wheel and buff disc) were evaluated. Disc-shaped specimens were fabricated from Ceramco II dental ceramic. Surface roughness means (Ra) of the ceramic specimens were determined with a rugosimeter. Data were analyzed statistically by two-way ANOVA and Tukey's test at 5% significance level. There was no statistically significant difference (p>0.01) between the polishing pastes. However, there were statistically significant differences (p<0.01) among the tested vehicles. Vehicle-paste interaction showed statistically significant difference (p<0.05) as well. It may be concluded that: 1) Robinson bristle brush, felt wheel and buff disc were efficient vehicles to be used in association with a diamond polishing paste; 2) The use of rubber cup as a vehicle showed poor efficiency for mechanical polishing of the ceramic surfaces; 3) Both pastes provided similar and efficient polishing and may be recommended for use with an appropriated vehicle.

⇒ Artikel frei einsehbar:

The effects of extraoral porcelain polishing sequences on surface roughness and color of feldspathic porcelain.

Yuzugullu B, Celik C, Erkut S, Ozcelik TB.


Abstract

The aim of this study was to evaluate the surface properties and color of porcelain modified by extraoral polishing sequences. Six different surface treatment regimens (diamond burs, self-glaze, overglaze, reglaze, Pearl Surface polishing system, and Diamond Twist SCL) were applied to 60 porcelain disks (n = 10 per group). Profilometry and atomic force microscopy (AFM) were used for the determination of surface roughness (Ra); color changes (deltaE*) were investigated by spectrophotometry. Statistical comparisons were made using analysis of variance, the Kruskal-Wallis test, and the Pearson correlation coefficient test. Surface treatments significantly affected Ra values (P < .001) but had no effect on color (P > .05). AFM findings were consistent with Ra values. Color did not appear to be correlated with surface roughness (P > .05). The findings concluded that the Pearl Surface system helps to decrease chairside time and may be used as an alternative to overglazing.