**Table 1.** **Materials used in this study.**

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| --- | --- | --- | --- |
| **Material** | **Application mode** | **Composition** | **Manufacturer** |
| **Adper** **Single Bond 2**(Adhesive system) | Apply one layer of adhesive, wait for 20 s, air stream for 5 s, and polymerize for 10 s | Bis-GMA, HEMA, dimethacrylates, ethanol, water, a novel photoinitiator system and a methacrylate functional copolymer of polyacrylic and polyitaconic acids | 3M ESPE, St. Paul, MN, USA. |
| **Filtek** **Z350 XT** (color A2B)Batch: 672912 | Apply increments of 2 mm and polymerize for 20 s each | Bis-GMA, UDMA, Bis-EMA, TEGDMA, PEGDMA, Zirconia and agglomerates of silica, camphorquinone | 3M ESPE, St. Paul, MN, USA. |
| **Fuji II LC**(color A3)Batch: 17051316 | GC conditioner was applied for 20 s, rinsed and dried for 10 s. 1 level scoop of powder to 2 drops of liquid was dispensed and mixed for 15-20 s. The mixture was transferred to the centrix syringe | Powder: fluor-amino-silicate glass. Liquid: aqueous solution of polycarboxylic acid, TEGDMA and HEMA | GC, Tokyo, Japan. |
| **Curaprox Enzycal Zero** (RDA-60)\*Batch: 442MHDEXP1121 | Fluoride-free Toothpaste(WF) | Water, Sorbitol, Hydrated Silica, Glycerin, Steareth-20, Titanium Dioxide (Cl 77891), Flavor, Sodium Phosphate, Carrageenan, Sodium Chloride, Citric Acid, Sodium Benzoate, Potassium Thiocyanate, Glucose Oxidase, Amyloglucosidase, Lactoperoxidase | Trybol, Neuhausen am Rheinfall, Swiss. |
| **Colgate Total 12**(RDA-70/80)\*Batch: 6184BR121R | Sodium Fluoride Toothpaste(NaF) | Sodium Fluoride (1450 ppm as NaF)Water, Triclosan, Sorbitol, Silica, Sodium Lauryl Sulfate, PMV / MA Copolymer, Sodium Hydroxide, Saccharin Sodium, Titanium Dioxide | Colgate-Palmolive, São Bernardo do Campo, SP, Brazil. |
| **Crest Pro-Health**(RDA-155)\*Batch: 6039GF | Stannous Fluoride Toothpaste(SnF2) | Stannous fluoride (1100 ppm F as SnF2)Glycerin, Hydrated Silica, Sodium Hexametaphosphate, Propylene Glycol, PEG 6, Water, Zinc Lactate, Trisodium Phosphate, Sodium Lauryl Sulfate, Sodium Lauryl Sulfate, Carrageenan, Sodium Saccharin, Xanthan Gum, Blue 1 | Procter & Gamble, Cincinnati, OH, USA. |

**Table 2. Nanohardness values of surfaces and restorative materials using different toothpastes. Mean (SD) H values expressed in GPa.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors** | **ERMGIC-C** | **ECR-C** | **RMGIC-C** | **CR-C** | **DRMGIC-C** | **DCR-C** |
| **WF** | 2.97 (0.45) Aa | 2.66 (0.40) Ab | 0.47 (0.20) Ab | 0.69 (0.12) Aa | 0.68 (0.15) Aa | 0.63 (0.10) Aa |
| **NaF** | 2.89 (0.73) Aa | 2.96 (0.43) Aa | 0.41 (0.19) Ab | 0.67 (0.17) Aa | 0.59 (0.12) Ba | 0.61 (0.15) Aa |
| **SnF2** | 3.09 (0.83) Aa | 2.98 (0.63) Aa | 0.49 (0.21) Ab | 0.70 (0.21) Aa | 0.65 (0.13) Aba | 0.67 (0.15) Aa |
| **Factors** | **ERMGIC-E** | **ECR-E** | **RMGIC-E** | **CR-E** | **DRMGIC-E** | **DCR-E** |
| **WF** | 0.51 (0.17) Aa\* | 0.55 (0.22) Aa\* | 0.29 (0.09) Ab\* | 0.64 (0.08) Aa | 0.05 (0.02) Aa\* | 0.10 (0.05) Aa\* |
| **NaF** | 0.52 (0.24) Aa\* | 0.50 (0.30) Aa\* | 0.34 (0.16) Ab | 0.65 (0.18) Aa | 0.08 (0.04) Aa\* | 0.06 (0.02) Aa\* |
| **SnF2** | 0.27 (0.07) Aa\* | 0.23 (0.06) Aa\* | 0.25 (0.14) Ab\* | 0.63 (0.11) Aa | 0.08 (0.03) Aa\* | 0.07 (0.02) Aa\* |
| Upper case letters compare toothpastes in each control or eroded side. Lowercase letters compare surfaces separately (p < 0.05). \*Statistical difference among the control and eroded surfaces. SD, standard deviation; H, nanohardness; GPa, gigapascal. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors** | **ERMGIC-C** | **ECR-C** | **RMGIC-C** | **CR-C** | **DRMGIC-C** | **DCR-C** |
| **WF** | 79.92 (7.45) Aa | 64.74 (7.14) Bb | 12.99 (3.38) Aa | 13.60 (1.56) Aa | 21.34 (3.56) Aa | 18.70 (2.53) Aa |
| **NaF** | 76.25 (14.51) Ba | 82.37 (8.08) Aa | 13.50 (3.07) Aa | 13.31 (2.15) Aa | 18.62 (2.97) Aa | 18.26 (2.57) Aa |
| **SnF2** | 87.73 (14.86) Aa | 75.22 (8.68) Aa | 14.71 (4.26) Aa | 14.26 (2.15) Aa | 19.08 (3.90) Aa | 19.70 (3.23) Aa |
| **Factors** | **ERMGIC-E** | **ECR-E** | **RMGIC-E** | **CR-E** | **DRMGIC-E** | **DCR-E** |
| **WF** | 30.23 (8.63) Aa\* | 17.08 (8.22) Bb\* | 10.18 (2.37) Ab\* | 13.45 (1.51) Aa | 1.54 (0.40) Aa\* | 2.65 (0.84) Aa\* |
| **NaF** | 34.52 (12.91) Aa\* | 34.59 (8.83) Aa\* | 10.38 (3.55) Ab\* | 13.52 (2.11) Aa | 1.97 (0.61) Aa\* | 2.06 (0.79) Aa\* |
| **SnF2** | 20.72 (9.90) Ba\* | 19.33 (3.26) Ba\* | 6.47 (1.14) Bb\* | 13.62 (1.50) Aa | 2.36 (0.66) Aa\* | 1.99 (0.40) Aa\* |
| Upper case letters compare toothpastes in each control or eroded side. Lowercase letters compare surfaces separately (p < 0.05). \*Statistical difference among the control and eroded surfaces. SD, standard deviation; Er, elastic modulus; GPa, gigapascal |

**Table 3.** **Elastic modulus of surfaces and restorative materials using different toothpastes. Mean (SD) Er values expressed in GPa.**

**Table 4**. **Mean (SD) calcium/phosphorus ratios in enamel surfaces by EDS analysis.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Factors** | **ERMGIC-C** | **ERMGIC –E** | **ECR-C** | **ECR-E** |
| **WF** | 1.80 (0.10) Aa | 1.78 (0.12) Aa | 1.79 (0.10) Aa | 1.80 (0.12) Aa |
| **NaF** | 1.75 (0.14) Aa | 1.78 (0.16) Aa | 1.80 (0.10) Aa | 1.87 (0.08) Aa |
| **SnF2** | 1.81 (0.02) Aa | 1.71 (0.09) Aa | 1.75 (0.12) Aa | 1.77 (0.09) Aa |
| Upper case letters compare toothpastes in each surface. Lowercase letters compare surfaces in each toothpaste (p < 0.05). SD, standard deviation. |

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| --- | --- | --- | --- | --- |
| **Factors** | **DRMGIC-C** | **DRMGIC –E** | **DCR-C** | **DCR-E** |
| **WF** | 1.74 (0.08) Aa | 0.53 (0.83) Ab | 1.71 (0.09) Aa | 0.62 (0.96) Bb |
| **NaF** | 1.68 (0.08) Aa | 1.12 (0.87) Aa | 1.95 (0.35) Aa | 1.77 (0.12) Aa |
| **SnF2** | 1.70 (0.08) Aa | 0.53 (0.81) Aa | 1.74 (0.10) Aa | 1.22 (0.95) ABab |
| Upper case letters compare toothpastes in each surface. Lowercase letters compare surfaces in each toothpaste (p < 0.05). SD, standard deviation. |

**Table 5.** **Mean (SD) calcium/phosphorus ratios in dentin surfaces by EDS analysis.**

**Table 6.** **Mean (SD) carbonate/phosphate ratios in enamel surfaces by Raman analysis (200 × 200 µm).**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Factors** | **ERMGIC-C** | **ERMGIC –E** | **ECR-C** | **ECR-E** |
| **WF** | 0.06 (0.08) Aa | 0.04 (0.01) Aa | 0.04 (0.01) Aa | 0.04 (0.01) Aa |
| **NaF** | 0.05 (0.01) Aa | 0.05 (0.02) Aa | 0.03 (0.01) Aa | 0.04 (0.01) Aa |
| **SnF2** | 0.04 (0.02) Aa | 0.08 (0.13) Aa | 0.04 (0.01) Aa | 0.04 (0.02) Aa |
| Upper case letters compare toothpastes in each surface. Lowercase letters compare surfaces in each toothpaste (p < 0.05). SD, standard deviation. |

**Table 7**. **Mean (SD) carbonate/phosphate ratios in enamel surfaces by Raman analysis (200 × 200 µm).**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Factors** | **DRMGIC-C** | **DRMGIC –E** | **DCR-C** | **DCR-E** |
| **WF** | 0.33 (0.20) Bb | 0.35 (0.05) Aab | 0.42 (0.07) Aa | 0.29 (0.04) Ab |
| **NaF** | 0.42 (0.06) Aa | 0.36 (0.08) Aab | 0.39 (0.04) Aa | 0.26 (0.08) Ab |
| **SnF2** | 0.45 (0.07) Aa | 0.31 (0.08) Ab | 0.42 (0.06) Aa | 0.25 (0.09) Ab |
| Upper case letters compare toothpastes in each surface. Lowercase letters compare surfaces in each toothpaste (p < 0.05). SD, standard deviation. |