

Department of Endodontics, Biruni University, İstanbul, Türkiye

AIM or PURPOSE: The aim of the present study was to assess the efficacy of chemical and mechanical techniques for removing debris from files during root canal treatment.

MATERIALS and METHOD: This study was approved by the ethics committee of Biruni University (2023/80-10). Forty extracted human single-rooted teeth were used. For determining apical debris extrusion, a model similar to Myers and Montgomery was used during the mechanical preparation. The teeth were randomly divided into four groups as three experimental and one control (n=10). The experimental groups for removal of debris from files during the preparation were: Sodium hypochlorite (NaOCl) impregnated sponge, saline impregnated sponge and dry sponge. The mechanical preparation was performed with step-back technique by using K-files apically and coronally to size 30 and 60, respectively. The teeth were irrigated with 2.5 ml distilled water on each file change and finally removed from the Eppendorf tube. Then, all the tubes were incubated at 105 °C for 12 hours to allow the evaporation of moisture before weighing the dry debris. The debris that was extruded apically was collected in preweighted tubes and compared by an electronic balance. Kolmogorov-Smirnov and ANOVA tests were used for statistical analysis.

RESULTS: NaOCl impregnated sponge group was found significantly higher than other groups regarding the extrusion of apical debris (p<0.001). There were no significant difference between the other groups (p>0.05).

CONCLUSION(S): NaOCl impregnated sponge was associated with more debris extrusion in comparison with the other methods. Therefore, one of the other three methods can be preferred as debris removal technique.

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Filling ability and bond strength of calcium silicate-based materials

Hakan Göktürk^{*1}, İsmail Özkoçak², Mert Ocak³, Seda Tan İpek⁴, Burak Bilecenoglu⁵

¹Department of Endodontics, Faculty of Dentistry, Istanbul Health and Technology University, İstanbul, Türkiye; ²Department of Endodontics, Faculty of Dentistry, Istanbul Medeniyet University, İstanbul, Türkiye; ³Körfez Oral Dental Health Center, Ministry of Health, Kocaeli, Türkiye; ⁴Department of Basic Medical Sciences, Faculty of Dentistry, Ankara University, Ankara, Türkiye; ⁵Department of Basic Medical Sciences, Faculty of Dentistry, Ankara Medipol University, Ankara, Türkiye

AIM or PURPOSE: This study aimed to evaluate the effect of different application methods of various calcium silicate-based materials on the filling ability and bond strength in retrograde cavities.

MATERIALS and METHOD: After Ethics Committee approval, 110 single-rooted-teeth were endodontically treated. After root-end resection and apical preparation, the specimens were separated into eleven groups: Biodentine, MTA Angelus, MTA Fillapex, MTA Repair HP, MTA Fillapex+ MTA Repair HP,

MTA Flow Thick, MTA Flow Putty, MTA Flow Thick + MTA Flow Putty, TotalFill BC RRM Paste, TotalFill BC RRM Putty, TotalFill BC RRM Paste + TotalFill BC RRM Putty. Using a Micro-CT scanner and tridimensional images reconstructed, the filling ability of materials (the volume percentage of gaps and voids) was calculated. After, two slides of root tip discs were created. Push-out bond strength was measured using a universal testing machine. Also, the relationship between the total volume of void% and push-out bond strength was examined.

RESULTS: All samples presented voids and gaps. There was no statistical difference regarding the volume of void%. Total-Fill BC RRM Paste had the highest volume of gaps. MTA Fillapex exhibited significantly the lowest bond strength than other groups. MTA Angelus had a significantly higher bond strength than other groups except for MTA Repair HP, Biodentine, and TotalFill BC RRM Putty. There was no significant correlation between the total volume of porosity% and push-out bond strength.

CONCLUSION(S): While the adhesion capacity of the investigated materials significantly decreased when the prior application of paste before delivery of putty, the change in volume of void% was statistically insignificant.

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Tissue Friendly Dentine Treatments (In Vitro Study)

Hala Fayed khalil^{*1}, Nadia Ezz El Din Metwalli², Sara Magdy²
¹Endodontic Department, Faculty Of Dentistry, The British University in Egypt, El Shrouk, Cairo, Egypt; ²Pediatric Dentistry and Dental Public Health Department, Faculty Of Dentistry, The British University in Egypt, El Shrouk, Cairo, Egypt

AIM or PURPOSE: Non biocompatible Irrigants will cause disintegration of cell proliferation, adhesion and enzyme systems in the area of contact and cause periodontal tissue irritation, damage and delayed wound healing. Human Periodontal Ligament Fibroblast cells are the first cells that face the irrigation solutions periapically. In a search for a stem cell friendly irrigation, this study was designed to compare sodium hypochlorite to HEDP Dual rinse Solution and Curcumin.

MATERIALS and METHOD: The study is registered (FD BUE REC 21-032). It encompass two parts using 20 days confluent stem cells: Part I Determination of sample cytotoxicity on cells: At the established times, media was mixed with MTT solution. Optical density at 560nm was read and subtracted from background at 620nm, using Spectrophotometer. Part II Determination of cell proliferation: At the established times, cells were harvested, stained with 0.1 ml of trypan blue solution in buffer and total number of cells and number of viable cells were counted by hemocytometer: Data were statistically analyzed for normality. Homogeneity of variances was tested using Levene's test followed by one-way ANOVA and Tukey's post hoc test.

RESULTS: HEDP recorded best results in the study. At 1 and 5 minutes group (I) HEDP recorded the best value in MTT assay