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Objective: Primary objective of this invitro study was to determine the effect of mandibular premolar pre and post access cavity preparation and shaping on pericervical dentin thickness [PCD] and the secondary objective was to compare the remaining PCD thickness among experimental groups shaped with different files based on varying cross sectional designs and principles.

Materials and Methods: Twenty seven permanent mandibular first premolar teeth with closed apices were used for the study. Preoperative CBCT scan of each sample was done. PCD thickness was measured at the level of CEJ, as an average of shortest distance from the canal outline to the closest adjacent root surface, measured on facial, lingual, mesial, and distal surfaces. Samples were divided into three groups of nine teeth each. Group 1: Traditional access cavity Group 2: Conservative access cavity Group 3: Ultra-conservative access cavity Each group was again be subdivided into three (three teeth per subgroup). Subgroup 1: K File (Dentsply Maillefer) Subgroup 2: ProTaper Gold (Dentsply Sirona) Subgroup 3: TruNatomy (Dentsply Sirona) Cleaning and shaping of pulp space were done for all the specimens in each group [Subgroup 1 - apical enlargement up to ISO K file size 25 and stepback up to ISO K file size 45, Subgroup 2 – up to ProTaper Gold F2, Subgroup 3 – up to TruNatomy PRIME]. For all groups 3% NaOCl, 17% EDTA and 0.9% Isotonic Saline solution were used as irrigants. Post instrumentation CBCT scans were made and PCD thickness was measured as mentioned.

Statistical Analysis: One-way ANOVA test.

Results: Different access cavity designs and instrumentation impact the remaining PCD thickness. Pericervical dentin was preserved more in ultra-conservative group using TruNatomy file system.

Conclusion: Different access cavity designs and instrumentation impact the remaining PCD thickness. In this study, pericervical dentin was preserved more in ultra-conservative group using TruNatomy file system.

Abstract 42

Crack formation in root dentin associated with four different rotary instrumentation systems: An *in vitro* study

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Objective: The objective of this study was to compare the incidence of crack formation on root dentin after shaping with four shaping files based on offset shape in cross section, thermal treatment, variable cross - section and slim NiTi wire design.

Materials and Methods: Forty freshly extracted permanent mandibular first premolar teeth were selected. Samples were divided into four groups (n = 10), Group 1 – One-curve (Micro-Mega) Group 2 – TruNatomy (Dentsply Sirona) Group 3 – ProTaper Gold (Dentsply Sirona) Group 4 –. ProTaper Next (Dentsply Sirona) Shaping of pulp space were done for all specimens in each group [Group 1 – with One-Curve, Group 2 -TruNatomy PRIME, Group 3 - up to ProTaper Gold F2, Group 4 – up to ProTaper Next X2] Roots were sectioned horizontally of length 4mm, from coronal, middle and apical third using diamond disc. All slices were then viewed under CBCT.

Statistical Analysis: Chi-square test.

Results: TruNatomy files inflicted less dentinal cracks, followed by one curve, ProTaper Next and ProTaper Gold. Crack formation were more in the apical third when compared to middle and coronal thirds.

Conclusion: All shaping files might inflict dentinal cracks. In this study, single file system induced less dentinal cracks in coronal, middle and apical third of the pulp space than multiple file system.

Abstract 43

Effect of different irrigation agitation techniques on postoperative pain in permanent anterior teeth with symptomatic irreversible pulpitis: A randomized controlled trial

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Aim: The randomized controlled trial compared the effect of Conventional needle irrigation (positive pressure irrigation) and EndoVac irrigation (true apical negative pressure irrigation) on the incidence of postoperative pain following biomechanical preparation in the permanent maxillary anterior teeth with symptomatic irreversible pulpitis.

Materials and Methods: Fifty patients of the age group 18-50 years, with symptomatic irreversible pulpitis were selected for the study. The subjects were randomly allocated to two groups, Group 1 (Conventional needle irrigation) and Group 2 (EndoVac irrigation) according to the final irrigation methods performed during root canal preparation. The preoperative pain was assessed prior to the procedure. In group 1, root canal irrigation was performed using a syringe and a 27-G open-ended needle (Dispovan). In group 2, the EndoVac system (Kerr Endodontics) was used for irrigation. Postoperatively, the patients were prescribed ibuprofen 200 mg to take every 8 hours if required. Pain levels were assessed by an analog scale questionnaire after 6, 12, 24, and 48 hours. The amount of ibuprofen taken within these intervals was recorded.

Results: The data were subjected to Mann-Whitney test and Chi-square test for intergroup analysis and Repeated Measures ANOVA for intragroup analysis. At 12-, 24-, and 48-hour time intervals, group 1 patients reported more intense postoperative pain than patients in group 2 ($p < .05$). There was no significant difference between the 2 groups at the first 6- hour time interval ($p > .05$), and in both groups the intensity of postoperative pain decreased over time. The number of analgesics taken was significantly higher in the conventional needle irrigation group ($p < .05$).

Conclusion: The use of the apical negative pressure irrigation system, EndoVac, resulted in significantly less postoperative pain and necessity for analgesic medication than a conventional needle irrigation protocol. From the results of this study, it was concluded