EVALUATION OF OBTURATION QUALITY USING GUTTA-PERCHA AND A RESIN-BASED MATERIAL WITH DIFFERENT TECHNIQUES

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ABSTRACT

Introduction: Gutta-percha (GP) has been accepted as the "gold standard" root filling material. It is the material against which most others are compared. The adhesive potential of GP to radicular dentine has been shown to be far from satisfactory. Therefore, resin-based materials that address many of the limitations of the GP/sealer combinations have been introduced. They are claimed to produce the so-called "monoblock" that is a gap-free union between core material and sealer, which adheres and penetrates into dentinal tubules. Examples of these resin-based filling materials include Resilon, EndoREZ and Guttaflow.

Objectives: The objectives of this study were to evaluate and compare the obturation quality in canals obturated with a GP/AH Plus® and a resin-based material, EndoREZ® (ER) through assessments of: apical extrusion of obturation materials; percentage of canal area occupied by core filling materials versus sealer + voids; and adaptation of obturation materials to the canal walls.

Materials and methods: Ninety-six mandibular premolars were randomly divided into two groups (n=48 each): GP and ER groups. Each group was further divided into 3 subgroups (n=16) according to different obturation techniques: Cold lateral compaction (CLC), warm lateral compaction (WLC) and single cone (SC). Apical extrusion was compared with Chi-square test for any association with the type of filling materials and techniques used. The teeth were subsequently embedded in resin, with one sample being selected randomly and sectioned longitudinally for scanning electron microscopy (SEM). All other samples were sectioned horizontally at 1, 3, 6 and 9 mm from the obturated canal terminus. All sections were viewed under a stereomicroscope (OLYMPUS szx7, Olympus Corp., Tokyo, Japan) at 40× magnification and micrographs were obtained. The area occupied by core filling material was determined using Cell^ D software (OLYMPUS Soft Imaging Solutions GmbH, 2008, Munster).

Then, for each section, the ratio of combined area of sealer + voids to cross-sectional area of root canal was calculated. Data were analyzed using two-way repeated measure, Wilcoxon and Mann-Whitney tests.

Results: There was no statistically significant difference in the incidence of material extrusion between materials and compaction techniques used. The SC group was not analysed because no extrusion was found for both materials. In CLC, the percentage of ER core filling material was significantly higher than the percentage of GP core filling material at 1 mm (P=0.005) and 3 mm (P=0.023) levels. In WLC, the percentage of ER core filling material was significantly higher than the percentage of GP core filling material at the 1 mm (P=0.029), 3 mm (P=0.006) and 9 mm (P=0.007) levels. In SC, the percentage of ER core filling materials was significantly higher than the percentage of GP core filling material at all levels: 1 mm (P=0.001), 3 mm (P=0.000), 6 mm (P=0.000) and 9 mm (P=0.000). SEM observation at different magnification showed that ER points/ER sealer seemed to suggest a better adaptation to dentine as compared to gutta-percha/AH Plus.

Conclusions: The resin-based material was superior to the gutta-percha in the percentage of core filling material that occupied the canal filled area.

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DECLARATION

I hereby declare that this dissertation/thesis entitled **"EVALUATION OF OBTURATION QUALITY USING GUTTA-PERCHA AND A RESIN-BASED MATERIAL WITH DIFFERENT TECHNIQUES."** is a genuine research carried out by my own independent work except where acknowledged in the text or by reference.

No part of this work has been submitted for a degree or diploma to this or any other university.

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List of figures

List of tables