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A comparative evaluation of apical seal associated with ultrasonic retrograde cavities filled with bioactive material: *In vitro* study

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Aim: The aim of this study was to evaluate and compare the apical microleakage around retrograde cavities prepared with ultrasonic technique and filled with (Biodentine™).

Materials & Methods: 40 extracted single rooted human permanent maxillary teeth with mature apices were selected. The roots were prepared chemo-mechanically using k-files with crown-down technique and then obturated with lateral condensation gutta-percha technique. Teeth were divided into four main groups according to the cavity preparation method either manual or ultrasonic technique: Group A (n=10): A class I retrograde cavity at root end was prepared with traditional hand piece equipped and placement of Biodentine with manual condensation. Group B (n=10): A class I retrograde cavity at root end was prepared with piezoelectric ultrasonic device equipped with ultrasonic tip with only manual compaction of the material. Group C (n=10): Traditional hand piece and placement of Biodentine using both manual compaction and 5 second ultrasonic activation. Group D (n=10): Piezoelectric ultrasonic device and placement of Biodentine with both manual compaction and 5 second ultrasonic compaction. The teeth were immersed in 1% aqueous Methylene blue dye for 72 hours. Then they were sectioned longitudinally with a diamond disc and the depth of dye penetration was examined under high magnification 20X.

Results: Statistical analysis showed a highly significant difference in microleakage among the tested groups in which piezoelectric technique has proved superiority in retrograde cavity preparation and compaction of Biodentine when dye penetration scores were compared. So microleakage was highest with cavities prepared with hand piece and manual application of retrograde material group A (2.73 ± 0.39) followed by microprepared cavities group C (1.86 ± 0.16), and it was lowest with ultrasonically-prepared cavities group B (1.09 ± 0.28) and group D (0.26 ± 0.19).

Conclusion: Ultrasonic preparation produced significantly less microleakage than conventional method. Also less microleakage was observed with ultrasonic compaction of Biodentine when compared with conventional method of compaction.

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