ASSESSMENT OF APICAL SEALING ABILITY OF RETROGRADE FILLING MATERIALS WITH GIC, MTA, BIODENTINE AND BIOAGGREGATE: AN IN VITRO STUDY

AIM: The aim and objective of this in vitro study was to evaluate and compare the sealing ability of four different retrograde filling materials by dye penetration method using stereomicroscope.

MATERIALS AND METHODS: Eighty extracted human single rooted premolars with single root canal were collected and decoronated at the cementoenamel junction (CEJ). Cleaning and shaping was done with ProTaper rotary file system upto F3 size and obturation was carried out using F3 gutta-percha point and AH plus root canal sealer. Thereafter the apical 3mm of the root-end of the teeth was resected using diamond disc and retrograde cavity was prepared using ultrasonic Satelac Retrotips (Acteon S13 RD, S 14 LD). The samples were then randomly divided into four groups of 20 samples each according to the material used for retrograde filling. In Group I, the samples were retrofilled with light cure Glass Ionomer Cement (GC Corporation), Group II with Mineral Trioxide Aggregate (MTA, Angelus), Group III with Biodentine (Septodent, France) and Group IV with BioAggregate (iRoot BP plus, IBC, Vancouver, Canada). These retrofilled samples were stored in sealed containers at 37 degree centigrade and 100% humidity for 24 hours. The samples were then immersed in 0.2% rhodamine B dye for 24 hours, washed, dried and sectioned longitudinally. These sectioned samples were analysed under stereomicroscope and the depth of dye penetration was evaluated in millimetres for each group using Digimizer Image Analysis Software.

RESULTS: The results showed that Group IV samples retrofilled with BioAggregate had the least dye penetration among all the four groups, followed by Group II MTA, Group III Biodentine and Group I GIC samples.

CONCLUSION: All the four tested materials showed dye penetration, indicating the sign of microleakage. The newly introduced bioceramic based material, BioAggregate showed better apical sealing ability as a retrograde filling material.

KEY WORDS: Apical seal, retrograde filling materials, microleakage, dye penetration, Glass Ionomer Cement, Mineral Trioxide Aggregate, Biodentine, BioAggregate.