

ABSTRACT

Aim:

To evaluate and compare the push-out bond strength and failure patterns of two different root end repair materials - Endosequence Root Repair Material fast set putty (ERRM) and Biodentine, stored in phosphate buffered saline solution.

Materials and methods:

Thirty extracted single rooted human maxillary central incisors with mature apices were selected, cleaned, sectioned in middle third of the root transversely using diamond disc to produce 60 root discs. Canal lumen of all the root discs were prepared to produce a standardized canal diameter of 1.5mm by GG drills No 1 to 5. The root discs were soaked in 17% EDTA and 3 % sodium hypochlorite for 3 minutes and then rinsed with normal saline and dried. Then they were divided into two groups of 30 samples in each as Group A (n=30) and Group B (n=30). The canal lumen was filled with Endosequence Root Repair Material fast set putty in Group A and Biodentine in Group B . Root discs were covered in gauze soaked in Phosphate Buffered Saline solution (PBS) for 28 days period and stored in incubator with 100% humidity at 37°C room temperature. The PBS solution was changed every 3 days.

The root discs were submitted to the push-out test with Universal Testing Machine. The maximum force applied to the filling material before deboning was evaluated in Newton. To express the bond strength in megapascals (MPa), the force recorded in Newton (N) was divided by the canal wall area in mm². The failure mode was analyzed by stereomicroscope at 25X magnification. The test results were statistically analyzed.

Results:

The push out analysis results showed that ERRM fast set putty had significantly higher bond strength ($p < 0.001$) than Biodentine after 28 days of incubation period. ERRM fast set putty had mean bond strength of 18.30 MPa and Biodentine had mean bond strength of 8.57 MPa.

While analyzing the failure pattern of the samples, both ERRM fast set putty and Biodentine had produced all the three types of failure modes. But cohesive failure mode was found to be present in maximum number in both groups compared.

Conclusion:

Within the limitation of the present study, it can be concluded that

1. Endosequence Root Repair Material fast set putty was found to have good bond strength when compared to Biodentine.
2. Both Endosequence Root Repair Material and Biodentine showed better adhesive bond to the dentinal wall.
3. Endosequence Root Repair Material fast set putty can be best used as root end repair material owing to its good adhesion and higher bond strength.

Keywords:

Push-out bond strength, Endosequence Root Repair Material fast set putty, Biodentine, Phosphate Buffered Saline solution, Universal Testing Machine.