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Original Research

Evaluating sealing ability of three different furcation perforation repair materials

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ABSTRACT:

Background: Perforations can be characterized as mechanical or obsessive correspondence between the root waterway framework and the outside tooth surface. This study evaluated sealing ability of three different furcation perforation repair materials. **Materials & Methods:** The present study was conducted on 30 single rooted mandibular premolars. Furcation perforations of 1 mm in diameter were created perpendicular to the centre of the pulp chambers. Group I had MTA, group II had light cured GIC and group III had biodentine. The sealing ability for the repair of furcal perforation was assessed using spectrophotometry. **Results:** The mean optical density of dye absorbance values in group I was 0.032, in group II was 0.028 and in group III was 0.025. The difference was significant (P< 0.05). **Conclusion:** Authors found that sealing ability of MTA was maximum followed by light cure GIC and biodentine.

Key words: Biodentine, GIC, MTA.

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INTRODUCTION

Perforations can be characterized as mechanical or obsessive correspondence between the root waterway framework and the outside tooth surface.[1] Ingle revealed that punctures were the second most noteworthy reason for endodontic disappointment and record for 9.6% of all fruitless cases. Perforations might be an aftereffect of endodontic control, or they might be because of inward or outside resorption.[2] Furcal punctures are one of the major iatrogenic difficulties that could prompt endodontic disappointment. Prompt fixing of punctures with appropriate materials lead to fruitful treatment. In this way an open, prudent and successful, biocompatible fixing material is necessary.[3]

Perforations from the pulp to the surrounding periodontium may occur from resorptive defects, caries or iatrogenic events during endodontic treatment.[4] Factors that affect treatment prognosis of perforation repair include the level, location and size of the perforation, the time delay before perforation repair and the material used to seal the perforation. Biocompatible materials with a short setting time and good sealability should be selected. The location of the perforation is of crucial importance.[5]

Mineral trioxide aggregate (MTA) has received particular attention as a perforation repair material. Glass ionomer cements are used in surgical endodontics and they have been advocated for use as a perforation repair material as well. Biodentine (Septodont, France) is another calcium silicate based helpful concrete with dentin like mechanical properties, which can be utilized as a dentin substitute on crowns and roots like how MTA is utilized.[6] This study evaluated sealing ability of three different furcation perforation repair materials.

MATERIALS & METHODS

The present study was conducted in the department of endodontics. It comprised of 30 single rooted mandibular premolars. The study was approved from institutional ethical committee.

Furcation perforations of 1 mm in diameter were created perpendicular to the centre of the pulp chambers. Perforation depth was measured with a micrometer from the pulp chamber floor to the

furcation. # groups were prepared based on type of material used. Group I had MTA, group II had light cured GIC and group III had biodentine. The sealing ability for the repair of furcal perforation was assessed using spectrophotometry. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

DISCUSSION

Perforations create an artificial communication between the root canal system and the supporting tissues of the teeth. If the perforation lies coronal of the crestal bone it will be easy to treat and have a good prognosis. Perforations near the crestal bone are susceptible to epithelial migration and rapid pocket formation and treatment of these has a low success rate.[7] Close proximity to the gingival sulcus may lead to endodontic-periodontal problems through contamination of the perforation with bacteria from the oral cavity through the sulcus. It is important that the level of crestal bone and epithelial attachment is taken into consideration. A wide range of materials have been utilized to fix aperture surrenders with fluctuating degrees of achievement.[8] These materials incorporate Zinc Phosphate concrete, Glass Ionomer concrete, Light Cure Glass Ionomer, Indium Foil, Amalgam, Cavit, Guttapercha, Calcium Hydroxide, Light Cure Calcium Hydroxide, Tricalcium Phosphate, Teflon Disk, Dentin Chips, Zinc Oxide Eugenol, Ketac silver, Dycal, Hydroxyapatite, Super EBA, Light Cure Composite sap, Calcium Enriched Mixture cement.[9] This study evaluated sealing ability of three different furcation perforation repair materials.

RESULTS

Table I Distribution of teeth

Groups	Group I	Group II	Group III
Method	MTA	Light cured GIC	Biodentine
Number	10	10	10

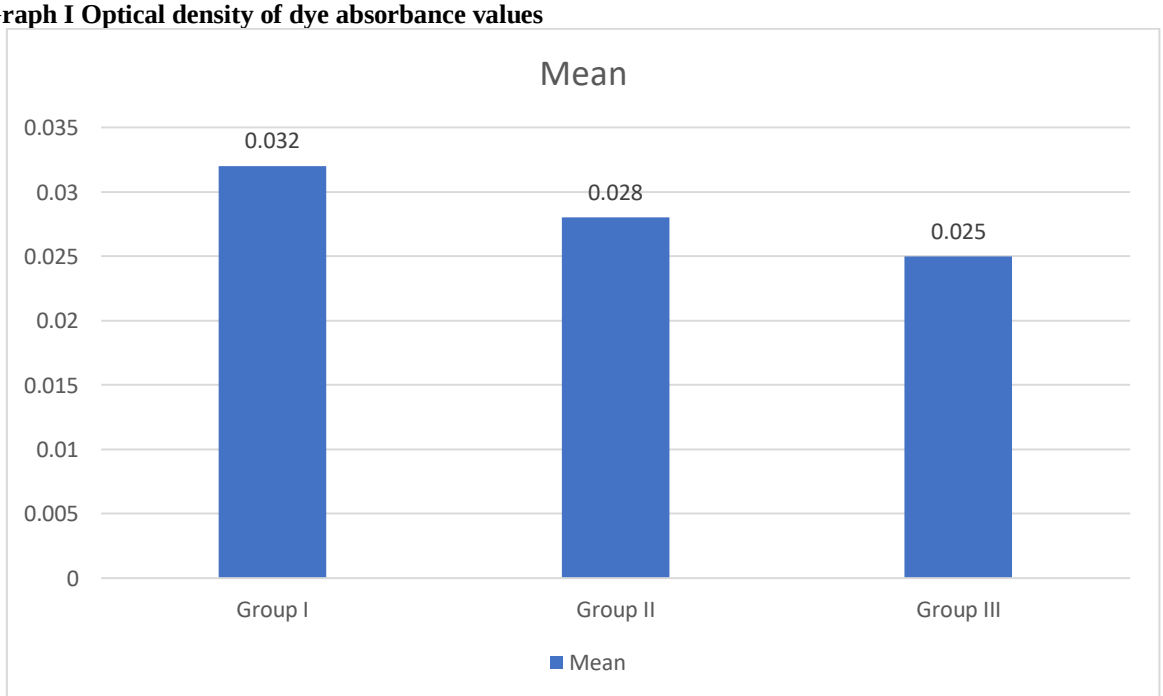
Table I shows type of material used in the study.

Table II Optical density of dye absorbance values

Groups	Mean	P value
Group I	0.032	0.02
Group II	0.028	
Group III	0.025	

Table II shows that mean optical density of dye absorbance values in group I was 0.032, in group II was 0.028 and in group III was 0.025. The difference was significant (P< 0.05).

Graph I Optical density of dye absorbance values



In this study we used mineral trioxide aggregate (MTA), GIC and biodentine material for perforation repair. Katge et al[10] compared sealing ability of mineral trioxide aggregate (MTA) Plus™ and Biodentine™ for the repair of furcal perforation in primary molars using spectrophotometry. Access opening was done for all ninety extracted teeth. Perforation was made in furcation area in all the teeth. The sample size consisted of ninety extracted teeth. They were divided into four groups, Group 1 (n = 30) in which perforations were repaired with MTA Plus™, Group 2 (n = 30) in which perforations were repaired with Biodentine™. The other two groups were considered as control groups, Group 3 (n = 15) in which perforations were left unsealed (positive control) and Group 4 (n = 15) without perforations (negative control). Dye extraction method was used to compare the sealing ability of MTA Plus™ and Biodentine™. The highest dye absorbance was seen in the positive control group with a mean value of 0.080 ± 0.033. The mean value of MTA Plus™ was 0.031 ± 0.026 and Biodentine™ was 0.024 ± 0.031.

We found that mean optical density of dye absorbance values in group I was 0.032, in group II was 0.028 and in group III was 0.025. Magala et al[11] included recently extracted mandibular molar teeth. The scores for microleakage were tested. 80% of the samples showed no leakage in MTA material, 5% of the samples showed no leakage in light cured GIC material and 90% of the samples showed no leakage in Biodentine material. Pair wise comparison -A significant difference is observed between MTA and light cured GIC materials with respect to dye penetration.

Lodeine et al[12] checked sealing ability of different repair materials and the pathway of bacterial penetration after closure of large pulp chamber floor perforations. The percentage of leaking samples was significantly higher in resin composite than in the other groups and the negative control group ($p < 0.05$). SEM inspection revealed the presence of bacteria in all leaking specimens. Bacteria were observed along the filling-dentine interface as well as in dentinal tubules at some distance from the filling.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that sealing ability of MTA was maximum followed by light cure GIC and biodentine.

REFERENCES

1. De Bruyne M, De Moor R. The use of glass ionomer cements in both conventional and surgical endodontics. Int Endod J 2004; 38: 129–136.
2. Maher W P, Johnson R L, Hess J, Steiman H R. Biocompatibility of retrograde filling materials in the ferret canine. Amalgam and IRM. Oral Surg Oral Med Oral Pathol 1992; 73: 738–745.
3. Torabinejad M, Hong C U, Pitt Ford T R, Kettering J D. Antibacterial effects of some root end filling materials. J Endod 1995; 21: 403–406.
4. Asgary S, Parirokh M, Eghbal M J, Brink F. Chemical differences between white and gray mineral trioxide aggregate. J Endod 2005; 31: 101–103.
5. Camilleri J, Montesin F E, Brady K, Sweeney R, Curtis R V, Ford T R. The constitution of mineral trioxide aggregate. Dent Mater 2005; 21: 297–303.
6. Ferris D M, Baumgartner J C. Perforation repair comparing two types of mineral trioxide aggregate. J Endod 2004; 30: 422–424.
7. Main C, Mirzayan N, Shabahang S, Torabinejad M. Repair of root perforations using mineral trioxide aggregate: a long-term study. J Endod 2004; 30: 80–83.
8. Breault L G, Fowler E B, Primack P D. Endodontic perforation repair with resin-ionomer: a case report. J Contemp Dent Pract 2000; 15: 48–59.
9. Aguirre, R., Eldeeb, M. E., & ElDeeb, M. E. Evaluation of the repair of mechanical furcation perforations using amalgam, gutta-percha, or indium foil. Journal of endodontics 1986; 12(6): 249-256.
10. Katge FA, Shivasharan PR, Patil D. Sealing ability of mineral trioxide aggregate Plus™ and Biodentine™ for repair of furcal perforation in primary molars: An in vitro study. Contemporary clinical dentistry. 2016;7(4):487.
11. Mangala TM, Pawar RR. Evaluating sealing ability of three different furcation perforation repair materials. Journal of Critical Reviews. 2020;7(7):658-61.
12. Lodiene G, Kleivmyr M, Bruzell E, Ørstavik D. Sealing ability of mineral trioxide aggregate, glass ionomer cement and composite resin when repairing large furcal perforations. British dental journal. 2011;210(5):7-12.