

ORIGINAL RESEARCH

Assessment of sealing Ability of two Different Restorative Materials Used as Coronal Sealants

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Received: 17 March, 2024

Accepted: 19 April, 2024

ABSTRACT

Background: Endodontic therapy aims to restore physiological normality to dental elements. Hence; the present study was conducted for assessing the sealing Ability of two Different Restorative Materials Used as Coronal Sealants. **Materials & methods:** 50 freshly extracted human maxillary first premolar was collected. Access opening was done followed by root canal preparation. Removal of the crowns was done at CEJ. Afterwards, two study groups were formed with 25 tooth specimens in each group as follows: Group A: 4 mm light cure composite resin group, and Group B: 4 mm GIC type II group. Coronal and mid segments of the canals were flared. The canals were dried and obturated. The coronal four mm of the canal over the gutta-percha received the following restorations over gutta-percha obturation. Placement of the roots was done in India ink for 48 h, rinsed with tap water. The maximum point of coronal dye penetration was measured from the CEJ under stereomicroscope. **Results:** The mean dye penetration assessment showed high value for group B in comparison to Group A. while comparing the results statistically, significant results were obtained. **Conclusion:** Composite group showed better results in comparison to GIC.

Key words: Coronal, Sealant, Restorative

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INTRODUCTION

Endodontic therapy aims to restore physiological normality to dental elements. Its success, however, depends on several steps; from the access surgery phase to the restoration of the dental element itself. Considering the large percentage of coronal microleakage-induced endodontic treatment failures, an adequate three-dimensional sealing is indicated, with the coronal portion being particularly important.¹⁻³

Several factors may lead to coronal microleakage, including premature loss of the temporary restoration, or an inadequate final restoration. Microleakage allows the oral microbiota to enter into the root canal system, which can cause the endodontic treatment to fail. Exposure of gutta-percha to saliva in the coronal chamber leads to the migration of bacteria and toxins towards the apex within a few days or hours, respectively.⁴⁻⁶ Thus, the addition of a coronal seal for

root canal fillings has been recommended. Lack of coronal seal can be a detrimental factor contaminating the obturated root canal, complicating the treatment outcome. From this perspective, it is important that the intracanal barrier should provide adequate coronal seal and prevent the entry of bacterial toxins into the root canal that compromises the success of the RCT.^{5,6} Hence; the present study was conducted for assessing the sealing Ability of two Different Restorative Materials Used as Coronal Sealants.

MATERIALS & METHODS

The present study was conducted for assessing the sealing Ability of two Different Restorative Materials Used as Coronal Sealants. 50 freshly extracted human maxillary first premolar was collected. Access opening was done followed by root canal preparation. Removal of the crowns was done at CEJ. Afterwards, two study groups were formed with 25 tooth

specimens in each group as follows: Group A: 4 mm light cure composite resin group, and Group B: 4 mm GIC type II group. Coronal and mid segments of the canals were flared. The canals were dried and obturated. The coronal four mm of the canal over the gutta-percha received the following restorations over gutta-percha obturation. Placement of the roots was done in India ink for 48 h, rinsed with tap water. The maximum point of coronal dye penetration was measured from the CEJ under stereomicroscope. Data was compiled and was assessed using SPSS software.

RESULTS

The mean dye penetration assessment showed high value for group B in comparison to Group A. while comparing the results statistically, significant results were obtained.

Table 1: Comparison of dye penetration variable

Dye penetration	Group A	Group B
Mean	6.96	9.17
SD	2.31	3.75
p-value	0.000 (Significant)	

DISCUSSION

Innovations in materials, equipments and techniques continue to sophisticate endodontic treatment procedures enhancing the incidence of predictable clinical success. However, in spite of these advances, clinical failures/shortcomings still persist.1 Concept of microleakage having an effect on the outcome of endodontic treatment has been known for more than 100 years. Early endodontic research focused on the quality of endodontic treatment to ensure long-term success and the effects of microleakage on endodontic treatments outcomes. Microleakage is defined as the “diffusion of the bacteria, oral fluids, ions and molecules into the tooth and the filling material interface” OR “defined as the clinically undetectable passage of bacteria, fluids, molecules or ions between tooth and the restorative or filling material.” Many studies emphasize that tooth filling materials are not fixed, inert and impenetrable borders but dynamic micro crevices, which contain busy traffic of bacteria, ions, and molecules.^{7- 9}Hence; the present study was conducted for assessing the sealing Ability of two Different Restorative Materials Used as Coronal Sealants.

The mean dye penetration assessment showed high value for group B in comparison to Group A. while comparing the results statistically, significant results were obtained. Parekh B et al compared the intra-orifice sealing ability of three experimental materials after obturation of the root canal system. Forty single rooted mandibular premolars were decoronated, cleaned, shaped and obturated. Gutta-percha was removed to the depth of 3.5 mm from the orifice with a heated plugger. Ten specimens each were sealed with Light Cure Glass Ionomer Cement (LCGIC), Flowable Composite (Tetric N-Flow), and Light Cure

Glass Ionomer Cement with Flowable Composite in Sandwich Technique along with a positive control respectively and roots submerged in Rhodamine-B dye in vacuum for one week. Specimens were longitudinally sectioned and leakage measured using a 10X stereomicroscope and graded for depth of leakage. According to the results of the present study LC GIC + Tetric N Flow demonstrated significantly better seal than LC GIC. However; there was no statistically significant difference in leakage between Tetric N-Flow and LCGIC+Tetric N-Flow groups. LCGIC+Tetric N-Flow was found to be superior over other experimental materials as intra-orifice barriers.¹⁰

In another study conducted by Divya et al, compared the sealing ability of glass ionomer cement (GIC), composite resin, gray mineral trioxide aggregate (GMTA) and white mineral trioxide aggregate (WMTA) when placed coronally as double - sealing material over gutta-percha in root canal treated teeth. A sample of 70 freshly extracted human single rooted teeth were cleaned, shaped and obturated with gutta-percha and AH Plus. The gutta-percha was reduced to a depth of 4 mm from the cemento enamel junction using hot plugger and standardized access cavities with 4 mm depth were prepared at the coronal ends of the roots. The specimens were randomly divided into four groups containing 15 teeth each depending on the restorations they received in the coronal cavity. The results were tabulated and analyzed using Kruskal-Wallis test and multiple comparison between each group was carried out using Mann-Whitney test. The groups sealed with GMTA and WMTA showed least dye penetration than other groups and the difference was statistically significant. Highest dye penetration was seen with groups sealed with GIC and was statistically significant compared with other three groups. The results showed that the GMTA and WMTA provided significantly better coronal seal when compared to other two restorations.¹¹

CONCLUSION

Composite group showed better results in comparison to GIC.

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