

Original Research

Impact of desensitizing agents on retention of crown with luting agents

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ABSTRACT:

Background: The present study was conducted for assessing the impact of desensitizing agents on retention of crown with luting agents. **Materials & methods:** A total of 90 human premolar teeth of almost similar size were selected for the study. The roots of the premolars were notched buccolingually with a diamond point for retention followed by were mounted in auto polymerizing acrylic resin block. Crown preparation was one and all the preparations were terminated in dentin. Three groups were made: Group A- control group, Group B: With "seal and protect" agent and group C: With "Tooth mouse" agent. The crowns were subjected to a vertical dislodgement force until failure on a universal testing machine. All the results were recorded and analysed by SPSS software. **Results:** Mean bond strength of the specimens of group A, group B and group C was 256.5 MPa, 238.6 MPa and 210.9 MPa respectively. Significant results were obtained while comparing the mean bond strength of the three study groups. **Conclusion:** There is slight reduction in the mean bond strength following exposure to the desensitizing agent.

Key words: Desensitizing, Crown, Luting

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INTRODUCTION

Dentistry is the health science that includes the study of basic principles and application of these principles to prevent deterioration of the oral structures and the use of pertinent clinical procedures to improve the oral health. Frequently patients exposed to fixed restorative procedures experience discomfort in the prepared teeth either during the treatment and sometimes following placement of restoration, which they perceived in the form of pain or other unyielding symptoms, which may be due to dentin hypersensitivity. Dentin hypersensitivity has been defined as short, sharp pain arising from exposed dentin typically in response to chemical, evaporative, thermal, tactile, or osmotic stimuli, which cannot be ascribed to any other form of dental defect or pathology. Earlier investigators stated that dentin hypersensitivity is an enigma being frequently encountered, yet ill understood. Desiccation, frictional heat generation during preparation, and

chemical irritation from the luting agent are important factors that increase the likelihood of hypersensitivity.¹⁻³

Retention is an important factor in determining the success and clinical service of FPDs. Optimal retention for extra-coronal restorations depends on the morphology of the prepared tooth and factors such as the degree of taper, the prepared surface area, roughness of the internal surfaces of crown, retentive grooves, texture of the treated surfaces, and the type of cement.⁴ Inadequate retention can lead to microleakage through the cement, development of secondary caries beneath the crown, cement washout beneath the crown, chipping and fracture of the crown, and the crown's eventual failure.⁴⁻⁶ Hence; the present study was conducted for assessing the impact of desensitizing agents on retention of crown with luting agents.

MATERIALS & METHODS

The present study was conducted for assessing the impact of desensitizing agents on retention of crown with luting agents. A total of 90 human premolar teeth of almost similar size were selected for the study. The roots of the premolars were notched buccolingually with a diamond point for retention followed by were mounted in auto polymerizing acrylic resin block. Crown preparation was one and all the preparations were terminated in dentin. Three groups were made: Group A- control group, Group B: With “seal and protect” agent and group C: With “Tooth mouse” agent. All the samples in each group were kept together to form a cube within an index. Impressions of the prepared teeth were made using a simultaneous dual-mix technique with an addition silicone impression material. Wax pattern was made and casting was done and was retrieved. All the cementations were done on the same day, immediately following the application of desensitizing agents. The crowns were subjected to a vertical dislodgement force until failure on a universal testing machine. All the results were recorded and analysed by SPSS software.

RESULTS

Mean bond strength of the specimens of group A, group B and group C was 256.5 MPa, 238.6 MPa and 210.9 MPa respectively. Significant results were obtained while comparing the mean bond strength of the three study groups.

Table 1: Comparison of bond strength

Bond strength (MPa)	Group A	Group B	Group C
Mean	256.5	238.6	210.6
SD	35.2	29.1	25.1
p- value	0.0001 (Significant)		

DISCUSSION

Retention of cast restoration is one of the basic principle criteria for success in fixed prosthodontics. It is mainly affected by the principles of tooth preparations and partially by variations in casting procedure, properties, and thickness of luting agents and postenvironmental stresses. Postcementation hypersensitivity is the most common problem encountered in the clinical practice because of the acidic nature of luting agents. In an effort to control postoperative sensitivity, a number of dentinal sealers have been described in the literature which is applied following crown preparation. These dentinal sealers may have an adverse or beneficial effect on retention of restoration, as these sealers may affect the bond strength of luting agents with the tooth structure. These sealers are basically glutaraldehyde and resin based. Sealing of dentinal tubules with resin-based sealer has been shown to greatly decrease hypersensitivity.⁷⁻⁹ Hence; the present study was conducted for assessing the impact of desensitizing agents on retention of crown with luting agents.

Mean bond strength of the specimens of group A, group B and group C was 256.5 MPa, 238.6 MPa and 210.9 MPa respectively. Significant results were obtained while comparing the mean bond strength of the three study groups. In a previous study conducted by Mapkar MA et al, authors assessed and compared the Effect of two desensitizing agents on crown retention using zinc phosphate cement. Thirty-three extracted human maxillary first premolar teeth were selected for the study, which were prepared using a special assembly and divided into three groups (i.e., ZP + U, ZP + G, and ZP) to compare the effect of Gluma (Heraeus-Kulzer, Germany) and Ultraseal (Ultradent, USA) on crown retention using zinc phosphate cement. It was seen that the group ZP + G was statistically significant with groups ZP and ZP + U. However, no such difference was observed between ZP and ZP + U. Both the agents can be used and prove effective when used with zinc phosphate cement. However, the major mode of failure was adhesive in nature with the cement being retained on both the crown and the tooth structure.¹⁰

Jalandar SS et al compared and evaluated the effect of two desensitizing agents on the retention of cast crowns when cemented with various luting agents. Ninety freshly extracted human molars were prepared with flat occlusal surface, 6 degree taper and approximately 4 mm axial length. The prepared specimens were divided into 3 groups and each group is further divided into 3 subgroups. Desensitizing agents used were GC Tooth Mousse and GLUMA® desensitizer. Cementing agents used were zinc phosphate, glass ionomer and resin modified glass ionomer cement. Individual crowns with loop were made from base metal alloy. Desensitizing agents were applied before cementation of crowns except for control group. Resin modified glass ionomer cement exhibited the highest retentive strength and all dentin treatments resulted in significantly different retentive values (In Kg.): GLUMA (49.02 ± 3.32) > Control (48.61 ± 3.54) > Tooth mousse (48.34 ± 2.94). Retentive strength for glass ionomer cement were GLUMA (41.14 ± 2.42) > Tooth mousse (40.32 ± 3.89) > Control (39.09 ± 2.80). For zinc phosphate cement the retentive strength were lowest GLUMA (27.92 ± 3.20) > Control (27.69 ± 3.39) > Tooth mousse (25.27 ± 4.60). The use of GLUMA® desensitizer has no effect on crown retention.¹¹

CONCLUSION

There is slight reduction in the mean bond strength following exposure to the desensitizing agent.

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