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Analysis of impact of desensitizing agents on the retention of crowns cemented with luting agents

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***Abstract*---**The present study was undertaken for assessing the impact of desensitizing agents on the retention of crowns cemented with luting agents. 40 freshly extracted mandibular molar teeth were selected. Two study groups were made: Group C: Control group-Glass ionomer cement; and Group G: Study group-GC Tooth Mousse desensitizer. Crowns were fabricated and were subjected under universal force testing machine. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Mean tensile bond strength of group C specimens was 49.1 Kg while mean tensile strength of Group 2 specimens was 47.1 Kg respectively. While comparing statistically, non-significant results were obtained. Application of desensitizing agents may be designated during

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fabrication of crowns as it will not affect the retentive ability of the luting cements.

***Keywords*---**luting agent, desensitizing agent, crown.

Introduction

Retention is an important factor in determining the success and clinical service of FPDs. The retention of crown is based on the presence of two almost parallel vertical surfaces from tooth preparation; previous authors suggested that the mean convergence angle between 22.4 and 25.3 degrees was clinically acceptable. Another authors recommended 5 - 12° taper to be ideal. 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.[1- 3]

Teeth which are prepared extensively for large amalgam restorations or crowns are at an enhanced risk of developing hypersensitivity because of the large number of tubules getting exposed during the preparation. Desiccation, frictional heat generation during preparation and chemical irritation from the luting agent are important factors that increase the likelihood of hypersensitivity.[4- 6]Retention of cast restoration is one of the basic principle criteria for success in Fixed Prosthodontics. It is mainly affected by principles of tooth preparations and partially by variations in casting procedure, properties and thickness of luting agents and post environmental stresses.[5- 7]Hence; the present study was undertaken for comparing the impact of desensitizing agents on the retention of crowns cemented with luting agents.

Materials and Methods

40 freshly extracted mandibular molar teeth were selected. Storing of all the specimens was done in normal saline. All the specimens were then thoroughly cleaned for removing surface deposits. Afterwards, the samples were stored in distilled water at room temperature. On the root surfaces, notches were created using diamond point. All the specimens were embedded in a metal mold partially filled with auto-polymerizing acrylic resin. Storing of the specimens was done in distilled water. Uniform taper was obtained by the design of a clamp which was able to secure a high-speed air-rotor hand piece. Two study groups were made: Group C: Control group-Glass ionomer cement; and Group G: Study group-GC Tooth Mousse desensitizer. The impressions were made and were poured in Type IV die stone. Crowns were fabricated and were subjected under universal force testing machine. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software.

Results

In the present study, a total of 40 freshly extracted molar were enrolled and were broadly divided into two study groups; Group C: Glass ionomer cement (Control), and Group G: Glass ionomer cement (GC Tooth Mousse desensitizer). Mean tensile bond strength of group C specimens was 46.8 Kg while mean tensile strength of Group G specimens was 45.3 Kg respectively. While comparing statistically, non-significant results were obtained.

Table 1
Comparison of mean tensile strength

Tensile strength	Group 1	Group 2
Mean	49.1	47.1
SD	5.1	5.8
p- value	0.81	

Discussion

Post-operative sensitivity often occurs after the cementation of fixed partial dentures. Factors related to post-cementation sensitivity include aggressive tooth preparation, inadequate provisional restorations, and removal of the smear layer by acid etching, and type of cement, and there is an inverse relationship between sensitivity and patient age. Several substances and methods have been suggested for reducing hypersensitivity, such as immediate dentin sealing. The application of desensitizers to the prepared abutment teeth may be very effective in relieving post-cementation sensitivity for FPDs and is beneficial in terms of patient comfort. Several agents have been used prior to cementation to decrease post-cementation sensitivity.[8- 10]Hence; the present study was undertaken for comparing the impact of desensitizing agents on the retention of crowns cemented with luting agents.

In the present study, a total of 40 freshly extracted molar were enrolled and were broadly divided into two study groups; Group C: Glass ionomer cement (Control), and Group G: Glass ionomer cement (GC Tooth Mousse desensitizer). Mean tensile bond strength of group C specimens was 46.8 Kg while mean tensile strength of Group G specimens was 45.3 Kg respectively. JalandarSS et al 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. Under tensional force the crowns were removed using an automated universal testing machine. 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. GC Tooth Mousse does not affect the retentive ability of glass ionomer and resin modified glass ionomer cement, but it decreases the retentive ability of zinc phosphate cement.[10]

In the present study, while comparing statistically, non-significant results were obtained.MausnerIK et al investigated the effects of Imperva bonding agent and All-Bond desensitizing agent on the retention of artificial crowns. The cements selected for this study were: zinc phosphate, polycarboxylate, glass ionomer, and resin luting agents. Extracted, intact, human molars were mounted in autopolymerizing acrylic resin and prepared for complete cast copings. Thirty-two teeth were treated with All-Bond desensitizing agent, 32 teeth with Imperva bonding agent, and 32 remained untreated. Castings were cemented and tested on an Instron testing machine. The results demonstrated a significant reduction in retention when All-Bond desensitizing agent was used with polycarboxylate cement and some reduction with zinc phosphate cement. Imperva bonding agent demonstrated less retention with glass ionomer cement.[11]

Conclusion

Application of desensitizing agents might be designated during fabrication of crowns as it will not affect the retentive ability of the luting cements.

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