

**ORIGINAL RESEARCH****Evaluation of effect of desensitizing agents on the retention of crowns cemented with luting agents: A clinical study**

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**ABSTRACT**

**Background:** The present study was undertaken for comparing the impact of desensitizing agents on the retention of crowns cemented with luting agents.

**Materials & methods:** 80 freshly extracted mandibular molar teeth were selected. Two study groups were made: Group 1: Control group-Glass ionomer cement; and Group 2: 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.

**Results:** 80 freshly extracted molar were enrolled and were broadly divided into two study groups; Group 1: Glass ionomer cement (Control), and Group 2: Glass ionomer cement (GC Tooth Mousse desensitizer). Mean tensile bond strength of group 1 specimens was 46.8 Kg while mean tensile strength of Group 2 specimens was 45.3 Kg respectively. While comparing statistically, non-significant results were obtained.

**Conclusion:** From the above results, the authors concluded that application of desensitizing agents might be designated during fabrication of crowns as it will not affect the retentive ability of the luting cements.

**Key words:** Luting agent, Desensitizing agent, Crown

**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.<sup>1-3</sup> Preservation of natural tooth structure has always been the primary goal of the dental profession. In an attempt to provide functional, mechanically sound and esthetic restorations, attention to comfort during and after the procedure has often been overlooked. Preparation of vital teeth results in millions of dentinal tubules being exposed. Dentin permeability may cause damage to the underlying pulpal cells. This leads to an increased possibility of postoperative dentin hypersensitivity. Hypersensitivity pain caused is transient, once the stimulus is removed; the pressure within the tubule returns to normal, and the pain subsides. The methods of treatment of dentin hypersensitivity are the tubular occlusion, blockage of nerve activity or remineralization. Bonding agents, varnish, fluoride treatment, calcium phosphate precipitation, oxalates, casein phosphopeptide (CPP)-amorphous calcium phosphate (ACP), LASER and Pro-Argin may be used as desensitizing agents.<sup>4-6</sup> Hence; the present study was undertaken for comparing the impact of desensitizing agents on the retention of crowns cemented with luting agents.

## MATERIALS & METHODS

80 freshly extracted mandibular molar teeth were selected. All the teeth were stored in normal saline till further use. Thorough cleaning of all the specimens was done 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 1: Control group-Glass ionomer cement; and Group 2: Study group-GC Tooth Mousse desensitizer. The impressions were made and were poured in Type IV die stone. The dies were recovered after one hour. Die hardener was applied on the finish line area to prevent abrasion by waxing instruments during the fabrication of the wax pattern. Adaptation of the margins was done followed by maintenance of wax coping. In the group 2, a generous layer of GC Tooth Mousse was applied on the prepared tooth surfaces using an applicator tip and left it undisturbed for a minimum of 3 minutes. 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 80 freshly extracted molar were enrolled and were broadly divided into two study groups; Group 1: Glass ionomer cement (Control), and Group 2: Glass ionomer cement (GC Tooth Mousse desensitizer). Mean tensile bond strength of group 1 specimens was 46.8 Kg while mean tensile strength of Group 2 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	46.8	45.3
SD	4.6	5.2
p- value	0.75	

## DISCUSSION

In the process of tooth preparation to receive the crown, the loss of the tooth structure leads to the pain and sensitivity, which is the most common complaint of patients either during tooth

preparation or after the procedure. This is caused by dentin hypersensitivity, described as a sharp pain that lingers for some time. This pain is usually felt when intaking cold drinks or with the impact of the air or any other stimuli that lead to fluid movement in the dentinal tubules. The preparation of the tooth and the luting cement are both key factors that may have an impact on the dental hypersensitivity. The restorations luted with cements like zinc phosphate and glass ionomer result in partial removal of the smear layer owing to their acidic nature. The cement can displace an equal amount of dentinal fluid, which may cause excessive hydrostatic pressure leading to post-cementation sensitivity. The orifices of the exposed tubules can be sealed off with polymerizable products like dentin bonding agents or with non-polymerizable formulations, which do not require light activation.<sup>7-9</sup> 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 80 freshly extracted molar were enrolled and were broadly divided into two study groups; Group 1: Glass ionomer cement (Control), and Group 2: Glass ionomer cement (GC Tooth Mousse desensitizer). Mean tensile bond strength of group 1 specimens was 46.8 Kg while mean tensile strength of Group 2 specimens was 45.3 Kg respectively. While comparing statistically, non-significant results were obtained. Dewan et al assessed the retention of zirconia crowns when Gluma, Shield Force Plus, and Telio CS desensitizers were used with resin luting cement. Four groups with ten specimens each (n = 10) were considered as Group 1 (Control group, with no desensitizer application before crown cementation with resin cement) and Groups 2, 3, and 4 (with a single coat of Glumadentin desensitizer, Telio CS desensitizer, or Shield Force Plus desensitizer applied before crown cementation, respectively). Thermocycling was then carried out, and each group was tested to determine the associated retentive forces and type of failure. The data were statistically analyzed, which showed that the mean tensile-strength values were significantly higher in Group 2 (p-value = 0.001), Group 3 (p-value = 0.027), and Group 4 (p-value = 0.014), when compared with the Control group. Clinicians should consider the application of any of these three desensitizers, as they can successfully abate dentin hypersensitivity after tooth preparation, as well as increase the durability and strength of the zirconia prosthesis.<sup>11</sup>

Sharma et al determined the retention of the casting cemented with three types of cement, with and without use of resin sealers and it determined the mode of failure. Extracted human molars (n=60) were prepared with a flat occlusal, 20-degree taper, and 4-mm axial length. The axial surface area of each preparation was determined and specimens were distributed equally among groups (n=10). A single-bottle adhesive system (one step single bottle adhesive system) was used to seal dentin, following tooth preparation. Sealers were not used on the control specimens. The test castings were prepared by using Ni-Cr alloy for each specimen and they were cemented with a seating force of 20 Kg by using either Zinc Phosphate (Harvard Cement), Glass Ionomer (GC luting and lining cement, GC America Inc.) and modified-resin cement (RelyXTMLuting2). Mean dislodgement stress for Zinc phosphate (Group A) was 24.55±1.0 KgF and that for zinc phosphate with sealer (Group D) was 14.65±0.8 KgF. For glass ionomer (Group B) without sealer, the mean value was 32.0±1.0 KgF and mean value for glass ionomer with sealer (Group E) was 37.90±1.0 KgF. The mean value for modified resin cement (Group C) was 44.3±1.0KgF and that for modified resins with sealer (Group F) was 57.2±1.2 KgF. The tooth failed before casting dislodgement in 8 to 10 specimens cemented with modified-resin cement. Resin sealer decreased casting retentive stress by 46% when it was used with Zinc phosphate.<sup>12</sup>

## 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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