

## 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:** This study was conducted for comparing the impact of desensitizing agents on the retention of crowns cemented with luting agents. **Materials & methods:** We chose 100 recently removed mandibular molar teeth. All of the teeth were kept in regular saline pending usage. To remove surface stains, each specimen underwent a thorough cleaning. The samples were then kept at room temperature in distilled water. Diamond point was used to cut notches on the surface of the roots. A metal mould containing auto-polymerizing acrylic resin was partially filled with all of the specimens. The specimens were kept in distilled water for storage. By creating a clamp that could hold a high-speed air-rotor hand piece, uniform taper was achieved. Two research cohorts were formed: Glass ionomer cement is the control group in Group A, while GC Tooth Mousse desensitizer is the study group in Group B. **Results:** The trial included 100 recently extracted molars, which were divided into two study groups: Group A, referred to as the "Control," received glass ionomer cement, while Group B, referred to as the "GC Tooth Mousse desensitizer," also received glass ionomer cement. The average tensile bond strength of specimens in group A was 61.8 kg, while specimens in group B had an average tensile strength of 59.7 kg. The statistical comparison yielded insignificant findings. **Conclusion:** Desensitising chemicals may be used while crowns are being made because they won't influence the luting cements' capacity for retention.

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

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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.<sup>1</sup> 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.<sup>2</sup> Earlier investigators stated that dentin hypersensitivity is an enigma being frequently encountered, yet ill understood.<sup>3</sup>

The areas of the tubules closer to the pulp chamber are wider and the fluid movement away from the pulp activates the nerves associated with the odontoblasts at the end of the tubule which may result in a pain response.<sup>4</sup> The initial low setting pH of the luting cements is the other possible causes for postoperative hypersensitivity.<sup>5</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

We selected 100 mandibular molar teeth that had been recently extracted. The teeth were stored in a standard saline solution until they were used. For the purpose of eliminating superficial discolorations, every sample underwent a meticulous cleansing process. Subsequently, the samples were stored in distilled water at ambient temperature. A diamond tip was

employed to create incisions on the surface of the roots. The metal mould, which held auto-polymerizing acrylic resin, was partially filled with all of the specimens. The specimens were stored in distilled water. Uniform taper was achieved by developing a clamp capable of securely holding a high-speed air-rotor hand piece. Two research cohorts were established, with Group A serving as the control group and utilizing glass ionomer cement, while Group B comprised the study group and employed GC Tooth Mousse desensitizer. The Type IV die stone was cast once the impressions had been created. The fatalities were discovered after a duration of one hour. To prevent damage caused by waxing equipment during the wax pattern manufacture, die hardener was applied to the finish line area. The maintenance of wax coping was performed subsequent to the adjustment of the margins. In group B, GC Tooth Mousse was generously administered to the prepared tooth surfaces using an applicator tip and kept undisturbed for a minimum of three minutes. Regalia were fashioned and subjected to comprehensive stress testing apparatus. The SPSS software was employed to analyze all the outcomes, which were documented in a Microsoft Excel spreadsheet.

### Results

The trial included 100 recently extracted molars, which were divided into two study groups: Group A, referred to as the "Control," received glass ionomer cement, while Group B, referred to as the "GC Tooth Mousse desensitizer," also received glass ionomer cement. The average tensile bond strength of specimens in group A was 61.8 kg, while specimens in group B had an average tensile strength of 59.7 kg. The statistical comparison yielded insignificant findings.

**Table 1: Comparison of mean tensile strength**

Tensile strength	Group A	Group B
Mean	61.8	59.7
SD	6.4	7.1
p- value	0.51	

### Discussion

Multiple reasons for post-cementation hypersensitivity have been postulated in the literature, including the opening of dentinal tubules, the chemical composition and the initial low pH of the luting cements, microleakage and bacterial leakage due to polymerization shrinkage of luting agents, desiccation of the tooth, hydraulic pressure on tubules during luting, higher permeability due to smear layer removal, etc.<sup>6,7</sup> To minimize this post-cementation hypersensitivity, DAs are commonly used before cementation. These DAs can be in the form of liquids or lasers.<sup>8-10</sup> They act in multiple ways, which include blocking the opening of dentinal tubules, reducing inflammation, depolarization of the nerves, etc. [11,47]. The protective layer formed by DA can affect

the retention of cemented crowns by reducing the micromechanical retention tags.<sup>11,12</sup>

This study included 100 recently extracted molars, which were divided into two study groups: Group A, referred to as the "Control," received glass ionomer cement, while Group B, referred to as the "GC Tooth Mousse desensitizer," also received glass ionomer cement. The average tensile bond strength of specimens in group A was 61.8 kg, while specimens in group B had an average tensile strength of 59.7 kg. The statistical comparison yielded insignificant findings.

Chandavarkar SM et al<sup>13</sup> evaluated the effect of dentin desensitizers on the retention of complete cast metal crowns luted with glass ionomer cement. Fifty freshly extracted human premolars were subjected to standardized tooth preparation (20° total convergence, 4 mm axial height) with a computer numerically controlled machine. Individual cast metal crowns were fabricated from a base metal alloy. Dentin desensitizers included none (control), a glutaraldehyde (GLU) based primer (Gluma desensitizer), casein phosphopeptide (CPP)-amorphous calcium phosphate (ACP) (GC Mousse), erbium, chromium: YSGG laser (Waterlase MD Turbo, Biolase) and Pro-Argin (Colgate Sensitive Pro-Relief desensitizing polishing paste). After desensitization, crowns were luted with glass ionomer cement and kept for 48 h at 37°C in 100% relative humidity. The samples were tested using a universal testing machine by applying a load at a crosshead speed of 0.5 mm/min. Statistical analysis included One-way ANOVA, followed by the Scheffe post-hoc test with P < 0.05. All dentin desensitizers showed significantly different values: Pro-Argin (4.10 Megapascals [Mpa]) < CPP-ACP (4.01 mpa) < GLU based primer (3.87 Mpa) < Virgin dentin (3.65 Mpa) < LASER (3.37 Mpa). On comparing the effect of prepared virgin dentin, GLU based primer, CPP-ACP, LASER and Pro-Argin on the retention of complete cast metal crowns luted with glass ionomer cement on prepared teeth, it was concluded that Pro-Argin and CPP-ACP showed the best retention in this in vitro study.

### Conclusion

Desensitizing agents can be employed during crown fabrication without affecting the adhesive properties of luting cements.

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