ORIGINAL RESEARCH

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

[1]Dr. Rohit Sharma, [2]Dr. Pratibha Rawat, [3]Dr. Harsha Tiwari

[1]Senior Resident, Garjraraja Medical College, Gwalior, Madhya Pradesh, India
[2]Professor, RKDF Dental College & Research Centre, Bhopal, Madhya Pradesh, India
[3]Private Practitioner, India

Corresponding Author
Dr. Rohit Sharma
Senior Resident, Garjraraja Medical College, Gwalior, Madhya Pradesh, India

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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 selected 100 recently extracted mandibular molar teeth. All of the teeth were kept in regular saline pending usage. To remove surface stains, each specimen underwent a thorough cleaning process. The samples were then kept at room temperature in distilled water. A metal mold 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:** 100 newly extracted molars were included in the trial, and they were roughly split into two study groups: Group A received glass ionomer cement (the "Control"), and Group B received glass ionomer cement (the "GC Tooth Mousse desensitizer"). The mean tensile bond strength of group A specimens was 50.2 kg, whereas group B specimens' mean tensile strength was 49.4 kg. Results from the statistical comparison produced non-significant results. **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

INTRODUCTION

Healthy natural dentition plays a vital role in speech, esthetics and mastication. The dental health of an individual is affected by conditions such as malocclusion, dental caries, and periodontal problems. Teeth with coronal destruction and retainers for fixed partial dentures are treated with complete cast coverage restorations.[1]Around 1-2 million dentinal tubules are exposed during an ideal crown preparation. Patients often experience discomfort in the tooth that is prepared either during the treatment or after the restorative procedure.[2,3] Due to exposed dentinal tubules or the chemical nature of the luting cements, about 5-24% of crowns and fixed partial dentures may in time result in pre and postoperative dentinal hypersensitivity.[4] This phenomenon is best explained by Brannstrom's hydrodynamic theory. He speculated that, "with any stimulus the tubular fluid is displaced. Fluid movement is conveyed to the nerve fibers in the pulp, causing stimulation that result in pain.[5]"

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.[6] The initial low setting pH of the luting cements is the other possible causes for postoperative hypersensitivity.[7] The acidic nature of the cement widens the dentinal tubules and removes the smear layer. The smear layer is the one which is present after the preparation, covers the dentinal tubules physically and seals them from outside stimuli.[8,9]

The use of desensitizing agents after tooth preparation and before cementation of the prosthesis is advocated to reduce the risk of vital teeth sensitivity and to preserve the health of pulpo-dentinal complex.[10,11] There are many effectively proven commercially available desensitizing agents with seemingly varied chemical forms. Application of desensitizing agent is gaining popularity, but unfortunately their effect on the retention of the crowns has been not consistent.[12]

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 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 process. The samples were then kept at room temperature in distilled water. A metal mold containing auto-polymerizing acrylic resin was partially filled with all of the specimens. 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 as the control group in Group A, while GC Tooth Mousse desensitizer along with glass ionomer cement was the study group in Group B. The Type IV die stone was poured after the imprints had been formed. After an hour, the dies were formed. In order to avoid abrasion by waxing tools during the production of the wax pattern, die hardener was applied to the finish line region. The upkeep of wax coping was done after the margins were adjusted. In group B, GC Tooth Mousse was liberally applied with an applicator tip to the prepared tooth surfaces and was left alone for at least three minutes followed by GIC application. Crowns were created and put through an all-purpose force testing equipment. The SPSS software was used to analyze all the results, which were recorded in a Microsoft Excel spreadsheet.

RESULTS

100 newly extracted molars were included in the trial, and they were roughly split into two study groups: Group A received glass ionomer cement (the "Control"), and Group B received glass ionomer cement after applying "GC Tooth Mousse desensitizer". The mean tensile bond strength of group A specimens was 50.2 kg, whereas group B specimens' mean tensile strength was 49.4 kg. Results from the statistical comparison produced non-significant results.

Table 1: Comparison of mean tensile strength

Tensile strength	Group A	Group B
Mean	50.2	49.4
SD	5.7	6.8
p- value	0.63	

DISCUSSION

Dentin hypersensitivity is one of the most common complaints after the crown preparation. To reduce the risk of vital teeth sensitivity and for preservation of the health of pulpo-dentinal complex an alternative approach is the concept of sealing the exposed dentinal tubules with the application of desensitizing or remineralizing agents.[2]

The retentive property of the crown depends on the properties of the luting cement and also the geometry of the preparation. Desensitizing agents are generally either polymerizable or non-polymerizable. Both of these types of agents do alter the surface of prepared dentin and also affect the bonding of the luting cements used during cementation thereby affecting the retention of the crown.[10]

In day-to-day practice, GICs and zinc phosphate cements are the most commonly used cement for luting. The frequent complaint in these cements being post cementation hypersensitivity. This study becomes clinically significant as it evaluates the effect of desensitizing agent on the retention of the crown using the commonly used luting cements.[12]

Hence; this study was carried out for comparing the impact of desensitizing agents on the retention of crowns cemented with luting agents.

In this study, 100 newly extracted molars were included in the trial, and they were roughly split into two study groups: Group A received glass ionomer cement (the "Control"), and Group B received glass ionomer cement after applying "GC Tooth Mousse desensitizer"). The mean tensile bond strength of group A specimens was 50.2 kg, whereas group B specimens' mean tensile strength was 49.4 kg. Results from the statistical comparison produced non-significant results.

In a study by Jalandar SS et al[13], 90 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. Statistical analysis included one-way ANOVA followed by Turkey-Kramer post hoc test at a preset alpha of 0.05. it was discovered that 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). It was concluded that the use of GLUMA® desensitizer had no effect on crown retention. GC Tooth Mousse didn't affect the retentive ability of glass ionomer and resin modified glass ionomer cement, but it decreased the retentive ability of zinc phosphate cement.

Kumar S et al[14] analyzed freshly extracted 48 maxillary first premolars and divided them into two groups, an untreated the control group and a desensitizing laser-treated group, which were exposed

to Erbium, Chromium: Yttrium, Selenium, Galium, Garnet laser at 0.5 W potency for 15 s. Each of the above two groups were again randomly divided into two subgroups, on to which full veneer metal crowns, which were custom fabricated were luted using glass-ionomer and resin luting cements, respectively. Tensile bond strength of the luting cements was evaluated with the help of a Universal Testing Machine. The tensile bond strength of crowns luted on desensitizing laser treated specimens using self-adhesive resin cement showed a marginal increase in bond strength though it was not statistically significant. The self-adhesive resin cements could be recommended as the luting agent of choice for desensitizing laser treated abutment teeth, as it showed better bond strength.

CONCLUSION

Desensitising chemicals may be used while crowns are being made because they won't influence the luting cements' capacity for retention.

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