EFFICACY OF GLUMA DESENSITIZER™ AND DURAPHAT™ IN RELIEVING DENTINAL HYPERSENSITIVITY IN NON-CARIOUS CERVICAL LESIONS

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ABSTRACT

The objective of this study was to compare the efficacy of Gluma Desensitizer™ and Duraphat™ in relieving dentinal hypersensitivity in non-carious cervical lesions by a randomized control trial. 196 patients having hypersensitive non-carious cervical lesions were divided into two groups. Gluma Desensitizer™ was applied to patients in Group A and Duraphat™ to patients in group B. Patient’s pain response to compressed air was recorded on the visual analogue scale at baseline, 5 minutes, 7 days and 30 days after treatment. Data were analyzed using SPSS version 12. Comparison of sensitivity between the two treatment groups on application of compressed air showed a statistically significant difference. The results of this study showed that Gluma Desensitizer™ showed better results in relieving dentinal hypersensitivity than Duraphat™ in non-carious cervical lesions.

Key words: Non-carious cervical lesions, Hypersensitive teeth, desensitizing agents, Gluma™, Duraphat™

INTRODUCTION

Etiology and treatment of dentine hypersensitivity or hyperalgesia, have been reported in the literature for over 100 years. It is a universal problem affecting people all over the world.1

Dentine hypersensitivity is described by short, sharp pain arising from exposed dentine due to thermal, evaporative or tactile stimuli, which cannot be explained, by any other dental defect or pathology.2,3,4

It has been reported that 15-17% of the population between the ages of eighteen and sixty-five years suffer from dentine hypersensitivity.5

Gluma is a dentine-bonding agent containing glutaraldehyde. Glutaraldehyde coagulates the serum albumin present in the dentinal fluid resulting in blockage of tubules.6,7 This reaction of glutaraldehyde with serum albumin is said to induce polymerization of hydroxyl ethyl methacrylate (HEMA) which is a hydrophilic monomer component of dentine bonding agents with the ability to infiltrate into acid etched and moist dental hard tissues.8

Duraphat is a varnish with high fluoride content. It creates a barrier by precipitating calcium fluoride thus blocking patent dentinal tubules and reducing hypersensitivity.3,7 The resinous base of this material is an alcoholic suspension which evaporates when applied to the tooth surface leaving a layer of fluoride rich varnish attached to the tooth surface.9

The study aims to compare the effectiveness of Gluma and Duraphat in relieving dentine hypersensitivity.

METHODOLOGY

This study was carried out in the Department of Operative Dentistry, Armed forces Institute of Dentistry. Patients presenting with the complaint of hypersensitivity in at least two teeth having non-carious lesions resulting in exposed dentine on the facial surface assessed by the application of compressed air for two seconds and a cold stimulus (ethyl chloride soaked cotton) were included in the study.

Patients taking analgesics, anti-inflammatory or tri-cyclic anti-depressants, receiving orthodontic treatment, pregnant and lactating mothers and those who had received desensitizing treatment during the previous three months prior to the study were not included.
A final sample of 196 patients, both men and women, was selected by purposive sampling. Lots were drawn in order to divide the sample into two equal sized, random groups. The person drawing the lots was blinded to the participants’ list.

Gluma Comfort Bond Plus Desensitizer (Heraeus Kulzer, Hanau, Germany) was applied to the patients in Group A. Each sensitive tooth was cleaned with a polishing paste, rinsed with water and air dried. The tooth was then conditioned with Gluma Etch 20 Gel for 20 seconds. Then it was rinsed, air dried and the tooth surface was moistened by pellets damped with distilled water. Gluma Comfort Bond Plus Desensitizer was applied using a disposable brush applicator. An additional coat of the Desensitizer was applied and light cured for 15 seconds.

Duraphat (Colgate Oral Pharmaceuticals, New York) was applied to the patients in Group B. Each sensitive tooth was cleaned with a polishing paste, rinsed with water and air dried. Duraphat was applied using a disposable brush applicator. An additional coat was applied after 5 minutes.

Each patient’s pain response was recorded at baseline, 5 minutes, 7 days and 30 days after treatment using a visual analogue scale by applying compressed air for two seconds.

The data analysis was carried out using SPSS (version 12). Descriptive statistics were calculated. Mean & standard deviation for numerical data for age and VAS score was calculated. Frequency and percentages for gender and intensity of pain were calculated. Chi-square test was used to compare pain intensity with both materials 5 minutes, 7 days and 30 days after treatment. The arbitrary p value of less than 0.05 was considered to be statistically significant.

RESULTS

The study included 196 patients requiring treatment for hypersensitivity in non-carious cervical lesions. Each treatment arm had 98 patients. All 196 patients were treated according to the laid out treatment protocol by a single operator. All patients were evaluated at baseline, five minutes and seven days after treatment. Fourteen patients (7.1%) failed to report at the 30 days evaluation.

Comparison of the two treatment groups was made for baseline characteristics to assess for effectiveness of randomization and assessment of bias. The mean age for Group A was 43.52 ± 7.17 years and 42.88 ± 7.27 years for Group B. There were 59 (60.2%) men and 39 (39.8%) women in group A while 56 (57.1%) men and 42 (42.9%) women in group B. Independent sample t test was used to assess any difference between the treatment groups with respect to age and gender. The two groups were found to be balanced with respect to age (p = 0.594) and gender (p = 0.663) (Figure 1).

The mean VAS for pain was 7.46 ± 1.09 for group A and 7.41 ± 1.00 for group B at the baseline. After five minutes, sensitivity for group A was 4.13 ± 1.07 and 5.11 ± 0.97 for group B. After seven days, it was 2.85 ± 1.31 for group A and 4.41 ± 1.26 for group B. After 30 days, it was 2.15 ± 1.39 and 3.86 ± 1.27 for group A and B respectively (Table 1).

Comparison of pain before treatment revealed that 53.1% of patients of Group A (Gluma Desensitizer) and 50% in Group B (Duraphat) had severe pain on application of compressed air for two seconds. About 46.9% patients of the group A and 50% patients of the group B had moderate pain. There was no significant difference between groups A and B in sensitivity with compressed air application at baseline (p value = 0.668) (Fig 2).

Five minutes after treatment with dentine bonding agent, in group A, 68.4% patients had moderate and 31.6% patients had mild pain while none had severe pain. In group B, 95.9% of patients had moderate pain while 4.1% of the patients had mild pain. There was a significant difference between the two treatment groups five minutes after application (p value < 0.05).

Seven days after the application of the Desensitizer in the patients within group A, 30.6% had moderate pain, 66.3% had mild pain while in 3.1% of the patients, the pain had completely subsided. In group B, 75.5% patients had moderate while 24.5% patients had mild pain. Both treatment groups revealed a significant difference in sensitivity 7 days after the application of the Desensitizer, with the patients in group A demonstrating more relief from the sensitivity (p value < 0.05).

Thirty days after treatment in group A, 19.6% patients had moderate pain, 65.2% had mild pain while 15.2% patients had no pain at all. In group B, 61.1% patients had moderate while 38.9% patients had mild pain. At 30 days, a significant difference was seen in sensitivity between the two groups, with 14 patients in group A being completely painless, whereas there was no patient in group B completely free of pain (p value < 0.05). (Fig 5).

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<th>Table 1: Mean &amp; SD for VAS at Different Intervals</th>
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Efficacy of Gluma Desensitizer™ and Duraphat™

Olusile et al. in a single blind, split mouth study design evaluated four agents. The mean VAS for teeth treated with Gluma and Duraphat were 6.03 ± 2.37 and 4.66 ± 1.82 respectively, while it was 7.46 ± 1.08 and 7.41 ± 1.00 in the present study. In this study, VAS was higher because only NCCLs were included. After 7 days, the VAS mean was reduced to 0.10 ± 0.44 and 1.0 ± 1.89, whereas it was 2.87 ± 1.32 and 4.40 ± 1.25 in the present study. A lesser reduction in pain was seen in this study can be assumed to be due to a greater number of open tubules in NCCL than normal. All the agents significantly reduced the sensitivity but Gluma desensitizer reduced sensitivity more than Duraphat at all measurement intervals. However, the evaluation period was quite less which does not give a long-term picture of effectiveness of these desensitizing agents. Only 25 patients were included in the above mentioned study. Such a small sample size could have biased the results. However, this study in which 196 patients were treated had similar results as that of the study by Olusile et al. There was no control group in either of the studies.3

A number of other treatment modalities and chemical agents have been employed for the treatment of dentinal sensitivity with mixed results.

Jalalian E compared the efficacy of potassium nitrate with Gluma desensitizer & control in reducing hypersensitivity in full coverage crown patients and found potassium nitrate to be more effective in reducing dentine hypersensitivity than Gluma or control.10

DISCUSSION

In the present study, a comparison of short term effectiveness of two commonly used tubule occluding agents - a dentine bonding agent with glutaraldehyde and a fluoride varnish was done.

The mean age in the study was 43.46 ± 7.11 for group A and 42.85 ± 7.20 for group B. Dentinal hypersensitivity affects women more often than men, though the sex difference is rarely significant and same is the case in this study.

Previously, only a few clinical studies have measured the efficacy of Gluma Desensitizer or Duraphat or both in class V cavities and the results have been mixed.

Fig 1: Gender distribution of treatment groups (p value = 0.567)

Fig 2: Baseline comparison of sensitivity in the treatment groups (p = 0.671)

Fig 3: Comparison of sensitivity between treatment groups after 5 minutes (p value<0.05)

Fig 4: Comparison of sensitivity between groups after 7 days (p value< 0.05)

Fig 5: Comparison of sensitivity between groups after 30 days (p value< 0.05)
Tasane & Worawan compared the efficacy of 30mW gallium-aluminum-arsenide laser (GaAlAs) applied for 1 minute with dentine bonding agent in 70 patients. The results revealed dentine bonding agents to be more effective in reducing hypersensitivity. 

However, in a study conducted by Corona et al., no significant difference was found between the efficacy of GaAlAs and dentine bonding agent. 4

Assis et al carried out a double blind split mouth study on ten patients having at least two teeth with gingival recession and root exposure. Gluma treated teeth had a mean VAS value of 4.75 ± 2.65 at baseline and 4.61 ± 3.14 after four weeks. Control teeth had a mean VAS value of 4.08 ± 2.91 at baseline and 4.76 ± 3.26 after four weeks. This shows that Gluma desensitizer had no effect on hypersensitive teeth with gingival recession and root exposure for up to four weeks. 12

Duran and Sengun compared the effectiveness of five desensitizer products, including Gluma desensitizer in a split mouth study design. 52 patients were included in the study with mean age of 36 ± 7 years while in the present study, the mean age of group A was 43.46 ± 7.11 and 42.85 ± 7.20 for group B. The mean VAS value for hypersensitivity in patients in which Gluma Desensitizer was employed was 5.21 ± 2.35 while it was 7.46 ± 1.08 in the present study, at the baseline. After treatment, it was reduced to 2.33 ± 2.32 in study conducted by Duran and Sengun and 4.14 ± 1.06 for this study. The VAS scores at post-treatment evaluation points were significantly decreased compared with baseline data (p<0.05) but a placebo control was not used. 13

Dondi dall’Orologio et al. found Gluma desensitizer to be successful in a non-controlled trial. However, evidence from studies without controls should be considered with great caution. 14

The efficacy of low viscosity glass ionomer (Fuji VII) was studied by Polderman and Frencken using the Discomfort Interval Scale (DIS) of 0-4. They found it to be superior (79%) in relieving dentine hypersensitivity after 6 months as compared to Gluma Desensitizer (40%) in a split mouth study design. 5

Ritter et al compared the effect of five percent sodium fluoride varnish (All Solutions fluoride varnish) with Duraphat (control) and found it to be effective in reducing dentine hypersensitivity. However, the efficacy was not significantly different from that of the control. 15

Atassi and Baby compared another fluoride containing desensitizing agent BilliFluorid with Duraphat and found that both are effective in occluding dentinal tubules when observed under electron microscope. 16

Among the strength of the study are: use of a randomized control trial study (randomization done by lottery method), application of materials by a single operator the materials, use of a larger sample size and employing a split mouth study design. Limitations of the study include: single blind study where bias of the operator or assistant recording the readings cannot be excluded, only subjects having NCCLs were included in the study whereas sensitivity can be present without these lesions, subjects may have found the use of it visual analogue scale difficult, nonuse of rubber dam for isolation (cotton rolls and high volume suction were used) and the control group was not used to rule out placebo effect.

CONCLUSION

The results of this study showed Gluma Desensitizer™ as a better agent in relieving dentinal hypersensitivity than Duraphat™ in non-curious cervical lesions.

Disclaimer: Authors declare that there was no conflict of interest.

REFERENCES


