

Original Research Article

Comparative evaluation of efficacy of gluma desensitiser vs diode laser in treating dentinal hypersensitivity: an *in vivo* study

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ABSTRACT

Background: There are different types of adhesives and resins available today for the treatment of dentinal hypersensitivity. Literature search showed fewer comparative studies using gluma desensitizing agent and diode laser (940nm) in the treatment of dentinal hypersensitivity. Hence, the aim of present study is to compare the efficacy of gluma desensitizing agent and diode laser (940 nm) in the treatment of dentinal hypersensitivity.

Methods: Patients were selected using VAS scale and randomly divided into group 1 (gluma) and group 2 (diode laser). Gluma and laser treatment was done for the patients on the contralateral sides. The follow up was done at an interval of 1 month and 3 months.

Results: Statistically significant difference was seen in intra group comparison for both gluma and laser treatment but no statistically significant difference was seen in the intergroup comparison of both the groups.

Conclusions: Both gluma and diode laser treatment were found to be equally effective for the treatment of dentinal hypersensitivity.

Keywords: Dentinal hypersensitivity, Desensitizing agent, Diode laser, Gluma

INTRODUCTION

Dentinal hypersensitivity is characterized by short, sharp pain arising from exposed dentine in response to tactile, evaporative, chemical or thermal stimuli and which cannot be ascribed to any other dental defect or pathology. The most accepted theory for the dentinal hypersensitivity is the hydrodynamic theory which states that when the external stimuli is applied it causes a rapid flow of fluid in the dentinal tubules activating mechanoreceptors at the pulp-dentine interface, leading to pain.¹

Various treatment modalities are available to treat the dentinal hypersensitivity such as fluorides, tubule sealants, calcium compounds, lasers, diet counselling, correction of brushing techniques etc. The application of

adhesins and resins was first introduced by Dayton et al in 1974. One of the adhesin which is tried recently is gluma which contains 5% glutaraldehyde and 35% HEMA (hydroxyethyl methacrylate) in water.

Glutaraldehyde reacts with serum albumin in the dentin fluid by coagulation, thus counteracting the hydrodynamic mechanism of dentin hypersensitivity.²

The conventional method for the treatment hypersensitivity is based on application of topical desensitizing agents. However, it has some disadvantages such as repeated application and longer treatment time, patient compliance. Newer treatment modalities include application of cautery and LASERS which has increased rapidly in the last 2 decades.³

Laser therapy was introduced as an alternative to management of dentinal hypersensitivity, the desensitizing action seems to depend mostly on type of laser therapy, its power used and irradiation parameters. The efficacy of laser in dentinal hypersensitivity therapy can be related both to high-power, causing coagulation of fluids contained in the dentin tubules having a melting effect with crystallization of dentin inorganic component, and to the direct action of laser to low-power on nerve transmission with suppression of the pulp nociceptive nervous fibers, blocking diffusion of pain to the central nervous system.

The 4 types of lasers are most commonly used to treat hypersensitivity (Nd: YAG, Er: Yag, CO₂, and diode lasers) lasers act by its thermomechanical ablation mechanism related to high absorption of its wavelength by water. The obliterating effect of dentine tubules for thermal coagulation of proteins present in the dentine fluid may be responsible for a significant reduction in dentine permeability after laser irradiation. Diode laser acts by closure of dentinal tubules and there by decrease in hydraulic conductance thus reduces hypersensitivity.⁴

The use of gluma as a desensitizing agent for the treatment of dentinal hypersensitivity is limited, therefore the objective of this study was use it and compare it along with a potent diode laser source. Literature search showed fewer comparative studies using gluma desensitizing agent and diode laser (940nm) in the treatment of dentinal hypersensitivity. Hence, the aim of the present study is to compare the efficacy of gluma desensitizing agent and diode laser (940nm) in the treatment of dentinal hypersensitivity.

METHODS

This study was conducted in outpatient department of Department of Periodontics and Implantology, KAHAR V K Institute of Dental Sciences, Belagavi. This study was started on 8th January 2021 and completed on 26th April 2021. This is a randomized controlled clinical trial conducted among 38 patients and informed consent was obtained from all participants. Sample size was estimated at a power of 95% and error of 5%. Patients having dentinal hypersensitivity caused by either recession or cervical abrasion or erosion, with a VAS score of ≥ 2 were selected for the study. It was made sure that the selected patients had not used any desensitizing toothpaste in the past 3 months and that were no decay or restorations on any teeth that is symptomatic. Patients with systemic diseases, history of previous periodontal surgery and those with nonvital teeth were excluded from the study. Patients were grouped into 2 groups randomly by lottery method. Gluma desensitizing agent was applied for the Group 1 patients according to the manufacturer's instructions. Diode laser was used for the Group 2 patients. Sensitivity was tested for each patient using visual analog scale. Assessment was done at 1 month, 3 months intervals.

Statistical analysis

Data obtained was subjected to statistical analysis. Demographic details were obtained by descriptive statistics. Paired t test was done for intragroup comparison and Independent t test was done for intergroup comparison.

RESULTS

The study characteristics which were considered in our study are Gender, presence of facets and presence of gingival recession which have shown 100% cumulative percentage. (Table 1).

Table 1: Study characteristics (gingival recession, facets, gender).

	Frequency	Percent	Cumulative percent
Gingival recession			
0	17	44.7	44.7
1	8	21.1	65.8
2	5	13.2	78.9
3	3	7.9	86.8
4	2	5.3	92.1
5	1	2.6	94.7
6	1	2.6	97.4
7	1	2.6	100.0
Total	38	100.0	
Facets			
0	19	50.0	50.0
1	8	21.1	71.1
2	4	10.5	81.6
3	2	5.3	86.8
4	5	13.2	100.0
Total	38	100.0	
Gender			
Female	20	52.6	52.6
Male	18	47.4	100.0
Total	38	100.0	

Table 2: Descriptive statistics of irritation score.

	Mean	Std. deviation	Std. error mean
PRE	4.87	1.630	0.264
GLUMA 1st month	0.76	1.478	0.240
LASER 1st month	1.00	1.708	0.277
GLUMA 3 months	1.26	1.88	-
LASER 3 months	2.02	2.11	-

Table 2 shows the descriptive statistics irritation score difference from pre to 1 month interval for both gluma and laser. The mean value for gluma was 0.76 and standard deviation was 1.478. The mean value for laser was 1.00 and standard deviation was 1.708 at 1 month interval. The mean value and standard deviation for

gluma at 3-month interval was 1.26 and 1.88 respectively. The mean value and standard deviation for laser at 3-month interval was 2.02 and 2.11 respectively.

Table 3 shows intra group comparison of both gluma and laser which was done using paired t test from pre to 1- and 3-months interval which has shown statistically significant reduction with p value >0.0001 when compared to pre values.

Table 3: Paired t test on pre and post intervention irritation score.

Paired differences	Mean	Std. deviation	Std. error mean	95% confidence interval of the difference		T	df	Sig.(2-tailed)
				Lower	Upper			
PRE GLUMA 1 st month	4.105	1.485	0.241	3.617	4.593	17.043	37	0.000
PRE LASER 1 st month	3.868	1.545	0.251	3.361	4.376	15.433	37	0.000

Table 4: Independent t test on gluma and laser intervention Irritation score.

t-test for equality of means	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% CI of the difference	
						Lower	Upper
	-0.646	72.504	0.520	-0.237	0.367	-0.967	0.494

DISCUSSION

Dentinal hypersensitivity is a most common problem among the people now a days even though various treatments exists. Causes for dentinal hypersensitivity are abrasion, recession, post periodontal surgery, faulty tooth brush techniques etc. the various treatment modalities available are topical desensitizing agents, cautery, lasers.¹ Most of the controlled trials are failed in demonstrating the gold standard approach as the there are drawbacks like repetitive applications and extended duration of time. Two approaches are there one is obliteration of dentinal tubules by blocking up sensitivity of dental nerves other one is decreasing sensitivity of dental nerves.² In the present study visual analog scale was used to score the sensitivity as it is reliable for the assessment of pain.

In group 1 of gluma desensitizer when intra group comparison was done statistically significant difference was found with reduction in sensitivity of 0.0001 in group when compared to baseline at 1 and 3month follow up. This is in accordance with the study conducted by Assis et al and Camela et al.⁴

In group 2 diode laser when intra group comparison was done statistically significant difference was found with reduction in sensitivity of 0.0001 in group when compared to baseline at 1 and 3 month follow up. This is in accordance with the study conducted by Ozlem et al in 2018 and Anely lopes et al in 2013.^{2,3}

When the inter group comparison was done between gluma and laser group no statistical difference was found

Table 4 shows inter group comparison of both gluma and laser which was done using independent t test from pre to 1- and 3-months interval which has shown statistically significant reduction with p value >0.0001 when compared to pre values. On comparisons of both means there was no statistically significant difference was found. Both the groups were equally effective.

at 1 month and 3 months. Both the groups have shown equal effectiveness against CDH. This is in accordance with study conducted by Felice et al in and Anely et al in.^{1,2}

This study has some limitations. Pre-operatively, average pain values (VAS scale) were taken for each tooth while post- operatively average pain values were taken for each test and control group. This could have had an impact on the study results.

CONCLUSION

Gluma desensitizer has demonstrated good efficacy when used alone as well as in combination with diode laser. Both gluma and diode laser treatment were found to be equally effective for the treatment of dentinal hypersensitivity. This study within its limitations has noted that gluma as a desensitizer should be used to help patients suffering from dentinal hypersensitivity among other measures. More studies with larger sample size should be conducted to confirm and validate its use.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee of KAHER's KLE VK Institute of Dental Sciences, Belagavi, Karnataka

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