EFFICACY OF DIODE LASER AND DESENSITIZING AGENT ON PREPARED TEETH

Haluk Baris Kara*, DDS, PhD, Umut CAKAN*, DDS, PhD, Burcu YILMAZ*, DDS, Pelin INAN KURUGOL*, DDS

*Department of Prosthodontics, Faculty of Dentistry, Istanbul Medipol University, Istanbul, Turkey

INTRODUCTION

Dentine sensitivity is a common symptomatic condition which may occur due to gingival recession, erosion, attrision or crown preparations. Under normal conditions, dentine is covered by enamel or cementum and is not sensitive to direct stimulation. Particularly, full crown preparations expose the peripheral terminations of 1-2 million dentine tubules (30.000-40.000 dentine tubules/mm^2).(1) The greater the number and diameter of exposed tubules, the greater the permeability of dentine. Through the exposed tubules, bacterial contamination may irritate pulp tissue or a thermal, tactile or chemical stimulus may induce dentinal fluid flow and activate the nerve response as a painful sensation with Brannstrom's hydrodynamic mechanism.(2) Thus, to reduce the risk of postoperative sensitivity and irritation to pulp tissue, occluding or sealing of exposed dentin tubules is vital.(3) Desensitizing agents can plug the dentinal tubules and make them less responsive to stimulation.
A combination product consisting of an aqueous solution of 5% glutaraldehyde and 35% hydroxyethyl methacrylate (Gluma desensitizer, Heraeus Kulzer GmbH, Wehreim, Germany) has been reported to be an effective desensitizing agent. The glutaraldehyde intrinsically blocks dentinal tubules, counteracting the hydrodynamic mechanism that leads to dentin hypersensitivity.(4)
Moderate level lasers encompassing a wide range of wavelengths have been used in the treatment of dentin hypersensitivity with variable success. Those lasers are thought to act by increasing the action potential of the nerve cells, thereby limiting the transmission of pain stimulus.

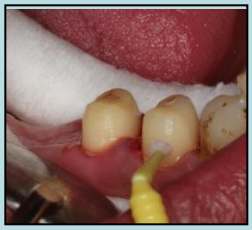

Fig. 1: Small amount of desensitizier was applied onto the prepared teeth by small cotton pellets.

Fig. 2: Prepared teeth (molar or premolars) were individually irradiated by diode laser

AIM

The purpose of this study was to compare the efficacy of diode laser and a commercial desensitizing agent on post preparation dentin sensitivity via sealing the dentinal tubules.

MATERIALS AND METHODS

Twenty patients (9 males and 11 females) with 76 teeth between the ages of 34 and 72 (mean age: 51.30±12.19 years) volunteered for this study. Study protocol and related consent forms were approved by Istanbul Medipol University research ethics committee (protocol number: 10840098-47). For each patient, prepared teeth (molar or premolars) in one quadrant were individually irradiated by diode laser (940 nm continuous waveform at 1W Power energy density) for 3 consecutive intervals of 20 seconds (Fig. 1) and in the symmetrical quadrant a small amount of desensitizer was applied onto the prepared teeth by small cotton pellets (Fig. 2). The surface was then dried by applying a stream of compressed air until the fluid film had disappeared and the surface was no longer shiny. At the control group, no treatment was performed on the prepared teeh. Temporary crowns were fabricated and cemented onto the prepared teeth using non-eugenol temporary cement. The effectiveness of both applications was assessed by one examiner who was not aware of the type of treatment applied at three examination periods; one day, one week and two weeks after treatment by mechanically sounding the finishing line circumferentially and the preparation surface mesiodistally and buccolingually through VAS scores. A Kruskal Wallis test was used for the intergroup comparisons and a Mann Whitney U test with Bonferroni correction was used for the determination of the group causing a difference. Friedman test was used for the in-group after one day, one and two weeks comparisons of the parameters. Significance was evaluated at a level of p<0.05.

RESULTS

All of the 20 participants completed the study in a period of 5 months. Regarding one day, one week and two weeks after treatment, mean VAS score of the control group was statistically higher than Diode laser (p:0.001) and Gluma (p:0.001) groups (p<0.017) (Fig. 3 and Table 1). The difference between VAS scores of the Diode laser and Gluma groups was statistically insignificant (p:0.763; p>0.05).
Regarding control group without desensitizing application and Diode laser and Gluma groups with desensitizing application, the difference between one day, one week and two week's VAS scores was statistically insignificant (p>0.05).

	Diode laser		Gluma		Control		
	Range	Mean±SD (Median)	Range	Mean±SD Median)	Range	Mean±SD (Median)	[1]p
One day	0-8	1,29±2,24 (0)	0-4	0,75±1,08 (0)	0-6	2,35±1,42 (2)	**,001****
One week	0-6	1,57±2,04 (1)	0-4	1 ,21±1,23 (1)	0-7	2,50±1,82 (2)	**,028***
Two weeks	0-7	1,36±2,02 (0,5)	0-4	0,96±1,23 (0,5)	0-7	2,50±2,09 (2)	**,011***
[2]p		**0,389**		**0,180**		**0,595**	

[1]*Kruskal Wallis test* [2] *Friedman Test*

Table 1: Mean VAS values and standard deviations (SD) of the teeth after one day, one week and two weeks of Diode laser and Gluma treatment.

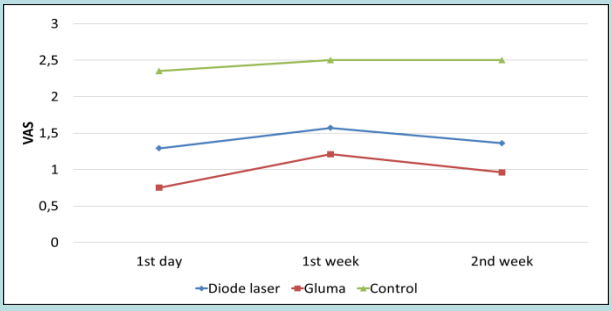

Fig. 3: Graphic presentation of the mean VAS scores after one day, one week and two weeks.

CONCLUSIONS

1. Both methods may be considered as effective in decreasing dentin hypersensitivity after tooth preparation.
2. To evaluate the efficacy of diode laser and desensitizing agent, in a standard treatment for dentinal hypersensitivity, further prospective longitudinal studies should be performed with larger number of patients.

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