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Comparing the Effectiveness of 2-Hydroxy Ethyl Methacrylate and Potassium Nitrate-Containing Gel with Lignocaine Hydrochloride Gel on Sensitivity during Ultrasonic Scaling: A Clinical Study

Dr. Shamila Shetty K
Reader, Department of Periodontology
A.J. Institute of Dental Sciences
Mangalore, India

Dr. Nishith R K., Dr. Christy George,
Dr. Misha Rose, Dr. ShrinidhiBallal
Post Graduate, A.J. Institute of Dental Sciences,
Mangalore, India

Abstract: Ultrasonic scaling is a routinely performed procedure in dental practice. The fear of pain during treatment has been identified as a major factor in preventing patients from seeking dental care. To overcome this, desensitizing agents are used.

- **Aims: This study aims to compare the effectiveness of 2-Hydroxy Ethyl Methacrylate and potassium nitrate containing gel and lidocaine containing gel on hypersensitivity during ultrasonic scaling.**
- **Material and methods: 30 patients were enrolled in this split mouth study. One side was applied with Shield Activ gel and the other with lignocaine gel. VAS scores were measured at baseline and post application.**
- **Results: The mean VAS score was significantly better in both groups when compared to baseline. Lignocaine gel shows better results compared to Shield Activ gel.**
- **Conclusion: 2-hydroxy ethyl methacrylate and potassium nitrate-containing gel and lignocaine hydrochloride gel both help in significant reduction of pain during ultrasonic scaling.**

I. INTRODUCTION

The treatment for periodontal disease involves nonsurgical and surgical periodontal therapy. Scaling and root planing have been shown in many studies to be an effective phase I treatment for periodontitis. When utilized as a part of the comprehensive treatment plan, scaling and root planning results in decreased gingival inflammation, bleeding on probing, clinical attachment levels, and probing depths. It is well established that the administration of high-quality scaling and root planing requires exquisite attention to detail. [(1)]

The instrumentations utilized are hand-driven and power-driven instruments. These power-driven instruments are sonic and ultrasonic scalers. Ultrasonic instrumentation is an integral component of the clinical curriculum and the majority of dental hygiene programs. The ultrasonic tips vibrate on a tooth with a frequency in the range of 25,000 – 42,000 Hz. This equipment is associated with several hazards. These include heating of the tooth during scaling, vibration hazards causing cell disruption, and others. [(2)]

These procedures may be perceived as painful. The fear of pain during treatment has been identified as a major factor in preventing patients from seeking dental care, and pain control is considered to be an extremely important outcome measure for successful periodontal therapy. To increase compliance of the patients, there is a need to reduce pain during scaling. Thus, attempts to alleviate or reduce pain during treatment are crucial to complete the treatment and to sustain successful periodontal maintenance and patient recall.[(3)]

Shield Activ Dentin Desensitizer which contains 2-Hydroxy Ethyl Methacrylate, Sodium Fluoride, and Potassium Nitrate and Ethanol is a highly effective, one step, chair-side treatment for dentinal hypersensitivity caused due to cervical erosions and exposed roots. It acts very fast to seal dentinal tubules. Several investigators have also advocated the use of a lidocaine 25 mg/g prilocaine 25 mg/g anesthetic gel in reducing root dentinal sensitivity following periodontal procedures.

This study aims to compare the effectiveness of 2-Hydroxy Ethyl Methacrylate and potassium nitrate containing gel and lidocaine containing gel on hypersensitivity during ultrasonic scaling.

II. MATERIALS AND METHODS

The study consisted of 30 patients who reported to department of periodontology, AJ Institute of Dental Sciences, Mangalore, wanting to undergo ultrasonic scaling treatment who complained of sensitivity during the treatment.

Informed consent was taken from all the patients participating in the study. Ultrasonic scaling was done on Maxillary anterior teeth and checked for sensitivity in that area. If patient complained of sensitivity he/she was enrolled for the study.

Inclusion criteria were patients requiring scaling of teeth, patients complaining of sensitivity during ultrasonic scaling, patients having minimum of 12 teeth i.e. all the anterior teeth. Exclusion criteria were patients with caries,

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teeth with abrasion, teeth with attrition and patients already using de-sensitizing toothpastes.

This was a split mouth study, where right or left arch of mandibular anterior teeth region was randomly selected as Shield Activ gel or lignocaine gel sites. The six mandibular anterior teeth only were selected for study as they are the most sensitive teeth during scaling. One drop of gel was taken in an applicator tip and applied to one tooth for 1 minute duration and same was repeated to all other teeth. The water and power control of the ultrasonic scaler was kept constant throughout the study. The time limit of scaling was maximum 3 minutes per tooth.

After ultrasonic scaling, the patient visual analog scale (VAS) was recorded for both the groups.

III. RESULTS

Statistical analysis was done by descriptive statistics. Comparison between the groups will be done by students unpaired t test. A statistical package SPSS version 23.0 was used to do the analysis.P<0.05 was considered as significant. Visual analogue scale was used to record the sensitivity at baseline and after the application if gels.

In the shield active group, average pain level in the base line was 8.033±0.718 and post VAS score was 7.066±1.080 with p <0.05. It shows there is significant improvement in pain from pre to post application of the shield active gel (Table 1). Average pain level in the LA gel group at base line was 8.033±0.718 and post VAS score was 6.4667±0.730 with p <0.05. It shows there is significant improvement in pain from pre to post application of LA gel (Table 2). When comparison was done between the two groups, there is significant difference between the reduction in pain level by shield active and LA gel. Reduction in pain level is significantly more in LA gel group (Table 3).

IV. DISCUSSION

In this study we treated 30 patients requiring ultrasonic scaling, all of whom were complaining of severe sensitivity during the procedure. This was a split mouth study where quadrant wise division was done to either the Shield active or the LA gel group. VAS score was recorded prior to and after application of the gels.

Chung JE et al [3] in their study evaluated the efficacy of a eutectic mixture of local anesthetic (EMLA) cream on pain perception during scaling. Significant pain reduction was achieved with the anesthetic mixture in their study. Magnusson et al [4] also found similar results in their study comparing the use of anesthetic gel and placebo in countering sensitivity during ultrasonic scaling. They also found significantly better results with anesthetic gel. The present study is also in tandem with the above mention studies. The lignocaine gel group showed significantly better VAS score when compared to baseline and also to the Shield active gel group.

Potassium nitrate is highly used in dentistry for treating hypersensitivity. Study done by Attar NB et al [2] evaluated the efficacy of 5% potassium nitrate gel application on the reduction of sensitivity during ultrasonic scaling. The mean VAS scores and patient satisfaction for the potassium nitrate group were statistically significant as compared to the control group. Suda T et al [5] studied the efficacy of oxalic acid in reducing the sensitivity during ultrasonic scaling. Oxalic acid also turned out to be a good agent in reducing sensitivity according to the study.Suda R et al [6] assessed the efficacy of hydroxyethyl methacrylate (HEMA) on dentinal hypersensitivity. The degree of the response to hypersensitivity was decreased significantly upon the combined application of HEMA and commercially available dentin bonding agents though it was still ineffective in nearly 30% of the 48 cases tested.

Shield Activ dentine desensitizer contains 2-Hydroxy Ethyl Methacrylate, Sodium Fluoride and Potassium Nitrate. All these agents have shown to decrease the dentinal hypersensitivity significantly. This study showed significant reduction in sensitivity after the application of the gel.

Lignocaine gel showed significantly better results when compared to Shield Activ gel in this study. According to manufacturer instructions Shield Activ gel is recommended to be applied 2 to 3 times for excellent results. Since in this study the gel was only applied once might owe to the lesser result found with Shield Activ when compared to lignocaine gel.

V. CONCLUSION

Any dental treatment requires patient compliance. Ultrasonic scaling is a major component of oral hygiene maintenance. Fear of treatment of patients to these procedures led to the exploring of options that will help in reducing the pain during the ultrasonic procedure. Both lignocaine gel and shield active gel showed promising results in this study. Further studies with large sample size will certainly help to determine the best agent to reduce sensitivity during ultrasonic scaling.

	mean±SD	t value	Result
Base line	8.033±0.718	5.491	P<0.05
Post	7.066±1.080		

Table 1: Mean And Standard Deviation In Shield Active

	mean±SD	t value	Result
Base line	8.033±0.718	15.099	P<0.05
Post	6.4667±0.730		

Table 2: Mean And Standard Deviation In La Gel

Type	mean±SD (post)	Avg diff	t value	Result
Shield active	7.066±1.080	0.6	3.884	P<0.05
LA gel	6.4667±0.730			

Table 3: Comparison Between Shield Active And La Gel

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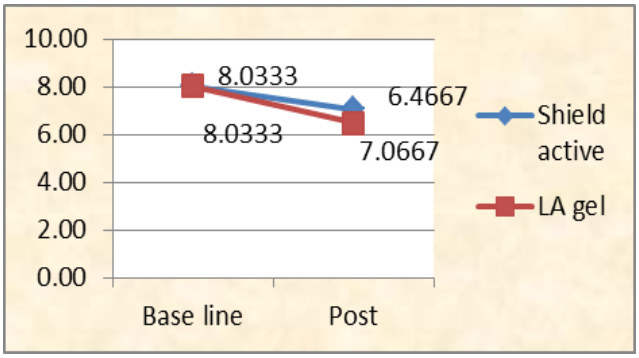

Graph 1: Comparison Between Shield Active And La Gel

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