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Research Article

Effect of Eutectic Mixture of Local Anaesthetics (EMLA) on Pain Perception During Scaling & Root Planing (SRP) Split-Mouth, Controlled, Randomized Clinical Trial

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Keywords EMLA; Local Anaesthetics; SRP Anaesthesia

Abbreviations EMLA - Eutectic Mixture of Local Anaesthetics; SRP - Scaling and Root Planing

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Abstract

Background: Scaling and Root Planning (SRP) is the most commonly used procedure for treating gingivitis and periodontitis, which 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. Pain control is considered to be an extremely important outcome measure for successful periodontal therapy.

Methods: Local application of Eutectic Mixture of Local Anaesthetic agent (EMLA) having higher concentration of local anaesthetic agent, considered as an effective way to reduce pain.

Results: The mean Visual Analogue Scale (VAS) when EMLA cream was used was lower compared to when EMLA cream was not used. The mean Verbal Rating Scale (VRS) was also lower when EMLA cream was applied.

Conclusion: The results of the present study warrant the use of EMLA in routine practice.

Introduction

Mechanical non-surgical therapy or Scaling and Root Planing (SRP) is the most commonly used procedure for treating gingivitis and periodontitis. 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. Pain control is considered to be an extremely important outcome measure for successful periodontal therapy.

The methods to reduce pain by infiltration or nerve block can induce fear in patients and local application may reduce efficacy of anesthetic agent. As EMLA is made up of equal mixture of lidocain & prilocain, without addition of any aqueous solvent. So EMLA can provide higher concentration of local anaesthetic with higher efficacy. Therefore, the aims of the present study are to: 1) evaluate the efficacy of the EMLA cream during scaling and 2) evaluate the intensities of pain provoked by hand and ultrasonic instruments with a split-mouth design.

Materials & Methods

Patients with chronic periodontitis were included in this study. There were fifty patients in which one quadrant was randomly assigned as control site (in which only scaling and root planig was performed) and another quadrant assigned as test site (in wich scaling and root planing along with the application of the EMLA cream was performed). Pain levels were assessed after each treatment modalities with visual analog scale (VAS; 0 to 10) and verbal rating score (VRS; 0 to 4).

The initial examination for subject selection, randomization completed. An impression recorded (figure 1) and scraped to create space for EMLA cream in such a way that the cream will occupy all existing teeth and extend 5mm over the gingival margin (figure 2). EMLA cream was applied at the buccal and lingual or palatal side of the scrapped impression (figure 3). All subjects were seated in an upright position that prevents leakage of the topical agent. The subjects were asked to close their eyes to prevent them from seeing the substances applied. After drying of the mucosa, the impression was inserted and left in position for 5 minutes, so that EMLA did not get diluted. Then, the impression and topical anesthetic were removed from the teeth and gingival with the help of water spray. After treatment of each quadrant, the subjective intensities of pain were assessed with a Visual Analog Scale (VAS) and a Verbal Rating Score (VRS).

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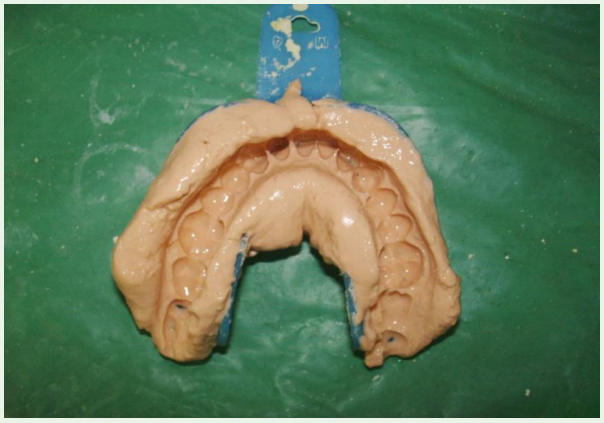

Figure 1: Alginate impression.

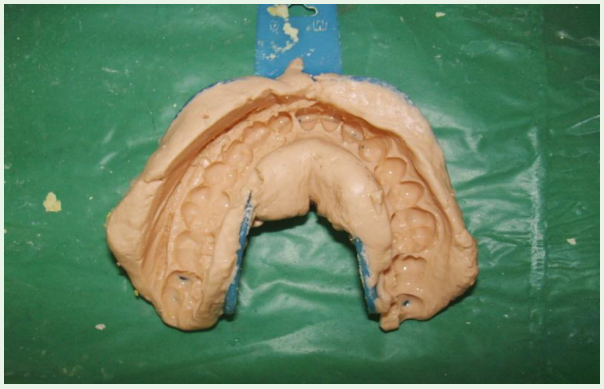

Figure 2: Scrapping of impression at the area of EMLA application.

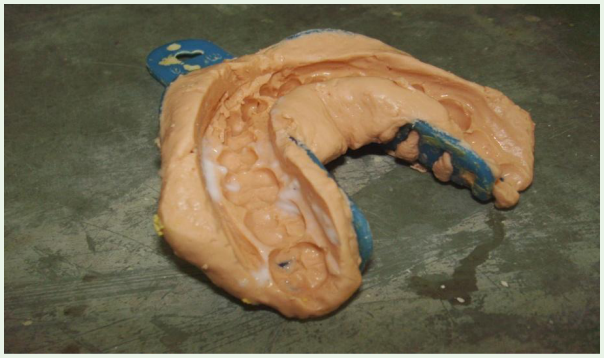

Figure 3: Application of EMLA.

Results

The mean VAS when EMLA cream was used was lower compared to when EMLA cream was not used. The mean VRS was also lower when EMLA cream was applied. Regardless of the type of instrument, the differences in VAS and VRS reached statistical significance (VAS: P <0.001; VRS: P <0.001) (Table I). There was no interaction between the instruments used and EMLA application for VAS (P = 0.837) and VRS (P = 0.486).

Outcome of Follow-Up Visit

Table I: statistical significance differences in VAS and VRS.

	TEST	CONTROL	P VALUE
VAS	1.56 ± 0.92	4.34 ± 1.31	< 0.001
VRS	0.52 ± 0.54	1.94 ± 0.84	< 0.001

After 24 hours of treatment, none of the subjects complained about pain, a burning sensation, or discomfort on the oral mucosa where the EMLA cream was applied. Also, no subjects showed a localized ulceration, desquamation, erythema, edema, or transient pallor.

Discussion

The EMLA cream, eutectic mixture of prilocaine and lidocaine, has been used to anesthetize skin before venepuncture and minor operations in dermatologic practice. In dentistry, the EMLA cream has been used on skin before venepuncture and TMJ Arthrocentesis [1]. Although EMLA cream was not originally designed for intraoral use, it was shown to have effective properties in needle-penetration studies [2,3] and injection studies [4-6].

The present study evaluates the efficacy of an EMLA cream on pain perception during scaling and root planing. Other studies reported that EMLA cream was more effective in increasing sensory and pain thresholds than a 2% lidocaine gel [7], 5% lidocaine gel [8,9] and 1%dyclonin, 10%cocaine, 20% benzocaine, and 10% lidocaine [10]. According to Svensson et al [8], sensory and pain thresholds were elevated up to 25 minutes after 2- to 15-minute application of EMLA cream. The systemic uptake of topical anesthetics from the oral mucosa is governed by the total dose and the time of application.

Thus, a short duration is advantageous. Haasio et al., [10] reported that the maximum plasma lidocaine concentration after the application of 4 g of EMLA was 0.47 μg/mL at 5 min.

This value is well below the minimum toxic concentration of 5 μg/mL

Pere et al., using a similar regimen noted that the gingival application of 4 g EMLA resulted in maximum plasma levels of lidocaine of 0.26 ug/mL at 15 min and 0.09 ,ug/mL prilocaine at 30 min.

Another aspect that needs to be discussed is the duration time of EMLA-cream application because a possibility of wear-off may have existed that impacted the results. Previous studies suggested a 25- to 30-minute duration time of EMLA-cream application [11,12]. According to Svensson et al.,[11] sensory and pain thresholds were elevated up to 25 minutes after removal of a 2- to 15-minute application of EMLA cream. Also, Hassio et al.[12] stated that the application of 4 g EMLA on the buccal gingival side with a toothbrush achieved an analgesic effect for 30 minutes. The approximate treatment time was 30 minutes. Because most of the treatment was completed within 30 minutes, it was assumed that the cream was still effective even at the last quadrant to be treated with a minimal impact on the results.

In the present study pain levels were measured using VAS & VRS scores. So it may be argued that, although the differences in VAS & VRS scores may have been statistically significant, questions remain if such differences had any translational clinical meaning. According to Lee et al., [13] a Minimum Clinically Important Difference (MCID)

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is defined as the mean change in VAS that corresponds to a patient perception of adequate analgesia or anesthesia, which means that if the value of MCID is 30 mm or a 30% reduction of VAS is observed, the findings may be considered clinically meaningful. In the present study, the mean VAS when the EMLA cream was applied was significantly lower (P <0.001) compared to the mean VAS when the EMLA cream was not used. Although VAS values never reached 30, the reduction of the VAS by using the EMLA cream was _30%, which fulfilled the MCID criteria.

Conclusion

Although most patients experienced limited pain during scaling, a significant reduction of pain is achieved by using EMLA cream. The results of the present study warrant the use of EMLA in routine practice nevertheless, further research is still awaited.

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