

Original Article

EFFECTS OF 5% EMLA CREAM VERSUS 20% BENZOCAINE ON PRE INJECTION ANALGESIA-A DOUBLE BLIND SPLIT MOUTH STUDY

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ABSTRACT:

Objective: To assess the effect of topical administration of 5% EMLA and 20% Benzocaine on the discomfort associated with local anaesthetic agent injection in an adult population.

Methods: The participants will be briefed on the nature and goal of the study including visual analogue scale (VAS). The areas will be separated into condition A- 5 percent EMLA and Condition B – 20 percent Benzocaine Gel. After marking injection sites, primary investigator will leave the room and the consultant will apply 5 percent EMLA gel at experimental area and 20 percent Benzocaine gel at control area. After pre-treatment with topical anaesthetic the consultant will deliver local anaesthesia to both sides. Then Principal investigator will be notified into the room and patient will be examined though visual analogue scale by him/her.

Results: Participants in the study were between the ages of 18 and 35, with a median age of 29.4 years. At three minutes, benzocaine group received a VAS score of 4.00; at six minutes, it received a VAS score of 4.23; at nine minutes, the EMLA group received a VAS score of 3.00 with a standard deviation of 2.04; and at nine minutes, it received a VAS score of 3.00. At three, six, and nine minutes, the Benzocaine group have higher VAS means than EMLA group (p-value 0.05). Between the Benzocaine and EMLA groups, there was no statistically significant difference. Both benzocaine and EMLA had comparable efficacy in both sexes. In neither group, individuals' ages had no effect on their VAS scores.

Conclusion:The authors propose applying topical analgesics on a regular basis. There are no known hazards linked with topical anaesthetics while according to the recent study, 5% EMLA found to be superior to 20% Benzocaine group.

INTRODUCTION:

Dental pain is a genuine dread for many people. Pain and anxiety treatment in dentistry has progressed over time through the use of behavioural modification and oral and injectable sedatives. Whereas local anaesthesia is regarded as the profession's backbone. Over the years, techniques have been developed to alleviate the pricking pain associated with local anaesthetic injections. Numerous factors contribute to the reduction of discomfort associated with local anaesthesia injections, including warming the local anaesthetic agent, using a specific gauge size, using a specific type of anaesthetic solution, and using topical anaesthetics. Prior to injections, topical anaesthetics are used to the insertion sites to alleviate the little discomfort associated with needle insertion. [1,2,3]

Benzocaine is a topical anaesthetic that is frequently used for dental operations.[4] Benzocaine is an FDA-approved medication that comes in a variety of forms and doses. With an onset time of 30 seconds and a duration of 5-15 minutes, benzocaine gel is the most often used topical anaesthetic in dentistry at a 20% dosage. EMLA is a eutectic mixture of two local anaesthetics, prilocaine and lidocaine, that melts at a lower temperature than any of its constituents, allowing for the administration of larger anaesthetic concentrations. [5] It is used to alleviate the discomfort caused by venous cannulation.

Several previous research have documented the pharmacologic and psychological effects of benzocaine and a mixture of local anaesthetics called Eutectic on pain control (EMLA). However, there is no valuable evidence on the effect of concurrent usage of 5% EMLA and 20% Benzocaine on pain perception during injection in the oral mucosa of the Karachi population. The purpose of this study was to determine the effect of topical administration of 5% EMLA and 20% Benzocaine on the discomfort associated with injection of the local anaesthetic agent in an adult population.

METHODOLOGY:

The study was double blind study – split mouth, conducted at Department of Dental & Maxillofacial Surgery, Dr Ishrat-ul-ebad khan institute of oral health sciences, Dow University of health Sciences Karachi. The estimated sample size calculated with epi calculator was 70.

Patients indicated for bilateral extraction and requiring same local anesthesia technique, patients in the age group of 18 to 35 years and patients willing to take part in study were primarily included in the study and the patients who are allergic to local anesthesia, patient with history of methemoglobinemia, patients presenting with local inflammation / tenderness at site of injection patients on antidepressant or anti-psychotic drugs and patients not willing to participate in the study were excluded.

A total number of 70 patients attending DOW Ojha hospital, fulfilling inclusion criteria and undergoing extraction of bilateral teeth will be included in this study. Approval of data collection will be sought from the Institutional ethical review board (IERB) of Dow University of health sciences (DUHS) for this study. The participants will be briefed about the nature and purpose of the study including visual analogue scale (VAS). They will be ensured that their information will be used for the study purpose only. Informed consent from the participants will be obtained. Complete history from patients will be taken. The sites will be divided into condition A- 5% EMLA and Condition B – 20% Benzocaine Gel. After marking injection sites, principal investigator will leave the room and the consultant will apply 5% EMLA gel at experimental area and 20% Benzocaine gel at control area. After pre-treatment with topical anesthesia the consultant will administer local anesthesia to both sides. Then Principal investigator will be signaled into the room and patient will be assessed though visual analogue scale by him and will be confirmed by supervisor.

Statistical Analysis:

Patient's data was compiled and analyzed through SPSS Version 23. Frequency and percentage will be figured out for variables i.e. 5% EMLA/ 20% Benzocaine. Calculation of Mean \pm SD for quantitative variable i.e. age, VAS will be done. The stratification will be done on age groups, groups (5% EMLA/ 20% Benzocaine) to see the effects of these products on outcome (VAS) using independent sample t-test. $P\leq 0.05$ will be considered as significant

RESULTS:

The study's participants ranged in age from 18 to 35 years, with a median age of 29.4 years. Each patient was required to receive local anesthesia, on experimental and control site. At 3 minutes, this group had a VAS score of 4.00, at 6 minutes, it had a VAS score of 4.23, while the EMLA group had a VAS score of 3.00 with a standard deviation of 2.04; at 9 minutes, it had a VAS score of 3.00. At all three time intervals, the Benzocaine group outperformed the EMLA group on a VAS means (average) scale (p-value < 0.05) at three, six, and nine minutes. The t-test and its associated p-value are highlighted in (Table 2.) At all-time points evaluated, EMLA patients had considerably lower mean VAS scores than benzocaine subjects (see Table 2). There was no statistically significant difference between the Benzocaine and EMLA (Table 3) groups. Both benzocaine and EMLA were equally effective on both sexes. Individuals' ages had no effect on their VAS scores in either group.

Table 1:

Demographics	Mean and Std.
Age in years	29.66 ±11.75
Weight in kgs (Mean ±SD)	65.43 ±8.87
Height in cm (Mean ±SD)	155.9 ±20.0
Gender (M/F) ratio	42/28

Table 2:

	P Value	Mean	Std. Error
VAS score at 3 minutes	0.035	1.001	0.466
VAS score at 6 minutes	0.005	1.376	0.486
VAS score at 9 minutes	0.004	1.526	0.524
Emla& benzocaine at all-time measures(VAS)	0.000	1.290	0.275

Table 3:

Difference at 3, 6, 9 minutes in Benzocaine group	Mean Square	P Value
Between Groups	3.049	0.539
Within Groups	4.948	
Difference at 3, 6, 9 minutes in EMLA group	Mean Square	P Value
Between Groups	8.634	0.168
Within Groups	4.823	

DISCUSSION:

Around 10% of the global population suffers from needle phobia, which is manifested by avoidance behaviour and physiological abnormalities in blood pressure, heart rate, electrocardiogram (ECG), and stress hormone levels [6,8]. Two topical anaesthetics were evaluated in a real-world environment to see which one performed better. In this trial, a needle injection was administered 3, 6, and 9 minutes after topical anaesthetic was provided. The topical anaesthetics investigation lasted significantly longer than the other studies, which lasted between two and twenty minutes. Three injections were utilised since it was easier to convince volunteers to take three injections on each side [7,12].

According to the manufacturer of the benzocaine utilized in this investigation, a time duration of less than ten minutes was most favourable for this trial. Al Melh and Andersson failed to explain how to avoid overlapping injections and where to place each one after injecting ten times[15]. Three injections were made three minutes apart and three millimetres apart at the selected sites in this investigation. It may have been easier for participants to estimate their pain levels if they had been able to rest and apply topical anaesthetics for extended periods of time, removing the possibility of needle injections interfering with one another[9,10]. As a result, a single expert was responsible for overseeing the entire trial and assuring consistent needle injection placement in all participants. Without anyone's knowledge, an anaesthetic cream had been applied. Even if both agents were equally easy to give, EMLA's handling characteristics may have been a result of benzocaine's higher flow rate[11].

When it comes to taste and scent, as well as ease of administration to various areas of the tongue, EMLA is unquestionably the victor. In this investigation, a new needle was used for each injection until it reached the bone. Multiple injections with the same needle can dull it. The subsequent injection shifted the beginning point. The VAS has established itself as a reliable instrument for evaluating pain intensity in chronic and experimental pain as a ratio scale. EMLA was shown to be significantly more effective in reducing discomfort than benzocaine gel in the maxillary vestibular mucosa [15] and palate mucosa [17]. EMLA has been shown in research to reduce discomfort caused by the dental dam clamp in children during gingival probing [11],

minor gingival tissue treatments [9], or periodontal debridement [10]. When applied to various parts of the oral cavity, including those with thick mucosal attachment, EMLA has been shown to be effective for as little as 3-9 minutes.

Primosch and Rolland-Asensi reported that benzocaine was more effective than EMLA at reducing pre-injection agitation in children [21]. Although gauze and water/air spray were used to remove the cream, several test subjects reported persistent numbness in their mouths for at least a half-hour following the procedure. The mucosa of the hard palate is more receptive to EMLA absorption, which may explain why EMLA is more quickly absorbed from the hard palate.

Numerous studies have established the efficacy of topical anaesthetics with 20% benzocaine. Another study discovered that topical anaesthetics were ineffective at alleviating pain related with inferior alveolar nerve blocks and posterior maxillary infiltration injections. When a local solution was injected, Hutchins et al. discovered no difference between a topical anaesthetic and a placebo. Even after only 20 minutes of treatment, several individuals showed no difference in reaction to benzocaine or a placebo [22]. Fukayama et al. discovered that 20% benzocaine was ineffective in areas supplied by the posterior superior alveolar or greater palatine nerves [23], correlating with our earlier findings that areas supplied by the greater palatine nerve had significantly lower VAS values when EMLA was used instead of 20% benzocaine at all application times. It's probable that the difficulty in applying for jobs stems from the large variety of application requirements displayed on numerous job sites.

According to Nakanishi and colleagues, a number of researchers utilised anaesthetics following the completion of the needle injection, with variable results [22]. Resulting from (Hutchins and others). According to Bhalla et al., there were no statistically significant differences in the durations of EMLA and Benzocaine topical administration at 2, 5, or 10 minutes [23]. Although the study's findings were insignificant, nine-minute injections of Benzocaine or Emla reduced discomfort by six points. According to the VAS results from this study, a longer anaesthetic administration is preferable.

According to Martin and colleagues, patients who used topical anaesthetics showed less anxiety because they anticipated the future needle injections to be less unpleasant [5] in multiple double-

blind, placebo-controlled studies discovered that topical anaesthetics have pharmacological effects. These studies discovered that variables such as the length and location of anaesthetic treatment can account for differences in results among studies [7]

CONCLUSION:

The authors propose using topical analgesics on a regular basis. There are no known dangers associated with topical anaesthetics, except in extremely rare instances of an adverse reaction to the anaesthetic medicine. There have been instances of adverse reactions to the usage of certain anaesthetics. Methemoglobinemia is the most often encountered adverse reaction to topical anaesthetics used by dentists. Certain individuals remained unconscious for up to 30 minutes after the EMLA was withdrawn from the injection site. Allergic reactions to benzocaine, skin irritation caused by benzocaine contact dermatitis, and household use of benzocaine (20%) have all been associated with methemoglobinemia.

DISCLOSURE:

This article is original and not presented for publication in any other journal.

ETHICAL APPROVAL:

Prior to the initiation of the study an ethical approval was obtained from Dow University of Health Sciences, Karachi. Approval no. 2021/568

CONFLICT OF INTEREST:

NO conflict of interest is declared by the authors of this study.

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