Comparison of the Effects of Local Pressure and Topical Anaesthetic Using 20% Benzocaine, 60% Lidocaine Gel, and Infiltration for Maxillary Anterior Teeth

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Abstract

Objective: The purpose of this study was to determine the efficacies of 2 topical anesthesia commonly used in dentistry and local pressure on pain during infiltration injection for maxillary anterior teeth. **Study design:** the alveolar mucosa of the upper incisors apices of 100 healthy volunteers was applied for 1 minutes with either 20% benzocaine gel or nothing as a control. The second part of experiment was done with 60% lidocaine gel and vehicles control. The third part used pressure before infiltration and then stimulation were given, and the pain rating score and visual analog pain scale were measured after each. **Methods** of stimulation in contrast, 60% lidocaine significantly reduced pain perception according to these measurement. We conclude that 60% lidocaine gel is effective for topical anesthesia before infiltration anesthesia, oral surg oral med oral pathol oral radial endod 2002; 94: 157-61. **Results:** Showed that lidocaine reduced the injection pain significantly more than benzocaine. Application of local pressure reduced the injection pain, but the difference from the control not significant. **Conclusion:** Topical anesthesia 60% lidocaine was more effective than 20% benzocaine in reducing pain severity during infiltration injection. However, it was not significantly different in comparison to the application of local pressure.

Keywords: Anesthesia, Lidocaine, Benzocaine, Pain, Pressure, Topical and Visual Analog Pain Scale.

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INTRODUCTION

In dentistry, managing paediatric patients is particularly challenging. Due of their lack of dental experience, they frequently experience worry and anxiety. The youngster does not comprehend or care that participation during therapy may result in a positive aesthetic or functional outcome because their coping mechanisms are either underdeveloped or mature. In paediatric dentistry, an efficient pain management substantially influences the best dental care. Therefore, the foundation of a kid-friendly dental procedure is local anaesthetic and pain management. According to studies, the majority of individuals put off going to the dentist because they are afraid of needles, pain, and biting injuries from injections. [2,3].

One of the critical problems with the majority of dental procedures is pain during the injection of local anaesthetic drugs[4,5,6]. which could be explained by mechanical injury from the pressure of the needle on the injection site, a local anaesthetic agent's quick expansion of tissues, or a syringe's rapid ejection of its contents. [7.] The primary method dentists employ to reduce the intensity of discomfort during injection is the application of topical anaesthetic. Although a variety of topical anaesthetics are available, none of them have been able to totally reduce pain associated with injections[8]. Lidocaine, a popular topical anaesthetic used to reduce pain during injections [9,10.] The first cutaneous use of lidocaine was documented in 1980[11]. In addition, Holst and Evers introduced its mucosal application first[12].

Dental procedures involving the buccal mucosa for restorative procedures[13], periodontal anaesthesia prior to procedures like periodontal probing [14], scaling and root planning [15], oral mucosa anaesthesia prior to removing maxillary and mandibular appliances[16], and pain relief during rubber dam placement17 have all been studied. Concerns about the topical anaesthetic agent's harmful effects on the oral mucosa have been raised in studies. [16,18]. Also, low viscosity and high PH are other disadvantages of lidocaine and lignocaine gel(EMLA) [13]. However, Tulga and Mutlu[18] observed that lidocaine-lignocaine gel was less effective than other topical anaesthetics, such as 20% vision gel (benzocaine). A popular topical anaesthetic drug from the

ester group that has had positive outcomes in clinical investigations [18,19] is benzocaine. There are a few additional easy ways to reduce discomfort during injections in addition to topical anaesthetic, such as applying local pressure to the area prior to injection. According to the theory of gate control, which was first presented by Melzack and Wall [20], sing local pressure could make injections more comfortable. Pressure and vibration-induced stimulation of a beta fiber could control the medullary dorsal horn, reducing painful nerve inputs from peripheral tissues [20, 21]. This split mouth clinical trial's objective was to examine the impact of local pressure and lidocaine-based topical anaesthetic on discomfort during infiltration injections for maxillary incisor teeth.

Materials and Methods

100 volunteer dentistry students were tested in this split-mouth double-blind randomised controlled clinical experiment. The inclusion criteria were ASA I or II category, minimally restored maxillary incisors, no aberrant periapical radio Figurey findings, and normal probing depth. clinical finding of a healthy tooth. Patients taking sedatives, using analgesics or anxiety medications for two weeks before to the study, or using any other drugs that might have influenced pain perception were excluded from the study. Other exclusion criteria included known allergies or contraindications to using anaesthetic materials.

All the clinical procedures were carried out in the department of pedodontics, Faculty of dentistry, Ahl al-Bayt university from 4 months. All the subjects completed informed consent forms after full explanations we provided in relation to the nature of the procedures and the possible discomforts and risks.

The 25 participants who volunteered for this study were divided into four groups at random. Before giving each group anaesthesia, a side was randomly chosen as the experimental side and the other side as the control side. In group 1, the injection site received a 60% lidocaine gel application (the experimental side). On the opposing side, a placebo was used (the control side). In group 2, 60% lidocaine gel was administered to one side of the alveolar mucosa at the injection site while finger pressure was applied to the other. In group 3, 20% benzocaine gel was used on the side opposite the injection site, and 60% lidocaine gel was placed there. One of the coauthors created a topical gel with the same look, flavour, and colour as the topical anaesthetic to serve as a placebo. According to the American Dental Association and US Food and Drug Administration recommendations, the topical anaesthetic agents, 60% lidocaine and 20% benzocaine, were administered to the injection site using a cotton applicator for 1 minute. The operator administering the injections applied finger pressure to the alveolar mucosa for one minute. The coauthor, a pharmaceutics expert, named the similar-looking tubes containing the commercial topical anaesthetic medicines, 60% lidocaine and placebo. As a result, neither the patients nor the operator knew about the topical gels or the placebo. Buccal infiltration of 1.8 ml of 2% lidocaine with 1:80,000 epinephrine in all groups. The subjects were asked to rate their level of pain during needle penetration and injection right after following the injection using the 10 mm VAS (Figure 2) forms. Within this range, 0was considered as no pain, 1to3 as mild pain, 4to6 moderate pain, and 7to9 as severe pain[22].

Statistical Analysis

Statistical programmes for the Social Sciences (SPSS) 20 were used to perform the statistical analysis (IBM, USA). Data analysis was done using the Wilcoxon test. The McNemar test was used to make pairwise comparisons.

Results

100 individuals in total, 48 boys and 52 girls, ranging in age from 6 to 15 years, took part in the study. Data analysis revealed that using lidocaine topical anaesthetic agent significantly decreased injection pain when compared to benzocaine P=0.01. The findings also revealed that using lidocaine considerably reduced injection discomfort when compared to using a placebo (P=0.00). Additionally, local pressure applied to the buccal side of the mucosa prior to infiltration decreased the pain from injections, but the difference was not statistically significant (P=0.06). Additionally, there was no statistically significant difference between applying local pressure versus using a topical anaesthetic medication containing lidocaine (0.07).and statistically significant was set at P<0.05. Figure 1.

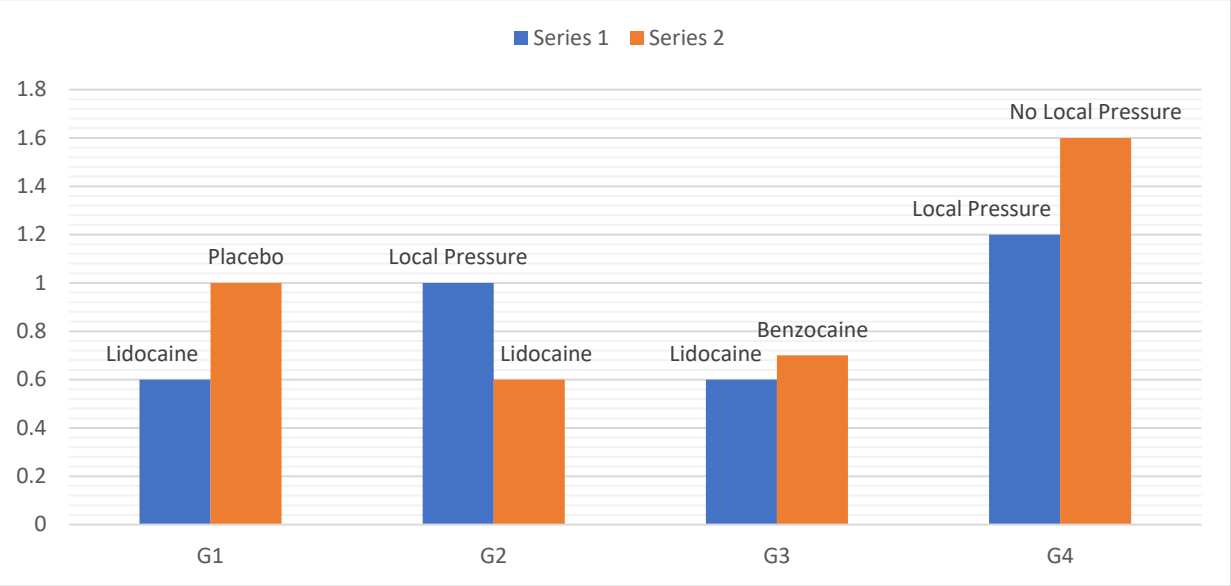

Figure (1): Based on median values, The Pain of The Study Groups (G1, G2, G3, G4)

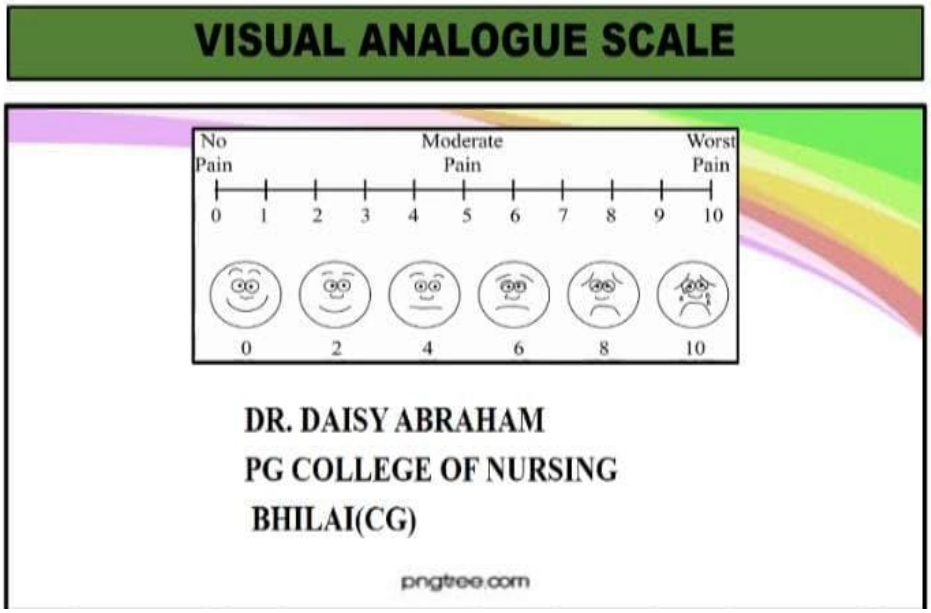

Figure (2): Visual analogue scale

Discussion

We compared the impact of local pressure and lidocaine as a topical anaesthetic agent on discomfort during infiltration injection for maxillary anterior teeth in this randomised clinical research. Given that lidocaine is one of the topical anaesthetics that dermatologists use the most frequently in their work, we assessed the effectiveness of lidocaine in this study to lessen pain during infiltration injection[10]. According to the gate control hypothesis, it may be useful in lowering pain during injection, which is why this study looked at the impact of local pressure on pain during infiltration injection. Additionally, local pressure and vibration impacts have been assessed[21]. In order to remove confounding variables, this study was conducted in a split-mouth fashion.

According to the study's findings, lidocaine and benzocaine were both more effective than a placebo at reducing discomfort brought on by the insertion of needles into the palate. The fact that the intensity of the pain was much lessened when lidocaine and benzocaine were applied was a glaring demonstration of their therapeutic effectiveness. These findings conflict with those made by Gill and Orr[24] and Kincheloe et al[25], who found no distinction between different topical anaesthetics and placebos. This mismatch can result from different approaches being applied. Because Gill and Orr[24] employed a 5-point descriptive scale to evaluate pain,

it's possible that they didn't notice any differences between the anaesthetics and the placebo.

This is not an accurate method because this scale is not sensitive.[26] Due to the fact that Kincheloe et al.25 administered 1.8 mL of anaesthetic solution in within 30 seconds, this may have happened in their study. It is conceivable that this may have obscured the action of the topical anaesthetic because the injection of a solution, even slowly, causes more pain than just needle insertion. Although several writers have demonstrated the superiority of topical anaesthetics over a placebo, often the mucovestibular fold was the location of the needle insertion.[27]", a region where noxious stimuli cause moderately painful symptoms. Additionally, Rosivack et al.'s[28] application of topical anaesthetics and placebo to the same subjects without using double-blind methodology may have caused the patients to report higher levels of discomfort when they received a placebo. Because they demonstrate that these anaesthetics are also effective in the palatine region, where injection is more painful, the current data provide an extension of past investigations. [29] In addition, there is no requirement to choose an equal number of men and women for similar experiments because sex has no impact on how well a medicine works or how intense the pain is.

There was no difference between the tasteless and mint-flavored pastes when we compared topical anaesthetics and placebos, indicating that flavour does not affect the effectiveness of topical anaesthetic. Some patients have voiced complaints regarding flavoured topical anaesthetics in our clinical experience. Additionally, these findings suggest that dental surgeons should keep using topical anaesthetics prior to injections because they significantly reduce pain. The need for better methods of pain management is highlighted by the fact that patients' perceptions of pain were still high even after topical anaesthetics were applied. This is important because discomfort can lead people to put off getting regular dental care.

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