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Maxillofacial Surgery

COMPARISON BETWEEN SINGLE BUCCAL INFILTRATION VERSUS CONVENTIONAL BUCCAL AND PALATAL INFILTRATION FOR REMOVAL OF MAXILLARY MOLAR TEETH.

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ABSTRACT **Background:** Although less painful injection techniques have been developed, most individuals still find palatal injection to be unpleasant. **Aims:** The purpose of this study was to evaluate the efficacy of single buccal infiltration versus conventional buccal and palatal infiltration for the removal of maxillary molar teeth. **Materials and Methods:** Fifty patients participated in a prospective randomized, split-mouth study, Group 1: 4% Articaine HCL infiltration – Only buccal, Group 2: 2% Lignocaine HCL – Buccal and palatal infiltration. Checking VAS score and Facial pain scale during Infiltration and during extraction. Factor analysis was used to determine the significance of the difference in mean scores between the two groups using both the independent sample t-test. **Results:** Even though the difference was not statistically significant (P > 0.05), patients in the articaine group reported much less discomfort during having their vital maxillary molars extracted compared to the lignocaine group. **Conclusion:** As was previously mentioned, it is feasible to avoid the palatal injection while removing molars from the maxilla. Specifically, the extraction of the upper molars, and buccal infiltration with articaine is a viable alternative to the use of traditional local anaesthetic.

KEYWORDS : Local anaesthetic, maxillary molars, palatal injection, buccal articaine, lignocaine.

Introduction:

When maxillary teeth are extracted through palatal injection, patients often experience discomfort from the injection itself, numbness of the soft palate, and a sensation of pressure. Of these effects, injection discomfort is notoriously poorly tolerated and a common source of patient complaints. To effectively control pain during dental procedures, local anaesthetics (LA) are essential because they block the nociception that is induced during the procedure. Instead of pain being caused by the needle entering the mucosa, palatal injections are associated with the mucoperiosteum being displaced [2, 3]. The palatal mucosa is profoundly neurally innervated and grips firmly to the basic periosteum.

A few methodologies — TENS, effective sedatives, precooling of the sense of taste, mechanized infusion frameworks, pressure organization, and a eutectic blend of LA — are only a couple of the techniques that have been utilized to ease torment, have been created to reduce agony and distress in patients, and have been proposed to lighten the aggravation related with LA specialist penetration [4,5]. However, none of these methods has gained widespread acceptance. The dread of dental injections prevents 5% of the population from getting the treatment they need, according to studies [2]. The posterior buccal maxilla is relatively thin and porous, making it simple to extract maxillary teeth without administering a palatal injection." It is expected that local anaesthetic (LA) would reach both soft and hard tissues, unlike more severe dental surgical procedures. Articaine has a larger diffusion coefficient through soft and hard tissues than other LAs, hence its infusion via the buccal mucosa of the maxilla may provide palatal soft tissue anaesthetic [1]. Articaine results in higher intraneural concentrations, more extensive longitudinal spreading and better conduction blockade. [19] Articaine's widespread use may be explained by the substance's reputed advantages over lidocaine in several clinical scenarios, including but not limited to: greater diffusion into soft tissue and bone; quick onset; good anaesthetic quality; and lesser toxicity. Articaine's excellent tissue penetration capabilities [6] allows for full anaesthesia even when infiltrating the tissue. One of the most common uses for local anaesthetics is in dentistry and medicine, where lidocaine is the drug of choice. The permanent maxillary tooth may be safely extracted with only one buccal infiltration with 2% lidocaine, eliminating the need for palatal injection and anaesthesia. When it comes to extracting maxillary molars, a study compared using a single buccal infiltration vs the more common buccal and palatal infiltration.

MATERIALS AND METHODS:

The Institutional Review Board (IRB) authorized this research. Before a patient participated in the study, they signed a consent form indicating that they gave their permission to participate in the study. Fifty participants were engaged in this research from Saveetha Dental College's Division of Oral and Maxillofacial Surgery." Exclusion criteria included a lack of severe systemic disease precluding tooth extraction, inability to understand the given instructions in Cantonese, and a positive diagnosis for extraction of both upper maxillary teeth. Inability to provide informed permission, allergy to articaine, or serious systemic disorders precluding maxillary tooth extraction under conventional local anaesthetic were among the exclusion criteria.

For this reason, we used a randomized, double-blind, split-mouth format. Power analysis utilizing a 5% margin of error and a 0.3 value for the identified difference in the pilot research led to the final sample size. As a result, the final sample size was calculated to be 28 and 5% was added. Fifty participants have been placed in each group. To determine who would receive which treatment, a randomization list was generated in GraphPad StatMate 1.01i "(GraphPad Software, Inc., Armonk, NY: IBM Corp)."

The extraction was done by a second experienced surgeon dentist, while the first dentist administered all the injections while blinded to the anaesthetic solutions. The subjects' outcomes were ascertained by an experienced investigator who was unaffiliated with the study. The statistician was coded into a different group than the one they were analysing.

A cotton swab and a topical anaesthetic gel (2% benzocaine) were used to apply pressure to the mucobuccal fold close to the teeth in question for about 30 seconds in both groups. Then, under sterile circumstances, group I received buccal injections, however, in the articaine group, the injection was 1.7 ml of 4% articaine. Group II received 1.5 ml of 2% lidocaine with 0.2 ml of adrenaline 1:80,000 was injected buccally and 0.2 ml was injected palatally using a 27-gauge needle. There was a 5-minute delay to ensure adequate time for buccal and palatal anaesthesia. The number 9 Molt periosteal elevator was used to examine the patient's vitals, first on the ipsilateral, then on the contralateral side, while the patient was under anaesthesia. Following the standard protocol, the tooth was extracted with minimal elevation of the palatal gingiva.

Results indicators Each group had a pulse oximeter inserted on their left index finger and averaged the readings from three readings obtained during, and after the extraction. Both the VAS (Visual analog scale) and the FPS (Facial pain scale) were used to keep track of how much patients were suffering throughout infiltration and extraction. The VAS is a horizontal line with a range of 100 millimetres, from the absence of any pain on the left to the most excruciating pain on the right. Every patient was given a line and instructed to place an indicator at their degree of discomfort. When using the FPS system, numbers are read from left to right, with 0 representing no pain and 10 representing extreme discomfort. The scale is meant to gauge how a person really feels, rather than how their exterior seems.

"The records were entered into an Excel 2013 spreadsheet created by Microsoft. The statistical analysis was performed using IBM SPSS Version 20.0. (Armonk, NY: IBM Corp.). independent sample t-test were used as empirical tests for comparing means across groups." When the P-value was lower than .05., it was thought that the data would be statistically significant.

Results:

Table 1: Intergroup comparison during local anaesthesia administration using Face pain score

Group	N	Mean ± SD	P value*
Group 1	50	1.64 ± 1.321	0.000
Group 2	50	3.48 ± 1.555	

In Table 1, group 1 shows mean value of 1.64 ± 1.321 while group 2 shows mean value of 3.48 ± 1.555 using face pain scale. The difference between the mean values of two group is highly significant (P Value =0.00)

Table 2: Intergroup comparison during local anaesthesia administration using VAS

Group	N	Mean ± SD	P value*
Group 1	50	1.70 ± 0.863	0.000
Group 2	50	3.92 ± 1.482	

*Independent Sample T- Test

Table 2 depicts VAS during local anaesthesia administration. Here group 1 shows mean value of 1.70 ± 0.863 while group 2 shows the mean value of 3.92 ± 1.482. The difference between the mean values of two group is highly significant (P Value= 0.00)

Graph 1:

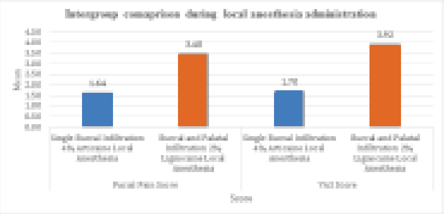


Table 3: Intergroup comparison during extraction using Face pain scale

Group	N	Mean ± SD	P value*
Group 1	50	2.32 ± 1.362	0.308
Group 2	50	2.04 ± 1.370	

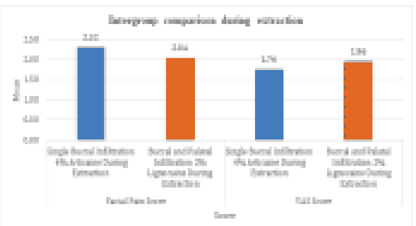
Table 4: Intergroup comparison during extraction using VAS

Group	N	Mean ± SD	P value*
Group 1	50	1.76 ± 1.117	0.350
Group 2	50	1.96 ± 1.009	

*Independent Sample T-Test

Table 3 and Table 4 shows pain score during extraction using Face pain scale and VAS respectively. In Table 3, group 1 and group 2 shows no statistically significant difference (P Value =0.308). In Table 4, group 2 shows higher value than group 1 but the difference is not statistically significant (P Value =0.350)

Graph 2:



Discussion:

This study compared the anaesthetic efficacy of 2% lignocaine and 4% articaine during infiltration and extraction in a, randomized, split-mouth design. The levels of pain and the need for additional anaesthesia during the procedure were the primary indicators of success in this study. Factors as varied as genetics, culture, and psychology all have a role in how we perceive and react to pain. Confounding variables such as age, gender, surgical difficulties, anxiety, and participants' own judgments of the severity of the painful stimuli were attenuated in the present research by using a split-mouth design in which each participant acted as their own control [7, 8]. Furthermore, As the treatment allocation was concealed from both the patients and their caretakers, any potential for interpersonal bias was mitigated. For pain assessment, both the visual analog scale (VAS) and the facial pain scale (FPS) have been shown to be credible and valid instruments. leading to improved treatment of pain in children and adolescents [9]. Detailed, widely accepted, and written about for years, palatal anaesthetic regimens have been described in textbooks and papers. To achieve nasopalatine and anterior palatine nerve anaesthesia, palatal injections are administered. The palatal mucosa, on the other hand, is dense and attached securely to the periosteum below it. In addition, although there are few axungia and no salivary glands in the anterior hard palate region of the stratum submucosal, the palatal tissues are well supplied with nerves [10]. As a result, patients who have undergone palatal injection report feeling mild to moderate pain, which is difficult for them to endure. Displacement of the mucoperiosteum, rather than needle penetration, appears to be the source of this pain [11]. Evidence suggests that providing palatal anesthesia, which is less invasive than traditional methods, is a good way to grow a practice and win over patients who might otherwise be hesitant to undergo treatment. In this research, subjects who received articaine during their maxillary molars extraction reported identical degrees of discomfort. The results of this research are in line with those of others[5, 6], "while those of another investigation, which revealed no articaine HCl at the palatal tissues after buccal injection [12], are at odds with those of the former. In our study, while receiving 2% lignocaine during bilateral maxillary molar extraction patients observed less pain than during local infiltration (p=0.000).

During their bilateral maxillary molars extraction, those in the lignocaine group reported much more VAS pain score than those in the articaine group (p=0.350), the same results were observed during local infiltration but statistical significance was seen between both groups (p=0.000). According to the findings, 4% articaine provides greater clinical performance than 2% lignocaine, especially when it comes to achieving sufficient palatal anaesthetic with buccal infiltration alone. When comparison was done for facial pain score (FPS) during local infiltration with 4% articaine patients observed less pain as compared to 2% lignocaine buccal and palatal infiltration, with statistical significance result (p=0.000), but when comparison was done during extraction 4% articaine with single buccal infiltration received more facial pain score than 2% lignocaine group but the results were not significant (p=0.308). However, the results of a few additional studies [14,15] are at odds with these findings, During the removal of primary molars from the maxilla, those who were given lignocaine reported more pain than those who were given a placebo. However, Mittal M et al. [16] found that articaine did not adequately numb the palate prior to the extraction of primary maxillary molars, contradicting the results of the current investigation. Since articaine is the only amide LA containing a thiophene ring, it is possible that this differential in efficacy between articaine and lignocaine buccal infiltration may be explained by this unique structural feature, making it more lipid soluble. Articaine's increased lipid solubility allows it to diffuse more efficiently into soft tissues, resulting in a greater intraneural concentration, wider longitudinal spreading, and more effective conduction blockage than other anesthetics. Articaine (2% and 4%) effectively suppresses the compound activity capacity of A strands in the severed rodent sural nerve, while lidocaine (2% and 4%) only partially does so [17]. Study participants less than 20 years old who were given articaine reported no discomfort during extraction [18]. Articaine, a thiophene derivative, inhibits ionic channels at far lower doses than its benzene counterpart (lidocaine). This is because the articaine's ability to penetrate the spongy maxillary bone gradually decreases as the patient ages.

The lack of uniformity in drug concentration across injectable and buccal infiltration anesthetic solutions was a flaw in the research. However, further large-scale randomized clinical studies are needed to synthesize more convincing data for using a friendly strategy in dentistry.

Conclusion: During a treatment to remove bilateral molars from the maxilla, it is possible to avoid giving a palatal injection. Articaine buccal infiltration was associated with lower pain ratings compared to lignocaine buccal and palatal infiltration. In addition, this method may be used on individuals whose mouths are too small to allow for a successful palatal injection.

REFERENCES:

1. Malamed S. Handbook of Local Anesthesia. 6th ed. St. Louis, MO: CV Mosby; 2013.
2. McArdle BF. Painless palatal anesthesia. JAm Dent Assoc 1997;128:647.
3. Ram D, Peretz B. Administering local anaesthesia to paediatric dental patients-current status and prospects for the future. Int J Paediatr Dent 2002;12:80-9.
4. Kravitz J. The palatal press and roll anesthesia technique. Pract Proced Aesthet Dent 2006;18:242, 244-5.
5. Munshi AK, Hegde AM, Latha R. Use of EMLA: Is it an injection free alternative? J Clin Pediatr Dent 2001;25:215-9.
6. Oertel R, Richter K, Weile K, Gramatté T, Berndt A, Feller K. A simple method for the determination of articaine and its metabolite articainic acid in dentistry: Application to a comparison of articaine and lidocaine concentrations in alveolus blood. Methods Find Exp Clin Pharmacol 1993;15:541-7.
7. Milgrom P, Coldwell SE, Getz T, Weinstein P, Ramsay DS. Four dimensions of fear of dental injections. J Am Dent Assoc 1997;128:756-66.
8. Primosch RE, Robinson L. Pain elicited during intraoral infiltration with buffered lidocaine. Am J Dent 1996;9:5-10.
9. Da Silva FC, Santos Thuler LC, de Leon-Casasola OA. Validity and reliability of two pain assessment tools in Brazilian children and adolescents. J Clin Nurs 2011;20:1842-8.
10. Borchard U, Drouin H. Carticaine: Action of the local anesthetic on myelinated nerve fibres. Eur J Pharmacol 1980;62:739.
11. Harker T. What injection? Br Dent J 1997;182(2):50.
12. Ozeç I, Tasdemir U, Gümüs C, Solak O. Is it possible to anesthetize palatal tissues with buccal 4% articaine injection? J Oral Maxillofac Surg 2010;68:1032-7.
13. Kumaresan R, Srinivasan B, Pendayala S. Comparison of the effectiveness of lidocaine in permanent maxillary teeth removal performed with single buccal infiltration versus routine buccal and palatal injection. J Maxillofac Oral Surg 2015;14:252-7.
14. Badcock ME, McCullough MJ. Palatal anaesthesia for the removal of maxillary third molars as practised by oral and maxillofacial surgeons in Australia and New Zealand. Aust Dent J 2007;52:329-32.
15. Yadav S, Verma A, Sachdeva A. Buccal injection of 2% lidocaine with epinephrine for the removal of maxillary third molars. Anesth Prog 2013;60:95-8.
16. Mittal M, Sharma S, Kumar A, Chopra R, Srivastava D. Comparison of anesthetic efficacy of articaine and lidocaine during primary maxillary molar extractions in children. Pediatr Dent 2015;37:520-4.
17. Potocnik I, Tomsic M, Sketelj J, Bajrovic FF. Articaine is more effective than lidocaine or mepivacaine in rat sensory nerve conduction block in vitro. J Dent Res 2006;85:162-6.
18. Somuri AV, Rai AB, Pillai M. Extraction of permanent maxillary teeth by only buccal infiltration of articaine.J Maxillofac Oral Surg 2013;12:1302.
19. Ramadurai, N., Gurunathan, D., Samuel, A. V., Subramanian, E., & Rodrigues, S. J. L. (2019). Effectiveness of 2% Articaine as an anesthetic agent in children: randomized controlled trial. Clinical oral investigations, 23(9), 3543–3550. https://doi.org/10.1007/s00784-018-2775-5