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Removal of maxillary teeth with buccal 4% Articaine without using palatal anesthesia—A comparative double blind study

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ABSTRACT

Objective: The aim of the present study was to evaluate and compare the property of vestibular to palatal bony diffusion of Articaine with that of lignocaine in the maxilla for the removal of maxillary teeth without the need for palatal injection.
Materials and methods: The study group (A) had 1.7 ml of 4% Articaine hydrochloride with adrenaline 1:100,000. The Articaine anesthetic agent was injected into the buccal vestibule by simple infiltration method along the long axis of the corresponding tooth. The patients were allowed to wait for 10 min. The control group (L) had 1.7 ml of lignocaine 2% with adrenaline 1:80,000. The parameters like pain during injection, objective symptom of numbness, pain during flap elevation, and pain during tooth extraction and the frequency of reanesthesia required were evaluated and marked by a different person. The pain was evaluated using the 0–100 mm VAS scale with descriptors on each end from NO PAIN to ABSOLUTE PAIN.
Statistical analysis used: Chi square test was used.
Results: Among the study group (A), 98.28% (114) patients had objective symptom of numbness on probing showing statistically significant p value (0.001). The complete control group (L) necessitating reanesthesia. 106 (91.38%) patients of the study group (A) required no reanesthesia showing statistically significant result (p value: 0.001).
Conclusion: The results of this study indicate that Articaine hydrochloride 4% with epinephrine 1:100,000 produce more effective buccal vestibule–palatal anesthesia (91.38%) than the 2% lignocaine with 1:80,000.

1. Introduction

Pain associated with administration of local anesthesia prior to oral surgical procedures has been researched since the advent of local anesthetic agents. Among the different techniques of local anesthetic administration, palatal anesthetia are the most painful. The reason being the adherence of the palatal mucoperiosteum to the bone, hence minimal space for deposition of the local anesthetic solution, leading to pain due to separation of the mucoperiosteum from bone by the deposited solution [1]. A number of techniques have been advocated to reduce the pain of intra oral palatal injections, which includes topical anesthetic application, topical cooling of palate, computerized injection systems, pressure administration, eutectic mixture of local anesthetics (EMLA), and transcutaneous electronic nerve stimulation (TENS). Although these adjunctive techniques have been described to reduce the pain during the palatal injection, they have not yet gained universal acceptance [2].

Maxillary tooth removal without palatal anesthesia has been the topic of much research. Among the local anesthetics, Lidocaine is the "gold standard" drug. Articaine is gaining popularly as an efficient local anesthetic due to its safety and potency [3]. The long duration of action of Articaine and its superior diffusion through bony tissue makes Articaine superior to other local anesthetics, hence maxillary buccal infiltration with Articaine provided adequate palatal soft tissue anesthesia, obviating the need for a painful palatal injection [4,5].

☆ AsianAOMS: Asian Association of Oral and Maxillofacial Surgeons; ASOMP: Asian Society of Oral and Maxillofacial Pathology; JSOP: Japanese Society of Oral Pathology; JSOMS: Japanese Society of Oral and Maxillofacial Surgeons; JSOM: Japanese Society of Oral Medicine; JAMI: Japanese Academy of Maxillofacial Implants.

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So the aim of this present study was to evaluate and compare the buccal vestibular to palatal bony diffusion of 4% Articaine with that of 2% lignocaine in the maxilla during the removal of maxillary teeth without the need for palatal injection.

2. Materials and methods

The report of the methodology used in the study conforms to the Consolidated Standards of Reporting Trials statement.

2.1. Trial design

This was a single-centered, balanced randomization, double blinded, parallel-group study conducted in the Maxillofacial Surgery Department, Vinayaka Missions University Hospital, Salem (Tamil Nadu, India). No changes to the trial design were made during the study.

2.2. Participants

The potential study participants were examined by a single surgeon at recruitment who was not involved in the follow-up of research subjects. Ethical approval for this study was obtained from the ethics committee at Vinayaka Missions University Hospital, Salem (Tamil Nadu, India). A member of the research team explained the study protocol, and written informed consent was recorded from all eligible subjects. The study was performed in compliance with Good Clinical Practice and the Declaration of Helsinki (most recent revision, 2000). Institutional ethical committee approval and informed consent from all volunteers was obtained. The patients who were included in the study were those with maxillary teeth that were grossly destroyed by caries, infected root stumps, impacted maxillary 3rd molars or therapeutic extraction of premolars. The number of teeth requiring removal varied from one to three. The exclusion criteria were patients who were allergic to local anesthetics, those with teeth showing even slight mobility, pregnant women and also the patients with severe systemic diseases contraindicating extractions.

2.3. Study setting

A total of 227 patients (102 male, 125 female) of age ranging from 15 to 65, who underwent extractions of maxillary teeth in the Dept. of Oral & Maxillofacial Surgery, Vinayaka Missions University, Salem, Tamil Nadu, India, from January 2012 to February 2012 were included in the study. The Maxillofacial Surgery Department receives patients from over a wide geographic area within and around the city of Salem.

2.4. Interventions

The study group (A) were administered 1.7 ml of 4% Articaine hydrochloride with adrenaline 1:100,000. The Articaine anesthetic agent was injected into the buccal vestibule by simple infiltration method along the long axis of the corresponding tooth to be extracted.

For cases involving multiple (maximum three) extractions, the local anesthetic was infiltrated into the buccal vestibule of the middle tooth. The patients were allowed to wait for 10 min. After the 10 min waiting period, the effect of local anesthetic was checked both subjectively and objectively. The objective symptom of numbness was tested using a sharp probe on the palatal gingival aspect of the corresponding tooth to be extracted. The extraction procedure was performed by the same surgeon who administered the local anesthetic. The control group (L) were administered 1.7 ml of lignocaine 2% with adrenaline 1:80,000 in a similar manner.

2.5. Outcomes

If the patient complained of pain during flap evaluation, then the local anesthetic solution was given on the palatal side. The parameters like pain during injection, objective symptom of numbness, pain during flap elevation, and pain during tooth extraction and the frequency of reanesthesia required were evaluated and marked by a different person. The pain was evaluated using the 0–100 mm VAS scale ranging from 0 for NO PAIN to 100 for ABSOLUTE PAIN.

2.6. Sample size

The study group comprised of a total of 116 individuals of which 55 were males and 61 were females. The control group had a total of 111 individuals with 47 males and 64 females. The number of patients requiring multiple extractions was 30. The number of patients requiring single tooth extraction was 197.

2.7. Randomization

The participants were allocated into the study or the control groups randomly using lot method. The envelopes containing (A) and (L) were sealed.

2.8. Blinding

The surgeons and the participants were blinded to their allocation to the Articaine (A) study or the lignocaine (L) control group. The observers performing the assessment of the objective symptoms were blind to the surgical outcome. Furthermore, the investigators who carried out the assessment were blind to the allocation of the patient to the (A) or (L) group. The study is thus a double blinded one.

2.9. Statistical methods

The collected data were statistically analyzed using SPSS 11.5 for Windows (IBM SPSS, Chicago, IL). Descriptive statistics were used to summarize all measurements. p values less than .05 were considered statistically significant.

3. Results

The number of patients involved in the study group (A) was 116, of which 55 were males and 61 were females. The patients were within the age ranging from 15 to 65 yrs with a mean age group being 41.08 yrs. The number of patients involved in the control group (L) was 111, of which 47 were males, 64 were females, within the age group of 15–65 yrs and the mean age was 41.18 yrs (Table 1 and Fig. 1).

Among the study group (A), 98.28% (114) patients had objective symptom of numbness on (Table 2) probing showing statistically

Table 1
Male and female comparison between the 2 groups.

Drug	Sex				Chi square	p
	Male		Female			
	N	%	*N*	%		
Study group (A)	55	47.41	61	52.59	0.59	0.443
Control group (L)	47	42.34	64	57.66		
Total	102	44.93	125	55.07		