



## RESEARCH ARTICLE

## “Comparison Of Pain Intensity Of AMSA Injection With Conventional Syringe And WAND System For Maxillary Periodontal Surgery”

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### Abstract

**Context:** Periodontal procedures require injection of local anaesthetic solution to avoid patient discomfort. Multiple injections are required to anesthetise anterior maxilla in the region of premolars to incisors. Anterior middle superior alveolar nerve block is a single palatal injection technique which anesthetises facial and palatal gingiva.

**Aims:** The aim of the study was to compare the pain severity of AMSA technique using a conventional syringe and WAND in periodontal flap surgery.

**Settings and Design:** 20 adult patients with a diagnosis of moderate to chronic periodontitis with an indication to periodontal surgery in maxillary quadrants were enrolled for the study. AMSA block was administered using a computer assisted syringe (WAND) on one side of mouth and a conventional syringe on the other at two separate appointments spaced at least one week apart. This was a split- mouth randomized cross over study. The pain intensities with respect to both the techniques were assessed by VAS scores

**Statistical analysis used:** Independent t – test was used to compare pain (VAS) during injection using conventional syringe & WAND system.

**Results:** The mean value of VAS scores in conventional group was found to be greater than those obtained by WAND system.

**Conclusions:** The AMSA technique delivered through WAND system is proven to be better compared to the conventional technique.

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### Introduction

Maxillary periodontal surgery typically requires multiple injections to obtain anesthesia of tissues and the pain of these repetitive trans-mucosal punctures is unpleasant for patient<sup>9</sup>. Hence to avoid this,<sup>5</sup> Anterior Middle Superior Alveolar nerve (AMSA) injection was proposed.<sup>4</sup> which anesthetizes maxillary teeth extending from second premolars on either sides<sup>2,3</sup>.

To avoid patient discomfort due to the tightly bound nature of palatal tissues, Computer-controlled anesthetic delivery systems have been recommended. Hence, this study aims at comparing the pain severity of AMSA technique using a conventional syringe and computer assisted local anesthetic delivery system on opposite sides of maxilla in periodontal flap surgery.

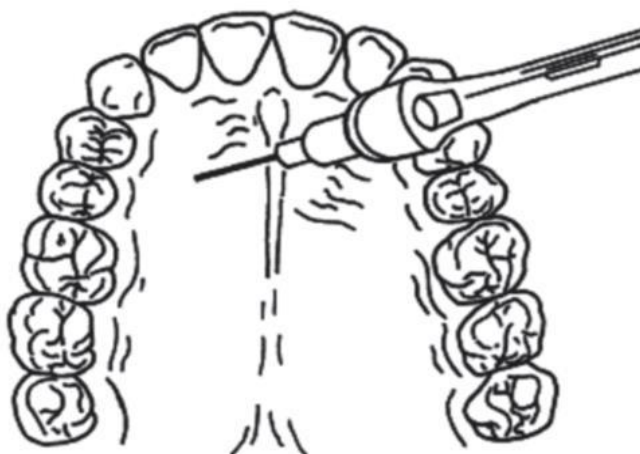
### Subjects and Methods:

Twenty adult patients (15 males and five females) who had moderate to severe chronic periodontitis with indication of periodontal surgery on both left and right maxillary sides participated in this study. They ranged in age from 20 to 60 years and were in good health. The patients were not taking any medications that would alter their pain

perception, as determined by a written detailed case history and oral questioning. Allergy to lidocaine, history of significant medical problems, use of central nervous system depressants within the previous 48 hours and pregnancy were the exclusion criteria. The nature of this investigation was explained to the participants in detail and the patients signed an informed consent form. All the patients underwent initial therapy, consisting of oral hygiene instructions and full-mouth scaling and root planing. In order to perform the periodontal surgery, AMSA technique and infiltration injections were administered on opposite maxillary arches by the same operator.

At baseline examination, the periodontist instructed the subjects to use a visual analog scale (VAS)<sup>6</sup> to record the level of pain they felt during treatment procedures. VAS was scored on a 100-mm horizontal line with the left endpoint marked “no pain” and the right endpoint marked “pain as bad as it can be.” This study was carried out according to a split-mouth design, with both injections given to all the patients. For each patient, the AMSA technique using the WAND STA system, 30 gauge needle was used on one side and conventional syringe, 27 gauge needle used on the contralateral side. The order of anesthesia techniques was randomly selected by the flip of a coin. The subjects received the injections during two separate appointments spaced at least one week apart in a crossover design.

The AMSA injection site is located at a point that bisects the maxillary first and second premolars, and midway between the crest of the free gingival margin and mid-palatine suture. The needle is orientated at a 45-degree angle with the bevel facing the palatal tissue (Fig. 1). All the injection were given by the same operator. Surgical sites were anesthetized utilizing one to two cartridges of lignocaine with adrenaline.



The operator obtained the VAS for each patient immediately after the injection was administered. All the surgical procedures were performed by the same surgeon. Surgery consisted of an open flap debridement procedure, reflection of a full-thickness mucoperiosteal flap and debridement of the exposed roots and osseous defects with hand and ultrasonic instruments. Bone architecture was not corrected except when it prevented good tissue adaptation to the cervical areas of the teeth. The flap was repositioned and sutured using 3-0 black braided silk sutures (interrupted direct sutures). Periodontal dressing was placed.

After the surgical procedure the patients were asked to use 0.2% chlorhexidine gluconate mouthwash twice daily for four weeks. Ibuprofen was prescribed for the relief of postoperative pain and 500-mg Amoxicilin capsules tid were administered for five days. The study was approved by the institutional ethical board and was held in accordance with the Helsinki Declaration 1975 as revised in 2000.

## Data Analysis

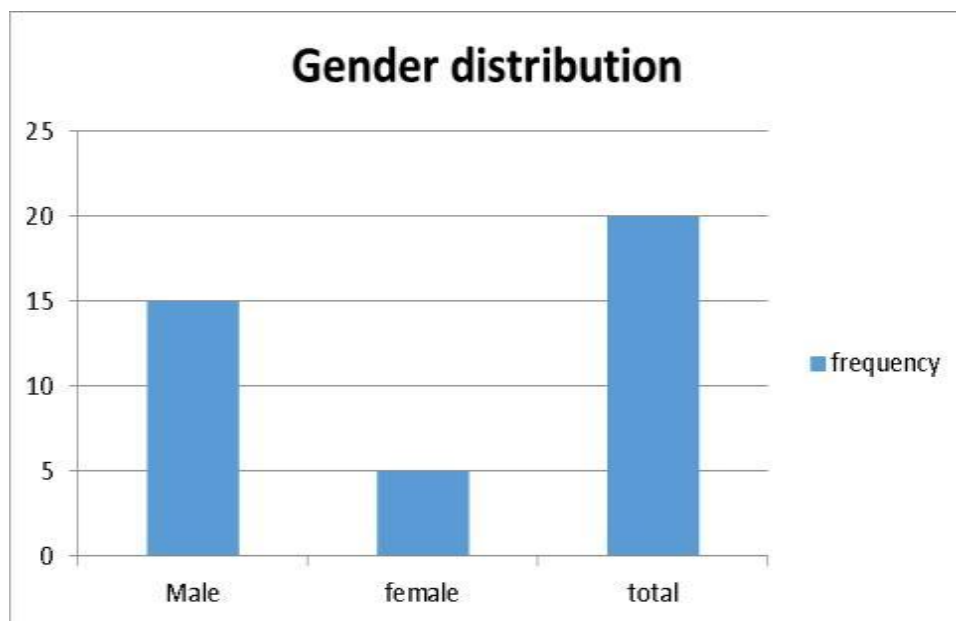
1. Descriptive statistics of pain during injection & post operative pain were analysed and presented in terms of mean with SD.
2. Independent t – test was used to compare pain (VAS) during injection using conventional syringe & WAND system.

**Results:**

In this study twenty patients (Graph1- 15 males & five females) in the mean age of 42.90 years were recruited. The mean of the observation was found to be more than double of standard deviation. The mean value of VAS scores of the conventional group was more than the WAND group.(Table 1). The average difference between the conventional and WAND group was found to be 4.20. The F value for groups at 2.435 was not significant showing that the variances in the two groups did not differ from which the samples were obtained. Confidence level was set at

$\alpha=0.05$  and the p value was found to be 0.000 thus the difference between the two groups is statistically significant (Table 2).

**Graph 1- Gender Distribution**



V1	N	Mean	Std. Deviation	Std. Error Mean
VAS 1(Conventional)	20	8.80	2.142	.479
2(WAND)	20	4.60	1.536	.343

**Table 1- Mean VAS scores in conventional and the WAND group**

t-test for Equality of Means
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	t	df	Sig. (2-tailed)	Mean Difference
VAS Equal variances assumed	7.126	38	.000	4.200
Equal variances not assumed	7.126	34.446	.000	4.200

**Table 2- Paired t test for equality of means**

## Discussion:

Obtaining profound anaesthesia is of utmost importance in dental procedures and thus the choice of appropriate anaesthetic technique is inevitable. In maxillary periodontal surgeries AMSA anaesthetic technique is a single injection technique which anesthetizes the maxillary teeth and adjacent gingival tissues. The present study investigated the pain intensity of AMSA injection using a conventional syringe and WAND for periodontal surgery and it was found that the pain scores of the WAND group was lesser than the conventional group. The Wand System offers several advantages over conventional syringes, including excellent tactile sensation afforded by the lightweight plastic handle and the ability to rotate the needle as it is introduced into tissues, producing a coring penetration that minimizes needle deflection. Presumably, the slow rate of anesthetic flow reduces patient discomfort compared with palatal injections administered with a traditional syringe<sup>1</sup>. Decreasing the total amount of anesthetic and vasoconstrictor necessary for maxillary anesthesia, shortening the total anesthesia time, and diminishing patient-operator anxiety are other advantages of the WAND<sup>10</sup>.

Friedman and Hochman<sup>2,3,4</sup> stated that careful needle insertion and slow anesthetic delivery could reduce the sensation of needle insertion. Anesthetic flow rate is independent of applied pressure in the Wand system. In a study carried out by Loomer and Perry in 2004<sup>8</sup> the use of a computer-controlled technique with AMSA was compared with greater palatine and nasopalatine anesthetic techniques. The results revealed a lower VAS for AMSA compared to the other two techniques; a less severe pain with the AMSA in that study was attributed to the use of a computer-controlled injection system, which was in accordance with our study. Lee et al.<sup>7</sup> reported that AMSA is more successful with WAND Plus compared to a conventional syringe similar to the higher analgesic effect which was in agreement with the present study.

Another study carried out by Yenisey et al in 2009<sup>11</sup>, the AMSA technique with the use of WAND system was compared with the infiltration technique and the results were evaluated using the VRS and the results showed less pain with the WAND system for anesthetic delivery, which was in accordance with our study.

The importance of this study was to bring about awareness among the clinician who have to use multiple injections for any treatment to be performed in the maxillary arch. The non compliance of the treatment on the maxillary arch is usually due to the fear associated with multiple anesthesia. Hence introducing AMSA injection with WAND system can help improve patient compliance as well as ease for the clinician. The WAND system for AMSA anaesthetic technique could be thus recommended for maxillary periodontal surgeries. Palatal vault shape was not analysed in the present study. The effect of deep and shallow palatal vaults on the efficacy of AMSA anaesthetic technique can be assessed in future studies.

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