

# Relationship Between the Experience of the Operator and the Efficacy of Inferior Alveolar Nerve Block

Hasan Mehdi<sup>1</sup>, Muhammed Junaid Lakhani<sup>2</sup>, Syed Muhammad Umer Hasan<sup>3</sup>, Aisha Shekhani<sup>4</sup>, Maeyda Khalid<sup>4</sup>, Nida Malkani<sup>4</sup> and Zainab Mahboob<sup>4</sup>

## ABSTRACT

**Objective:** The objective of this study is to investigate the efficacy of local anesthesia in the mandible on the basis of experience of the operator.

**Study Design:** Clinical, Analytical, descriptive / cross-sectional study

**Place and Duration of Study:** This study was carried out in a private sector college, Jinnah Medical and Dental College Karachi from 13<sup>th</sup> October 2016 to 16<sup>th</sup> February 2017.

**Materials and Methods:** This study was performed at Oral and maxillofacial surgery department of Jinnah Medical and Dental College Karachi. The data was collected from 44 patients visiting the OPD for extraction of mandibular posterior teeth. The operators were divided into two groups, Interns (including students and house officers) and senior faculty. The data was collected for time taken for effective local anesthesia by the two groups of operators. The time taken for the anesthesia to be effective was divided into three groups (A=1-3 minutes, B= 4-6 minutes and C= 7-10 minutes). The time was calculated when the inferior alveolar block was administered till the effective anesthesia was confirmed, which was checked by using a probe on sulcus of lower canine and asking the patient for the numbness of the tongue and lower lip on the side the block was administered. After the completion of all the information, the data was stored in excel sheet and analyzed using SPSS.

**Results:** The sample constituted of 54.5% males and 45.5% females. The majority of the patients were in between the ages 20-40 years. The most common comorbid was hypertension noticed in 15.9% of the patients. The results of the study showed that group A had a significant percentage of patients who were treated by senior faculty (72%) whereas group B and group C had more percentage of patients who were treated by interns (78% and 80% respectively). Therefore, the time taken for local anesthesia to be effective was more for interns than for senior faculty.

**Conclusion:** This study indicates that the experience of the operator does play a major role in the efficacy of local anesthesia.

**Key Words:** Experience, knowledge of anatomical landmarks, Local Anesthesia administration, Time evaluation, confidence

**Citation of article:** Mehdi H, Lakhani MJ, Hasan SMU, Shekhani A, Khalid M, Malkani N, Mahboob Z. Relationship Between the Experience of the Operator and the Efficacy of Inferior Alveolar Nerve Block. Med Forum 2017;28(5):160-164.

## INTRODUCTION

Effective local anesthesia is administered in preparation for various dental treatments. It expedites a pain free treatment, so that the patient's ease is maximal during

<sup>1</sup>. Department of Oral and Maxillofacial Surgery, Fatima Jinnah Dental College, Karachi.

<sup>2</sup>. Department of Oral and Maxillofacial Surgery, Jinnah Medical and Dental College, Karachi.

<sup>3</sup>. Department of Oral and Maxillofacial Surgery, Dow International Dental College, Karachi.

Correspondence: Prof. Muhammed Junaid Lakhani, Professor, Department of Oral & Maxillofacial Surgery, Jinnah Dental College, Karachi.

Contact No: 0300-8222287

Email: drmjunaid@hotmail.com

Received: March 13, 2017;

Accepted: April 11, 2017

the procedure and the dentist is able to work with concentration and precision.<sup>1,2</sup> Inferior alveolar nerve block (IANB) is commonly used to induce local anesthesia for various applications throughout modern dentistry.<sup>3</sup> IANB failure rates can be substantial, reaching 15-20%, and often cannot be overcome with a repeat IANB injection.<sup>4,5</sup> Inferior alveolar nerve block failure has been accompanied with inflammation, age, history of medications, pathological processes, previous surgery, error in IANB administration and psychological causes, such as fear, anxiety and apprehension.<sup>6</sup>

Poor technique has been reported to be the most common reason for failure of conventional IANB. It is a technique sensitive procedure, therefore the experience of the operator plays a pivotal role in the efficacy or failure of local anesthesia.

Poor technique may be due to improper mouth opening, incorrect needle placement, failure to give adequate

time for the anesthesia to become effective. Also IANB administrators may place the needle either too anterior or posterior.<sup>7</sup> Two implications can be derived which include 1) positioning the tip of the needle too far medially resulting in inadequate anesthesia. 2) positioning the tip of the needle too far inferiorly resulting in anesthesia of only the lingual nerve.<sup>8,9</sup>

In order to decrease the IANB failure rate, instructions should be followed related to anatomical landmarks and pre-IANB aspiration should also be enhanced.<sup>3,10</sup>

The objectives of this study were to assess the efficacy of inferior alveolar nerve block on the basis of experience of the operator and to assess the difficulties encountered during IANB administration by the operators. This study will provide a foundation for the augmentation of dental teaching curriculum, particularly administration of local anesthesia.

**MATERIALS AND METHODS**

This study was performed at Oral and maxillofacial surgery department of Jinnah Medical and Dental College Karachi. The data was collected from 44 patients visiting the OPD for extraction of mandibular posterior teeth. The operators were divided into two groups; Interns (including students and house officers) and senior faculty. The data was collected for time taken for effective local anesthesia by the two groups of operators. The time taken for the anesthesia to be effective was divided into three groups (A=1-3 minutes, B= 4-6 minutes and C= 7-10 minutes). The time interval that was measured started from the administration of inferior alveolar block till the effective anesthesia was confirmed, which was checked by using a probe on sulcus of lower canine and asking the patient for the numbness of the tongue and lower lip on the side of the block. After the completion of all the information, the data was stored in excel sheet and analyzed using SPSS.

**RESULTS**

This research was based on the efficacy of LA according to the level of operator. The data for the research was collected from a dental OPD of 44 patients out of which 54.5% were males and 45.57% were females. The majority of the patients were in between the ages 20-40 years. The most common comorbid was hypertension noticed in 15.9% of the patients. Table 1.

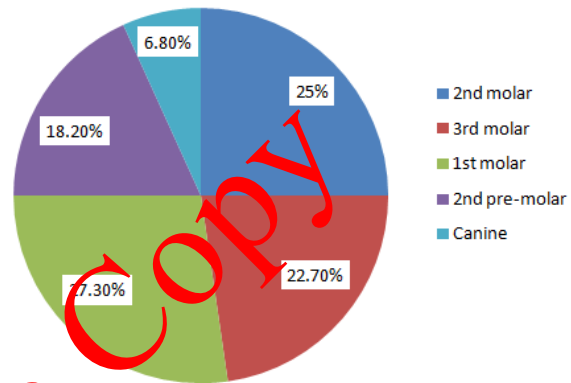
Moreover, there were patients with certain habits such as pan chewing and smoking. 20.5% of the patients had a habit of frequent pan-chewing, 6.8% were indulged in smoking and the remaining 6.8% were observed to be in the habit of both pan-chewing and smoking. First molars were the most frequently extracted teeth in this study accounting for 27.3%, followed by 2nd and third molar respectively. Figure 1.

The purpose of this research was to analyze time taken for the efficacy of local anesthesia on the basis of

level of operator. The time taken for the anesthesia to be effective was divided into three groups (A=1-3 minutes, B= 4-6 minutes and C= 7-10 minutes). Table 2

**Table No.1: Comparison of gender with regard to morbid**

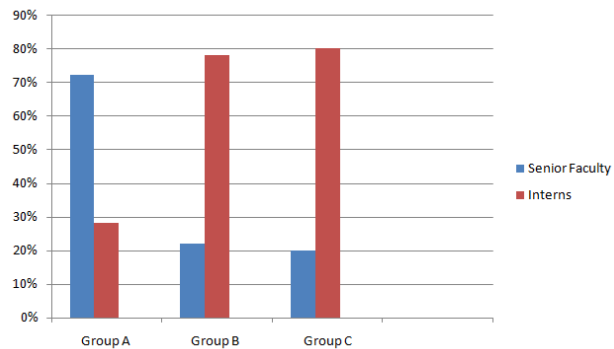
Gender	Age	Co-Morbids
<b>Male: 54.5%</b>	0-20years: 9%	No known co-morbids: 70.5%
<b>Female: 45.5%</b>	20-40years: 68%	Hypertension: 15.9%
	40-60years: 23%	Diabetes Mellitus: 4.5%
<b>Minimum=10 Maximum=80 Standard deviation=1.364</b>		



**Figure No.1: Extraction of mandibular teeth.**

**Table No.2: Comparison of patients divided in groups with regard to their treatment**

Group	Time (minutes)	No. of Patients
<b>A</b>	1 – 3	11
<b>B</b>	4 – 6	18
<b>C</b>	7 – 10	15



**Figure 2: Time taken for anesthesia**

The results of the study showed that group A had a significant percentage of patients who were treated by senior faculty (72%) whereas group B and group C had more percentage of patients who were treated by interns (78% and 80% respectively). Therefore, the time taken for local anaesthesia to be effective was more for interns then for senior faculty. Figure 2

## DISCUSSION

The present study evaluated the efficacy of IANB according to the experience of the operator. There were three study groups (on the basis of time required for the IANB to be effective). Each group included both the senior faculty and interns. Group A had the shortest time interval (1 – 3 minutes), Group B (4 – 6 minutes) and Group C had the longest time interval (7 – 10 minutes).

Our results showed that a higher percentage of senior faculty was able to achieve IANB within 1-3 minutes (72%) as compared to interns 28%. Keetley and Moles reported 91.9% success rates and they relate this success to the operator experience. Study by AlHindi study reported 44.9 % of the failure of local anesthesia is attributed to the fact that the junior operators lack both knowledge and training.<sup>3</sup>

The high success rate of IANB by the senior faculty was not unexpected. This higher percentage can be attributed to the expertise and level of experience of the senior faculty, proper knowledge of anatomic landmarks and anatomic variations and the trust put in by patients while being treated by a more experienced dentist.

Similarly, a study published in August 2010, used a preclinical study model which allowed one group of students to practice IANB technique prior to practicing it on patients. This study revealed that the students with preclinical training were more calm and confident and a significant reduction in the level of pain was observed while inserting the needle as opposed to students without pre clinical training, who were more nervous. Maryam et al reported that 14% of their interns often faced failure of IANB. Also, almost half of the participants (47%) repeated the injection to achieve profound anesthesia.<sup>3,12</sup>

The reliability on repeat injections maybe due to the inability of the operator to perform alternative techniques. The author also attributed IANB failure to anatomic variations which differs somewhat with the opinions of Haas and Malamed's studies, who considered it to be the second most common cause of IANB failure.<sup>13,14</sup>

Subsequently, the data of the present study reflects that that there is a lack of anatomical knowledge and training with alternative techniques among students. The interns, with whom we were indulged with throughout our research, felt difficulty in identification and accessibility of anatomical landmarks, provided they had sufficient theoretical knowledge. The only identifiable reason in this case being the inadequate clinical exposure and confidence required to administer IANB.

## CONCLUSION

IANB is one of the important components of general dental practice. Experience and expertise of the operator plays a strong role in the success of IANB. In order to decrease the IANB failure rate, instruction

related to anatomical landmarks, anatomical variation, and pre-IANB aspiration should also be augmented in each dental curriculum. The clinical exposure of the dental students and interns should also be enhanced.

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

## REFERENCES

1. Meechan JG. Anaesthesia: How to overcome failed local anaesthesia. *Bri Dent J* 1999;186(1):15-20.
2. Dunbar D, Reader A, Nist R, Beck M, Meyers WJ. Anesthetic efficacy of the intraosseous injection after an inferior alveolar nerve block. *J Endodont* 1996;22(9):481-6.
3. AlHindi M, Rashed B, AlOtaibi N. Failure rate of inferior alveolar nerve block among dental students and interns. *Saudi Medi J* 2016;37(1):84.
4. Kanaa MD, Whitworth JM, Corbett IP, Meechan JG. Articaine buccal infiltration enhances the effectiveness of lidocaine inferior alveolar nerve block. *Int Endod J* 2009; 42: 238-246.
5. Aggarwal V, Jain A, Kabi D. Anesthetic efficacy of supplemental buccal and lingual infiltrations of articaine and lidocaine after an inferior alveolar nerve block in patients with irreversible pulpitis. *J Endod* 2009; 35: 925-929.
6. Malamed SF. Techniques of mandibular anesthesia. In: *Handbook of local anesthesia*. 4th ed. Noida (IN): Harcourt Brace; 1997. p. 193-219.
7. Goldberg S, Reader A, Drum M, Nusstein J, Beck M. Comparison of the anesthetic efficacy of the conventional inferior alveolar, Gow-Gates and Vazirani-Akinosi techniques. *J Endod* 2008;34: 1306-1311.
8. Steinkruger G, Nusstein J, Reader A, Beck M, Weaver J. The significance of needle bevel orientation in achieving a successful inferior alveolar nerve block. *J Am Dent Assoc* 2006;137: 1685-91.
9. Zenouz TA, Ebrahimi H, Mahdipour M, et al. The incidence of intravascular needle entrance during inferior alveolar nerve block injection. *J Dent Res Dent Clin Dent Prospects* 2008; 2: 38-41.
10. Meechan JG. How to overcome failed local anaesthesia. *Br DentJ* 1999; 186: 15-2.
11. Brand HS, Baart JA, Maas NE, Bachet I. Effect of a training model in local anesthesia teaching. *J Dent Edu* 2010 Aug 1;74(8):876-9.
12. Haas DA. Alternative mandibular nerve block techniques. A review of the Gow-Gates and Akinosi-Vazirani closed mouth mandibular nerve block techniques. *JADA* 2011; 142: 8s-12s.
13. Malamed SF. Techniques of mandibular anesthesia. In: *Handbook of local anesthesia*. 4th ed. Noida (IN): Harcourt Brace; 1997. p. 193-219.
14. Wong MK, Jacobsen PL. Reasons for local anesthesia failures. *J Am Dent Assoc* 1992;123: 69-73.