



TO ESTIMATE THE ANESTHETIC EFFICACY OF MENTAL NERVE BLOCK TECHNIQUES FOR EXTRACTIONS OF MANDIBULAR TEETH –A RANDOMIZED DOUBLE-BLIND SPLIT-MOUTH STUDY

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ABSTRACT

Background: To compare the anaesthetic efficacy of mental nerve block via two different techniques, i.e., to inject local anaesthesia in between the roots of two premolars and to give local anaesthesia distal to the second premolar, among patients requiring extractions of a mandibular premolar or anterior teeth bilaterally.

PATIENTS AND METHODS: A prospective, randomized-controlled, split-mouth clinical study was implemented. Healthy adult patients between the ages of 12-65 years seeking



extraction of the mandibular anterior and both premolar teeth were included in this study. Teeth extractions were randomly assigned to two equal groups while giving a mental nerve anaesthesia to inject local anaesthesia in between the roots of two premolars (group 1) and to give local anaesthesia distal to the second premolar (group 2). After 5 min of local anaesthetic injection, the tooth was extracted, and each patient was asked to record the intensity of the extraction pain using the Visual Analogue Scale (VAS).

RESULT: 84 patients with a mean age of 12-65 years were studied. The results showed a 61.4% success rate for injections distal to the second premolar and a 56.8% success rate for injections between premolars.

CONCLUSION: No significant difference was found; however, slight favoring results for the technique used distal to the premolar as compared to injecting in between the first and second premolar.

KEYWORDS: Mental-incisive nerve block (MINB), inferior alveolar nerve block (IANB), local anaesthesia (LA), extraction, VAS, mental nerve.

INTRODUCTION

Due to their crucial role, local anesthetic agents are among the most commonly used medications in both modern dentistry and medicine.^[1] It is commonly known that the administration of a local anesthetic usually causes anxiety and that a patient's expectation of pain may jeopardize dental treatment. LA is a popular method for giving patients painless dental care while lowering their fear and anxiety related to tooth extraction.^[2] Landmarks related to indications for various nerve supplies, which make it easier to administer the anesthetic. Local anesthesia in dentistry can be given as either infiltration or block anesthesia.^[3]

Generally, infiltration anesthesia is commonly used in the maxilla, whereas block anesthesia is frequently used in the mandible. In addition, there are supplemental local anesthesia techniques that can be utilized when infiltration and block methods have failed to achieve profound anesthesia. Supplemental techniques include intraligamentary, intraosseous, intrapulpal, and interseptal anesthesia. While in the mandible, the inferior alveolar nerve block (IANB) or



mandibular nerve block, mental nerve block (MNB), and mental-incisive nerve block (MINB) are commonly used to block for effective sedation in local concerned anatomical landmark.^[4] While a mental nerve block is very handy in lacerations of the skin of the lower lip and chin region, where injection at the injured site may be kept at arm's length, it can lead to complications such as edema and disfigurement of soft tissues. In procedures that concern mandibular premolars and anterior teeth, mental or incisive nerve blocks can be given with substantial success. The success rate is nearly 100% because access of nerve is relatively effortless.^[5] The mental foramen (MF) is an orifice located on the body. Though by blocking IAN, the teeth and bone of the hemi-mandible, the lower lip and chin, and the lateral mucosa of the lower incisors, canine, and first premolar, it could be performed solely or combined with others. Like it is performed along with long buccal nerve infiltration, anesthetizing the mandibular teeth up to the midline, body of the mandible, inferior portion of the ramus, floor of the mouth, anterior 2/3rd of the tongue, and buccal mucoperiosteum of the same side. Woefully, it appears to be the technique with enormous rates of failure. Though it may appear to be strange, IANB given with correct injection technique, studies demonstrate that the failure rate of this technique is about 30-45%.^[6]

In the mandible, where the mandibular canal concludes. It delivers an exit for the mental nerve and blood vessels, which are terminal branches of the inferior alveolar nerve, artery, and vein. The mental nerve supplies innervations to the lower teeth anterior to the first molars, lip and gingiva. The oval or rounded mental foramen is mostly located in the body of the mandible at nearly identical distances from the upper and lower borders, below or in the middle of the apex of the first and second premolars.^[7] The location of the mental foramen varies in different individuals. These differences in the locality of the mental foramen cause problems in obtaining ample anesthesia. In 24% of the population, it is located posterior to the roots of the second premolar; in 50%, it is present in between the two premolar roots; in 20-25%, it is at the region of the second premolar root and in 1-2% it is present anterior to the first premolar tooth root. A bilateral uniformity is usually perceived in the whereabouts of mental foramina.^[8] Anesthesia via nerve block to the mental nerve exactly at the location as it exits the mental foramen brings forth anesthesia of a high grade to the ipsilateral chin, lip, gingiva and lower teeth.^[9] This block



is very simple to perform, safe and very easy to teach to dentists. If we determine where exactly to give a mental nerve block in our population, it will be very easy for every dentist to achieve excellent anesthesia for extraction of lower teeth without facing problems of less numbness or repeating IAN block even after a mental nerve block.^[10] This activity reviews the indications, contraindications, anatomical considerations, equipment, techniques, and complications of local anesthesia in dentistry and highlights the dental team's role in the safe and efficient delivery of local anesthesia.^[11] The purpose of this study is to assess the anesthetic efficacy of mental nerve block by means of two techniques involving mandibular lower anterior and premolar teeth.^[12]

OBJECTIVE

To compare the anesthetic efficacy of mental nerve block via two different techniques, i.e., to inject local anesthesia in between the roots of two premolars and to give local anesthesia distal to the second premolar, among patients requiring extractions of mandibular premolars or anterior teeth bilaterally.^[13]

MATERIAL AND METHODS

This study will be a randomized, double-blind, split-mouth clinical trial. Randomization will be carried out via simple randomization in which participants falling into the inclusion criteria of the study will be selected for the research and asked to sign the consent form. This randomized, double-blind, split-mouth controlled trial will be conducted at the Department of Oral and Maxillofacial Surgery, Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, DUHS.

Individuals will be given a mental nerve block via two different techniques. One technique is to inject the local anesthesia (L.A.) in between the first and second premolars, and in the other method, L.A. is given distal to the second premolar. Experimenters will be recruited to administer the mental nerve block. The experimenters can be house officers or fellow postgraduate trainees of the author. Patients will be given two chits, each containing one of the two techniques of mental nerve block, respectively. The patient will be allowed to choose one at the first surgical visit and will be given the other at the next visit. Both the author and the patients will not be informed which technique of mental nerve block is used. Scoring for pain analysis during the extraction of teeth will be done by the author or the co-author of this study via the VAS scoring system for pain analysis. VAS scoring for pain analysis will be done during



the time of extraction of a particular tooth. The patient will be called for follow-up on the 3rd postoperative day as well. ^[14] The questionnaire is structured and will be interviewer-administered. It will comprise basic demographic data (such as name, age, sex, etc.) and questions for VAS scoring for pain analysis during the extraction. This randomizing mode continued to the end of the study. Patients reporting in OPD in the department of Oral and Maxillofacial Surgery, Dow University of Health Sciences, Ojha campus, duration of study 6-8 months sample size. All injections and procedures were done by the same operator. Immediately after performing the injection, the patient was asked to rate the injection pain using HP VAS. Ten minutes after injection, the patient was asked whether he/she had lip numbness. Any patient without lip numbness at this stage was excluded from the study.

Sampling technique: Consecutive sampling technique has been used

Inclusion Criteria: Only patients aged between 15 and 50 years, without systemic diseases, will be considered for participation. Those who consent to the use of their information will be included in the study. Both male and female patients are eligible, provided they have bilateral central and lateral incisors, canines, and first and second premolars.

Exclusion Criteria: Pregnant, medically or immunocompromised patients, those with pathological dental conditions, non-compliant patients unable to attend follow-ups, patients on oral contraceptives, and those with a history of radiotherapy or chemotherapy will be excluded.

Data Collection: Data for this study will be collected at Dr. Ishrat-ul-Ebad Khan Institute of Oral health sciences, department of oral and maxillofacial surgery OPD. Patients falling into inclusion criteria of the study will be selected for the research purpose. Patients will be told about the research and its purpose. Consent will be signed by the patient or its attendant. The Questionnaire is structured and will be interviewer administered. It will comprise of basic bio-demographic data for VAS scoring for pain analysis during the extraction of teeth (such as name, age, sex, etc.) and question.

Data Analysis Procedure: Data were analyzed using SPSS version 26. Sample size calculation, based on the WHO Sample Size, where P-values < 0.05 were considered statistically significant.

RESULTS

We assess 84 patients including men and women with mean age of 16-65 who had lower anterior teeth or premolars bilaterally requiring extraction (26 male and 48 female) were enrolled and randomly allocated into the two study arms. All enrolled patients completed the baseline according to inclusion criteria.

Table 1 and 2: Distribution of success rate on the basis of mental-incisive nerve block technique separately

Insertion Of Needle In Between Premolar

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	mild to no pain	25	56.8	56.8	56.8
	mild to moderate pain	18	40.9	40.9	97.7
	severe pain	1	2.3	2.3	100.0
	Total	44	100.0	100.0	

Insertion Of Needle Distal To Premolar

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	mild to no pain	27	61.4	61.4	61.4
	mild to moderate pain	16	36.4	36.4	97.7
	severe pain	1	2.3	2.3	100.0
	Total	44	100.0	100.0	

• Success Rates:

- **Distal to second premolar technique:**
 - Success rate: 61.4% (mild to no pain for the majority)
 - 36.4% reported mild to moderate pain intensity
 - 2.3% experienced severe pain intensity



- **Between first and second premolar technique:**
 - Success rate: 56.8% (mild to no pain for the majority)
 - 40.9% reported mild to moderate pain intensity
 - 2.3% experienced severe pain intensity
- **Statistical Findings:**
 - No significant difference between the two techniques
 - Slightly higher success rate for the distal to second premolar technique in both study arms (Table 2)
- **Injection Pain Scores:**
 - The mean pain score for the technique between the first and second premolars was significantly higher than for the technique distal to the second premolar.

DISCUSSION

The goal of this study was to assess the effectiveness of mental nerve ,to compare the anesthetic efficacy of mental nerve block via two different techniques i.e.to inject local anesthesia in between the roots of two premolars and to give local anesthesia distal to second premolar, among patients requiring extractions of mandibular premolar or anterior teeth bilaterally. ^[15] The present study has evaluated the MINB, an alternative technique to IANB, in providing anesthesia for mandibular premolars and anterior. Alternative approaches were looked into because of the IANB techniques numerous potential problems and inconsistent, high reported failure rates. ^[16] Previously to decrease the IANB failure rate, Gow-Gates technique and the Vazirani-Akinosi technique involve anesthetizing the inferior alveolar nerve, lingual nerve, and long buccal nerve with a single injection. Interestingly all these techniques were used, beneficial for posterior mandibular teeth .However efforts are needed to overcome this problem for anterior mandibular teeth, our study is based on one of this effort by blocking mental nerve. Studies have shown that the administration of local anesthetic injections is stressful for dentists. When treating a patient with a history of failed mandibular blocks or when faced with inadequate mandibular anesthesia during treatment a measured simple approach is advocated.



Evaluation and reassessment of each individual patient is required at times in order to achieve success. Paying particular attention to the intra and extra oral anatomy, patient history and patient anxiety can help to improve results. Two alternative techniques (Gow-Gates technique and the Vazirani-Akinosi) are described to help improve outcomes and increase success in obtaining mandibular anesthesia. While there is no one single answer to methods of increasing the success of mandibular local anesthesia for anterior teeth. It will be very easy for any dentist to achieve excellent anesthesia for the extraction of lower anterior teeth without experiencing issues with less numbness or the need to repeat the IAN block even after mental nerve block anterior teeth anesthesia technique.

Moreover it is important to know precise location of mental nerve block in our population. This will aid in the proper selection of the ideal local anesthetic technique that will achieve a higher and more predictable success rate. As inferior alveolar nerve supplies all the mandibular teeth, and its terminal branches are the incisive nerve, the one which runs inside the canal, and the mental nerve, the one which leaves the mental foramen and supplies sensation to the lower lip, buccal mucosa in front of the mental nerve and the skin of the chin ventral to the mental foramen. If we can identify it conclusively, the intraosseous path of the mental nerve has been a topic of controversy in the literature for a longer time. ^[18]

The only difference between these two [Mental-incisive nerve block (MINB), inferior alveolar nerve block (IANB)] very similar blocks is that an incisive nerve block involves injecting the solution into the mandible through the mental foramen, while a mental block involves depositing the solution around the mental nerve as it leaves the mandible at the mental foramen. As a result, the incisive nerve—the anterior extension of the inferior alveolar nerve—is blocked up to the midline.

In dental treatments that require pulpal anesthesia of mandibular teeth anterior to the mental foramen, such as from central incisors to premolars or from premolar to premolar, the mental-incisive nerve block (MINB) can be used as an alternative to the inferior alveolar nerve block (IANB). According to a study, the MINB works best when the needle penetrates distal to the second premolar, with an effectiveness rate of 95%, as opposed to 72.5% when the needle is placed between the two premolars. However it was established clinically by blocking the mental



nerve during the extraction of anterior mandibular teeth, research findings has demonstrated the efficacy of a single injection for the extraction of mandibular front teeth, as all study and control group participants tolerated the procedure without requiring further local anesthetic to be administered^[19]

CONCLUSION

Studies have shown that the administration of local anesthetic injections is stressful for dentists. In order to refrain re-administration of block anesthesia different technique have tried. Infiltrating the mental nerve was focus of this study for anterior mandibular teeth anesthesia. To achieve better results we have tried 2 different methods by blocking mental in between roots premolars and by blocking it distal to second premolar. Interestingly we find results favoring for technique used distal to premolar as compare to giving it in between first and second premolar. To further establish the efficacy between two, its application on a larger scale in field is required.

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