Mylohyoid Nerve Injection for Unsuccessful Anesthesia of Posterior Teeth with Successful Inferior Alveolar Nerve Block

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Background and objective: variations in mylohyoid could lead to failure of an inferior alveolar nerve blockade. This study aimed to evaluate the impact of mylohyoid nerve variation on the persistence of pain following a successful inferior alveolar nerve block.
Method: This clinical study was performed at the oral and maxillofacial department/college of Dentistry, Hawler Medical University. All patients with pain following a successful inferior alveolar nerve block were enrolled in this study. An additional submucosal injection (infiltration technique) as few drops in the lingual mucosa of the offending tooth is given by the same surgeon
Results: A total of fifty patients were enrolled in this study,30 males and 20 females. age range was (16-56). Among the total only 20 patients (60%females,40% males) experienced pain on the lingual side during the attempt of dental extraction. Following lingual infiltration, all the cases were treated successfully in a pain free environment. Descriptive statistics was used to analyze the data.
Conclusion: Lingual submucosal injection of 1/3 of 1.8 ml of local anesthesia might be an effective way to block all possible nerve variation on the lingual side.
Keywords: Inferior alveolar nerve block (IANB), mylohyoid nerve variation, lingual mucosal infiltration, pain.

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INTRODUCTION

The mylohyoid nerve MN originates from the posterior surface of the inferior alveolar nerve IAN just above the mandibular foramen. The MN is generally considered as a motor nerve that supplies the mylohyoid muscle and the anterior belly of the digastric muscle. As a variation, the nerve can have terminal sensory branches that might innervate the submental skin or mandibular teeth.[1]

The lingual nerve LN branches off the mandibular division of the trigeminal nerve and supplies sensory fibers to the mucosa of the anterior two-thirds of the tongue, the floor of the mouth, and the lingual gingiva of the mandible. It descends medially and anteriorly to the inferior alveolar nerve (IAN) in the pterygomandibular space. [2,3] Lingual nerve communication with mylohyoid nerve was reported by Sinha et al. [4] In such cases, sensory fibers of the lingual nerve may supply mandibular teeth via branches of the mylohyoid nerve.[5]

Other Variations of the MN range from originating inside the mandibular canal, originating and running parallel to the LN, running through bony grooves on the mandible, the presence of communication between the MN and LN near the submandibular

ganglion and third molar tooth, and communication with the hypoglossal nerve to dually innervate the MHM Due to the numerous variations of the MN, it is not surprising that IAN blockades can fail at providing full dental anesthesia in mandibular surgeries. [6,7]

The inferior alveolar nerve block is the technique most frequently used for local anesthesia when performing restorative and surgical procedures in the mandible.[8] However, the approximate failure rate of these procedures ranges from 5 to 15% or 15 to 20% according to Kaufman[9] reaching even higher percentages in pulpal anesthesia.[10,11]

In the clinical setting, the mylohyoid nerve's sensory innervation of the first molar tooth is essential in nerve blocks. The mylohyoid nerve, along with the lingual nerve, is anesthetized during the extraction of the first molar tooth. The inferior alveolar nerve may require anesthetization in procedures involving the chin, lower lip, and gingivae.[12,13]

Anatomical variations of the mylohyoid nerve innervations may account for the failure of the nerve blocks and hence, knowledge is very important for the practitioner.[14]

The study aimed to evaluate the role of mylohyoid nerve anatomical variation in pain persistence after IAN block.

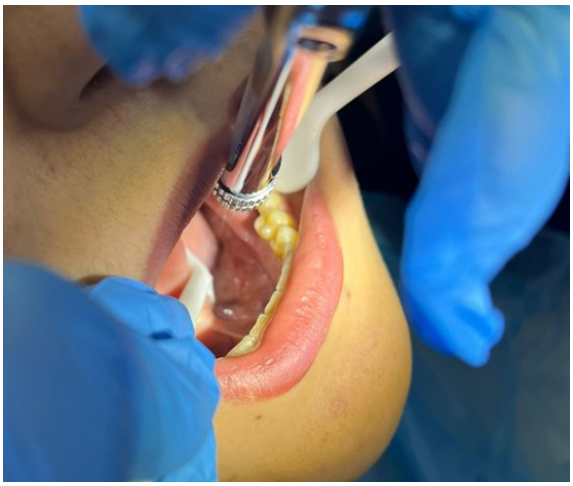
METHOD

Fifty patients were enrolled in this clinical study for three months, (16- 56) years old, 30 males and 20 females. Patients intended for extraction of posterior mandibular teeth. The inferior alveolar nerve block was given for all patients with long buccal nerve infiltration as the first technique to anesthetize the accused tooth, waiting for 3- 5 minutes then anesthesia was checked subjectively by asking the patient for numbness of lower the lip and anterior two third of the tongue of that side. If the patient felt numbness in those structures that meant the block technique was successful and the next step was giving local infiltration for the long buccal nerve to anesthetize the buccal soft tissue, local anesthesia was checked objectively by the dental probe during the separation of the soft tissue from the accused tooth, extraction started by using either dental forceps or dental elevator. With those patients who experienced pain during extraction, infiltration was given to the lingual mucosal tissue as shown (Figure 1), the tongue was reflected by a dental mirror. The site of injection was directed with the lingual aspect in the lingual vestibule of the tooth intended to be extracted as in infiltration technique ,2-3 mm of the dental needle was inserted in the lingual vestibule against the tooth to be extracted, 1/3 of 1.8 lignocaine HCL 2%: Epinephrine 1:100 000 carpool was administrated , then waiting for 2-3 minutes ,anesthesia was checked by applying forceps or elevator to the tooth, pain after the lingual mucosal injection was relieved completely ,extraction was performed successfully without pain, by this, mylohyoid nerve with its accessary efferent fibers were anesthetized completely.

Figure 1:lingual mucosal injection.

RESULTS

In this clinical study, thirty patients out of 50 (60%) 22 males (73.3. %), and 8 (26.6%) females the extraction was performed by inferior alveolar nerve block



with long buccal nerve infiltration successfully, female to male ratio was 4:11. Twenty patients out of fifty patients (40 %), 8 males (40%) and 12 females (60%), the extraction was performed with an inferior alveolar nerve block, long buccal infiltration with lingual mucosal infiltration. female to male ratio was 3:2, IANB to Lingual infiltration ratio was 3:2. females had more prediction of having mylohyoid nerve variation which affected the success of IANB (Table 1).

Table 1: patient distribution

	No of patients	Percentage	female No	Female %	Male no	Male %	Female to male ratio
IANB only	30	60%	8	26.6%	22	73.3%	4:11
Lingual infiltration	20	40%	12	60%	8	40%	3:2
IANB To Lingual infiltration		3:2					

DISCUSSION

The frequency of MN, found 40% of the cases presented with pain after successful IANB. pain experienced in the presence of MN variation reported by Bennett S.[15]

Hasan et al in their study reported 85 % of mylohyoid nerve variation.16 other authors like Clark et al reported a failure rate of 38 to 90% in IANB which was referred to anatomic variations of the MN, such as the presence of accessory mylohyoid nerve.[17]

Mylohyoid nerve variation among 50 patients enrolled in this study in Erbil city was 40%, while in Hasan et al study, he enrolled 14 volunteers, and the variation was 85 % his study was done in Cappadocia, Turkey.

The technique performed to anesthetize mylohyoid nerve in this study was by lingual infiltration, with the long axis of the accused tooth by inserting 2-3 mm of the dental needle tip in the lingual vestibule as in (Figure 1), this technique was easy to be used with less trauma to the surrounding and underlying anatomical structures.

Hasan et al technique for anesthetizing mylohyoid nerve was at the mylohyoid region and vestibular sulcus, Mylohyoid nerve infiltrations were done under the mylohyoid muscle at the

level of the distal root of the first molar teeth, the nozzle of the injector was advanced about 1.5 cm into the floor of the mouth and stored supraperiostally under the mylohyoid muscle.

In Stanley F. Malamed hand book of local anesthesia, the technique used to anesthetize the mylohyoid never when there was a failure of the inferior alveolar block was by Placing the syringe in the corner of the mouth on the opposite side and directing the needle tip to the apical region of the tooth immediately posterior to the tooth in question, Penetrate the soft tissues and advance the needle until bone (e.g., the lingualborder of the body of the mandible) is contacted .[18]

In this study 1/3 of 2% lignocaine carpool 1:100,000 epinephrine was used, in Hasan etal study 1 mL articaine HCI (Ultracaine D-S ampoule, 4% articaine HC1 withepinephrine) was used.

There are reports of communications of the LN and MHN. [7] Jablonski et al reported the origin of the MHN from the LN. In such cases, sensory fibers of the LN may supply mandibular teeth via branches of the MHN.[8]

Sinha et al reported communication of the mylohyoid and lingual nerves, showing that some of the afferents of the MHN may also supply the tongue, teeth and the skin below the chin.

An IAN block will only be effective in mandibular surgical procedures when it is delivered correctly and the MN arises from the IAN. Therefore, variation of the location of

the NM and its complex origin may contribute to the failure of IAN blocks. Although the regular course of the NM has been well documented, further research on variant pathways of the NM is important because it allows dentists and oral surgeons to better assess procedural risks and better understand complications. [3,13]

CONCLUSION

Lingual submucosal injection of 1/3 of 1.8 of local anesthesia might be an effective way to block all possible nerve variation on the lingual side.

Conflicts of interest

The author reported no conflicts of interest.

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