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### Original Research

#### Evaluation of efficacy and pain in intra oral versus extra oral inferior alveolar nerve block technique for third molar extraction: An Original Research

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#### ABSTRACT:

**Aim:** The purpose of the study was to assess the efficacy as well as pain perception status in different techniques (both intra-oral and extra-oral) of inferior alveolar nerve block. **Methodology:** 50 patients were divided in 3 groups where 20 patients were included in open mouth technique (intra-oral), 20 in closed mouth technique (intra-oral) and 10 in Kurt Thoma extra-oral technique of inferior nerve block technique for Lower third molar extractions. Pain Perception (VAS), Speed of anaesthesia, Patient anxiety and Clinician expertise were measured. **Results:** Intra-oral technique is less technique sensitive as compared to extra-oral technique (Kurt Thoma). Conventional intra-oral open mouth technique is the least technique sensitive as well as more comfortable with patients as well having minimal pain perception. Group III had more pain perception on VAS scale. Speed of anesthesia was moderate in group I & II and slow in Group III. Patient anxiety was high on Group III as compared to other groups. Clinical expertise was high for Group III, moderate for Group II and normal for Group I. **Conclusion:** Intra-oral open mouth technique is still the most popular choice amongst clinicians and the pain sensitivity is also negligible amongst the patients with intra-oral technique. Extra-oral and closed mouth technique requires more skilled expertise.

**Keywords** Inferior Nerve Block, Local Anaesthesia, Pain, Visual Analogue Scale.

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#### INTRODUCTION

Mandibular third molar extraction is one of the most commonly performed procedures in dentistry. Most patient's primary concern is pain during dental extraction. Pain control is an essential part of dental extraction, and the most common method of pain control is local anaesthesia. Local anaesthesia may be categorized in a number of ways according to the extent of the area to be anesthetized. To anaesthetize the mandible, there are many local anaesthesia methods that target the inferior alveolar nerve, which runs along the mandibular canal. The conventional inferior alveolar nerve block has been used frequently

in various procedures for many years. However, the success rate of the inferior alveolar nerve block is, in fact, only modest, and associated complications, such as aspiration and nerve injury, are fairly common. Thus, various anaesthesia methods for inferior nerve block (Figure 1) have been continuously studied to try to address this issue.<sup>1</sup> The conventional inferior alveolar nerve block is the most commonly used nerve block technique in dentistry. This technique involves anaesthesia of the inferior alveolar nerve, which enters the mandibular foramen, via the positioning of the needle on the mandibular foramen area. The crucial clinical landmarks of this technique are the

coronoid notch and pterygomandibular raphe. The insertion point is located 3/4 down the line drawn from the deepest part of the pterygomandibular raphe to the coronoid notch. The needle must be advanced until the bone is contacted. Aspiration is mandatory prior to administration of the local anaesthetics and administration should be done very slowly. The nerves anesthetized are the inferior alveolar, incisor, mental, and lingual nerves. The mandibular teeth to the midline, the body of the mandible, the lower part of the mandibular ramus, buccal periosteum and mucous membrane to the premolars, anterior 2/3<sup>rd</sup> of the tongue, oral floor, lingual soft tissue, and the periosteum are all anesthetized. The failure rate of the conventional inferior alveolar nerve block is greater than 20%. Anatomical variations of the mandible and insufficient insertion depth into the soft tissue are thought to be the key factors in nerve block failure.<sup>2</sup> In 1973, George Albert Edwards Gow-Gates proposed a new technique. This technique has a higher success rate than the conventional inferior alveolar nerve block. It has a blood aspiration rate of approximately 2%, which is lower when compared to that of the conventional inferior alveolar nerve block (10~15%). In this block technique, the needle is positioned just inferior to the mesiolingual cusp of the upper second molar and advanced slowly until it makes bony contact with the frontal side of the condylar. As the insertion height of this technique is higher on the occlusal plane of the mandible than that of the conventional inferior alveolar nerve block, the Gow-Gates technique anesthetizes the inferior alveolar, mental, incisor, lingual, mylohyoid, auriculotemporal, and buccal nerves in about 75% of patients. The advantages of the Gow-Gates technique include less pain during insertion when compared to the conventional inferior alveolar nerve block and anesthetization of a more extensive area with a single injection. A disadvantage of the Gow-Gates technique is the slower onset of anesthesia.<sup>3</sup> The conventional inferior alveolar nerve block has potential risks including neural or vascular injury. Takasugi et al. introduced a technique that can eliminate such risks. As opposed to the conventional technique, in which the needle tip is directed at the mandibular foramen, this technique positions the needle anterior to the mandibular foramen.<sup>4</sup> The Fischer 1-2-3 technique, which is also called the indirect technique, requires the identification of several anatomical landmarks, including the internal and external oblique ridge, and coronoid notch. Boonsiriseth et al. have introduced a technique for achieving anaesthesia of the inferior alveolar nerve without periosteum contact. The insertion point is the same as that of the conventional inferior alveolar nerve block and the syringe is positioned parallel to the mandibular occlusal plane of the same side of the surgical site. The insertion depth is controlled by a rubber stop. A 30 mm needle is used and, with the rubber stop positioned at 20 mm, the needle is advanced until the rubber stop makes

contact. As the needle does not contact the periosteum, this technique provides less pain compared to the conventional technique and reduces the frequency of positive aspiration and the risk of neural or vascular injury.<sup>5</sup> Professor Kurt Thoma has been given credit for an extraoral technique called Kurt Thoma technique. Firstly, anterior border of masseter is located. Patient is asked to clench his teeth and lowest point is identified. Skin must be cleansed properly before injecting. Line is drawn which connects this point and the tragus of ear and midpoint is marked, which indicates the position of the mandibular foramen externally 21-gauge needle is marked with the same length as measured. Long needle is inserted on inner aspect of lower border of mandible, keeping it as near as possible to the bone. Needle is inserted up till the mark and solution is injected slowly.<sup>6</sup> Traditionally, pain management in the mandible, especially in the molar region, is far more complex than in the maxilla which can be measured with Visual Analogue scale (VAS). The VAS consists of a straight line with the endpoints defining extreme limits such as 'no pain at all' and 'pain as bad as it could be'. The patient is asked to mark his pain level on the line between the two endpoints. The distance between 'no pain at all' and the mark then defines the subject's pain. This tool was first used in psychology by Freyd in 1923. If descriptive terms like 'mild', 'moderate', 'severe' or a numerical scale is added to the VAS, one speaks of a Graphic Rating Scale (GRS).<sup>7</sup> Several anatomical factors like the presence of a thick bone cortical plate, the thickness of soft tissue through which the needle must penetrate and the possibility of accessory innervations have been related to the low efficacy of inferior alveolar nerve blocks (IANB). However, most authors explain the high failure rates (up to 15-20%) associated with IANB with a deficient technique, due to the difficulty of accurately locating the neurovascular bundle. Another important disadvantage of IANB is the high risk of intravascular injections, which can lead to systemic complications.<sup>8</sup> Therefore, our study encompasses effectiveness and pain perception in patients of various IANB techniques.

#### AIM OF THE STUDY

The purpose of the study was to assess the efficacy as well as pain perception status in different techniques (both intra- and extra-oral) of inferior alveolar nerve block.

#### METHODOLOGY

50 patients were enrolled in the present study who were given inferior alveolar nerve block for extraction of mandibular 3<sup>rd</sup> molar teeth by various techniques. They were divided in 3 different groups where- Group I- 20 patients were included in open mouth technique (intra-oral)

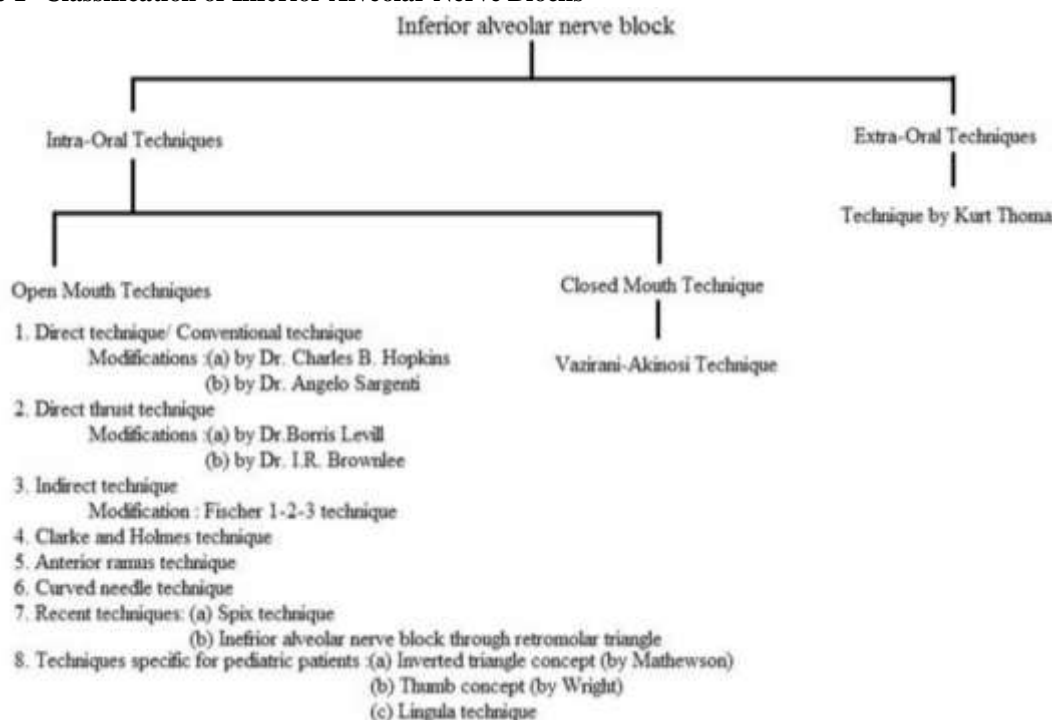
Group II- 20 patients in closed mouth technique (intra-oral)  
 Group III- 10 patients in Kurt Thoma extra-oral technique.  
 Pain Perception (VAS)(Figure 2), Speed of anaesthesia, Patient anxiety and Clinician expertise were measured

group I & II and slow in Group III. Patient anxiety was high on Group III as compared to other groups. Clinical expertise was high for Group III, moderate for Group II and normal for Group I. If comparison is done between various types of intra-oral techniques, conventional technique is still the best in terms of less expertise required as well as pain perception by the patient. (Table 1) In extra-oral technique, more expertise is required by the clinician to accurately deliver IANB. It also suffers from a major disadvantage of slow anaesthesia spread as compared to normal 3-5 mins of intra-oral technique's local anaesthesia spread.

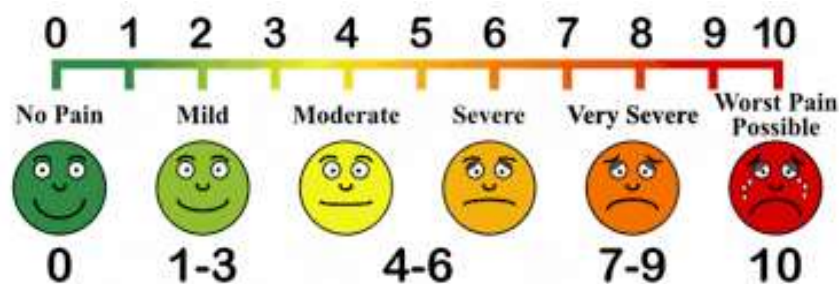
**RESULTS**

The result show that intra-oral technique is less technique sensitive as compared to extra-oral techniques. Group III had more pain perception on VAS scale. Speed of anesthesia was moderate in

**Figure 1- Classification of Inferior Alveolar Nerve Blocks**



**Figure 2: VAS Scale for Pain Measurement**



**Table 1- Various parameters of efficacy and pain perception in the present study.**

Groups	Pain Perception (VAS)	Speed of anaesthesia	Patient anxiety	Clinician expertise
I	3	Moderate	Mild to Moderate	Normal level
II	5	Moderate	Moderate	Moderate level
III	6	Slow	High	High level

\*VAS- Visual Analogue Scale – 0-10.

## DISCUSSION

Pain, often described as an unpleasant emotional experience, is the most distressing component of any dental treatment, including surgical procedures. According to research of University of Pittsburgh, patients avoid dental offices due to their fear for pain than compared to other reasons combined. Thus; its management has been one of the prime concerns for dental surgeons ever since dentistry came into existence. Being dual in nature pain perception and pain reaction must be considered. Among the two, pain perception is controlled by injecting local anaesthetics in proximity to the nerve or nerves involved by conduction blockade.<sup>9</sup> Infiltration techniques have shown extremely high success rates in the maxilla but seem to have disappointing figures when made in the lower molar region. Most authors recommend IANBs when a dental treatment is being made in this region. However, this technique can be difficult to perform specially because the anatomical landmarks used are not always reliable, and also because of the long distance between the injection point and the area where the local anaesthetic is finally placed. This fact along with the considerably high positive aspiration rate shows the need for alternative techniques to the traditional IANB.<sup>10</sup> One of the most severe local complications of IANB is the lesion of the lingual and inferior alveolar nerves. The fact that patients included in the experimental group frequently referred an electric discharge sensation in the tongue might indicate that the modified technique increases the incidence of lingual nerve impairments. A report by Pogrel and Thamby, which analyzed a pool of 83 patients with inferior alveolar nerve or lingual nerve injuries allegedly related to IANB, showed that 47 patients (56.6%) received a very painful injection or felt this electric shock sensation. Therefore, in our opinion, the injection location should be included in future studies about nerve injuries related to dental anesthesia, since it can be an important risk factor.<sup>11</sup> Kurt Thoma technique is especially beneficial when there is severe limitation of the opening of jaws. Therefore, not preferred for usual purposes and as with other extraoral techniques, this also serves with the disadvantage that anaesthesia spreads slowly as compared to intraoral technique of IANB. Closed technique does come with the advantage of locating the anatomical landmarks but requires more skilled approach as compared to intraoral technique. So, most

of clinicians prefer conventional intra-oral technique as it is less technique sensitive.

## CONCLUSION

Intra-oral open mouth technique is still the most popular choice amongst clinicians and the pain sensitivity is also negligible amongst the patients with intra-oral technique. Extra-oral and closed mouth technique requires more skilled expertise.

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