

EXTRACTION OF MANDIBULAR POSTERIOR TEETH: COMPARISON BETWEEN STANDARD INFERIOR ALVEOLAR NERVE BLOCK AND LOCAL INFILTRATION ANESTHESIA

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ABSTRACT

Objective: The current study assessed the success of infiltration anesthesia versus inferior alveolar nerve block (IANB) anesthesia during (mobile and non-vital) teeth extraction in posterior mandible.

Materials and methods: In a prospective study, 120 patients were included to extract one tooth for each patient in the posterior mandible under local anesthesia either by local infiltration = 60 (18 males, 42 females); or IANB = 60 (32 males, 28 females). Comparing anesthetic success rate of the two techniques and time until onset of anesthetic action (min).

Results: IANB was successful in 100% of the patients, where infiltration anesthesia succeeded in 85%. In addition, duration until onset of action was found to be equal with $p = (0.7)$

Conclusion: Infiltration technique offers a simpler substitute with less complication compared to IANB in establishing effective anesthesia for mandibular mobile and non-vital posterior teeth during intra-alveolar dental extractions.

KEYWORDS: IANB, infiltration, Extraction, lidocaine, mandibular molars

INTRODUCTION

Local anesthesia has an essential part in dentistry and anesthetic drugs are the most regularly used drugs in either medicine^[1] and dentistry^[2,3]. (IANB) still is the commonest anesthetic technique used in the posterior mandible^[4,5]. When successfully

administered, it provides sufficient anesthesia in a wide zone of the posterior mandible to perform surgery and restorations.^[6,7] at the same time, it has a somewhat high failure rate of 7 to 75%^[8-13]. Furthermore, it has major complications, as systemic toxicity from iatrogenic intravascular injections,

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bleeding from injury to neighboring blood vessels, prolonged mandibular anesthesia, also transient or even permanent paresthesia of the inferior alveolar and lingual nerves [14-17]. To evade IANB drawbacks, researchers used alternative techniques like periodontal ligament injection anesthesia (PDL). Correlated to IANB, PDL is adequate for single tooth anesthesia [18], has no risk for nerve damage, and less painful injection. However, PDL damages the periodontal tissue, causes root resorption [19], and severe bacteremia up to 100% [20]. Local infiltration anesthesia is another simple alternative with less complications, which has proven to be successful in surgical and restorative work in both the maxilla as well as in the anterior part of mandible, but not been used frequently in the posterior mandible due to the dense bone at this region [21]. On the other hand, recent studies indicated that 4% articaine could achieve successful anesthesia even in the posterior mandible [22]. Local infiltration advantage over IANB is that, it decreases the patients' discomfort of a painful injection; this can be beneficial for patients with non-vital teeth, remaining roots and teeth with grade III mobility. Therefore, the objective of the present study was to evaluate the success of infiltration anesthesia compared with the most commonly used direct IANB on patients extracting mobile and non-vital teeth in posterior areas of the mandible.

MATERIALS AND METHODS

Patients

This prospective study was conducted between September 2017 and May 2018 at Oral & Maxillofacial surgery clinics, Taibah University, Madinah, KSA. Patients were classified into two groups to be given either inferior alveolar nerve block (IANB) or infiltration anesthesia for mandibular mobile and non-vital premolars and molars teeth for extraction. A detailed medical history and a signed informed consent were acquired from each

patient prior to dental treatment. Inclusion criteria were as follow: healthy patients, older than 18 years, patients have a tooth in the posterior mandible needs extraction under local anesthesia. Exclusion criteria were allergy to local anesthesia, pregnant patients, patients taking medications affecting pain sensation as (analgesics, antidepressants, narcotics and sedatives), and patients having active pathology at the site of injection.

Procedure

The patients' two groups were sixty subjects each: Group I, (IANB) were administered 1.8-mL cartridge of 2% lidocaine with 1:100,000 epinephrine (Xylocaine; Astra Zeneca). The cartridge divided into 1.5 ml, which was given for IANB (1ml of local anesthesia given for inferior alveolar nerve and 0.5ml for lingual nerve block). The remaining 0.3 ml of the cartridge for long buccal nerve infiltration. Group II, (Infiltration anesthesia). Two injections using short needle and dental syringe were given for the targeted tooth; buccally injected 1.5 ml out of 1.8 ml of 2% lidocaine targeting the soft and hard tissues, the second injection was 0.3 ml in the lingual side for lingual soft and hard tissues [17]. The success of anesthesia tested within 2-5 minutes subjectively by asking the patient about numbness in the lip and tongue. In addition to objective test by put on a probe at the gingival margin from buccal and lingual sides. We used a stopwatch to record onset of anesthetic action (min).

A visual analog scale (VAS) Heft-Parker was used during dental extraction to assess the amount of pain patient felt. (Fig1). This scale was divided into 4 categories. [23] (No, Mild, Moderate, and Sever pain). No pain equal to 0-mm. Mild pain defined as > 0 mm and ≤ 54 mm. Moderate pain defined as > 54 mm and < 114 mm. Severe pain defined as ≥ 114 mm. Each patient was asked to put a mark on the line below to show the amount of pain that he felt (Fig1). If the patient felt no pain, the anesthetic technique considered successful and either elevators or dental forceps did the extraction.

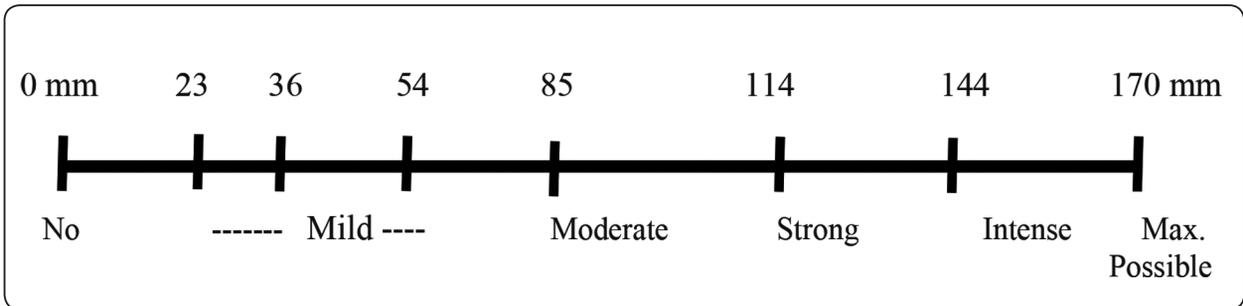


Fig. (1) Heft-Parker visual analog scale (VAS) for pain evaluation during treatment.

In (group II) if there was pain, the procedure was terminated and IANB performed to the patient to complete the extraction. The same experienced surgeon conducted all the intra-alveolar extractions.

Statistics

Data were analyzed by using the statistics software SPSS version 16. For independent testing of IANB vs. Infiltration technique. Non- parametric Mann-Whitney U tests were done. Pearson’s chi-square test used for the two applied anesthetic techniques vs onset of anesthetic action.

RESULTS

The total number of patients were, 120 (male = 50, female = 70; mean age was 37.4 years (± 10.8) All performed extractions were simple. Table 1 displays the teeth distribution in the mandible, teeth nature and the two anesthetic techniques used. The anesthetic technique considered successful when patients had no pain during the treatment (VAS equaled 0 mm). The anesthetic success presented in (Fig 2) which was a 100% in group I (60/60) IANB, whereas success in group II Infiltration was achieved in 85% (51/60) p = (0.003). As regards to the duration until onset of anesthetic action in (min), our findings showed no difference in both methods that were performed. Infiltration technique mean was 3.6 min ± 0.8 vs. IANB mean 3.58 min ± 0.73 with p=(0.7)

TABLE (1) The distribution of the extracted teeth and all analyzed factors.

| Tooth | No. of extracted teeth | Tooth nature | | Anesthetic technique | |
|-------|------------------------|--------------|-----------|----------------------|------|
| | | Mobile | Non-vital | Infiltration | IANB |
| 34 | 4 | 0 | 4 | 0 | 4 |
| 35 | 12 | 0 | 12 | 6 | 6 |
| 36 | 7 | 3 | 4 | 3 | 4 |
| 37 | 35 | 23 | 12 | 21 | 14 |
| 38 | 14 | 7 | 7 | 6 | 8 |
| 44 | 7 | 2 | 5 | 3 | 4 |
| 45 | 5 | 0 | 5 | 3 | 2 |
| 46 | 24 | 10 | 14 | 12 | 12 |
| 47 | 9 | 2 | 7 | 3 | 6 |
| 48 | 3 | 3 | 0 | 3 | 0 |
| Total | 120 | 44 | 76 | 60 | 60 |

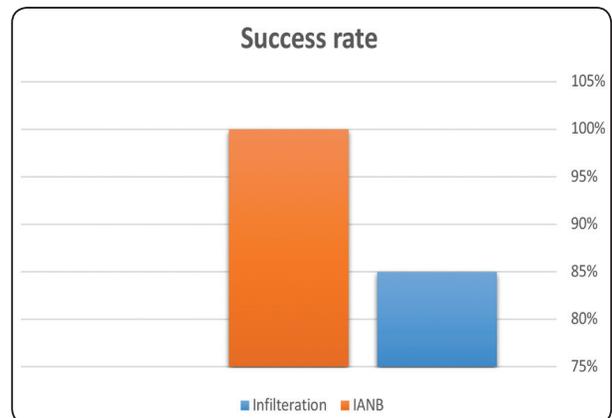


Fig. (2) Bar chart presenting the success of local infiltration and (IANB) anesthesia (in percentage)

DISCUSSION

Dentists and oral & maxillofacial surgeons faced by the difficulty of achieving profound local anesthesia in patients undergoing intra or trans- alveolar tooth extraction in the posterior area of the mandible ^[24-26], due to the thickness of the cortical bone in this location. IANB is the standard technique used in posterior mandible ^[4], but because of its risky complications and the need for safer and easier anesthesia, practitioners and scientists searched for substitutes for IANB in the last few years. One of these alternatives was PDL as mentioned earlier. Another one, is the infiltration technique that was not the first select in the adult posterior mandible; because they believe that the thick cortex prevents diffusion of anesthetic solution into the cancellous bone, to the nerves supplying the teeth pulp. ^[27] recently researchers reported that, infiltration anesthesia can fulfill the requirements and can provide equal anesthetic effects to standard technique used in posterior mandible. ^[28, 29, 30].

In our study, local infiltration of 1.8 ml of 2% lidocaine with 1:100,000 epinephrine was investigated against IANB with the same anesthetic solution in posterior mandible during extraction of simple cases. Sixty non-vital and mobile posterior teeth were extracted in each technique. Mobile teeth represented 36.7% of the extracted teeth, the causes for mobility were mainly due to periodontitis, and chronic periapical infection. Infiltration anesthetic technique included 12 premolars and 48 molars. While IANB included 16 premolars and 44 molars

Pain was recorded during extraction, for IANB and there were no pain complain from any patient, so success rate was 100%. While with infiltration there were, nine patients complained of pain. (Six patients showed mild pain and three showed moderate pain). The success rate for infiltration was 85%

Our finding was the same as (Corbett IP, et al) ^[22] they associated the infiltration of 1.8 mL of 4% articaine to IANB of 2.0 mL of 2% lidocaine

and, similar to Jung and colleagues, ^[15] who showed no difference in success between the two techniques (70% and 56%, respectively). Furthermore, El-Kholey ^[27] reported local infiltration success ranges in the posterior mandibular area from 54 to 94%.

In contrast to other studies ^[31, 32] showed that infiltration anesthesia when compared to the IANB anesthesia was significantly less effective in patients undergoing extraction of mandibular posterior teeth.

The onset of anesthesia was measured in minutes for IANB and infiltration technique; there was no significant difference in the onset of anesthesia between the two methods. This was in accordance (Thiem DGE., et al) ^[31], and in difference with Jung and colleagues, ^[15] who used 4% articaine for buccal infiltration and IANB. Represented that onset of anesthesia was faster in the infiltration technique.

The success of the infiltration anesthesia at the posterior region of the mandible in the current study can be explained by the presence of accessory foramina in the human mandible in up to 96.2% of specimens studied by Madeira et al., ^[33] and in another study that found 2449 accessory foramina in 300 dried human mandibles. ^[34]

CONCLUSION

Infiltration technique offers a simpler substitute with less complication compared to IANB in establishing effective anesthesia for mandibular mobile and non-vital posterior teeth during intra-alveolar dental extractions.

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