Assessment of the Need for Routine Distolingual Local Anesthetic Infiltration in Addition to Traditional Inferior Alveolar, Lingual and Long Buccal Nerve Blocks in Mandibular Third Molar Extractions

Abstract

Background and Objectives: Persistent pain during the removal of mandibular third molars is often due to accessory nerve supply causing inadequate local anesthesia. This study aims to assess the requirement of routine distolingual infiltration anesthesia in addition to traditional inferior alveolar, lingual, and long buccal nerve block in mandibular third molar extractions. Methodology: Sixty patients requiring mandibular third molar extraction were randomly divided into two equal groups; Group A (Classic inferior alveolar, lingual, and buccal nerve block) and Group B (with an additional 0.2 ml distolingual infiltration). During various steps of the procedure, any complaint of pain was recorded and graded on a subjective Visual Analog Scale (VAS). Results: There was no significant difference between the two groups in regard to age (P = 0.666) and sex (P = 0.432). Also, no difference was found in angulation (P = 0.757), class (P = 0.417) and position (P = 1.000) of third molars. Mean VAS scores in Group B (0.153) were significantly lower (P = 0.004) than that of Group A (0.600). VAS scores during procedural steps were significantly lower in Group B during mucoperiosteal elevation (P = 0.050), bone guttering (P = 0.037), and tooth splitting (P = 0.052). Conclusion: Routine distolingual infiltration anesthesia, in addition to classic inferior alveolar, lingual, and long buccal nerve block, is recommended for the extraction of mandibular third molars.

Keywords: Accessory nerve supply, disto-lingual infiltration, local anesthesia, mandibular third molar, retromolar canal

Introduction

The extraction of mandibular third molars under local anesthesia can be further complicated by persistent pain during the procedure. Conventionally, a classical inferior alveolar nerve block (IANB), long buccal nerve block, and lingual nerve block are administered to achieve anesthesia for the extraction of mandibular third molars. IANB has the highest failure incidence of any dental anesthetic technique.[1‑2] Even after successful IANB, as determined by subjective and objective symptoms, patients often complain about pain during various steps of surgical removal of third molars. It is more often noticed during lingual mucoperiosteal elevation, mesiobuccal bone guttering, and tooth splitting. Accessory nerve supply, such as from mylohyoid nerve, transverse cervical nerve, pharyngeal plexus, or auriculotemporal nerve, is considered to be one of the important reasons for this.[13] Meechan, while discussing how to overcome local anesthetic failures, says, it has been observed that despite an apparently effective lingual nerve block, the distolingual gingiva is not anesthetized. This finding is so common that a routine injection of about 0.2 ml solution at this site is recommended before the third molar surgery.[6] The presence of retromolar foramen as a common anatomical occurrence and several structures passing through it, including nerve, is well established.[5‑8] Filo et al., in their study of the retromolar canal, go on to suggest to consider additional locoregional anesthesia in the retromolar region.[9] Considering all this, we felt a study comparing traditional IANB, lingual, and long buccal nerve blocks to that with an additional distolingual infiltration was necessary.

Methodology

Sixty patients requiring removal of mandibular third molar were included in this study. Patients requiring removal of mandibular third molars were randomly divided into two equal groups; Group A (with an additional 0.2 ml distolingual infiltration) and Group B (without distolingual infiltration). During various steps of the procedure, any complaint of pain was recorded and graded on a subjective Visual Analog Scale (VAS). Results: There was no significant difference between the two groups in regard to age (P = 0.666) and sex (P = 0.432). Also, no difference was found in angulation (P = 0.757), class (P = 0.417) and position (P = 1.000) of third molars. Mean VAS scores in Group B (0.153) were significantly lower (P = 0.004) than that of Group A (0.600). VAS scores during procedural steps were significantly lower in Group B during mucoperiosteal elevation (P = 0.050), bone guttering (P = 0.037), and tooth splitting (P = 0.052).

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the study with the following exclusion criteria: patients, with the American Society of Anesthesiologists Status III and above, requiring multiple teeth extractions in the same appointment, with acute pericoronitis or infection in the mandibular third molar region, with pathologies related to the operative site, in whom communication may be a problem, for example, speech or mental impairments, allergic to Lignocaine and/or in whom the use of adrenaline was contraindicated. Informed consent was obtained from all the patients and were randomly divided into two groups of thirty each using simple randomization as, Group A: Patients in whom mandibular third molar was removed under local anesthesia with the administration of classical IANB, lingual and long buccal nerve blocks and Group B: In addition to the above, a 0.2 ml infiltration was administered on the distolingual aspect of mandibular third molar [Figure 1]. An equal amount of 2% Lignocaine HCL with 1:80,000 Adrenaline was used in all the patients. A single operator followed a standard procedure for the removal of the tooth. A standard envelop flap and a lingual flap was raised in all the patients. To record the study data, the procedure was divided into five steps as, mucoperiosteal elevation, bone guttering, tooth splitting, tooth elevation, and suturing. Any complaint of pain during any of the steps was recorded and graded in intensity based on the verbal visual analog scale (VAS). For patients complaining of pain during the procedure, additional measures of pain control like local infiltration or periodontal ligament or pulpal infiltration anesthesia were used and recorded.

Results

Out of sixty patients, 24 patients complained of pain during various steps of the procedure. There was no difference between the two groups with regard to age ($P = 0.666$) and sex ($P = 0.432$) [Table 1]. Furthermore, no significant difference was found in the classification of third molars between the groups in angulation ($P = 0.757$), class ($P = 0.417$) and position ($P = 1.000$) [Table 2]. Seventeen patients (57%) complained of pain in Group A compared to seven (23%) in Group B. Mean VAS scores of Group B (0.1533) was significantly ($P = 0.004$) less than Group A (0.6000) [Table 3]. VAS scores of Group B were also significantly lower than Group A during early steps of extraction such as mucoperiosteal elevation ($P = 0.050$), bone guttering ($P = 0.037$), and tooth splitting ($P = 0.052$) [Table 4]. No difference was found in the later stages like tooth elevation ($P = 0.582$), and during suturing, none of the patients complained of pain. Group B patients required significantly less additional measures ($P = 0.008$) than Group A [Table 5].

Discussion

Failure to achieve adequate local anesthesia is a much-researched subject in the field of dentistry. Yet, there is no single solution that can be universally applied to resolve this issue. Persistent pain during the extraction can be frustrating to the operating dentist and will result in increased procedural time. IANB is the most difficult to master the nerve block technique and also the technique with the highest incidence of failure. Surgical removal of mandibular third molar under local anesthesia requires an effective IANB. However, even after a successful nerve block, much too often, we had encountered patients complaining pain during distolingual mucoperiosteal elevation or bone guttering or tooth splitting. Accessory nerve supply is one of the main reasons for this; we studied the usefulness of additional infiltration anesthesia, as suggested by many previous studies. In this study, we found distolingual infiltration anesthesia was significantly effective in reducing the incidence of pain during the mandibular third molar extraction procedure. Especially in the early steps like mucoperiosteal elevation and bone guttering, we had a smaller number of patients complain of pain in Group B. Since all the extractions in our study did not involve tooth splitting, the results in this parameter cannot be considered significant. During the later stages of the extraction procedure, there was no significant difference between the groups. The reason might be the use of additional measures of pain control. A number of patients who needed additional measures of pain control were more in Group A (17) compared to Group B (7), further substantiating the effectiveness of distolingual infiltration. Earlier studies regarding additional infiltration anesthesia to IANB have given mixed conclusions. Most studies have determined the effectiveness of the addition of lingual infiltration on mandibular molars by checking for pulpal anesthesia.

![Image](59x72 to 291x248)

**Figure 1: LA infiltration on lingual aspect of mandibular third molar**

| Table 1: Age and sex distribution among groups |
|-----------------------------------------------|
| Mean age | Significant (two-tailed) | Sex | $\chi^2$ | $P$ |
|----------|---------------------------|-----|--------|------|
| Group A  | 31.3333 | 0.666 | 14     | 16   | 0.6171 | 0.4321 |
| Group B  | 32.4000 | 0.666 | 11     | 19   |        |        |
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In our study, the response of the patients during the procedure was considered. Intra-osseous and intra-ligamentary injections have also been tried when IANB fails to achieve adequate pulpal anesthesia. These are cumbersome techniques, and the requirement for these can be reduced by using a simple infiltration technique. This study provides the basis for eliminating inadequate local anesthesia through an additional distolingual infiltration.

**Conclusion**

The extraction of mandibular third molars under local anesthesia requires good patient cooperation. Any pain during the procedure may increase the patient’s apprehension. Through this study, we recommend that the practitioner can consider a routine distolingual infiltration in addition to IANB for the extraction of mandibular third molars.

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Nil.

**Conflicts of interest**

There are no conflicts of interest.

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### Table 2: Angulation, class, and position distribution between the groups

| Angulation | P | Class | P | Position | P |
|------------|---|-------|---|----------|---|
| V | MA | H | DA | I | II | III | A | B | C |
| Group A | 8 | 12 | 6 | 4 | 0.757 | 18 | 12 | 0 | 0.417 | 23 | 7 | 0 | 1.000 |
| Group B | 11 | 11 | 6 | 2 | 21 | 9 | 0 | 23 | 7 | 0 |

V: Vertical; MA: Meso-angular; H: Horizontal; DA: Disto-angular

### Table 3: Overall visual analog scale scores

| Procedure steps | Group | Mean VAS score | Mean difference | t | Significant (two-tailed) |
|-----------------|-------|----------------|----------------|---|-------------------------|
| Mucoperiosteal elevation | A | 1.0333 | 0.4467 | 3.3749 | 0.0004 |
| Bone guttering | A | 1.0667 | 0.2333 | 1.42877 | 0.26086 | 0.981 | 0.52 |
| Tooth splitting | A | 0.6000 | 0.1667 | 0.14921 | 0.20982 | 0.554 | 0.582 |
| Tooth elevation | A | 0.3000 | 0.0000 | 0.0000 | 0.0000 | NA |
| Suturing | A | 0.0000 | 0.0000 | 0.0000 | 0.0000 | NA |

VAS: Visual analog scale; SD: Standard deviation; SEM: Standard error of the mean; NA: Not available

### Table 4: Significance of procedure visual analog scale scores between the groups

| Procedure steps | Group | n | Mean VAS score | SD | SEM | t | Significant (two-tailed) |
|-----------------|-------|---|----------------|----|-----|---|-------------------------|
| Mucoperiosteal elevation | A | 30 | 1.0333 | 1.73172 | 0.31617 | 1.997 | 0.050 |
| Bone guttering | A | 30 | 0.3000 | 1.02217 | 0.18662 | 2.129 | 0.037 |
| Tooth splitting | A | 30 | 0.6000 | 0.97143 | 0.17736 | 2.129 | 0.037 |
| Tooth elevation | A | 30 | 0.3000 | 0.35615 | 0.06667 | 0.554 | 0.582 |
| Suturing | A | 30 | 0.0000 | 0.64772 | 0.11826 | 0.0000 | 0.0000 |

### Table 5: Requirement for additional measures

| Additional measures | Yes | No | χ² | P |
|---------------------|-----|----|----|---|
| Group A | 17 | 13 | 6.9444 | 0.0084 |
| Group B | 7 | 23 | |

using an electric pulp tester. In our study, the response of the patients during the procedure was considered. Intra-osseous and intra-ligamentary injections have also been tried when IANB fails to achieve adequate pulpal anesthesia. These are cumbersome techniques, and the requirement for these can be reduced by using a simple infiltration technique. This study provides the basis for eliminating inadequate local anesthesia through an additional distolingual infiltration.
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