

# FREQUENCY OF INJURY TO LINGUAL NERVE & INFERIOR ALVEOLAR NERVE IN CASE OF MANDIBULAR 3RD MOLAR IMPACTION

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## ABSTRACT

**Objective:** The main objective of the study is to determine the frequency of injury to lingual nerve & inferior alveolar nerve in case of mandibular 3rd molar impaction.

**Materials and Methods:** This cross sectional study was conducted in Bakhtawar Amin Dental Hospital, Multan, during July 2018 to December 2018 with the permission of ethical committee of hospital. A total of 100 mandibular extractions were performed with the age range from 15-80. 25 patients were males and 75 were females. The predictor variables for the study were age, gender, level of impaction (soft tissue, partial bony or total bony), type of buccal flap raised (in surgical extractions), lingual flap retraction and protection, surgeon's experience (specialists, residents, house officers or students) and the tooth side (right or left) in relation to the handedness of the operator (R/L). The outcome variable was the presence of postoperative lingual neurosensory deficit and inferior alveolar nerve deficit.

**Results:** Out of 100 patients, six patients were diagnosed with lingual nerve paraesthesia on 1st and 7th postoperative day evaluation. The overall incidence rate of lingual nerve injury was 6%. One patient with paraesthesia was lost from the study after approximately 3 months of observation due to geographical relocation but this patient had definite sign of return of sensation when he was lost from study.

**Conclusion:** It is concluded that the risk of lingual nerve paraesthesia is higher than inferior alveolar nerve paraesthesia post operatively after third molar extractions.

**Keywords:** Lingual Nerve Injury, Inferior Alveolar Nerve Injury, Tooth, Extraction, Surgical Extraction, Dental, Patients, Complications, Exodontia, Minor Oral Surgeries.

## INTRODUCTION

Surgery to the mandibular third molar is common, but injuries to the inferior alveolar nerve (IAN) and the lingual nerve (LN) remain well-recognized complications. The reported incidence of nerve damage during this procedure has been reported to range from 0.26 to 8.4% for IAN and from 0.1 to 22% for

LN.<sup>1</sup> The wide variability of these values makes it impossible to provide a reliable estimate owing to differences in surgical technique, examined samples, follow-up and evaluation criteria used in the studies that have been reported in the literature.<sup>2</sup>

The following risk factors for IAN injuries in third molar surgery have been reported in the literature: higher patient's age, pre-existing disease, deep impaction and close anatomic relationship between the tooth roots and the inferior alveolar canal (IAC), intraoperative exposure of the nerve trunk, less-experienced surgeon, use of the lingual split surgical

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technique, use of rotary instruments for bone removal or tooth sectioning and compression of the nerve during root elevation.<sup>3</sup> In addition to increasing age, deep and distal impaction, and the use of the lingual split technique, the risk factors for LN involvement have been mainly related to iatrogenic causes such as poor flap design, using a periosteal elevator to raise and retract the lingual flap, clumsy instrumentation, and iatrogenic fracture of the lingual plate.<sup>4</sup>

Extraction of impacted or erupted mandibular third molars (M3s) is one of the most frequently performed dentoalveolar surgical procedures. There are well-established indications for removal of impacted M3s, and the controversies about prophylactic removal of asymptomatic M3s are based on evaluating the costs and risks of removal against the consequences of non-removal.<sup>5</sup> The reasons for prophylactic surgery include the need to minimize the risk of disease (cysts and tumours), the reduction of the risk of mandibular angle fracture, increased difficulty of surgery with age, non-restorable caries or periodontal disease, and that M3s may be of less importance for mastication.<sup>6</sup> Within 4 - 8 weeks after surgery, 96% of inferior alveolar nerve (IAN) injuries recover, and the recovery rates are not influenced by gender and only slightly by age. Some injuries may be permanent, lasting longer than 6 months, and with varying outcomes ranging from mild hypoesthesia to complete anaesthesia and neuropathic responses resulting in chronic pain.<sup>7</sup> The M3 is close to important structures such as the IAN, lingual nerve, and adjacent second molar. The lower it is, the more difficult it is to extract and more complications may occur during operation or postoperatively. Among them, injury of the IAN is of most concern for surgeons. Sometimes it is unavoidable and is most likely to lead to legal disputes between doctors and patients.<sup>8</sup>

The risk of IAN injury (IANI) complication depends mainly on the position of the impacted tooth in relation to the mandibular canal (MC) before surgery. The IAN travels within the MC in the mandible, and is thus supported by the alveolus and the neurovascular bundle.<sup>9</sup> Anatomically, the inferior alveolar vein is the most superior structure in the canal. When rotary instruments penetrate the canal, the bleeding will alert the surgeon that the superior aspect of the bony canal has been breached and the vein is injured.<sup>10</sup> Nonsurgical removal of the M3 is unlikely to cause any damage to the nerve unless

excessive force has been used. The radiographic position of the M3 in relationship to the MC has been shown to be useful in assessing the risk of damage to the IAN following extraction. If the IAN is injured, unless it is displaced by bony fragments from the roof of the MC or displaced into the socket, it will remain within the canal and regenerate.<sup>11</sup>

The main objective of the study is to determine the frequency of injury to lingual nerve and inferior alveolar nerve in case of mandibular 3<sup>rd</sup> molar impaction.

## MATERIALS AND METHODS

This cross sectional study was conducted in Bakhtawar Amin Dental Hospital, Multan, during July 2018 to December 2018 with the permission of ethical committee of hospital. The data were collected from one hundred patients who visited the hospital for dental treatment. The surgical approach for removing the mandibular third molar involves anaesthesia, incision and elevation of mucoperiosteal flap, ostectomy and tooth sectioning, elevation and avulsion according to the root axis, socket debridement, and suturing. Local anaesthesia is generally preferred, and can be induced using an IAN block (mepivacaine 3% without epinephrine) and tissue infiltration (mepivacaine 2% with 1:100,000 epinephrine).

### Data collection

A total of 100 mandibular extractions were performed with the age range from 15-80. 25 patients were males and 75 were females. The predictor variables for the study were age, gender, level of impaction (soft tissue, partial bony or total bony), type of buccal flap raised (in surgical extractions), lingual-flap retraction and protection, surgeon's experience (specialists, residents, house officers or students) and the tooth side (right or left) in relation to the handedness of the operator (R/L). The outcome variable was the presence of postoperative lingual neurosensory deficit and inferior alveolar nerve deficit.

After extractions, each patient received instructions for care. Most patients received ibuprofen and/or codeine as an analgesic, with the dosage adjusted according to usual guidelines. Patients were contacted by telephone 48 hours after the surgery and verbal questions were asked about their postoperative condition. They were followed up after one week and

asked about any alterations in the sensations of the lower lip, chin and tongue. Patients who reported paraesthesia were kept under follow-up weekly and any improvement was noted.

**Statistical analysis**

The collected data were analyzed using SPSS software (version 17). The results are presented as a mean with 95% confidence interval limits or standard deviations. The significant value for  $P \leq .05$  was accepted as statistically significant.

**RESULTS**

Out of 100 patients, six patients were diagnosed with lingual nerve paraesthesia on 1<sup>st</sup> and 7<sup>th</sup> post-operative day evaluation. The overall incidence rate of lingual nerve injury was 6%. One patient with paraesthesia was lost from the study after approximately 3 months of observation due to geographical relocation but this patient had definite sign of return of sensation when he was lost from study. In one patient paraesthesia persisted even after 6 months of follow up in spite of conservative therapy of Cyanocobalamin 1500 unit/day. Other four patients with paraesthesia recovered within 6 months of observation. The significant value for  $P \leq .05$  was accepted as statistically significant.

When gender is considered, no significant difference could be found between male and female regarding the incidence of lingual nerve damage.

**Table: 1 Buccolingual inclination and paraesthesia**

| Buccolingual inclination | No. of patients | Paraesthesia |
|--------------------------|-----------------|--------------|
| Buccal Inclination       | 45              | 4.4%         |
| Lingual Inclination      | 25              | 20%          |
| No Inclination           | 30              | 3.2%         |

**Table: 2 Incidence of lingual nerve injury related to gender**

| Gender | No. of patients | Altered lingual sensation | %age |
|--------|-----------------|---------------------------|------|
| Male   | 25              | 01                        | 0.92 |
| Female | 75              | 02                        | 1.58 |



**Fig 1:**

**DISCUSSION**

Different surgical techniques have been described for preventing neurological injury during mandibular third molar surgery. Coronectomy (partial odontectomy or root retention) consists of removing only the crown of an impacted mandibular third molar, leaving part of its roots at least 3 mm below the crestal bone, and without performing pulpal treatment.<sup>12</sup> Coronectomy seems a reliable procedure for reducing the incidence of injuries to the IAN (0–9.5%) and LN (0–2%), with low rates of post-operative failure (on average less than 10%) and post-operative complications (pain, swelling, infection, dry socket and root migration).<sup>13</sup> In some cases, accidental intraoperative loosening or mobilization of the roots and post-operative root exposure made it mandatory to perform conventional surgical extraction.<sup>14</sup> However, this technique is considered controversial by many oral surgeons due to the potential adverse effects of the retained roots. New randomized clinical studies involving larger samples and long follow-up periods are needed to accurately assess the long-term success of this approach.<sup>15</sup>

The orthodontic-assisted extraction requires surgical exposure of the third molar crown, placement of an orthodontic anchorage and orthodontic extrusion in order to move the roots away from the IAC; the extraction is then performed after 3–6 months, when the tooth has moved sufficiently in the occlusal plane.<sup>16</sup> Although this technique can improve periodontal healing distal to the second molar, it has disadvantages of being complex to perform, not well tolerated by the patient due to discomfort of the orthodontic device, time-consuming and expensive.<sup>17</sup>

**CONCLUSION**

It is concluded that the risk of lingual nerve

paraesthesia is higher than inferior alveolar nerve paraesthesia post operatively after third molar extractions. Minimizing intra- and post-operative neurological complications requires a good knowledge of anatomy in order to identify the presence of risk factors and to decide on the most appropriate surgical technique. The role of expertise and professional experience in the incidence of complications associated with third molar removal should also not be underestimated, since complications reportedly occur more often among inexperienced surgeons than among those with experience related to IAN and LN injury.

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