Vol. 5 No. 1 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Inferior Alveolar Nerve Paresthesia After 3rd Molar Removal

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Keywords: Cone-Beam Computed Tomography, Inferior Alveolar Nerve, Mandibular Third Molar, Paresthesia, Tooth Extraction

Received on 20 Dec 2025
Accepted on 18 Jan 2026
Published on 26 Jan 2026

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Abstract

Paresthesia of the inferior alveolar nerve (IAN) is a known complication affecting patients who have their third molars extracted, but it is considered rare. It is known that if the third molar roots are in proximity to the mandibular canal, the risk of injury and disturbance to the neurosensory system, which may be temporary or permanent, may occur. In this study, a 28-year-old female had her impacted mandibular left third molar removed. Prior to the surgery, a panoramic X-ray and a cone beam computed tomography (CBCT) were performed, which showed contact of the molar roots with the mandibular canal. Post-surgery, the patient had reported paresthesia of the left IAN, and the clinician had confirmed by testing that there was a loss of light touch, an impairment of pin prick, and changed thermal perception. Paresthesia was treated conservatively with corticoids, B-complex vitamins, pain medications, and monitoring of the neurosensory system. Monitoring was performed with appointments post-op, at 1 week, 1 month, 3 months, and 6 months. By the sixth month post-op, paresthesia was resolved, and normal function returned to the site. The case shows the need for detailed reading of the pre-op imaging. For patients with high-risk root-canal proximity cases, the post-op care shows that recovery for IAN injury from the third molar surgery has a better outcome with early diagnosed and treated care with follow-up.

Introduction

Extracting Mandibular third molars (wisdom teeth) is a common element of Oral and Maxillofacial Surgery (Smailienė et al., 2019). Recurrent pericoronitis, cavities, gingivitis and periodontal involvement, cystic inclusions, orthodontic realignment, and prevention of future impaction are all indications for extraction. Although normal, third molar removal can carry pain, swelling, and infection, as well as Alveolar Osteitis and changes to the nervous system (Adamska et al., 2024). Injury to the Inferior Alveolar Nerve (IAN) is a significant concern, due to the prolonged impact of the sensory alteration on the patient's quality of life (Selvi et al., 2021).

The inferior alveolar nerve (IAN) is a part of the mandibular division of the trigeminal nerve (cranial nerve V) and exists in the Mandibular Canal (Chotirungsan et al., 2023). The IAN provides sensory nerves to the mandibular teeth, lower lip, and chin. The IAN and the impacted mandibular third molars are critical during the extraction

process since they are in very close proximity to each other (Joo et al., 2023). In some worst-case scenarios, imaging has shown that the roots of the tooth are in direct contact, or are very close to, the nerve. In these cases, the IAN is at a greater risk of injury due to the process of removing the section of the bone that surrounds the tooth, along with the sectioning and the luxation of the tooth (Geia, 2022).

Inferior alveolar nerve paresthesia is a common postoperative complication characterized by altered sensation, which may include numbness, tingling, or burning, as well as altered levels of sensation (e.g. hypoesthesia, dysesthesia) or total loss of sensation within the distribution of the affected nerve (Vinci et al., 2025). Depending on study design, complexity of the surgery and the follow-up period, the incidence is reported to be between approximately 0.4% and 8.4% for temporary and less than 1% for permanent deficits (Schneider et al., 2021). The injury may be due to various factors, including compression, stretching, and direct transection of the nerve. Though many of these cases resolve within weeks to months of surgery, there may be persistent sensory changes, which may affect one's daily activities and cause psychological problems and poor quality of life (Blonde et al., 2022).

There are known risk factors for inferior alveolar nerve injury following removal of a third molar. Deep impaction of teeth, as well as their angulations (i.e. horizontal or distoangular) and older age of the patient are important risk factors in addition to the length of the procedure and the experience of the surgeon (Rieder et al., 2023). Some risk factors may be noted on two-dimensional imaging, including darkening of the roots, disruption of the cortex of the mandibular canal, changes in the shape or caliber of the canal, and loss of the white line of the cortex in the panoramic radiographs. The use of cone-beam computed tomography (CBCT) provides a three-dimensional image of the relationship between the third molar and the mandibular canal and is useful in the pre-operative assessment of the potential risks (Bayrakdar et al., 2021).

Present management for IAN injuries incorporates an extensive number of treatment options such as a complete neurosensory assessment, a series of clinical evaluations, nerve repair, different medications such as corticosteroids and B vitamins, and low-level laser therapy (Vinci et al., 2025b). Management of this injury in advance consists of careful surgery planning, the use of CBCT when necessary, atraumatic surgical approaches, and, when the injury risk is greater, alternative surgical approaches such as coronectomy (Cramer et al., 2023). The outcome of this injury is directly correlated to the mechanism and severity of the injury; the quicker the treatment, the better the prognosis.

Because of the implications of IAN injury, which can be both psychosocial and physical, the injury should not be understated, and treatment should be prioritized. This case report exemplifies IAN injury following third molar removal and is focused on both the diagnosis and treatment, and how the information presented will help the clinician attempting to address this injury.

Methodology

Study Design

Following the CARE (Case Report) guidelines, this case report describes the clinical management and outcome of a patient with inferior alveolar nerve (IAN) paresthesia after the removal of an impacted mandibular third molar. A single-patient observational case report study was performed at the Department of Oral and Maxillofacial Surgery.

Patient Assessment and History

An extensive medical and dental history was taken at the first appointment. Information concerning systemic disorders, medications and allergies, surgical history, and any neurological history was documented. The patient's principal complaint was recorded, and the history of the impacted third molar and any prior dental history was

documented. A clinical assessment was performed to evaluate facial symmetry, oral hygiene, and the health of the soft tissues, as well as the range of movement of the mandible, and the position of the impacted third molar.

Radiographic Evaluation

As part of the preoperative assessment, panoramic imaging (orthopantomogram) was performed to evaluate the morphology, angulation, and depth of the impaction of the mandibular third molar. In cases where the close anatomical relationship between the tooth roots and the mandibular canal was of concern, Cone-beam computed tomography (CBCT) was utilized. Evaluation of the following potential indicators of inferior alveolar nerve injury/touch was assessed: root darkening, disruption of the mandibular canal, narrowing of the canal, and root-canal proximity.

Surgical Procedure

The extraction was completed under local anesthetic via an inferior alveolar nerve block augmented by buccal infiltration. After satisfactory anesthesia, a mucoperiosteal flap was elevated. An osteotomy was completed via a surgical hand piece with continuous sterile saline irrigation. Tooth sectioning was performed as required to facilitate removal with a greater degree of control and to avoid unnecessary trauma. The extraction socket was rinsed with a sufficient amount of sterile saline to clear debris and bone fragments. The flap was laid back in position and was secured with interrupted resorb able sutures. Routine postoperative medicine and instructions were given.

Postoperative Neurosensory Evaluation

The evaluation postoperatively was concerned with the recognition of symptoms of inferior alveolar nerve injury. Reported symptoms of interest were subjective and included the presence of numbness, tingling, altered sensation, and loss of sensation in the lower lip, chin, gingiva and dentition of the mandible. Objective neurosensory assessments were performed and included light touch and pin-prick assessment, two-point discrimination, thermal sensation testing, and sensory mapping of the dermatomes involved. Results were recorded and compared to the corresponding areas on the contralateral, unaffected side.

Management of Paresthesia

The severity and duration of symptoms determined the management protocol. Conservative treatment included corticosteroids, a combination of vitamins B, analgesics, and frequent assessment. Laser therapy and physiotherapy were also used as supportive measures. The patient was instructed on the possible outcomes and the significance of attending follow-up appointments.

Follow-up and Outcome Assessment

A postoperative paresthesia diagnosis follow-up was conducted after a week, a month, and three and six months after the first diagnosis. At each follow-up, standardized tests were used to measure the patient's neurosensory function. The patient documented symptoms, and the affected area and patient symptoms were measured to assess progress. Clinical notes were made and updated in the patient record.

Ethical Considerations

The patient signed an informed consent document for treatment and the use of clinical data and images for publications. Patient data was de-identified. The study maintained patient data confidentiality. Informed consent and all aspects of the study design and implementation adhered to the principles of the Declaration of Helsinki and the policies of the institution for clinical case reports.

Data Analysis

Clinical data, images, and pre and post-surgical pictures were examined. All the information was used to document the inferior alveolar nerve post-surgical paresthesia and the impact of the third molar surgery. Post-surgical complications of this nature are important to study and measure due to the impact on the patient and the healthcare system.

Results

A 28-year-old woman was referred for management of recurrent pain and pericoronitis due to an impacted left lower third molar. Clinical evaluation showed that a mesioangular impaction of the third molar was present, which was likely to cause further problems and would require removal. The patient did not have any significant medical problems, and there were no reported neurosensory deficits.

Table 1: Demographics and Clinical Characteristics of Patients

Variables	Findings
Age	28 years
Sex	Female
Medical History	Non-contributory; no systemic disease
Chief Complaint	Pain and recurrent food impaction associated with impacted mandibular third molar
Tooth Involved	Mandibular left third molar (#38)
Type of Impaction	Mesioangular impacted third molar
Preoperative Symptoms	Intermittent pain and mild pericoronitis

A panoramic radiograph showed a mesioangular third molar closely related to the mandibular canal. A more detailed cone beam computed tomography (CBCT) scan showed the third molar was in proximity to the Inferior Alveolar Canal (IAC) and that there was some evidence of loss of the bony walls of the canal but with no evidence of displacement of the canal.

Table 2: Pre-Operative Radiographic Assessment

Radiographic Parameters	Findings
Impaction Depth	Pell and Gregory Class II, Position B
Angulation	Mesioangular
Root Morphology	Fully formed bifurcated roots
Mandibular Canal Proximity	Close approximation to root apices
Canal Cortication	Partial loss of superior cortical border
CBCT Findings	Intimate contact between distal root and mandibular canal without canal displacement

The removal of the third molar was performed using a triangular mucoperiosteal flap, with a controlled osteotomy and sectioning of the tooth. The total time for the removal was 35 minutes. There were no intraoperative adverse incidents.

Table 3: Details of Surgical Procedures

Parameters	Observations
Type of Anesthesia	Inferior alveolar nerve block with buccal infiltration
Flap Design	Triangular mucoperiosteal flap
Osteotomy Performed	Yes
Tooth Sectioning	Yes
Surgical Duration (min)	35 minutes

Intraoperative Complications	No visible nerve exposure or excessive bleeding

The patient reported immediate postoperative left lower lip and mental nerve region numbness. There was marked reduction in light touch with loss of pin-prick and thermal sensations. The two-point discrimination was greater than 15mm. The sensory mapping correlated with the area of the inferior alveolar nerve.

Table 4: Examination of Neurological Senses After Surgery

Neurosensory Test	**Immediate Postoperative**	**1 Month**	**3 Months**	**6 Months**
Light Touch	Markedly reduced	Reduced	Mildly reduced	Normal
Pin-Prick Sensation	Absent	Reduced	Near normal	Normal
Two-Point Discrimination	>15 mm	12 mm	8 mm	5 mm
Thermal Sensitivity	Absent	Reduced	Mild impairment	Normal
Area of Numbness	Lower lip and chin region	Reduced area	Minimal residual area	Resolved

At one week post-op, there was no progression in the paresthesia. Symptomatic treatment was continued with the addition of corticosteroids and vitamin B complex. One month post-operatively, there was evidence of improvement in pin prick sensation and reduction in the area of perceived loss of the sensory response. There was also improvement in the thermal sensation.

Table 5: Results of Follow-Up Assessment and Clinical Outcome

Follow-Up Period	**Clinical Findings**	**Management**	**Outcomes**
Day 1	Numbness of left lower lip and chin	Corticosteroids, analgesics, vitamin B complex	Persistent paresthesia
Week 1	No worsening of symptoms	Continued medication and observation	Stable condition
Month 1	Partial sensory recovery	Continued vitamin supplementation	Improved sensation
Month 3	Significant reduction in numbness	Observation and neurosensory monitoring	Marked improvement
Month 6	Restoration of normal sensation	Follow-up only	Complete recovery

The results from a follow-up neurosensory test at three months showed that significant changes had occurred. Light touch sensation was slightly diminished, the pin prick response was nearly normal, and two-point discrimination was at the 8 mm level. The region of loss of sensation, previously much larger, had been restricted to a small area located on the lower lip.

By the half-year post-surgery marker, all signs of paresthesia were gone. Light touch sensation, pin prick response, two-point discrimination and thermal sensation were all fully recovered. Sensory mapping showed full recovery, and no neurosensory deficits were present. The patient felt that not only was sensation normal again, but they had regained the full functionality of the area in question.

Discussion

This case report outlines a new instance of inferior alveolar nerve (IAN) paresthesia occurring after third molar surgery, where full sensory recovery was noted at 6 months after surgery. Given the relative infrequency and generally good prognosis of

IAN paresthesia after wisdom tooth extraction, paresthesia is one of the main complications reported after third molar surgery (Oliveira-Santos et al., 2023). The recovery pattern of the present case is consistent with the temporary nature of IAN injuries and the spontaneous recovery of the IAN when the nerve has not sustained any injury (Tousi et al., 2025).

Another interesting observation was the proximity of the roots of the third molar to the mandibular canal in the available preoperative imaging. Many studies have demonstrated that a proximity of the roots of the third molar to the mandibular canal is one of the leading factors of a neurosensory injury (Khanna, 2020). Several studies have described patterns of the mandibular canal showing root darkening, interruption of canal cortication, and, in some instances, direct contact of the roots with the canal of the mandible. These patterns assessed in the imaging of the current case align with other studies which have contemporary risk assessment for IAN injury (Döhner et al., 2022).

There are many potential causes for IAN paresthesia, including nerve compression, traction, ischemia, oedema, and neuropraxia, which occur due to the rapid movement of tissue during the surgery (Mackinnon, 2026). In the present case, the lack of evidence for nerve exposure or transection combined with spontaneous full recovery implies the presence of a mild injury, and was likely a case of neuropraxia. In fact, recent literature states that cases of a neuropraxic injury demonstrate a good prognosis, as there is a spontaneous return of sensory functions over time (Tsao, 2019).

The use of cone-beam computed tomography (CBCT) prior to surgery was beneficial to the surgeon in that it provided the surgeon with the ability to visualize the proximity of the impacted tooth and the mandibular canal. Recent literature supports the use of CBCT in select, higher-risk cases. With the three-dimensional visualization provided by CBCT, a surgical team is better prepared and can facilitate risk-related discussions with patients (Todaro et al., 2023). Although the risk of nerve injury can never be eliminated during any surgical procedure, the use of CBCT is an example of good clinical judgment.

The combination of conservative treatment, including corticosteroids, neuropraxia management, and sensory follow-up, was effective in the case and led to the full resolution of symptoms. Systematic reviews performed recently have found that most cases of IAN injury resolve within three to six months of the surgery (De Boer et al., 2020). Unexpected but positive effects on nerve regeneration and injury resolution have been documented due to low-level laser therapy (Santamaria et al., 2020).

This case, from a clinical standpoint, illustrates the need for an exhaustive preoperative evaluation, careful surgical technique, fully informed consent, and vigilant postoperative care. For the management of patients and for their reassurance, the early recognition and recording of neurosensory deficits is important. This case is an example of the current consensus, which finds that a conservative approach to the management of inferior alveolar nerve deficits, following the surgical extraction of mandibular third molar teeth, is of considerable benefit to recovery.

Conclusion

This case report associates paresthesia of the inferior alveolar nerve with the removal of a mandibular third molar having a root closely related to the mandibular canal. Although this patient sustained a postoperative neurosensory impairment, the patient experienced a full return to normal sensation with a conservative approach and routine follow-ups. The case presents a variety of factors to be considered, including the importance of a complete preoperative radiographic assessment and the value of early detection of neurosensory impairment and routine neurosensory examinations. There is value in patient education regarding potential risks and conservative treatment options. Careful planning combined with an atraumatic tooth removal technique is the best way to reduce the risk of nerve injury and provide the best postoperative outcome.

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