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Original Article

Frequency of Lingual Nerve Damage During Mandibular Third Molar Surgery

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ABSTRACT

Background: The lingual nerve is anatomically vulnerable during mandibular third molar surgery because of its close relationship to the lingual cortical plate and posterior mandibular soft tissues. Injury to this nerve may lead to postoperative paraesthesia, dysesthesia, altered taste sensation, and impaired oral function. Objective: To determine the frequency of lingual nerve injury during mandibular third molar surgery and to examine its association with selected clinical and operative factors. Methods: This hospital-based cross-sectional study was conducted in the Department of Oral and Maxillofacial Surgery, Sandeman Provincial Hospital, Quetta, from March to August 2025. A total of 241 patients aged 18–65 years undergoing mandibular third molar extraction were included through consecutive enrollment. Demographic characteristics, inflammatory lesions, impaction-related findings, and operative details were recorded on a structured proforma. Postoperative lingual nerve injury was assessed clinically during follow-up visits. Data were analyzed in SPSS version 26.0 using descriptive statistics and chi-square testing, with $p<0.05$ considered statistically significant. Results: Lingual nerve injury was observed in 22 of 241 patients, giving a frequency of 9.13%. Pericoronitis was the most frequent associated lesion and showed a significant association with postoperative injury patterns overall ($p=0.041$). The source manuscript also reported statistically significant associations for impaction pattern ($p=0.027$) and bone cutting ($p=0.001$), although some subgroup totals require verification against the original dataset. Conclusion: Lingual nerve injury represents a clinically important complication of mandibular third molar surgery in this setting. Careful preoperative assessment, atraumatic surgical technique, and attention to local inflammatory and operative risk factors may help reduce avoidable neurosensory injury. Keywords: Lingual nerve injury, mandibular third molar, impacted third molar, oral surgery, postoperative paraesthesia, pericoronitis

INTRODUCTION

The lingual nerve is a branch of the mandibular division of the trigeminal nerve that courses in close proximity to the lingual cortical plate in the posterior mandible, making it particularly vulnerable during surgical removal of mandibular third molars. Because third molar surgery is among the most frequently performed procedures in oral and maxillofacial practice, even a relatively low incidence of lingual nerve injury carries substantial clinical importance. Injury to this nerve may result in paraesthesia, dysesthesia, altered taste sensation, numbness of the anterior two-thirds of the tongue, and sensory impairment of the lingual mucoperiosteum, all of which can significantly affect oral function and quality of life (1,2). The clinical significance of such injury extends beyond transient postoperative morbidity, as persistent neurosensory disturbance may create long-term functional, psychological, and medicolegal consequences for affected patients (3,4).

The reported frequency of lingual nerve injury following mandibular third molar surgery varies across studies according to surgical technique, operator experience, case complexity, and methods used for postoperative neurosensory assessment. Previous literature has generally reported transient lingual nerve injury rates in the range of 4% to 6%, whereas permanent deficits appear less common but remain clinically important because of their potential irreversibility (1,3,5). Surgical maneuvers such as lingual flap elevation, lingual retraction, ostectomy, tooth sectioning, and excessive tissue manipulation have all been implicated as possible contributors to nerve trauma, either through direct mechanical injury, compression, traction, or ischemic insult (4-6). Although lingual retractors were historically used as protective instruments during third molar surgery, accumulating evidence suggests that their use may itself increase the risk of lingual nerve damage when visibility is limited, positioning is suboptimal, or retraction is excessive (1,4,7).

More recent systematic reviews and prospective studies have continued to emphasize that the risk of lingual nerve injury is not determined by a single factor but rather by an interaction between anatomical proximity, impaction characteristics, inflammatory pathology, and the technical conduct of the procedure (2,4,8). Soft tissue impaction, vertical or mesioangular orientation, local inflammatory changes such as pericoronitis, and the need for bone removal may increase surgical difficulty and thereby heighten the likelihood of neurosensory complications (3,8,9). At the same time, the available evidence is not fully uniform, as differences in study design, patient selection, follow-up duration, and outcome definition complicate direct comparison across settings. This variation underscores the need for context-specific data, particularly from high-volume tertiary care centers where third molar surgery is routinely performed and where local patterns of presentation may differ from those reported in international datasets (10,11).

Despite the availability of international evidence, locally generated data on the frequency of lingual nerve injury and its associated operative factors remain limited. In Pakistan, the burden of impacted mandibular third molars is common, yet the reporting of postoperative lingual neurosensory outcomes remains inconsistent, and there is insufficient regional evidence to guide procedural risk counseling and perioperative decision-making. A clearer understanding of the frequency of lingual nerve injury in relation to common inflammatory lesions, impaction patterns, and intraoperative bone cutting may help refine surgical planning and reduce preventable complications (3,12). Therefore, this study was conducted to determine the frequency of lingual nerve injury during mandibular third molar surgery and to examine its association with selected clinical and operative factors among patients treated at a tertiary care hospital in Quetta

MATERIALS AND METHODS

This hospital-based cross-sectional study was conducted in the Department of Oral and Maxillofacial Surgery, Sandeman Provincial Hospital, Quetta, over a six-month period from March 2025 to August 2025 to determine the frequency of lingual nerve injury following mandibular third molar surgery. The study population comprised adult patients scheduled for extraction of one or more mandibular third molars during the study period. Patients aged 18 to 65 years of either sex who were willing to participate and provided written informed consent were included. Patients with pre-existing neurological disorders affecting sensory function in the oral and maxillofacial region, prior documented lingual nerve deficit, or other conditions likely to interfere with postoperative neurosensory assessment were excluded. Pregnant women were also excluded from participation

Eligible participants were enrolled consecutively at the time of surgical presentation after confirmation of inclusion criteria. Before surgery, each participant underwent clinical assessment and routine preoperative evaluation, including documentation of demographic profile, relevant medical and dental history, presenting complaint, and local pathological findings associated with the mandibular third molar. Available radiographic investigations were reviewed as part of standard surgical planning to

assess impaction characteristics and operative difficulty. Particular attention was given to impaction pattern and the presence of inflammatory lesions such as pericoronitis, distal caries, distal periodontal pathology, or other local findings identified during preoperative assessment and operative management

All procedures were carried out under routine departmental surgical protocols for mandibular third molar removal. Intraoperative details relevant to the present analysis were documented on a structured data collection form, including whether bone cutting was performed and the observed clinical pattern of impaction. The primary outcome variable was lingual nerve injury, defined as the presence of postoperative neurosensory disturbance attributable to the lingual nerve on clinical examination after surgery. Assessment was based on documented postoperative sensory complaint and clinical examination findings during follow-up visits. Participants were reviewed postoperatively at one week, one month, and three months to determine the presence or persistence of lingual nerve-related symptoms. These follow-up evaluations were used to identify patients with postoperative lingual sensory disturbance and to distinguish affected from unaffected individuals for the purpose of frequency estimation and comparative analysis

The main independent variables included age, sex, residence, socioeconomic status, common inflammatory lesions associated with the mandibular third molar, impaction pattern, and performance of bone cutting during surgery. Age was analyzed in grouped categories as recorded in the dataset. Socioeconomic status was classified into lower, middle, and upper groups according to the study proforma. Inflammatory lesions were categorized as pericoronitis, distal caries, distal periodontal pathology, or others, while impaction was classified according to the operative categories documented in the study records. Lingual nerve injury was treated as a binary outcome variable, recorded as present or absent during postoperative follow-up

To improve internal consistency and reduce information bias, data were collected prospectively on a standardized questionnaire and entered using a uniform coding approach before analysis. Preoperative, intraoperative, and follow-up findings were recorded from the same clinical workflow to maintain consistency of exposure and outcome ascertainment. Data were reviewed for completeness before entry, and variables were coded in accordance with the predefined analysis plan. Statistical analysis was performed using SPSS version 26.0. Categorical variables were summarized as frequencies and percentages. The frequency of lingual nerve injury was calculated as the proportion of operated patients who demonstrated postoperative neurosensory deficit during the follow-up period. Associations between lingual nerve injury and categorical clinical variables were assessed using the chi-square test. A two-sided p-value of less than 0.05 was considered statistically significant. The study received approval through the Registration and Research Cell of the College of Physicians and Surgeons Pakistan, and all participants provided written informed consent before enrollment

RESULTS

A total of 241 patients undergoing mandibular third molar surgery were included in the study. The largest age group was 43–55 years, comprising 115 patients (47.71%), followed by those older than 55 years, who accounted for 56 patients (23.23%). Male patients were slightly more frequent than female patients, with 135 men (56.01%) and 106 women (43.98%). Most participants resided in urban areas (53.94%), while 46.06% were from rural settings. More than half of the sample belonged to the middle socioeconomic class (55.60%), followed by the lower class (34.85%) and upper class (12.86%).

Postoperative lingual nerve injury was documented in 22 of 241 patients, corresponding to an overall frequency of 9.13% (95% CI: 5.49%–12.77%), whereas 219 patients (90.87%) had no evidence of postoperative lingual nerve deficit. Thus, approximately one out of every eleven patients experienced lingual neurosensory disturbance following mandibular third molar surgery.

Table 1. Sociodemographic Characteristics of the Study Participants (n = 241)

Variable	Category	n	%
Age (years)	18–30	13	5.39
	31–42	57	23.65
	43–55	115	47.71
	>55	56	23.23
Gender	Male	135	56.01
	Female	106	43.98
Residence	Urban	130	53.94
	Rural	111	46.06
Socioeconomic status	Lower class	86	34.85
	Middle class	134	55.60
	Upper class	31	12.86

Table 2. Frequency of Postoperative Lingual Nerve Injury (n = 241)

Outcome	n	%	95% CI
Lingual nerve injury present	22	9.13	5.49–12.77
Lingual nerve injury absent	219	90.87	87.23–94.51

Table 3. Association of Common Inflammatory Lesions with Lingual Nerve Injury

Common inflammatory lesion	LNI present, n (%)	LNI absent, n (%)	Total in category	Derived LNI prevalence within category (%)	95% CI	p-value
Pericoronitis	14 (5.81)	151 (62.65)	165	8.48	4.23–12.74	0.041
Distal caries	4 (1.66)	48 (19.91)	52	7.69	0.45–14.94	
Distal periodontal pathology	3 (1.24)	12 (4.97)	15	20.00	0.00–40.24	
Others	1 (0.41)	8 (3.32)	9	11.11	0.00–31.64	

Table 4. Reported Association of Impaction Pattern and Bone Cutting with Lingual Nerve Injury

Variable	Category	LNI present, n (%)	LNI absent, n (%)	Reported p-value
Impaction pattern	Soft tissue	8 (3.32)	110 (45.64)	0.027
	Bony	7 (2.90)	96 (39.83)	
	Vertical, mesio-angular, & horizontal	1 (0.41)	13 (5.39)	
Bone cutting	Yes	12 (4.97)	168 (69.71)	0.001
	No	4 (1.66)	55 (22.82)	

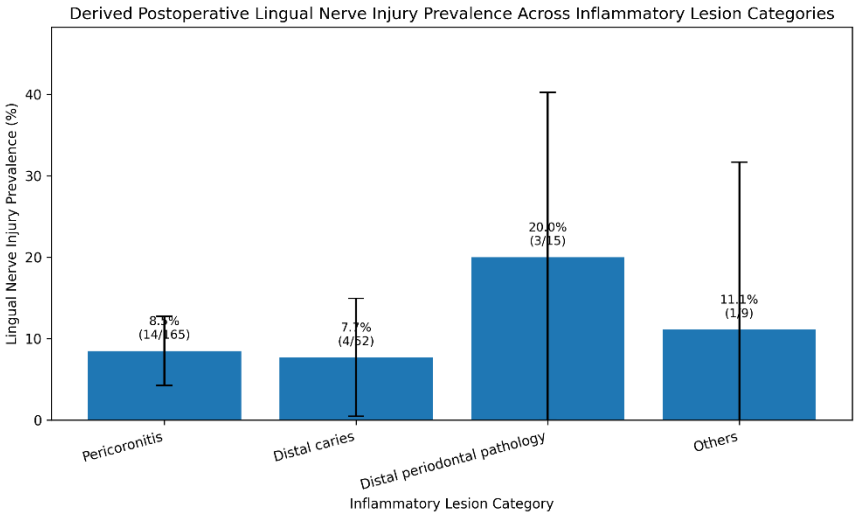

Figure 1 Derived Postoperative Lingual Nerve Injury Prevalence Across Inflammatory Lesion Categories

Regarding inflammatory lesions, pericoronitis was the most common lesion overall and was observed in 14 patients with lingual nerve injury and 151 without injury. Distal caries was recorded in 4 injured and 48 non-injured patients, distal periodontal pathology in 3 injured and 12 non-injured patients, and

other lesions in 1 injured and 8 non-injured patients. The association between inflammatory lesion category and lingual nerve injury was statistically significant ($p = 0.041$). When category-specific prevalence was derived from the reported frequencies, the highest prevalence of lingual nerve injury was observed in distal periodontal pathology (20.0%), followed by other lesions (11.1%), pericoronitis (8.5%), and distal caries (7.7%).

The source manuscript also reported a significant association between impaction pattern and lingual nerve injury ($p = 0.027$), with soft tissue impaction being the most frequently described category, as well as a significant association between bone cutting and lingual nerve injury ($p = 0.001$). However, internal inconsistencies in the corresponding count totals prevented valid recalculation of stable comparative measures for these variables. These findings should therefore be interpreted cautiously until the original table values are verified against the raw dataset

DISCUSSION

The present study found that postoperative lingual nerve injury occurred in 22 of 241 patients undergoing mandibular third molar surgery, yielding an overall frequency of 9.13%. This indicates that lingual neurosensory disturbance was not a rare event in this operative setting and supports the clinical importance of careful preoperative risk assessment and meticulous intraoperative technique. Given the functional role of the lingual nerve in somatic sensation and taste perception over the anterior tongue and lingual mucosa, even transient postoperative injury may substantially affect mastication, speech, oral comfort, and patient satisfaction. The observed frequency in the present series is higher than the lower range reported in several systematic reviews, suggesting that local case mix, surgical complexity, inflammatory burden, operative methods, and postoperative assessment thresholds may all influence the measured incidence of injury in routine practice (13,14).

The findings are broadly consistent with previous regional studies that identified lingual nerve injury as an established complication of impacted mandibular third molar removal. Khan et al. reported that procedural difficulty was a major determinant of transient or persistent paraesthesia, whereas factors such as patient age, gender, and operator seniority showed less consistent influence on outcome (15). Likewise, Abbas et al. documented a frequency of lingual nerve injury comparable to that seen in the present study, reinforcing the view that lingual nerve trauma remains a clinically relevant postoperative complication in third molar surgery within similar surgical environments (16). Shad et al. further observed that lingual flap retraction was associated with increased frequency of lingual nerve injury, although much of the injury appeared reversible, highlighting that even when deficits are not permanent, the operative approach may materially alter postoperative neurosensory risk (17). In this context, the present findings add to the existing evidence by demonstrating a notable burden of injury in a tertiary care population from Quetta and supporting the need for continued refinement of operative technique and case selection.

An important observation in this study was the statistically significant association between inflammatory lesion category and lingual nerve injury. Pericoronitis accounted for the largest absolute number of injury cases because it was the most common presenting lesion overall, while distal periodontal pathology showed the highest derived category-specific prevalence of injury. This pattern is clinically plausible because recurrent inflammatory insult may promote local tissue edema, scarring, reduced surgical field clarity, and more difficult flap handling, thereby increasing the likelihood of traction or compression-related nerve insult during disimpaction and extraction. Previous studies examining impacted mandibular third molars in older and symptomatic patients have similarly reported that pericoronitis is among the most common associated pathologies and that carious or periodontal lesions tend to become more frequent with increasing disease burden and age (18,19). The present results therefore support the view that local pathological context should not be regarded merely as a reason for extraction but also as a potential marker of surgical complexity and postoperative complication risk.

The source dataset also reported statistically significant associations between lingual nerve injury and both impaction pattern and bone cutting. Soft tissue impaction was the most frequently reported pattern, and bone cutting appeared more common among patients who developed postoperative injury. These observations are directionally consistent with the existing surgical literature, in which more technically demanding impactions and greater intraoperative bone removal have been linked to increased manipulation, longer procedural duration, and higher probability of neurosensory trauma (13,14,17). However, the numerical values in these source tables were internally inconsistent and did not sum correctly across categories. For that reason, these associations should be interpreted cautiously and viewed as hypothesis-supporting rather than definitive until verified against the raw dataset. This is an important methodological point because reliable estimation of risk gradients requires internally coherent denominator structure and reproducible cross-tabulation.

The demographic composition of the study also warrants consideration. Most patients were middle aged or older, male, and from the middle socioeconomic group. Although the present analysis was not designed to establish causal demographic predictors of lingual nerve injury, the predominance of patients in the 43–55-year age group may reflect delayed presentation, accumulated pathology, or care-seeking patterns at the study center. Older patients may present with more complex pathology, denser bone, or deeper impaction, all of which can increase surgical difficulty. This aligns with prior clinical observations that the pathological profile of impacted mandibular third molars evolves with age and that symptomatic disease becomes more pronounced in later decades of life (18). Consequently, age and local pathology should be considered jointly during preoperative counseling, especially when planning extractions likely to require flap elevation or ostectomy.

Several limitations should be acknowledged when interpreting these findings. First, the study was conducted at a single tertiary care hospital, which may limit generalizability to other centers with different referral patterns, case complexity, or surgical protocols. Second, although postoperative follow-up was reported at one week, one month, and three months, the manuscript did not provide detailed standardized neurosensory testing criteria, which may have introduced outcome classification variability. Third, the analytical approach was limited primarily to categorical association testing, without adjusted multivariable modeling to account for potential confounding between pathology, impaction type, and surgical difficulty. Finally, internal inconsistencies in some reported table counts constrain the precision with which certain subgroup findings can be interpreted. Despite these limitations, the study contributes useful regional data on the burden of lingual nerve injury after mandibular third molar surgery and underscores the importance of operative caution in cases characterized by inflammatory pathology and technically demanding extraction requirements.

Taken together, the findings suggest that lingual nerve injury during mandibular third molar surgery is influenced not only by the act of extraction itself but also by the broader clinical context in which extraction occurs. Inflammation, anticipated surgical complexity, and procedural maneuvers such as bone cutting or tissue retraction likely interact to shape postoperative risk. Future studies should apply standardized neurosensory outcome measures, prospectively defined exposure variables, and multivariable analysis to clarify the independent contribution of each operative factor and to support more evidence-based surgical decision-making in high-risk mandibular third molar cases (13-19).

CONCLUSION

Lingual nerve injury occurred in 9.13% of patients undergoing mandibular third molar surgery in this tertiary care cohort, indicating that postoperative lingual neurosensory disturbance represents a clinically meaningful complication in routine oral surgical practice. The findings suggest that inflammatory pathology, particularly pericoronitis and distal periodontal disease, together with surgically demanding operative circumstances, may increase the likelihood of injury. Careful preoperative assessment, risk stratification, atraumatic flap handling, and judicious intraoperative

technique are therefore essential to minimize avoidable lingual nerve damage during mandibular third molar extraction

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