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Original Article

Retained Wisdom Tooth Root Fragment Versus Complete Extraction for Preventing Inferior Alveolar Nerve Injury in High-Risk Patients

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ABSTRACT

Background: Inferior alveolar nerve disturbance remains an important complication of mandibular third molar surgery, particularly when preoperative imaging shows close proximity between the roots and mandibular canal. Coronectomy, involving removal of the crown while retaining a healthy apical root fragment, may reduce nerve trauma by avoiding apical manipulation in high-risk cases. **Objective:** To compare coronectomy with complete surgical extraction for reducing short-term inferior alveolar nerve disturbance in patients with radiographically high-risk mandibular third molars. **Methods:** A parallel-group randomized controlled trial was conducted in the Islamabad–Rawalpindi region over five months. Seventy-two adults aged 18–40 years with impacted mandibular third molars showing radiographic proximity to the inferior alveolar canal were randomized equally to coronectomy or complete extraction. Neurosensory function was assessed using light-touch and two-point discrimination testing at baseline, 1 week, 4 weeks, and 8 weeks. Pain, facial swelling, and infection were also recorded. **Results:** Sixty-seven participants completed follow-up, including 33 in the coronectomy group and 34 in the complete extraction group. At 8 weeks, inferior alveolar nerve disturbance was lower after coronectomy than complete extraction, 6.1% versus 23.5% ($p=0.041$). Two-point discrimination was also better after coronectomy, 5.2 ± 1.1 mm versus 6.8 ± 1.5 mm ($p<0.001$). Early postoperative pain and swelling were significantly lower in the coronectomy group, while infection rates did not differ significantly. **Conclusion:** Coronectomy reduced short-term inferior alveolar nerve disturbance and improved early postoperative recovery compared with complete extraction in selected high-risk mandibular third molars. **Keywords:** Coronectomy; Inferior Alveolar Nerve; Mandibular Third Molar; Nerve Injury; Oral Surgery; Randomized Controlled Trial; Tooth Extraction.

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INTRODUCTION

Surgical removal of impacted mandibular third molars remains one of the most common procedures in oral and maxillofacial practice, yet it continues to carry a clinically important risk of inferior alveolar nerve injury, particularly when the roots are anatomically close to the mandibular canal (1). Injury to this nerve may produce altered sensation, numbness, dysesthesia, paresthesia, or persistent neurosensory disturbance involving the lower lip, chin, and mandibular dentition, with consequences that may affect oral function, patient comfort, quality of life, and medico-legal outcomes (2). Although many postoperative sensory disturbances are transient, the possibility of prolonged or permanent deficit makes risk reduction a central priority when planning surgery for mandibular third molars with radiographic signs of close nerve proximity (3).

Complete surgical extraction has traditionally been regarded as the definitive management strategy for impacted mandibular third molars because it removes the entire tooth and eliminates the future risk of recurrent pericoronitis, odontogenic infection, cystic change, and other tooth-related pathology (4).

However, in patients whose preoperative imaging demonstrates high-risk features such as darkening of the roots, interruption of the mandibular canal cortex, narrowing of the canal, root deflection, or intimate root-canal overlap, complete removal may require apical manipulation close to the inferior alveolar neurovascular bundle. In such cases, the same procedure intended to definitively resolve the dental problem may increase the probability of mechanical compression, traction, ischemic insult, or direct nerve trauma during luxation and root delivery (5).

Coronectomy, also described as intentional partial odontectomy or planned retention of a healthy apical root fragment, has emerged as a conservative alternative for selected high-risk mandibular third molars. The biological rationale is that removal of the crown eliminates the eruptive or pericoronal component of the tooth while avoiding unnecessary disturbance of the apical root portion that lies closest to the inferior alveolar canal. When the retained root fragment is non-mobile, pathology-free, and positioned below the alveolar crest, this approach may reduce the need for aggressive root elevation and thereby decrease the risk of inferior alveolar nerve injury (6). Nevertheless, coronectomy is not free from concern, because retained roots may migrate, become infected, require secondary surgery, or create uncertainty during long-term follow-up, making careful patient selection and informed consent essential (7).

Existing evidence suggests that conservative root-retention approaches may reduce neurosensory complications in anatomically high-risk cases, but the strength of the evidence remains limited by variation in study design, surgical technique, imaging criteria, outcome definitions, and follow-up duration (8). Many available studies are observational, include heterogeneous patient populations, or lack standardized neurosensory testing, which restricts the certainty with which clinicians can compare coronectomy with complete extraction. In addition, studies often differ in whether they define nerve injury using patient-reported symptoms, objective sensory testing, or combined clinical criteria, creating difficulty in translating findings into routine surgical decision-making (9).

The clinical decision is therefore best framed using a patient-centered PICO approach. In adults with impacted mandibular third molars judged to be at high risk for inferior alveolar nerve injury on radiographic assessment, the relevant intervention is planned coronectomy with retention of a healthy apical root fragment, the comparator is conventional complete surgical extraction, and the principal outcome is postoperative inferior alveolar nerve disturbance assessed through standardized neurosensory evaluation. Secondary outcomes such as pain, swelling, infection, and need for re-intervention are also important because the value of nerve preservation must be balanced against postoperative morbidity and the safety of retained roots.

The key knowledge gap is the limited availability of randomized comparative evidence evaluating whether coronectomy provides measurable short-term neurosensory benefit over complete extraction in clearly defined high-risk patients. Addressing this gap is clinically important because surgeons and patients must weigh the immediate benefit of nerve protection against the potential future risks associated with retained root fragments. Therefore, the present randomized controlled trial was designed to evaluate whether planned retention of a healthy root fragment through coronectomy reduces the incidence of short-term inferior alveolar nerve disturbance compared with complete surgical extraction in patients with radiographically high-risk mandibular third molars. The study further assesses early postoperative recovery outcomes, including pain, swelling, infection, and neurosensory improvement over time, to determine whether coronectomy offers a safer and clinically acceptable alternative in selected high-risk cases (10).

MATERIALS AND METHODS

A parallel-group randomized controlled trial was conducted in the Islamabad–Rawalpindi region to compare coronectomy with complete surgical extraction for reducing inferior alveolar nerve disturbance in patients with radiographically high-risk mandibular third molars. The trial was carried

out over five months, from April 2025 to August 2025 , including participant recruitment, surgical intervention, postoperative monitoring, and final outcome assessment. The intervention was performed as a single-session surgical procedure, and participants were followed for 8 weeks after surgery to evaluate neurosensory recovery and early postoperative morbidity.

Adult patients aged 18–40 years presenting with impacted mandibular third molars were assessed for eligibility. Participants were included when preoperative radiographic evaluation demonstrated close anatomical proximity between the mandibular third molar roots and the inferior alveolar canal, including signs such as darkening of the roots or interruption of the canal cortex. Patients were excluded if they had active odontogenic infection, cystic or neoplastic pathology associated with the tooth, systemic conditions likely to impair healing, previous mandibular nerve injury, or pregnancy. Eligible participants were recruited from clinical dental settings in the study region, and informed consent was obtained before enrollment.

A total of 94 patients were screened, of whom 72 fulfilled the eligibility criteria and were randomized in a 1:1 ratio into two treatment groups. Thirty-six participants were allocated to the coronectomy group and 36 to the complete extraction group. Randomization was performed using a computer-generated random sequence. Allocation concealment was maintained through sequentially numbered, sealed, opaque envelopes that were opened at the time of surgery. Because of the procedural nature of the interventions, blinding of the operating surgeon was not feasible; however, postoperative neurosensory assessment was performed by outcome assessors who were blinded to group allocation to reduce detection bias.

In the intervention group, coronectomy was performed by removing the crown of the impacted mandibular third molar while intentionally retaining the apical root fragment in situ. The retained root portion was kept at least 3 mm below the alveolar crest and was required to be free from mobility and visible pathology. In the control group, conventional complete surgical extraction was performed with removal of the entire tooth. All procedures were conducted under local anesthesia by experienced oral surgeons using a standardized surgical protocol that included mucoperiosteal flap elevation, bone removal where required, tooth sectioning as clinically indicated, copious irrigation, and wound closure. Postoperative management was standardized for both groups and included analgesics, antibiotics, and oral hygiene instructions.

The primary outcome was postoperative inferior alveolar nerve disturbance assessed through standardized neurosensory testing. Sensory function was evaluated at baseline and again at 1 week, 4 weeks, and 8 weeks after surgery. Clinical assessment included light-touch discrimination and two-point discrimination testing, with measurements recorded consistently across follow-up visits. The principal endpoint was the presence of inferior alveolar nerve disturbance at 8 weeks. Change in two-point discrimination over time was also evaluated as a continuous neurosensory recovery measure.

Secondary outcomes included postoperative pain, facial swelling, infection, and need for re-intervention. Pain intensity was measured using a Visual Analog Scale, while facial swelling was assessed using standardized facial measurements during early postoperative follow-up. Infective complications were identified clinically based on postoperative signs requiring additional management. Re-intervention was recorded if further surgical or clinical treatment was required because of retained root complications or postoperative morbidity.

Bias control was addressed through random allocation, concealed group assignment, standardized eligibility criteria, uniform surgical and postoperative protocols, and blinded outcome assessment. Baseline demographic and clinical variables were collected to assess comparability between groups, including age, sex, preoperative radiographic nerve proximity signs, and baseline pain score. Participants were monitored through scheduled follow-up visits, and adherence was assessed using attendance records and clinical documentation. Attrition was recorded with reasons for loss to follow-up.

Sample size was determined before recruitment using evidence from previous interventional studies evaluating inferior alveolar nerve injury in high-risk mandibular third molar surgery. The planned sample of 72 participants allowed equal allocation between groups and included allowance for potential loss to follow-up while maintaining adequate power to detect a clinically meaningful difference in neurosensory outcomes between coronectomy and complete extraction.

Data were entered into a structured database and checked for completeness, consistency, and range errors before analysis. Continuous variables were summarized using means and standard deviations, while categorical variables were presented as frequencies and percentages. Normality of continuous data was assessed using the Shapiro–Wilk test. Between-group comparisons for continuous outcomes were conducted using independent-samples t-tests, and within-group changes over time were assessed using paired t-tests. Repeated measures analysis of variance was used to evaluate changes in neurosensory outcomes across baseline, 1-week, 4-week, and 8-week assessments, including time effects, group effects, and time-by-group interaction. Categorical outcomes, including inferior alveolar nerve disturbance and infection, were compared between groups using appropriate tests for proportions. Pearson correlation analysis was performed to examine the relationship between surgical variables and neurosensory outcomes. Statistical significance was set at $p<0.05$.

Of the 72 randomized participants, 67 completed the 8-week follow-up and were included in the final outcome analysis, comprising 33 participants in the coronectomy group and 34 in the complete extraction group. Five participants were lost during follow-up, including three from the coronectomy group and two from the complete extraction group. Missing outcome data were handled by documenting attrition and analyzing available follow-up data. Data integrity was supported through standardized case-record documentation, consistent timing of outcome assessment, blinded neurosensory evaluation, and uniform statistical procedures across both treatment groups.

RESULTS

A total of 94 patients were assessed for eligibility during the recruitment period. Of these, 72 patients fulfilled the inclusion criteria and were randomized equally into the coronectomy group and complete extraction group, with 36 participants assigned to each arm. During follow-up, five participants were lost: three from the coronectomy group and two from the complete extraction group. The final analyzed sample included 67 participants, comprising 33 in the coronectomy group and 34 in the complete extraction group.

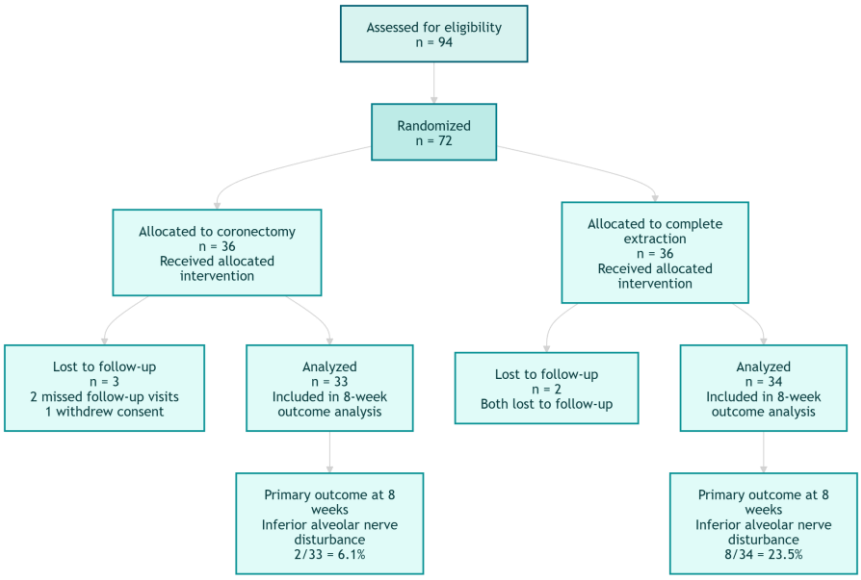

Figure 1. CONSORT Flow Diagram of Participant Screening, Randomization, Follow-Up, and Analysis

The CONSORT flow diagram summarizes participant progression through the randomized controlled trial. A total of 94 patients were assessed for eligibility, of whom 72 met the inclusion criteria and were randomized equally to coronectomy or complete extraction, with 36 participants in each group. During follow-up, 3 participants were lost from the coronectomy group and 2 from the complete extraction group, leaving 33 and 34 participants, respectively, for the final 8-week analysis. At the primary endpoint, inferior alveolar nerve disturbance occurred in 2 of 33 participants in the coronectomy group and 8 of 34 participants in the complete extraction group.

Baseline demographic and clinical characteristics were comparable between groups. The mean age of the total randomized sample was 27.8 ± 5.4 years, with similar mean ages in the coronectomy group and complete extraction group, 28.1 ± 5.2 years and 27.5 ± 5.6 years, respectively. Both groups had identical sex distribution, with 19 males and 17 females in each arm. All randomized participants demonstrated preoperative radiographic signs of close proximity between the mandibular third molar roots and the inferior alveolar canal. Baseline pain scores were also similar between groups, with mean Visual Analog Scale scores of 2.0 ± 0.8 in the coronectomy group and 2.2 ± 1.0 in the complete extraction group.

Table 1. Baseline Demographic and Clinical Characteristics of Randomized Participants

Variable	Total Sample (N=72)	Coronectomy (n=36)	Complete Extraction (n=36)	p-value
Age, years	27.8 ± 5.4	28.1 ± 5.2	27.5 ± 5.6	0.64
Male sex, n (%)	38 (52.8%)	19 (52.8%)	19 (52.8%)	1.00
Female sex, n (%)	34 (47.2%)	17 (47.2%)	17 (47.2%)	1.00
Preoperative nerve proximity signs, n (%)	72 (100%)	36 (100%)	36 (100%)	—
Baseline VAS pain score	2.1 ± 0.9	2.0 ± 0.8	2.2 ± 1.0	0.48

At the final 8-week assessment, inferior alveolar nerve disturbance was observed in 2 of 33 participants in the coronectomy group and 8 of 34 participants in the complete extraction group. This corresponded to event rates of 6.1% and 23.5%, respectively. The absolute difference between groups was −17.4 percentage points, with a 95% confidence interval from −32.8 to −2.1, indicating a significantly lower incidence of postoperative nerve disturbance in the coronectomy group. Two-point discrimination at 8 weeks was also more favorable after coronectomy, with a mean value of 5.2 ± 1.1 mm compared with 6.8 ± 1.5 mm after complete extraction. The between-group mean difference was −1.6 mm, with a 95% confidence interval from −2.2 to −1.0, and the difference was statistically significant.

Table 2. Primary Outcomes at 8 Weeks in the Final Analyzed Sample

Outcome	Coronectomy (n=33)	Complete Extraction (n=34)	Effect Estimate (95% CI)	p-value
Inferior alveolar nerve disturbance, n (%)	2 (6.1%)	8 (23.5%)	Absolute difference: −17.4% (−32.8 to −2.1)	0.041
Two-point discrimination, mm	5.2 ± 1.1	6.8 ± 1.5	Mean difference: −1.6 mm (−2.2 to −1.0)	<0.001

Longitudinal neurosensory assessment showed improvement in two-point discrimination over time, with a stronger recovery pattern in the coronectomy group. In the coronectomy group, mean two-point discrimination improved from 7.1 ± 1.3 mm at baseline to 5.2 ± 1.1 mm at 8 weeks, representing a mean reduction of 1.9 mm. In the complete extraction group, the corresponding change was smaller, from 7.0 ± 1.4 mm at baseline to 6.8 ± 1.5 mm at 8 weeks, representing a mean reduction of 0.2 mm. Within-group improvement was statistically significant in both groups, but the magnitude of improvement was substantially greater after coronectomy. Repeated measures analysis demonstrated a significant time effect, group effect, and time-by-group interaction, indicating that the pattern of neurosensory recovery differed significantly between treatment groups.

Table 3. Longitudinal Change in Two-Point Discrimination

Outcome	Group	Baseline	8 Weeks	Within-Group Change	p-value
Two-point discrimination, mm	Coronectomy	7.1 ± 1.3	5.2 ± 1.1	−1.9 mm	<0.001
Two-point discrimination, mm	Complete Extraction	7.0 ± 1.4	6.8 ± 1.5	−0.2 mm	0.041

Table 4. Repeated Measures Analysis of Neurosensory Recovery

Analysis Component	Test Statistic	p-value
Time effect	F=18.6	<0.001
Group effect	F=6.2	0.015
Time × group interaction	F=5.8	0.004

The significant time-by-group interaction showed that the coronectomy group experienced a more pronounced improvement in neurosensory function across the postoperative period than the complete extraction group.

Secondary outcomes favored coronectomy during early postoperative recovery. At 1 week, mean VAS pain score was 3.4 ± 1.2 in the coronectomy group compared with 4.6 ± 1.5 in the complete extraction group, giving a statistically significant between-group difference. Facial swelling was also lower after coronectomy, with mean swelling of 8.2 ± 2.1 mm compared with 10.5 ± 2.8 mm after complete extraction. Infection occurred in 1 participant in the coronectomy group and 2 participants in the complete extraction group, corresponding to rates of 3.0% and 5.9%, respectively, with no statistically significant between-group difference. Surgical duration showed a moderate positive correlation with postoperative nerve disturbance, with r=0.42 and p=0.002, indicating that longer procedures were associated with greater neurosensory disturbance.

Table 5. Secondary Outcomes and Association With Surgical Duration

Outcome	Coronectomy	Complete Extraction	Effect Estimate / Association	p-value
VAS pain at 1 week	3.4 ± 1.2	4.6 ± 1.5	Mean difference: −1.2	0.002
Facial swelling at 1 week, mm	8.2 ± 2.1	10.5 ± 2.8	Mean difference: −2.3 mm	0.001
Infection, n (%)	1 (3.0%)	2 (5.9%)	Absolute difference: −2.9%	0.56
Surgical duration and nerve disturbance	—	—	Pearson r=0.42	0.002

Overall, coronectomy was associated with a lower 8-week incidence of inferior alveolar nerve disturbance, better two-point discrimination, and reduced early postoperative pain and swelling compared with complete extraction. Infection rates were low in both groups and did not differ significantly. The longitudinal neurosensory findings indicated that recovery was not only better at the final follow-up point but also followed a more favorable trajectory across time in the coronectomy group.

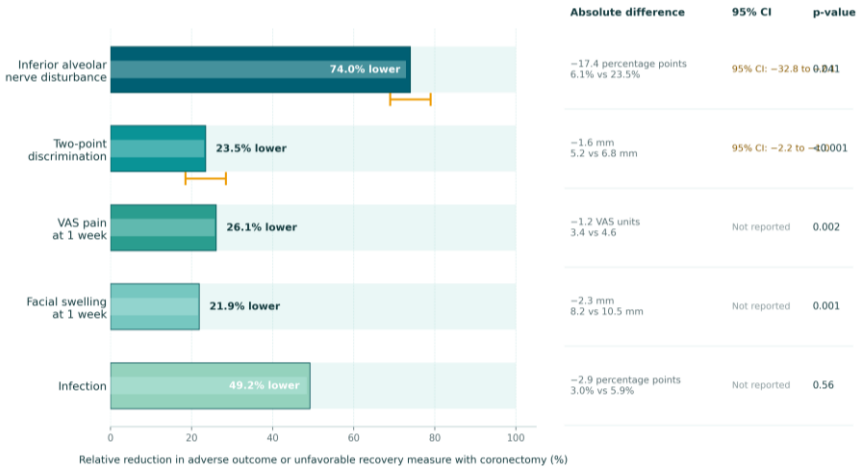

Figure 2. Clinical Benefit Gradient of Coronectomy Compared with Complete Extraction

The clinical benefit gradient showed the largest relative reduction with coronectomy for inferior alveolar nerve disturbance, which was 74.0% lower than complete extraction, corresponding to an absolute reduction of 17.4 percentage points at 8 weeks. Coronectomy also demonstrated favorable recovery differences in two-point discrimination, with a 23.5% relative reduction and a mean difference of −1.6 mm, alongside lower early postoperative pain and swelling by 26.1% and 21.9%, respectively. Infection was numerically lower in the coronectomy group by 49.2%, although this difference was not statistically

significant, indicating that the strongest clinically and statistically supported advantages were concentrated in neurosensory preservation and early postoperative recovery.

DISCUSSION

The present study demonstrated that coronectomy was associated with a lower incidence of inferior alveolar nerve disturbance than complete surgical extraction among patients with radiographically high-risk mandibular third molars. At 8 weeks, nerve disturbance occurred in 6.1% of patients treated with coronectomy compared with 23.5% of those undergoing complete extraction, representing an absolute reduction of 17.4 percentage points. This finding supports the biological rationale that avoiding manipulation of the apical root segment, particularly when it lies in close proximity to the inferior alveolar canal, can reduce mechanical traction, compression, or direct trauma to the neurovascular bundle during third molar surgery. The significant improvement in two-point discrimination in the coronectomy group further indicates that the benefit was not limited to a lower event count but also reflected better objective neurosensory recovery over the postoperative period (11).

The observed pattern of neurosensory recovery is clinically important because inferior alveolar nerve impairment after mandibular third molar surgery may range from transient altered sensation to persistent sensory dysfunction affecting the lower lip and chin. Although most neurosensory disturbances after third molar surgery improve over time, early postoperative deficits can cause patient anxiety, functional discomfort, and medicolegal concern. In this context, the lower 8-week incidence of nerve disturbance and the more favorable two-point discrimination values after coronectomy suggest that a conservative approach may offer meaningful short-term protection in carefully selected high-risk cases. The significant time-by-group interaction further strengthens this interpretation, showing that recovery trajectories differed between the two procedures rather than representing only a single end-point difference (12).

These findings are consistent with the concept that complete extraction, while definitive, may expose the inferior alveolar nerve to greater risk when the apical roots are anatomically close to the mandibular canal. During complete extraction, root elevation, sectioning, luxation, or apical delivery may transmit force to the canal region, particularly in cases with radiographic warning signs such as root darkening, canal interruption, or close root-canal overlap. Coronectomy modifies this risk profile by removing the crown while leaving the non-pathological apical root fragment undisturbed below the alveolar crest. This tissue-preserving strategy may therefore reduce surgical trauma in the region most vulnerable to nerve injury while still addressing the coronal component responsible for eruption-related or pericoronal symptoms (13).

The secondary outcomes also favored coronectomy during the early postoperative phase. At 1 week, patients in the coronectomy group reported lower pain scores and demonstrated less facial swelling than those in the complete extraction group. These differences likely reflect the reduced invasiveness of coronectomy, including less apical manipulation and potentially less extensive bone removal or root delivery. Although pain and swelling are expected to diminish as healing progresses, improved early recovery remains clinically relevant because it influences patient comfort, return to daily activities, analgesic needs, and overall satisfaction with treatment. The parallel improvement in both neurosensory and early morbidity outcomes suggests that coronectomy may provide a broader short-term recovery advantage beyond nerve preservation alone (14).

Infection rates were low in both groups, with no statistically significant difference between coronectomy and complete extraction. This finding suggests that short-term retention of a healthy, non-mobile, pathology-free root fragment did not produce an obvious increase in early infective complications when standardized surgical and postoperative protocols were followed. However, the interpretation of this safety outcome should remain cautious because infection and re-intervention are relatively infrequent events, and the 8-week follow-up period mainly captures early postoperative complications. Delayed root

migration, late infection, exposure of retained roots, and secondary surgical intervention require longer clinical and radiographic follow-up before the long-term safety profile of retained root fragments can be fully characterized (15).

The moderate positive correlation between surgical duration and nerve disturbance adds another clinically relevant dimension to the findings. Longer procedures may reflect more complex impactions, greater surgical difficulty, increased bone removal, prolonged tissue retraction, or more extensive manipulation near the mandibular canal. These factors can contribute to postoperative neurosensory disturbance independently of the assigned surgical technique. The association between operative duration and nerve disturbance therefore supports the importance of careful case selection, preoperative risk stratification, surgical efficiency, and operator experience when managing high-risk mandibular third molars. It also suggests that future analyses should consider surgical duration and impaction complexity as potential confounding or mediating factors in the relationship between treatment approach and neurosensory outcome (16).

The strengths of this study include its randomized controlled design, comparable baseline characteristics between groups, concealed allocation, standardized surgical management, and blinded neurosensory outcome assessment. The use of repeated follow-up intervals allowed evaluation of recovery over time rather than relying only on a final postoperative measurement. The inclusion of both categorical nerve disturbance and continuous two-point discrimination strengthened the clinical interpretation of neurosensory outcomes, while assessment of pain, swelling, and infection provided a more complete view of early postoperative recovery. These design features improve internal validity and support the reliability of the observed short-term differences between coronectomy and complete extraction (17).

Despite these strengths, several limitations should be considered when interpreting the findings. The final analyzed sample included 67 participants, and the number of nerve injury events was small, which may limit the precision of effect estimates. The follow-up period of 8 weeks was adequate for early neurosensory assessment but insufficient to determine whether retained root fragments remain stable over the long term or whether late complications emerge. Operator blinding was not feasible because of the nature of the surgical procedures, and subtle differences in surgical difficulty, root morphology, canal relationship, and individual healing response may have influenced outcomes. In addition, the findings apply most directly to selected patients with radiographically high-risk mandibular third molars and should not be generalized to all impacted third molars without similar anatomical risk features (18).

The clinical implications of these results support a selective rather than universal role for coronectomy. Complete extraction remains appropriate for many mandibular third molars, especially when roots are not closely related to the inferior alveolar canal or when pathology requires full removal. However, in patients with high-risk radiographic signs and healthy apical roots, coronectomy may represent a nerve-preserving alternative that reduces short-term neurosensory morbidity while maintaining acceptable early safety. The decision should be individualized through careful radiographic assessment, discussion of benefits and risks, and informed consent that explains both the potential reduction in nerve injury and the possibility of retained-root complications requiring future monitoring or intervention (19).

Future research should include larger multicenter randomized trials with longer follow-up periods to assess the durability of nerve protection and the long-term behavior of retained root fragments. Standardized definitions of inferior alveolar nerve disturbance, uniform neurosensory testing protocols, and inclusion of patient-reported sensory and quality-of-life outcomes would improve comparability across studies. Additional analyses incorporating impaction depth, angulation, canal relationship, root morphology, surgical duration, and imaging modality could help refine selection criteria and identify patients most likely to benefit from coronectomy. Long-term radiographic follow-up would also clarify the frequency and clinical relevance of root migration, exposure, infection, and secondary intervention (20).

Overall, the findings indicate that coronectomy provides a clinically meaningful short-term reduction in inferior alveolar nerve disturbance compared with complete extraction in selected high-risk mandibular third molar cases. The procedure was also associated with better two-point discrimination recovery and reduced early postoperative pain and swelling, without a significant increase in short-term infection. These results support coronectomy as a conservative, tissue-preserving option when the primary surgical priority is nerve protection, while emphasizing the need for continued follow-up to define retained-root safety and long-term patient-centered outcomes (21).

CONCLUSION

In selected patients with radiographically high-risk mandibular third molars, coronectomy with intentional retention of a healthy apical root fragment was associated with a significantly lower 8-week incidence of inferior alveolar nerve disturbance compared with complete surgical extraction. The coronectomy group also demonstrated better two-point discrimination recovery and reduced early postoperative pain and facial swelling, while short-term infection rates remained low and did not differ significantly between groups. These findings support coronectomy as a clinically useful, nerve-preserving alternative to complete extraction in carefully selected high-risk cases, provided that retained roots are healthy, stable, and appropriately monitored. Longer follow-up remains necessary to determine the durability of neurosensory protection and the long-term behavior of retained root fragments.

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