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Original Article

Midline mini-ıncision versus a modified open technique in open carpal tunnel release: A retrospective comparative cohort study

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Abstract

Aim: To compare the standard midline mini-incision with a modified open technique preserving superficial nerve branches in primary open carpal tunnel release (OCTR).

Materials and Methods: This retrospective cohort study included consecutive patients undergoing primary OCTR at one tertiary center between January 2021 and June 2024. Patients were grouped by technique: midline mini-incision (Group A, n = 36) or modified open technique (Group B, n = 32). The modified technique uses a curvilinear incision along the ulnar border of the thenar crease, layered dissection to identify and preserve superficial nerve branches, and a fascial flap covering the released canal. The primary outcome was pillar pain at 3 months. Secondary outcomes included Boston Carpal Tunnel Questionnaire (BCTQ) Symptom Severity Scale (SSS) and Functional Status Scale (FSS) scores, time to return to daily activities, wound complications, scar tenderness, grip strength recovery, and revision rates.

Results: Sixty-eight wrists in 62 patients were analyzed. Baseline characteristics and preoperative scores were comparable. Pillar pain at 3 months was lower in Group B (9.4% vs 33.3%; adjusted OR 0.21, 95% CI 0.05 – 0.84; p = 0.027). Both groups improved significantly in BCTQ-SSS and BCTQ-FSS. Postoperative BCTQ-SSS was lower in Group B (1.42 ± 0.38 vs 1.68 ± 0.51; p = 0.018), whereas BCTQ-FSS did not differ (1.34 ± 0.32 vs 1.45 ± 0.41; p = 0.216). Return to daily activities was faster in Group B (17.8 ± 5.9 vs 24.2 ± 7.5 days; p < 0.001), while operative time was shorter in Group A (8.4 ± 2.3 vs 15.1 ± 3.2 minutes; p < 0.001). Complication rates were comparable.

Conclusion: Both techniques provide safe and effective median nerve decompression. The modified technique was associated with less pillar pain, lower postoperative symptom severity, a trend toward reduced scar tenderness, and faster return to daily activities, whereas the midline mini-incision offers shorter operative time.

Keywords: Carpal tunnel syndrome; decompression; pain; median nerve

INTRODUCTION

Carpal tunnel syndrome (CTS) is the most prevalent compressive neuropathy of the upper extremity, affecting approximately 3 – 6% of the general adult population (1,2). When conservative management fails to provide adequate symptom relief, surgical decompression of the transverse carpal ligament remains the definitive treatment, with success rates exceeding 85 – 95% in well-selected patients (3).

Open carpal tunnel release (OCTR) has been the gold standard for surgical decompression and continues to be the most widely performed technique worldwide (4). Despite its well-established efficacy, the surgical approach—specifically the method of soft-tissue dissection, handling of superficial nerve branches, and the depth of the incision—remains a subject of ongoing investigation. Several technique modifications have been described to minimize postoperative morbidity, including, endoscopic approaches, variations in incision length, location, and the extent to which subcutaneous structures are preserved (5-9).

The standard midline mini-incision technique, popularized in the 1990s, offers direct visualization of the transverse carpal

ligament through a 2 – 3 cm longitudinal incision aligned with the axis of the ring finger (5,6). This approach typically involves sharp dissection straight down through subcutaneous fat and palmar fascia to expose the transverse carpal ligament. While favored for its simplicity and short operative time, this direct dissection may transect small superficial sensory nerve branches—including palmar cutaneous branches of the median and ulnar nerves—that cross the operative field. Injury to these branches is thought to contribute to postoperative scar pain, pillar pain, and scar tenderness, which are among the most common complaints following OCTR (10,11).

Modified open techniques that emphasize preservation of these superficial nerve branches have been proposed to reduce incision-related postoperative discomfort (12,13). These modifications may incorporate a curvilinear incision along the ulnar border of the thenar crease—which avoids the central weight-bearing surface of the palm—combined with careful layered dissection to identify and retract superficial skin nerves before dividing the transverse carpal ligament, and a fascial flap to provide soft-tissue coverage over the released canal. Siegmeth and Hopkinson-Woolley described a modified approach emphasizing nerve preservation and reported reduced scar tenderness compared with the standard technique (12). The rationale is that by avoiding a sharp, direct dissection through the subcutaneous plane, the surgeon can visualize and preserve small nerve fibers that would otherwise be inadvertently divided, while the ulnar incision placement and fascial flap coverage further reduce mechanical scar irritation, thereby decreasing the incidence and severity of postoperative scar pain.

Pillar pain—defined as tenderness over the thenar or hypothenar eminence following carpal tunnel release—occurs in 6 – 36% of patients and represents a significant cause of delayed functional recovery (10). Its etiology remains incompletely understood, but transection of superficial sensory nerve branches during dissection is thought to be a contributing factor, alongside incision placement over the palmar pillars and alteration of carpal arch mechanics (14,15).

Despite the theoretical advantages of nerve-sparing approaches, few studies have directly compared the standard midline mini-incision with a modified open technique emphasizing superficial nerve preservation, using validated patient-reported outcome measures. The aim of this study was to compare the clinical outcomes of these two techniques in primary OCTR, with a focus on pillar pain, scar pain, The Boston Carpal Tunnel Questionnaire scores (BCTQ), and time to return to daily activities.

MATERIALS AND METHODS

Study Design and Setting

This was a retrospective comparative cohort study conducted at a single tertiary referral center. The study protocol was approved by the institutional review board of the institutional ethics committee with the number of 2026/32, and informed consent was waived due to the retrospective nature of the analysis. The study was performed in accordance with the Declaration of Helsinki and reported following the Strenthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational studies.

Patient Selection

All consecutive patients who underwent primary OCTR between January 2021 and June 2024 were identified from the institutional surgical database. Inclusion criteria were: (1) age ≥ 18 years; (2) electrophysiologically confirmed CTS; (3) failure of conservative management for ≥ 3 months; (4) primary unilateral or sequential bilateral surgery; and (5) availability of preoperative and 3-month postoperative BCTQ scores. Exclusion criteria were: (1) prior carpal tunnel surgery (revision cases); (2) concomitant procedures (e.g., trigger finger release, ganglion excision); (3) acute CTS secondary to fracture or dislocation; (4) pregnancy-associated CTS; (5) inflammatory or rheumatic arthropathy; and (6) incomplete follow-up data or missing BCTQ records at 3 months.

Surgical Techniques

Standard Midline Mini-Incision (Group A): Under local anesthesia (1% lidocaine with 1:100,000 epinephrine) and tourniquet control, a 2 – 2.5 cm longitudinal incision was made in line with the axis of the ring finger, centered over the distal wrist crease and extending into the proximal palm without loop magnification (Figure 1). Sharp dissection was carried directly through subcutaneous fat and palmar fascia to expose the transverse carpal ligament, which was divided under direct visualization from distal to proximal. The median nerve was inspected, and hemostasis was achieved. The skin was closed with interrupted 4-0 nylon sutures.

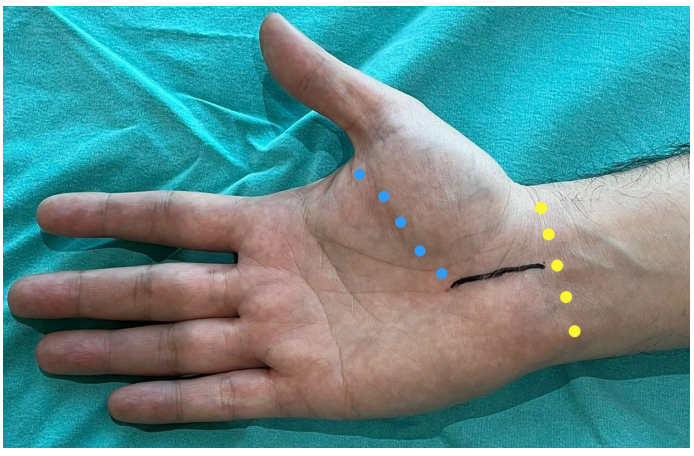


Figure 1. A 2 – 2.5 cm longitudinal incision was made in line (black line) with the axis of the ring finger, centered over the distal wrist crease (yellow dots) and extending into the proximal palm to Kaplan' cardinal line (blue dots).

Modified Open Technique with Nerve Preservation (Group B): Under identical anesthetic conditions, a 3 – 3.5 cm curvilinear incision was made along the ulnar border of the thenar crease, beginning at Kaplan's cardinal line and extending proximally under loop magnification (Figure 2). In contrast to the standard technique, sharp dissection straight down through subcutaneous fat and palmar fascia was deliberately avoided. Instead, careful layered dissection was performed through the subcutaneous tissue, with systematic identification and preservation of superficial sensory nerve branches crossing the incision site, including palmar cutaneous branches of the median and ulnar nerves. Small nerve fibers were gently retracted rather than divided. A radially based fascial flap was then elevated, exposing the transverse carpal ligament. The ligament was elevated from the insertion of the hamate under direct visualization. Once complete decompression was confirmed and the median nerve was inspected, the ligament and the fascial flap was repositioned over the released canal to provide soft-tissue coverage. Hemostasis was achieved, and the skin was closed with interrupted 4-0 nylon sutures.

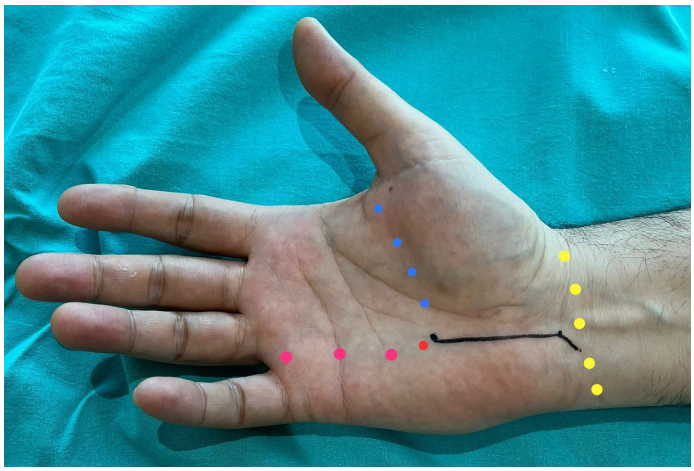


Figure 2. A 3 – 3.5 cm curvilinear incision (black line) was made along the ulnar border of the thenar crease (red dots), beginning at Kaplan's cardinal line (blue dots) and extending proximally (yellow dots).

All procedures were performed by two surgeons. Surgeon assignment was based on individual preference and was consistent throughout the study period (one surgeon exclusively used the standard midline technique, one exclusively used the modified open technique). Postoperative management was standardized: a bulky dressing was applied for 48 hours, followed by light dressings. Patients were encouraged to begin gentle finger range-of-motion exercises immediately. Suture removal was performed at 14 days.

Outcome Measures

The primary outcome was the incidence of pillar pain at 3 months postoperatively, defined as tenderness to palpation over the thenar or hypothenar eminence elicited during clinical examination and reported by the patient as pain with grip or direct pressure.

Secondary outcomes included: (1) BCTQ Symptom Severity Scale (SSS; 11 items, score range 1 – 5, with higher scores indicating greater symptom severity) and Functional Status Scale (FSS; 8 items, score range 1 – 5, with higher scores indicating greater functional impairment) assessed at baseline (preoperative) and 3 months postoperatively; (2) change in BCTQ-SSS and BCTQ-FSS scores from baseline to 3 months (ΔSSS and ΔFSS); (3) time to return to daily activities (self-reported, in days); (4) wound complications (infection, dehiscence, hematoma) within 30 days; (5) scar tenderness at 3 months; (6) grip strength recovery at 3 months (measured by Jamar dynamometer, expressed as percentage of contralateral hand); (7) operative time (skin incision to closure, in minutes); and (8) need for revision surgery within 12 months (16,17).

Data Collection and Statistical Analysis

Demographic and clinical data were extracted from electronic medical records. BCTQ questionnaires were administered as part of routine clinical care at the preoperative visit and at the 3-month follow-up appointment. Categorical variables were compared using chi-square or Fisher's exact test, and continuous variables using Student's t-test or Mann-Whitney U test as appropriate. Within-group changes in BCTQ scores were assessed using paired t-tests. To address concerns regarding overfitting given the limited number of primary outcome events (n = 15), the multivariate logistic regression model for the primary outcome (pillar pain) was limited to two covariates selected a priori based on clinical relevance: preoperative electrophysiologic severity and operating surgeon. Multiple linear regression was used for continuous secondary outcomes, including postoperative BCTQ scores (with preoperative scores entered as a covariate). A p-value < 0.05 was considered statistically significant. All analyses were performed using SPSS version 28.0 (IBM Corp., Armonk, NY) and R version 4.3.1 (R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

Patient Demographics

A total of 81 OCTR procedures were performed during the study period. After applying exclusion criteria, 68 wrists in 62 patients were included in the final analysis: 36 wrists in Group A (standard midline) and 32 wrists in Group B (modified open technique). Six patients underwent bilateral sequential procedures. The mean age was 53.8 ± 12.4 years, and 61.3% were female. Baseline characteristics are summarized in Table 1. There were no statistically significant differences between groups in age, sex, body mass index (BMI), diabetes prevalence, dominant hand involvement, preoperative electrophysiologic severity, or preoperative BCTQ scores.

Table 1. Baseline characteristics of the study population

Variable	Group A (Standard) n = 36	Group B (Modified) n = 32	p-value
Age (years)	53.2 ± 12.8	54.5 ± 11.9	0.667
Female sex, n (%)	23 (63.9)	19 (59.4)	0.710
BMI (kg/m²)	28.1 ± 4.9	27.6 ± 5.2	0.686
Diabetes mellitus, n (%)	8 (22.2)	6 (18.8)	0.724
Dominant hand, n (%)	21 (58.3)	18 (56.3)	0.863
Severe NCS, n (%)	13 (36.1)	11 (34.4)	0.882
Symptom duration (mo)	13.8 ± 8.2	14.1 ± 7.6	0.876
Preop BCTQ-SSS	3.24 ± 0.72	3.18 ± 0.68	0.726
Preop BCTQ-FSS	2.86 ± 0.65	2.79 ± 0.61	0.647

Values are mean ± SD or n (%). Abbreviations: BCTQ, Boston Carpal Tunnel Questionnaire; BMI, body mass index; FSS, Functional Status Scale; NCS, nerve conduction studies; SSS, Symptom Severity Scale; mo, months.

Primary Outcome: Pillar Pain

Pillar pain at 3 months was observed in 12 of 36 wrists (33.3%) in Group A and 3 of 32 wrists (9.4%) in Group B unadjusted odds ratio (OR) 0.21, 95% confidence interval (CI) 0.05 – 0.82; p = 0.018, Fisher's exact test) (Table 2). After multivariate adjustment for age, sex, BMI, diabetes, electrophysiologic severity, and operating surgeon, the adjusted OR was 0.21 (95% CI 0.05 – 0.84; p = 0.027). The difference in pillar pain incidence was statistically significant in favor of the modified open technique group.

Table 2. Clinical outcomes by incision group

Outcome	Group A (Standard)	Group B (Modified)	p-value
Pillar pain at 3 mo, n (%)	12 (33.3)	3 (9.4)	0.018
Adjusted OR (95% CI)	—	0.21 (0.05–0.84)	0.027
Return to activities (days)	24.2 ± 7.5	17.8 ± 5.9	< 0.001
Scar tenderness, n (%)	9 (25.0)	3 (9.4)	0.038
Grip strength (% contra.)	80.6 ± 13.1	88.2 ± 10.8	0.013
Operative time (min)	8.4 ± 2.3	15.1 ± 3.2	< 0.001
Wound complications, n (%)	1 (2.8)	1 (3.1)	1.000
Revision surgery, n (%)	0 (0)	0 (0)	—

Values are mean ± SD or n (%). Abbreviations: CI, confidence interval; contra., contralateral; min, minutes; mo, months; OR, odds ratio.

Boston Carpal Tunnel Questionnaire Outcomes

Both groups demonstrated significant improvement in BCTQ scores from baseline to 3 months postoperatively (Table 3). In Group A, the BCTQ-SSS decreased from 3.24 ± 0.72 to 1.68 ± 0.51 (ΔSSS = -1.56 ± 0.64; p < 0.001, paired t-test), and the BCTQ-FSS decreased from 2.86 ± 0.65 to 1.45 ± 0.41 (ΔFSS = -1.41 ± 0.58; p < 0.001). In Group B, the BCTQ-SSS decreased from 3.18 ± 0.68 to 1.42 ± 0.38 (ΔSSS = -1.76 ± 0.59; p < 0.001), and the BCTQ-FSS decreased from 2.79 ± 0.61 to 1.34 ± 0.32 (ΔFSS = -1.45 ± 0.54; p < 0.001).

Between-group comparison of postoperative scores revealed a significantly lower BCTQ-SSS in Group B at 3 months (1.42 ± 0.38 vs 1.68 ± 0.51; mean difference -0.26, 95% CI -0.48 to -0.04; p = 0.018). This difference remained significant after adjustment for preoperative BCTQ-SSS and other covariates in the multiple linear regression model (β = -0.24, 95% CI -0.45 to -0.03; p = 0.024). The postoperative BCTQ-FSS did not differ significantly between groups (1.34 ± 0.32 vs 1.45 ± 0.41; mean difference -0.11, 95% CI -0.29 to 0.07; p = 0.216). The magnitude of improvement (ΔSSS and ΔFSS) did not differ significantly between groups (ΔSSS: p = 0.182; ΔFSS: p = 0.768), indicating that the between-group difference in postoperative SSS was primarily driven by lower residual symptom burden—particularly scar-related discomfort—in the modified technique group rather than a differential response to nerve decompression itself.

Table 3. Boston Carpal Tunnel Questionnaire scores by group and timepoint

BCTQ Subscale	Group A preop	Group A 3-month	Group B preop	Group B 3-month	p*
SSS (1–5)	3.24 ± 0.72	1.68 ± 0.51	3.18 ± 0.68	1.42 ± 0.38	0.018
ΔSSS	—	-1.56 ± 0.64	—	-1.76 ± 0.59	0.182
FSS (1–5)	2.86 ± 0.65	1.45 ± 0.41	2.79 ± 0.61	1.34 ± 0.32	0.216
ΔFSS	—	-1.41 ± 0.58	—	-1.45 ± 0.54	0.768

Values are mean ± SD. * p-value for between-group comparison of 3-month postoperative scores (SSS, FSS) or change scores (ΔSSS, ΔFSS); Within-group pre-to-post changes were all significant at $p < 0.001$. Abbreviations: FSS, Functional Status Scale; SSS, Symptom Severity Scale; Δ, change from preoperative to 3-month postoperative.

Other Secondary Outcomes

The mean time to return to daily activities was significantly shorter in Group B compared with Group A (17.8 ± 5.9 vs 24.2 ± 7.5 days; mean difference -6.4 days, 95% CI -9.6 to -3.2; $p < 0.001$). This difference remained significant after multivariate adjustment (β = -5.9, 95% CI -9.3 to -2.5; $p = 0.001$).

Scar tenderness at 3 months was reported in 9 of 36 wrists (25.0%) in Group A and 3 of 32 wrists (9.4%) in Group B ($p = 0.118$, two-sided Fisher's exact test). Grip strength at 3 months, expressed as a percentage of the contralateral hand, was 80.6 ± 13.1% in Group A and 88.2 ± 10.8% in Group B ($p = 0.013$).

Operative time was significantly shorter in Group A (8.4 ± 2.3 vs 15.1 ± 3.2 minutes; $p < 0.001$). Wound complications occurred in 1 wrist (2.8%) in Group A (one superficial infection treated with oral antibiotics) and 1 wrist (3.1%) in Group B (one minor wound dehiscence managed conservatively) No revision surgeries were performed in either group during the 12-month follow-up period.

DISCUSSION

This retrospective comparative cohort study compared clinical outcomes of the standard midline mini-incision and a modified open technique with superficial nerve preservation in 68 consecutive primary OCTR procedures. Our findings indicate that both techniques provide safe and effective decompression of the median nerve, with comparable overall complication rates and no revision surgeries during the follow-up period. The modified open technique was associated with a statistically significant reduction in pillar pain at 3 months (9.4% vs 33.3%; adjusted OR 0.21; $p = 0.027$), along with significant advantages in postoperative BCTQ symptom severity scores, time to return to daily activities, and grip strength recovery.

The central mechanistic rationale for the modified technique is the preservation of superficial sensory nerve branches that traverse the operative field. During standard midline mini-incision OCTR, sharp dissection carried directly through subcutaneous fat and palmar fascia may transect small palmar cutaneous nerve fibers, leading to neuroma formation or neuropraxia that manifests as scar pain, dysesthesia, and pillar discomfort (12,13). Ruch et al. demonstrated that the base of the palm has a dense concentration of sensory nerve endings, with the highest innervation density at the central palmar region overlying the transverse carpal ligament (15). By using careful layered dissection to identify, isolate, and retract these nerve branches rather than blindly dividing them, the modified technique aims to minimize iatrogenic nerve injury in this anatomically vulnerable zone. Furthermore, the ulnar curvilinear incision placement along the thenar crease positions the scar away from the central weight-bearing surface, and the fascial flap provides additional soft-tissue padding over the released ligament—both of which may contribute to reduced mechanical scar irritation during grip.

Our finding of significantly reduced pillar pain (9.4% vs 33.3%) in the modified technique group supports this nerve-preservation hypothesis. Although scar tenderness was numerically lower in Group B (9.4% vs 25.0%), this difference did not reach statistical significance on two-sided testing ($p = 0.118$). Additionally, the fascial flap component of the modified technique provides an extra layer of soft-tissue coverage over the released carpal ligament, which may further reduce direct pressure transmission to the underlying structures during grip and contribute to lower scar-related discomfort. Siegmeth and Hopkinson-Woolley, in a prospective randomized study comparing standard open decompression with a nerve-sparing modification, reported similar findings, with reduced scar tenderness in the nerve-preserving group (12). The present study extends these observations by incorporating the BCTQ as a validated patient-reported outcome measure, providing a more comprehensive assessment of the clinical impact of nerve preservation.

The inclusion of the BCTQ strengthens the assessment of functional outcomes in this study. Both groups demonstrated substantial and clinically meaningful improvement in BCTQ-SSS and BCTQ-FSS scores at 3 months, consistent with the well-established efficacy of OCTR for CTS (1,3,4). The magnitude of improvement observed (ΔSSS of 1.56 – 1.76 points; ΔFSS of 1.41 – 1.45 points) exceeds previously established minimal clinically important differences (MCID) for the BCTQ, which are approximately 0.8 – 1.0 points for the SSS and 0.5 – 0.8 points for the FSS (17).

The significantly lower postoperative BCTQ-SSS in the modified technique group (1.42 vs 1.68; p = 0.018) is a noteworthy finding. While the absolute difference of 0.26 points is modest and below the MCID for the SSS, it suggests that the nerve-sparing approach contributes to a lower residual symptom burden at 3 months. This difference is likely attributable to the reduced scar pain and pillar pain observed in this group, as these symptoms are captured within the SSS items related to palmar pain and discomfort with gripping. The absence of a significant difference in BCTQ-FSS scores (p = 0.216) indicates that both techniques achieve comparable functional recovery, consistent with previous studies showing that OCTR effectively restores hand function regardless of the specific open technique employed (1,18,19).

The finding that patients in the modified technique group returned to daily activities approximately 6.4 days earlier than the standard group is clinically relevant. The likely explanation is multifactorial: preservation of superficial nerve branches reduces early postoperative wound sensitivity, the ulnar incision placement avoids the central palmar weight-bearing zone, and the fascial flap coverage provides a buffer between the scar and underlying structures—all of which allow patients to use their hand for gripping and weight-bearing activities with less discomfort during the critical first weeks of recovery. This has practical implications for patients who rely on manual hand function for their occupation or daily self-care.

The significantly shorter operative time in the standard midline group (8.4 vs 15.1 minutes) reflects the technical simplicity of direct dissection compared with the more meticulous approach required for the modified technique, which involves layered dissection for nerve identification and preservation, curvilinear incision design, fascial flap elevation, and repositioning of the flap at closure. While a 7-minute difference is unlikely to be clinically significant in the context of a procedure performed under local anesthesia, it may have practical implications in high-volume surgical settings. Wound complication rates were low and comparable between groups (2.8% vs 3.1%; p = 1.000), confirming that the modified technique does not introduce additional surgical morbidity.

Limitations

Several limitations warrant consideration. First, the retrospective design introduces inherent selection bias. Although baseline characteristics including preoperative BCTQ scores were comparable and multivariate adjustment was performed, unmeasured confounders may influence results. Second, surgeon assignment was non-random; one surgeon used the standard technique and one used the modified technique, introducing potential surgeon-level confounding. Because each surgeon exclusively performed one technique, operating surgeon and surgical technique are collinear, and statistical adjustment for surgeon does not fully resolve this confounding. It is not possible to fully distinguish the effect of the technique from the effect of the individual surgeon's skill, experience, or tissue-handling habits. Accordingly, the findings should be interpreted as hypothesis-generating rather than confirmatory evidence of technique superiority. Third, the relatively small sample size (68 wrists) limits the generalizability of the findings and the statistical power for subgroup analyses. While the primary outcome reached significance, the wide confidence intervals (adjusted OR 0.05 – 0.84) reflect the imprecision inherent in small samples. Fourth, BCTQ scores were collected at only two timepoints (preoperative and 3 months); additional assessments at 6 weeks and 6 or 12 months would provide a more complete trajectory of recovery. Fifth, the 3-month follow-up may not capture the full natural history of pillar pain, which can persist for 6 – 12 months in some patients.[13] Sixth, the study did not employ intraoperative confirmation of nerve branch preservation (e.g., intraoperative magnification or electrophysiologic verification), so the extent of superficial nerve preservation was based on intraoperative visualization and surgeon assessment rather than independent objective verification, as intraoperative electrophysiologic confirmation is not standard practice in routine OCTR. Finally, the study was conducted at a single center, which may limit external validity. Additionally, six patients contributed bilateral wrists to the analysis; although the numbers are small, this may introduce within-patient correlation and potentially violate the independence assumption in wrist-level analyses. Furthermore, the relatively small number of primary outcome events (n = 15 pillar pain cases) may limit the stability of multivariate regression estimates. Finally, multiple secondary outcomes were evaluated without formal correction for multiple comparisons; secondary findings should therefore be interpreted as exploratory.

Clinical Implications

The choice of dissection technique in OCTR should be individualized based on surgeon expertise, patient factors, and clinical priorities. The standard midline mini-incision remains a reliable, efficient, and well-validated approach familiar to most hand surgeons. The modified open technique with nerve preservation, while requiring a more meticulous dissection, a modest learning curve, and additional operative time, may be preferable for patients at higher risk of postoperative scar pain, including manual laborers and those with particular concerns about palmar sensitivity. Future prospective randomized trials with larger sample sizes, multiple BCTQ assessment timepoints, intraoperative verification of nerve preservation, and longer follow-up are warranted to confirm these findings.

CONCLUSION

Both the standard midline mini-incision and the modified open technique provide safe and effective decompression in

primary OCTR, with significant and clinically meaningful improvements in BCTQ symptom severity and functional status scores. In this cohort of 68 wrists, the modified open technique—combining a curvilinear ulnar incision along the thenar crease, deliberate preservation of superficial sensory nerve branches, and fascial flap coverage of the released canal—was associated with significantly lower pillar pain incidence (9.4% vs 33.3%), lower postoperative BCTQ-SSS scores, shorter time to return to daily activities, and better grip strength recovery at 3 months. A numerical reduction in scar tenderness was also observed (9.4% vs 25.0%), though this did not reach statistical significance on two-sided testing. The standard midline approach offers the advantage of shorter operative time. Both techniques are associated with low complication rates and no need for revision surgery in the short term. The proposed mechanisms—nerve preservation, ulnar incision placement, and fascial flap coverage—warrant further investigation in adequately powered prospective randomized trials with objective intraoperative nerve assessment and longitudinal patient-reported outcomes.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that there is no financial support.

Ethical Approval

Ethical approval was obtained from the Ethics Committee of Liv Hospital Ankara (Approval No: 2026/032, Decision No: 032, Date: March 23, 2026).

Informed Consent

This was a retrospective comparative cohort study conducted at a single tertiary referral center. The study protocol was approved by the institutional review board of Liv Hospital Ankara with the number of 2026/32, and informed consent was waived due to the retrospective nature of the analysis.

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