

Open versus Endoscopic Carpal Tunnel Release: A Comparative Study of Patient-Reported Outcomes and Minimum Clinically Important Differences

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INTRODUCTION: There is limited research comparing patient-reported outcomes (PROs) of open carpal tunnel release (OCTR) and endoscopic carpal tunnel release (ECTR). We hypothesize that both OCTR and ECTR will lead to comparable improvements in PROMIS Upper Extremity (UE), PROMIS Pain Interference (PI), and QuickDASH scores, as well as similar proportions of patients meeting the minimum clinically important difference (MCID) value at 4-month follow up.

METHODS: Retrospective chart review was performed on patients who underwent OCTR or ECTR at a Midwest, multi-hospital, academic health system between September 2020 and February 2022. Patients who underwent bilateral CTR, additional procedures, or revision CTR were excluded. Patients undergoing CTR completed preoperative and 4-month postoperative questionnaires including UE, PI, and QuickDASH, and responded to the anchor question: "Since your treatment, how would you rate your overall function?" (much worse, worse, slightly worse, no change, slightly improved, improved, much improved). Previously published MCID values for UE, PI, and QuickDASH were referenced during calculations. Preoperative, postoperative, and changes in scores for UE, PI, QD were compared using two-tailed t-Tests for normal distributions and the Mann-Whitney *U* Test for non-normal distributions. MCID proportions and the rates of reported subjective improvement were compared with the Fisher Exact Test.

RESULTS: Of 124 patients who completed preoperative and postoperative questionnaires, 52 underwent OCTR and 72 underwent ECTR. There were no significant differences in mean follow up, age, race, gender, or medical comorbidities. For the 4-month follow up, OCTR and ECTR patients demonstrated significant improvement in UE ($p < 0.01$), PI ($p < 0.01$), and QuickDASH ($p < 0.01$); however, there was no significant difference in postoperative change in score between the two groups (UE: $p = 0.16$, PI: $p = 0.27$, QuickDASH: $p = 0.93$). The percentage of OCTR patients meeting MCID was 53.8%, 50.0%, and 76.9% for UE, PI, and QuickDASH, respectively. The percentage of ECTR patients meeting MCID was 62.5% ($p = 0.33$), 62.5% ($p = 0.17$), and 70.8% ($p = 0.36$) for UE, PI, and QuickDASH, respectively. There were no significant differences found between the two groups anchor question responses ($p = 0.24$) or nerve complications ($p = 1.00$).

DISCUSSION AND CONCLUSION: Based on our findings, our study suggests that both open carpal tunnel release (OCTR) and endoscopic carpal tunnel release (ECTR) demonstrate comparable improvements in pain and function, as evaluated through patient-reported outcomes (PROs) at the 4-month follow up. Both techniques show similar levels of significant clinical enhancement from the patient's perspective. These results provide valuable guidance to healthcare providers when deciding between the two procedures.

Table 1. 4-month postoperative outcomes for OCTR and ECTR patients

	Open	Endoscopic	p-value
Days until Follow-up Survey, mean (SD)	143 (47.5) days	140 (48.7) days	$p = 0.92$
PROMIS UE Score, mean (SD)			
Preoperative	36.8 (7.2)	35.7 (8.6)	$p = 0.42$
Postoperative	45.1 (11.0)	46.6 (11.7)	$p = 0.44$
Difference	8.6 (9.4)	10.9 (9.9)	$p = 0.16$
PROMIS PI Score, mean (SD)			
Preoperative	59.1 (7.3)	59.6 (6.8)	$p = 0.95$
Postoperative	49.8 (10.0)	48.5 (9.7)	$p = 0.29$
Difference	-9.0 (10.4)	-11.1 (9.8)	$p = 0.27$
QuickDASH Score, mean (SD)			
Preoperative	47.7 (15.3)	43.9 (19.3)	$p = 0.24$
Postoperative	19.3 (20.8)	17.1 (20.1)	$p = 0.33$
Difference	-27.6 (19.4)	-27.9 (20.6)	$p = 0.93$

Table 2. 4-month proportion of patients meeting MCID, anchor question, and rate of complications for OCTR and ECTR patients

Proportion of patients meeting MCID, n (%)	OCTR	ECTR	p
PROMIS UE	28 (53.8%)	45 (62.5%)	$p = 0.33$
PROMIS PI	26 (50.0%)	45 (62.5%)	$p = 0.17$
QuickDASH	40 (76.9%)	51 (70.8%)	$p = 0.36$
7-level anchor question, n (%)			$p = 0.56$
Much Improved	22 (42.3%)	28 (38.9%)	
Improved	15 (28.8%)	26 (36.1%)	
Slightly Improved	10 (19.2%)	14 (19.4%)	
No Change	2 (3.8%)	0 (0%)	
Slightly Worse	3 (5.8%)	2 (2.8%)	
Worse	0 (0%)	1 (0.8%)	
Much Worse	0 (0%)	1 (0.8%)	
Complications			
Surgical Site Infection	1 (1.9%)	0 (0%)	$p = 0.24$
Nerve Injury	0 (0%)	0 (0%)	$p = 1.00$