



# A Comparison of Changes in Ultrasound Cross-sectional Area of the Median Nerve Between Three Commonly Utilized Carpal Tunnel Release Techniques

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## Introduction:

- Ultrasound has been well-established as a diagnostic modality for carpal tunnel syndrome (CTS), but its prognostic utility has not been deeply investigated.
- In 2019, Smith *et al.* showed that patients undergoing endoscopic carpal tunnel release (ECTR) had a decrease in median nerve cross-sectional area (CSA) at six weeks post-operatively while patients undergoing open CTR showed an increase in CSA at the same time period.
- The goal of this study was to compare the change in median nerve CSA and Boston Carpal Tunnel Questionnaire (BCTQ) score at the six-week follow up time between endoscopic, limited incision, and open CTR.

## Methods:

- Patients with CTS were evaluated with ultrasound and the BCTQ before and six weeks post-surgery.
- Patients were eligible for inclusion if they underwent ECTR, limited incision carpal tunnel release (LICTR), or open carpal tunnel release (OCTR).
- Two surgeons performed all surgeries. Choice of surgery type was at the discretion of the surgeon.
- Changes in median nerve CSA and BCTQ scores and their associated surgical techniques were analyzed.

## Results:

- A total of 63 hands in 57 patients were included in this study: 41 ECTR, 12 LICTR, and 10 OCTR.
- The average  $\Delta$ BCTQ scores were 1.36, 1.32, and 1.47 for ECTR, LICTR, and OCTR respectively.
- The average  $\Delta$ CSA were 1.80, -0.50, and -0.70 mm<sup>2</sup> for ECTR, LICTR, and OCTR respectively.

## Conclusions:

- Median nerve CSA increased in both LICTR and OCTR but decreased in ECTR.
- The significance of this finding is unclear but may explain early recovery and return to work in ECTR.

**Table 1.** Change in BCTQ and CSA

Surgery:	ECTR	95% CI	LICTR	95% CI	Open	95% CI	P Value
Hands	41		12		10		
Pre-op BCTQ	2.92 (0.79)	2.67-3.16	3.34 (0.57)	2.98-3.71	2.74 (0.80)	2.17-3.31	0.142
6w BCTQ	1.56 (0.59)	1.37-1.74	2.02 (0.83)	1.50-2.56	1.27 (0.37)	1.01-1.53	0.016
$\Delta$ BCTQ	1.36 (0.90)	1.08-1.65	1.32 (0.93)	0.72-1.91	1.47 (0.98)	0.77-2.18	0.921
$\Delta$ FSS	1.13 (1.03)	0.81-1.46	0.96 (1.22)	0.18-1.74	1.24 (1.17)	0.40-2.08	0.822
$\Delta$ SSS	1.59 (0.89)	1.31-1.87	1.67 (0.74)	1.21-2.14	1.70 (0.90)	1.06-2.35	0.909
Pre-op CSA	13.59 (4.36)	12.21-14.96	11.17 (4.04)	8.60-13.73	10.70 (2.50)	8.91-12.49	0.057
6w CSA	11.79 (4.52)	10.35-13.21	11.67 (3.12)	9.11-14.23	11.40 (3.27)	9.06-13.74	0.968
$\Delta$ CSA (mm <sup>2</sup> )	1.80 (3.59)	0.67-2.94	-0.50 (3.12)	-2.48-1.48	-0.70 (3.27)	-3.04-1.64	0.039