

# CLINICAL PERFORMANCE OF ULTRASOUND SHEARWAVE ELASTOGRAPHY IN CARPAL TUNNEL SYNDROME

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## Background and Aims

To evaluate the effectiveness of Shearwave elastography(SWE) in diagnosing Carpal tunnel syndrome(CTS).

## Methods

We recruited a normal control group and patients with CTS, performing nerve conduction studies(NCS) and electromyography(EMG) and ultrasound examinations of the median nerve on both wrists. Wrists were categorized into control and CTS groups based on NCS/EMG results using the AANEM classification. Data on pain intensity(NRS), BCTQ-SS/FS(Boston Carpal Tunnel Questionnaire – symptom severity/Functional Status scale), NCS/EMG findings, and ultrasound cross-sectional area(CSA) at the carpal tunnel inlet were collected. SWE measurements assessed the median nerve's elasticity in the longitudinal view around the carpal tunnel inlet.

## Results

The study encompassed 99 wrists from the 50 patients, comprising 48 normal wrists and 51 wrists with CTS. Based on severity, the classification included 22 mild, 20 moderate, and 9 severe cases. Comparing CSA, CTS wrists had significantly larger CSA compared to normal control wrists ( $13.63 \pm 3.09 \text{ mm}^2$  vs  $8.95 \pm 2.49 \text{ mm}^2$ ,  $p < .001$ ). While the normal group had significantly smaller CSA compared to the mild, moderate, and severe CTS groups ( $p < .001$ ). When comparing elasticity, the CTS group had significantly higher elasticity compared to the normal control group ( $106 \pm 47.22 \text{ kPa}$  vs.  $60.96 \pm 21.8 \text{ kPa}$ ,  $p < .001$ ). The normal group had significantly lower elasticity compared to the CTS groups, but there was no significant difference in elasticity among the different severity levels within the CTS group. When using the CSA x elasticity value for analysis, the severe group had significantly higher values compared to the mild group ( $p = .006$ ). The ROC analysis for predicting severe cases yielded a cut-off value of 1225.97 (sensitivity 0.78, specificity 0.73, accuracy 0.77).

## Conclusion

SWE can aid in diagnosing CTS, with higher specificity and accuracy when combined with CSA measurements. This combination is particularly useful in screening and diagnosing severe CTS cases requiring surgical treatment.

**Keywords:** Carpal tunnel syndrome; ultrasound; shearwave elastography; electromyography