



# Diagnosis of Median Nerve Injury with High-Resolution Ultrasound Following Carpal Tunnel Release using Indiana Tome Technique

Jonathan Keith MD<sup>1</sup> and Joseph E. Imbriglia, MD<sup>2</sup>

<sup>1</sup>Division of Plastic Surgery,  
University of Pittsburgh Medical Center

<sup>2</sup>Department of Orthopaedic Surgery  
University of Pittsburgh Medical Center

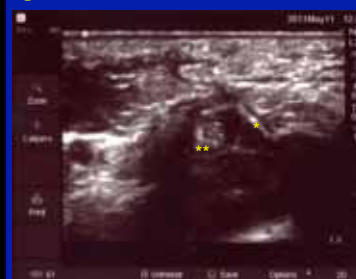
## Introduction:

Previous studies suggest that serious injury to the median nerve following carpal tunnel release using Indiana Tome technique is rare. Neuropraxia of the third common digital nerve (TCDN) is the most common complication. However, re-operative rates are very low. Herein, we report the use of high-resolution ultrasound to establish the diagnosis of median nerve injury following carpal tunnel release using Indiana Tome technique.

## Methods:

We report the case of a 60-year-old right hand dominant female who presented to the Hand & Upper Ex Center in Wexford, Pennsylvania for evaluation of her left hand after undergoing carpal tunnel release using Indiana Tome technique at another hospital one-month prior. She complained of paresthesias of her ulnar long finger, radial ring finger and in the 3-4 webspace as well as overall weakness of her hand and pain in her palm. On physical examination, she had a Tinel's sign distal to the midpalmar incision and her 2-point discrimination was > 8 mm over her thumb, long and ring fingers. Repeat EMG showed TCDN neuropathy and residual compression neuropathy of the median nerve at the carpal tunnel. A high-resolution ultrasound evaluation of her left median nerve using a 14 Mhz 2-dimensional, linear transducer (S-Nerve, Sonosite) was performed prior to exploratory surgery.

Figure 1a:



\*: Median Nerve  
\*\*: scarring within Median Nerve

Figure 1b:



\*: Median Nerve  
PQ: Pronator Quadratus  
R: Radius

Figure 2:



## Results:

High-resolution ultrasound evaluation revealed a circular, hyper-echogenic density within the perineural sheath on the ulnar side of the median nerve at the level of the incision (Figure 1a) consistent with a fascicular injury and scarring near the takeoff of the TCDN. The pattern resolved as we tracked the median nerve proximally to the insertion of the pronator quadratus (Figure 1b). Exploratory surgery confirmed an ulnar-sided, full thickness, longitudinal fascicular injury to the median nerve with a 1.5 cm neuroma-incontinuity (Figure 2). The transverse carpal ligament was fully released, neurolysis performed and a hypothenar fat flap was inset over the median nerve. At six-week follow-up she had resolution of pain and paresthesias in her left hand.

## Conclusion:

High-resolution ultrasound is a novel, non-invasive technique that yields anatomic information with unprecedented clarity. While TCDN neuropraxia is the most common complication following carpal tunnel release using Indiana Tome technique, few patients undergo further diagnostic imaging or exploration. In this case, high-resolution ultrasound clearly predicted and detailed the site, size and nature of the nerve injury prior to exploratory surgery.