

## Electrodiagnostic Predictors of Outcomes After *In Situ* Decompression of the Ulnar Nerve

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In patients with severe ulnar neuropathy at the elbow (UNE), outward clinical symptoms may not accurately represent the severity of the underlying nerve lesion, necessitating use of objective assessment tools such as electrodiagnostic studies. Timing is often critical, as delayed diagnosis and treatment can lead to irreversible nerve damage and poorer post-operative outcomes. Traditional electrodiagnostic parameters, such as motor nerve conduction velocity (NCV), conduction block and signal latencies, have not been shown to accurately capture the later stages of UNE. Compound muscle action potential (CMAP), an electrodiagnostic parameter that measures the viability of axons at the distal motor target, may offer a more accurate picture. This study aimed to determine whether specific CMAP parameters were able to accurately predict postoperative outcomes after *in situ* ulnar nerve decompression at the elbow.

Forty-two patients with UNE were selected from five tertiary hand surgery institutions for this prospective, nonrandomized cohort study. The diagnosis of UNE was confirmed via nerve conduction study, with a motor NCV across the elbow segment of <50 m/s required to meet criteria for study participation. Exclusion criteria included post-traumatic UNE, previous ulnar nerve surgery to the affected elbow, additional compressive neuropathies on the ipsilateral side and a history of substance abuse, traumatic brain injury or major psychiatric comorbidity. Study participants underwent *in situ* ulnar nerve decompression at the elbow, with follow-up reassessments at six weeks, three months, six months and 12 months after surgery.

Outcomes measures were taken both at baseline and at each subsequent post-surgical visit. These included: nerve conduction studies (latency, NCV, and CMAP), motor and sensory function measures (grip and pinch strength, static 2-point discrimination [2-PD] and Semmes Weinstein Monofilaments) and patient-reported outcomes (PROs; Michigan Hand Outcomes Questionnaire [MHQ], Disabilities of the Arm, Shoulder and Hand [DASH] and Carpal Tunnel Questionnaire [CTQ]).

Controlling for motor NCV and demographic factors, CMAP amplitude was the only electrodiagnostic variable found to predict scores on all three PROs, as well as overall recovery of motor function (both grip and pinch strength). Notably, male sex was also found to correlate with a faster recovery of grip and pinch strength. Motor NCV scores were found to independently predict recovery of 2-PD and pinch strength. Neither CMAP nor NCV scores predicted the MHQ subsections of pain, aesthetics or satisfaction, or the Semmes-Weinstein outcome postoperatively.

The authors concluded that CMAP is a useful electrodiagnostic parameter to identify the severity of UNE and should be utilized to determine timing of treatment for UNE and prognosis. CMAP scores were predictive of post-operative recovery trends of *in situ* ulnar nerve decompression, particularly for functional PROs and motor function return of grip and pinch strength. Decreased CMAP amplitude pre-operatively was shown to be predictive of poorer treatment outcomes post-operatively.

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