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# Do comorbid ulnar symptoms or ulnar neuropathy affect the prognosis of workers with carpal tunnel syndrome?

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## Do Comorbid Ulnar Symptoms or Ulnar Neuropathy Affect the Prognosis of Workers With Carpal Tunnel Syndrome?

### To the Editor:

Carpal tunnel syndrome (CTS) is a common and costly disease among working-aged adults, and a leading cause of work-related disability<sup>1</sup> and has affected almost five million US workers with prevalence estimated between 3.1% and 7.8%.<sup>2</sup> Although prognosis after surgery has been described in previous studies,<sup>3,4</sup> many questions exist about predictors of CTS prognosis in working populations.<sup>5</sup> The presence of ulnar symptoms or neuropathy have been considered predictive of a poor outcome in CTS cases. We aimed to describe a 3-year evolution of CTS with and without ulnar symptoms in a large cohort of workers.

This study presents data collected prospectively on 1107 newly hired workers in the United States recruited between July 2004 and October 2006 from eight employers and three trade unions, representing manufacturing, construction, biotechnology, and health care. Subjects were followed for 3 years ( $n = 888$ ) and came from three main occupational groups: construction apprentices, office and laboratory workers, and service workers/housekeepers.<sup>6</sup> At baseline, subjects answered questions about the presence of hand pain in the past year (occurring three times or lasting at least 1 week) and about the nature and location of symptoms.

This study was supported by CDC/NIOSH (grant # R01OH008017-01) and by the National Center for Research Resources (NCR) (grant # UL1 RR024992), a component of the National Institutes of Health (NIH), and NIH Roadmap for Medical Research. Its contents are solely the responsibility of the authors and do not necessarily represent the official view of NIOSH, NCR or NIH. NEUROMETRIX provided electrodes for nerve conduction testing.

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Bilateral nerve conduction studies were performed for median and ulnar nerves at the wrist, using the NC-Stat automated nerve conduction testing device (NEUROMETRIX, Inc, Waltham, MA). The NC-Stat device followed an automated testing protocol to measure median and ulnar distal motor latencies (wrist-thenar eminence and wrist-hypothenar eminence) and distal sensory latencies (wrist-third finger and wrist-fifth finger).<sup>7</sup> Abnormal median nerve conduction was defined as sensory latency more than 3.5 ms (14 cm) or motor latency more than 4.5 ms or median-ulnar sensory latency difference of more than 0.5 ms (14 cm). For the ulnar nerve, we used sensory or motor latency more than the 95th percentile. Subjects were categorized according to baseline data into mutually exclusive groups (see Table 1). Workers with symptoms of CTS with and without fifth finger involvement were also described, including those with confirmed CTS and confirmed ulnar syndrome (symptoms and abnormal nerve studies).<sup>4</sup>

Three outcomes were used at follow-up: "severe hand pain," defined as hand pain within the past 30 days with a rating of 5 or higher on a scale of 0 (no discomfort) to 10 (worst discomfort imaginable); "functional status limitations," assessed via the Levine Functional Status Scale; and "job limitation," a dichotomous composite outcome that included all workers who reported a limitation attributed to hand symptoms in one or more of the following areas: (1) limited ability to work, (2) decreased productivity, (3) lost time from work, (4) placed on job restrictions, and (5) changed job or employer.

Among the 888 workers followed, baseline mean age was 30.3 years (range, 18 to 66 years), and 63.9% were men. Carpal tunnel syndrome prevalence and incidence were similar to that reported in other worker populations.<sup>8-10</sup> From Table 1, ulnar neuropathy at the wrist was associated with CTS in only 4 of the 21 CTS cases at follow-up. These workers had a slightly higher proportion of severe hand pain but similar limitations. More than half of the subjects with symptoms of CTS had symptoms in the fifth finger ( $n = 45$  of 79), without differences on the other outcomes, and only one worker had confirmed CTS and ulnar syndrome.

This study was limited by the small number of cases and by the use of the NC-Stat automated nerve testing device,<sup>7</sup> which limited our testing of ulnar neuropathy to the wrist. Nonetheless, our findings provide an interesting perspective. In clinical settings,

some case reports suggest that associated median and ulnar neuropathies affect prognosis after nerve release.<sup>3,11-13</sup> Nevertheless, our results are consistent with a recent study of ulnar neuropathy at the elbow; while 60.5% of subjects had persistent symptoms at follow-up, there were no differences in disability and symptom severity seen among the 5% of patients with ulnar neuropathy who had comorbid CTS.<sup>14</sup>

Ulnar neuropathy is relatively understudied, and future research is needed from large prospective studies to determine the prognosis, management, and prevention of ulnar neuropathies from entrapment at the wrist or elbow.

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**TABLE 1.** Description of Outcomes at Follow-Up (Severe Hand Pain, Functional Status Limitation on Levine Scale, and Job Limitation) Among Subjects Categorized at Baseline on Clinical Status and Nerve Conduction Status

Outcomes (at Follow-Up)	Variables (Baseline)	Total (N)	Cases (n)	n/N, %	Crude Odds Ratios (95% Confidence Interval)
Severe hand pain	No hand pain	732	111	15.16	1.00 (—)
	Other hand symptoms	82	22	26.83	2.05 (1.21–3.48)
	Symptoms of CTS, no nerve conduction abnormalities	53	16	30.19	2.42 (1.30–4.50)
	CTS confirmed without ulnar neuropathy	17	10	58.82	7.99 (2.98–21.44)
	CTS confirmed with ulnar neuropathy	4	3	75	16.76 (1.73–162.49)
Functional status limitation on Levine scale	No hand pain	732	59	8.06	1.00 (—)
	Other hand symptoms	82	6	7.32	0.90 (0.38–2.16)
	Symptoms of CTS, no nerve conduction abnormalities	53	7	13.21	1.74 (0.75–4.01)
	CTS confirmed without ulnar neuropathy	17	4	23.53	3.51 (1.11–11.10)
	CTS confirmed with ulnar neuropathy	4	1	25	3.80 (0.39–37.13)
Job limitation	No hand pain	732	72	9.84	1.00 (—)
	Other hand symptoms	82	19	23.17	2.76 (1.57–4.88)
	Symptoms of CTS, no nerve conduction abnormalities	53	9	16.98	1.88 (0.88–4.00)
	CTS confirmed without ulnar neuropathy	17	5	29.41	3.82 (1.31–11.15)
	CTS confirmed with ulnar neuropathy	4	1	25	3.06 (0.31–29.76)

CTS, carpal tunnel syndrome.

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