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Injuries to the Median and Ulnar Nerves Following Grinder Use: A Case Report

Jae-In You, MD, Kang-Jae Jung, MD, Min-ji Chae, MD, Hyo-Sik Park, MD
Department of Rehabilitation Medicine, Daejeon Eulji University Hospital, Eulji University School of Medicine

Introduction

Hand injuries resulting from grinder use are prevalent among young adults, significantly impacting daily activities and physical functions with consequent socioeconomic implications. Standard examination methods may overlook damage to the deep branch of the ulnar nerve, emphasizing the need for comprehensive assessments. Preston and Shapiro suggested that ulnar motor nerve conduction study with first dorsal interosseous (FDI) recording should be done in all patients with suspected ulnar neuropathy at the wrist. High-resolution ultrasonography (HRUS) can satisfactorily assess small nerves and may detect morphological changes of the nerves. It can also reveal the causes of nerve compression when structural abnormalities or space-occupying lesions are present.

Case Report

A 42-year-old male sustained an injury to his left palm from a grinder while at work in May 2022. Subsequent surgical intervention at another hospital was followed by electrodiagnostic study to localize the damage, revealing injury to the median nerve. In January 2024, the patient presented to the Department of Physical Medicine and Rehabilitation clinic for grip strength assessment. A pinch and grasp strength test indicated decreased strength. Electrodiagnostic study was conducted to identify the underlying cause of the decreased grip strength. Nerve conduction study results demonstrated normal ulnar nerve compound muscle action potentials (CMAP) in the abductor digiti minimi (ADM) muscle. However, there was decreased CMAP and delayed latency in the first dorsal interosseous (FDI) muscle and prolonged latency of the recurrent branch of the median nerve (Table 1). Needle electromyography revealed abnormal spontaneous activity solely in the left FDI muscle. Following the grinder-related injury extending from the palm of the hand between third and fourth fingers to the scaphoid tubercle, HRUS examination was performed to assess structural abnormalities in the deep branch of the ulnar nerve and the recurrent branch. of the thenar muscle (Figure 1). Ultrasound examination revealed maintained nerve continuity without observed compression, swelling, or cystic structures compressing the nerve.

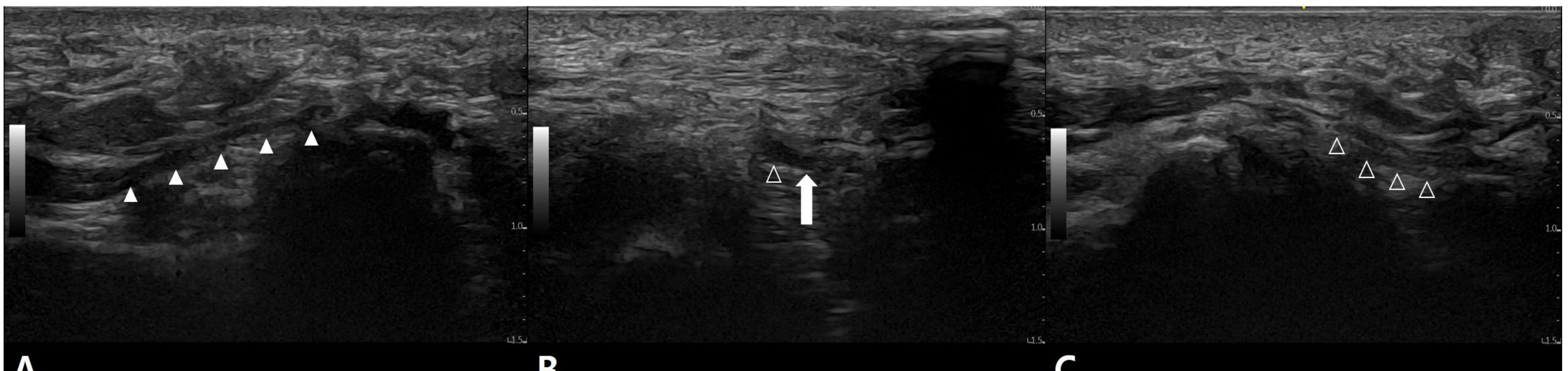

Fig. 1. The Ultrasound shows nerve continuity without observed compression, swelling, or cystic structures

Nerve / Sites	Onset Latency (ms)	Peak Latency (ms)	Peak to Peak Amplitude (μV)
Right Median - Digit II	2.81	3.70	32.5
	2.81	3.65	32.4
Left Median - Digit II	2.71	3.44	16.5
	2.71	3.49	14.5
Right Median - Digit III			
Palm	1.09	1.98	44.6
Wrist	2.86	3.80	43.5
Left Median - Digit III			
Palm	1.51	2.40	11.3
Wrist	3.07	3.91	9.3
Right Ulnar - Digit V	2.55	3.28	26.6
	2.55	3.33	24.0
Left Ulnar - Digit V	2.60	3.49	26.0
	2.66	3.49	26.9
R Median, Ulnar - Ring finger comparison			
Median Wrist	2.76	3.59	29.2
Ulnar Wrist	2.45	3.18	23.4
L Median, Ulnar - Ring finger comparison			
Median Wrist			No response
Ulnar Wrist	2.50	3.33	19.2

Nerve / Sites	Muscle	Onset Latency (ms)	Peak to peak Amplitude (mV)	Velocity (m/s)
Right Median				
Wrist	APB	3.25	18.60	
Elbow	APB	7.98	17.36	52.86
Left Median				
Wrist	APB	3.83	15.91	
Elbow	APB	8.62	14.99	52.17
Right Ulnar				
Wrist	ADM	3.02	17.86	
Below Elbow	ADM	7.71	15.67	53.33
Left Ulnar				
Wrist	ADM	3.04	16.57	
Below Elbow	ADM	7.77	13.02	52.86
Right Ulnar				
Wrist	ADM	3.35	13.59	
Below Elbow	ADM	7.44	13.18	52.65
Above Elbow	ADM	9.15	13.17	58.54
Left Ulnar				
Wrist	ADM	3.88	7.24	
Below Elbow	ADM	8.19	6.05	51.01
Above Elbow	ADM	9.96	5.76	56.47

Table 1. The Motor nerve conduction study revealed normal CMAP in ADM and decreased CMAP and delayed latency in FDI

Conclusions

This case underscores the correlation between electrodiagnostic study and HRUS examinations. Suspicion of deep branch ulnar nerve damage after palm injuries warrants electrodiagnostic study evaluation. Additionally, comparing latency on both sides is crucial. Supplementary HRUS examinations offer valuable anatomical insights into nerve damage, emphasizing the role of ultrasound in assessing nerve damage and identifying potential causes of compression.