Osmangazi Journal of Med, 2025;47(6):931-938
DOI: 10.20515/otd.1768712

Research Article
Araştırma Makalesi

Osmangazi Journal of Medicine
e-ISSN: 2587-1579

Evaluation of Patients Referred for Isolated Distal Upper Limb Extensor Weakness: A Retrospective Electrophysiological Study

İzole Distal Üst Ekstremite Ekstansör Güçsüzlük Nedeniyle Yönlendirilen Hastaların Değerlendirilmesi: Retrospektif Elektrofizyolojik Çalışma

Seyma Aykac , Seray Ibis Göksal, Abdullah Arı , Esra Asıkdogan ,İbrahim Aydoğdu

Ege University, Faculty of Medicine, Department of Neurology Izmir, Türkiye

ORCID ID of the authors
ŞA. 0000-0003-3994-0019
SIG. 0000-0002-2763-923X
AA. 0009-0006-1995-210X
EA. 0000-0002-1416-9443.
İA. 0000-0001-7209-7161

Correspondence / Sorumlu yazar:
Şeyma AYKAÇ

Ege University, Faculty of Medicine,
Department of Neurology Izmir, Türkiye

e-mail: symaykac@gmail.com

Ethics Committee Approval: The study was approved by the Clinical Research Ethics Committee of Ege University (Decision no:,25-7T/69 Date:10.07.2025

Informed Consent: The authors declared that it was not considered necessary to get consent from the patients because the study was a retrospective data analysis.

Authorship Contributions: Idea/Concept: Seyma Aykac, Abdullah Arı, Design: Seyma Aykac, Abdullah Arı, Esra Asıkdogan, Data Collection/Processing: Seray Ibis Göksal Analysis/Interpretation: Seyma Aykac, Seray Ibis Göksal, Literature Review: Seyma Aykac, Seray Ibis Göksal ,Drafting/Writing: Seyma Aykac, Ibrahim Aydogdu, Critical Review: Seyma Aykac, Ibrahim Aydogdu,Corresponding author; Seyma Aykac

Copyright Transfer Form: The copyright transfer form was duly signed by all authors.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

Received : 19.08.2025

Accepted : 01.09.2025

Published :. 02.08.2025

Abstract: This study investigated the clinical and electrophysiological features of patients with isolated distal upper extremity extensor weakness, focusing on etiologies and anatomical levels of peripheral nerve involvement. A retrospective review included 57 patients evaluated between 2007 and 2025 with wrist or finger drop. All underwent motor and sensory conduction studies of the median, ulnar, and radial nerves, as well as needle EMG of radial nerve–innervated muscles and C7–C8 roots. Radial nerve lesions were classified into three levels: Level 1 (proximal to the triceps branch), Level 2 (distal to triceps and proximal to supinator branches), and Level 3 (posterior interosseous nerve). Nerve injuries were categorized as axonal or demyelinating. Of the 57 patients (40 men, 17 women), 56 had confirmed radial nerve injury. Trauma was the leading cause, followed by surgical and compression-related injuries. Electrophysiologically, Level 2 was the most frequent site, typically corresponding to distal humeral injuries. Level 1 injuries were associated with proximal humeral lesions, while Level 3 was linked to radial shaft involvement. All patients showed axonal damage: 49% partial, 28% total, and 23% prominent partial. Our results show that trauma-related radial nerve injury is the predominant cause of isolated distal extensor weakness. Electrophysiological evaluation is essential for accurate localization, diagnosis, and management.
Keywords: Wrist drop, finger drop, traumatic radial nerve injury, electromyography

Özet: Bu çalışma, izole distal üst ekstremite ekstansör güçsüzlüğü bulunan hastaların klinik ve elektrofizyolojik özelliklerini inceleyerek etiyolojileri ve periferik sinir tutulumunun anatomik seviyelerini açıklamayı amaçlamaktadır. 2007–2025 yılları arasında el bileği veya parmak düşüklüğü ile başvuran 57 hasta retrospektif olarak değerlendirildi. Tüm hastalara median, ulnar ve radial sinirlerin motor ve duyu ileti çalışmaları ile birlikte radial sinir ve C7–C8 kökleri tarafından innerve edilen kasların iğne elektromiyografisi (EMG) uygulandı. Radial sinir lezyonları üç düzeyde sınıflandırıldı: Düzey 1 (triseps dalının proksimali), Düzey 2 (triseps sonrası ve supinator öncesi), Düzey 3 (posterior interosseöz sinir). Sinir hasarı aksonal veya demiyelinizan olarak kategorize edildi. 40'ı erkek, 17'si kadın olmak üzere toplam 57 hastanın 56'sında radial sinir hasarı saptandı. En sık neden travma olup, bunu cerrahi ve kompresyona bağlı yaralanmalar izledi. Elektrofizyolojik bulgular, en sık tutulumun distal humerus ile ilişkili olan Düzey 2'de görüldüğünü ortaya koydu. Düzey 1 yaralanmaları proksimal humeral lezyonlarla, Düzey 3 ise radius cismi ile ilişkili lezyonlarında sık izlendi. Tüm hastalarda aksonal hasar saptanmakla birlikte, olguların %49 unda kısmi, %28 inde total ve %23 belirgin kısmi aksonal hasar mevcuttu. Bulgularımız, travmaya bağlı radial sinir yaralanması izole distal ekstansör güçsüzlüğünün en önemli nedeni olduğunu göstermektedir. Lezyonların doğru lokalizasyonu, tanının kesinleştirilmesi ve uygun tedavi stratejilerinin belirlenmesi açısından elektrofizyolojik değerlendirme gereklidir.
Anahtar Kelimeler: Düşük el, düşük parmak, travmatik radial sinir hasarı, elektromyografi

How to cite/ Atıf için: Aykac S , Ibis Göksal S, Arı A, Asıkdogan E, Aydoğdu I. Evaluation of Patients Referred for Isolated Distal Upper Limb Extensor Weakness: A Retrospective Electrophysiological Study, Osmangazi Journal of Medicine, 2025;47(6):931-938

1. Introduction

Distal upper limb extensor weakness may present clinically as either finger drop or wrist drop. Finger drop is characterized by pronounced weakness of the finger extensor muscles at the metacarpophalangeal (MP) and interphalangeal (IP) joints, with preserved strength in the finger flexors and both wrist extensors and flexors (1). In contrast, wrist drop involves weakness in both the wrist and finger extensor muscles (2). These clinical patterns can arise from a broad spectrum of neurological disorders, including pathologies affecting the muscle, peripheral nerves, brachial plexus, nerve roots, or anterior horn cells (3-13). Electrodiagnostic studies are indispensable for accurate localization of the affected anatomical level. These investigations not only enable differentiation between myopathic, neuropathic, plexopathic, or radicular origins but also aid in identifying or excluding other potential neurological conditions. Additionally, they provide critical insights into the severity of axonal damage and serve as valuable tools for estimating prognosis and guiding clinical management.

In this study, we retrospectively evaluated patients referred to our neurophysiology laboratory due to distal upper limb extensor weakness, clinically manifesting as either finger or wrist drop. The primary aim was to assess the diagnostic contribution of electrodiagnostic studies in determining the anatomical level of pathology and to identify the most frequently observed underlying etiologies.

2. Material and Methods

This retrospective descriptive study analyzed the electrophysiological findings of patients referred to the neurophysiology laboratory at Ege University Hospital between 2007 and 2025 with a preliminary diagnosis of isolated distal upper limb extensor weakness, clinically presenting as wrist or finger drop. Electromyography (EMG) reports of these patients were reviewed to determine the affected level of peripheral nervous system—muscular, neural, plexus, or radicular. Patients with clinical signs of wrist or finger drop but no pathological findings on EMG were excluded.

To determine the affected level within the peripheral nervous system, motor and sensory conduction studies of the radial, median, and ulnar nerves were examined, alongside needle EMG findings of muscles responsible for extension and innervated by the radial nerve and the C7–C8 roots. Motor conduction studies were performed using the orthodromic technique, while sensory conduction used the antidromic approach. Motor conduction studies of the radial nerve were recorded from the extensor indicis proprius muscle while stimulating at forearm-above elbow and below spiral groove of humerus-above spiral groove of humerus, while sensory nerve conduction study of the radial nerve typically was assessed just the superficial branch of the radial nerve and was recorded at the anatomic stuff box. Three levels of radial nerve injury were distinguished based on the branching pattern of the radial nerve, as determined by nerve conduction studies and needle EMG findings:

1. Level 1, proximal radial nerve involvement, localized proximal to the branch supplying the triceps muscle (proximal humerus–axillary level).

2. Level 2, radial nerve distal to the triceps branch, situated distal to the nerve's triceps branch but proximal to the supinator (humerus level).

3. Level 3, posterior interosseous nerve (PIN) involvement, distal to the branch for extensor carpi radialis longus/brevis, corresponding to the extensor part of forearm region.

When radial sensory responses were normal but needle EMG revealed neurogenic changes, such as long-duration motor unit potentials with or without signs of denervation, restricted to PIN-innervated muscles (e.g., extensor indicis, extensor digitorum communis) with sparing of the branches to extensor carpi radialis longus/brevis, a diagnosis of PIN neuropathy (level 3 involvement) was made. If radial sensory responses were absent or showed low amplitudes, and needle EMG demonstrated abnormalities in the extensor indicis, extensor digitorum communis, extensor carpi radialis longus/brevis and while sparing the triceps, a radial nerve lesion distal to the triceps branch, suggesting level 2 involvement, was suspected. Conversely, when radial sensory responses were pathological and needle EMG identified neurogenic findings in the extensor indicis, extensor digitorum communis, extensor carpi radialis longus/brevis and triceps muscles, involvement at the proximal humerus or axillary level, consistent with level 1, was considered. To evaluate for possible cervical radiculopathy, particularly in patients presenting with pure motor findings that mimic PIN neuropathy, additional needle EMG was performed on other C7–C8-innervated muscles, such as the first dorsal interosseous and flexor carpi radialis. In cases where the lesion was localized to the axillary level, further evaluation included muscles innervated by the axillary nerve, such as the deltoid and teres

minor, to assess for possible posterior cord or more extensive brachial plexus involvement.

Axonal injury was classified based on needle EMG findings. The presence of denervation potentials, either alone or accompanied by neurogenic motor unit potentials (MUPs), was considered indicative of axonal damage. If denervation activity was observed in the absence of any MUPs, the lesion was defined as a total axonal injury. When a small number of MUPs were present and maximal voluntary contraction revealed repetitive firing of the same motor units, the injury was classified as prominent partial axonal damage. In cases where multiple distinct neurogenic MUPs were detected with reduced recruitment during maximal contraction, the lesion was interpreted as partial axonal injury. Conversely, if neurogenic MUPs were absent and reduced recruitment was noted during maximal effort, and if motor nerve conduction studies of the radial nerve showed a ≥50% reduction in compound muscle action potential (CMAP) amplitude between proximal and distal stimulation sites, these findings were considered suggestive of a demyelinating process. Only EMG reports obtained at least one month following the clinical insult were included in order to allow sufficient time for pathological changes to manifest electrophysiologically.

For each patient, data were systematically reviewed, including the referring clinical department, presumed etiology, anatomical localization of the lesion, pattern of nerve involvement (classified as axonal or demyelinating), and available imaging findings. The study protocol was approved by the Ethics Committee of Ege University (Approval No: 25-7T/69). The findings obtained in this study were presented using descriptive statistical measures, including counts, percentages, and means.

3. Results

This study included 57 patients presenting with distal upper limb extensor weakness, clinically manifesting as either wrist or finger drop. Of these, 17 were female and 40 were male. The mean age was lower among male patients (39 years) compared to female patients (46 years). The left upper limb was more frequently affected than the right, with one case involving bilateral symptoms. Most referrals originated from surgical departments (56%), while internal medicine clinics accounted for 39% of referrals. Electrophysiological studies revealed radial nerve involvement as the primary etiology in 56 of the 57 patients, with only one case attributed to C7–T1 radiculopathy based on EMG findings (Table 1). An identifiable cause of radial nerve injury was found in 40 patients, with trauma being the most common etiology, responsible for 29 cases. Trauma remained the leading cause across referral sources, accounting for 32% of cases referred from internal medicine and 63% of those from surgical departments. Surgical interventions and compression injuries were the next most frequently identified causes (Table 1).

Table 1. Study population, affected part of peripheral nervous system and etiology

		Number of Patients
Gender	Female	17/57 (30%)
	Male	40/57 (70%)
Affected Side	Right	22/57 (38%)
	Left	34/57 (60%)
	Bilateral	1/57 (2%)
	Surgery Clinics	32/57 (56%)
Referring Department	Internal Medicine	22/57 (39%)
	Unknown	3/57 (5%)
Affected part of peripheric nervous system	Radial nerve	56/57(98%)
	C7-T1radicular involvement	1/57 (2%)
Cause of Injury	Trauma	29/57 (50%)
	Surgery	5/57 (9%)
	Compression	5/57 (9%)
	Radiculopathy	1/57 (2%)
	Unknown	17/57 (30%)

Among patients with trauma-related injuries, 16 had humeral fractures and 5 had radial fractures. Penetrating injuries were identified in 3 cases, and a gunshot wound was documented in one patient. Imaging enabled the precise localization of the humeral fracture in 11 patients and in all patients with radial fractures. In contrast, the level of nerve injury in cases of penetrating trauma could not be determined due to the complexity of the injury and the surgical interventions performed. The lesion in the patient with a gunshot wound was localized to the distal humerus. Of the five patients with surgery-related radial nerve injuries, two had undergone mass excision over the dorsal forearm, while the remaining three had orthopedic procedures for fractures involving either the distal humerus or radius. Although imaging was not performed in patients with compression-related injuries, the etiology was presumed to be due to improper sleep posture affecting the humerus or proximal radius in all five cases (Table 2).

Table 2. Cause, type and anatomical localization of the injury

Cause of Injury	**Type of Injury**	**Anatomical Location Of the injury**	**Number of Patients**
Trauma (n=29)	Fracture		21/29
	Humerus	Humerus-Proximal	2
	(n=16)	Humerus-Shaft	6
		Humerus- Distal	3
		Humerus – Unknown segment	5
	Radius	Radius – Proximal	3
	(n=5)	Radius – Shaft	2
	Penetrating injury	(Level not specified)	3/29
	Gunshot injury	Distal humerus	1/29
	Unknown trauma	–	4/29
Surgical (n=5)	Mass excision	Radius – Proximal	1
	(n=2)	Radius – Shaft	1
	Fracture-related	Humerus – Shaft	1
	(n=3)	Radius – Proximal	1
		Unknown location	1
Compression (n=5)		Humerus-proximal	1
		Humerus shaft	2
		Radius – Proximal	2

n; number-reflects total number of patients in this category

.

In the electrophysiological classification of radial nerve involvement, Level 2 emerged as the most frequently affected segment, followed by Levels 3 and 1 (Table 3). When the etiology was analyzed in relation to the electrophysiologically defined level of involvement, trauma was identified as the leading cause across all levels, notably impacting Levels 1, 2, and 3 of the radial nerve. Surgical procedures and compressive neuropathies also contributed significantly, particularly in cases involving Level 2 and Level 3 segments (Table 3). When trauma localization was considered, injuries to the proximal or midshaft regions of the humerus were more commonly associated with Level 1 involvement, whereas lesions near the distal humerus and the radius were predominantly linked to Level 2 and Level 3 segments, respectively (Table 3).

Table 3. Electrophysiologically determined levels of radial nerve involvement and localization of associated etiologies

Radial Nerve Level	Etiology	Number of Patients (%)
Level 1	-Compression:Proximalhumerus - Trauma: Proximal humeral fracture	8 (14%)
Level 2	- Trauma: Humeral shaft or distal humerus fracture, gunshot injury (distal humerus) - Surgery: Fracture repair (humerus shaft), mass excision (proximal radius) - Compression: Humeral shaft	34 (61%)
Level 3	- Trauma: Radial shaft fracture - Surgery: Fracture repair (proximal radius), mass excision (radius) - Compression: Proximal radius	14 (25%)

All patients demonstrated electrophysiological evidence of axonal injury; no cases of demyelinating radial neuropathy were identified. Partial axonal injury was the most prevalent pattern, observed in 49% of cases, followed by total axonal injury in 28% and prominent partial axonal injury in 23% (Table 4). Among trauma-related cases, fracture caused total axonal injury in 5 patients, partial axonal in 15 patients and prominent partial axonal in 5 patients. 1 patients with gun shut injury and 3 patients with penetrating injury had total axonal injury. In the surgical group, 2 patients with mass excision and 1 patients with fracture related surgery had total axonal injury. The other 2 patients with fracture related surgery had partial and prominent partial axonal injury. In cases of compression-related neuropathy, 2 patients had partial axonal injury, while 3 exhibited prominent partial axonal involvement.

Table 4. Type of nerve injury (axonal -demyelinating) and related etiology

Type of Axonal Injury	Associated Causes and number of the cases		Number of Patients (%)
Partial	-Trauma(Fracture):	15	28 (49%)
	-Surgery(Fracture-related):	1	
	-Compression:	2	
	- Unknown:	10	
Prominent Partial	-Trauma(Fracture):	5	13 (23%)
	-Surgery(Fracture-related):	1	
	-Compression:	3	
	- Unknown:	3	
Total	-Trauma(Fracture: 5, Gunshot: 1, Penetrating injury: 3):	9	16 (28%)
	-Surgery(Mass excision: 2, Fracture-related: 1):	3	
	-Unknown:	4	
Demyelinating	–		0 (0%)

4. Discussion

This study provides clinically relevant insights into unilateral distal upper extremity extensor weakness based on electrophysiological evaluation. The key findings are as follows: (1) most patients had weakness due to traumatic radial neuropathy; (2) the site of trauma corresponded with the affected nerve segment; (3) Level 2 involvement—distal to the triceps branch—was the most common; and (4) axonal injury predominated, with severity influencing the extent of axonal loss. While many of these findings are consistent with previous studies on radial neuropathy in adults, the aim here was not to reassess radial neuropathy itself but to explore its contribution to isolated distal extensor weakness. Although similar symptoms may arise from other neurological disorders, electrophysiological testing revealed radial nerve involvement in nearly all cases. Only one patient exhibited C7–C8 radiculopathy, a rare presentation in the literature (14). This limited etiological distribution likely reflects our inclusion criteria and referral patterns. Most patients had documented trauma or surgery and were referred primarily by surgical departments. In these cases, EMG was specifically requested to localize the lesion and assess injury severity, rather

than to explore broader differential diagnoses involving multiple nerves or muscle groups.

Radial nerve involvement due to trauma is well recognized. Although radial neuropathy is less common among upper extremity mononeuropathies (14), it remains the most frequently injured peripheral nerve (15). Gill et al. highlighted its predominance in men aged 15–30, likely reflecting higher exposure to physical trauma (2). In our cohort, younger males were also more frequently affected. Radial nerve palsy occurs in 2–17% of traumatic humeral shaft fractures, which account for up to 70% of all radial neuropathies (16,17). The spiral groove is the most commonly affected segment (18–21). Consistent with previous findings (16), humeral fractures were the leading cause in our series, most often involving the main trunk—Level 2—on electrophysiological evaluations. Radial fractures followed in frequency. Surgical repair of these fractures may also cause secondary nerve injury, with a reported incidence of 10–20% (22,23); three of our patients developed radial neuropathy postoperatively. Radial nerve involvement can occur secondary to tumoral lesions such as schwannomas, neurofibromas. Post-surgical radial nerve palsy is most commonly associated with involvement of motor fibers by the tumor (24). In our series, two patients developed radial nerve palsy following surgical excision of tumoral lesions located on the extensor surface of the forearm. However, the origin of the tumors and pathological confirmation were not available for these cases. Although less frequent, non-traumatic cases were also identified. Unlike the median and ulnar nerves, the radial nerve is anatomically well protected, making compression neuropathies less common. Still, entrapment can occur, especially at the axilla, spiral groove, or dorsolateral wrist (25). In our compression-related cases, electrophysiological studies localized involvement most frequent in the proximal and main trunk of the radial nerve.

Electrodiagnostic evaluation plays a critical role in confirming radial mononeuropathy and determining the precise lesion site (16). A thorough assessment should include both motor and sensory nerve conduction studies of the radial nerve, particularly targeting segments in the proximal arm, alongside needle EMG of related muscles. Differential diagnoses such as C7 radiculopathy, brachial plexopathy, and mononeuropathy multiplex must also be systematically ruled out. Motor conduction studies are especially useful in detecting demyelinating lesions at the spiral groove. Stimulation above the groove can help reveal conduction blocks, while reduced CMAP amplitudes—typically evident 5–7 days after injury—suggest axonal loss. Radial sensory conduction, often recorded at the anatomical snuffbox, aids in distinguishing between lesions of the main trunk and the posterior interosseous nerve (PIN). Needle EMG enhances diagnostic precision by localizing the lesion along the nerve course (16). Commonly assessed muscles include the triceps brachii, brachioradialis, extensor carpi radialis, extensor digitorum communis, extensor carpi ulnaris, and extensor indicis proprius. Neurogenic changes typically indicate axonal damage, whereas demyelination—such as from mid-humeral compression—may manifest as reduced recruitment. Accurate differentiation between axonal and demyelinating injuries is most reliable around four weeks post-onset; thus, in our study, EMGs performed at least one month after the initial clinical insult were evaluated. Among 24 patients who underwent radial motor conduction studies, conduction block at the spiral groove was identified in three. In the remaining cases, severe axonal loss precluded effective stimulation of the motor branch. Radial sensory conduction was successfully assessed in all patients and proved helpful in differentiating main trunk lesions from isolated posterior interosseous nerve (PIN) involvement. Needle EMG focused on key muscles: triceps brachii, extensor carpi radialis, supinator, extensor digitorum communis, and extensor indicis proprius. Triceps involvement indicated Level 1 injury, as its innervation precedes the spiral groove. If triceps was spared but extensor carpi radialis showed neurogenic changes, the lesion was localized to Level 2. Conversely, when extensor carpi radialis was unaffected but PIN-innervated muscles showed abnormalities, the injury was classified as Level 3. In cases where conduction studies were inconclusive due to axonal degeneration, needle EMG was critical for precise localization. The single patient with C7–C8 radiculopathy also showed neurogenic changes in muscles innervated by these roots (e.g., flexor carpi radialis, first dorsal interosseous), aiding differential diagnosis (16).

The anatomical location of injury was strongly correlated with electrophysiological findings. Proximal humeral trauma was typically associated with Level 1 involvement, whereas injuries to the distal humerus or radius were more commonly linked to Level 2 or Level 3 segments. Electrophysiological evidence of axonal injury was observed in all patients. Compression-related etiologies were primarily associated with partial or prominent partial axonal loss, while direct trauma—such as gunshot wounds, penetrating injuries, surgical interventions, and certain fracture cases—

was more frequently linked to complete axonal damage. Consistent with previous reports, blunt trauma, penetrating injuries, and gunshot wounds were the leading causes of total axonal injury in our cohort (26).

This study has several important limitations. First, we included only patients referred to our EMG laboratory specifically for isolated distal upper extremity extensor weakness. Patients presenting with this weakness alongside other neurological signs were excluded, as their evaluation targeted broader neurological conditions rather than isolated motor deficits. Consequently, our findings may not represent all neurological disorders that can manifest with similar symptoms. Second, due to the retrospective design, we relied on previously recorded electrophysiological data. As a result, we could not consistently distinguish between finger drop and wrist drop based on clinical presentation. Instead, our analysis focused solely on electrophysiological findings, which may limit the clinical specificity of our observations. Moreover, electrophysiological follow-up was not conducted; therefore, prognostic information could not be provided.

6. Conclusion

Radial nerve injury emerged as the most common cause of isolated distal extensor weakness in the upper limb. Trauma was the predominant etiology, with electrophysiological studies frequently localizing the lesion to the main trunk of the radial nerve, distal to the triceps branch. Axonal injury was the primary pathological feature, and its severity strongly correlated with both the mechanism and nature of trauma—highlighting its potential role as a prognostic marker. To enhance our understanding of the underlying etiologies and prognostic indicators in this clinical presentation, future prospective studies incorporating standardized EMG protocols and refined clinical classifications are warranted.

REFERENCES

1. Shields LB, Iyer VG, Zhang YP, Shields CB. Clinical, Electrodiagnostic, and Ultrasound Findings in 87 Patients With Finger Drop. Cureus. 2024;16(4):e57913.
2. Gill ZA, Ayaz SB, Ahmad A, Matee S, Ahmad N. Electrophysiological and etiological evaluation of 119 cases of wrist drop: A single center study. J Pak Med Assoc. 2019;69(5):672-6.
3. Choudhury C, Chaudhry N, Sengupta A, Gyanchandani K. Bilateral finger drop: a rare presentation of amyotrophic lateral sclerosis. Int J Sci Res. 2018;9:1279-81.
4. Varatharaj A, Pinto A, Manning M. Differential diagnosis of finger drop. Neurologist. 2015;19(5):128-31.
5. Cho TK, Bak KH. Posterior interosseous nerve (PIN) syndrome caused by anomalous vascular leash. J Korean Neurosurg Soc. 2005;37:293-5.
6. Incecik F, Herguner OM, Besen S. Finger drop sign in a child with acute motor and sensory axonal neuropathy form of Guillain-Barré syndrome. Acta Neurol Belg. 2017;117(1):393-4.
7. Kudlac M, Cummings R, Finocchiaro J. Finger drop: cervical radiculopathy, peripheral nerve lesion, or multifocal neuropathy? A case report. JOSPT Cases. 2022;2:112-6.
8. Campbell WW, Buschbacher R, Pridgeon RM, Freeman A. Selective finger drop in cervical radiculopathy: the pseudopseudoulnar claw hand. Muscle Nerve. 1995;18(1):108-10.
9. Furukawa M, Kamata M: Classification of finger posture in drop finger due to cervical foraminal stenosis: a mini-review. Int J Phys Med Rehabil. 2020;8:548.
10. Athar I, Khattak NN, Rajput HM, Badshah M, Zayian Z. Finger drop sign in Guillain-Barre syndrome. Pak J Neurol Sci. 2021;16:1.
11. Yoon BA, Ha DH, Park HT, Kusunoki S, Kuwahara M, Lee JH, et al. Finger drop sign as a new variant of acute motor axonal neuropathy. Muscle Nerve. 2021;63(3):336-43.
12. Nicolle MW. Wrist and finger drop in myasthenia gravis. Clin Neuromusc Dis. 2006;8:65-9.
13. Campbell WW, Buschbacher R, Pridgeon RM, Freeman A. Selective finger drop in cervical radiculopathy: the pseudopseudoulnar claw hand. Muscle Nerve. 1995;18(1):108-10.
14. Fernandez E, Di Rienzo A, Marchese E, Massimi L, Lauretti L, Pallini R. Radial nerve palsy caused by spontaneously occurring nerve torsion. Case report. J Neurosurg. 2001;94(4):627-9.
15. Robinson LR. Traumatic injury to peripheral nerves. Muscle Nerve. 2000;23(6):863-73. 4598(200006)23:6<863::aid-mus4>3.0.co;2-0.
16. Mondelli M, Morana P, Ballerini M, Rossi S, Giannini F. Mononeuropathies of the radial nerve: clinical and neurographic findings in 91 consecutive cases. J Electromyogr Kinesiol. 2005;15(4):377-83.

17. Niver GE, Ilyas AM. Management of radial nerve palsy following fractures of the humerus. Orthop Clin North Am. 2013;44(3):419-x.
18. Carlson N, Logigian EL. Radial neuropathy. Neurol Clin. 1999;17(3):499-vi.
19. Wang LH, Weiss MD. Anatomical, clinical, and electrodiagnostic features of radial neuropathies. Phys Med Rehabil Clin N Am. 2013;24(1):33-47.
20. Markiewitz AD, Merryman J. Radial nerve compression in the upper extremity. J Hand Surg Am. 2005;5:87–99.
21. Lowe JB 3rd, Sen SK, Mackinnon SE. Current approach to radial nerve paralysis. Plast Reconstr Surg. 2002;110(4):1099-113.
22. DeFranco MJ, Lawton JN. Radial nerve injuries associated with humeral fractures. J Hand Surg Am. 2006;31(4):655-63.
23. Samardzić M, Grujicić D, Milinković ZB. Radial nerve lesions associated with fractures of the humeral shaft. Injury. 1990;21(4):220-22.
24. Żyluk A, Owczarska A. Outcomes of surgery for schwannomas of the upper extremity. Pol Przegl Chir. 2021;94(2):49-53.
25. Laumonerie P, Dufournier B, Vari N, Manchec O, Tibbo ME, Cintas P, et al. Atraumatic proximal radial nerve entrapment. Illustrative cases and systematic review of literature. Eur J Orthop Surg Traumatol. 2022;32(5):811-20.
26. Guo Y, Chiou-Tan FY. Radial nerve injuries from gunshot wounds and other trauma: comparison of electrodiagnostic findings. Am J Phys Med Rehabil. 2002;81(3):207-11.