Review paper

Cite as: Cosentino A, Carlier Y, Rennie WJ, Pesquer L: Ultrasound evaluation of the ulnar nerve in cubital tunnel syndrome: anatomy, normal and abnormal findings, and postoperative aspects. J Ultrason 2026; 26: 2. doi: 10.15557/JoU.2026.0002.

Submitted: 17.10.2025
Accepted: 17.12.2025
Published: 13.03.2026

Ultrasound evaluation of the ulnar nerve in cubital tunnel syndrome: anatomy, normal and abnormal findings, and postoperative aspects

Aurelio Cosentino[1], Yacine Carlier[2], Winston J. Rennie[3], Lionel Pesquer[4]

[1] Department of Medical Imaging, Hôpital Riviera-Chablais, Switzerland
[2] Centre de l'Arthrose, Clinique du Sport, France
[3] Department of Radiology, Leicester Royal Infirmary, United Kingdom
[4] Department of Radiology, Enosis, Clinique du Sport, France

Corresponding author: Aurelio Cosentino; e-mail: aurelio.cosentino@hopitalrivierachablais.ch

DOI: 10.15557/JoU.2026.0002

Keywords
ulnar nerve; ultrasound; cubital tunnel syndrome; postoperative

Abstract

Cubital tunnel syndrome is the second most common compressive neuropathy of the upper limb after carpal tunnel syndrome and results from entrapment of the ulnar nerve around the elbow. High-resolution ultrasound has become a central diagnostic modality because of its excellent spatial resolution, capacity for dynamic assessment, and broad availability in clinical practice. This review offers an integrated and updated overview of the ultrasonographic evaluation of the ulnar nerve in cubital tunnel syndrome, detailing relevant anatomy, characteristic normal and pathological appearances, and key considerations in postoperative follow-up. The ulnar nerve may be compressed at several anatomical sites, including the arcade of Struthers, the retrocondylar groove, Osborne's ligament within the cubital tunnel, and the aponeurosis between the two heads of the flexor carpi ulnaris. Typical sonographic abnormalities include focal or segmental nerve enlargement, disruption or loss of the normal fascicular architecture, and changes in echogenicity. Dynamic maneuvers during ultrasound examination can further identify nerve subluxation, dislocation, or snapping over the medial epicondyle, all of which may contribute to clinical symptoms. Postoperative ultrasound evaluation is increasingly important for detecting complications or persistent compression following in-situ decompression, medial epicondylectomy, or anterior transposition. A standardized and reproducible ultrasound protocol is therefore essential for accurate diagnosis, appropriate management, and follow-up. Radiologists play a pivotal role in this multidisciplinary approach by providing detailed imaging assessments that guide surgical decision-making and help optimize patient outcomes.

Introduction

Cubital tunnel syndrome (CuTS) involves entrapment of the ulnar nerve at the elbow and represents the second most common compressive neuropathy of the upper limb after carpal tunnel syndrome, with an incidence of 21–25/100,000[(1)]. The 51st round-table meeting of the French nerve surgeons (GEM-SFCM) in 2015 reported that for every eight carpal tunnel surgeries, only one ulnar tunnel at the elbow is operated[(2)].

Conventionally, neuropathies are diagnosed on the basis of clinical examination, including positive Tinel's sign, and nerve conduction studies. However, the low sensitivity of these methods and their lack of anatomical information have led to increased use of imaging, particularly high-resolution ultrasound (US). US offers excellent spatial resolution and dynamic evaluation, with direct visualization of the ulnar nerve fascicles and surrounding tissues.

This article provides a practical overview of the ultrasonographic assessment of the ulnar nerve in CuTS, highlighting key examination techniques, diagnostic markers, dynamic evaluation features, and post-surgical evaluation.

Normal anatomy of the ulnar nerve at the elbow

The ulnar nerve arises from the medial cord of the brachial plexus and carries fibers from the C8-T1 ventral roots. The nerve originates in the axillary fossa behind the pectoralis minor muscle and courses through the anterior compartment alongside the brachial artery.

It enters the posterior compartment via the medial intermuscular septum to pass under the arcade of Struthers, a controversial structure that some consider an accessory head of the medial triceps or the internal brachial ligament[3,4]. It continues in the retrocondylar groove behind the medial epicondyle and enters the cubital tunnel, bounded by Osborne's ligament and the medial collateral ligament. Distally, it traverses beneath the aponeurosis between the heads of the flexor carpi ulnaris (FCU) muscle and the arcade of Amadio and Beckenbaugh. The ulnar nerve provides sensory innervation to the ulnar fourth and entire fifth finger and to the medial aspect of the forearm; motor supply includes the FCU muscle and the medial half of the flexor digitorum profundus proximally, and all thenar and hypothenar muscles of the hand, except the opponens pollicis, the superficial head of the flexor pollicis brevis, and the first two lateral lumbricals, which are supplied by the median nerve. Ulnar neuropathy initially affects sensory fibers, and progression impairs motor fibers, leading to muscular weakening and muscular atrophy over time[5].

Microscopic anatomy. Histologic examination of the ulnar nerve within the cubital tunnel reveals a fascicular architecture that varies according to location. Green and Rayan's cadaveric study[6] demonstrated a polyfascicular configuration proximally, with an average of 11 fascicles three centimeters above the medial epicondyle. As the nerve approaches and crosses the medial epicondyle, this pattern shifts to an oligofascicular arrangement, with as few as 3–4 large fascicles and several smaller ones. This structural simplification within the fibrosseous tunnel and at the level of the common flexor aponeurosis is hypothesized to provide biomechanical protection in a region exposed to elevated pressure during elbow flexion[6,7]. Distally, the ulnar nerve resumes a polyfascicular pattern, increasing again to an average of 13 fascicles, five centimeters beyond the epicondyle.

Normal and abnormal ultrasound nerve findings

A high-frequency linear transducer (12–18 MHz) is recommended. Scanning is performed in both short- and long-axis planes, and the transducer must be orientated perpendicular to the nerve course to reduce anisotropy. The examination starts from the axillary region, where the ulnar nerve is visualized together with the median nerve, and then followed distally past the cubital tunnel to the mid-forearm. The patient should be examined with the arm in varying degrees of flexion to evaluate nerve mobility and potential subluxation[1,8].

A normal ulnar nerve appears oval to round and well-defined, with hypoechoic fascicles surrounded by a hyperechoic epineurium, the two combined producing the classic "honeycomb" appearance.

Pathologic changes resulting from nerve compression lead to ischemia of the vasa nervorum and venous congestion, ultimately producing intraneural oedema. As the condition progresses, fibrosis of the perineurium may ensue. These pathophysiologic changes are reflected in sonographic findings, which include abrupt changes in nerve diameter with focal flattening at the entrapment site and proximal nerve enlargement due to oedema. The normal fascicular "honeycomb" pattern may be lost, replaced by a homogeneous hypoechoic appearance, often accompanied by epineural oedema or halo sign. Coalescence or swelling of fascicles, hyperechoic fibrotic spots in chronic cases, and hypertrophy of the epineurium may also be seen. Color Doppler can detect hypervascularity due to inflammation. In longstanding disease, atrophy of the innervated muscles may manifest as loss of muscle bulk with increased echogenicity[1,8–10]. Table 1 summarizes quantitative measurements of normal and abnormal ulnar nerve in CuTS.

Ulnar nerve compression sites around the elbow

Medial intermuscular septum and arcade of Struthers

These proximal sites may be overlooked but are increasingly recognized as sources of ulnar nerve entrapment, particularly in cases of persistent or recurrent CuTS.

Anatomy. The medial intermuscular septum (MIS) separates the anterior and posterior compartments of the arm and extends from the lesser tuberosity to the medial epicondyle of the humerus. The ulnar nerve pierces this septum to pass from the anterior to the posterior compartment, and subsequently passes beneath the arcade of Struthers. This is a musculoaponeurotic arcade, located approximately 8 cm proximal to the medial epicondyle, that may be formed by fibrous bands between the medial head of the triceps and the MIS.

Tab. 1. Quantitative measurements of the ulnar nerve and CuTS reported in the literature. CSA: cross-sectional area

Parameter	Criteria	Notes
Average CSA of ulnar nerve at ulnar tunnel	$8\ mm^2 \pm 3\ mm^2$	Based on GEL (Ultrasound French study group) reference study[11]
Enlarged CSA at medial epicondyle	$>10\ mm^2$	Indicates possible ulnar nerve enlargement[11–13]
Enlarged CSA within the ulnar tunnel	$>15\ mm^2$	
CSA ratio (compressed site vs non-compressed proximal site)	>1.4–1.5	When associated with pathological changes[13,14]
CSA difference (pathologic vs. contralateral side)	$>2\ mm^2$	Suggests abnormality if asymmetry is present[15]

Common etiologies. *Fibrous bands* between the medial head of the triceps and the MIS, often congenital or acquired through repetitive mechanical stress. To identify such a focal fibrous band as pathological – within the context of normal anatomical structures such as the MIS and the arcade of Struthers – comparison with both more proximal and distal segments, as well as with the contralateral arm, is necessary. Moreover, when a structure is considered pathological, corresponding alterations of the ulnar nerve at that level should be demonstrated, ideally supported by dynamic assessment to evaluate possible nerve tethering. *Hypertrophied or anomalous triceps muscle slips* forming a compressive tunnel. *Iatrogenic scarring* following previous decompression/transposition surgeries.

Ultrasound findings. The ulnar nerve is hypoechoic as it transverses the MIS and the arcade of Struthers. Compression is inferred by an abrupt calibre change, nerve flattening or displacement against the septum, with proximal swelling. US can resolve fascicular changes and identify thick fibrous bands. Dynamic scanning may show nerve tethering or abnormal motion and torsion during flexion-extension[16].

Retrocondylar groove

Anatomy. The retrocondylar groove is an osseous channel between the medial epicondyle and the olecranon that contains the ulnar nerve. It is vulnerable to mechanical irritation and subluxation during elbow flexion, particularly in patients with cubitus valgus deformity[17].

Common etiologies. *Repetitive microtrauma or sustained continuous pressure* (e.g., leaning on the elbows), may lead to perineural fibrosis. *Congenital dysplasia* of the epicondyle or trochlea can narrow the osseous channel.

Snapping elbow. Snapping elbow (Fig. 1) refers to subluxation or dislocation of the ulnar nerve over the medial epicondyle during elbow flexion and is often related to a shallow groove, ligamentous laxity, or absence of Osborne's ligament. Notably, at this level, the medial head of the triceps may also dislocate over the medial epicondyle, leading to characteristic patient-reported symptoms of first (nerve) and second (medial triceps head) snap during elbow flexion. In patients reporting snapping sensations, both the nerve and the triceps muscle must be evaluated[10,13]. Resisted extension and flexion under ultrasound may be required to show the abnormal movement.

Ultrasound findings. With the elbow in extension, the normal nerve is oval and lies within the groove; during flexion, medial displacement or subluxation of the nerve can be dynamically visualized. In chronic cases, loss of fascicular detail and signs of perineural fibrosis may be evident[10].

Osborne's ligament (cubital tunnel retinaculum)

This is the classic site of CuTS and a major focus of diagnostic imaging.

Anatomy. Osborne's ligament extends from the medial epicondyle to the olecranon, forming the roof of the cubital tunnel. It tightens with elbow flexion, reducing the tunnel section by ~55% and raising extraneural pressure. The medial elbow joint capsule forms the floor of the cubital tunnel[6,7,18].

Common etiologies. *Thickened Osborne's ligament* (humeroulnar aponeurotic arcade), often visualized as a compressive band over the ulnar nerve (Fig. 2). *Anconeus epitrochlearis muscle* is the most common structural cause of CuTS (present in ~10%–34% of individuals), which may replace Osborne's ligament due to its analogous course and can compress the nerve with flexion[19]. *Fibrous or muscular hypertrophy* resulting from repetitive strain (e.g., heavy manual labor, sports activities) may further contribute to nerve compression. *Periarticular or articular conditions* such as synovitis, osteoarthritic periarticular spurs, ganglion cysts, (osteo)chondromatosis, or joint effusion of the adjacent elbow, all of which may also lead to compression.

Ultrasound findings. The nerve demonstrates a focal caliber change with maximal compression beneath Osborne's ligament at ~135° of elbow flexion[20]. The ligament may be thickened or replaced by an accessory anconeus epitrochlearis muscle with a triangular or trapezoid shape.

Flexor carpi ulnaris (FCU) muscle heads and the Amadio-Beckenbaugh arcade

Sites of compression distal to the cubital tunnel must be actively and systematically evaluated, as they are often overlooked.

Anatomy. Distal to the cubital tunnel, the ulnar nerve passes between the humeral and ulnar heads of the FCU muscle. Distally, five to seven centimeters below the medial epicondyle, it passes beneath the arcade of Amadio and Beckenbaugh, defined as the common aponeurosis between the humeral head of the FCU and the flexor digitorum superficialis, which forms an elliptic tunnel.

Common etiologies. *Hypertrophy of the FCU heads*, commonly associated with repetitive overuse or high-load activities (e.g., weight-lifting, throwing sports), may progressively compress the ulnar nerve.

Presence of *fibrous septa or aponeurotic bands* arising from the flexor–pronator origin (Fig. 3) and *post-traumatic fibrosis or scarring*, can alter the normal gliding environment of the ulnar nerve and predispose it to entrapment.

Ultrasound findings. Enlargement of the ulnar nerve cross-sectional area (CSA) distal to the tunnel may suggest continued compression. Fascial fibrous hypertrophy between the heads of the FCU can be seen. Color Doppler imaging may show hyperemia in inflammatory causes. Anomalous accessory muscles (e.g., accessory palmaris longus, accessory flexor carpi ulnaris, or accessory abductor digiti minimi) have been reported as potential causes of ulnar nerve compression and should be considered when evaluating more distal sites in the forearm[21], although a precise description of these entities lies beyond the scope of the present article.

MRI comparison

Magnetic resonance imaging (MRI) can identify muscular asymmetry and oedema, and nerve signal hyperintensity. However, MRI

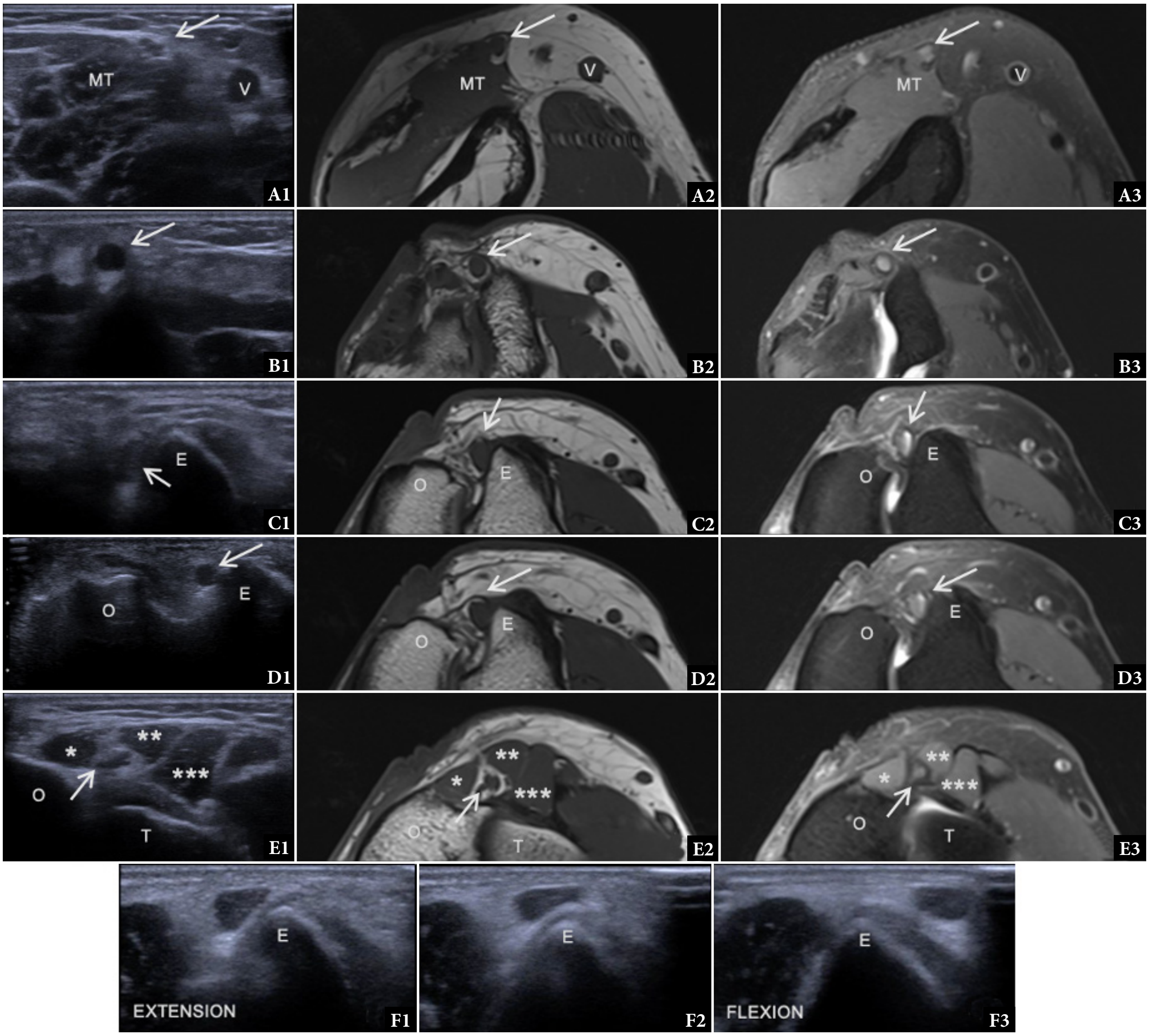

Fig. 1. *Ulnar nerve neuropathy due to instability.* **A–E.** *Proximal to distal axial images in a 55-year-old male patient with ulnar nerve neuropathy due to instability. Ultrasound axial images (first column); MRI axial T1 TSE images (second column); MRI axial PD FS TSE images (third column).* **A.** *Arcade of Struthers level: Normal ulnar nerve (arrow), medial head of triceps (MT), basilic vein (V).* **B–C.** *Retrocondylar groove level: Neuropathic ulnar nerve – hypoechoic on ultrasound and hyperintense on PD FS MRI. Medial epicondyle (E).* **D.** *Cubital tunnel level: Neuropathic ulnar nerve (arrow). Medial epicondyle (E), olecranon (O).* **E.** *Flexor carpi ulnaris (FCU) level: Normal ulnar nerve (arrow), olecranon (O), medial margin of humeral trochlea (T), ulnar head of FCU (*), humeral head of FCU (**), flexor digitorum superficialis (***).* **F.** *Ultrasound at the same level as* (**C**) *during dynamic assessment:* **F1.** *Elbow in extension, ulnar nerve in normal position;* **F2.** *Ulnar nerve luxation during elbow flexion;* **F3.** *Ulnar nerve displaced anteriorly at 90° elbow flexion*

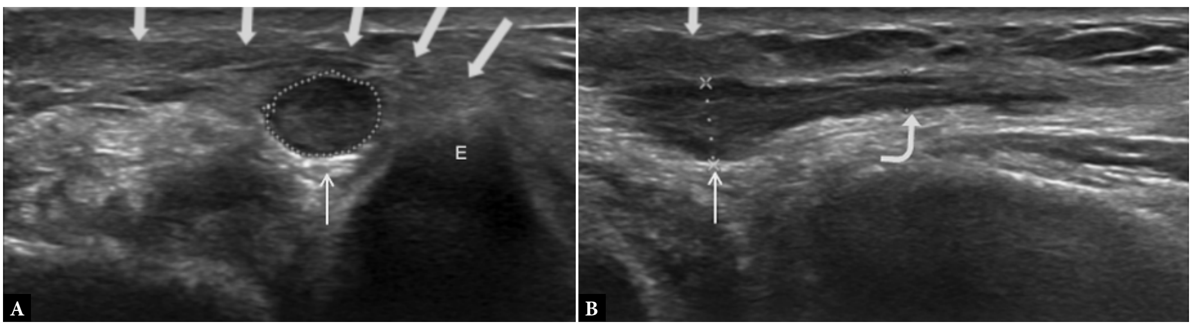

Fig. 2. *Ulnar nerve neuropathy due to compression by Osborne's ligament.* **A.** *Transverse ultrasound view and* **B.** *Longitudinal ultrasound view at epicondyle level (E). The ulnar nerve appears hypoechoic, enlarged, and swollen (thin arrow). Osborne's ligament is thickened (multiple thick arrows). Distally to the impingement, the ulnar nerve fascicular pattern is preserved (curved arrow)*

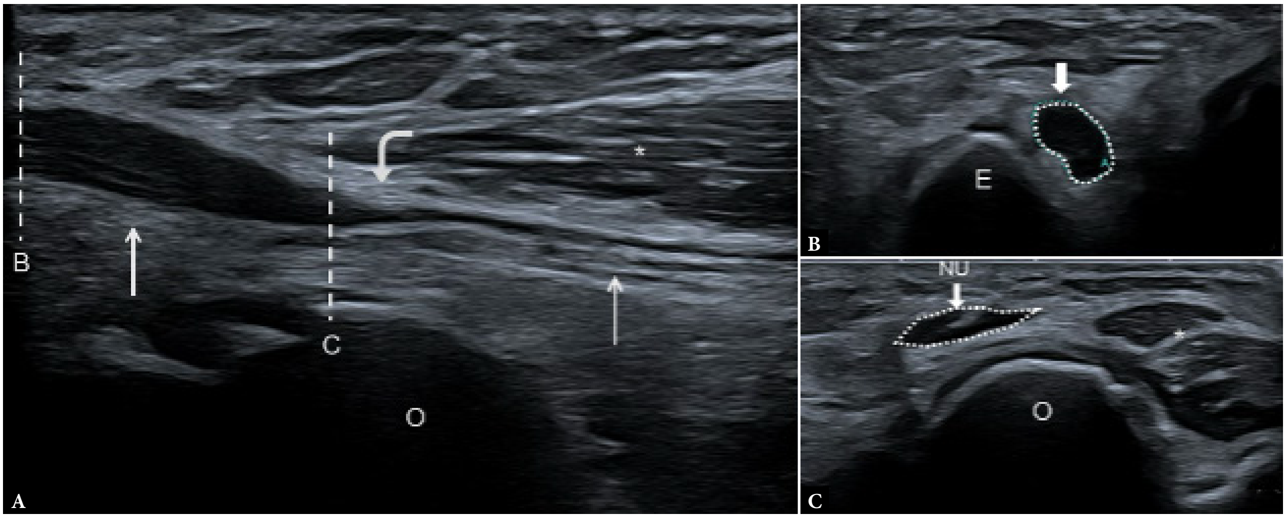

Fig. 3. *Ulnar nerve impingement at the FCU level. Ultrasound with longitudinal (**A**) and axial (**B, C**) views with corresponding levels (dashed lines). The ulnar nerve (straight arrows) appears hypoechoic, enlarged, and swollen (**B**) proximal to the FCU arcade (curved arrow). At the FCU level, the nerve appears flattened (**C**) with intraneural hyperechoic spot due to possible fibrosis. Distal to the compression site, the fascicular pattern is preserved in (**A**). (NU and dotted circle) ulnar nerve; (E) epicondyle; (O) olecranon; (*) FCU muscle*

resolution may be insufficient for thin fibrous bands, and it lacks the dynamic capability to demonstrate motion or snapping.

Functional and systemic contributors

In addition to anatomical compressive lesions, several systemic or biomechanical factors may predispose or contribute to CuTS: *Occupational or athletic overuse,* particularly activities involving repetitive or prolonged elbow flexion, or acute elbow trauma, like baseball (notably pitchers), wrestlers, cyclists, weightlifters, martial arts fighters, and skiers[13]. The biomechanics of pitching, in particular, involve periods of prolonged elbow flexion with medial loading, and nerve CSA has been shown to asymptomatically increase in baseball pitchers from preseason to postseason [22]. Patients at risk include truck drivers, who rest the flexed elbow against the open window of their truck, and cell phone users[1].

Diabetes mellitus, which predisposes to peripheral nerve entrapment through microvascular ischemia and nerve swelling. Obesity has also been proposed as a factor increasing tissue pressure around the cubital tunnel and thereby reducing available space; however, this association remains more controversial and is not consistently supported across the literature[23,24].

Intrinsic pathologies

Although less common than compressive etiologies, intrinsic pathologies should also be considered in the differential diagnosis. These include *peripheral nerve sheath tumors (PNSTs)*, which may be benign or malignant, such as schwannomas and neurofibromas, as well as post-traumatic neuromas and intraneural hematomas. Schwannomas typically present as well-defined, fusiform masses, hypo- to isoechoic relative to muscle, with preserved fascicular continuity. Rare malignant variants should be suspected when lesion size exceeds 5 cm, with poorly defined borders[17]. *Post-traumatic neuromas*, in contrast, may appear as irregular, hypoechoic swellings that lack a clear fascicular structure on ultrasound. *Hematomas*, often following trauma or iatrogenic injury, can compress the nerve internally (intraneural) or externally, appearing as non-vascular, heterogeneous echogenic masses depending on their age[1].

Differentiation among these lesions is essential, particularly as their management differs significantly from that of compression neuropathies, often necessitating biopsy, surgical excision, or close follow-up with serial imaging.

Extrinsic masses or lesions (any level)

Although less common, mass lesions can cause compression anywhere along the ulnar nerve. Notably, ganglion cysts, typically arising from the elbow joint capsule but occasionally developing intraneurally, heterotopic ossification, and vascular anomalies, such as ulnar artery aneurysm, can cause compression on the ulnar nerve. Benign soft-tissue tumors, such as elbow lipomas, are typically benign and incidental, with ulnar nerve involvement occurring only when the lesion is large or deep and develops within the osteoligamentous tunnel or intramuscularly[25].

Iatrogenic etiologies include compression during general anesthesia, subdermal contraceptive implants, and following venipuncture.

Surgical techniques in CuTS: imaging considerations for radiologists

Surgery in CuTS aims to relieve impingement of the ulnar nerve and restore function. While the choice of technique depends on patient-specific anatomy and severity of symptoms, radiologists must focus on anatomical changes and their imaging appearances, which are critical for evaluating both surgical success and potential complications.

Surgical techniques

In situ (simple) decompression. One of the most common surgical techniques is in situ decompression, in which Osborne's ligament and adjacent fascial structures are incised or excised without altering the course of the ulnar nerve. Postoperatively, the nerve remains in its anatomical position within the retrocondylar groove. The ligament may be absent or thinned, and transient local edema is often present. On MRI, the nerve may appear hyperintense on T2-weighted images for several weeks due to postoperative inflammation; persistence of MRI signal change should not be interpreted as treatment failure[26]. On ultrasound, persistent thickening may last several weeks or months, making the diagnosis of recurrent impingement challenging. Radiologists must carefully assess for incomplete decompression, particularly at proximal or distal sites like the arcade of Struthers or between the FCU heads. Dynamic ultrasound is useful in the postoperative evaluation of nerve instability, which in some cases may be exacerbated by decompression.

Medial epicondylectomy. Medial epicondylectomy is another technique where part or all of the medial epicondyle is resected to relieve bone compression. Often combined with decompression, this procedure alters key osseous landmarks. Postoperative anatomy reveals partial or complete absence of the medial epicondyle and an altered relationship between the ulnar nerve and the flexor-pronator origin. The nerve may still lie within the groove or slightly anterior. On imaging, the surgical bed often demonstrates remodeling or persistent oedema. While mild scarring of adjacent soft tissues is common, it does not necessarily correlate with clinical symptoms. Radiologists should also check for changes in muscle origin or signs of medial collateral ligament injury, which can cause valgus instability.

Anterior transposition. The third major group of techniques is anterior transposition (Fig. 4), in which the ulnar nerve is relocated from its native posterior position to a new location anterior to the medial epicondyle. It is performed to prevent subluxation, reduce mechanical irritation, or address recurrent entrapment. There are three variations of these transpositions and the resultant nerve position may be subcutaneous, intramuscular, or submuscular, depending on the depth and site of nerve relocation[27]. Postoperatively, the nerve follows a more anterior course, typically paralleling the median nerve. The cubital tunnel is left vacant, and the fascial planes along the new path are irregular. Ultrasound and MRI are used to confirm the new nerve path and determine whether the nerve lies within subcutaneous fat, between muscle bellies, or beneath the flexor-pronator mass.

Both MRI and US often reveal persistent postoperative edema along the nerve. Linear signal changes and disruption of perineural fat planes are expected, whereas retraction or ring-like fibrosis should raise concern for re-entrapment. Kinking or tethering at entry or exit points – commonly the arcade of Struthers proximally or distal FCU fibers – can compromise outcomes. Secondary entrapment at the level of the arcade of Struthers (Fig. 5) has been reported more com-

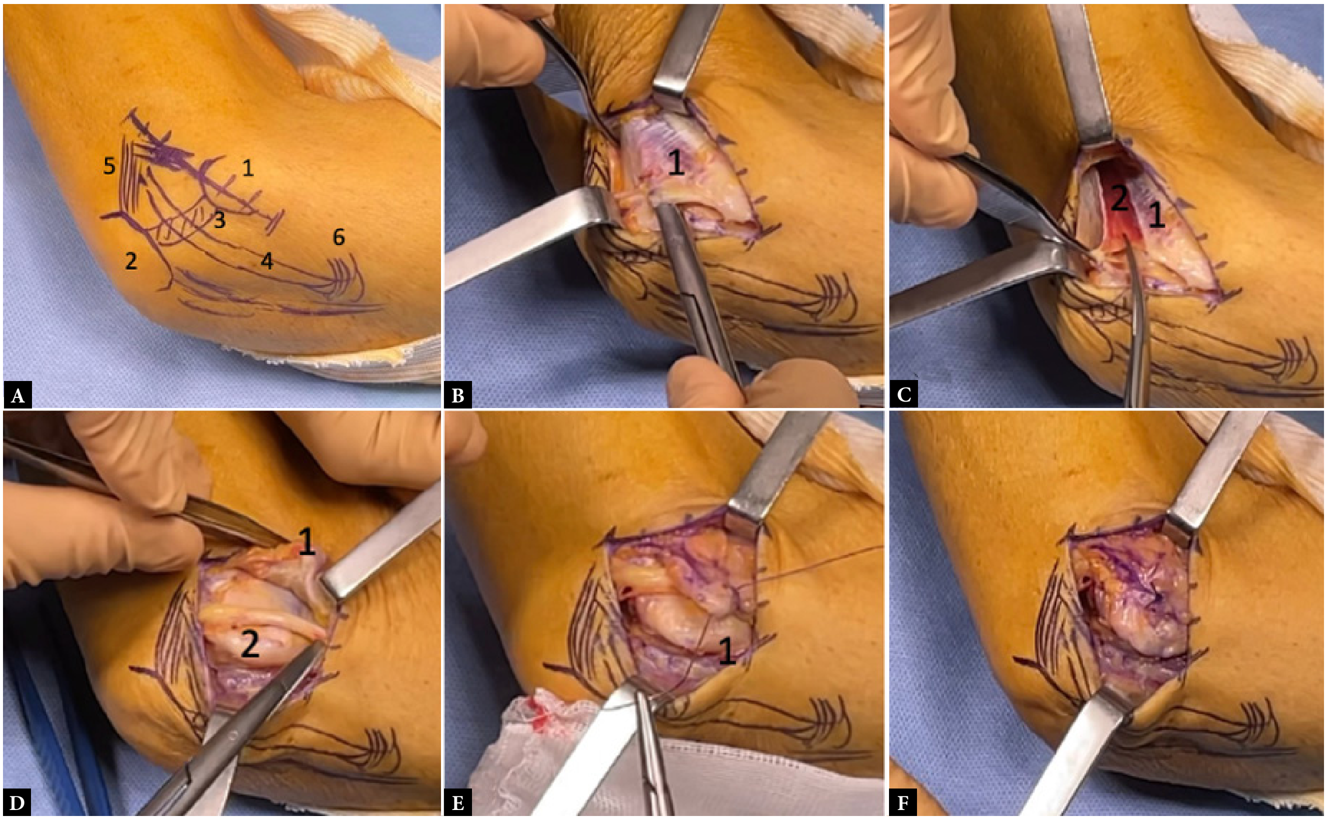

Fig. 4. *Ulnar nerve transposition at the elbow – surgical view.* **A.** *Drawing of anatomical landmarks- 1 – medial epicondyle; 2 – olecranon; 3 – Osborne's ligament band; 4 – ulnar nerve; 5 – flexor carpi ulnaris (FCU) origins; 6 – arcade of Struthers.* **B.** *Identification of FCU: 1 – FCU aponeurosis.* **C.** *Release of FCU aponeurosis: 1– superficial aponeurosis ; 2 – deep aponeurosis.* **D.** *Anterior transposition of the ulnar nerve in front of the medial epicondyle: 1 – aponeurotic flap; 2 – ulnar nerve.* **E, F.** *Coverage of ulnar nerve with aponeurotic flap. 1 –epicondyle*

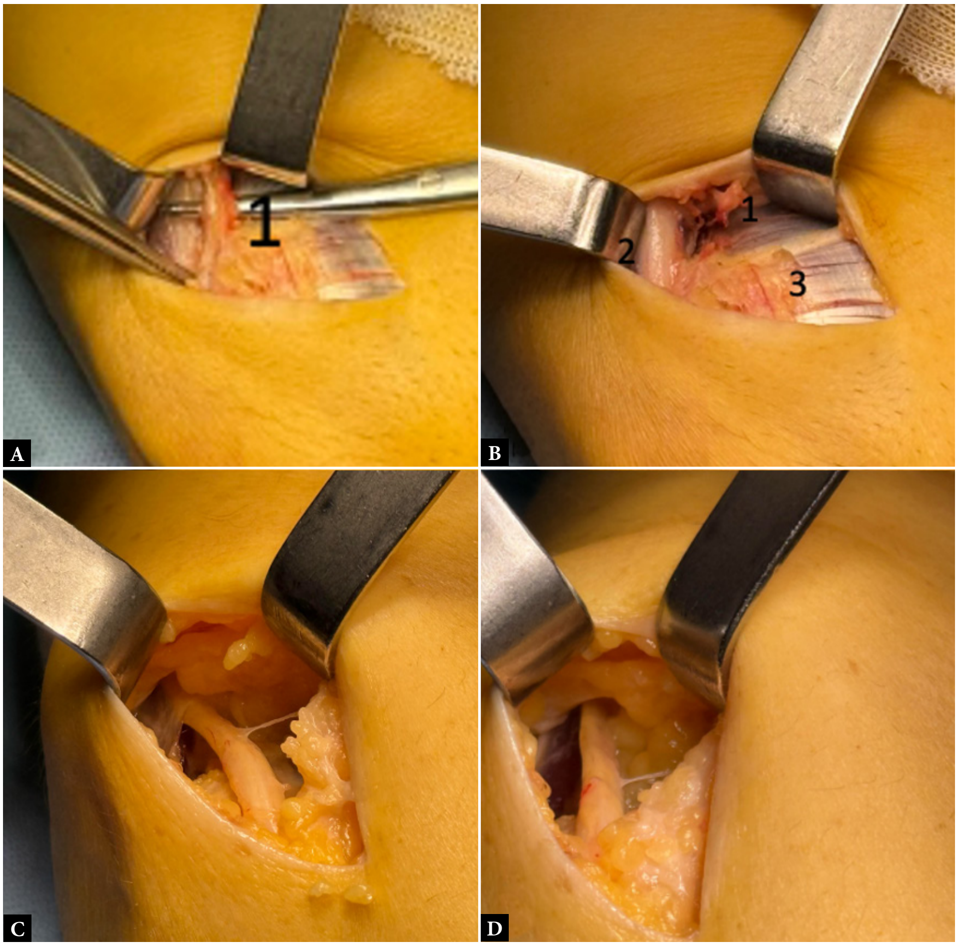

Fig. 5. *Release of Struthers' ligament – surgical view in two patients. This structure is rigid and creates a "razor blade" effect, compressing the ulnar nerve. The effect is exacerbated during elbow flexion and ulnar nerve instability.* **A.** *Identification of Struthers' ligament, located anterior to the ulnar nerve at the upper border of the medial epicondyle.* **B.** *Release of Struthers' ligament prior to anterior transposition of the ulnar nerve (not shown).* **C–D.** *Release of Struthers' ligament in another patient, note the changes in ulnar nerve angulation between* **C** *and* **D**. **A–D.** *1 –Struthers' ligament; 2 – ulnar nerve; 3 – flexor carpi ulnaris (FCU)*

monly following anterior transposition, likely due to tethering of the nerve from its altered course[4,28]. Additional complications include neuroma formation, perineural scarring, hematoma, and seroma.

Postoperative imaging strategy and interpretation

Ultrasound is the modality of choice for assessing dynamic nerve mobility and identifying instability. Postoperative scarring (Fig. 6) typically appears as hypoechogenic, noncompressible tissue enveloping the nerve. MRI, by contrast, is optimal for visualizing deep muscular compartments and evaluating for nerve oedema, muscle denervation, and the integrity of surgical corridors. T2-weighted hyperintensity and loss of fascicular detail are consistent with oedema or neuritis, while chronic denervation manifests as fatty infiltration of the affected muscles. Post-contrast sequences can differentiate active inflammation, neuroma, or granulation tissue. Postoperative fibrosis appears as a thick rind-like enhancement on T1-weighted images and hypointense tissue on T2-weighted images.

To guide interpretation, radiologists should follow a structured approach:

- Identify the surgical technique e.g., decompression, epicondylectomy, or transposition.
- Trace the new path of the nerve from proximal to distal, verifying that it lies in the expected location.
- Evaluate for persistent or new compression.
- Look for signs of kinking, scarring, or associated muscle signal abnormalities.
- Look for discrete fluid collections (such as hematoma, seroma, or abscess).
- Correlate imaging findings with the clinical course; residual signal abnormalities do not necessarily indicate surgical failure, especially in asymptomatic patients.
- Compare imaging with previous imaging for differentiating preexisting neural oedema and enlargement.

Conclusion

High-resolution ultrasound is central to the evaluation of cubital tunnel syndrome. Its diagnostic value depends on a thorough understanding of ulnar nerve anatomy, common compression sites, and surgical decompression techniques. Radiologists therefore play

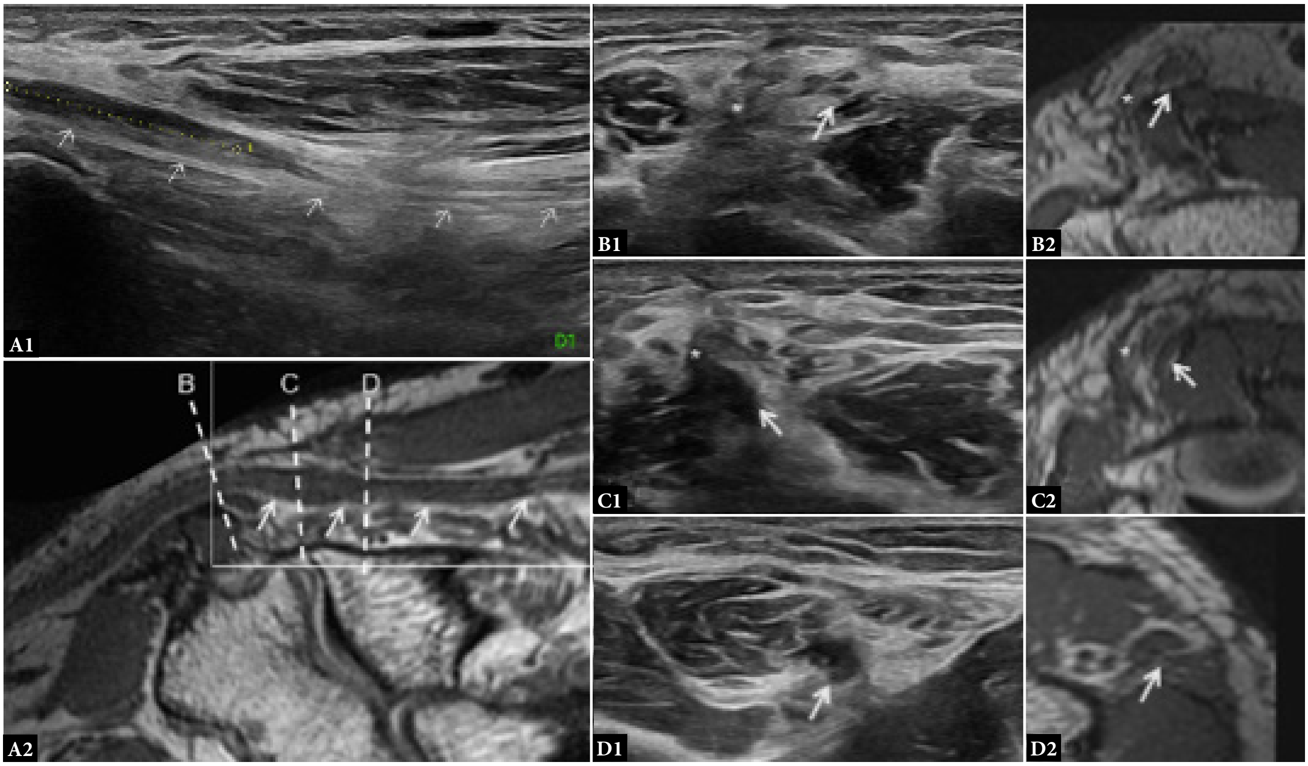

Fig. 6. *Ulnar nerve impingement at the level of postoperative scar following ulnar transposition*: **A–D1.** *Ultrasound;* **A–D2.** *PD SPACE reformat. In* **A2***, the square corresponds to the US view in* **A1** *and dotted lines correspond to the axial images in* **B–D.** *Arrows*: *ulnar nerve.* **A.** *Longitudinal view showing focal hypoechoic ulnar nerve with caliber change. This alteration is clearer on US than MRI.* **B.** *Ulnar nerve proximal to the scar (*); the fascicular pattern is preserved.* **C–D.** *At the scar level (* in* **C***), and slightly distally (***D***), the ulnar nerve appears distorted and hypoechoic, with loss of normal fascicular architecture*

a crucial role in both preoperative planning and postoperative evaluation with a standardized protocol, as summarized in this article, underscoring the importance of interdisciplinary collaboration.

Conflict of interest

The authors do not report any financial or personal connections with other persons or organizations which might negatively affect the contents of this publication and/or claim authorship rights to this publication.

Author contributions

Original concept of study: AC, LP. Writing of manuscript: AC, YC, LP. Analysis and interpretation of data: AC. Final acceptation of manuscript: AC, YC, WJR, LP. Collection, recording and/or compilation of data: AC. Critical review of manuscript: AC, YC, WJR, LP.

References

1. Klauser AS, Buzzegoli T, Taljanovic MS, Strobl S, Rauch S, Teh J, et al. Nerve entrapment syndromes at the wrist and elbow by sonography. Semin Musculoskelet Radiol. 2018;22(3):344–353. doi: 10.1055/s-0038-1641577.
2. Fantino O, Brasseur JL. Le nerf ulnaire. In: Echographie des nerfs périphériques. Sauramps Medical; 2022:358.
3. Natroshvili T, Meene M van de, Szweryn WJ, Kemler MA. The controversy surrounding the arcade of struthers: a systematic review of literature. Indian J Plast Surg. 2025;58(1):11–17. doi: 10.1055/s-0044-1793948.
4. Siqueira MG, Martins RS. The controversial arcade of Struthers. Surg Neurol. 2005;64 Suppl 1:S1:17-20; discussion S1:20–21. doi: 10.1016/j.surneu.2005.04.017.
5. Park GY, Kim JM, Lee SM. The ultrasonographic and electrodiagnostic findings of ulnar neuropathy at the elbow. Arch Phys Med Rehabil. 2004;85(6):1000–1005. doi: 10.1016/j.apmr.2003.09.016.
6. Green JR, Rayan GM. The cubital tunnel: anatomic, histologic, and biomechanical study. J Shoulder Elbow Surg. 1999;8(5):466–470. doi: 10.1016/s1058-2746(99)90078-2.
7. Pechan J, Julis I. The pressure measurement in the ulnar nerve. A contribution to the pathophysiology of the cubital tunnel syndrome. J Biomech. 1975;8(1):75–79. doi: 10.1016/0021-9290(75)90045-7.
8. Martinoli C, Bianchi S, Pugliese F, Bacigalupo L, Gauglio C, Valle M, Derchi LE. Sonography of entrapment neuropathies in the upper limb (wrist excluded). J Clin Ultrasound. 2004;32(9):438–450. doi: 10.1002/jcu.20067.
9. Nguyen C, Chou R. Diagnostic ultrasonography of upper extremity dynamic compressive neuropathies in athletes: A narrative review. Int Orthop. 2025;49(4):925–933. doi: 10.1007/s00264-025-06417-3.
10. Tagliafico AS, Bignotti B, Martinoli C. Elbow US: Anatomy, Variants, and Scanning Technique. Radiology. 2015;275(3):636–650. doi: 10.1148/radiol.2015141950.

11. Jacob D, Creteur V, Courthaliac C, Bargoin R, Sassus B, Bacq C, et al. Sonoanatomy of the ulnar nerve in the cubital tunnel: a multicentre study by the GEL. Eur Radiol. 2004;14(10):1770–1773. doi: 10.1007/s00330-004-2401-6.
12. Chang KV, Wu WT, Han DS, Özçakar L. Ulnar nerve cross-sectional area for the diagnosis of cubital tunnel syndrome: a meta-analysis of ultrasonographic measurements. Arch Phys Med Rehabil. 2018;99(4):743–757. doi: 10.1016/j.apmr.2017.08.467.
13. Hussein M, Hanumanthu MM, Shirodkar K, Papineni VRK, Rahij H, Velicheti S, et al. Cubital tunnel syndrome: anatomy, pathology, and imaging. Skeletal Radiol. 2025;54(1):1–15. doi: 10.1007/s00256-024-04705-4.
14. Choi SJ, Ahn JH, Ryu DS, Kang CH, Jung SM, Park MS, Shin DR. Ultrasonography for nerve compression syndromes of the upper extremity. Ultrasonography. 2015;34(4):275–291. doi: 10.14366/usg.14060.
15. Andreisek G, Crook DW, Burg D, Marincek B, Weishaupt D. Peripheral neuropathies of the median, radial, and ulnar nerves: MR imaging features. Radiographics. 2006;26(5):1267–1287. doi: 10.1148/rg.265055712.
16. Morag Y, Popadich M, Chang K, Yang LC. Imaging the intermuscular septum in the context of ulnar neuropathy. Skeletal Radiol. 2022;51(3):505–511. doi: 10.1007/s00256-021-03835-3.
17. Agarwal A, Chandra A, Jaipal U, Saini N. Imaging in the diagnosis of ulnar nerve pathologies – a neoteric approach. Insights Imaging. 2019;10(1):37. doi: 10.1186/s13244-019-0714-x.
18. Prasetyo M, Rahardja RR, Yanuar A, Prihartono J, Setiawan SI. Ultrasonography evaluation of the normal ulnar nerve in adult: Comparison of the cross-sectional area at elbow extension and flexion. Eur J Radiol Open. 2021;8:100331. doi: 10.1016/j.ejro.2021.100331.
19. Husarik DB, Saupe N, Pfirrmann CWA, Jost B, Hodler J, Zanetti M. Elbow nerves: MR findings in 60 asymptomatic subjects--normal anatomy, variants, and pitfalls. Radiology. 2009;252(1):148–156. doi: 10.1148/radiol.2521081614.
20. James J, Sutton LG, Werner FW, Basu N, Allison MA, Palmer AK. Morphology of the cubital tunnel: an anatomical and biomechanical study with implications for treatment of ulnar nerve compression. J Hand Surg Am. 2011;36(12):1988–1995. doi: 10.1016/j.jhsa.2011.09.014.
21. Natroshvili T, Roorda A, van Doorn M, Foumani M. Uncommon anatomical causes of ulnar compression: a narrative review. Ann Plast Surg. 2024;92(5):557–563. doi: 10.1097/SAP.0000000000003919.
22. Keller RA, Marshall NE, Bey MJ, Ahmed H, Scher CE, van Holsbeeck M, Moutzouros V. Pre- and postseason dynamic ultrasound evaluation of the pitching elbow. Arthroscopy. 2015;31(9):1708–1715. doi: 10.1016/j.arthro.2015.06.019.
23. Nyman E, Dahlin LB. The unpredictable ulnar nerve-ulnar nerve entrapment from anatomical, pathophysiological, and biopsychosocial aspects. Diagnostics (Basel). 2024;14(5):489. doi: 10.3390/diagnostics14050489.
24. Uzunkulaoğlu A, Ikbali Afsar S, Karataş M. Association between gender, body mass index, and ulnar nerve entrapment at the elbow: a retrospective study. J Clin Neurophysiol. 2016;33(6):545–548. doi: 10.1097/WNP.0000000000000288.
25. Savvidou OD, Koutsouradis P, Bolia IK, Kaspiris A, Chloros GD, Papagelopoulos PJ. Soft tissue tumours of the elbow: current concepts. EFORT Open Reviews. 2019;4(12):668–677. doi: 10.1302/2058-5241.4.190002.
26. Chadwick N, Morag Y, Smith BW, Yablon C, Kim SM, Yang LJ. Imaging appearance following surgical decompression of the ulnar nerve. Br J Radiol. 2019;92(1094):20180757. doi: 10.1259/bjr.20180757.
27. Nakashian MN, Ireland D, Kane PM. Cubital Tunnel syndrome: current concepts. Curr Rev Musculoskelet Med. 2020;13(4):520–524. doi: 10.1007/s12178-020-09650-y.
28. Spinner M, Kaplan EB. The relationship of the ulnar nerve to the medial intermuscular septum in the arm and its clinical significance. Hand. 1976;8(3):239–242. doi: 10.1016/0072-968x(76)90008-5.