Cubital Tunnel Syndrome

Synonym: ulnar neuritis, ulnar neuropathy at the elbow (UNE)

See related separate article Ulnar Nerve Disorders.

The ulnar nerve arises from the medial brachial plexus and innervates the muscles of the forearm and parts of the hand. It also carries sensory neurones supplying the skin of the back of the forearm, the palm and the ring and little fingers. Most damage to the ulnar nerve occurs at the elbow where it passes behind the medial epicondyle and under Osborne's ligament (humeroulnar aponeurotic arcade), through the cubital tunnel. \[1\]

The ulnar nerve may also be damaged:

- At the wrist: due to pressure in Guyon's canal from a deep ganglion, tumour or laceration.
- In the hand: due to compression of the deep motor branch against the pisiform and hamate, such as with prolonged pressure over the outer palm - eg, motorcyclists and using vibrating drills.

Epidemiology\[2\]

- The elbow is the most common site of compression of the ulnar nerve.
- Cubital tunnel syndrome is the second most common compressive neuropathy, after carpal tunnel syndrome.
- Cubital tunnel syndrome affects men twice as often as women.

Aetiology

Symptoms and signs are due to pressure and/or traction causing irritation of the ulnar nerve at the elbow:

- Constricting fascial bands.
- Compromise under general anaesthetic.
- Subluxation of the ulnar nerve over the medial epicondyle.
- Cubitus valgus.
- Bony spurs.
- Joint deformity in osteoarthritis or rheumatoid arthritis: osteoarthritic or rheumatoid narrowing of the ulnar groove and constriction of the ulnar nerve as it passes behind the medial epicondyle.
- Associated with medial epicondylitis ('golfer's elbow').
- Tumours.
- Ganglia.

One study of 117 people with cubital tunnel syndrome suggests that direct compression (eg, habitual leaning on elbows such as by administrative workers) appears to be the more likely cause when the nerve is damaged as it goes behind the medial epicondyle; it is more common in the non-dominant arm. Repetitive elbow flexion and extension, such as found in heavy manual workers, on the other hand, is associated with entrapment as the nerve passes under the humeroulnar aponeurotic arcade and is more common in the dominant arm.\[3\]

Other causes of ulnar nerve lesions at the elbow include:

- Fractures: friction of the ulnar nerve due to cubitus valgus (a possible sequel to childhood supracondylar fractures - 'tardy ulnar palsy') can cause fibrosis of the ulnar nerve and ulnar neuropathy.
- Elbow dislocation.
- Severe haematoma.
Presentation

- Ulnar nerve palsy causes wasting and weakness of the small muscles of the hand and partial clawing of the ring and little finger.
- The extent of the deformity and disability depends on the site of the lesion.
- Patients often have numbness and tingling along the little finger and ulnar half of the ring finger, often associated with a weakness of grip and particularly when the patient rests on, or flexes, the elbow.
- Patients may experience pain and tenderness at the level of the cubital tunnel. The severity of pain is very variable and the distribution of pain may spread proximally and/or distally.
- Symptoms may be intermittent at first and then become more constant.
- Patients with chronic ulnar neuropathy may complain of loss of grip and pinch strength and loss of fine dexterity.
- Patients may also complain that their little finger gets caught when putting their hand in their pocket. This is due to slightly greater abduction as a result of loss of the adductor effect from interosseous muscle (Wartenberg’s sign).
- Severe prolonged compression may present with intrinsic muscle wasting and clawing or abduction of the little finger.

Signs

- Examination may be normal in recent-onset, mild ulnar nerve palsy or show marked neurological abnormalities in prolonged severe ulnar nerve compression.
- Inspection for claw hand (hyperextension at the metacarpophalangeal joints and flexion of the interphalangeal joints; mainly little finger and ring finger) and wasting of the small muscles of the hand and hypothenar eminence. Adduction of the little finger may be impossible.
- Loss of sensation over the palmar and dorsal aspect of the little finger and the medial half of the ring finger.
- Palpate the cubital tunnel region to exclude mass lesions.
- Tinel's sign to detect an irritated nerve:
  - Tapping over the cubital tunnel causes pain, tingling or shock-like sensation down the arm into the fingers.
  - A positive Tinel's sign finding is typically present in cubital tunnel syndrome. However, Tinel's sign may be positive in asymptomatic people.
- The elbow flexion test:
  - Is a specific diagnostic test for cubital tunnel syndrome.
  - The patient flexes the elbow past 90°, supinating the forearm and extending the wrist for three minutes.
  - The result is positive if discomfort is reproduced or paraesthesia occurs or worsens within 60 seconds.
- Froment’s sign:
  - The patient holds a piece of paper between both thumbs and the sides of the adjacent index fingers as the paper is pulled away.
  - A patient with an ulnar nerve palsy cannot activate the adductor pollicis. As a result, they will flex the affected thumb at the interphalangeal joint to try to keep hold of the paper.

Differential diagnosis

- Other sites of ulnar nerve lesion - e.g., Guyon's canal at the wrist. Causes of ulnar nerve lesions at the wrist include compression by tumour or ganglion, blunt trauma, fractures.
- Acute pressure-related nerve palsy after lying or leaning on the elbow.
- Other causes of neurological dysfunction along the C8-T1 distribution - e.g., cervical spondylosis with cervical radiculopathy, brachial plexus damage, thoracic outlet syndrome, syringomyelia, Pancoast's tumour (apical lung cancer) and motor neurone disease.
- Carpal tunnel syndrome.
- Polyneuropathy - e.g., diabetes, renal disease, multiple myeloma, amyloidosis, chronic alcoholism, malnutrition, leprosy.
**Investigations**

- Nerve conduction studies are usually performed to confirm a clinical diagnosis. [7]
- Ultrasound of the cubital tunnel is excellent at diagnosing the cause and site of ulnar neuropathy at the elbow. [2] There is also a correlation between the stage of ulnar nerve palsy and the diameter of the major axis.
- MRI scan is sensitive and specific for diagnosis of ulnar nerve lesions at the elbow. [8]

**Management** [4]

Management includes physiotherapy, splinting, painkillers, surgical transposition of the nerve and surgical decompression for cubital tunnel syndrome. The treatment depends on the site and severity of the lesion:

- Avoidance of aggravating factors, such as prolonged full elbow flexion and pressure on the elbow, may be sufficient in mild cases.
- There is no agreement on the best type or duration of splinting. However, nocturnal elbow splinting at 45° for three months, combined with modification of daytime activities, have been shown to be effective and acceptable for those with mild-to-moderate symptoms. [9]
- Patients with persistent paraesthesia and objective weakness, or progression of symptoms and signs, require surgical decompression before the development of muscle atrophy, which is largely irreversible.
- Simple decompression of the nerve and decompression with transposition to the front of the medial epicondyle are equally effective. [10]
- There is currently insufficient evidence to recommend a 'best treatment'.
- Recovery may be slow and incomplete; often the symptoms are temporarily exacerbated.

**Prognosis**

- Up to 50% of people get better with conservative, non-surgical treatment. [5]
- Prolonged compromise to the nerve can lead to complete loss of function.
- More pronounced ulnar nerve thickening at the time of the diagnosis is associated with poorer outcome at follow-up, especially in conservatively treated cases. [11]
- The recurrence rate following surgical decompression is 12%. [8]
- Conduction study signs of demyelination on testing usually indicate a favourable outcome. [11]

**Further reading & references**

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