

Ulnar Nerve Entrapment

Summary

Ulnar nerve entrapment is caused by a combination of compression, traction and friction of the ulnar nerve at the elbow, especially when flexed. It causes pain around the elbow and numbness in the little and ring fingers. Nonoperative management should be trialled in patients with mild and moderate cubital tunnel syndrome. Surgery is advised in severe disease.

Definition

Ulnar nerve entrapment, or cubital tunnel syndrome, is symptomatic ulnar nerve dysfunction at the elbow.

Causes

Ulnar nerve entrapment is caused by a combination of compression, traction and friction of the ulnar nerve within the cubital tunnel. As the elbow flexes the cubital tunnel cross-sectional area shrinks ~30%. This can cause compression, a reduction in blood flow and ischaemia. Pressure on the nerve is **lowest at ~45°** of elbow flexion. It **sharply increases with flexion >90°**. The ulnar nerve usually glides ~2cm within the cubital tunnel. Any reduction may cause traction and friction on the nerve. Nerve dysfunction leads to pins and needles, and pain. It can lead to permanent numbness, weakness, wasting and joint deformities when severe.

Risk Factors

It is the 2nd most common peripheral nerve compression syndrome, after carpal tunnel syndrome, affecting **over 1% of the population**. Previous elbow trauma is the only common risk factor.

Symptoms

Symptoms include:

- **Waking up at night due to numbness in the fingers;**
- Numbness in the same fingers **when reading a book or holding a phone to your ear;**
- Pain in the elbow that radiates to the fingers;
- Weakness or wasting of muscles in the hand with a feeling of clumsiness.

Diagnosis

Cubital tunnel syndrome is **diagnosed with a combination of history, examination and investigations**. **Nerve conduction studies** provide objective findings but **false negatives are possible**. They help evaluate other possible causes of nerve dysfunction. Evidence for the use of ultrasound and MRI is increasing but its routine use is not recommended.

Examination findings include:

- Numbness in the fingers supplied by the ulnar nerve (little finger and half the ring finger), as well as the back of the hand on the ulnar side.
- Muscle weakness or wasting in the intrinsic muscles of the hand;
- Weakness in the little and ring finger flexors;
- Reduced pinch and grip strength;
- Wartenberg's sign, Froment's sign, ulnar clawing;
- Positive Tinel sign;
- Positive elbow flexion test.

Treatment

Cubital tunnel syndrome may be **categorised as mild, moderate or severe**. Sensory change that is not permanent, with no weakness, constitutes mild disease. Moderate disease has weakness but no wasting.

Nonoperative management should be trialled in all patients with mild and moderate cubital tunnel syndrome. A hand therapist can help and may include:

- Stopping strengthening muscles that may press on the ulnar nerve (triceps and wrist flexors);
- Avoiding direct pressure over the cubital tunnel;
- Activity modification to encourage resting the elbow flexed $\sim 45^\circ$;
- An elbow orthosis to prevent elbow flexion $>45^\circ$ at night;
- Nerve gliding exercises.

60-90% of patients will get improvement in their symptoms with this approach. Surgery is considered in those that fail nonoperative treatment.

Surgery is advised when a patient has severe disease, with obvious wasting and poor sensation. There are 4 common operations.

- Simple Decompression releases the structures superficial to the ulnar nerve but leaves it within the cubital tunnel. This maintains the vascularity of the nerve. Potential reasons for ongoing symptoms include persistent tension on the nerve and irritability as the nerve moves in and out of the tunnel.
- Subcutaneous transposition moves and stabilises the nerve in front of the elbow. This reduces the tension on the nerve by providing a straighter path and prevents it from slipping back into the tunnel.
- Submuscular transposition releases the muscles of the medial side of the elbow to allow the ulnar nerve to pass on the other side of them. The muscles then need to be repaired back onto the elbow. This provides the straightest path for the nerve. The

greatest concern with both transpositions is the greater dissection and potential devascularisation of the nerve.

- Medial epicondylectomy requires a small osteotomy or cut in the bone of the medial elbow. This allows the nerve to translate forwards to reduce tension. Potential complications include persistent elbow pain and instability.

Analysis of all clinical studies concluded there is **not enough evidence to identify the best operation for cubital tunnel syndrome.**

Complications are more common in transposition procedures compared to simple decompression and have been reported in 31% of patients by some authors. Most of these were temporary. One of the most common complications with all four operations is injury to small sensory nerves around the elbow. This can be a cause of persistent surgical site pain. **The most common complication is failure of symptoms to improve.** Good or excellent outcomes have been reported in ~70% of patients but complete resolution in only ~50%. **Revision surgery has to be carefully considered as ~25% of patients have been reported to get worse.**

Prevention

Modification of activities that exacerbate your symptoms may help, including avoiding direct pressure on the cubital tunnel and avoiding prolonged elbow flexion of >45°. A hand therapist can assist, including providing a night splint.

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