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REVIEW

Compression neuropathies of the forearm: anatomy, clinical features and management

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Abstract

The upper limb consists of four major parts: a girdle formed by the clavicle and scapula, the arm, the forearm and the hand. Peripheral nerve lesions of the upper limb are divided into lesions of the brachial plexus or the nerves arising from it. Lesions of the nerves arising from the brachial plexus are further divided into upper (proximal) or lower (distal) lesions based on their location.

Peripheral nerves in the forearm can be compressed in various locations and by a wide range of pathologies. A thorough understanding of the anatomy and clinical presentations of these compression neuropathies can lead to prompt diagnosis and management, preventing possible permanent damage. This article discusses the aetiology, anatomy, clinical presentation and surgical management of compressive neuropathies of the upper limb.

Key words: Compression; Hand; Nerve; Surgery

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Introduction

Peripheral nerve injuries and entrapment neuropathies of the upper limb can be challenging for upper limb surgeons because of the anatomical complexity and variation in injury patterns, as well as the diversity in the underlying conditions resulting in entrapment. Signs and symptoms of upper limb compressive neuropathy can present to a wide range of medical practitioners and, if left untreated, result in significant disability.

Nerve lesions of the upper limb most commonly affect patients aged between 16 and 20 years old with a 3:1 male to female ratio (McAllister et al, 1996; Lindqvist et al, 2014). The most common peripheral nerve entrapment neuropathy is of the median nerve at the wrist, known as carpal tunnel syndrome, accounting for 90% of all compression neuropathies (Aroori and Spence, 2008). Its incidence in the general population is 3.8% (Ibrahim and Khan, 2012), with an annual incidence between 0.1% and 0.35% (Nordstrom et al, 1998). The second most common peripheral nerve entrapment condition is cubital tunnel syndrome, where the ulnar verve is compressed within the cubital tunnel at the elbow, with an overall annual incidence of 0.03% (Latinovic et al, 2006). Radial nerve entrapment is the least common entrapment neuropathy of the three principal nerves of the upper extremity; collectively, posterior interosseous nerve syndrome, radial tunnel syndrome and Wartenberg's syndrome have an annual incidence of 0.003% (Latinovic et al, 2006).

This article reviews the pathoanatomy, clinical aspects and management of the principal compressive neuropathies affecting the upper extremity.

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Anatomy

The upper limb is supplied by the brachial plexus, a network of nerves beginning in the root of the neck and extending into the axilla (Figure 1). The brachial plexus receives nerve roots from the anterior rami of cervical spinal nerves C5–C8 and the first thoracic vertebra (T1). These roots then form a network of trunks, divisions, cords and five terminal branches or nerves: the musculocutaneous, axillary, radial, median and ulnar nerves. Compression neuropathies of the upper limb can be broadly divided by the branch of the brachial plexus they affect, most commonly the median, ulnar or radial nerves (Tables 1–3).

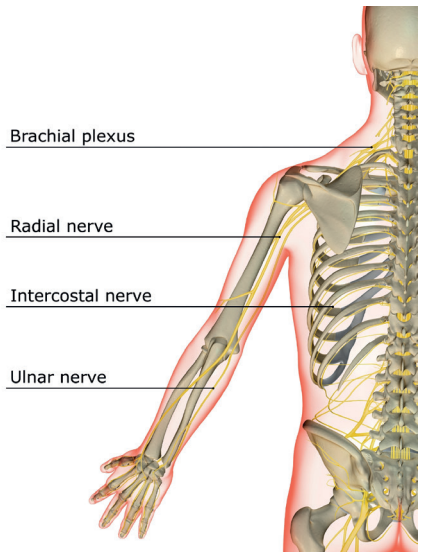

Figure 1. Posterior view of the nerve supply of the upper limb.

Table 1. Presentation and treatments of median nerve compressive neuropathies

Syndrome	Pathoanatomy	Clinical features	Investigations	Management
Pronator syndrome	■ Compression of median nerve at the elbow. Five potential sites: ■ Supracondylar process ■ Ligament of Struthers ■ Bicipital aponeurosis ■ Between ulnar and humeral heads of pronator teres ■ Flexor digitorum superficialis aponeurotic arch	Sensory: paraesthesia volar surface of thumb, index, middle and radial half of ring finger. In contrast to carpal tunnel syndrome, may have aching over proximal volar forearm	Plain film X-ray of elbow. Electromyography and nerve conduction velocity may be helpful if positive but are often inconclusive	First line: rest, non-steroidal anti-inflammatory drugs, splinting for 3–6 months Second line: decompression of nerve at all five potential sites of compression
Anterior interosseus nerve syndrome	■ Compression of terminal, motor branch of median nerve. Sites of compression: ■ Tendinous edge of deep head of pronator teres (most common cause) ■ Fibrous arch of the flexor digitorum superficialis ■ Thrombosed radial, ulnar or anterior interosseous artery ■ Accessory head of flexor pollicis longus (Gantzer's muscle) ■ Accessory muscle from flexor digitorum superficialis to flexor digitorum profundus ■ Abberant muscles (flexor carpi radialis brevis, palmaris profundus)	Motor: anterior interosseous nerve supplies flexor digitorum profundus, flexor pollicis longus and pronator quadratus. Deficit will manifest as inability to make 'OK' sign, with weakness of grip and pinch Sensory: no deficit	Magnetic resonance imaging may be used when concerns of a mass. Nerve conduction velocity or electromyography can be useful to exclude proximal lesions, and to assess severity of injury and assess recovery	First line: observation, rest and physical therapy for 12 months Second line: surgical decompression of anterior interosseous nerve
Carpal tunnel syndrome	Compression of median nerve within carpal tunnel, at the level of the wrist May be caused by local compression (eg rheumatoid arthritis) or by exposure to repetitive motions and vibrations	Sensory: paraesthesia in thumb, index, middle and radial half of ring finger. Night-time symptoms Motor: May have thenar wasting	Nerve conduction velocity or electromyography may be used to confirm, but are not obligatory	First line: non-steroidal anti-inflammatory drugs, night splint, activity modifications Second line: steroid injection Third line: carpal tunnel release

Table 2. Presentation and treatments of ulnar nerve compressive neuropathies

Syndrome	Pathoanatomy	Clinical features	Investigations	Management
Cubital tunnel syndrome	Compression of the ulnar nerve at the level of the elbow, within the cubital tunnel	Sensory: paraesthesia in little finger and ulnar half of ring finger, volar and dorsal surfaces Motor: paralysis of intrinsic muscles of hand: weakened metacarpophalangeal flexion, thumb adduction (Froment's sign)	Electromyography or nerve conduction velocity may be helpful in establishing diagnosis and prognosis	First line: non-steroidal anti-inflammatory drugs, activity modification and night-time elbow extension splint Second line: decompression +/- transposition
Ulnar tunnel syndrome	Compression of ulnar nerve within Guyon's canal, at the level of the wrist. May present with motor, sensory or both depending on level of compression	Sensory: pain and paraesthesia in little finger and ulnar half of ring finger Motor: clawing of ring and little finger as a result of loss of function of the intrinsic hand muscles (thenar, hypothenar, interossei and lumbricals). As per carpal tunnel syndrome, weakened grasp and thumb adduction	X-rays and computed tomography useful to evaluate any hook of hamate fractures Magnetic resonance imaging to exclude ganglion cyst Doppler to exclude ulnar artery thrombosis or aneurysm	First line: activity modification, non-steroidal anti-inflammatory drugs and splinting Second line: local decompression. Tendon transfer may be used to correct clawing or loss of power

Median nerve

The median nerve is formed by the medial and lateral cords of the brachial plexus. Initially, it runs lateral to the brachial artery, superficial to the coracobrachialis muscle. Halfway down the arm, the median nerve crosses over the brachial artery to run medially. As the median nerve enters the cubital fossa, it passes below the bicipital aponeurosis, with the biceps tendon and brachial artery lying lateral to it. It enters the forearm between the two heads of pronator teres, deep to the radial head and superficial to the ulna. At this level, the median nerve gives rise to the anterior interosseous nerve. The main trunk then passes under the proximal fibrous arch of the flexor digitorum superficialis, travelling distally between the flexor digitorum superficialis and the flexor digitorum profundus. Approximately 4–5 cm proximal to the distal wrist crease, the palmar cutaneous branch of the median nerve branches, to innervate the skin of the palm. The median nerve eventually passes through the carpal tunnel under the transverse carpal ligament, dividing into digital and muscular branches.

Ulnar nerve

The ulnar nerve arises from the medial cord of the brachial plexus and runs down the medial aspect of the upper arm, medial to the brachial artery. Proximal to the elbow it gives off an articular branch to the elbow joint, before passing posterior to the medial epicondyle of the humerus through the cubital tunnel (Figure 2). The ulnar nerve enters the forearm deep to the arcuate ligament, an aponeurosis between the humeral and ulnar heads of the flexor carpi ulnaris.

In the forearm the ulnar nerve passes between the flexor carpi ulnaris and the flexor digitorum profundus. It gives off several branches: muscular branches to the flexor carpi ulnaris and the ulnar half of flexor digitorum profundus, as well as the palmar cutaneous branch and the dorsal cutaneous branch. It then passes into the hand via Guyon's canal, a fibro-osseous tunnel between the pisiform and the hook of the hamate. Within Guyon's canal, it bifurcates into a superficial sensory branch and a deep motor branch.

Radial nerve

The radial nerve is a direct continuation of the posterior cord of the brachial plexus. It exits the axilla inferiorly, via the triangular interval. Continuing within the spiral groove of the humerus, it moves from the posterior compartment of the arm into the anterior compartment, piercing the lateral intermuscular septum about 10–12 cm proximal to the lateral epicondyle. At the level of the lateral condyle, it bifurcates into deep and superficial branches.

Table 3. Presentation and treatments of radial nerve compressive neuropathies

Syndrome	Pathoanatomy	Clinical features	Investigations	Management
Posterior interosseus syndrome	Compression of posterior interosseous nerve in forearm affecting forearm extensor compartment. Possible sites: ■ Fibrous tissue anterior to the radiocapitellar joint ■ Leash of Henry ■ Extensor carpi radialis brevis edge ■ Arcade of Fröhse ■ Supinator muscle edge	Sensory: pain in the forearm and wrist Motor: innervates both common and deep extensors in the forearm, resulting in weak metacarpal extension and weak wrist extension in neutral or ulnar deviation. Wrist extension in radial deviation less affected since posterior interosseous nerve does not innervate the extensor carpi radialis longus	X-rays not typically required. Magnetic resonance imaging may be useful to determine level of compressive lesion and for surgical planning	First line: rest, activity modification, splints, non-steroidal anti-inflammatory drugs Second line: local anaesthetic or steroid injection Third line: surgical decompression
Radial tunnel syndrome	Compression of posterior interosseous nerve with pain only. Can occur at same sites of compression as posterior interosseous nerve syndrome	Sensory: pain over lateral forearm. Maximal tenderness often 3–5 cm distal to lateral epicondyle Motor: no deficit	Magnetic resonance imaging may be used to exclude other causes but is usually normal	First line: activity modification temporary splints, non-steroidal anti-inflammatory drugs for at least 12 months Second line: corticosteroid injection Third line: radial tunnel release
Wartenberg's syndrome	Compression of the superficial radial nerve in the forearm. Usually compressed externally, or by scissoring action of brachioradialis and extensor carpi radialis longus during forearm pronation	Sensory: ill-defined pain +/- paraesthesia over dorsoradial hand Motor: no deficit	X-rays may demonstrate an old forearm fracture, one possible cause	Spontaneous resolution is common First line: rest, activity modification, non-steroidal anti-inflammatory drugs, splint Second line: corticosteroid injection (limited evidence) Third line: surgical decompression

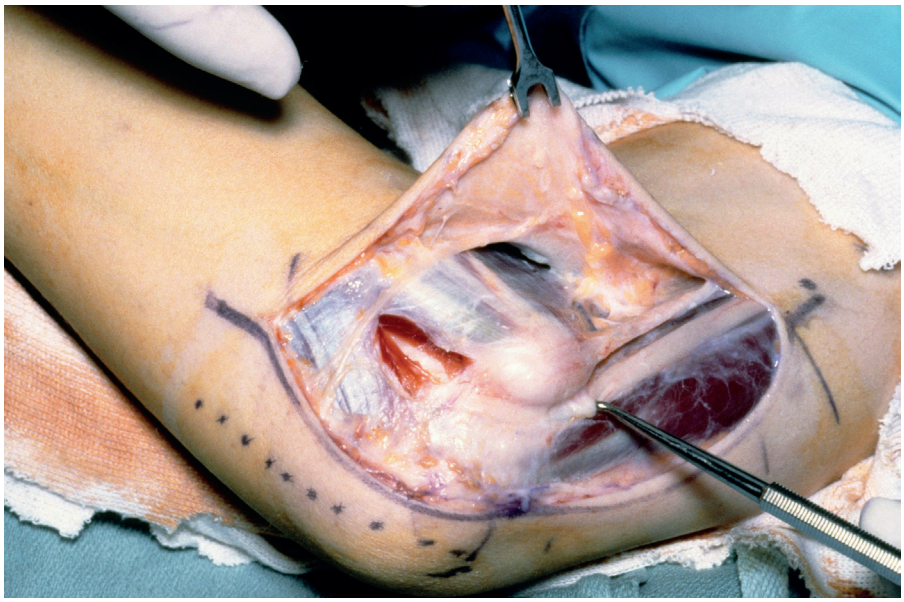

Figure 2. Surgery to treat cubital tunnel syndrome.

When the deep branch of the radial nerve penetrates the supinator muscle, it is termed the posterior interosseus nerve. The radial tunnel, which represents a musculoaponeurotic space about 3–4 finger breadths long, starts at the point where the posterior interosseous nerve courses over the radiohumeral joint and ends as it exits the deep head of the supinator muscle. Its floor is created by the capsule of the radiocapitellar joint.

The superficial radial nerve, a purely sensory nerve, travels between the radius and the brachioradialis in the forearm. It eventually becomes subcutaneous in the distal third of the forearm around 9 cm proximal to the radial styloid. It continues between the brachioradialis and extensor carpi radialis longus tendon and crosses the roof of the anatomical snuffbox to provide sensation over the dorsal surface of the hand on the radial side (Abrams et al, 1992).

Entrapment neuropathies

Median nerve

Pronator syndrome

Pronator syndrome is compression of the median nerve at the elbow, when it passes between the two heads of the pronator teres or under the proximal edge of the proximal flexor digitorum superficialis arch. It is most often caused by tumours (commonly lipomas), trauma, congenital abnormalities or pronator teres hypertrophy (Andreisek et al, 2006). Potential sites of compression include the supracondylar process, the ligament of Struthers (Lubahn and Cermak, 1998), the bicipital aponeurosis, the space between the ulnar and humeral heads of pronator teres, and at the proximal aponeurotic arch of the flexor digitorum superficialis.

Symptoms usually have an insidious onset, with paraesthesia seen in the thumb, index, middle and radial half of the ring finger (mimicking that of carpal tunnel syndrome) and are exacerbated by repetitive pronation-supination. In contrast to carpal tunnel syndrome, patients with pronator syndrome will often get aching over the proximal volar forearm, with a lack of night-time symptoms. Furthermore, patients with pronator syndrome will have sensory loss in the entire median nerve distribution, whereas patients with carpal tunnel syndrome will have sensation intact over the thenar eminence as the palmar cutaneous branch leaves the median nerve proximal to the carpal tunnel. Pain reproduction with resisted forearm pronation from a neutral position should point towards entrapment at the level of the pronator teres, whereas pain or paraesthesia with flexion of the middle finger (flexor digitorum superficialis contraction) is related to compression at the level of the fibrous arch between the two heads of the flexor digitorum superficialis.

First-line treatment should be rest, splinting to minimise forearm rotation and non-steroidal anti-inflammatory drugs for 3–6 months, and is indicated in mild to moderate symptoms. Surgery is indicated when non-operative management fails and involves decompression of the median nerve at all five aforementioned potential sites of compression. A case series by Tsai and Syed (1994) demonstrated excellent, good or fair results in 86% of patients. Only three patients showed no improvement, two of which developed separate compressive neuropathies and one who subsequently developed rheumatoid arthritis.

Anterior interosseous nerve syndrome

Isolated anterior interosseous nerve entrapment is also known as Kiloh–Nevin syndrome. Potential sites of compression include the tendinous edge of the deep head of the pronator teres, the fibrous arch of the flexor digitorum superficialis, thrombosed radial, ulnar or anterior interosseous artery, and the accessory head of the flexor pollicis longus (Gantzer's muscle), or aberrant muscles (Horak and Kuz, 2008).

Clinical features

Anterior interosseous nerve syndrome presents with motor deficits without sensory loss. Commonly patients present with partial or complete loss of flexor pollicis longus function, which prevents the patient from making the 'OK' sign. When asked to grasp a piece of paper between the affected thumb and index finger, patients try to compensate by hyper-extending the interphalangeal joint of the thumb and the distal interphalangeal joint of the index finger. Although no loss of sensation is expected, patients may experience pain in their forearms along the course of the anterior interosseous nerve.

The majority of patients with anterior interosseous nerve syndrome will improve with non-operative treatment, including rest and targeted physical therapy. Surgical decompression is indicated in failed non-operative therapy after 12 months, or if a clear space-occupying lesion is identified. This involves an incision in the proximal volar forearm over the anatomical area of most concern. The anterior interosseous nerve needs to be visualised proximal to distal, with the following structures released: superficial head of pronator teres, lacertus fibrosus, superficial arch of flexor digitorum superficialis, Gantzer's muscle (if present) and ligation of any crossing vessels.

Carpal tunnel syndrome

Carpal tunnel syndrome is caused by compression of the median nerve within the carpal tunnel, at the level of the wrist. It presents with numbness and/or tingling in the cutaneous distribution of the median nerve: the volar aspect of the thumb, index, middle and radial half of the ring finger. Eventually, weakness can occur with wasting of the thenar eminence, supplied by the median nerve (Padua et al, 2016).

Initial treatments include non-steroidal anti-inflammatory drugs, night splints, daily modifications and steroid injections. Operative management, in the form of carpal tunnel release, is indicated in failure of non-operative treatment or in cases of acute carpal tunnel syndrome such as in distal radius fractures. Carpal tunnel decompression is 70–90% effective in providing long-term symptomatic relief (Prime et al, 2010).

Ulnar nerve

Cubital tunnel syndrome

The ulnar nerve passes the elbow in the cubital tunnel, where it stretches and slides during elbow movements. With elbow flexion, the shape of the cubital tunnel changes from an oval to an ellipse, narrowing the canal by 55% and increasing intramural pressure. There are five possible sites where the ulnar nerve may be compressed around the elbow:

1. The medial intermuscular septum
2. The arcade of Struthers
3. The medial epicondyle
4. The cubital tunnel
5. The deep flexor aponeurosis.

The sensory deficit in cubital tunnel syndrome is paraesthesia in the little finger and the ulnar half of the ring finger, both volar and dorsal surfaces. Night symptoms may be caused by sleeping with the arm in flexion, increasing pressure in the cubital tunnel. Loss of motor innervation will cause paralysis of the intrinsic muscle of the hand. This may lead to weakened grasp as a result of loss of metacarpal phalangeal flexion and weak pinch as a result of loss of thumb adduction. In contrast to anterior interosseous nerve palsy, when asked to grasp a piece of paper between thumb and index finger, thumb adduction will be weakened and patients will compensate by using the flexor pollicis longus to flex the interphalangeal joint of the thumb, known as Froment's sign.

Non-steroidal anti-inflammatory drugs, activity modification and night-time elbow extension splints are first-line treatments and are effective in ~50% of cases (Padua et al, 2002). Surgical management is indicated in failed non-operative treatment. Surgical technique is controversial but may include:

1. Simple ulnar nerve decompression and/or medial epicondylectomy
2. Ulnar nerve decompression with anterior transposition.

Ulnar tunnel syndrome

Compression of the ulnar nerve within Guyon's canal at the wrist is termed ulnar tunnel syndrome. Within Guyon's canal, the ulnar nerve branches into a superficial sensory and deep motor branch. In 1969, Shea and McClain were the first to anatomically divide ulnar tunnel syndrome into three different types: zone 1 ulnar tunnel syndrome with compression of the ulnar nerve trunk proximal to its bifurcation, zone 2 ulnar tunnel syndrome with compression of the deep motor branch of the nerve after its bifurcation and zone 3 ulnar tunnel syndrome with compression of the superficial sensory branch of the ulnar nerve after the bifurcation.

Clinical features vary depending on the zone affected. Zone 1 ulnar tunnel syndrome will cause mixed motor and sensory deficits, causing pain and paraesthesia in the little finger and the ulnar half of the ring finger, with weakness of the intrinsics, ring and little finger flexion and thumb adduction. Zone 2 ulnar tunnel syndrome will cause only the motor deficits in zone 1 ulnar tunnel syndrome, and zone 3 ulnar tunnel syndrome causes pure sensory deficits. Further clinical assessment in ulnar tunnel syndrome was detailed by Scarborough et al (2020).

For mild symptoms, activity modification, non-steroidal anti-inflammatory drugs and splinting may be used. Surgical treatment for failed conservative treatment involves local decompression. Ulnar tunnel syndrome may be accompanied by concurrent carpal tunnel syndrome, in which case surgical carpal tunnel decompression is indicated. Tendon transfers may be used to improve clawing of the fingers or to improve power pinch in chronic ulnar tunnel syndrome.

Radial nerve

Entrapment of the posterior interosseous nerve in the radial tunnel may yield two different clinical presentations: posterior interosseous nerve syndrome and radial tunnel syndrome. Both syndromes can be caused by compression of the posterior interosseous nerve along its course inside the radial tunnel at five possible sites:

1. The fibrous bands anterior to the radial head between the brachialis and brachioradialis
2. The distal border of the supinator
3. The recurrent radial vessels at the level of radial neck (leash of Henry)
4. The tendinous origin (medial proximal) of the extensor carpi radialis brevis or most frequently
5. The proximal superficial head of the supinator (arcade of Frohse) (Ferdinand et al, 2006).

Posterior interosseous nerve syndrome

Posterior interosseous nerve syndrome is a compressive neuropathy of the posterior interosseous nerve with motor deficits of the extensor muscle group of the forearm, without significant sensory loss.

The main symptom is pain in the forearm and wrist. The posterior interosseous nerve innervates both common and deep extensors in the forearm, so the major motor weakness will be weak metacarpal extension and weak wrist extension in neutral or ulnar deviation. Since posterior interosseous nerve does not innervate the extensor carpi radialis longus, wrist extension in radial deviation is less affected.

As for other compression neuropathies, initial treatments are rest, activity modification, stretching, splinting and non-steroidal anti-inflammatory drugs. Failing this, combined lidocaine and steroid injections may be used, provided a mass has been excluded. This is usually a single injection 3–4 cm distal to the lateral epicondyle, at the site of compression. If non-operative treatments fail after 3 months or a compressive mass is identified, surgical decompression is indicated. The most common approach is an anterolateral approach to the elbow, with release of the fibrous bands connecting the brachialis and brachioradialis, the leash of Henry, the fibrous edge of the extensor carpi radialis brevis and the radial tunnel. The outcome of surgery for posterior interosseous nerve syndrome varies depending on the timing of surgery after the onset of symptoms and the length of follow up. Hashizume et al (1996) showed recovery rates of 94% at 4.5 months for patients operated on after an average of 2.2 months of symptoms, compared to just 75% recovery at 5 years for patients operated on after 4.7 months of symptoms (Vrieling et al, 1998).

Radial tunnel syndrome

In contrast to posterior interosseous nerve syndrome, radial tunnel syndrome is a compressive neuropathy of the posterior interosseous nerve with pain only. The presenting symptom is commonly lateral forearm pain that is exacerbated by repetitive forearm rotation and lifting activities (Ferdinand et al, 2006; Kim et al, 2007). Even though these symptoms are almost identical to those of lateral epicondylitis, radial tunnel syndrome can be differentiated based on the point of maximum tenderness. In lateral epicondylitis, the focal point is directly over the lateral epicondyle, whereas patients with radial tunnel syndrome typically report tenderness 3–4 cm distal to the lateral epicondyle (Roles and Maudsley, 1972).

As for posterior interosseous nerve syndrome, initial management involves activity modification, splinting, non-steroidal anti-inflammatory drugs and steroid injection. Radial tunnel release is indicated in cases where non-operative treatment fails. However, results have been disappointing with only 41% patient satisfaction after 3.5-year follow up (Atroshi et al, 1995). Radial tunnel release has lower success rates in patients with concomitant multiple entrapment neuropathies or lateral epicondylitis. Long-term follow up (8 years) showed 70% resolution of symptoms (Jebson and Engber, 1997).

Wartenberg's syndrome

Wartenberg's syndrome is a compression neuropathy of the superficial sensory radial nerve, also known as cheiralgia paraesthetica. The most common site of compression is where the superficial radial nerve emerges from between the brachioradialis and extensor carpi radialis longus, 9 cm proximal to the radial styloid, as the nerve becomes subcutaneous. Direct pressure or stretch injury from trauma are the most common causes of Wartenberg's syndrome. This can be either a result of pressure from a wristband (Stopford, 1922) or handcuffs (Massey and Pleet, 1978), or traction during close manipulation for distal radius fracture (Braidwood, 1975).

Wartenberg's syndrome causes a sensory deficit only, over the first and second dorsal web space and the dorsolateral thumb. Symptoms are typically aggravated by motions involving repetitive wrist flexion and ulnar deviation. Symptoms may be similar to the pain of De Quervain's tenosynovitis, although in Wartenberg's syndrome the pain is aggravated by wrist pronation, whereas in De Quervain's tenosynovitis it is not.

Spontaneous resolution of symptoms is common once the external compression is removed. Surgical decompression is indicated in cases of failure of non-operative treatments after 6 months. The approach is usually a longitudinal incision volar to Tinel's sign, avoiding injury to the lateral antebrachial cutaneous nerve. The nerve is freed from scissoring between the brachioradialis and extensor carpi radialis longus.

Discussion

In the majority of cases treatment begins with non-operative methods including targeted therapy, non-steroidal anti-inflammatory drugs, splints and steroid injections. Surgery is often reserved for patients with an organic compressive lesion, a motor deficit or after failure of conservative treatment. If there is no improvement in motor dysfunction by approximately 3 months, spontaneous recovery is unlikely with conservative treatment (Spinner, 1978), and surgery is favoured to prevent long-term fibrosis and weakness.

Patients with untreated or severe compression neuropathy of the upper limb may suffer permanent weakness and contractions. Advances in nerve transfer have allowed a return of function in previously denervated muscle. One such example is anterior interosseous nerve transfer to restore ulnar intrinsic function. The distal anterior interosseous nerve can be transferred to the ulnar deep motor branch to restore partial motor function. Similar techniques have been used to restore sensation in median, ulnar and radial nerve injuries, based on sacrificing nerves which supply non-critical sensation.

Upper limb peripheral nerve lesions are common and can present with a wide spectrum of symptoms. Good knowledge of anatomy is vital to specify the level of the lesion and will dictate future investigations and management. A combination of imaging and nerve conduction studies can aid the diagnosis of nerve compression syndromes, confirming the site of compression and the cause of entrapment. Early recognition is vital to allow prompt investigation and avoid lasting injury.

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Key points

- A wide range of pathologies can cause compression neuropathies in the upper limb.
- Compression at different levels can lead to a specific set of clinical symptoms.
- A thorough knowledge of anatomy is required to diagnose the level of compression.
- Treatment strategies largely begin with activity modification, non-steroidal anti-inflammatory drugs and physiotherapy, but may progress on to surgery.

Conflicts of interest
The authors declare that they have no conflicts of interest.

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