Peripheral Nerve Entrapment

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Conflict of Interest

I have no financial interests to disclose
Objectives

- Describe the most common peripheral nerve entrapments
  - Median Nerve
  - Ulnar Nerve
  - Radial Nerve
  - Peroneal Nerve
  - Suprascapular Nerve
- Describe physical exam findings associated with the above
- Describe the treatments
Symptoms

- Positive (abnormal excitability)
  - Pain
  - Paresthesia
  - Dysesthesia
  - Hyperalgesia
  - Allodynia
  - Spasm

- Negative (reduced conduction)
  - Anesthesia
  - Hypoesthesia
  - Weakness
Carpal Tunnel Syndrome

- Most common entrapment syndrome
  - 3-6% of general population
- Median nerve compression by the transverse carpal ligament
- More women than men
- Often bilateral, but usually worse in dominant hand
- Parethesia usually in median nerve distribution
  - thenar eminence spared as supplied by palmar cutaneous branch that comes off before tunnel
- May have thenar wasting and weakness affecting thumb opposition and palmar abduction
Physical Exam

- Diminished sensation in first 3 digits
- Thenar muscle wasting
- Weakness in thumb opposition, flexion, and palmar abduction
- Tinel’s sign at wrist
- Phalen’s test
Thumb Opposition
Etiology

Idiopathic
Repetitive hand use
RA
Hypothyroidism
DM
Sarcoid
Acromegaly
Obesity

Chronic Dialysis
Mass in wrist
ganglion cyst
neurofibroma
Pregnancy
Persistent wrist flexion
Familial
Diagnosis

- Phalen’s sign good specificity and moderate sensitivity for CTS
- Tinel’s sign is similar
- NCS and EMG help confirm diagnosis and can rule out other causes

Differential Diagnosis:
- Radiculopathy
- Brachial Plexopathy
- Proximal Median Neuropathy

Identified with pain in neck, decreased reflexes, weakness outside of median nerve distribution
Treatments

- Activity modifications
- Wrist splint
- NSAIDs
- Injections
- PT
- Surgical decompression
Outcomes

Outcome of carpal tunnel surgery in 6263 operations:
- Cured: 49%
- Much better: 28%
- Slightly better: 10%
- Unchanged: 6%
- Worse: 7%
Ulnar Neuropathy at Elbow

Second most common entrapment in upper extremity
Compression of ulnar nerve in the ulnar groove or cubital tunnel
Caused by repeated trauma, OA, ganglion, tumors, fibrous tissue
Progressive loss of grip and pinch strength
Clumsiness
Numbness in 5th digit and ulnar half of 4th digit
Wasting of hypothenar and interosseous muscles
Ulnar neuropathy at elbow

Induced by prolonged flexion or elbow or compression

May wake people up from sleep

Pain in elbow radiating into hand

Ulnar nerve may be palpable and tender
Ulnar nerve may be palpable and tender

Paresthesia provoked by Tinel’s at elbow or elbow flexion

Making a fist may result in 4th and 5th fingers not flexing

Thumb abduction and opposition spared

Slow rapid thumb to finger touching

Decreased grip

Muscle atrophy
Ulnar claw hand

Opening the hand

Hyperextension of MP joints in 4th and 5th digits

Partial flexion of both IP joints

Loss of function of interossei and lumbricals
Wartenburg’s sign

5th digit more abducted when compared to normal hand

Weakness in third palmar interosseous muscle
Froment’s sign

Weak adductor pollicus and thumb adduction does not occur

Motion taken over by median innervated flexor pollicus longus
Differential Diagnosis

C8-T1 Radiculopathy
Brachial Plexopathy
UNE forearm or wrist
Weakness in muscles not innervated by ulnar nerve or loss of sensation into the forearm
“Double Crush”
Ulnar nerve palsy
Cervical Radiculopathy
Treatment

Prevent aggravating factors
Joint protection with elbow pad
Elbow splint
Surgery
  Decompression
  Transposition
  Medial Epicondylectomy
Outcomes

Over 70% improvement with surgery

No significant difference between surgery options

Transposition had increased complications (Infections)
Ulnar nerve compression at Wrist

Similar manifestation

Worsened by activities like bike riding and manual labor

Compression of ulnar nerve in Guyon’s canal

Ganglion cysts or tumors

May require US, CT or MRI for diagnosis

Conservative therapy usually successful but may need decompression if mass present
Radial Neuropathy at Spiral Groove

Saturday night palsy
Complete wrist and finger drop
Numbness in lateral dorsum of hand
Weak supination and elbow flexion
Triceps reflex normal

Brachioradialis reflex reduced
Nerve lies near spiral groove of humerus making it liable to compression
Prolonged or severe compression leads to demyelination
Can be caused by trauma or prolonged pressure
Radial nerve palsy

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Radial Nerve

Area of sensation

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Differential Dx

Radial nerve in axilla

Weakness in triceps and numbness in arm and forearm

Posterior Interosseous nerve

Finger drop but wrist extends with radial deviation

No sensory loss

Cervical radiculopathy
EMG and NCS to locate area of entrapment or injury

Treatment usually conservative

Protection of nerve

Wrist splint

Recovery depends on demyelination or axonal damage

Surgery for ongoing symptoms
Suprascapular Neuropathy

C5 and C6

Innervates the supraspinatus and infraspinatus muscles

First 20 degrees of shoulder abduction

External rotation of arm
Insidious onset

Wasting over infra and supraspinatus

Inability to laterally rotate and abduct

Pain in posterior shoulder and on palpation

Common in weight lifters, dancing

Gangliomas or other masses

Surgical positioning

Nerve trapped in suprascapular notch beneath transverse scapular ligament

Less common at spiroglenoid notch
Differential Dx

C5-6 Radiculopathy
- neck pain, reduced bicep reflex, weakness in other muscles,
- sensory changes

Brachial plexopathy

Parsonage-Turner syndrome

Rotator cuff tear
Diagnosis

MRI of neck and shoulder

EMG and NCS

Suprascapular nerve block
Treatment

Stop offending activity

Physical Therapy

Surgery

especially if mass identified

>70% had significant improvement

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Peroneal Neuropathy

Weakness in ankle dorsiflexion and eversion of foot

Ankle inversion spared

Sensory loss over dorsum of foot and lateral calf

Lateral Cutaneous nerve of the calf spared

Compression of common peroneal nerve at the fibular tunnel below the fibrous edge of the peroneus longus muscle and fibular head

Tinel’s sign at fibular head
Causes

Strawberry picker’s disease (Often bilateral)

Habitual leg crossing

Slimmer’s paralysis

Trauma with or without fracture of fibula

Prolonged immobilization

Mass
Differential Diagnosis

L5 Radiculopathy

- Both have numbness and/or pain at lateral knee/foot
- Both can have foot drop
- Weak inversion is key (posterior tibial nerve)
- EMG and NCS essential as well
Treatment

Eliminate offending activity

Physical therapy

AFO

Surgery

Rarely needed unless extensive nerve damage or mass
Peripheral nerve entrapments are common

They can cause significant pain and suffering

Accurate diagnosis and treatment is essential due to large differential

Proper treatment leads to very happy patients