

Occupational therapy interventions in hand nerve lesions

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NERVE INJURY

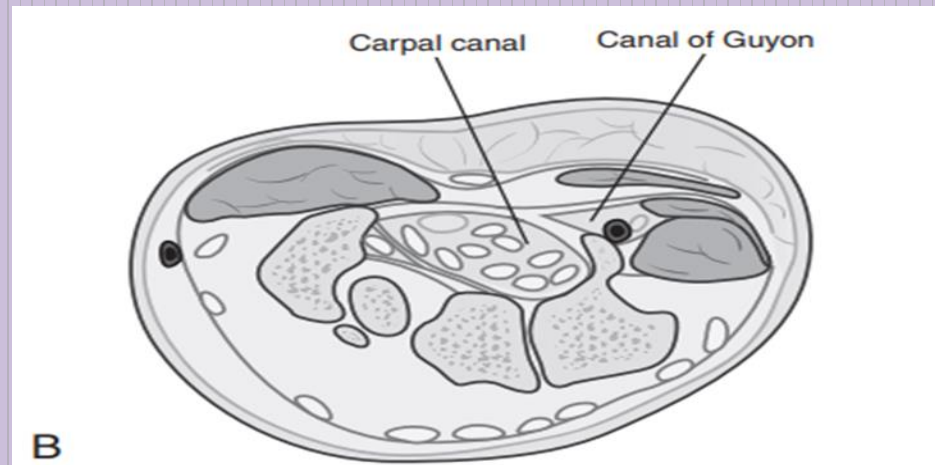
- When injury or disease occurs to a neural structure in the upper extremity, there is a high likelihood that multiple areas of **neural pathology** will develop.
- This phenomenon is known as the double or multiple crush syndrome.
- The various mechanisms of nerve injury include acute or chronic compression, stretch ischemia, electrical shock, radiation, injection, and laceration

Hand therapy

- valuable education to patients about their diagnosis and general recovery sequence
- teaches protective guidelines to compensate for sensory loss
- monitors changes in sensory and motor function and helps prevent joint contractures by reevaluating:
 - ROM
 - Sensation
 - muscle status

NERVE COMPRESSION

- **Median Nerve Compression at the Wrist, or Carpal Tunnel Syndrome** is the most common upper extremity nerve entrapment.
- Swelling or thickening of the tendons can lead to pressure on the nerve, resulting in sensory symptoms in the distribution of the median nerve



TYPICAL COMPLAINTS

- hand numbness(particularly at night or when driving a car)
- pain and paresthesia in the distribution of the median nerve (thumb through radial ring finger pads)
- clumsiness or weakness

Associated diagnoses

- RA
- Colles' fracture
- diabetes
- deconditioning obesity
- thyroid disease
- Transient carpal tunnel syndrome is fairly common in pregnancy

- Carpal tunnel syndrome may be associated with **repetitive use** or flexor tenosynovitis caused by increased friction between the tendons and nerve.
- For these people, focus intervention on resolving the tendinitis

EVALUATION

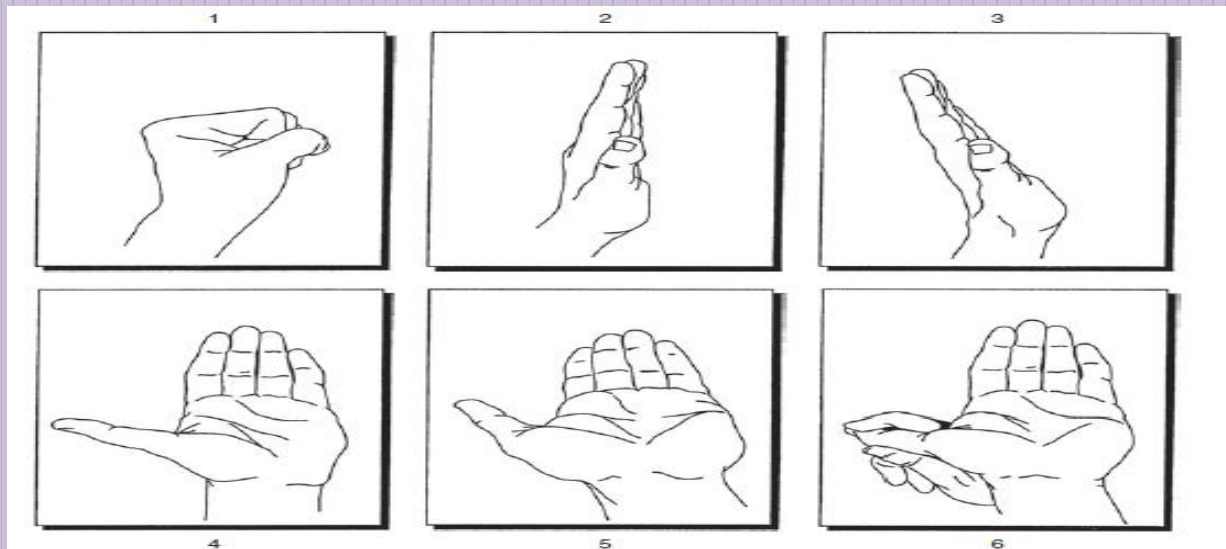
- Perform a cervical screening
- and evaluate posture, ROM, grip and pinch
- manual muscle test looking for independent excursion of FDP and FDS.
- do Tinel's, Phalen's, Semmes-Weinstein Monofilament, and two-point discrimination tests.
- Tapping at the **volar wrist** elicits Tinel's sign, which is a sensation of tingling or electric shock if the median nerve is compromised.

EVALUATION

- Phalen's test provokes sensory symptoms in the median nerve distribution if positive, created by maintaining the **wrist in flexion** for 60 seconds
- Phalen's test should be done with extended elbows to avoid confusing these findings with a positive elbow flexion test.
- Advanced cases of carpal tunnel syndrome reveal thenar atrophy of the abductor pollicis brevis, which can be functionally debilitating.

Intervention

- Conservative medical management may include **steroid injection**.
- with the wrist in neutral Conservative therapy for carpal tunnel syndrome includes **night splinting** because this position minimizes pressure in the carpal tunnel



- differential **flexor tendon gliding** exercises.



- aerobic exercise, proximal conditioning, ergonomic modification, and postural training.
- Teach patients to avoid extremes of forearm rotation or of wrist motions and to avoid sustained pinch or forceful grip.

- Provide **padded gloves** and **built-up handles**.
- Thick padded automobile steering wheel covers are helpful.



Postoperative therapy

- edema control
- scar management
- desensitization as needed
- nerve and tendon gliding exercises
- Many therapists postpone strengthening exercises until at least 6 weeks following carpal tunnel release to avoid inflammation.
- Patients with new and mild symptoms tend to recover best.

Radial Nerve Compression

- Posterior interosseous nerve syndrome is purely motor.
- It presents two clinical pictures:
 - 1- paralysis affects all muscles innervated by the posterior interosseous nerve, with inability to extend the MP joints of thumb, index, long, ring, or small fingers. Wrist extension occurs only radially because of paralysis of extensor digitorum and ECU.
 - 2- the person cannot extend the MP joint of one or more digits. Paralysis may spread to other digits if it is not treated on a timely basis.

Therapy

Therapy focuses on:

- maintaining PROM
- orthotic selection (to prevent deformity)
- promote function

Nerve Laceration

- 1) complete
- 2) Partial
- 3) Stretching and contusion injuries can occur along with the laceration.

Nerve reconstruction:

- 1) primary (if within 48 hours)
- 2) early secondary (if within 6 weeks)
- 3) late secondary (after 3 months)

neuroma

- A neuroma , a disorganized mass of nerve fibers, can follow nerve injury.

Significant nerve pain is elicited by tapping over the neuroma, with hypersensitivity limiting functional use of the hand.

to promote functional use:

- 1) Desensitization techniques
- 2) padding over the painful area

Median nerve laceration at the wrist

- 1) **low median nerve palsy**
- 2) denervation of the opponens pollicis and abductor pollicis brevis of the thumb and of the lumbricals to the index and long fingers.
- 3) Clawing of the index and long fingers does not usually occur because the interossei remain ulnarly innervated.
- 4) Loss of sensation of the radial side of the hand is
- 5) present.
- 6) the absence of thumb abduction and opposition.



orthosis

- **hand-based thumb abduction** orthosis to:
 - 1) maintain balance
 - 2) substitute for lost thumb opposition
 - 3) prevent overstretching of denervated muscles

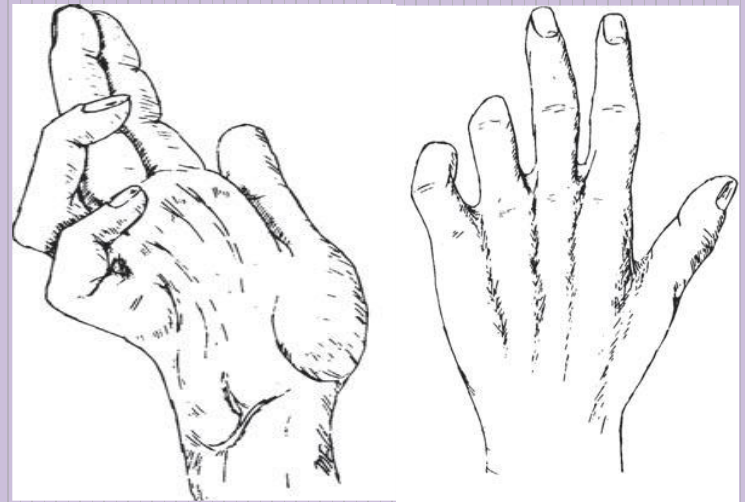
Median nerve laceration creates:

- 1) serious functional loss of manipulation
 - 2) sensibility of the thumb, index, and long fingers.
- **Be sure to:**
 - 1) teach compensatory strategies (to avoid reinjury while sensibility is impaired).
 - 2) Instruct the patient to perform PROM (to maintain joint mobility).
 - 3) Fabricate orthotics (to sustain thumb abduction and digital MP flexion with IP extension to promote functional hand use)

Low Ulnar Nerve Lesion

Laceration of the ulnar nerve at the wrist level is called a low ulnar lesion

- flattening of the hand
- loss of the ulnar transverse metacarpal arch
- loss of thumb adduction and MP support
- loss of digital abduction or adduction
- claw deformity



- Fine manipulation skills are compromised.
- Sensory loss involves the ulnar digits
- extrinsic imbalance

orthosis

- MP blocking orthosis (maintains slight MP flexion and prevents MP extension)
- Orthotic intervention for ulnar nerve palsy aims to prevent overstretching of the denervated ring and small finger intrinsics.



recommendations

- **Teach patients to:**

- 1) compensate for sensory loss
 - 2) maintain passive range of the MPs in flexion and the IPs in extension.
- It is very important to prevent PIP flexion contractures.
 - Built-up handles in conjunction with the MP blocking orthosis may be helpful.

Low Radial Nerve Lesion

Low radial nerve injury of the deep motor branch is called posterior interosseous palsy.

- Presentations vary
- Efforts to extend the wrist yield strong radial deviation.
- MP extension is affected.
- Sensation on the dorsal radial hand is affected.

Therapy

- Therapy is similar to radial nerve compression, with emphasis on :
 - 1) maintaining PROM for wrist, thumb, and digital extension
 - 2) orthotics to promote tenodesis for functional pinch, grip, and release.

Thank You
For
Your Attention!

Any Questions?