CARPAL TUNNEL SYNDROME

An Evidence-Based Protocol

Patricia Meyer, D.O., M.S.
Assistant Professor
Touro University Nevada

CARPAL TUNNEL SYNDROME

- Entrapment of the median nerve at the wrist
- Causing paresthesias, pain and occasional paralysis
- ICD-9 354.0

ASSOCIATED DISEASES

- Pregnancy
- Rheumatoid Arthritis
- Diabetes Mellitus
- Hypothyroid
- Colle’s fracture
- Amyloidosis
- Acromegaly
- Repetitive activities

CLINICAL PRESENTATION

- Palmar aspect of the first three digits of hand
  - Paresthesias
  - Numbness
- Motor weakness
  - Abductor pollicis brevis
- Night time symptoms
- Flick sign

DIFFERENTIAL DIAGNOSIS

- Cervical Radiculopathy
- Thoracic Outlet Syndrome
- Arthritis of carpometacarpal joint of the thumb
- Wrist arthritis
- Flexor carpi radialis tenosynovitis
- Ulnar neuropathy
- Volar radial ganglion

PHYSICAL EXAM FINDINGS

- Neurologic Assessment
  - Check reflexes
  - Check sensation and strength
  - Foraminal compression test
  - Adson’s, Military, Wright’s (thoracic outlet syndrome)
**Physical Findings and Special Tests**

- Percussion over the middle wrist
- Midline between the thenar and hypothenar eminences for 30 seconds
- Positive test
  - Paresthesias

**Physical Exam Findings**

- Compression Test
  - Pressure over the median nerve for 30 seconds
- OK Sign
  - Patient holds a piece of paper between thumb and forefinger
- Loss of two-point discrimination
- Thenar atrophy

**Osteopathic Manipulative Treatment**

- Sucher
  - Cadaver Studies
  - Treating at wrist
  - MRI, NCS
- Double Crush Theory
- Ramey
  - Treating path of the median nerve
  - MRI, NCS

**Sub-Therapeutic Ultrasound**

- Studied as a treatment for CTS
- Used in other OMT studies as a placebo
- Equivalent time with physician
- Same areas will be treated
- Lowest settings possible

**Sub-Therapeutic Ultrasound Protocol**

- Wrist – 5 minutes
- Forearm – 5 minutes
- Anterior Thorax/Shoulder – 3 minutes
- Posterior Thorax/Upper Back – 3 minutes
- Neck – 3 minutes

**Treatment Groups**

- OMT
  - Cervical Spine
    - Origin of Brachial plexus C5-T1
  - Thoracic Spine
    - Sympathetic innervation to upper extremity T2-T6
  - Sibson’s Fascia, Pectoralis Minor, Clavicle, 1st Rib
    - Possible impediment to neural and vascular supply to extremity
  - Forearm
  - Wrist
    - Direct association to carpal canal

- Standard Care
  - No intervention other than as prescribed by PCP
### OMT Treatment Protocol

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrist</td>
<td>Ligamentous Articular Strain, Opponens Roll, Articulation with Traction</td>
</tr>
<tr>
<td>Intersosseus Membrane Forearm</td>
<td>Myofascial Release, Counterstrain</td>
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<tr>
<td>Pectoralis Minor</td>
<td>Ligamentous Articular Strain, Muscle Energy, Articulated Positional Release</td>
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<tr>
<td>Clavicle</td>
<td>Indirect Articulatory, High Velocity Low Amplitude, Myofascial Release,</td>
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<tr>
<td>First Rib</td>
<td>Counterstrain</td>
</tr>
<tr>
<td>Supraventricular fascia</td>
<td></td>
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<tr>
<td>Thoracic Spine: T1-T8 (choice)</td>
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<tr>
<td>Cervical Spine (choice)</td>
<td></td>
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</tbody>
</table>

### Articulatory with Traction
- Physician places hands over dysfunctional carpal articulation
- Squeeze the palms of hands (can pull apart the fingers)
- Apply gentle traction
- Articulate in both clockwise and counter clockwise manner

### Ligamentous Articular Strain
- Grasp the thumb and hypothenar eminence
- Flex the wrist and supinate the arm, direction of force as shown
- Slowly take the wrist through its ROM waiting for any barriers to release
- Once the forearm is pronated carry the wrist into ulnar deviation

### Myofascial Release Long Axis Approach
- Grasp the wrist and the elbow as shown
- Take into barrier in supination/pronation of forearm
- Take into barrier in flexion/extension/abduction/adduction of wrist
- Add in compression or traction
- Use respiratory cooperation as needed

### Forearm Tenderpoints and Counterstrain
- Supinator
- Supinator muscle at the lateral aspect of the forearm near the radial head
- Treatment position
  - Extension
  - Supination
  - Slight abduction of forearm

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**References:**
- Sacher, B. *Pulmonary diagnosis and manipulative management of carpal tunnel syndromes.* *JMAA.*
**FOREARM TENDERPOINTS AND COUNTERSTRAIN**
- Promator
- Medial forearm at the proximal pronator teres attachment
- Treatment position
  - Flexion
  - Pronation
  - Slight adduction of the forearm

*Rossie, P. Counterstrain and Exercise: An Integrated Approach.* 2004. pp 58-95

**MYOFASCIAL RELEASE LONG AXIS APPROACH**
- Grasp the wrist and the elbow as shown
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**PECTORALIS MINOR RELEASE**
- Patient supine
- Maintain steady, balanced pressure with the pad of the thumb
- Start at lateral edge of pectoralis minor about 2 inches from coracoid
- Sweep medially across the chest as muscle relaxes


**CLAVICLE MYOFASCIAL RELEASE**
- Patient seated (may also do supine version)
- Thumbs at medial third of the clavicle as a fulcrum
- Fingers monitor at the SC and AC joints
- Patient turns away slightly (side opposite the treated clavicle)
- Patient drapes arm over the physician’s arm


**FIRST RIB – FACILITATED POSITIONAL RELEASE**
- Patient supine.
- Monitor the posterior portion of the first rib with one hand
- With the other hand grasp the patient’s elbow, flex the arm to 90 degrees and abduct and internally rotate until your feel a softening of the tissue under the monitoring hand
- Add a compressive force through the elbow
- Hold for 3-5 seconds
- Maintaining the compressive force take the arm across the chest and through its ROM and back into a neutral position


**SPINE SOMATIC DYSFUNCTION**
- C5-T1
- T2-8
- Treatment based on physician and patient preference
  - HLVA
  - Muscle Energy
  - Myofascial release
SPECIAL THANKS
- Touro University Nevada – Class of 2014
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