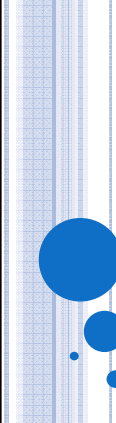


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2011 Annual Meeting, Orlando, Florida, November 1, 2011



CARPAL TUNNEL SYNDROME
AN EVIDENCE-BASED PROTOCOL

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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)

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PHYSICAL FINDINGS AND SPECIAL TESTS

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



PHYSICAL FINDINGS AND SPECIAL TESTS

- Hands flexed for 60 seconds
- Positive test
 - Paresthesias in median nerve distribution


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
- Ramey
 - Treating path of the median nerve
 - MRI, NCS
- Double Crush Theory




TREATMENT GROUPS

<p>OMT</p> <ul style="list-style-type: none"> ○ Cervical Spine <ul style="list-style-type: none"> • Origin of Brachial plexus C5-T1 ○ Thoracic Spine <ul style="list-style-type: none"> • Sympathetic innervation to upper extremity T2-T8 ○ Sibson's Fascia, Pectoralis Minor, Clavicle, 1st Rib <ul style="list-style-type: none"> • Possible impediment to neural and vascular supply to extremity ○ Forearm ○ Wrist <ul style="list-style-type: none"> • Direct association to carpal canal 	<p>Sub-Therapeutic Ultrasound</p> <ul style="list-style-type: none"> ○ 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 <p>Standard Care</p> <ul style="list-style-type: none"> ○ No intervention other than as prescribed by PCP
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SUB-THERAPEUTIC ULTRASOUND PROTOCOL

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



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OMT Treatment Protocol	
Wrist	Ligamentous Articular Strain Opponens Roll Articulation with Traction (Squeeze Technique)
Interosseous Membrane Forearm Tenderpoints	Myofascial Release Counterstrain
Pectoralis Minor Clavicle First Rib Supraclavicular fascia Thoracic Spine: T1-T8 (choice of tx) Cervical Spine (choice of tx)	Ligamentous Articular Strain Muscle Energy Facilitated Positional Release Indirect Articulatory High Velocity Low Amplitude Myofascial Release Counterstrain

OPPONENS ROLL

- o Used to assess rotation of the thumb away from palm
- o Combination of abduction and extension
- o Treatment with lateral rotation component to stretch the opponens pollicus muscle and stretch transverse carpal ligament
- o Contact pisiform and scaphoid
- o Extend, abduct and lateral rotation of thumb



Sucher, B. "Palpitory diagnosis and manipulative management of carpal tunnel syndrome." JAOA; 94(8)

ARTICULATORY WITH TRACTION

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



Kimberly, P. Outline of Osteopathic Manipulative Procedures. The Kimberly Manual, 2000; pp 248-249

LIGAMENTOUS ARTICULAR STRAIN

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



Speece, C and Crow W. Ligamentous Articular Strain: Osteopathic Manipulative Techniques for the Body, 2001; pp 126-127.

MYOFASCIAL RELEASE LONG AXIS APPROACH

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



Ward R. "Integrated Neuromusculoskeletal release and myofascial release." Foundations of Osteopathic Medicine, 2003; pp 955-966.

FOREARM TENDERPOINTS AND COUNTERSTRAIN

- o Supinator
- o Supinator muscle at the lateral aspect of the forearm near the radial head
- o Treatment position
 - Extension
 - Supination
 - Slight abduction of forearm



Rennie, P. Counterstrain and Exercise: An Integrated Approach, 2004; pp 88, 91

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FOREARM TENDERPOINTS AND COUNTERSTRAIN

- Pronator
- Medial forearm at the proximal pronator teres attachment
- Treatment position
 - Flexion
 - Pronation
 - Slight adduction of the forearm



Rennie, P. Counterstrain and Exercise: An Integrated Approach. 2004; pp 88, 91

MYOFASCIAL RELEASE LONG AXIS APPROACH

- Grasp the wrist and the elbow as shown
- Take into the barrier in supination/pronation of forearm
- Take into barrier in flexion/extension/abduction/adduction of wrist
- Add in compression or traction
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Ward R. "Integrated Neuromusculoskeletal release and myofascial release." Foundations of Osteopathic Medicine. 2003; pp 965-996.

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



Speece, C and Crow W. Ligamentous Articular Strain: Osteopathic Manipulative Techniques for the Body, 2001; pp 120

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



Kimberly, P. Outline of Osteopathic Manipulative Procedures: The Kimberly Manual, 2000; pp 233

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 you 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



Schiowitz S, DiGiovanna E, Dowling D. "Facilitated Positional Release." Foundations of Osteopathic Medicine. 2003; pp 1020-1022.

SPINE SOMATIC DYSFUNCTION

- C5-T1
- T2-8
- Treatment based on physician and patient preference
 - HLVA
 - Muscle Energy
 - Myofascial release



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SPECIAL THANKS

- Touro University Nevada – Class of 2014
 - Lynn Mackovick OMS-II
 - Michelle Lynn OMS-II
 - Barbara Kiersz OMS-II
- Todd Yokley, PhD

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