



## WRIST CASE STUDY

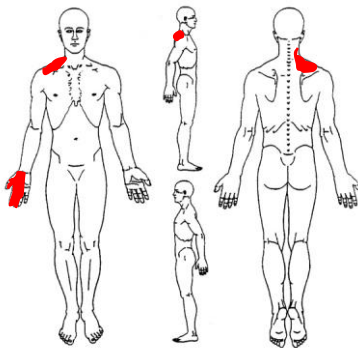
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Orthopaedic Manual Physical Therapy Series  
Charlottesville 2017-2018



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## VOMPTI\_CLINICAL REASONING FORM



### Body Chart – Initial Hypothesis:

CTS  
C6-C7 Radiculopathy  
TOS  
1<sup>st</sup> CMC OA  
DM neuropathy  
Pronator Teres Syndrome



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**SUBJECTIVE EXAM**

**Subjective \*Asterisks\* Signs/Symptoms:** (Aggravating/Easing factors, Description/location of symptoms, Behavior, Mechanism of injury):

- 50 yo female computer programmer with gradual onset of night time R hand numbness and now daytime pain
- R hand dominant
- Hx of chronic R neck/"upper trap" pain for years which is exacerbated during work
- Unsure of relationship of neck and hand symptoms
- Hand numbness wakes her
- States "clumsy" feeling lately when using her R hand
- Hand pain is intermittent, but becoming more frequent
  - Aggs: night time, typing, gardening, using push mower, prolonged driving—uses L hand only to steer/turn
  - Eases: decreased use of R hand,
  - Pain worse on work days



**STRUCTURE at Fault:**

Joints in/refer to the painful region	Myofascial tissue in/refer to the painful region	Non Contractile tissue in/refer to the painful region	Neural tissue in/refer to the painful region	Other structures that must be examined – non MSK
C6-7 facets CTJ/Rib 1 midcarpal radiocarpal 1-3 CMC , MCP, IP	Upper Trap Pronator Teres Thenar mm Wrist flexors	C6-7 disc Transverse Carpal Lig	C 6,7 nerve roots Median Nerve	Systemic Neuropathy (DM)

**Primary HYPOTHESIS after Subjective Examination:** CTS

**Differential List (Rank/List in order to rule out):**

- C6-7 radiculopathy
- TOS
- De Quervain's
- Intersection Syndrome
- 1<sup>st</sup> CMC OA
- PTS
- Scaphoid fracture/instability



**Physical Exam \*Asterisks\* Signs/Symptoms** (Special tests, Movement/Joint Dysfunction, Posture, Palpation, etc)

- Observation: Forward head posture, rounded shoulders
- Wrist ROM: (+ pain) end ROM flex, ext
- Wrist strength 4-/5 flex and ext due to pain c/o
- Cervical AROM WNL all planes except L rot 75%
- UE myotomes WNL
- Spurlings, cervical distraction/compression neg
- Weakness with grip strength testing R vs. L



➤ **Rate your assessment of Severity & Irritability**

Justify your assessment with examples from the Subjective Exam &/or Objective Exam

- Severity      Non              Min              **Mod**              Max

Sleep interruption, work ability affected

- Irritability      Non              **Min**              **Mod**              Max

Can decrease symptoms with activity modification

➤ **Stage & Stability?**

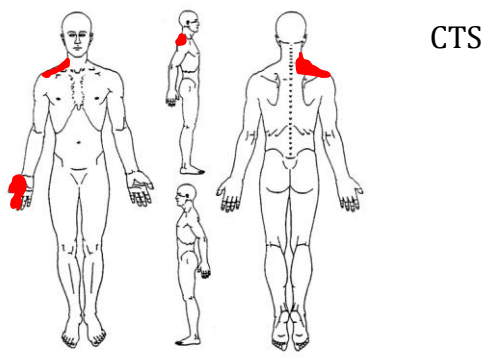
- Acute              Subacute              **Chronic**              Acute on chronic
- Stable              Improving              **Worsening**              Fluctuating              Red Flags

Identify any potential risk factors (Yellow, Red flags, non MSK involvement, biopsychosocial)

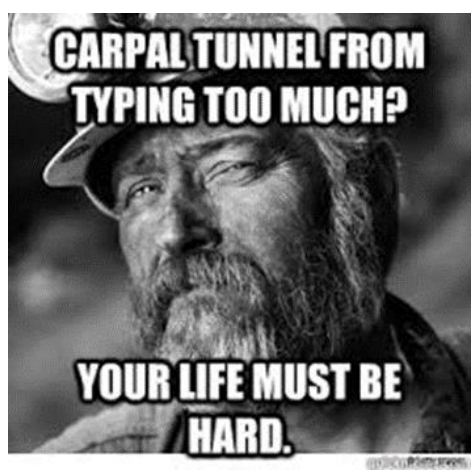
None



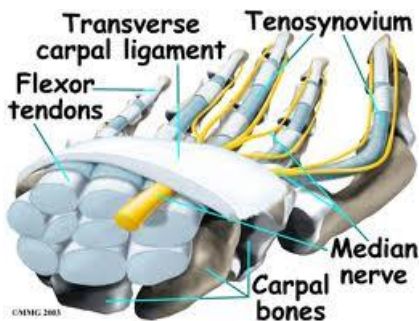
- Are the relationships between the areas on the body chart, the interview, and physical exam consistent? "Do the features fit" a recognizable clinical pattern? **Yes** No



CTS



# Carpal Tunnel



- Tunnel contains 9 flexor tendons and median nerve
- Roof is transverse carpal ligament



# CTS

- Any condition decreasing cross sectional area of CT or increasing volume of its contents restricts median n. perineural blood supply
- Examples:
  - Carpal fracture/dislocation
  - Increased fluid
  - Tenosynovitis
  - Sustained wrist flex or ext
  - External wrist pressure
  - Vibration

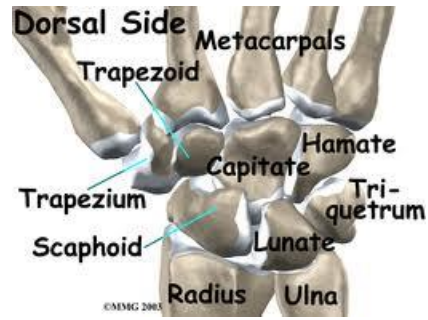


# Wrist Anatomy/Palpation

## Palmar



## Dorsal



## Carpal Palpation

### Palmar

- 3 creases on wrist
  - Proximal = prox end of synovial flexor tendon sheaths
  - Middle = prox wrist joint
  - Distal = prox. Fl retinaculum/transverse carpal ligament
- Follow FCR to scaphoid tubercle, then trapezium
- Follow FCU to pisiform, then to hook of hamate
- Connect the above to show borders of CT
- Between hook of hamate and triquetrum (under pisiform) is Guyon's Canal (motor fibers exit for hypothenar eminence)



## Carpal Palpation Dorsal



- Dip at proximal end of
  - 3<sup>rd</sup> MC –capitate
  - 2<sup>nd</sup> MC –trapezoid
  - 4<sup>th</sup>/5<sup>th</sup> – hamate
- At distal ulnar styloid – triquetrum
- Across distal radio-ulnar – meniscus of wrist
- Between ulnar styloid and triquetrum, palp on radial deviation – TFCC
- 3 palpation sites for Scaphoid –distal radius, snuff box, & tubercle (palmar aspect).



## CTS

- Most common Nerve compression in UE
- Peak prevalence females >55 y.o.
- Symptoms:
  - pain, paresthesia or numbness in median nerve sensory distribution
  - Nocturnal paresthesia—may begin as only 3<sup>rd</sup> digit
  - Sensory impairment affects object recognition, coordination, manipulation
- NO volar wrist symptoms (supplied by palmar cutaneous branch of median n. that does NOT enter CT)



## “New” wrist bracing for CTS



## CTS

- Differential Diagnosis
  - TOS
  - Cervical radic
  - DM neuropathy
  - C6-7 radiculopathy
  - De Quervain's
  - Intersection Syndrome
  - 1<sup>st</sup> CMC OA
  - Pronator Teres Syndrome
  - Scaphoid fracture/instability





## Cervical Radiculopathy

- Disorder of Cervical Nerve Root
- Commonly caused by disc herniation or space occupying lesion
- Result in nerve root inflammation, impingement or both
- CPR for diagnosis (90% probability with all 4 criteria)
  - (+) Spurling
  - (+)Distraction
  - (+) ULTT (medial nerve bias)
  - Presence of < 60 deg cervical rotation toward involved side



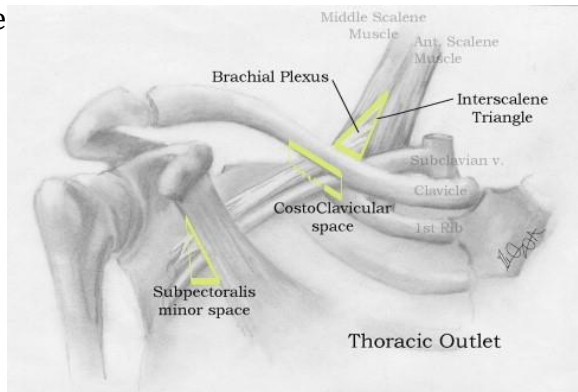
## TOS

- Onset age: 20-40 yrs
- Females affected > males
- 2 types-Neurogenic (more common) and Vascular
- Typical s/s:
  - Medial arm pain, numbness, paresthesia of UE, weakness
  - Aggs: OH activity, heavy lifting, repetitive motion disorders, postural issues, or traumatic movements of the neck or shoulder that can cause dysfunction to the scalene musculature.



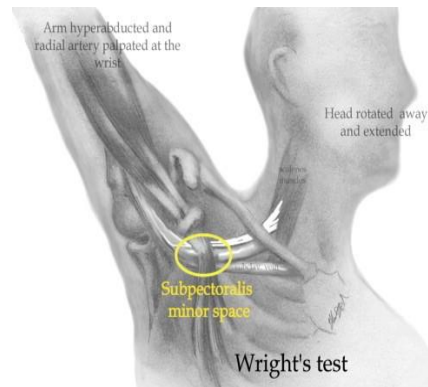
## TOS

- 3 Compression sites
  - Interscalene triangle
  - Costoclavicular space
  - Subpectoralis (subcoracoid) space



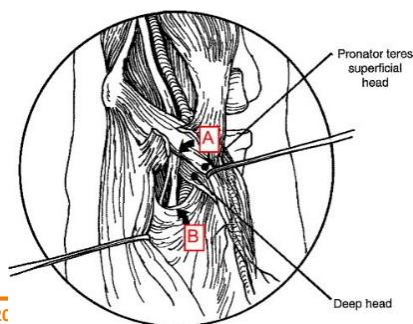
## TOS

- Special tests
  - Hyperabduction test
  - Adson test
  - Both have poor false (+) reliability
- No true objective criteria for diagnosis
- Best diagnosis is history combined w/physical exam including palpation of entrapment sites, visual inspection, ROM of cspine and UE



## Pronator Teres Syndrome

- History
  - Median nerve compression btw heads of pronator teres
  - Paresthesias digits 1-3 increased w/activity
  - Weakness in forearm and hand mm (Med nerve)
- Differential Diagnosis
  - Medial epicondylalgia
- Treatment
  - Splint 4-6 weeks
  - Median nerve gliding
- Physical Exam
  - (+)TTP prox PT
  - Pain with RSC elbow flex, forearm pronation and 3<sup>rd</sup> digit PIP flexion
  - Differentiate pronation w/elbow extension



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## Scaphoid Fracture/Instability

- History
  - Most frequently fx carpal bone bc scaphoid links prox and distal rows
  - Fx upon falling in ext/supination (backward onto hand)
- Differential Diagnosis
  - Thumb CMC Arthritis
  - DeQuervain's Tenosynovitis
  - Radial Styloid Fracture
  - Intersection Syndrome
  - Superficial Radial Sensory Nerve
- Physical Exam
  - (+) axial compression of thumb vs scaphoid
  - (+) Scaphoid shift/Watson test
- Treatment
  - \*\*Decreased blood supply so waiting to treat could lead to necrosis
  - If x-ray (-), immobilize x 2 weeks then re-xray or bone scan

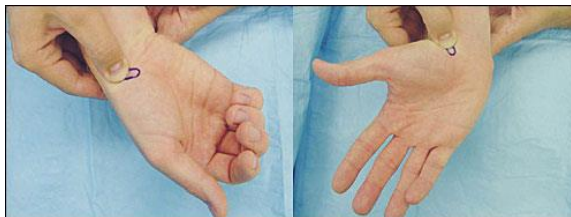


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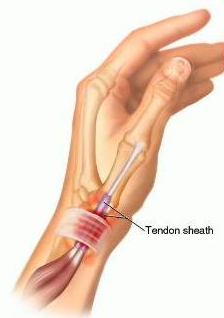
## Scaphoid Fracture/Instability

- Diagnosis
  - Axial Load of Thumb
  - Scaphoid Shift/Watson's Test
- Dorsal directed pressure on scaphoid as wrist moves from UD to RD. (+) if relocating clunk as scaphoid flexes and strikes radius



## DeQuervain's Tenosynovitis

- History
  - Most common overuse injury of hand
  - Common activities of forceful grip + UD (tennis serve)
  - Pain dorsal/radial wrist along 1<sup>st</sup> dorsal compartment w/ROM
- Physical Exam
  - (+) Finkelstein's Test
  - Painful RSC Thumb Extension
  - TTP APL/EPB tendons, radial styloid, swelling, thickening



## DeQuervain's Tenosynovitis

- Finkelstein's Test
  - Flex the thumb into the palm and close the fingers around the thumb
  - Ulnar deviate the wrist
  - Positive test results in pain at the 1st dorsal compartment
  - Sn 100%, Sp 100%



## DeQuervain's Tenosynovitis

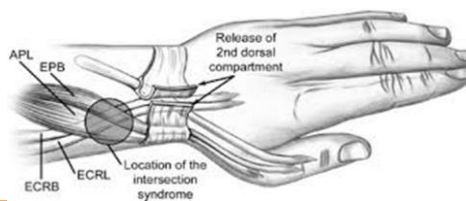
- Differential Diagnosis
  - Thumb CMC Arthritis
  - Scaphoid Fracture
  - Radial Styloid Fracture
  - Intersection Syndrome
  - Superficial Radial Sensory Nerve
- Treatment
  - Thumb spica splint worn 2 weeks all day/night and at night 6-8 weeks





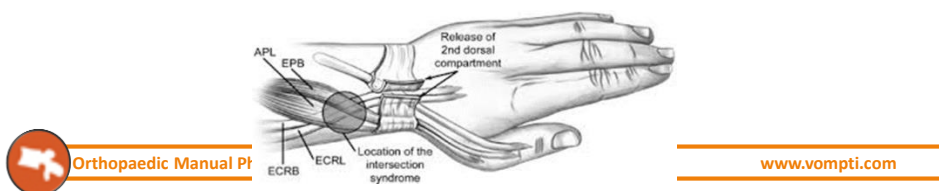
## Intersection Syndrome

- History
  - Pain/swelling at radial wrist where 1<sup>st</sup>/2<sup>nd</sup> dorsal compartments meet due to inflammation of wrist extensors vs. APL and EPB
  - Mechanism: repetitive grip w/thumb abd activity (rowing, racket use, pulling rake vs. ground, holding ski poles)
- Physical Exam
  - TTP radial wrist at site of 1<sup>st</sup>/2<sup>nd</sup> dorsal compartments
  - Crepitus with thumb and wrist ROM



## Intersection Syndrome

- Differential Diagnosis
  - Thumb CMC Arthritis
  - Scaphoid Fracture
  - Radial Styloid Fracture
  - De Quervain's Syndrome
  - Superficial Radial Sensory Nerve Injury
- Treatment
  - PT for education of activity modification, treatments for reducing inflammation
  - NSAIDS
  - Thumb Spica
  - Surgical Release



## Lateral Wrist Pain



## 1<sup>st</sup> CMC OA

- History
  - 30-40% of post-menopausal females and men 40-50 y.o.
  - Degeneration at 1<sup>st</sup> trapezio-MC joint
- Physical Exam
  - Joint assessment
  - 1<sup>st</sup> CMC grind test
- Differential Diagnosis
  - DeQuervain's Tenosynovitis
  - Radial Styloid Fracture
  - Intersection Syndrome
  - Superficial Radial Sensory Nerve
- Treatment
  - Distraction mobs
  - Median nerve glides

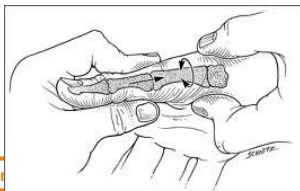


Fig. 2: Grind test performed by your physician.



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The use of joint mobilization to improve clinical outcomes in hand therapy:  
A systematic review of the literature

*R. Heiser et al. / Journal of Hand Therapy 26 (2013) 297–311*

- First CMC OA mobilization evidence:
  - Some limited evidence joint mobilization will reduce short term pain symptoms
  - Villafane 2011 JMPT study



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**HYPALGESIC AND MOTOR EFFECTS OF KALTENBORN MOBILIZATION ON ELDERLY PATIENTS WITH SECONDARY THUMB CARPOMETACARPAL OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL**

*Journal of Manipulative and Physiological Therapeutics*  
October 2011

- Female pts with 1<sup>st</sup> CMC OA (70-90yrs old)
  - Treatment Gp: 1<sup>st</sup> CMC Gr III PA w/distraction
  - Control Gp: sham US
- Results
  - Treatment Gp: significant pain relief immediate post mobilization and positive trend in both improved pain and grip strength at 1-2 week f/u visit
  - Control Gp: no change in pain or grip strength



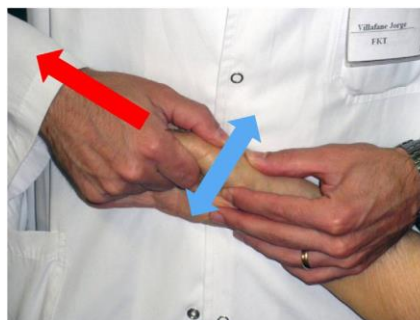
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**HYPALGESIC AND MOTOR EFFECTS OF KALTENBORN MOBILIZATION ON ELDERLY PATIENTS WITH SECONDARY THUMB CARPOMETACARPAL OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL**

*Journal of Manipulative and Physiological Therapeutics*  
October 2011

- Pt seated w/arm in anatomical position, elbow 90° flex
- PT grasps prox end of 1<sup>st</sup> MC and performs PA w/distraction while stabilizing trapezium with other hand
- Pt medial hand stabilized vs. PT's body
- 3 min mobs, 1 min break x 3



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## SHORT-TERM EFFECTS OF NEURODYNAMIC MOBILIZATION IN 15 PATIENTS WITH SECONDARY THUMB CARPOMETACARPAL OSTEOARTHRITIS

Journal of Manipulative and Physiological Therapeutics  
September 2011

- 15 pts with 1<sup>st</sup> CMC OA (70-90yrs old)
  - Median n. sliders—  
elbow ext + wrist flex  
→ elbow flex + wrist ext
  - 4 sessions over 2 wks
- Results
  - Improved pain pressure threshold at 1<sup>st</sup> CMC and grip strength



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## Radial Nerve Mobilization Decreases Pain Sensitivity and Improves Motor Performance in Patients With Thumb Carpometacarpal Osteoarthritis: A Randomized Controlled Trial

Arch Phys Med Rehabil Vol 93, March 2012

- Female pts with 1<sup>st</sup> CMC OA (70-90yrs old)
  - Treatment Gp: radial nerve sliders
  - Control Gp: sham US
- Results
  - Treatment Gp: PPT increased at 1<sup>st</sup> CMC, scaphoid, and hamate and improved tripod and tip pinch grip strength
  - Control Gp: no change in pain or grip strength



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## The Effectiveness of a Manual Therapy and Exercise Protocol in Patients With Thumb Carpometacarpal Osteoarthritis: A Randomized Controlled Trial

204 | APRIL 2013 | VOLUME 43 | NUMBER 4 | JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY

- 60 pts with 1<sup>st</sup> CMC OA (65-90yrs old)
  - Treatment Gp: radial nerve sliders, median n sliders, 1<sup>st</sup> CMC distraction/mobilization, hand therex
  - Control Gp: sham US
  - Treatment 3x/week x 4 weeks
- Results
  - Treatment Gp: improvement in VAS pain at 1<sup>st</sup> CMC, no change in PPT or grip strength
  - Control Gp: no change in any variable

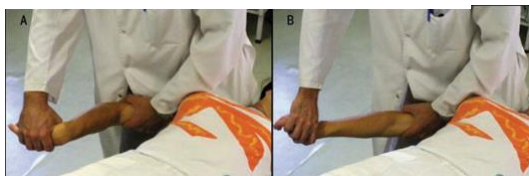


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## The Effectiveness of a Manual Therapy and Exercise Protocol in Patients With Thumb Carpometacarpal Osteoarthritis: A Randomized Controlled Trial

- Radial n slider:
  - Wrist flex/elbow flex → elbow ext/wrist ext
- Median n slider:
  - Wrist flex/elbow ext → elbow flex/wrist ext



204 | APRIL 2013 | VOLUME 43 | NUMBER 4 | JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY

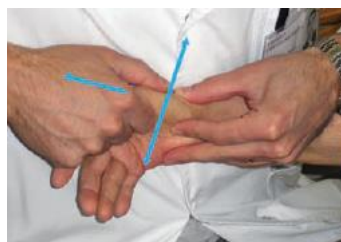


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## The Effectiveness of a Manual Therapy and Exercise Protocol in Patients With Thumb Carpometacarpal Osteoarthritis: A Randomized Controlled Trial

- Gr III PA at 1<sup>st</sup> CMC w/distractio
- PT grasps R thumb MC of pt w/R thumb and index finger and distracts joint retracting the thumb and gliding 1<sup>st</sup> MC in PA direction
- 3min on, 1 min rest for 3 sequences



**FIGURE 1.** Posterior/anterior glide with distraction of the first carpometacarpal joint (**ONLINE VIDEO**).

204 | APRIL 2013 | VOLUME 43 | NUMBER 4 | JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY



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## The Effectiveness of a Manual Therapy and Exercise Protocol in Patients With Thumb Carpometacarpal Osteoarthritis: A Randomized Controlled Trial

TABLE 1	HAND EXERCISES
Exercise	Description
Tabletop	The hand and wrist are held in a neutral position; the subject flexes the second to fifth MCP joints only, then returns to neutral.
Small fist	From neutral position, the subject flexes at the second to fifth proximal interphalangeal joint and distal interphalangeal joint only, then returns to neutral.
Large fist	From neutral position, the subject flexes all joints to form a fist, then returns to neutral.
Okay signs	From neutral position, the subject flexes to form an "O" with the tip of the thumb to the tip of each finger, in turn, returning to neutral after each.
Finger spread	From neutral position, the hand is placed on a flat tabletop and the fingers are spread apart as wide as possible before returning to neutral.
Thumb reach	From neutral position, the subject reaches across the palm of the hand and touches the tip of the thumb to the fifth MCP joint and then returns to neutral.
Gripping	Subject holds the Thera-Band Hand Exerciser ball in the palm of the hand and squeezes until the ball is about 50% depressed.
Key pinch	Subject holds the Thera-Band Hand Exerciser ball between the side of the thumb and the side of the index finger and squeezes until the ball is about 50% depressed.
Fingertip pinch	Subject holds the Thera-Band Hand Exerciser ball between the tip of the thumb and the tip of the index finger and squeezes until the ball is about 50% depressed; this is repeated for digits 3 to 5.
Abbreviation: MCP, metacarpophalangeal.	



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## CPR for CTS

Arch Phys Med Rehabil Vol 86, April 2005

- Wainner, 2005
- CPR
  - Age > 45
  - Reports shaking hands relieves symptoms
  - Wrist Ratio Index >.67
  - Symptom Severity Scale Score > 1.9
  - Reduced Median Nerve Sensory Field First Digit



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## CPR for CTS

- Wrist Ratio Index
  - indicator of carpal canal volume
  - larger ratios (>.67) suggested a predisposing factor for CTS.
  - calipers was used to measure AP and ML wrist width in centimeters.
  - wrist ratio index calculated by dividing AP by ML width



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## CPR for CTS

- Symptom Severity Scale (SSS)
  - 11 statement items related to 6 domains thought critical for the evaluation of CTS.
  - scored by calculating the mean of the individual items.
  - A higher overall SSS score represents more severe symptoms.



### Clinical Diagnosis of Carpal Tunnel Syndrome:

#### A Systematic Review

J HAND THER. 2004;17:309-319.

- Phalen's: 68% Sn, 73% Sp
- Tinel's: 50% Sn, 77% Sp
- Carpal compression 64% Sn, 83% Sp
- Two-point discrimination 24% Sn, 95% Sp
- Semmes-Weinstein Monofilament 72% Sn, 62% Sp



## Diagnosing CTS

J Hand Surg Am 2014 Jul;39(7):1403-7

- Phalen's: 68% Sn, 73% Sp
- Tinel's: 50% Sn, 77% Sp
- **Carpal compression with wrist flexion 80% Sn, 92% Sp**
- Abductor pollicis brevis strength 80 % Sp, 29% Sn
- Abductor pollicis brevis atrophy 94% Sp, 80% Sn



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## Objective Examination for CTS

- Phalen's Maneuver
- Tinel's Sign
- Carpal Compression
- Semmes-Weinstein Monofilament



## Phalen's Maneuver

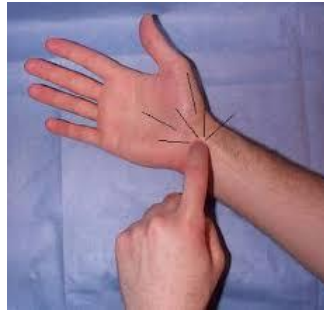
- Rationale:
  - Flexion increases pressure in CT
  - Median n compressed by high P in CT
- Method
  - Wrists held in max flexion x 30-60 sec
- Positive Result:
  - Paresthesia in Median N distribution





## Tinel's Test

- **Rationale:**
  - Regenerating nerve fibers are susceptible to mechanical deformation
- **Method:**
  - PT taps along the median nerve at CT
- **Positive Result:**
  - Tingling felt along median nerve



## Carpal Compression

- **Rationale:**
  - Direct pressure on median n. compromises impaired nerve
- **Method:**
  - PT compresses median n. by pressing
- **Positive Result:**
  - Paresthesia along Median n.



## Effectiveness of Hand Therapy Interventions in Primary Management of Carpal Tunnel Syndrome:

A Systematic Review

J HAND THER. 2004;17:210-228.

- Current evidence shows “Grade B” evidence from splinting, pulsed US, nerve/tendon gliding, carpal bone mobilization, and yoga for people w/CTS



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### Treatment planning

➤ Impairments	Functional limitations	Goals
Limited , painful AROM	Difficulty sleeping, tolerating driving and job activity	Sleep w/o waking due to numbness
Postural Deficits		
Grip weakness	Impaired object manipulation	RTW and driving painfree
Nerve irritability		



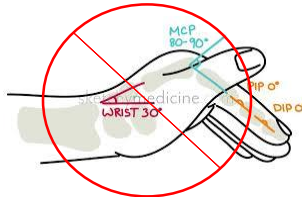
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➤ What is your primary treatment Objective after initial evaluation?

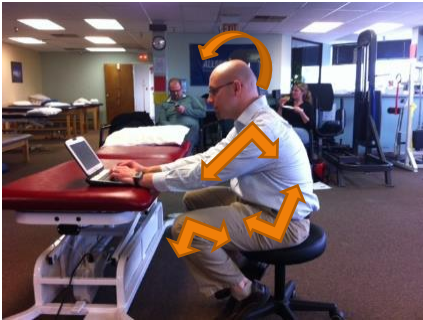
• Education:

- Condition
- \*\*Posture
- Activity modification
  - Hand tools promoting neutral wrist-large, padded handles
  - Avoidance of tight fist posture, especially in max wrist flex or ext and intrinsic plus position
    - These positions pull lumbricals into the CT and dec space
  - Avoidance of direct palm/wrist pressure, vibration
  - Use of padded gloves



## Postural Education

- Poor posture



- Posterior pelvic tilt due to hips 'lower' than knees
  - Promotes
    - FHRs posture
    - Excessive CS lordosis
    - Reverses LB lordosis
- No stable base with feet
- UE reaching out



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## Postural Education

- Corrected posture



- FIRST CORRECTION: Hips higher than knees
  - May add LB roll next to accentuate LB lordosis and reduce CS lordosis
- Feet flat on floor
- Computer/steering wheel closer (reduce shldr flex)
- Pretend a string is pulling the crown of their head UP
  - Adjust rear view mirror slightly above normal



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➤ **What is your primary treatment Objective after initial evaluation?**

- **Education**

- **Splinting**

- Neutral splint: Purpose is to immobilize the wrist in a neutral position to avoid flexion or extension, which reduces compression of the median nerve
    - Night time vs. Sustained?



## **Splinting is effective for night-only symptomatic carpal tunnel syndrome patients**

*J. Phys. Ther. Sci. Vol. 27, No. 4, 2015*

- 40 CTS pts divided into 2 groups: Night only symptoms or day and night
- Purpose of splinting: immobilize the wrist in a neutral position to avoid flexion or extension, which reduced compression of the median nerve
- After 3 months of splinting, VAS pain levels of night-only symptom pts were lower than those in sustained splints
- No difference found in severity level, functional capacity, and electrophysiological findings.
- Splinting alone for night-only symptomatic patients seemed to decrease pain but combined therapy may be needed for sustained symptomatic patients



**RANDOMISED CLINICAL TRIAL ON EFFICACY OF COMBINING  
HANDSPLINTING WITH PHYSIOTHERAPY OR ULTRASOUND  
TREATMENT FOR PATIENTSWITH CARPAL TUNNEL  
SYNDROME**

Research Report Platform Presentation Number: RR-PL-654 Sunday 3 May 2015 08:41 Hall 405  
Physiotherapy 2015; Volume 101, Supplement 1 eS1238–eS1642

- Adding nocturnal hand splinting to either MEX or MEX + US showed no added improvements
- Pts with CTS undergoing MEX or MEX + US treatment received no additional benefits with hand splinting in the short term (7weeks) or long term (52 weeks).
- MEX and therapeutic ultrasound were beneficial and could be recommended for patients with CTS.



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➤ **What is your primary treatment Objective after initial evaluation?**

- Manual Therapy
  - Cervical Mobilization?
  - Median nerve gliding
    - Local or at more proximal (less irritable) location
  - Carpal mobilization
    - AP
    - PA



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## Link between CTS and Cervical Spine involvement? (Double Crush)

### Women With Carpal Tunnel Syndrome Show Restricted Cervical Range of Motion

JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY | VOLUME 41 | NUMBER 5 | MAY 2011

Females with min/mod/severe CTS exhibited significantly dec Cerv AROM compared to those w/o CTS

### Increased Forward Head Posture and Restricted Cervical Range of Motion in Patients With Carpal Tunnel Syndrome

JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY | VOLUME 39 | NUMBER 9 | SEPTEMBER 2009

Pts with mid/mod CTS exhibited > FHP and dec Cerv AROM than healthy individuals



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### An investigation to compare the effectiveness of carpal bone mobilisation and neurodynamic mobilisation as methods of treatment for carpal tunnel syndrome

A. Tal-Akabi\*, A. Rushton†

*Manual Therapy* (2000) 5(4), 214–222

- Investigated differences in CTS outcomes with 3 groups:
  - No treatment
  - Median Nerve mobilization
  - Carpal mobilization (PA or AP--restriction dependent-- and flexor retinaculum stretch)
- Both mobilization groups had statistically significant decrease in pain compared to no intervention and less surgery
- No significant difference of benefit btw nerve/carpal mobilization groups



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## Manual Physical Therapy versus Surgery for Carpal Tunnel Syndrome: a Randomized Parallel-Group Trial.

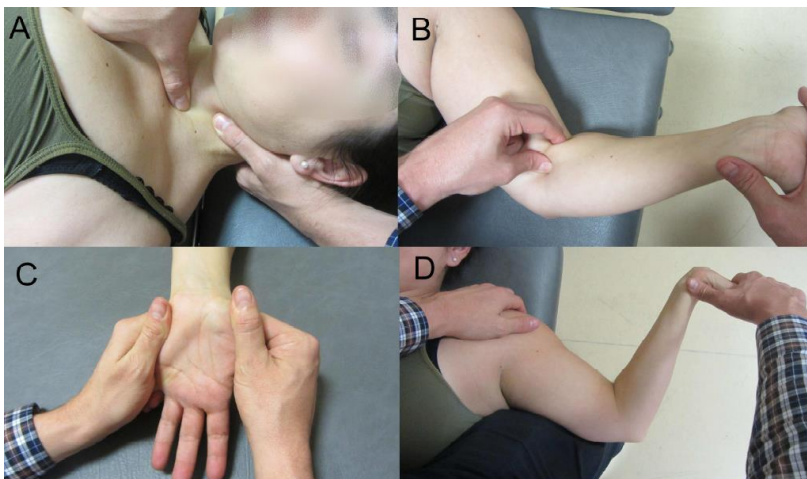
J Pain. 2015 Aug 14.

- PT consisting of manual therapies was more effective at 1 and 3 months, but equally effective at 6 and 12 months than surgery for improving pain and function in women with CTS
  - desensitization maneuvers of the central nervous system
  - soft tissue mobilization
  - nerve and tendon gliding



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## Carpal Mobilization Radiocarpal A-P/P-A

- **Pt. Position:** Supine, anatomical position for A-P, pronated forearm for P-A
- **P.T. Position:** Standing, stabilizing hand holds distal radius/ulna. Mobilizing hand holds prox row of carpals
- **Indications:**
  - A-P: restricted flexion.
  - P-A: restricted extension



## Carpal Mobilization Radiocarpal Ulnar and Radial Glide

- **Pt. Position:** Supine, arm at side, neutral pronation/supination
- **P.T. Position:** Standing, stabilizing hand holds distal radius/ulna. Mobilizing hand holds prox row of carpals
- **Indications:**
  - Ulnar glide: restricted radial deviation
  - Radial glide: restricted ulnar deviation



## Carpal Mobilization Radiocarpal – Physiological Extension

- **Pt. Position:** Supine, arm at side, forearm pronated
- **P.T. Position:** Standing, holding wrist with index and middle fingers supporting palmar aspect of carpals. Tips of thumbs on proximal row of carpals at location where emphasis is indicated by evaluation findings
- **Indications:** restricted extension



## Carpal Mobilization Midcarpal A-P, P-A

- **Pt. Position:** Supine, anatomical position for A-P, pronated forearm for P-A
- **P.T. Position:** Standing, stabilizing hand holds proximal row of carpals. Mobilizing hand holds distal row of carpals
- **Indications:**
  - A-P: restricted flexion.
  - P-A: restricted extension



## Carpal Mobilization Intercarpal A-P, P-A

- **Pt. Position:** Supine, arm at side, pronated forearm
- **P.T. Position:** Standing, stabilizing hand holds carpal with index finger and thumb. Mobilizing hand holds neighboring carpal with index finger and thumb.
- **Indications:**
  - A-P: restricted flexion.
  - P-A: restricted extension.



### Nerve and Tendon Gliding Exercises and the Conservative Management of Carpal Tunnel Syndrome

J HAND THER 11:171-179, 1998.

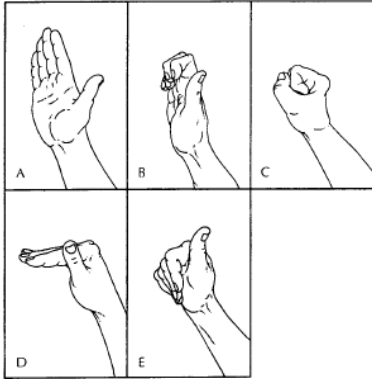
- Group I: std CTS care (splinting + NSAIDS)
- Group II: std CTS care + nerve and tendon glides
  - Gr I: 71.2% had CTS surgical release
  - Gr II: 43% had CTS surgical release
  - Gr II interviewed at 23 mo. f/u.
    - 70.2% reported good or excellent results



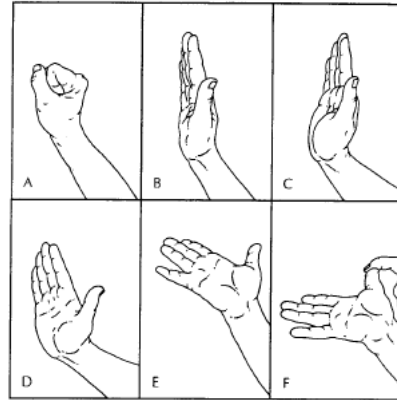
## Nerve and Tendon Gliding Exercises and the Conservative Management of Carpal Tunnel Syndrome

J HAND THER 11:171-179, 1998.

### Tendon Glides



### Median Nerve Neural Glides



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## Median Nerve Glides



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# Pattern Recognition

Identify the key subjective and physical features (i.e. **clinical pattern**) that would help you recognize this disorder in the future.

Subjective	Physical
<ul style="list-style-type: none"><li>• Pain, numbness, paresthesias in median nerve distribution on palmar aspect of hand</li><li>• Night symptoms</li><li>• Exacerbated with ADLs</li><li>• C/o impaired object recognition, manipulation, coordination</li></ul>	<ul style="list-style-type: none"><li>+ Phalen’s Maneuver</li><li>+ Tinel’s Sign</li><li>+ Semmes-Weinstein Monofilament</li><li>+ EMG testing</li></ul>



