PTs can give a Hand in Hand Therapy

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Disclosure

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- no financial relationships to disclose.

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Learning Objectives

1. Attendees will be able to clarify the role that physical therapists have in the scope of practice regarding hand and upper extremity conditions and upper extremity orthotics
2. Attendees will be able to discuss the clinical practice guidelines for treatment interventions of a distal radius fracture, CMC osteoarthritis, carpal tunnel syndrome, and trigger finger.
3. Attendees will be able to identify appropriate orthoses for managing hand and wrist impairments
4. Attendees will be able to discuss the requirements to become a Certified Hand Therapist and how to grow professionally treating hands and the upper extremity.

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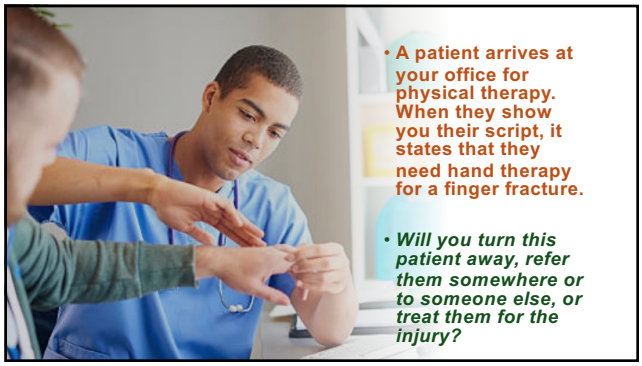

- **A patient arrives at your office for physical therapy. When they show you their script, it states that they need hand therapy for a finger fracture.**
- ***Will you turn this patient away, refer them somewhere or to someone else, or treat them for the injury?***

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APTA Guide to PT Practice- Interventions

Adaptive and Assistive Technology	**Biophysical Agents**	**Functional Training**
Integumentary Repair and Protection	**Manual Therapy**	**Motor Function/Movement Training**
Respiratory and Ventilatory Techniques for Enhanced Respiratory Function	**Therapeutic Exercise**	

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- "Physical therapists select, **prescribe, apply, fabricate, and modify** adaptive technologies when the examination findings, diagnosis, and prognosis indicate that the use of these technologies will meet the individual's unique immediate and anticipated medical and functional needs.
- When such technologies already are in use, physical therapists use examination data, diagnosis, and prognosis to determine how effectively the technologies are working to meet the individual's needs.
- **Prescription, application, and, as appropriate, fabrication and/or modification of adaptive technologies may include the following**:
- Orthoses (e.g., ankle-foot orthoses, knee-ankle-foot orthoses, body jackets, **wrist cock-up splints**, shoe inserts)."

APTA Guide to PT Practice

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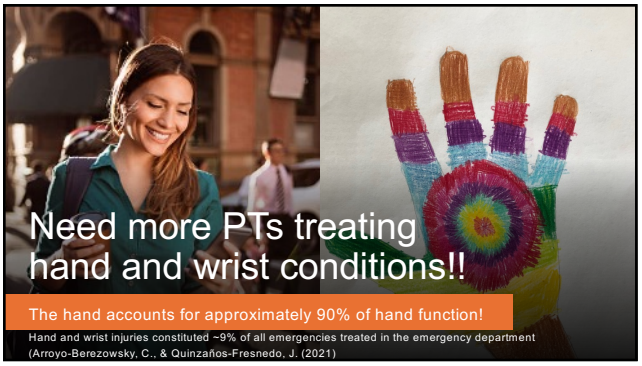

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Hand and wrist injuries need to receive specialized treatment to avoid complications and permanent disability!

- (Arroyo-Berezowsky, C., & Quinzaños-Fresnedo, J. (2021)

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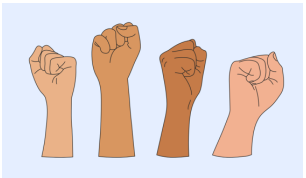
Grip strength and Longevity: a Vital Sign for Physical Therapy



(Marlon Cassio Pereira Grigol, Patricia Morsch, & Ângelo José Gonçalves Bós, 2022).

(Keller et al., 2025)

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Strength perspective

- Older adults have priorities toward improving QOL, extending longevity, and independence
- Grip strength directly has an impact
- # of Sit to stands is also a predictor of falls (normative data)
- Grip strength is a useful indicator of overall muscle strength. (D'Onofrio et al, 2023)
- Any upper extremity dysfunction → Test grip strength → measurable outcome

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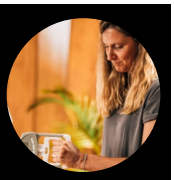
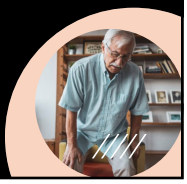
Assessment of Muscle Strength



Grip strength:

- Evaluated using hand held dynamometer, squeezed tightly, with multiple readings (3) obtained from both hands.
- Reflection of overall muscle strength



Assessment of lower limb strength:

- Can evaluate by assessing quadricep strength in performing walking lunges or a double leg squat. Can evaluate number of sit to stands during a 30 second period to assess for leg strength and endurance.

(D'Onofrio et al, 2023)

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Normative Grip Strength Data (Jamar)

Males → Females → Males

		Males		Females		Males		Females	
Age	Hand	Mean (lbs)	SD	Mean (lbs)	SD	Mean (kg)	SD	Mean (kg)	SD
6-7	R	32.5	4.8	28.6	4.4	14.7	2.2	13.0	2.0
	L	30.7	5.4	27.1	4.4	13.9	2.4	12.3	2.0
8-9	R	41.9	7.4	35.3	8.3	19.0	3.4	16.0	3.8
	L	39	9.3	33	6.9	17.7	4.2	15.0	3.1
10-11	R	53.9	9.7	49.7	8.1	24.4	4.4	22.5	3.7
	L	48.4	10.8	45.2	6.8	22.0	4.9	20.5	3.1
12-13	R	58.7	15.5	56.8	10.6	26.6	7.0	25.8	4.8
	L	55.4	16.9	50.9	11.9	25.1	7.7	23.1	5.4
14-15	R	77.3	15.4	58.1	12.3	35.1	7.0	26.4	5.6
	L	64.4	14.9	49.3	11.9	29.2	6.8	22.4	5.4
16-17	R	94	19.4	67.3	16.5	42.6	8.8	30.5	7.5
	L	78.5	19.1	56.9	14	35.6	8.7	25.8	6.4
18-19	R	108	24.6	71.6	12.3	49.0	11.2	32.5	5.6
	L	93	27.8	61.7	12.5	42.2	12.6	28.0	5.7
20-24	R	121	20.6	70.4	14.5	54.9	9.3	31.9	6.6
	L	104.5	21.8	61	13.1	47.4	9.9	27.7	5.9
25-29	R	120.8	23	74.5	13.9	54.8	10.4	33.8	6.3
	L	110.5	16.2	63.5	12.2	50.1	7.3	28.8	5.5
30-34	R	121.8	22.4	78.7	19.2	55.2	10.2	35.7	8.7
	L	110.4	21.7	66	17.7	50.1	9.8	30.8	8.0
35-39	R	119.7	24	74.1	10.8	54.3	10.9	33.6	4.9
	L	112.9	21.7	66.3	11.7	51.2	9.8	30.1	5.3
40-44	R	116.8	20.7	70.4	13.5	53.0	9.4	31.9	6.1
	L	112.8	18.7	62.3	13.8	51.2	8.5	28.3	6.3
45-49	R	109.9	23	62.2	15.1	49.8	10.4	28.2	6.8
	L	100.8	22.8	56	12.7	45.7	10.3	25.4	5.8

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Grip Strength Continued (Jamar)

		Males		Females		Males		Females	
Age	Hand	Mean (lbs)	SD	Mean (lbs)	SD	Mean (kg)	SD	Mean (kg)	SD
50-54	R	113.6	18.1	65.8	11.6	51.5	8.2	29.8	5.3
	L	101.9	17	57.3	10.7	46.2	7.7	26.0	4.9
55-59	R	101.1	26.7	57.3	12.5	45.9	12.1	26.0	5.7
	L	83.2	23.4	47.3	11.9	37.7	10.6	21.5	5.4
60-64	R	89.7	20.4	55.1	10.1	40.7	9.3	25.0	4.6
	L	76.8	20.3	45.7	10.1	34.8	9.2	20.7	4.6
65-69	R	91.1	20.6	49.6	9.7	41.3	9.3	22.5	4.4
	L	76.8	19.8	41	8.2	34.8	9.0	18.6	3.7
70-74	R	75.3	21.5	49.6	11.7	34.2	9.8	22.5	5.3
	L	64.8	18.1	41.5	10.2	29.4	8.2	18.8	4.6
75+	R	65.7	21.	42.6	11	29.8	9.5	19.3	5.0
	L	55	17	37.6	8.9	24.9	7.7	17.1	4.0

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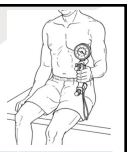
Testing grip strength standard procedure



- Use 2nd position on the hand dynamometer
- Patient seated in chair, feet on floor, elbow flexed to 90°
- Patient squeezes and measurement is taken. Repeat 3x and take the mean average (measured in psi)
- Measure both hands (note hand dominance and injured hand)
- Normals male/female and dependent on age

Hand	Left (psi)	Right (psi)
Measurement #1		
Measurement #2		
Measurement #3		
Average (mean)		

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Grip Strength Applications to PT Practice

Clinical Application	Example
Orthopedic	Measuring progress post surgery
Geriatric	Assessing frailty, fall risk, ADL abilities
Neurologic	Monitoring recovery post CVA
Oncology/Chronic Disease Management	Tracking physical decline/improvement with conditions such as COPD or cancer

Hayhurst, 2025

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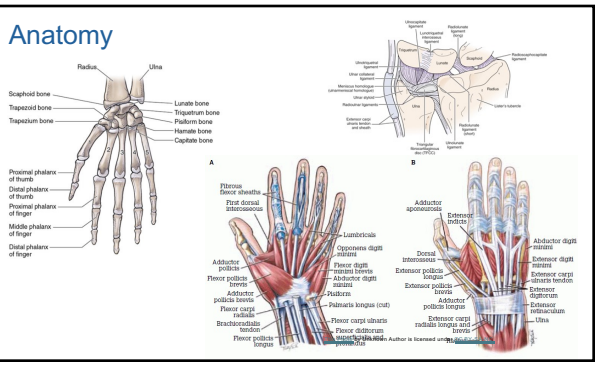
Anatomy



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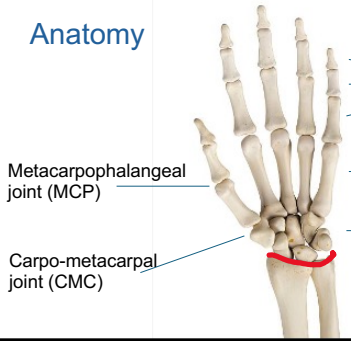
Anatomy



Phalanges

Metacarpophalangeal joint (MCP)

Metacarpals

Carpals

Carpo-metacarpal joint (CMC)

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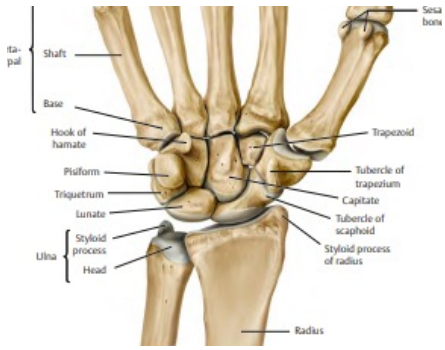
Carpals



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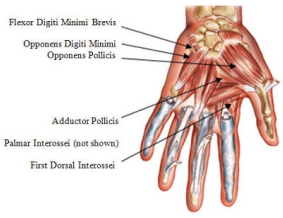
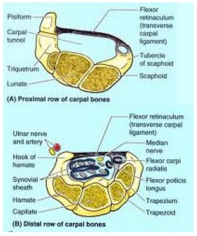
Hand and Wrist: Ligaments and Muscles/tendons





ALL FOR ONE & ONE FOR ALL!

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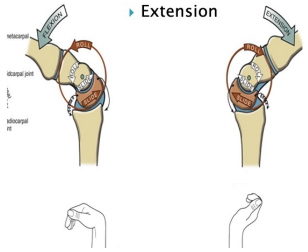
Wrist Flexion and Extension

- Flexion
- Extension



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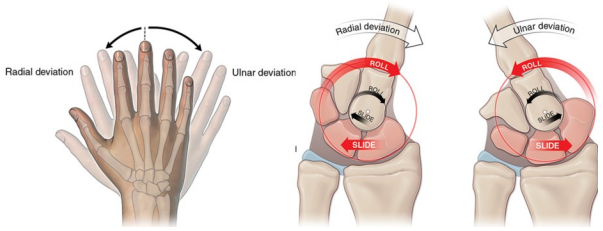
Wrist Radial and Ulnar Deviation



Left hand dorsal view

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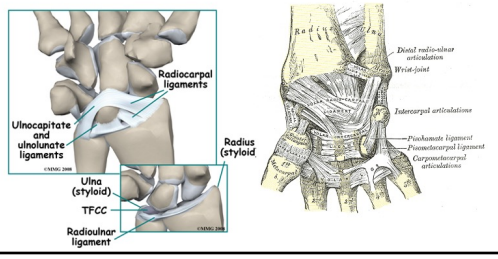
Radial carpal joint: ligaments and cartilage



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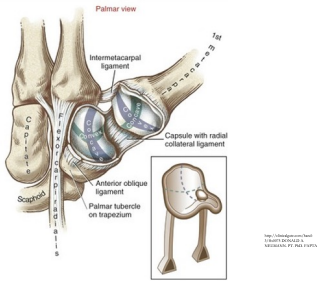
1st CMC Arthrokinematics



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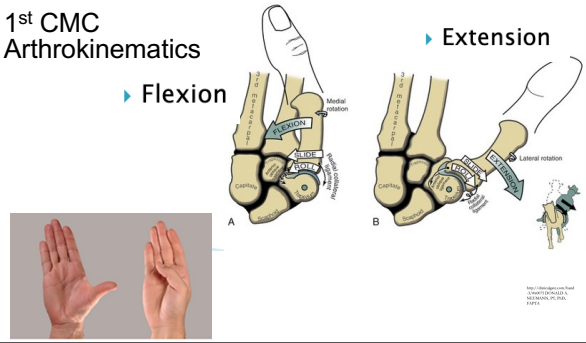
1st CMC Arthrokinematics

- Flexion
- Extension



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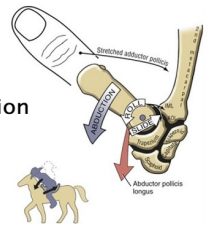
1st CMC Arthrokinematics

- Abduction



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Examination and Assessment

- Demographics: Pt age?
- Location of injury?
- Occupation: Have there been increased demands on the wrist or hand?
- MOI: What happened?
- Tasks: What are patient limitations? What are they unable to do? (Use Quick DASH)
- Timeline: When did injury occur and how long has patient been limited?
- Hand dominance?
- Previous injury?
- Pain or abnormal sensation or both? Location?

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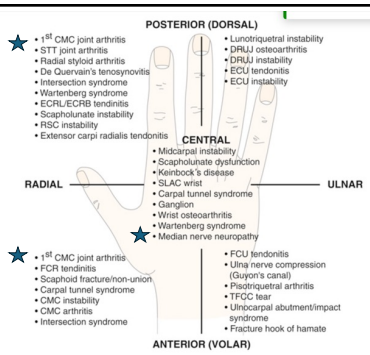
Conditions

Location?



Magee, 2021

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Distal Radius Fracture

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Distal Radius Fracture

- Colle's fracture vs. Smith's fracture
- Fall on an outstretched hand (extended or flexed position)
- Fracture is named according to the distal end of bone displacement
- Colle's fracture - Dorsal displacement, fall on extended wrist
- Smith's fracture- volar displacement, fall on flexed wrist
- Can be immobilized/casted or have surgery ORIF
- Wrist control orthosis

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ORIF

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Distal Radius Fracture Clinical Practice Guidelines (CPG)

Examination (from CPG)

- Use grip strength assessment (when appropriate)
- Wrist and forearm ROM
- Clinicians may administer the five-times chair stand test (CST) for screening lower extremity muscle strength in individuals with DRF and consider the scores of >12 seconds as the threshold for impaired lower extremity muscle strength (no weight bearing with fracture)

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Level of Evidence	Category	Recommendation
A	Early therapy	Start AROM (hand, wrist, shoulder) + light activity → improves short-term (≤3 mo) pain, AROM, grip strength, function; long-term (≥6 mo) wrist AROM, grip strength
A	Therapy HEP	Therapists should instruct home programs → improves short- & long-term pain, AROM, grip, function.
A	Sensorimotor Training	Use Graded motor imagery: Early rehab (6–8 wks) → improves pain, AROM, function.
B	Strengthening	Submaximal (towel, putty, light load grip) → at 2 weeks following ORIF or week 2 of cast immobilization improves pain, AROM, grip, function (≤6 mo) with minimal risk.
B	Supervised therapy +HEP	Improves short- & long-term wrist pain, AROM, grip strength, function.
B	Manual therapy	Safe when based on tolerance/stability → short-term improvements in pain, AROM, upper-limb function.
B	Therex	Properly timed exercises AROM, PROM, tendon gliding, motor control, resistance exercises to include scapular and GH to improve pain, AROM, strength, function.
B	Modalities	Utilize lasertherapy, pulsed electromagnetic field, warm whirlpool, hot packs, and cold packs as part of multimodal care → improves short-term pain, edema, sensation, AROM, grip strength, function.
C	Edema control	Manual lymph drainage, mobilization, elevation, compression, bandaging, gloves, home program → short-term (2–6 wks) reduction in swelling, pain, ↑ AROM, function.
C	Sensorimotor training	With conventional therapy during 6–8 wks post-op → improves short-term pain, AROM, function.

Mehta, S. P., Karagiannopoulos, C., Pepin, M.-E., Ballantyne, B. T., Michlovitz, S., Macdermid, J. C., Grewal, R., & Martin, R. L. (2024). Distal Radius Fracture Rehabilitation. *Journal of Orthopaedic & Sports Physical Therapy*, *54*(9).

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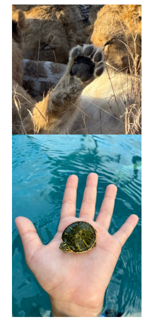
DRF Interventions



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DRF ORIF/Conservative Interventions

ORIF

- Early AROM/AAROM to shoulder, elbow, wrist, forearm, and hand at 5-7 days post-op
- Scar massage, edema control
- Do not force PROM
- 4 wks: Weighted wrist stretches 1-3 lb weight
- 5-6 wks: Putty hand strengthening
- 6-8 wks: strengthening light weights 1-2 lbs.
- Incorporate scapula stabilization, biceps, triceps, RTC

Conservative

- AROM/AAROM thumb, digits, and shoulder
- Decrease edema
- Cast or orthosis immobilization for 5-6 weeks, Begin AROM to wrist/forearm
- Gentle wrist strengthening 8-9 weeks

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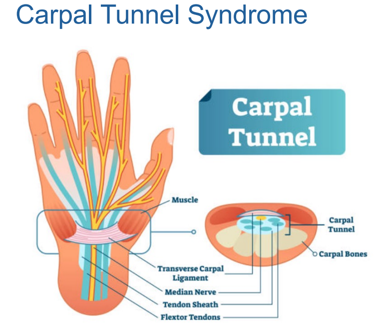
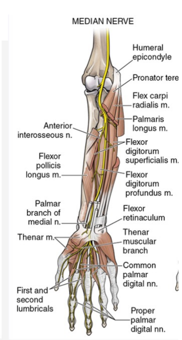
Carpal Tunnel Syndrome





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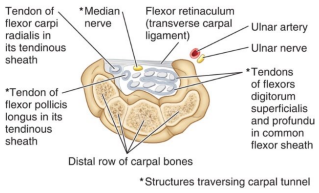
Median Nerve Entrapment at the wrist

- Carpal tunnel syndrome: compression of the median nerve at the wrist
- History: repetitive typing, extending/flexing wrist for prolonged periods, pregnancy, occupation related



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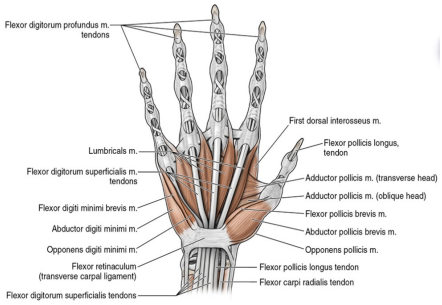
Thenar eminence muscles



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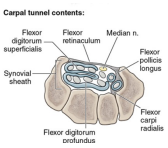
Acute **carpal tunnel syndrome** may present in young athletes due to tenosynovitis of the digital flexors secondary to repetitive digital flexion activities. (typing, cell phones)

Clinical presentation

- Numbness/tingling in median nerve distribution of hand
- Pain or burning sensation
- Weakness with gripping objects
- Shaking hands
- Symptoms increase at night



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Carpal tunnel examination

- **Posture/Ergonomics**
- **Sensory testing:** Semmes Weinstein: What muscles could be weak?
- **Muscle strength/atrophy**
  - Muscles MMT, Grip Strength Assessment
- **Neurodynamic testing**
- **Symptoms?** when? where?
- **Special tests:**
  - Phalens
  - Reverse Phalens
  - Tinel's sign
  - Carpal compression test
  - Palpation of median nerve entrapment sites
    - Biceps aponeurosis
    - Ligament of Struthers
    - Pronator teres
    - Carpal tunnel

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- Carpal tunnel CPG
  - recommend a neutral-positioned wrist orthosis worn at night for short-term symptom relief and functional improvement for individuals with CTS

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What are CTS Interventions?

- Manual therapy
  - MFR/STM or manual stretch
  - Graded mobilizations
- Therapeutic Exercise
  - ROM, Tendon Glides, Stretching
  - Postural training/Desk ergonomics
  - Addressing associated impairments
  - Improving neurodynamics
- Strength
  - Abductor pollicis, flexor pollicis, opponens pollicis
- Motor function movement training
  - Deep neck flexor training
  - Scapular muscle strengthening and stabilization, RTC strengthening
- Functional training
  - Education, Activity modification, Sleep training/positioning
  - Posture, ergonomics
- Modalities
  - Neutral/cock up wrist orthosis
  - Ultrasound
  - Laser

Rest, Immobilization with orthosis initially!

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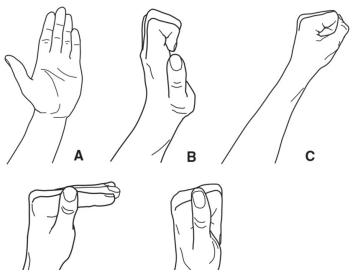
Tendon Gliding



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Desk Ergonomics Checklist

Neutral wrist position – wrists should be straight, not bent up (extension) or down (flexion), when typing or using a mouse.

Elbow angle ~90° – forearms parallel to the floor, shoulders relaxed (not shrugged).

Keyboard & mouse placement – close to the body, at or just below elbow height. Avoid reaching forward.

Screen height – monitor top at or just below eye level to reduce forward head/rounded shoulder posture.

Breaks & micro-movement – encourage patients to take a short break every 30–45 minutes to stretch fingers, roll shoulders, and reset posture.

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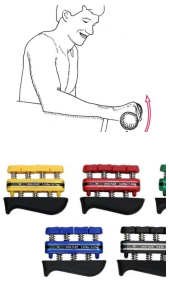
AROM/Strengthening



- Wrist flexion/extension
- Wrist radial/ulnar deviation
- Forearm pronation/supination
- Thumb flexion/extension
- Thumb adduction/abduction
- Thumb opposition
- Biceps/triceps
- Scapula Stabilizers

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Grip strengthening

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Scapula Stabilization

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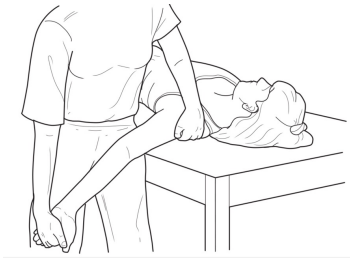
Neurodynamics



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CMC OA

- Thumb CMC OA, 2nd most common form of hand OA, most disabling
- CMC joint is crucial for grip and pinch tasks and overall hand function
- 1/10 men and 1/3 of women by age 50's and 60's
- prevalence rate of 33% (post-menopausal women)
- Affects roles, self-care, ADLs, dressing, use of tools, sleep, social participation, sense of self
- Unique mobility of the thumb allows humans to perform fine motor tasks – opposition and pinch

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Collapse of Thumb

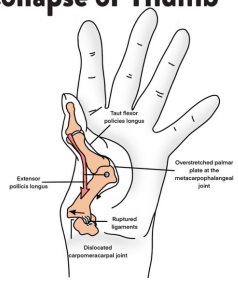

Image credit: hand therapy academy

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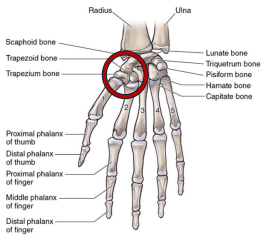
CMC OA

- Sx include pain, atrophy
- Instability, subluxation, pain with pinching
- Decreased neuromuscular control
- Decreased ROM and strength
- grip and pinch weakness
- loss of dexterity
- Dropping items
- Difficulty with opening jars
- Decreased overall hand function
- +Adduction Stress test



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CMC OA Interventions

Activity modification/rest

- Education on joint protection
- NSAIDs
- Orthosis: hand based thumb spica
- Injections: Corticosterioids, hyaluronic acid derivatives
- Hand Therapy! –Evidence suggests Orthosis +Exercise

Goal is to wean out of orthosis

- Surgical options

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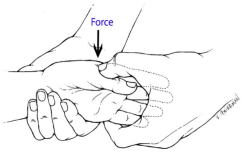
Adduction OA Provocation Test

Adduction Stress Test

- Sensitivity of 0.94
- Specificity of 0.93
- Interrater reliability 0.75 excellent (Gelberman et al. 2015)



Bring the thumb parallel to the index metacarpal with the arrow indicating the direction of force application
Valdes (2022)

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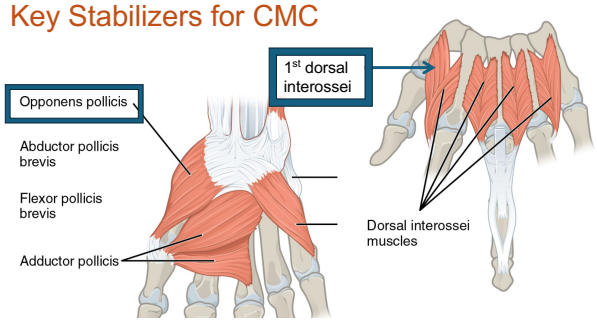
Key Stabilizers for CMC



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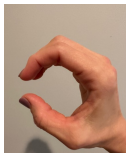
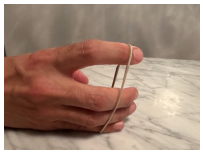
CMC OA Interventions

- Maintaining "C" position
- Chip clip in adductor web space –keep webspace wide
- Activate 1st dorsal interossei and opponens pollicis (key stabilizers)





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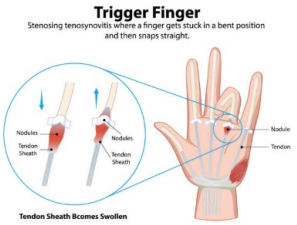
Trigger finger

Condition may develop idiopathically or secondary to repetitive gripping or grasping of an object with a sharp edge

Stenosis or tenosynovitis of the digital flexor tendon sheath in area of the A 1 pulley



What structure is most commonly involved in trigger finger?

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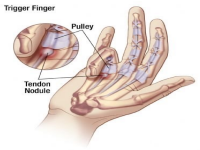
Trigger finger



- Thickening of the flexor tendon sheath, causes sticking of the tendon when the patient attempts flex the finger
- Inflammation of the proximal fold of the flexor ter leads to swelling and constriction (stenosis) in th digital flexor tendon. (proximal to volar MCP)
- When the patient attempts to flex the finger, the tendon sticks, and the finger “let’s go,” often with a snap.
- As the condition worsens, eventually the finger will flex but not let go, and it will have to be passively extended until finally a fixed flexion deformity occurs.

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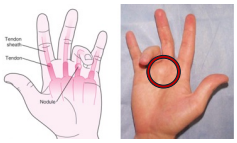
Patient Examination Trigger finger

- Intermittent finger locking during active flexion that requires a passive force to extend the finger
- PROM Normal
- Patient may develop a palpable tender nodule proximal to the A1 pulley



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Trigger finger Interventions

- Avoidance of repetitive gripping, rest, PRICE principle as needed
- Hand based or finger splint that positions the MCP joint @ 0 degrees and allows full DIP joint movement
- If symptoms persist the patient may undergo surgical release of the A1 pulley system

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Clinical pearls from CHT

Buddy taping

- Use ¼ inch paper tape or buddy straps
- Wrap around injured finger first and then loop around adjacent finger careful not to block the joint lines
- Can find softer materials online

Scar management

- Use silicone scar pad
- Wrap at night on clean, dry skin
- Wear until patient does not feel scar anymore

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Clinical pearl: AROM and PROM

- AROM initially! (different than a RTC repair!)
- Keep everything moving outside of orthosis

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Clinical pearls: Types of orthoses

- Know when and what to recommend!

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Clinical pearls: Types of orthoses

- When do I recommend an orthosis?
  - Suspect fracture
  - To immobilize
  - To mobilize
  - To protect
  - To align
  - To support
  - To promote motion at adjacent joints

You don't need to be a CHT to recommend an appropriate prefabricated orthosis!

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Wrist Control


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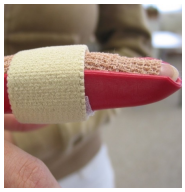
Finger gutter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Certification and Career Advancement

The path to becoming a CHT:

- Educate yourself
- Get involved
- Mentorship

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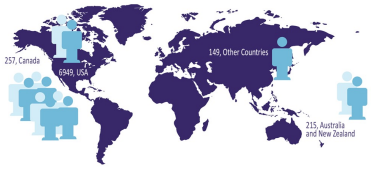
There are 7,322 CHTs worldwide. HTCC.org



Occupational Therapists = 87%
Physical Therapists = 12 %
CHTs who are both OT & PT = 1%

(HTCC, 2025)

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Professional growth

- Join APTA Hand & Upper Extremity Section (students free)
  - Webinars, early career therapist opportunities
- Hand Therapy Certification Commission for getting the CHT credential is here. HTCC.org
- You can get the CHT study guide "purple book" and start studying for the exam.
- Join ASHT.org http://asht.org/
- Indiana Hand Protocol Book https://www.diagnosisandtreatmentmanual.com/
- Take an orthosis fabrication course
- Shadow a CHT
- Know your hand anatomy

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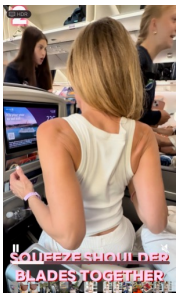
Marketing and Advocacy

- Contact physicians and let them know that you can treat wrist and hand conditions
- Inform patients
- Get involved!



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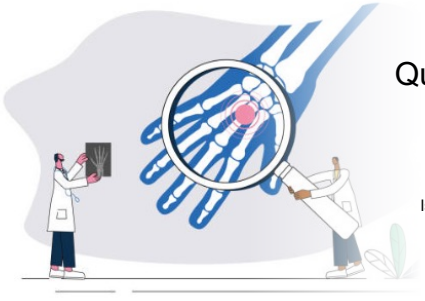

Questions?

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