Exploring Hand Therapy, Corporation d/b/a Treatment2Go
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Special Thank you to Eugenia Papadopoulos, MA, OTR/L, CHT for the use her awesome photos... thank you
Q: You mentioned 8 muscles that surround the thumb can you please list them?

Q: Does a shoulder sign mean the patient will have more pain?
A: No not at all. The shoulder sign means the thumb is more dislocated and less subluxed. It may have less pain in actuality as it becomes more of a fixed deformity and the less motion yields less pain.

Q: Would I change my implementation or goals if a patient arrives for conservative therapy and they have a shoulder sign?
A: If they have a shoulder sign it is likely that a neoprene or soft orthosis/splint will be more helpful than a custom molded orthosis. The hard orthosis often create increased pain on the dislocated joint.

Q: In regards to conservative treatment and decreased web-space: What are my goals for decreased web-space? And would I splint/orthosis with a web-spacer splint?
A: Sometimes a web-space splint can be indicated but more often than not the decrease in web space is addressed under surgical intervention as this is often a fixed web space contracture by the time you see them.

Q: Would the web-space be something I would expect to be “normal” post surgical intervention?
A: After surgical intervention the web space is often improved dramatically

Q: In your opinion what would you say is the most important activity modification I can teach my patient if they have: 1. Subluxed CMCJ and 2. Dorsal Dislocation?
A: Avoidance in lateral pinch is KEY in both subluxation and dislocation.

Q: You mentioned many orthotic designs for the thumb CMCJ. What is your opinion on long term jewelry splints for conservative treatment specifically for the 1st CMCJ?
A: I have not used them very often for the CMCJ deformity but more for the MCP deformity that is secondary.

Q: You mentioned during conservative treatment to teach the patient not to go beyond pain especially with thumb flexion and opposition (like touching thumb tip to each finger tip). Would this also apply to post surgical?
A: Yes it will early on in the post surgical management. Later in the rehabilitation stage the patient will be allowed to have more “pain/discomfort” to regain the desired motion.
Q: For conservative treatment you mentioned no strengthening the Adductor Pollicis muscle? Why?
A: The adductor pollicis muscle pulls the thumb into the deforming posture and assists with dorsal dislocation of the first metacarpal.

Q: Can I stretch the Adductor Pollicis muscle?
A: Yes you can do contract – relax exercises and fascia stretches to help decrease the tight adductor pollicis muscle. This can potentially improve web space contractures.

Q: You stressed no lateral pinch and AVOID AVOID AVOID. This is really hard in everyday life so would you recommend long term splints or what?
A: You can only avoid what you can avoid and if anything hurts just use a splint while doing it and that will reduce the stress when you simply can’t avoid certain positions.

Q: You mentioned no research to support hot/cold modalities and really not needed. Are you only talking about the clinic or a home program as well? And if recommended for home what would you recommend?
A: Home program for modalities is often heat vs cold and many patients like paraffin treatment.

Q: You said the laser (LLLT) therapy there was evidence of increased function but did nothing for pain. Would you not think if there is an increased in function then the pain had to decrease to achieve greater function? Please clarify.
A: Yes I agree that it would seem likely that the pain would improve if the function did – but the outcome they reported did not show this statistically. Likely pain was improved just not measureable on subjective reports.

Q: You mentioned Companion 80 Iontophresis is a 24 hour patch. Would you recommend this over clinical treatment? How would a clinic bill?
A: I would recommend trying anything that works! You can charge for the set up to include wear, care, and precautions of the drug delivery apparatus as well as the drug being administered. Check with your clinic for specific billing protocols.

Q: You mentioned pain is intense initially post operatively LRTI. How do I know when not to progress? What is “expected” pain and pain I must respect?
A: Yes respect the pain and push the patient to the point of discomfort only. The patients do relatively good after this procedure and do not end up with a lot of ROM limitations so being extremely aggressive will not do the patient any great service.

Q: What are signs of overuse? And how do I modify my clinical and home program?
A: If the patient is fatigued after the treatments or has extended periods of pain your treatment is overzealous and should be toned down.

Q: Do I need to be concerned the tendon anchovy will dislocate?
A: I have never seen a dislocation after this procedure with an anchovy technique. Dislocation will be more common with implants.
Q: You said nothing works well surgically to date. I thought there was good success rate with CMCJ surgical intervention. Please clarify what you meant?
A: I think I may have misled you – I meant to say nothing is a panacea. The proceeds are effective and sound but many surgeons have varied approaches and tweaks to the technique to get the best clinical results.

Q: You mentioned with an arthrodesis there is a 20% failure rate. What are the signs of the procedure being a failure or on its way to being a failure?
A: An arthrodesis failure occurs when you note motion at the CMCJ – motion is indicative of a failure.

Q: Is the failure rate with arthorodesis primarily with the young or the elderly?
A: It is more likely to fail with somebody who is aggressive with the hand.

Q: You mentioned up to 50% of silicone arthroplasty procedures will develop silicone synovitis?
   a. Did the implants move to non-silicone material or are they mostly all silicone? Most are not using silicone in the thumb due to high failure rate
   b. If my patient has an arthroplasty how do I know if it is silicone or not? It will be noted on the operative note
   c. What are the early signs of silicone synovitis? This synovitis can only be determined on a x-ray and if it occurs the implant will likely need to be removed.
   d. What can I do to teach my patient about preventing silicone synovitis? This procedure is not used very often as silicone synovitis will likely occur from generalized use of the joint.
   e. Since 50% of the patients get silicone synovitis do they all have to have additional surgery? That will depend on the surgeon and the patient. But typically, yes.

Q: What are some precautions with topical analgesics?
A: Allergic reactions are the most common complaints

Q: Do you recommend topical analgesics’ under an orthosis?
A: Yes they can be helpful under splints or without splints, just be cautious with “heat” producing topical analgesics. Always read the manufactures recommendations and precautions.

Q: What would your home strengthening program include and would it be with or without an orthosis?
A: They can be with or without orthosis depending on the patient and the pain level. I prefer the program to be close to pain free. This is more important than whether the orthosis is on or off. The orthosis is more likely off during the ROM program vs. strengthening programs.
   a. Precautions – avoid exercise that causes increased pain and swelling
   b. Frequency – strengthening can be up to 1x a day but often times is only 3x a week like any other strength regime. Again this is patient specific not protocol specific.

Q: Generally speaking when would you D/C home neoprene orthosis or the taping program when using with functional ADLS?
A: When the patients pain is resolved. Often times they will use orthosis or tape long term or when they have flare ups. It is not uncommon for pain to linger for 1+ year(s).
Incidence

- Osteoarthritis (OA) affecting up to 20% of men and women older than 40 years.
- Prevalence rates of radiographic CMC OA have been cited as high as 42% in males and 57% in females older than 75 years.
- Postmenopausal women.

Basal Joint OA
Terms for First CMCJ of the Thumb

- Thumb Carpo-metacarpal joint, (CMCJ)
- Thumb Trapeziometacarpal joint (TMCJ)
- Trapeziometacarpal joint (TM)
- Saddle joint
- Basal joint
2 Major articulations
- Trapeziometacarpal articulation to the thumb (BLUE)
- Scaphotrapezial articulation (orange)
- Two lesser articulations
  - Trapezotrapezoid (Yellow)
  - Trapeziometacarpal (green)
    - to the index finger

3 planes of motion
- abduction–adduction
- flexion–extension
- opposition
We have one main ligament stabilizer

– Volar Beak ligament or anterior oblique ligament (AOL) or deep anterior oblique ligament is the KEY to this pathology

Mobility may Sacrifice Stability

• The stability of the joint relies on the small ligaments
• If the ligaments loosen enough to allow too much sliding of the joint surfaces, a wearing down of the joint cartilage will occur leading to arthritis.
The Degenerated Joint

- Mechanics can lead to damage on the articular surface.
- Eventually, the joint is no longer able to compensate for the increasing damage and the result is PAIN!

A degenerative joint is very painful
Muscles influence thumb CMCJ motion

- We have 3 inefficient extensors/abductors
  - APL
  - EPB
  - EPL

- 3 of our 4 thenar muscles are strong flexors pulling the metacarpal head into flexion
Why does CMCJ OA occur?

- Abnormal loads across the joint cause the articular cartilage to wear out
- It leaves bare bone ends rubbing on each other and causes pain
- Predisposed to arthritis in this joint

Why Does this Occur Cont.

- The cause is often times unknown
- Repeated motions
- Common reports of pain and difficulty opening jars, turning keys, picking up books, holding objects.
Physical examination

- Reveals a dorsoradial prominence of the thumb metacarpal base secondary to subluxation due to ligamentous laxity and the pull of the adductor pollicis longus muscle. (shoulder sign)

Subluxed

Subluxation of CMC joint
• There is tenderness to palpation at the trapeziometacarpal joint
• Pain complaints with forceful pinching

Evaluation Techniques

• Adduction-flexion deformity noted on exam of the thumb reducing the thumb index web angle
Differential Diagnosis

- RA
- Tenosynovitis
- OA
- Septic Arthritis
- Lupus
- Psoriatic arthritis
- Scleroderma
- Gout
- Gamekeeper’s thumb
- CTS
- De Quervains
- Trigger thumb
- Volar ganglion
- Neuroma
- SLAC/SNAC
- FRC tendinitis
Eaton Classification based on radiographs

- Stage I
  - Normal or slightly widened trapeziometacarpal joint
  - Normal articular contours
  - Trapeziometacarpal subluxation
  - Ligament laxity

STAGE I

- Stage II
  - Decreased trapeziometacarpal joint space
  - Trapeziometacarpal subluxation
  - Osteophytes or loose bodies less than 2 mm in diameter
STAGE II

STAGE III

- Stage III
  - Further decrease in trapeziometacarpal joint space
  - Subchondral cysts or sclerosis
  - Osteophytes or loose bodies 2 mm or more in diameter (purple)
  - Trapeziometacarpal joint subluxation of one third or more of the articular surface
• Stage IV
  – Involvement of the scaphotrapezial joint (less commonly the trapeziotrapezoid or trapeziometacarpal joint to the index finger) (yellow)
  – Sclerosis, cystic changes (blue)

STAGE IV

Burton’s Staging

• Stage 1 – pain, positive grind test, ligament laxity, dorsoradial subluxation of the joint
• Stage 2 – Instability, chronic subluxation, radiographic changes
Stages continued

- Stage 3 – involvement of the scaphotrapezial joint
- Stage 4 – degenerative changes at the metacapophalangeal joint, pan trapezial arthritis

Chapter 2
Treatment

Conservative Treatment

- Activity modifications
- Rest
- Nonsteroidal anti-inflammatory drugs (NSAIDs) ibuprofen (Advil, Motrin IB) and naproxen (Aleve, Naprosyn)
- Exercises
- Splinting
- Modalities
- Corticosteroid injections
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- The first line of conservative treatment is splinting.
- Splinting is effective – shown via research
- Decrease inflammation by providing rest and immobilization
- Reduce pain by providing stability during loading activities

Types of Splints:
- Long – with wrist involvement
- Short – MP free if it is stable
  - Hard
  - Soft
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Long splint

Long splint with wrist

Hand based MPJ free
Many have contended in the past that the wrist must be included for adequate stabilization but this has been reported in many studies to be untrue.

- Pain reduction is possible with the smaller splint designs that exclude all joints but the CMCJ.
- A split must allow maximal mobility while providing stability at the same time.
- There is high to moderate evidence to support the intervention of orthotics.
Long Oppenens

- Best with STT arthritis as CMCJ splinting alone will not relieve the symptoms
Exercise

• Current literature suggests that strengthening the thumb extensors, abductors, and wrist extensors will help to counteract the deforming forces that act on the CMC joint
• First Dorsal Interossei strengthening is also valuable
• Exercises should be performed at 40–50% of the individual's one repetition maximal effort
• Prescribing resistive exercises to the CMC joint may cause further joint damage and is cautioned unless you are very specific
• Thumb strengthening exercise programs should be performed in a pain-free manner or just not used as ADL's will allow strength to occur

Exercise
• Extension to flexion (gentle pain free)
• Adduction to abduction (lined up with index)
• Touch fingertips... if can reach little ok but not force and watch for any deforming patterns... do not slide
• CMC extension with palm flat on table
• Bend just the tip of the thumb
• Bend just the MPJ
• Exercise 10 – 15 reps ; 2-3 times a week
• All in pain free range

Exercise - strengthening
• Strengthening thenar muscles is controversial but NEVER strengthen the adductor pollicis
  – Thumb extension and abduction against resistance (Isometrics usually safer than grip/pinch
• Gentle O position –
Strength exercises -
- Rubber band around the hand flat on table – just over CMCJ
- Grip strength OK – putty squeeze, hand gripper
- Isometric C in tip to tip position strengthens the EPB, ABPB and Oppponens
- AVOID lateral and key pinch completely

Web space contracture Stretching
- Contracture of the thumb web space limits full pronation of the thumb, which prevents tip-to-tip prehension, causing the index finger to oppose to the lateral aspect of the thumb, and creating a crank action at the MCP with progressive loss of thumb metacarpal abduction and rotation

Contracture release
- Pressure on adductor by pinching
- Hold firm for 30 seconds
- Reassess web space after releasing
Distraction/mobilization
- 1. Behind back allows weight of arms to do the work
- 2. Place CMC on the head put opposite thumb in webspace and distract
  - Rock back and forth for 1-3 minutes
- 3. Place hand on chest reach over dorsum on hand and pull thumb away – retroposition hold 1-3 min.

Exercise TIPS
- A goal of full or normal motion is NOT desirable in these patients as the goal is a stable and pain free joint that is sufficient to support the patients functional needs.
- Increased or full motion will result in pain and no functional benefit to the patient
- Don’t apply deforming forces including reaching across to the base of the 5th metacarpal
Joint Protection/Activity Modification

- The literature indicates moderate evidence to support the use of AE for pain reduction and improved function
- Avoid lateral pinch
- Avoid pinch and use whole hand/arm

Adaptive Equipment

- Pens to enlarge grip
- Ring pen
- Other devices to avoid small pinch force
Modalities

- Paraffin or moist heat – superficial heating
- The literature shows weak level of evidence that support the use of heat to improve grip and decrease pain and improve function
- No controlled trials were found that examined the use of cold application for OA
- Ultrasound – deep heating
Modalities Cont.

- Cold Laser – Low Level Laser Therapy (LLLT)
- One study examined cold laser for hand OA and showed improved in grip and thumb opposition ROM but the conclusion was the LLT was no better than the placebo for decreasing hand pain or improving hand function
  - Show device if we have it
- Electrical Modalities:
  - TENS
  - High Volt
When joints are hot and inflamed, applying cold can decrease pain and swelling.

- Bag of frozen vegetable works great!
- Instant cold packs
- Bag of slush
Iontophoresis

- Iontophoresis – alternative to cortisone injections
- Dex. applied over the CMCJ to reduce inflammation in the joint and secondarily reduce pain
- Iomed – various electrodes

24 Hr. System

- Companion 80 is a 24-hour controlled power iontophoresis system with the battery onboard.
- Companion 80 is an excellent drug deliver choice when:
Taping

- We have an awesome taping course by Tambra Marik
- She is a specialist in taping
- This technique is fantastic for short term pain relief

Tape to Promote Functional Pinch and Stability

**Step 1: Star pattern at the thumb CMC joint**

1. Cut 3 - 1 inch lengthwise strips /1/2 inch width.
2. Patient holds "C" position.
3. Tear in the middle of strips. Apply with 75% tension.
4. No tension at the base of strips.
Tape to Promote Functional Pinch and Stability

**Step 2:**
1. Cut two 5 lengthwise strips with ~1 in width.
2. Pt. maintains "C".
3. One strip applied with no tension at dorsal radius.
4. Tension tape ~50% when crossing CMC.
5. 25% tension around web space.
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**Tape to Promote Functional Pinch and Stability**

**Step 3:**

1. One strip applied with no tension at volar radius.
2. Tension tape ~50% when crossing CMC joint.
3. 25% tension around web space.

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Treatment Continued

- A topical analgesic, such as biofreeze may be helpful for joint tenderness
- Home application to manage painful joints – excellent follow-up technique
What happens if conservative treatment fails?
• Patient continues to have pain, decreased function and instability
• Early stage CMCJ OA the trapeziometacarpal ligament can be reconstructed and or in combination with an arthroplasty
• arthrodesis (rare), arthroplasty
  • ranging from simple partial to complete trapeziectomy to various implant and ligament interposition reconstructions.

Medical treatment
• Steroid injections
• Mild anti-inflammatory medications, such as aspirin or ibuprofen.
• NSAIDS

Surgical Options
• Soft tissue reconstruction alone for stage one
  – For instability with no articular changes
  – FCR to reconstruct the beak lig.
  – Used in early destruction of first CMCJ – Stage One
  – Described by Eaton and Littler
Therapy

• 4 weeks cast
• Apply thermoplastic splint
• ROM with focus on MP/IP
• 6 - 8 weeks AROM of the CMCJ
• Resistive exercise at 12 weeks

Surgical techniques - overview

• Many techniques often means NOTHING has worked to well! No consensus

GOAL

• The surgeon must restore the normal tension of the volar beak ligament to reposition the thumb in its anatomic position to allow for improved thumb mechanics
Surgical intervention

- **Arthroplasty.** Arthroplasty involves replacing or reconstructing part or all of the affected joint.
- **Arthrodesis.** This procedure involves using pins, plates, or screws to fuse the trapezium and the metacarpal bone together – this has fallen out of favor.

Surgical Options

- **Arthrodesis** (stage 3 and 4)
  - for young high demand patients (laborer)
  - 20% failure rate
  - Less favorable

- **Total joint arthroplasty** (stage 3 and 4)
  - Constrained ball & socket design - wear rates of 34% at 5yrs.
  - Less constrained designs in development.
- **Partial trapeziectomy**
• **Silicone Swanson prosthesis** (stage 3 and 4)
  — Problems:
  • implant subluxation & dislocation
  • rapid wear - not good long term
  • silicone synovitis (50% of long-term cases showed this)

• **Titanium arthroplasty** arose as an alternative bearing surface to silicone.
  — Appears to only be helpful for patients with low demand and good bone stock
• **The artelon spacer** is another option

Common
• **LRTI very common** — ligament reconstruction with tendon interposition
  — Described by Burton and Pellegrini
  — Uses complete removal of the trapezium, a segment of the FCR tendon for support and to fill the defect
  — Many variations (surgical)
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Ligament Reconstruction Tendon Interposition – classic protocol

- Splint or cast applied CMC extended, MP in 10 degrees of flexion and IP free
- 4 weeks cast removed
- Pin removed if one is present
- Thumb spica splint made – use for 2 more weeks

Hand based splint after cast removed
LRTI protocol continued

- Some protocols will apply this splint just at night
- Begin opposition exercises and AROM exercises at 4-6 weeks pending surgeons request-10
- PROM begins at 6 weeks
- Strengthening at 8 weeks
- Expect PAIN!!!

Varied protocol for LRTI – or similar

- 3-5 days pain and edema control addressed
  - AROM/AAROM of thumb and fingers and the wrist
  - Sutures out by day 10
  - Massage, isotoner gloves, TENS and ice o.k
  - Watch for signs of infection and tight dressing

continued

- 4 weeks – splints to use for night use depending on surgeon
  - Light resistive strengthening for forearm/grip
  - Start thumb CMC extension
  - Ultrasound, scar care, wound care skin care
- 6 weeks neoprene splint if needed, continued scar car, PROM for CMC extension, BTE, Theraputty, increase functional use watch for over use
Neoprene splint

Continued

• 6-8 weeks – CMC extension splint if needed
  – Increase resistive exercise
  – Focus on functional strength avoid aggressive pinch
  – Monitor for thick scar
• 8-12 weeks neoprene as needed, regular exercise, return to ADL’s pain free, monitor for overuse

Trending to earlier mobilization
Yaprak Oct 2012

• Thumb spica splint 2 weeks
• Custom made short opponens for another 2 weeks
• ROM to all uninvolved joints during immobilization
• At week 4: begin CMC and first MCP motion
• No base of thumb exercises allowed
• 6 weeks begin progressive ROM and strengthening exercises (splint all other times)
• Allow flexion across the palm
• At 8 weeks splint at night only
• No restrictions at 12 weeks
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Long oppones splint

Short oppones

Post Op Complications

- **General complications:**
- Infection (Less than 1%),
- Neuroma (Less than 1%, a coiled painful nerve bundle),
- Reflex Sympathetic Dystrophy
Post Op Complications

- **Specific complications:**
- Failure to completely resolve the symptoms (this may be due to arthritis in adjacent joints, this should be rare but may require further surgery).
- The thumb will be weaker on the opposite side, which should improve with time, but will never be normal.
- Dislocation (5% - 10% when an implant is used)

Thank You

- You will now need to login to the exam center at [www.liveconferences.com](http://www.liveconferences.com) to complete your exam and receive your certificate

Bibliography

Bibliography


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