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Jan. 2025

Clinical Pearls

No. 88

WHAT IS YOUR APPROACH TO TREATING THUMB CMC JOINT OSTEOARTHRITIS?

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Do you treat every patient with carpometacarpal osteoarthritis (CMC OA) with the same protocol? Our experience is that patients with CMC OA are like snowflakes; no two are alike! Newly diagnosed individuals usually have isolated pain at the CMC joint which may present after resistive activities. Individuals with undiagnosed CMC OA may be pain free until they experience an injury or overuse that causes thumb pain, whereas individuals with advanced CMC OA are often pain free but seek treatment because of weakness and/or loss of function. Should these patients be treated the same?

Newly Diagnosed CMC OA

Complaint/s: Mary, a 58-year-old nurse, is experiencing worsening pain in her right non-dominant thumb when she draws injections and opens medication packages. Her pain with resistive thumb use, and especially loaded tip pinch, is typical. She also complains of pain with full thumb extension/abduction but unlike some other patients, she does not complain of her thumb aching at night. She has no other diagnosis affecting her hand/thumb.

Presentation: A visual examination shows no visible arthritic changes at the base of thumb or other obvious abnormalities. *See Figure 1*.

Examination: Manual examination of Mary's hand focuses on the stability of all three thumb joints to know which joints are most vulnerable under load. Under load, the thumb is like the closed chain interdependence of the three leg joints, so we want to identify the most likely weak "link." A quick screen of her thumb web space for early tightness (adduction deformity) and a sensibility screen to rule out carpal tunnel completes Mary's examination; she has neither limitation.



Figure 1: Mary's thumb.

Observation: It is essential to know how Mary's thumb looks under load. If unstable joints are identified during the manual examination, we watch those joints carefully as we see if the Colditz Tear Test causes thumb collapse [Dynamic Loading Posture of the Thumb: The Colditz Tear Test; Journal of Hand Therapy – 2013].

Observing your patients performing resistive tasks informs both treatment approaches and activity modification.

Treatment Goals: Not only is our goal to decrease Mary's thumb pain but also to minimize progression of her CMC OA. Anything that alters the load on the CMC joint can reduce pain and traditionally most protocols immobilize the thumb CMC joint to achieve this goal. But immobilizing the thumb CMC joint requires immobilizing adjacent joints, which is usually unnecessary, and it leads to decreased thumb strength and frequent abandonment of the orthosis.

Therefore, our goal is to provide an orthosis designed to maintain thumb stability (thumb stays in

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an arch or "C" shape under load) by allowing the stabilizing muscle to contract inside the orthosis. Orthotic wear is complemented with home exercises for improved stability.

Treatment: Mary was measured for a Push MetaGrip and, although she measured for a size 2 MetaGrip, she preferred the fit of size 1 because her thenar muscles are relatively small. *See Figure 2.* It is preferable to try both sizes to assure optimal fit because the brace must fit snugly and precisely to be effective. Squeezing the metal insert is what adequately controls the first metacarpal movement.

The Colditz tear test is repeated in the brace to assure the thumb collapse pattern cannot occur when the brace is worn. If use of the MetaGrip does not maintain the stable "C' shape, additional bracing of other joints, or perhaps only bracing the IP or MP joints, may be needed to maintain the correct "C" posture when the thumb is loaded. It requires trial and error to determine which combination maintains the best thumb stability under load. Also, remember: No brace fits all patients perfectly, so you may need to slightly modify the MetaGrip.



Figure 2: Mary wearing the Push® MetaGrip® CMC orthosis.

Be sure your patient understands the importance of wearing the MetaGrip brace when loading the thumb. Although it can also be worn at night, the most important time is when using the hand.

Mary began a home exercise program for improved thumb stability, as specific home exercises have been found to decrease pain associated with CMC joint OA.

Prognosis: Many individuals with first time thumb CMC pain eliminate their pain with a short period of orthotic wear. Some may not have the pain return, but more likely an individual with an imbalanced thumb posture will have recurring episodes of pain. The ideal is to help the patient modify their thumb posture under load. Since our thumb posture is embedded in our motor cortex it is extremely challenging for an adult to change their active thumb posture.

An individual must be committed to the use of the appropriate orthosis and completion of stabilizing exercises to make a permanent change, but with pain abated, rarely is the patient motivated to commit the time and energy required. Without a long-term commitment, Mary is likely to have recurring episodes of thumb CMC pain and perhaps also an increasing collapse deformity.

Recent Trauma/Overuse Exacerbating CMC OA

Complaint/s: When Kathy, 78, began active range of motion and light activities following closed reduction and 6 weeks of cast immobilization for a Colles fracture of her right (dominant) wrist, she complained of pain at her thumb CMC joint that radiated into her wrist. It is not unusual that individuals develop CMC joint changes without symptoms until trauma alters the mechanics, or overuse creates pain.

Presentation: Kathy's thumb CMC joint motion is limited by her subluxation of the first metacarpal relative to the trapezium (shoulder sign) and the adducted posture of her first metacarpal. *See Figure 3.* Note: Her recent distal radius fracture may have changed her bony contours to mask/accentuate the contour at the base of her thumb.

Examination: Kathy's CMC joint can be partially reduced without pain; and gentle passive stretching of the thumb web slightly improves abduction. Her interphalangeal (IP) and metacarpophalan-

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geal (MP) joints have normal lateral stability, but she hyperextends the MP joint about 40 degrees passively and falls into a zigzag collapse deformity whenever using her thumb. Sensibility testing is within normal limits, but it would not be unusual to find sensory changes in the median nerve distribution as a result of her recent Colles fracture.



Figure 3: Kathy's CMC OA, exacerbated by Colles fracture.

Observation: The Colditz tear test was not administered because Kathy exhibits collapse of her thumb MP joint into hyperextension and her IP joint into hyperflexion with any attempted use.

Treatment Goals: Kathy's treatment focuses on increasing the functional motion of her wrist without exacerbating pain at her thumb CMC joint.

Her long-term goal is to reduce the thumb CMC joint subluxation and increase the distance of the web space - without pain, if possible. Increasing the CMC joint mobility can open the door for improving thumb stability.

Treatment: To assure her wrist and forearm exercises do not exacerbate thumb CMC pain, her exercises were modified to allow her thumb to remain adducted and all exercises avoided loaded precision pinch.

When Kathy developed thumb CMC symptoms her post-immobilization custom wrist orthosis was designed to include the thumb CMC joint. When she no longer needed wrist support, the orthosis was again modified to free up the wrist to continue to provide support to the thumb CMC joint. *See Figure 4.* The custom CMC orthosis was continued because Kathy's adduction contracture made it challenging to fit a ready-made orthosis; a soft CMC support could also have been used.



Figure 4: Kathy's custom CMC orthosis.

After Kathy regained functional wrist motion without aggravating her thumb pain, she began a home program of gentle prolonged stretching of the first metacarpal into abduction/extension to see if the CMC joint motion can be improved without increasing pain. Massage and stretching of the first web space was combined with the CMC joint stretching.

Prognosis: Only time can determine whether Kathy's thumb CMC joint range of motion can be improved with stretching exercises. If improvement is accomplished, the next challenge is to convert her thumb collapse pattern into a stable thumb posture under load. Since the thumb CMC pain usually goes away quickly, it is questionable whether an individual such as Kathy will be motivated to commit the time and energy necessary for a long-term change. At the very least, she has increased her awareness of tasks that cause her thumb to collapse and so she can endeavor to maintain the ideal thumb posture during the task.

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Functional Loss from Longstanding Thumb CMC OA

Complaint/s: Pearl, 83, complains of intermittent numbness/ tingling in the median nerve distribution and weakness in her right dominant hand which is consistent with her referral diagnosis of carpal tunnel syndrome. She has no complaints of thumb pain but she complains of difficulty opening jars/containers and using scissors.

Presentation: Pearl has long standing thumb CMC osteoarthritis causing her thumb CMC joint to be dislocated, severely limiting her CMC joint motion. Accompanying this is the expected severe adduction contracture of the first web space. *See Figure 5.*



Figure 5: Pearl's thumb with limited mobility.

Examination: Pearl's thumb CMC joint is rigid, and the web space of her thumb is tight with minimal ability to passively move her thumb away from her palm. Her IP joint postures in hyperextension and her MP joint is fused with minimal active movement. As expected, her grip strength is 10 pounds in her right dominant hand as compared to 17 pounds in her left hand. Sensibility testing reveals decreased discriminatory touch to the thumb, index, and long fingers. There is palpable synovitis in the palm at the level of the A1 pulley of the ring finger, and a reported popping sensation with active finger flexion, indicating a possible trigger finger.

Observation: Pearl has adapted to her misaligned thumb position and is able to perform all basic self-care without pain.

Treatment Goals: Therapy goals are to reduce Pearl's median nerve symptoms and increase her hand strength, or increase her hand function with adaptive equipment. Since she has a non-correctable thumb deformity and no thumb pain, a CMC orthosis is not indicated. She chose adaptive equipment to improve hand function. Additionally, we encouraged gentle active range of motion to maintain her current hand/thumb flexibility.

Treatment: In addition to customary treatment for her carpal tunnel syndrome, Pearl wore a wrist orthosis and compression glove at night. She also began isometric exercises to hopefully strengthen her hand without increasing pain or provoking trigger finger symptoms in her right ring finger.

Prognosis: Relatively little change in Pearl's thumb posture or function is expected. Without thumb CMC mobility it is extremely difficult for her to increase her strength and impossible for her to change her thumb pattern under load. Learning new ways of doing things and procuring the right equipment to make tasks easier will, however, likely lead to Pearl's improved function.

Final Comments

Not only do we see patients with thumb CMC osteoarthritis in different disease stages, but also with varying severities of thumb collapse deformity, making treatment choices more complex. Each patient's treatment must be individualized to fit the needs of their specific presentation. As we reflect on this common, but often complex, diagnosis we ask, "How do you individualize your treatment of patients with thumb CMC osteoarthritis?"

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