This protocol is intended for use following Arthroplasties of the thumb CMC joint with soft tissue reconstruction. Designed to progress the individual through rehab to activity participation taking into consideration specific patient needs and issues.

General Guidelines/Precautions:

- The goal of the surgery is to improve joint stability and decrease pain at rest & with activity at the base of the thumb, with people that have failed conservative treatment for at least 2-3 months.

- Considerations:
  - There are approximately four types of CMC reconstructions that utilize a tendon serving as the soft tissue arthroplasty (Burton- Pellegrini, Anchovy, Weilby-Kleinman and Zancolli)
  - The course of postoperative rehabilitation must be carefully managed, and the therapy plan must emphasize the extent of the disease, the extent of the surgical procedure, joint stability postop and complications. Patients will typically indicate their thumb and hand have restored functional use within 6 months.
  - The inability to flatten the palm after the procedure is typical, patient education for this functional thumb position to maintain stability at the CMC joint is necessary.

Phase	Suggested Interventions	Goals/Milestones for Progression
Phase I Early Intervention	10-14 days post-op: Bulky compressive dressing support is removed, following suture removal, the patient is fitted a custom fabricated hand-based thumb static orthosis to wear during the day and custom-fabricated wrist and thumb static splint with the IP joint free at night. The thumb is positioned midway between palmar and radial abduction, with the MP joint slightly flexed. If a wrist and thumb static splint is fitted, a light compressive dressing was applied to the hand and forearm prior to fabricating the custom splint. When 50% of the tendon is used for reconstruction, the wrist and thumb static orthosis is worn initially during the	Goals of Phase: Criteria to Advance to Next Phase: 1. Suture/wound remains closed and absent of infection 2. Pain management 3. Swelling is reduced Restrictions: 1. Lifting limited to 2 lbs. (weight of coffee cup)

	day. (Some surgeons prefer a wrist and thumb static splint during the day and night the initial four weeks). * NOTE: The thumb must not be positioned in radial abduction, as this would risk stretching out the reconstruction -Initiate scar mobilization 48 hours post suture removal and assess need for scar remodeling / compression materials (silicone gel sheet, elastomer, etc.) Use of dry mobilization, scar retraction using a piece of Dycem and followed by lotion/cream. - Post-op edema management strategies. - Sleep positioning for post-surgical wrist/hand and thumb (for future, when out of splint inform not to sleep with hand in "flattened position") -2nd-through 5th digit: AROM of the non-affected joints (wrist, digits and thumb IP joint) to help with joint, tendon and edema movement. 3-4 times per day for 5–10-minute sessions. -AROM for the wrist can be started when the procedure includes the entire tendon as opposed to a portion of the tendon. -*The surgeon may decide to wait 4 weeks post op for AROM of the wrist.	

Phase II	3-week post-op: -Patients that can begin AROM to the wrist at 10-14 days post-op, gentle PROM exercises are started to the wrist 3-4 times per day, 10-15 repetitions. - Dense, adherent scars can begin ultrasound - if severe pain limits exercise, TENS and/ or Fluidotherapy can be added to address pain & hypersensitivity - Patient education explaining **gradual** recovery of hand function and the timeframes involved - AROM initiated to the MP joint, while stabilizing the first metacarpal (the CMC joint) with the opposite hand. 4 weeks post-op: -Splint: • Transition to hand-based thumb spica splint, fabricated by the therapist • Continue wearing a splint between exercise sessions and at night for the protection of the surgical procedure and for comfort. -Begin AROM to the thumb and wrist including: • Thumb palmar abduction • Thumb circumduction, flexion and extension, MP blocking supported for flexion • Lightly touching each finger with the thumb • Wrist: flexion /extension • continue composite flexion and extension tendon gliding, active joint blocking • Begin practicing functional and prehension activities to regain dexterity and minimize frustration • HEP 6-8x per day for 10 min sessions	Goals of Phase: Functional goals: 1. Begin **very** light ADLs within lift/carry/grasp restrictions with prehension/ dexterity of lightweight objects at 3-4 weeks and light ADLs at 6 weeks post-op, normal activity at 3-4 months post-op and activity with a tight, sustained grasp against counterforce wait until 5-6 months post-op. 2. Knows conservative measures to address pain or edema with re-entry into activity (contrast bath, ice, heat, self- soft tissue mobilizations, positioning day and night-time) 3. Monitor for postop complications such as: Infections, paresthesias, prolonged edema and complex regional pain syndrome

	• *Avoid movement patterns: lateral pinch, adduction of the thumb and wide radial abduction. - Begin manual desensitization beginning with light, soft fabrics, progressing to deeper pressure with coarse textures. -Patients wear a wrist and thumb static splint during the initial month, they may be fitted with a custom-fabricated short opponens splint during the day and the thumb & wrist static splint is continued at night. 5 weeks post-op: PROM exercises are added to the MP and IP joints of the thumb, with the CMC supported (manually or with an orthosis	
Phase III	6 weeks post-op: • Add isometric resistance for the APB/ Opponens • If scar tissue remains to be painful or a motion limitation, consider ultrasound as a modality to improve visco-elasticity of the soft tissues. • Patients wearing the custom wrist and thumb static splint wear between exercise sessions and at night, may gradually begin weaning out during the day for light ADLs. They should continue wearing the splint at night for 8-10 weeks and gradually eliminate by 12 weeks post-op. • Patients wearing the custom short opponens splint during the day gradually wean out over the next 2-4 weeks. (Leaving splint off for light ADLs, 3-4 times per day for less than an hour, working up to an hour as tolerated). • The hand-based custom-fabricated orthosis or a prefabricated orthosis should be worn during the day with repetitive or weighted resistance activity	Goals of Phase: Functional goals: 1. Return to light ADL demands to begin and introduce prehension with small, lightweight objects to regain dexterity and minimize frustration. 2. Inability to flatten palm is typical, retrain with functional activity to improved motion, strength and pain levels within precautions. 3. Integration of body mechanics and joint protection 4. Monitor for postop complications such as: Infections, paresthesias, prolonged edema and complex regional pain syndrome

	demands for the hand or involved UE. Depending on the level of need, either a thermoplastic or Neoprene splint (i.e. Comfort Cool brand) can be used. • If necessary, add dynamic flexion splinting to the MP and IP joint of the thumb and must be fit to provide maximum support of the CMC joint & proper alignment. Wearing 20–30-minute sessions, 3-4 times per day.	
Phase IV	8 weeks post-op: • Begin gentle strengthening when the patient reports concerns for hand and thumb strength. The preference is to regain hand strength and endurance through normal daily activity versus putty or hand exerciser use. • The wrist and thumb static splint may begin weaning or discontinue between the 8–12-week phases, or when cleared by surgeon. The patients who require use of their hands in repetitious, heavy lifting or pinching activities may be more comfortable in a short opponens splint to provide external support (refer to week 6 phase for details). • Persistent hypersensitivity along the surgical site may respond well to high rate, conventional TENS with continuously until the pain decreases. Prepare for returning to work/ heavier demands with ADLs or leisure with instruction in the following for the phase V: • Body mechanics and ergonomics, avoiding repetitive overuse of thumb, joint protection, ergonomically designed tools or workstation.	Goals of Phase: Functional goals: 1. Return to modified activity with work pacing and positioning principles. 2. Patients will be provided with education initiated to perform hand-related body mechanics (gripped surfaces, joint protection, gloves/materials, ergonomically designed hand-tools, workstations).

Phase V Return to normal activity	10-12 weeks post-op: • Emphasis on **reviewing the guidelines in conservative management of CMC arthritis** should be completed of reviewed, non-skid pads, gloves, jar openers, etc. enforced. • Review: ongoing strengthening, protocol timeline as it may take a few more months to normalize hand use. Ongoing recovery is gradual, and patients shouldn't try to speed up the process. • Body mechanics and ergonomics, avoiding repetitive overuse of thumb, joint protection, ergonomically designed tools or workstation. • If symptomatic, wearing a CMC orthosis at night may be helpful to prevent CMC joint collapse against palm or radial flattening. • Review: the inability to flatten the palm after the procedure is normal, positioning the thumb for maintaining the stability of the CMC joint. • Encourage to continue isometrics for the APB each day 15-25 reps for 6 months to a year to address the common loss of thenar strength.	• Goals of Phase: • Full return to work status: continue exercises at least a couple times a day, especially if working in an office type setting