# Stiff Hand

- Any upper extremity injury can result in the serious and sometimes irreversible problem of a stiff hand. Even an injury in the proximal upper extremity can cause serious stiffening of the digits. The stiff hand is what hand therapists try to prevent.
- Edema is the main culprit in the series of events leading to a stiff hand. Edema is a natural response to trauma, occurring in the inflammatory phase. The challenge for hand therapy is to strike a balance between rest and movement.
- Too much rest may increase the edema. Too much movement may increase the inflammation. The right amount of rest in an appropriate position reduces inflammation and promotes healing.
- Proximal motion plus well- tolerated hand and wrist exercise and functional use, particularly while elevated, help to reduce edema and restore motion.

- Encourage the patient to achieve gentle full arcs of available motion with functional use or exercise instead of performing quick or incomplete arcs of motion that are less effective.
- Make exercises relevant to occupational functioning or at least goal oriented whenever possible (e.g., grasping and releasing items).
- If the patient's hand is painful or more swollen after use or exercise, it is imperative to decrease temporarily the amount of exercise being performed

- Avoid aggressive PROM. It is okay to coax tissues to lengthen within their available comfortable range, but always respect the feeling of tissue resistance, and do not exceed it.
- Gentle passive motion, if indicated, should be accompanied by joint traction to promote gliding of the joint surfaces.
- Sustained holding of a position is much more effective than fast jerky stretches, which frequently add to the inflammation.

- During the acute inflammatory stage, static splinting is usually most appropriate.
- After the inflammation has subsided and while the joint displays a soft end feel, dynamic splinting is productive. Inflamed tissue is not as flexible as uninflamed tissue.
- Watch closely for signs of inflammation and return to static splinting as indicated.
- Later, if there is a hard end feel, serial static or static progressive splinting will most likely be needed.
- Many patients with hand impairments complain of morning stiffness. Night splinting, which can be very helpful for this problem, also corrects tissue tightness that limits daytime use of the hand.

# Tendinitis/Tendinosis

- The pain associated with tendinitis/tendinosis can be severe and can seriously impact performance in all areas of occupation. Symptoms include pain with AROM, with resistance, and with passive stretch of the involved structures.
- Tendons are made up of connective tissues that are not well vascularized. Tendinitis has been treated historically as if it is an inflammatory phenomenon. More recent histological evidence has shown that the pathology of tendinitis includes alterations in tissue with disorganized and degenerated collagen and atypical vascular granulation tissue.

- These findings are described as angiofibroblastic hyperplasia or angiofibroblastic tendinosis. It is now believed that the patients who are diagnosed with tendinitis actually have tendinosis. Because the pathology is not primarily inflammatory, treatment approaches now emphasize interventions that restore nourishment to collagen.
- The question of use of modalities with this diagnosis remains intriguing. Most authorities report that modalities are effective in reducing pain, normalizing the vascular status of the involved tissue, and quieting inflammation if it exists.

- Tendons are vulnerable because they are relatively avascular. Cell damage may become chronic.
- Biomechanical deficits include muscular weakness, inflexibility, and scar tissue.
- Early treatment of an acute traumatic case typically has a better prognosis than after the injury has become chronic.

## Evaluation

- An overaggressive evaluation that provokes pain can set the treatment timetable back significantly and undermine the trust of and rapport with the patient.
- Start the evaluation with a cervical screening to look for proximal causes of distal symptoms. Compare both extremities.
- Assess for pain that may be local or diffuse, swelling, sensory changes, and loss of function.

- Tendinitis typically is accompanied by pain with AROM, with resistance, and with passive stretch of the involved structures. Compare subjective and objective findings, but remember that symptoms are often elusive and may occur dynamically or intermittently.
- Patients who seem angry or hostile may understandably be depressed over their loss of function.

- It is essential to identify the activity causing the pain. Occupational therapists possess unique skills for ergonomic-related analysis of occupational performance and activity modification. It is best to observe the actual activity. If this is not possible, simulate the activity. Ergonomic risk factors for tendinitis include forceful, rapid, repetitive movements. A movement is considered repetitive if it is performed more than once every 30 seconds or for more than half the total work time. Additional risk factors include a history of soft-tissue problems, pressure and shear forces, stress and muscle tension, and hypermobility.

- **Intervention**
- Treat the acute phase with ice, compression, elevation of the involved structures, and rest if needed to manage pain. Anti-inflammatory physical agent modalities may be useful at this time, but remember that tendinitis/tendinosis is no longer thought to be primarily inflammatory. Splinting is individualized to the patient's and physician's preferences. Orthotic intervention may be most beneficial and least problematic at night. There are also clinical compromises associated with disuse from immobilization. Soft supports may be very helpful. Try to avoid pain, and monitor the clinical responses. Active pain-free motion is the best way to begin revascularizing the involved tissues.

- After the inflammation subsides, upgrade intervention to restore normal function through gradual mobilization balanced with rest. Most importantly, pain must be avoided. Instruct in tendon gliding exercises in a pain-free range appropriate to the particular structures involved.
- Progress from isometric exercises with gentle contractions of involved structures to isotonic exercises. Gradually introduce low-load, high-repetition strengthening in short arcs of motion. Then increase the arc of motion and modify proximal positions to be more challenging if appropriate for work simulation. Instruct in gentle flexibility exercises in a pain-free range. It is often difficult for patients to learn to perform slow and pain-free passive stretch. Aerobic exercises and proximal conditioning are essential.

- Prevent re-injury through education. Simulation and biofeedback can promote biomechanically efficient upper extremity use.
- Teach the patient to avoid reaching and gripping with an extended elbow or a flexed or deviated wrist.
- First, solve the easily recognizable issues, such as obviously poor posture or trunk twisting with reaching and lifting.
- Instruct in pacing to avoid fatigue that leads to reinflammation.

- Unsupported upper extremity use is taxing, as are nonsymmetrical upper extremity use, non-frontal trunk or upper extremity alignment, and unilateral upper extremity work.
- Many people with distal symptoms recover well by focusing intervention on posture, conditioning, and proximal strengthening.
- Using handheld tools with ergonomic design can be helpful. Even a small ergonomic adjustment, such as learning to lift bilaterally with proper body mechanics or making use of a telephone headset instead of laterally flexing the neck and elevating the shoulder to hold the receiver, can often lead to dramatic improvement.

# Lateral Epicondylitis or Tennis Elbow

- Lateral epicondylitis involves the extrinsic extensors at their origin. The extensor carpi radialis brevis is most commonly involved. Pain is at the lateral epicondyle and extensor wad (the proximal portion of the extensor muscles).
- This diagnosis is differentiated clinically from radial tunnel syndrome, in which tenderness occurs more distally over the radial tuberosity. Test for radial tunnel syndrome with the middle finger test (positive if there is pain secondary to resisting the middle finger proximal phalanx while the patient maintains elbow extension, neutral wrist, and MP extension) or by percussing distally to proximally over the superficial radial nerve. This percussion test is positive if it elicits paresthesia

- Exercises should include proximal conditioning and scapular stabilizing. Instruct the client to use built-up handles. If using an orthosis, support the wrist in extension, especially at night. Splinted wrist position recommendations range from neutral to about 30°. Also try a counterforce strap , which is a strap placed over the extensor wad to prevent full muscle contraction and to reduce the load on the tendon during the day with activity. Safety Message: Avoid applying the counterforce strap too tightly, because this can cause radial tunnel syndrome.

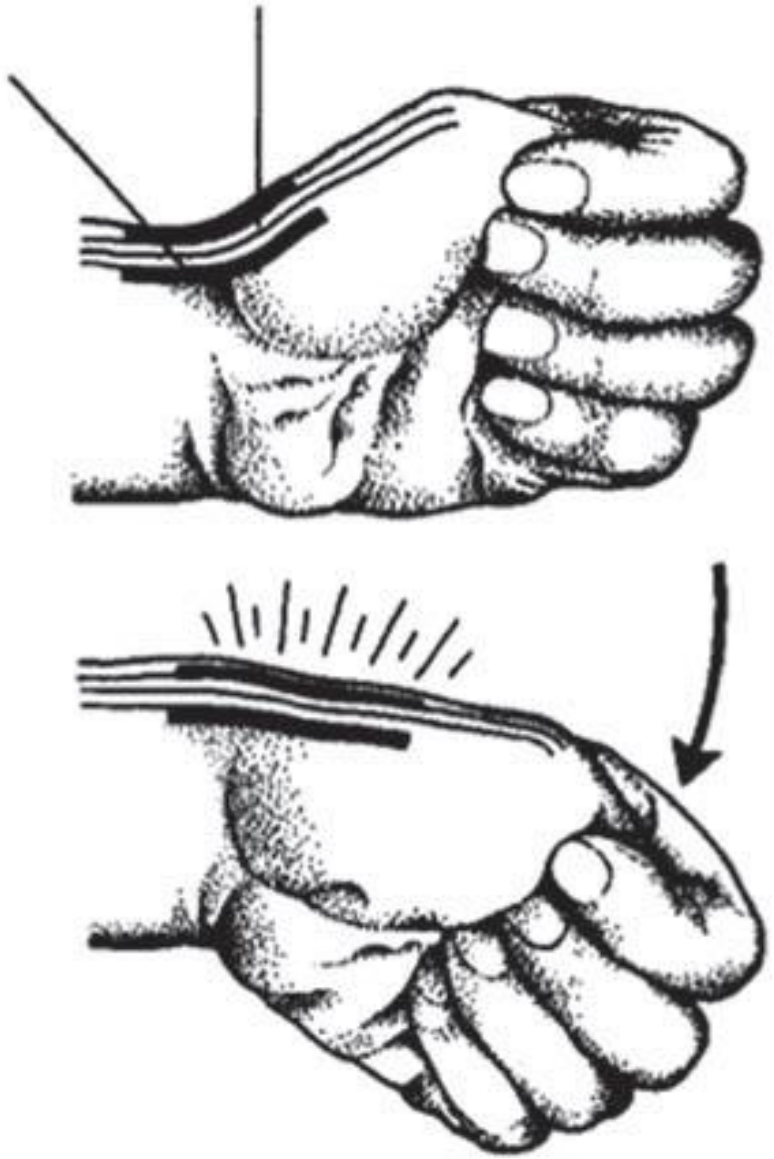
# Medial Epicondylitis, or Golfer's Elbow

- Medial epicondylitis involves the extrinsic flexors at their origin. The flexor carpi radialis (FCR) is most commonly involved. Pain is at the medial epicondyle and flexor wad (the proximal portion of the flexor muscles) and worsens with resisted flexion and pronation. Exercise should promote proximal conditioning. Avoid activity that requires force at end ranges. Provide built-up handles. If using an orthosis, maintain the wrist in neutral, and try a counterforce strap over the flexor wad.

# De Quervain's Tenosynovitis

- De Quervain's tenosynovitis is tendinitis involving the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons at the first dorsal compartment. It is the most common upper extremity tenosynovitis.
- Finkelstein's test is positive if there is exquisite pain with passive wrist ulnar deviation while flexing the thumb. This diagnosis occurs frequently among golfers, knitters, and racquet sports players. Thumb posture in sustained hyperabduction at the computer space bar may also be provoking.

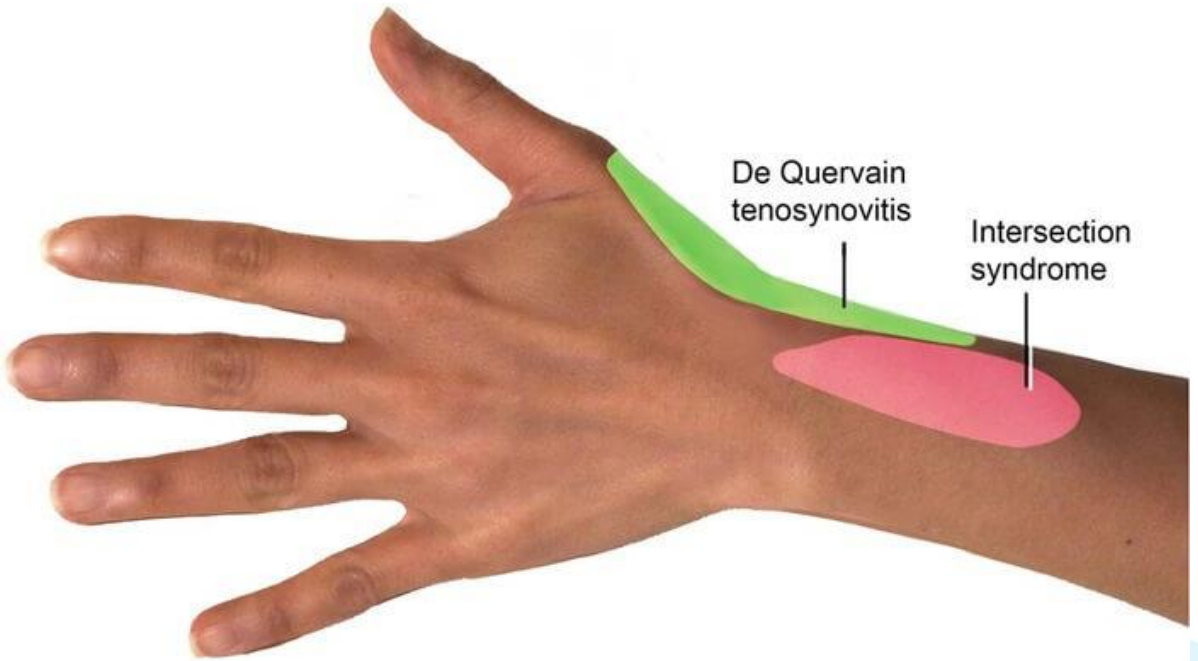
- Differential diagnosis is for carpometacarpal (CMC) arthritis, scaphoid fracture, intersection syndrome, and FCR tendinitis.
- Teach patients to avoid wrist deviation, especially in conjunction with pinching.
- Provide built-up handles. If splinting, use a forearm-based thumb spica, leaving the IP free. Watch for irritation from the radial splint edge along the first dorsal compartment.



# Intersection Syndrome

- Intersection syndrome presents as pain, swelling, and crepitus of the APL and EPB muscle bellies approximately 4 cm proximal to the wrist, where they intersect with the wrist extensor tendons (extensor carpi radialis brevis and extensor carpi radialis longus).
- This diagnosis is associated with repetitive wrist motion and occurs in weight lifters, rowers, and canoers.
- Teach patients to avoid painful or resisted wrist extension and forceful grip.
- Orthotic selection is the same as for de Quervain's disease use a forearm-based thumb spica, leaving the IP free.


Extensor retinaculum
ECRB
ECRL
APL
EPB


De Quervain tenosynovitis
Intersection syndrome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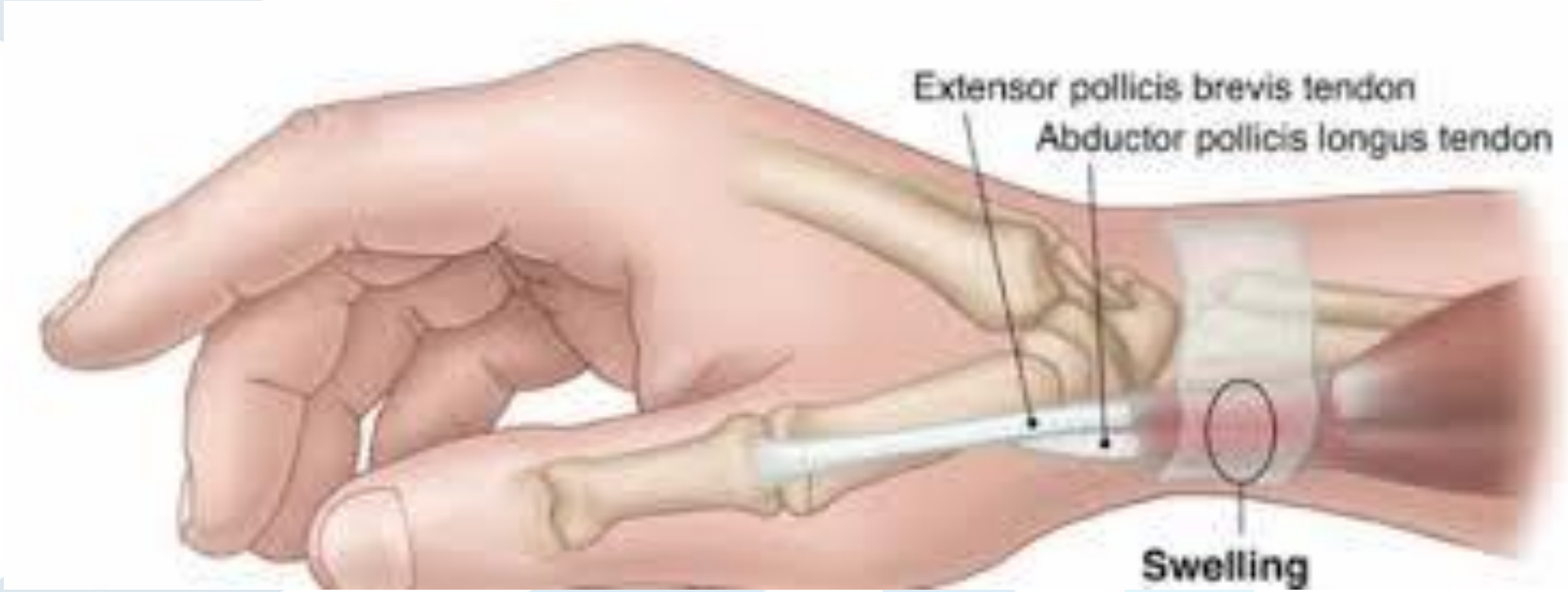
Short
Mid
Long

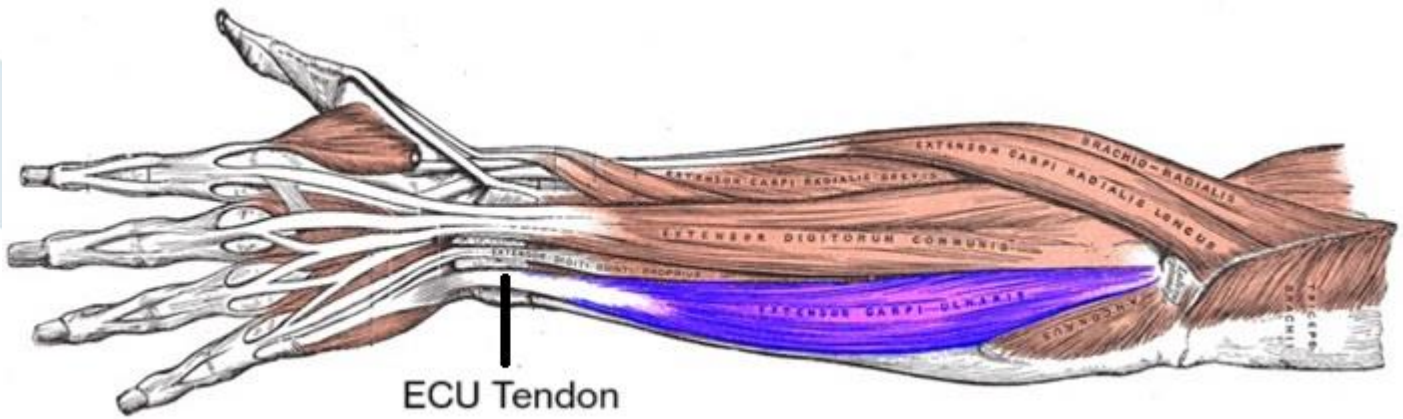
# Extensor Pollicis Longus Tendinopathy

- Also called drummer boy palsy, tendinitis of the extensor pollicis longus (EPL) reveals pain and swelling at Lister's tubercle (a dorsal prominence at the distal radius around which the EPL passes).
- EPL tendinitis is associated with activities requiring repetitive use of the thumb and wrist, as seen in drummers. Rupture of the EPL may occur in persons with rheumatoid arthritis (RA) or Colles' fracture.
- Help patients to identify and eliminate provocative activities. Enlarge the girth of utensils. The orthotic choice is a forearm-based thumb spica that includes the IP.


Extensor pollicis brevis tendon
Abductor pollicis longus tendon
Swelling

# Extensor Carpi Ulnaris Tendinopathy

- Tenosynovitis of the extensor carpi ulnaris (ECU) occurs fairly frequently. It causes pain and swelling distal to the ulnar head and is associated with repetitive ulnar deviation motions.
- Subluxation of the ECU tendon elicits a painful snap with forearm supination and wrist ulnar deviation.
- Differential diagnosis includes instability of the distal radioulnar joint and ulnocarpal abutment or tears of the triangular fibrocartilage complex. Teach patients to avoid ulnar deviation with activities. Orthotic intervention consists of a forearm-based ulnar gutter or a wrist cock-up splint.


EXTENSOR CARPI RADIALIS LONGUS
BRACHIO-RADIALIS
EXTENSOR DIGITORUM COMMUNIS
EXTENSOR CARPI ULNARIS
ECU Tendon


WRIST PAIN
EXTENSOR CARPI ULNARIS


Ulnar Gutter Splint
FPnotebook.com

# Flexor Carpi Radialis Tendinopathy

- With tendinitis of the FCR, pain is over the FCR tendon just proximal to the wrist flexor creases. Differential diagnosis is for a volar ganglion or arthritis of the scaphotrapeziotrapezoid joint. Orthotic intervention consists of a wrist cock-up in neutral or a position of comfort.

# Flexor Carpi Ulnaris Tendinopathy

- Flexor carpi ulnaris (FCU) tendinitis is more common than FCR tendinitis. It causes pain along the volar–ulnar side of the wrist. Inflammation occurs where the FCU inserts at the pisiform. Differential diagnosis is pisiform fracture and pisotriquetral arthritis or triangular fibrocartilage complex injury. Teach patients to avoid wrist flexion with ulnar deviation.
- Orthotic intervention consists of a forearm-based ulnar gutter. For comfort, pad the ulnar head if it is prominent, so the splint does not rub or irritate it.


1.Align the silicone pad at the ulna of the wrist

2. Bend the aluminum plate and hold onto the palm of your hand

3. Paste all the Velcro properly

4. Adjust to a comfortable position

# Flexor Tenosynovitis, or Trigger Finger

- Trigger finger is also called stenosing tenosynovitis of the digital flexor.
- The usual cause is stenosis at the A-1 pulley, which is part of the fibro-osseous tunnel that prevents bow-stringing of the digital flexors.
- Tenderness is over the A-1 pulley of the digital flexor along with pain with resisted grip and painful catching or locking of the finger in composite flexion.

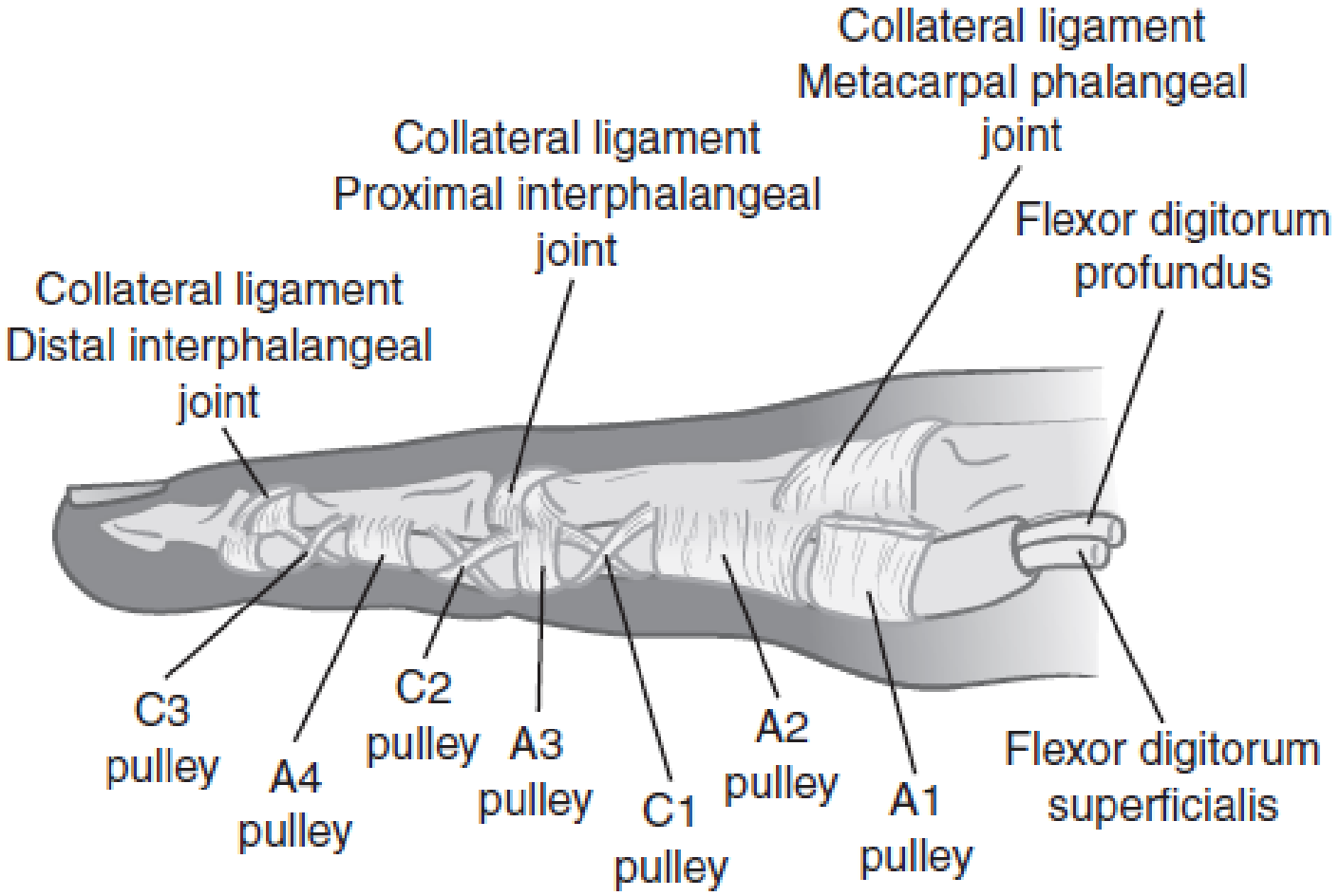
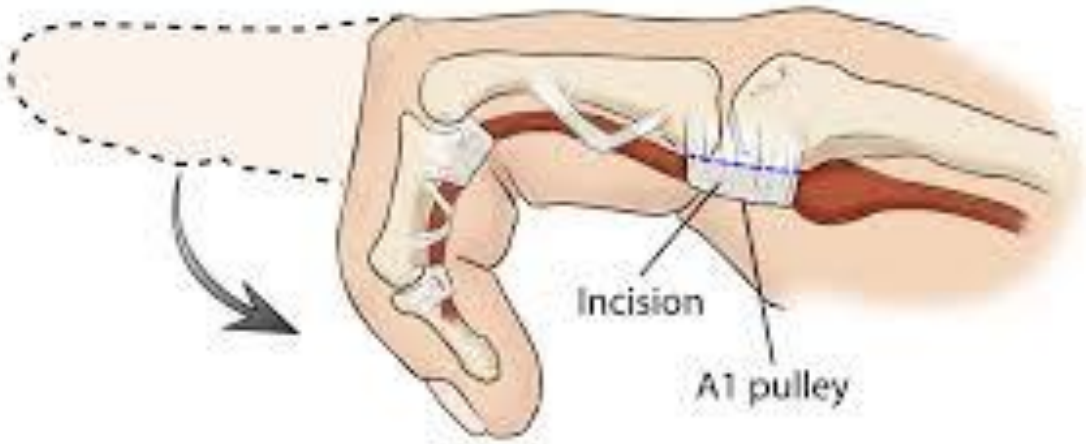



**Figure 37-8** Pulley system. (Adapted with permission from Rayan, G., & Akelman, E. [2011]. *The hand: Anatomy, examination, and diagnosis.* Philadelphia: Lippincott Williams & Wilkins.)


Incision
A1 pulley

- The origin of this impairment can be inflammatory or not. It has been strongly associated with diabetes and RA.
- Medical management often consists of a mixture of steroid and local anesthetic injected into the flexor sheath. The injection may be repeated a few times.
- Therapy consists of splinting the MP in neutral to prevent composite digital flexion (preventing triggering), while promoting tendon gliding, and place-and-hold fisting that avoids triggering. Built-up handles, padded gloves, and pacing strategies are helpful. Instruct the patient to avoid triggering, as this reinflames the tissue. If symptoms persist, the surgeon may surgically release the A-1 pulley.

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# Thank you