

Occupational Injuries in the Injured Worker

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Medical Training

- 1991-1995 MEDICAL COLLEGE OF WISCONSIN, MILWAUKEE, WI
- 1995-2000 ORTHOPAEDIC SURGERY @ RUTGERS – NEW JERSEY MEDICAL SCHOOL, NEWARK, NJ
- 2000-2001: HAND & UPPER EXTREMITY FELLOWSHIP- SUNY, STONY BROOK NY
- 2001-Present: CENTER FOR SPORTS ORTHOPAEDICS, HOFFMAN ESTATES, IL 60169 – PRACTICING UPPER EXTREMITY SURGEON

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CURRENT PRACTICE COMPOSITION

- 90% of PRACTICE consists of Treating All upper extremity conditions including shoulder rotator cuff tears, elbow injuries, Hand and wrist injuries and conditions
- OFFICE/CLINIC – 80-110 patient visits per week
- Surgeries – 6-8 surgeries per week
- IMEs -4 per week.

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Injured Worker

Workers are injured by many different mechanisms

- Hand crushed by scissor lift or between a crane and a machine
- Meat rack hyperextends wrist after being hit by a forklift
- Slip and fall on the ICE
- Wrist fracture from falling in a drainage covered with muddy water.
- Right shoulder injury from forklift falling 6 feet because tractor-trailer drove away from loading dock.
- Some stories are amazing that you can't make that up !!



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Injured Workers are like Professional Athletes

Professional athletes are paid a lot of money in their contracts; therefore missed games due to injury are very costly to the employer

Injured Workers that miss work cost the employer in terms of lost work days, lost productivity and potentially increased worker's compensation insurance premiums.

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GOALS

Professional Athlete: Return to play at near 100% as quickly as possible reducing missed games. Providing efficient medical care to reduce overall medical expense

Injured Worker: Return to work at near 100% as quickly as possible reducing missed time at work and lost productivity. Providing efficient medical care to reduce overall medical expense.

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Injured Worker Treatment



Obtain medical evaluation as quickly as possible – same day



Obtain any initial and advanced imaging studies as quickly as possible



Minimized lost work days

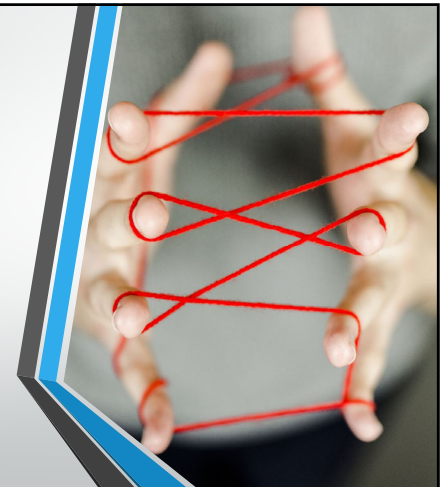


NEVER Ignore the patient's injury. Delaying medical care tends to upset the patient leading to secondary gain issues such as unwillingness to return to work seeking litigation for higher settlements.

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Wrist Injuries

- Distal radius fractures: Usually fall on an outstretched hand, also from direct impact from machinery.
- Ligament injuries: Scapholunate ligament injuries
- Nerve compression or laceration – median nerve or ulnar nerve: repetitive high force activity or laceration from a penetrating injury (broken glass), respectively
- Wrist tendonitis – these can include tendinitis of the thumb – DeQuervain's tenosynovitis. Extensor Carpi Ulnaris tendonitis
- TFCC Tear – ulnar side of the wrist



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Distal Radius Fracture

- Fall on an outstretched hand (FOOSH INJURY)
- Must check for signs of traumatic carpal tunnel syndrome which can occur from swelling or direct contusion.



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Distal Radius Fracture

- How Do I get a patient back to work the fastest?
- Sometime better to offer surgery to obtain a faster recovery.(Brace Only)
- Also return to work and recovery can be impeded with median nerve compression (traumatic carpal tunnel syndrome)



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Distal Radius Fracture

- I have a low threshold for performing a carpal tunnel release with surgery for the distal radius fracture. Post-operative nerve dysfunction can cause stiffness and or numbness of the fingers. This can delay recovery



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Distal Radius Fracture

Post Surgery : GET FINGERS MOVING RIGHT AWAY and MINIMAL IMMOBILIZATION – I TRY to avoid a cast and start early wrist motion.

Vitamin D Supplementation – Most people are vitamin D deficient.

Easier to avoid cast with operative fixation

I do limit strengthening for the first 6 weeks because excessive load can slow down healing of a fracture.

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WRIST LIGAMENT INJURIES



- Most Common are the Scapholunate ligament usually from a fall on an outstretched hand or direct impact

In my Practice I see them less commonly then Distal radius fractures.

Usually They show up as high energy injuries associated with wrist dislocations. (Fall from a Roof or high ladder, Motorcycle accident)

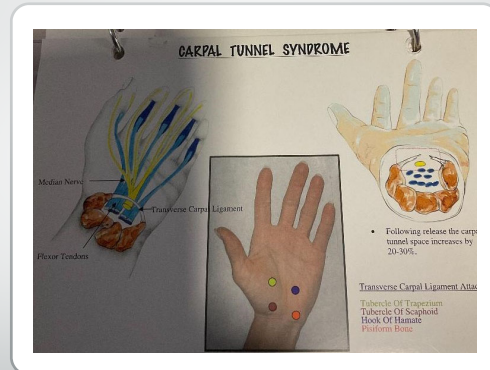
VERY DIFFICULT TO GET BACK TO 100% !!

They do NOT occur from repetitive motion activities.

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NERVE INJURIES IN WRIST

- Compression neuropathy – Carpal tunnel syndrome and Ulnar tunnel syndrome at the wrist
- Nerve laceration – usually median nerve, less commonly the ulnar nerve.



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CARPAL TUNNEL SYNDROME

- Very common condition in the general public but how about the Work comp population?

IS IT COMMONLY OR UNCOMMONLY WORK RELATED?

1. COMMONLY WORK RELATED
2. UNCOMMONLY WORK RELATED

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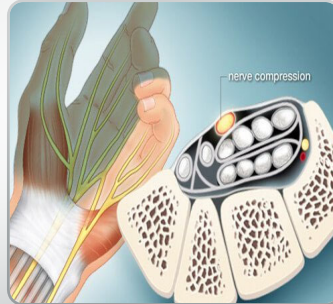
CARPAL TUNNEL SYNDROME

- ❖ Work Related Causes: REPETITIVE ACTIVITY
- ❖ What kind of Repetitive Activity

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Carpal Tunnel Syndrome (CTS) in the United States¹⁻⁴

- Most common entrapment neuropathy, characterized by median nerve compression in carpal tunnel
- 13 million cases in the United States
 - 3-5% of population
 - 7.8% of manual labor workers
- A leading cause of workplace absence
- 580,000 Carpal Tunnel Release (CTR) surgeries per year
 - ~70-80% of these are Open Carpal Tunnel Release
- Typical symptoms include:
 - Pain
 - Paresthesia (e.g., tingling or prickling) in palmar aspect of thumb, index and middle fingers, and radial half of ring finger



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CARPAL TUNNEL SYNDROME Symptoms

Early or Mild carpal tunnel syndrome – vague forearm pain along the median nerve or ache in the volar forearm.

Moderate - Intermittent numbness and tingling in the thumb, index, middle fingers. Worse at night because wrist tends to bend over in sleep and compress the nerve further

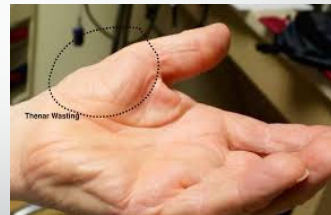
Most people cannot differentiate the 2 sides of the ring finger

Some people cannot differentiate any of the fingers and will say all the fingers are numb.

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CARPAL TUNNEL SYNDROME - Symptoms

- Severe – constant numbness or tingling in the thumb, index, middle fingers
- Atrophy at the base of the thumb and weakness of pinch



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CARPAL TUNNEL SYNDROME - Diagnosis



EMG/NCV are NOT required to make the diagnosis



They are expensive tests and may be negative in early/mild cases.



Ultrasound evaluation is starting to gain traction – Cross Sectional Area > 10mm

Ultrasound Findings in Patients with Normal Nerve Conduction Despite Clinical Signs and Symptoms Consistent with Carpal Tunnel Syndrome

220 patients with clinically diagnosed CTS

24 (28 hands) patients with normal nerve studies

The mean CSA was 10.1 +/- 2.1mm²

US may have a role in patients with clinically suspected CTS but normal nerve studies

	CTS+ NCS- (n=120)	C-CTS+ NCS- (n=12)
Age	43.1 ± 14.9	43.8 ± 12.7
Gender (female)	41 of 52 (79%)	21 of 24 (88%)
Height (in)	64.9 ± 5.1	64.2 ± 3.4
BMI	27.0 ± 5.5	31.1 ± 5.5
Diabetes (Y)	4 of 52 (8%)	6 of 24 (25%)
CSA (mm ²)	15.5 ± 3.9	10.1 ± 2.1
CSA > 10mm ²	7 of 52 (13%)	19 of 24 (80%)

Chen J, Fowler JR. Ultrasound Findings in Patients with Normal Nerve Conduction Despite Clinical Signs and Symptoms Consistent with Carpal Tunnel Syndrome. Reconstructive Surgery. 2022 Aug; 154(4):1501-1506.

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CARPAL TUNNEL SYNDROME - Diagnosis

Clinical Symptoms are the best diagnosis
AND

A Carpal tunnel Corticosteroid injection is
an excellent confirmatory diagnostic tool
because

If the patient feels even a little bit better a
couple of weeks of later with an injection
then

IT IS CARPAL TUNNEL SYNDROME!!

Lot cheaper this way and QUICKER –
Everything can be done in 2 office visits.

CARPAL TUNNEL SYNDROME - Treatment

- When there is numbness, tingling only and no weakness or no atrophy
- CORTICOSTEROID INJECTION IN THE CARPAL TUNNEL is my first line treatment – (YES it also was the diagnostic tool)
- It works way better and FASTER than splinting and therapy.
- Therapy and splinting takes too long to improve symptoms.

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CARPAL TUNNEL SYNDROME - Treatment

- If the Injection Does not work well enough then ...
- Surgery works –Ultrasound guided carpal tunnel release used a puncture wound and patient are back to light work in one-two days to light duty and in up to 3 weeks for full duty for heavy work.
- Traditional open Carpal tunnel release – make take longer to return to work. Generally requires more treatment such as therapy.

Current CTR Treatment Options

Traditional Open CTR (OCTR)

Palmar Incision



- Palmar incision (2-9 cm)¹
- Visualize anatomy through incision
- Recovery time: 4-weeks to 3-months^{1,2}

Mini-open CTR (mOCTR)

Palmar Incision



- Palmar incision (2-4 cm)¹
- Visualize anatomy through incision
- Recovery time: 3-weeks^{1,2}

Endoscopic CTR (ECTR)

Wrist Incision



- Wrist & palm incisions (1.0-1.5 cm)¹ for 1 or 2 ports
- Visualize anatomy through endoscopic camera lens
- Recovery time: 2-4 weeks^{1,2}

CTR with Ultrasound Guidance

Wrist Incision



- Wrist incision (0.5-1 cm)
- Visualize anatomy with ultrasound guidance/visualization
- Recovery time: 3-5 days³

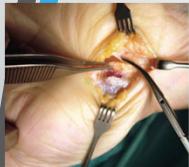
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Visualization with Current Treatment Options

Ultrasound enables "3D" visualization of all anatomic structures in real time

OCTR



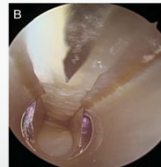
- Open field of view (FOV) is limited to the plane that can be directly visualized

mOCTR



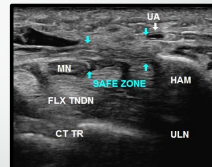
- Mini-open CTR has a more limited FOV than a traditional open approach
- The field of view is limited to the plane that can be directly visualized

ECTR



- FOV is limited to the "tunnel" of the scope
- Key anatomy and anatomical variants can be difficult to visualize and may be more susceptible to injury^{1,2}

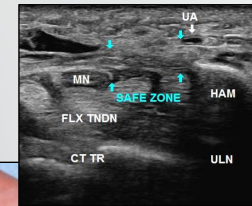
CTR-US



- Expanded FOV
- Ultrasound enables visualization of all anatomic structures including the thenar motor branch and digital nerves in three-dimensions, in real-time, without cutting or disrupting tissue

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Percutaneous Carpal Tunnel Release with Ultrasound Guidance (CTR-US)



- Over 20,000 procedures performed in the United States¹
- Typically performed with WALANT technique (Wide Awake, Local Anesthesia, No Tourniquet)²⁻¹³
- Avoids palmar incision
- Percutaneous incision (0.5-1 cm incision)²⁻¹³
- Does not typically require sutures²⁻¹³
- Ultrasound (US) guidance provides expanded, three-dimensional FOV
- 3-6 days recovery²⁻¹³
- No device related complications in published literature
- Complications < 1%²⁻¹³
- Expanded Field of View (FOV)
- Can visualize all anatomic structures including the thenar motor branch and digital nerves in three-dimensions, in real-time, without cutting or disrupting tissue

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UltraGuideCTR™

Carpal Tunnel Release with Real-Time Ultrasound Guidance

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Clinical Evidence – UltraGuideCTR

16 Peer-Reviewed Clinical Publications*¹⁻¹⁶

- Results reported on over **1,300 patients / 1,700 hands**
- Patients followed for durations ranging from 3-months to greater than 6 years
- Return to normal activities (RTA) in 2-3 days
- Return to work (RTW) in 3-5 days
- Statistically & clinically significant reduction in PROMs
 - (QDASH, BCTQ) as early as **1-2 weeks**
 - Outcomes sustained at long-term follow-up (**up to 6+ years**)
- Large number of simultaneous bilateral releases
 - Outcomes similar for simultaneous bilateral vs. unilateral releases**
- Acetaminophen or NSAIDs for post-op discomfort
- No routine post-operative therapy
- No device-related AEs

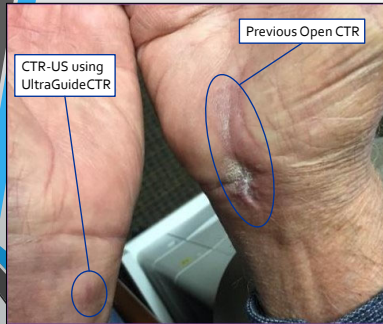
Systematic Review/Meta Analysis^{17 (Apr 20)}

- Open Carpal Tunnel Release (OCTR), mini-Open Carpal Tunnel Release (mOCTR), Endoscopic Carpal Tunnel Release (ECTR) - RTA and RTW
- 48 peer-reviewed published studies**
- 63 groups; 7,386 patients
- Outcomes on return to normal activities and return to work were looked at for all 3 techniques
- Mini-Open Carpal Tunnel Release
 - RTA – 11 days
 - RTW – 21 days
- Endoscopic Carpal Tunnel Release
 - RTA – 12 days
 - RTW – 18 days
- Open Carpal Tunnel Release
 - RTA – 17 days
 - RTW – 31 days

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CTR-US with UltraGuideCTR: Benefits for Injured Workers¹⁻⁵

UltraGuideCTR reduces pain and bleeding, reducing or eliminating need for intra- or post-operative opioids¹⁻⁵



Most injured workers can return to work and normal activities within 3-6 days¹⁻⁵

- ▶ Smaller incision size reduces bleeding and tissue disruption
- ▶ No tourniquet
- ▶ Most treated with acetaminophen/NSAIDs (No opioids typically required intra- or post-op)
- ▶ Activities as tolerated – rapid recovery
- ▶ No modification of anti-coagulant and anti-platelet medications
- ▶ Use local anesthetic - avoid general / MAC
- ▶ No physical or occupational therapy
- ▶ No bracing required

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Potential Cost Savings

- Diagnostic EMG can typically be replaced with a diagnostic ultrasound scan
- CTR-US can be performed on both wrists at the same time when required
- Performed in a procedure room or office setting
- Typically performed using local anesthesia-
 - Injured workers can avoid general / MAC anesthesia and the labs and other workups often required with sedation
 - No modification of anti-coagulant or anti-platelet medications
- Opioids generally NOT needed postoperatively
- Postoperative therapies (e.g., physical and occupational) are NOT typically required
- Bracing is not typically needed postoperatively



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TRIGGER FINGER



Pain at the base of the affected finger, where the finger joins with the palm

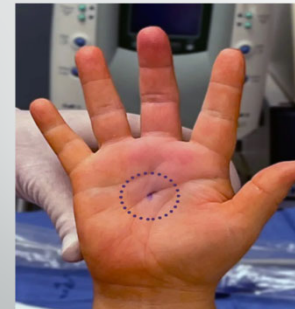
Swelling within the affected tendon or development of a cyst

Stiffness or loss of motion, difficulty in bending the finger

Mechanical symptoms: popping, catching or locking

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TRIGGER FINGER RELEASE

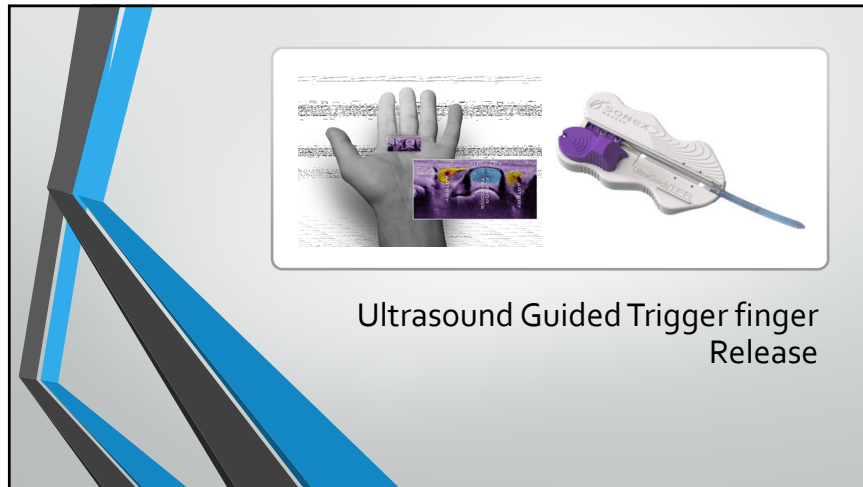


Puncture incision. Does not require stitches

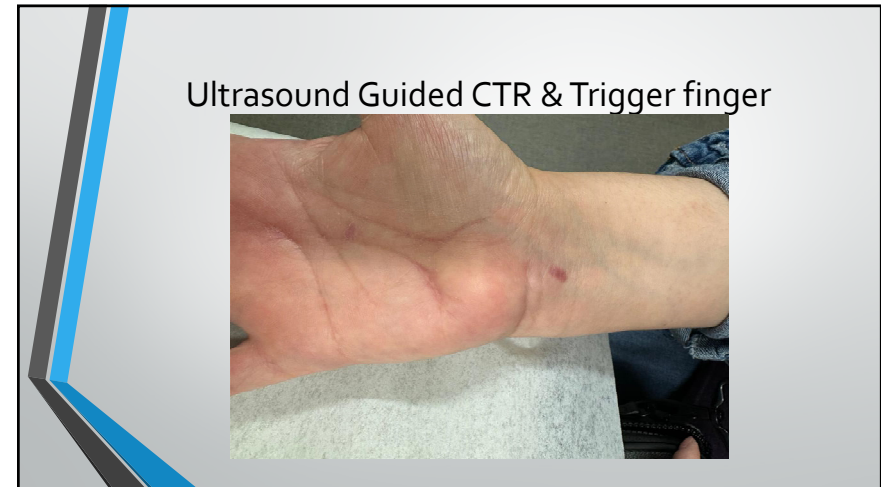
Rapid Recovery- Can return to light work in days

Can return to full duty in 1-2 weeks

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WHAT'S THE DIAGNOSIS ?

- IME - Claimant sustained an impact injury to the hand by crane carrying 2000lbs sheet metal.
- The crane swung and hit the left hand against the side of a machine.
- He Developed numbness and tingling of the 4th and 5th finger.

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WHAT'S THE DIAGNOSIS ?

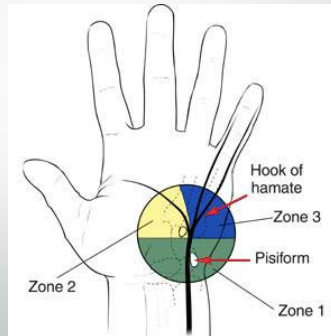
CARPAL TUNNEL SYNDROME :
Compression of the Median Nerve at the wrist: causes numbness to the thumb, index, middle finger

ULNAR TUNNEL SYNDROME:
Compression of the Ulnar nerve at the wrist: Causes numbness to the 4th and 5th finger.

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ULNAR TUNNEL SYNDROME

- Direct repetitive compression on the base of the palm along the 5th finger side of the palm.
- Can occur from using the palm as a hammer
- A crush injury to the ulnar side of the hand.



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ULNAR TUNNEL SYNDROME - Symptoms

- Symptoms: Numbness and tingling along the 4th and 5th fingers.
- Advanced injury - weakness of the small muscles of the hand, with atrophy - cramping of the hands, clumsy coordination, weakness of the hand.



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ULNAR TUNNEL SYNDROME - DIAGNOSIS

Clinical Diagnosis only – Tinel's sign at the Ulnar Tunnel

EMG/NCV usually non-diagnostic

Sometimes Corticosteroid injections work but not consistently like in Carpal tunnel syndrome

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ULNAR TUNNEL SYNDROME - TREATMENT

I found that surgery for Ulnar nerve release at the wrist is the most efficient to resolve symptoms and get the patient back to work the fastest

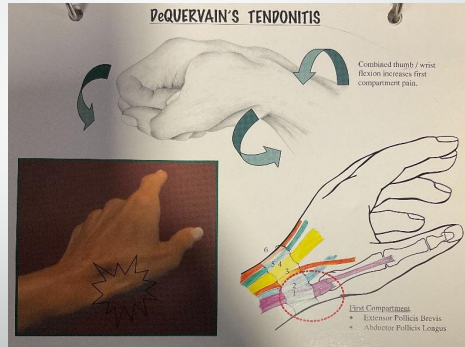
There is only surgery for an open release similar to an open carpal tunnel release.

Unfortunately there is no endoscopic or ultrasound techniques at this time

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DeQuervain's Tendonitis

- Inflammation along the thumb tendons
- Caused by repetitive wrist flexion and twisting
- Direct blow to the radial side of the wrist
- Recent childbirth or pregnancy!!



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DeQuervain's Tendonitis - Diagnosis

- Positive tenderness along the thumb tendons
- Positive Finkelstein's test



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DeQuervain's Tendonitis - Treatment

Therapy – Deep tissue massage, stretching of the thumb tendons

Thumb Spica Splint

These treatments take weeks to months to see improvement

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DeQuervain's Tendonitis - Treatment

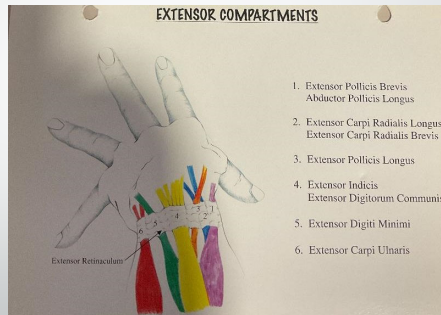
- Corticosteroid injection in the thumb tendon sheath
 - Much more efficacious and efficient. Recovery usually within 2 weeks.
 - In my practice I try to get a 'pop' when given the injection (This is a separation of the scar from the tendon). Patients get the fastest results.

Surgery – 1st Dorsal compartment release – last resort
 Can cause injury to the superficial radial nerve
 Can have postoperative scarring that can cause the same problem

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Extensor Carpi Ulnaris Tendonitis

- Commonly mistaken for TFCC tear because both are the ulnar side of the wrist.
- Located at the 6th compartment on the left side of picture.
- Usually caused by repetitive twisting injury.



Extensor Carpi Ulnaris Tendonitis


- Commonly mistaken for TFCC tear because both are the ulnar side of the wrist.





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Extensor Carpi Ulnaris Tendontis


Easily treated with
Corticosteroid
injection in the
sheath.

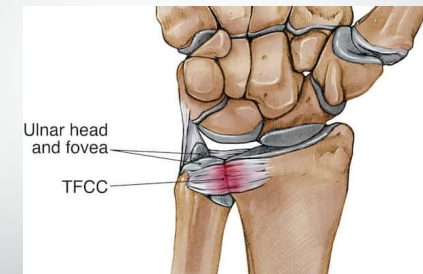

Occasionally
may require
surgery for scar
removal or
repair


Fast recovery
because early therapy
can be started for
range of motion and
casting is not
necessary

TFCC INJURY/TEAR

Caused by a twisting
injury however usually a
higher force is involved





Most common that I see
is a drill that gets caught
in the wood or metal.



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TFCC INJURY/TEAR - Treatment

-  TFCC tear is initially treated with a corticosteroid injection in the wrist joint
-  And a supination stretching program but if unsuccessful then...
-  Requires wrist arthroscopic surgery for repair or Debridement
-  IF REPAIRED then 6 weeks in a CAST followed by a lot of therapy.

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Extensor Carpi Ulnaris (ECU) tendonitis vs. TFCC Tear

It is important to differentiate the difference between the two

Since the treatments recoveries are vastly different.

A symptomatic ECU tendonitis is much easier to treat with a faster recovery then a TFCC tear.

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CONCLUSION – FINALLY !!

Lots of information but the theme is the same

I try to treat the Injured worker like an athlete with a goal of earlier return to work.

Make the diagnosis quickly and institute treatments that get fast results

GOAL: Limit lost workdays and return the claimant back to work as close to 100% as quickly as possible

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CONCLUSION – FINALLY !!

Consider ordering IMEs before any proposed surgery to prevent a surgery for a wrong diagnosis or a missed opportunity to deliver simpler treatments.

Consider second opinions/ IMEs if the treatment seems to follow the clinical study and not the mechanism of injury

• i.e. office worker being treated for TFCC injury or rotator cuff tear because of MRI findings.

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THANK
YOU

TOGETHER, we have been working to reduce workers compensation costs and provide early return to work treatment programs

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