Corrective Therapies for Hand Disorders:
How to Implement Changes to Reduce the Incidence of Complications

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Objectives

- To understand some of the complications after a distal radius fracture
- To understand the warning signs
- To be able to educate persons with DR fx of the warning signs
- To emphasize the importance of a team approach when changes are made to ensure success
- To highlight a study that has reported to reduce the likelihood of CRPS by 24%

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What is CRPS?

- **CRPS I-** classic reflex sympathetic dystrophy, is defined as
  pain, autonomic dysfunction, trophic changes, and functional impairment *without an identifiable nerve injury.*
- **CRPS II**, causalgia, is identical *with a nerve injury*. Either may be sympathetically maintained or sympathetically independent based on diminution of pain after sympatholytic intervention (e.g., oral anti-depressants or anticonvulsants or parenteral stellate or other blocks).

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What are the Symptoms of CRPS?

- Pain
- Swelling
- Osteopenia
- Atrophy of hair and nails
- Hypertrophy of skin
- Difficulty with fine motor tasks
- Fixed posturing
- Arthrofibrosis

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Introduction

- Approximately 15%-36% of CRPS sufferers experience persistent pain and impairment 2 to 6 years after onset
- CRPS can be resistant to therapies, and its management is challenging for clinicians
- Prevention is desirable…… no known proven cure

Hypothesis

- The incidence might be reduced with:
  - Attention to detail in fracture management
  - Increasing awareness of staff working closely with the patient to identify risk factors
  - Be able to address signs and symptoms/warning signs early and make changes early

Setting

- University Hospital in England
- Patient population is 86% British and white
- They have a traumatic fracture clinic Mon-Fri and the hand subspecialty has clinic 2 sessions (half days) a week
- The staff there includes:
  - MD
  - Physiotherapists (one OT and one PT)
  - Nursing
  - Plaster technicians (ortho tech)

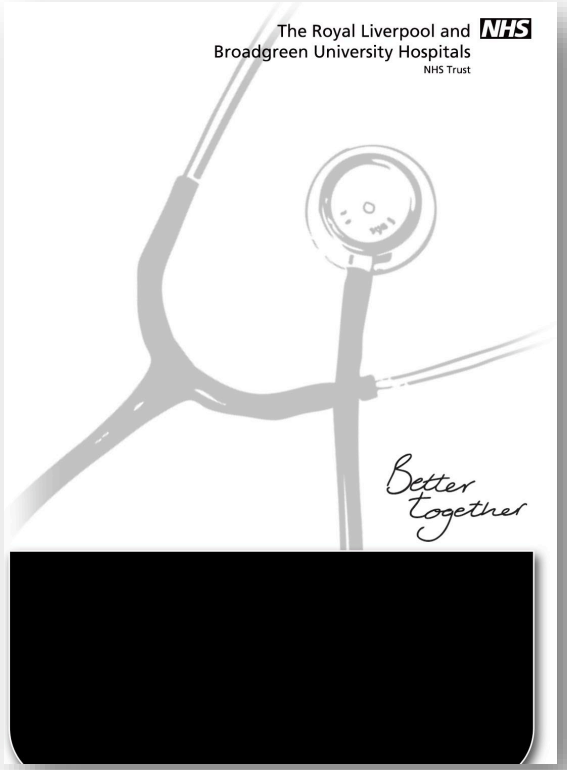
Defining the Problem

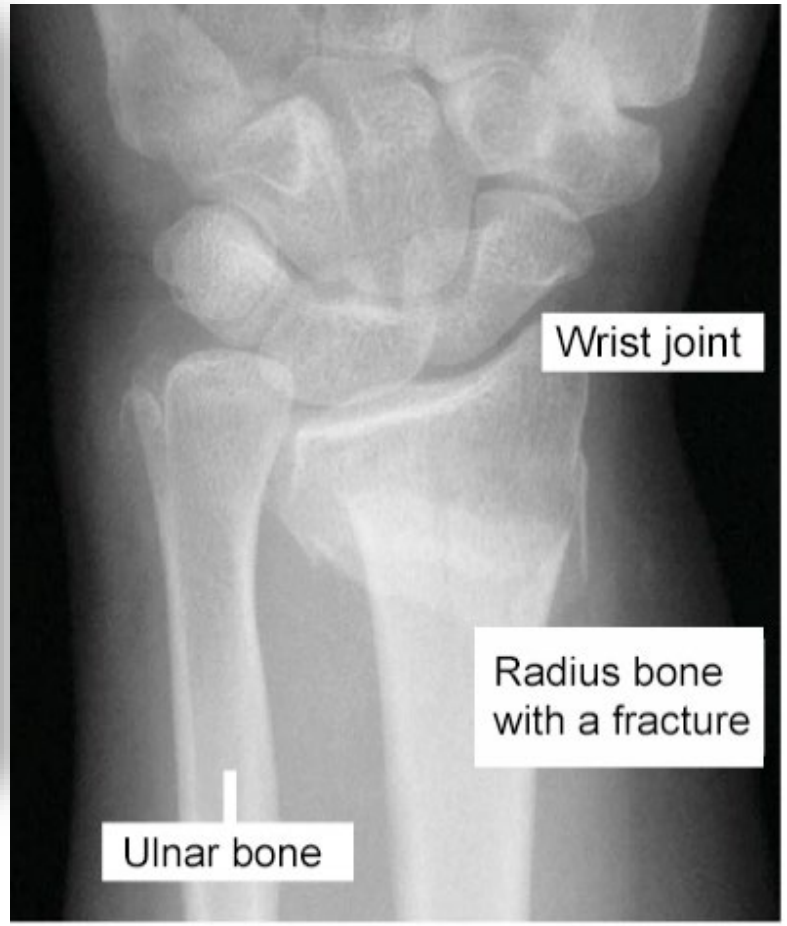
- 2004 Audit was performed
- Findings
  - Inconsistent knowledge of CRPS
  - Unable to identify significant signs and symptoms and therapies that might be helpful
  - Established that the incidence was around 25% of the DR fx population experienced CRPS
  - Strong correlation between tight and over-flexed casts

Implementing Education

- Updated patient education leaflet
- Formal staff education
- In-formal education
- Posters in the fracture clinic re: criteria for CRPS diagnosis and care pathways

Leaflet Given to Patients





A fracture is a break of the bone. Most wrist fractures are caused by a fall onto an outstretched hand, but a direct blow to the forearm can also cause a fracture

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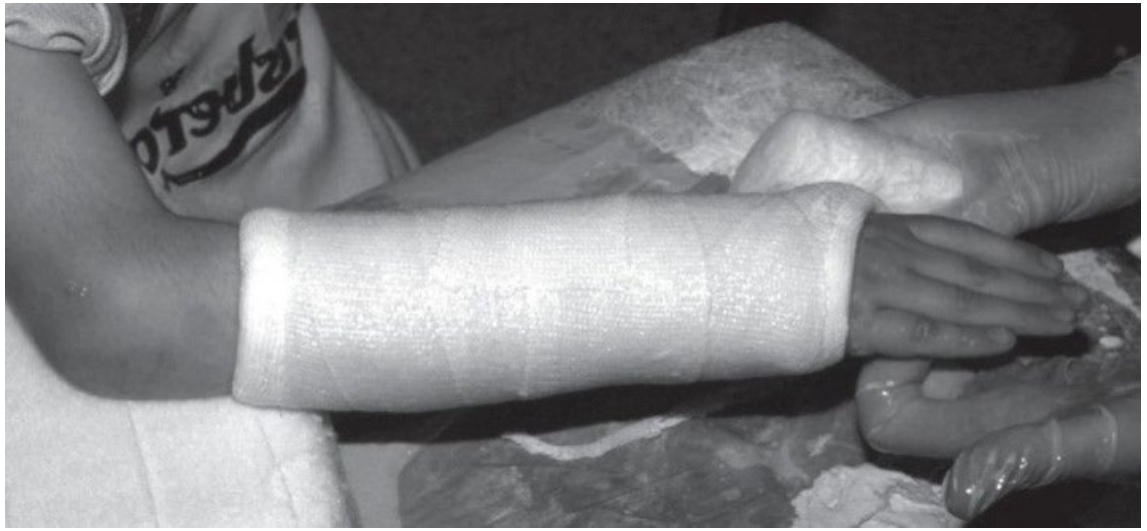
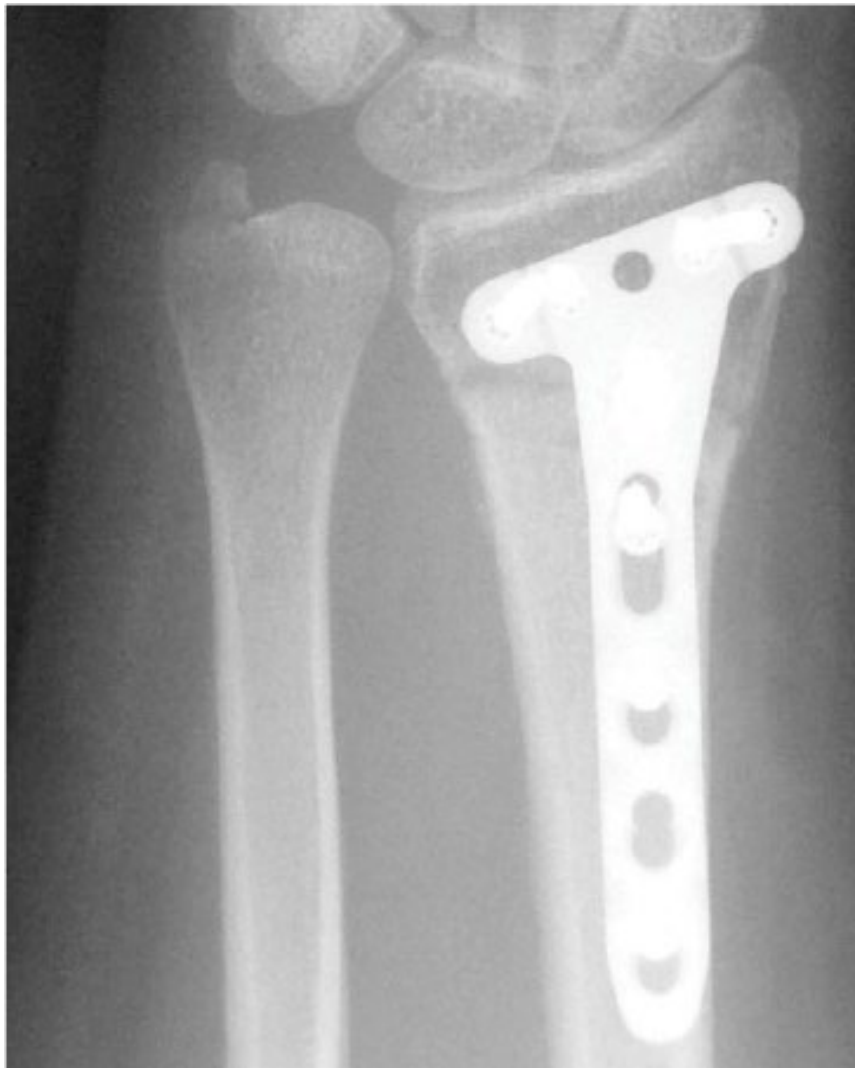
Following a fracture, the wrist is often immobilized in plaster cast or splint, usually for up to 6 weeks. This assists in stabilizing the bones to help ensure they heal in a good position. In most simple fracture cases this is sufficient support. The plaster cast can also help to control your pain



In some cases an operation may be suggested to improve the position of the bones so they heal in a more natural position and the soft tissues (muscles, tendons, ligaments and skin) are supported. Sometimes the support from a plaster is not enough to keep the bones in the best position

It is not always a clear case of an operation is the best treatment or a plaster is the best treatment and the pros and cons will be discussed with you on an individual basis (if appropriate) to help you decide which way you would prefer to be
treated.

If this is the case you may have option of treating this with an operation using pins and plates to hold the bone firmly while it heal. This option will be discussed with you in clinic if it is relevant to you



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What Can I Do Now?

1. Do control your pain

It is important that your pain is minimal to allow the uninjured parts to be kept moving and allow you to sleep well. Ask in clinic, or your family doctor (GP) for a prescription if necessary. Your pharmacist may also be able to advise you

2. Do reduce the swelling

Your hand and arm may swell because of your injury. The swelling may also increase your pain as it puts increased pressure on the injured parts. If the swelling continues it can cause your joints to become stiff. Any stiffness of the unaffected joints may delay your return to work or affect your ability to perform activities of daily living. A sling may be helpful in the first few days but should not be use for longer as this may result in stiffness

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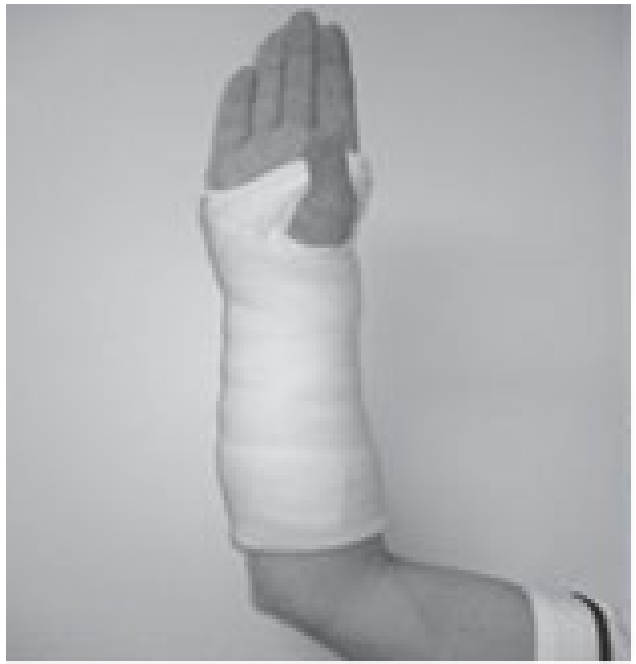
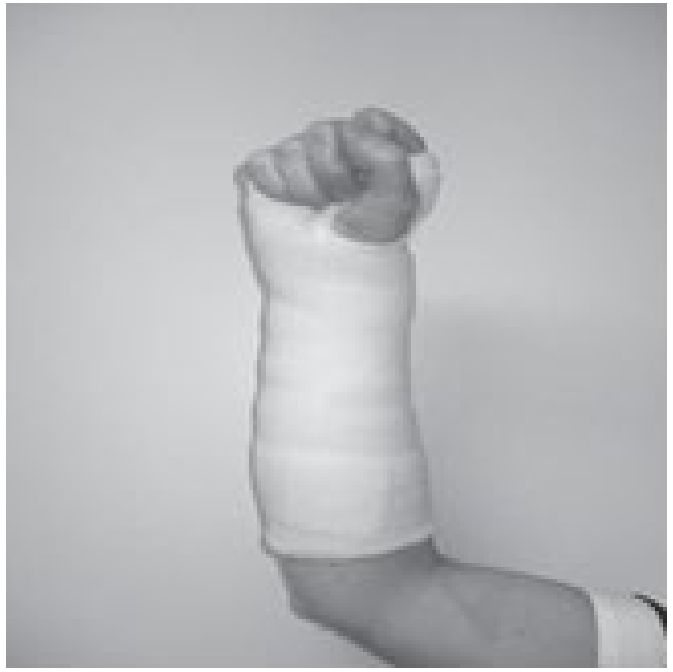
Swelling Can be Reduced by Raising Your Arm

1. Keep your hand raised above the level of your heart as much as possible
2. **If resting/watching television, rest arm out straight, raised on several pillows**
3. Every 15 minutes within the hour, raise our hand right up above your head and pump the fingers





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Do Keep Fingers, Thumb, Elbow and Shoulder Moving

In order to keep your uninjured joints healthy, it is important they are kept moving. This will also encourage the blood supply to your soft tissues and reduce the swelling, as the muscle action helps squeeze the extra fluid away from the injury. **Studies have shown that keeping the uninjured parts moving helps speed up your recovery once the plaster has been removed.**

Do make sure your plaster fits comfortably. **A well-fitting plaster will not stop you getting full finger movements i.e. making a fist.**

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Do Try to Use Your Hand Normally for all Light Activities

(Except in water) e.g. brushing hair, dressing, buttons, zips, feeding yourself; use your good hand to help if necessary. Try not to ignore your injured hand. This will help to prevent muscle weakness and abnormal pain responses.

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Eat Healthy and Avoid Smoking

Try to eat a healthy varied diet, as poor nutrition and smoking are known to slow healing. Vitamin C 500mg daily for the first six weeks can help reduce the risk of complications.

What should I do if I have a problem with my plaster?

Any problems with your cast need to be reviewed by the medical team**.**

Tightness, increase in pain whilst in cast or loosening of the cast may cause further complications. (The cast should not move against your skin but also should not feel tight or cause swelling of your fingers or thumb, or cause pressure on your skin). If your new cast does not feel right we will always be happy to check it.

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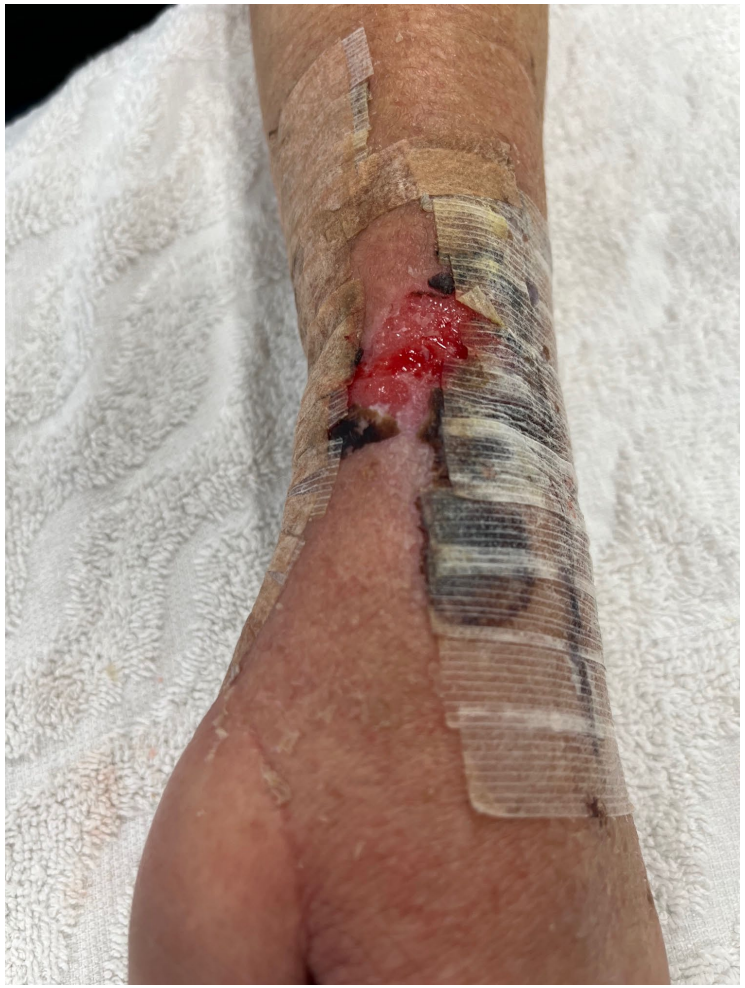
This Cast was Rubbing



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Possible Complications

All risks of complications can be reduced if you follow the guidance in this leaflet.

Stiffness is a common complication in the short term and *may take months to resolve* but rarely affects function long term.

Reduced function is a common complication in the short term but only occasionally remains a long term problem.

Persistent pain is uncommon in the long term but can occur.

Complex Regional Pain Syndrome (CRPS) is a rare complication after injury involving skin, nerves, muscle and bone. It usually resolves with normal activity and with the help of physiotherapy/occupational therapy but very rarely may be a long term problem and require further help from a pain management team.

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Return to the Emergency Department If

- Increased swelling
- Pins and needles/numbness
- Inability to move fingers
- Unusual coloring e.g. blue/purple
- Increased pain

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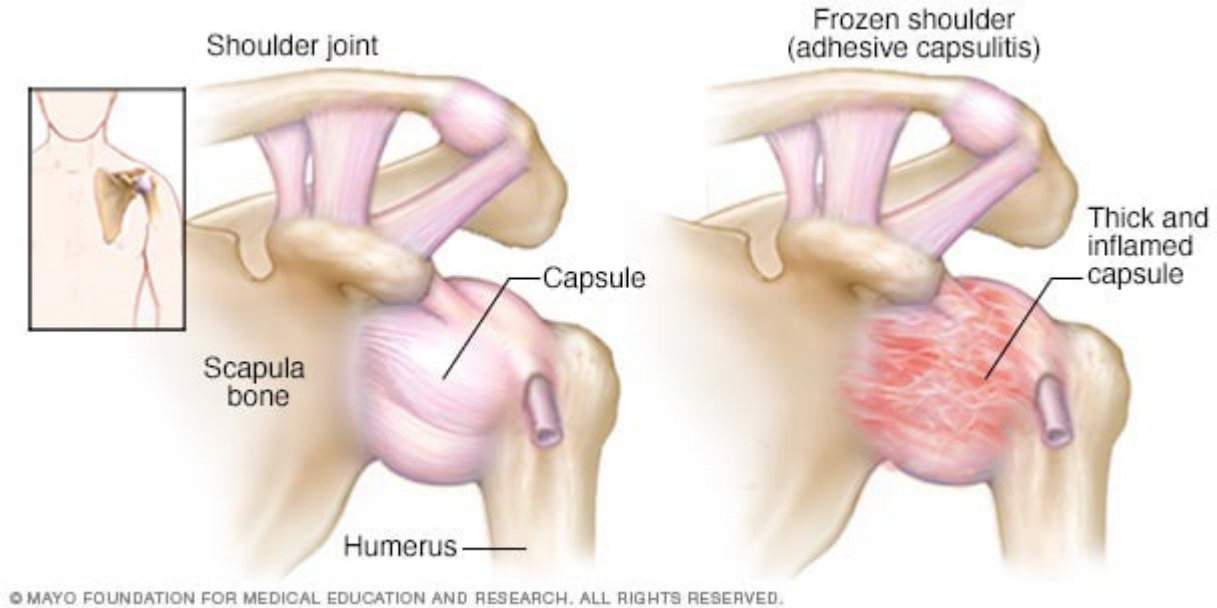
Other Complications

- Stiffness or frozen shoulder
- Loss of elbow motion
- Loss of active thumb and finger motion
- Carpal tunnel syndrome

Frozen Shoulder

- Keeping a shoulder still for a long period increases the risk of developing frozen shoulder
- This might happen after having surgery or breaking an arm



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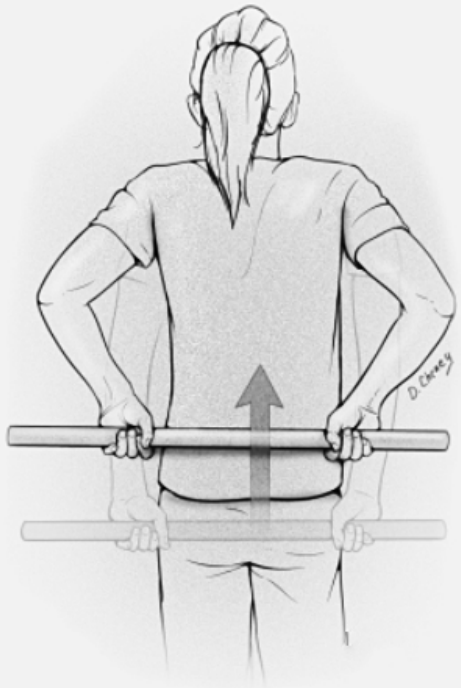
Exercises to Reduce Frozen Shoulder

AA Elevation

AA External Rotation

AA Internal Rotation



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Elbow Stiffness

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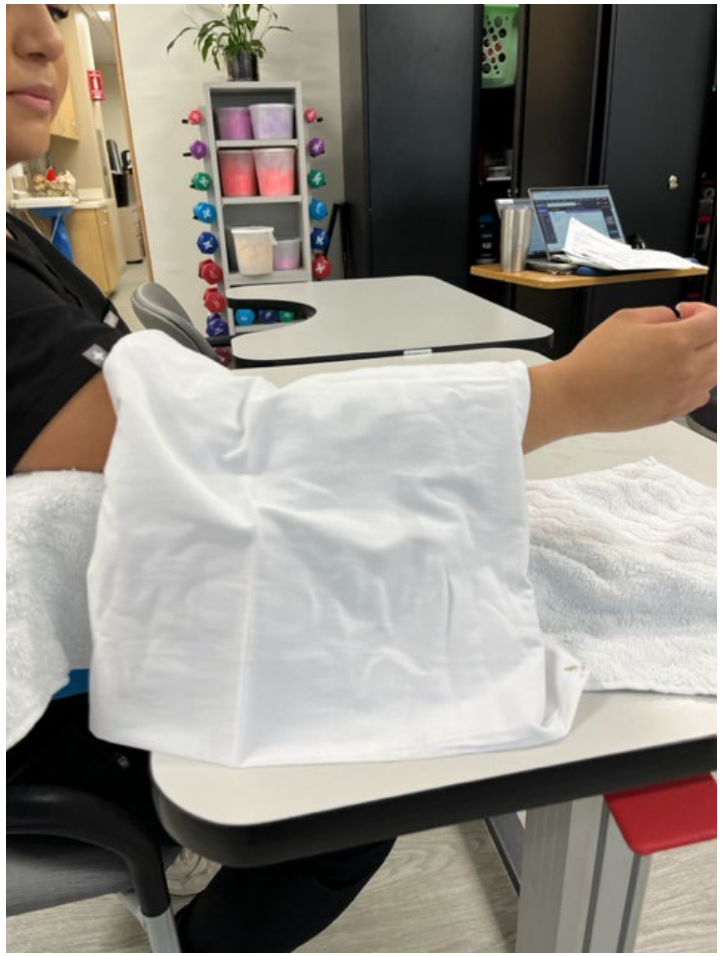
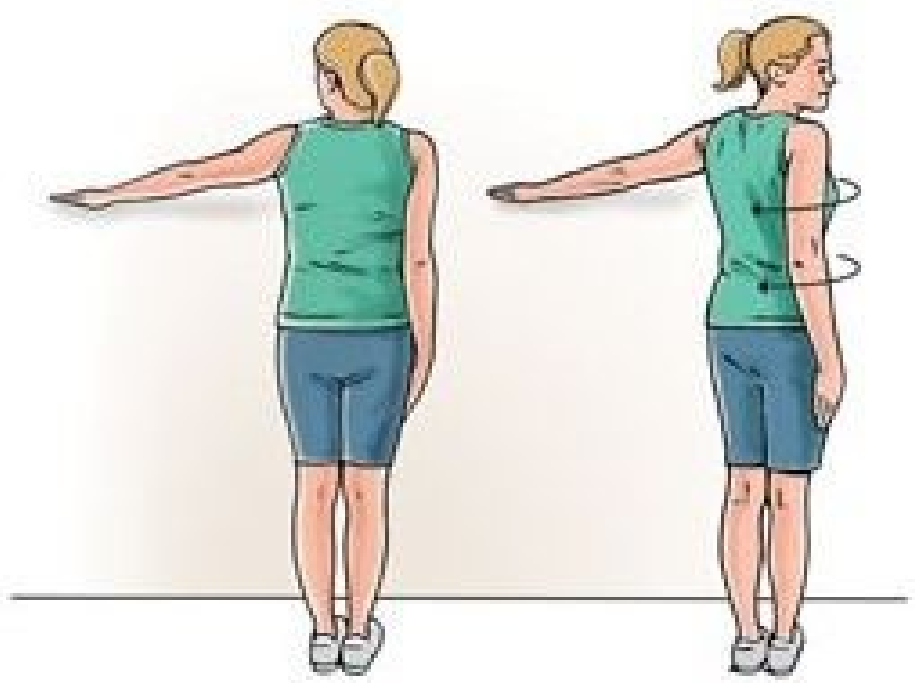
Alleviating Elbow Stiffness





Biceps stretch

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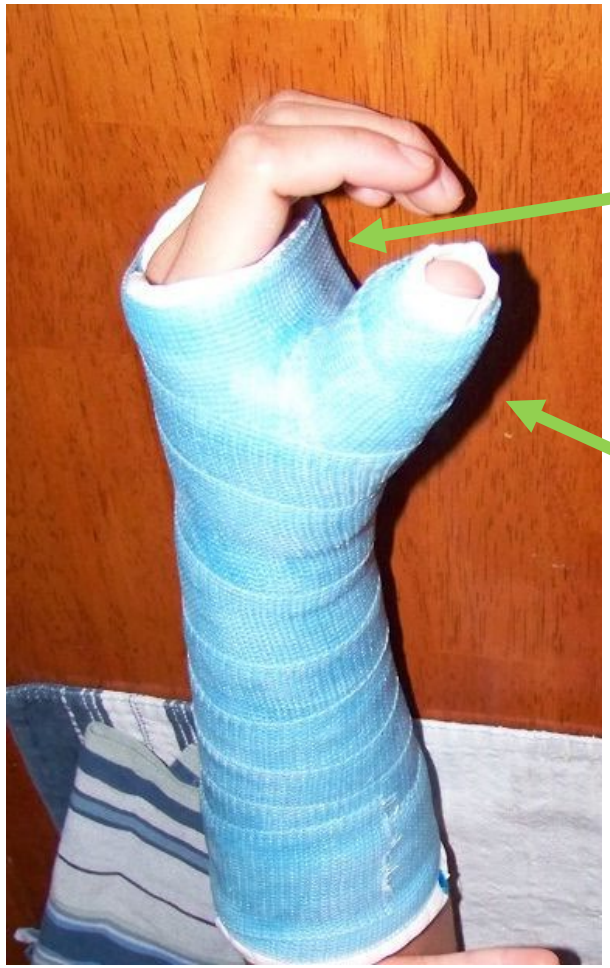
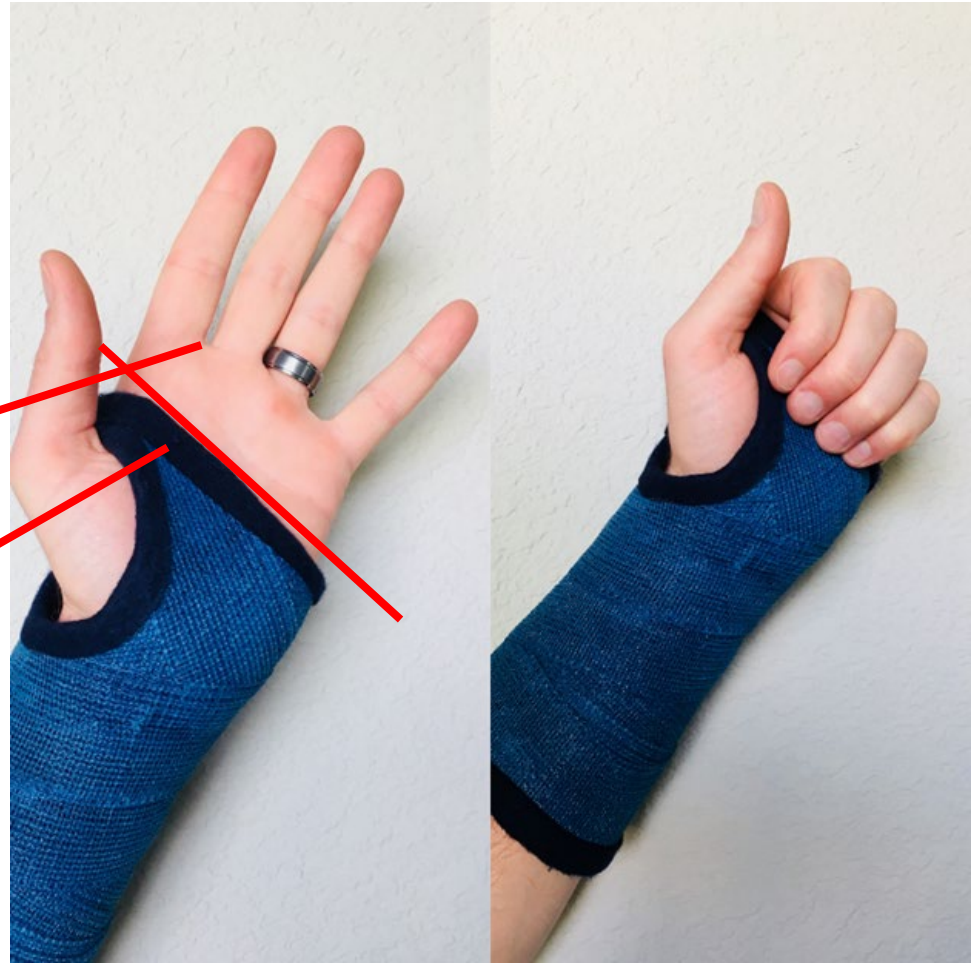
Loss of Active Thumb and Finger Motion





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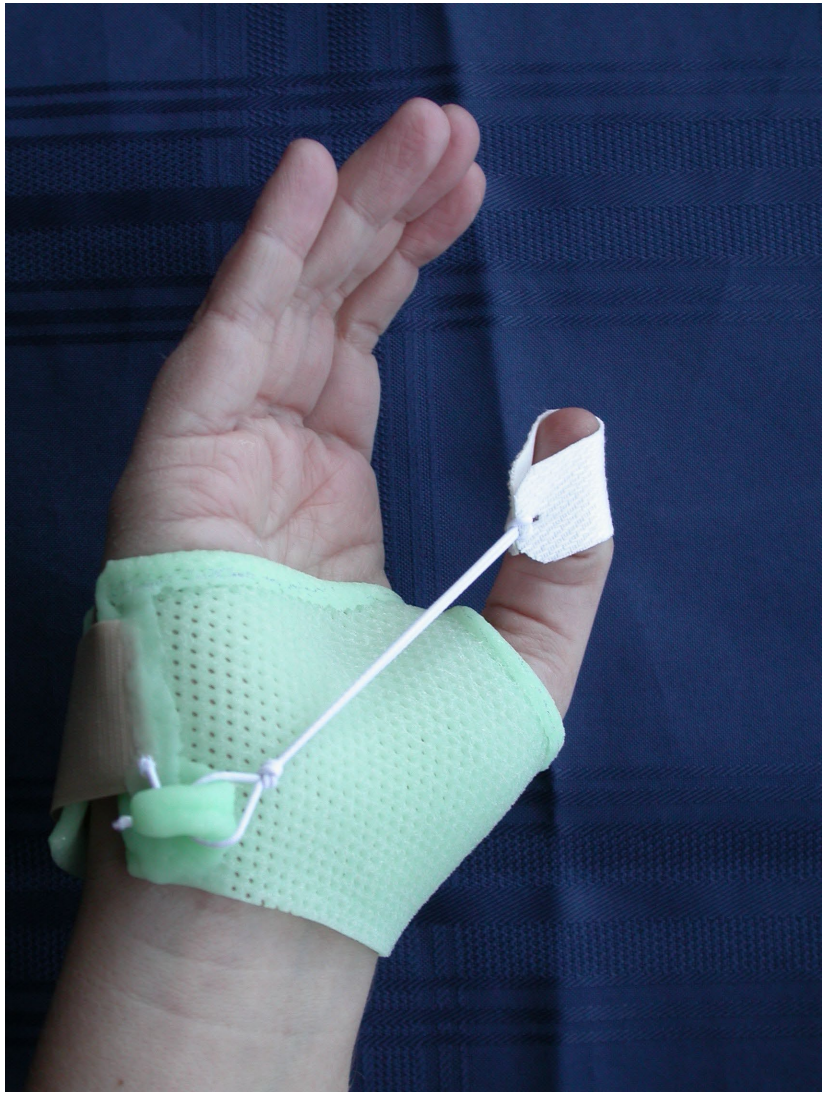
Treating the Stiff Hand

- Treatments include:
  - Modalities
  - Joint Mobilizations
  - Massage
  - Active Assisted Exercises
  - Splints/Orthotics
    - Low Load Prolonged Stretch



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Treating the Stiff Hand

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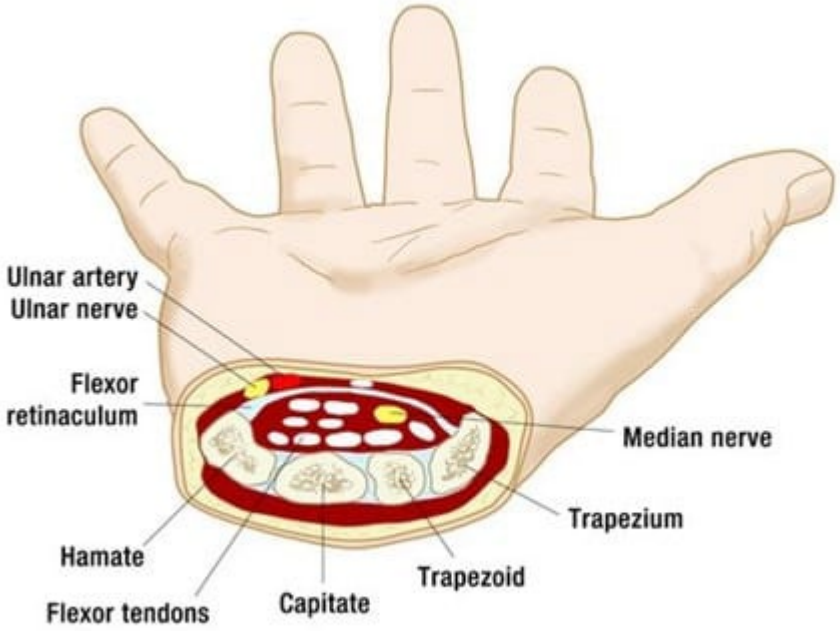
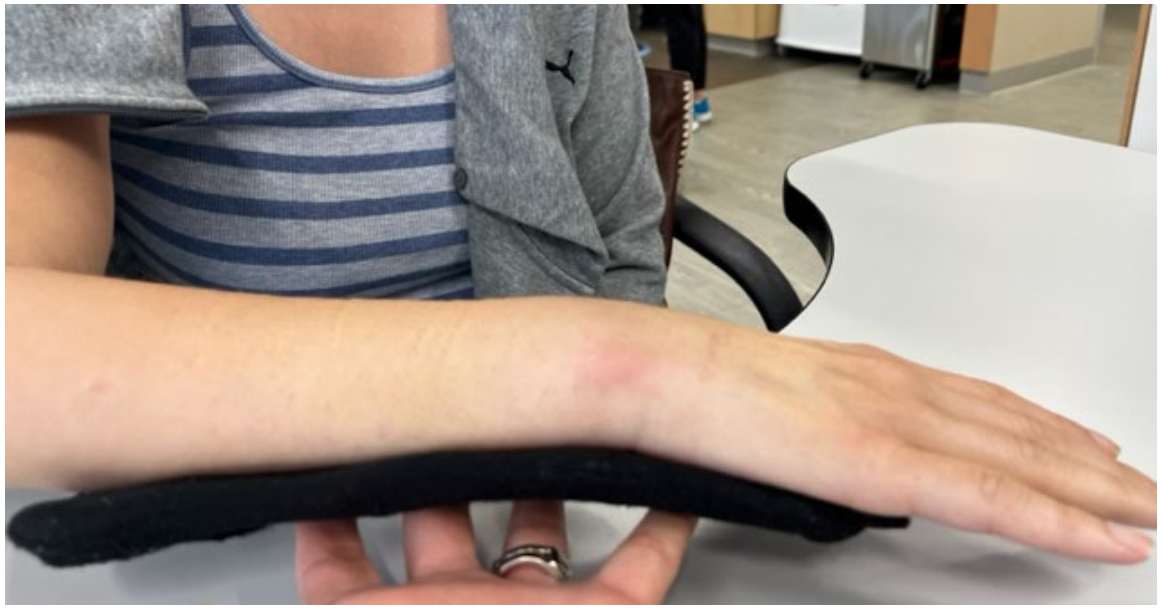
Carpal Tunnel Syndrome





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Conservative Management of Carpal Tunnel Syndrome

Treatments may include:

- Ergonomic changes
- Night Splints
- Steroid injections
- Surgery

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Gold Standard

- Do not immobilize DRF excessively or unnecessarily.
- Ensure casts are well fitting and comfortable, avoiding over flexion, sharp edges and ensuring there is no restriction to MCPJs.
- Encourage hourly full-range composite grip/release exercises to control swelling in elevation.
- Encourage light function and attention to limb while in plaster.

Gold Standard

- All verbal information given is to be supported with a patient leaflet
- All advice given is to be recorded in patient notes.
- Patients reporting tight/overflexed and/or restrictive cast should always have their cast changed.
- Patients requesting repeated change of cast or reporting “claustrophobia in cast” to trigger immediate referral to specialist physiotherapist within the fracture clinic.

You Can Help Yourself Recover Faster After Injury

- Keep all your joints outside a cast moving as freely as possible
- Raise your limb higher than your heart hourly and fully move your fingers, thumb or toes to reduce swelling
- Keep using your limb whilst you are in a cast for light activities
- Do not smoke: smoking reduces your bodies ability to heal
- Eat a healthy balanced diet including at least 500mg vitamin C daily which can be gained from 5 portions of fruit or vegetables a day or a supplement: this gives your body all the nutrients it needs to heal and prevent other problems
- If you have a tight cast or it is restricting your unaffected joints or excessive pain come back to the emergency room or plaster room as soon as possible

Where we all make a difference

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Implementing Close Monitoring

At the study site, *all patients who have risk factors and/or early signs of CRPS, whether or not they meet the CRPS diagnostic criteria,* enter the CRPS care pathway.

It is not possible to determine whether a patient will definitely go on to develop CRPS; therefore, all such patients are treated as at-risk patients.

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Implementing Close Monitoring

These early warning signs are displayed in all clinical areas

Patients are fast-tracked to hand therapies, even while they are in cast, and there is agreed first- and second-line analgesia locally and a pathway to acute pain team if indicated.

Consider your Patient “at risk” of CRPS and Involve the Senior Therapist “CRPS Champions” Early If You Notice:

WARNING SIGNS

- Multiple cast changes
- Neglect of limb/anger with limb
- Reports “claustrophobia in cast”
- Reports “ limb does not feel like my own”
- Allodynia
- Uncontrolled pain while in cast by 2 weeks
- Restricted unaffected joint motion while in cast

****Action for all:** Seek to facilitate function with adequate pain control and educate to avoid unhelpful beliefs

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Summary of Interventions/Toolkit to Reduce Incidence of CRPS in DRF in Trauma Clinics

- Patient information leaflet for DRF including light function, swelling management, and advice regarding what to do if you have a tight or restrictive cast
- Local gold standard for management of DRF
- Formal and informal multidisciplinary team education/shared learning opportunities
- Posters in staff areas with local gold standard for care of patients with DRF

Summary of Interventions/Toolkit to Reduce Incidence of CRPS in DRF in Trauma Clinics

- Posters in staff areas to guide actions for patients with early warning signs of CRPS
- Posters in patient areas to encourage light function and swelling control
- CRPS champions to act as local best practice and knowledge source, clinical support, and patient collaborative care coordinator
- CRPS collaborative care pathways

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Discussion

- Prior to this, there have been no studies on a team approach to reducing CRPS in the DR fx population
- This translation of knowledge empowered the staff to be seen as shaping practice standards
- The ability to effect change through strategic and collective leadership, where goals and values are shared across the team had the greatest impact
- Reflecting and learning as a team helped each of them grow professionally and personally

Discussion

- Posters in clinical and patient care areas served as reminders of the culture change they were involved in
- Professional knowledge is enhanced through co-participation, and the community of practitioners becomes open to new approaches and becomes transformed itself.
- The authors discuss the concept of CoP- communities of practice and that there are many layers of involvement

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Conclusion

- Distal radial injuries are usually seen in primary care and emergency medicine
- Staff should familiarize themselves with warning signs and cast placement
- Early intervention and fast tracking to therapy or a specialist would help reduce long standing complications
- Coordination between specialties, nursing support teams and clinicians will provide the best outcomes for patients and reduce long-term sequelae.

Case Study

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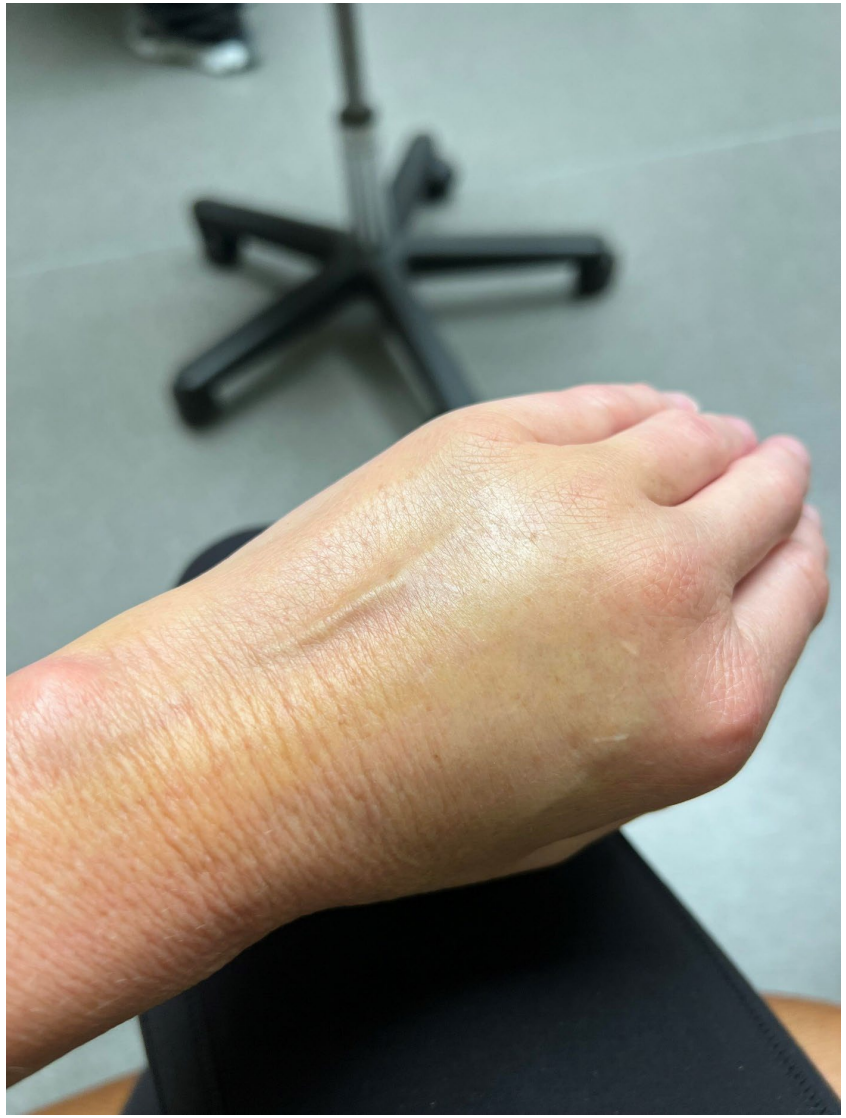
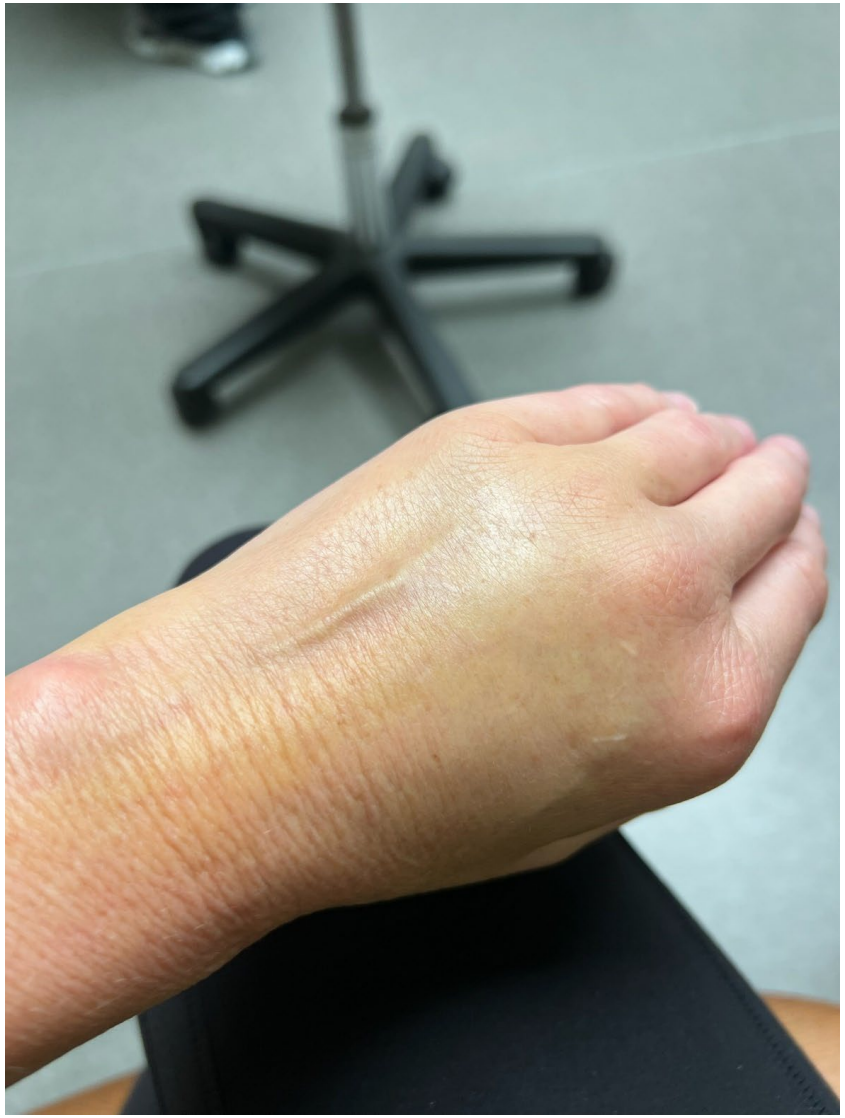
Case Study





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Case Study

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References

- Fiona Cowell, Grad dip Phys, MSc,Sharon Gillespie, Grad dip Phys, MSc, Graham Cheung, MBChB, FRCS (Tr & Orth), Daniel Brown, FRCS (Tr & Orth), MA (Clin Ed) **Complex regional pain syndrome in distal radius fractures: How to implement changes to reduce incidence and facilitate early management**. Journal of Hand Therapy. VOLUME 31, ISSUE 2, P201-205
- Taylor SS, Noor N, Urits I, Paladini A, Sadhu MS, Gibb C, Carlson T, Myrcik D, Varrassi G, Viswanath O. **Complex Regional Pain Syndrome: A Comprehensive Review**. Pain Ther. 2021 Dec;10(2):875-892.
- Corsino CB, Reeves RA, Sieg RN. **Distal Radius Fractures**. [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK536916/

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