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Dr. Myeroff's Elbow Dislocation Information Sheet

What is an elbow dislocation?

- The elbow is made up of 3 bones (Figure 1 & 2): Each bone has complex 3D anatomy and a cartilage covered joint. It is a highly tuned joint with many functions.
    - The distal humerus (far end of your upper arm bone)
    - The proximal ulna "olecranon" (near end of your inner forearm bone)
    - The radius "radial head" (near end of you outer forearm bone)
- There are several important ligaments (Figure 3) and tendons around the elbow that play a role
    - Medial (ulnar) collateral ligament
        - On the inner side of your elbow, the "Tommy John" Ligament.
            - Often injured in athletes, especially baseball pitchers
    - Lateral ulnar collateral ligament
        - On the outer side of your elbow
        - This is by far the most important ligament in elbow injuries
            - Needed for normal elbow use.
    - Joint capsule (joint lining)
    - Annular ligament
        - Wraps around the radial head

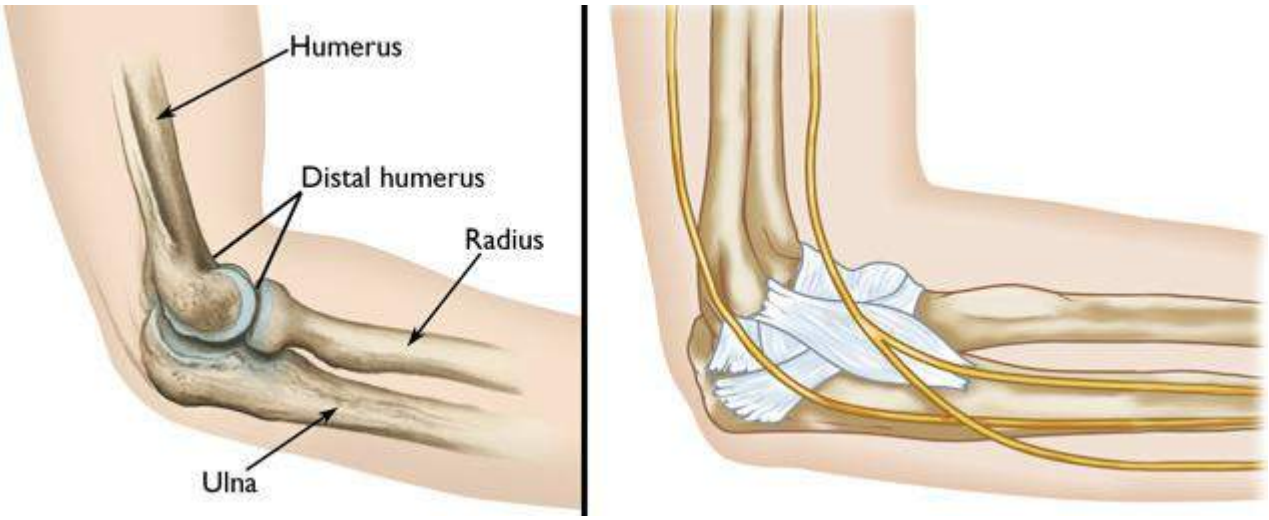

Figure 1(Left) The bones of the elbow. (Right) The nerves and ligaments of the elbow. (https://orthoinfo.aaos.org/en/diseases--conditions/distal-humerus-fractures-of-the-elbow/)

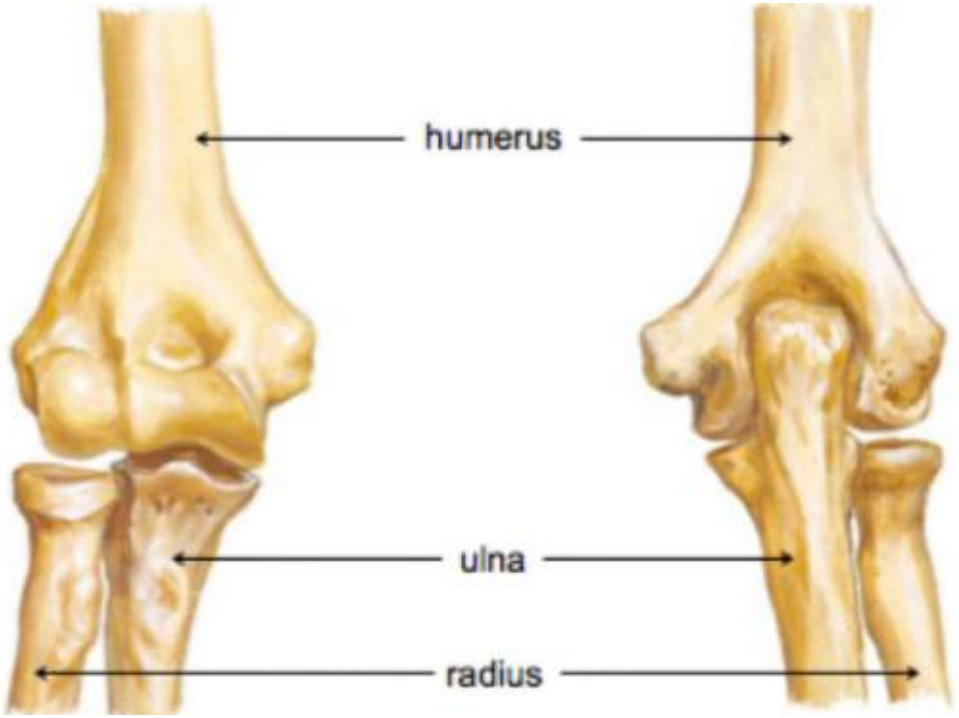

Figure 2Elbow viewed directly from the front (left) and back (right).

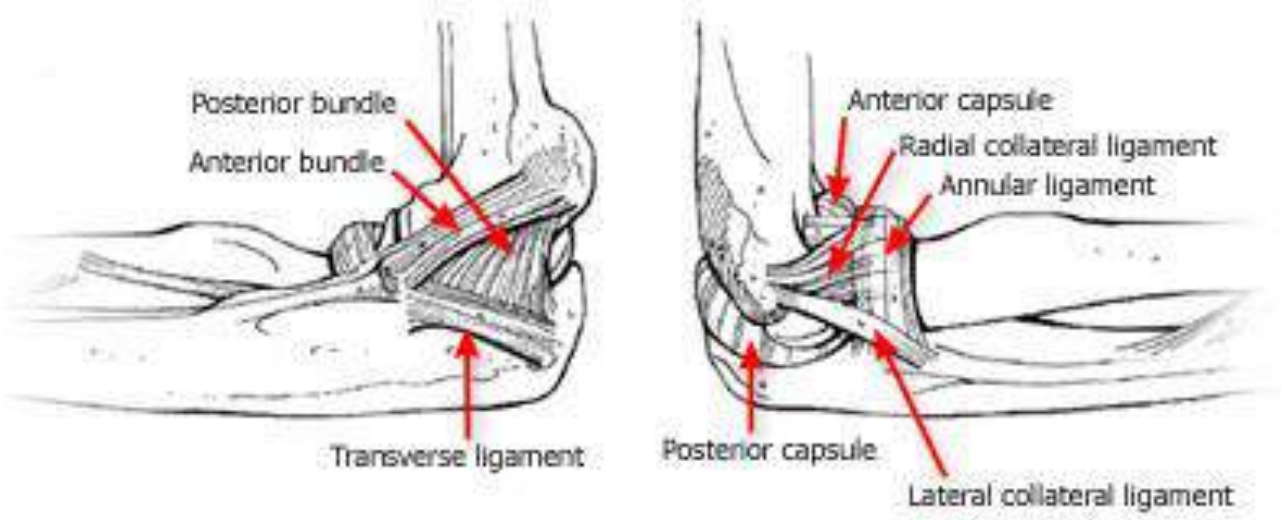

Figure 3(Left) Medial elbow ligaments (Right) Lateral elbow ligaments

- Dislocations
  - Simple Dislocation – The elbow fully dislocates but there are no broken bones (Figure 4a).
    - Only the soft tissues tear (capsule, ligaments)
  - Complex Dislocation – Ligaments are torn AND there are broken bones

- "Terrible Triad" the combination of a coronoid fracture, radial head fracture, and lateral ulnar collateral ligament are injured.
    - Note the term "terrible" was coined before modern medicine. We now have reliable surgical solutions with better results.
- Transolecranon fracture-dislocation
    - The olecranon is severely injured and the elbow dislocates through it (Figure 5)

Figure 4a Simple Complete Dislocation

Figure 4b Simple Subluxation (partial dislocation)

Figure 5Complex Fracture-Dislocation

- Elbow injuries are at risk of two conflicting outcomes
    - **Instability** (dislocation)– Ligament and bony injury (fracture) can cause the elbow can dislocate or be unstable.
        - Can cause pain, a sense of dislocation or slipping, or simply not trusting the elbow
            - Dislocation – The elbow bones completely separate, often requiring a medical professional to reduce it (Figure 6a).
            - Subluxation – The patient feels the elbow 'almost' dislocate but does not completely separate, a feeling of "looseness" (Figure 4b).
        - Sometimes stability can be restored without surgery as the ligaments and capsule "scar in".
            - Usually, this is the case with "simple dislocations" – dislocations where there is no bony break
            - This does require close observation of therapy and restrictions.
        - Other times surgery is required

            - Such as the “complex dislocations” - dislocations associated with a fracture
        - Elbow instability can result in both stiffness and arthritis. Therefore, we take this diagnosis seriously and watch carefully for it at the time of injury and as you recover.
    - Stiffness – because of its complex anatomy, the elbow is famous for stiffness after injuries.
        - After the first 3 months from injury, it is incredibly hard or impossible to obtain more motion in the elbow without a surgery.
            - Therefore, our window to optimize your lifelong elbow function (mostly in the form of motion) is as soon as safe.
        - For this reason, our goal is to begin range of motion with therapy as soon as it is safe.

How are elbow dislocations diagnosed?

- The first thing I do is listen to your story.
- Exam: I will examine your elbow carefully. I will mostly be checking your nerves and ruling our additional injuries (especially elbow, wrist and skin issues).
    - If the bone came through the skin (termed ‘open fracture’) that is an emergency and requires urgent surgery to decrease your chance of infection.
    - If you have increasing pain to the point narcotics are not helpful and it is progressive this could be an emergency called compartment syndrome and you should come to our emergency room immediately.
- Imaging:
    - X-Rays: This is the first and most helpful test we can get.
        - X-rays provide a lot of information about your bones.
    - For some severe injuries, I may order a CT scan. This shows me a 3D X-ray of your bones and helps with planning your treatment.

Day of injury

- Typically, you will be seen in an urgent care or emergency room
    - TRIA Orthopaedic Center
    - Regions Hospital
- An exam will be done to check your nerves and arteries.
- Images will be obtained, often including adjacent bones to make sure other injuries are not missed.
- If you have an “open fracture” (poke hole in the skin), you will be given antibiotics and a tetanus shot, and advised to undergo urgent surgery (within 18-24 hours) to decrease your chance of infection.
    - This means being transferred to a Level I Trauma Center like Regions Hospital.
- Your elbow will be reduced into place usually under anesthesia, and immobilized in a splint and you will be given a sling to support the arm.

    - If your sling is uncomfortable we can provide you a different design at your clinic visit.
- It is never too early to work on controlling swelling and finger range of motion discussed below.

How will we get you back to function?

- Your treatment plan is a shared process between you, myself, and your loved ones (if you wish). It is based on your level of activity, your health, and your fracture type. Most importantly it is based on your decision after we have a thorough discussion on the risks and benefits of each option – a process called informed consent.
- Treatment of these fractures is a battle between perfect fracture healing (best done by **NOT MOVING** the elbow) and preventing stiffness (best done by **MOVING** the elbow. Hence, our **dilemma**!
    - The elbow gets stiff very easy so I very rarely recommend keeping the elbow still for very long.
- Goal - Maximize your function by following these steps:
    - Decrease swelling
        - Swelling can increase your scarring, your pain and contribute to stiffness
        - To combat this, I recommend:
            - Routine icing 20min every hour while awake
            - Elevation above your heart (Figure 6)
                - When possible you should lay on your back (supine) with your elbow propped up over your chest with or without your sling.
                    - By using with a pillow folded at your side, and another folded on your chest.
                    - This is the only way to truly elevate your elbow above your heart.
                    - It is nearly impossible to elevate your arm above your heart without laying down.
            - An Ace wrap, tubigrip stocking or other gentle compressive sleeve from the hand to the armpit should be used for at least 4 weeks.
            - Finger wrist and elbow motion helps pump excess fluid out.
    - Restore or maintain your anatomy
        - Restore: Surgery is often required around the elbow to restore your bone alignment and repair soft tissues.
            - Doing this allows us to safely begin early range of motion with physical therapy to combat stiffness.
        - Maintain: Very specific activities and restrictions help protect the repairs made, ok prevent further shifting of your bones.
    - Maintain your finger and wrist function (Figure 7).

        - You must come out of your sling 2-3 times per day to work on finger and wrist motion. We don't want to cause stiffness elsewhere just because your elbow is injured.
    - Maximize your elbow motion (Figure 8)
        - Timing and degree of elbow exercises depends on many factors but usually begins within 2 weeks of injury or surgery.
            - I will guide you through this and provide instructions to you and your therapist.
            - Remember you have 3 months to beat scar formation in the elbow!
            - We are restricted somewhat by healing. The more healed your injury is, the more aggressive we can be with your exercises.
    - Return to function
        - Elbow strengthening is usually not a problem and begins after you have regained full motion and your bones and ligaments have healed.
            - Usually starts around 6-12 weeks after injury.
        - Expectations
            - Your results are based on obtaining as normal anatomy as possible and as much motion as possible, not usually your strength.
                - Expect 3-6 months until you can return to heavy labor, 6-12 months until your recovery is complete.
                    - You will be clear to do desk work usually within the first 2-6 weeks after your injury.
                    - I recommend discussing work restrictions (and vocational training it needed) with your employer as soon as possible.
                    - Our office will provide notes, and complete your employer's paperwork as appropriate.

What are your treatment options?

- Your treatment choice is a shared process between you, me, and your loved ones.
    - I present all of the information we know and you decide what fits your goals.
        - In rare instances I will make a strong recommendation.
- **Non-operative (conservative) treatment:**
    - Most simple dislocations (without bone fracture) can be managed without surgery, but this decision should usually be made with the help of an orthopaedic surgeon.
        - Indications:
            - Simple dislocations without continued dislocations
            - Some rare stable, simple complex dislocations
                - Especially in very low demand patients.
            - Medically unwell

        - When surgery is ill-advised or unsafe
- Non-operative treatment involves a period of restrictions, followed by protected motion with physical therapy once your fracture is stable enough to begin motion exercises.
    - The timing of beginning and advancing your rehabilitation, and time to healing are variable and dependent on many factors unique to you.
- Benefits
    - Little to no additional medical risk
- Risks
    - Wounds or Infection
        - Even perfectly placed splints, casts and braces can cause skin or wound issues
            - Please let a provider know if you are experiencing unexpected discomfort or note any blistering, wounds or signs of infection
    - Non-union
        - There is a chance the bones don't heal
    - Mal-union
        - There is a chance the fractures heal in the wrong position
            - Anatomy – Some degree of mal-union is predictable since we have little ability to improve the bony alignment without surgery, sometimes it can worsen with time
            - If there is a lot of shift in your fracture (especially if it goes into the joint cartilage surface), this can contribute to pain, stiffness, arthritis and weakness
    - Stiffness (scar)
        - We can't start elbow motion (breaking up the scar) until your fracture shows signs of healing and stability
        - You will likely have some degree of permanent stiffness regardless of your treatment.
            - Especially fully straightening.
            - Our goal is minimizing this as much as possible.
    - Instability
        - A small portion of simple dislocations will continue to be unstable, either early or in the future ultimately requiring surgery.
            - This is called posterolateral rotatory instability.
        - This usually requires surgery to repair or replace your ligaments.
    - There is a chance we need to perform surgery later.
        - This could be either bone or ligament repair.
        - Delayed surgery is slightly riskier.
    - Heterotopic ossification
        - For unexplained reasons, elbow injuries are prone to developing extra bone which limits motion and can affect nerves and arteries.

        - Avascular Necrosis (dead bone)
            - The injury can cut off the blood supply to your bone and may result in the bone dissolving.
        - Arthritis
            - Arthritis occurs in 20% of elbow injuries overall
                - The cartilage can be damaged at the time of injury.
                - More common when there is ligament instability (especially when not addressed surgically)
                    - Complex Dislocations / Terrible triad
        - Continued pain
- **Surgery**
    - Some elbow dislocations are best treated with surgery. This is needed for dislocations around the elbow are not stable and not suitable for early therapy otherwise. (which is crucial to minimize stiffness, instability, and arthritis)
        - Goal (Benefits):
            - Restore anatomy
                - Surgery allows the best chance of your bones healing in normal alignment
            - Early Rehabilitation
            - Maximize your range of motion (and function)
                - A stable, well-fixed elbow has fewer restrictions and earlier rehabilitation
            - Limit skin and soft tissue complications associated with casting
                - Goal: Limit splinting or immobilization to <2 weeks
            - Decrease Arthritis
                - Restore your cartilage joint surface as well as possible
                - Address ligament instability
                    - Which can cause repetitive cartilage injury.
    - **Open Reduction and Internal Fixation**
        - Fixing the bone fracture with metal plates and screws
            - This positions and holds your bones and cartilage as close as possible to normal, while they heal.
            - There is some new scar created from surgery, but the new stability allows us to begin early therapy to combat stiffness.
                - I almost always start occupational therapy within 2-weeks of elbow surgery, Often as early as the day after surgery
    - **Ligament repair or reconstruction**
        - Ligaments can be injured along with your bones and compromise your function if the elbow is unstable (loose).
            - These may need to be addressed at the time of surgery
        - Types of ligament surgery
            - Repair

                - Your ligament is tied back to its original location with a plastic or metal anchor in the bone and permanent stitches.
            - Reconstruction
                - When your ligament can't be repaired, we may need to use a tendon from your own body (autograft) or a cadaver (allograft) to replace the ligament.
                    - Usually needed when ligament surgery is delayed more than 6 weeks.
        - If the ligament surgery is performed, your post-surgery therapy will have additional restrictions
            - Since ligaments heal slower than bone and are less secure, we have to protect the repair using restrictions for 12-weeks.
    - **External fixation**
        - Rarely, we may need to place external pins and bars on the elbow to provide temporary stability
            - I would discuss this with you if there is any risk of needing this.
            - In the setting of very unstable elbows or in severe injuries with profound skin and muscle damage.
        - These are generally removed as soon as possible when definitive surgery or elbow stability (healing) is complete.
    - **Radial head replacement**
        - Some severe radial head fractures may need to be replaced with a metal joint if not able to be repaired well with plates and screws.
            - This is a small cylinder of metal, it is much less complex than a knee or hip replacement.
- Risks
    - Surgery shares many of the same risks as non-operative care:
        - Some risks are higher with Surgery:
            - Infection / wound issues, Heterotopic ossification
        - Some risks are lower with surgery:
            - Non-union, Mal-union, Instability, Arthritis
    - Complications specific to surgery
        - Infection
            - 3-5% risk
        - Nerve or blood vessel injury
            - Up to 20% risk of temporary nerve irritation. This is can rarely permanent.
                - The most at risk nerve is the ulnar nerve, but the median nerve and radial nerve can be injured as well.
                - It is not uncommon to have some forearm numbness after surgery.
        - Symptomatic hardware

        - Some patients are irritated by the implants, up to 20% of patients wish to have them removed.
            - This number is lower in my practice, and I do not remove these types of implants very often.
    - Medical complications
        - Urinary tract infections, pneumonia, cardiac complications, transfusion, blood loss, blood clot
    - Continued instability
    - Repeat surgery
- **Hospital Course**
    - If elbow surgery is chosen, studies show it is best to be done <u>within 2 weeks</u> of injury.
    - Most surgeries take about 2-3 hours, but this varies.
    - Usually about half of the day is dedicated to getting ready and recovering.
    - You will speak with the anesthesiologist on the day of surgery to determine the appropriate pain control options.
        - You may be offered a nerve block by the anesthesiologist to numb the entire arm for up to 12 hours.
        - If not, I will place numbing medication in the incision to help.
    - If this is your only injury, surgery is usually done outpatient meaning you go home that day.
    - For more severe fractures, or when there are other injuries, you may stay overnight.
        - A benefit of this is the opportunity for medical management and early physical therapy.
- **Recovery (regardless of treatment choice):**
    - Bone healing takes about 6-12 weeks.
        - Prior to that, the bony fragments are prone to moving out of place if your activity is too aggressive.
            - That's why you will have restrictions to protect the repair.
        - Desk work or light duty is usually appropriate for this period as soon as you feel up to it.
        - You will be released from restrictions after this period if your elbow is healed and you are physically capable.
            - Otherwise you may require continued occupational therapy to complete your recovery.
    - Top ways <u>YOU can help</u>.
        - **Read this packet!**
            - Set your expectations for return to work / sport appropriately.
                - Make arrangements ahead of time
                    - Speak with your employer and come up with a plan.
                    - Please fax employer or insurance related paperwork to me as early as possible to 651-254-8127.
        - Stop smoking!

- Smoking doubles your risk of the bones not healing (nonunion), doubles the time it takes to heal, and quadruples your risk of complications.
    - I recommend nicotine alternatives (gum, patches)
    - I recommend consulting your primary doctor for consideration of Chantix, a medication that has been shows to improve your chances of quitting.
- Control your diabetes
    - Poorly controlled blood sugars severely increase your risk of medical and surgical complications especially infection.
- Avoid NSAID Ibuprofen, Advil, Aleve for 6 weeks
    - These may prevent bone healing.
- Bone health
    - I recommend the following medications to help healing and prevent another fracture:
        - Initiating over the counter supplements (I recommend Citrical petite)
            - 1500mg Calcium daily
            - 2000 IU Vitamin D daily
        - If your fracture occurred from a low energy fall (ground level fall), it is possible you have osteoporosis (thinning of the bones) and I highly recommend and will facilitate bone health workup with labs and a DEXA scan.
            - You will have a consult with our bone health specialist (Donna Marko, NP-AG) to forge a plan to optimize your bone strength.
            - You should work with therapy on avoiding future falls:
                - Home safety evaluation
                - Cane / walker / wheelchair
                - Balance / strength training
- Follow by your restrictions with 2 main early goals
    - **Avoid fracture displacement**: Your restrictions are meant to allow safe physical therapy while preventing too much stress on your repair
        - The plates, screws and sutures are strong, but not nearly as strong as your own power.
    - **Avoid stiffness:** You should:
        - Move your fingers, wrist and elbow three times per day (Figure 7-8).
        - Elevate the elbow as much as possible over the chest on pillows while you are lying flat (Figure 6).
            - Swelling contributes to pain, stiffness, and wound complications.
    - **Terrible Triad / elbow instability protocol (first 12 weeks).**

- Goal: Obtain range of motion while protecting your lateral collateral elbow ligament
  - Work on flexion and extension with the elbow at the side and wrist pronated (palm down)
  - Work on pronation (palm down) and supination (palm up) with the elbow at the side bent to 90 degrees.
- Avoid varus at the elbow
  - Keep your elbow tucked at the side by your hips
  - Avoid raising your shoulder and holding your arm out in front of you.
- You will receive personalized rehab protocol. You should view this as a home exercise program. **You should do your exercises three times per day.**
  - Remember: Therapy is a thing you do, NOT a place you go!
    - Therapy is your homework
    - The therapist is your teacher, designed to keep you on track.
- Be patient… be A patient!
  - You are probably eager to begin strengthening and get back to your activities, but you have to trust the process.
  - You will get your strength back, it is more important you follow by your restrictions, heal your fracture, and regain your motion.

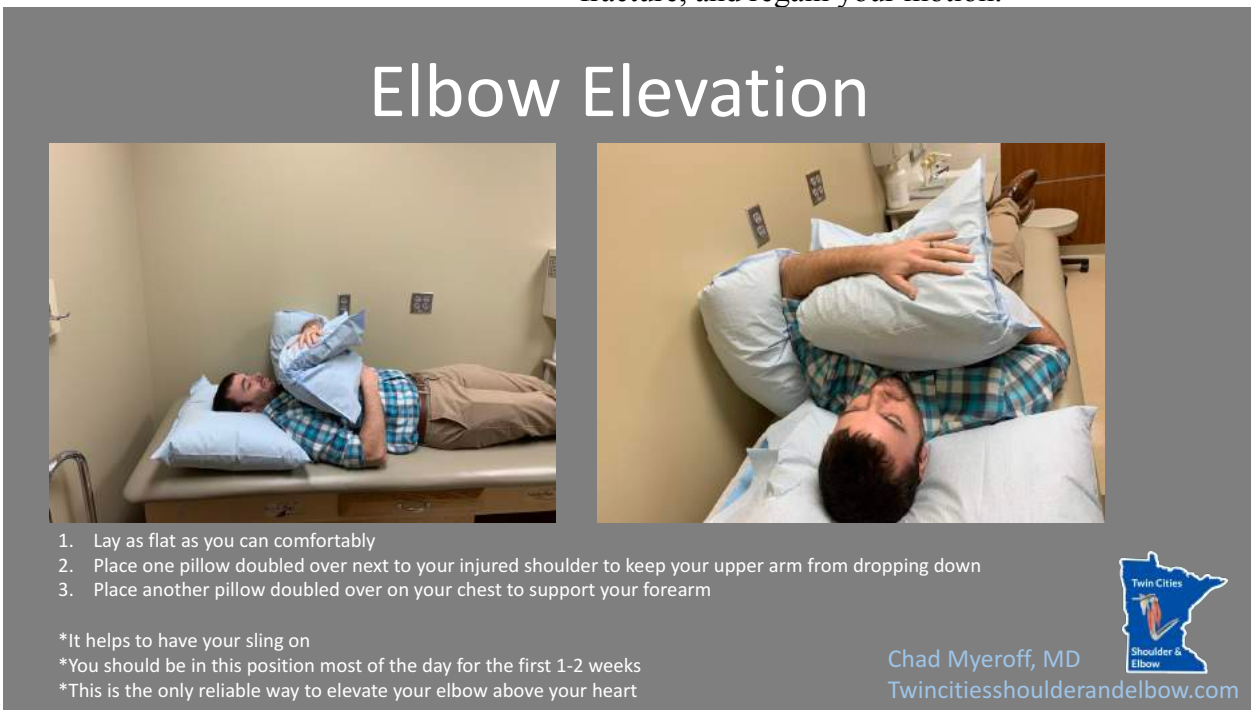

Figure 6 Elbow elevation above the heart

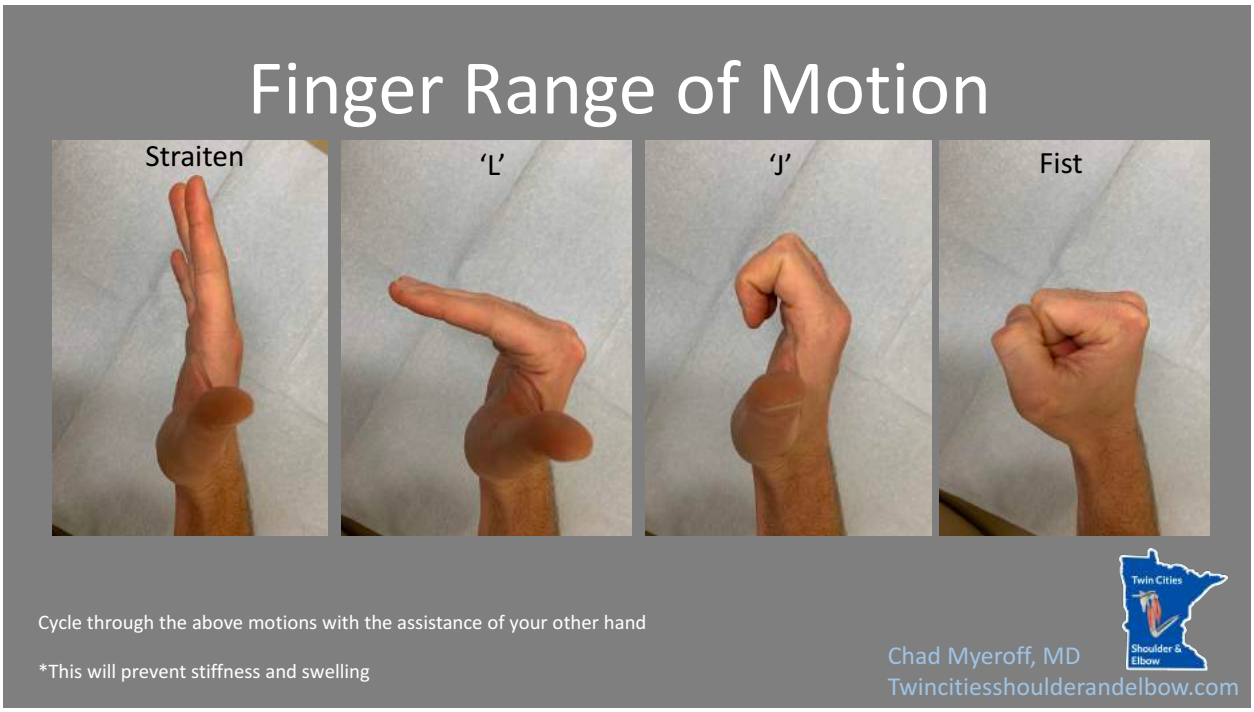

Figure 7 Finger range of motion

Figure 8 Protected elbow range of motion

Want More information?

- Please visit:
  - twincitiesshoulderandelbow.com
  - https://orthoinfo.aaos.org/en/diseases--conditions/elbow-dislocation
- Regions Hospital / Health Partners Specialty Center
  - Clinical questions: 651-254-8300 option 2
  - To schedule appointments: 651-254-8300 option 1
  - To schedule surgery: 651-254-8399 or 651-254-8338
  - Fax employer or insurance related paperwork ASAP to 651-254-8127.
- TRIA Orthopaedic Center
  - Clinical questions: 952-977-3301
  - To schedule an appointment: 952-831-8742
  - To schedule surgery: 952-977-3414
  - Fax employer or insurance related paperwork ASAP to 952-977-3459.