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Dr. Myeroff's Elbow Stiffness Information Sheet

What makes up the elbow? twincitiesshoulderandelbow.com/elbowanatomyvideo/

- The elbow is made up of 3 bones (Figure 1): 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 your outer forearm bone)
- The elbow capsule (and ligaments) tightly wrap around the elbow to provide stability. (Figure 2).

Please scan these codes with your camera phone to learn more from Dr. Myeroff's website as you go!

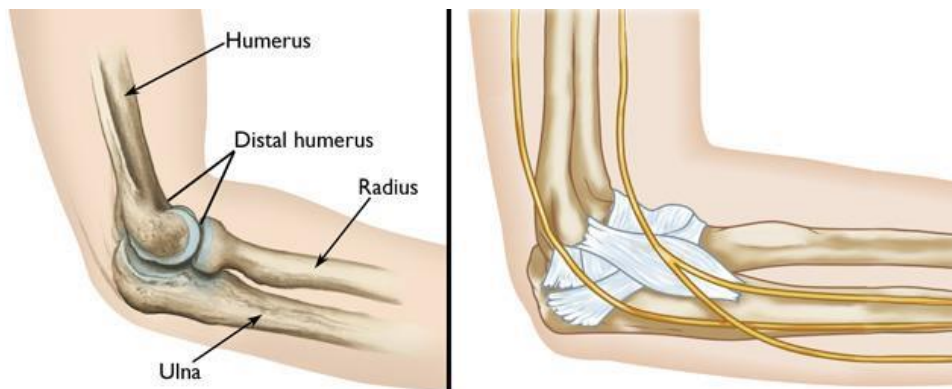


Figure 1(Left) The bones of the elbow. Figure 2 (Right) The nerves and ligaments of the elbow. (<https://orthoinfo.aaos.org/en/diseases--conditions/distal-humerus-fractures-of-the-elbow/>)



What are the causes of elbow stiffness?

- Osteoarthritis twincitiesshoulderandelbow.com/elbowarthritis/
 - Elbow arthritis can be caused by a combination of time, genetics and injuries. It can set in quickly or slowly.
 - Symptoms:
 - Pain
 - Stiffness
 - Locking / Catching
 - Causes
 - Narrowing of the joint or loss of cartilage
 - Profound cartilage loss would result in pain throughout the entire range of motion of your elbow.
 - Fortunately, this is actually quite rare and cartilage is often normal, even in elbow arthritis. This allows us to save your elbow.
 - Osteophytes (bone spurs) form around the joint (figure 3)

- This is your body’s attempt to stiffen the joint.
- These spurs “impinge” on bone like a door jam during motion.
- You tend to lose both straighten and bending end ranges of motion.
 - Results in pain when you try to straighten (terminal extension) or bend (terminal flexion).
- This causes pain, and stiffness.

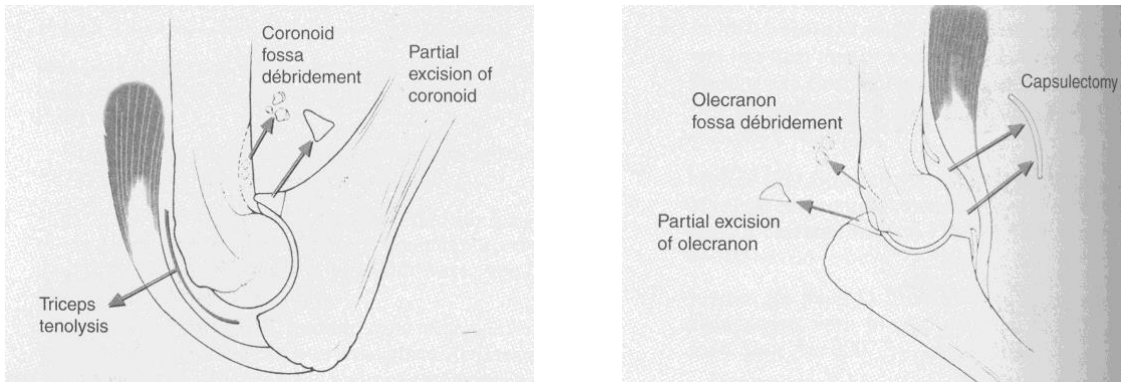


Figure 3 Areas of scar (capsule) and impingement (osteophytes) that limit motion and cause pain. These are the targets for removal in an elbow release.

Post-Traumatic Stiffness twincitiesshoulderandelbow.com/elbowstiffness/

- This can be from an injury or just wear and tear from years of hard use.
- Due to the 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.
- The amount of elbow motion needed to do most things on your own (functional elbow range of motion) is 30-130° flexion (bending) and extension (straightening), and 45° or pronation (palm down) and supination (palm up).
 - Symptomatic stiffness usually occurs once your motion becomes less than this.
- Symptoms
 - Stiffness
 - After a bad elbow injury, post traumatic stiffness is common
 - Pain
 - Pain may be less common from cartilage loss and more so from the stiffness itself
- Causes twincitiesshoulderandelbow.com/elbowstiffnessvideo/
 - Fractures and dislocations cause an incredible amount of inflammation
 - This causes scar which leads to stiffness
 - Cartilage can be injured or lost at the time of injury
 - Implants like plates and screws in the elbow can contribute to stiffness
- Loose bodies
 - Symptoms:
 - Mechanical symptoms (locking, catching, instability).



- Like a “pebble in the shoe” these feelings can come and go depending on where these pieces settle.
 - Causes
 - Loose bodies are usually composed of cartilage or bone.
 - They can occur when a piece of cartilage or bone spur is chipped off
 - Loose bodies can happen in multiple forms of arthritis like OCD etc.
- OCD (Osteochondritis Dissecans)
 - Symptoms
 - Mechanical symptoms
 - Achiness
 - Stiffness
 - Causes
 - Often happens in young female athletes, (especially gymnastics)
 - For unknown reasons, an area of poor blood supply results in detachment of cartilage from the bone.
 - This causes an unstable cartilage piece, which can either:
 - Heal with time and limited weightbearing / activities
 - Fail to heal – continued pain symptoms
 - Become a loose flap or cartilage or loose body
 - Treatment
 - This is a special cause of arthritis that may require arthroscopic treatment like debridement and microfracture, or a surgery to reconstruct the cartilage.
- Heterotopic Ossification
 - HO is a progressive excessive bone formation in the elbow joint that causes severe stiffness and sometimes completely fuses the joint from moving.
 - Symptoms
 - Progressive unexplained stiffness
 - Causes
 - Often occur after skin burns, or major head injury.

How are elbow stiffness diagnosed?

- The first thing I do is listen to your story. It is incredibly important to know if you have had an injury, a surgery, or any other treatment like an injection or physical therapy and if they helped
- Exam: I will examine your elbow carefully. I will mostly be checking your nerves and ruling out additional injuries.
 - I will pay particular attention to your elbow motion, and sites of pain or discomfort.
- Imaging:
 - X-Rays: This is the first and most helpful test we can get.
 - X-rays provide a lot of information about your bones.
 - Like fractures, arthritis, loose bodies.
 - I may find it helpful to order a CT scan or MRI. This shows me a 3D X-ray of your bones (CT Scan) or soft issues (MRI) and helps with planning your treatment.

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 symptoms and goals. 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.

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: twincitiesshoulderandelbow.com/rehab/

- Therapy
 - Early after an injury, aggressive elbow motion is paramount to avoid stiffness
 - Your therapist will teach you 3x per day home exercises working on progressively obtaining elbow range of motion.
 - Dynamic Progressive Splinting
 - If gains are slow but still possible, your therapist and I may recommend a special device (such as Dynasplint) that helps stretch your elbow for you.
 - This can be used to avoid surgery, and also to optimize the results after surgery.
 - After 3 months from injury or surgery it becomes increasingly difficult to regain motion and progress may be limited.
 - However, a trial of therapy to regain motion is quite low risk and could be very helpful.
 - Since osteoarthritis causes progressive pain and stiffness from bony blocks to motion, I see little benefit to physical therapy in this setting. It will likely increase your pain and waste your time and money.
- Ice, anti-inflammatories and activity modification are the first line medical treatment.
 - If pain is your main symptom, this is the safest treatment.
 - However, medical treatment will have little effect on blocks to motion.
 - If tolerated by your kidneys and stomach, I recommend 600mg Ibuprofen up to three times per day as needed.
 - Since this is a progressive process, it is in your interest to work on ways to limit future wear and tear on your elbow by modifying your hobbies, work, exercise, and activities as much as possible. However, my goal is to keep you active!
- Steroid Injections twincitiesshoulderandelbow.com/injectionvideo/
 - Like anti-inflammatories, steroid injections can temporarily help your pain but would not be expected to improve your motion.
 - I am happy to provide steroid injections in clinic. If it is more convenient, I will place an order for injections to be performed by one of my colleagues with image guidance (slightly more accurate, may be more convenient).
 - I sterilize the skin and use a cold spray that can decrease the pain.



- I use 2 medications
 - Marcaine – A local anesthetic that will numb the inside of the shoulder for up to 8 hours. Make sure not to “over-do it” that day.
 - Depomedrol – A steroid (acts like a high dose ibuprofen inside your joint) that will start working about 2 days later.
 - Hence, a 2-day gap where your pain may be worse.
- Injections can provide anywhere from 0-3 months of pain relief. Repeat injections can be performed depending on how beneficial they are.
 - Please keep a log for your next appointment:
 - How long did the injection help? What % relief did you have?
- These can be repeated up to 4 times per year.
- What are the risks?
 - Injections can buy you months of pain relief but do tend to be less and less helpful over time.
 - While it is slightly uncomfortable, I use a thin needle and most of my patients find it quite tolerable.
 - If you have diabetes, the steroid can increase your blood sugars for several days, you will need to monitor them closely.
 - There is roughly a 1:10,000 risk of infection
 - Injections are forbidden within 3 months of a shoulder replacement due to the risk of a post-operative infection.

Surgery twincitiesshoulderandelbow.com/preparingforsurgery/

- **Manipulation Under Anesthesia**

- MUA is where you are surgically put to sleep and elbow motion is regained for you at that time passively.
 - Often done when you have post traumatic stiffness (stiffness after a recent injury like a dislocation or trauma.
 - This is not helpful for arthritis.
- This can “reset” your elbow motion if it is done within 3 months of injury or surgery.
 - Like other surgeries, this requires aggressive therapy to maintain these gains
- Benefits
 - No incision is made which lowers risks of complications.
- Risks
 - The biggest risks are the chance of breaking a bone, dislocating your elbow, this is very rare but possible. The nerves, arteries and skin are at mild risk as well.
 - It is possible you do not maintain these improvements (repeat stiffness).

- **Elbow Release** twincitiesshoulderandelbow.com/elbowstiffnessvideo/

- This is an excellent surgical option for longstanding symptomatic stiffness, and most forms of arthritis.



- Provides permanent / longlasting improvement in pain and motion
 - The procedure involves removing the scarred tissue (capsule), bone spurs, and loose bodies. (Figure 3)
 - It does not replace cartilage, but fortunately the cartilage is usually in good shape in elbow stiffness / arthritis
 - For this reason, this is one of the few joints where a “cleanout” can have longstanding benefits
 - This procedure can be done both open or arthroscopic. I will make the final recommendation based on a number of factors, but often times it is up to you.
 - Open Elbow Release – An incision is made on one of both sides of the elbow
 - Benefits:
 - Best when there is severe stiffness and bone spurs, you have already had open elbow surgery, severe trauma, or your ulnar nerve has been moved (transposed).
 - Negatives
 - Larger incision
 - Higher risk of heterotopic ossification (extra bone formation).
 - Arthroscopic Elbow Release
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 - Benefits:
 - Minimally invasive – uses 1cm incisions with minimal muscle disruption, lower blood loss
 - Best for very specific tasks and when stiffness is more subtle
 - Negatives
 - Your nerves cannot be directly visualized and may be at slightly higher risk, but this is still quite low.
 - Additional portions of the procedure
 - Manipulation under anesthesia (MUA) – After the procedure is complete, I move your elbow for you. This allows me to break up any remaining scar while you are asleep.
 - This portion of the surgery can result in a bone fracture or dislocation but this is very rare.
 - Ulnar nerve decompression – The ulnar nerve is the funny bone nerve behind the inside corner of your elbow. When you have been diagnosed with cubital tunnel syndrome or ulnar neuritis at the elbow, I may recommend releasing the ulnar nerve to remove scar tissue from around it with the goal to avoid weakness and numbness. Additionally, if I increase your elbow motion dramatically this may prevent future scarring of the nerve.



- Ulnar nerve transposition – in some cases the ulnar nerve may have to be moved to a new location (transposed) to the front of the elbow. Often this is decided intra-op.
- Risks of Open and Arthroscopic Elbow Release
 - While each of the below risks is low (around 1%), it is important you know they are possible albeit unlikely. The overall risk of complications (large and small) is 10%. Risks include:
 - Fracture of your bones, instability(dislocation) of the elbow, nerve or artery injury, recurrent stiffness, heterotic ossification (new bone formation) infection, blood loss, blood clot, medical complications, need for repeat surgery like a manipulation under anesthesia.
- Both open and arthroscopic procedures take about 2 hours, this results in about ½ day of your time at the surgery center
- You will have a nerve block which could last 8-72 hours depending on the mixture.
 - I recommend following surgery with a therapy visit the same day, and next day while the block is working to work on range of motion before your pain sets in
 - Therapy will also fabricate a night time terminal extension splint. This helps you stretch the most important direction while you sleep.
- Recovery twincitiesshoulderandelbow.com/recovery/
 - Goal - Maximize your function by following these steps:
 - Limit swelling
 - Swelling can increase your scarring, your pain and contribute to repeat stiffness.
 - To combat this, I recommend:
 - Routine icing 20 minutes every hour while awake
 - Elevation above your heart as much as possible (Figure 5)
 - 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.
 - 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 motion helps pump excess fluid out.
 - Maintain your finger and wrist function (Figure 6)



- 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 recovering.
 - Maximize your elbow motion (Figure 7)
 - This most critical component to a good outcome is aggressive, routine, home and formal therapy sessions where you work on elbow range of motion.
 - This begins THE DAY OF 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!
 - Manipulation under anesthesia
 - If you do not make appropriate progress, we may need to perform another surgery around 2-3 months where we move your elbow aggressively while you are asleep under anesthesia.
- Expectations
 - Approximately 3 months until recovery
 - You will continue to work on motion for 6 months total
 - You will be clear to do desk work usually within the first 2-6 weeks after your surgery.
 - You will have no formal restrictions on lifting after surgery.
 - You should expect a profound decrease in your pain
 - There are very rare instances where improving your motion can increase the pain from arthritis, in these cases it is a tradeoff between pain and function.
 - You can expect 30-40° improvement in motion but complete full extension is rarely obtained.
 - Top ways YOU can help.
 - **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 shown to improve your chances of quitting.
- Control your diabetes
 - Poorly controlled blood sugars severely increase your risk of medical and surgical complications especially infection.
- Bone health
 - I recommend the following medications to improve your bone quality:
 - Initiating over the counter supplements (I recommend Citrical petite)
 - 1500mg Calcium daily
 - 2000 IU Vitamin D daily
- Work hard three times per day on your elbow motion

Elbow Elevation

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1. Lay as flat as you can comfortably
2. Place one pillow doubled over next to your injured shoulder to keep your upper arm from dropping down
3. Place another pillow doubled over on your chest to support your forearm

*It helps to have your sling on
 *You should be in this position most of the day for the first 1-2 weeks
 *This is the only reliable way to elevate your elbow above your heart

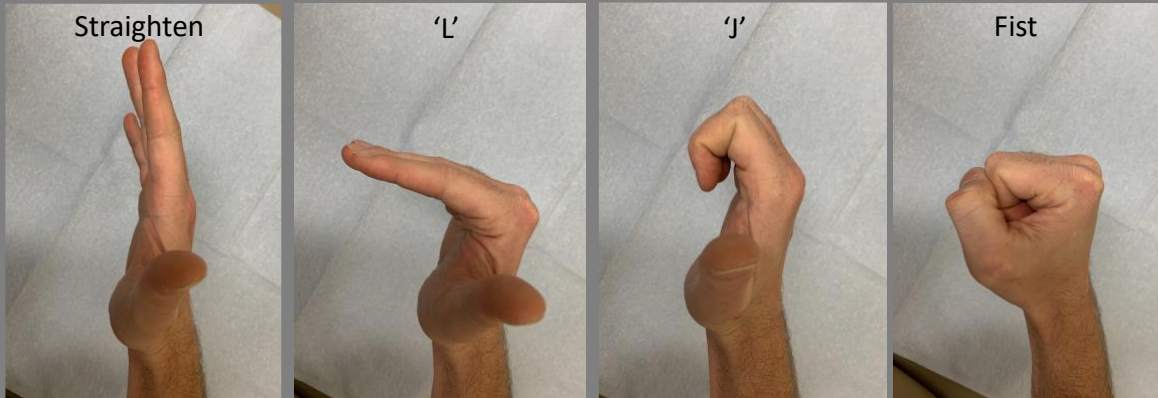



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Figure 6 Elbow elevation above the heart

Finger Range of Motion

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Cycle through the above motions with the assistance of your other hand

*This will prevent stiffness and swelling

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Figure 7 Finger range of motion

Elbow Range of Motion

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Types of Motion

Passive: An outside force moves your arm for you entirely

Active assist: Using the power of your injured arm with the assistance of your uninjured arm or an outside force

Active: Using the power of only your injured arm

*Tuck your elbow at your side for all exercises

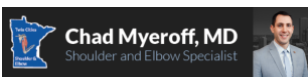
*Can be done sitting, laying, or standing

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Figure 8 Elbow range of motion

Want More information?



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- Please visit:
 - twincitiesshoulderandelbow.com/elbowstiffness/
 - <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.

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