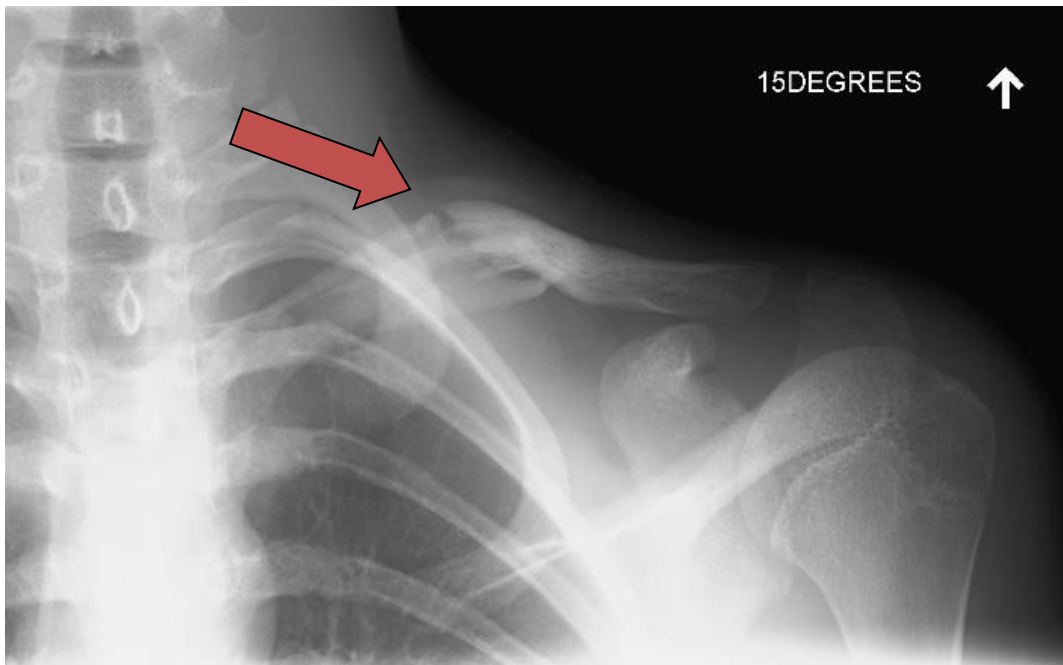


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Nonunion/Malunion of Clavicle Fracture

Fractures may not heal correctly for a variety of reasons, ranging from smoking and poor nutrition to improper early activity and infection. This condition may occur with or without surgical intervention. A nonunion indicates a lack of healing, while a malunion is healing of the fracture in improper alignment. Without intervention, a majority of nonunions and some malunions will continue to cause pain and physical limitations.



Nonunion of clavicular fracture with incomplete healing, over three months post-injury

Frequent Signs and Symptoms

- Persistent pain months after injury, with continued pain and soreness that does not resolve
- Numbness, coldness, or paralysis below the fracture involving the forearm or hand from pressure on or stretching of blood vessels or nerves (rare)
- Loss of strength or pain when attempting to move the affected arm
- Obvious deformity or bump at fracture site



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Etiology (Causes)

- Improper angulation or fixation of the fracture ends (meaning the ends were not lined up correctly when the fracture was healing)
- Inadequate stability after injury or surgery
- Poor nutrition and diet
- Lack of necessary blood supply
- Patient noncompliance with restrictions/limitations
- Site of injury (some bones heal better than others)
- Smoking
- Infection

Risk Factors

- Chronic diseases such as diabetes, anemia, hypothyroidism, etc.
- Smoking
- Older age
- Infection
- Dietary vitamin/mineral deficits

Prevention

- Avoid tobacco products and ensure proper nutrition
- Abide by post-injury or post-surgical guidelines from your medical provider
- Maintain appropriate conditioning, particularly neck, shoulder, and arm muscle strength, endurance, and flexibility
- Use proper technique with activities, and have a coach or medical professional correct improper technique
- Surgery to reduce and stabilize excessively displaced or comminuted fractures

Outcomes

Nonunion and malunion fractures are diagnosed by evaluating the patient's symptoms and imaging (X-rays, MRIs, CT scans) over time. If the pain persists and fracture is not healing at an appropriate rate, or in an appropriate position, timely treatment is important. Patients with symptomatic nonunion/malunion fractures may require surgical treatment to re-align bone graft and stabilize the fracture. Nonunions and malunions of fractures are difficult to treat and require a careful work up to determine the reason for poor healing, and a thorough treatment plan to address and correct all issues, including stiffness, weakness, infection, failed hardware,



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lack of healing response, fracture stability and alignment, etc. The surgical procedure can obtain fracture healing but functional outcomes are often less than those obtained primarily (healing directly after the first injury).

Potential Complications

- Chronic pain, stiffness, loss of motion, or swelling of the shoulder
- Heterotopic ossification (calcification of the soft tissues)
- Injury to the nerves of the hand or wrist due to stretching from the fracture, causing numbness, weakness, or paralysis
- Arrest of normal bone growth in children
- Failure to heal
- Infection
- Hardware pain

Treatment Considerations

Surgery usually includes repositioning the bones and holding them in proper alignment with sutures, wires, rods, plates, pins or screws. Malunion/nonunion patients may also require bone grafting to fill in the “gaps” in bony healing. Bone grafts may be transplanted from another area of the body, an allograft (cadaver donation), or synthetic material. After immobilization, exercises to regain shoulder motion and strength lost as a result of injury and healing process are necessary before returning to sport and activity. These exercises may be done on your own, or with the assistance of a physical therapist or athletic trainer for further evaluation and treatment. Rehabilitation can require up to four to six months.

Possible Medications

- Strong pain relievers may be prescribed as necessary. Use only as directed.

Modalities (Cold Therapy)

Cold is used to relieve pain and reduce inflammation. Cold should be applied for 10 to 15 minutes every two to three hours for inflammation and pain and immediately after any activity that aggravates your symptoms. Use ice packs or an ice massage with a cloth between the ice and your skin to prevent burning /freezing your skin.

Notify My Office If Symptoms Worsen

This information is provided by Dr. Steven Chudik. It is not to be used for diagnosis and treatment. For a proper evaluation and diagnosis, contact Dr. Chudik at contactus@chudikmd.com, or 630-324-0402.



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