

### Explanation of Diagnosis and/or Procedures

#### Shoulder Anatomy

The humerus is the long bone that connects the shoulder to the elbow. The upper part of the humerus forms part of the shoulder joint and the lower part of the bone helps form part of the elbow joint. The shoulder joint is essentially a ball and socket joint. However, unlike the ball and socket joint of the hip, the shoulder has much greater mobility. This mobility is dependent upon an elaborate array of muscles, tendons and ligaments that make the shoulder one of the most complex joints in the body. The proximal humerus refers to the upper part of the bone that makes up the ball component of the shoulder's ball and socket joint.

In addition to forming the ball component of the shoulder joint, the proximal humerus serves as the attachment site for the rotator cuff which is the intricate tendon system surrounding the shoulder joint.



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#### Proximal Humerus Fractures

Fractures of the ball of the humerus are relatively common particularly in those affected by osteoporosis.

This injury is most commonly a result of a fall onto the affected side or shoulder. There may not be a crack heard or felt but there is immediate pain and rapid swelling. Immediately following a fracture, it can be quite difficult and painful to try to move at the shoulder. Bruising may develop in the days following the fracture. Most fractures are not displaced (moved out of the normal anatomic position of the bone) and therefore just need a period of immobilization. Fractures that are displaced can have severe consequences such as lost function and chronic pain if left to heal in a poor position.

Symptoms can include:

- Severe pain in the shoulder
- Inability to move at the shoulder
- Swelling and bruising at the shoulder
- Numbness or weakness in the hand

Most patients with a proximal humerus fracture are usually seen initially in the emergency room. The emergency room physician or your personal physician will usually recommend that you see an orthopedic surgeon. Typically, your initial orthopedic visit for a shoulder fracture will involve a history in which you describe the injury along with a limited exam to primarily ensure there are no other injuries including injuries to the nerves. X-rays are necessary to determine the severity of the fracture and are usually done even if films were performed at an emergency room as the fragments can shift somewhat for the first few weeks after such an injury. A CT scan may be necessary to better define the severity and, in many cases, help determine whether or not surgery would be beneficial.

### Management of Proximal Humerus Fractures

The initial management of shoulder fractures involves:

- Immobilization with a sling
- “Setting” the fracture is usually not necessary except in rare instances.
- Ice and pain medication
- Visit with an orthopedic surgeon within 3-5 days to assess need for further treatment

The definitive management of your fracture will be determined by your orthopedic surgeon. The need for surgical repair of these fractures is based on the x-rays and CT scans when necessary. The majority of proximal humerus fractures are not displaced significantly. These can be treated non-surgically, typically with a period of immobilization in a sling which can range from three to six weeks depending on the type of fracture and its stability.

Fractures in which the displacement is significant may require surgical repair. This can be a minimal operation in which the fracture is manipulated externally and pins are placed through the skin or it may require a large incision on the front of the shoulder to directly manipulate the fragments with placement of a plate and screw construct or, in some cases, replacement of the shoulder.

### Nonsurgical treatment

Cast immobilization is not practical for fractures of the shoulder and therefore some form of sling immobilization is usually recommended. There is some risk of fracture shifting in the first several weeks therefore your surgeon may want to see you back several times in the first two to three weeks to ensure that the fracture position remains optimal. The frequency of these visits will depend on the type and stability of the fracture. Once the fracture has healed sufficiently, physical therapy is usually started with a gradual return to normal daily functions. Complete bony healing often takes at least three months so therapy and function are slowly resumed prior to this to minimize the risk of severe stiffness and muscle atrophy. While healing is often complete by roughly three months after the fracture, full recovery may take up to a year. Due to the complexity of the shoulder joint, some degree of mobility and strength loss can be seen even with minor fractures.

### Surgical treatment

If the fracture is more severely displaced, surgical repair may be necessary to minimize the risk of chronic pain and lack of function. Your surgeon will typically recommend surgical treatment if your fracture clearly places you at risk for chronic pain or poor function. Surgery is designed to reduce the amount of pain and dysfunction that otherwise would exist if a poorly positioned fracture were allowed to heal on its own.

There are several options for surgical repair, the choice of which depends on many factors including type and severity of fracture, patient age and medical conditions, and bone quality. It is relatively common to consider several methods of surgical treatment for a particular fracture with the ultimate decision being based on findings during the surgery.

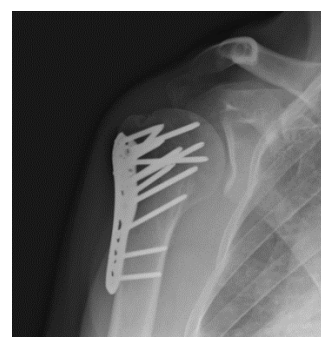
### **Pinning**

In some fractures, external manipulation can be performed and, with x-ray guidance, metal pins can be placed through the skin to stabilize the fracture in optimal position. This does require a second minor operation to remove the pins three to four weeks after the initial surgery but this is a minimally invasive procedure that typically results in an accelerated recovery. This can be done as an outpatient procedure or occasionally may require an overnight hospital stay.



### **Open reduction with internal fixation**

If the fracture is more severe or not appropriate for external manipulation, an open procedure may be performed to manipulate the fragments into an acceptable position and then fix them in place using a combination of pins, wires, sutures, plates and/or screws. An incision is usually made over the front of the shoulder and the fragments are placed in anatomic position as confirmed by an x-ray done in the operating room. This is a more invasive procedure which can take several hours and therefore usually requires an overnight stay in the hospital.



### **Shoulder replacement**

Generally reserved for more severe fractures or those in patients with poor bone quality (more common in older patients), shoulder replacement involves replacement of the proximal humerus (ball) and is termed hemiarthroplasty as the socket is usually in good condition and does not need replacing. Occasionally, the rotator cuff or the bone to which it attaches is not salvageable and this may require reverse shoulder replacement in which a ball is attached to the socket with a cup attached to where the fractured ball was.

Reverse shoulder replacement is used in non-fracture patients who have severe damage to the rotator cuff and likewise may be used in fracture patients who also have compromise of the rotator cuff and/or its attachment sites.

### **What to expect at surgery**

The hospital will inform you what time you should arrive to the hospital the morning of surgery. It is essential that your orthopedic surgeon be aware of ALL the medications and supplements you are taking.

Please bring with you to the hospital a list of these medications and their dosages.

After you check in with the hospital's admissions staff, you will be taken to the pre-operative area where you will change clothes. You will meet the pre-operative nurses as well as a member of the anesthesia team. They will ask your several questions, review your medical history and examine you. The anesthesia personnel will also discuss and explain your anesthesia.

An IV will be started to provide you with fluids and medications. Special elastic stockings will also typically be applied to your legs at this time to help with your circulation during the surgery.

A member of your orthopedic surgeon's team will also meet you in the pre-operative area to review the surgical plan and answer any questions.

Family members will have time to be with you in the pre-operative area prior to your surgery.

You will be taken to the operating room where you will be transferred to a special operating table. You will meet the operating room nurses and staff who will help you get comfortable on the operating table and explain to you what steps are occurring.

### **Care after surgery**

After your surgery, you will arrive in the recovery room where you will be given pain medicine to keep you comfortable. You will remain in the recovery room until you have recovered completely from the anesthesia; about one hour. Your arm will typically be in a sling or shoulder brace. You will then be taken to your hospital room and be introduced to your hospital floor nursing team.

Depending on the time of day at which you arrive to your room, you may be visited by a member of the therapy team to review and initiate your arm exercises. In some cases, this will begin on the following morning.

To help prevent nausea, your diet will be advanced from ice chips to liquids and then to regular meals. The IV will remain in place for one or two days after surgery to administer fluids, pain medicines and antibiotics.

Although it is normal to feel some pain after surgery, be sure to tell your nurse of your pain. In many ways, the nursing staff relies upon you informing them of your comfort level.

To help re-expand your lungs after your anesthesia and surgery, you will be given a simple breathing apparatus (incentive spirometer). Your nurse will show you how to use it effectively.

You may have a drainage tube coming out of the bandages which helps to drain any last remnants of blood that may accumulate within the wound. This tube will typically be removed on the first post-operative day.

Generally, bandages are changed on the first postoperative day in the hospital. Showering may begin on the second day as well but no submersion (bath or swimming) may occur for at least four weeks after surgery.

The nurses will help you get out of bed and sit in a chair as well as help you with walking.

On the first post-operative day, your surgical team and nurses will encourage you to use your non-operative arm for simple activities of daily living such as bathing, dressing and eating.

### **Therapy in the Hospital**

Depending on the type of shoulder repair, the post-operative exercise program may begin the day after surgery but for most fractures, exercise on the surgical shoulder is not initiated for several weeks. You may be visited by an occupational therapist that will assist you in learning normal daily activities using primarily your nonsurgical arm with minimal assist from the hand and wrist of your surgical arm.

### **At Home**

When at home, plan to take it easy as you become increasingly independent and begin to resume your activities. You may walk as much as you like. You may drive a car when authorized by your surgeon, which is typically after six weeks. When to return to work will depend largely upon your employment duties. Check with your surgeon.

### **Medications**

Take as prescribed. Narcotic pain medications such as Norco (hydrocodone) or oxycodone are used for severe pain. They can be taken up to every four hours as necessary. Most patients only require these medications for the first week. Once pain is better controlled, you may simply take Tylenol (acetaminophen) every four to six hours, not to exceed 3000 mg in one day. Take these medications with food. If you have any problems taking the medications, please stop them immediately and notify the clinic.

### **Possible complications and instructions**

Expect to see some bruising and swelling of your arm after your fracture repair. The risk of complications after shoulder reconstruction is low. However, as with any invasive procedure there is some risk that the following conditions may arise.

- Bleeding
- Infection. Common signs of infection include increasing pain after surgery, increased redness around the incision, swelling, and drainage.
- Complications from anesthesia, including death
  
- Permanent or temporary nerve or blood vessel injury
- Failure of fixation
- Need for further surgery
- Damage to other tissues or fracture
- Loss of limb or function
- Recurrent instability is possible though uncommon

Contact your surgeon if you develop: drainage and/or foul odor from the incision, problems with your wound, a fever of 101 degrees or greater, increased swelling, redness, sore throat, breathing problems, cardiac or circulation problems, changes around your incision, or any other problems that give you concern. Also, remember to contact your surgeon if you have any questions regarding your exercises.

Your stitches or staples will be removed in one to two weeks. Your complete recovery period may take twelve months or more depending upon your progress.

### **Do's and Don'ts**

Do NOT use the arm to push yourself up in bed or from a chair because this requires forceful contraction of muscles.

Do NOT overdo it. Early overuse of the shoulder may compromise your repair.

Do NOT lift anything heavier than a glass of water for the first 6 weeks after surgery.

Do NOT put your arm in any extreme position, such as straight out to the side or behind your body for the first 6 weeks after surgery.

Do ask for assistance. Your physician may be able to recommend an agency or facility if you don't have home support.

### **Post-Operative Visit**

Your first post-operative visit with your surgeon will typically be in one to two weeks. At this point, your stitches or staples will be removed, your wound examined, X-rays obtained, your progress evaluated and plans for the next time interval made.

Remember that some decreased strength and mobility is common after a shoulder fracture severe enough to require surgery. The surgery is designed to minimize any permanent pain or dysfunction you potentially would face without surgical repair. Understanding the steps before and after your surgery will help you avoid any pitfalls and maximize your recovery.

### **Questions**

The CORE Institute is dedicated to your outcome. If any questions or concerns arise, please call The CORE Institute at 1.866.974.2673.