

## **Postoperative Protocol For Proximal Humerus Fractures Following ORIF-- Dr. Trueblood**

**Indications:** Most proximal humerus fractures will heal, but having them heal in a desirable position can be tricky. Nonoperative treatment is indicated for all non-displaced and for most minimally displaced fractures in virtually all age groups. Displaced fractures of the proximal humerus that distinctly change the geometry of the rotator cuff's bony insertion relative to the shaft of the humerus or to the joint surface may benefit from correction of this deformity using rigid internal fixation. Nonoperative treatment of such injuries frequently leads to painful loss of shoulder motion due to bony impingement and effective rotator cuff deficiency due to loss of mechanical advantage and leverage.

**Technique:** An anterior incision is made over the shoulder and the interval between the pectoralis major and deltoid is exposed. The cephalic vein is mobilized medially and protected for the duration of the case. A complete subdeltoid release is performed and the clavicular fascia is released at the lateral margin of the conjoint tendon. The biceps tendon is tenodesed to the leading edge of the pectoralis major and then traced back to its origin at the apex of the glenoid. The biceps is then excised. Traction stitches are then placed through the supraspinatus and subscapularis and the humeral head positioned using a combination of direct and indirect reduction techniques. Extensive medial comminution is addressed with an intercalated dowel of allograft bone and lateral comminution usually addressed with osteoconductive bone-graft substitute. Provisional fixation is achieved with sutures and temporary pinning and then secured definitively with locked plate fixation. The construct is further neutralized by multiple #5 Fiberwire stitches placed through the bone-tendon junction of the rotator cuff and holes in the plate. The shoulder is taken through a full range of motion and the tuberosities are confirmed to move as a unit. The deltopectoral interval is closed with nonabsorbable stitch and the skin closed in layers over a deep drain. The patient is typically admitted overnight for postoperative pain control, drain management, and antibiotics.

### **Postoperative Days 0-14--**

#### **Goals:**

1. Protect fracture repair
2. Minimize swelling and pain.
3. Optimize independence while accomplishing the above.

### **Review postoperative precautions with patient and care-partner.**

- No shoulder AROM.
- No lifting of objects
- When reclining or lying supine, the patient is encouraged to keep a pillow or blanket

behind their elbow, preventing extension through the shoulder, to reduce stress on the anterior repair site. As a rule of thumb, the patient should always be able to see their elbow.

- No excessive shoulder motion beyond side pocket, especially into internal rotation (IR)
- No excessive stretching or sudden movements (particularly external rotation (ER))
- No supporting of body weight by hand or elbow on involved side
- May shower at 4 days postop, letting water run over the skin and patting dry with a clean towel. No standing in a pool or bathtub for 3 weeks. No swimming for at least 10 weeks.
- No driving for 6 weeks

#### **Post-operative education/ inpatient therapy:**

- Instruct in scapular elevation, depression, retraction, and protraction (clock exercises)
- Preview safety and ADLs for life in a sling. Emphasize donning and doffing of shirts.
- Patient may remove sling for short periods of time and allow elbow to extend fully.
- Instruct patient and family in 6-pack exercises for upper extremity:

1. **Clockwise shoulder pendulum**
2. **Counterclockwise shoulder pendulums**
3. **Tight fist**-- patient makes a tight fist then fully extends fingers
4. **Thumb to shoulder**-- the patient flexes the elbow to touch the anterior shoulder with the tip of their thumb and then extends the elbow fully.
5. **Front-assisted forward elevation**: using either a cane or dowel (broomstick), the patient grasps the device with hands 6 inches apart. They then use their uninjured extremity to slowly lift the injured arm. The deltoid of the injured arm should not contract actively. The arm is lifted to the point of mild discomfort, then gently lowered back to the resting position.
6. **Side-assisted lift**: the same dowel is used but hands are placed shoulder-width apart. The uninjured arm pushes the dowel to the injured side, abducting the injured structure with no active muscle contraction of its own.

#### **1st postoperative visit at 2 weeks--**

- 3-views of proximal humerus for comparison with intraoperative x-rays.
- Assess pain control/ refill or adjust pain medications as needed.
- Formal therapy requirement:
  - if forward elevation >90°: continue with HEP alone.
  - If forward elevation <90° or if elbow, wrist, or hand have any noticeable

limitation: start formal therapy.

- Review postoperative precautions and activity limitations.
- Work Limitations: No use of operative arm for other than typing or writing. No lifting, pushing, or pulling. Full-time sling use at job site. No driving/ operation of medium+ machinery.
- Expected return to work:
  - Cognitive work: 1-2 weeks
  - Light manual (retail/ light personal service): 8 weeks
  - Manual labor: 12-14 weeks
  - Overhead lifting intensive manual work: 4-6 months
- Follow-up visit in 4 weeks.

#### **Therapy Rx Weeks 2-6:**

- 1-2x/week x 4 weeks
- PROM of shoulder in plane of scapula. No IR/ ER.
- AROM/ PROM of elbow, wrist, and hand.
- Scapular isometrics in protraction, retraction, elevation, and depression.
- Modalities prn for muscle relaxation
- HEP

#### **2nd postoperative visit at 6 weeks--**

- 3-views of proximal humerus for comparison with intraoperative x-rays.
- Assess pain control/ refill or adjust pain medications as needed.
- Review postoperative precautions and activity limitations.
- Therapy Rx:
  - If patient shows bridging bone at three+/four cortices on AP and axillary views, advance to formal therapy.
  - Paucity of callus (<3 cortices bridged) or focal tenderness persisting at shoulder results in continuing sling and AROM restrictions for another 2 weeks, then reassessing in office.
- Work Limitations: Limit 20# weight. No pushing or pulling. No overhead activity. May drive.
- Return to work:
  - Cognitive work: 1-2 weeks
  - Light manual (retail/ light personal service): 8 weeks
  - Manual labor: 12-14 weeks
  - Overhead lifting intensive manual work: 4-6 months

### **Therapy Weeks 6-12:**

- 1-2 x/ week for 6 weeks
- AROM/ AAROM/ PROM of shoulder, elbow, wrist, and hand. Emphasize ER and pec minor stretching early to minimize scapular protraction with forward elevation. Scapular mechanics are critical to early progress with active range of motion.
- Okay to start light glides and mobilization maneuvers at 8 weeks postoperative.
- Start isometric rotator cuff strengthening at 6 weeks, advance to isotonic RC strengthening as tolerated.
- General upper extremity strengthening at 10 weeks.

### **3rd postoperative visit at 12 weeks--**

- 3-views of proximal humerus for comparison with intraoperative x-rays.
- Assess pain control/ refill or adjust pain medications as needed.
- Review postoperative precautions and activity limitations.
- Therapy Rx:
  - May advance to work conditioning when ROM is symmetric to contralateral side and strength 4+/5 in all directions.
  - For patients who perform cognitive or light manual work or who are retired, may transition to HEP at the same point.
- Work Limitations: No lifting restriction. May push and pull. No overhead lifting.
- Return to work:
  - Cognitive work: 1-2 weeks
  - Light manual (retail/ light personal service): 8 weeks
  - Manual labor: 12-14 weeks
  - Overhead lifting intensive manual work: 4-6 months

### **Therapy Weeks 12+:**

- 1-2x/ week for 6 weeks
- Transition to HEP as tolerated.
- AROM/ PROM of shoulder, elbow, wrist, and hand.
- Glides and mobilization maneuvers as needed. Emphasize pec minor stretching.
- Modalities prn.
- Rotator cuff and scapular stabilization strengthening.
- General upper extremity strengthening.