

Riverview Health Orthopedics and Sports Medicine

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Proximal Humerus FX Nonoperative treatment

1. Defined
 - a. Fracture of the Humerus at the shoulder joint
 - b. Fracture is typically impacted and may involve the tuberosities
 - c. The Fracture is left to heal in current position. In some cases (elderly with significant comorbidities or otherwise poor surgical candidates) this may be very malaligned, however, proximal humerus fractures can tolerate a significant amount of displacement and still function reasonably well.
2. Goals
 - a. Protect healing tissue (especially tuberosities which have the rotator cuff attachments)
 - b. Control post-operative pain and swelling.
 - c. Improve post-operative range of motion.
 - d. Improve functional strength, stability, and neuromuscular control.
 - e. Restore deltoid/ rotator cuff force couple.
3. Rehabilitation Principles
 - a. Be aware of compromised and/or repaired tissue.
 - b. Healing tissue should never be overstressed but appropriate levels of stress are beneficial.
 - i. Inflammatory phase days 1-3.
 - ii. Tissue repair with proliferation phase days 3-20.
 - iii. Scar tissue most responsive to remodeling 21-60 days but occurs from 1 to 8 weeks.
 - iv. Final maturation taking as long as 12-18 months.
 - c. Tissue reactivity of the shoulder and tissue healing will dictate the rehabilitation process. Reactivity is determined by the clinical exam.
 - i. Level I Reactivity
 1. Resting pain, pain before end range.
 2. Aggressive stretching is not indicated.
 3. Grade I-II mobilization for neurophysiological effect.
 - ii. Level II Reactivity
 1. Pain onset occurs with end range resistance.
 2. Grade III and IV mobilization appropriate per patient tolerance.

- iii. Level III Reactivity
 - 1. Engagement of capsular end feel with little or no pain.
 - 2. Pain occurs after resistance.
 - 3. Grade III and IV mobilization and sustained stretching is appropriate.
 - d. Eliminate inflammation as the cause of pain and neuromuscular inhibition.
 - e. Ensure return of appropriate joint arthrokinematics.
 - f. Apply techniques in the loose pack position and apply unidirectional movements to minimize the strain on the soft tissue and articular structures.
 - g. As mobility increases and reactivity decreases, initiate more multi-directional techniques.
 - h. Re-establish voluntary and pain-free control of the deltoid and rotator cuff musculature. Progress by the following principles:
 - i. Isometrics (submax/non-painful) intended for neuromuscular education and fluid decongestion.
 - ii. Isotonics “Downstairs” (<90 degrees) “Gravity Eliminated” elevation in a controlled fashion.
 - iii. Isotonics “upstairs” (>90 degrees)
 - i. Improve and or maintain scapular mobility and stabilization.
 - j. Facilitate performance of complex skills with proprioceptive and kinesthetic techniques: Low to high, sagittal to frontal, bilateral to unilateral, stable to unstable, slow to fast, fixed to unfixed surface
 - k. Encourage life-long activity modification with the use of safe zone principles.
 - l. Factors that affect the rehab process
 - i. Tissue quality (appearance, temperature, texture)
 - ii. Presence of concomitant bicipital/deltoid/scapular pathology
 - iii. Age of patient
 - iv. Presence and severity of osteoporosis
 - v. Activity level
 - vi. Pre and intra-operative range of motion
 - vii. Pain and sensitivity levels
 - viii. Cognitive abilities
- 4. Post op functional guidelines
 - a. Functional Activities dependent upon: (will assist in decision to return to functional activity)
 - i. Glenohumeral ROM
 - ii. Pain
 - iii. Tissue healing restraints
 - iv. Rotator cuff and deltoid strength
 - v. Scapular strength and stability
 - vi. Proprioceptive/reflex control
 - vii. Quality of tissue and degree of discomfort
 - b. Driving-6-12 weeks Dependent upon:
 - i. Automatic Transmission

- ii. Ability to maintain arm in a safe, functional position.
 - iii. Alleviation of sharp pains/muscle spasms.
 - iv. No dependency on pain medications
 - v. Car insurance restrictions on driving after surgery.
 - vi. Adequate confidence to handle car in challenging situations.
 - c. Work dependent upon:
 - i. Sedentary job- no earlier than 1-2 weeks
 - ii. Physical job- no earlier than 12 weeks
 - d. "Overhead" recreational activities 7-9 months (no high velocity)
 - i. Swimming, basketball, easy tennis/racquetball, easy throwing
 - ii. Initiate in sagittal/scapular plane
 - iii. Avoid pain increases with this motion
 - iv. Avoid significant thoracic extension substitutions
 - v. Initiate such activities first in the clinic, with supervision
 - e. Golf-3-6 months dependent upon:
 - i. Symptoms (pain frequency and intensity)
 - ii. Ability to tolerate prolonged dependency
 - iii. Ability to move arm in multiplanar, overhead motions
 - iv. No significant, unnecessary thoracic substitutions.
 - 1. encourage the following
 - a. Backwards golf (putting, chipping, short irons, progressing from 50-90% swings)
 - b. Avoid heavy grass or possibilities for increased ground contact.
 - c. Warm up properly with stretching
5. Post-operative equipment guidelines
- a. Sling: at all times (includes night) except bathing and exercises. Sling typically worn for 4-6 weeks
 - b. Cryo Cuff for comfort
6. Rehabilitation
- a. **Phase I** (3-6 weeks) *Protective ROM*
 - b. Begin physical therapy at 3-4 weeks post op, 2 x/week
 - i. Goal: Protect the healing tuberosities and decrease tissue reactivity. Maintain joint integrity. Reduce pain. **Try to prevent adhesive capsulitis, but this is near impossible with nonoperative treatment of proximal humerus fractures. These will all get very STIFF!**
 - ii. RX:
 - 1. Hand/finger/elbow AROM exercises
 - 2. Scapular setting-without pain increases.
 - 3. Shoulder PROM (initiate in plane of the scapula and progress based on tissue tolerance)
 - 4. Grade I-II mobilizations-avoid pain, guarding.
 - 5. Postural education-initiate for brief periods, emphasize less kyphosis.

6. Encourage trapezius/levator stretches in cervical region if needed.
7. Incorporate “core strengthening” as appropriate within framework of rehab.

iii. Limitations/ Precautions

1. **Sling use all times except exercises and bathing/changing**
2. **Sleep in recliner if more comfortable than bed use.**
3. **No AROM (no lifting or reaching back)**
4. **No resisted or active IR or ER**
5. **No PROM for ER/IR past point of pain (Do not put excessive torques on the humerus)**
6. **No activities creating vibrational stress (running, jumping, horseback riding etc.)**

iv. Rx/Clinical Expectations

1. Reduction in guarding with PROM
2. Achieves at least 30 degrees flexion PROM
3. Achieves at least 30 degrees abduction PROM
4. Achieves at **most** 10 degrees ER PROM (plane of scapula)

c. Phase II (6-9 weeks) Protective PROM and AAROM- “gravity reduced”

i. Goal: Protect tuberosities, increase PROM and decrease tissue reactivity. Reduce pain.

ii. Continue physical therapy 2 x/week

iii. RX:

1. AAROM flexion/scaption (if patient demonstrates independent competence). May initiate use of pulleys at this time.
2. Verbal and tactile queing for proper performance of home program.
3. Scapular exercises (no resistance)
4. Continue PROM (within restrictions)
5. Grade I-III mobilizations
6. Start elbow strengthening (while minimizing stress on shoulder)
7. Encourage trapezius/levator stretches in cervical region if needed.
8. Gentle soft tissue massage for alleviation of muscle spasm/fibrosis.
9. Incorporate “core strengthening” as appropriate within framework of rehab.

iv. Limitations/ Precautions

1. **Sling use at all times. Sling will be discontinued around 6 weeks at the discretion of MD**
2. **Sleep in recliner or wherever is comfortable**
3. **No activities creating vibrational stress (running, jumping, horseback riding etc.)**

4. **No AROM (no lifting or reaching back)**
5. **No cuff strengthening**
6. **No PROM for ER greater than 40 degrees**
- v. Rx/Clinical Expectations
 1. No guarding with PROM.
 2. Tolerates AAROM, isometric program
 3. Achieves at least 60 degrees flexion PROM
 4. Achieves at least 60 degrees abduction PROM
 5. Achieves at **most** 30 degrees ER PROM (plane of scapula)
 6. Achieves at least 15 degrees IR PROM (plane of scapula at 30 degrees of abduction)

d. **Phase III** (10-14 weeks) *Active ROM*

- i. Goal: reduce pain, increase AAROM, increase to full PROM.
- ii. Continue physical therapy 2 x/week, may decrease to 1 x week per PT discretion
- iii. RX:
 1. Continue PROM and AAROM techniques
 2. Continue scapular strengthening techniques
 3. Continue isom. with gradual increase in force (add IR-submax/non-painful)
 4. Submaximal isometric RTC exercises at 6 weeks
 5. Progressive isotonic RTC exercises at 8 weeks, low weights, high reps. Begin "gravity reduced" AROM, then progress to seated/standing positions (with elbow flexed initially to reduce lever arm)
 6. General UE strengthening at 10 weeks
 7. Grade I-IV mobilizations
 8. Encourage trapezius/levator stretches in cervical region if needed.
 9. Pec minor stretching to minimize scapular protraction with flexion
 10. Progress, upper extremity progressive weight bearing in an upright position with hands in "downstairs" position; progress complexity (follow proprioception principles)
 11. Incorporate "core strengthening" as appropriate within framework of rehab.
 12. Postural education.

iv. **Limitations/ Precautions**

1. **10 # weight limit**
2. **Activities which create large "vibrational stresses"**
3. **Avoid shoulder level and overhead activity.**
- v. RX/Clinical Expectations
 1. Achieves full flexion PROM
 2. No guarding with PROM

3. Achieves 100 degrees flexion and abduction PROM
4. Achieves 45 ER PROM (plane of scapula)
5. Achieves 45 IR PROM (plane of scapula at 30 degrees of abduction)
6. Able to actively elevate shoulder against gravity with good mechanics to 90 degrees by week 14
7. Advance to work/sport specific conditioning once AROM is = bilateral and
8. strength is 4+/5 in all directions

e. **Phase IV** (14+ weeks plus) *strengthening*

- i. Goal: Prepare for overhead activities
- ii. Continue physical therapy 1 x/week and transition to HEP per patient progress
- iii. RX:
 1. Continue all previous, necessary techniques
 2. Achieve Full PROM in all planes
 3. Multi-planar strengthening activities (PNF patterns) and overhead endurance work.
 4. Closed chain/kinesthetic work in overhead positions (proprioception principles)
 5. Advance RTC/deltoid strength as tolerated, avoiding substitutions.
 6. Continue glenohumeral and sustained stretching techniques/mobilizations
 7. Cleared for prone scapular activities if patient tolerates positioning (elbow flexed initially to minimize joint stress)
 8. Body blade activities
 - a. Progressing from:
 - i. “downstairs” to “upstairs”
 - ii. Short arm to elbow extension
 - iii. Sagittal plane to coronal positions
 9. Upper extremity plyometrics (including plyoball) can be initiated
 - a. Progressing from:
 - i. Two hands to one
 - ii. “downstairs” to “upstairs”
 - iii. “Safe zone” to multi-planar positions
 - iv. Soft toss to higher speeds
 - v. Light to heavy weight
 10. Tailor final stage to particular work or hobby related activities and positions. (MD must clear for any dumbbell resistance workout programs)
 11. Incorporate “core strengthening” as appropriate within framework of rehab.

12. Establish a life-long upper extremity fitness program to include appropriate stretching/strengthening activities, with solid education on global posture and joint protection.

iv. Limitations/Precautions

- 1. No heavy weight**
- 2. No prolonged overhead activity**
- 3. No restrictions at all after 4-6 months**

v. RX/Clinical expectations

1. Gradually progress strengthening program
2. Gradually return to moderately challenging functional activities.

vi. Late phase clinical expectations (4-6 months)

1. Return to recreational hobbies, gardening, sports, golf, doubles tennis

vii. Criteria for discharge from skilled therapy

1. Patient able to maintain pain free AROM
2. Maximized functional use of upper extremity
3. Maximized muscular strength, power and endurance in upper extremity.
4. Patient has returned to advanced functional activities.

7. References

- a. Blackburn, Turner A, et al. Rehabilitation after Ligamentous and Labral Surgery of the Shoulder: Guiding Concepts. *Journal of Athletic Training* 2000;35(3):373-381
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- c. Unverzgat, Ross, Hughes; Case Report: Rehabilitation and Outcomes for a Patient Following Implant of a Reverse Delta III Shoulder Prosthesis. *Orthopaedic Physical Therapy Practice* 2006; 18 (2): 32-37
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