IVAN WONG, MD FRCS (C)
Dip. Sports Medicine, Orthopaedic Surgeon
Specializing in Sports and Trauma Surgery
Arthroscopic Reconstruction of Shoulder, Hip, and Knee
2nd Floor, Room 2106, Camp Hill Veteran's Memorial Building
5655 Veteran's Memorial Lane, Halifax, Nova Scotia, B3H 2E1

OPEN PEC REPAIR

This protocol is intended to provide clinicians with guidelines for the post-operative management of a patient who has undergone an open pec repair. This protocol is not a substitute for a clinician's clinical reasoning during a patient's post-operative healing/progress. Clinical reasoning should be based on individual symptoms, physical signs, progress, and/or the presence of operative complications. If a clinician requires assistance or guidance at any stage of recovery they should consult with Dr. Wong's office.

Postoperative Guidelines:

- Physiotherapy commencing at 3 weeks post-op

- Protect surgical repair
  - **14 weeks** is required for sufficient tendon-to-bone healing post-operatively

- Prevent post-op rehabilitation complications:
  - Failed tissue repair due to insufficient tendon-to-bone healing from overstretching

- [Protected] Mobility before strengthening
  - Gaining ROM too slowly may result in residual stiffness and delayed recovery
  - Early emphasis on rotational mobility should be performed in resting position of the glenohumeral joint (scapular plane)
  - Strengthening when range is not available can lead to compensatory movement strategies and poor muscle activation patterns.
    NO RESISTED STRENGTHENING UNTIL 14 weeks POST OP
  - N.B. Exercises must not reproduce pain

- Return to Work
  - Determined by Orthopaedic Surgeon – generally occurs between 3-6 months post-op
  - Often associated with graduated hours and modified duties

- Return to Sport
  - Determined by Orthopaedic Surgeon – generally occurs between 6 & 12 months post-op
    - Dependent on contact vs. non-contact, as well as level of play

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OPEN PEC REPAIR WITH ALLOPATCH

Phase I (Protection): *0-3 weeks*

Short Term Goals of Phase I:

1. Education: posture, joint protection, positioning, hygiene, restrictions
2. Immobilization with sling (abduction pillow/wedge) to protect surgical procedure
3. Minimize pain and inflammatory response
4. Maintain/restore ROM of uninvolved joints (neck, thorax, elbow, wrist/hand)

Restrictions/Precautions for Phase I:

1. Remain in sling at all times; remove only for showering and ROM exercises
    a. *when sleeping with the sling a reclining chair is often most comfortable*
2. Avoid getting incisions wet
3. No driving
4. No active motion (AROM) of shoulder
5. No mobilizations/manipulations/traction to GHJ
6. No lifting/pushing/pulling objects with operative shoulder
7. No arm use beyond ROM guidelines/restrictions
8. No passive range of motion abduction x3 weeks post op
9. No external range of motion past neutral x 12 weeks post op
10. Weeks 3-6 = PROM; 6-10 = AAROM (if PROM is full); No active motion (AROM) of shoulder until 10 weeks
11. Weeks 0-3 gentle passive flexion. Limit passive shoulder flexion by 10° per week, as tolerated

Management Recommendations for Phase I:

- Weeks 3-6 = PROM; 6-10 = AAROM (if PROM is full); No active motion (AROM) of shoulder until 10 weeks

- **Mobility**
    - Neck, thorax, elbow, wrist/hand*:* general ROM (as needed)

- **Muscle Activation / Awareness**
    - No muscle activation

- **Scar Management -** keep incisions clean and dry

- **Modalities -** home cryotherapy for ~10 - 20 min every few hours for pain and inflammatory control

Comments:

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Phase II (Mobility): *3-6 weeks*

Requirements to progress to Phase II:

1. Follow-up with Orthopaedic Surgeon
2. Appropriate healing from surgery by following precautions & immobilization guidelines
3. ROM guidelines met but not exceeded
4. Pain control within allowed ROM

Short Term Goals of Phase II:

1. Education: posture, joint protection, positioning, hygiene, restrictions
2. Immobilization with sling (abduction pillow/wedge) to protect surgical procedure
3. Minimize pain and inflammatory response
4. Maintain/restore ROM of uninvolved joints (neck, thorax, elbow, wrist/hand)
5. Achieve recommended PROM through gentle and painfree PROM mobilizations with Physiotherapist
6. Prevent post-operative stiffness
1. Normalize scapular position and mobility (dissociation from GHJ)
2. Improve stability and neuromuscular control of cervical spine (if necessary)

Restrictions/Precautions for Phase II:

1. Remain in sling (include sleeping); remove only for showering and ROM exercises
2. No driving
3. Weeks 3-6 = PROM; 6-10 = AAROM (if PROM is full); No active motion (AROM) of shoulder until 10 weeks
4. Shoulder flexion & abduction 30° at 3 weeks post op, increasing by 10° per week, as tolerated
5. Do not over-stress repair with stretching (beyond R2) within first 12 weeks
6. Avoid Active Release Techniques
7. No mobilizations (arthrokinematics)/manipulations/traction to GHJ
8. No lifting/pushing/pulling objects with operative shoulder
9. No arm use beyond ROM guidelines/restrictions
10. No external rotation past neutral x 12 weeks post op
11. No resisted strengthening x 14 weeks post op

Special considerations:

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Management Recommendations for Phase II:

1. **Manual Therapy**
   - Passive ROM (passive physiological ROM) within R2
     - **o** isolate GHJ (ensure full ROM) before progressing to full elevation
     - o begin in scapular plane to reduce stress on healing tissue and maximize humeral head/glenoid congruency
   - Soft tissue massage to shoulder complex (as needed)

2. **Mobility - PROM** *(3-6 weeks)* and **AAROM** *(6-10 weeks)*
   - Cradle pendulums *for passive cradle pendulums arm should be cradled by non surgical arm and muscles be completely relaxed. Move the arm by ONLY using the non surgical arm)*
   - Shoulder*:* use opposite arm for self PROM (follow ROM guidelines; respect R2)
     - o can progress to wall walking or a stick/cane for AAROM if appropriate timeline and follow ROM restrictions and ensure patient does not push beyond R2
   - Scapula: perform mobilizations of scapula as needed– ensure no active movement of GH
   - Neck, thorax, elbow, wrist/hand*:* general ROM (as needed)

3. **Muscle Activation/Awareness**
   - Posture awareness/correction
   - Ball squeezes (gentle grip strengthening)
   - *Scapular awareness / stabilization (4 weeks)*
     - o Scapular set to restore optimal position (counteract anterior tilt, depression and downward rotation)
     - o Unilateral elevation/depression/protraction/retraction (commence in sling); progress to scapular clock exercises (as able)
   - *Rotator Cuff/Pec* strengthening restricted x 14 weeks
   -
4. **Scar management** (once incisions have closed)

5. **Proprioceptive Awareness**
   - *Must fit within ROM guidelines/restrictions; utilize non-operative arm*

6. **Modalities** *(if no contraindications present)*
   - Pain management (e.g., Ice 10-15 minutes every few hours; TENS / IFC)
   - Cryotherapy ↔ Heat

7. **Recommended Concomitant Service(s):** Massage Therapy *(ensure complimentary to PT Rx)*

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Phase III (Neuromuscular Retraining): *6-14 weeks*

Requirements to progress to Phase III:

1. Follow-up with Orthopaedic Surgeon
2. Compliant with recommendations/restrictions to ensure appropriate healing from surgery
3. ROM improving and guidelines not exceeded
4. Pain control within allowed ROM

Short Term Goals of Phase III:

1. Education: restrictions
2. Prevent/eliminate pain and inflammatory responses
3. Restore active shoulder mobility within correct movement patterns progressively
4. Maintain/restore appropriate capsular extensibility
5. Improve scapular awareness and stability
6. Improve neuromuscular control and endurance of shoulder musculature
7. Increase endurance of cervical spine stabilizing musculature (if applicable)

Restrictions/Precautions for Phase III:

1. Continue to avoid any pain with stretching; do not stretch beyond R2 (Shoulder flexion & abduction 30° at 3 weeks post op, increasing by 10° per week, as tolerated)
2. Slowly increase active motion (AAROM/AROM) of shoulder
3. Avoid terminal stretching
4. No mobilizations (arthrokinematics)/manipulations/traction to GHJ
5. No lifting/pushing/pulling objects with operative shoulder
6. No external rotation past neutral x 12 weeks post-op
7. No resisted strengthening x 14 weeks post-op

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Management Recommendations for Phase III:

1. **Manual Therapy**
   - Restore mobility progressively – PROM/AAROM (*avoid aggressive terminal stretching; no ER x 12 weeks post-op*)
     - **i.** i.e., Passive Physiological ROM, METs
     - **ii.** i.e., Soft tissue release to antagonistic muscle(s)

2. **Mobility – AAROM/AROM** (10 weeks post op if 90% PROM is regained)
   - Perform AAROM/AROM with good scapular control and avoidance of compensatory movements (except no ER past neutral x 12 weeks)
     - Begin in scapular plane to maximize humeral head/glenoid congruency

3. **Muscle Activation/Endurance**
   - *Scapular stabilization*
     - Restore and challenge optimal mechanics & positioning (facilitate upward rotation)
     - include OKC & CKC exs; consider requirements for ADLs, sport, work
   - *Pec/Rotator Cuff* - improve neuromuscular control (recruitment) then endurance
     - As enhance muscular recruitment, begin to address low intensity endurance retraining (using active ROM; no resistance)
       - Prescribe <u>appropriate</u> parameters; gradually address muscle demand/intensity
       - Neuromuscular Electrical Stimulation (if no contraindications present) can help facilitate muscle activation/awareness
       - Start neutral & progress range at limits of good scapular positioning and control
       - Start in scapular plane; progress to all motion planes (coronal & sagittal)
       - Begin strength/hypertrophy at 14 weeks post-op
       - * ***Exercises must be performed within available active ROM***

4. **Proprioceptive Awareness** – OKC and CKC beginner exercises

5. **Modalities** *(if no contraindications present)*
   - Neuromuscular Electrical Stimulation

6. **Recommended Concomitant Service(s):** Massage Therapy *(ensure complimentary to PT Rx)*

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Phase IV (Strength and Function): *14^{+} weeks*

Requirements to progress to Phase IV:

1. Follow-up with Orthopaedic Surgeon
2. Compliant with recommendations/restrictions to ensure appropriate healing from surgery
3. Full active shoulder mobility within correct movement patterns
4. Improved neuromuscular control and stabilization of scapula
5. Improved neuromuscular control and recruitment of shoulder musculature

Short Term Goals of Phase IV:

1. Increase strength and endurance of shoulder musculature
    a. Progress strengthening at limits of good scapular positioning and control
    b. Include all planes of motion (scapular, coronal and sagittal)
    c. Introduce parameters to address endurance and strength/endurance
    d. Introduce parameters to address both concentric and eccentric loads
    e. Integrate CKC exercises (not only OKC)
2. Improve functional strength of shoulder girdle
3. Improve Proprioceptive awareness of shoulder girdle – both OKC and CKC exercise
4. Introduce return to work retraining
5. Introduce sport-specific retraining (approx. 16^{+} weeks post-op)
6. Improve functional stability and neuromuscular control of cervical spine (if necessary)
7. Gently/slowly increase external rotation mobility

Precautions for Phase IV:

1. Avoid aggressive terminal stretching
2. No manipulations to GHJ
3. Light- lifting/pushing/pulling objects with operative shoulder
4. Plyometric retraining must be cleared by Orthopaedic Surgeon

Special considerations: