SLAP Repair

1. Defined
    a. Reattachment of the superior labrum of the glenoid
    b. Types of SLAP lesions
        i. Type I- fraying of the labrum, superior labrum, and biceps tendon attachment is preserved. Degenerative in nature. Surgical fix is arthroscopic debridement of frayed labrum without anatomic repair.
        ii. Type II – detachment of the superior labrum and biceps anchor from the glenoid. Unstable biceps labral complex, anterior to posterior involvement. Surgical fix is an anatomic repair involving biceps anchor.
        iii. Type III – anterior/posterior bucket handle tear of the superior labrum. No detachment of the superior labrum or biceps anchor from glenoid. Surgical fix is arthroscopic debridement of frayed labrum without anatomic repair.
        iv. Type IV – anterior/posterior bucket handle tear, which extends into the bicep tendon, with an unstable biceps labral complex. Surgical fix is an anatomic repair involving biceps anchor.
2. Goals
    a. Protect healing tissue
    b. Control post-operative pain and swelling
    c. Improve post-operative range of motion
    d. Improve functional strength, stability, and neuromuscular control
3. Rehabilitation Principles
    a. Be aware of compromised and/or repaired tissue
    b. Path mechanics and effects on rehabilitation
        i. Compression mechanism of injury
            1. Falling on outstretched arm causes compression of the superior joint surface superimposed with subluxation of the humeral head
            2. Avoid weight bearing exercises to minimize compression and sheer on the superior labrum
        ii. Traction mechanism of injury
            1. High eccentric activity of the biceps brachia during arm deceleration and following through of overhead throw – biceps contraction raises the labrum off the glenoid rim
            2. Avoid heavy resisted or excessive eccentric biceps contractions
        iii. Peel back mechanism of injury
            1. In a position of 90 degrees Abduction and 90 degrees external rotation producing a twist at the base of the biceps with a torsion force on the anchor
            2. Avoid excessive shoulder external rotation while shoulder is healing
    c. 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 21-60days but occurs from 1 to 8 weeks
        iv. Final maturation taking as long as 360 days
    d. 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 or pain before end range
    2. Aggressive stretching is contraindicated
    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/IV mobilization and sustained stretching is appropriate

e. Eliminate inflammation as the cause of pain and neuromuscular inhibition
f. Ensure return of appropriate joint athrokinematics
g. Apply techniques in loose packed unidirectional and progress to close packed and multidirectional based on tissue healing and patient response
h. 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

i. Encourage life-long activity modification to reduce factors associated with re-injury. Work within the "safe-zone" for upper extremity activity.
j. Encourage integration of core strengthening with therapeutic exercises
k. Factors that affect rehab process
    i. Surgical approach
    ii. Tissue quality
    iii. Presence of concomitant pathology
    iv. Age of patient
    v. Co-morbidities
    vi. Pre and intra-operative range of motion
    vii. Pain and sensitivity levels
    viii. Cognitive abilities
l. Re-establish voluntary and pain free control of the rotator cuff to prevent rotator cuff shutdown and decrease humeral head migration with AROM. Exercising through the shrug sign may damage the repair. Progress through the following:
    i. Isometrics
    ii. Active assisted elevation with eccentric lowering and isometric holds
    iii. Isotonic<90 degrees ("downstairs" or gravity reduced)
    iv. Isotonic>90 degrees ("upstairs")
    v. Rhythmic stabilization
        1. Flexion (prone and supine)
        2. Internal/external rotation
m. Maintain scapular stabilization and mobility; proximal stability for distal mobility

4. Post op functional guidelines
    a. Dependent on functional range, strength, and neuromuscular control
    b. Drive
        i. No research to support recommendations for return to driving
        ii. Refer patient to physician
        iii. Refer patient to drug precautions
        iv. Refer patient to auto insurance coverage
    c. Work
        i. Sedentary up to 14 days
        ii. Medium to high physical demand level will be job specific

1. Dependent on functional demands of job
2. Physician input is required for final decision

d. Sport
   i. Golf no earlier than week 12
      1. Encouraging backward golfing
         a. Begin putting at week 4
         b. Utilize the driving range for all practice
         c. Begin with short irons and partial swings progressing to long irons and full swing
         d. Progress to drivers and hybrid by week 12
   ii. Swimming
      1. Kick board with arm at side at week 6
      2. Freestyle stroke no earlier than week 14
      3. Weight lifting no earlier than week 12
      4. Reinforce safe zone principles
      5. Emphasize scapular stabilizers
      6. Begin with individual muscles, single joint movement, and light weights. Progress to large muscle groups, multi-joint movements, and heavy weights
      7. Incline bench, bench press, and military press begin at week 24
   iii. Throwing
      1. Emphasize proper biomechanics and proprioception with a functional progression through phases of throwing no earlier than week 6
      2. Initiate ER at 90 degrees Bad at week 9
      3. Initiate interval throwing program no earlier than week 12
      4. Throwing from the mound no earlier than week 16
      5. Throwing from the mount, full velocity no earlier than week 20
   iv. Contact Sports
      1. No earlier than week 24

5. Post op equipment guidelines
   a. Sling with abduction pillow at all times when not bathing or performing exercises
      i. Begin weaning out of sling 4-6 weeks per MD orders
   b. Polar Care as needed for pain and inflammation

6. Rehabilitation Guidelines

a. Week 1-4: Protective PROM Phase

i. Precautions/Limits
   1. No active elevation
   2. Limit passive flexion 150
   3. Limit passive ER to 45 at 0 degrees abduction
   4. Limit passive IR to 45 in scapular plane
   5. No passive abduction
   6. No passive extension past 0
   7. No resisted elbow flexion

ii. Clinical Expectations by end of week 4
   1. Passive flexion 150
   2. Passive ER to 45 at 0 Abd
   3. Passive IR to 45
   4. Achieve PROM to post-op restriction by end of week 4

iii. Treatment
   1. PROM for shoulder elevation such as pulleys, pendulum, or manual passive range
   2. Grade I-II joint mobilizations
   3. Modalities as indicated for pain and swelling

4. Isometric scapular setting and scapular AROM such as scapular clocks, shoulder shrugs, or shoulder squeezes
5. Sub-max pain free isometric contraction of the rotator cuff with gradual increase in force production
6. Initiate ER/IR with resistance with respect to tissue reactivity and within ROM limitations
7. Initiate elbow, hand, and finger AROM and hand and finger PREs for total arm strength
8. Initiate integration of core strengthening into therapeutic exercises

b. Week 5-8: AROM Phase

i. Precautions/Limits

1. Limit passive flexion and scaption 180
2. Limit passive abduction to 120
3. Limit passive ER to 60 degrees at 0 abduction and to 45 at 45 abduction
4. Limit passive IR to 60 in scapular plain

ii. Clinical Expectations by end of week 8

1. Progress to grade III-IV joint mobilization if not meeting passive range of motion expectations
2. Modalities as indicated for pain and swelling
3. AAROM for shoulder elevation such as pulleys, want, wall walks, or manual assisted range
4. Progress AAROM to AROM
5. Begin gravity reduced and progress to gravity resisted elevation
6. Passive posterior shoulder stretching
7. Functional IR stretching with scapular stabilization such as reaching behind back at week 6
8. Sub-max pain free isometric contraction of the biceps with gradual increase in force production progressing to low resistance bicep curl by end of week 7
9. Gravity reduced rhythmic stabilization at 90 degrees flexion in scapular protraction beginning gradually with light resistance and progressing from proximal to distal at week 6
10. Initiate partial weight bearing exercises such as wall push up at week 8
11. Progress integration of core strengthening into therapeutic exercises as indicated for pain and swelling
12. AAROM for shoulder elevation such as pulleys, want, wall walks, or manual assisted range
13. Progress AAROM to AROM
14. Begin gravity reduced and progress to gravity resisted elevation
15. Passive posterior shoulder stretching
16. Functional IR stretching with scapular stabilization such as reaching behind back at week 6
17. Sub-max pain free isometric contraction of the biceps with gradual increase in force production progressing to low resistance bicep curl by end of week 7
18. Gravity reduced rhythmic stabilization at 90 degrees flexion in scapular protraction beginning gradually with light resistance and progressing from proximal to distal at week 6
19. Initiate partial weight bearing exercises such as wall push up at week 8
20. Progress integration of core strengthening into therapeutic exercises

c. Week 9-12: Strengthening Phase

i. Precautions/Limits
   1. Progress symptomatically

ii. Clinical Expectations by end of week 12
   1. Passive flexion and scaption to 180
   2. Passive ER 90-115 at 90 degrees abduction as indicated for sport
   3. Passive IR to 70 at 90 degrees abduction
   4. Active elevation in the plane of the scapular to 150 without shrug sign
   5. Active functional ER to C7 level
   6. Active functional IR to L5 level
   7. Strength 4/5 for ER at 0 abduction

iii. Treatment
   1. Grade III/IV joint mobilization if indicated
   2. Modalities as indicated for pain and swelling
   3. Initiate passive ER at 90 abduction at week 9
   4. Progress resistance and reps with isotonic throughout phase concentrating on eccentric control
   5. Advance proprioception for rehabilitation principles including PNF patterns and rhythmic stabilization
   6. Advance weight bearing exercises per rehabilitation principles
   7. Progress integration of core strengthening into therapeutic exercises
   8. Initiate 2 handed ply metrics at week 12

d. Week 13+: Functional Training

i. Precautions/Limits
   1. Progress symptomatically
   2. MD clearance for sport activities

ii. Clinical Expectations by the end of week 16
   1. Symmetrical AROM for elevation without shrug sign
   2. Symmetrical active functional ER and IR
   3. Strength 4+/5 for ER at0 degrees abduction
   4. Strength 4/5 for ER at 90 degrees abduction
   5. Symmetrical strength for elevation at 90 degrees abduction

iii. Treatment
   1. Progress isotonic and two handed ply metrics
   2. Continue PRN and rhythmic stabilization in open and closed kinetic chain exercises
   3. Continue to progress rotator cuff and scapular strengthening and proprioception encouraging working shoulder safe zone principles
   4. Initiate 1 handed ply metrics at week 14
   5. Initiate overhead ply metrics at week 14
   6. Initiate sports specific training
   7. Progress integration of core strengthening into therapeutic exercises
   8. Lower extremity strengthening and stretching
   9. Return non-overhead athletes back to sports as tolerated per post-op functional guidelines