5 Shoulder Instability Repairs

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INTRODUCTION

Shoulder instability is common in young individuals. Whether it is a relatively straightforward acute anterior traumatic dislocation, posterior instability, or a more subtle multidirectional instability, it is important to ascertain the type of shoulder instability in order to correctly guide treatment. Shoulder instability can be unidirectional or multidirectional, as well as both traumatic and atraumatic in nature. The classical acronyms TUBS (Traumatic Unidirectional Bankart Surgery) and AMBRI (Atraumatic Multidirectional Bilateral Rehabilitation Inferior capsular shift) have long been used to help the clinician guide treatment based on the type of instability. While these simple acronyms have been used for years and may not cover all types of shoulder instability, they are still helpful in drawing attention to the mechanism of instability and the nature of treatment often recommended.

When evaluating a patient with possible shoulder instability, several critical factors must be assessed. First is the patient's age. Younger individuals with anterior shoulder dislocations are at a significantly higher risk to have recurrent instability compared to older individuals. Among 15 to 35 year olds, about 50% will have a subsequent instability in the first 2 years following primary dislocation, and about two-thirds within 5 years. Due to the high recurrence rate, and the significant impact that shoulder instability can have on an individual, surgical stabilization is often recommended to treat young active patients. In contrast, older patients are much less likely to have recurrent instability, and those over age 40 years are far more likely to sustain a rotator cuff injury at the time of an initial anterior dislocation.

Most unidirectional shoulder instability is anterior and traumatic. Anterior instability usually manifests as a dislocation event and often requires a closed reduction. Typically, the mechanism of injury is an abduction and external rotation (ER) force on the arm. The anterior inferior glenohumeral ligaments (AIGHL) and the posterior inferior glenohumeral ligaments (PIGHL) are the primary restraints to anteroposterior translation with the arm abducted. The Bankart lesion, considered the "essential" lesion, is an avulsion injury of the anterior labrum that typically extends from the 2 o'clock position to the 6 o'clock position (in a right shoulder) (Figure 5.1) and disrupts the AIGHLs and has variable healing. There are several varieties of anterior labral injuries, including glenoid labral articular defect (GLAD) lesions and anterior labral periosteal sleeve avulsion (ALPSA) lesions. If these lesions are not treated surgically, patients may suffer from recurrent instability. Anterior glenohumeral instability without labral injury and atraumatic anterior instability is relatively uncommon.

Several other lesions are also associated with acute shoulder dislocation, including humeral avulsions of the glenohumeral ligament (HAGL) lesions and glenoid rim fractures. Also seen,

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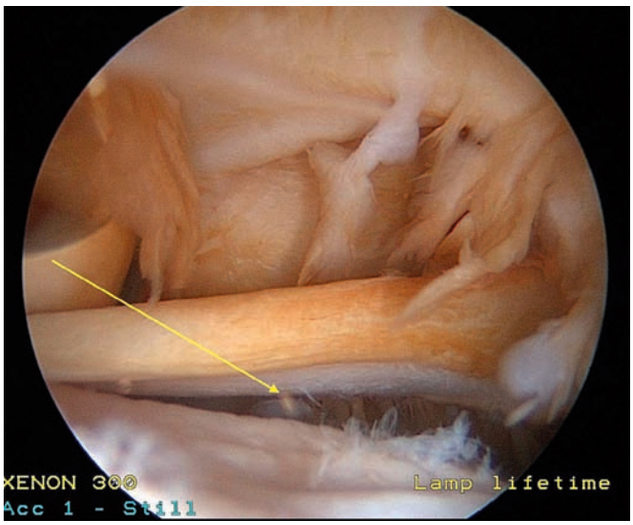

Figure 5.1 Arthroscopic image of a Bankart lesion (*yellow arrow*).

especially after repeated anterior shoulder dislocation, are Hill Sachs lesions, or osteochondral impaction injuries to the posterosuperior humeral head. These are caused by impaction of the posterosuperior humeral head on the anterior glenoid rim with a dislocation event. Recurrent glenohumeral instability often leads to glenoid bone loss and can affect the decision regarding the surgical technique and the outcome of repair (Figure 5.2).

Traumatic posterior instability is much less common, involving the posterior labrum and PIGHLs and a reverse Bankart lesion. Posterior instability can be either traumatic dislocation or atraumatic repetitive microtrauma to the posterior capsule and labrum. Traumatic posterior instability is often seen with a posterior directed force on a shoulder that is flexed, adducted, and internally rotated, or it may be associated with a seizure or electric shock when a forceful tetanic muscle contracture causes the stronger posterior shoulder muscle to dislocate the humeral head posteriorly. Atraumatic posterior instability is more common; it is seen in individuals who perform activities with repetitive posterior-directed forces, such as football offensive linemen, weight lifters, and overhead athletes.

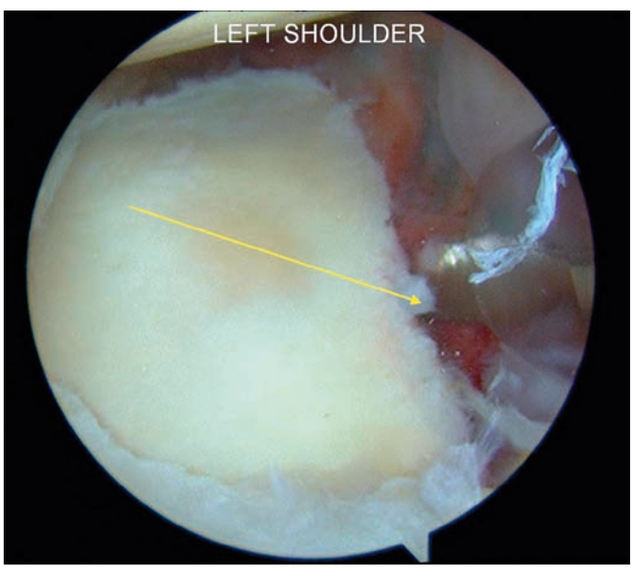

Figure 5.2 Arthroscopic image showing anteroinferior glenoid bone loss (*yellow arrow*).

Multidirectional instability (MDI) is typically defined as instability in two or more directions. While MDI is generally thought of as being atraumatic in nature, and associated with repetitive microtrauma or congenital laxity, it can also be due to extensive labral tears. Those with MDI coupled with large labral tears are probably an extension of traumatic unilateral instability. Patients with atraumatic MDI usually complain of pain or subjective instability with particular activities or arm positions. Often, MDI is seen in overhead athletes, especially those who participate in swimming, volleyball, and gymnastics. They may have associated hyperlaxity and collagen disorders, such as Marfan's disease and Ehler's Danlos. These associated collagen disorders decrease the likelihood of a successful surgical outcome.

PREOPERATIVE EVALUATION

A thorough history and physical examination should be performed to ascertain the nature of the instability. Both shoulders are examined to assess range of motion (ROM), strength, direction of shoulder instability, as well as signs of generalized ligamentous laxity.

Plain radiographs, including true anteroposterior, axillary lateral, and West Point views, should be obtained to evaluate for humeral and glenoid bone loss. A computed tomography (CT) scan with three-dimensional reconstructions should be considered for any patient who demonstrates instability at low angles of abduction, planned revision surgery, or presence of bone loss on plain radiographs. Bone loss greater than 20% may result in failed isolated arthroscopic soft-tissue repair (Figure 5.3). An MR arthrogram is commonly used to assess for the extent of capsulolabral injury, a HAGL lesion, rotator cuff integrity, or posterior pathology.

SURGICAL MANAGEMENT

When patients have failed conservative measures and continue to have pain and recurrent instability, surgical intervention is often warranted. The nature of the surgery is dependent on the patient's age, mechanism of injury, and type of instability present. Regardless of the surgical procedure, the patient must be mentally prepared for the surgery, which frequently requires a long rehabilitation period.

Unidirectional Anterior Glenohumeral Instability

The goal of surgical intervention is to restore the attachment of the labrum and AIGHL. Open repair was traditionally achieved with the Bankart procedure. While these procedures

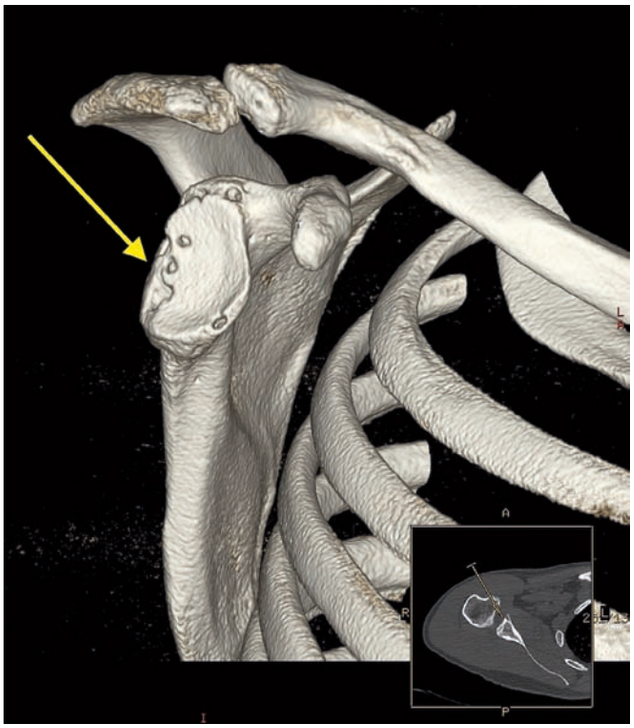

Figure 5.3 A three-dimensional CT scan showing significant posterior bone loss after 2 failed posterior instability repairs (*yellow arrow*).

are very effective, over the past 10 to 20 years, the advances in shoulder arthroscopy have allowed us to perform these procedures minimally invasively with comparable results. Additionally, arthroscopic repairs have advantages over open surgery, including lower complication rates (fewer infections and nerve injuries) as well as avoiding surgical disruption of the subscapularis anteriorly and the infraspinatus posteriorly.

Arthroscopic Repair

The patient can be placed in a beach chair or lateral decubitus position depending on the surgeon's preference. Our preference is to perform all instability procedures in the lateral decubitus position. Accurate portal placement is the key to visualization, tissue mobilization, and accurate hardware placement. A standard posterior viewing portal is placed 1 cm medial and 2 cm inferior to the posterolateral acromion. A standard anterior midglenoid (AMG) portal low in the rotator interval, just above the subscapularis tendon, is also established and used for suture management and the easy passage of arthroscopic tools. A posteroinferior (PI) portal, or a 7 o'clock portal (left shoulder), can be placed 3 cm distal and 1 cm lateral to the posterolateral acromion. It gives excellent access to the inferior glenoid and is useful for glenoid preparation, posterior anchor placement, and suture management. The portal also provides access to the posterior glenoid should the lesion extend more posteriorly. Other commonly used portals include an anterior superior portal through the rotator interval and an accessory lateral (Wilmington) portal 1 cm lateral to the acromion.

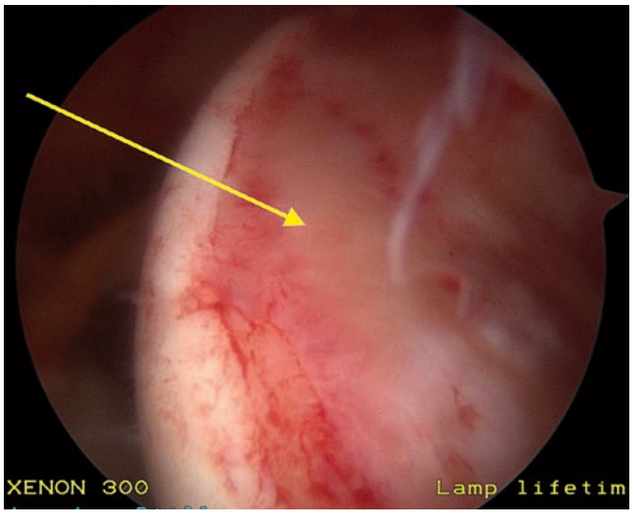

Figure 5.4 Arthroscopic image of a Hill Sachs lesion of the humeral head (*yellow arrow*).

A standard diagnostic arthroscopy is performed to evaluate the labrum, rotator cuff, and biceps tendon. The humeral head is evaluated for the presence and size of a Hill Sachs lesion (Figure 5.4). Specific attention must be paid to the integrity of the labrum to evaluate for any sign of a Bankart lesion or associated fracture. Glenoid bone loss is assessed, as this may alter the surgical procedure. An ALPSA is found when the disrupted labroligamentous heals medially along the glenoid. This lesion is often found in recurrent dislocators and can be best seen from the anterior superior viewing portal. Special attention is also paid to the anterior capsule to evaluate for the presence of a HAGL. Visualization of the subscapularis muscle fibers through the capsule suggests the presence of this lesion. The arthroscope should also be placed through the anterior portal to fully evaluate the posterior structures. Failure to recognize and address all associated pathology will likely result in an unsatisfactory outcome.

Once a thorough diagnostic arthroscopy is completed, an arthroscopic elevator is used to develop a plane between the glenoid and capsulolabral complex (Figure 5.5, A) in order to fully release the capsule and labrum so that they can be mobilized onto the glenoid rim (Figure 5.5, B). The glenoid rim is then carefully prepared using an arthroscopic burr or rasp. The bony surface should be decorticated to remove any overlying fibrous tissue and to achieve a bleeding surface, but excessive bone should not be removed.

Once the glenoid rim has been prepared, suture anchors are placed into the glenoid rim to repair the labral tissue back to the glenoid. Regardless of the type of suture anchor used, the key maneuver of the shoulder stabilization procedure is to reestablish the tension of the AIGHL. The most inferior anchor is placed first as a drill guide is introduced into the posterior inferior portal, from which both limbs of the suture pass. The tip of the drill guide is placed between the 5:30 to 6:00 position on the glenoid (right shoulder). This will allow

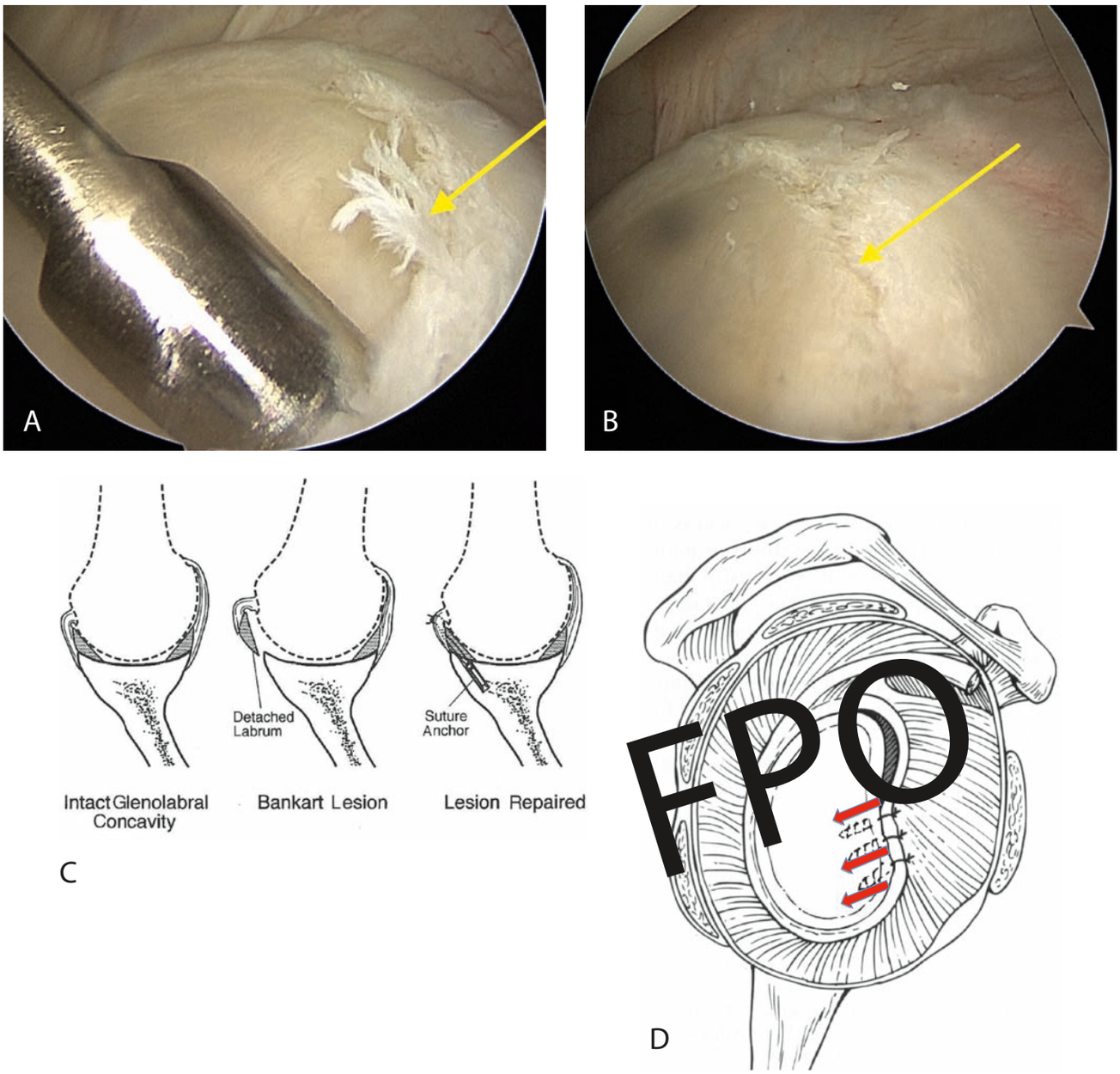

Figure 5.5 Arthroscopic images showing development of a plane between the glenoid and capsulolabral complex. **A**, The labrum should be thoroughly elevated with an arthroscopic elevator (*yellow arrow*). **B**, An adequate release has been achieved when the labrum rests without tension at the level of the glenoid (*yellow arrow*). **C**, Illustration of an axial image of an arthroscopic Bankart repair for anterior glenohumeral instability of a right shoulder. **D**, Illustration of a sagittal image of an arthroscopic Bankart repair for anterior glenohumeral instability of a right shoulder. (**C** reproduced with permission from Trumble TE, Budoff JE, Cornwall R: *Hand, Elbow, & Shoulder: Core Knowledge in Orthopaedics.* Philadelphia, PA, Elsevier, 2006.)

the tissue captured with the suture to be brought anteriorly and superiorly (Figure 5.5, C and D).

We prefer to work from a posterior to anterior direction. In order to restore the disrupted labral tissue back to the glenoid rim and reestablish the appropriate tension, the suture-passing instrument should enter the capsule approximately 1 cm posterior and inferior to the planned anchor site. In the inferior capsule, one needs to be careful to avoid passing the device too deeply into the soft tissue to avoid injury to the axillary nerve. Once this anchor has been placed, the surgeon should note the reduction of the inferior capsular redundancy. The suture can then be cut with an arthroscopic suture cutter. It is important to cut the suture without tails to prevent mechanical irritation and damage to the articular surface. This process is then repeated from an inferior to superior direction in order to elevate the labral tissue back to the glenoid and to restore

tension. For typical Bankart lesions, we use three anchors; however, this is ultimately dictated by the size of the labral tear.

Posterior Glenohumeral Instability

Many of the technical aspects of arthroscopic posterior instability repairs are similar to anterior repairs. A complete diagnostic arthroscopy should be performed with careful inspection of the posterior labrum and capsule. With careful inspection, one may encounter a reverse Bankart lesion or a reverse Hill Sachs lesion. Injuries to the posterior capsule, a posterior HAGL, or a Kim lesion (incomplete avulsion of the posterior labrum) may also be present. As with anterior instability, the labrum is elevated to an anatomic position and the associated capsulolabral tears are repaired with the use of suture anchors. However, in these procedures, the process of placing anchors begins anteriorly and progresses posteriorly to recreate the sling effect of the PIGHL and to decrease the posterior capsular volume.

Multidirectional Instability

The surgical repair for multidirectional instability involves capsular plication. It requires the same basic setup and portal placement as is noted with the anterior instability repair. However, in this procedure, the main focus is addressing the generalized capsular laxity. To do this, anchors are placed along the glenoid rim with the focus on trying to remove the capsular redundancy that leads to multidirectional instability. In what is called a pinch-tuck technique, anchors are placed and then a "pinch" of capsular tissue is obtained with an arthroscopic suture passer; the capsular tissue is then tied down to the anchor. This decreases the capsular volume and stabilizes the shoulder. As with anterior or posterior instability, stabilization proceeds from inferior to superior. To encourage the redundant capsular tissue to scar to itself and permanently decrease the capsular volume, the surface of the capsule is abraded with a rasp prior to suture plication. If additional capsular plication is desired to further decrease the capsular volume, plication stitches without anchors can be placed around the intact labrum in areas between the previously placed suture anchors.

POSTOPERATIVE REHABILITATION

Rehabilitation plays a vital role in the functional outcome following shoulder stabilization surgery. The goal of the postoperative treatment is to ensure a balance between mobility and stability. We utilize a criteria-based approach to rehabilitation that divides the rehabilitation into 4 progressive phases, each tailored to the specific surgical procedure. Each phase consists of specific goals and exercises that are designed to systematically introduce forces and loads to the healing tissues while avoiding overstressing them. It is the intent of these programs to serve as a guideline. therefore, based on the patient and surgical intervention, the clinician will be able to make appropriate adjustments to each program. Although there are many common principles that can be applied to the rehabilitation of all instability repairs, there are also specific differences that relate to the direction of instability as well as to the repair.

Table 5.1 PATIENT FACTORS AFFECTING THE REHABILITATION PROGRAM

- Patient's tissue status
- Hyperelasticity ↔ hypermobility
- Dynamic stabilizers status
- Muscle–bone
- Muscular strength and balance
- Proprioceptive ability
- Classification of instability
- Previous activity level
- Desired activity level (expectations)
- Healing abilities (rapid healers, slow healers)

When designing a shoulder instability rehabilitation program, the therapist must take into account several patient-related (Table 5.1) and surgery-related (Table 5.2) variables that may impact the rehabilitation. First, healing tissues should never be overstressed; therefore, the program must be progressive and sequential, with each phase building from the prior phase. Based on our experience of poorer outcomes following prolonged immobilization followed by a rapid progression of ROM, we implement the restoration of ROM in a gradual, systemic format with stretching precautions for the first 8 to 10 weeks following surgery. Second, the effects of immobilization must be minimized, especially in the overhead athlete. After shoulder stabilization surgery, a short period of immobilization may be indicated to allow initial healing. During this phase, however, the clinician can incorporate mild dynamic stabilization drills, gentle restricted passive motions, and submaximal isometrics to enhance dynamic stability, assist in collagen organization, and prevent loss of motion. In addition, the quality of end feel should be continually monitored throughout the rehabilitation by applying a slight overpressure at the end range of passive ROM (PROM). If a firm or hard end feel

Table 5.2 SURGICAL FACTORS AFFECTING THE REHABILITATION PROGRAM

- Type of surgical procedure (exposure, specific procedure, tissue used)
- Method of fixation
- Type of instability (instability classification)
- Patient's tissue status (hyperelasticity, normal, hypoelasticity)
- Patient's response to surgery
- Patient's dynamic stabilization (muscle strength, dynamic stability, proprioception)
- Patient's activity level (past, present, desired goals)
- Physician's philosophical approach

is noted, the clinician may accelerate the rate of ROM progression; with a soft or empty end feel, the patient's stretching program will be slowed. Third, the patient must fulfill specific criteria to progress from one phase to the next, thus allowing the rehabilitation program to be individualized based on the patient's unique healing rate and constraints. Finally, a successful outcome is related to a team effort, with the physician, therapist, and patient all working together toward a common goal.

Phases of Rehabilitation After Surgery

Phase I

In the immediate postoperative period, ROM is restricted. The primary goal of this phase is to prevent excessive scarring by allowing movement, but avoiding overaggressive motion that may compromise the surgical repair. For example, after an anterior stabilization procedure, external rotation is restricted, as this may overstress the capsulolabral repair. Submaximal and subpainful isometric contractions are also initiated during phase 1 to stimulate muscle training, neuromodulate pain, and prevent muscle atrophy that occurs as a result of immobilization (Figure 5.6).

Phase II

During this intermediate phase, the emphasis is on advancing shoulder mobility. Active assistive range of motion (AAROM) and PROM exercises are incorporated into the treatment program. The patient's ROM and capsular end feel will be used to determine the rate of progression. Patients with sufficient ROM and a soft end feel will be progressed slower than a patient with restricted ROM and a hard end feel. Joint-mobilization techniques are used to restore normal motion and to correct asymmetric capsular tightness. If one side of the capsule is excessively tight, the humeral head may translate in the opposite direction away from the tightness (Figure 5.7). In an overhead athlete, the clinician will progress the stretching exercises to allow the athlete to obtain "thrower's motion" of approximately 115° ± 5° ER to allow the athlete to return to throwing. Strengthening exercises can be progressed to include isolated rotator cuff and scapular exercises. Performing dynamic stabilization drills, manual resistance training, and proprioceptive neuromuscular facilitation (PNF) drills with rhythmic stabilizations can enhance neuromuscular control and reestablish muscular balance (Figure 5.8). During this phase, we usually initiate the "thrower's ten exercise" program.

Figure 5.7 Photograph of joint mobilization performed in a posterolateral direction to improve posterior capsular mobility.

Phase III

Phase III is designed to maintain shoulder ROM while improving strength, power, and endurance. Strengthening exercises are progressed to restore optimal sufficient muscle ratios (Table 5.3). Muscular balance and dynamic joint stability

Figure 5.6 Photograph of rhythmic stabilization drills performed in the plane of the scapula to facilitate rotator cuff activation and neuromuscular control.

Figure 5.8 Photograph of manual resistance proprioceptive neuromuscular facilitation drills incorporating rhythmic stabilizations to facilitate dynamic joint stability.

Table 5.3 ISOKINETIC SHOULDER STRENGTH CRITERIA FOR OVERHEAD ATHLETES

Bilateral Comparison (dominant arm vs. nondominant arm)

Velocity[a]	ER	IR	Abduction	Adduction
180	98%–105%	110%–120%	98%–105%	110%–128%
300	85%–95%	105%–115%	96%–102%	111%–129%

Peak Torque (ft-lb) to Body Weight (lb) Ratios

Velocity[a]	ER	IR	Abduction	Adduction
180	18%–23%	28%–33%	26%–33%	32%–38%
300	12%–20%	25%–30%	20%–25%	28%–34%

Unilateral Muscle Ratios

Velocity[a]	ER/IR	Abduction/Adduction	ER²/Abduction
180	66–76%	78%–84%	67%–75%
300	61%–71%	88%–94%	60%–70%

[a]Degrees per second.
ER = external rotation, IR = internal rotation.

should be achieved before initiating aggressive strengthening exercises, such as plyometrics or functional activities. During this phase, eccentric muscle training and proprioceptive training are emphasized. Muscular endurance training also is performed to enhance dynamic functional joint stability and to prevent fatigue-induced subluxation. Plyometric training drills are utilized to increase the athlete's functional mobility and to gradually increase the functional stresses onto the shoulder joint. Overhead athletes are also progressed to the thrower's ten program to improve strength, endurance, and posture during this period.

Phase IV

During this phase, the goal is to increase the functional demands on the shoulder and return the patient to unrestricted sport or daily activities. Upon successful completion of the rehabilitation program and achieving the desired goals, the patient may initiate a gradual return to sport activity in a controlled manner. Other goals of this phase are to maintain the patient's muscular strength, dynamic stability, and functional motion established in the previous phase. Therefore, the patient is encouraged to maintain a stretching and strengthening program on an ongoing basis to maintain optimal shoulder function.

Arthroscopic Anterior Instability Repair Rehabilitation Protocol

Phase I: Immediate Postoperative Phase (Weeks 0–6)

Goals

- Protect the anatomic repair
- Prevent negative effects of immobilization
- Promote dynamic stability and proprioception
- Diminish pain and inflammation

Weeks 0 to 2

- Sling at all times during THE day for 3 to 4 weeks and sleep in an immobilizer for 4 weeks
- Elbow/hand ROM, hand-gripping exercises
- PROM and gentle AAROM exercise
  - Flexion to 70° week 1, 90° by week 2
  - ER/internal rotation (IR) performed with the arm in 30° abduction
    - ER to 5° to 10°
    - IR to 45°

Note: No active ER, extension, abduction

- Submaximal isometrics for shoulder musculature
- Rhythmic stabilization drills ER/IR
- Proprioception drills
- Cryotherapy, modalities as indicated

Weeks 3 and 4

- Discontinue use of the sling during the day but continue the immobilizer during sleep

Note: To be discontinued at 4 weeks unless otherwise directed by physician

- Continue gentle ROM exercises (PROM and AAROM)
  - Flexion to 90°
  - Abduction to 90°
- ER/IR at 45° abduction in the scapular plane
  - ER in the scapular plane to 15° to 20°
  - IR in the scapular plane to 55° to 60°

Note: The rate of progression is based on evaluation of the patient. No excessive ER, extension, or elevation.

- Continue isometrics and rhythmic stabilization (submaximal)
- Core stabilization program

Figure 5.9 Photograph of external rotation tubing performed with concomitant rhythmic stabilizations to promote dynamic stability, neuromuscular control, and core stability.

- Initiate scapular strengthening program
- Continue use of cryotherapy

Weeks 5 and 6

- Gradually improve ROM
  - Flexion to 145°
  - ER at 45° of abduction: 55° to 50°
  - IR at 45° of abduction: 55° to 60°
- May initiate stretching exercises
- Initiate exercise tubing ER/IR (arm at side; Figure 5.9)
- Scapular strengthening
- PNF manual resistance

Note: In general, all exercises begin with 1 set of 10 repetitions and should increase by 1 set of 10 repetitions daily, as tolerated, to 3 sets of 10 repetitions.

Phase II: Intermediate Phase (Weeks 7–14)

Goals

- Gradually restore full ROM (week 10)
- Preserve the integrity of the surgical repair
- Restore muscular strength and balance
- Enhance neuromuscular control

Weeks 7 to 9

- Gradually progress ROM
  - Flexion to 160°
  - Initiate ER/IR at 90° of abduction
  - ER at 90° of abduction: 70° to 80° at week 7
  - ER to 90° at weeks 8 to 9
  - IR at 90° of abduction: 70° to 75°
- Continue to progress isotonic strengthening program
- Continue PNF strengthening

Weeks 10 to 14

- May initiate slightly more aggressive strengthening
- Progress isotonic strengthening exercises
- Continue all stretching exercises
- Progress ROM to functional demands (i.e., overhead athlete)
  - Progress to isotonic strengthening (light and restricted ROM)

Phase III: Minimal Protection Phase (Weeks 15–20)

Goals

- Maintain full ROM
- Improve muscular strength, power, and endurance
- Gradually initiate functional activities

Criteria to Enter Phase III

- Full nonpainful ROM
- Satisfactory stability
- Muscular strength (good grade or better)
- No pain or tenderness

Weeks 15 to 18

- Continue all stretching exercises (capsular stretches, including the sleeper stretch) (Figure 5.10)
- Continue strengthening exercises
  - Throwers ten program or fundamental exercises
  - PNF manual resistance
  - Endurance training
  - Restricted sport activities (light swimming, half golf swings)
- Initiate interval sport program weeks 16 to 18

Weeks 18 to 20

- Continue all exercise listed earlier
- Process interval sport program (throwing, and so on)

Phase IV: Advanced Strengthening Phase (21 Weeks and Beyond)

Goals

- Enhance muscular strength, power, and endurance
- Progress functional activities

Figure 5.10 Photograph of modified sleeper stretch performed in the scapular plane to decrease stress on the subacromial structures.

- Maintain shoulder mobility
- Gradual return to sports at 7 to 9 months

Criteria to Enter Phase IV

- Full nonpainful ROM
- Satisfactory static stability
- Muscular strength 75% to 80% of contralateral side
- No pain or tenderness

Weeks 21 to 24

- Continue flexibility exercises
- Continue isotonic strengthening program
- Neuromuscular control drills
- Plyometric strengthening
- Progress interval sport programs
- Continue stretching and strengthening program
- Gradually progress sport activities to unrestrictive participation when full functional ROM and satisfactory strength and stability are achieved

Arthroscopic Posterior Instability Repair Rehabilitation Protocol

Phase I: Immediate Postoperative Phase (Weeks 0–6)

Precautions

- Postoperative brace in 20° of abduction, and approximately 30° of ER for 4 weeks (physician will determine length of time and position)
- Brace must be worn at all times, with the exception of exercise activity and bathing
- No activities above the head or across the body
- Precautions: No IR motions, horizontal adduction, or pushing motions for 4 to 6 weeks
- Must sleep in brace for 4 to 6 weeks

Goals

- Allow healing of repaired capsule
- Initiate early protected and restricted ROM
- Minimize muscular atrophy
- Decrease pain/inflammation

Weeks 0 to 4

- Cryotherapy
  - Ice before and after exercises for 20 minutes and up to 20 minutes per hour to control pain and swelling

Exercises

- Gripping exercises with putty
- Active elbow flexion/extension, wrist flexion/extension and pronation/supination
- Passive shoulder ROM only for the first 2 to 3 weeks. May begin to initiate AAROM at 4 weeks.
  - Flexion to 90° for 2 to 4 weeks
  - ER at 45° abduction to 0° to 10° (first 2 weeks)
  - ER at 45° abduction to 15° to 20° (weeks 3–4)
  - No IR for 6 to 8 weeks (unless specified by physician)
  - No cross-body motion for 6 weeks
- Submaximal shoulder isometrics: Flexion, abduction, extension, ER, IR
- Scapular manual resistance
- Rhythmic stabilization drills ER/IR in scapular plane at 45° abduction
- Scapular neuromuscular control drills, manual resistance in sling
- Avoid closed kinetic-chain exercises, pushing motion, and crossed body activities

Weeks 4 to 6

Goals

- Gradual increase in ROM
  - Flexion to increase 125° to 145°
  - Begin light easy increase in ER at 45° of abduction
- Normalize arthrokinematics
- Improve strength
- Decrease pain/inflammation
- May discontinue brace 4 to 6 weeks postsurgery (per physician discretion)

Range of Motion Exercises

- L-Bar active-assisted exercises
- Initiate ER at 90° of abduction to tolerance
- Shoulder flexion to tolerance to 90° at week 4, then 125° at week 6
- No IR for 6 to 8 weeks (unless physician specifies)
- Rope and pulley (flexion only)
  - Shoulder scaption to 90° at week 4, 125° to 145° at week 6
- All exercises should be performed to tolerance
- Do not push or aggressively stretch into IR, or horizontal adduction

Strengthening Exercises

- Exercise tubing ER/IR at 45° of abduction (IR to neutral rotation only)
- Active shoulder flexion (full can) to 90° elevation
- Active shoulder abduction to 90° elevation
- Isotonic biceps and triceps
- Scapular strengthening with arm at 0° or 30° of abduction
  - Prone horizontal abduction and horizontal abduction with ER
  - Prone rowing and prone extensions
- Sidelying ER with dumbbell
- Rhythmic stabilization ER/IR and flexion/extension
- Avoid closed-chain kinetic exercises
- Proprioception and kinesthesia training
  - Initiate joint reposition training

Phase II: Intermediate Phase (Weeks 7–15)

Goals

- Gradually reestablish ROM
- Normalize arthrokinematics
- Increase strength
- Improve neuromuscular control
- Enhance proprioception and kinesthesia

Weeks 7 to 10

Range of Motion Exercises

- L-Bar active-assisted exercises
  - ER at 90° of abduction to tolerance (should be 80°–85° by week 8)
  - ER at 90° of abduction to 115° (if patient is a thrower) by week 10 to 12
  - Shoulder flexion to tolerance (180° by week 8)
  - IR at 90° of abduction to 30° to 45° by week 10
  - Rope and pulley: elevation in scapular plane

Strengthening Exercises

- Tubing for IR/ER at 0° of abduction
- Initiate isotonic dumbbell program
  - Shoulder abduction, shoulder scaption with ER (full can), seated rowing
- Horizontal abduction
  - Horizontal abduction full can
  - Prone rowing
- Biceps curls and triceps pushdowns
- Scapular muscle training (sidelying)
- No push-ups or pushing movements (until 12 weeks)
- Prone dumbbell rows, horizontal abduction, and horizontal abduction ER
- Sidelying ER dumbbell
- Initiate Neuromuscular Control Exercises for Scapulothoracic Joint

Weeks 11 to 15

Continue all exercises listed earlier. Initiate the following:

- Progress ER/IR at 90° abduction
- ER to 90° or 115° for overhead athletes
- IR to 45° to 50°
- Full elevation
- Progress strengthening program
- Initiate push-ups into wall at week 12
- Initiate plank (bilateral) against wall and onto floor
- Emphasize muscle strength of ER, scapular region

Phase III: Minimal Protection Phase (Weeks 16–21)

Goals

- Maintain/progress to full ROM
- Improve strength/power/endurance
- Emphasize posterior shoulder muscles and scapular muscles
- Improve neuromuscular control
- Enhance dynamic stability
- Improve scapular muscular strength

Weeks 13 to 20

Exercises

- Continue isotonic program (emphasize posterior glenohumeral joint and scapular retraction)
- Continue trunk/lower extremity (LE) strengthening and conditioning exercises
- Continue neuromuscular control exercises
- Machine resistance (limited ROM)
  - Latissimus dorsi pulldowns
  - Seated row
  - Seated bench press (week 14)
- May progress closed kinetic chain program
  - Ball on wall
  - Push-up with rhythmic stabilization on unstable surface (if appropriate)

Week 16 to 20

- Continue all exercises as listed before
- Emphasis on gradual return to recreational activities
- Progress plyometrics—2-hand drills

Criteria to Progress to Phase IV

- Full ROM
- No pain/tenderness
- Satisfactory clinical exam
- Satisfactory isokinetic test

Phase IV: Return to Activity Phase (Weeks 21–32)

Goals

- Progressively increase activities to prepare the patient for unrestricted functional return

Exercises

- Continue isotonic strengthening exercises outlined in Phase III
- Clearance for bench press, pushups, football blocking drills, and so forth (determined by physician)
- Continue ROM exercises—light stretching
- Initiate interval programs between 22 to 26 weeks (if the patient is an athlete), (physician determines)
- Gradual return to sports but continue scapular and glenohumeral joint muscle training

Arthroscopic Multidirectional Instability Repair Rehabilitation Protocol

Phase I: Immediate Postoperative Phase (Weeks 0–6)

Goals

- Reduce postoperative pain and inflammation
- Promote capsular healing
- Slow muscular atrophy
- Controlled motion to shoulder

Weeks 0 to 2

- Sling and swathe for 4 weeks at all times, except for exercises
- Pendulum exercises
- AAROM with L-bar and PROM
  - Flexion to 70° by week 1, and 90° by week 2
  - ER in scapular plane 30° of abduction to 5° to 10°
  - IR in scapular plane 30° of abduction to 15° to 20°
- Rope and pulley to 70° and 90°
- Isometrics for shoulder flexion, abduction, and scapular retraction

Figure 5.11 Photograph of stabilization exercise performed with the arm in the scapular plane, with the hand placed on a ball on a wall to facilitate dynamic stabilization and providing compressive forces into the glenohumeral joint.

- Rhythmic stabilization IR/ER
- Biceps isometrics (if SLAP repair not for 6 weeks)

Modalities

- Cryotherapy for first 7–10 days

Weeks 3 and 4

- Continue use of sling and swathe
- AAROM and PROM exercises
  - Flexion to 90° to 100°
  - ER at 45° of abduction, scapular plane to 30°
  - IR at 45° of abduction, scapular plane to 45°
- Continue pendulum and rope/pulley
- Muscular strengthening exercises
  - Tubing ER/IR at 0° of abduction
  - Continue isometrics
  - Prone rowing
  - Prone horizontal abduction (limited ROM)
  - Lower trapezius table lifts
  - Continue manual resistance rhythmic stabilization for IR/ER
- Initiate proprioception drills

Weeks 5 and 6

- Discontinue sling and swathe (week 4)
- Progress ROM overhead (above 90° of abduction)
- AAROM and PROM
  - Flexion to 145° (week 5)
  - Flexion to 160° (week 6)
  - ER at 90° of abduction to 70° at week 6
  - IR at 90° of abduction to 65° at week 6
- Initiate light isotonics (week 5)
  - Full can (begin with 1 Ib)
  - Shoulder abduction (begin with 1 Ib)
  - Sidelying ER
  - Scapular strengthening
  - Continue manual resistance
  - Initiate light resistance closed kinetic chain wall drills (Figure 5.11)
- Continue proprioception drills
- Initiate core stabilization drills

Phase II: Intermediate Phase (Weeks 7–16)

Goals

- Gradually increase ROM and flexibility
- Enhance dynamic stabilization
- Improve muscle strength and endurance
- Gradually increase applied loads

Weeks 7 to 9

- Flexibility and ROM exercises
  - ER at 90° of abduction to 90° (week 8)
  - IR at 90° of abduction to 65° (week 8)
  - Full flexion at 180°

Muscle Training

- Continue rhythmic stabilization drills
- Proprioceptive neuromuscular facilitation D2 flexion/extension with rhythmic stabilization
- Begin "throwers ten program"
  - Progress 1 Ib/week if nonpainful
- Progress scapular strengthening program
- Push-ups on ball on table with rhythmic stabilization
- Wall stabilization onto ball into wall
- Tubing ER strengthening
- Closed kinetic chain drills
- Proprioception drills

Weeks 10 to 12

- Continue all exercises listed earlier
- Progress ER at 90° of abduction to 110° to 115° at week 12
- Initiate self-capsular stretches
- Initiate 2-hand plyometrics (weeks 10–11)

Weeks 13 to 16

- Continue all exercises listed earlier
- Initiate progressive resistance exercises
  - Bench press (narrow grip)
  - Pull-downs (in front of body)
  - Push-ups
  - Seated rowing
  - Pectoralis flies
- Plyometrics 1-hand drills/throws (week 14)
- Wall dribble with 2-Ib plyoball

Phase III: Minimal Protection Phase (Weeks 16–23)

Goals

- Progress strengthening, power, and endurance
- Enhance dynamic stabilization
- Initiate overhead throwing program

Weeks 16 to 20

- Continue all flexibility and ROM exercises
- Continue self-capsular stretches
- Continue ER/IR stretch at 90° of abduction
- Throwers ten program
- Plyometrics 2-hand and 1-hand drills
- Endurance drills
- Core stabilization drills
- Initiate interval throwing program (Phase I)

Weeks 21 to 23

- Continue all of the previously listed exercises
- Initiate interval throwing program (Phase II) at weeks 21 to 22

Phase IV: Return to Activity Phase (Weeks 24–32)

Goals

- Progress to unrestricted full activity
- Continue/progress strengthening exercise

Weeks 26 to 30

- Stretch and improve ROM and flexibility
- Throwers ten program
- Plyometrics 2-hand and 1-hand drills
- Progress throwing program

Criteria for Return to Play

- Full nonpainful ROM
- Satisfactory isokinetic test
- Satisfactory clinical exam
- Completion of interval throwing program
- Physician approval

OUTCOMES

Mazzocca et al reported on an average 37-month (range 24–66 months) follow-up following arthroscopic anterior Bankart repair in collision athletes. The authors found an 11% overall recurrent dislocation rate that was isolated to football players. A recent meta-analysis by Harris and colleagues comparing the rate of return to sport for open anterior Bankart repair to arthroscopic suture anchor repair found similar results (89% vs. 87%) for both procedures. Bradley et al published successful results in 200 athletes following arthroscopic posterior capsulolabral reconstruction, with 90% overall returning to full sport. In addition, 91% of the contact athletes were able to return to sport without recurrence of instability. Similarly, Provencher et al published a series of 33 patients, in which 88% remained stable at a mean follow-up of 39 months after a posterior labral repair. The return-to-sport rate has been reported following capsular plication for multidirectional instability to be 86% in the cohorts of Baker et al and Treacy et al. Similarly, Jones et al reported at a mean follow-up of 3.6 years (range, 2.0–5.5 years) following capsular plication for MDI; 18 (90%) patients returned to overhead sports, with 17 (85%) at their preinjury level.

PEARLS

- Imaging should be carefully scrutinized for associated lesions. If there is concern for bone loss, a CT scan should be performed.
- Accurate portal placement is key for proper placement of suture anchors.
- Capsulolabral repair should start far inferior to recreate the sling effect to the inferior glenohumeral ligament complex.
- During rehabilitation, never overstress healing tissue. The rehabilitation program must match the surgical procedure, the patient's tissue quality, and the patient's desired functional goals.
- ROM is progressed based on the clinical assessment of quality of end feel. A firm end feel necessitates acceleration in restoration of motion; a softer end feel should alert the therapist to slow the restoration of motion.
- The systematic implementation of incorporating stresses and forces via functional and sport-specific drills is imperative to allow a return to activity.

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