Shoulder Impingement: Current Concepts in Diagnosis and Rehabilitation

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Learning Objectives

1. **Identify**
   Use special tests and clinical observation to correctly identify shoulder impingement in the evaluation of shoulder pain.

2. **Plan**
   Develop a treatment plan for both acute and chronic shoulder impingement.

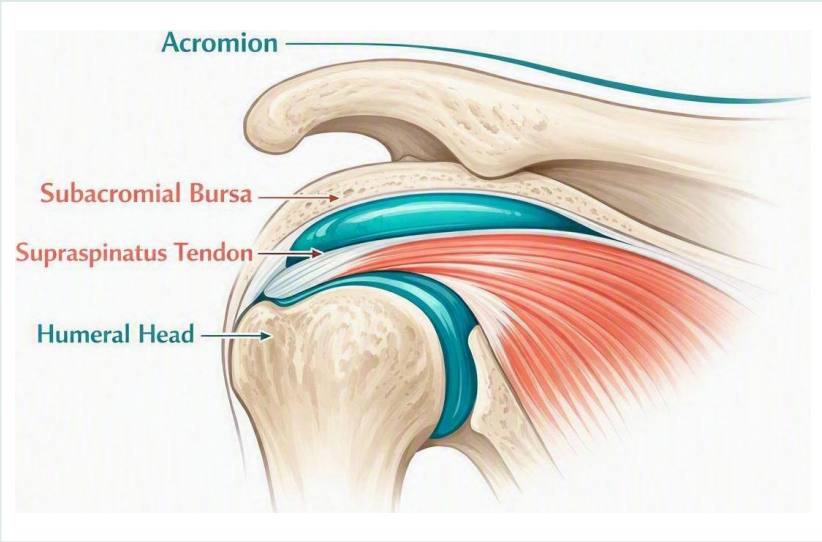
3. **Prescribe**
   Prescribe appropriate exercises for a successful home program.

4. **Apply**
   Gain confidence applying therapeutic techniques to relieve pain and improve function.

What Is Shoulder Impingement?

A reduction of the subacromial space, compressing the soft tissue that passes beneath the coracoacromial arch.

- Space narrows between the humeral head and the acromion
- Tendon, bursa and biceps are compressed with elevation
- Repetitive compression drives irritation, then degeneration
- Pain is typically mechanical and position-dependent



The subacromial space: acromion above, cuff tendon and bursa below.

The Evolution of Terminology

NEER, 1983

Impingement lesions

Structural compression under the acromion, staged from bursitis to full-thickness tear.

LATE 1990S–2000S

Mechanism questioned

Imaging and surgical trials fail to confirm compression as the sole pain driver.

LEWIS ET AL., 2018

Subacromial Pain Syndrome

A symptom-based umbrella term that avoids implying a single structural cause.

WHY IT MATTERS

The name we use shapes the treatment we choose — a symptom-based label keeps us looking at the whole shoulder rather than one structure.

Epidemiology: Who is at risk?

Overhead athletes

Swimmers, throwers, volleyball and tennis players — repeated abduction with external rotation.

Overhead workers

Painters, electricians, stockers and assemblers who work at or above shoulder height.

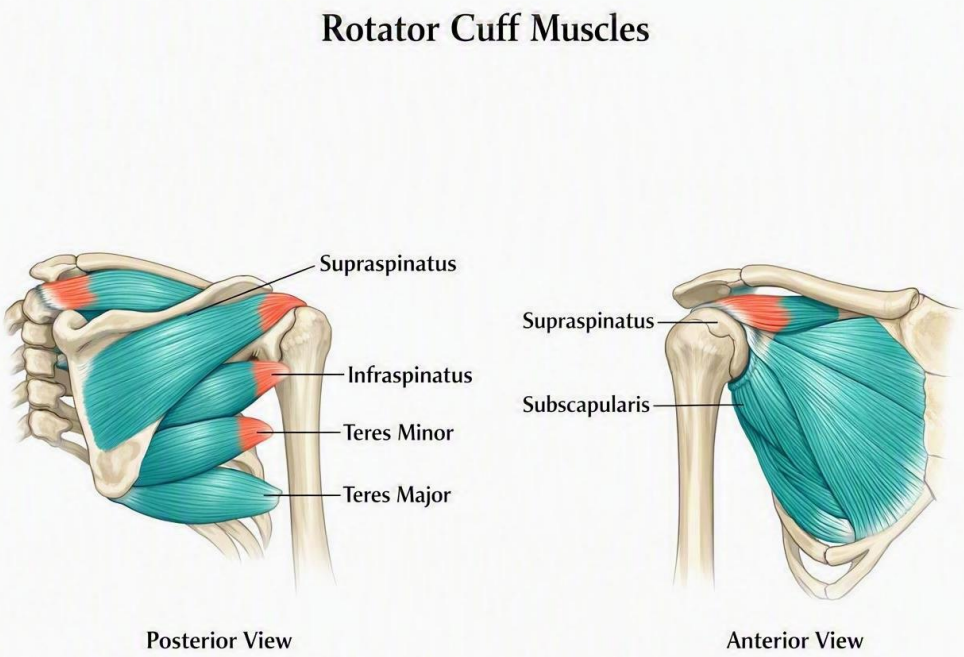
Aging population

Age-related cuff degeneration, reduced tissue tolerance and postural change.

COMMON THREAD

Cumulative load in elevation — not a single injuring event.

Functional Anatomy



Rotator cuff musculature and its attachments.

Supraspinatus

Initiates abduction; depresses the humeral head against deltoid pull.

Infraspinatus & teres minor

External rotators that center the head in the glenoid.

Subscapularis

Anterior stabilizer; balances the force couple with the posterior cuff.

Coracoacromial arch

Acromion, coracoid and the ligament between them — the roof of the space.

Structures Involved

Supraspinatus tendon

Inserts on the greater tuberosity; the most frequently implicated structure and the site of the classic painful arc.

Long head of biceps

Passes through the bicipital groove; anterior pain and tenderness with resisted supination or elevation.

Subacromial bursa

A richly innervated cushion — the earliest and often the most painful structure to become inflamed.

PALPATION PEARL

Anterior-lateral pain with a painful arc points to bursa and supraspinatus; groove tenderness with resisted elbow flexion shifts suspicion to the long head of the biceps.

Primary vs. Secondary Impingement

Subacromial (external)

The supraspinatus tendon at its insertion on the greater tuberosity, the subacromial bursa, and the long biceps tendon in the bicipital groove sit anterior to the coracoacromial arch and are compressed against it.

Internal impingement

Contact between the posterosuperior labrum and the undersurface of the supraspinatus and infraspinatus tendons — typically in overhead athletes with the arm abducted and externally rotated.

Neer's three stages of progression

STAGE 1

Chronic bursitis

edema and hemorrhage; typically reversible

STAGE 2

Partial tearing

Fibrosis and tendinopathy of supraspinatus

STAGE 3

Complete tear

Full-thickness rupture and bony change

Anatomical Factors: Acromion Types



Type I **Flat**

Smooth undersurface; the lowest association with cuff pathology.

Type II **Curved**

A gentle concave curve following the humeral head.

Type III **Hooked**

An anterior hook that narrows the outlet; most associated with cuff tears.

Biomechanical Factors

1 Scapular dyskinesis

Loss of upward rotation and posterior tilt reduces the space available during elevation.

2 Rotator cuff weakness

Without cuff depression the deltoid drives the humeral head superiorly.

3 Posterior capsule tightness

Tightness posteriorly forces obligate anterosuperior translation of the head.



THE GOOD NEWS!
All three are trainable.

Subjective History

Painful arc
Pain during the mid-range of active elevation, easing again at end range.

Night pain
Difficulty lying on the involved side; waking with ache is hallmark complaint.

Overhead pain
Reaching, throwing, washing hair, or placing objects on a high shelf reproduces symptoms.

Gradual onset
Usually insidious and load-related rather than traceable to one traumatic event.



Physical Exam: Scapular Dyskinesis

- Observe both scapula from behind, unclothed, at rest and in motion
- Watch 5–10 repetitions of elevation — fatigue exposes dyskinesis
- Note medial border or inferior angle prominence, early elevation, and loss of smooth upward rotation



Observe from behind through repeated elevation and lowering.

- Add a scapular assistance or retraction test — if pain drops, you have your treatment target

Scapular assist in elevation





Evaluation of scapular depression

-Cue the patient to raise their arms overhead
-With your hands on the inferior angle of the scapula when they reach end range assist in elevation and upward rotation and see if they gain pain free end range
-Greater range and decreased pain means weak serratus

Special Tests: The Cluster

Hawkins-Kennedy
Shoulder and elbow flexed; examiner forces internal rotation. Pain suggests subacromial impingement.

Neer
Passive forward elevation with the scapula stabilized, forcing the greater tuberosity against the acromion.

Painful Arc
Active abduction in the scapular plane; pain appears through mid-range and eases at end range.

Yocum's
Hand on the opposite shoulder, raise the elbow without lifting the shoulder.

Empty Can
Resisted abduction with the thumb pointed down; assesses the supraspinatus.

Resisted rotation
Pain or weakness resisting external rotation, or Yergason's for associated biceps tendonitis.

REMINDER

A positive test reproduces the patient's **familiar** pain — not simply any discomfort.

Impingement Tests



Hawkins-Kennedy



Neer

Diagnostic Utility

High sensitivity
The Neer test is highly sensitive — a negative result is useful for ruling impingement out.



High specificity
The Hawkins-Kennedy test is highly specific — a positive result helps confirm impingement.

Best combination
Hawkins-Kennedy plus painful arc sign plus the infraspinatus muscle test gives the highest diagnostic probability.

Differential Diagnosis: What Else Could be Going on?

Rotator cuff tear

Weakness disproportionate to pain, drop-arm sign, and lag on resisted testing.

Glenohumeral instability

Apprehension in abduction with external rotation; often the younger, lax athlete.

Labral pathology

Clicking, catching, deep-seated pain; internal impingement frequently coexists.

Adhesive capsulitis

Loss of passive as well as active motion, with a capsular pattern.

Acromioclavicular joint

Point tenderness over the AC joint and pain with cross-body adduction.

Cervical referral

Spurling's test; screen the cervical spine every time. Address the first rib

Non-Operative vs. Operative

Conservative first

- Randomized trials show exercise matches surgical outcomes in subacromial impingement
- No surgical risk, no immobilization period
- Addresses the modifiable drivers directly
- Builds patient self-efficacy and a lasting home program

Surgical referral

- Reserved for failure of a genuine, well-executed trial of therapy
- Typically after 3–6 months of consistent conservative care
- Consider earlier with a significant full-thickness tear
- Structural findings alone do not justify operating

Medication & Modalities

NSAIDs
Useful for short-term pain control in the irritable phase; they create a window for movement rather than a cure.

Corticosteroid injection
Meaningful short-term benefit, but the advantage over exercise fades over months. Best used to unlock a stalled rehab program.

Ice and heat
Simple, patient-controlled, and easy to teach
Heat before, ice after
Heat increases blood flow and provides pain relief

Therapeutic ultrasound
Research found ultrasound therapy did not provide significant benefit for these patients.

The Benefits of Therapy

1. **Loads the tissue**

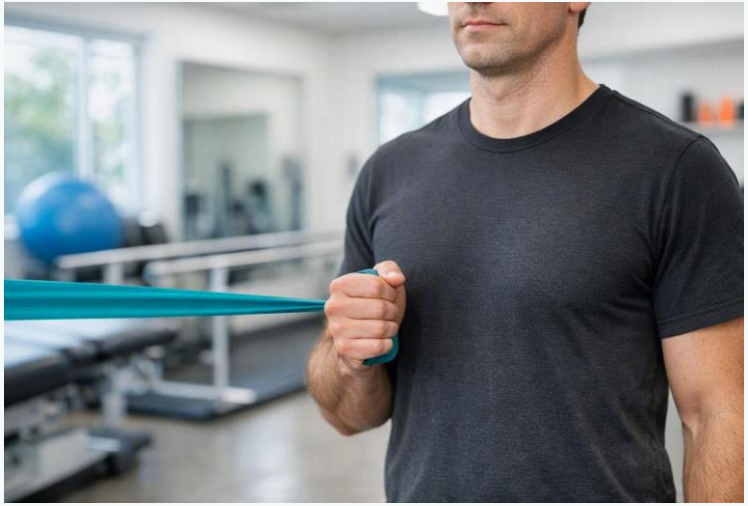
   Progressive load restores tendon capacity — rest alone lets it decondition further.

2. **Restores the mechanics**

   Cuff and scapular training rebuild the force couples that preserve the space.

3. **Lasts longer**

   Gains are carried home in a program the patient owns and can repeat.



Phase I:
ACUTE / IRRITABLE PHASE

Pain Management
Protection
Patient Education



Goals of the Acute Phase

01
Relieve pain and inflammation

02
Normalize range of motion

03
Re-establish muscular balance

04
Improve posture and alignment

05
Educate on aggravating positions

REMEMBER:
The patient spends 167 hours a week away from you. What they understand about position, load and pacing will do more for their shoulder than anything that happens in your session.

Activity Modification



Avoiding provocative positions

- Sustained or repetitive overhead reaching
- Heavy lifting away from the body
- Sleeping on the involved side
- End-range abduction with external rotation in overhead athletes

SWAP, DON'T STOP

Manual Therapy & Modalities

- Thoracic spine mobilization
- Soft tissue work to pectoralis minor
- Manual scapular mobilization
- Trigger point release
- Biofeedback and neuromuscular re-education for the scapula



HANDS-ON WITH PURPOSE

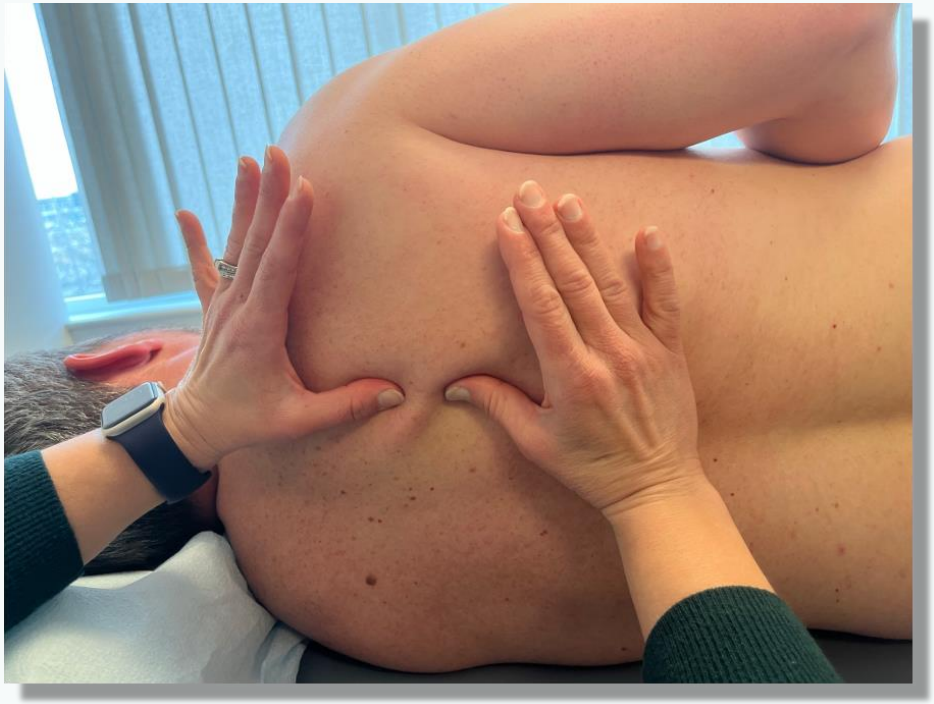
Manual positioning of the scapula has been shown to increase supraspinatus strength and awareness, and to increase the subacromial space — used in the early phase to set up the exercise that follows.

Addressing the Scapula



- Scapular mobilization with patient in side-lying
- Place and hold scapula submaximal isometrics: adduction and depression
  - increases scapular awareness
  - Foundational for AAROM and AROM

Addressing the Scapula continued



- Scapular place and hold with submaximal isometric contraction

Goal: Pain-Free Range of Motion

- Pendulums
- Wand exercises
- Pain-free AAROM
- Pulleys
- Joint mobilization
- Ice and heat



Dowel assisted exercise

Chest press to 90°







Progress to dowel work into overhead ranges. Motion should lead with the thumb to provide some ER of the humerus and minimize impingement symptoms

Ease into Strength and Conditioning

Cuff isometrics

Rhythmic stabilization

Always Address Scapula



Isometrics often provide an immediate analgesic effect



Rhythmic Stabilization

- Protects the joint from injury and optimizes strength performance
- Lack of stability can lead to OH shoulder pain
- Stabilization exercises promote better shoulder kinematics ultimately decreasing impingement symptoms



Posterior Capsule Mobility



Restore the glide, then own the range

Sleeper stretch

Side-lying on the involved side, arm at 90°, gently rotate the forearm down.

Cross-body stretch

Scapula stabilized so the stretch reaches the capsule, not the shoulder blade.

Pectoralis minor stretch

Doorway or corner stretch to release the anterior tilt.

Balance with strength

Stretch anteriorly while strengthening the scapular muscles posteriorly.

Progress with Scapular Stabilization

Push-up plus

Plank or knee plank; move only the shoulder blades together, then push apart.

Prone I-T-Y-W

Face down, lift the arms in each position, pinching the shoulder blades.

Serratus work

Supine with a light weight; push up moving only the shoulder blade.

Band pull-aparts

Straight arms in front; pull to the chest, squeezing the blades together.

Wall slides/band on wall clocks

Back to the wall, elbows and wrists touching; slide up and down slowly.

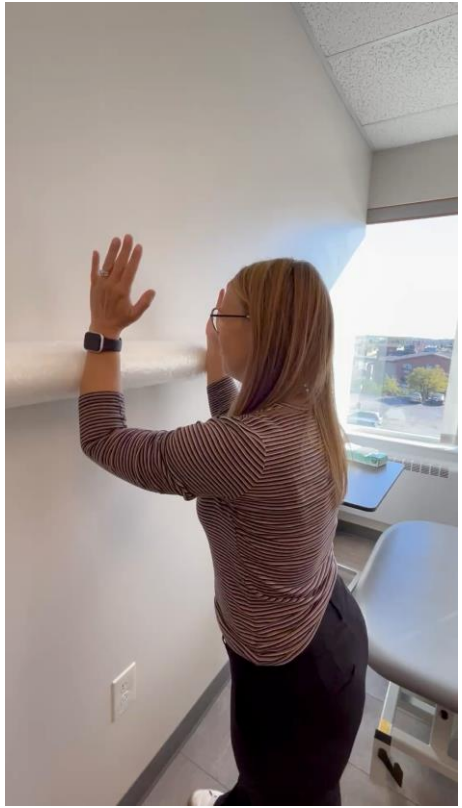
Rows and band ER

Band anchored; row or rotate out, keeping the blades back and down.



Wall slides for lower trapezius.





Working the Serratus

- promotes upward rotation of the scapula improving mechanical advantage and decreasing pain
- Forward elevation to at least 120 degrees with the addition of a shoulder shrug at end range

Tips for Success

How you coach the program matters as much as which exercises you pick

2–3

sets

Perform 2–3 sets of 10–15 repetitions.

Slow

tempo

Focus on slow, controlled movement rather than speed.

Down

and back

Avoid shrugging — keep the shoulders down and away from the ears.

CHRONIC / SUBACUTE PHASE

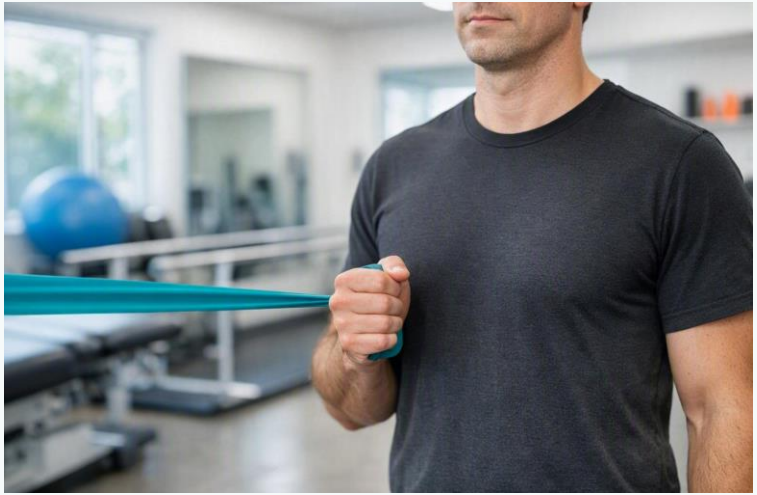
Strengthening Conditioning Functional Restoration



Progressive Cuff Strengthening

Re-establish full pain-free motion and normalize the arthrokinematics

1. **Side-lying external rotation**
   Isolates infraspinatus with minimal deltoid substitution.
2. **Band internal / external rotation**
   Elbow at the side first, then progress toward elevation.
3. **Below-90 elevation work**
   Build capacity in scapular plane before returning overhead.
4. **Endurance before max load**
   Higher repetitions, controlled tempo, monitored for next-day soreness.



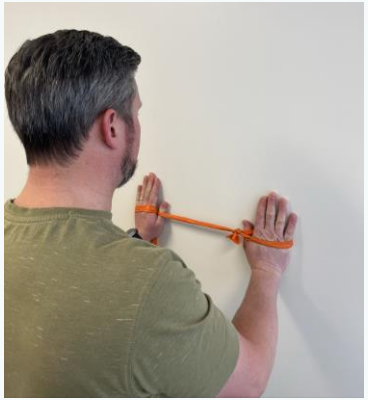
Kinetic Chain Integration

- The shoulder is the last link — power is generated from the ground up
- Use weight-bearing positions to drive co-contraction around the joint
- Progress from stable to unstable, bilateral to single arm, static to dynamic
- Rehearse the movement the patient actually needs to return to



Half-kneeling: the core and hips feed the shoulder.

Band clocks, prone, and core







Resistance band on the wall: increases recruitment of the lats, serratus and rotator cuff while performing shoulder motion

Prone work

Cue patient to:

- Activate the core
- Squeeze their glute
- Hold end position for 3 seconds



Gradual Return to Function

- Graded return to work tasks and daily activities
- Load below shoulder height first, then to shoulder height
- Build tolerance with volume before intensity
- Re-check scapular control under fatigue



Hold the line on

- Prolonged overhead activity
- Weighted overhead lifting

DISCHARGE CRITERIA

Full pain-free motion and a home program the patient can run alone.

Summary of Key Points

01

Education

The patient's understanding of position, load and pacing drives the outcome between sessions.

02

Scapular control

Restore upward rotation and posterior tilt and the space takes care of itself.

03

Cuff strength

A cuff that can depress and center the humeral head is the shoulder's own decompression.

THE TAKEAWAY

Conservative care works when it is specific: calm the irritable shoulder down, then build the scapular and cuff control that keeps the space open under load.

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Questions & Discussion

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Thank you for attending.

