# 2019 Encore-Uhler Sports Medicine Symposium

## Rotator Cuff Syndrome

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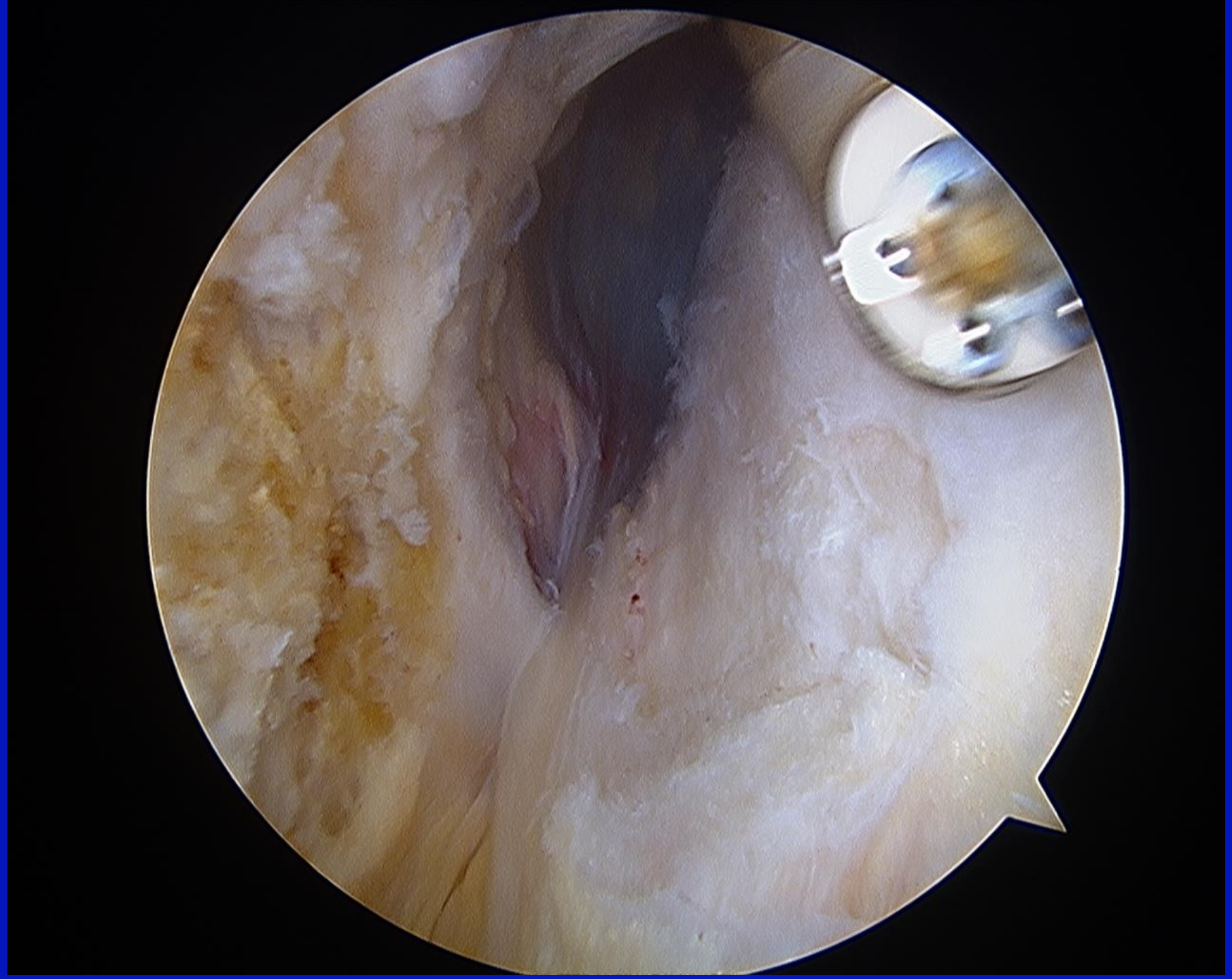
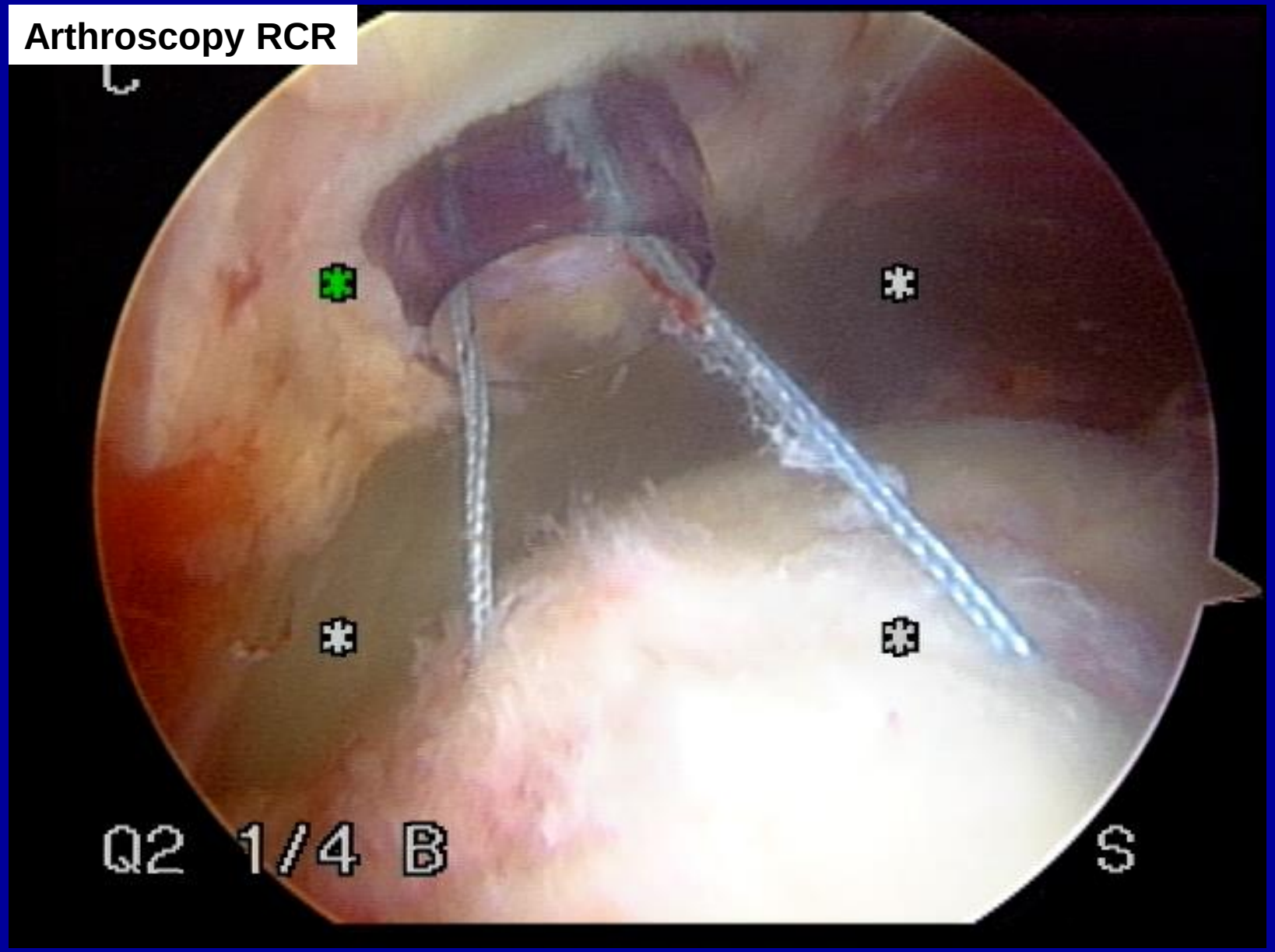
# Repairs for Rotator Cuff Lesions

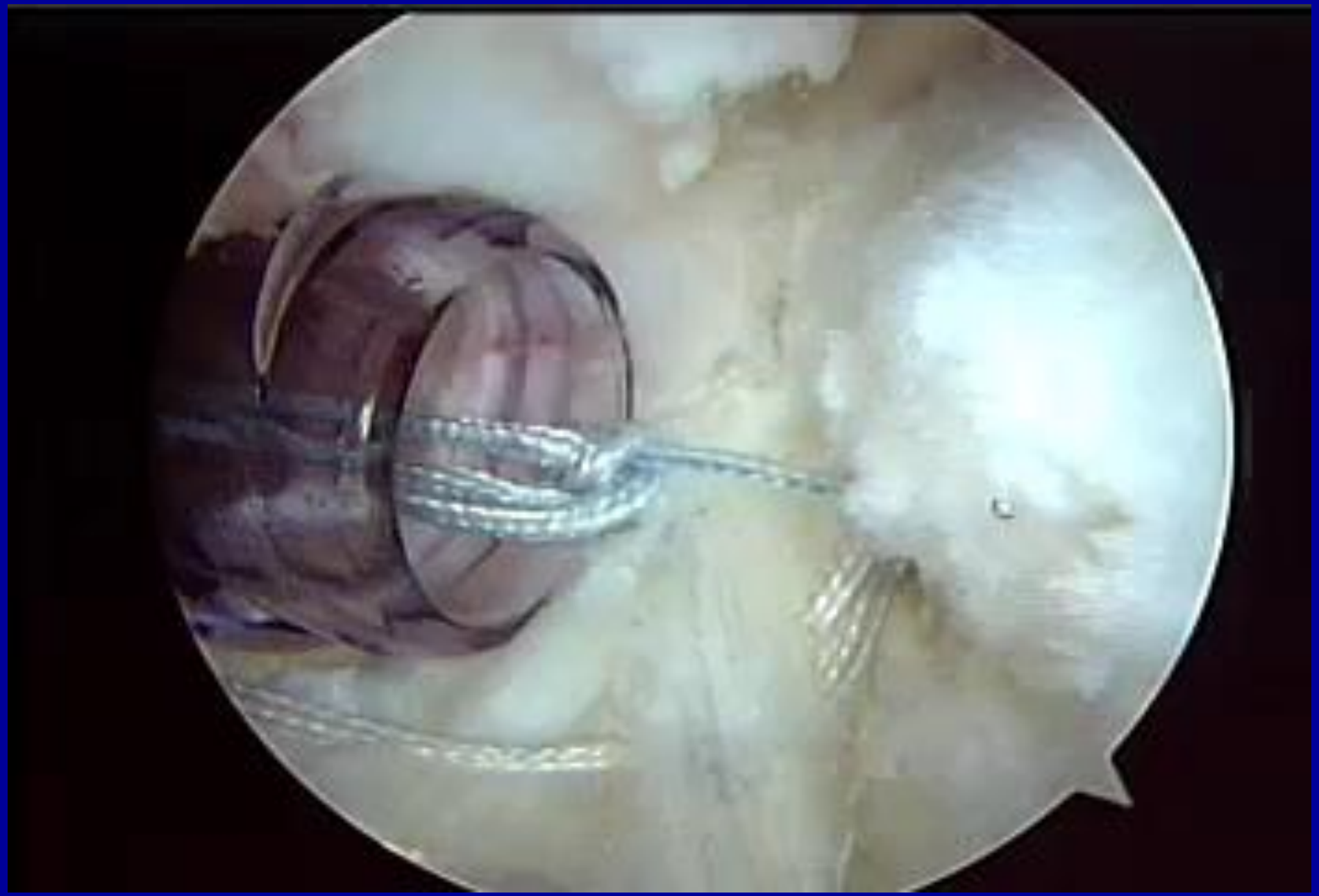
1. Small to medium sized tears
Partial thickness lesions (1cm – 3cm)

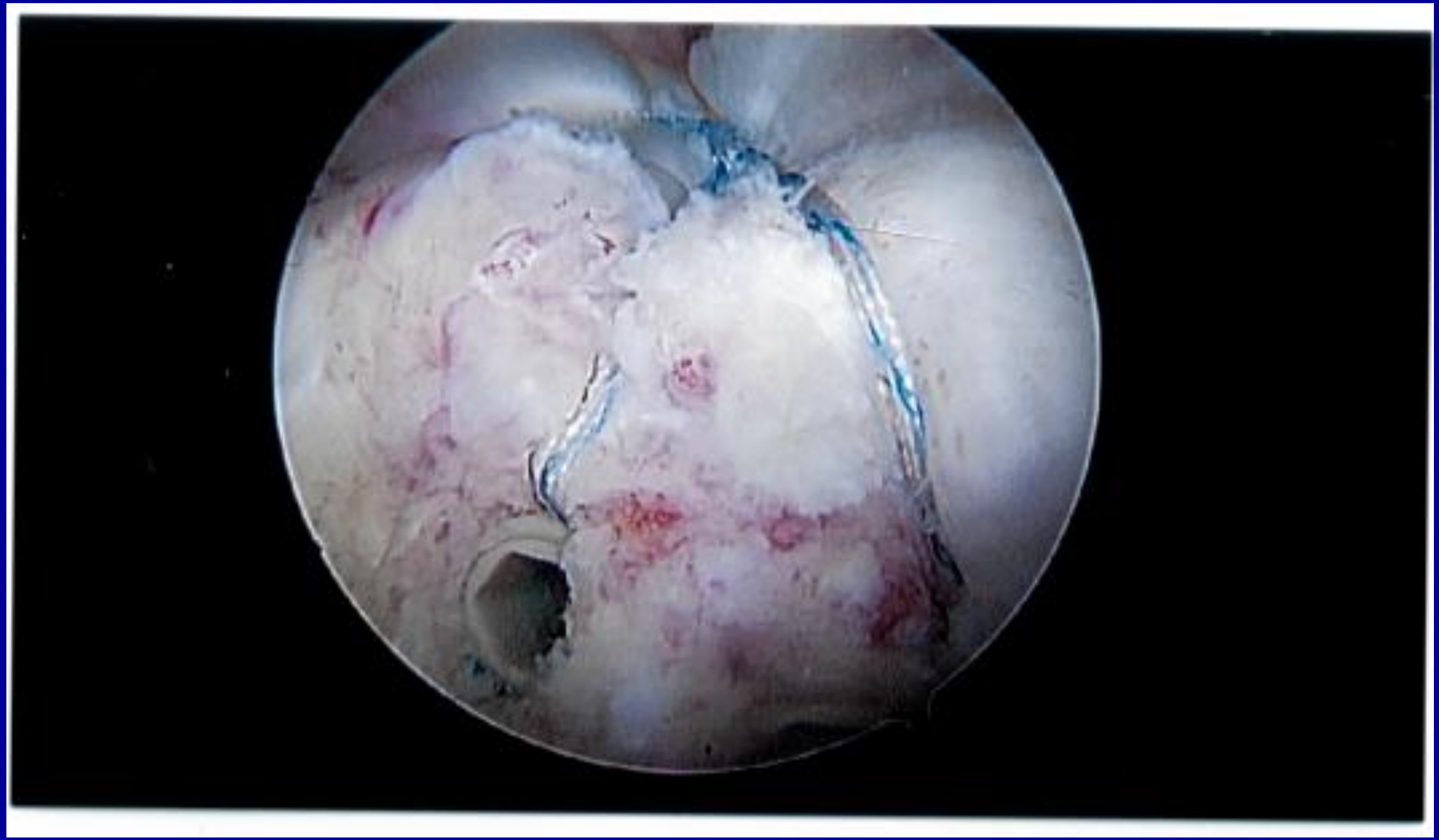
2. Large to massive tears
Full thickness > 4cm – 5cm
Complete rupture

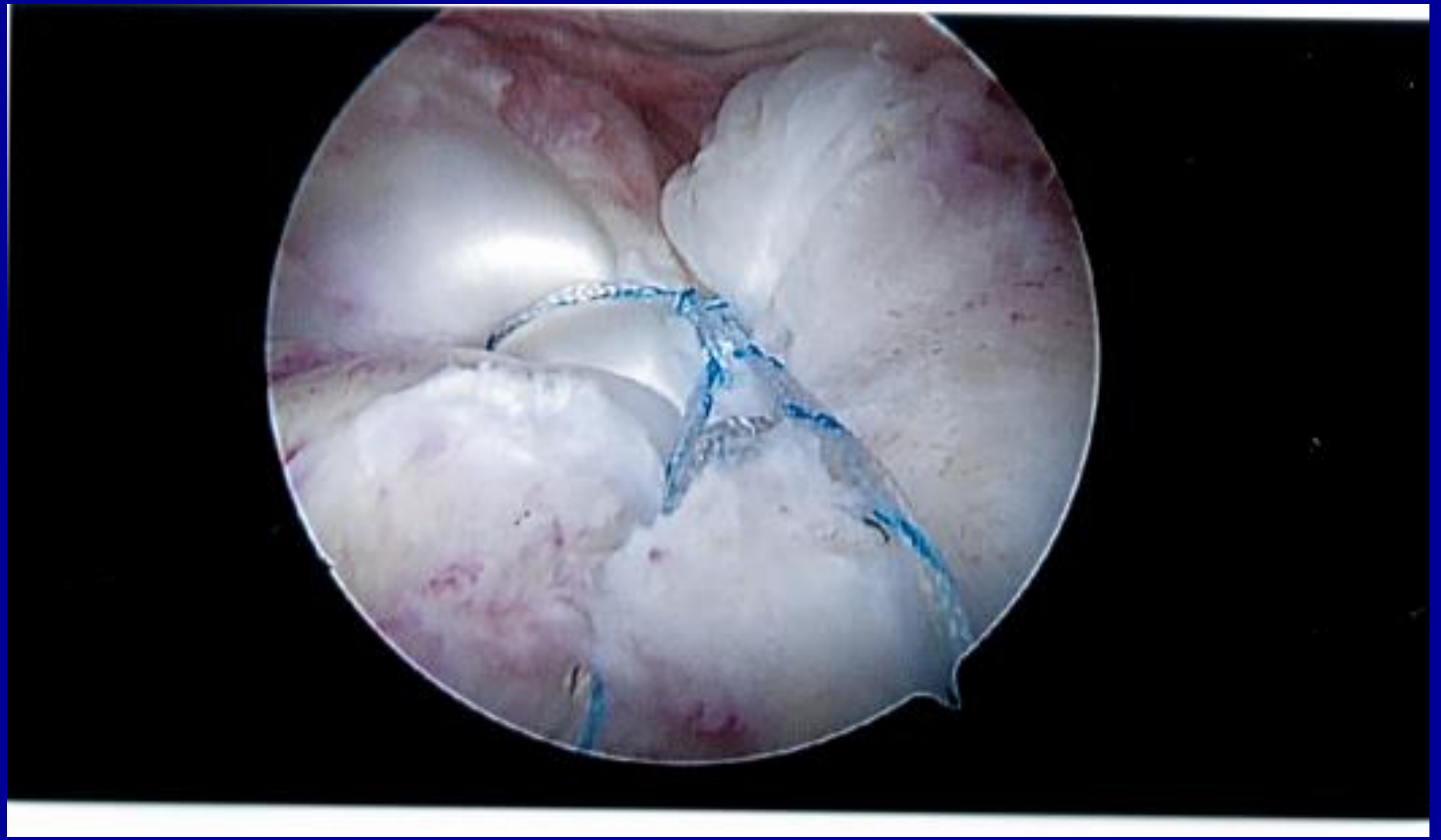


Arthroscopy RCR









# FUNCTIONAL REHABILITATION OF THE SHOULDER

**Open Kinetic Chain Rehabilitation Challenge**

- Mobility – range of motion
- Recruitment – neuromuscular control
- Stabilization – tri-plane functionality

# Three Phases of Rehabilitation

- Pre-functional – Mobility
- Return to Function – Recruitment
- Return to Activity – Tri-Plane Stabilization

*References:  T.L. Trundle. 2011, 2016*

*Schmidt, DT; Harris, BA; Aimee, K, 2008.*

# Concepts of the Three P's

- Pivoters – scapular stabilizers i.e. rhomboids, trapezius, pectoralis minor and serratus anterior
- Protectors – rotator cuff
- Positioners – deltoids, latissimus dorsi, pectoralis major

*Reference: Ellen M, Rogers DP, Gilhoal JJ, 2000*

# True Function of the Rotator Cuff

- Dynamic decompression of the humeral head by providing balance of the upper pull of the deltoids and not allowing the scapula to overcome the G-H joint
- Result = smooth rotational movement to allow shoulder elevation primarily in the transverse plane

Clinical application: Elevation Hike Dysfunction

1. Rotator Cuff Weakness
2. Loss of transverse plane motion

*Reference: Tate AR. et. al. JOSPT (40) 2010*
*Trundle, TL 2016*

# Clinical Examination: Motion

## “The Vital Three Motion Patterns”

Mobility:

- Short lever arm rotation
  - External rotation in modified scaption (1)
  - Internal rotation – spine level
- Long lever arm movement
  - Elevation – transverse plane (2) – distal marker: thumb up
  - Horizontal abduction above 90° (3)
  - Abduction – modified scaption
- Clinical Concerns of Early Motion
  1. Gravity point concept
  2. Manual motion should begin in a scaption angle
     - - “Rotation before Elevation”
  3. Counter contraction decompression

# Level 1 EMG Based Exercises for the Shoulder

- “Passive motion concept should be reconsidered.”
- Level One – Low EMG
  - – Clinician Assisted Forward Elevation
  - – Pendulum (Codman) – if performed correctly
  - --Gravity Eliminated Forward Elevation
    - UE Ranger™ - seated glides
  - – Scapular retraction sets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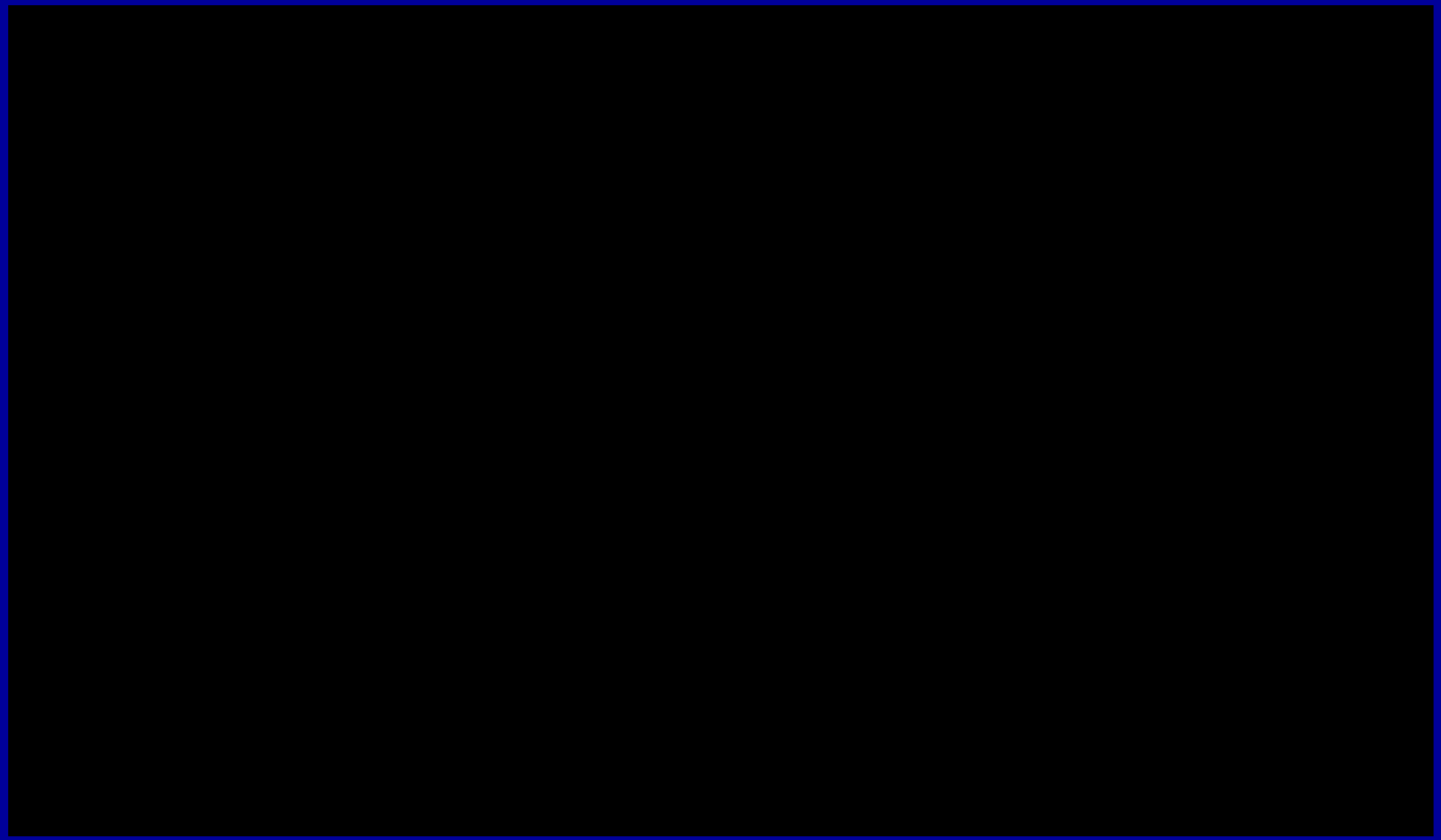
# Passive Micro-Mobility
## Preparation Glides

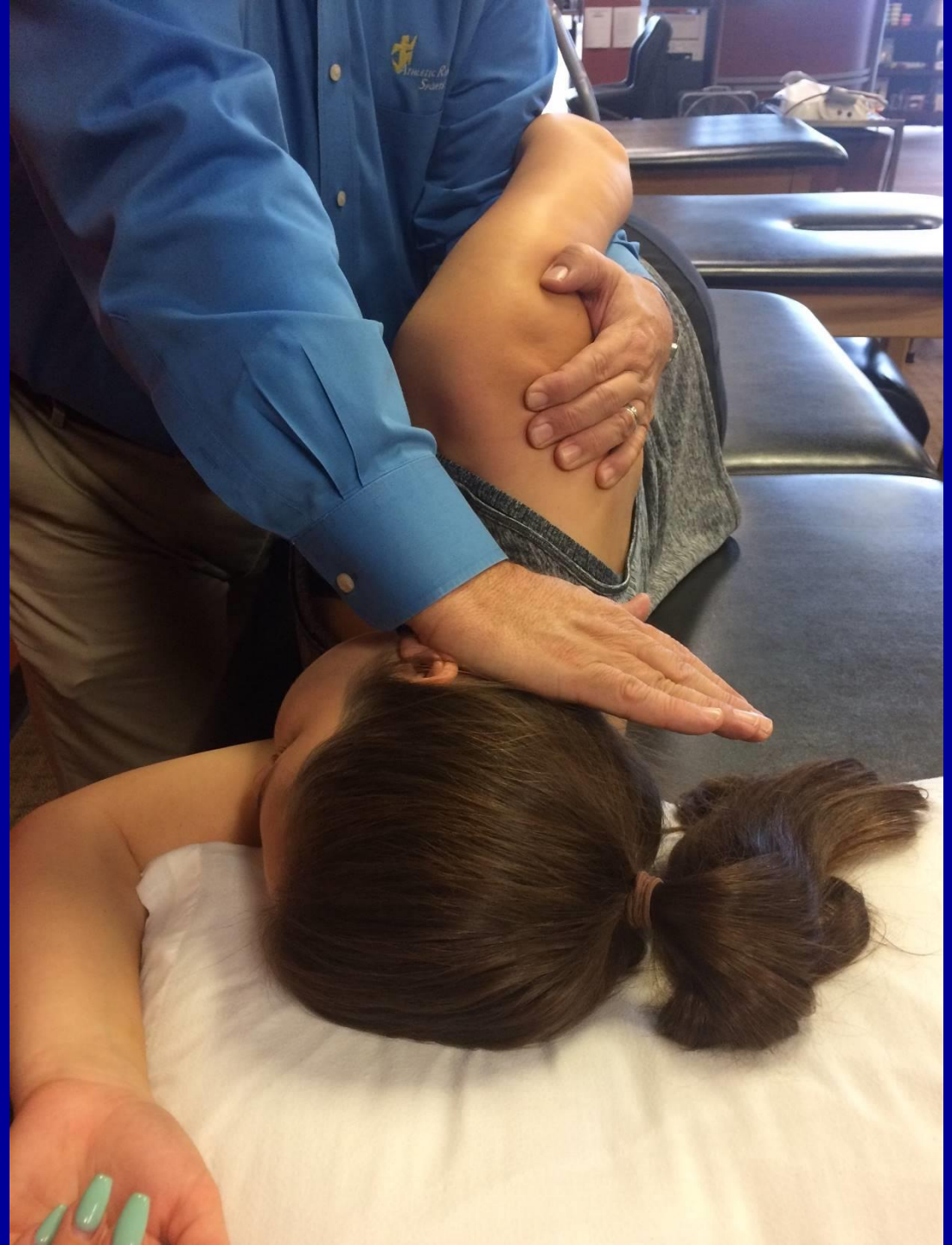
- Scapular Release with diagonals
  - Upper Trapezius Release
  - Lateral Glide

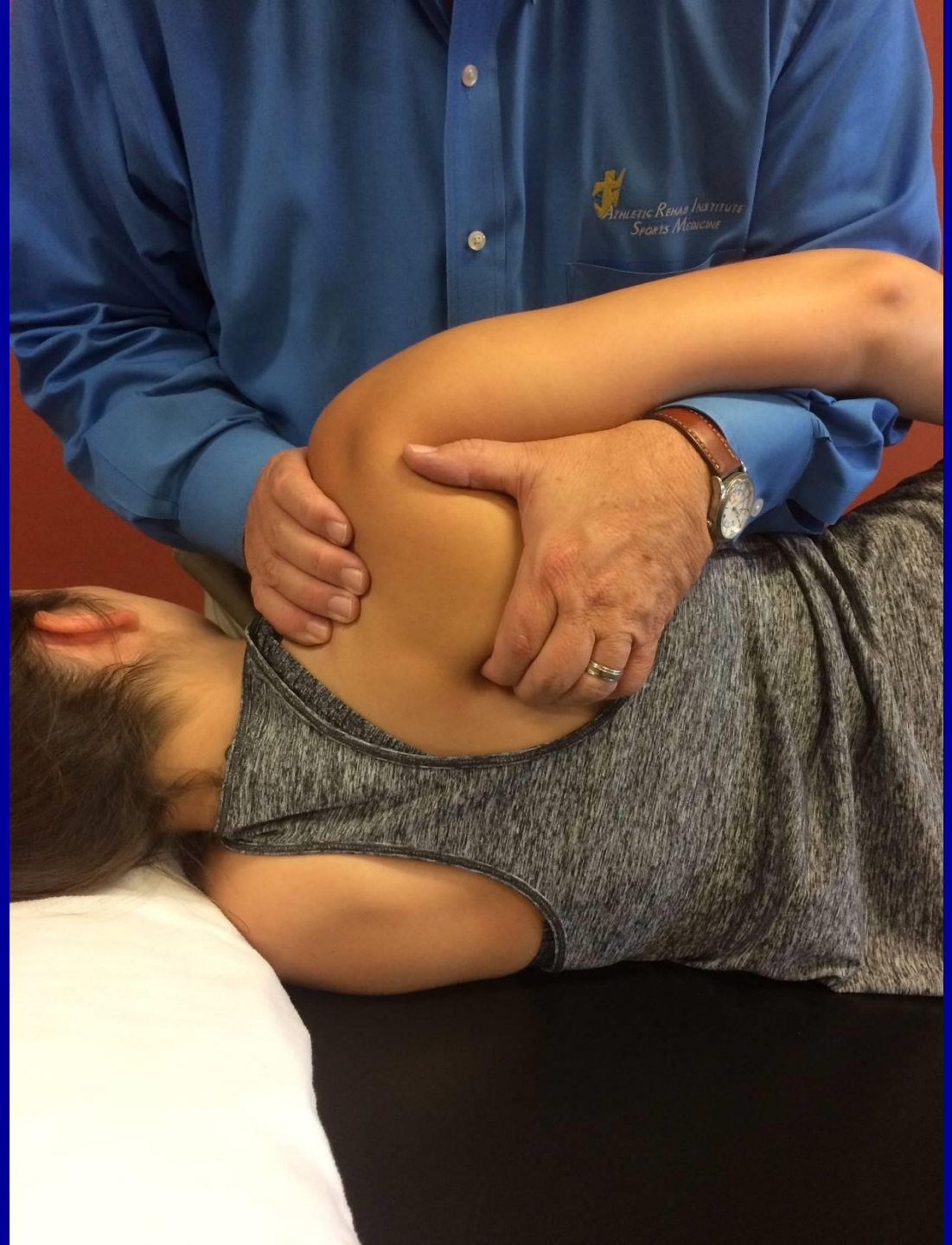
Treatment should focus on preparation of mobility based on clinical findings

- Post-immobilization stiffness
- Loss of glide motion due to aging
- Prepare for retraction setting vs protraction preparation

Reference: Camargo PR, et al. JOSPT 2015
Trundle TL Orthopedic Management of the Shoulder 2016



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# Rotator Cuff Repair

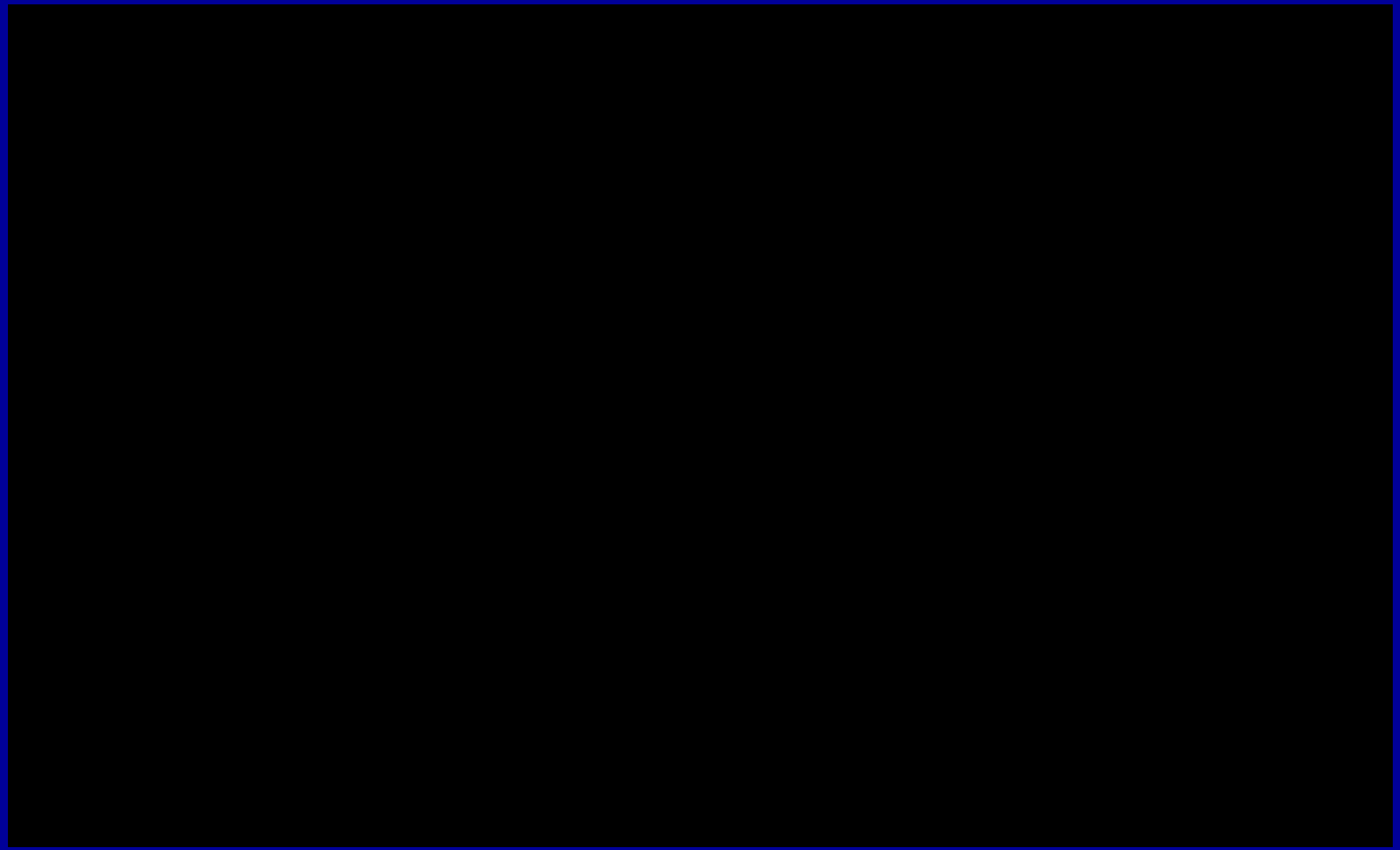
Pre-Functional Phase 5 – 8 weeks

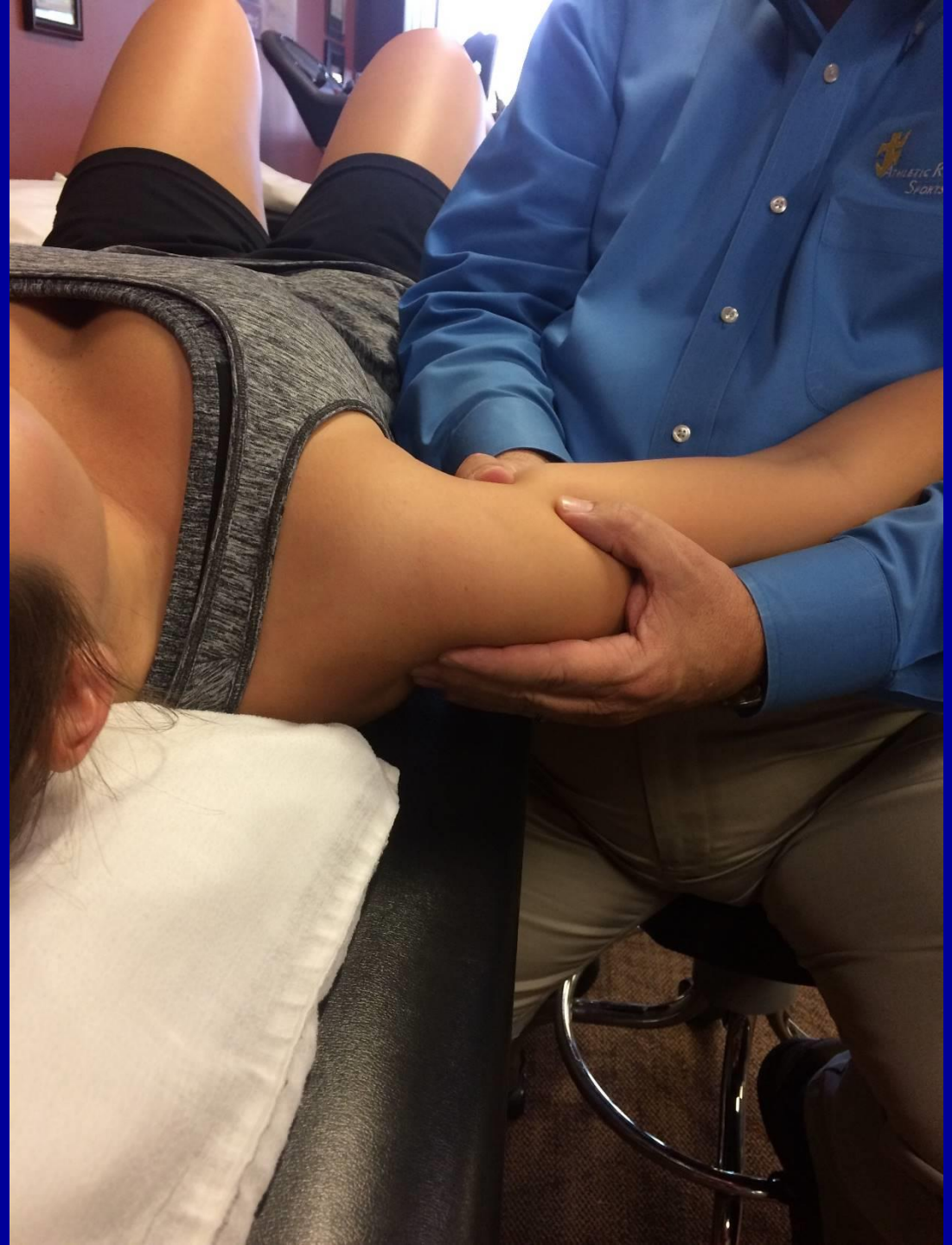
- Manual control range of motion
  - ER – progressive toward 90°
  - Positional internal rotation to spine level
  - Horizontal abduction to 0°
  - Elevation to WFL then to WNL
- G-H joint glides based on need
- UBE – 4-6 weeks- delay retro-crank with biceps' involvement

# Glenohumeral Preparation Glides

- Inferior Glide
- Rotational Glide
- Posterior glide
- Lateral glide
  - Anterior glide

*Reference: Trundle, T.L., 2011, 2016*



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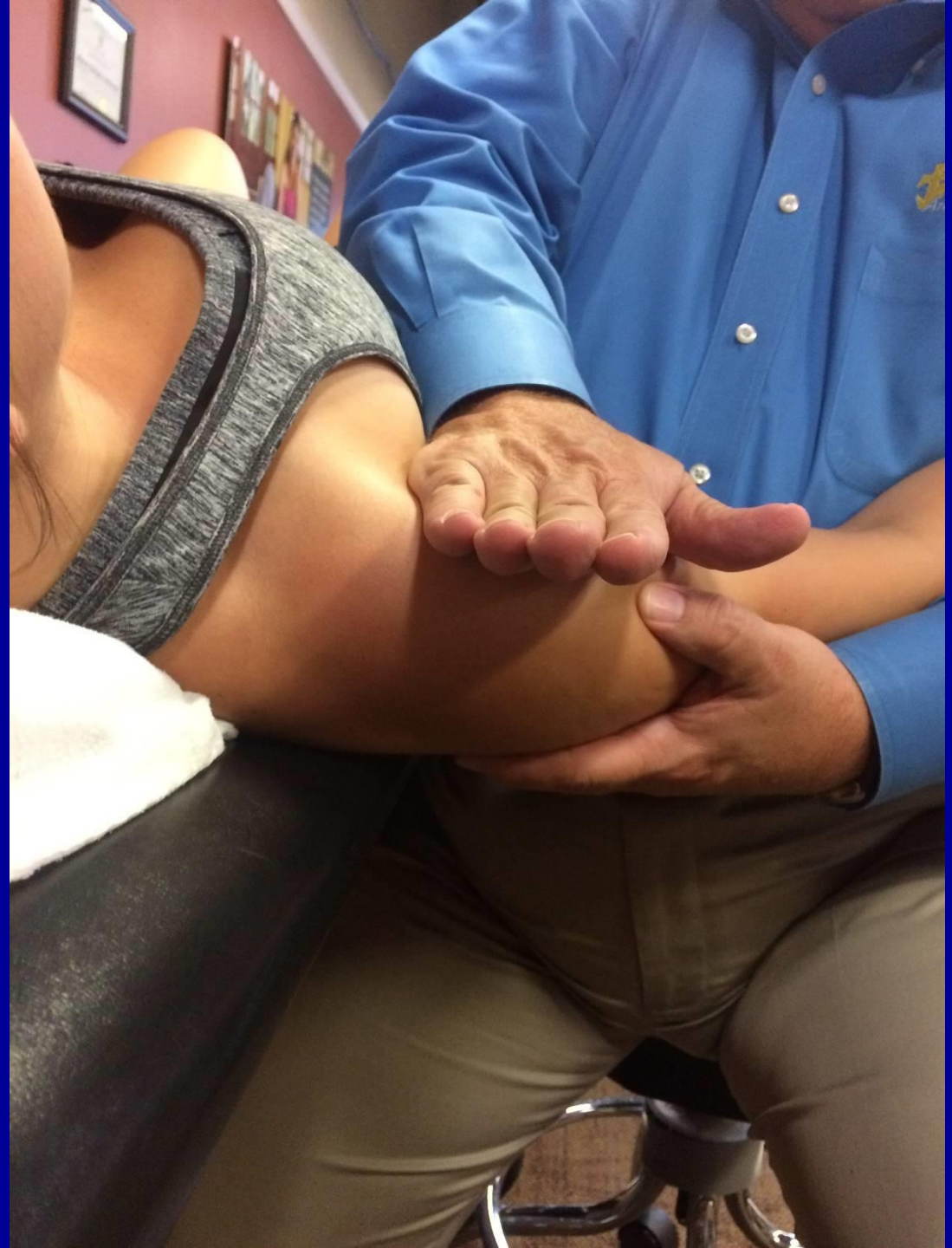

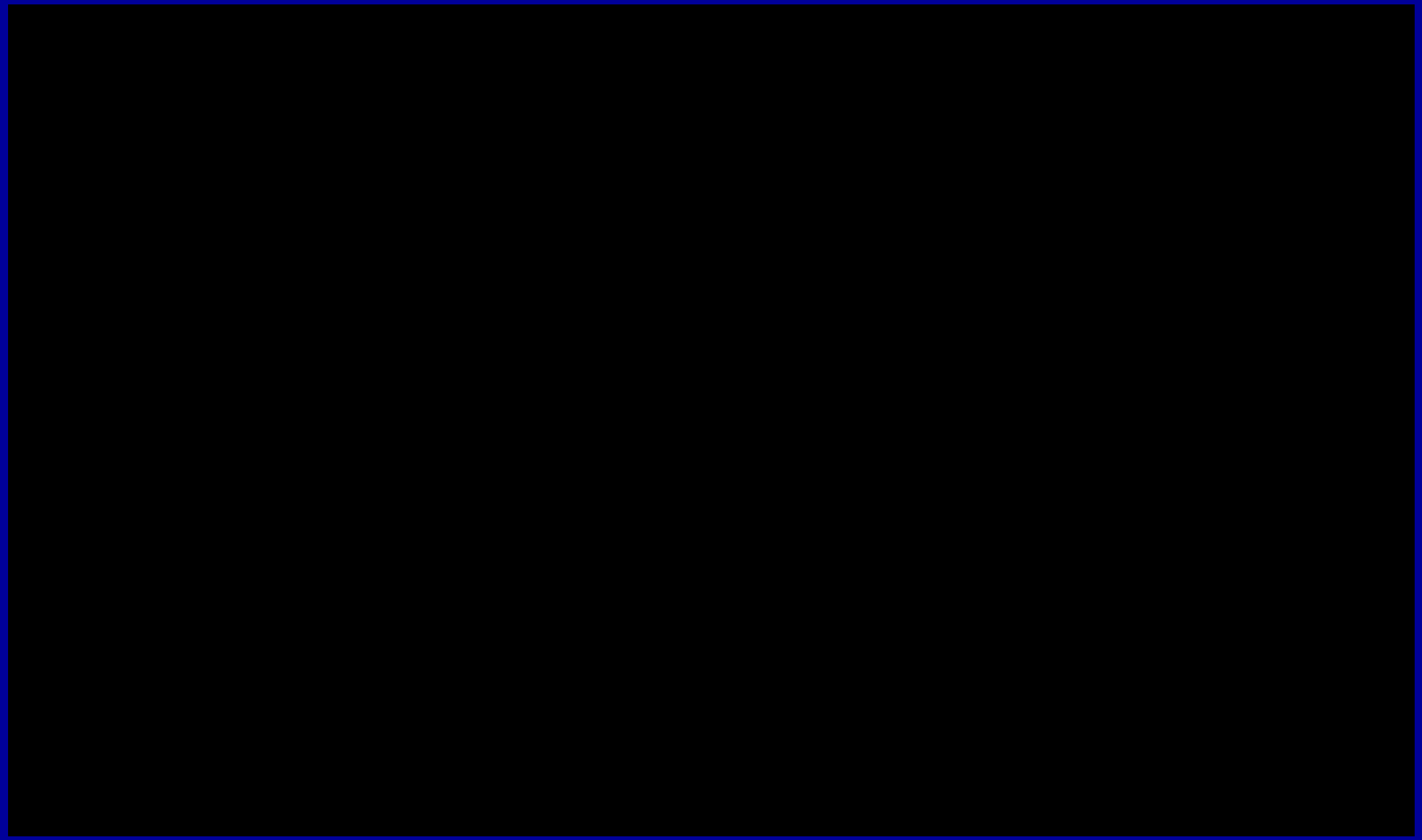

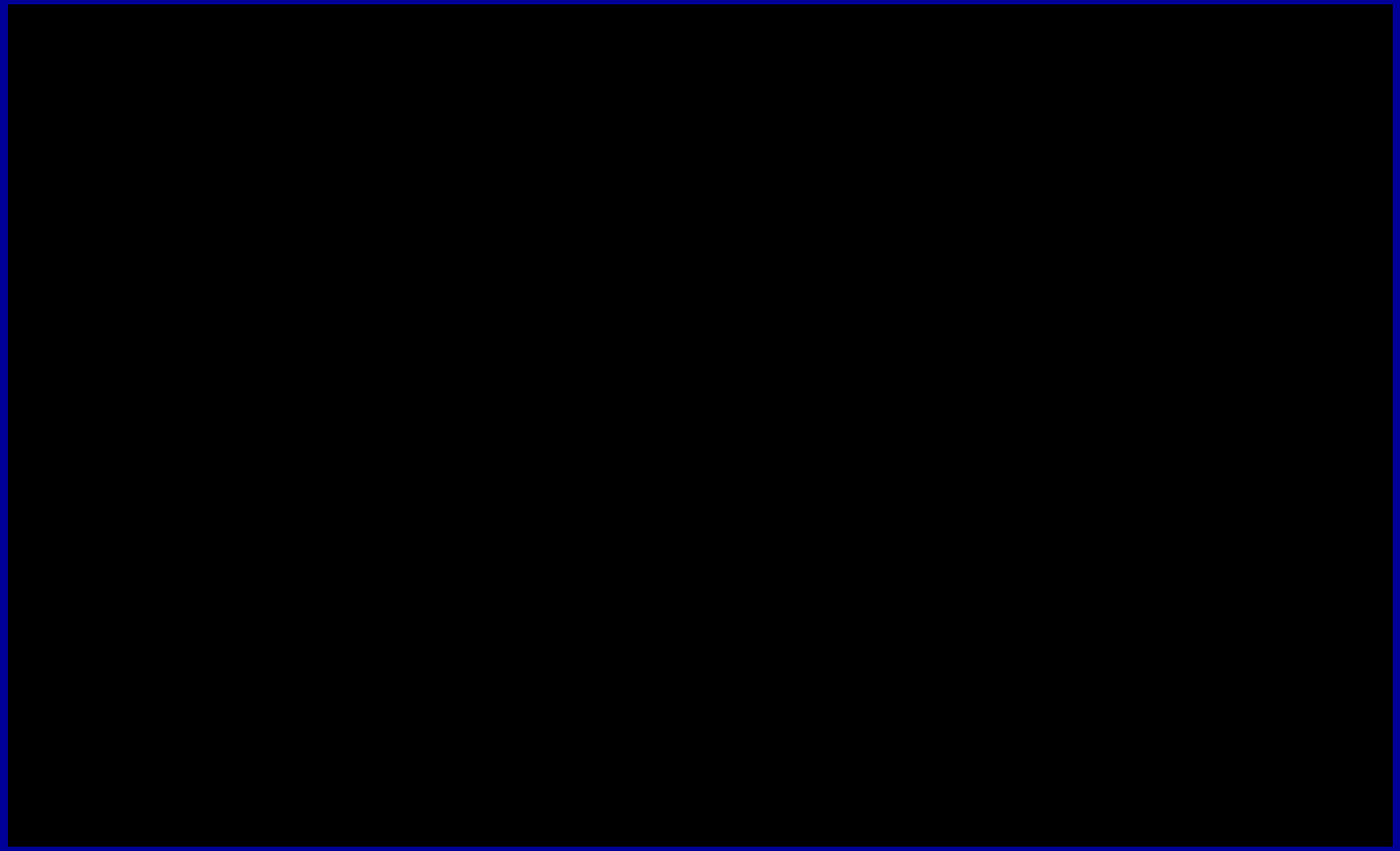


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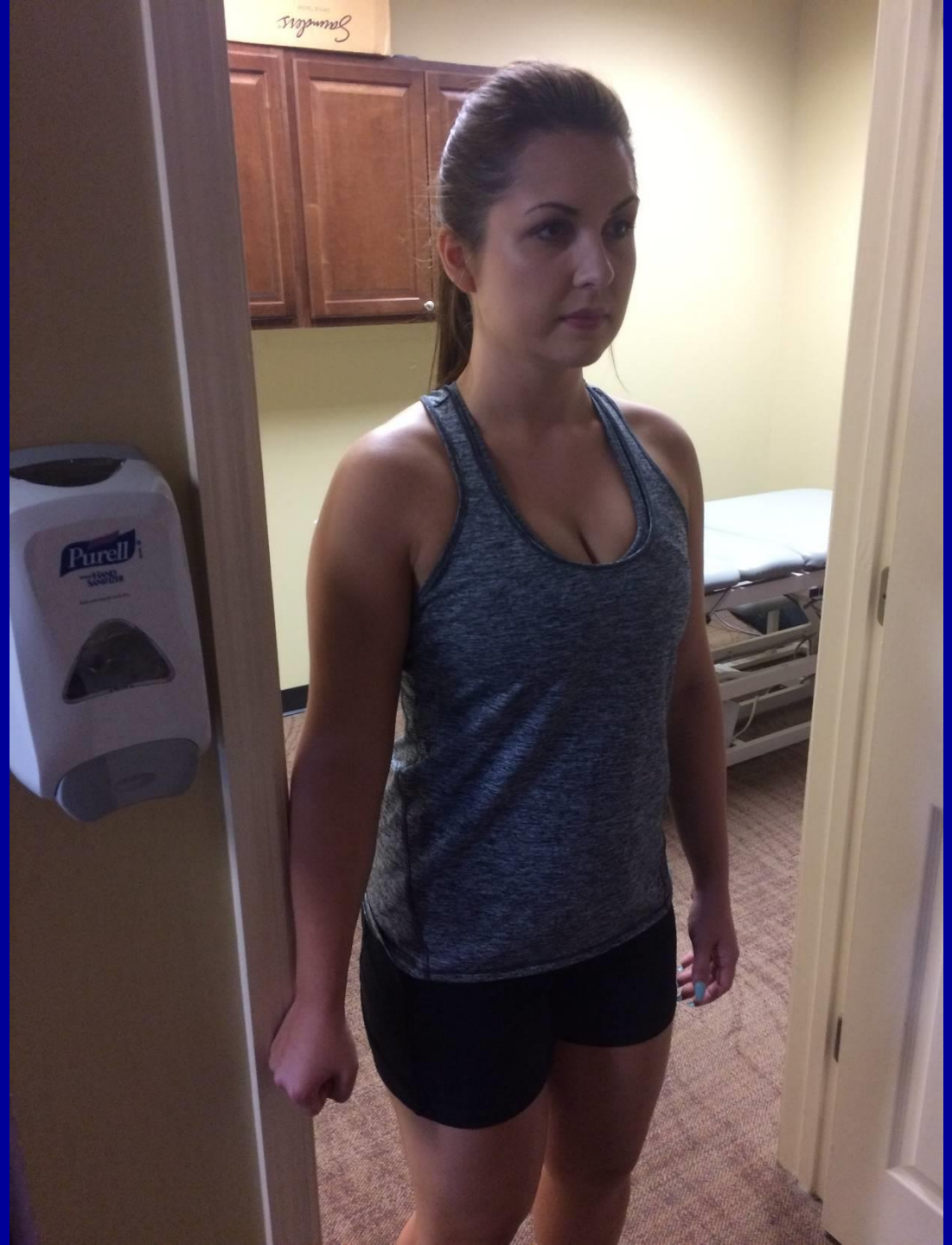
# Rotator Cuff Repair

- UE Ranger Low EMG based activation
- Manual exercises – rhythmic stabilization – short lever arm – arm control
- Isometric deltoids (submax = no pain)
- Protraction – manual applied press-up plus
- Triceps push downs
- Standing Extension to hip – progress to prone position
- Wall push-ups (double arm) – closed kinetic chain exercises
- Shoulder Sphere – static protocol 1-2


Purell


Purell

# Isometric deltoids

# Short lever arm isometric internal rotation


BIODEX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-John H.
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# Rotator Cuff Repair

Return to function Phase “longest phase of rehab”

- Isotonic strengthening with positional recruitment – Time frame to begin exercises depends on range of motion and muscle control
- Elevation strengthening – Supine position
  - Prone scaption 100° - short arc to 30°
  - Prone scaption 120° - short arc to 30°
  - Prone horizontal ABD – ER short-arc
  - Sidelying external rotation to neutral
  - Scaption - (Full Can)
- Protraction PRE – manual applied force distally
- Single arm wall push-ups
- Placement eccentrics – correction of elevation hike dysfunction
- Advanced scapular stabilization – retraction and protraction
- Rhythmic stabilization (long lever arm)
- Shoulder Sphere – dynamic workout; 3-5 reps

*Reference: Trundle, TL, 2011, 2016*

*Meijden OA et al. 2012*

*Strickland, JP; et.al, 2010.*


Dynatronics


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# Prone Scaption Series

1. Scaption at 100°
2. Scaption at 120°
   - Short-arc ROM for rotator cuff recruitment
3. Long-arc ROM for advanced scapular stabilization with increase of activation of the lower trapezius, used in advanced stages of exercises
   - EMG Level 4

Scaption elevation to hike

# Placement Eccentrics

- Scaption
- Sidelying External Rotation
- Prone Scaption

Recommended exercise progression

2 sets of 5 – geriatric
3 sets of 5 - traditional
2 sets of 10 – advanced

Guard against eccentric overload

# Muscle Recruitment

- Placement Eccentric
  - Isometric to eccentric isotonic activity is more likely to create functional carryover (improved recruitment)
  - Holding isometric to muscle lengthening (Eccentric) leads to controlled mobility (closing the gap)
  - The goal for the patient is to develop automatic controlled mobility during functional performance (elevation control)

*Reference: Trundle TL 2011, 2016*


Dynatronics

# Muscle Type Composition of Rotator Cuff Muscles

- Type I – slow-twitch: resistant to fatigue
- Type II – fast-twitch: type II A, type II X

- Muscles disuse is associated with a type I to type II shift.
- Endurance exercise protocols may result in an increase of type I fibers.
- Losing muscle mass, strength, injured or post-operative muscles are likely to be more fatigable due to fiber changes with disuse atrophy.

**Clinical Concept**: Missing link is eccentric strengthening of external rotation.

*Reference:* Lovering, Russ. JOSPT 2008


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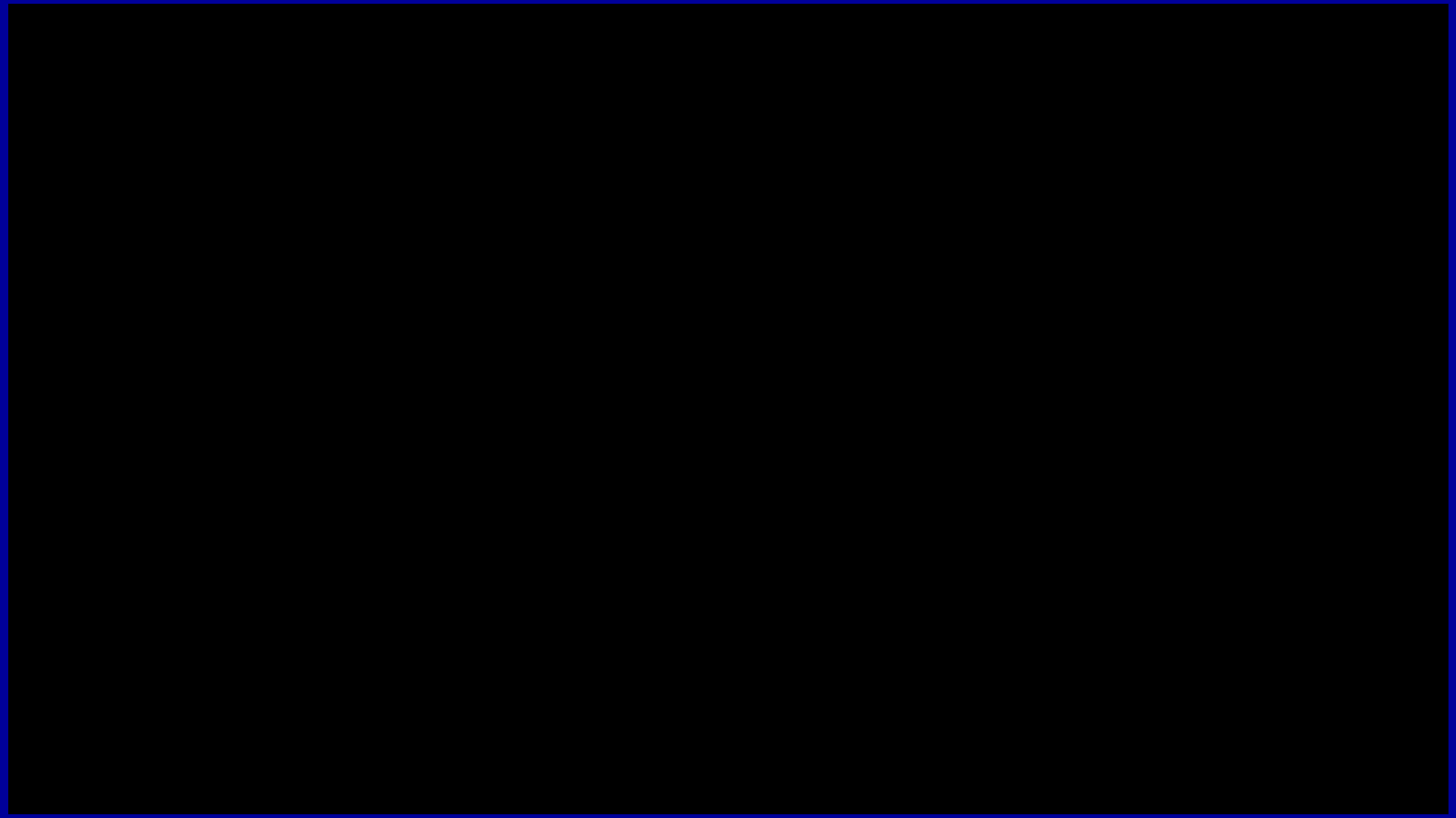
# Average Force (pounds) for Thera-band Elastic band®

| % Elongation | Yellow | Red | Green |
|---|---|---|---|
| 50% | 2 | 2.5 | 3 |
| 100% | 3 | 4 | 5 |
| 150% | 4 | 5 | 6.5 |
| 200% | 5 | 6 | 8 |

Reference Page, et al JOSPT 2000


*Ref: Evans NA, Dressler EV, Uhl T, JOSPT (CSM 2017)*

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SHOULDER SPHERE

# Vital Five Exercises – Home Program

- Scapula Stabilization
- Single arm wall push-up – progress to uneven surface
- Prone series- PRE/selective exercises
- Scaption strengthening – progress to above 90°
- Sidelying external rotation – past neutral

# Positional Recruitment for Rotator Cuff Health Summary

1. Sidelying External Rotation
2. Standing Scaption thumb-up
3. Prone Extension
4. Prone Scaption – 100°
5. Prone Scaption – 120°
6. Prone Horizontal Abduction with rotation

# Rotator Cuff Repairs

Return to activity Phase-Advanced exercises

- Continue all selected positional strengthening exercises – optional high repetition PRE program
- Plyo-toss – double arm – plyometrics
- BodyBlade® – three planes – oscillation training
- Shoulder Sphere – high velocity simulation of activities

Progression is based on clinical interactive outcome and functional needs.

# Rehabilitation Summary

- Scapula-cuff stabilization using the three “p’s”
  - Pivotors – scapular stabilizers, i.e., rhomboids & trapezius – serratus anterior
  - Protectors – rotator cuff → decompression
  - Positionors – deltoids, latissimus dorsi, pectoralis major → controlled elevation - end product of function

# Questions