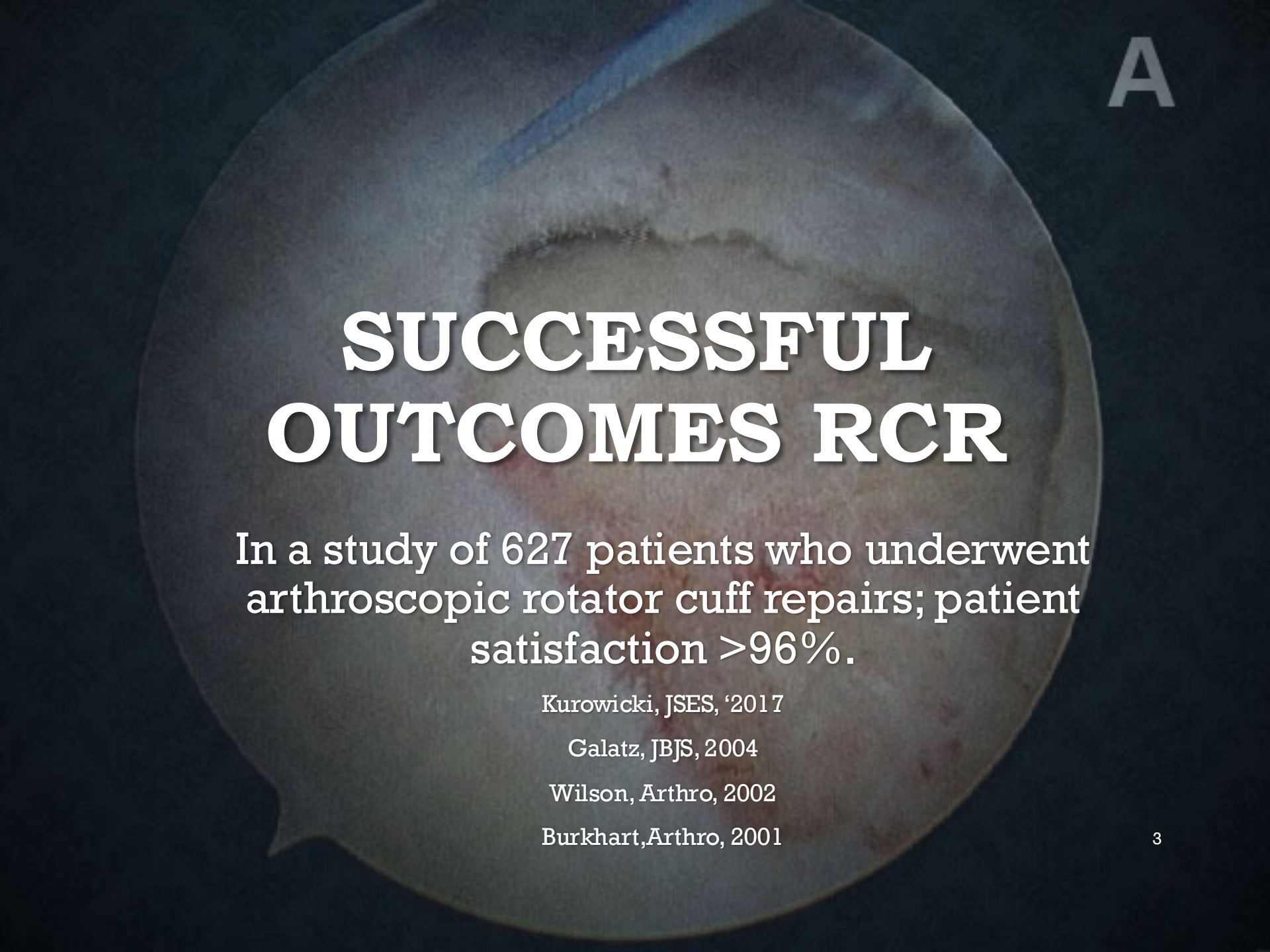
REHAB POST ROTATOR CUFF SURGERY

2025 ORTHOPAEDIC & THERAPY UPDATE

Kevin Axtman
PT, DPT, ATC

ROTATOR CUFF TEAR REHAB THINGS TO CONSIDER

- Common Surgery
- Can be a high re-tear rate!
- Which protocol to follow?
- Early or Delayed Rehab?
- When to start ROM?
- What about Stiffness?
- When can we safely strengthen?



SUCCESSFUL OUTCOMES RCR

In a study of 627 patients who underwent arthroscopic rotator cuff repairs; patient satisfaction >96%.

Kurowicki, JSES, '2017

Galatz, JBJS, 2004

Wilson, Arthro, 2002

Burkhart,Arthro, 2001

RE-TEAR RATES

- Harryman 1991

  1 tendon 20%, 2 tendon 47%, 3 tendon 68% (105 open RCR's followed an average of 5 years using ultrasonography) Most were satisfied with the result.

- Cho 2009

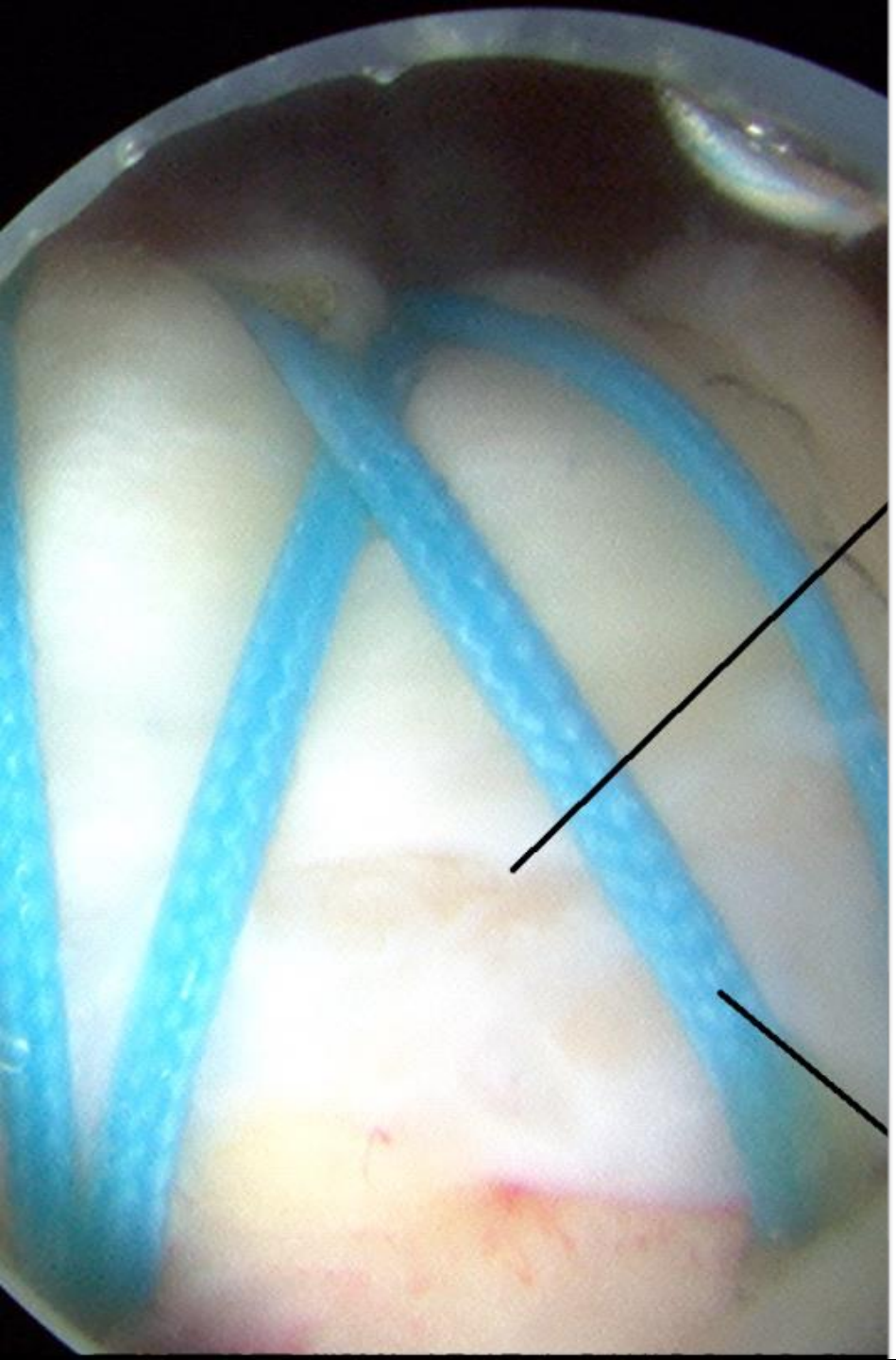
  1 tendon 10%, 2 tendon 41% (169 RCR's evaluated with MRI up to 2 yrs po)

- Rashid 2017

  Data from a large randomized controlled trial; 1 year

  255 pts underwent RCR; overall failure rate 43%

  (Small tears 34%, medium 36%, large 47%, massive 73%)



RISK FACTORS

- Tear Size
- Age >65
- Chronicity of Tear
- Diabetes
- BMI
- Smoking
- Worker Comp

TEAR SIZE

"Tear size the most influential effect on repair integrity."

Gladstone, AJSM, '2007

Wu, AJSM, '2012

Le, AJSM, '2014

Rashid, Acta Ortho, 2017

- **Small** or less than 1 cm
  - Usually involves the supraspinatus alone
- **Medium** 1 to 3 cm
  - Supraspinatus only?
- **Large** 3 to 5 cm
  - Full thickness tears affecting multiple areas
- **Massive** greater than 5 cm
  - Usually chronic, with poor quality tissue, retraction

TEAR SIZE AND RCR HEALING RATES

- Small-sized tears (30 shoulders)
  - 96% healing rate
- Medium-sized tears (71 shoulders)
  - 87% healing rate
- Large-sized or massive tears (68 shoulders)
  - 58% healing rate

- Cho,Clinics in Ortho Surgery, '2009

AGE AND RCR HEALING RATES

- <50 years of age (49 shoulders)
  - 87% healing rate
- 51-60 years of age (68 shoulders)
  - 79% healing rate
- **>61** years of age (52 shoulders)
  - 65% healing rate

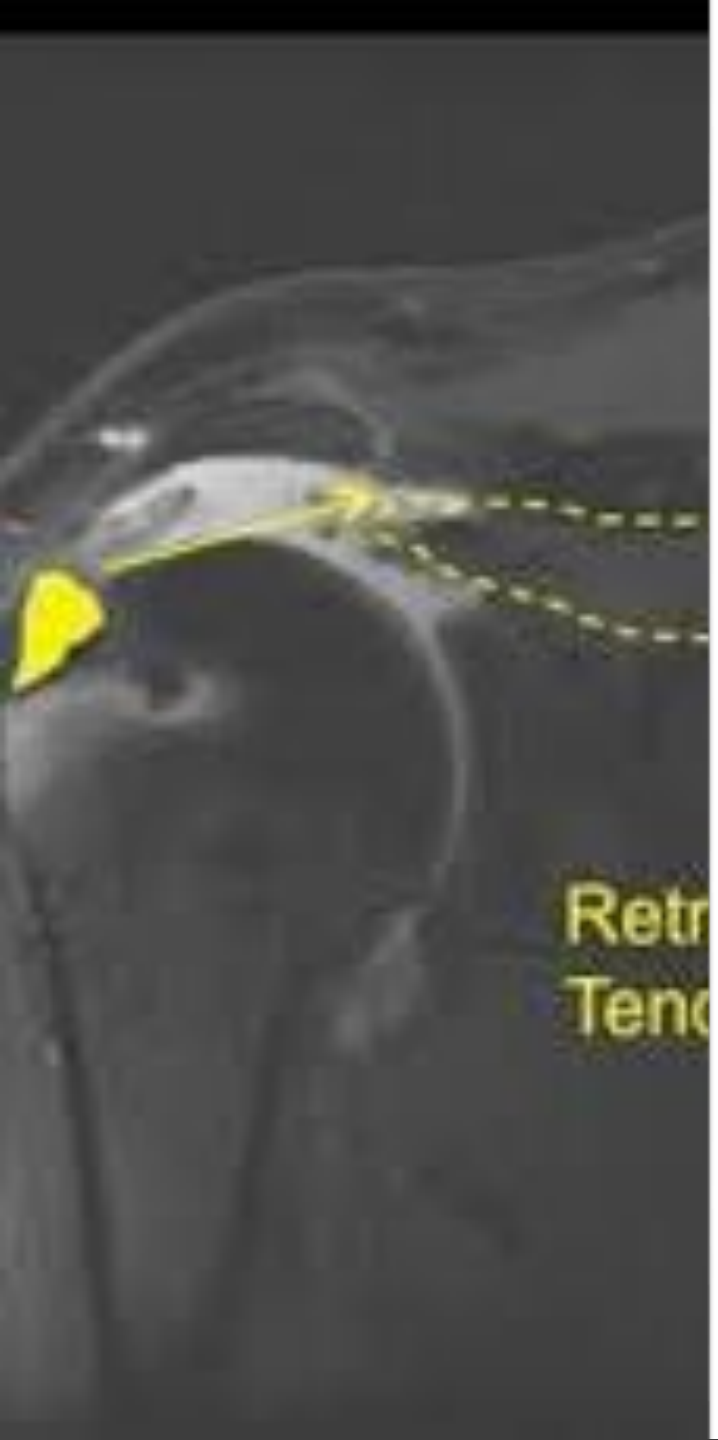
  Cho, Clinics in Ortho Surgery, '2009

- "**Age** is a dominant risk factor for failure of rotator cuff healing."

  Wu, AJSM, '2012

  Rashid, Acta Ortho, '2017

  Zhao, JSES, '2021



TISSUE QUALITY

- Osteoporotic bone
  - Charousset, Arthro, '2010
- Tendons
  - Degenerative tear; thinned, weak, retracted tendon
    - Ghodadra, JOSPT, '2009
  - Fatty infiltration plays a significant role in the functional outcome after RCR.
    - Tashhjian, AJSM, '2010
    - Nakamura, Arthro, '2015
    - Ohzono, AJSM, '2017
  - A successful repair did not lead to a reversal of muscle degeneration.
    - Gladstone, AJSM '2007

OTHER RISK FACTORS

- Diabetes
- BMI
  - Bedi, JSES, '2010
  - Zhao, JSES, 2021
- Smokers and Workers Comp

TYPE OF SURGICAL APPROACH

- Open procedure which may include partial deltoid detachment
- Arthroscopic assisted with a mini deltoid split;

  SVA to perform subacromial decompression without deltoid detachment
- All arthroscopic

  Single row

  Double row

Lafosse, JBJS, '2007

Duquin, AJSM, '2010

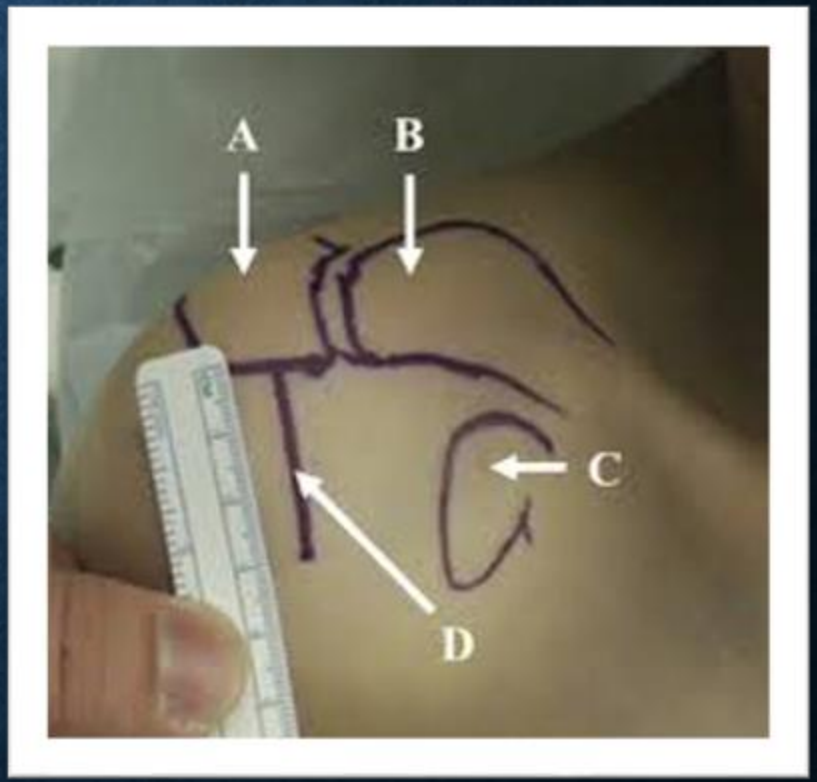
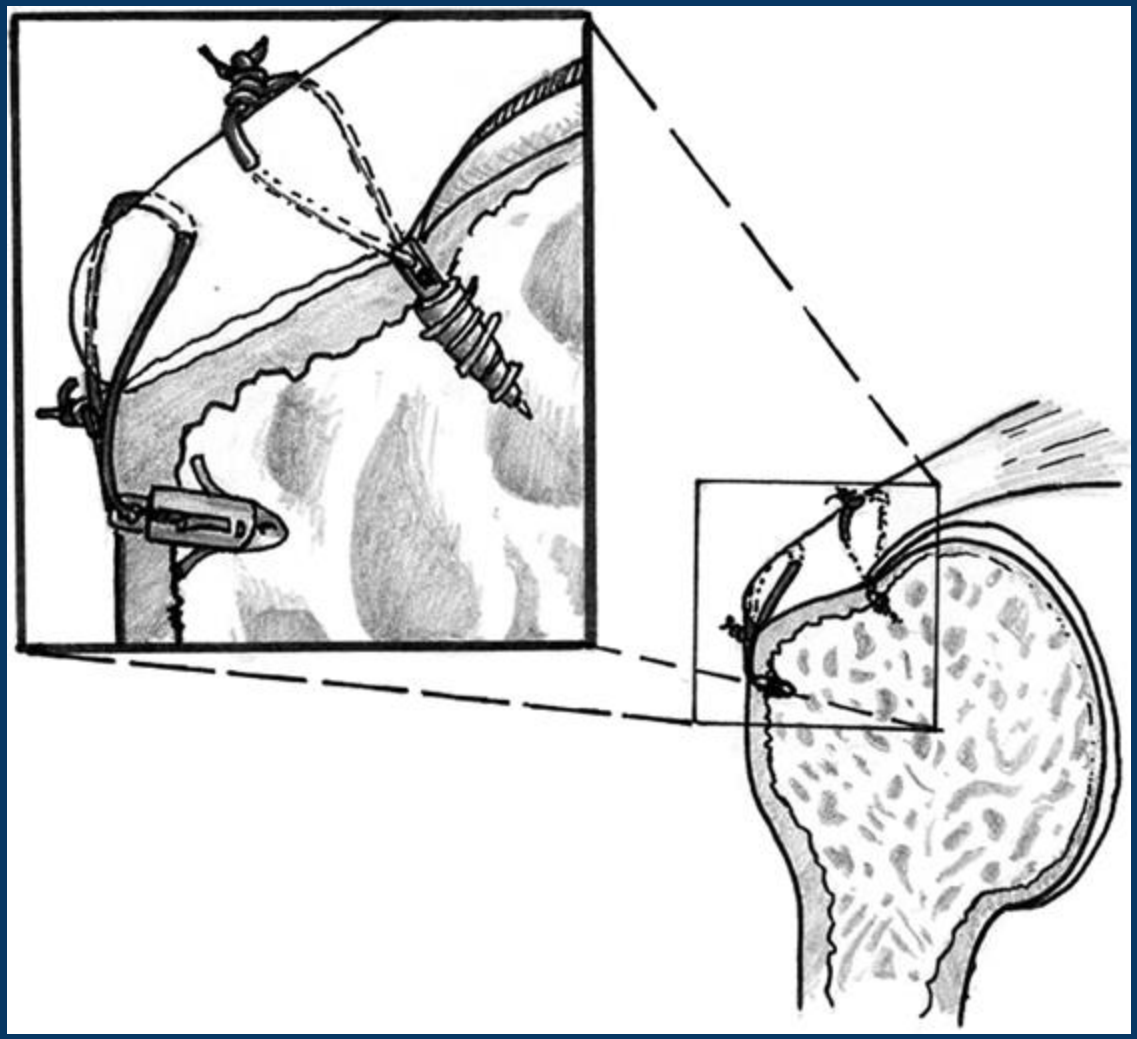
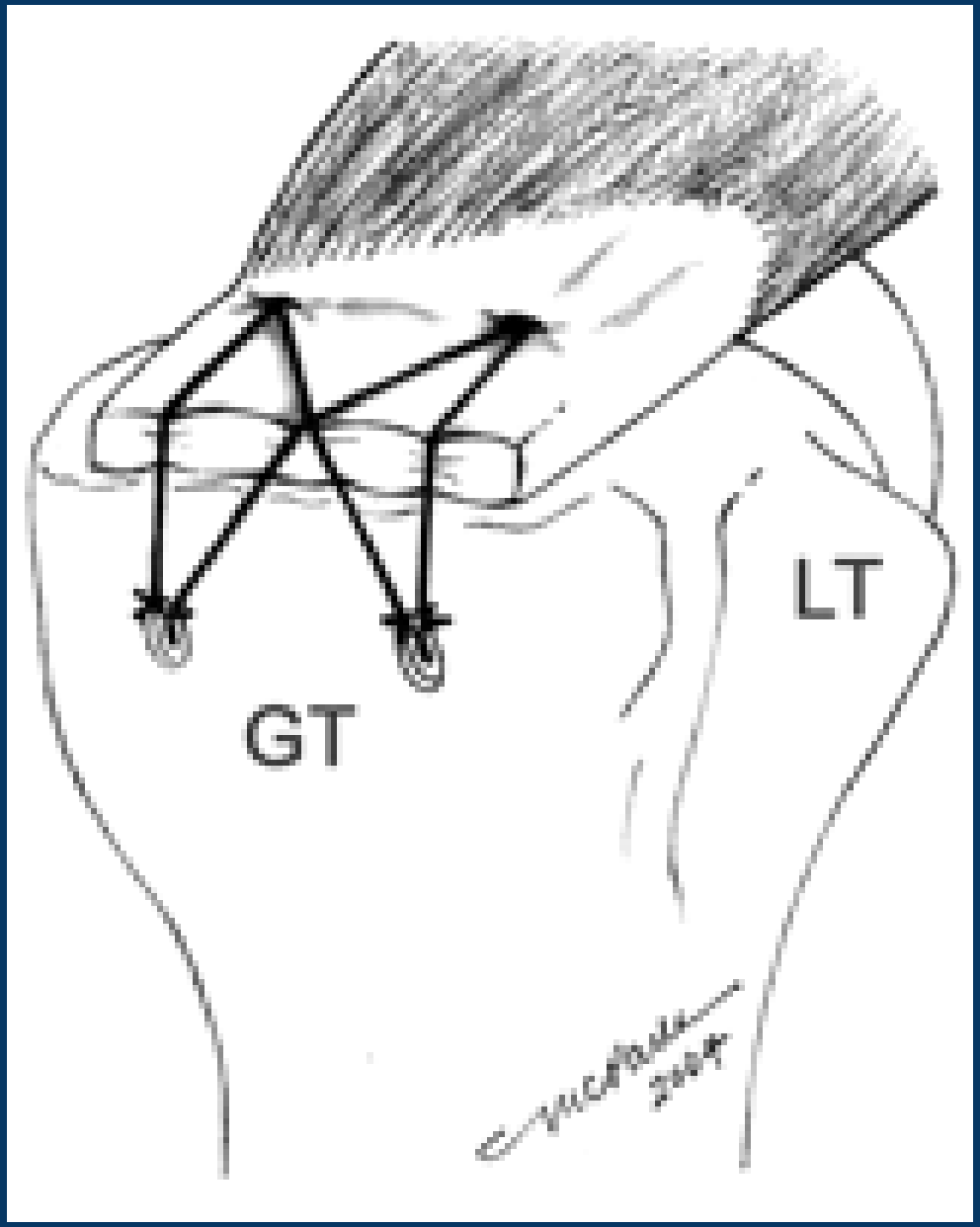


Fig. 3 Illustration depicting the restoration of the rotator cuff footprint with use of a double-row of suture anchors.



Lafosse , J Bone Joint Surg ‘2007

JB&JS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WHAT ABOUT REHAB?

TEAR SIZE

- TABLE I Repair Integrity, as Seen with Ultrasound at Three Weeks Postoperatively and at the Time of Final Follow-up (minimum of 12 months), According to Tear Size

	Intact at **3 Wk Postop.**	Intact at Final Follow-up
Small tears	(n = 16) 15 (94%)	14 (88%)
Medium tears	(n = 121) 117 (97%)	113 (93%)
Large tears	(n = 41) 37 (90%)	32 (78%)
Massive tears	(n = 32) 21 (66%)	15 (47%)

Huijsmans, JBJS, '2007

WHEN DO RCR'S RETEAR?

- Majority of retears occur within the first 6 months of repair.
- 6 weeks – 3 months the most common retear time

  Le, AJSM, '2014

  Yamaura, JSES, '2023

  - Repairs >4 cm (Large to Massive) fail <12 weeks
    - 41% recurrent tear rate

      Miller, AJSM, '2011
  - Repairs <3 cm fail 3-6 months (avg 19.2 weeks)
    - 17% recurrent tear rate at 1 year

      Iannotti, JBJS, '2013

WHY THE CONCERN?

- Intact cuff = better function
  - Better shoulder functional outcome scores
  - Increased ROM in forward elevation
  - Increased strength in forward elevation

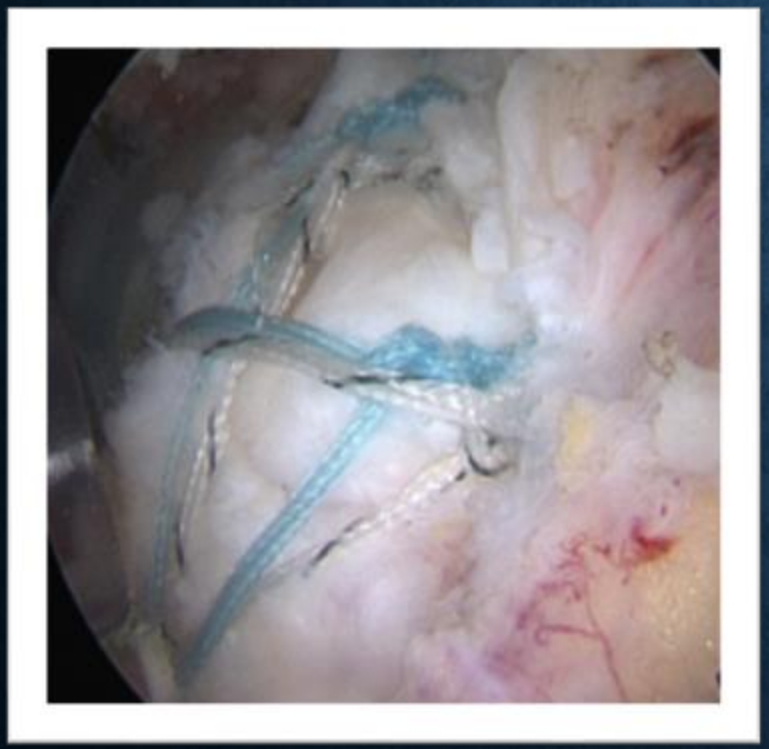
Harryman, JBJS. ‘1991

Huijsmans, JBJS, ‘2007

Slabaugh, Arthroscopy, ‘2010

Le, AJSM, ‘2014

EARLY VS DELAYED PROM



- Shuxiang, Medicine, '2018
  - Systematic review and meta-analysis of randomized studies (8), consisting of 671 patients;
  - Early PROM group had "superior ROM recovery after arthroscopic RCR", "but likely to result in lower rates of tendon healing in shoulders with large-sized tears".

Houck, AJSM, 2017

- Systematic review of overlapping meta-analyses, containing 5896 patients;
- "The current, best available evidence suggests that early motion improves ROM after RCR but increases the risk of rotator cuff re-tear." (in large-sized tears)

Saltzman, JSES, '2017

Jancuska, OJSM, '2018

Li, Medicine, '2018

AAOS EVIDENCE-BASED CLINICAL PRACTICE GUIDELINES 2019

- Early (0-2 weeks) or delayed (4-8 weeks) mobilization showed similar outcomes in RC healing, ROM and patient reported outcomes.
  - Early mobilization had improved ROM
  - Delayed mobilization had higher rates of po healing, especially larger tears

EARLY VS DELAYED AROM

- Kluczynski, AJSM, 2016
  - Systematic review and meta-analysis, consisting of 37 studies, 2251 repairs; starting AROM <6weeks after surgery versus those starting >6 weeks.
  - "Early AROM was associated with increased risk of a structural defect for **small and large rotator cuff tears**"

STAGES OF TENDON HEALING

Inflammatory stage; 0-10 days

Remove tissue debris and prepares the area for healing.

Proliferative or reparative stage; 10 days-few weeks.

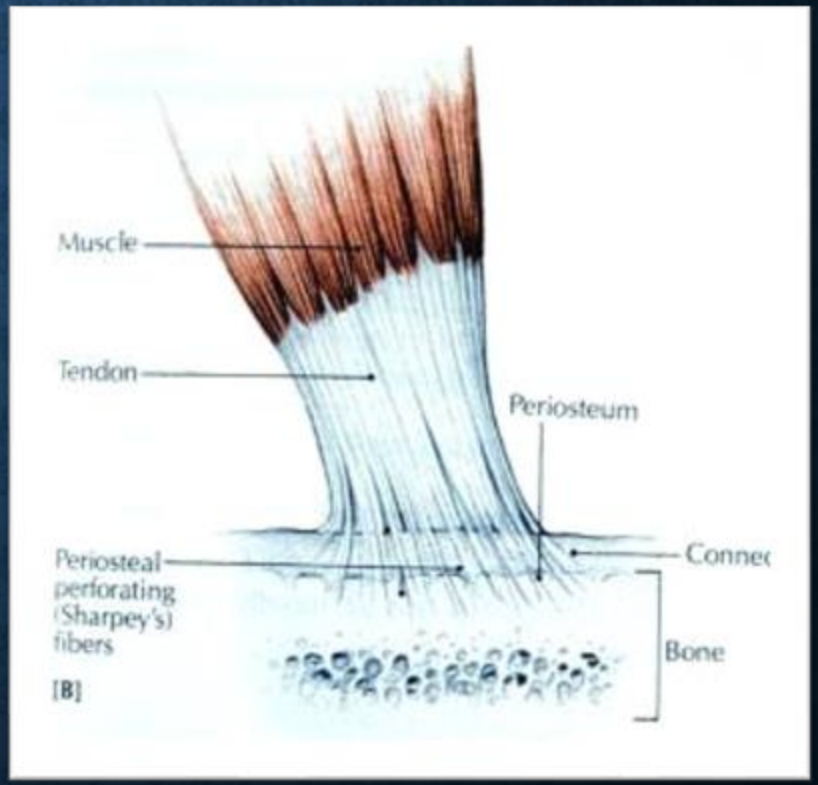
Tendon has very low tensile strength.

Remodeling; starts 6-8 weeks after injury (repair strength 19%-30%)

Higher proportion of type I collagen at this stage (scar-tissue).

STAGES OF TENDON HEALING

- Sharpey's fibers
  - Not appearing in any considerable number before 12 weeks (repair strength 29%-50%), and not fully developed till after 15 weeks.
    - Sonnabend, JBJS, '2010



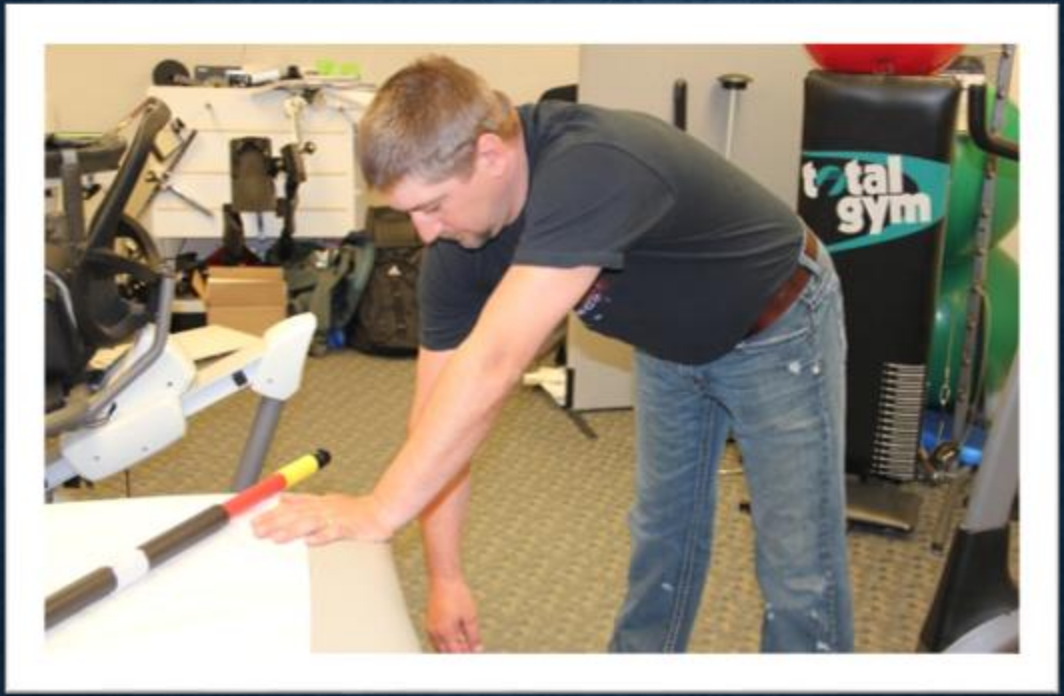
AMERICAN SOCIETY OF SHOULDER AND ELBOW THERAPISTS CONSENSUS STATEMENT ON THE REHABILITATION FOLLOWING ARTHROSCOPIC ROTATOR CUFF REPAIR 2016

- Weeks 0-2: Strict immobilization
- Weeks 2-6: Protective PROM
- Week 7: Restoration of AROM
- Week 12: Progressive strengthening


CHAMPIONSHIP
NHRA
DRAG RACING

EMG ANALYSIS OF THE ROTATOR CUFF IN POSTOPERATIVE SHOULDER PATIENTS DURING PASSIVE REHABILITATION EXERCISES. BASIC SCIENCE 2012

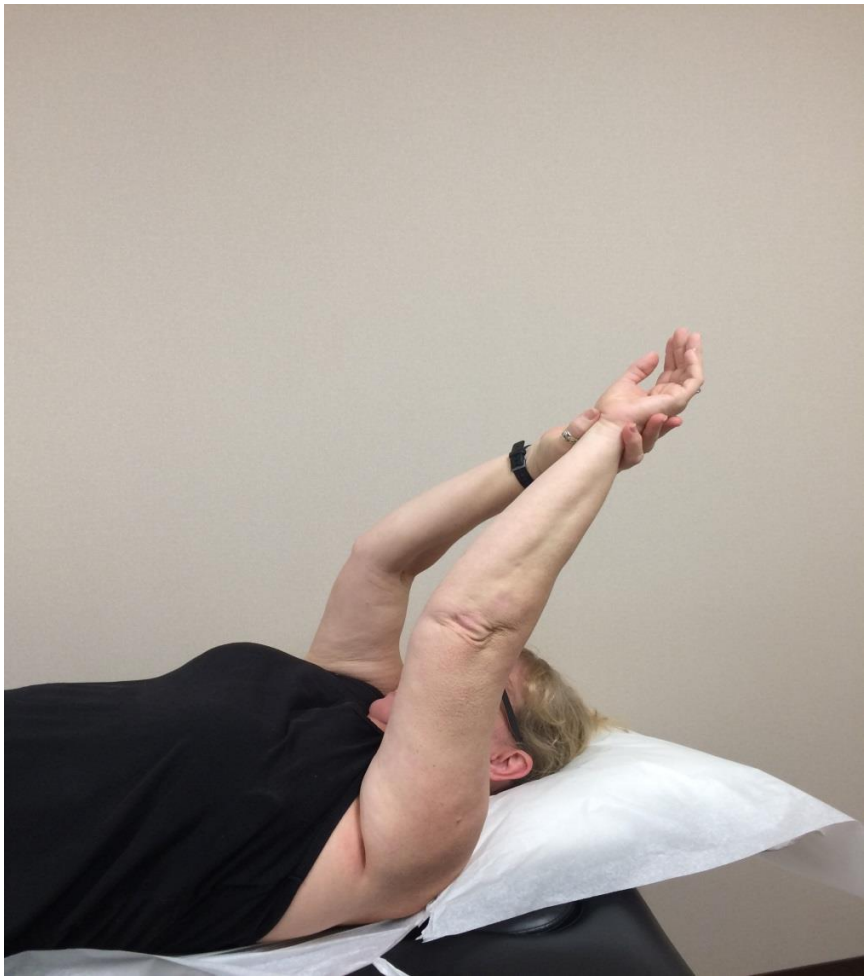
- Exercises which provided no greater supraspinatus activation than baseline resting measure.
  - PT and self assisted ER
  - PT assisted elevation
  - Pendulums



PENDULUM EXERCISE

ASSISTED ER TO NEUTRAL ONLY

FORWARD BOW



SUPINE ASSISTED ELEVATION

PULLEYS

MOST COMMON COMPLICATION AFTER ROTATOR CUFF REPAIR?

- 263 pts underwent SVA for rotator cuff repair during a 6-month period in 2003.
  - 28 pts identified with a complication
  - **STIFFNESS** was the number one complication; 23/28!

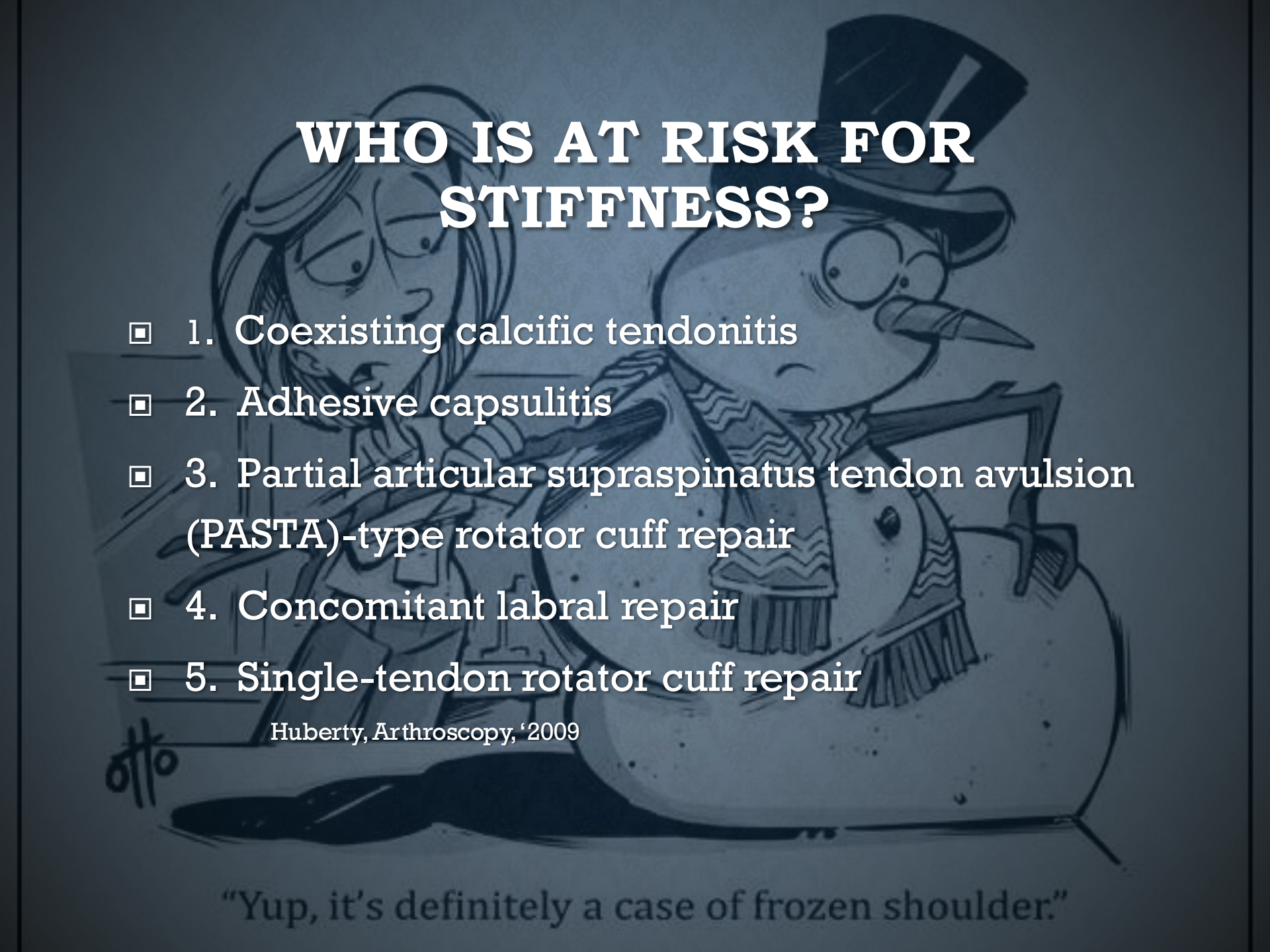
    Brislin, Arthroscopy, '2007

    Namdari, Med, '2018

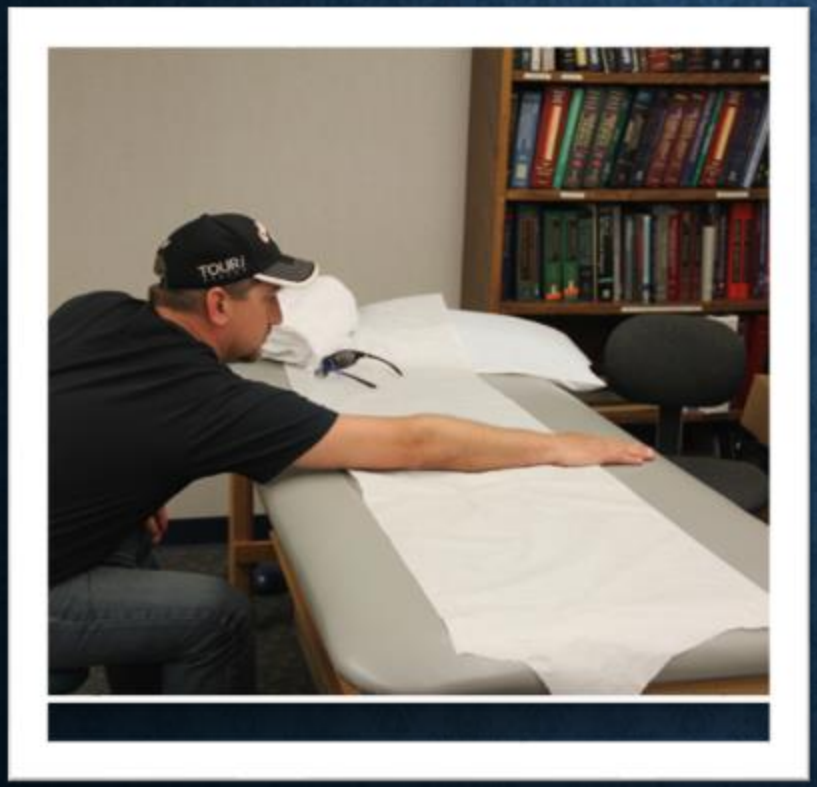
WHO IS AT RISK FOR STIFFNESS?

- 1. Coexisting calcific tendonitis
- 2. Adhesive capsulitis
- 3. Partial articular supraspinatus tendon avulsion (PASTA)-type rotator cuff repair
- 4. Concomitant labral repair
- 5. Single-tendon rotator cuff repair

Huberty, Arthroscopy, '2009



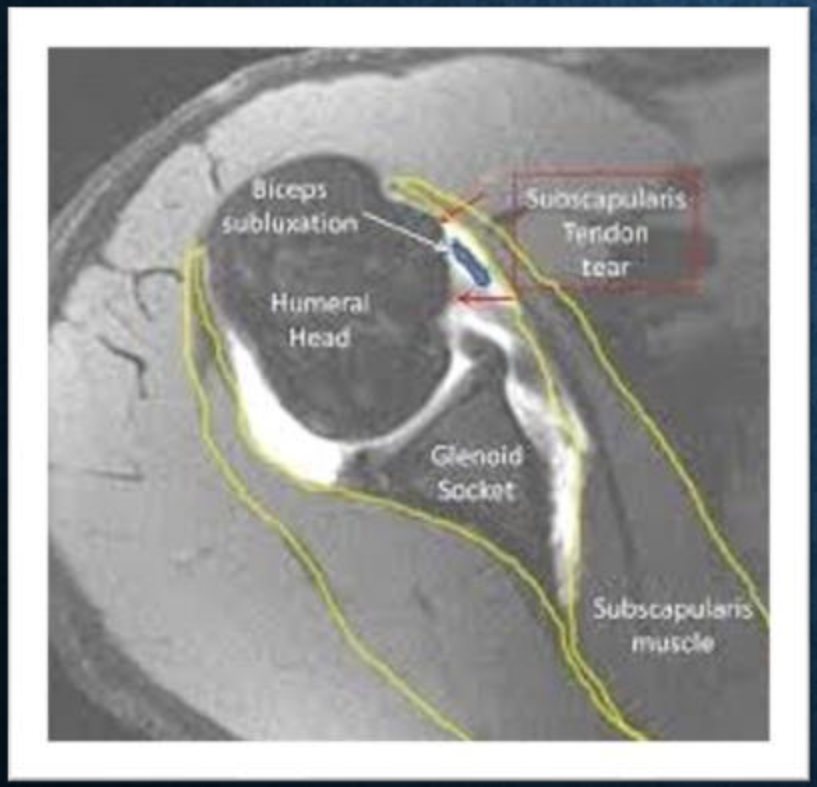
FOLLOW-UP STUDY



- Modified rehabilitation protocol setup;
  - Added early closed-chain passive overhead stretching

Koo, Journal of Arthroscopic and Related Surgery, '2011

ASSOCIATED INJURIES/SURGERIES



- Biceps repair/SLAP
- Instability
- Subscapularis

MESSAGES FROM THE OP-REPORT

- "We will plan to use the Bone and Joint massive protocol due to patient's soft tissue quality."
- "This was a bit of a triangle-shaped tear and so we did perform 2 side-to-side stitches, and I did bring the stitches down into the trough."
- "We will plan to use the Bone and Joint massive protocol secondary to the patient's relatively poor soft tissue quality and poor rotator cuff tissue."
- "The patient will be started on a labrum protocol, biceps precautions, and also consideration of the type 2 rotator cuff protocol…"

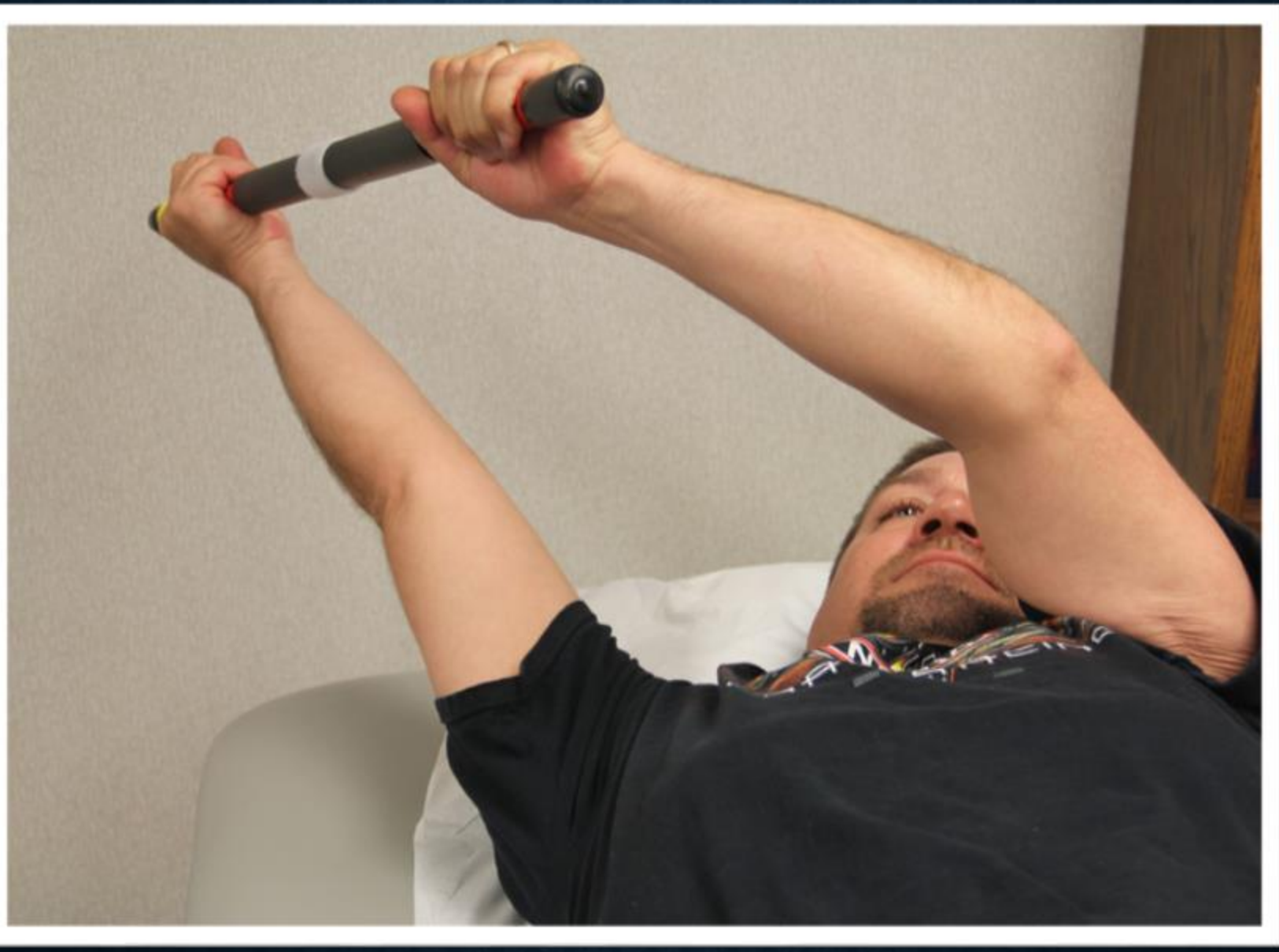
WHAT ARE SAFE POSITIONS/MOTIONS?

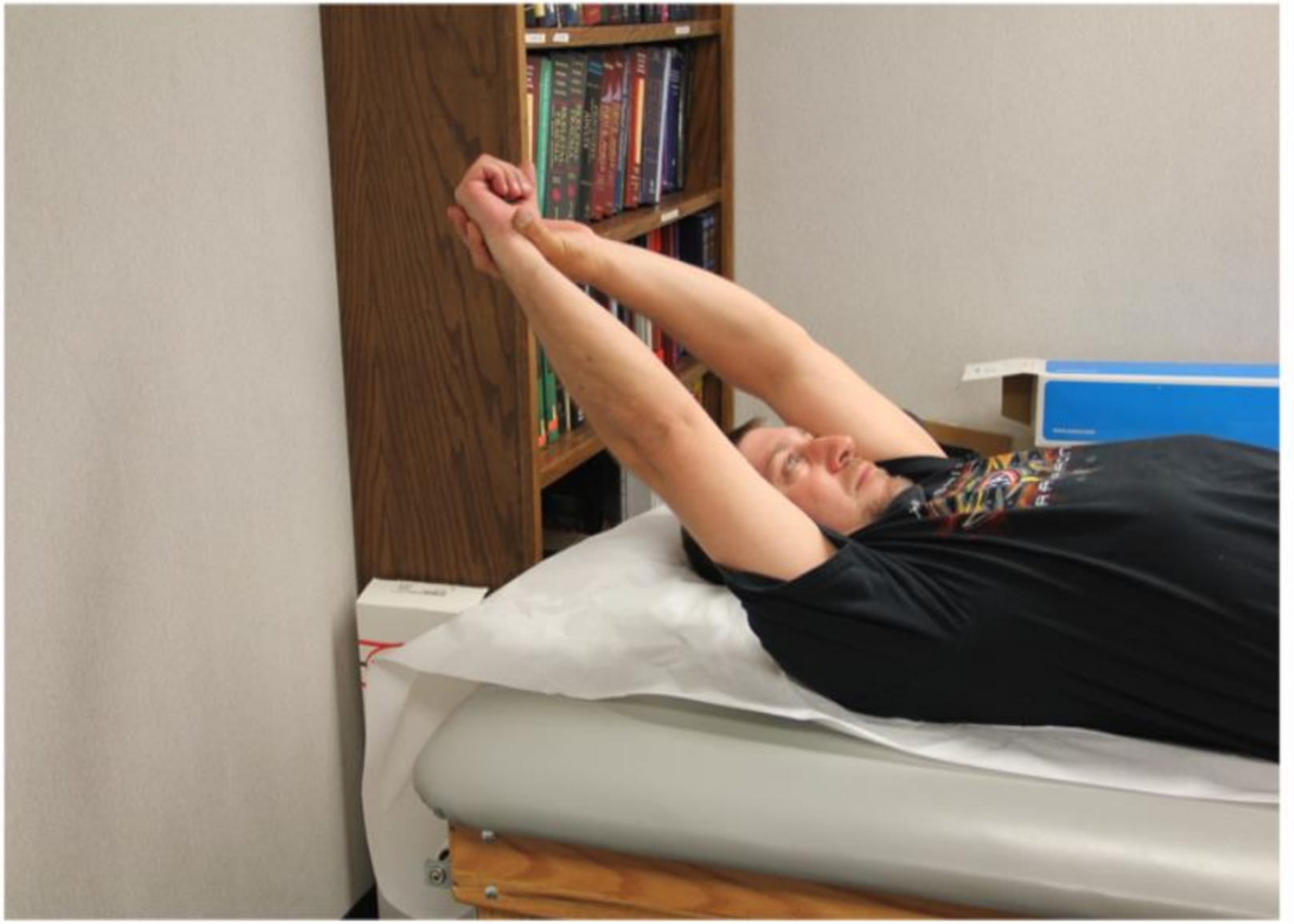
External Rotation with the arm at the side after cuff repair affected gap formation at the anterior supraspinatus.

- Park, AJSM, '2007
- Park, AJSM, '2008

"During postoperative rotation exercise, external rotation up to 60 degrees with the arm elevated (at least 30 degrees) in the scapular or coronal plane can be safely performed…"

- Hatakeyama, AJSM, '2001
- Sgroe, Cur Rev Musc Med, '2018





PROTOCOLS FOR RCR PROGRESSION

Type I	Type II	Type III
• Usually for small or partial tears/repairs with good tissue quality, and/or younger patients.	• Medium to large tears but watch tissue quality.	• Large to Massive tears/poor tissue quality/or tears which may require grafting, older patients, and/or revision repairs.

PROTOCOLS FOR RCR PROGRESSION

Type I	Type II	Type III
• Sling 3-4 weeks • AROM 6 weeks • Light resistance 8-10 weeks	• Immobilizer/sling 4-6 weeks • AROM 6-8 weeks • Light resistance 10-12 weeks	• Abduction immobilizer/sling 6-8 weeks • AROM 10-12 weeks • Light resistance 12+ weeks

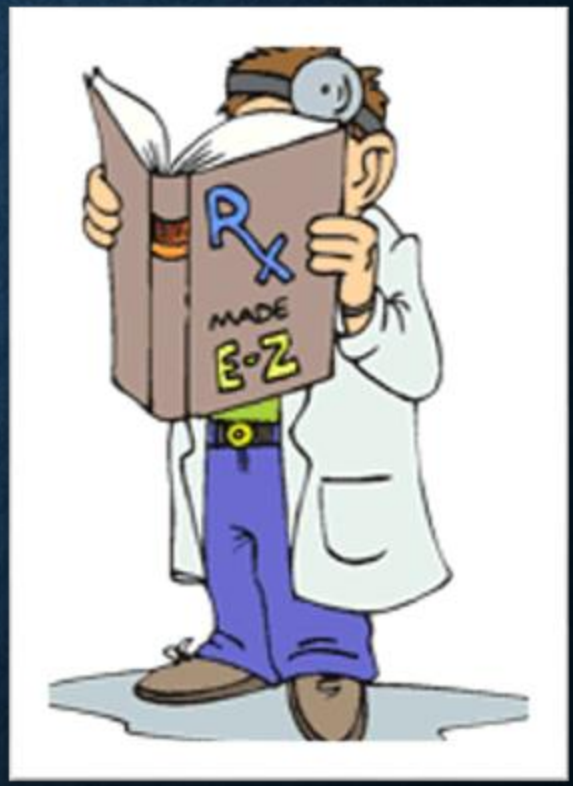

TOUR
11


NHRA


11
NHRA

SUMMARY

- Get the op report!
  - Know the tear size/# of tendons/retracted!
  - Tissue quality
  - Surgical approach
  - Additional procedures?
  - Protocol guidance
- Early passive motion in **<u>at risk patients</u>** improves ROM
- Delayed passive motion in **<u>larger tears</u>** improves healing
- Slow down!
  - 2-week period of immobilization
  - Restore AROM <u>after 6 weeks po</u>
  - Strengthening approximately week 12 po; emphasize higher reps and lower resistance first 3-4 months



Ghodadra, JOSPT '2009
Thigpen, JSES, '2016
Sgroe, Cur Rev Musc Med, '2018
McColl, JSES, '2019


THANK YOU!
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