Rotator Cuff Disease: Current Recommendations for Treatment

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Burden of Disease

8% of all American adults suffer chronic shoulder pain

140% increase in RTC repairs 1996-2006

250,000 RTC repairs annually @ ~ $6,300/patient

Lifetime societal savings per year for 250,000 repairs is > $3 billion

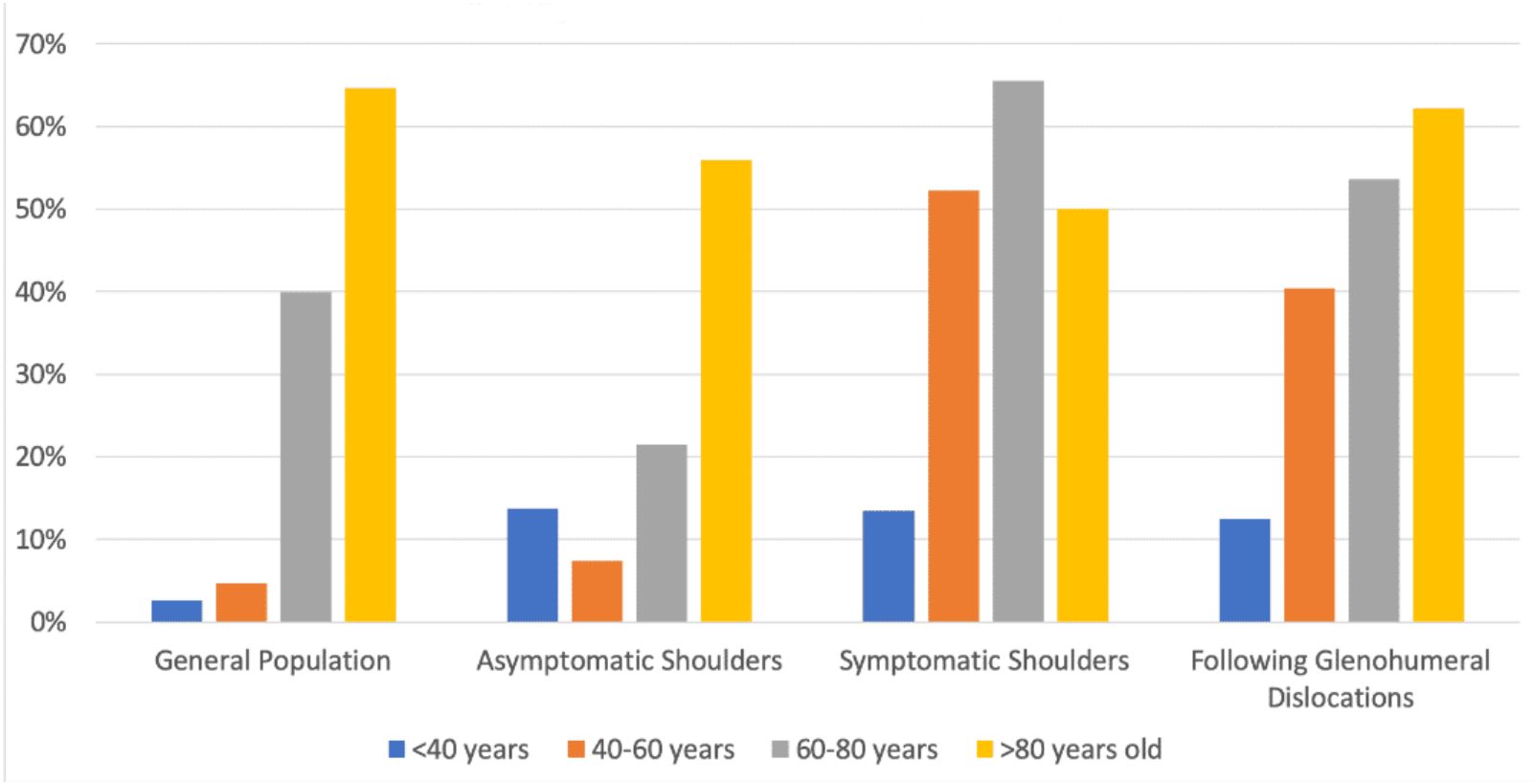
Incidence and Prevalence

4.5 million patient visits

2/3 treated with RTC repair are working age

Prevalence increased with age

- 13% in 50's
- 20% in 60's
- 31% in 70's
  - Not all symptomatic!



Risk Factors

> 40 years old

Repetitive overhead work

- Painters, carpenters

Shoulder dislocation in patient over age 40

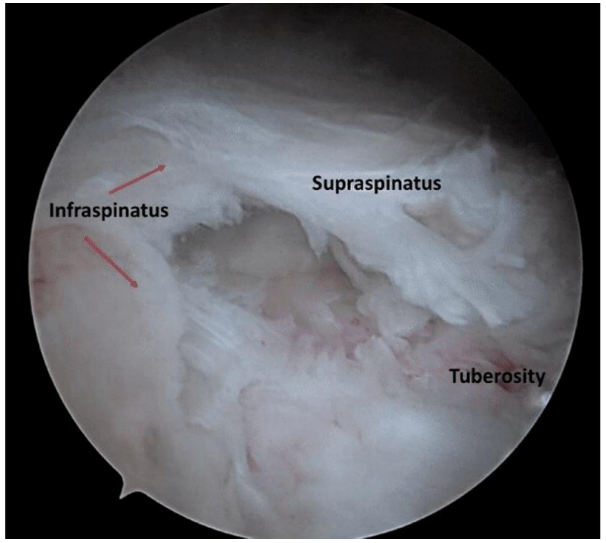
Management: Strong Evidence

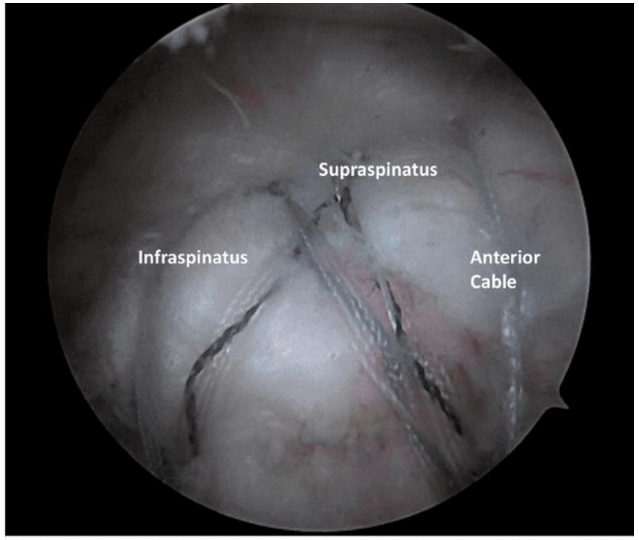
Small to medium tears

- Both PT and surgery resulted in improvement in PRO

Long-term non-surgical management

- PT shows improvement, but increased tear size and irreparability occurs over 5-10 years





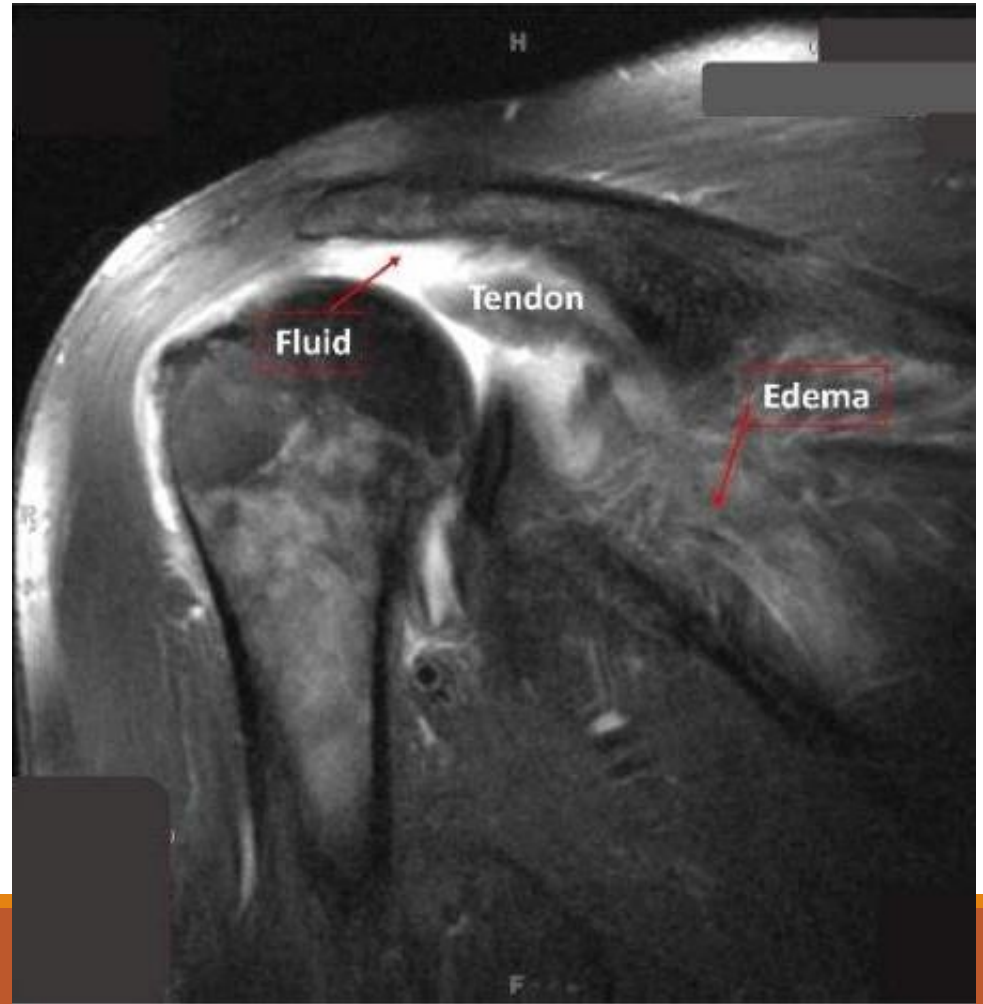
Diagnosis

Clinical exam is useful to diagnose RTC tears

MRI and US are useful adjuncts to exam

MRI helps determine repairability

- Grade fatty atrophy and retraction



Management: Evidence Moderate

Healed RTC repairs show improved PRO and functional outcomes compared to PT alone

Not all acute RTC tears need an acromioplasty at surgery

Distal clavicle resection should be performed at time of RTC repair if degenerative

Clinical Exam

Subscapularis

- Lift-off-test
- Belly-press-test
- Bear-hug-test

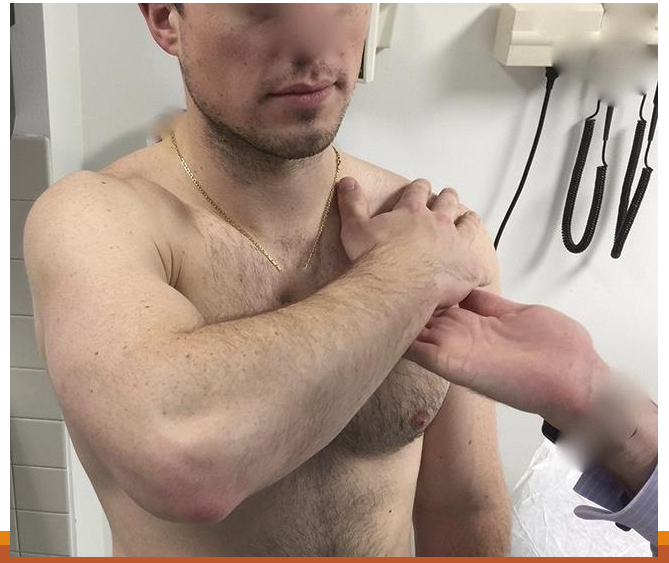


Table 6

Diagnostic Accuracy of Subscapularis Examination Tests

Examination Tests	Sensitivity	Specificity	LR+	LR−
Belly press (Napoleon's)	28%-50%	96%-99%	12.2-20	0.61
Belly-off	86%	91%	9.67	0.14
Liftoff	12%-25%	95%-100%	4.96	NA
Bear hug	19%-60%	81%-92%	7.5	0.32
Internal rotation lag sign	20%-32%	93%-97%	NA	NA
Internal rotation resistance test at abduction and external rotation	77%	80%	NA	NA

NA = not available

Clinical Exam

Infraspinatus
- External rotation lag sign
- Horn blowers

Teres Minor
- External rotation weakness
- Horn blowers

Table 5

Diagnostic Accuracy of Infraspinatus and Teres Minor Examination Tests

Examination Tests	Sensitivity	Specificity	LR+	LR−
External rotation				
Pain	54%	NA	NA	NA
Weakness	76%-84%	53%-57%	1.76	0.3
Patte (Hornblower)	79%-100%	67%-93%	12	0.05
External rotation lag sign	33%-100%	66%-100%	6.33	0.7

LR+ = positive likelihood ratios, LR− = negative likelihood ratios, NA = not available

Clinical Exam

- Supraspinatus
  - Jobe/Empty-can test
  - Obrien's test

Table 4

Diagnostic Accuracy of Supraspinatus Examination Tests

Examination Tests	Sensitivity	Specificity	LR+	LR−
Jobe				
Partial thickness tear or tendinitis	62%	54%	NA	NA
Full-thickness tear	41%	70%	1.37	0.84
Large or massive full-thickness tear	88%	70%	2.93	0.17
Full can				
Pain	66%-80%	50%-64%	NA	NA
Weakness	77%-83%	53%-74%	1.78-2.98	0.31-0.32
Drop arm	10%	98%	5.0	0.92
Painful arc	67%-98%	10%-62%	1.27-1.98	0.39-0.69

LR+ = positive likelihood ratios, LR− = negative likelihood ratios, NA = not available

Clinical Exam

Drop arm test

- Multiple tendon with disruption of shoulder force couple/suspension bridge.

Injections

Corticosteroids single injection can give significant relief of pain for impingement, bursitis, and shorter term for full-thickness RTC tears.

Injections

Hyaluronic acid limited evidence supports

PRP limited evidence supports

Post-op Mobilization

Strong evidence supports early mobilization for small to medium size tears

- Size classification
  - Small: < 1cm, ½ tendon, 1-2 anchors
  - Medium: 1-3 cm, 1 tendon, 4 anchors
  - Large: 3-5 cm, 2 tendons, 6 anchors
  - Massive: > 5 cm, 3 or more tendons, > 6 anchors

High Grade Partial Thickness Tears

STRONG EVIDENCE SUPPORTS REPAIR BY CONVERTING TO FULL THICKNESS TEAR AND REPAIR.

Biologic Augmentation

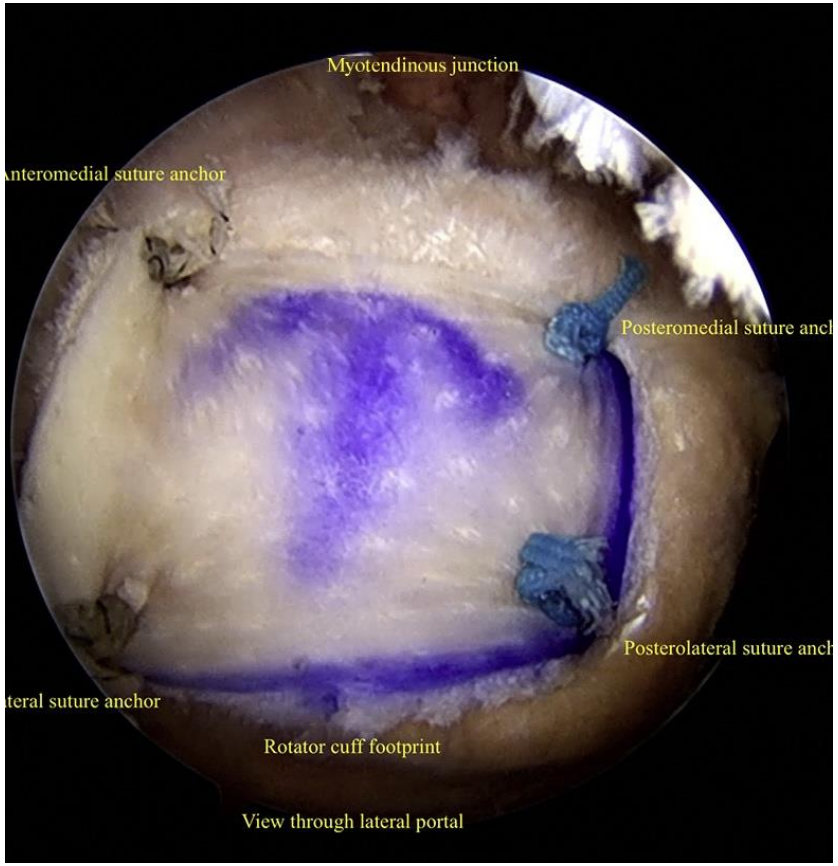
Strong evidence does not support PRP in improving RTC repair success

Marrow stimulation may decrease retear rates

- Preparation of greater tuberosity
- Acromioplasty

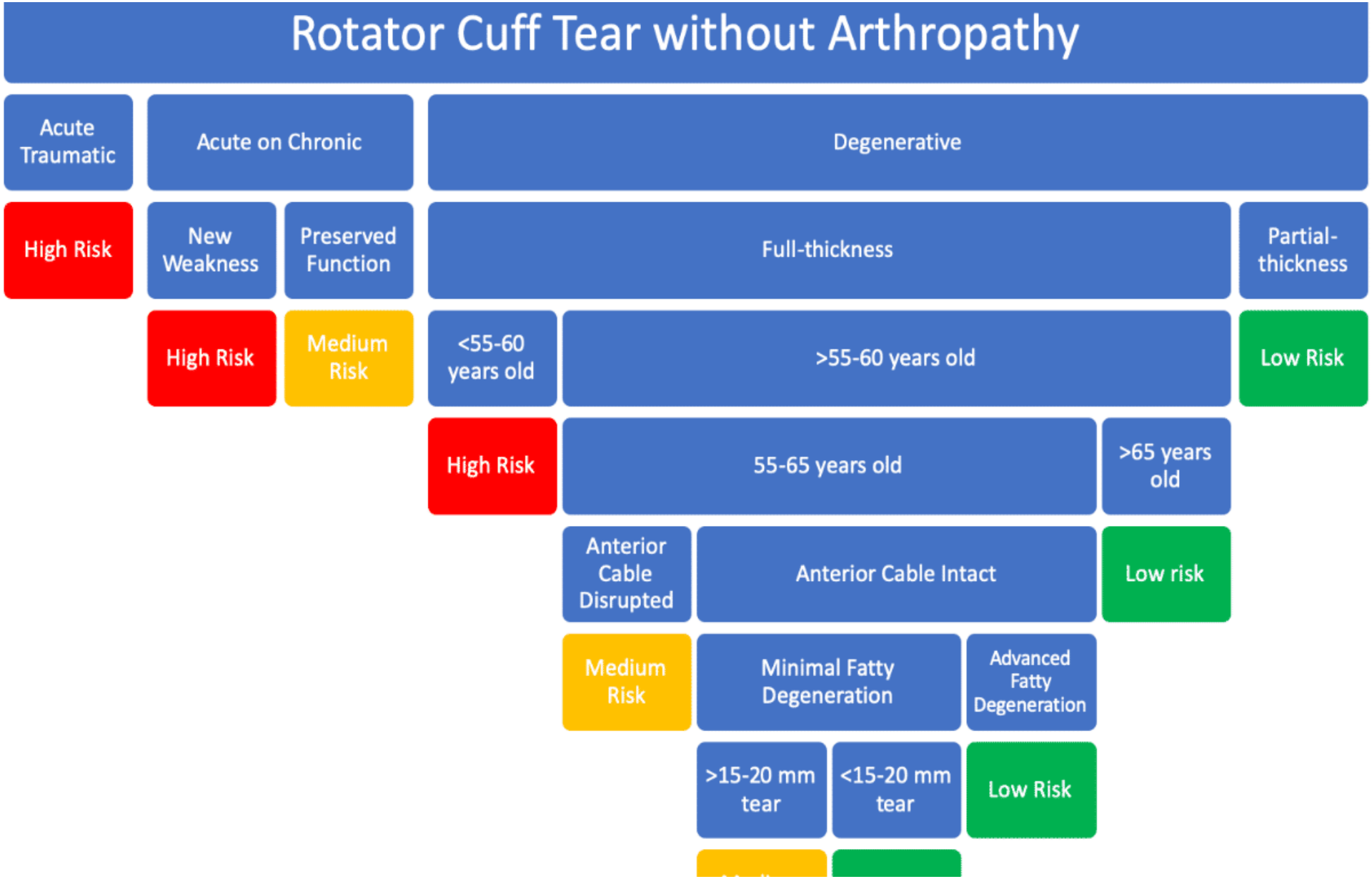
Dermal Allografts

Limited evidence shows use of Dermal allografts/patch grafting may improve PRO in large to massive RTC tears after repair.



Open vs Arthroscopic Repair

Strong evidence no difference after 1 year between repair techniques, however all arthroscopic repairs show significant improvement in post-op recovery of motion and pain.


Rotator Cuff Tear without Arthropathy
Acute Traumatic
Acute on Chronic
Degenerative
High Risk
New Weakness
Preserved Function
Full-thickness
Partial-thickness
High Risk
Medium Risk
<55-60 years old
>55-60 years old
Low Risk
High Risk
55-65 years old
>65 years old
Anterior Cable Disrupted
Anterior Cable Intact
Low risk
Medium Risk
Minimal Fatty Degeneration
Advanced Fatty Degeneration
>15-20 mm tear
<15-20 mm tear
Low Risk

Unrepairable Tears without Arthritis

PT, BT, partial repair, tendon transfer, SCR, and allograft augmentation can improve PRO.

Grade 1 (AHI≥6mm)

Grade 2 (AHI≤5mm)

Grade 3 (AHI≤5mm, with acetabulization)

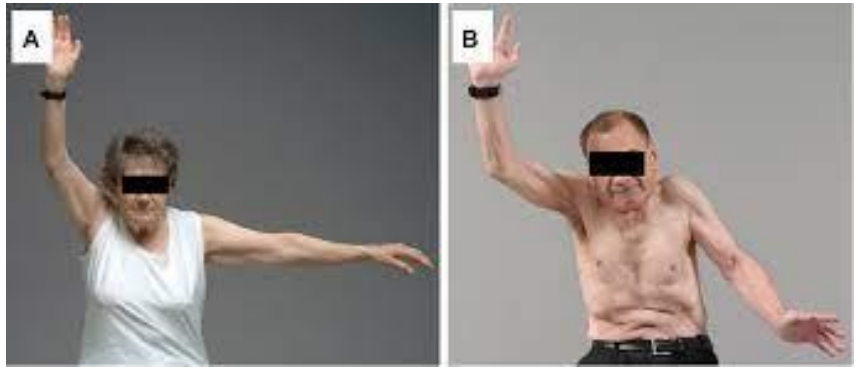
Grade 4A (glenohumeral arthritis, without acetabulization)

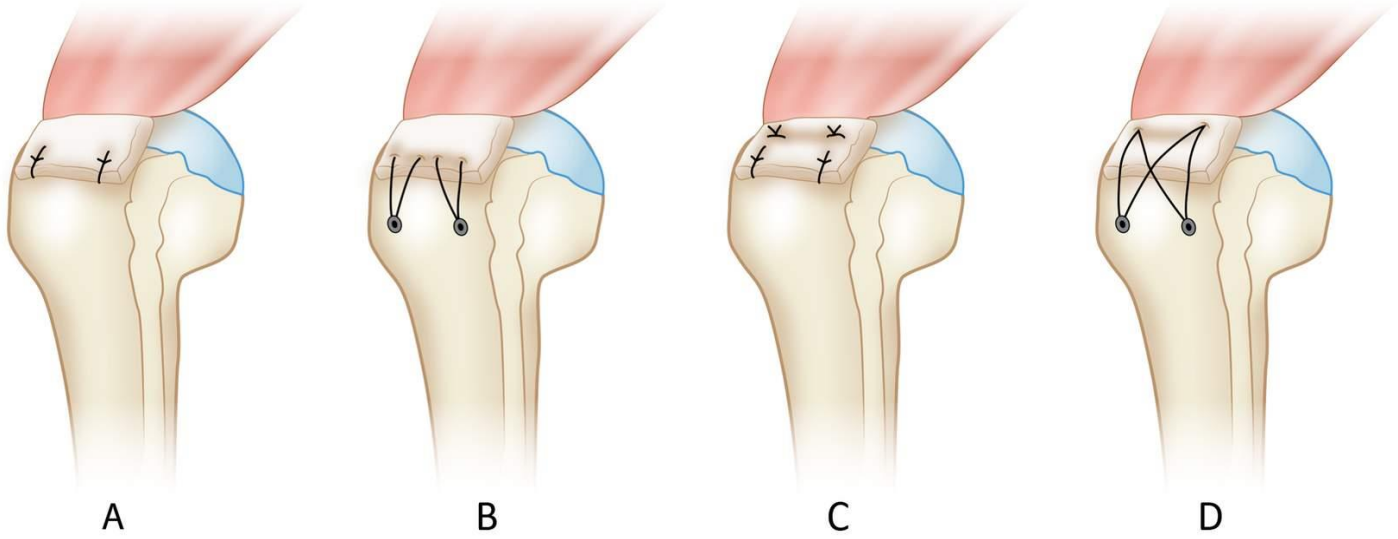
Grade 4B (glenohumeral arthritis, with acetabulization)

Grade 5 (glenohumeral arthritis, with humeral head collapse)

Massive Unrepairable Tears

+ Drop arm test, pseudo paralysis; Reverse TSA significantly improves PRO's





Arthroscopic Repair

New gold standard is a double-row repair

- Increased surface area contact of tendon to bone
- Increased strength of repair to allow earlier rehab
- Biologic augmentation may be of benefit in degenerative tears

Poor Prognosis after Repair

DM - prone to frozen shoulder

Smoker - poor blood supply

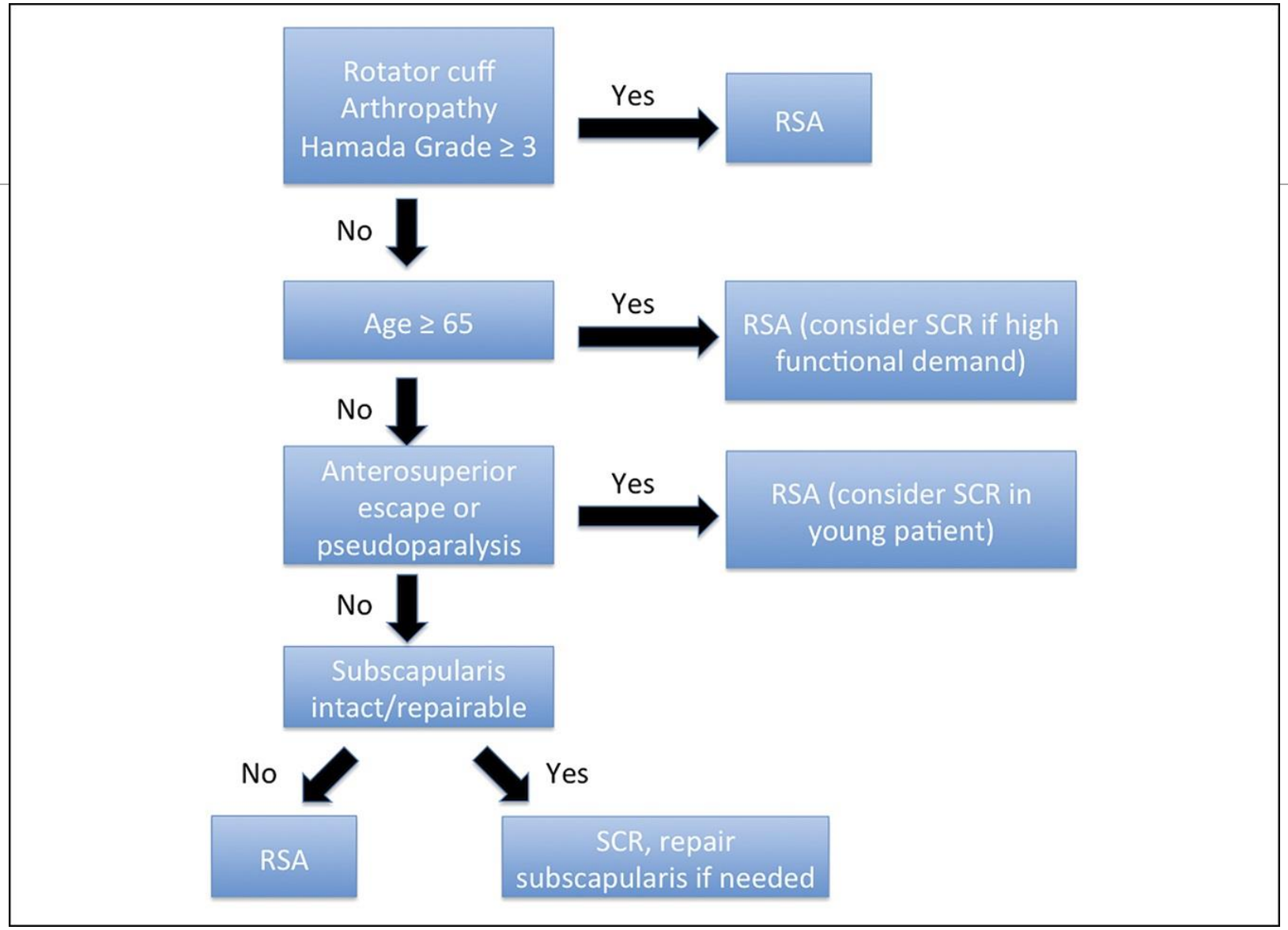
Obese – heavier arm, DM

> 70 years of age – poor tissue

Tear size > 5 cm

Fatty infiltration

- > Goutallier number


Rotator cuff Arthropathy Hamada Grade ≥ 3
Yes
RSA
No
Age ≥ 65
Yes
RSA (consider SCR if high functional demand)
No
Anterosuperior escape or pseudoparalysis
Yes
RSA (consider SCR in young patient)
No
Subscapularis intact/repairable
No
Yes
RSA
SCR, repair subscapularis if needed

Thank you!

References

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