

Sports Injury Prevention

Ed Salazar, MD

Orthopedic Sports Medicine Surgery

Arizona Sports Medicine Center

Abrazo Medical Group

- Strength
- Flexibility
- Safety

Questions?



Thank you!



Outline

- Introduction
- Definitions
- Principles of injury prevention
- Common injuries/treatment

Ed Salazar, MD

- Orthopedic Sports Medicine Surgery
- ASU → UA → UCSF Fresno → UHZ (Miami, FL)
- Areas of focus
 - Sports medicine
 - Knee instability and meniscus surgery
 - Shoulder instability and rotator cuff
 - Shoulder resurfacing/replacement
- Fluent in Spanish and Brazilian Portuguese

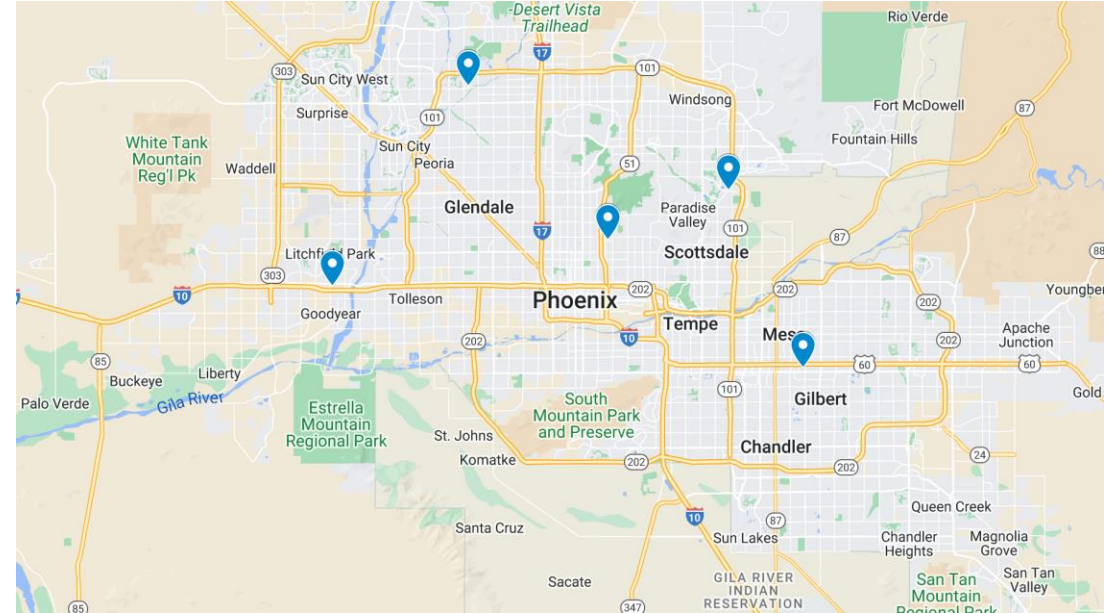




- 13 orthopedic surgeons
 - Shoulder and elbow
 - Sports medicine
 - Hip and knee replacement
 - Hip arthroscopy
 - Foot and ankle surgery
 - Hand surgery

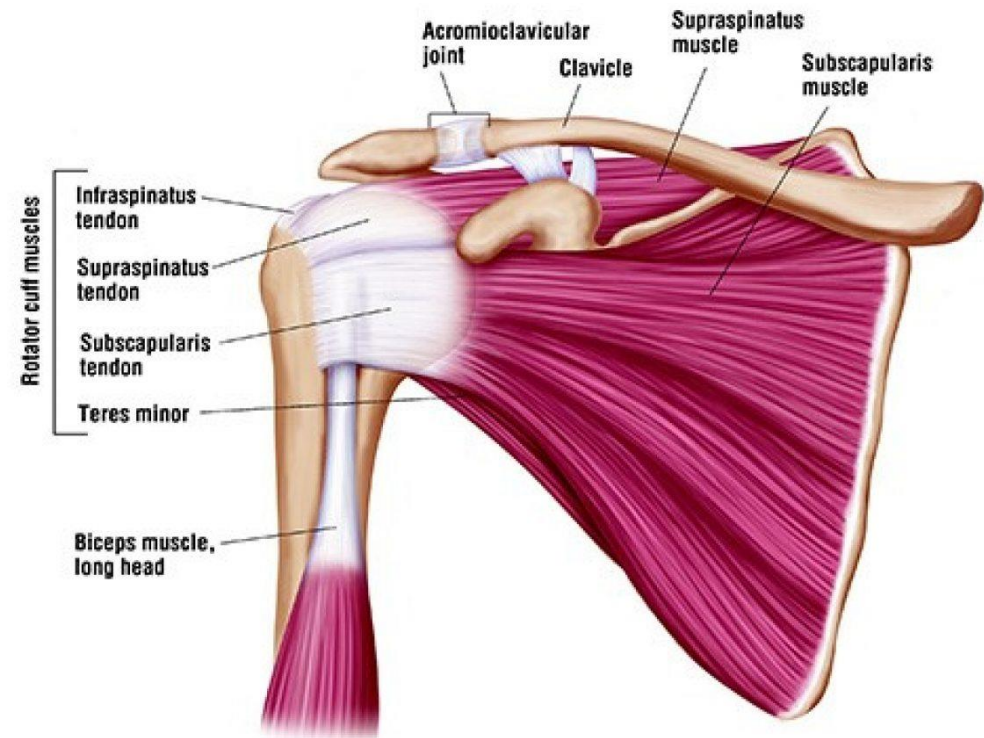


- Office locations
 - Scottsdale
 - Biltmore Terrace
 - Mesa
 - Arrowhead
 - Goodyear
- Surgical locations throughout the Valley



Definitions

- Muscle
 - Long cells that contract when stimulated
- Tendon
 - Connects muscle to bone
- Ligament
 - Connects bone to bone
- Joint
 - Two or more bones meet
- Capsule
 - Lining of the joint



Definitions (continued)

- Strain
 - Muscle or tendon
- Sprain
 - Ligament or joint capsule
- Sprain/strain
 - Stretching or partial tear
- Rupture
 - Complete tear



Principles of Injury Prevention

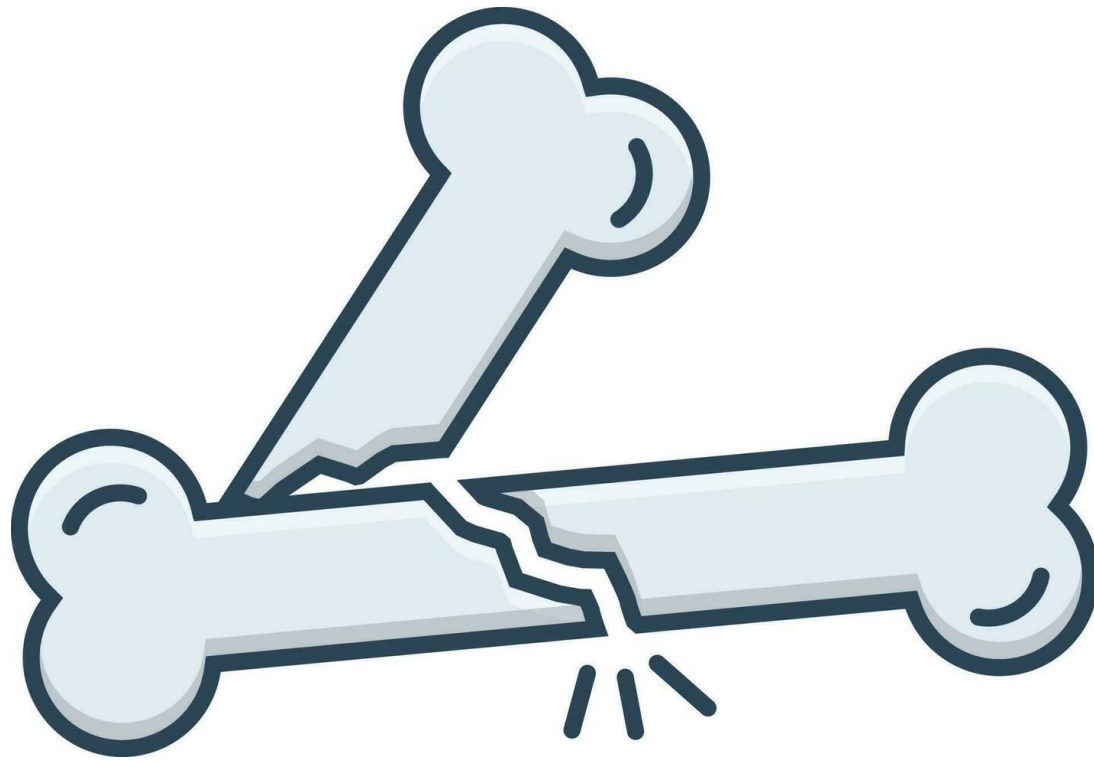
”Staying In Shape”

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- Wolff's Law
 - Bone remodels and strengthens to the load applied to it
 - "What doesn't break me makes me stronger"

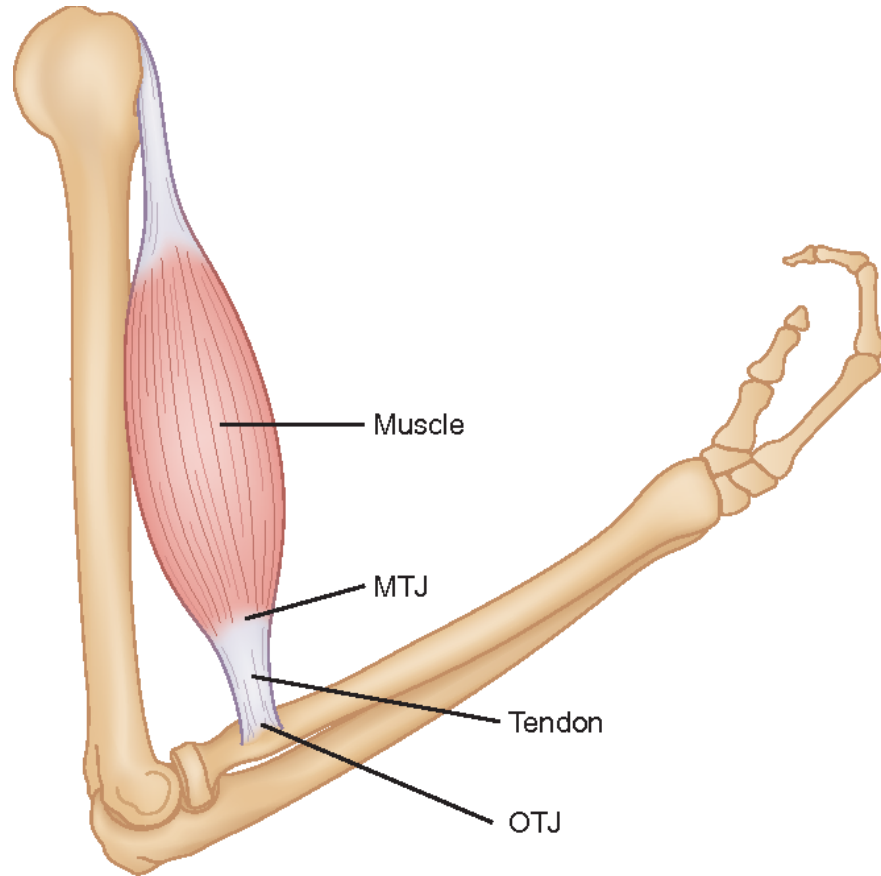


FIGURE 7-1 The biceps muscle-tendon unit. *MTJ*, Musculotend-

- Where do soft tissue injuries happen?
 - 35% at the tendon
 - 28% at the muscle-tendon junction
 - 18% at the bone-tendon junction
 - 13% muscle
 - 6% bone

Tissue remodeling

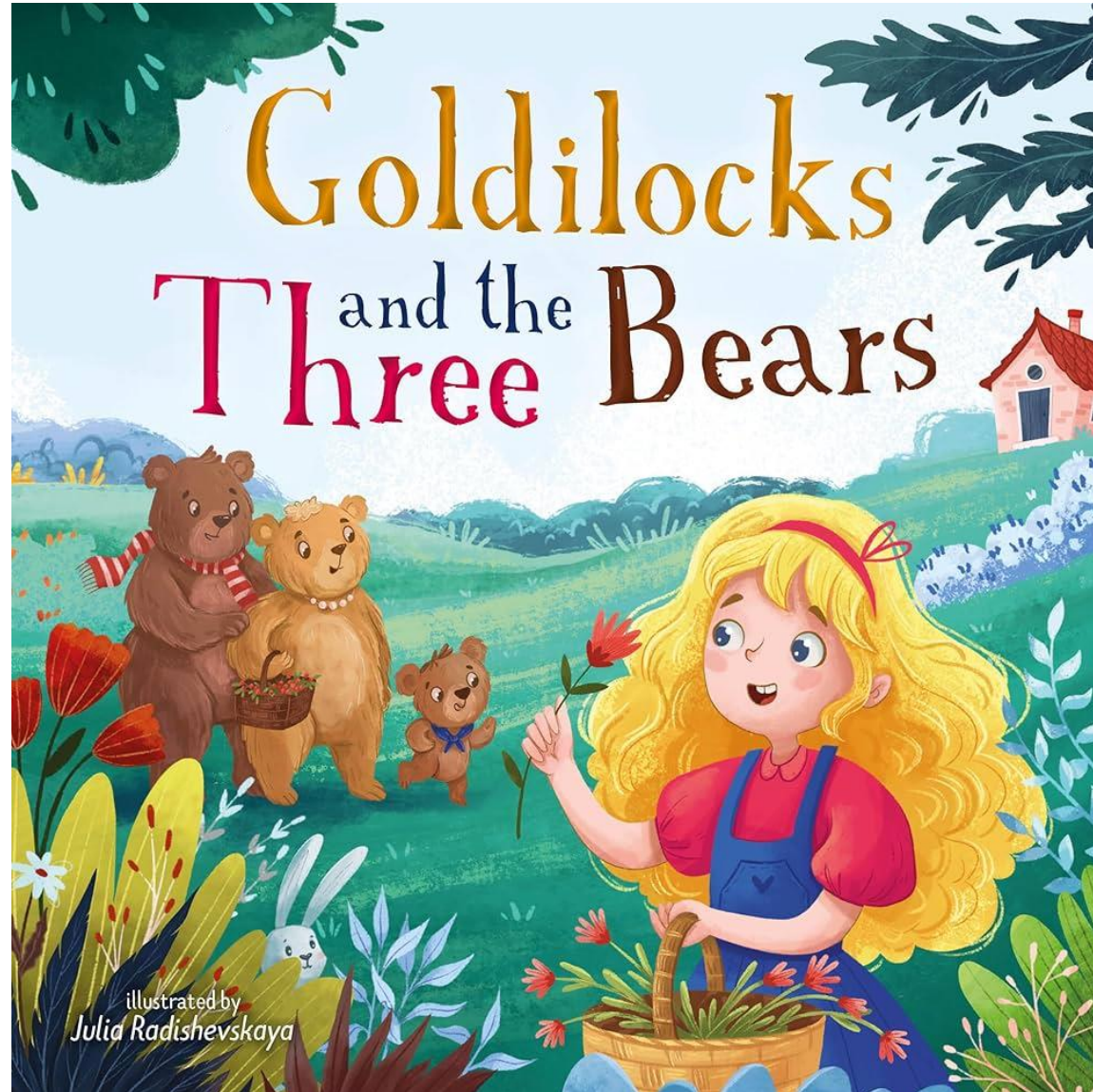


- Tissue remodeling
 - “What doesn’t tear me makes me stronger”
- What can tear a tendon/ligament/muscle?
 - Too much load
 - Too much tension
 - Too much fatigue



Summary

- Tissue remodeling
 - Not enough load/tension → weak muscles/tendons/ligaments
 - Too much load/tension → muscle/tendon/ligament fails (injury)
 - Too much fatigue → failure



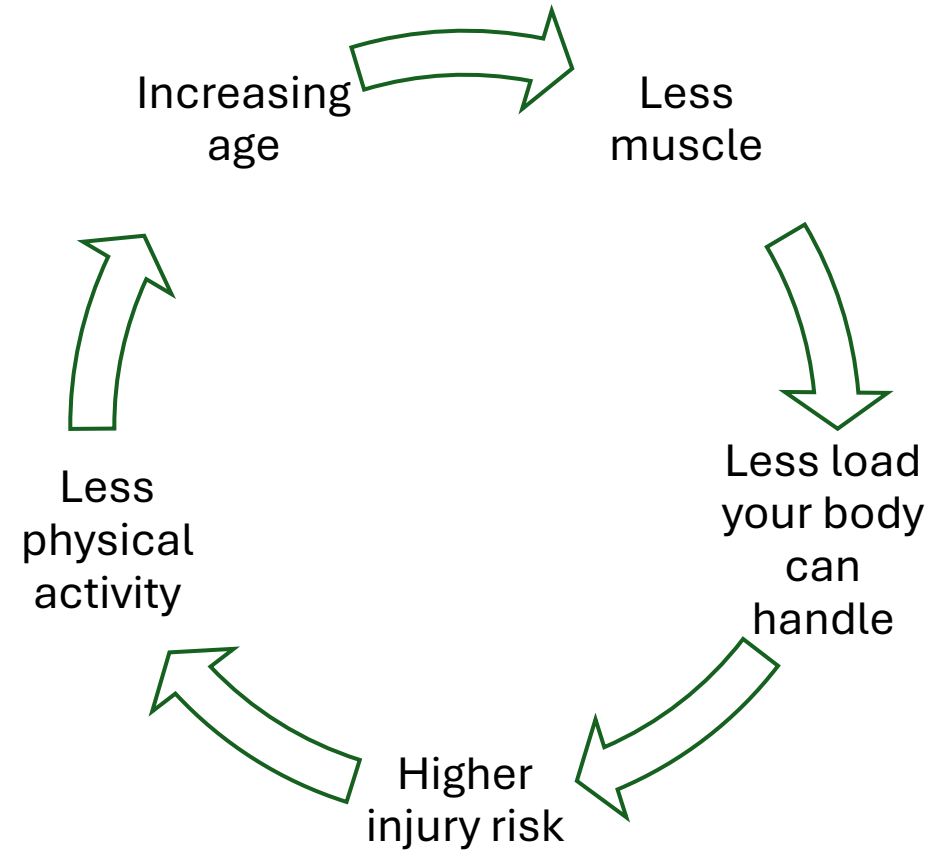
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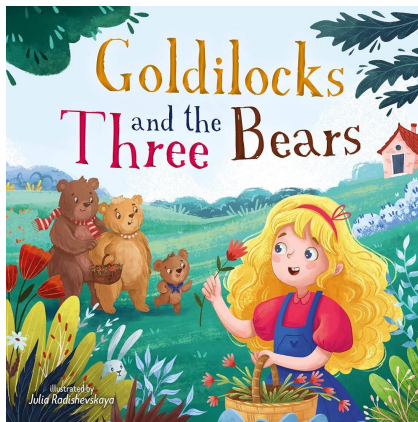
- “Just right” load → resistance training
- ”Just right” tension → flexibility
- ”Just right” movements to avoid too much fatigue or injury elsewhere

Why resistance training matters

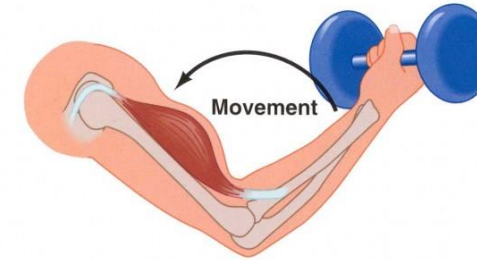


How to resistance train

- Eccentric contraction
 - Controlling the weight as the muscle lengthens
 - “Negatives”
 - More efficient for muscle building and injury prevention

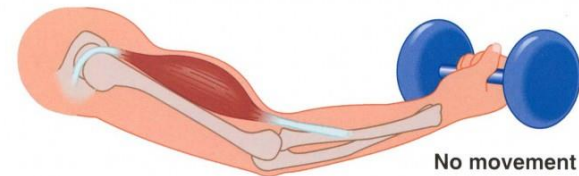


Concentric contraction

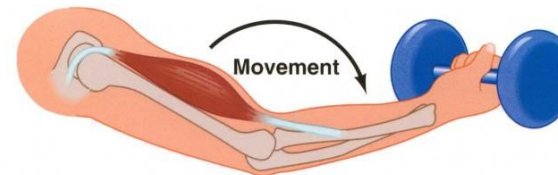


Isometric contraction

Muscle contracts but does not shorten



Eccentric contraction



Eccentric contraction - benefits

- Applies load → builds muscle
- Focuses on range of motion → applies load
- Proper load + proper tension
 - Builds strength
 - Helps recover from injury
 - Helps prevent injury

So how much should I lift?

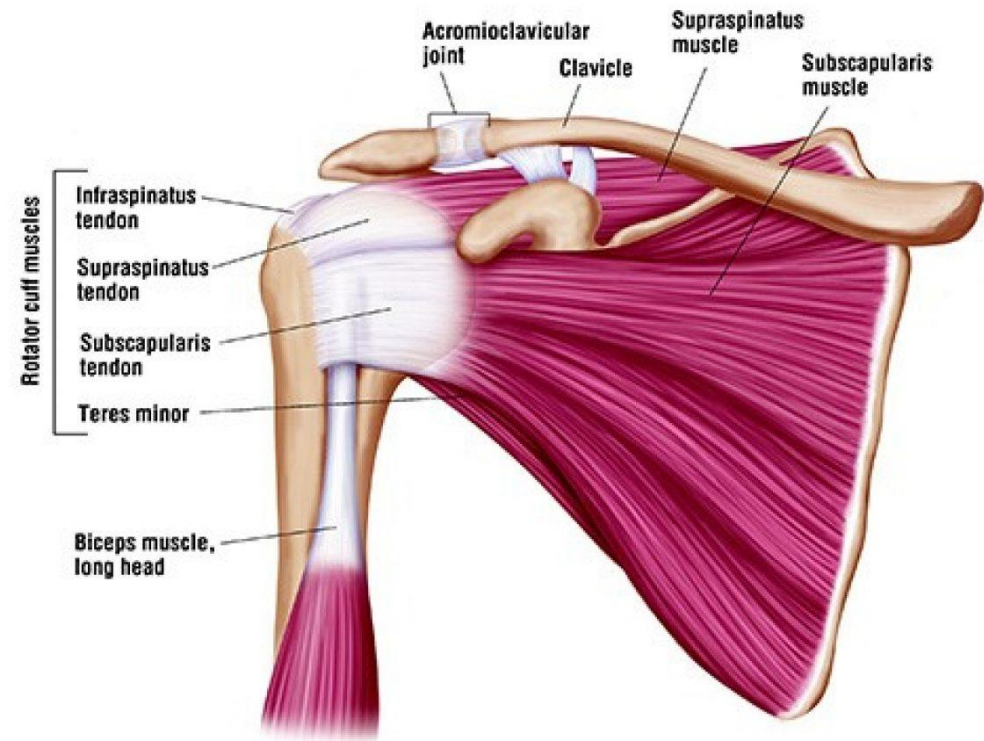
- 8 rep maximum
 - Weight that you can do 8 times *with good eccentric control and proper technique*





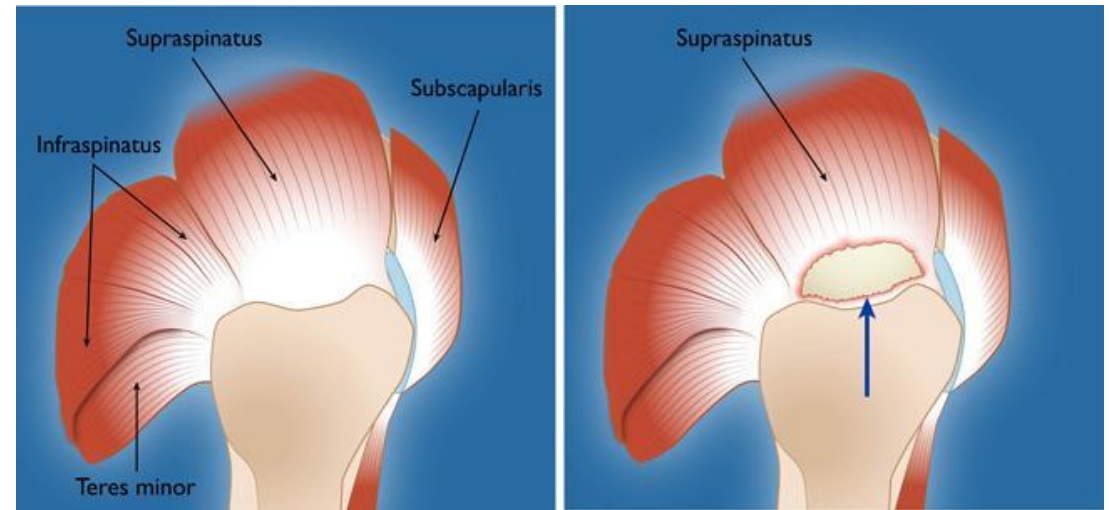
Shoulder

- Rotator cuff
- Labrum/biceps injuries

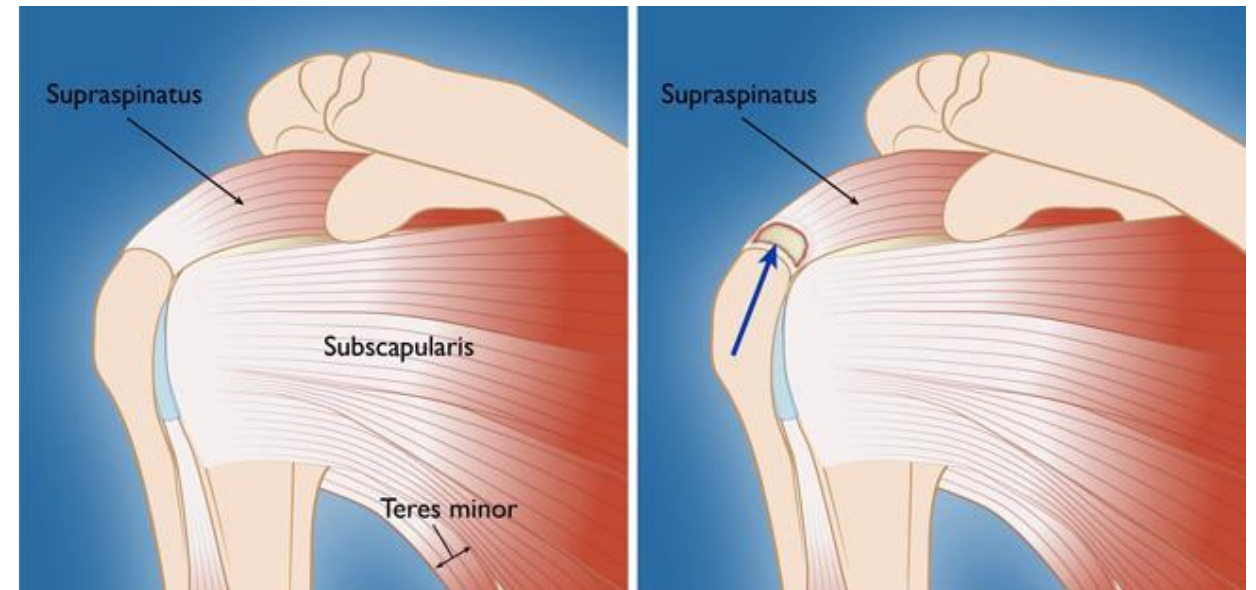


Rotator Cuff

- 4 muscles, responsible for stability and motion of the shoulder
- 40% of people age > 60 have a rotator cuff tear
- Diagnosed through history, physical exam, and imaging

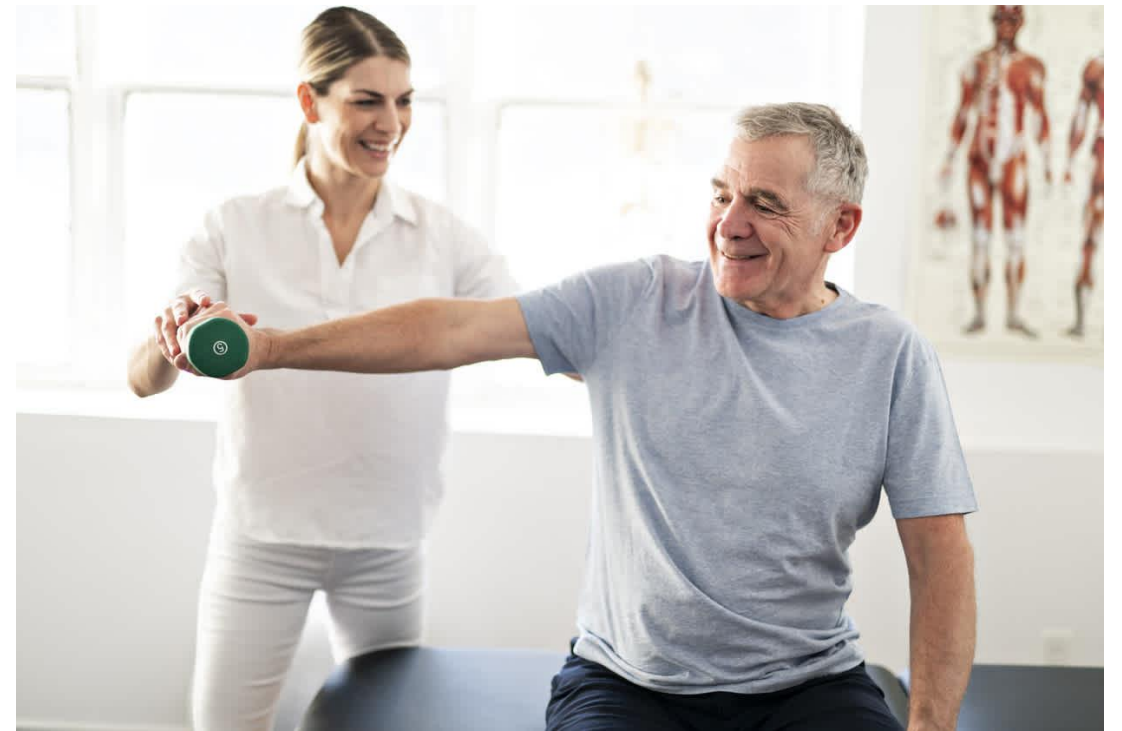


- Symptoms
 - Pain with overhead motion or lifting
 - Pain while lying on the affected arm
 - Crepitus (cracking) sensation with motion



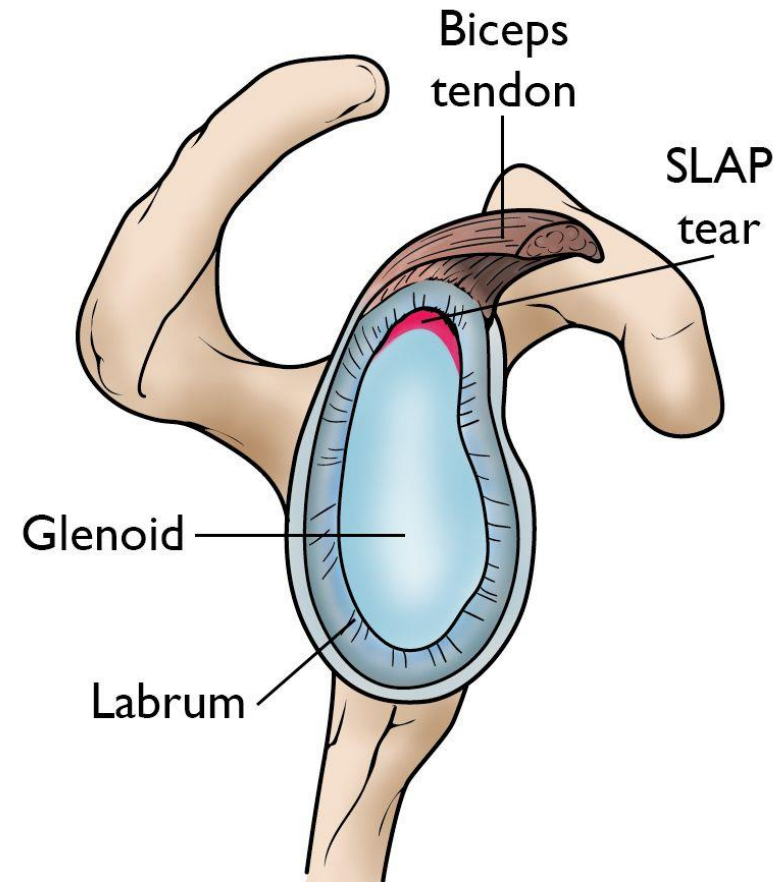
Rotator Cuff – Nonsurgical

- 75% of patients avoid surgery
 - Physical therapy
 - Home exercise program
- Surgery 2nd option*
 - Early surgery better for traumatic rotator cuff tears



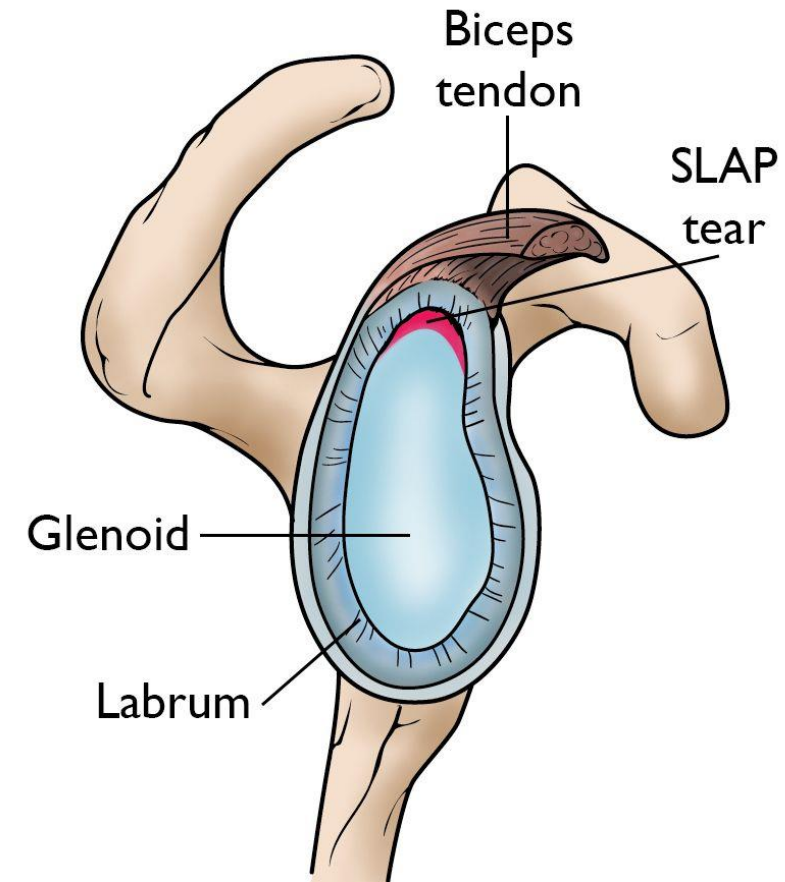
Labrum/SLAP tear

- Ring surrounding the shoulder socket
 - Stability
- Biceps tendon attaches to the top of the ring
 - Weak link in the chain
- Tearing is *common* in patients age > 40



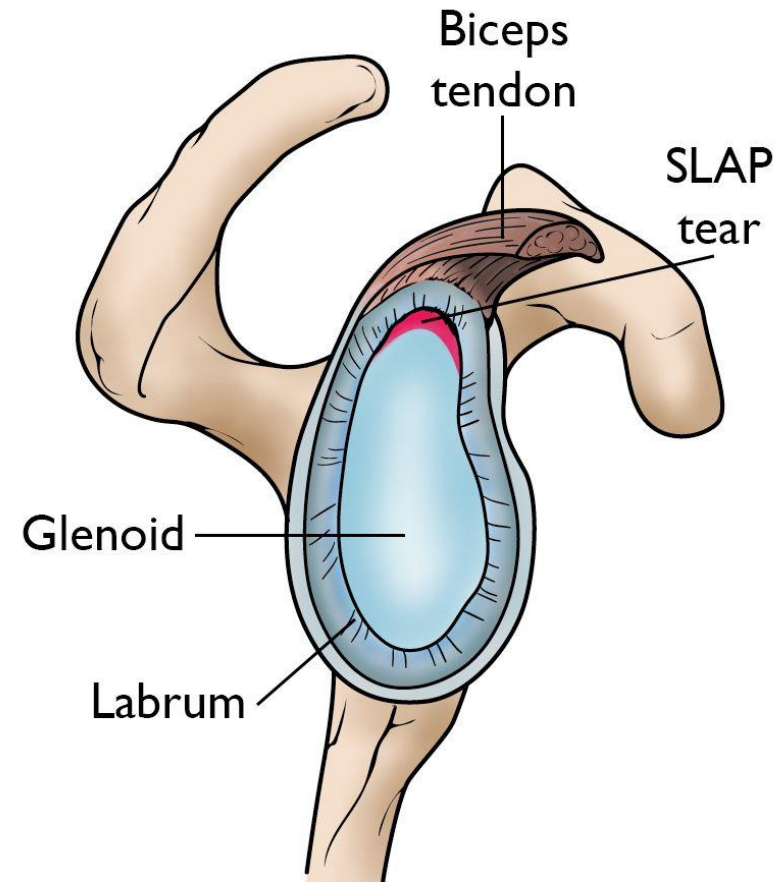
Labrum/SLAP tear

- Symptoms
 - Locking
 - Popping
 - Catching
 - Grinding
 - Pain lifting overhead



Labrum/SLAP - Treatment

- Nonsurgical Always first treatment
 - PT
 - Anti-inflammatory meds
 - Injection
 - Most patients improve within 20 PT visits
- Surgery if above treatment doesn't improve symptoms



Summary – Shoulder

- Most (but not all) shoulder problems are going to be treated nonoperatively first
- Surgery is usually second option

Back injuries

- Thoracolumbar strains most common
- 90% of people will have back pain at some point in life
- Treatment
 - Core strengthening
 - Improving trunk mobility



Review > [J Orthop Sports Phys Ther. 2022 Aug;52\(8\):505-521. doi: 10.2519/jospt.2022.10671.](#)

Epub 2022 Jun 19.

Best Exercise Options for Reducing Pain and Disability in Adults With Chronic Low Back Pain: Pilates, Strength, Core-Based, and Mind-Body. A Network Meta-analysis

[Rubén Fernández-Rodríguez](#), [Celia Álvarez-Bueno](#), [Iván Cavero-Redondo](#), [Ana Torres-Costoso](#),
[Diana P Pozuelo-Carrascosa](#), [Sara Reina-Gutiérrez](#), [Carlos Pascual-Morena](#),
[Vicente Martínez-Vizcaíno](#)

PMID: 35722759 DOI: [10.2519/jospt.2022.10671](#)

- Pilates had highest chance of reducing pain (93%) and disability (98%)
- Best exercise programs
 - At least 1-2 sessions per week of Pilates or strength exercises
 - Sessions < 60 minutes of core-based, strength, or mind-body exercises
 - Training programs 3-9 weeks long of Pilates and core-based exercises

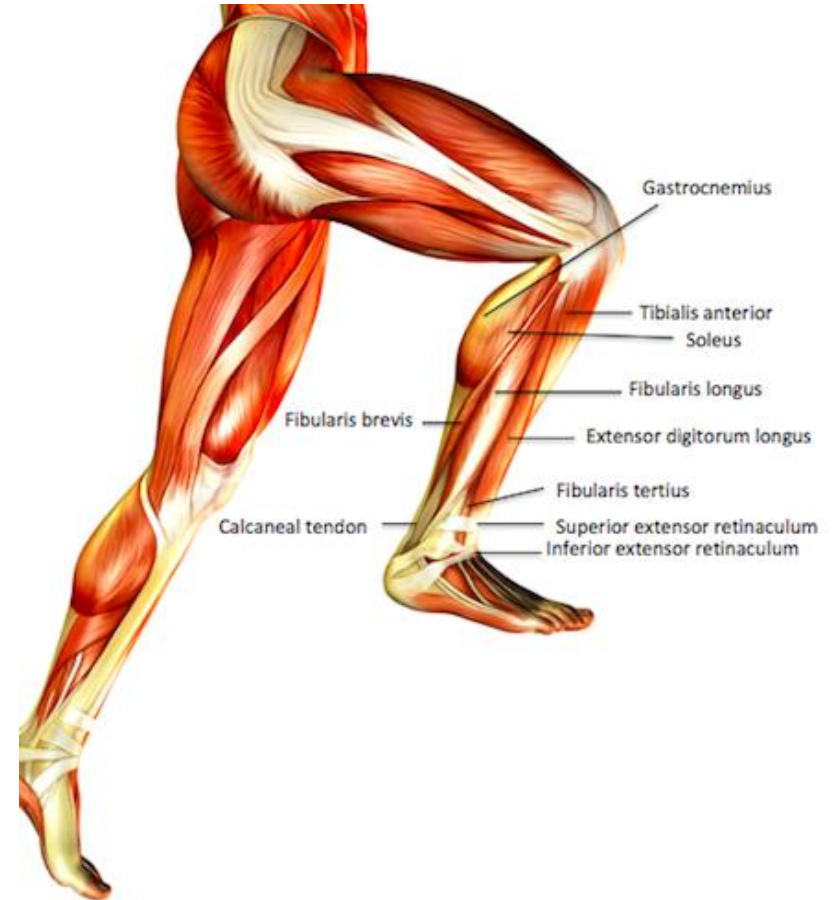
Summary - back pain

- Pilates, Pilates, Pilates
- Core strength
- **Scan this code for a beginner Pilates workout**

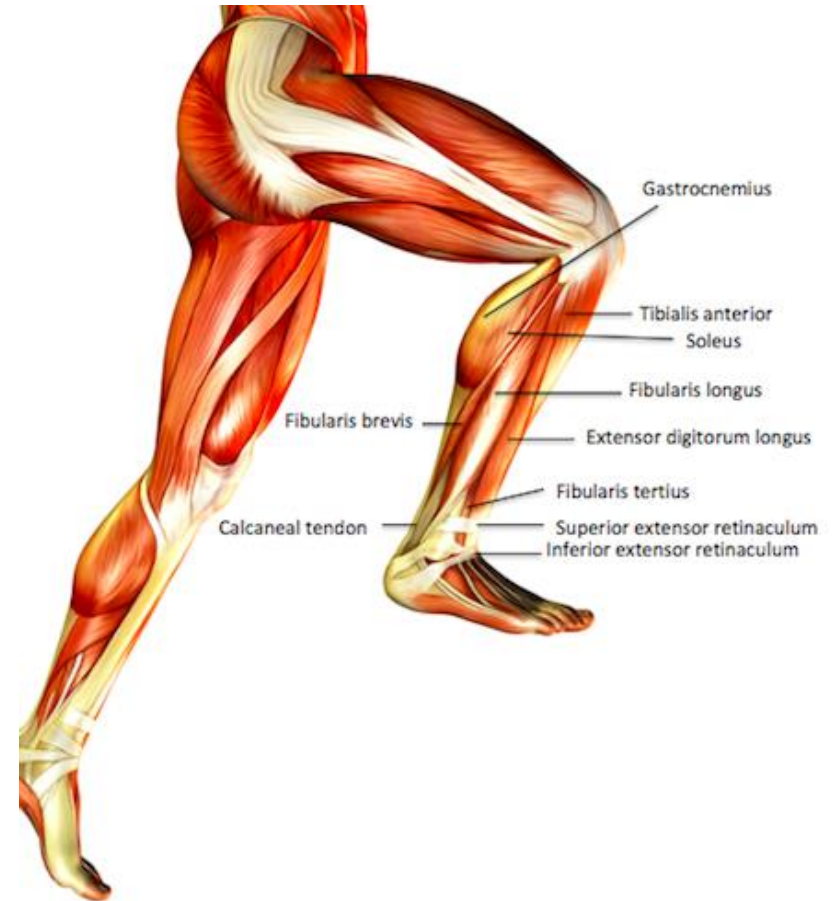


Lower extremity

- Hamstrings
- Quadriceps
- Calf/Achilles tendon



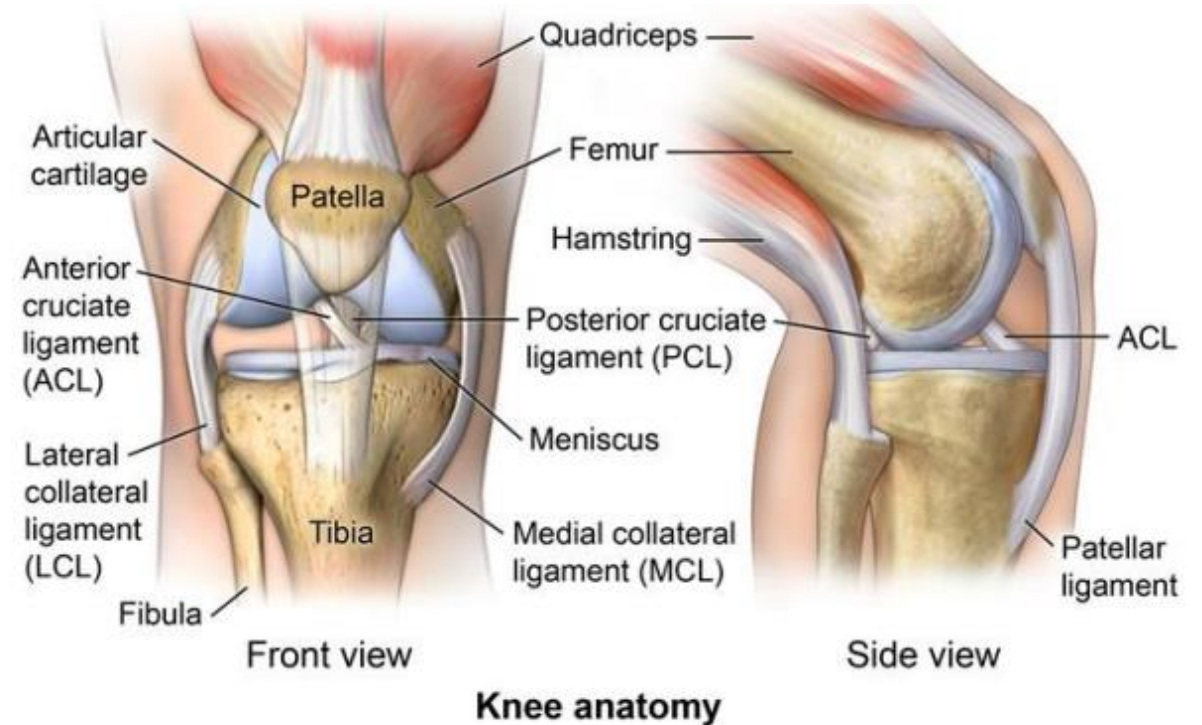
- Most common injury is strains
 - Hamstrings most common
- Tightness is very common
 - Too much tension → tissue failure
- **ECCENTRIC STRENGTHENING** is key for injury prevention and recovery





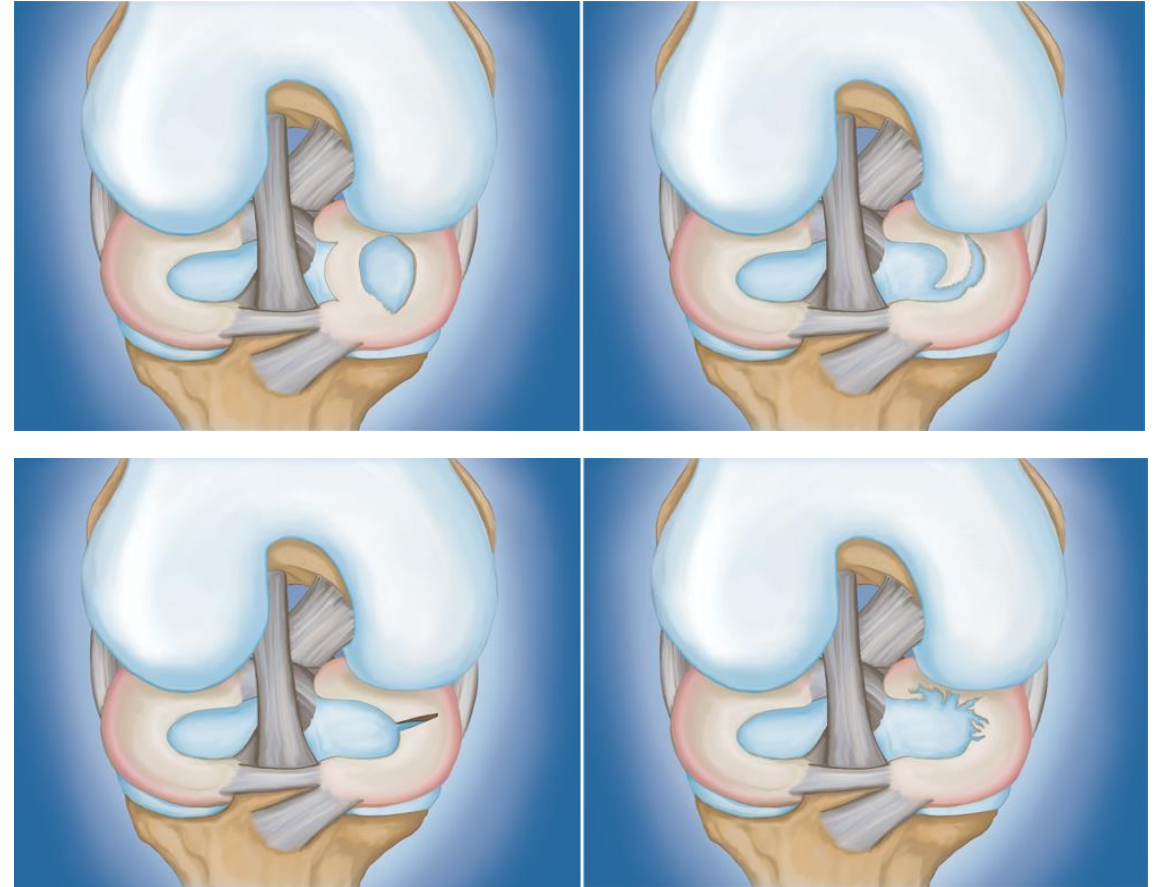
Knee

- Ligament
- Meniscus
- Quadriceps/patellar tendon



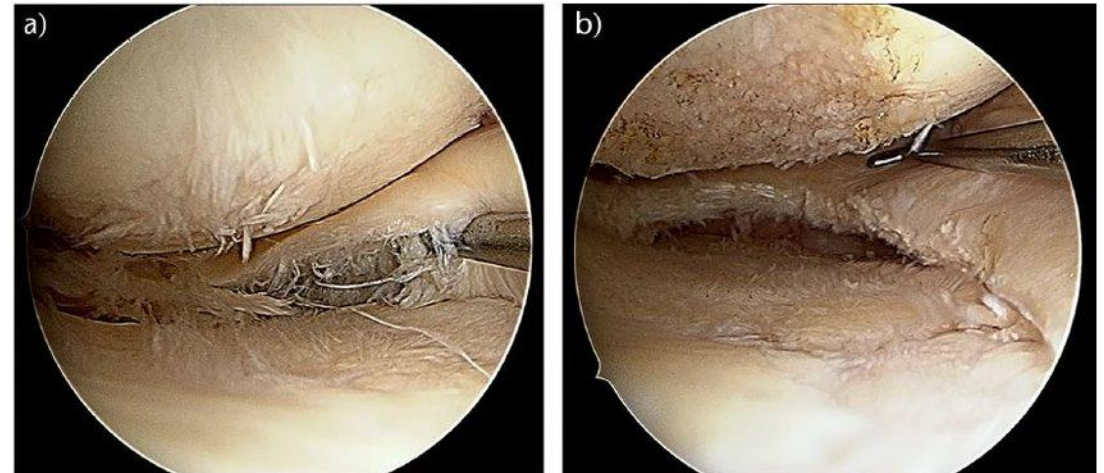
Meniscal Tears...

- Treatment is highly controversial
- Despite how common these injuries are, we have a lot more to learn about them
- Considerations
 - Arthritis
 - Mechanical symptoms
 - Type of tear
 - Timing of tear



Arthroscopic Partial Meniscectomy

- Aka “clean out”
- What we know
 - Saving meniscus is generally better
 - Higher reoperation risk
 - Better protection against arthritis
- What we don't know...
 - Which patients should actually have the surgery?



American Academy of Orthopedic Surgery Clinical Practice Guideline

- Arthroscopic partial meniscectomy can be used for the treatment of meniscal tears in patients with concomitant mild to moderate osteoarthritis *who have failed physical therapy or other nonsurgical treatments*

American Academy of Orthopedic Surgery Clinical Practice Guideline

- Arthroscopy with lavage and/or debridement in patients with a *primary diagnosis of knee osteoarthritis is not recommended*

American Academy of Orthopedic Surgery Clinical Practice Guideline

- In the absence of sufficient evidence, it is the opinion of the workgroup that patients with a displaced or displacing acute meniscal tear, particularly those restricting knee range of motion, can benefit from acute surgical intervention

Summary – Knee

- Meniscal tears are not all equal
- Not all of them benefit from surgery

Injury Prevention!

- **Eccentric strengthening**
 - 8 rep max
 - Right load + right tension + right movement = less injury
- **Pilates and core strength**
 - Very effective
 - High drop out rate – don't give up!

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