

# Primary Repair of ACL Tears



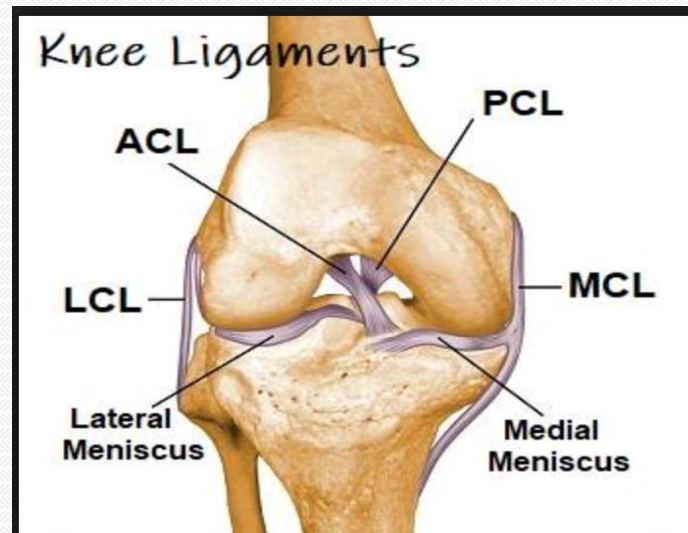
**KOCO EATON, M.D.**

**TAMPA BAY RAYS (1995 – PRESENT)**

# Knee Ligaments



- Anterior Cruciate Ligament
- Posterior Cruciate Ligament
- Medial Collateral Ligament
- Lateral Collateral Ligament



# Blood Supply



- Medial and Lateral Collateral Ligaments have a direct blood supply
- Anterior and Posterior Cruciate Ligaments have a poor blood supply

# ACL Function

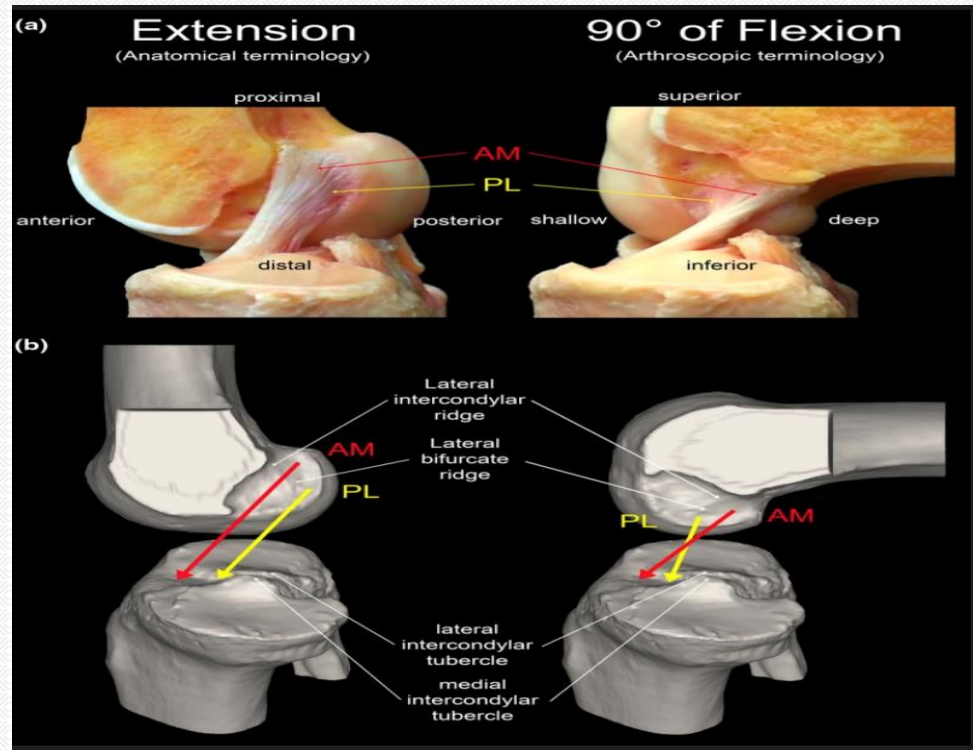


- Prevent anterior translation of tibia to femur.
  - Restrain tibial rotation

# ACL Anatomy



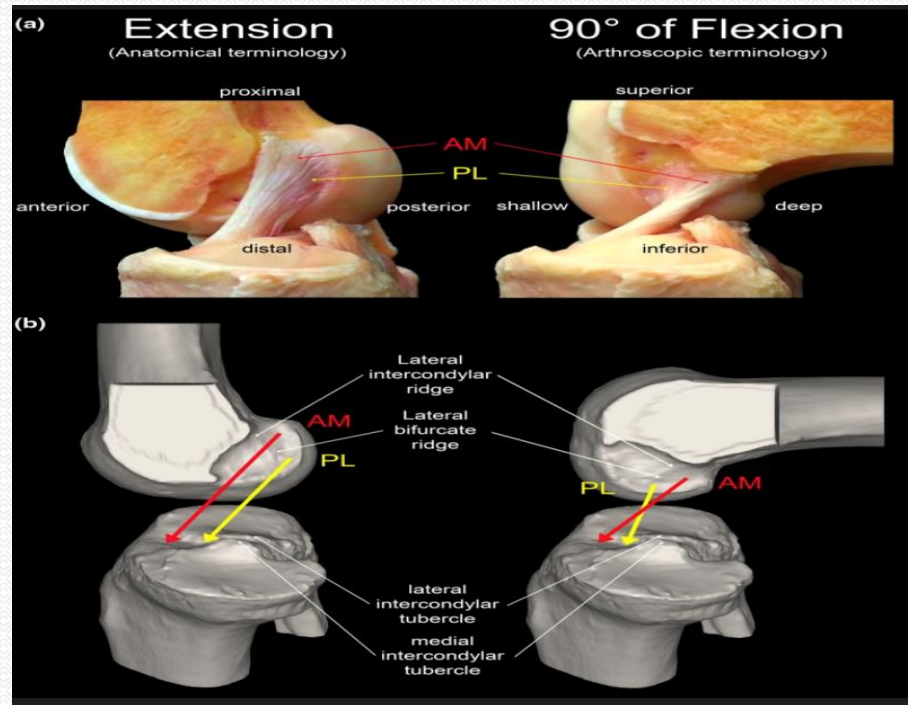
- Anterior-medial bundle (tight in flexion)
  - Function: retains anterior translation



# ACL Anatomy



- Posterior-lateral bundle (tight in extension)
  - Function: rotational stability



# ACL Surgery



- Repair
  - Historic
  - Open
  - Limited fixation
  - Mixed outcomes

# ACL Surgery



- ACL Reconstruction
  - Arthroscopic
  - Graft choices
  - Accelerated rehab
  - Gold standard



# ACL Repair



- New technique
  - Arthroscopic
  - Excellent fixation
  - Improved outcome

# ACL Repair



- **Indications**
  - Sufficient ACL to repair
  - Open physis
  - Moderate demand

# ACL Repairs



## Systematic Review

### Primary Repair of the Anterior Cruciate Ligament: A Systematic Review



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Gregory S. DiFelice, M.D.

# ACL Repairs

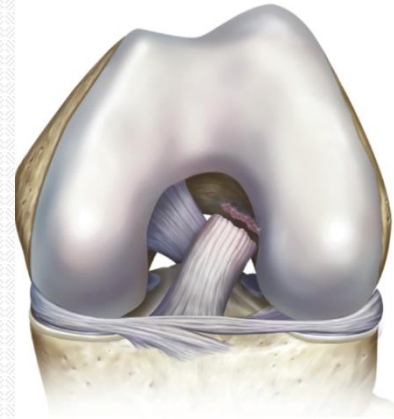


- A tool for specific injuries
- New indication for familiar tools
- 2 studies

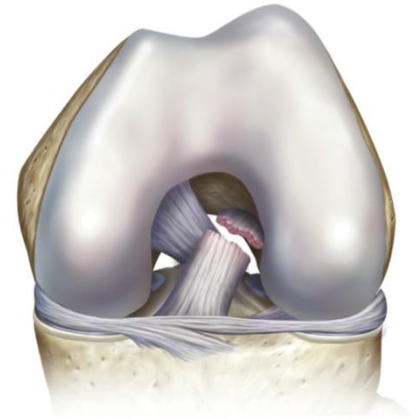
# Indications for ACL Repair



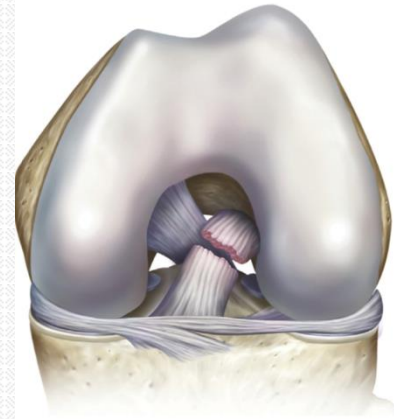
- Proximal tears – Sherman classification
- Avulsed off femur
- Partial tears
- Open physis



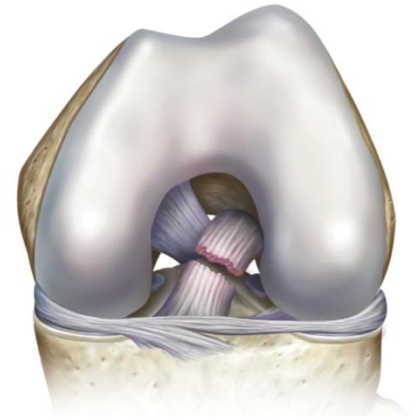
Type 1



Type 2



Type 3



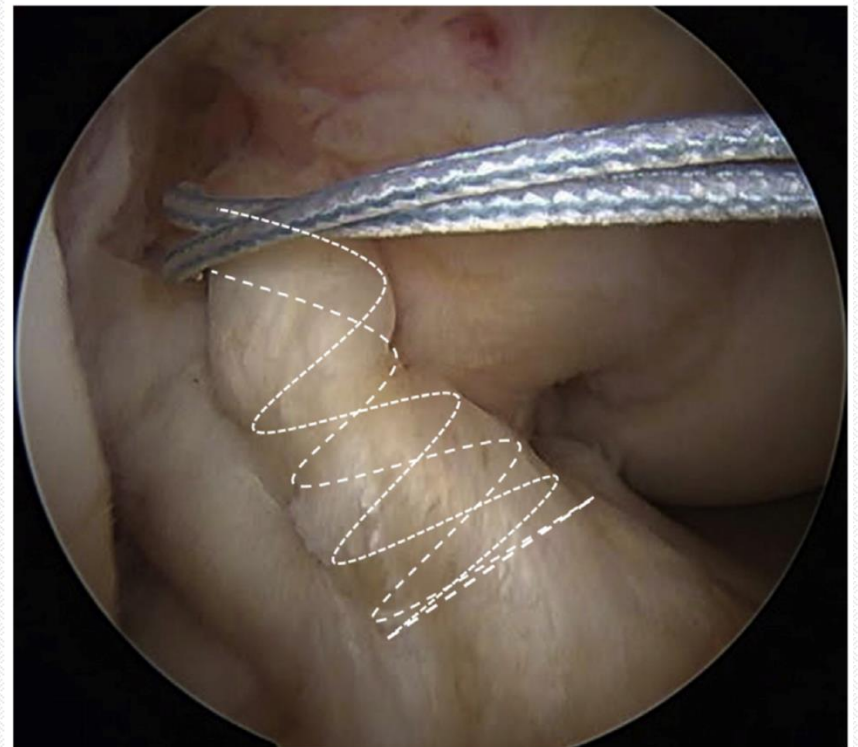
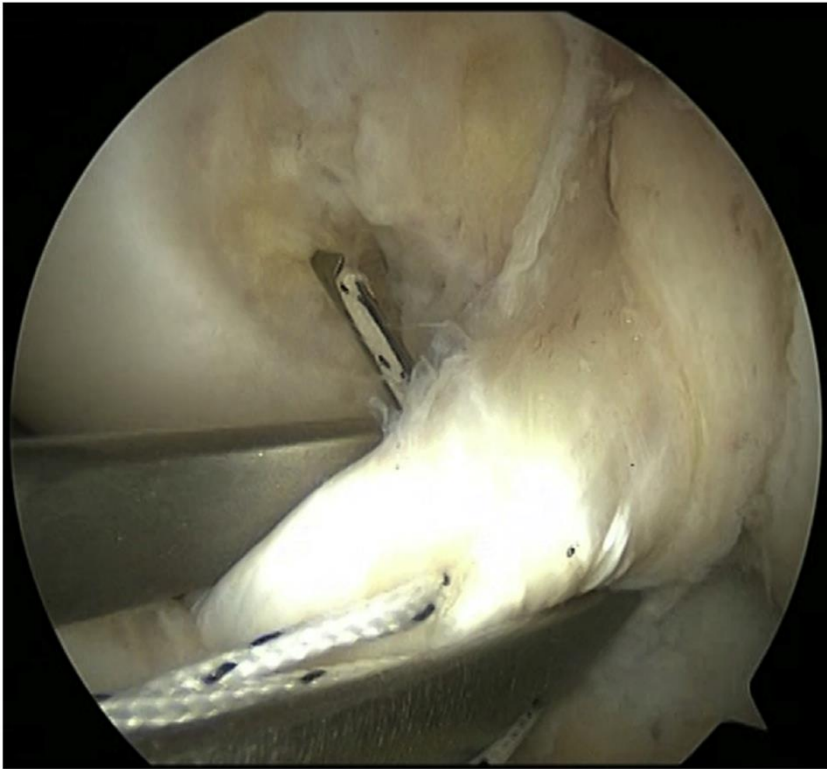
Type 4

# Study #1 – DiFelice et al



- DiFelice et al. Arthroscopy 2015
  - 11 consecutive cases
  - 2 anchors
  - 10/11 patients with excellent results
  - KT-1000 arthrometer and knee score tests

# DiFelice Technique



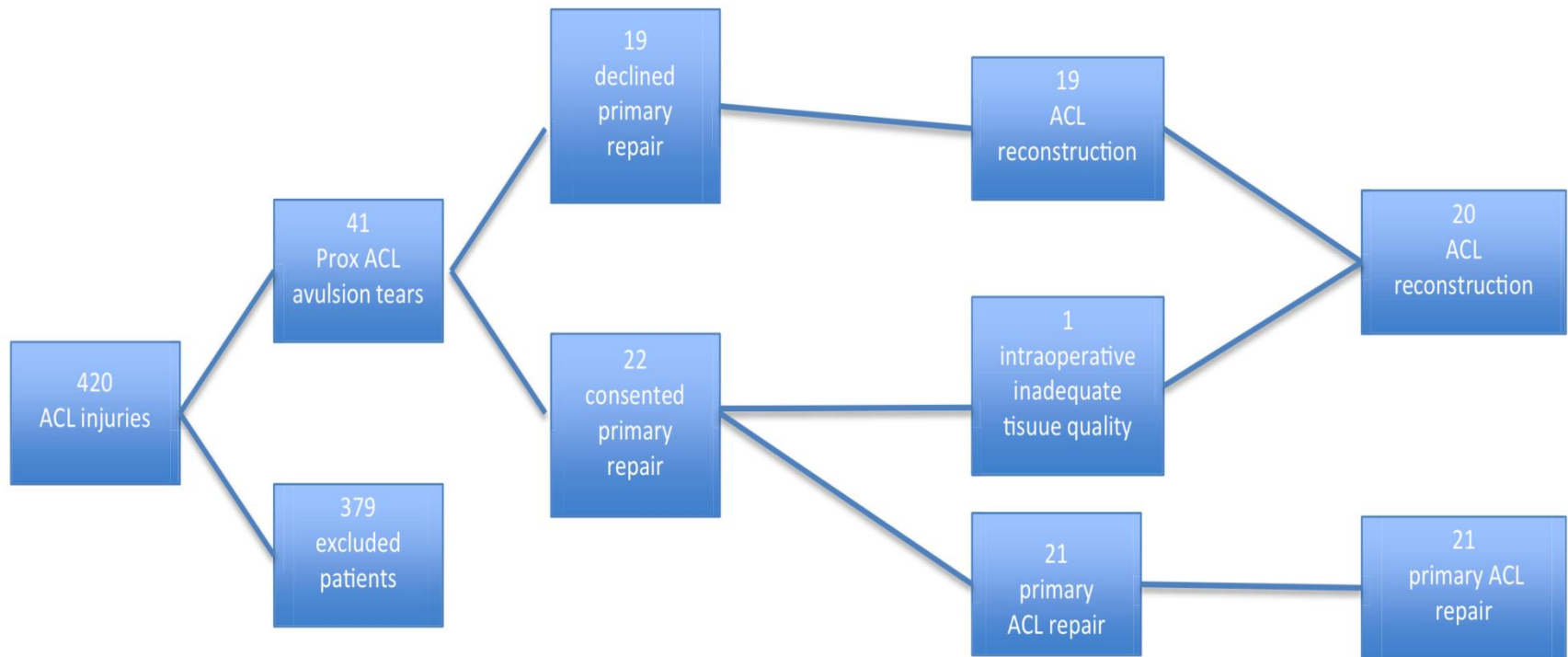
# Study #2 – Achtnich et al



- Achtnich et al. Arthroscopy 2016
  - 420 total ACL patients
  - 41 patients underwent repair
  - Single anchor
  - Microfracture



# ACL Repair Algorithm

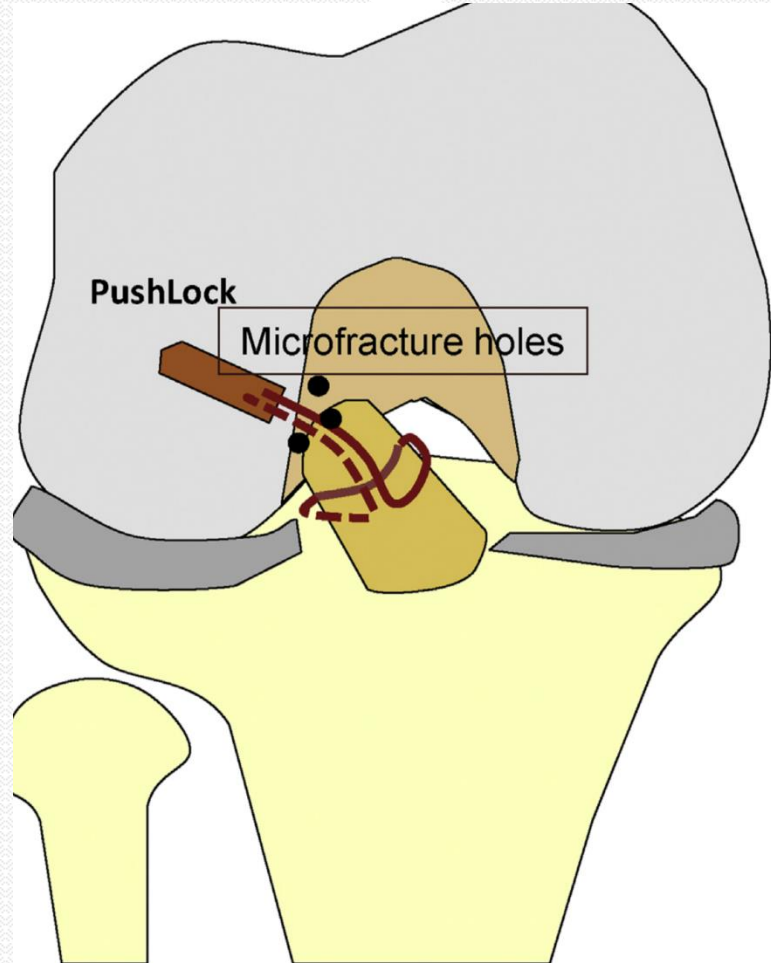


# Study #2 – Achtnich et al



- 6 weeks from injury
- 28 months follow-up with KT-1000 and IKDC score
- 20 patients follow-up
- 15% failure rate in repair group
- 100% success in reconstructed group

# Overview of ACL Repair



# ACL Repair – My Results



- 138 ACL repairs performed out of 405 total ACL surgeries since 2014
- 34 % of ACL injuries treated effectively with ACL repair surgery
- To date, 10 failures, and one patient requiring MUA due to lack of extension
- Effective treatment of ACL injury in the right patient

# ACL Repair Technique

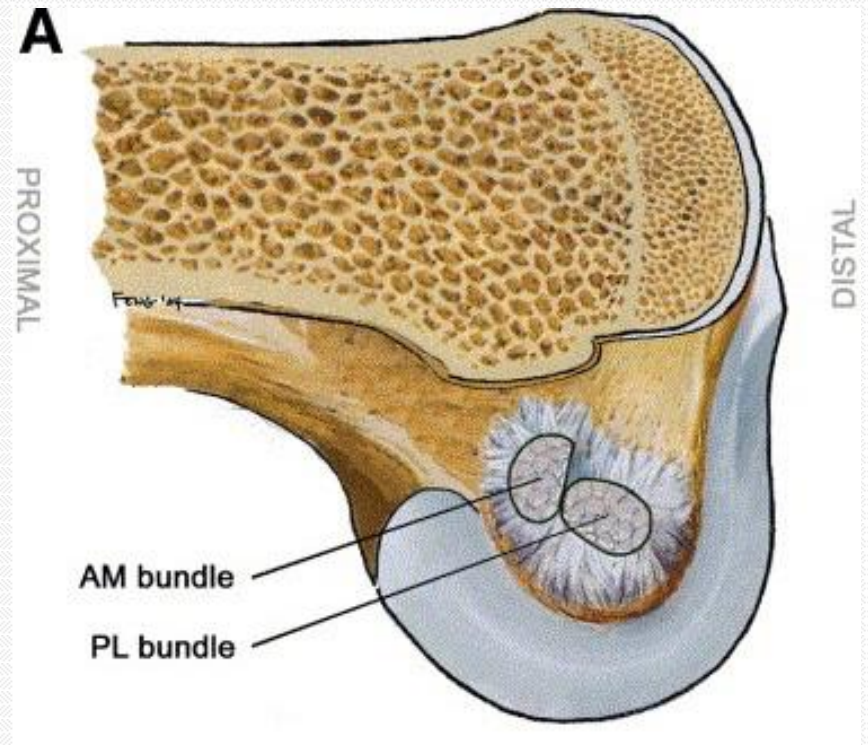


- #2 FiberWire is passed as Krackow locking stitch through ACL remnant
- Microfracture performed within notch at location of anchor placement to create bleeding bone bed
- Hole punched/tapped in notch to receive SwiveLock anchor
- Suture passed through anchor and inserted at intercondylar ridge

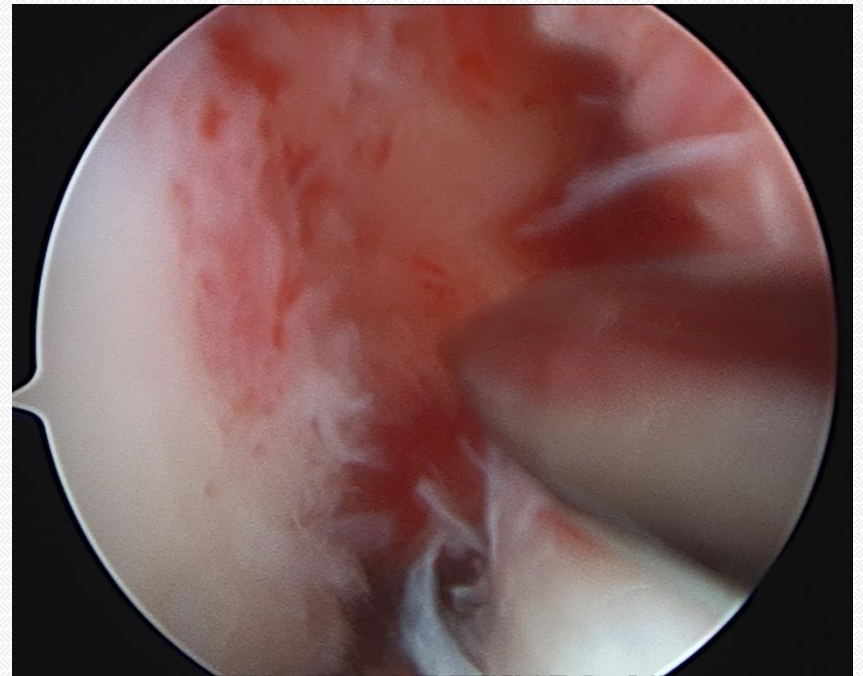
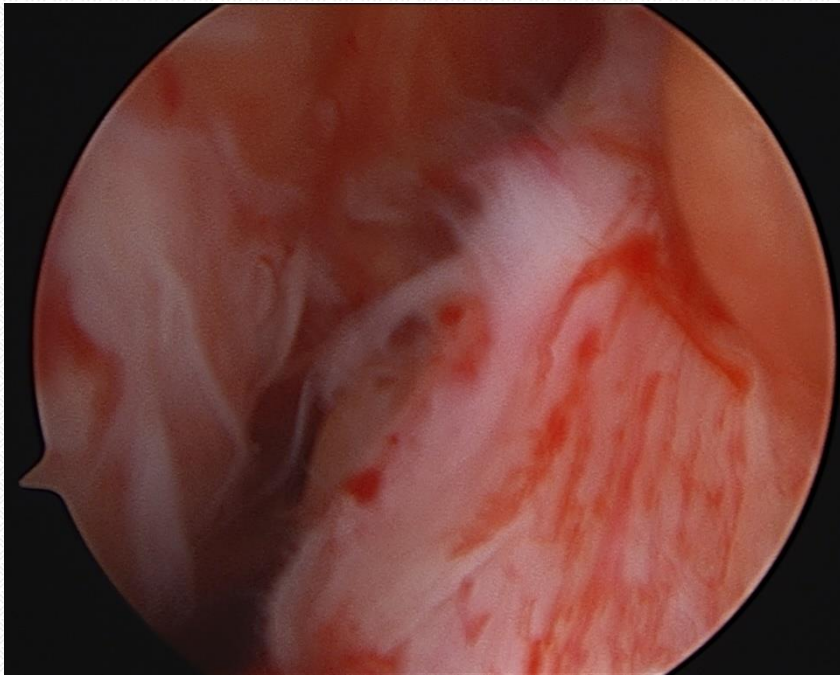
# ACL Repair Location



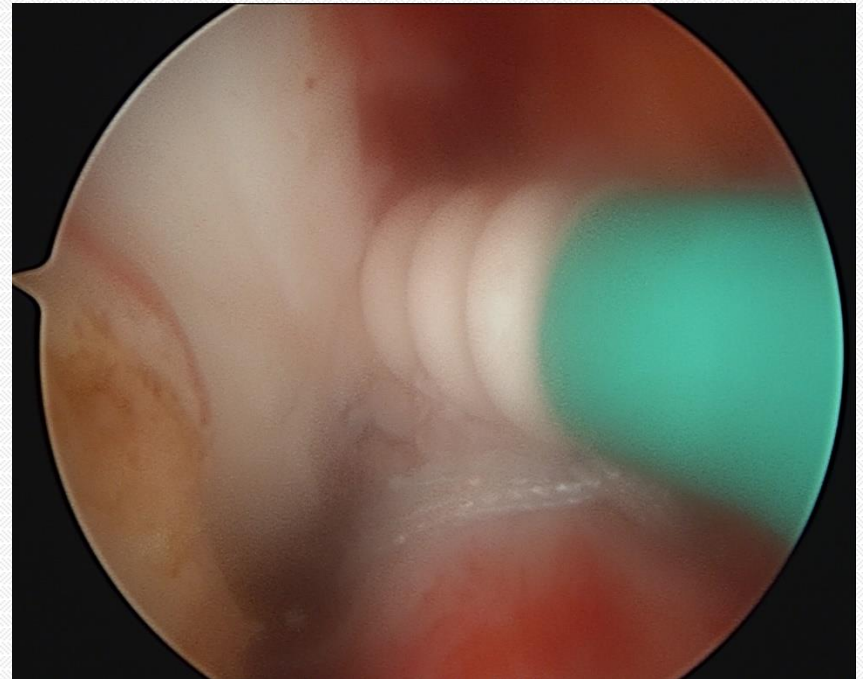
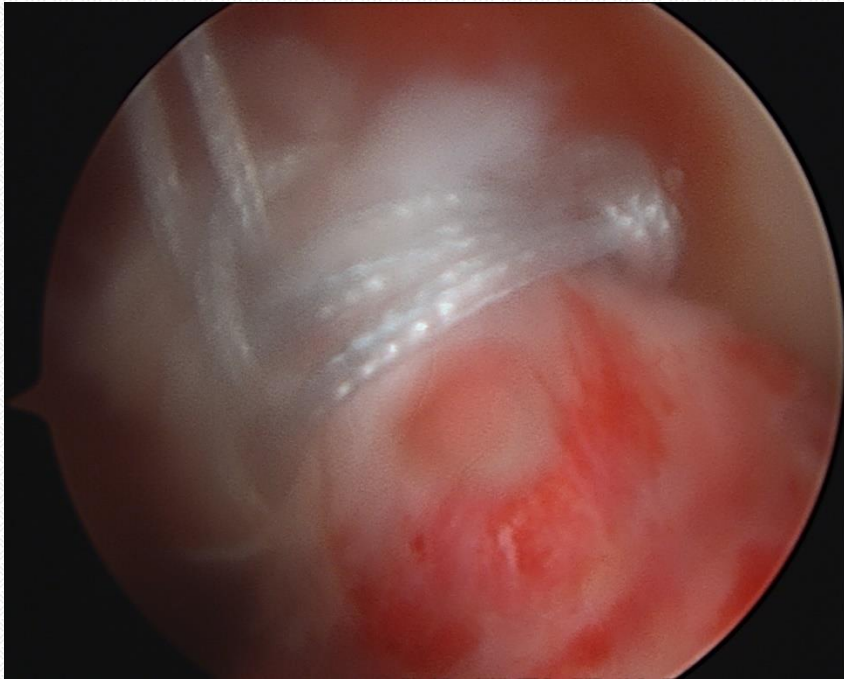
- Punch hole located within intercondylar notch at the ridge
- Anchor dimensions are 4.75 mm x 19.1 mm



# ACL Repair Technique

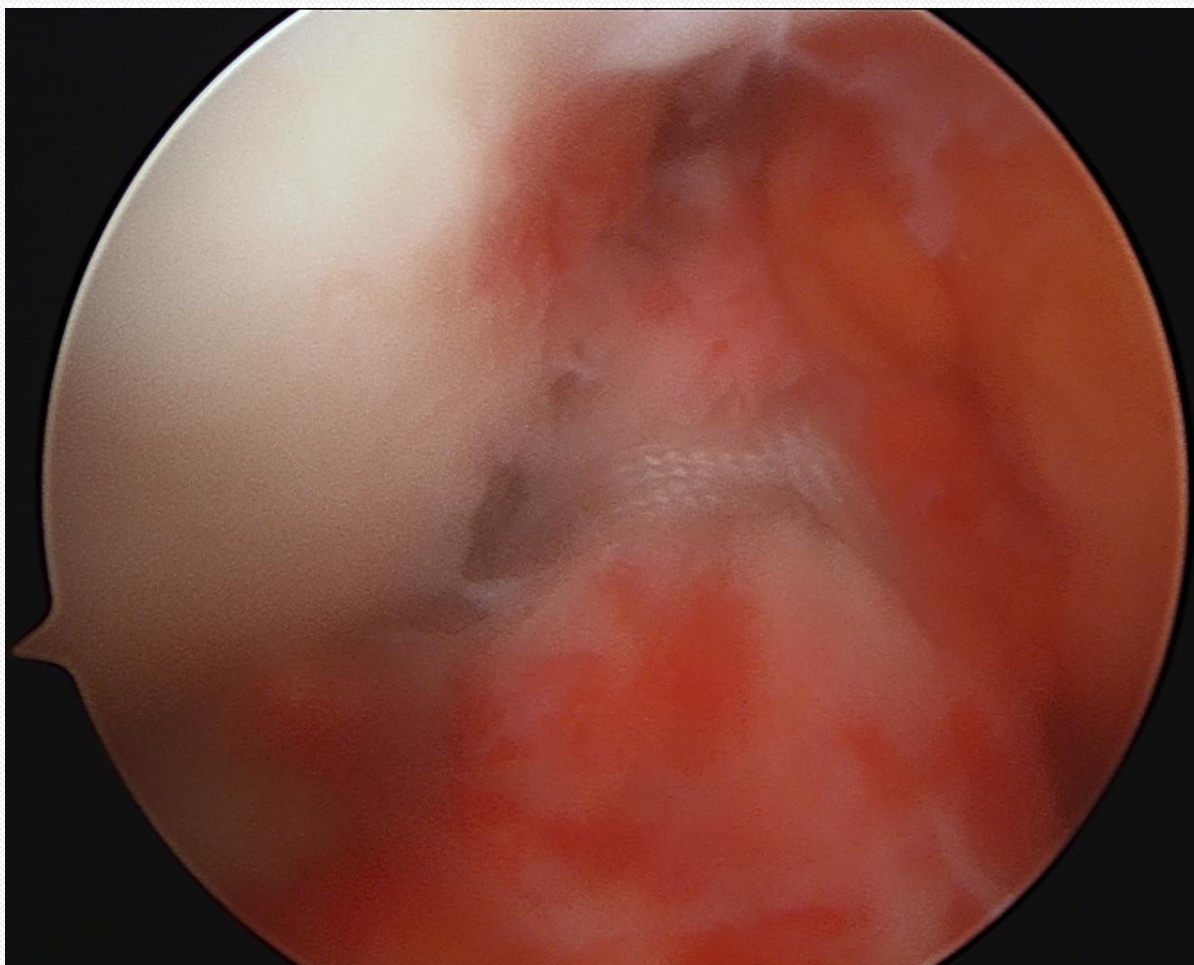


# ACL Repair Technique

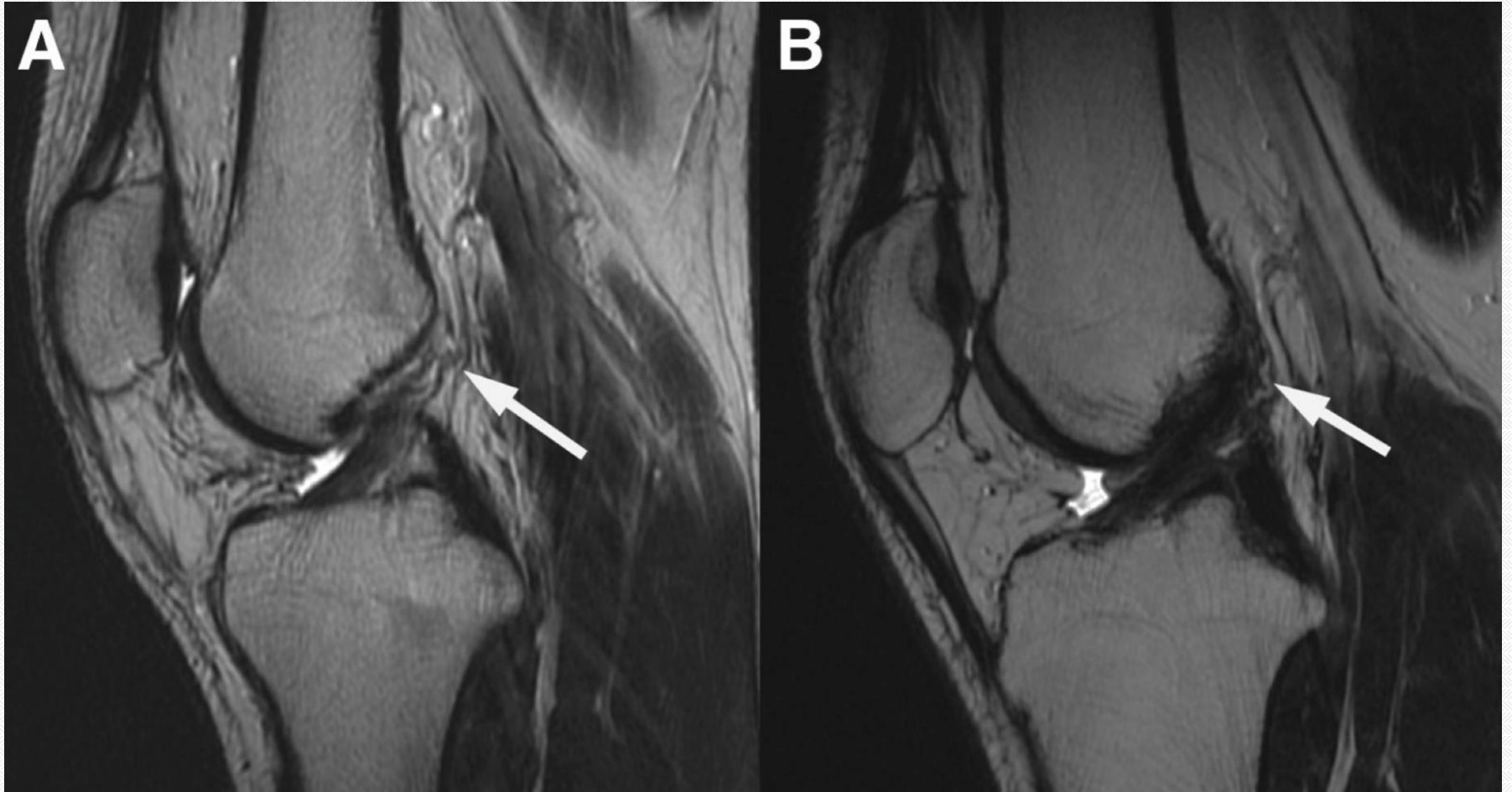




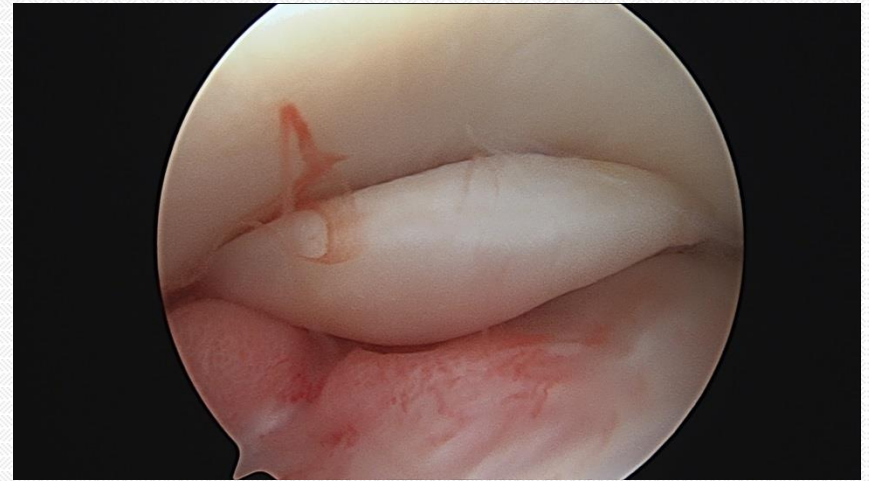
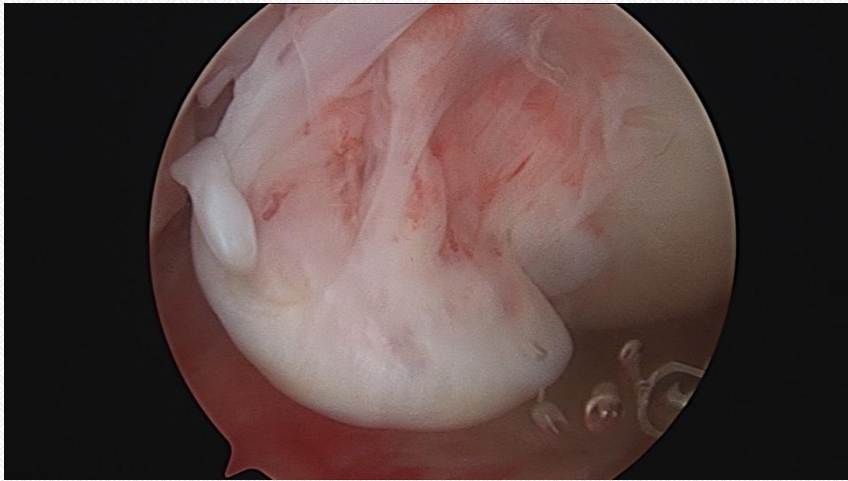
# ACL Repair – End Result



# MRI – Before and After ACL Repair



# My Second Look – due to notch impingement

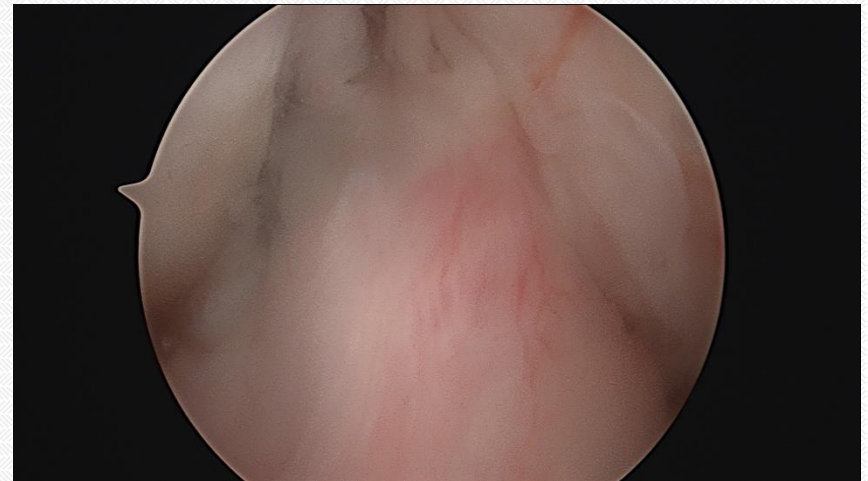
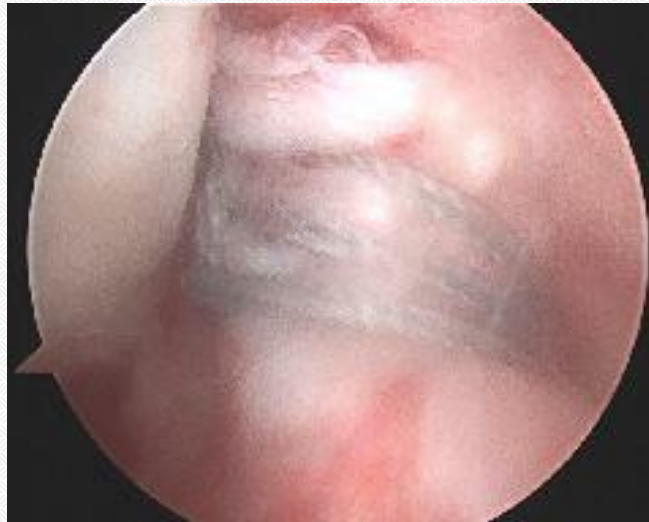


# My Second Look – due to notch impingement



4/3/17 repair

11/1/17 2<sup>nd</sup> look



# Testing the Repair

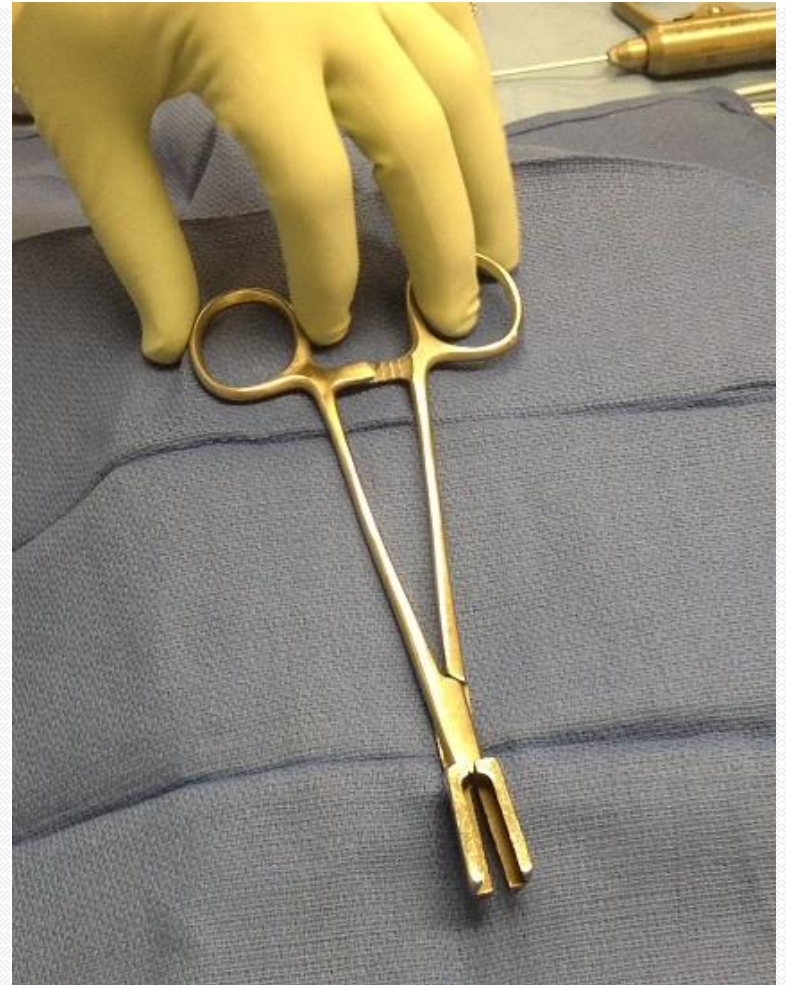


- At the conclusion of every repair:
  - Take the knee through full range of motion
  - Lachman exam
  - Pivot shift
- If a repair isn't rock solid, reconstruct it.

# A New Device - The Bone Clamp



- WHITTLE NO MORE!
- Cuts down graft preparation time
- Reproducible results
- Securely holds graft for suture passing

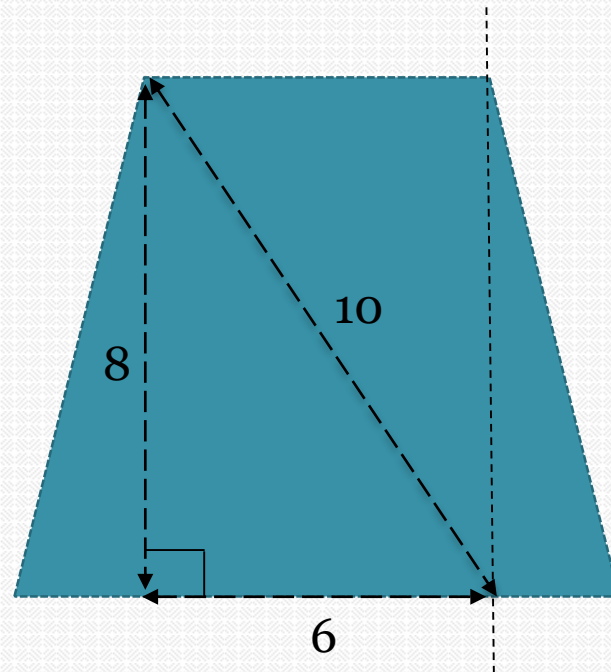


# The Bone Clamp

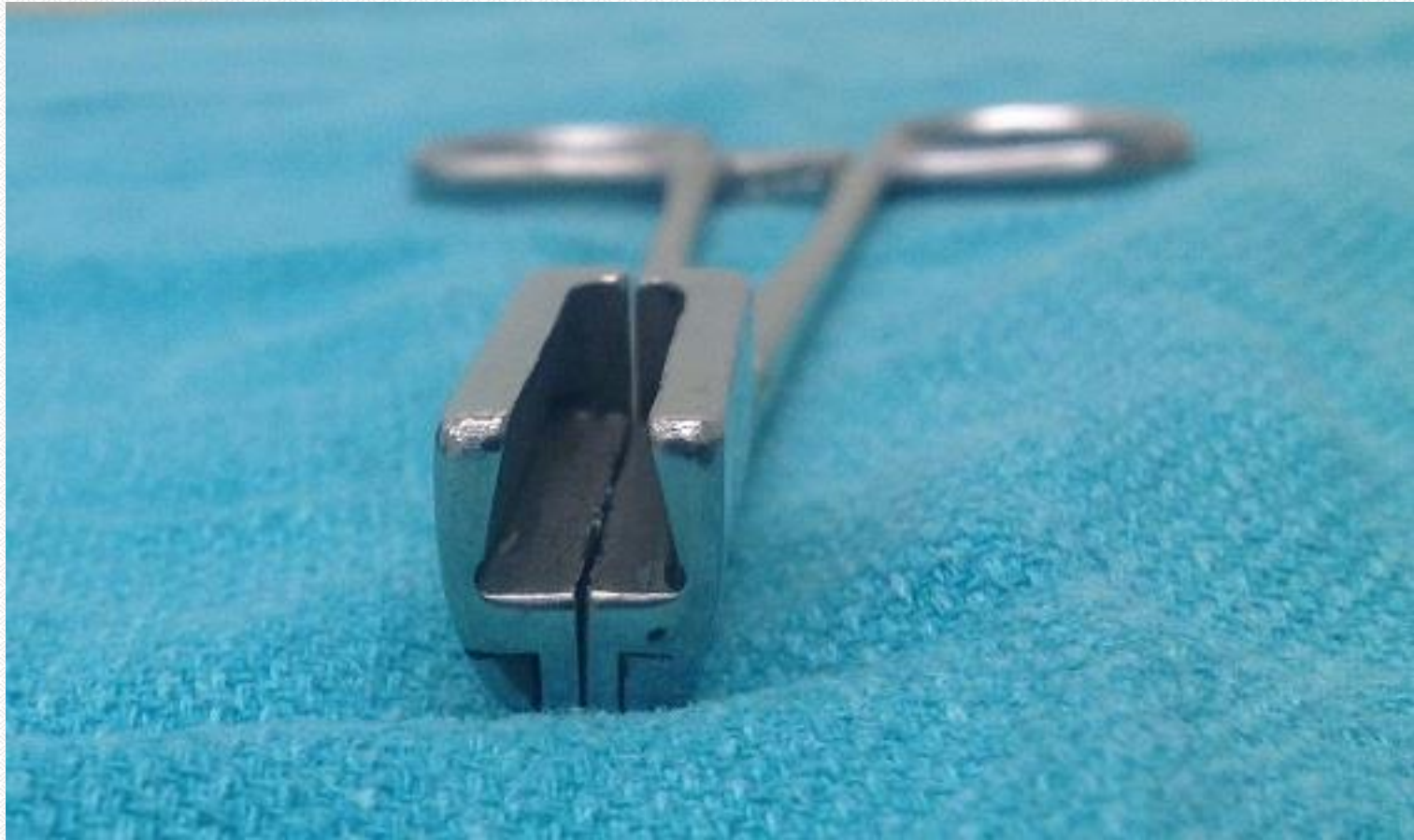


- Idea behind the sizing of the bone plug is based on the Pythagorean Theorem
- $a^2 + b^2 = c^2$

In order for  $c$  to be 10mm, sides  $a$  and  $b$  are 6 mm and 8 mm respectively



# The Bone Clamp





# The Koco Clamp



- The Koco clamp securely holds the bone plug
- A TPS saw blade is passed over the bone plug, removing excess bone



# The Bone Clamp



- Bone plug is rotated 90°, tendinous portion turned away, and cut is repeated
- Small holes drilled through bone plug while cradled in the bone clamp for passing of suture



# Conclusion



Similar to the UCL repair, primary ACL repair may be indicated as the right surgery for the right patient.

# Citations



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