ACSM TPC Part 2
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Acute Knee Ligament Injuries in Athletes

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Acute Knee Ligament Injuries in Athletes
Main Menu

- Introduction
- Dislocation
- AMRI / ALRI
- ALRI
- PLRI
- Conclusions

Instabilities

- Anteromedial rotatory instabilities (AMRI)
- Combined AMRI and ALRI
- Anterolateral rotatory instabilities (ALRI)
- Straight posterior
- Posterolateral rotatory instabilities (PLRI)
- Combined ALRI and PLRI
- Straight instabilities

PCL

- Mechanism
  - Low velocity – sports blow to anterior tibia, foot plantarflexed
- Exam
  - Grades I-II-III based on relation to medial femoral condyle
- Assess collateral ligaments
  - Most commonly posterolateral instability
  - Greater tibial external rotation
- Acute reconstruction
  - Knee dislocation
  - Grade III collateral ligament injuries

PCL – 22 YO Offensive Lineman







Straight posterior instability

Normal Knee Exam: PCL Exam



Normal Knee Exam: PCL Exam



Normal Knee Exam: PCL Exam



Knee dislocation ACL/PCL/MCL tears
Skin only stabilizing medial side of the knee

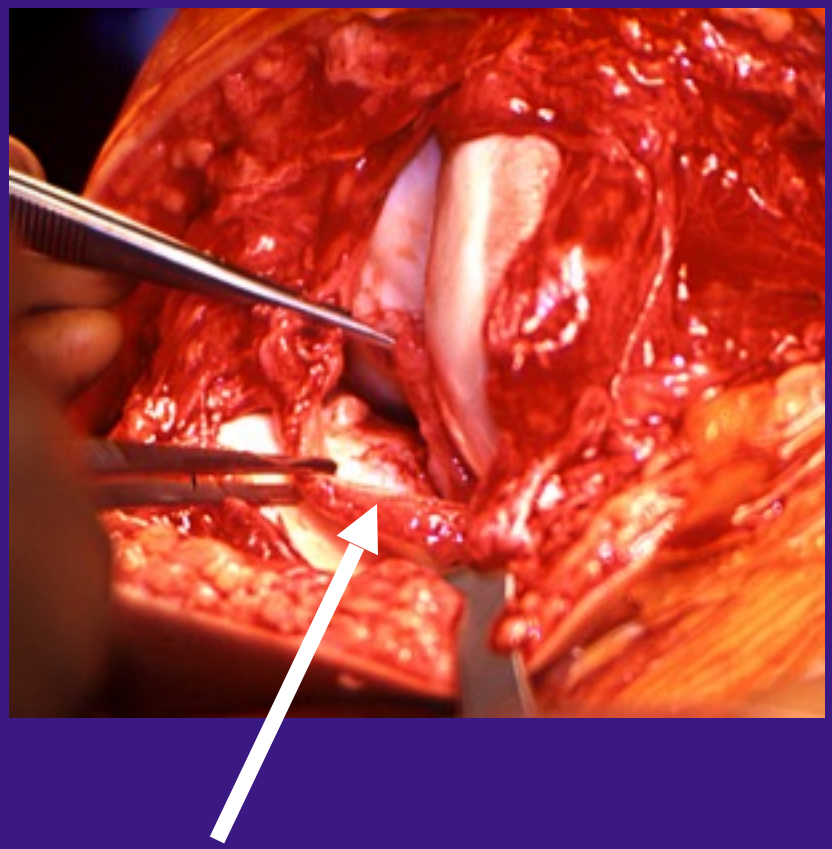


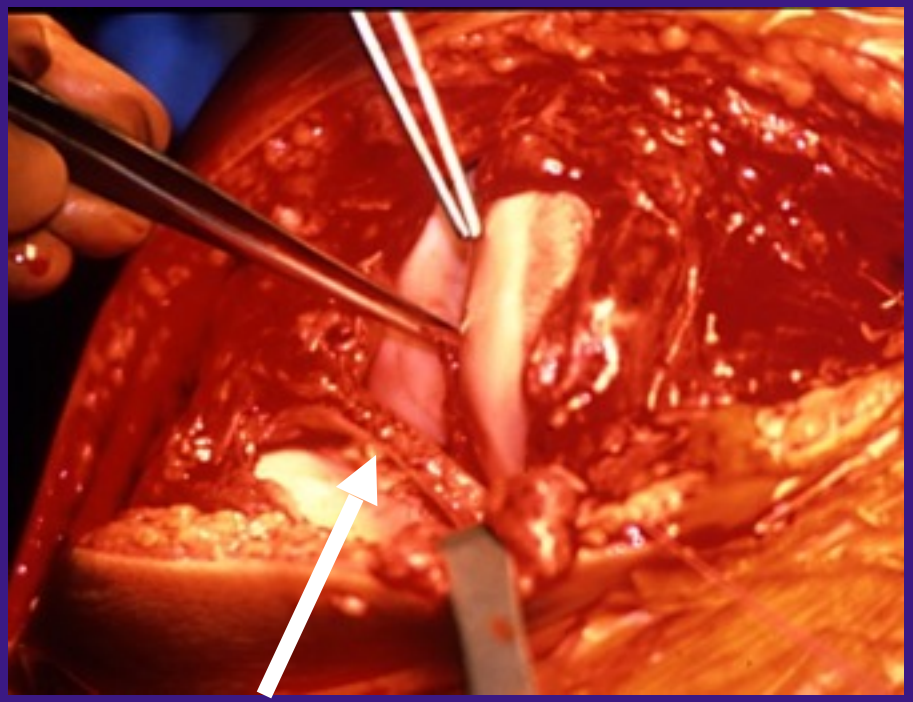


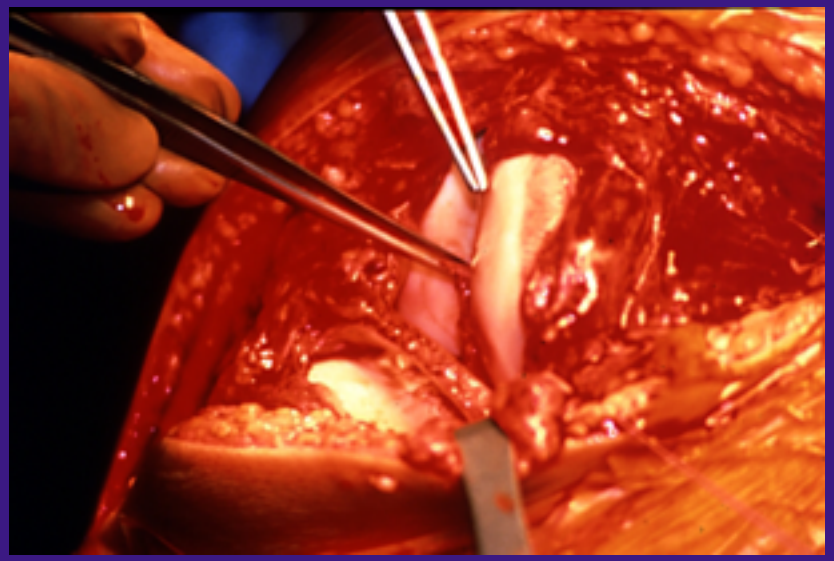


Combined instabilities: AMRI, ALRI, Straight posterior

Medial meniscus

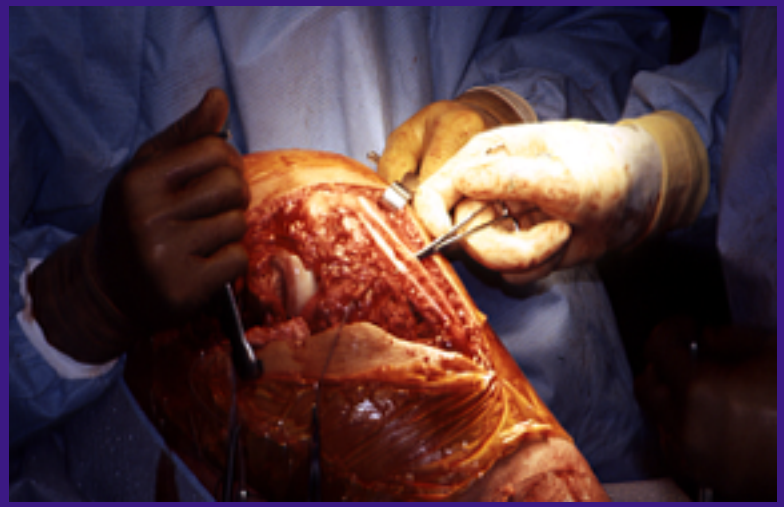






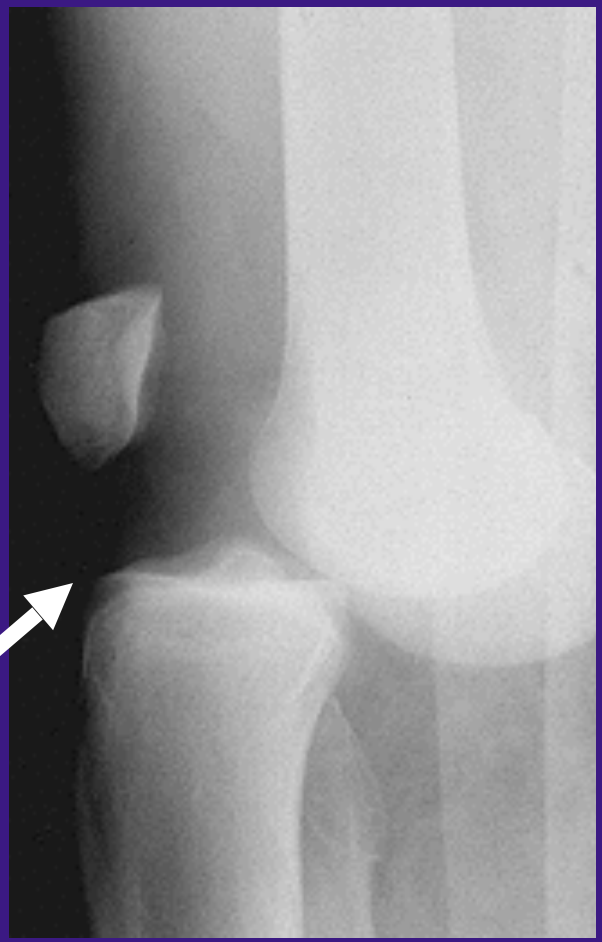






Acute Knee Dislocations

- Uncommon, but . . .
  May be underdiagnosed
- If knee opens up to varus/valgus stress testing in extension, assume a knee dislocation
- Direction of dislocation
  - Anterior: hyperextension mechanism
  - Posterior: direct blow anterior proximal tibia



KNEE



KNEE



KNEE



Knee Dislocation

- Happens on fields – not often, but:
- Don’t miss
- Assess vascular status
  - Physical exam
  - Pulse ratios
  - MRI scan
  - Arteriogram








Knee Unstable in Extension. . .


Knee Unstable in Extension. . .


Knee Unstable in Extension. . .

Marcus Lattimore, running back, MOI:
South Carolina vs. Tennessee



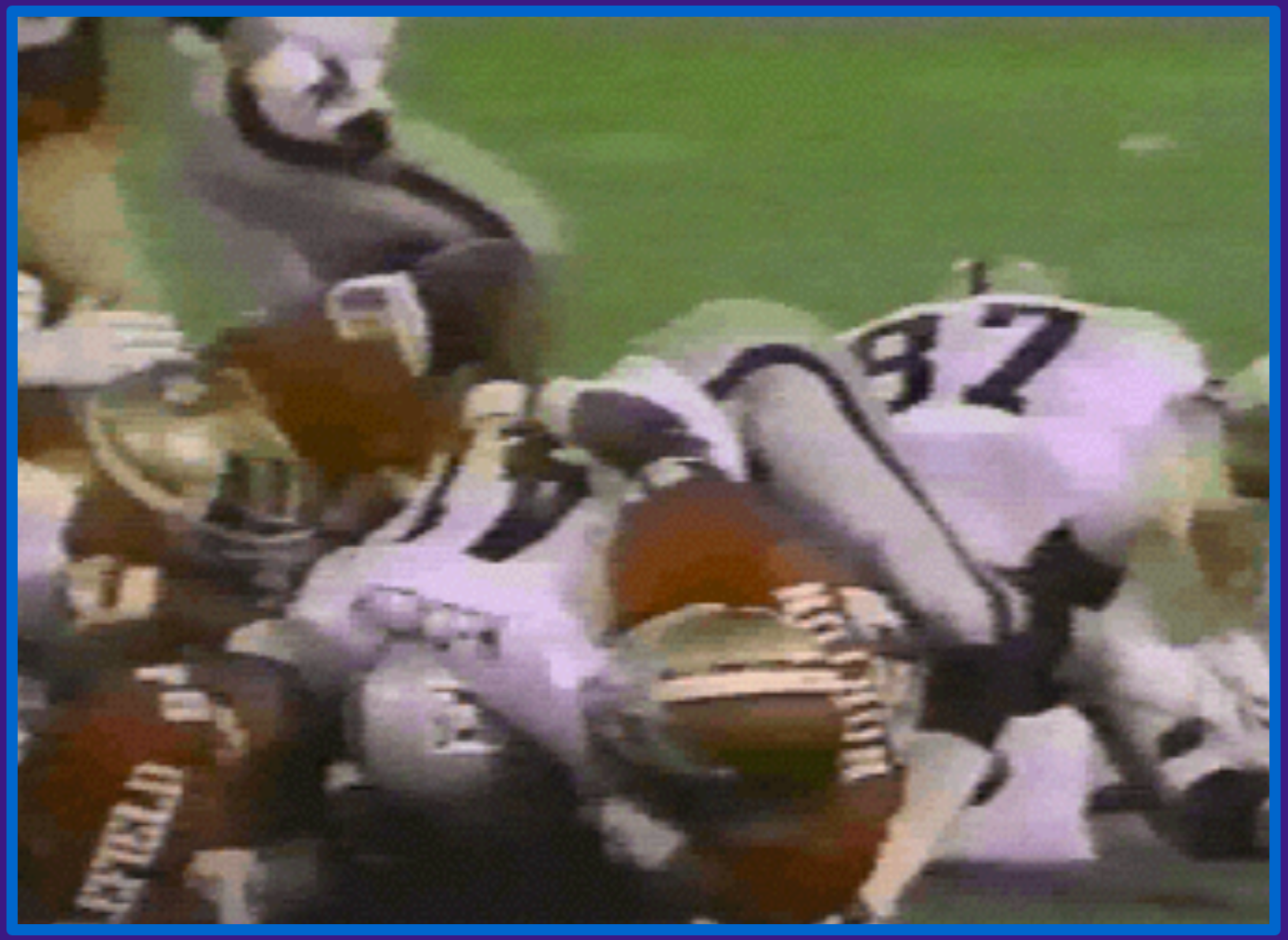
Marcus Lattimore, running back, MOI:
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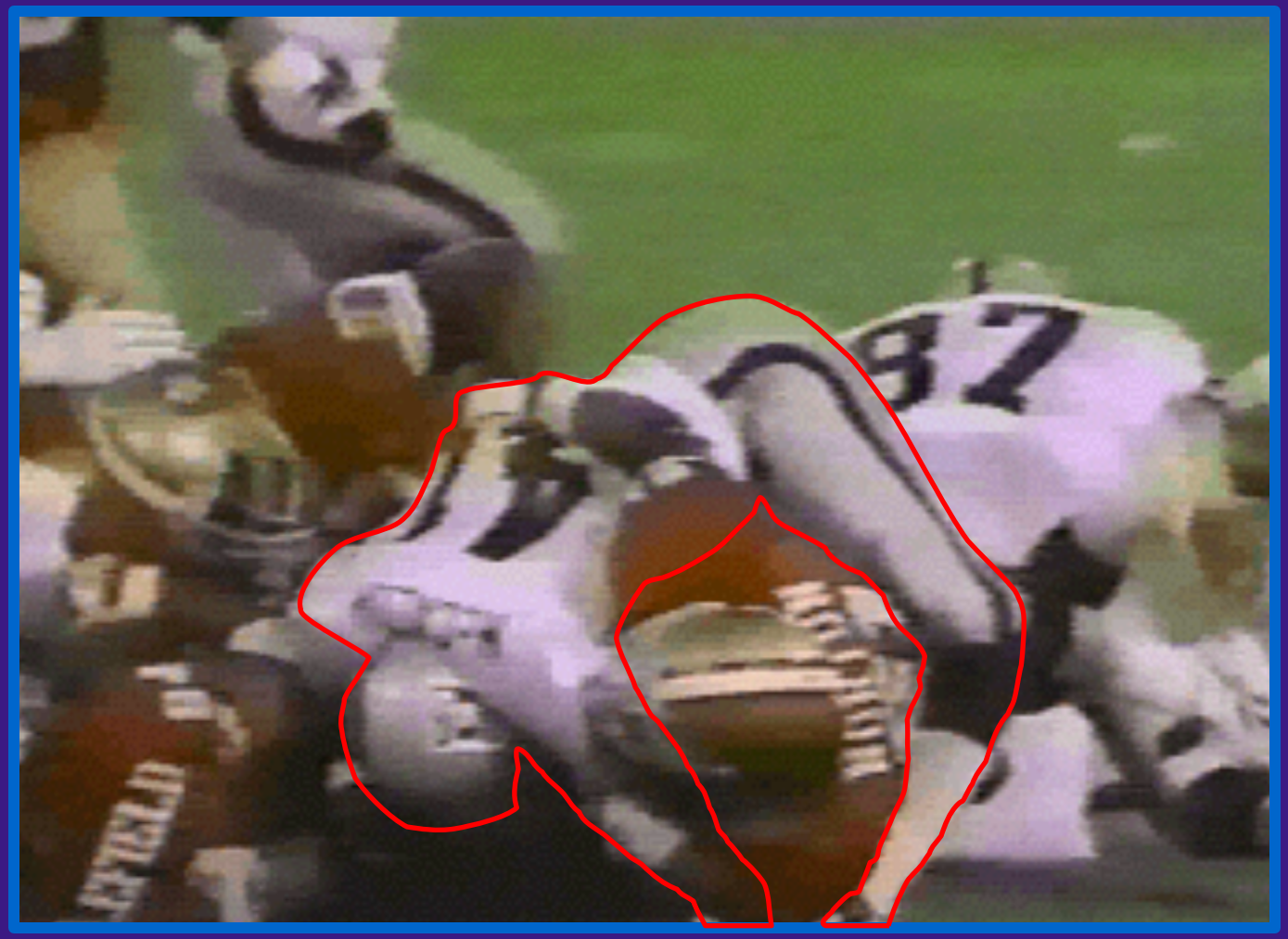
Marcus Lattimore, running back, MOI:
South Carolina vs. Tennessee



Football: Knee Dislocation



Football: Knee Dislocation



Willis McGahee, Univ. of Miami 2003



Willis McGahee, Univ. of Miami 2003



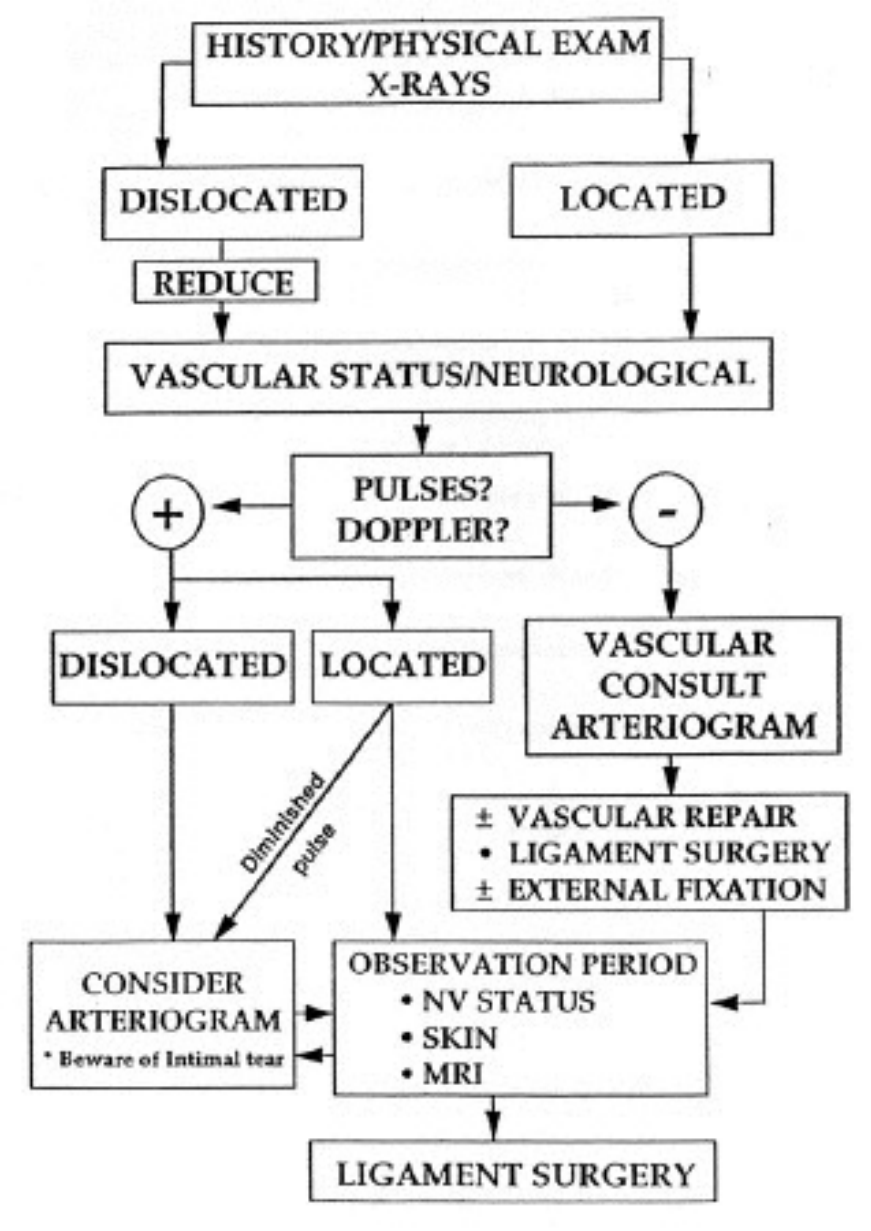
Willis McGahee, Univ. of Miami 2003



Knee Dislocations

- Most knee dislocations reduce spontaneously
- Refer to center with vascular surgeon
- Communicate with ER
  - Use your cell phone to call the ER
  - Put a note on the patient
  - Transfer to facility with angiography suite and vascular surgeon on call
- If high suspicion, do arteriogram

Knee Dislocation Algorithm



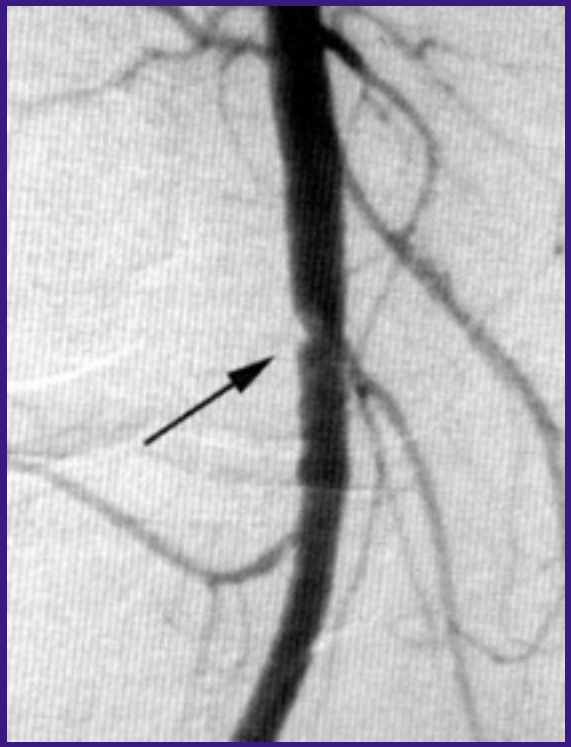
Algorithm for treatment of the Multiple Ligament Injured Knee, from Harner, CD, "Complex Knee Injuries including dislocation: Preoperative planning, evaluation and pitfalls," AAOS, Phoenix AZ, Feb. 3-6, 2000.

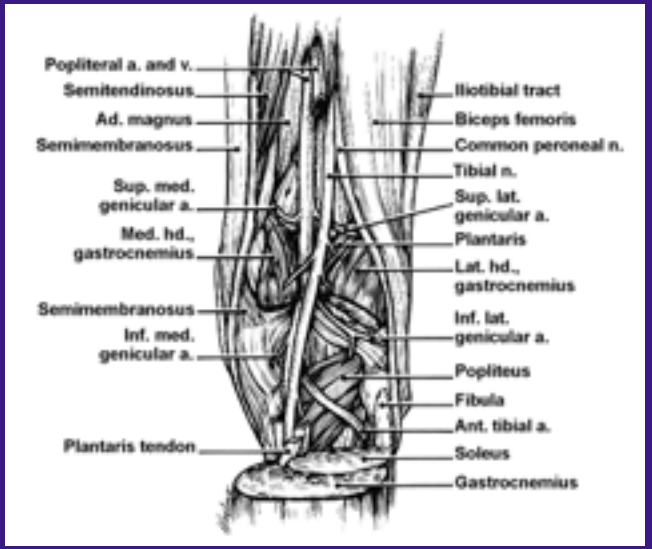
Vascular Injury

Arteriogram Gold Standard

Injury ranges from :
- Thrombus
- Tear:
  - Intimal
  - Partial
  - Complete

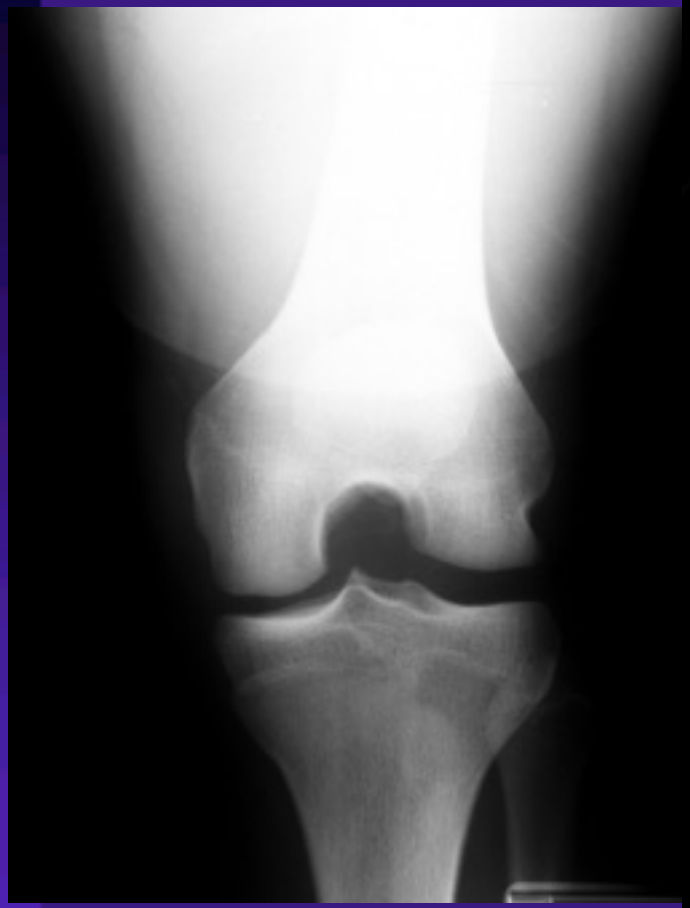
Late Vascular compromise from:
- Thrombus
- Propagation of Intimal Tear





History

- 16YO white male, high school football player
- Football game, valgus twisting blow to body injury
- Unable to keep playing
- Evaluated on sideline, seen in ER
- Seen in office 3 days later

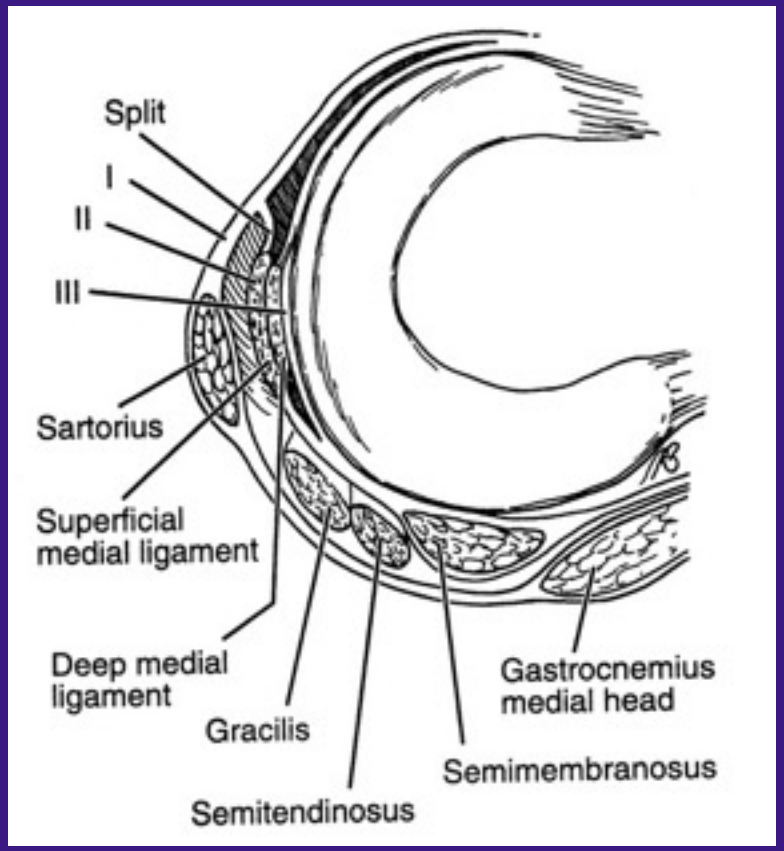


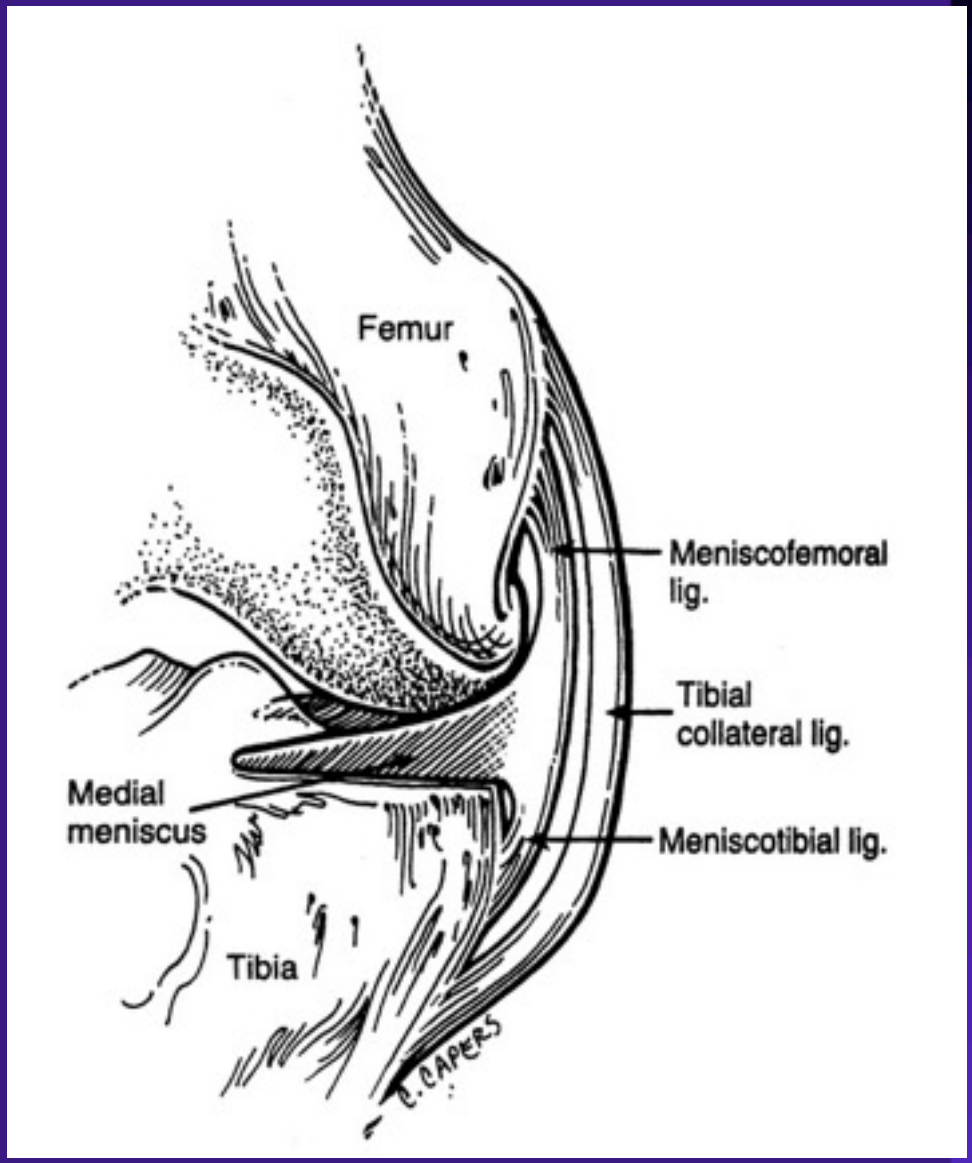




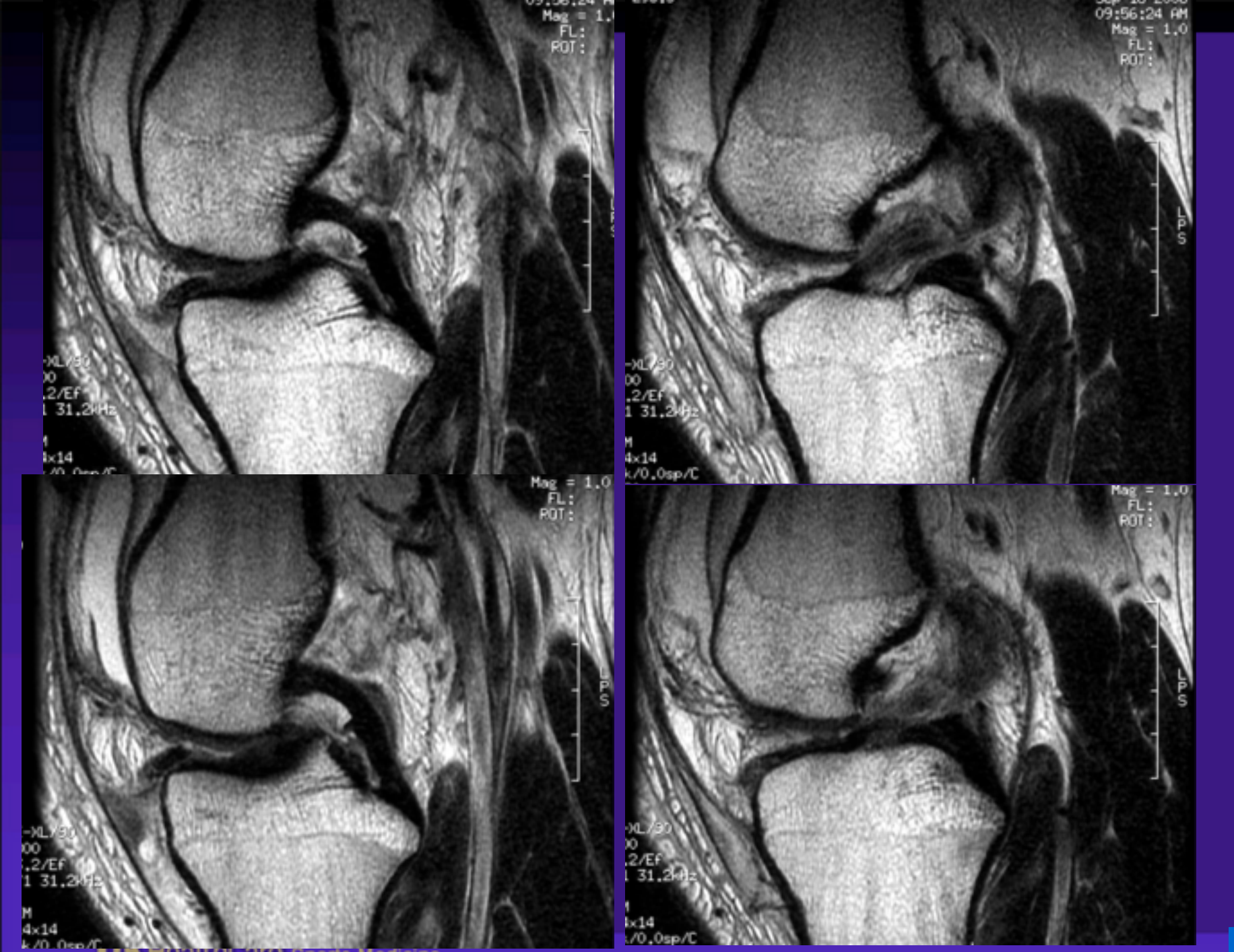


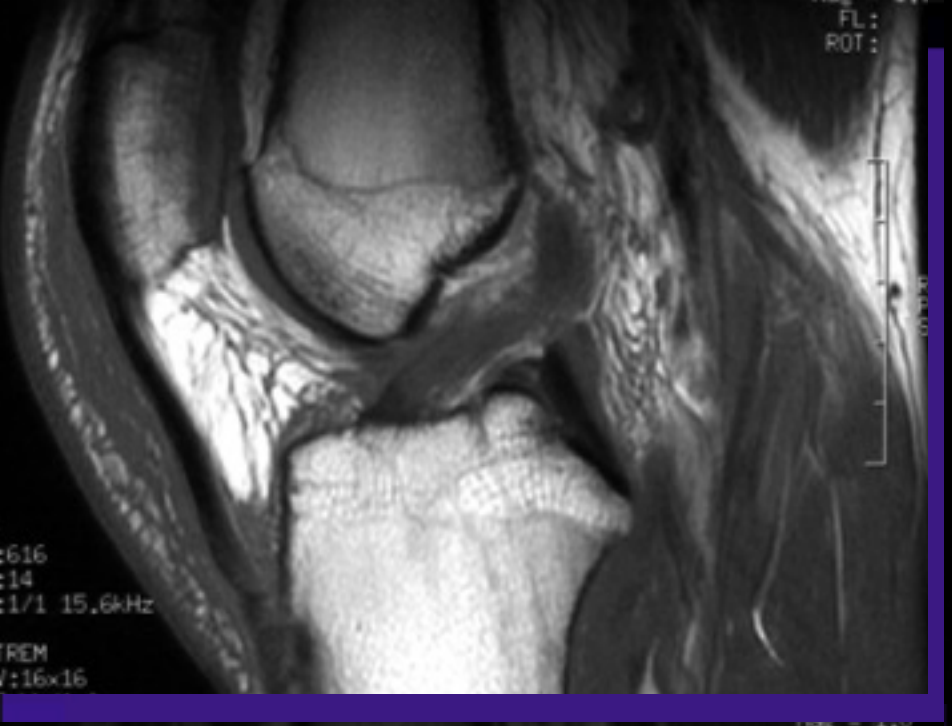

13
SE-XL/90
3450
82.7/Ef
1/1 31.2kHz
REM
:16x16
thk/1.0sp


Split
I
II
III
Sartorius
Superficial medial ligament
Deep medial ligament
Gracilis
Semitendinosus
Semimembranosus
Gastrocnemius medial head


Femur
Meniscofemoral lig.
Tibial collateral lig.
Medial meniscus
Meniscotibial lig.
Tibia
C. CAPERS


Mag = 1.0
FL:
ROT:
ET:8
R
A
JP
FSE-XL/90
TR:2466
TE:35.2/Ef
EC:1/1 20.8kHz
EXTREM
FOV:16x16
4.0thk/1.0sp


09:56:24 AM
Mag = 1.0
FL:
ROT:
LPS







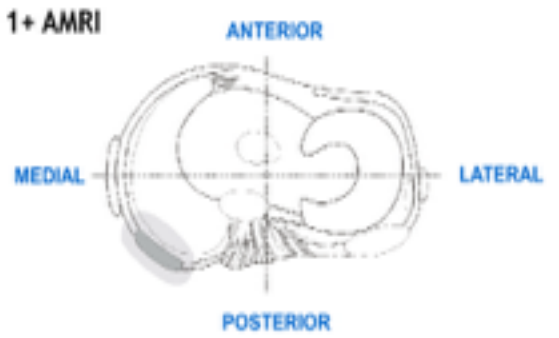


GE Healthcare Sports Medicine

Knee Instabilities

AMRI

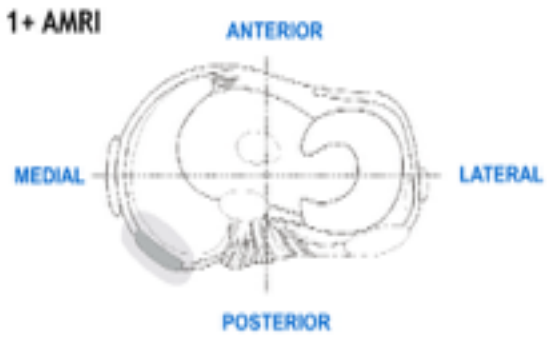




Knee Instabilities

AMRI

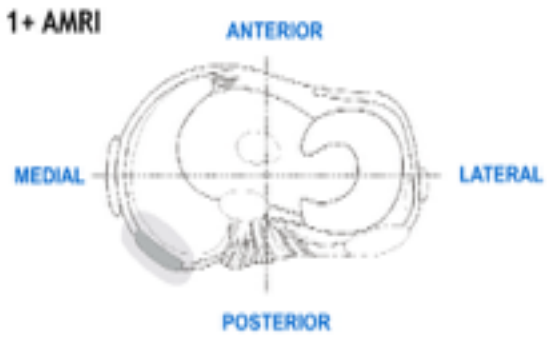




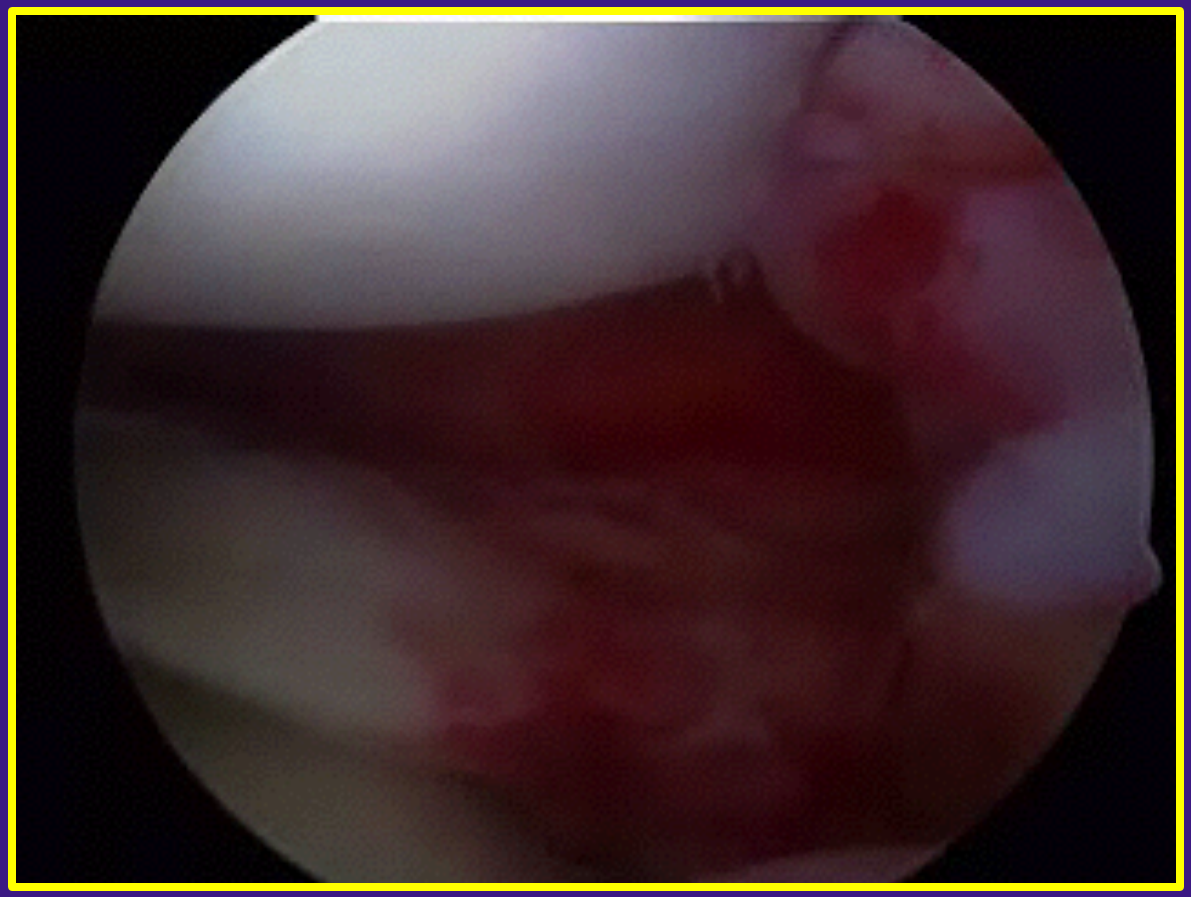
Knee Instabilities

AMRI

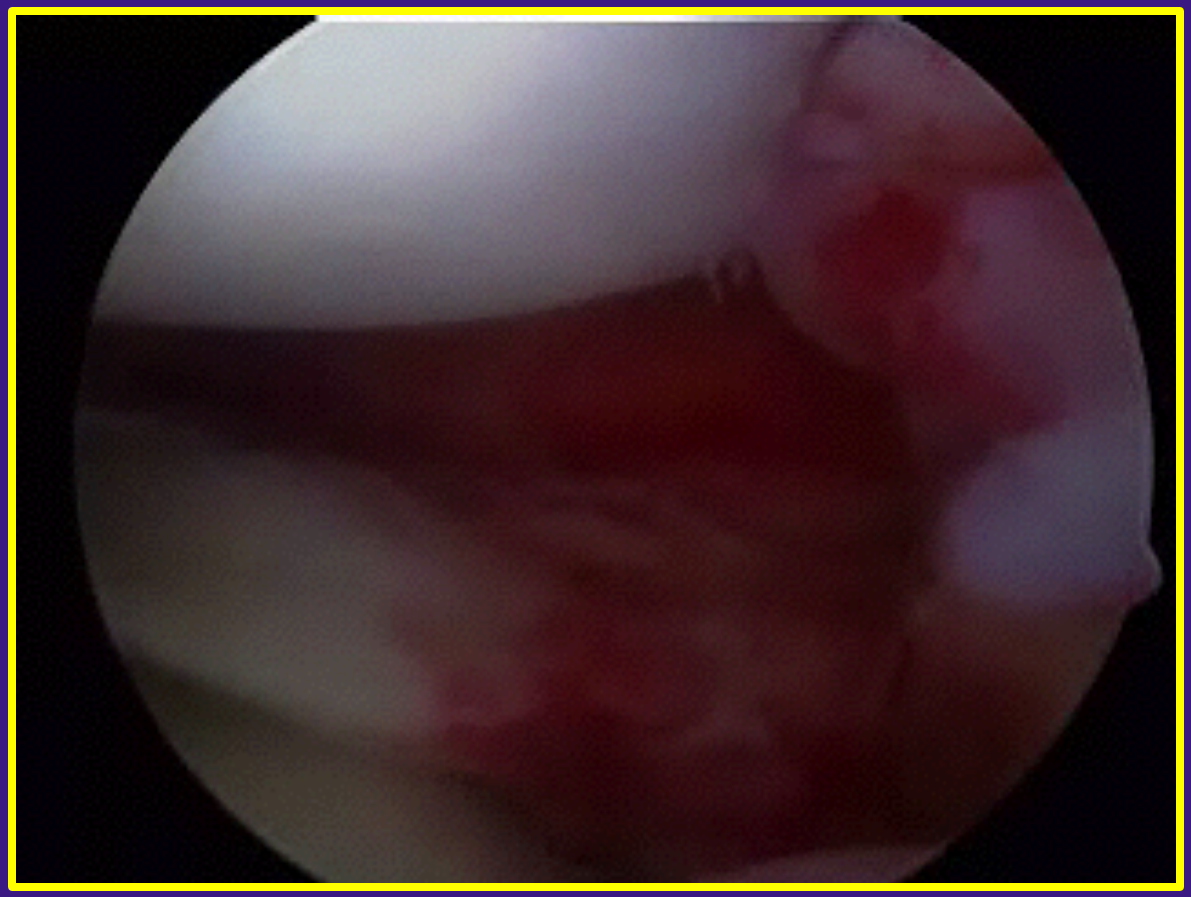




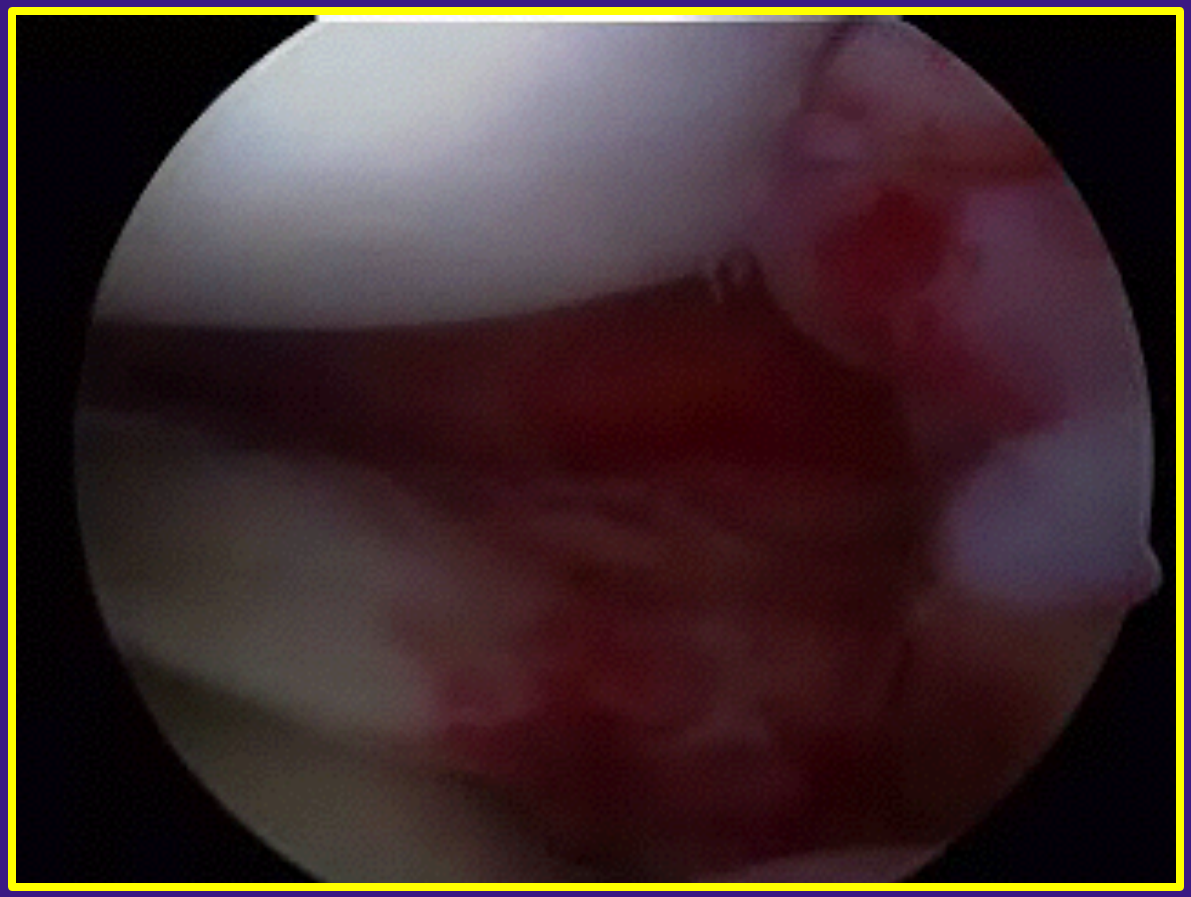
Surgery: Arthroscopy



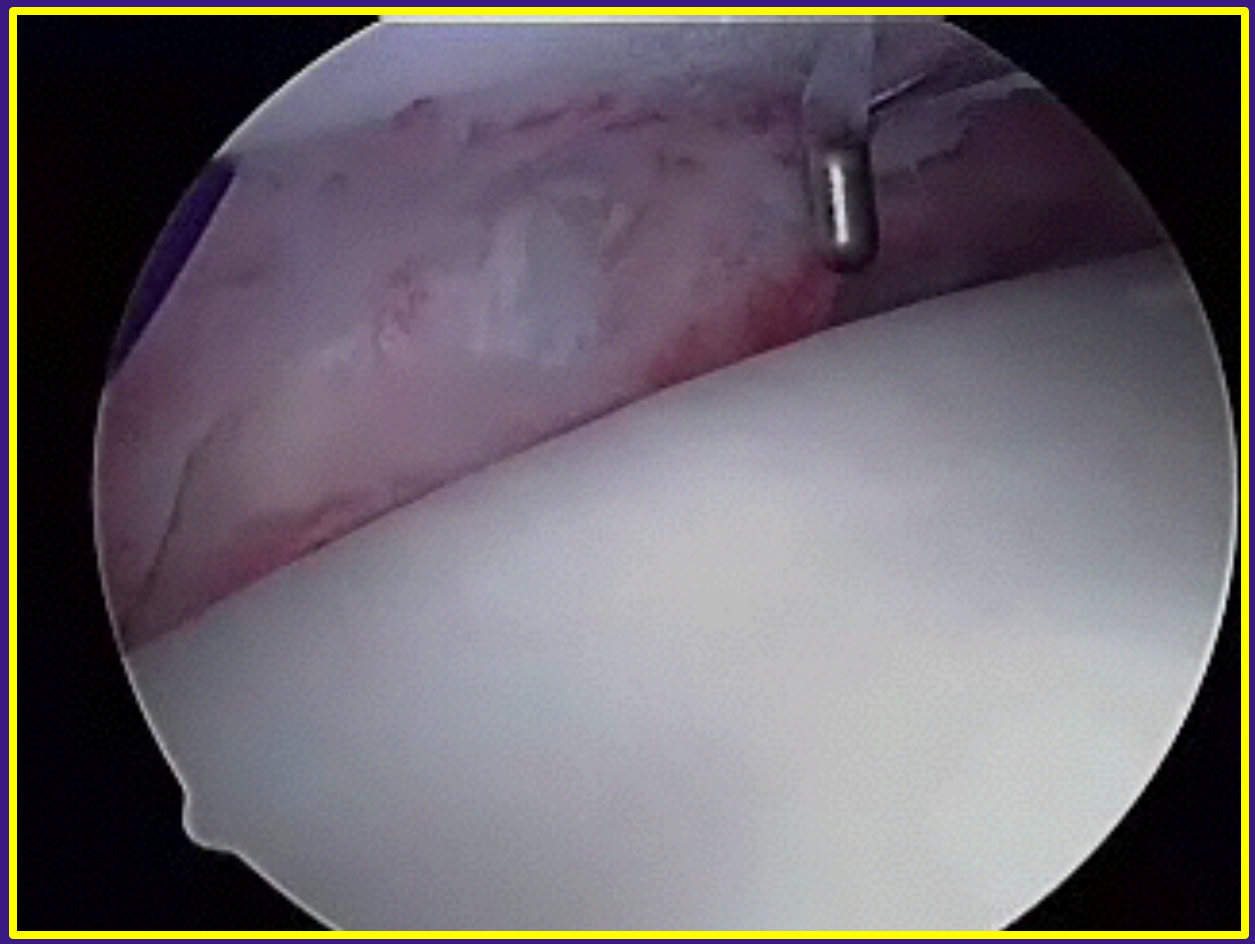
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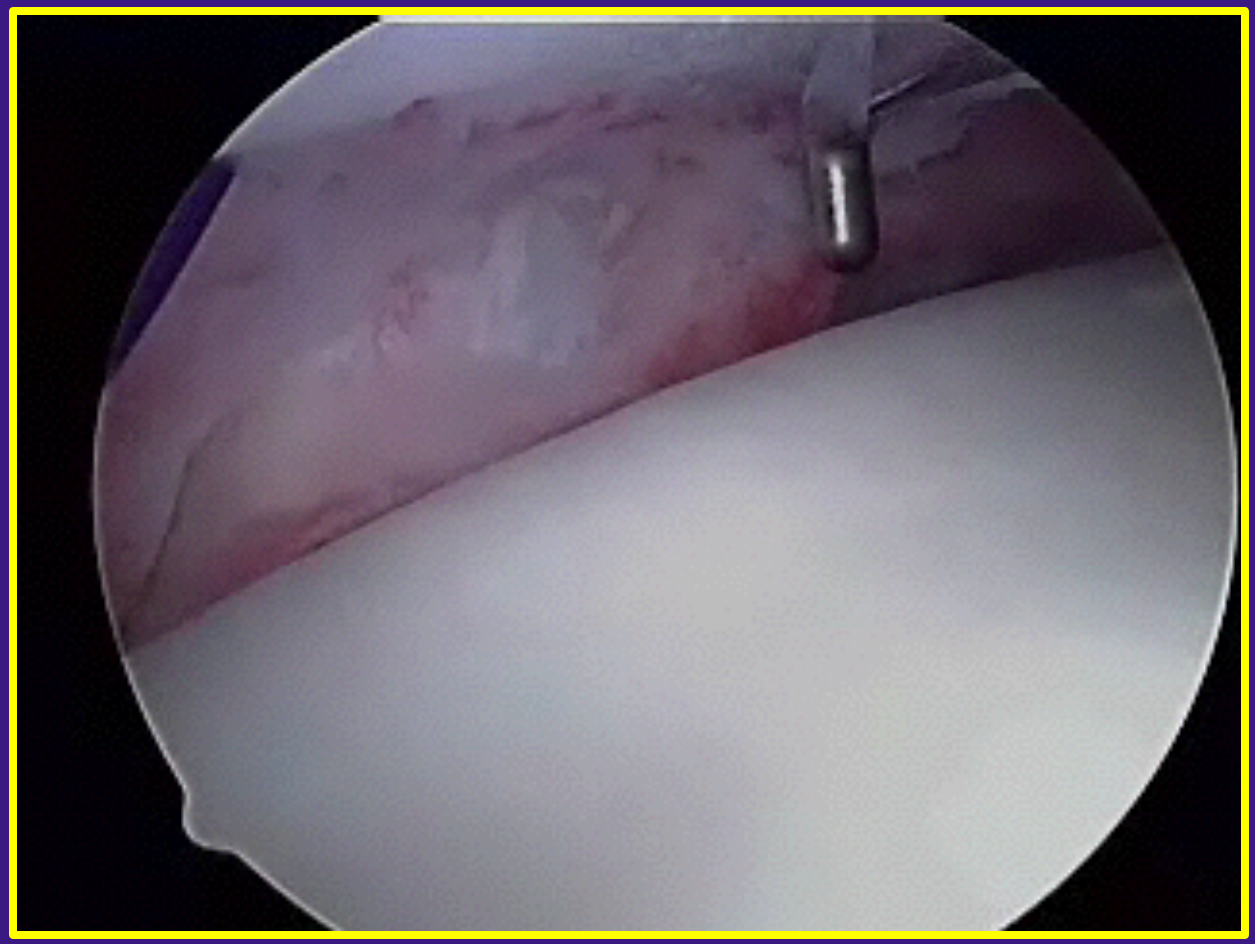
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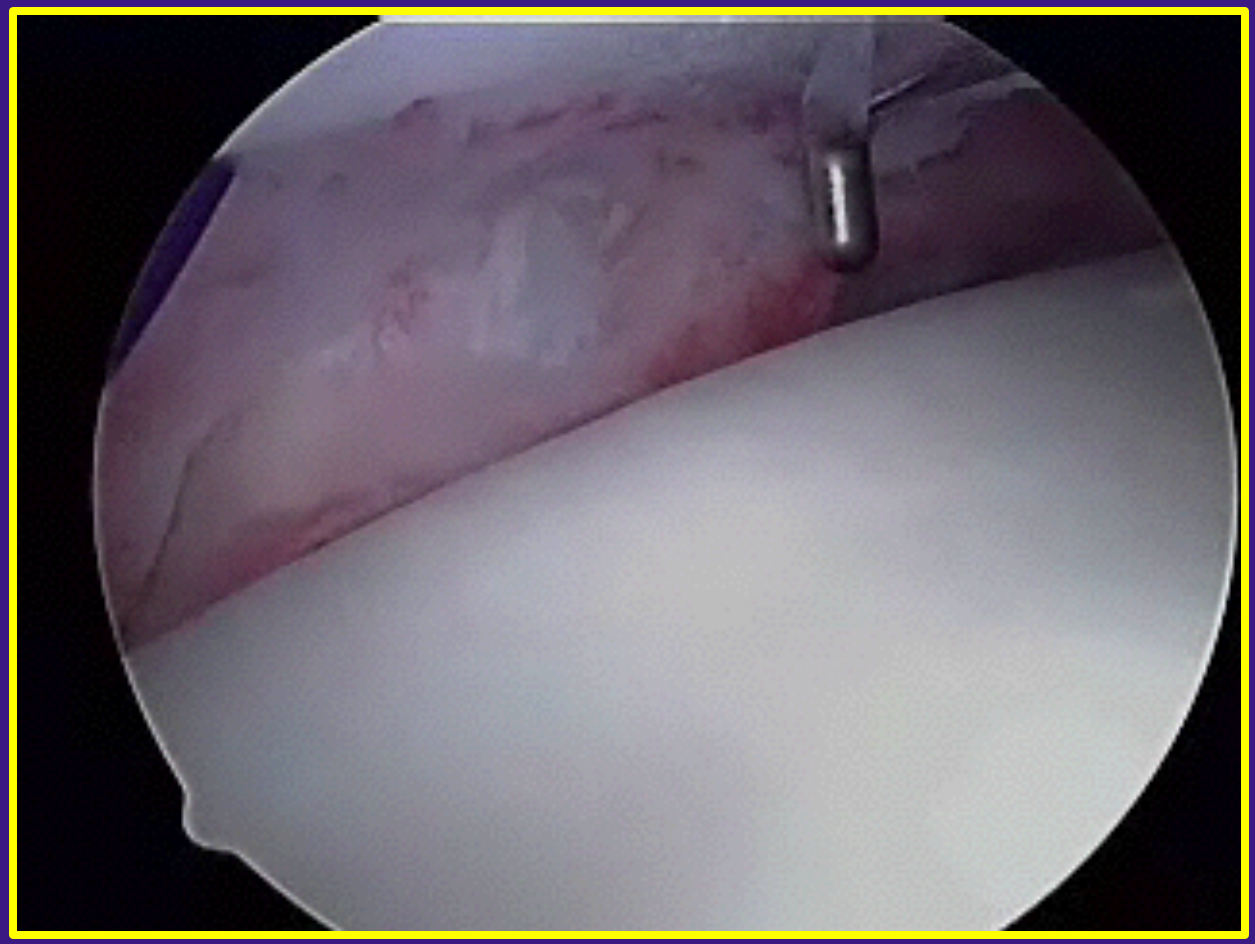
Surgery: MCL Repair



Surgery: MCL Repair



Surgery: MCL Repair



Gymnastics



Gymnastics



Gymnastics





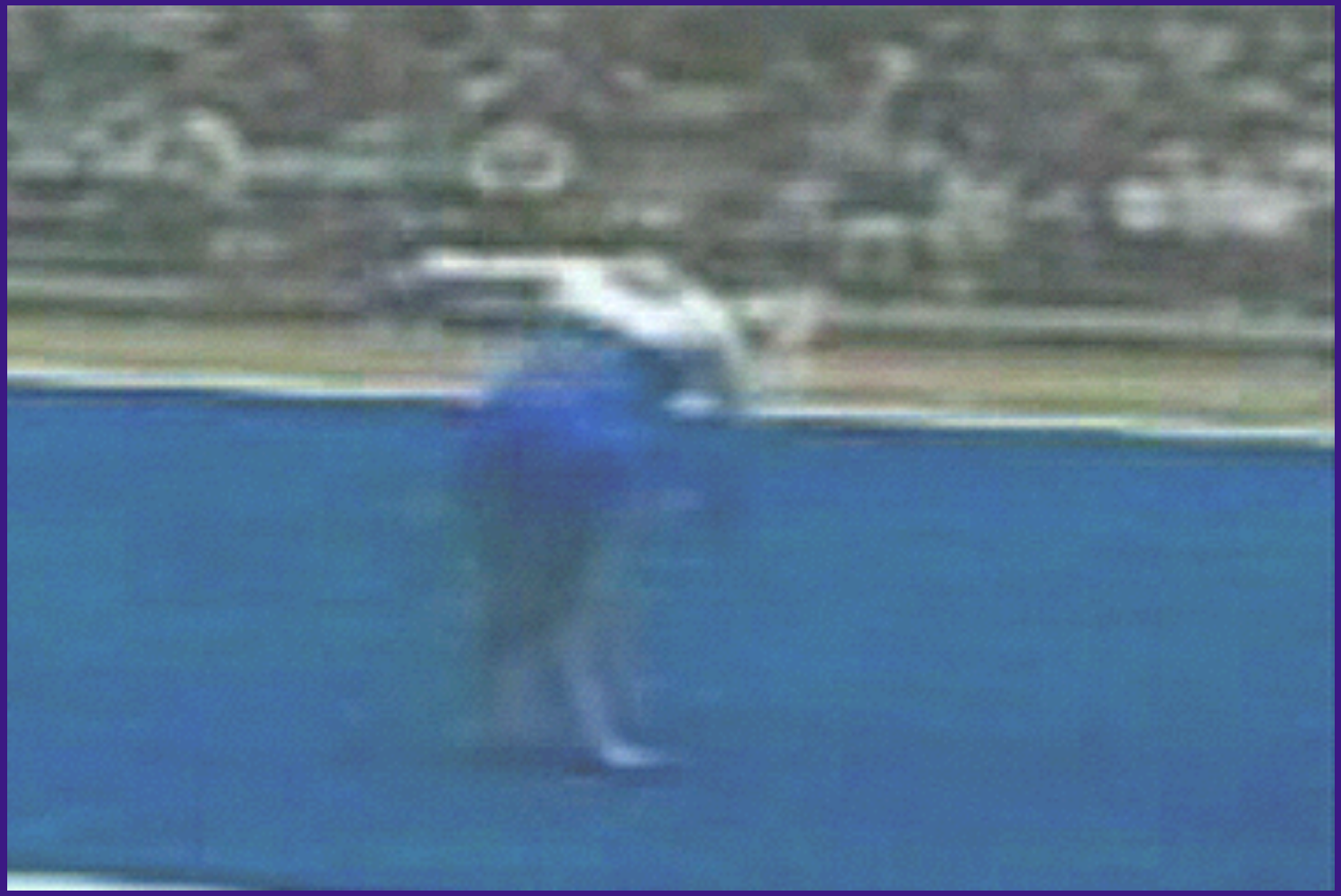












ACL Tear



ACL Tear



ACL Tear



Basketball



Basketball



Basketball



Basketball



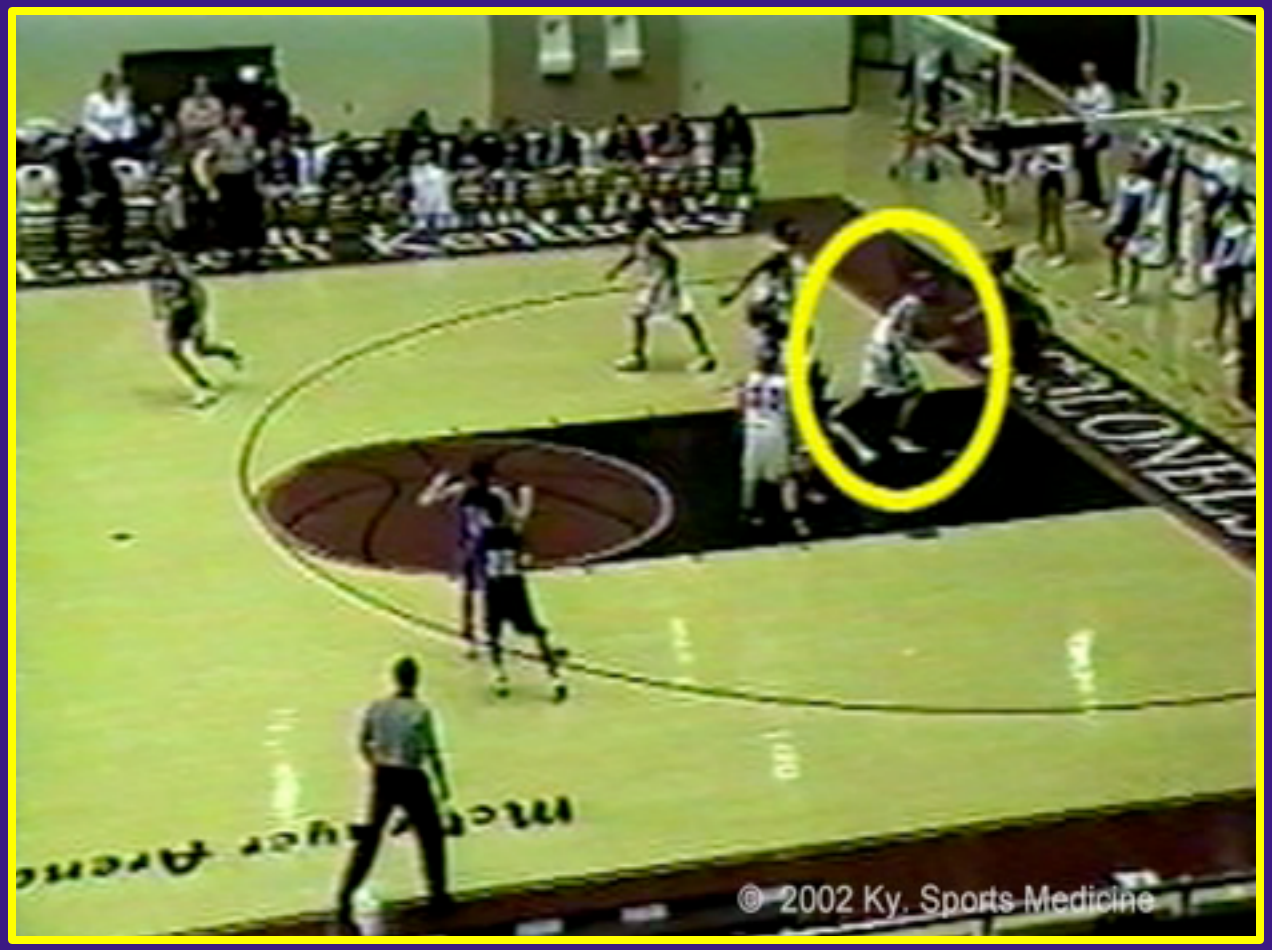
Basketball



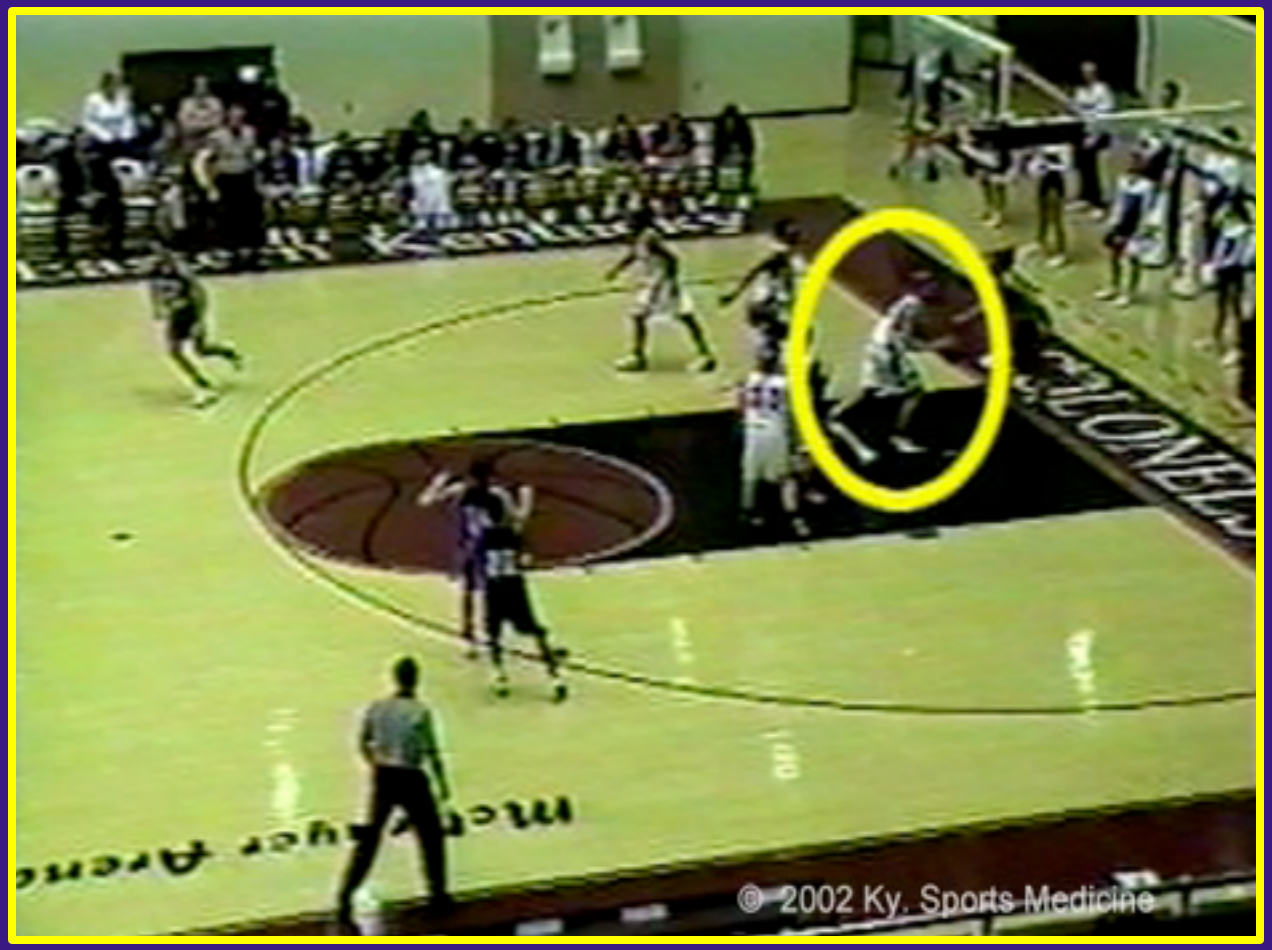
Basketball



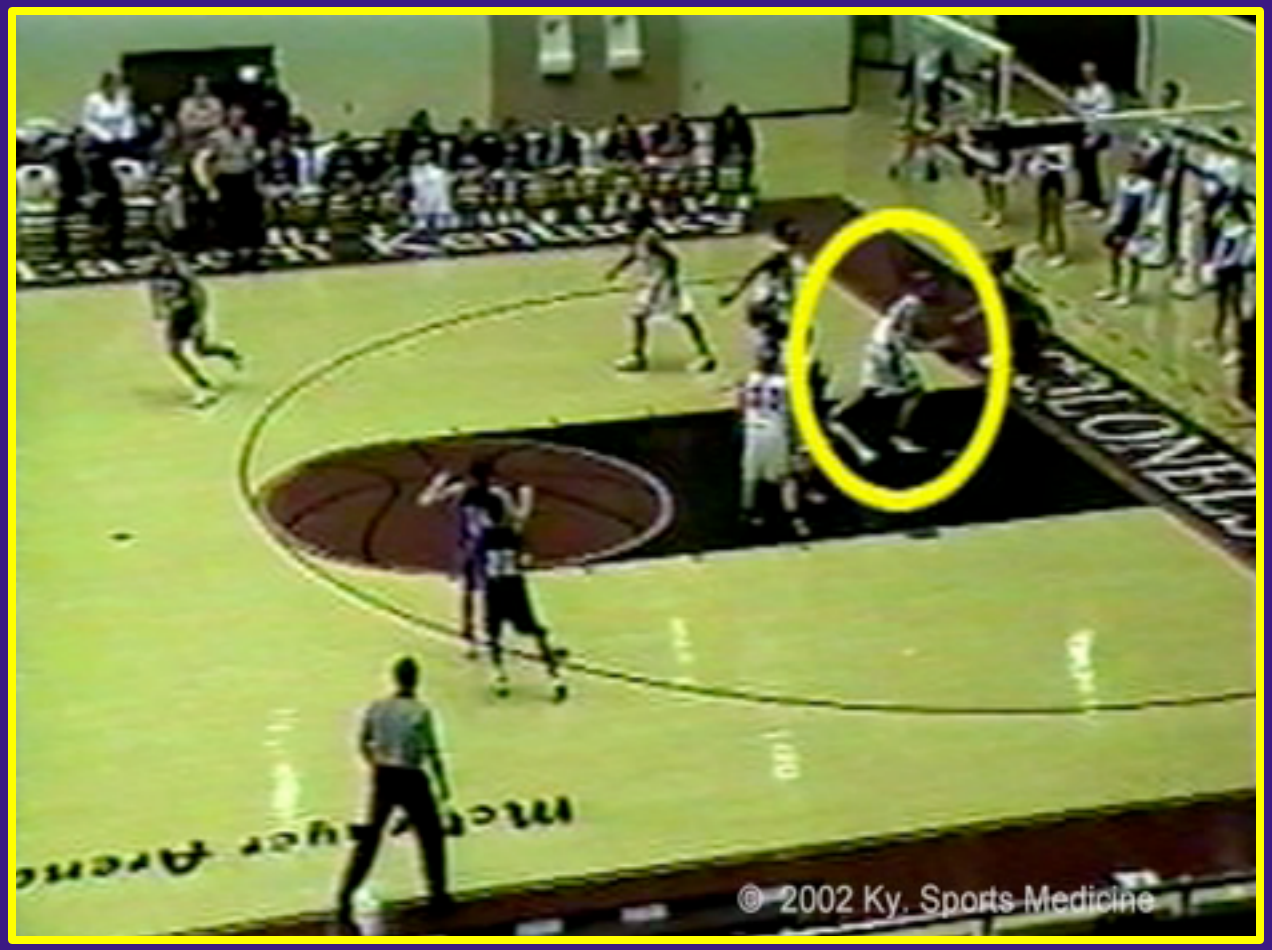
Basketball: non-contact, unexpected, not thinking



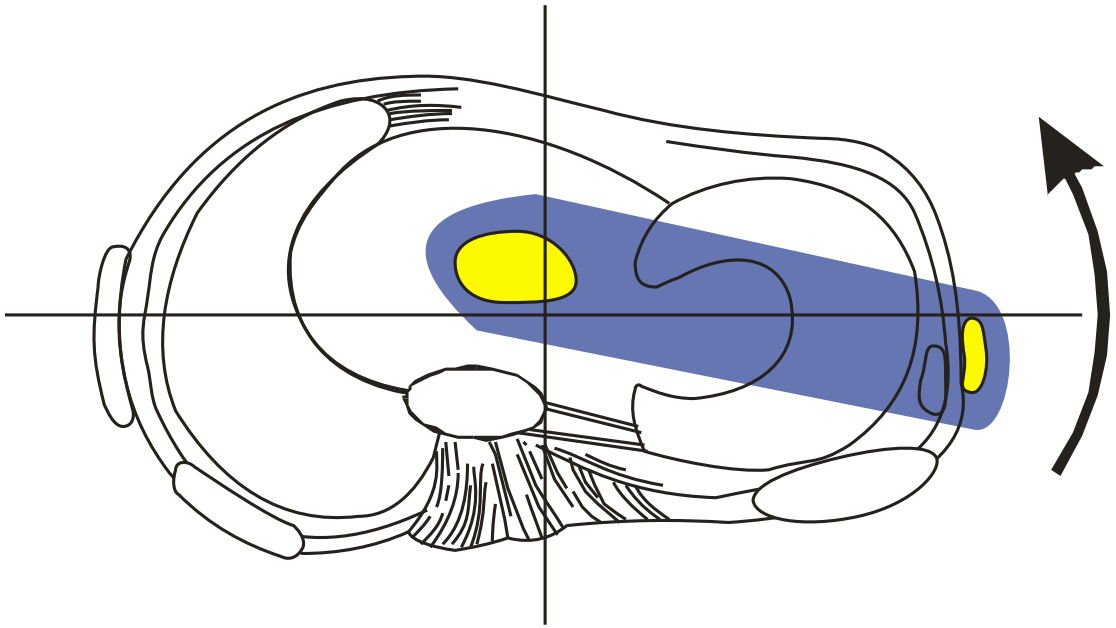
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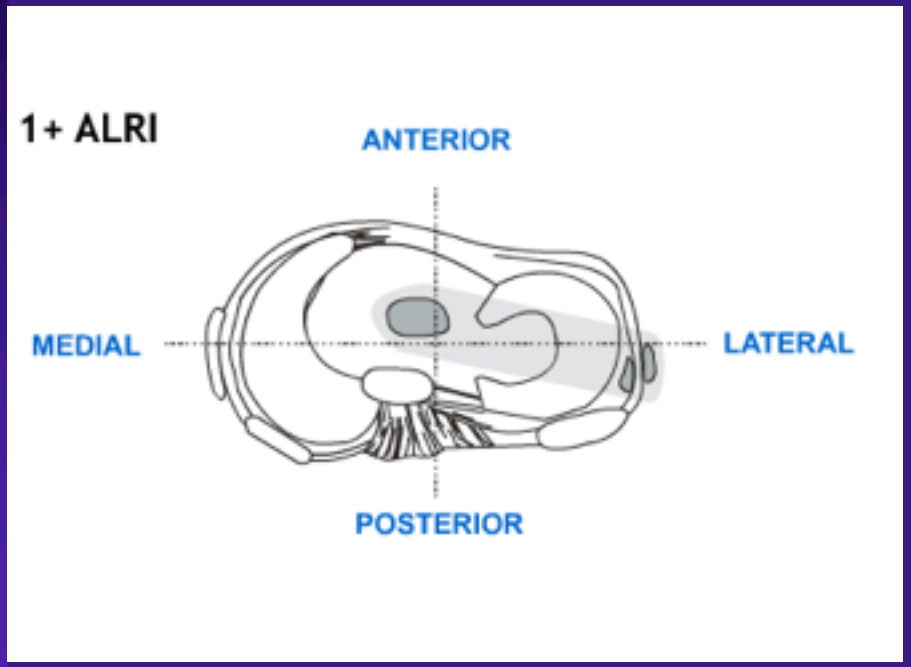
Diagnosis	Involved Anatomic Structures
1+	ACL Lateral Capsule

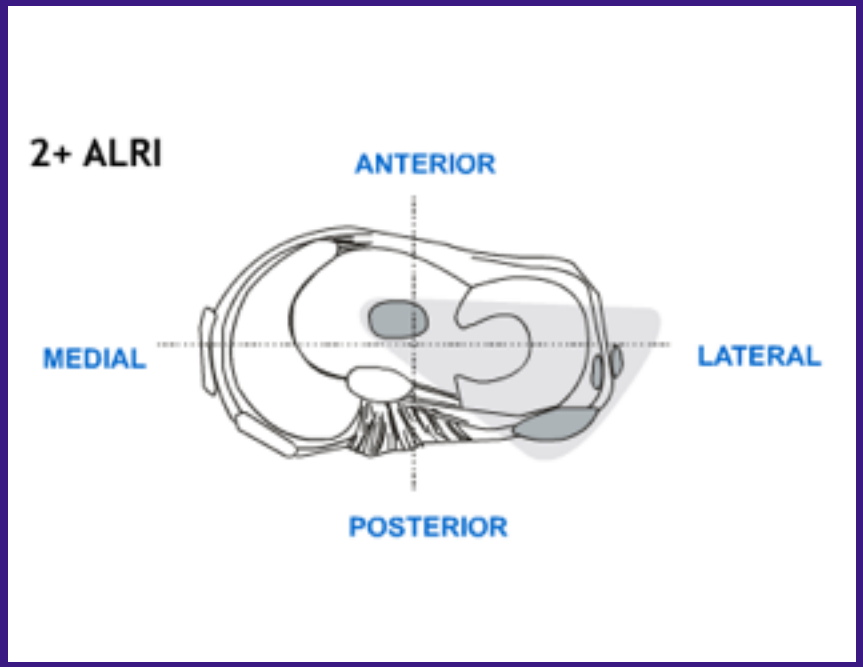


Antero-Lateral Rotatory Instabilities (ALRI)

Knee Instabilities

ALRI

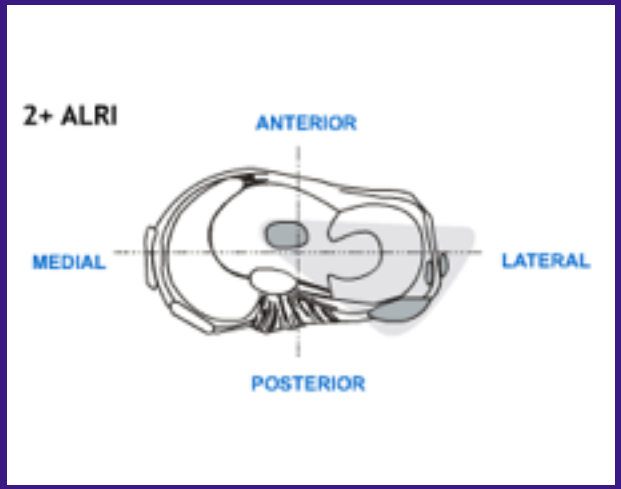






EUA:

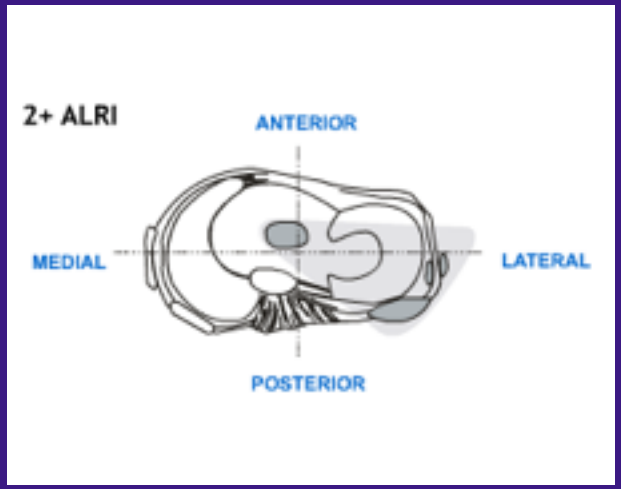
Correlate mechanism of injury, anatomy, surgical findings to study design in the lab

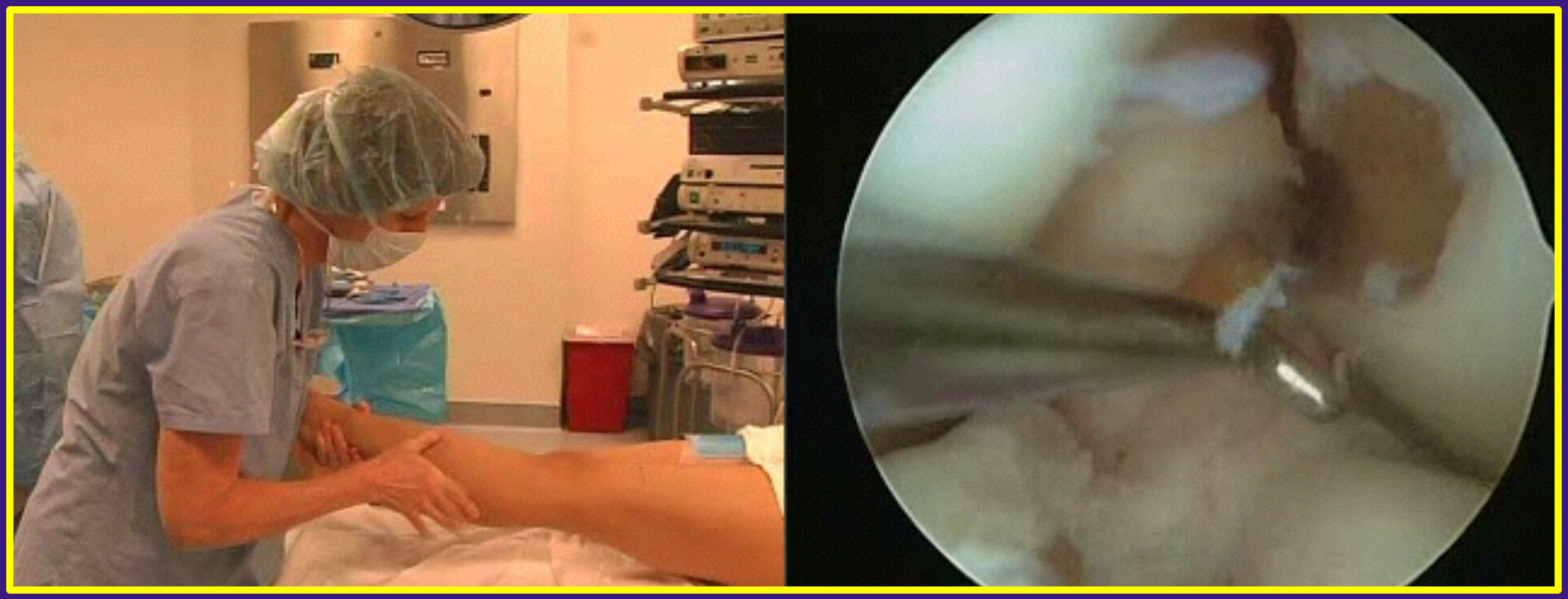




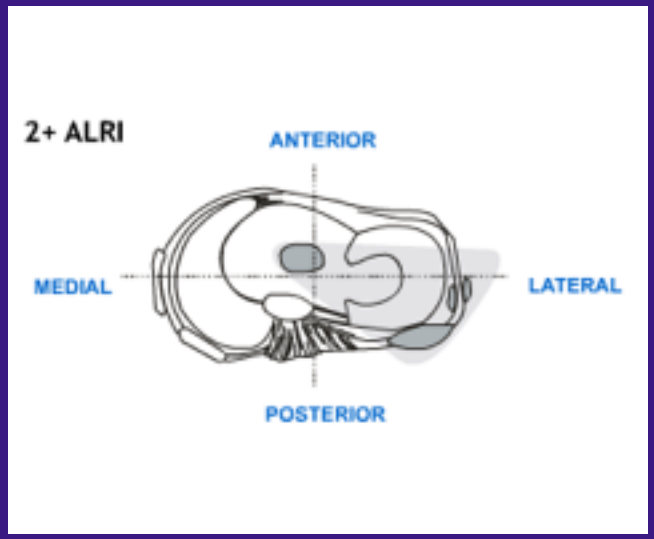
EUA:

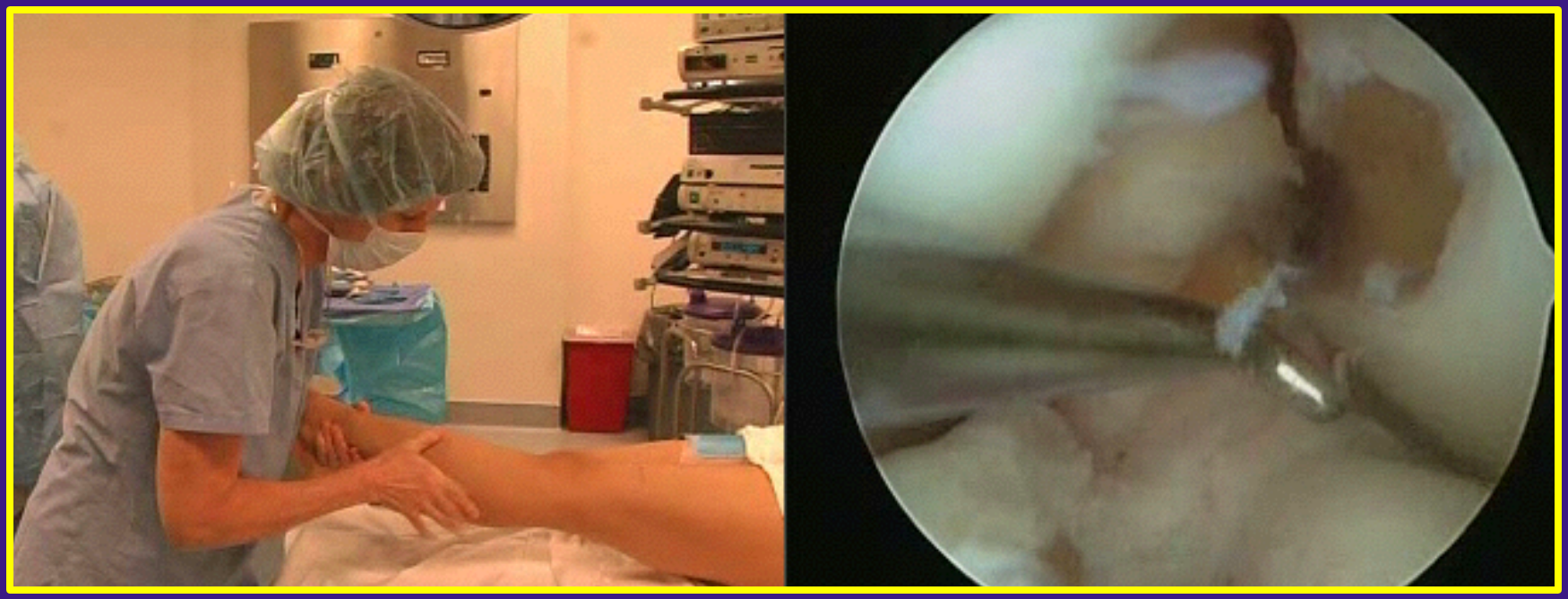
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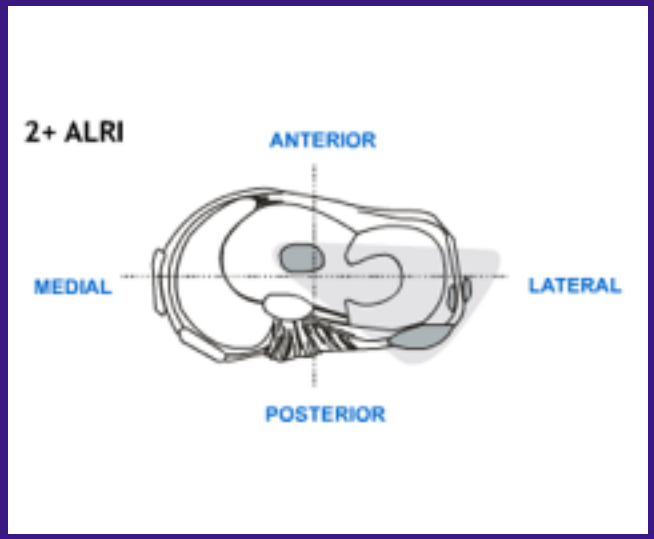


Pivot Shift
Lateral tibial plateau internally rotating, anteriorly subluxing at 30 to 0 degrees





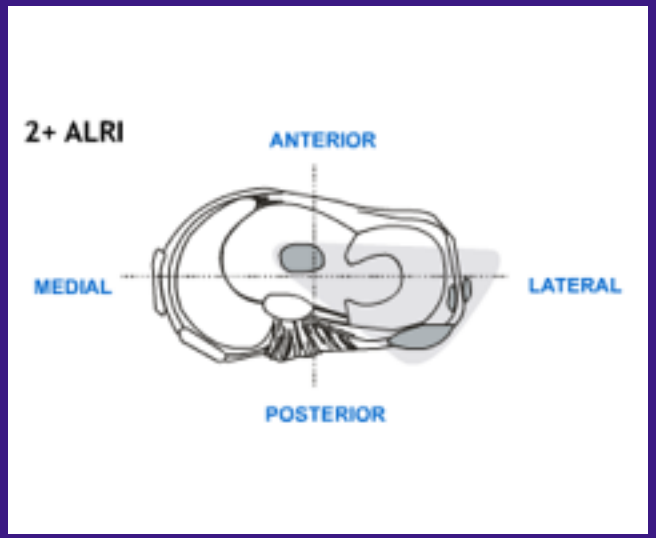
Pivot Shift
Lateral tibial plateau internally rotating, anteriorly subluxing at 30 to 0 degrees





Medial compartment:

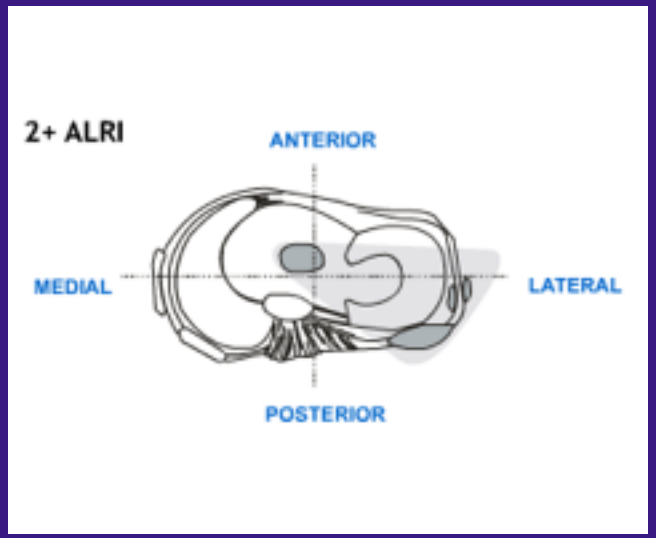
compressive forces posterior medial meniscus, typical tear pattern vertical, posterior





Medial compartment:

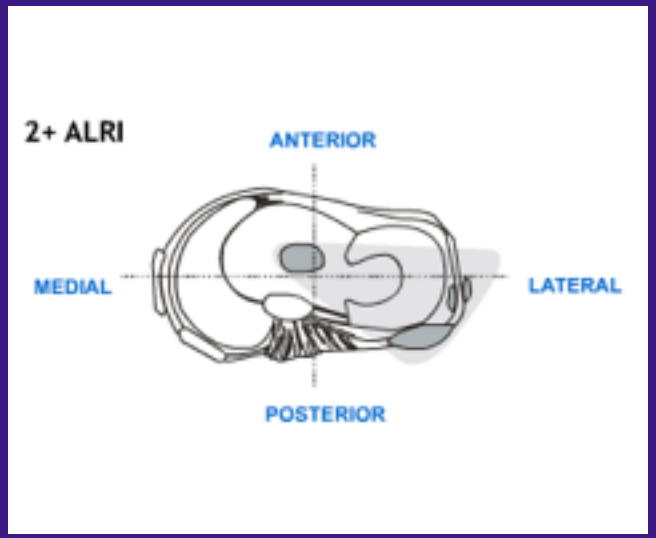
compressive forces posterior medial meniscus, typical tear pattern vertical, posterior



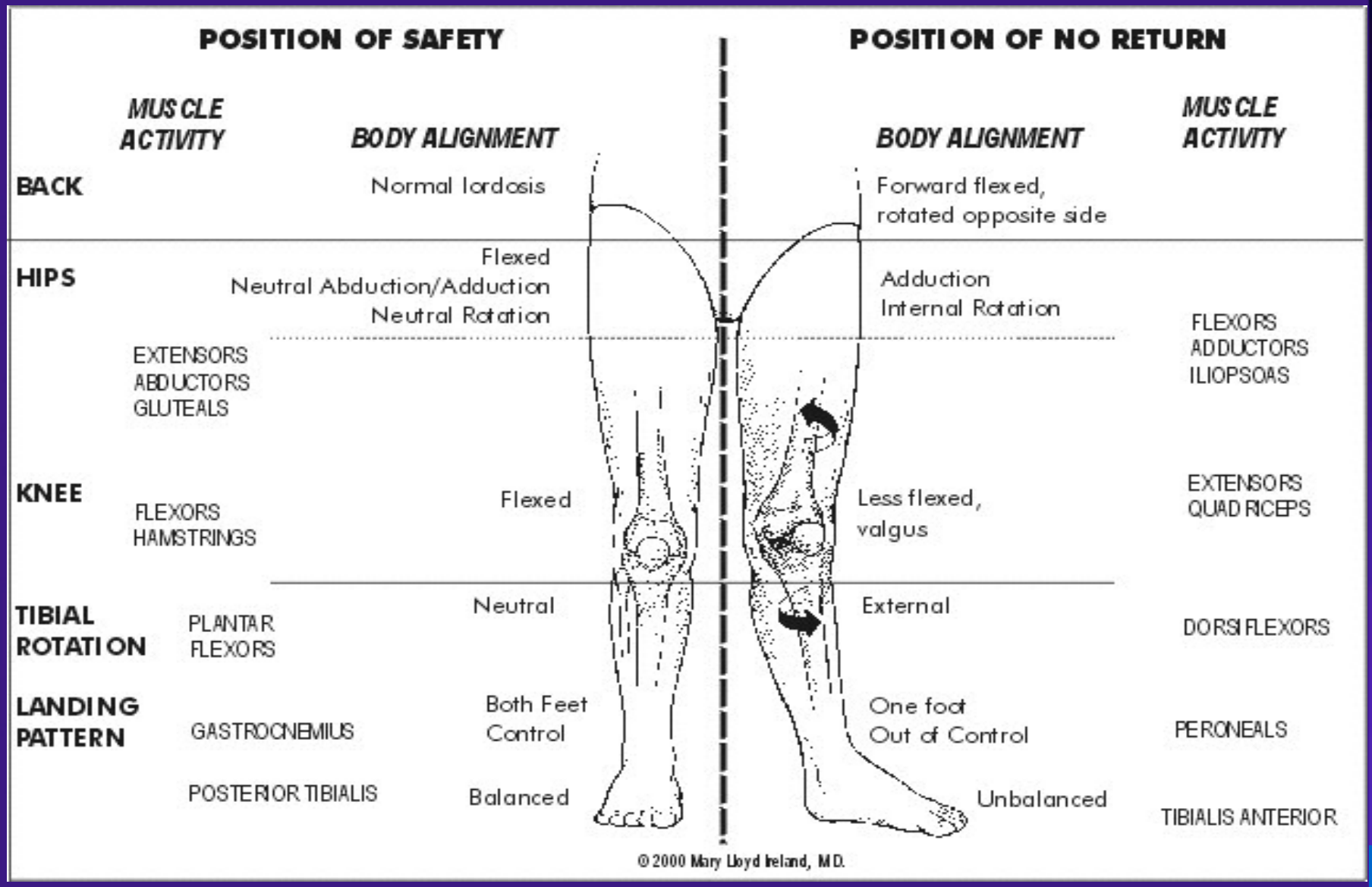


Medial compartment:

compressive forces posterior medial meniscus, typical tear pattern vertical, posterior

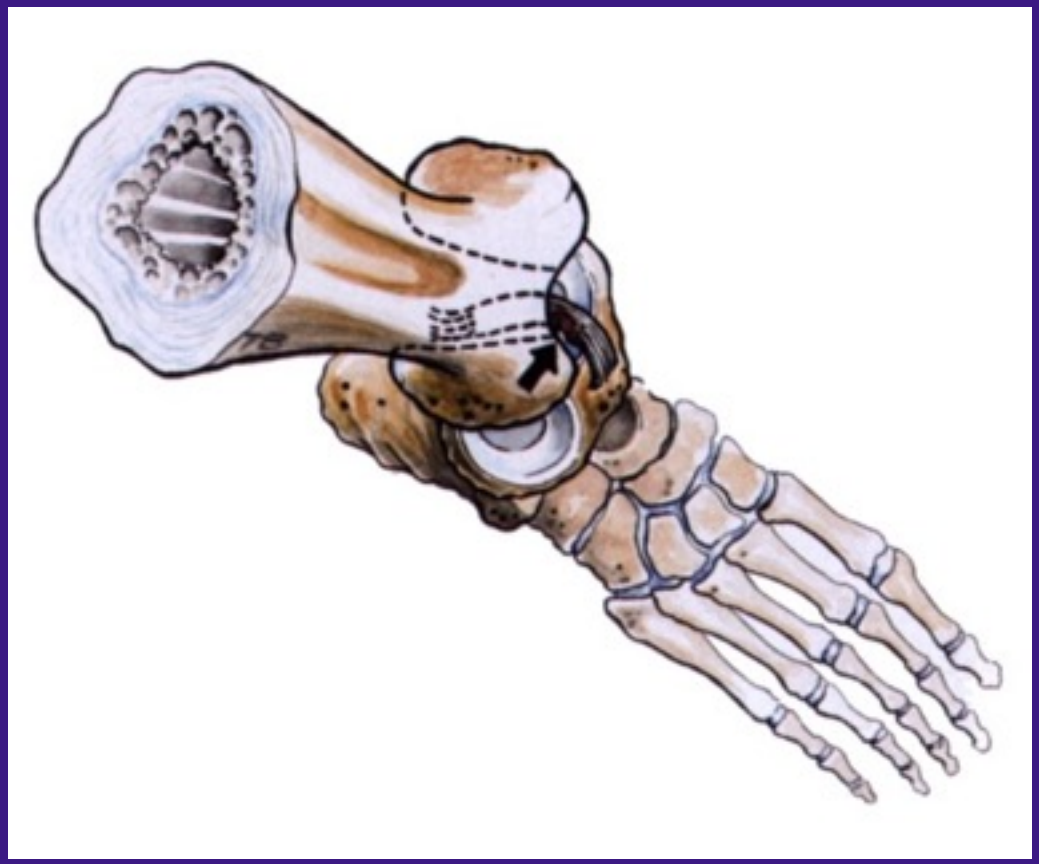


Injury Mechanisms – Body Positions



Team Handball

Olsen OE,
Myklebust G,
Engebretsen L,
and Bahr R,
"Injury Mechanisms for Anterior Cruciate Ligament Injuries in Team Handball: A Systematic Video Analysis,"
in *Am J Sports Med* 32(4); June 2004, 1002-1012.




ODDSEN
ODDSEN
ODDSEN


ODDSEN
ODDSEN
ODDS


ACL Injury occurred,
Foot fixed and externally rotated
Wide stance, 15° knee flexion,
20 ° valgus, tibia IR 10 °





ACL injury occurred
Foot fixed and externally rotated, knee 20°, tibia ER 10°, valgus 10°

Off-balance, in the air



Soccer



Soccer



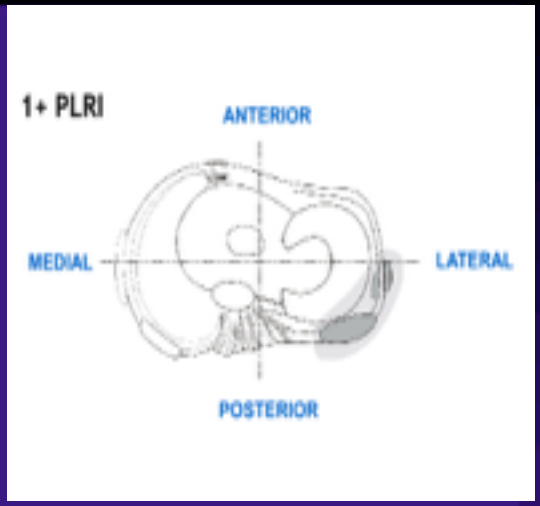
Soccer



Knee Instabilities

PLRI

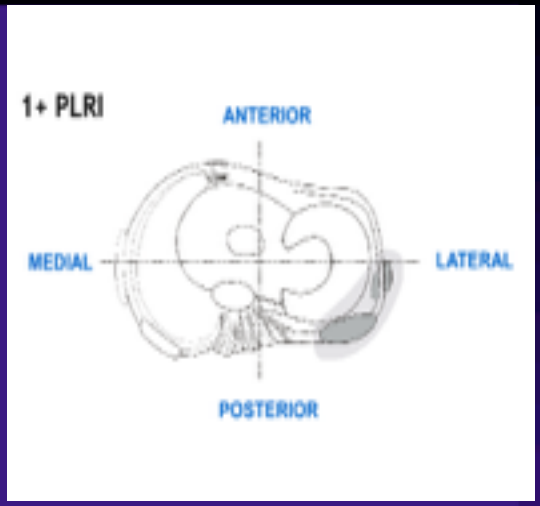




Knee Instabilities

PLRI

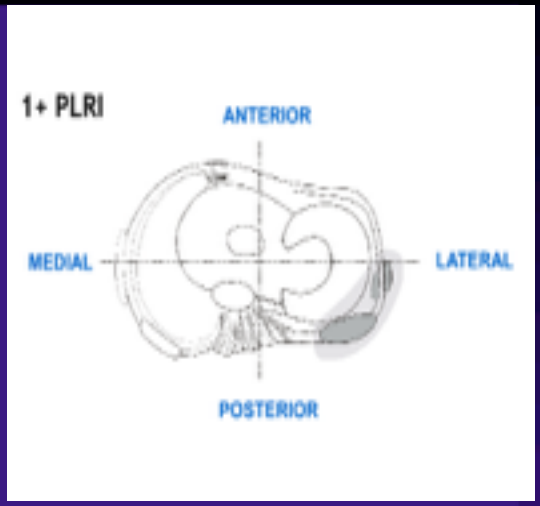




Knee Instabilities

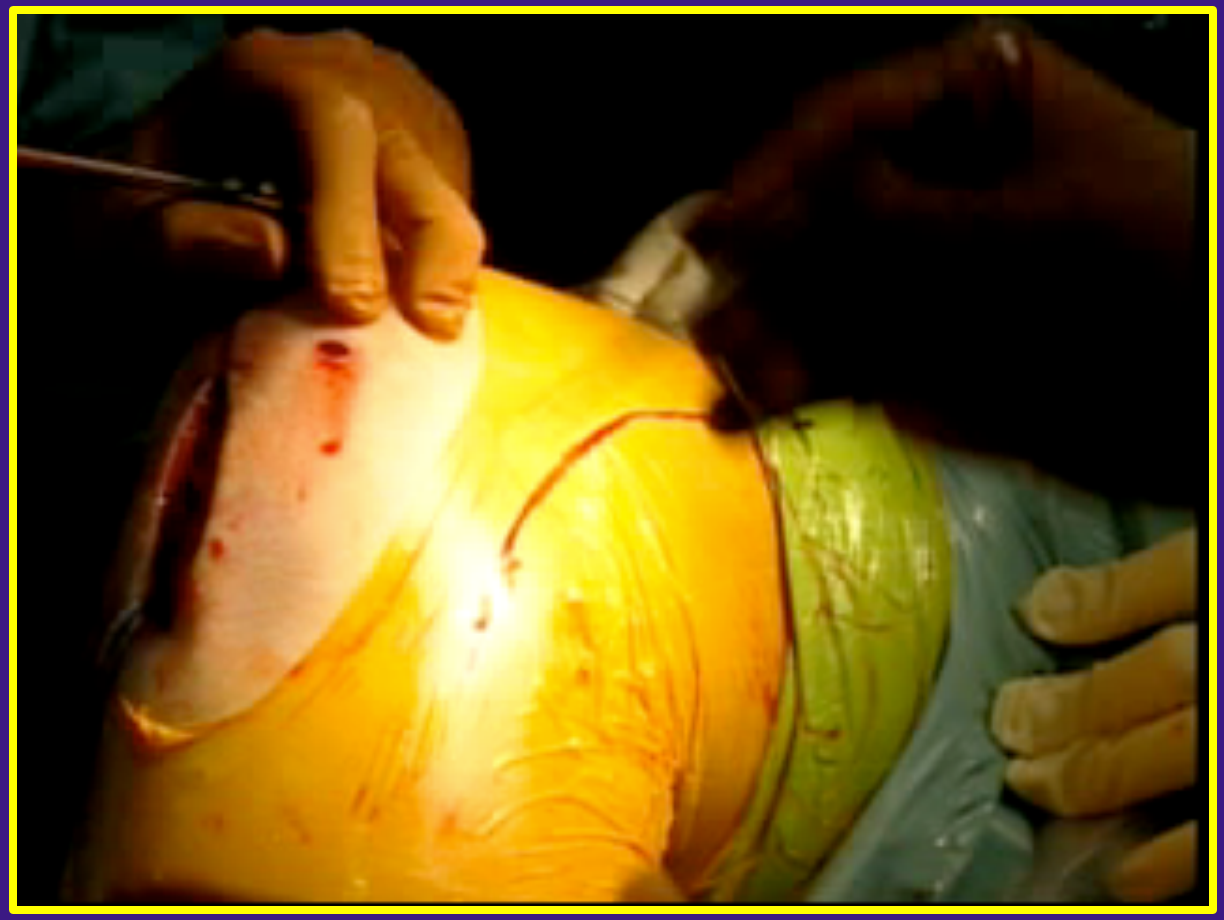
PLRI

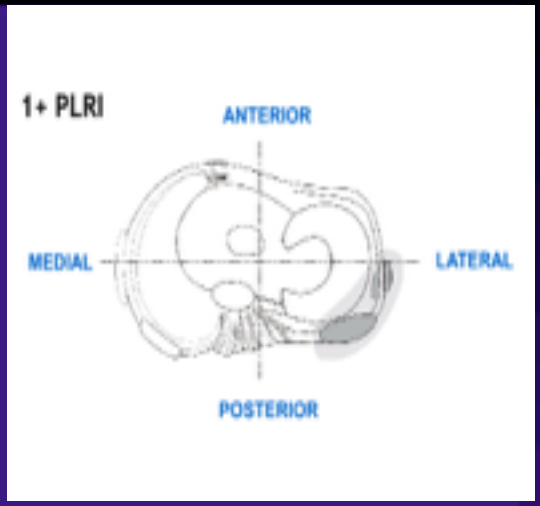




Knee Instabilities

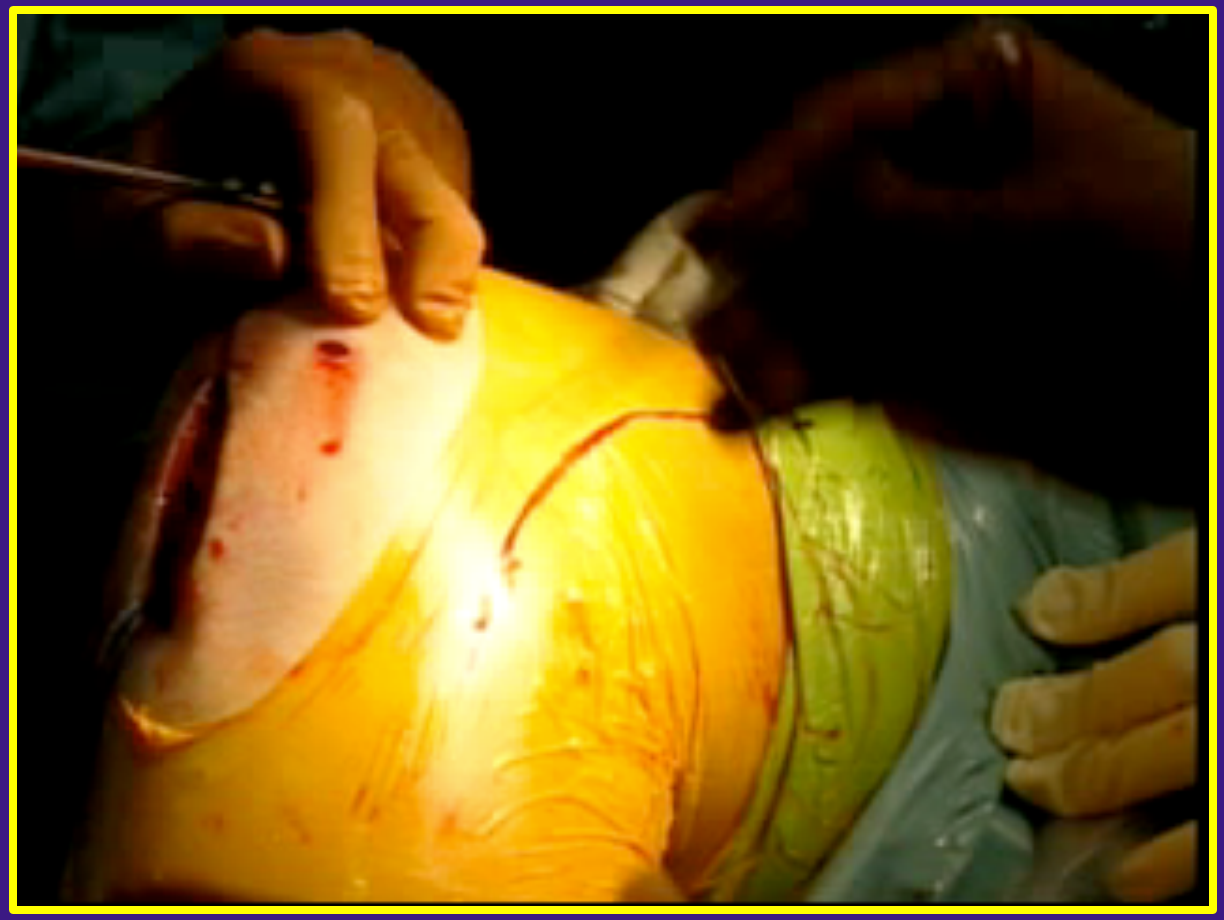
PLRI

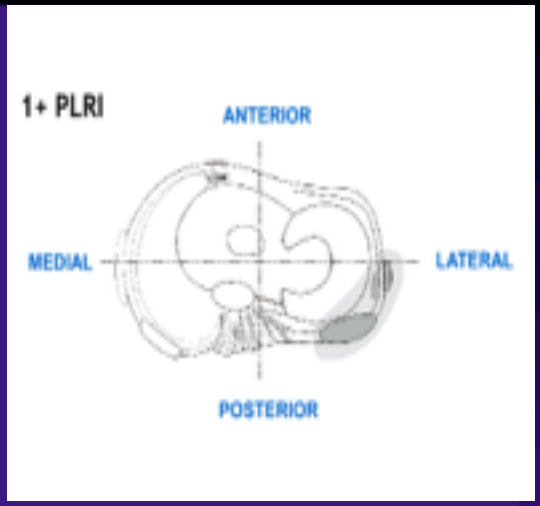




Knee Instabilities

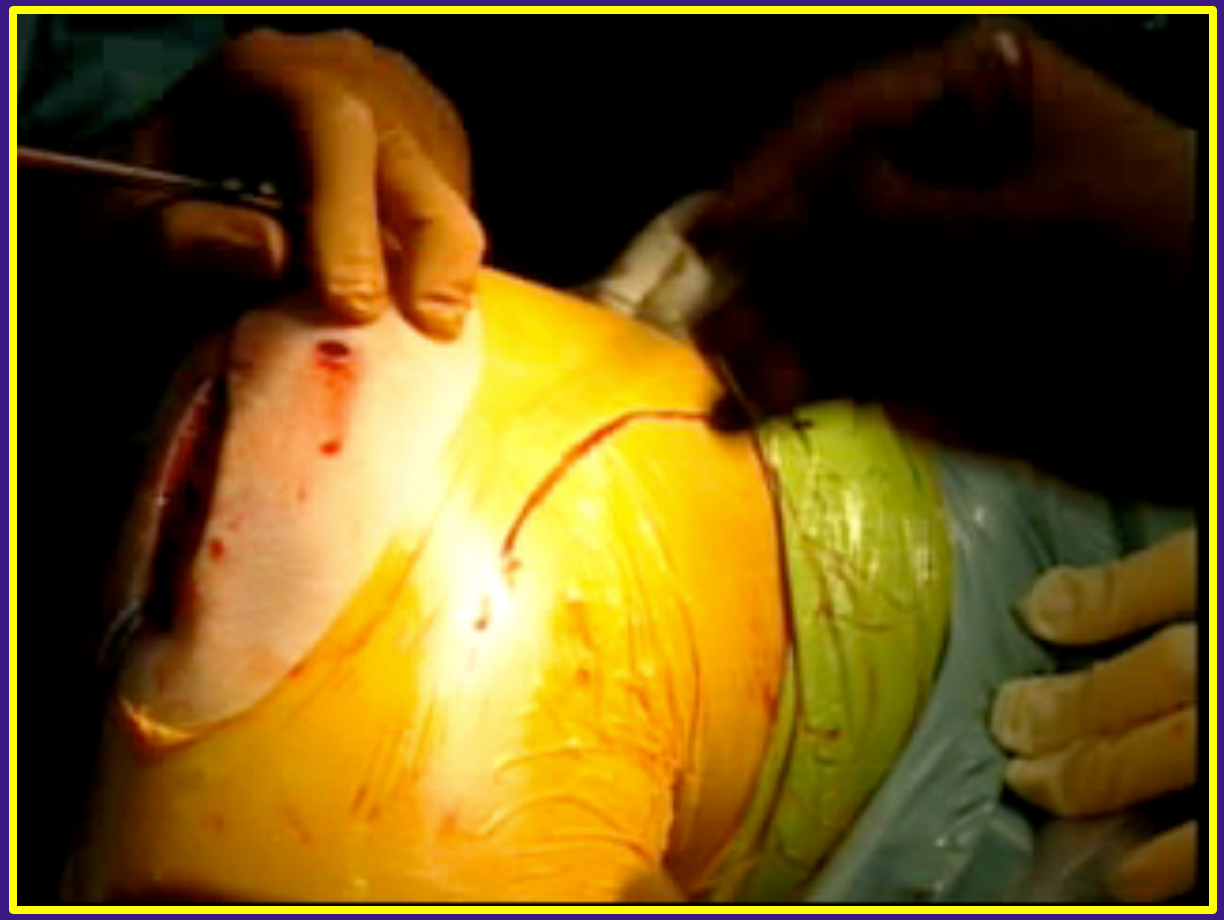
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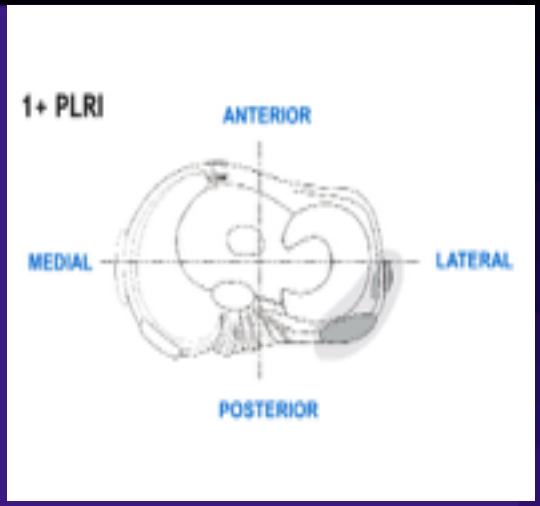




Knee Instabilities

PLRI

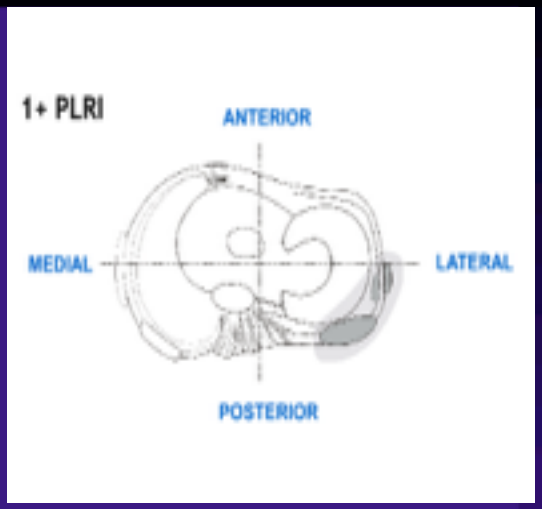




Knee Instabilities

PLRI

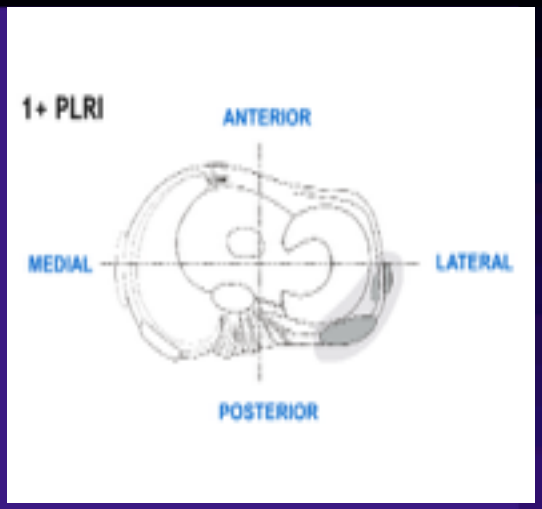




Knee Instabilities

PLRI

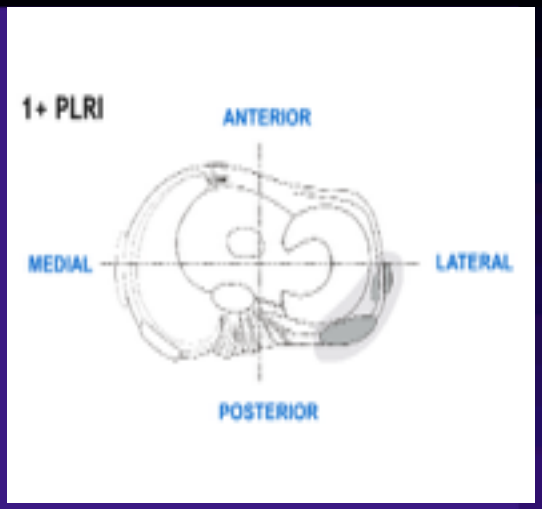


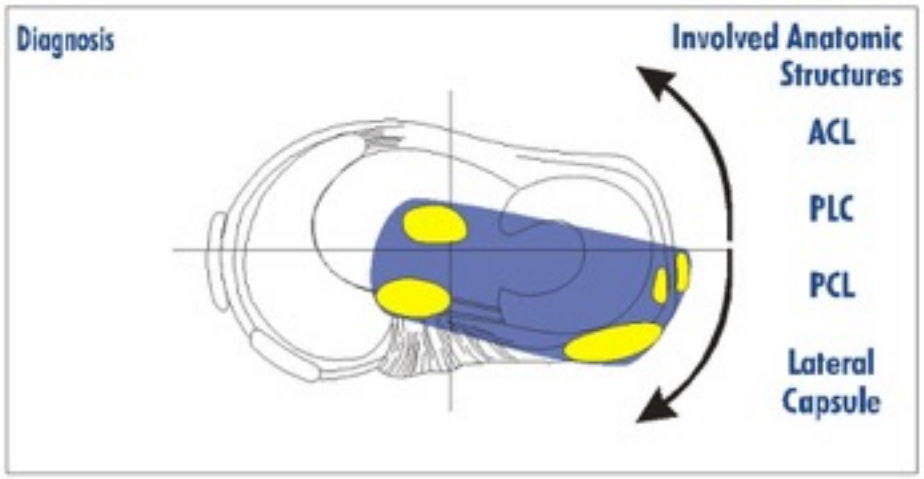


Knee Instabilities

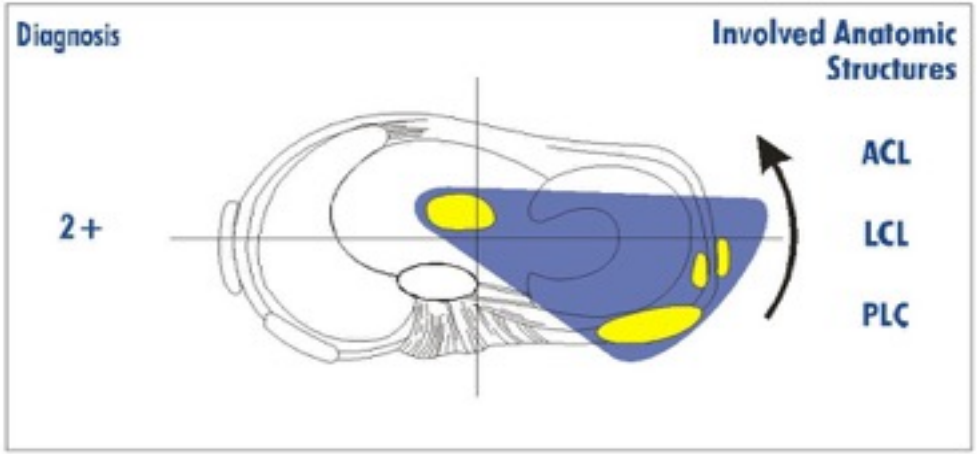
PLRI







Combined ALRI and PLRI



Antero-Lateral Rotatory Instabilities (ALRI)

Sideline Assessment of Injuries



To Make the Diagnosis:

Use observation of mechanism, physical exam skills, and talk to the athlete



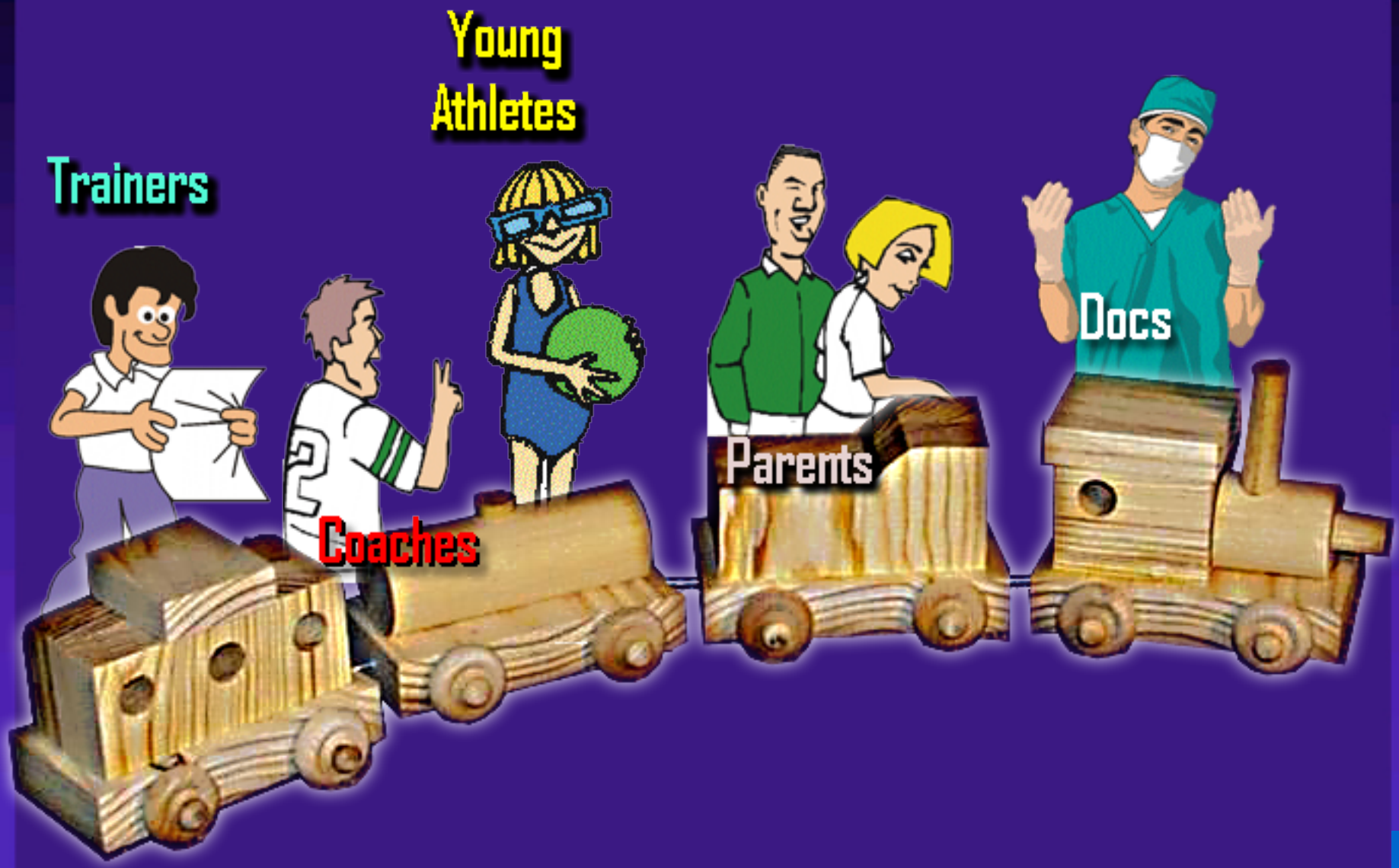


Jerry Rice

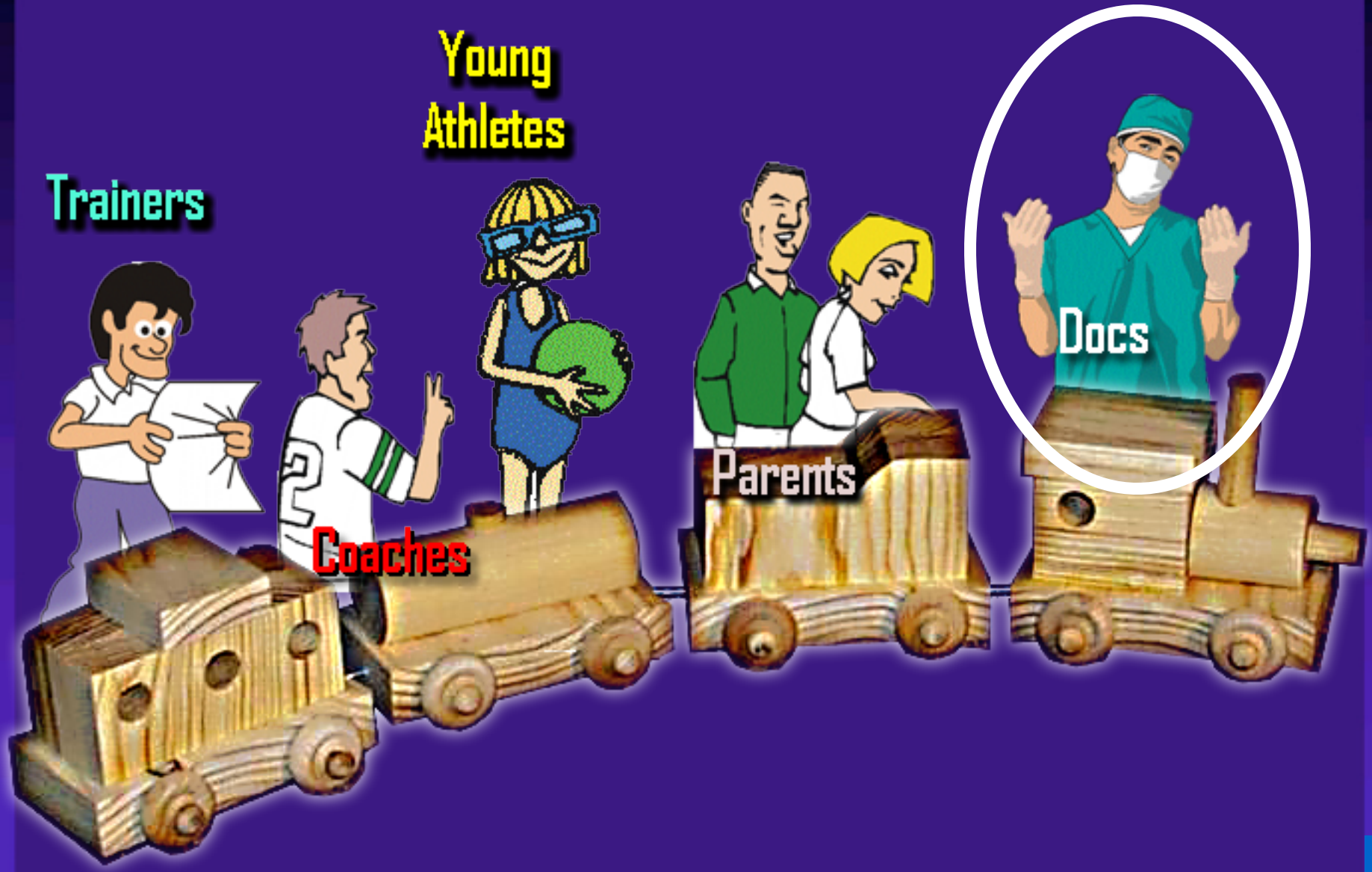
Non-contact ACL tear, professional football athlete

Injuries occur at all levels of talent and experience

Who is driving the sideline decision and return to play train?



Who is driving the sideline decision and return to play train?



Acute Knee Ligament Injuries in Athletes



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ACSM TPC Part 2
Miami, Florida
February 9, 2013

The End . . . Thank You!

Acute Knee Ligament Injuries in Athletes



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