

Initial Management of Knee Dislocations

Kenneth G. Swan, Jr., MD
University Orthopaedic
Associates

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Life In Motion

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Disclosures

- No disclosures to report

There's more to just the player with ball....



Why this talk matters...



Texas football player set for return to gridiron after knee injury led to amputation

MLKI Definition

- Acute, traumatic knee injury involving at least 2 ligaments
- Incidence likely under reported
 - Propensity to self reduce (50%!!)
 - Misdiagnosis
- Thorough and timely evaluation paramount to successful outcome



MLKI Classification

Anatomic Knee Dislocation Classification System

Classification	Description
KD I	KD with PCL intact. Collateral ligaments may be injured.
KD II	KD with both PCL and ACL injured and collateral ligaments intact.
KD III ^a	KD with both PCL and ACL injured and one collateral ligament injured, either medial or lateral.
KD IV	KD with ACL, PCL, and both collateral ligament injury.
KD V	KD with a periarticular fracture



Clinical and Functional Outcomes of Documented Knee Dislocation Versus Multiligamentous Knee Injury

A Comparison of KD3 Injuries at Mean 6.5 Years Follow-up

- Documented dislocation had:
 - Worse outcome scores (Lyschom, tegner, IKDC)
 - Same pain rates
 - Higher vascular injury rate (45.0% vs 13.6%; $P = .040$).
 - KD3-L worse than KD3-M

Mechanism

- High energy
 - MVC
 - Pedestrian struck by car
- Lower energy
 - Sporting event
 - Trampoline
 - Low velocity knee dislocation in morbidly obese

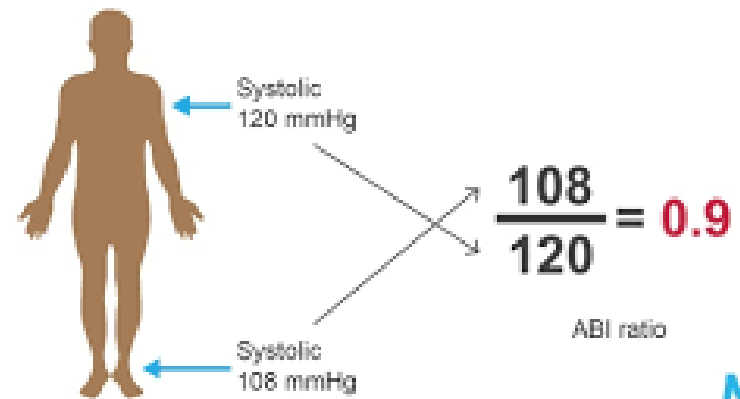
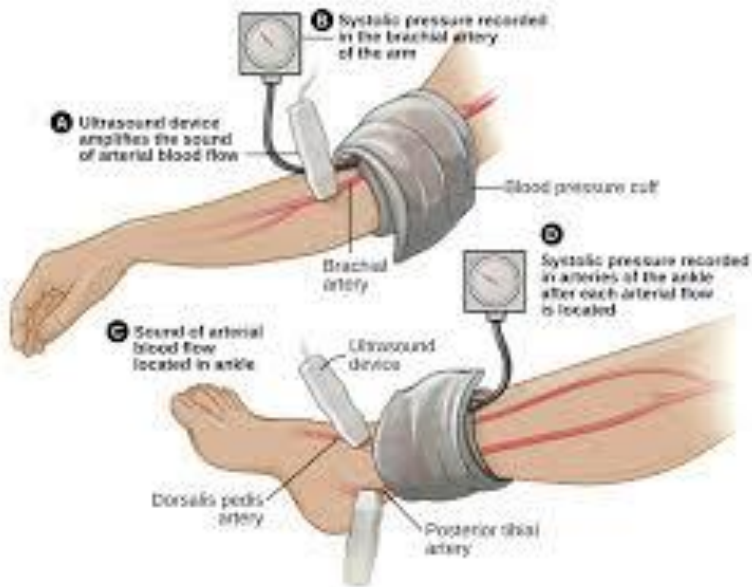


Why does this matter?

- Vascular injury with MLKI
 - Up to 40%
 - Delay of >8hrs resulted in 85% amputation rate
 - Anterior= intimal damage
 - Posterior= transection
- Need hospital admission and observation even if normal pulses
- **NEED GOOD COMMUNICATION b/t**
ATC → EMT → ER/MD
- ABIs

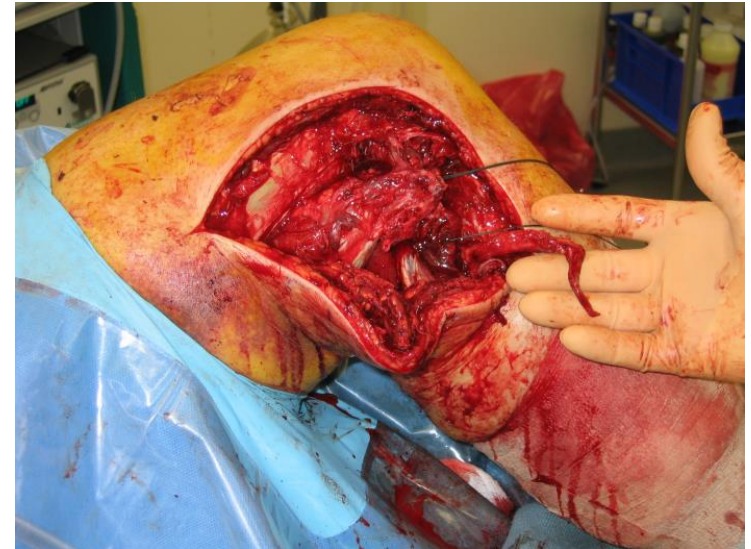


Ankle/Brachial Index (ABI)



OTHER CONCERNS.....

- Nerve damage
 - Peroneal nerve most common
 - Occurs in 25% of knee dislocations
 - ~50% will never recover
 - Usually stretch; transection uncommon
 - Tendon transfer, AFO
- Compartment syndrome



History of Acute Knee Injury



-Proper history
essential

-Mechanism of injury

Contact or Noncontact

-Symptoms

-Functional limits

squatting, giving way, stairs,
pain upon rising, instability,
snapping/catching, etc ...

Exam- Sideline Evaluation

- Start with ABCs
- Assess for obvious deformity > reduce/re-align
- Coronal plane exam important
- Neurovascular exam
- Assess for paresthesias or motor/sensory deficit in the foot
 - If present, increases risk of vascular injury



Sideline Evaluation

- What do you do next?
 - Knee immobilizer
 - Take cleat/shoe and sock off
 - Crutches
- If concern for reduced knee dislocation
 - Ensure knee is reduced...feel condyles
 - Hospital
 - ***Convey concern to family, EMTs, etc.***



Exam is important!

- Compare injured knee motion to normal side
- Perform a comprehensive knee exam so you don't miss anything
- Examine the area that hurts the most last

Look for Signs of Acute Knee Injury

- Hemarthrosis
- Locked knee



Patellofemoral Abnormalities

-Athlete often will say “my knee dislocated”

- Lateral patellar subluxation / dislocation

-Traumatic and atraumatic causes

-Traumatic can have large effusion

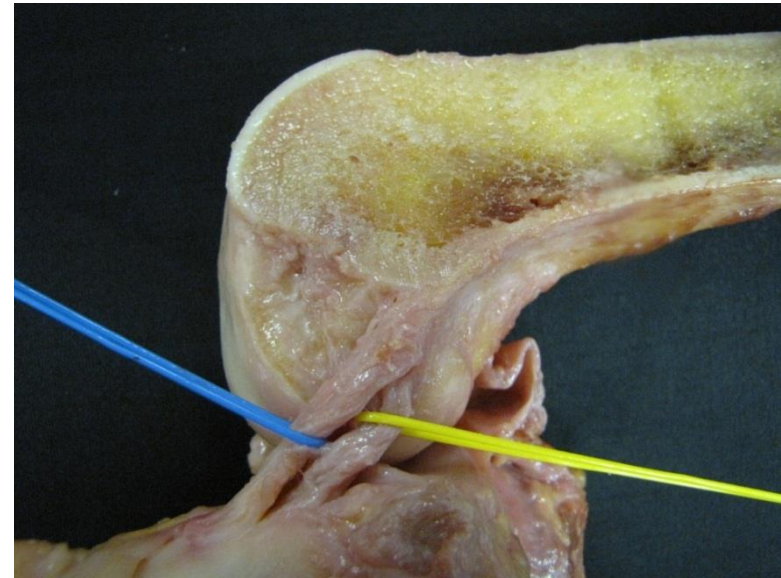
-J-sign

-Lateral patellar apprehension test



Anterior Cruciate Ligament

Main stabilizer to anterior translation (30°)



Lachmans Test

(ACL tears)

- Most effective test for ACL injury
- 20 - 30° knee flexion
- Side-to-side difference > 3 mm
- Soft endpoint

Assessment of Anterolateral Rotation

Pivot Shift Exam

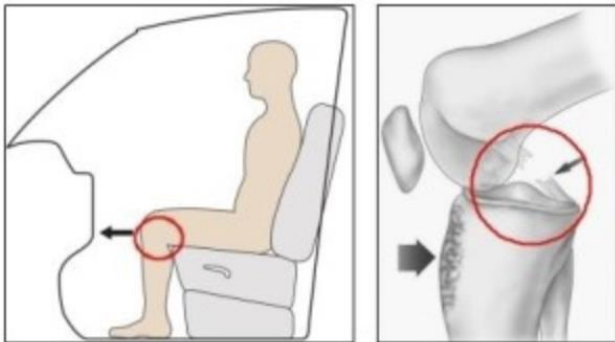
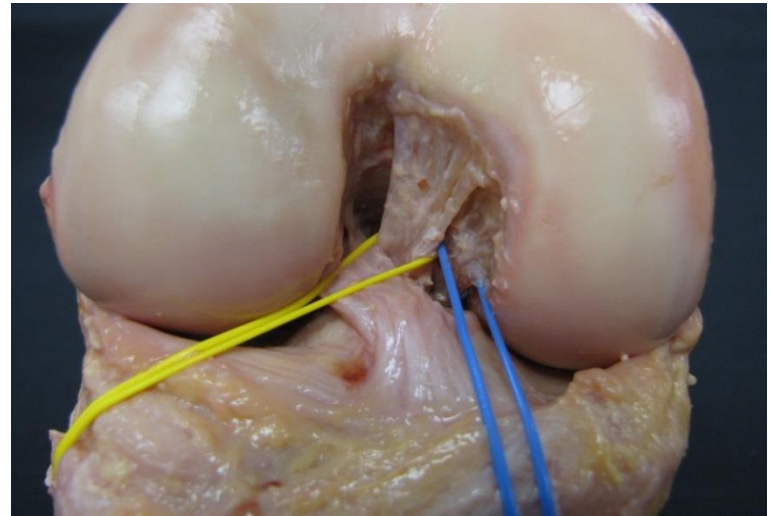
- Knee in extension
- Valgus
- Internal rotation
- Flex knee
- Tibia will reduce as knee flexes around 30°



Posterior Cruciate Ligament

Main stabilizer to posterior translation (95% at 90°)

Anterolateral/
posteromedial bundles



Dashboard injury

Assessment of Posterior Translation

Posterior Drawer Test

- Complete relaxation
- Neutral, 90°
- Apply posterior force

Pseudo-Lachman's Test

- Results from posterior sag
- Tibia translates anteriorly back to normal position



Medial Collateral Ligament (MCL) Complex

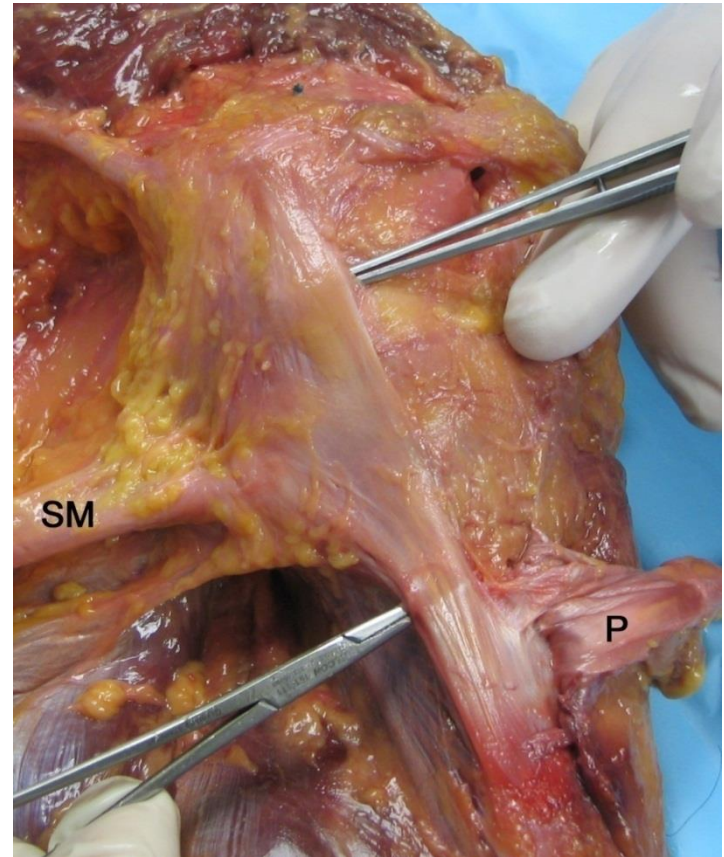
(JBJS, 2007; AJSM, 2009)

A group of anatomic structures

- Superficial / deep MCL
- POL

Provide stability to a valgus force at 30°

- IR at 0°
ER at 30°/90°



History

- Valgus contact/
noncontact
Side-to-side
instability
+/- knee effusion



Clinical Diagnosis of Medial Knee Injuries

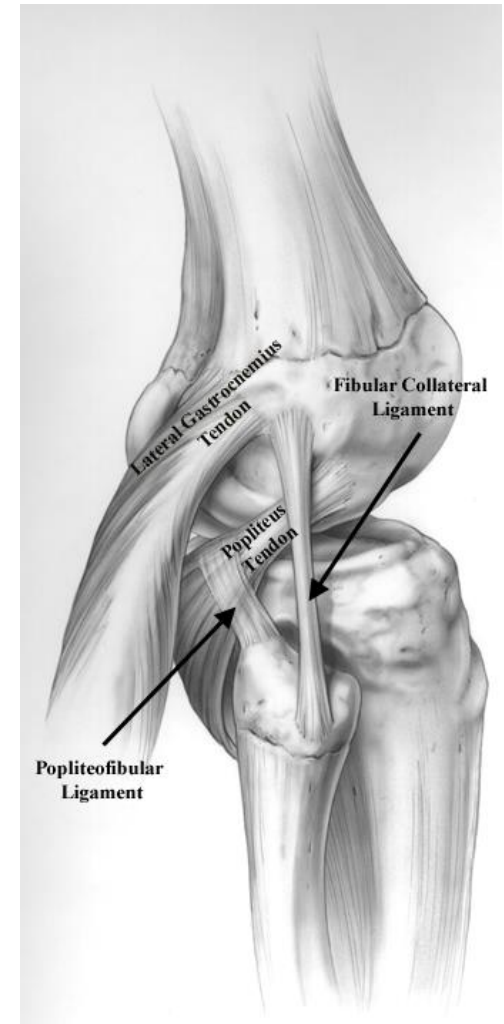
- Valgus stress test at 0° and 30°
 - Hold ankle not the leg
 - Apply valgus stress through foot/ankle
 - Use fingers to measure joint line opening (AMA classification)



Lateral and Posterolateral Knee Abnormalities

(AJSM, 2003)

- Hyperextension, varus injury, or a knee dislocation
- 15% peroneal nerve injury



Diagnosis of Posterolateral Knee Injuries

- External Rotation Recurvatum Test
 - Lift big toe
 - Assess recurvatum
- Indicative of significant knee injury



Diagnosis of Posterolateral Knee Injuries

- Varus stress test at 30°
 - Check contralateral knee
 - Put fingers over joint line
 - Apply stress through foot/ankle, not the leg

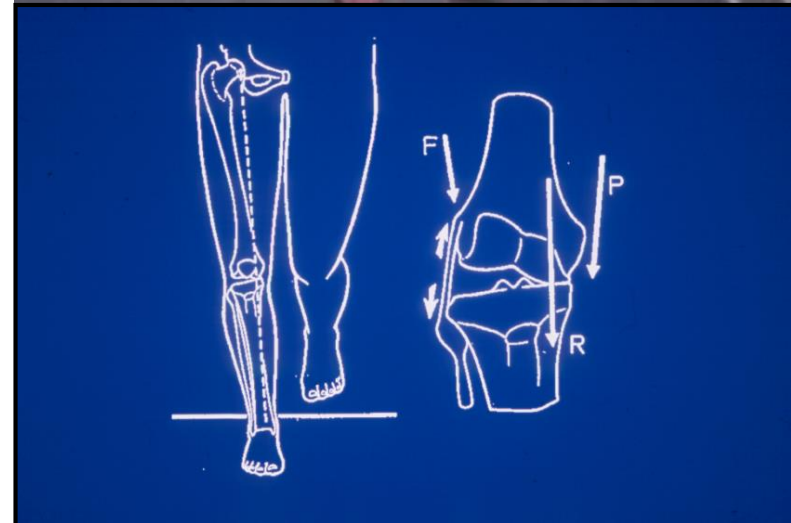


Varus Thrust Gait

Abnormal lateral joint line opening at foot strike

- Extremely disabling

Acute knee injury, 3 mm on stress xrays



Imaging

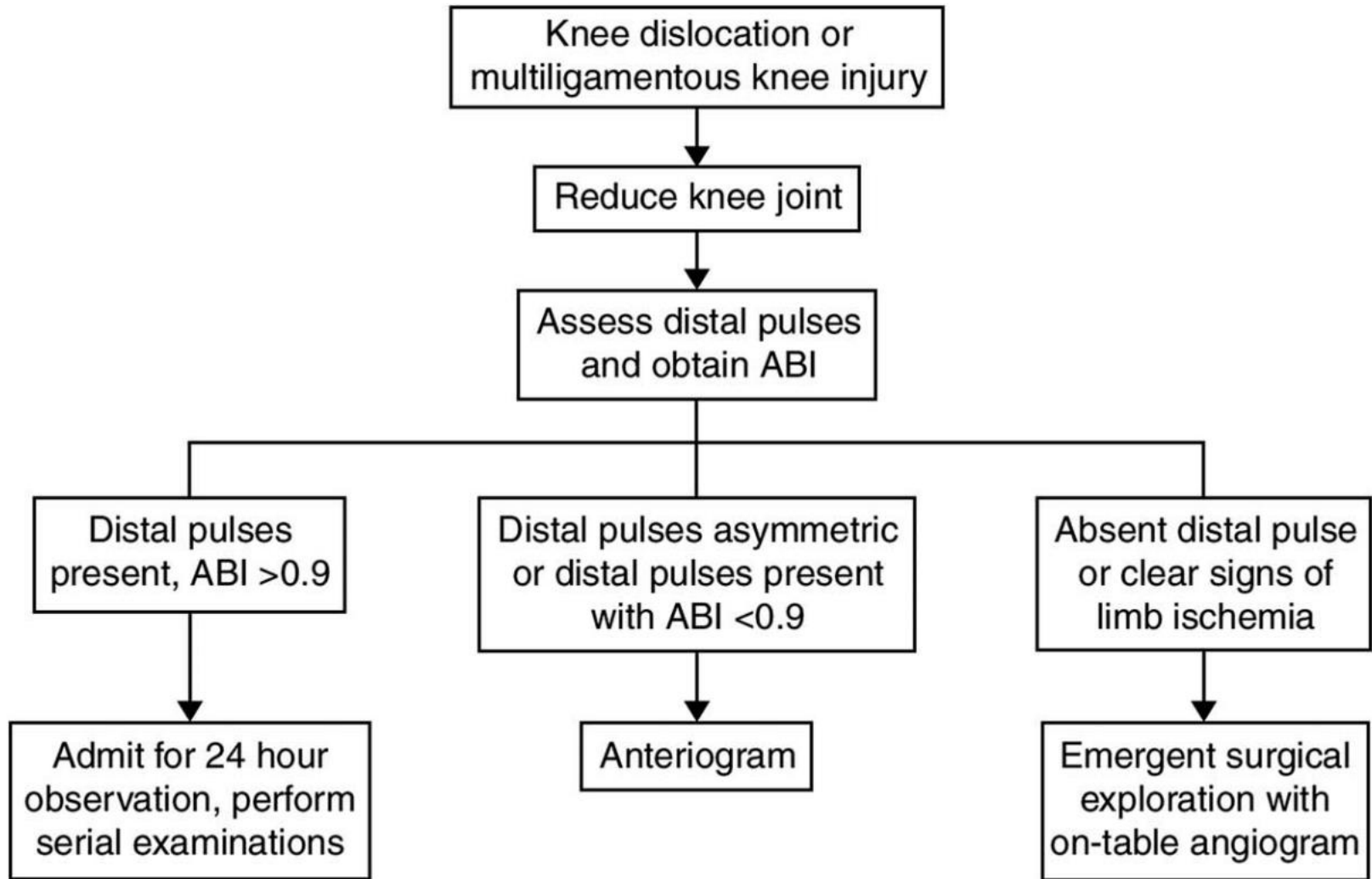
- Xrays
- MRI
- CT Angio



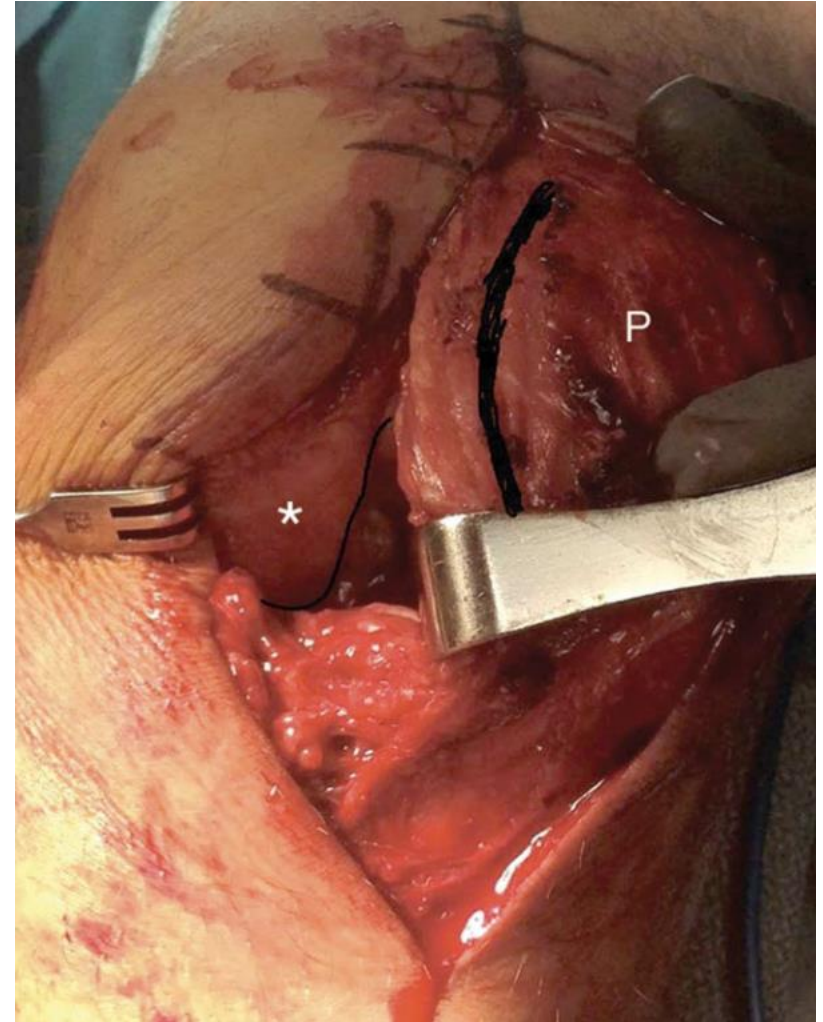
Knee dislocation with vascular injury



Vascular Algorithm



Irreducible Knee Dislocation



SUMMARY

- MLKIs are relatively rare injuries
- Can be **limb threatening**
- Injury history/mechanism, sideline evaluation are crucial components of the workup
- Appropriate to re-align/reduce on the field
- Needs hospital evaluation
- CLEAR AND REPEATED COMMUNICATION TO PATIENT, FAMILY, RECEIVING MEDICAL TEAM CRUCIAL TO AVOID CATASTROPHE

Multi-Ligamentous Knee Injuries: Treatment

- **Non-operative Management**

- Long-leg cast
- Bracing with early ROM

- **External Fixation**

- Joint-spanning Ex Fix
- Hinged External Fixator

- **Operative Treatment**

- Repair vs Reconstruction
- Early vs Delayed
- Staged vs Single-Stage

Multi-Ligamentous Knee Injuries: Treatment

- **GOALS:**

- Ligamentously stable knee
- Full, pain-free motion
- Return to daily activities....
- Prevent early DJD ?



MultiLigamentous Knee Injury Treatment: Bottom Line

- Highly complex injuries
 - Each one is unique
 - Treatment must be individualized
-
- **Ideally: Single-stage Multi-Ligament Reconstruction (+/- repair), at 2-4 week, with early and aggressive PT and ROM**

Knee Dislocation PT Protocol

- Early:
 - Control pain and swelling
 - Full extension week 1
 - NWB ~ 6 weeks
 - 0-90 degrees first 6 weeks
 - * Prone PROM flexion if PCL reconstruction (remove gravity-sag stress on PCL)
- Mid:
 - Strengthening, avoid active hamstring until ~8-10 weeks if PCL/PLC
 - Transition from hinged knee brace to more functional brace (“Playmaker”) after 6 weeks
 - Communicate concerns with MD; 20-30% reoperation rate, typically for stiffness
- Late:
 - Agilities, sports specific exercises after ~8 mos
 - Expect some level of kinesiophobia
 - RTP delayed for 1+ years
 - Custom brace

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A large, light gray, stylized graphic of a person with their arms raised in a 'V' shape, positioned on the left side of the slide. The person's head is represented by a simple oval shape.

THANK YOU!