Outline

• Meniscal Injuries
  – anatomy
  – Exam
  – Treatment

• ACL Injuries
  – Etiology
  – Physical Exam
  – Treatment
  – Prevention

• Platelet Rich Plasma (PRP)
Meniscal Injuries
Anatomy/Function

- Shock Absorber
- 2 “C” shaped structures
  - Medial (inside)
  - Lateral (outside)
- Very poor blood supply, limits healing potential
- Functions:
  - Load sharing
  - Distribute knee fluid
  - Secondary restraint for knee stability
TYPES OF TEARS

• Radial Tears
• Flap / Parrot Beak Tears
• Peripheral Longitudinal Tears
• Bucket Handle Tears
• Horizontal Cleavage Tears
• Complex Degenerative Tears
Diagnosis of Torn Meniscus

• History usually involves trauma
• Medial or lateral pain, worse with activity, better with rest
• Possible swelling
• Locking / catching
• Giving way
• Consider concomitant ACL injury if a “pop” is felt at the time of injury
Imaging and Evaluation

- **Plain x-rays**: little benefit for meniscal evaluation however help rule out OCD, loose body, fracture, or tumor.

- **MRI**: key imaging procedure
  - Sensitivity and specificity rise with patient’s age
  - Can identify other injuries in the joint

- **Arthroscopy**: provides direct visualization and treatment
BUCKET HANDLE TEAR
Current Treatment Options: 
*observe, repair, or excise*

Meniscal preservation is the goal to minimize articular compromise

- **Criteria for observation:**
  - Peripheral tears of outer 3-5mm
  - <10 mm in length
  - Partial thickness
  - Patient co-morbidities

- **Physical Therapy to strengthen leg and regain motion**
Treatment Options

Repair

- **Indications:**
  - Peripheral tears of outer 3-5mm (red-red)
  - No complex or degenerative component

- Most meniscal tears in young patients are peripheral and longitudinal → opportunity for repair, especially with ACL tears

- Even perfect repair can still fail!!!
Treatment Options
Partial Meniscectomy

- Most tears
- Long-term results unknown, however, studies suggest better than total meniscectomy
- Better than a painful “broken” meniscus
- Better to remove shock absorber than to have a broken shock absorber
ACL INJURY

- Prevalence: 1 per 3000 Americans
- History:
  - Noncontact injury
    » Changing direction, landing from jump
  - “Pop”
  - Hemarthrosis
  - May have difficulty bearing weight/continuing play
What is the ACL?

• ACL (Anterior cruciate ligament)
• When athletes “blow” out their knee, this is the most common ligament injured
• Not normally stressed during day to day activities
• crucial for cutting activities performed during many sports.
ACL injuries occur when bones of the leg twist in opposite directions under full body weight.
CLINICAL SIGNS & SYMPTOMS

• Physical Exam:
  – Loss of motion
    » Effusion
    » Pain
    » Muscle spasm
    » ACL stump impingement
    » Meniscal pathology
• X-ray:
  • Not as helpful
  • Avulsion fx’s

• MRI:
  • Overall accuracy 95%
  • Increased signal in ACL
  • Irregular contour, loss of tautness
  • 60% have accompanying “bone bruise”
  • Assess for other lesions
    » Meniscal, Ligamentous, Chondral
TREATMENT OPTIONS

• Operative vs. Nonoperative intervention
• Consider:
  • Presence or absence of other lesions
  • Patient age and activity level
  • Degree of instability, functional disability
  • Potential risk of future meniscal damage
  • Type of sports in which patient wishes to participate
  • Ability to comply with operative rehabilitation
NONOPERATIVE TREATMENT

- Splinting, crutches for comfort acutely
- Early active ROM
- Strengthening using closed chain WB exercises
  » HS, quad strength to w/in 90% contralateral limb
- Avoid high-risk activities to prevent recurrent injury
- Role of functional knee bracing is controversial
Why do we fix?

• Instability
• Need to get back to high level sport/activity
• Protect the meniscus (shock absorber) and articular cartilage (smooth bone coating) from future damage
ACL Graft Options

• Autograft (own tissue)
  – Hamstring
  – Patella Tendon
• Allografts (Cadaver tissue)
Who's At Risk?

- Soccer
- Basketball
- Football
- Lacrosse
- Volleyball
- Skiers
Gender Specific Differences

• Females up to 2-8 times higher risk of ACL tear
Female ACL Injury Rate

- NCAA Soccer: 2.4 X higher
- Basketball: 4-5 X higher
- Volleyball: 4 X higher
THEORIES

-- ANATOMIC DIFFERENCES
   Pelvis Width, Q Angle, Size of ACL
   Size of Intercondylar Notch

-- HORMONAL DIFFERENCES
   Estrogen + Progesterone Receptors

-- BIOMECHANICAL DIFFERENCES
   Static and Dynamic Stabilizers
Are we giving you a stronger ACL than you had before?

• No, in the best case scenario we are simply restoring your native ACL anatomically, biomechanically, and functionally.
Consequences of ACL Injury

Loss of season
Academic performance
Scholarship funding
Mental health
Arthritis
Can we stop ACL injuries?

• No, but we can minimize the great number of injuries.
ACL INJURY PREVENTION PROGRAM

- WARM UP
- STRETCHING
- STRENGTHENING
- PLYOMETRICS
- AGILITY DRILLS
- COOL DOWN
Conclusions

• There is evidence that **neuromuscular training** decreases potential biomechanical risk factors for injury and **decreases injury incidence in athletes**.

• Train athlete to put less force on ACL

• Many current studies analyzing effectiveness of ACL prevention programs
Questions?
Thank You

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Platelet Rich Plasma
What are we talking about?
What is it made out of?
Human Blood
Components of Blood

Components of blood:

- Plasma
- Red Blood Cells
- White Blood Cells
- Platelets
Plasma

Liquid component of blood that consists mainly of water.

Contains dissolved salts (electrolytes).

Plasma acts as a reservoir that can either replenish insufficient water or absorb excess water from tissues.
Platelet Biology

- Platelets are small, anuclear cytoplasmic fragments that play an essential role in blood clotting and wound healing.
- Circulate for 7-10 days
Platelet Activation

α-Granules are released after injury.

Substances that induce platelet activation are called agonists.

Agonists attach to a specific receptors on the platelet, causing a series of reactions inside of the platelet.
Blood is drawn using provided 60mL Tube and transferred into centrifugation tube.

Blood is transferred to concentrator.

Blood is centrifuged for 15min at 3200rpm.

Platelet-Rich Plasma is collected from the Red Port.

Platelet-Poor Plasma is removed from Yellow Port.
When do we use PRP?

- Treatment of various tendinopathies.
  - Lateral Epicondylitis
  - Degenerative Joint Disease
  - Partial tendon tears
  - Plantar fasciitis
- Ligament tears (acute injury)
- Muscle Injuries
- Augment surgical repairs
- Osteoarthritis
What’s the problem here

• Most tendiniopathies involve anatomic areas with minimal **BLOOD FLOW & LOW CELL TURNOVER RATE**

✓ Joint spaces, ligaments & cartilage have a naturally limited blood supply
✓ Muscle & tendons commonly experience decreased local blood flow following injury (e.g. rotator cuff, lateral epicondyle, Achilles, patella)

• This imbalance of Growth Factor supply & demand hinders the regenerative process
PRP thought to use the body's own ability to heal itself

- Tendinopathies have poor healing potential
- Platelet rich therapies allow for an opportunity to utilize the body's own growth factors (GF) to improve the quality & speed of recovery from an injury.
PRP – Tendon Treatment

- PRP has been used for the treatment of various tendinopathies.
  - Lateral Epicondylitis
  - Partial tendon tears

- Still need for long term randomized studies.

- Many studies show faster healing. However, some studies show little difference with controls

- No negative effects of PRP have been reported.
PRP – Acute Injuries

- PRP has been used in sports medicine for the treatment of muscle tears and sprains. (MCL, Hamstring: traditional non operative injuries)

- Certain preliminary studies show that athletes return to full strength in as early as half the expect time.

- However, no randomized human studies supporting the use of PRP for acute injuries have been performed.