Getting Back in the Game: Athletic Knee and Hip Injuries

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My Background

• Grew up Detroit, MI
• Medical School:
  – University of Michigan
• Orthopedic Residency:
  – Case Western Reserve University
• Fellowships:
  – #1 Stem cell repair of cartilage
  – #2 Minimally invasive-arthroscopy
Common Athletic Knee Problems

- Over-use Injuries*
- Ligament Tears
- Meniscus Tears
- Cartilage Injury
Knee Anatomy

- Patella
- Femur
- Articular Cartilage
- ACL
- Meniscus
- Collateral Ligament
- Patella
- Fibula
- Tendon
- Tibia

Knee in Extension

Knee in Flexion
Knee Overuse Injuries

- Very common
- Patella tendon
  - Basketball
- Quad. tendon
- Iliotibial band
  - Cyclist / Runners
- Treatment:
  - R.I.C.E.
  - Therapy
Ligament Injuries

- Ant. Cruciate Lig.*
- Post. Cruciate Lig.
- Medial Collateral Lig.*
- Lateral Collateral Lig.*

* Common
ACL Injuries

- Patella
- Femur
- Articular Cartilage
- ACL
- Meniscus
- Collateral Ligament
- Patella
- Fibula
- Tendon
- Tibia

Knee In Extension

Knee In Flexion
ACL Numbers - U.S.A.

- >95,000 tears / year
- >50,000 surgeries / year
- #’s increasing
  - People more active
  - Type of sports played
  - More women athletes
ACL Function

- Most important ligament for knee stability
- Important in activities where knee cuts / pivots
  - Skiing
  - Basketball
  - Soccer
Diagnosis

- History
  - Non-contact sports
  - Hear “POP”
  - Knee swelling
  - Stop activity

- Exam:
  - Instability test

- Work-up:
  - Sometimes MRI
Treatment Options

- **Non-operative:**
  - (+) no surgery
  - (-) cartilage and meniscus damage

- **Repair:**
  - (+) seem intuitive
  - (-) poor results >1 year

- **Reconstruction:**
  - (+) good long term results
  - (-) Surgery and rehab needed
ACL Treatment

- In-active patients
  - Treat w/o surgery
  - Activity limitations

- Active patients
  - Treat w/ reconstruction
  - Prevents cartilage & meniscus injury
  - Reconstruction with graft
When Can I Return to Sports??

- Takes 6 months of rehab.
- Graft acts as a scaffold
- Can return to high level sports with a stable knee
ACL Gender Differences

- Women have 2-8x more ACL tears than men when participating in same sport
  - Lots of theories why
- Different jumping and landing patterns – different muscle recruitment
- Can we do something to prevent this?
  - Training programs?
MCL Injuries

Diagram of knee structures: Patella, Femur, Articular Cartilage, ACL, Meniscus, Collateral Ligament, Patella Tendon, Fibula, Tibia.
MCL Injury

- Most common knee ligament injury
- Runs from femur to tibia
- Functions as a side to side stabilizer
- Cause:
  - Valgus force
  - Hit outside of knee
- Present:
  - Swelling
  - Pain inner knee
  - +/- instability
MCL Injury Treatment

- Grade I, II, III
- If isolated injury can be treated w/o surgery
- Treatment:
  - R.I.C.E.
  - Motion
  - Brace
Meniscus Injuries
Meniscus Anatomy & Function

- 2 C-shaped structure
- Act as shock absorbers
- Historical treatment:
  - Arthritis after complete removal
  - Lesson: Preserve the meniscus
Meniscus Tears Numbers

- Tears very common
- Cause:
  - Abnormal rotation of the a bent knee during sports
- 2 Age Groups:
  - Young
    - Large force
  - Older
    - Minimal injury
Meniscus Tears

• **Present:**
  – Sudden onset of pain
  – Twisting injury
  – Knee swelling
  – +/- knee locking

• **Exam:**
  – Swelling / Pain
  – +/- locking
Treatment of Meniscus Tears

- **Leave alone**
  - Tear will not heal
- **Partial meniscectomy**
  - Remove torn tissue
- **Meniscus repair**
  - Save torn tissue

Limited healing potential due to blood supply
Partial Meniscectomy

- Treatment for the majority of tears
- Preserve as much as possible
Mensical Repair

- Preserves shock absorber
- Most tears are not repairable (<5%)
Cartilage Defects
What is the Problem w/ Cartilage?

- No blood supply
- Cartilage cells cannot divide
- Lacks healing ability
- How to fix cartilage defects?
Treatment of Cartilage Defect

- Depends:
  - Size defect
- Small Defect:
  - Micro-fracture
  - Carticel
  - OATS
- Large Defect:
  - No good answers
Micro-fracture

- Break through bone under cartilage
- Allow bone marrow cells into defect
- Clot forms
- Repair is scar/cartilage
Micro-fracture
- Obtain healthy cartilage biopsy
- Grow cartilage cells
- Place back in defect
- Repair: scar/cartilage
- Initial enthusiasm decreased
OATS

- Take donor plugs of healthy cartilage
- Fill in defect
- Stealing from one place to fix another
- Repair: cartilage/scar
- Can do for small defects
Cartilage Summary

- No good answers
- Repair scar / cartilage
- How long will repair last?
- My thinking:
  - Micro-fracture first
  - Other techniques as back up if micro-fracture fails
Athletic Knee Injury Questions?
Common Hip Injuries in the Athlete

• Groin pulls
• Hip bursitis
• Cartilage injuries
• Labrum tears
Groin Pull

- Strain of Adductor Muscles
  - Run inner pelvis to femur
- Cause: Rapid stretch of muscle leads to muscle injury
  - Sports w/ quick starts & stops
- Presentation:
  - Groin pain
  - Swell / Bruise
Groin Pull Treatment

- **Treatment:**
  - R.I.C.E.
  - Stretching
  - Surgery rarely needed if an adductor tendon pulled off pelvis

- **Prevention:**
  - Warm-up
Hip Bursitis

- Bursa acts as grease pad
- Between G.T. and gluteal tendons
- Bursa can become inflamed in running athletes
- Presentation:
  - Pain on outside of hip
  - Pain w/ pressure on bursa
Hip Bursitis Treatment

- R.I.C.E.
- Therapy – stretching
- Cortisone injection
  - Diagnosis
  - Treatment
- Surgery
  - Remove bursa
  - Very rare
Sports Hernia

- Abdominal muscles attach to pelvis
- Hernia is an outpouching of tissue through area of thin abdomen
- Occur in athletes - bent forward
- Present:
  - Pain low abdomen / groin
  - May worsen w/ cough
Sports Hernia Treatment

- **R.I.C.E.**
- **Surgery**
  - Often needed to repair weakened tissue
Hip Cartilage Injury

- Hip is ball / socket joint
- Cartilage lining
- Athlete injury by:
  - Joint impaction
  - Joint subluxation
Hip Cartilage Injury

• Presentation:
  – Groin Pain
  – Catching
• Treatment:
  – Before large surgery
  – Now hip arthroscopy

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Hip Cartilage Injuries

Remove Cartilage Flap

Remove Loose Bodies
Hip Labrum Tears

- Ring or washer around socket
- Cause of tears:
  - Isolated trauma
  - Repetitive use in athletes that adduct hip
    - Golfers
    - Tennis
    - Soccer
Hip Labral Tears

- **Presentation**
  - Adductor athlete
  - Groin pain
  - Catching

- **Evaluation**
  - Difficult area to examine
  - MRI helpful
  - Injection helpful
Labral Tear Treatment

- Treatment w/ hip arthroscopy and labral debridement
Athletic Hip Injury Questions?
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