Pediatric Musculoskeletal Injuries-Case Studies

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Pediatric Orthopedic Case Studies

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Some objectives ...

1. List musculoskeletal injuries in pediatric patients
2. Perform appropriate orthopedic examination on the injured pediatric patient
3. Order appropriate imaging when necessary
Case #1

• 13 year old boy with knee pain post trauma

History

• How did this happen?
• Was there contact with another player?
• When did it swell?
• Did you play the rest of the game/practice?
• Did you walk off of the field?

History

• Was playing soccer
• Pivoting injury
• No contact with another player
• Immediate swelling
• Unable to bear weight, did not finish game
Differential diagnosis based on traumatic hemarthrosis

- ACL tear
- Meniscus tear
- Fracture
- Patellar dislocation

Effusion

- May need to milk down from prepatellar area

Lachman exam

- 25 degrees
- Move tibia forward on femur
Anterior Drawer

- Knee at 90 degrees
- Move tibia forward on femur

Pivot shift

- From flexion to extension with valgus stress
- ITB takes over and reduces knee

MEDIAL McMurray

- Knee brought from flexion to extension with valgus stress and external rotation
LATERAL McMurray

• Knee brought from full flexion to extension with varus stress and internal rotation

McMurray Exam

• 53% sensitivity
• 59% specificity

Apley grind test

Stabilize thigh with examiner’s leg
Apply pressure through leg and externally rotate tibia
Positive test reproduces pain and catching
Thessaly test

- Patient stands on one foot with knee bent 20 degrees, pivots in and out 3 times, positive test reproduces click/clunk/pain

Case #2, Anterior knee pain

14 year old female with pain in the front of her knee

- Did the kneecap “pop out”?
- First time?
- What has been done?
- Exam?
- What to do??
14 year old female with pain in the front of her knee

- Did the kneecap “pop out”? no
- Trauma? no
- What has been done? nothing
- Exam? Positive patellar grind
- What to do??
  - Brace, therapy, consider arch supports

14 year old female with pain in the front of her knee

- Did the kneecap “pop out”? yes
- First time? yes
- Trauma? no
- What has been done? nothing
- Exam? Patellar apprehension
- What to do??
  - Brace therapy brace therapy brace therapy

14 year old female with “knee dislocation”

- First time? no
- Trauma? yes
- What has been done? Therapy, bracing
- Exam? Patellar subluxation
- What to do??
  - Consider surgical referral (MPFL reconstruction)
Patellofemoral Pain

• Etiology
  – Malalignment?
  – Q-angle?
  – Joint mobility?
  – Femoral anteversion?
  – None of these correlated with increased incidence of knee pain
    – Fairbank, Pynsent, Phillips, JBJS 1984

Q angle

• Tibial tubercle to midpoint of patella
• Midpoint of patella to ASIS
• Men: 15
• Women: 20
  – Emami et al, Arch Iranian Medicine, 2008

Q angle

• Theory:
  – Female pelvis widens at maturity
  – Q angle increases
  – ? Etiology for increased incidence of patellofemoral issues
Joint Hypermobility

- Elbow hyperextension
- Palms flat to floor
- Thumb to forearm

Alignment: Femoral Anteversion

- Examine with patient prone
- Hip rotation:
  - Internal >> External
  - Normal anteversion as teenager 10°
Patellofemoral Pain

• Radiographic measures
  – Patellar tilt?
  – Patellar displacement?
  – Patellar angle?
  – Patellar height?
  – None of these correlated with increase knee pain
    – Laprade and Culham, CORR, 2003

Patellofemoral Pain: History

• No specific trauma
• Pain with stairs
• Movie theater sign
• Patient may or may not be active
• Differentiate from patellar instability

Patellofemoral Exam

• Assess patellar facets
  – Tenderness
  – Crepitus
Patellofemoral Physical Exam

- Apprehension

Patellofemoral Pain: Physical Exam

- Effusion?

Patellofemoral Pain: Physical Exam

- Compression test (grind test)
- Pressure on patella, patient activates Quads
14 year old female with pain in the front of her knee

- Did the kneecap “pop out”? yes
- First time? yes
- Trauma? no
- What has been done? nothing
- Exam? Patellar apprehension
- What to do??
  - Brace, therapy, brace therapy
14 year old female with “knee dislocation”

- First time? no
- Trauma? yes
- What has been done? Therapy, bracing
- Exam? Patellar subluxation
- What to do?? Consider surgical referral (MPFL reconstruction)

Case #3

- 12 year old boy
- Hip pain after football practice today

History:

- Did you have hip pain before today?
- Does your foot point out when you walk? For how long?
- Were you hit?
- Did you walk off of the field?
Hip

- Labral tears
- Snapping hip
- Tendonitis
- Sfe
- Stress Fractures

Extraarticular Sources of Pain

- Snapping iliotibial band over the greater trochanter
- Snapping hamstring over the ischial tuberosity
- Psoas snapping
- Psoas tendonitis

Snapping Hip

- IT band over greater trochanter
Ober Test

- For IT Band tightness or irritation

Snapping hip

- Hamstrings over ischial tuberosity

Snapping hip

- Iliopsoas over iliopsoptineal line
Psoas Tendonitis

- Psoas stress test
- Treat with PT

Intraarticular Sources of Hip Pain

- Labral tears
- SCFE
- Femoral neck stress fracture

Intraarticular Hip Pain

- C sign
  - labral tears
  - loose bodies
  - impingement
Labral tears of the hip

- Dancers, gymnasts
- Feel clicking, popping, pain
- Diagnosed by PE and MRI arthrogram
- Treat with rest, PT
- If that fails, hip arthroscopy is available

Hip Impingement Sign

- Flexion
- Adduction
- Internal rotation
- Mimics symptoms
Labral tears of the hip: MRI

- Sensitivity of plain MRI for labral tear is 36%
- Sensitivity of MRA (MR Arthrogram) increases to 91%

SCFE

- Usually obese
- Femoral retroversion
  - External rotation > internal rotation
- Obligate external rotation with flexion
- ↓ Hip abduction

Pediatric Knee Injuries

SCFE