ADOLESCENT SPORTS INJURIES

Orthopaedics in Motion
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OVERVIEW:

Shoulder Injuries
Knee Injuries
Leg/Ankle Injuries
Injuries to the shoulder girdle are vast and wide ranging. Encompass fractures, sprains, labral injuries and dysfunction. Exam can be difficult due to overlap between regions. Must obtain an accurate history to provide clues to mechanism of injury.
SHOULDER EXAM:

- Inspection, palpation, ROM
- Special exams:
  - Hawkins, Jobes, Bear Hug, O’Brien, Speed, Yergason
- Neck exam
SHOULDER INJURIES
17 YO MALE FB INJURY
OPTIONS

- Nonoperative
  - Healing rates >90%, cosmesis, weakness, nonunions

- Operative
  - Infection risk, faster time to union, NVI risk, pneumothorax risk

- Operative Treatment
  - Indications of operative treatment
    - Absolute
      - Unstable Group II fx (Type IIA, Type IIB, Type V).
      - Open fx.
      - Widely displaced >= 2 cm: increased risk for nonunion.
      - Displaced fx with skin tenting, hypertrophic callus.
      - Subclavian artery or vein injury.
      - Floating shoulder (clavicle and scapula neck fx).
      - Symptomatic nonunion.
      - Posteriorly displaced Group III fx.
      - Displaced Group I (middle third).
17 yr old male FB injury
OPTED FOR SURGICAL TREATMENT
15 YO FEMALE FALL AT YMCA
OPTED FOR SURGICAL INTERVENTION BASED OFF CONCERN FOR COSMESIS
AC SEPARATIONS

Grading
Treatment
Case Presentation
GRADING I-V.

Based off the displacement between the acromion, clavicle and coracoid. As increase in grade, more involvement of ligaments. Exam will demonstrate gross deformity at the AC joint with palpable clavicular head.
CASE:

OPTIONS:
Nonoperative
ORIF
Arthroscopic

AC Dislocation
• Grade III Injury most controversial
• > 60 Published Techniques
• Strength of fixation
• Cyclic Failure
• Inconsistent Outcomes
OPTED FOR SURGICAL MANAGEMENT
SHOULDER INJURIES:

- Labral
  - SLAP, BANKART, KIM, ALPSA
- Rotator cuff
  - VERY RARE IN ADOLESCENCE. WILL NOT DISCUSS D/T TIME
- Scapular Dysfunction
  - IMPINGEMENT SYNDROME, CAN INCLUDE STINGERS/BURNERS
LABRAL INJURIES: SLAP TEARS

- Common in overhead use sports
  - Baseball, Volleyball, Tennis
- Repetitive overhead hitting/throwing/swimming
- Can be multifactorial for why it develops
MECHANISMS FOR INJURY:
SLAP TEAR GRADING SYSTEM
CASE PRESENTATION:

- 15 yo female presented 3 months out from softball injury
  - Sliding head first into base with arm extended overhead
  - Pain with overhead activities
  - Difficulty with summer volleyball camps
  - Very active athlete preparing for fall sports
RADIOGRAPHS:
EXAM:

- TTP over coracoid and anterior-inferior acromion
- Scapular protraction
- Pain with SLAP/labral shear testing
- +Speeds exam
- FAROM
MANAGEMENT:

- Discussed nonoperative vs operative
- Patient and family elected to proceed with nonoperative management as patient wanted to participate in volleyball
- Placed her into PT and withheld from overhead activities until scapular dyskinesia improved and had better shoulder girdle strength and control
NONOPERATIVE COURSE:

- Progressed with PT decently
- Regained control
- Started 2-a-days without problems
- Had two setbacks very early with overhead activities
- Pain increased over the course of the volleyball season
- Came back at the conclusion of season with overhead dysfunction
- Obtained MRI arthrogram
MRI ARTHROGRAM
ULTIMATELY, PATIENT AND FAMILY DECIDED TO PROCEED WITH SURGERY
CASE 2:

- 15 yo female with right shoulder pain
  - Full time VB player
  - Plays year round
  - Has had increasing pain and dysfunction with overhead activities
  - Exam consistent with SLAP tear
17 YO M WITH SHOULDER PAIN

- Has been ongoing since he was freshman
- Hurts with weightlifting and football
- Direct contact/tackling causes severe pain
- Has hx of burners/stingers
- Exam consistent with posterior instability
- MRI report positive for posterior labral tear
15 YO M S/P ANTERIOR SHOULDER DISLOCATION

- Presented following two anterior shoulder dislocations.
- Sustained first dislocation and underwent closed reduction with RTS 2 weeks later.
- Following second dislocation was placed into brace and allowed to return.
- Has experienced repeated instability since that time. Exam demonstrates anterior instability.
ANTERIOR INSTABILITY IN ADOLESCENTS

- High risk of recurrence (~90% age <20)
- Normally involves anterior inferior labrum (Bankart tear)
- Treatment for first time dislocators is controversial
ALPSA LESION
ALPSA LESION

- Rare variant
- Anterior labrum heals to the glenoid neck
- Leads to gross recurrent instability d/t laxity
LIGAMENTOUS/MENISCAL INJURIES OF THE KNEE

- Could discuss just this for >1 hr
- Involves patellar dislocation, MCL, LCL, PLC, PCL, ACL, menisci, patellar tendon, quadriceps tendon, hamstring strains, etc
- Focus on ACL/PCL/meniscal injuries
MCL/LCL INJURIES:

- Laxity at 30 degrees flexion isolated injury to either
- Must be wary of associated injuries: ACL/PLC
- MCL sprains are common knee ligament injury
- Grade I-III
- Normally, treated nonoperatively initially. Must fail nonop before proceeding to operative treatment
PCL INJURIES

5-20% of knee injuries
Result of direct blow to anterior tibia
Hyperflexion with plantarflexed foot
Grade I-III
Posterior drawer test-most accurate
Normally, attempt nonoperative management first
ACL INJURIES

- 400k ACL recons/year
- Noncontact pivot injury
- ~50% will have lateral meniscus tear
- More common in women (4:1)
- 85% of stability to prevent anterior translation of tibia
- Secondary restraint to tibial rotation

- Hemarthrosis
- Quadriceps avoidance gait
- +Lachman’s exam/pivot shift test
  - Grade 1-3 A/B
- Reconstruct for younger patients
ACL EXAM:
CASE 1:

- 16 yo female dove for a VB at state tournament
- Completed game with swollen, painful knee
- Hasn't improved over the past 10 days
- Anterior knee pain
- Exam demonstrates guarding, +posterior drawer, pain along medial retinaculum of patella
PCL INJURY
PCL TREATMENT

Acute PCL injury

- Tibial avulsion fracture
  - Large fragment
  - Small fragment
    - Grade I/II laxity
    - Grade III laxity
- Isolated PCL rupture
  - Grade I/II laxity
  - Grade III laxity
- Combined ligament injury
  - Athlete
  - Non-athlete

DRIF (Open reduction and internal fixation)
- Conservative treatment
- PCL reconstruction
- Conservative treatment
- PCL reconstruction
- Surgical repair and reconstruction < 3 weeks
CASE 2:

15 yo female with noncontact, pivot-shift injury while playing basketball. Had immediate swelling and inability to complete the game.

- On exam, large hemarthrosis with inability to fully extend the knee. Guarding with ligamentous injury. +Lachmans exam
ACL rupture with medial and lateral meniscus tears.
CASE 3:

- 17 yo male s/p valgus moment while playing FB
- Pain to medial aspect of the knee
- Exam TTP medial knee, mild swelling to knee and pain with valgus stress. 6mm opening with valgus stress
MCL SPRAIN

- Classification
  - I-III
- Treatment
  - Nonoperative vs operative
- Patient was treated nonoperatively with TROM brace and progressive PT.
Nonoperative management consists of bracing with physical therapy and progressive return to sport.

- Proximal MCL sprains heal at higher rates than distal sprains. Tibial sided sprains have a higher rate of nonhealing
- Grade I sprains RTS at 1-2 weeks
- Grade II RTS at 4-6 weeks
- Grade III RTS at 8-12 weeks
OPERATIVE MANAGEMENT

- Acute recon for Grade III multilig injuries
- Subacute repair of Grade III with continued instability and >10mm opening with valgus stress
- Medial approach using semi-T autograft or hamstring or TA or Achilles allograft
LOWE R EXTREMITY INJURIES

- Again, vast topic which could be another hours long talk
- Encompasses fractures, bone bruises, sprain/strains, ankle instability, neuromuscular conditions
TIBIAL STRESS SYNDROME

- Overuse injury or repetitive-load injury to tibiae.
  - Medial tibial stress syndrome
  - Anterior tibial stress syndrome
- 10-15% of running injuries
- 60% of leg pain syndromes
- Poor shoe wear
- Training error (increase activity too quickly)
- >20 miles/week
- Early hill training
- Flat footed anatomy
EXAM

- History-biggest clue
- Evaluate stance
- Palpation
- Radiographs (dreaded black line)
- Vague, diffuse pain
- TTP over PM border of tibia starting 4cm proximal to medial malleolus

- Treatment is multimodal
- Activity restriction
- Physical therapy
- Home stretching program
- Cross training
- Shoe wear modification
FRACTURES

- Tibia/fibula/ankle
- Twisting mechanism vs direct blow
- Pain, deformity, inability to bear weight
- Radiographs and clinical exam
- Not all fractures require surgery
CASE 1:

- 13 yo male s/p direct blow to leg while playing football
- Unable to complete game
- Inability to bear weight
- Seen at outside facility
CASE 2:

17 yo male s/p football injury with foot planted and blow to the leg. Presented to outside facility.
QUESTIONS???
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