“Sports Medicine Red Flags”

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Disclosures

• NONE
Educational Objectives

• Recognize and Recite important historical questions.

• Formulate and Categorize a differential diagnosis.

• Illustrate and Discuss Musculoskeletal Red Flags/Cases
  – Hip
  – Knee
  – Spine
Take Home Points

- Listen
- History
- “Follow Your Instinct”
- Address Concerns
- Persistent
- “Hard Thing-Right Thing”
History Road Map

CHLORIDE

- Character
- Location
- Onset
- Radiation
- Intensity/Severity
- Duration
- Events

- Prior Episodes
- Aggravating
- Alleviating
- Associated Symptoms
Important “Red Flag” History

• Fever
• Weight Loss
• Malaise
• History of Cancer
• Extremes of Age

• Night Pain
• Pain at Rest
• Inability to WB
• Trauma or Travel
• Rashes
Differential Road Map

VINDICATE

• Vascular
• Inflammation
• Neoplasm
• Degenerative
• Intoxication
• Collagen/Congenital
• Autoimmune
• Trauma
• Endocrine

VITAMIN C

• Vascular
• Infection
• Trauma
• Autoimmune
• Metabolic
• Idiopathic
• Neoplastic
• Congenital
Cleidocranial Dysplasia
Pediatric Knee Differential

- **Inflammation**
  - Synovitis
  - JIA

- **Infection**
  - Septic Joint
  - Bone
    - Osteomyelitis
    - Brodie’s Abscess

- **Malignancy**
  - Tumor/Soft Tissue Lesions

- **Trauma/Injury**
  - Fractures
    - Sleeve
    - Tibial Spine Avulsion
  - Meniscus
    - Bucket Handle
  - Ligament
    - ACL-Open Physis
  - Patellar Dislocation
  - OCD Lesion

- **NAI/NAT**
Adult

- Inflammation
  - Synovitis
  - PVNS

- Infection
  - Septic Joint
  - Bone
    - Osteomyelitis

- Meniscus
  - Bucket Handle

- Ligament
  - ACL/Patellar Dislocation

- OA
  - Tibial Stress Fx

- OCD Lesion
  - Idiopathic
  - Patellar Dislocation

- Fractures
  - Tibial Plateau

- Tumor/Soft Tissue Lesions
Knee Red Flags

- Inability to Bear Weight
- Pain out of Proportion
- Systemic Complaints
- Locking
- Swelling/Effusion
- Bilateral
- Other Joint Involvement
- Hip
Knee Pain

- 10 y/o Soccer
- Anterior Knee Pain
- Fall-Flexed Knee
- Felt “Pop”
- Difficulty WB
- Anterior Swelling
- Overall Healthy
- No PI

- Mild Ant Swelling
- Small Effusion
- ROM
- TTP
- Ligaments
- Extensor Mechanism
- N/V
Anterior Knee Pain

- Patellar Fx
- Patellar Dislocation
- Quadriceps Injury
- Osgood Schlatter
- Sinding-Larsen-Johansson
- Jumpers Knee
- PFPS
Patellar Sleeve Fx

- Rare but MCC Pediatric Patellar Fx’s
- Inferior Patellar Pole
- Ecc Contraction Quad-Flexed Knee
- Easily Missed
- Avulsion Fx-Radiographs Misleading

DeLee and Drez's Orthopaedic Sports Medicine, 3rd ed
Patellar Sleeve Fx

- Inability to WB
- Swelling
- Effusion
- Limited A/P ROM
- TTP Inf Pole
- Extension Lag
• Small Avulsion

• Normal
  – Large Articular Cartilage

• MRI...MRI...MRI

• Surgery-Consult

• Crutches

• Immobilizer

• Non-operative
  – Malalignment
  – Heterotopic Ossification

  – ORIF
  – Restore Extensor Mechanism

  – Good Outcomes
  – Growth Disturbance-rare

Canale & Beaty: Campbell's Operative Orthopaedics, 12th ed.
Non-accidental Injuries

• Injury in non-ambulatory/totally dependent child
• Incompatible/changing Hx
• Delay in seeking care
• Multiple Fx’s with no family history of MBDz
• Household Fall-Fx

http://radiopaedia.org/articles/non-accidental-injuries
Risk Factors and Red Flags

• Any socioeconomic status
• Special Needs children
• Substance Abuse
• Single Parent
• Extreme Stress
• Former Abuse Victim

ota.org/media/34582/P02_Abuse-Revision.ppt
NAI-Fractures

- 85% of NAI Fx’s <3
- 70% infants <1
- Multiple Fx’s
- Various Stages of Healing
- Ask Child-MOI
- Watch parent/child interaction

- Pulling
  - Metaphyseal-Corner Fx
- Twisting
  - Spiral Fx
- Femur-nonambulatory
- Violent Squeeze
  - Rib Fx’s
- Scapula
- Sternum
- Skull
Clinical Approach

• “Listen to your Gut”
• “Push Back”
• Call Peds Teaching Service
• Direct Admission
• Skeletal Survey
• Forensic Peds Team
• Labs-Metabolic Bone WU

Personal Communication-K. Sease MD
Cheerleader with Leg Pain

- 18 y/o male
- Level 5 Gymnast
- ATC
- 4 wks increasing pain
- Limit Activities
- Trains 20 hrs/wk

- Began FB Season
- 2 months pain/swelling
- 6/10
- Rest and Ice Cups
- NSAID’s most days
- NO GI side effects
• Neg PMHx and PSHX
• Denied Tob/ETOH/Drugs
• No prior injuries

• “Fair Nutrition”
• Takes MVI and B Supp
  – 25 (OH) D & DEXA

• “Dull Ache”
• Rest Pain
• Night Pain
• More Constant

• Ht 67” Wt lbs 177, BMI 27.72
• Exam
• Plain Films
Diagnostic Evaluation

• TSH and PTH-nl

• 25 OH Vit D Total-17.9
  ng/ml (<20 def)

• DEXA-nl
“Dreaded Black Line”

- Runners and Military Recruits
- Change in “FITSS”
- Repetitive Load-Tension Side
- Insidious
- Progressive Pain
- TTP over Anterior Tibia
- Plain Films
- MRI
• NWB-Crutches
• Pneumatic Compression
• Pain Control
• Nutritional Hx
• Consider Labs/DEXA
• Orthopedic Consult

Stress Fracture “Bad Actors”

• Femoral Neck-Tension

• Navicular

• 5\textsuperscript{th} Metatarsal

• Talar Neck

• Sub-Trochanteric

Risk Factors

Intrinsic

• Poor Conditioning
• Female Athlete Triad
  – Low BMD
  – Nutritional Issues
  – Menstrual Irregularity
• Leg Length
• Poor Mechanics

Extrinsic

• Sport
• “FITSS”
• “Too Much Too Fast”
• Footwear
• Smoker
“Bone Health Labs”

Tier I

- CBC
- CMP
- Ca/Phos
- 25 (OH) Vitamin D Total
- TSH

Tier II-III

- Bone
- Alk Phos
- PTH
- Ur Calcium excretion
- Osteocalcin
Spine Differential

• Intrinsic Spine
  – Trauma
    • Compression Fx
    • Strain
  – HNP
  – Spondylolysis
    • Adolescent Athlete
  – Spondylosis
    • DDD
    • Facet Arthropathy
  – Spondylolisthesis
  – Spinal Stenosis
  – Cauda Equina
  – Piriformis
  – SI Joint

• Systemic
  – Inflammatory Spondyloarthropathy
  – Malignancy
  – CTDz
  – Infection
    • Diskitis
    • Osteomyelitis

• Referred
  – AAA
  – GI
  – Zoster
  – Pelvic
  – Renal

Spine Red Flags

• Extremes of Age

• Systemic Complaints
  – Fever
  – Night pain
  – Unexplained Wt Loss

• Hx of Cancer

• IV Drug use

• Immunosuppression
  – Prolonged Steroids

• Trauma
  – Calcaneus
  – L-Compression Fx

• Cauda Equina
  – Bowel Bladder
  – Saddle Anesthesia

• Surgery last 12 months
  – Severe Pain

Golfer with Back Pain

- 55 y/o DM
- 2 weeks
- Intermittent Leg Pain
- No F/C/S
- No Sx, IV Drugs, + ETOH, + Cigars
- No bowel/bladder, Saddle Anesthesia
- Guys Trip to Myrtle Beach
- Urgent Care-MDP/Flexeril/Norco
Vertebral Osteomyelitis or Discitis

- C-T-L Spine
- > 50 M>F
- Hematogenous
- Pain-Fever-Systemic Sx’s
- RF-IV Drug use, Trauma, Sx, DM, Steroids, ICP
- Fever only 40-50%
- Localized Spinal TTP
- PE, Plain Films, CBC, ESR/CRP, Blood Cultures
- MRI Contrast, CT-guided Bx
- Consult-ID, Ortho Spine/Neurosurgery

Back Pain in Adolescent Athlete

- 14 y/o Baseball & FB
- St Joseph’s
- Insidious
- Tick Bite?
- Lower/Upper Mid Back
- Low grade fever
- No wt loss
- No night pain
- No trauma
• 7/18/09
  • ER-Back pain
    – Plain films neg

• 7/21/09
  • PCP-LUQ pain
    – KUB   Constipation
    – Abd US  Normal
    – ? 2x0.9 peripancreatic lymph node

• Evening Clinic
• Presumed Spondylolysis
  – Brace
  – NSAID’s

• Lumbar MRI 7/23/09
  – ? L Pedicle Stress Reaction
• 8/10/09
• Reviewed MRI
• Mom-concerned
• Bone Scan
• SPECT/CT Fusion
- Radiology
- Ortho Spine
- PCP
- Hospital

- Hodkin’s Lymphoma
  - Nodular Sclerosing
  - Chemo/XRT
- Autologous BMT 2/11
- Remission
Hip Differential

- Infection
  - Septic Hip
  - Osteomyelitis
  - Transient Synovitis

- Trauma
  - Fx
  - SCFE
  - Avulsion Fx
  - Stress Fx

- Idiopathic
  - Perthes
  - AVN

- Acquired
  - FAI/Labral Tear
  - Degenerative
  - Bursitis
  - Glut Tendon Tear
  - Osteitis Pubis

- Referred
  - Lumbar
  - Knee
  - Abdominal
  - Pelvic
  - Renal
  - Entrapment Neuropathy
Hip Red Flags

• Extremes of Age

• Systemic Complaints
  – Fever
  – Night pain
  – Unexplained Wt Loss

• Hx of Cancer
  – Mets

• Immunosuppression
  – Prolonged Steroids

• Trauma

• Inability to WB
Organic Causes

- Passive IR
- Day and night
- Weekends and vacations
- Interrupts play etc.
- Unilateral
- Refuse to walk
- Systemic complaints
Non-Organic Causes

- School days
- Normal ambulation & play
- No recognizable pattern
- Bilateral
- No constitutional symptoms
Slipped Capital Femoral Epiphysis

- Adolescent
- 11-13 (pre-pubescent growth phase)
- 25-30% Bilateral
- Overweight
- Acute
- Chronic
Contributory Factors

• Obesity
• Endocrine
  – Hypothyroidism
  – Renal Osteodystrophy
  – Hypogonadism
  – Pseudohypoparathyroidism
  – GH deficiency
• Radiation therapy
Clinical Findings

- Insidious
- Painful limp
- “Ache”
- Easily misdiagnosed
- Loss of abduction/IR
- ER w/ hip flexion
Slip Severity

Slipped Capital Femoral Epiphysis

A

B

C
Klein’s Line
Complications

- AVN
- Chondrolysis
- Varus Deformity
- Osteoarthritis
- Risk of contralateral slip
Surgery
STRESS FRACTURES

• Femoral Neck

• Sacrum

• Pubic Rami

• Female Athlete Triad

Femoral Neck Stress Fractures

- Activity
- Rest
- Radiographs
- Imaging
Treatment

- Relative Rest
- Pain Free
- Cross Train
- Rehab Program
- Nutrition
- Mechanics
- Equipment
- Training Program

Take Home Points

• Listen

• History

• “Gut Instinct”

• Address Concerns

• Persistent

• “Hard Thing-Right Thing”
Summary

• Never to late to take a good history.

• Categorize your differential diagnosis.

• Consider “red flags” and “bad actors”.