MAINTAINING HEALTHY JOINTS THROUGH GROWTH SPURTS

For Athletes of All Programs

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Agenda

- Immature vs mature skeletons
- Salter fractures
- Apophysitis
- Spine fractures
- OCD lesions
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- Salter fractures (fractures through a growth plate)
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- Spine fractures
- OCD lesions (injuries to cartilage)
Immature Skeleton

Fetus: First 2 months
- Cartilage model forms
- Compact bone develops starting at primary ossification site

Fetus: At 2–3 months
- Blood vessel

Childhood
- Cavity
- Spongy bone develops at secondary ossification sites

Adolescence
- Cartilage growth plate
- Compact bone containing osteocytes
- The growth plates promote longitudinal growth until young adulthood
- Cartilage growth plate
Immature Skeleton

Parts of a Growing Bone

- Wrist Bones
- Wrist joint
- Epiphysis
- Physis (Growth Plate)
- Metaphysis
- Diaphysis

Ulna  Radius
Immature Skeleton

- Wrist Bones
- Wrist joint
- Ulna
- Radius
Salter Fractures

I can't feel my epiphysis!

You're lookin' at the most common type. I'm so cool.

Salter-Harris Fractures

Injury to growth plate

Type 1: through growth plate
Type 2: through growth plate and metaphysis
Type 3: through growth plate and epiphysis
Type 4: through all three elements
Type 5: crush injury of growth plate

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Salter Fractures

- Distal radius (thumb side of wrist)
Salter Fractures

- Distal fibula
Salter Fractures

Presentation

- **Wrist**
  - Chronic/overuse or “jam”
  - Pain at “watch strap”

- **Ankle**
  - Acute/sudden injury
  - More pain/less function than a sprain
Salter Fractures

Treatment

- Immobilization
- Wean from immobilization to daily life
- Initiation of range of motion and strength exercise
- Gradual return to gymnastics while continuing advanced rehab
Salter Fractures

Complications

- **Wrist**
  - Growth arrest
  - Positive ulnar variance
  - Destruction of soft tissue pinkie side of wrist

- **Ankle**
  - Slow recovery
  - *Less instability*
Salter Fractures

Prevention

- Wrist
  - Shoulder/upper back flexibility
  - Strength in small muscles of hand

- Ankle
  - Stability and proprioception
  - Strength in small muscles of foot
Apophysitis
Apophysitis

OSGOOD-SCHLATTER DISEASE

PATELLAR TENDON

INFLAMMATION
Apophysitis
Apophysitis

- **Locations**
  - Hip
    - Ilium
    - Ischium
  - Knee
    - Osgood Schlatter’s
    - Sinding-Larsen-Johansson’s
  - Heel
    - Sever’s
  - Outside of foot
    - Iselin’s
Apophysitis

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Apophysitis

Presentation

- Wax and wane
- Painful when squeezing and when stretching the muscle
- Focal or pinpoint area of pain
- +/- Swelling
Apophysitis

- **Treatment**
  - Modify activity
  - Ice, ice, ice, and more ice
  - Massage and GENTLE stretch
  - Correct the poor mechanics
  - Counterforce straps or heel cups
Apophysitis

- Prevention (?)
  - Early detection and action
  - Correction of technique
  - Adjustment of technique
  - Modifying flexibility strategies
Spine Fractures

- Pars Interarticularis
- Spondylolysis
- Spondylolisthesis
Spine Fractures

- **Presentation**
  - Gradual onset low back pain
  - Midline
  - Worse with arching/extension
  - Painful outside of gymnastics
Spine Fractures

- Diagnosis
  - History
  - Physical exam
  - X-rays
  - MRI vs CT vs CT SPECT
Spine Fractures

- **Treatment**
  - “Immobilization”
  - Off-loading
  - Early initiation of rehab to stabilize spine, correct contributing deficiencies
  - Progression of rehab over minimum of 12 weeks
  - Follow-up imaging
OCD Lesions

Osteochondritis Dissecans

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OCD Lesions

- Capitellum (elbow)
- Femoral Condyle (knee)
- Talus (ankle)
OCD Lesions

Presentation
- Gradual onset of pain, then sudden worsening
- Pain with compression/loading of the joint
- Swelling
- Loose body sensation, ie locking
OCD Lesions

Diagnosis

- History
- Physical exam
- X-rays
- MRI and/or CT
OCD Lesions

Treatment

- Depending on grade or severity
- Immobilization
- Surgery
- Physical therapy to regain normal motion and stability
- Correction of mechanical factors that lead to the injury
OCD Lesions

Prevention

- Monitoring volume of impact and joint loading
- Correction of mechanical factors
  - Elbow – avoid hyperextension in support
  - Ankle – avoid/limit short landings
- Early detection = much better outcome and shorter recovery
Review

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- Salter Fractures
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- OCD Lesions
Review

- When to call the doctor?
  - Pain crosses the gym door threshold
  - Limping or otherwise obvious compensation
  - No improvement with ice and rest > 10 days
  - Location of pain
    - Watch strap
    - Pinpoint pain on a bone
Expectations for treatment

- Diagnostic work-up
- Bones need immobilization and off-loading in order to heal
- Evaluation and correction of mechanical factors
- Training modifications may be necessary throughout a growth period
Review

- **Prevention**
  - Monitor impact and loading volumes
  - Correct mechanical factors
    - Hyperextension of elbow
    - Poor shoulder/upper back flexibility
    - Overuse of hip flexors for core stability
    - “Butt under” technique for landings
    - Knees knocking on landings
    - Ankle stability and proprioception
  - Consider modification of flexibility training
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