S305- Approach to Common Pediatric Orthopedic Conditions and Injuries You Don’t Want to Miss!

Craig Spurdle, M.D.
Division of Orthopaedic Surgery
Miami Children’s Hospital
Miami, Florida
Disclosure of Relevant Relationship

• Dr. Spurdle (or spouse/partner) has not had (in the past 12 months) any conflicts of interest to resolve or relevant financial relationship with the manufacturers of products or services that will be discussed in this CME activity or in his presentation.

• Dr. Spurdle will support this presentation and clinical recommendations with the “best available evidence” from medical literature.

• Dr. Spurdle does not intend to discuss an unapproved/investigative use of a commercial product/device in this presentation.
Approach to Common Pediatric Orthopedic Conditions and Injuries You Don’t Want to Miss!

Craig Spurdle, M.D.
MCH Orthopaedic Surgery
Overview

• Use case examples to review common orthopaedic problems and solutions

• Foot review

• Helpful Reminder for Clinical practice
Case 1: “Can’t Move Right Arm”

- 2-year-old boy
- Stepped off curb and mom pulled arm upwards
- No swelling, deformity, no pain
Nursemaid Elbow: Background

• Ages 1-5

• Cause-TRACTION
  – Swinging by wrists
  – Pulling by arms
  – Struggling into a coat
Nursemaids Elbow

- Entrapment of annular ligament between radial head and capitellum
Reduction Maneuvers

Supination and flexion

Hyperpronation
Case 2: “Right Knee Pain”

- 12-year-old boy with limping after baseball game
- Right knee pain intermittent x 2 months
- Next step??
AP Pelvis

Diagnosis?
Frog Lateral
SCFE: Background

- Classic - “overweight male - 12 yo”
  - Less common in females
  - Can be associated with endocrine abnormalities

- *Can* become bilateral in up to 40% of children

- Usual complaint is thigh or knee pain**
Management

• Bed rest. Ortho consult- admit
• Pain management
• Definitive treatment is surgical.
  – Screw placed through femoral neck
SCFE

Knee pain is hip pain until proven otherwise!!
Case 3: “Limp”

• 8-year-old boy with left-sided limp for 3 months while playing soccer.
• No fever, labs-nl, decrease abduction/ IR
Legg-Calvé-Perthes Disease

- **Avascular necrosis** leading to collapse, fragmentation, and then reossification
- Synovitis in joint
- Most frequent between 4 and 9 years
- Boys >> girls, usually not obese
Management

• **Refer** to ortho
• Disease can be **self-limited** – limp can last 2 to 4 years
• NSAIDS
• Goals- **Maintain motion, keep hip located**
  – Crutches and bracing can be useful for controlling symptoms
• Remodeling does occur
Case 4: “Fever and Refuses to Walk”

- Father brings 2 yo girl to clinic with fever and refusal to walk.
- Febrile to 101.5
- Pain with any motion of hip
Differential Diagnosis??

• General impression:
  – Stable with fever, unable to walk

• Differential diagnosis:
  – Septic arthritis/osteomyelitis
  – Toxic synovitis (age 3-8 years)
  – Juvenile rheumatoid arthritis
  – Leukemia
  – Perthes disease
  – Trauma
  – Tropical myositis (pyomyositis)

• PLAN?? – send to ED
Lab Results

- WBCs = 12,000
- CRP = 5.4
- ESR = 75
- Blood culture obtained***
- Ultrasound or Xray can confirm fluid in hip
Case Discussion

- **Septic arthritis** needs urgent orthopaedic evaluation.
- Infection can break down intra-articular cartilage.
- ORTHO- Surgical I/D
- IV abx
Role of MRI? --It’s NOT ALWAYS SEPTIC ARTHRITIS!

For Unclear exam or clinical picture

Other

• Tropical myositis
• Pyomyositis

• CAN HELP AVOID UNNECESSARY SURGERY
Toxic/Transient Synovitis of the Hip vs. Septic Arthritis (Kocher Criteria)

- Fever (>101.5)
- Non-weight bearing
- ESR > 40
- WBC > 12,000

(***New studies now include elevated CRP)**

- Chance of septic arthritis
  - 1 of 4 = 5%
  - 2 of 4 = 62%
  - 3 of 4 = 97%
  - 4 of 4 = 99.8%
Case 5: “Hip Click”

- 5-week-old left hip click
- Left side—“clunk” on Ortolani maneuver, and decreased abduction
- DX--???
Developmental Dysplasia of the Hip

- Occurs in neonatal period
- More common in first-borns, female, and breech position deliveries
- “Packaging disorder”-Association with congenital muscular torticollis and metatarsus adductus (not club feet)
### TABLE 12-1  Ortolani and Barlow Maneuvers

<table>
<thead>
<tr>
<th>Ortolani (Reduction) Maneuver</th>
<th>Barlow (Provocative) Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Stabilize the pelvis with one hand.</td>
<td>• Stabilize the pelvis with one hand.</td>
</tr>
<tr>
<td>• With the other hand, slightly abduct the infant’s hip.</td>
<td>• Place the thumb on the inner aspect of the thigh near the lesser trochanter.</td>
</tr>
<tr>
<td>• With the index and long fingers over the greater trochanter, pull the thigh up to gently reduce the hip.</td>
<td>• Adduct the hip.</td>
</tr>
<tr>
<td></td>
<td>• Exert downward pressure on the thigh with the thumb, pushing it into the table.</td>
</tr>
</tbody>
</table>

![Images showing Ortolani and Barlow Maneuvers](source: Adv Neonatal Care © 2003 W. B. Saunders)
Clinical Features: Your First Clue

- Asymmetric hip creases
- Positive Barlow and/or Ortolani maneuver
- Limited abduction of hip
- Refer to Ortho
Diagnostic Studies

- Ultrasound (age <4-5 mos)
- Pelvis Xray older pts
Management- ortho refer

• **Birth-6 months:**
  – Pavlik harness (No triple diapering)
Management

• **6-18 months:**
  – Abduction bracing. Possible Closed reduction attempt vs surgical relocation
Case 6
“My Toddler Refuses to Walk”
Presentation

• 3 year old slipped and fell yesterday

• Won’t bear weight on left lower extremity

• Normal vitals, no fevers, labs WNL
Differential Diagnosis

- Trauma (contusion, sprain, fracture)
- Infection (cellulitis, septic arthritis, osteomyelitis, discitis)
- Neoplasm (leukemia, bone or soft tissue tumor)
- Neuromuscular (hemiplegia)
- Inflammatory (JRA, synovitis)
- Foreign body
- Plan--?? Xray- ortho eval
Toddler’s Fracture

- Low energy fractures common (toddler’s fracture, spiral tibia fractures)
- Without fracture of fibula
- Rotational force
Principles of Treatment

- Refer to ED/ ortho
- Place in a cast 4-6 wks
Now, Consider 14 yo football Player injured and casted 2 days ago.

- pain out of proportion with movement toes
- Increasing pain meds without relief
- Concerns?? Considerations??
What is **compartment syndrome**?

- Compression of vital structures within closed space
  - leads to tissue death
Compartment Syndrome

- **Intrinsic factors** – bleeding (crush injury, fracture), infiltrated IV (arm)

- **Extrinsic causes** – Tight dressings, cast, tourniquet from blood draws (picu, nicu)

- A true Emergency! Need to **Release “extrinsic” causes** - call ortho
Compartment Syndrome

- Urgent Ortho Surgical evaluation
- Possible surgical fasciotomy if needed

Cast release, dressings removed 1st
Case- 7

- 10 month old male, pre walker, with leg pain for 5 days

Assessment??
ED Skeletal survey
Recognition of Non Accidental Trauma (NAT) **Important**

- Unrecognized and return to home
  - 5%-10% risk of death - next abuse event

- Abuse --second leading cause of mortality in infants and children

- Important to recognize and get child into safe environment
Red Flags

• Inconsistent history or mechanism of injury

• Delay in seeking medical attention

• Discovery of multiple fx in different stages of healing
Fractures Commonly seen in NAT - High Specificity

- Femur fracture in child < 1 year old not yet walking (60-70%)
- Humeral shaft fracture in < 3 year old
- Sternal fractures
- Metaphyseal corner (bucket-handle) fractures
- Posterior rib fxs
- Digit fractures in nonambulatory children
Evaluation/ Treatment

• **Avoid Judgment**- initiate investigation with **Team approach** if concerned

  – pediatrician, medical social worker, subspecialties( **ortho**), law enforcement, government child protection agencies

  – Keep in hospital for work up
Let's Talk about Feet!
Definitions: Varus & Valgus- “hindfoot”

Varus  Normal  Valgus
Cavus- Forefoot
Pes Planus
Case 8- new born female with foot deformity?

cavus (high arch), varus (hindfoot), equinus (fixed in plantar flexion), adductus
Congenital Talipes Equinovarus (CLUBFOOT)

- **Local dysplasia**
  - lower limb
  - Not a “packaging disorder”

- Both **syndromic** and **idiopathic**

- Defined- cavus (high arch), varus (hindfoot), equinus (fixed in plantar flexion), adductus
Treatment

- **Refer to Ortho**
- "**Flexible**"- Passively correctable
  - Gentle stretching/casting
- "**Rigid**"- not passively correctable
  - Serial Casting
  - +/- surgery
Case 9: foot deformity in 2 month old?

Can dorsiflex ankle 35 degrees
Metatarsus Adductus

• **Adductus**
  - No cavus, equinus, varus (clubfoot)
  - Prominent base of 5th Metatarsal

• May be associated with intrauterine packaging disorders *unlike clubfoot*
Metatarsus Adductus

- Treatment - Ortho refer
  - Gentle stretching
  - Casting /reverse lass shoes
- Need for surgery rare
- 90% resolved at 1 year
Case 10: Office visit for intoeing 7 yo female dancer

- Foot progression angle - 15 degrees internal

- What are the deformities that can cause this?

- Femoral Anteversion
- Internal Tibial Torsion
- Forefoot Adductus
Intoeing

TFA
Clarify Myths - Intoeing

• Most Intoeing improves with growth

• **No bracing or special shoes effective**

• Rare treatment - at age >7 - osteotomies both legs only for most severe cases

• Ortho referral **not needed** (femoral anteversion/ tibial torsion)
Other foot problems: Newborn clinic visit?

• First born, female
• Plan-? Ortho consult
Talipes Calcaneovalgus

- Hyper dorsiflexion of foot
  - flexion can be limited, valgus hindfoot
- Packaging disorder
  - intrauterine crowding
- First born females more common
- With or without tibia posterior medial bowing**
Talipes Calcaneovalgus

- Usually flexible-
  - resolves with gentle stretching or casting 3-6 mos
- If Associated with posterior medial bowing of tibia
  - Leg length problems in future
  - Surgical treatment in adolescence
- Don’t confuse with congenital vertical talus or clubfoot
Pain free Flat foot-friend or foe?

- Pain free Flexible flat feet
  - normal finding
  - Ligamentous laxity
- Prophylactic orthotics ineffective and unnecessary
- No referral needed
- Our Job is to not miss the bad acting flat feet-
  - Painful, rigid, coalitions, vertical talus

What about painful flexible flat feet

- Refer to ortho
- Orthotics
  - first line treatment
- Numerous surgeries to correct flexible flatfoot deformity
  - If fails conservative treatment
How do I know if it’s flexible?

• Check hindfoot motion
• Causes of rigid flatfoot:
  – Vertical talus
  – Tarsal coalition
  – Neuromuscular conditions
Tarsal coalition - painful rigid flat foot

- Hx of ankle sprains common
- Age 8-14
- When two or more tarsal bones are congenitally joined together
- Refer to ortho
If fails conservative tx - Resection

Calcaneo-navicular coalition

Resection plus interpositional fat graft
Vertical Talus

- Rocker bottom deformity of foot

- Commonly associated with neuromuscular conditions (up to 50%)
  - Refer to ortho and neuro
Treatment Vertical Talus

- Surgical treatment is standard of care

- “Oblique talus”- flexible form responsive to casting

- Better results with early diagnosis and treatment
Pathologic Cavus foot

• Frequent inversion injuries - sprains

• **Progressive** -
  - Consider neurologic origin (CMT, intraspinal pathology)
  - Neurology consult!
  - Ortho consult

• **Non progressive** - idiopathic asymptomatic
• Join us- 1:30-3:30 Hands on musculoskeletal exam Ortho workshop…. 
  – Scoliosis Check/ back pain 
  – Exam and management of knee, ankle, shoulder sports injuries 
  – Intoeing exam 
  – And more
THANKS!!

Craig J. Spurdlle, MD