Looking for the Zebra and Finding the Horse

Andrea Morrison, MD, MS
David Vyles, DO
Disclosures

We have no relevant financial relationships to disclose.
Objectives

• To understand the utility of plain xray for neck, chest, abdominal, and orthopedic conditions
• To understand common findings in plain xray
• To describe differences in pediatric vs. adult plain xrays for certain conditions
C-Spine Imaging
Normal C-Spine Xrays

http://www.sickkids.ca/PEMCurriculum
Lateral Neck

predental space

https://calsprogram.org
Cervical Spine
Soft Tissues

http://www.wikiradiography.net/page/Soft+Tissue+Signs+-+Cervical+Spine
Cervical Spine
Soft Tissues

http://www.wikiradiography.net/page/Soft+Tissue+Signs+Cervical+Spine
6 yo female with neck pain

- Acting differently per parents
- Not moving neck as much
- Thrown into a pool yesterday
C2 Pseudo-Subluxation on C3

https://www.hawaii.edu/medicine/pediatrics/pemxray/zindex.html
9 yo male with neck pain

- Wrestling with sibling earlier today
- Chin is turned to the right with pain/tightness on the right SCM
- Normal neurological exam
Atlantoaxial Rotary Subluxation

http://www.wikiradiography.net
Lumbar Spine Imaging
16 yo male football lineman with low back pain

- Started during the beginning of football
- No fevers
- No neurological abnormalities
Spondylolisthesis

Courtesy of Dr. Kevin Walter
Spondylolysis

Courtesy of Dr. Kevin Walter
2 yo male with fever, refusal to walk and back pain.

- Family denies injury or trauma
- Labs show increased ESR and WBC
14 yo male presenting with back and abdominal pain after MVA
Chance Fracture
Bronchiolitis
Mycoplasma
Asthma
18 month old with cough, rhinorrhea, fever, and trouble breathing

Bacterial Pneumonia
3 month old with cough, rhinorrhea, fever for 2 days, and coarse breath sounds.
Thymus in Infant with DiGeorge
Thymus
Congenital heart disease with CHF
Esophagus vs trachea
3 y/o asthmatic with wheezing for 2 days and now worsening SOB and hypoxia

Pneumomediastinum
4 y/o with 3 days of cough and wheeze

Which side is the foreign body on?

Inspiration

Expiration

© Children’s Specialty Group. All rights reserved.
Bilateral Lateral Decubitus Films

Which side is the FB on?
Hip and Pelvis Imaging
7 yo male presenting with a limp, no fevers, no recent illness
Legg Calves Perthes Disease

Courtesy of Dr. Lisa Uherick
14 yo male presenting with a limp, no fevers, no recent illness
Slipped Capitol Femoral Epiphyses

 Courtesy of Dr. Lisa Uherick
14yo male soccer player felt a “pop” in his left hip as he kicked the ball. Had pain and difficulty running.
Pelvic Avulsion Fractures (and apophysitis)

Courtesy of Dr. Kevin Walter
Pelvic Avulsion Fractures (and apophysitis)

Courtesy of Dr. Kevin Walter
Upper Extremity Imaging
5 year old on the monkey bars, fell onto an outstretched arm.

- Pain at forearm with swelling
Radial Buckle Fracture

Courtesy of Dr. Eric Kroner
Greenstick Fracture

Courtesy of Dr. Eric Kroner
Monteggia fracture

Courtesy of Dr. Eric Kroner

© Children’s Specialty Group. All rights reserved.
Galeazzi Fracture

Courtesy of Dr. Eric Kroner
5 year old on the monkey bars, fell onto an outstretched arm.

- Pain at elbow with swelling
Normal Pediatric Elbow Xray

Courtesy of Dr. Jean Pearce
# Supracondylar Fracture Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>Imaging</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Nondisplaced</td>
<td>Posterior long arm splint</td>
</tr>
<tr>
<td>Type 2</td>
<td>Displaced, posterior cortex intact</td>
<td>Reduction then OR</td>
</tr>
<tr>
<td>Type 3</td>
<td>Completely displaced</td>
<td>Reduction then OR</td>
</tr>
</tbody>
</table>
Type 1 SC Fracture
Type 2 SC Fracture

Courtesy of Dr. Jean Pearce
Type 3 SC Fracture

Courtesy of Dr. Jean Pearce
Hand/Wrist Imaging
5 year old on the monkey bars, fell onto an outstretched arm.
Scaphoid Fracture

Courtesy of Dr. Eric Kroner
13 yo male complaining of pain in the hand for a week.

- Denies injury or trauma
Boxer fracture

Courtesy of Dr. Eric Kroner
Abdominal
2 y/o with low grade fevers, vomiting, and diarrhea

Gastroenteritis
Obstruction/Incarcerated inguinal hernia
6 month old with bilious vomiting

Malrotation with volvulus
3 y/o with abdominal pain and vomiting

Intussusception
6 y/o with fever, abdominal pain, and vomiting

Appendicitis
Duodenal Atresia

3 day old with emesis
6 day old with emesis, lethargic with distended abdomen on exam.
Siblings saw 20 month old swallow a coin

- But on closer look at the coin, you see this:

- What would this make you think of?
30 day old in ED with cough, rhinorrhea and decreased feeding.

Hirschprung’s Disease
Lower Extremity Imaging
14 month old, slipped and fell on wet floor, now with leg pain

- What are you thinking about?
- Imaging
Spiral Tibial Fracture
“Toddler’s Fracture”
14 month old, slipped and fell on wet floor, now with leg pain

- What are you thinking about?
- Imaging?
12 year old male presents left knee pain, gradually worsening

- No fevers
- Continues to play basketball, but pain is limiting activity
Normal Knee Xray

Epiphysis
Growth plate
Metaphysis
Diaphysis
Osgood-Schlatter Disease

Courtesy of Dr. Kevin Walter
Sinding-Larsen-Johansson Disease

Courtesy of Dr. Kevin Walter
Foot/Ankle Imaging
7 yo female presenting with ankle pain after a fall
Tri-Planar Fracture

https://readersdigest.e-bookshelf.de
10 yo female presenting with foot pain after running/slipping
Lis Franc Fracture

Courtesy of Dr. Eric Kroner
Severs Disease

Courtesy of Dr. Eric Kroner
Congenital Diaphragmatic Hernia-Morgagni
Retropharyngeal Cellulitis/Abscess
AVN Tarsal Navicular
2 y/o with cough, increased work of breathing, and wheezing

Viral Pneumonitis
12 yo dancing at a party, fell down and now her shoulder hurts

- Difficulty moving arm completely above head, point tenderness over deltoid.
- What do you want to do? XRAY?
Humerus Fracture

Courtesy of Dr. Danny Thomas

© Children’s Specialty Group. All rights reserved.
Enlarge tonsils
12 y/o with knee pain for 2 weeks

Osteochondritis Dissecans
9 y/o with ankle pain after a fall

Aneurysmal Bone Cyst
8 y/o with knee pain after a fall

Unicameral Bone Cyst
Pathologic Fracture – Unicameral Bone Cyst
12 y/o with intermittent fevers and knee pain for 3 weeks

Osteosarcoma
6 y/o with intermittent fevers and ankle pain for 3 weeks

Osteomyelitis
A 4-year-old child with intermittent fevers and arm pain for 3 weeks. The diagnosis is Leukemia.
2 month old with a diagnosis of laryngomalacia and persistent stridor

Double Aortic Arch
Tetralogy of Fallot
Coarctation of Aorta
Mediastinal Bronchogenic Cyst
Chlamydial Pneumonia
Lingular Consolidation
Atelectasis
Pneumothorax
Duodenal Stenosis
Duodenal Web
Midgut Volvulus
Malrotation with volvulus
Ileo-ileal intussusception
Necrotizing Enterocolitis
Necrotizing Enterocolitis
Lead Lines
Acromioclavicular Separation
Abuse: Metaphyseal Fractures
Greenstick Ulnar Fracture
6 month old with cough and increased work of breathing

**Congenital Lobar Emphysema**
6 week old with tachypnea since birth

CCAM
3 y/o with cough, low grade fevers, and a history of recurrent pneumonias

Pulmonary Sequestration
Pulmonary Atresia

Coarctation of Aorta
Clavicle Fracture
Resources/References

• https://www.hawaii.edu/medicine/pediatrics/pemxray/
Contact Information

Andrea Morrison, MD, MS
David Vyles, MD
(414) 266-2625

Physician Consultation and Referral: (800) 266-0366