Skeletal Injuries Supplement

Specificity of Radiologic Findings for Inflicted Injury:

<table>
<thead>
<tr>
<th>High Specificity</th>
<th>Moderate Specificity</th>
<th>Low Specificity</th>
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</thead>
<tbody>
<tr>
<td>Classic metaphyseal lesions</td>
<td>Multiple fractures, especially bilateral</td>
<td>Subperiosteal new bone formation</td>
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<tr>
<td>Rib fractures, especially posterior</td>
<td>Fractures of different ages</td>
<td>Clavicular fractures</td>
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<tr>
<td>Scapular fractures</td>
<td>Epiphyseal separations</td>
<td>Long bone shaft fractures</td>
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<tr>
<td>Spinous process fractures</td>
<td>Vertebral body fractures &amp; subluxations</td>
<td>Linear skull fractures</td>
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<tr>
<td>Sternal fractures</td>
<td>Digital fractures</td>
<td></td>
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<tr>
<td></td>
<td>Complex skull fractures</td>
<td></td>
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</tbody>
</table>

*Highest specificity applies in infants

Distribution of Inflicted Fractures:

Distribution of 165 inflicted fractures in 31 infant fatalities. Single vertebral fracture is not shown. The skull fractures in 13 infants are not included in the analysis.


Timetable of Radiologic Changes in Children’s Fractures:

<table>
<thead>
<tr>
<th>Category:</th>
<th>Early</th>
<th>Peak</th>
<th>Late</th>
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<tbody>
<tr>
<td>1. Resolution of soft tissues</td>
<td>2-5 days</td>
<td>4-10 days</td>
<td>10-21 days</td>
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<tr>
<td>2. Subperiosteal new bone formation</td>
<td>4-10 days</td>
<td>10-14 days</td>
<td>14-21 days</td>
</tr>
<tr>
<td>3. Loss of fracture line definition</td>
<td>10-14 days</td>
<td>14-21 days</td>
<td></td>
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<td>4. Soft callus</td>
<td>10-14 days</td>
<td>14-21 days</td>
<td></td>
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<tr>
<td>5. Hard callus</td>
<td>14-21 days</td>
<td>21-42 days</td>
<td>42-90 days</td>
</tr>
<tr>
<td>6. Remodeling</td>
<td>3 months</td>
<td>1 year</td>
<td>2 years to physeal closure</td>
</tr>
</tbody>
</table>

*Repetitive injuries may prolong categories 1, 2, 5, and 6.*
Is it OI?

Algorithm to establish the diagnosis of osteogenesis imperfecta in a patient with probably inflicted trauma:

Radiographic skeletal survey

- Significant or equivocal osteoporosis
- Clinical and radiologic evaluation for:
  - Wormian bones (significant number)
  - Blue sclareae
  - Abnormal skin texture
  - Dentinogenesis imperfecta
  - Hearing loss
  - Joint laxity

Normal bone density by visual inspection

- Is family history positive or clinical evaluation concerning for OI?
  - Yes
  - Needs OI work-up
  - Stop! Probably not OI.
  - No

Clinical evaluation (+)

- Stop! Diagnosis is OI.

Clinical evaluation (-)

- Skin biopsy-collagen test for Type I collagen defect
  - Abnormal
  - Stop!
  - Normal
  - Stop!

Abnormal

- Diagnosis is OI.

Normal

- Diagnosis is either not OI, or OI with or without a determinable mutation at present.