We Want To Take You Higher

Better Sites for Intraosseous Access in Kids

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Disclosures

• Founder & Chief Medical Officer
  Handtevy - Pediatric Emergency Standards, Inc.
Questions

- What is the track record of the proximal tibial IO in pediatrics?
- Is there an alternative site that can improve clinical use?
**Humeral Head Insertion Site Selection**

- Humeral Head fully ossified during 9-10\textsuperscript{th} YR
- Consider IO at this age
Proximal Tibia Landmarks
Clinical paper

Intraosseous needles in pediatric cadavers: Rate of malposition

Daniel Maxien\textsuperscript{a,e,*}, Stefan Wirth\textsuperscript{a,d}, Oliver Peschel\textsuperscript{c}, Alexander Sterzik\textsuperscript{f}, Sonja Kirchhoff\textsuperscript{g}, Uwe Kreimeier\textsuperscript{b}, Maximilian F. Reiser\textsuperscript{a}, Fabian G. Mück\textsuperscript{d}

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### Table 2 – Infant cadavers (age <1 year).

<table>
<thead>
<tr>
<th></th>
<th>All IO devices</th>
<th>EZ-IO</th>
<th>Manual devices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n Cases</td>
<td>%</td>
<td>n Cases</td>
</tr>
<tr>
<td>Cadavers</td>
<td>22</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>ION&lt;sup&gt;a&lt;/sup&gt;</td>
<td>34</td>
<td>64</td>
<td>25</td>
</tr>
<tr>
<td>Number of cadavers with at least one malpositioned ION</td>
<td>14</td>
<td>64</td>
<td>11</td>
</tr>
<tr>
<td>Number of malpositioned ION</td>
<td>16</td>
<td>47</td>
<td>12</td>
</tr>
<tr>
<td>Number of malpositioned ION perforating the bone on both sides</td>
<td>5</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>Cadavers without a correctly placed ION</td>
<td>7</td>
<td>32</td>
<td>5</td>
</tr>
<tr>
<td>Cadavers with two ION</td>
<td>10</td>
<td>45</td>
<td>8&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Cadavers with three ION</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

<sup>a</sup> Intraosseous needle.

<sup>b</sup> One cadaver with one EZ-IO and one manual device.

### Table 3 – Child cadavers (age ≥1 year).

<table>
<thead>
<tr>
<th></th>
<th>All IO devices</th>
<th>EZ-IO</th>
<th>Manual devices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n Cases</td>
<td>%</td>
<td>n Cases</td>
</tr>
<tr>
<td>Cadavers</td>
<td>16</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>ION&lt;sup&gt;a&lt;/sup&gt;</td>
<td>23</td>
<td>50</td>
<td>22</td>
</tr>
<tr>
<td>Number of subjects with at least one malpositioned ION</td>
<td>8</td>
<td>50</td>
<td>7</td>
</tr>
<tr>
<td>Number of malpositioned ION</td>
<td>9</td>
<td>39</td>
<td>8</td>
</tr>
<tr>
<td>Number of malpositioned ION perforating the proximal and distal cortical bone</td>
<td>1</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Cadavers without a correctly placed ION</td>
<td>3</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>Cadavers with two ION</td>
<td>5</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>Cadavers with three ION</td>
<td>1</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

<sup>a</sup> Intraosseous needle.
47% Infants & 39% > 1 YR Malpositioned
EZ-IO
Distal Femur Site Identification

• Out-stretched leg
• Palpate the patella
• The insertion site is just proximal to the patella (maximum 1cm) and approximately 1-2 cm medial to midline.
Distal Femur

**Pediatric Landmarks**

- The insertion site proximal to the patella (maximum 1cm) and 1-2 cm **medial** to midline
- No risk to the growth plate
Distal Femur Pediatric Landmarks

- Diaphysis
- Epiphysis
- Patella
- Spongy bone (red marrow)
- Articular cartilage
- Infrapatellar fat
Distal Femur Clinical Pearls

• Recommended Site in the unconscious patient (arrest)

• Is too painful in the awake patient compared to the proximal tibia

• Do not use pink (15 mm) needle
Needle selection is based on patient weight, anatomy and tissue depth overlying the insertion site.

- 25 mm
- 45 mm

EZ-IO® Needle Set Selection
Correct Placement
Questions

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