FOOT AND ANKLE STRESS FRACTURES IN CHILDREN AND ADOLESCENTS. A PECULIAR PRESENTATION PATTERN.

- Marcelo Prado, MD, PhD
- Marcel Nobrega, MD
- Cristiane Wosny, MD
- Alberto Mendes, MD
- Bruno Medeiros, MD
- Laercio Rosemberg, MD, PhD

HOSPITAL ISRAELITA ALBERT EINSTEIN
Authors have nothing to disclose

HIAE, São Paulo, Brazil
Bone overuse can cause micro-damage and cracks that occur faster than they can be repaired, leading to bone fatigue and fracture. These stress fractures (SFs) are less common in children and adolescents than adults.

The objective of this study was to evaluate a case series of foot and ankle SFs in children and adolescents and to describe their peculiar patterns with respect to adult patients.
Cases and methods

- TC, X-rays, and MRIs of 49 children and adolescents referred to the imaging department of Albert Einstein Hospital (Sao Paulo, Brazil) complaining of foot and ankle pain and presenting with signs of SF between January 2011 and December 2012 were retrospectively reviewed.

- Patients were healthy, having no disease affecting bone mineral mass, no acute injuries, and started having pain after sporting or recreational activity.

- Two musculoskeletal radiology experts evaluated all clinical images, noting any stress reactions and/or SFs, and data was submitted for statistical analysis.
Results

- 59.2% male and 40.8% female patients
- Mean age of 11.20 ± 2.97 years
- Left-side fractures - 61.2%
- Number of affected bones averaged 2.61 ± 1.63
- Calcaneus (51.2%), talus (51%), navicular (49%), and cuboid (38.8%), with the fifth metatarsal being the least affected (12.2%)

<table>
<thead>
<tr>
<th>NUMBER OF BONES</th>
<th>FREQUENCY</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13</td>
<td>26.5</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>30.6</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>20.4</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>14.3</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>4.1</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>49</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Number of affected bones did not significantly correlate with patient age (p=0.292; Pearson correlation)

The average number of affected bones between the two groups (under and over 11 years of age) was not statistically different (p=0.355; Student’s t-test)
Discussion

- In adults, SF frequently affects bones of the foot and ankle, most commonly (in order of decreasing frequency) the second metatarsal, calcaneus, navicular, and talus.\textsuperscript{11} This is in direct contrast to current findings involving children and adolescents. In our patients, the most frequent SF sites were in the calcaneus, talus, and navicular.


Discussion

- the incidence of SF affecting multiple bones was higher in children and adolescents (76.5%; Table 4) in this study relative to what has been observed previously in adults (only one bone affected in this population).


- SF bone distribution patterns, as well as the type and number of foot and ankle bones involved, changes with age
SF affects multiple bones in 76.5% of children and adolescents in this study with no significant difference in incidence patterns between age groups (children and adolescents). The pattern of bone involvement observed in this study differs from that of adults. SF may appear in clinical imaging as malignant lesions, and health care professionals must remember not to cause unnecessary anxiety in pediatric populations. All attending doctors and radiologists are suggested to familiarize themselves with child/adolescent SF patterns to facilitate early diagnosis and proper treatment.