Prevalence and location of bone spurs in anterior ankle impingement

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**Disclosure** | Background | Methods | Results | Discussion

Our disclosure is in the Final AOFAS Program Book. We have no potential conflicts with this presentation.

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Background

- Anterior ankle impingement (AAI) manifests in patients as anterior joint line pain with decreased dorsiflexion range of motion.
- Spur formation has been implicated in its etiology, along with repetitive, soft tissue microtrauma during sports.
- It is unclear as to the spur prevalence in a large population and the individual contributions of the talus and tibia to osseous impingement.
Hypothesis:

There is a high prevalence of AAI spur formation in the general population with certain locations and morphological variations, particularly among genders.
Materials and Methods

- 670 ankle specimens from 344 individuals (111 female, 233 male) between the ages of 20 and 40 years were provided by the Hamann-Todd human osteological collection (Cleveland, OH).

- When evaluating specimens, the tibia and talus were apposed, carefully moved through a physiologic range of motion and spurs graded as non-impinging or impinging.

- Osseous outgrowth locations were measured on tali and distal tibiae and ratios were calculated to allow for comparison among specimens (see next slide).

- Statistical analyses of impingement prevalence at the subject level by gender and race found odds ratios (OR) with 95% confidence intervals (CI) of a multivariable logistic regression model including age, gender, race, and height.
Figure 1. Superior view of talus (left) showing location of osteophyte and anterior view of distal tibia (right) showing an osteophyte from a different subject. Distances used to assign a coordinate location to the osteophyte: medial margin to osteophyte, M, and talar articular surface to osteophyte, P, were divided by neck width and neck length, respectively, to give a relative position. On tibial spurs, distance O was measured against the total width of the articulation.
Results – Odds Ratios (OR)

Table 1. Effects from the multivariable model. For dichotomous covariates the OR reflects the increase or decrease in odds of impingement when moving from the reference to the comparison group. For continuous covariates, the OR reflects the increase or decrease in odds for a unit change in the covariate.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Prevalence in reference group (Female and Caucasian)</th>
<th>Prevalence in comparison group (Male and African-American)</th>
<th>OR (CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add 5 years of age</td>
<td>-</td>
<td>-</td>
<td>1.6 (1.2, 2.2)</td>
<td>0.003</td>
</tr>
<tr>
<td>Gender: female → male</td>
<td>11/111 (9.9%)</td>
<td>61/233 (26.2%)</td>
<td>3.3 (1.5, 7.6)</td>
<td>0.004</td>
</tr>
<tr>
<td>Race: Caucasian → AA</td>
<td>21/114 (18.4%)</td>
<td>51/230 (22.2%)</td>
<td>1.8 (1.0, 3.3)</td>
<td>0.069</td>
</tr>
<tr>
<td>Add 100m of height</td>
<td>-</td>
<td>-</td>
<td>1.0 (0.7, 1.5)</td>
<td>0.927</td>
</tr>
</tbody>
</table>
Results – Relative spur locations (as if you are looking down onto right ankle)

- Relative position of spur along tibia medial-lateral axis
- Relative position of spur along talus medial-lateral axis
- Relative position of spur along talus posterior-anterior axis

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Discussion

• Impingement was observed in 72 (20.9%) individuals, bilaterally in 27 (7.8%).
• There was a higher prevalence in males (P=0.001) and with increased age (P=0.002).
• There was no significant effect with respect to height or race.
• Impinging spurs were more prevalent on the dorsal talar neck (12.7% of observed ankles) than on the tibia (5.8%).
• Most spurs were located on the anterolateral talus (77.6%) and the anterolateral portion of the distal tibial margin (79.5%).
• Of the 99 impinged ankles, spurs were seen on the talus only (60.6%), tibia only (14.1%), and both the tibia and talus (25.3%).
Conclusion

• In a large, young population of osseous specimens, we found a 21% prevalence of AAI-causing spurs which is potentially higher than what is treated clinically.

• These bony morphologies may predispose individuals to developing symptomatic AAI after traumatic injury and surgical tactics should thoroughly evaluate particularly the anterolateral talus and anterolateral distal tibia.

References


