Differences in injury risk between flat and normal feet during martial arts practice

G. ROMEO, N. MARTINELLI, C. BONIFACINI, A. BIANCHI, M. HOSSEINZADEH, E. SARTORELLI, F. MALERBA
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My disclosure is in the Final AOFAS Mobile App.

I have no potential conflicts with this presentation.
INJURY PATTERNS AND INJURY INCIDENCE IN MARTIAL ARTS

- OVERUSE INJURIES (TENDINOPATHY, CHRONIC PAIN)

- DIRECT TRAUMA (FRACTURES, CONTUSIONS)

- ANKLE SPRAINS, MUSCLE INJURY

18 % FOOT/ANKLE
OBJECTIVE

To compare foot and ankle injuries rate in five martial arts in athletes with acquired flat foot.
POPULATIONS

- 154 ATHLETES
  - 129 M - 25 F
  - Age: $26.6 \pm 13.8$ (range 38-63 years)
  - 62 Elite (40.3%) - 92 Amateur (59.7%)
  - BMI $22.6 \pm 4.3$ (range 13.1-39)
ASSESSMENT

SPORTS INFORMATION QUESTIONNAIRE:
- TYPE OF MARTIAL ART
- PRACTICE LEVEL (amateur/professional)
- EXPERIENCE (years)
- TIME AND NUMBER OF SESSION PER WEEK
- INJURY RATES, NATURES, ANATOMICAL LOCATIONS

CLINICAL EVALUATION

HINDFOOT ALIGNMENT

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA valgus</td>
<td>53</td>
<td>34.4%</td>
</tr>
<tr>
<td>HA normal</td>
<td>93</td>
<td>60.4%</td>
</tr>
<tr>
<td>HA varus</td>
<td>8</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

NAVICULAR DROP

<table>
<thead>
<tr>
<th>Type</th>
<th>Dx</th>
<th>Sx</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND</td>
<td>9.0±5.4</td>
<td>9.4±6.0</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>HA</td>
<td>3.4±3.6</td>
<td>3.6±3.7</td>
<td>&gt;0.05</td>
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</table>
Represent the sagittal plane displacement of the navicular height (NH) from a neutral position to a relaxed position in standing.

\[ ND = \text{NH (NEUTRAL POSITION)} - \text{NH (STANDING POSITION)} \]
STATISTICAL ANALYSIS

INJURY

FREQUENCY RATE: \( \text{injuries/athletes} \)

INCIDENCE RATE: \( \text{athletes with one or more injuries} \)

athletes

LOGISTIC REGRESSION TO PREDICT OUTCOMES:

Variations of HA and ND vs. Injury
Predictive factors of sports injuries (age, level, experience, etc.)
RESULTS

Injury frequency rate: 76.6%

Injury frequency rate in foot/ankle: 22.3%

Injury incidence rate: 54.5%

Injury incidence rate in foot/ankle: 20.1%
## RESULTS

<table>
<thead>
<tr>
<th>Predictive Factor</th>
<th>Odds ratio</th>
<th>95% CI for odds ratio</th>
<th>P value</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>lower</td>
<td>upper</td>
</tr>
<tr>
<td>Age</td>
<td>0.9</td>
<td>0.94</td>
<td>1.01</td>
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<tr>
<td>Sex</td>
<td>1.5</td>
<td>0.46</td>
<td>5.49</td>
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<tr>
<td>Experience (years)</td>
<td>2.2</td>
<td>1.34</td>
<td>3.86</td>
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<tr>
<td>Sport</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Level</td>
<td>0.9</td>
<td>0.35</td>
<td>2.51</td>
</tr>
<tr>
<td>ND</td>
<td>1.1</td>
<td>0.90</td>
<td>1.15</td>
</tr>
<tr>
<td>HA</td>
<td>1.1</td>
<td>0.89</td>
<td>1.50</td>
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</table>
CONCLUSIONS

NO SIGNIFICANTLY DIFFERENCES IN INJURY RATES WERE FOUND BETWEEN FLAT AND NORMAL FEET DURING MARTIAL ARTS IN BARE FEET. THERE IS A HIGHER RATE OF INJURY IN HIGH LEVEL ATHLETES THAN YOUNGER BEGINNERS.

DIFFERENT MARTIAL ARTS HAVE SIGNIFICANTLY DIFFERENT TYPES AND DISTRIBUTION OF INJURIES. NEVERTHELESS, MARTIAL ARTS APPEAR TO BE SAFE FOR YOUNG ATHLETES, PARTICULARLY THOSE AT BEGINNER OR INTERMEDIATE LEVELS.


