The efficacy of a measurement technique using pedography compared with radiographic evaluation

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Department of Orthopaedics, Graduate School of Medical Science, Kyoto Prefectural University of Medicine
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My disclosure is in the Final AOFAS Mobile App.
I have no potential conflicts with this presentation.
Purpose

• In the primary examination of the athlete, a pedography-based evaluation of the foot shape is a simple and useful procedure that allows us to identify an effective prophylaxis for the sports injury on sight.

• The purpose of this study is to determine the efficacy of the pedography-based technique by comparing it with the radiographic evaluation.
Patients and Methods

- 92 feet of 46 volunteers
  - mean age: 61.7 years old (15-80 years old)
  - male: 10 cases, female: 36 cases
Each foot print was taken using pedography. Radiographs of the foot were also taken in loading condition.
measurements of foot print and radiographs

Foot print index (FPI)

\[ \text{FPI} = \frac{B}{A} \]

For assessment of the correlation between FPI and radiographic evaluation, a simple linear regression analysis was used.

Flat foot was defined as Meary’s angle over 5 degrees. Receiver operator characteristic (ROC) analysis was also used to determine the sensitivity and specificity of FPI.
Results

Meary’s angle

Calcaneal pitch

There was a correlation between FPI and both Meary’s angle and calcaneal pitch.

\[ Y = -24.833 + 70.758 \times X \]
\[ (R^2 = 0.452) \]

\[ Y = 9.345 + 27.173 \times X \]
\[ (R^2 = 0.415) \]
There was also a weak correlation between FPI and talonavicular coverage angle.
ROC analysis demonstrated that FPI predicted flat foot with a sensitivity and specificity of 69.8% and 80.0%, respectively (the area under the ROC curve = 0.83, p < 0.001), when the cutoff value of FPI was 0.24.
Queen reported that the most reliable footprint measurement was FPI, followed by the Staheli index, arch index, truncated arch index, and arch length index. Therefore, we used FPI in this study.
FPI could be used to accurately evaluate the shape of the medial longitudinal arch due to the correlation between FPI and radiographic evaluation. It is believed that pedography is a useful method for evaluating foot shape non-invasively.

<table>
<thead>
<tr>
<th></th>
<th>n (feet)</th>
<th>footprint measurement</th>
<th>X-ray measurement</th>
<th>correlation</th>
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</thead>
<tbody>
<tr>
<td>Kanatil (2001)</td>
<td>38</td>
<td>arch index</td>
<td>Meary’s angle</td>
<td>p&lt;0.05</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>talo-horizontal angle</td>
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<td>talo-calcaneal angle</td>
<td>n.s.</td>
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<td>calcaneal pitch</td>
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<tr>
<td>Yamamoto (1992)</td>
<td>37</td>
<td>Staheli index</td>
<td>Yokokura method</td>
<td>p&lt;0.05</td>
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<td></td>
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<td>FPI</td>
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<tr>
<td>Our study (2013)</td>
<td>92</td>
<td>FPI</td>
<td>Meary’s angle</td>
<td>p&lt;0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>calcaneal pitch</td>
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</tr>
</tbody>
</table>
Conclusions

• We evaluated the efficacy of the pedography-based technique by comparing it with the radiographic evaluation.

• There was a correlation between FPI and both Meary’s angle and calcaneal pitch.

• ROC analysis demonstrated that FPI predicted flat foot with a sensitivity and specificity of 69.8% and 80.0%, respectively, when the cutoff value of FPI was 0.24.

• It is believed that pedography is a useful method for evaluating foot shape non-invasively.