Multi-faceted turnout: Influence of Training Level, Measurement Method and Sex

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Background:

Screening has become a recommended practice in dance medicine1-6 and injury surveillance can help identify causes of injury and guide preventative measures.7,8

Aspects of turnout and its measurement techniques have been examined9,10 and a relationship between turnout and nontraumatic injuries in dancers has been established.11

There is limited literature comparing turnout across level of dance training or by sex.12

Methods:

This study examines prospective cohort data from dance wellness screens. Standing functional turnout angles were measured using rotation discs and floor protractor.

Each dancer was tested on each instrument one time in first position. The angle was ascertained from the disc reading and along the line of the second metatarsal on the floor protractor.

Subject Demographics, N = 95

- Professional dancers (N=23) – yellow & orange:
  - 8 males
  - 15 females
- Pre-Professionals (N=40) – blue:
  - 26 collegiate
  - 14 academy students ≥ 16 years old
- Academy Students (N=46) – patterned (green & blue):
  - 14 academy students ≥16 years old
  - 27 academy students < 16 years old
  - 5 other academy students (lack of DOB)

Purpose:

Compare turnout using two measurement methods to determine whether turnout differed by level of dance training or sex.

Statistical Analyses:

- 2 x 2 x 2 ANOVA was used to determine if turnout in professional dancers differed between limbs by measurement method and sex.
- 3 x 2 ANOVA (training level by measurement method) was used to determine the difference between measurement method across dance group affiliation.
- One-way ANOVA was used to compare disc turnout angles across dancer training level.
- A priori statistical significance set at 0.05.

Results:

- There was a significant interaction between measurement method and limb (p=0.035) and main effects of limb (p=0.008) and method (p=0.001).
- Turnout asymmetries were identified only by disc method (p=0.005). Turnout angles were significantly smaller on the disc on both limbs (p=0.001).

No significant interaction between measurement method and dance group affiliation was found (p=0.236).

There was a main effect of measurement method (p=0.001); floor turnout was significantly greater than disc turnout regardless of dance group affiliation.

Results:

- Table 1: Single limb disc turnout angle by dancer training level (student groups defined by age)

<table>
<thead>
<tr>
<th>Dancer training level</th>
<th>Number of dancers</th>
<th>Mean turnout angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional</td>
<td>23</td>
<td>63.8 ± 8.1</td>
</tr>
<tr>
<td>Pre-professional ≥ 16 y.o.</td>
<td>40</td>
<td>57.1 ± 10.4</td>
</tr>
<tr>
<td>Novice &lt; 16 y.o.</td>
<td>27</td>
<td>61.2 ± 9.5</td>
</tr>
</tbody>
</table>

†Both professionals (p<0.001) and novices (p=0.02) had significantly greater turnout angles than pre-professionals on the discs. No significant difference in turnout angles between the professionals and novices (p=0.15).

Conclusion/Discussion:

At the professional level, sex may not affect turnout angles. Disc turnout may best capture limb asymmetries in professionals, which may be due to asymmetries in strength, range motion, or dance training.

Greater turnout angles were identified on the floor regardless of training level, when the friction of the floor may have aided positioning.

Future analyses will aim to understand the relationships between injury risk and turnout asymmetries, across training level and dance genre.

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References:


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