Compensatory Movement Patterns of Agility and Non-Agility Sport Athletes
Thomas Broback, Matt Hanowski, Anna Krieger, Mary Stenson, Don Fischer
College of Saint Benedict/Saint John’s University
Department of Exercise Science and Sport Studies

Introduction
- Compensatory movements, such as knee valgus and core instability, are risk factors for both patellofemoral syndrome and non-contact anterior cruciate ligament (ACL) injuries.5
- Patellofemoral syndrome is common in female non-agility sport athletes, such as cross country (CC) runners.5
- Non-contact ACL injuries are common in female agility sport athletes, such as volleyball (VB), basketball (BB), and soccer (SC) players.5
- No research to this point has compared agility and non-agility sport athletes’ relative risk for injury based on the presence of compensatory movement patterns.

Purpose
- The purpose of this study was to compare the compensatory movement patterns of agility sport athletes to non-agility sport athletes.

Materials
Participants:
- Total of 76 division III female athletes; 52 agility sport athletes (VB n = 20, SC n = 24, and BB n = 8) and 24 non-agility sport athletes (CC n = 24).

Landing Error Scoring System (LESS):
- Athletes were videotaped performing three box drop vertical jump (BDVJ) test trials from a 30cm platform.
- The video image of the jump producing the greatest vertical displacement for each athlete was scored using the 17 item LESS, and a Composite LESS score was calculated (maximum possible score = 19).
- Based on Composite LESS scores, each athlete was assigned a LESS Relative Risk classification: 0 = excellent (LESS ≤ 4), 1 = good (4 < LESS ≤ 5), 2 = moderate (5 < LESS ≤ 8), or 3 = poor (LESS > 8).2

Functional Movement Screen (FMS):
- Athletes performed seven separate compensatory movement tests with each test scored (using published criteria), a Composite FMS score was calculated (maximum possible score = 21).
- Based on Composite FMS scores, each athlete was classified as either 1= high risk of injury (FMS score < 14) or 0 = low risk of injury (FMS score > 14).2

Results

Table 1. Independent t-Test comparing scores of agility athletes to non-agility athletes.

<table>
<thead>
<tr>
<th></th>
<th>Agility Athletes (Mean ± SD)</th>
<th>Non-Agility Athletes (Mean ± SD)</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMS™ Composite</td>
<td>15.1 ± 2.10</td>
<td>15.3 ± 1.37</td>
<td>0.53</td>
</tr>
<tr>
<td>FMS™ Relative Risk</td>
<td>0.40 ±0.495</td>
<td>0.25 ± 0.442</td>
<td>0.18</td>
</tr>
<tr>
<td>LESS Composite (Left Leg)</td>
<td>5.63 ±1.59</td>
<td>5.25 ± 1.73</td>
<td>0.34</td>
</tr>
<tr>
<td>LESS Relative Risk (Left Leg)</td>
<td>1.50 ±1.08</td>
<td>1.46 ± 1.18</td>
<td>0.88</td>
</tr>
<tr>
<td>LESS Composite (Right Leg)</td>
<td>5.69 ± 1.59</td>
<td>5.50 ± 1.72</td>
<td>0.63</td>
</tr>
<tr>
<td>LESS Relative Risk (Right Leg)</td>
<td>1.56 ± 1.09</td>
<td>1.58 ± 1.10</td>
<td>0.93</td>
</tr>
</tbody>
</table>

Figure 1. Starting position for BDVJ test.

Discussion
- Non-significant differences were found in LESS Composite scores, LESS Risk classification, FMS™ Composite scores, or FMS™ Risk classification between the athletes participating in agility sports compared to non-agility sports.
- While the mean FMS Composite scores were greater than 14 for both groups, 11 agility and 2 non-agility sport athletes scored below 14 indicating 4-fold increase in risk of lower extremity injury for those athletes.1

Implications
- Trainers and health professionals involved in the care of female athletes should understand the physical nature of the athlete is not the only risk factor of getting injured in a sport. The nature of the sport is a large component of what type of injuries the athlete could possibly sustain.

Future Research
- Future research should examine the relative effectiveness of the FMS™ and LESS in predicting athletic injuries.

Conclusion
- Athletes from agility and non-agility sports have similar movement characteristics and injury risk based on FMS™ and LESS scores.

References

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