A Comparison of Injury Risk Determined by Laboratory and Field Tests
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Introduction
• College athletic programs commonly use laboratory and field tests to assess athletes’ injury risk.
• Larger peak eccentric vertical ground reactions force (GRFv) predicts non-contact anterior cruciate ligament (ACL) injury in female athletes.1,2
• Functional Movement Screen (FMS) has been shown to predict injury in female athletes.2
• Landing Error Scoring System (LESS) is a reliable method of identifying high risk movements3 but does not predict ACL injuries in high school or college athletes.4
• No research has examined the relationship between these measures of injury risk.

Purpose
• The purpose of this study was to determine the relationship between variables measured by three injury risk assessments: LESS, peak eccentric GRFv, and FMS.

Methods
• Seventy-six Division III female athletes (basketball n = 8, soccer n = 25, cross-country n = 23, and volleyball n = 20).
• The athletes performed a 10-minute general dynamic warm-up prior to testing.
• Each athlete performed three box drop vertical jump (BDVJ) trials from a 30cm box onto an Accupower force platform and all BDVJ trials were videotaped. Force plate data were sampled at 400Hz and normalized to body weight.
• The BDVJ that produced the greatest vertical jump height, based on flight time, was used for GRFv and LESS analysis.
• The 17 item LESS was used to qualitatively assess landing and jumping mechanics for each athlete and a composite LESS score was calculated for each leg (maximum possible score = 19), from which a LESS Relative Risk classification was assigned [0 = excellent (LESS ≤ 4), 1 = good (4 < LESS ≤ 6), 2 = moderate (6 < LESS ≤ 8), or 3 = poor (LESS > 6)].1
• Athletes then performed 7 separate movement tests associated with the FMS. Each test was analyzed and scored using a 5-point scale.5 A Composite FMS score was calculated and a FMS injury risk classification was assigned [1 = high risk of injury (FMS score < 14) or 0 = low risk of injury (FMS score > 14)].5

Results

Table 1. Bivariate correlations examined the relationships between test variables.

<table>
<thead>
<tr>
<th></th>
<th>GRFv</th>
<th>LESS Right</th>
<th>LESS Left</th>
<th>Peak Ecc</th>
<th>FMS</th>
</tr>
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<td>Peak Ecc GRFv</td>
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<td>N 76</td>
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<td>Pearson</td>
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<td>N 76</td>
<td>1</td>
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<tr>
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<td>254**</td>
<td>N 76</td>
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<tr>
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<td>Pearson</td>
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<td>N 76</td>
<td>0.016</td>
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</tbody>
</table>

* Indicates significant results (p < 0.05), ** indicates significant results (p < 0.01)

Graph 1. GRFv Example.

Graph 1.

Discussion
• The significant positive correlation with LESS and peak eccentric GRFv suggest the two tests measured similar or related risk factors.
• Since, peak eccentric GRFv has been shown to predict non-contact ACL injury risk1, the significant correlation with the LESS may provide evidence of a modest criterion-related validity for the LESS in predicting ACL injury risk.
• The lack of significant correlation between FMS and LESS suggests that these tests can complement one another for a more comprehensive injury risk assessment than either test alone.

Future Research
• Future research should compare the ability of the FMS, LESS and peak eccentric GRFv to predict injuries, particularly ACL injuries, in isolation or in combination.
• Future research should continue to establish criterion-related validity of the peak eccentric GRFv in regard to the LESS.

Conclusion
• LESS and peak eccentric GRFv may assess similar or related injury risk factors.
• LESS and FMS appear to have little or no overlap in injury risk factor assessment.
• FMS and peak eccentric GRFv appear to assess distinctly different injury risk factors.

References

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