Neuromechanical Factors Associated with College Football Injury Risk

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RESULTS

Table 1. Predictor Cut-Off p-Value* Sensitivity Specificity OR (CLL 95%) OR-Adj (CLL 95%)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>p-Value</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>OR (CLL 95%)</th>
<th>OR-Adj (CLL 95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exp-GP ≥ 2 Games</td>
<td>0.13</td>
<td>75%</td>
<td>65%</td>
<td>2.68 (1.19)</td>
<td>5.89 (2.01)</td>
</tr>
<tr>
<td>WBRA-TT ≥ 358 ms</td>
<td>0.03</td>
<td>87%</td>
<td>34%</td>
<td>3.25 (1.20)</td>
<td>—</td>
</tr>
<tr>
<td>Con Hx Any</td>
<td>0.02</td>
<td>85%</td>
<td>47%</td>
<td>2.96 (1.34)</td>
<td>4.16 (1.26)</td>
</tr>
<tr>
<td>Con Sx Any</td>
<td>0.06</td>
<td>67%</td>
<td>84%</td>
<td>2.59 (1.17)</td>
<td>—</td>
</tr>
</tbody>
</table>

• Univariable and multivariable analysis results for associations of predictive variables with injury occurrence presented in Table 1
• Exp-GP identified as strongest injury predictor (Figure 3); ≥ 2 GP provided optimal cut-point for binary risk cateogorization
• Logistic regression identified 4-factor model: Exp-GP ≥ 2 games, WBRA-TT ≥ 745 ms, WBRA-ATT ≥ 101 s, and Con-positive

Table 2. Risk Factors Injury No Injury Incidence

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Injury</th>
<th>No Injury</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sport-related concussion (SRC)</td>
<td>20</td>
<td>15</td>
<td>57.1%</td>
</tr>
<tr>
<td>Relative OR = 2.53</td>
<td>5.60 (90% CI: 2.50, 12.55)</td>
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<td></td>
</tr>
</tbody>
</table>

• Sport-related concussion (SRC) affects 1.6 to 3.8 million athletes each year,1 which can have long lasting adverse effects
• Deficits in neurocognitive performance, coordination, and balance typically resolve within 7 to 10 days

Figure 2

• Suboptimal neuromechanical performance capabilities may represent modifiable injury risk factors that should be assessed

Figure 3

• Injury defined as any core or lower extremity (LE) sprain or strain that required evaluation and treatment

Figure 4

• Potential confounding effect of differential exposure to game conditions represented by number of games played (Exp-GP)

Figure 5

• Association of each potential binary predictor variable with injury occurrence represented by univariable odds ratio (OR)
• Predictive cut-point for binary risk categorization

Figure 6

• Stratification of data performed to examine relationships among risk factors influencing injury incidence
• Con-positive associated with elevated injury incidence for both high and low Exp-GP subgroups (Figure 4)

Figure 7

• Injury surveillance throughout pre-season practice period and 11-game season; each practice and game counted as 1 exposure

Participants & procedures

• 89 NCAA Division I-FCS football players (20 ±1.3 yrs; 100.6 ±19.2 kg; 183.7 ±6.59 cm) tested during summer conditioning period
• Concussion history (Con Hx) based on attested self-report; current concussion symptom (Con Sx) derived from survey questionnaire
• Injury defined as any core or lower extremity sprain or strain that required evaluation and treatment

REFERENCES