Association of Neuromechanical Responsiveness with Lower Extremity Injury

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BACKGROUND AND PURPOSE

Lower extremity injury is extremely common among athletes, which frequently leads to chronic dysfunction and disability. 

History of time-loss LE injury was reported by 46% of athletes (22/48) representing 6 different sport categories (Table 1)

- Little evidence exists to support specific methods for identification of elevated injury risk or reduction of risk
- Sledding includes Bobsled and Skeleton; Multi-event includes Pentathlon, Track & Field, Triathlon, and Weightlifting
- Although some tests have been validated for specific populations, tests with broad applicability are needed
- ROC and cross-tabulation analyses identified 8 variables strongly associated with history of time-loss LE injury (Table 2)
- Neuromechanical responsiveness may be a critical factor for injury avoidance that may be overlooked by clinicians

Our purpose was to retrospectively assess associations between indicators of neuromechanical responsiveness and history of time-loss LE injury during previous 12 months.

Both factors positive: 100% positive predictive value (7/7) for time-loss LE injury during previous 12 months

Both factors negative: 84% negative predictive value (16/19) for no time-loss LE injury during previous 12 months

Individualized training for improvement of neuromechanical responsiveness may address a highly modifiable risk factor

Whether cause or effect of previous injury, suboptimal Dual-Task VMRT or WBRA test results may elevate injury risk

Table 1. Time-loss Lower Extremity Injury

<table>
<thead>
<tr>
<th>Sport</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
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<tbody>
<tr>
<td>Wrestling</td>
<td>8/12(67%)</td>
<td>4/4(100%)</td>
<td>12/16(75%)</td>
</tr>
<tr>
<td>Sledding</td>
<td>1/3(33%)</td>
<td>2/4(50%)</td>
<td>3/7(43%)</td>
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<tr>
<td>Figure Skating</td>
<td>3/4(75%)</td>
<td>1/3(33%)</td>
<td>4/7(57%)</td>
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48 healthy participants recruited at Olympic Training Center, with all testing completed at a single session

- 34 males: 23.8 ± 4.4 yrs, 178.3 ± 8.9 cm, 80.2 ± 27.8 cm, 64.2 ± 12.8 kg

Training programs focused solely on improvement of neuromuscular performance capabilities may be inadequate

Our findings support emerging evidence that integration of visual, cognitive, and motor processing represents a critically important dimension of the patient evaluation and treatment process

REFERENCES


