Using the King Devick Test as a Measure of Changes in Neurocognitive Decline in Collegiate Men’s Lacrosse Athletes


**Objective:** Explore a method of detecting subconcussive impacts below the threshold of what constitutes a concussion and as a result are difficult to detect/management.

**Background:**
- The King Devick Test has been previously shown to be an accurate and reliable method for identifying athletes with head trauma.
- It is considered a strong candidate to be used as a rapid sideline screening test for concussion.
- The test is based on measurement of the speed of rapid number naming, and captures dysfunction of eye movements, attention and other correlates of suboptimal brain function as a result of a concussive event.
- Any worsening of King-Devick Test from baseline has shown to be indicative of a five-times greater likelihood of concussion.

**Methods:**
- The King Devick Test was administered to 17 NYIT NCAA Division II Men’s Lacrosse athletes over the course of the sports season (i.e. pre, mid, and post-season).
- There were three cards, with each subsequent card being more difficult than the previous.
- The subjects read the numbers out loud to a test administrator, who recorded time to complete each card in seconds (s) and number of errors.
- Data was analyzed by comparing the scores from pre-season, mid-season and post-season using the repeated measures analysis of variance followed by the pairwise comparisons with the pre-season as a reference.
- Statistical significance was evaluated with α=0.05.

**Results:**

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Pre-Season</th>
<th>Mid-Season</th>
<th>Post-Season</th>
<th><em>p-value</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>KDT Total (s)</td>
<td>38.8 (34.4, 42.9)</td>
<td>34.4 (29.4, 38.3)</td>
<td>35.0 (30.3, 39.9)</td>
<td></td>
</tr>
<tr>
<td><strong>Mean Difference</strong></td>
<td>Reference</td>
<td>0.002</td>
<td>0.019</td>
<td>-</td>
</tr>
<tr>
<td>KDT Total</td>
<td>0.4 (0.0, 0.9)</td>
<td>0.9 (0.5, 1.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean Difference</strong></td>
<td>Reference</td>
<td>0</td>
<td>0.5</td>
<td>0.08</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>Reference</td>
<td>1</td>
<td>1.29</td>
<td>0</td>
</tr>
</tbody>
</table>

**Discussion:**
- Decrease in scores were not seen in pre-season to post-season as initially hypothesized.
- The King Devick’s test is normally used as an immediate post-event concussion screening test, however, it’s use as an indicator of subconcussive related impairment could be limited.
- The improvements in King Devick test scores, as seen in King Devick card 1 and 2 can most likely be explained by a learning effect, as seen in previous studies assessing test-retest reliability.
- Card 3 may be too challenging to exhibit statistically significant results.
- King Devick is a statistically validated concussion test, but may not be an appropriate test to use repeatedly, even when tests are spread out by several weeks.

**References:**

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