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

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Introduction

- Sports-related head injuries are the second most common cause of mTBI suffered by young adults from the ages of 15-24
- Even in the absence of a mTBI, pathophysiologic changes in brain function can be seen due to an accumulation of subconcussive impacts
- Subconcussive impacts are impacts below the threshold of what constitutes a concussion and as a result are difficult to detect/manage
- **Objective:** Explore a method of detecting athletes at risk of cerebral impairment caused by subconcussive impacts using the King Devick's Test
- We hypothesize that scores on each card would worsen from the pre-season to post-season

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 (1)
- 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

NCAA DII Lacrosse Athletes Performance in the King Devick's Test Throughout the 2019 Season

Subscale	Pre-Season	Mid-Season	Post-Season	*p-value
KDT Total (s)	38.8 (34.6, 42.9)	34.0 (29.4, 38.5)	35.0 (30.3, 39.8)	-
Mean Difference	Reference	-4.8	-3.7	0.005
**p-value	Reference	0.002	0.019	-
KDE Total	0.4 (0.0, 0.9)	0.4 (0.0, 0.8)	0.9 (0.5, 1.3)	-
Mean Difference	Reference	0	0.5	0.08
**p-value	Reference	1	0.29	0

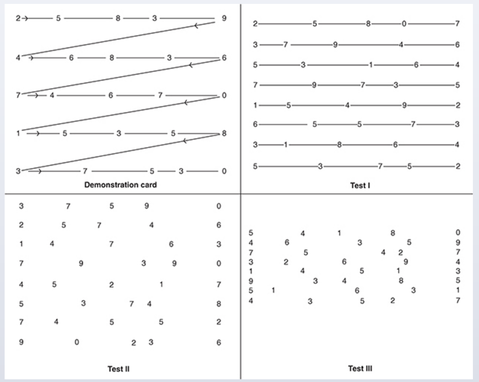

Figure 1. The King Devick Test

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 (4)
- 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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