SACCADIC LATENCY MEASURES ON OCULOMOTOR TRACKING AND KING DEVICK TESTING PERFORMANCE MEASURES IN PEDIATRIC CONCUSSION PATIENTS

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Background:
King-Devick (KD) testing has been a reliable clinical tool used to identify changes in rapid eye movements between fixation points (saccades) after concussion. Other clinical tools such as oculomotor tracking (OMT) devices have been used to assess the extent of visual dysfunction in concussion patients to aid diagnosis, subtyping, and symptom management.

Purpose:
To compare trends in OMT saccadic motion analysis data to KD times/performance in concussed patients.

Methods:
Retrospective study of 66 pediatric patients (ages 12 to 21) with concussion. KD testing was conducted using standard 3 card protocol with a series of numbers which the patient reads aloud in a specific pattern as fast and accurately as possible without head movement. The length of time to complete each card was noted and the three KD times were averaged, resulting in one mean KD value for each patient. Patients were categorized into either a "Fast" (average KD time from 0 - 20 seconds), n=56, or "Slow" group (average KD time above 20 seconds), n=10. Each patient underwent testing with an OMT device during the same visit (250 Hz video-eye tracker), which measured vertical and horizontal saccadic latencies. Statistical analysis using a paired two sample t-test assuming equal variances compared the OMT data between the slow and fast groups. Exclusion criteria included history of visual disorders, learning disorders, seizure disorder, or intracranial hemorrhage.

Results:
The slow KD group had an average vertical saccadic latency of 248.88 ms and a horizontal saccadic latency of 214.66 ms (Table 1). The fast KD group had an average vertical saccadic latency of 217 ms and a horizontal saccadic latency of 196.64 ms. A t-test of vertical latency showed a statistically significant difference between slow and fast groups (p value = 0.002). A T-test of horizontal latency resulted in a p value = 0.069, which may support a statistically significant difference with a larger sample size.

Conclusion:
A potential relationship between patients with slower KD test times and slower horizontal/ vertical saccadic latencies on OMT saccadic analysis may be present. However, these trends will need more testing under larger sample sizes in order to make definitive conclusions.

Table 1: Vertical and Horizontal Latency in Fast vs Slow KD patients

	Fast (0-20 seconds)	Slow (>20 seconds)	P-value (alpha =0.05)
Vertical Latency (ms)	217.00	248.88	0.0021
Horizontal Latency (ms)	196.64	214.66	0.069