

QUANTIFIABLE METRICS OF SACCADIC EYE-MOVEMENT IMPROVE WITH TIME IN CONCUSSED SUBJECTS

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Introduction: Current concussion assessment tools rely on qualitative and subjective methods. Our objective is to quantify metrics of saccadic eye-movement and observe improvement with time in concussed subjects.

Methods: Twenty concussed subjects performed a saccadic eye-movement task, while being concurrently recorded using a webcam and a commercial eye-tracking tool. We developed analysis software for quantifying and comparing the eye tracking movements. Metrics of interest included the time constant (τ [ms]) of a transition event, and the concurrence of eye position before, during, and after each transition.

Results: A significant difference in all parameters between the control and concussed subjects, indicated that concussed subjects had slower transition time and difficulty fixating on a target (Figure 1A). These parameters improve with time in concussed subjects, specifically in the before and during phase of a saccadic eye-movement, * $p < 0.05$ (Figure 1B).

Discussion and Conclusions: Additional eye-tracking tools may help in the understanding and assessment of concussions. These tools could be utilized for possible clinical or diagnostic use.

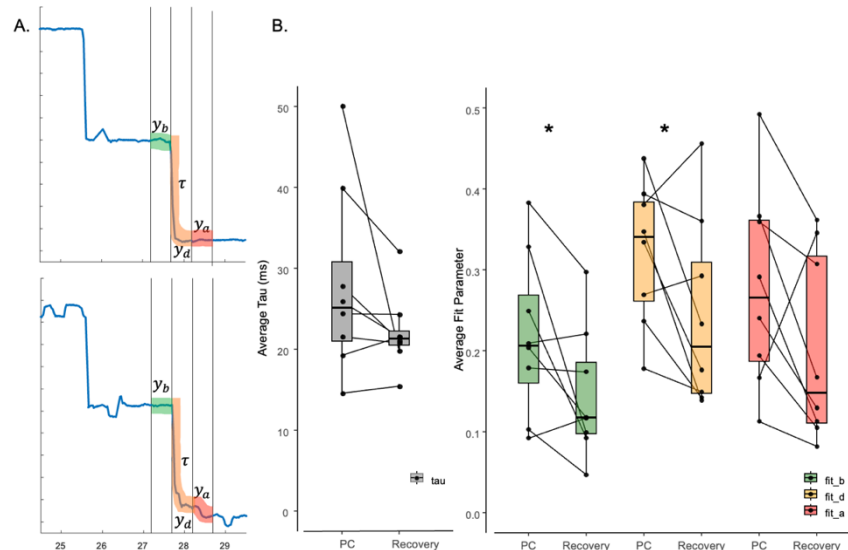


Figure 1A: Comparison of the horizontal displacement of a control (top) and a concussed (bottom) subject's trace during a saccadic eye-movement. **1B:** Saccadic exercise performed in concussed subjects where the average tau (ms) and fits (before, during, and after) are shown post-concussion (3 trials) and into recovery (1-4 trials). Concussed subjects were defined as having/described as having experienced a concussion within the last 6 months, with recovery trials taken 1-3 months after initial trials, $n=8$. * $p < 0.05$

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