

Ocular motility dysfunction

Disconjugate eye movements have been associated with **traumatic brain injury** since ancient times. Ocular motility dysfunction may be present in up to 90% of patients with **concussion** or **blast injury**.

Samadani et al. developed an algorithm for **eye** tracking in which the Cartesian coordinates of the right and left **pupils** are tracked over 200 sec and compared to each other as a subject watches a short film clip moving inside an aperture on a computer screen. They **prospectively** eye tracked 64 normal healthy noninjured control subjects and compared findings to 75 **trauma** subjects with either a positive head **computed tomography** (CT) scan (n=13), negative head CT (n=39), or nonhead injury (n=23) to determine whether eye tracking would reveal the **disconjugate gaze** associated with both structural **brain injury** and concussion. Tracking metrics were then correlated to the clinical concussion measure Sport Concussion Assessment Tool 3 (**SCAT3**) in trauma patients. Five out of five measures of horizontal disconjugacy were increased in positive and negative head CT patients relative to noninjured control subjects. Only one of five vertical disconjugacy measures was significantly increased in brain-injured patients relative to controls. Linear regression analysis of all 75 trauma patients demonstrated that three metrics for horizontal disconjugacy negatively correlated with SCAT3 symptom severity score and positively correlated with total **Standardized Assessment of Concussion score**. Abnormal eye-tracking metrics improved over time toward baseline in brain-injured subjects observed in follow-up. Eye tracking may help quantify the severity of ocular motility disruption associated with concussion and structural brain injury ¹⁾.

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Samadani U, Ritlop R, Reyes M, Nehrbass E, Li M, Lamm E, Schneider J, Shimunov D, Sava M, Kolecki R, Burris P, Altomare L, Mehmood T, Smith T, Huang JH, McStay C, Todd SR, Qian M, Kondziolka D, Wall S, Huang P. Eye Tracking Detects Disconjugate Eye Movements Associated with Structural Traumatic Brain Injury and Concussion. J Neurotrauma. 2015 Jan 12. [Epub ahead of print] PubMed PMID: 25582436.

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