The relationship of brain connectivity markers with clinical outcomes in children recovering from mild traumatic brain injury
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90% of traumatic brain injuries (TBI) are more common in childhood and adolescence than any time in life. 25% of mild TBIs lead to persistent concussion symptoms, leading to a detrimental impact on development.

In 110 child mTBIs, 65% of symptom variance was explained by fMRI (BOLD) connectivity. Poor sleep/fatigue and cognition was linked to reduced connectivity in visual, somatosensory, and default mode networks.

Functional BOLD connectivity and grey matter DMN biomarkers in 110 children at 1 month post-injury was highly predictive of clinical outcomes at 3 months post-injury.

Connectivity markers were next examined following a 4-week melatonin intervention (double-blind, placebo-controlled RCT) in 63 children with persistent concussion symptoms.

Key takeaways
- Brain connectivity markers from imaging in childhood mTBI enabled early identification of brain correlates with common symptoms such as sleep and cognition problems.
- The function-structure profile of core DMN regions in childhood mTBI is highly predictive of future recovery.
- Interventional response was also successfully detected and differentiated by functional and structural brain connectivity markers during a 4-week course of melatonin treatment in children with persistent post-concussion symptoms.
- Connectivity markers in childhood mTBI could provide a robust method to monitor concussion recovery and help stratify these children towards personalized therapeutic interventions.