A Scoping Review on Structural and Functional MRI Modalities Used in Diagnostics of Persistent Post-Concussion Symptoms in Pediatric Populations

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30% of children with an mTBI experience persistent post-concussion symptoms lasting a minimum 4 weeks.

**Background**

- Clinicians rely on clinical history and self-report for PPCS diagnosis.
- Magnetic resonance imaging offers a variety of ways to detect structural and functional images of the brain.
- FUNCTIONAL = Connectivity between neurons and networks.
- STRUCTURAL = Anatomical properties.

**Methods**

**PROCESS:**

- Records through database searching (n = 4,907)
- Records after duplicates removed (n = 4,674)
- Records title and abstract screened (n = 4,674)
- Full-text articles screened (n = 386)
- Studies included in analysis and synthesis (n = 39)

**DATABASES:**

- MEDLINE
- CNAL
- PsycINFO
- EMBASE

**SOFTWARE:**

- EndNote
- Covidence
- Excel

**Preliminary Results**

- Majority of studies utilized functional MRI or white matter scans (diffusion weighted imaging)
- Varying regions of interest

**Discussion**

**OVERALL:**

- Inconsistencies in significant findings is concerning, and calls upon further research to investigate neural underpinnings of PPCS to create clearer definitions and diagnostic criterion.
- Greater fMRI imaging to explore complexities in neural network connections in PPCS.

**STRENGTHS:**

- Comprehensive overview - all MRI modalities and inclusive of ages 0-18.

**LIMITATIONS:**

- Broad definition of PPCS to capture as many studies as possible.

**FUTURE DIRECTION:**

- Systematic review and/or meta-analysis of studies to comment on the effectiveness of study design and results.

References


**Objective**

To synthesize and summarize the results of MRI modalities used in child, youth, and adolescent studies with persistent post-concussion symptoms.