Temporal Lobe Pathology and Increased Somatic Complaints in Pediatric TBI

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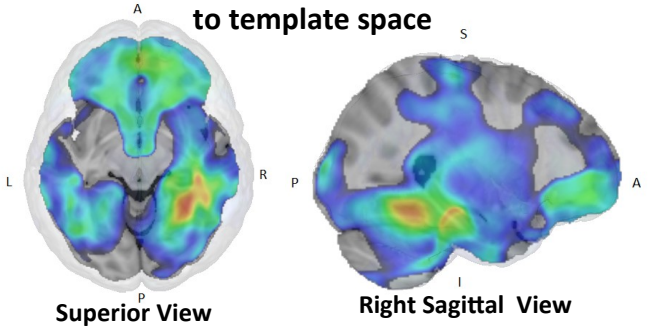
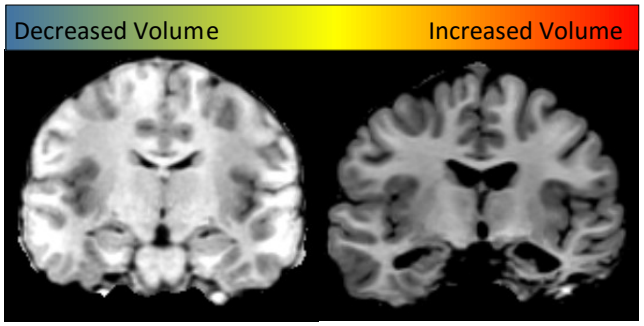
Objective

Individuals who have sustained a traumatic brain injury (TBI), including children, often complain of physical symptoms. The current study examined neuroanatomical alterations of 72 TBI and 50 OI children (8-13 years of age) from the Social Outcomes of Brain Injury in Kids (SOBIK, see Bigler et al. 2013 a,b) investigation. Parents rated the degree of somatic symptoms in their children based onbehavior based on the Behavioral Assessment System for Children (BASC-2).

Heat map of statistical values mapped to template space



Superior View Right Sagittal View

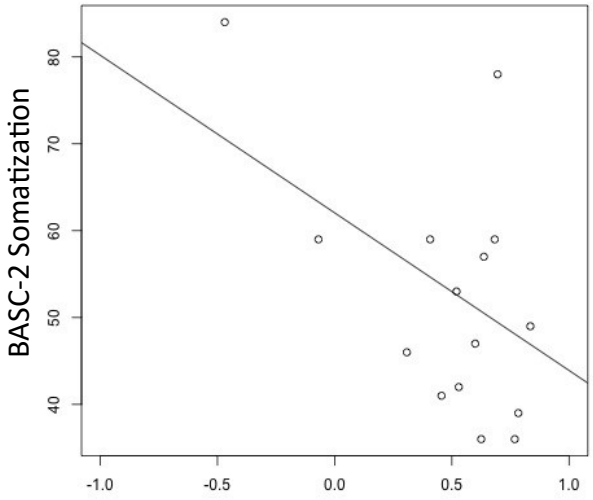


Orthopedic Control Severe TBI

Participants & Methods

Injury severity based on the Glasgow Coma Scale (GCS) was used to subdivide TBI into mild, moderate, and severe injury groups. Voxel-based morphometry was performed using Advanced Normalization Tools (ANTs, https://stnava.github.io/ANTs/) and statistical analyses were performed using the Statistical Parametric Mapping (SPM8) toolbox in Matlab (www.fil.ion.ucl.ac.uk/spm).

Deformation in Relation to Somatization Scores Severe TBI Group



Jacobian Matrix of Subject to Template Deformation

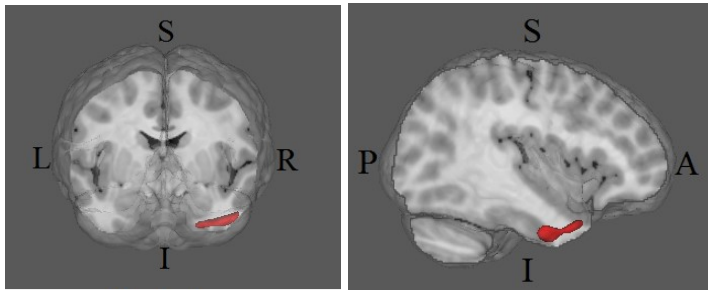
Results

Increased space anterior to the temporal pole was associated with increased reports of somatic symptoms in the severe TBI group. This association was statistically significant at the cluster-level ($p < .05$).

Clusters reflecting volume loss

Brain Region	Voxel Size (mm3)	MNI Peak X	MNI Peak Y	MNI Peak Z	Peak t-Value
Right Temporal Lobe	1,539	34	-47	-8	5.25

Significant clusters mapped to template



Posterior View Right Sagittal View

Conclusions

Reports of somatic symptoms in pediatric TBI were associated with alterations in the right anterior temporal lobe. Specifically, decreased brain volumes in the ventral and polar regions were associated with higher reports of somatization.

Reynolds CR, Kamphaus RW. BASC-2: Behavior Assessment System for Children. Vol 2nd ed. Minneapolis, MN: Psychological Corporation; 2004.

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