

## WHITE MATTER INTEGRITY AND FUNCTIONAL OUTCOME IN CHRONIC TRAUMATIC BRAIN INJURY

Limited prospective research has been conducted to understand the anatomical correlates of rehabilitation outcomes in brain injury. The purpose of the present study was to address this void in the field using magnetic resonance imaging (MRI) and diffusion tensor imaging (DTI), given that DTI has been shown to be sensitive to diffuse axonal injury (DAI) across all severities and in all stages of TBI.

A total of 8 participants received a baseline MRI study on average 37 days following admission (M=37.13 days, SEM=13.96) to an inpatient intensive cognitive rehabilitation program (average length of stay: 105 days, SEM=13.96). Cognitive rehabilitation focused upon areas including attention, processing speed, mental flexibility, visual imagery, categorization, and reasoning.

Both at baseline and discharge, functional abilities were assessed using the Disability Rating Scale (DRS), Centre for Neuro Skills Rating Scale (CNS), Mayo-Portland Adaptability Inventory (MPAI), Living Status Scale, (LSS), Occupational Status Scale (OSS), and Independent Living Scale (ILS).

Correlations between change in DRS, CNS, and MPAI from baseline to discharge were examined relative to fractional anisotropy in the corpus callosum, superior longitudinal fasciculus, cortico-spinal tract, corona radiata (anterior and posterior), forceps minor and forceps major, and cingulum. Of these tracts, integrity of the sagittal stratum was most consistently found to relate to change from baseline to discharge on all three assessments (DRS:  $r=0.938$ ,  $p=0.001$ , CNS:  $r=0.826$ ,  $p=0.011$ , and MPAI:  $r=0.769$ ,  $p=.026$ ).

This study highlights a role for imaging in the rehabilitation setting and provides preliminary support for the sagittal stratum to underlie some functional changes specific to this cognitive rehabilitation program.