



Comparing two processing pipelines to measure subcortical and cortical volumes in patients with and without traumatic brain injury

Purpose

To compare the validity of neuroimaging technologies- NeuroQuant and FreeSurfer by integrating them into a clinical, service member study.

Participants

Service Members (n=148) from the following groups participated in this imaging study: mTBI, orthopedic injury, and PTSD groups. Each group was recruited from local clinic referrals after diagnostic testing.

How was the study conducted?

MRI scans collected the images from every participant, and the two processing systems, NeuroQuant and FreeSurfer, analyzed the given data, producing volume output. Pearson coefficients and Mann-Whitney U tests were run to measure effect size and validity.

Findings

Results concluded that both systems were comparable and valid, although certain areas of the brain were biased for each system. Specifically, the hippocampi and pallidum displayed larger volumes for NeuroQuant, while the lateral ventricles, the amygdali, and forebrain parenchyma volumes appeared larger with the FreeSurfer system. Overall, both systems are able to provide accurate brain volume measurements.

Military Impact

This study has found new ways of analyzing neuroimages that may help with the better diagnosis of TBIs in Veterans and service members.

Reid, M.W., Hannemann, N.P., York, G.E., Ritter, J.L., Kini, J.A., Lewis, J.D., ... & Tate, D.F. (2017). Comparing two processing pipelines to measure subcortical and cortical volumes in patients with and without mild traumatic brain injury. J Neuroimaging, 365-371.