AMERICAN ACADEMY OF NEUROLOGY®

AAN 65th ANNUAL MEETING ABSTRACT

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Abstract Title: The Association of Impaired White Matter Integrity with the Presence and Severity of Depression in Retired National Football League Athletes

Press Release Title: NFL Players May be at Higher Risk for Depression as They Age

Objective: We studied a group of retired National Football League (NFL) players to test the hypothesis that impaired white matter integrity would be associated with the presence and severity of depression.

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Background: Impaired white matter integrity, defined by reduced fractional anisotropy (FA) on diffusion tensor imaging (DTI), is well documented in traumatic brain injury and is also present in subgroups of patients with major depressive disorder. Concussions and subconcussive injuries are common in American style football and these athletes are also at risk for mood disorders.

Design/Methods: Our study population consisted of 26 retired NFL athletes. We measured depression severity using the Beck Depression Inventory II (BDI). Depression was indicated by a BDI score >12, confirmed by clinical interview. Each subject received a DTI scan from which FA maps were created and subsequently analyzed using the tract based spatial statistics module in FSL. We performed correlations between the BDI scores and the FA values using both an unbiased voxelwise approach as well as a region of interest (ROI), tractwise approach. A receiver operating characteristics (ROC) curve using FA to identify subjects with depression was plotted for the significant tract ROIs.

Results: Five subjects were depressed (mean BDI 23.8, range 18-28) and 21 were not (mean BDI 4.2, range 0-11). The voxel-wise analysis identified widely distributed voxels that negatively correlated with BDI scores ($p<0.05$ corrected). The mean FA from four tract ROIs negatively correlated ($p<0.01$) with BDI scores: forceps minor, right frontal aslant tract, right uncinate fasciculus and left superior longitudinal fasciculus. The mean FA of the forceps minor differentiated depressed athletes from non-depressed athletes with 100% sensitivity and 95% specificity.

Conclusions: Depressive symptoms in retired NFL athletes correlate negatively with FA using either an unbiased voxel-wise or an ROI based, tract-wise approach. DTI holds promise as a biomarker for depression in this population.

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