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Abstract Title: Motor Findings in Former National Football League Players

Press Release Title: Repetitive Head Injuries May Not Cause Movement Problems for Former NFL Players

Objective: To examine later-life motor functioning in former National Football League (NFL) players.

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Background: Chronic traumatic encephalopathy (CTE) is associated with prior exposure to repetitive head impacts (RHI) and clinically presents with cognitive, behavior and mood symptoms. Motor disturbances have historically been prominent in former boxers with autopsy-confirmed CTE, but this has not been the case in recent day neuropathological studies among former NFL players with CTE.

Design/Methods: 95 former NFL players (ages 40-69) were compared to 25 same-age male controls were examined using the Movement Disorder Society (MDS) Unified Parkinson’s Disease Rating Scale (MDS-UPDRS), Balance Error Scoring System (BESS), Grooved Pegboard, and cognitive and behavior/mood evaluations. A cumulative head impact index (CHII) estimated RHI exposure. Principal Component Analysis generated clinical function composites. Analysis of Covariance controlling for age and body mass index (BMI) examined group differences on the MDS-UPDRS, BESS, and Grooved Pegboard. Partial correlations (age and BMI adjusted) tested the relationship between the MDS-UPDRS and the CHII and clinical function composite scores.

Results: MDS-UPDRS scores were low for both groups, but significantly higher in the former NFL group (mean[SD]=5.26[4.25]) than in controls (mean[SD]=2.40[3.25]), p=0.020. A majority of NFL subjects received normal ratings on individual MDS-UPDRS items; a subset had slightly abnormal ratings. Former NFL players had worse BESS (p=0.032) and dominant (p=0.007) and non-dominant (p=0.001) Grooved Pegboard scores. The CHII and MDS-UPDRS were not associated (p>0.05). Worse MDS-UPDRS scores correlated with worse psychomotor speed/executive function (p=0.006).

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Conclusions: Former NFL players exhibited statistically significant worse motor function than controls, but their motor test performances were relatively normal and unrelated to RHI exposure. The biomechanics of head trauma in American tackle football may have less impact on motor brain regions compared to boxing. Future macro- and microstructural neuroimaging investigations in former NFL players will test this hypothesis.

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