

**Amyloid PET Across the Cognitive Spectrum in Former Professional and
College American Football Players: Findings from the DIAGNOSE CTE
Research Project**

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Supplementary Materials

Additional File 1

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Algorithm for Diagnostic Categorization

Specific tests, variables, and cutoff scores for this study were determined *a priori* to group participants into one of four categories: cognitively normal (CN), subjective memory complaints (SMC), mild cognitive impairment (MCI), and dementia (DEM). The Cognitive Complaint Index (CCI, Items 1-12) (1), Neuropsychological Assessment Battery (NAB) List Learning Test delayed recall T-score (2,3), and the Functional Activities Questionnaire (FAQ) total score (4), are included as measures of subjective memory complaints, objective verbal episodic memory, and functional dependence, respectively. A cutoff score of > 16 on the CCI was used to represent meaningful subjective memory complaints (C+). A NAB T-score ≤ 35 (i.e., performance ≥ 1.5 SD worse than age, sex, and education norms) was used to indicate episodic memory impairment (M+). A cutoff of ≥ 9 on the FAQ was used to indicate functional dependence (D+). The following algorithm was used to classify participants: CN = all three measures not beyond cutoff (C–M–D–); SMC = CCI beyond cutoff and NAB and FAQ scores not beyond cutoff (C+M–D–); MCI = CCI and NAB scores beyond cutoff and FAQ score not beyond cutoff (C+M+D–); DEM = CCI, NAB, and FAQ scores all beyond cutoff (C+M+D+).

Supplemental Tables

Supplementary Table 1. Proportion of Positive Amyloid PET Scans by Age within Exposure

Characteristic	Group			<i>P</i> value ^a
	Former Professional Football Players (PRO) (n=119)	Former College Football Players (COL) (n=60)	Unexposed (UE) (n=58)	
Positive florbetapir PET scans by decade, n (%)				
45-54	0 (0.00)	1 (5.0)	0 (0.00)	0.08
55-64	5 (25.0)	0 (0.00)	0 (0.00)	
65-74	5 (25.0)	6 (30.0)	3 (15.0)	

Abbreviations: PRO, former professional American football players; COL, former college football

players; UE, men without a history of exposure to repetitive head impacts. ^aBased on Pearson's chi-square test.

Supplementary Table 2. Correlations^a of Florbetapir PET Average SUVR with Clinical Measures and Years of Football

Predictor	Estimate	P-Value	n	CI
FAQ	0.09	0.27	158	(-0.07, 0.25)
MoCA T-score	-0.07	0.41	159	(-0.23, 0.09)
NAB LL Trials 1-3 T-score	-0.06	0.49	159	(-0.23, 0.10)
NAB LL Short Delay T-score	0.04	0.62	159	(-0.12, 0.20)
NAB LL Long Delay T-score	0.01	0.94	159	(-0.15, 0.17)
Total years of Football	-0.10	0.17	159	(-0.27, 0.05)

^aEstimates following *P*-value adjustment based on partial r-squared values representing the squared semi-partial correlations after adjusting for all other background covariates. Abbreviations: FAQ Functional Activities

Questionnaire⁴ total score; MoCA, Montreal Cognitive Assessment; NAB, Neuropsychological Assessment Battery³

Note: Race, education, age, and APOEε4 status were used as background covariates in all models.

References for Supplementary Materials

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