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BACKGROUND

- Skeletal muscle quality and mass are critically important for maintaining physical function during advancing age.
- CT muscle density provides an estimate of fatty infiltration of muscle, with lower density indicating greater fatty infiltration.
- We leveraged baseline data from REPRIEVE to characterize paraspinal muscle density (MD) and muscle area (MA), and evaluate whether they are associated with cardiac or physical function outcomes in people with HIV (PWH).

METHODS

- REPRIEVE is a double-blind randomized trial evaluating the effect of pitavastatin for primary prevention of coronary artery disease (CAD) in PWH. This cross-sectional analysis focuses on participants who underwent coronary CT at baseline.
- Lower thoracic paraspinal MD (Hounsfeld units, HU) and MA (cm²) were assessed on non-contrast CT image (Figure 1). MA was divided by height (MA/HT) to allow examination of associations across various body sizes.
- Associations were evaluated using log-binomial regression (binary outcome measures) and linear regression models (continuous outcome measures). Unless specified otherwise, models were adjusted for age, natal sex and BMI.
- Parameter estimates are shown per 1 SD shift in covariate: 17.74 HU for MD and 4.95 cm²/m for MA/HT, and are plotted in the log scale for visual purposes (for binary measures).

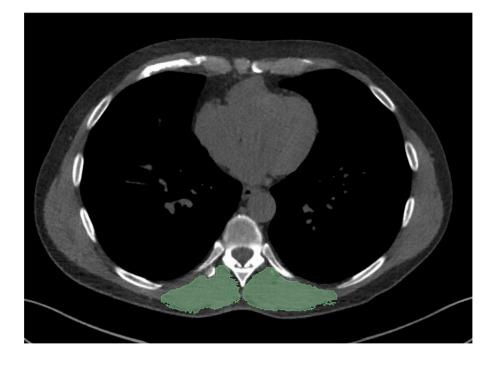


Figure 1. Paraspinal Muscle on Non-Contrast CT Scan, in green

RESULTS

- Of 805 708 PWH, paraspinal measurements (139) had physical function measures) Median age was 51 (Q1, Q3: 46, 55) years; 17% were natal
- female, 53% White, 36% Black, and 25% Hispanic.

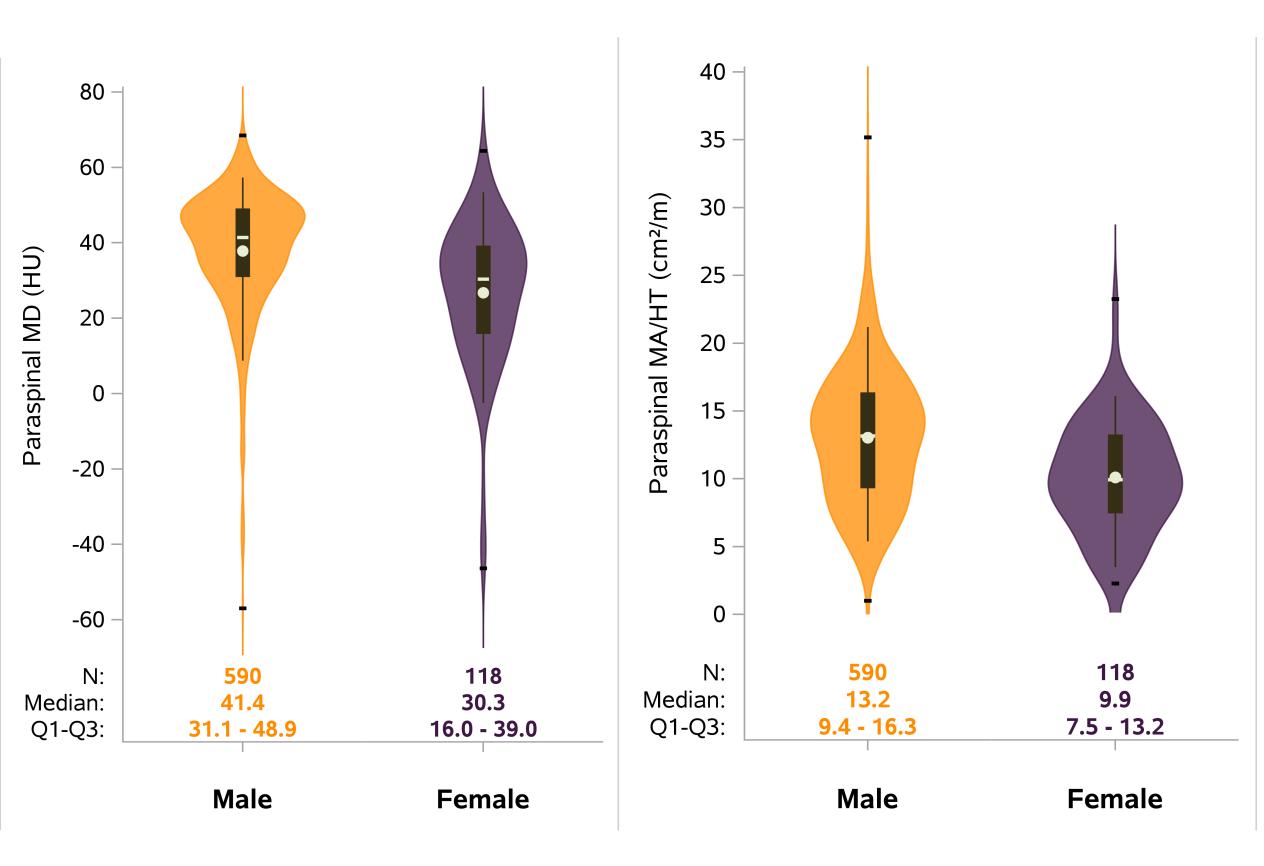


Figure 2. Paraspinal MD and MA/HT among males and females (baseline)



MUSCLE QUALITY IS ASSOCIATED WITH CORONARY ARTERY PLAQUE AND PHYSICAL FUNCTION IN PEOPLE WITH HIV

had

Among PWH, greater paraspinal muscle density was associated with lower prevalence of coronary artery disease and higher muscle area was associated with better physical performance.

RESULTS (continued)

• Lower MD (as outcome) was associated with older age, female sex, thymidine analogue exposure, greater BMI and waist and hsCRP, MCP-1, sTNFR-1, circumference. inflammatory index score (data not shown). • Smaller MA/HT (as outcome) was associated with older age,

female sex, non-Black race, greater ASCVD risk, and MCP-1 (data not shown).

Figure 3. Associations between paraspinal MD and MA/HT with CT-based plaque measures. (a) Adjusted for Age and Natal Sex

Outcome	Ν		Estimate 95% CI	P-value	Muscle density	
Presence of Plaque					but not muscle	
Paraspinal MD	684	⊢♠⊣	0.91 (0.87, 0.96	6) <0.001	area was	
Paraspinal MA/HT	684	⊢_	0.97 (0.90, 1.05	5) 0.44		
Calcium Score >0					associated with the	
Paraspinal MD	658	⊢	0.89 (0.81, 0.97) 0.013	presence of	
Paraspinal MA/HT	658	⊢ ♦ −1	0.97 (0.87, 1.07) 0.50	coronary plaque	
Leaman Score >5					and calcium score	
Paraspinal MD	673	⊢ → 1	0.87 (0.75, 1.00) 0.06	>0 in analyses	
Paraspinal MA/HT	673	⊢	→ 0.97 (0.81, 1.16	6) 0.72		
					adjusted for age	
	0.6	0.8 1 Relative Risk per SD shift in cova	1.2 1.4 ariate		and natal sex (Figure 3a).	
(b) Adjusted for AS		Relative Risk per SD shift in cova			and natal sex	
(b) Adjusted for AS Outcome		Relative Risk per SD shift in cova		P-value	and natal sex (Figure 3a).	
	CVD Risk	Relative Risk per SD shift in cova	ariate	P-value	and natal sex (Figure 3a).	
Outcome	CVD Risk	Relative Risk per SD shift in cova	ariate		and natal sex (Figure 3a).	
Outcome Presence of Plaque	CVD Risk N	Relative Risk per SD shift in cova Score	ariate Estimate 95% CI	0) 0.046	and natal sex (Figure 3a). These associations	
Outcome Presence of Plaque Paraspinal MD	CVD Risk N 684	Relative Risk per SD shift in cova Score	ariate Estimate 95% CI 0.94 (0.88, 1.00	0) 0.046	and natal sex (Figure 3a). These associations were attenuated in	
Outcome Presence of Plaque Paraspinal MD Paraspinal MA/HT	CVD Risk N 684	Relative Risk per SD shift in cova Score	ariate Estimate 95% CI 0.94 (0.88, 1.00	0) 0.046 7) 0.89	and natal sex (Figure 3a). These associations were attenuated in models adjusted	
Outcome Presence of Plaque Paraspinal MD Paraspinal MA/HT Calcium Score >0	CVD Risk N 684 684	Relative Risk per SD shift in cova Score	eriate Estimate 95% Cl 0.94 (0.88, 1.00 0.99 (0.92, 1.07	0) 0.046 7) 0.89 0) 0.05	and natal sex (Figure 3a). These associations were attenuated in models adjusted for ASCVD risk	
Outcome Presence of Plaque Paraspinal MD Paraspinal MA/HT Calcium Score >0 Paraspinal MD	CVD Risk N 684 684 658	Relative Risk per SD shift in cova Score	Estimate 95% Cl 0.94 (0.88, 1.00 0.99 (0.92, 1.07 0.91 (0.83, 1.00	0) 0.046 7) 0.89 0) 0.05	and natal sex (Figure 3a). These associations were attenuated in models adjusted	
Outcome Presence of Plaque Paraspinal MD Paraspinal MA/HT Calcium Score >0 Paraspinal MD Paraspinal MA/HT	CVD Risk N 684 684 658	Relative Risk per SD shift in cova Score	Estimate 95% Cl 0.94 (0.88, 1.00 0.99 (0.92, 1.07 0.91 (0.83, 1.00	0) 0.046 7) 0.89 0) 0.05 3) 0.61	and natal sex (Figure 3a). These associations were attenuated in models adjusted for ASCVD risk	

Relative Risk per SD shift in covariate

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and the

RESULTS (continued)

Figure 4. Associations between paraspinal MD and MA/HT with physical function. (a) Models for Categorical Physical Function Measures Ν Outcome

Impairment by DASI			
Paraspinal MD	708		
Paraspinal MA/HT	708		
Impairment by SPPB			
Paraspinal MD	139		
Paraspinal MA/HT	139		
Frailty/Pre-frailty			
Paraspinal MD	137		
Paraspinal MA/HT	137		
	0	6 F	

Outcome

Composite mSPPB

Paraspinal MD	139	
Paraspinal MA/HT	139	
Gait Speed (m/s)		
Paraspinal MD	139	F
Paraspinal MA/HT	139	
	0 1	
	-0.1	-

Outcome

Chair Rise Rate (rises/min)						
Paraspinal MD	139					
Paraspinal MA/HT	139					
Grip Strength (kg)						
Paraspinal MD	138					
Paraspinal MA/HT	138					

Muscle *area* but not muscle density was associated with some (not all) measures of physical function.

MMARY

- function.
- apparent.
- We also found associations of lower paraspinal MD or MA with greater inflammatory markers.
- _astly, we found modest associations between thoracic MA and measures of physical function and frailty, although these assessments were limited by a small sample size.
- Overall, these findings provide novel evidence of a link between MD and CVD among PWH.
- Whether incorporating measures of MD, MA, or muscle function into cardiovascular risk models may improve prediction among PWH can be further evaluated within the REPRIEVE longitudinal trial, in addition to better understanding the cause or effect of associations identified here.



DASI = Duke Activity Status Index **SPPB**= Short Physical Performance Battery **mSPPB**= modified SPPB **MD** = muscle density **MA/HT** = muscle area, adjusted for height

648

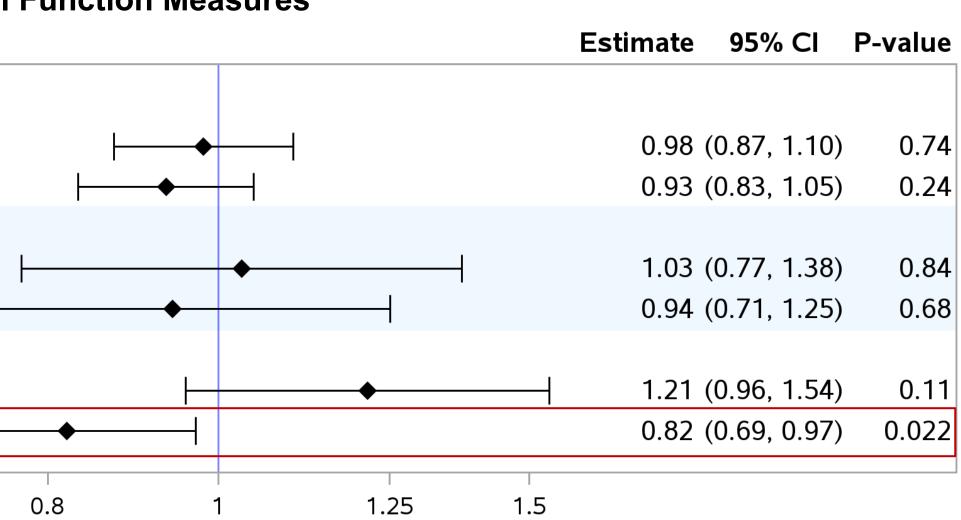
P-value

0.60

0.012

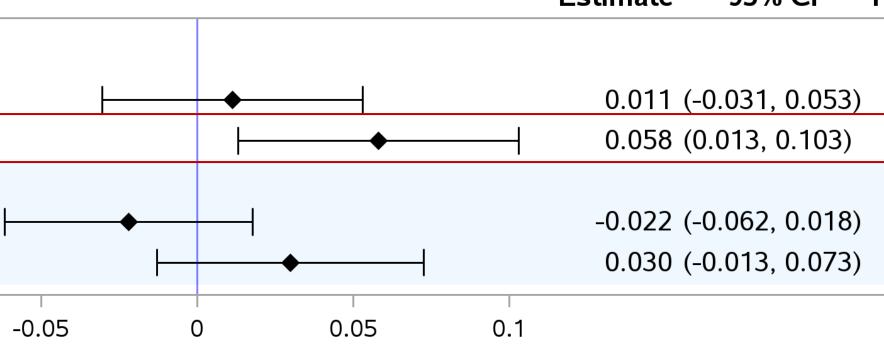
0.28

0.17



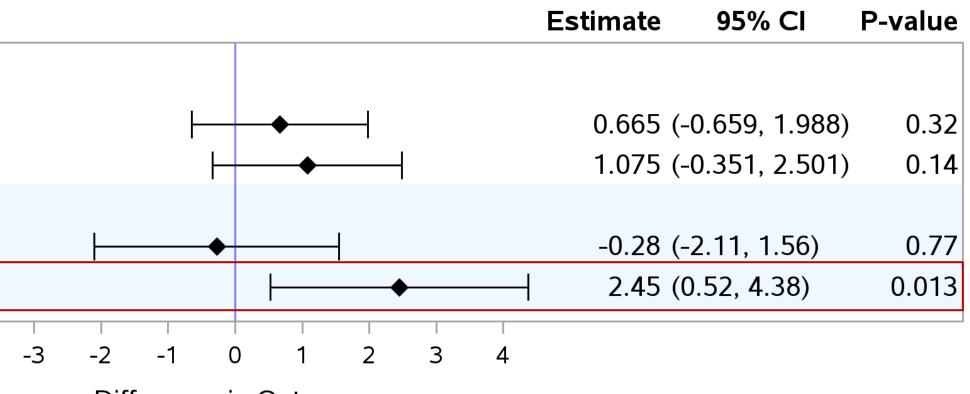
per SD shift in covariate

(b) Models for Continuous Physical Function Measures: mSPPB and Gait Speed Estimate 95% Cl



Difference in Outcome per SD shift in covariate

(c) Models for Continuous Physical Function Measures: Chair Rise and Grip Strength



Difference in Outcome per SD shift in covariate

We present the first data on associations of cardiac CT-based muscle measures with coronary artery plaque and physical

Lower paraspinal MD was associated with several markers of greater plaque burden, while no associations with MA were