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MUSCLE QUALITY AND PHYSICAL FUNCTION IN MEN WITH AND WITHOUT HIV

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BACKGROUND

- Data on muscle area and density and their impact on physical function are limited among people with and without HIV (PWH and PWoH).
- Lower muscle density indicated more fatty infiltration.
- We assessed associations of individual and aggregated abdominal and thigh muscle area and density with longitudinal physical function among PWH and PWoH.

METHODS

- We used data from Multicenter AIDS Cohort Study (MACS), a cohort of men who have sex with men.
- Single-slice computed tomography scans were analyzed for left and right abdominal and thigh muscle (lateralis, rectus, psoas, paraspinal, quadriceps, and hamstring muscle) area and density.
- Gait speed and grip strength were evaluated twice annually using standard methods from the index visit up to 5 years later.
- Aggregated muscle quality was summarized using factor analysis.
- We assessed the longitudinal association of gait speed and grip strength by baseline muscle area and density using multivariable linear regression models with a generalized estimating equation.

RESULTS

- Of 798 men, 61% were HIV seropositive, median age was 54 years (IQR 49-59), 61% were white, 32% black, 10% Hispanic, 22% had BMI>30 kg/m2, and 14% had diabetes.
- Older age, Black race, Hispanic ethnicity, diabetes, high total cholesterol, and low high-density lipoprotein were independently associated with slower gait speed; and Black race and Hispanic ethnicity with lower grip strength.
- All individual muscle density and area was associated with gait speed and grip strength, independent of demographic, BMI, glycemic status, and cholesterol level.

Gait speed was associated with overall muscle density (fatty infiltration). Grip strength was associated with both muscle density and area.

Table 1. Results of exploratory factor analysis on muscle area and density with a four-factor solution in Multicenter AIDS Cohort (MACS)

Muscle quality		Factor Loadings				Communality*
		Factor1	Factor2	Factor3	Factor4	
Abdominal muscle area	Right Lateralis	-0.00173	0.79038	0.33343	0.14012	75.6
	Left Lateralis	-0.00904	0.80887	0.31106	0.14123	77.1
	Right Rectus	0.34423	0.51861	-0.39248	0.52267	81.5
	Left Rectus	0.27755	0.55254	-0.41016	0.51196	81.3
	Right Psoas	0.25326	0.59407	-0.48869	-0.41539	82.8
	Left Psoas	0.25038	0.62424	-0.47084	-0.40284	83.6
	Right Paraspinal	0.17229	0.66561	0.57522	0.05070	80.6
	Left Paraspinal	0.16683	0.67856	0.56459	0.04339	80.9
Thigh muscle area	Quadriceps	0.24599	0.69311	-0.16981	-0.17142	59.9
	Hamstring	0.16735	0.60073	-0.15155	-0.19014	44.8
Abdominal muscle density	Right Lateralis	0.84357	-0.28375	0.09668	0.05508	80.5
	Left Lateralis	0.83536	-0.27448	0.10449	0.02557	78.5
	Right Rectus	0.71820	-0.15192	-0.17288	0.42286	74.8
	Left Rectus	0.73172	-0.1553	-0.16737	0.41785	76.2
	Right Psoas	0.79711	-0.01562	-0.08152	-0.27508	71.8
	Left Psoas	0.80257	-0.02281	-0.08232	-0.28200	73.1
	Right Paraspinal	0.80078	-0.02675	0.29050	-0.14994	74.9
	Left Paraspinal	0.81661	-0.04481	0.28950	-0.14847	77.4
Thigh muscle lean density	Quadriceps	0.68067	-0.1974	0.09036	0.00763	51.0
	Hamstring	0.72718	-0.29474	0.06342	-0.07146	62.5
Eigenvalues**		6.51	4.67	1.96	1.54	
% of the total variance		32.5%	23.4%	9.8%	7.7%	
Total Variance					73.4%	

*Communality is defined as the proportion of each muscle measurement's variance that can be explained by the retained factors. Variables with high values are well represented, variables with low values are not well represented.
**Eigenvalue is the variance of the factor; expect the first factor to account for the most variance.

RESULTS (Cont.)

- Factor analysis generated 4 factors that represented 73.4% of the variance in all muscle quality (**Table 1**).
- Faster gait speed was associated with overall muscle density: every unit increase in overall muscle density (**Figure 1, factor 1**) was independently associated with 0.03 meter/second (95% CI: 0.02, 0.04, p<0.01) faster gait speed.
- Grip strength (**Figure 2**) was associated with muscle density (**factor 1**), muscle area (**factor 2**), and combined abdominal muscle area and density (**factor 3 and 4**).

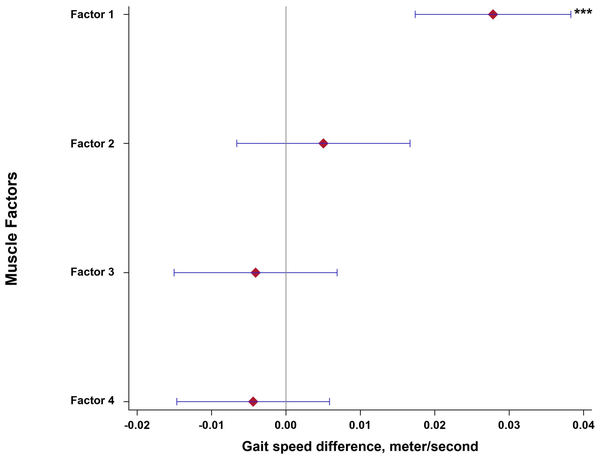


Figure 1. Gait speed difference by every unit increase in muscle quality factors

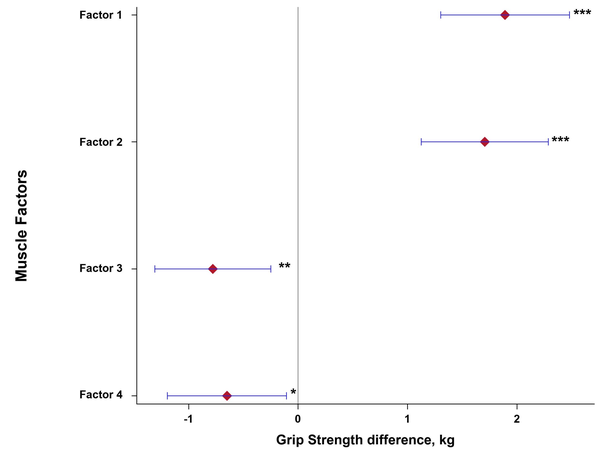


Figure 2. Grip strength difference by every unit increase in muscle quality factors

CONCLUSIONS

- Gait speed was mainly associated with overall muscle density (fatty infiltration). Grip strength was associated with both muscle density and area.
- These results highlight the importance of studying both muscle density and area to guide intervention and long term care to improve physical function among people living with HIV.

Questions or Comments:

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