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EFFECTS OF HIV, AGE, AND SEX ON SKELETAL MUSCLE MASS AND DENSITY

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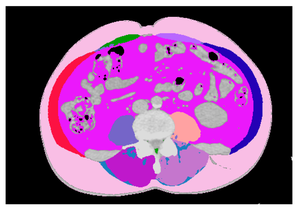
BACKGROUND

- Lower muscle density due to ectopic fat in skeletal muscle is associated with worse physical function.
- Muscle density declines with antiretroviral therapy (ART) initiation.
- Both muscle density and area decline with increasing age in persons with HIV, though data in women is limited.
- We examined the effects of age, sex, and HIV serostatus on muscle density to understand potential mechanisms of impaired physical function.

METHODS

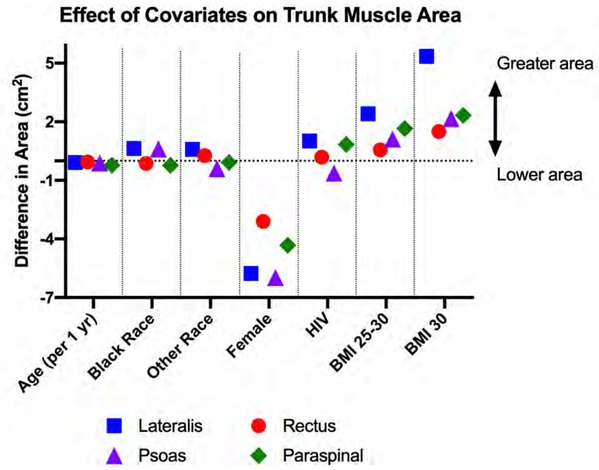
- Men and women with and without HIV in the musculoskeletal substudies of the Multicenter AIDS Cohort Study (BOSS) and Women's Interagency HIV Study (MSK) were included.
- Participants underwent L4-L5 computed tomography scans to quantify total density (Hounsfield Units, HU) and area (centimeters^2) of four trunk muscle groups.
- We identified factors associated with muscle density and area using generalized linear regression models.
- Exploratory analyses investigated the association between muscle density and area with gait speed and grip strength.

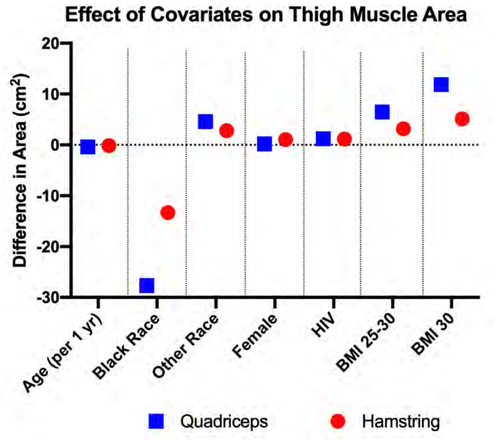


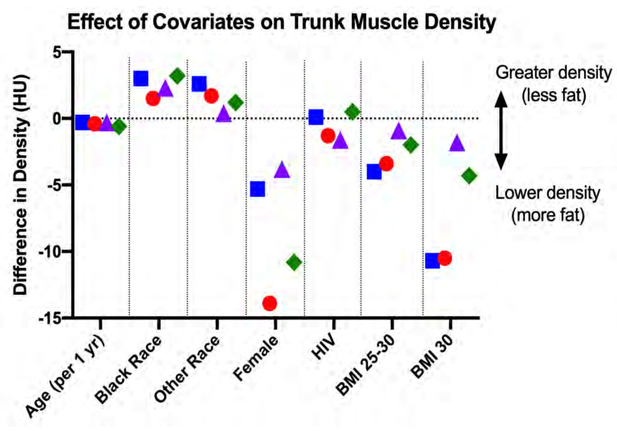
RESULTS

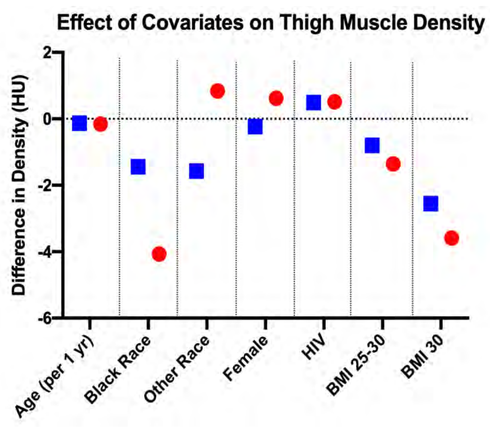
- 387 men (198 with HIV) and 184 women (118 with HIV) had available CT scans.
- Among men, mean age was 64, 20% were black, 13% current smokers, and 19% were obese (BMI ≥30 kg/m^2).
- Among women, mean age was 50, 51% were black, 53% current smokers, and 44% were obese. All with HIV were on ART.
- In sex-stratified models of trunk muscles, the association between HIV serostatus and trunk muscle area was only seen in men; HIV serostatus was not associated with density.
- In sex-stratified models of leg muscles, greater quadriceps area was associated with HIV serostatus only among women.

Older age and female sex were associated with smaller, fattier muscle. HIV was associated with smaller, fattier trunk musculature, but larger, more dense thigh muscles. These findings may have important functional implications.









RESULTS (CONTINUED)

Trunk Muscle Density & Area and Physical Function:

- Greater *density* of lateralis, rectus, and psoas, and spinalis (p≤0.01)was associated with faster gait speed among men but not among women (p≥0.09).
- Trunk muscle *area* was not associated with gait speed among men or women (p≥0.06).
- Greater *density* of lateralis, psoas, and spinalis (p≤0.004) was associated with stronger grip in men but not women (all p≥0.20).
- Greater *area* of the lateralis, rectus, psoas (p≤0.04) but not lateralis (p=0.07) was associated with stronger grip among men, and of the psoas and spinalis (p≤0.01) among women.

Leg Muscle Density & Area and Physical Function:

- Among men, greater quadriceps (p=0.003) area but not hamstring *density* (p=0.1) was associated with faster gait; no association was seen among women (p≥0.18).
- Quadriceps (p=0.03) and hamstring (p=0.008) *area* were associated with faster gait speed among women but not among men (p≥0.28).
- Greater quadriceps (p<0.001) but not hamstring (p=0.12) density were associated with stronger grip among men; neither quadriceps (p=0.80) or hamstring density (p=0.07) were significantly associated with grip in women.
- Greater quadriceps and hamstring area (p≤0.01) were associated with stronger grip in both men and women.

CONCLUSIONS

- Older age and being a woman were associated with smaller, fattier muscle; obesity was associated with larger and fattier muscle.
- HIV serostatus was associated with lower area and density of some trunk musculature, but greater area and density of thigh musculature.
- Greater trunk muscle *density* was associated with better gait/grip more than trunk muscle area. In contrast, leg muscle *area* but not density was associated with better function. The link between muscle density and function were most pronounced among men.
- The longitudinal associations between muscle function, density, and area among men and women with HIV, and the impact of interventions such as statins, diet, and exercise should be investigated.

CONTACT & ACKNOWLEDGEMENTS

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