
BACKGROUND: Sarcopenia is defined as the loss of skeletal muscle mass and function associated with aging. Muscle mass can be reliably and accurately quantified using clinical CT scans but reference measurements are lacking, particularly in healthy US populations.

METHODS: Two-phase CT scans from healthy kidney donors (age 18-40) at the University of Michigan between 1999-2010 were utilized. Muscle mass was quantified using two thoracic and two lumbar muscle cross-sectional area (CSA) measures. Indexed measurements were computed as area divided by height-squared. Paired analyses of non-contrast and contrast phases and different Hounsfield Unit (HU) ranges for muscle were conducted to determine their effect on CSA muscle measures. We report the means, standard deviations, and 2SD sarcopenia cutoffs from this population.

RESULTS: Healthy population CSA (cm²) cutoffs for N=604 males/females respectively were: 34.7/20.9 (T12 Dorsal Muscle), 91.5/55.9 (T12 Skeletal Muscle), 141.7/91.2 (L3 Skeletal Muscle), 23.5/14.3 (L4 Total Psoas Area), and 23.4/14.3 (L4 Psoas Muscle Area). Height-indexed CSA (cm²/m²) cutoffs for males/females respectively were: 10.9/7.8 (T12 Dorsal Muscle), 28.7/20.6 (T12 Skeletal Muscle), 44.6/34.0 (L3 Skeletal Muscle), 7.5/5.2 (L4 Total Psoas Area), and 7.4/5.2 (L4 Psoas Muscle Area). We confirmed that a mask of -29 to 150 HU is optimal and shows no significant difference between contrast-enhanced and non-contrast CT scan CSA measurements.

CONCLUSIONS: We quantified reference values for lumbar and thoracic muscle CSA measures in a healthy US population. We defined the effect of IV contrast and different HU ranges for muscle. Combined, these results facilitate the extraction of clinically valuable data from the large numbers of existing scans performed for medical indications.