The use of ultrasound for the estimation of muscle mass: one site fits most?

During the last two decades, DXA-derived appendicular lean soft tissue mass has served as a major criterion for diagnosing the age-related loss of skeletal muscle mass (i.e. sarcopenia).[1] From a clinical perspective, however, DXA measurements are costly, and the device has limited availability. A possible alternative method for measuring muscle size (e.g. muscle thickness) in humans may be B-mode ultrasound. It is well known that ultrasound is a non-invasive, quick, valid, and reliable imaging technique to estimate muscle thickness in muscles of the extremity and trunk.[2,3]

With this in mind, we read with great interest the article by Nijholt and colleagues[4] where they reported the validity and reliability of ultrasound to quantify musculature in older adults. The authors also reported on two prediction equations for estimating DXA-derived muscle mass. Although not reported within this paper, we previously noted that two of those prediction equations selected by Nijholt et al. included systematic error.[5] Over the last couple of years, we have published several prediction equations for estimating DXA-derived appendicular lean mass in older adults.[6–8] Unfortunately, those equations were not included in the article by Nijholt et al.[4] Interestingly, a single site measurement of forearm muscle thickness was found to be good predictor of DXA-derived lean soft tissue mass in older Caucasian adults,[6] and the equation was also found to be accurate in older Japanese adults.[7] Notably, the standard error of the estimate was 1.95 kg for the equation that used a single muscle thickness site, whereas the standard error of the estimate of the equation that included eight predictors was 1.13 kg.[6] The amount of time required for a single ultrasound measurement is generally less than 1 min per person, so this estimate appears both valid and pragmatic.

In summary, our previous studies[6,7] suggest that forearm muscle thickness measurements are a tolerable and less demanding assessment to use for older adults, and ultrasound estimated appendicular lean mass from the forearm muscle thickness may be a useful indicator for evaluating muscularity in older adults. Although additional research is needed, our recent work along with others noted within the Nijholt et al.[4] review may be useful with the development of ultrasound evaluation for health screenings as well as for the primary diagnosis of sarcopenia.

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