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). 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.

With this in mind, we read with great interest the article by Nijholt and colleagues 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. Over the last couple of years, we have published several prediction equations for estimating DXA-derived appendicular lean mass in older adults. Unfortunately, those equations were not included in the article by Nijholt et al. Interestingly, a single site measurement of forearm muscle thickness was found to be a good predictor of DXA-derived lean soft tissue mass in older Caucasian adults, and the equation was also found to be accurate in older Japanese adults. 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. 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 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. 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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