

Response to: “The use of ultrasound for the estimation of muscle mass: one site fits most?”

We thank Takashi Abe, Jeremy P. Loenneke, and Robert S. Thibaud for their valuable response to our systematic review in their Letter entitled “The use of ultrasound for the estimation of muscle mass: one site fits most?”¹

We feel encouraged by their response that ultrasound has the potential to play an important role in assessing muscle mass in daily practice in the future. The authors remarked that we included only two studies in our systematic review that evaluated the validity of ultrasound-derived prediction equations for the prediction of muscle mass in older adults.² The authors elaborate on three other studies that indicate that forearm muscle thickness measurements could be used for the prediction of muscle mass in older adults. Although these articles provide additional information on the possibilities of muscle ultrasound for the prediction of muscle mass, we did not include these three articles in our systematic review because these articles were published later than the period included in our search,^{3,4} or did not meet our inclusion criterion for age.⁵

The authors’ suggestion of using forearm muscle thickness measurements for the prediction of muscle mass is interesting for daily practice. It is very promising that the size of peripheral muscles is associated with (whole body) muscle mass. However, we do not fully agree with the statement that one site fits most. Despite the fact that the current definitions of sarcopenia and malnutrition focus on the assessment of (whole body) muscle mass,^{6,7} we would like to emphasize that the assessment of peripheral muscles is of utmost importance. It has previously been observed that the loss of muscle mass is not uniform across all muscles.⁸ In general, the loss of muscle mass of the lower limbs is a consequence of inactivity, whereas the loss of muscle mass in the upper limbs is more prone to nutritional depletion.⁹ This illustrates the importance of assessing peripheral muscles. Peripheral muscles can be quantified using muscle ultrasound, but muscle ultrasound can also be used to qualify the muscle, e.g. to assess the amount of intramuscular fat and scar tissue. These changes in muscle quality result in increased echogenicity, i.e. the reflectance of the emitted ultrasound signal,¹⁰ and are associated with decreased muscle function in older adults.¹¹ These findings implicate that not only the

size of the muscle matters but also the composition of muscles needs to be assessed.

In summary, we agree with Abe, Loenneke, and Thibaud that ultrasound has high potential for the assessment of muscles in daily practice. However, we believe that assessing peripheral muscles is equally, or may be even more, important than the prediction of muscle mass. Therefore, we propose a paradigm shift from the assessment of (whole body) muscle mass to quantifying and qualifying peripheral muscles.

Acknowledgements

The authors declare that no conflict of interest relevant to this article exists. The authors certify that they comply with the ethical guidelines for authorship and publishing of the *Journal of Cachexia, Sarcopenia and Muscle*.¹²

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