

Ultrasonographic muscle screening in combination with gait analysis: the ultimate combo in frailty screening

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The research experience on the spatiotemporal disentanglement of the gait cycle in relation to muscle strength and muscle mass is limited. To what extent muscle quality, strength and structure, results in a specific change in these gait characteristics and relates to sarcopenia is not yet defined. A study on gait and muscle strength concluded that the quadriceps muscle strength influenced gait speed in men and women. The hip flexion and abduction muscle strength were associated with gait cycle variability in women. On the other hand, the research on the association between muscle structure and gait characteristics showed varying results with Dual-energy X-ray absorptiometry (DXA) or Bioelectrical Impedance Analysis (BIA). A study using DXA associated higher intra-muscular fat deposit with a decrease in gait speed and cadence and an increase in step-time and step-width in community dwelling older adults. Higher muscle density was related to smaller step width. Measurements with Direct Segmental Multi-frequency(DSM)-BIA, however, showed that the Fat-free Mass Index was associated with step time and double support time variability. Relative Muscle Mass seemed the most significant independent body composition parameter to influence gait quality. The relation was seen with gait speed, mean step length and swing time variability. Step width and cycle time variability were more related to body fat mass and relative fat mass. So far one might conclude that the results on the present muscle imaging techniques are volatile.

A new research protocol combines gait analysis, DSM-BIA and regular sarcopenia screening with ultrasonographic muscle screening, a focused imaging of muscle structure, muscle mass and fat infiltration. The correlation between the different technics focused on the key muscle groups might sort out the direct relation between these variables and clarify the link to sarcopenia and disability This might clarify the possible use of these techniques for frailty screening. Presentation of the study protocol.