Letter to the Editor

Are muscle weakness and falls status really correlated in physically active women? 

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We read with great interest and enthusiasm the original article by Crozara and colleagues (2016). They discriminated older adults with a recent history of falling from older non-fallers, through the assessment of neuromuscular function of lower limb muscles. Despite its promising impact, we believe that a couple of methodological flaws need to be discussed.

First, the significant results (e.g. correlations between the level of lower-extremity muscle activation and power and number of falls) may have been “contaminated” by the baseline differences between older non-fallers and fallers. Definitively, we also support the assumption that the knee and ankle muscle weakness is a risk factor for falls. But research needs to examine all potential confounding variables, such as abnormal balance or altered cognition, that were both identified among the most important intrinsic predictors of falls [1]. In view of baseline differences in the cognitive status (i.e. lower cognitive ability for the fallers) and Berg Balance Scale scores between older fallers and non-fallers, we believe that it would be interesting to re-examine the results by controlling these baseline differences into new statistical analyses (e.g. ANCOVA) [2]. This would strengthen the robustness of the findings and the impact of future conclusions.

Second, the authors observed no difference in plantarflexors (PF) co-contraction during maximal isokinetic dorsiflexion between young and older groups while most of the studies reported a decreased PF co-activation/co-contraction with aging [3–5]. Beyond the potential effect of the contraction types (i.e. isokinetic herein vs. isometric in the aforementioned studies), other methodological considerations might explain this discrepancy. First, Crozara and colleagues estimated the PF co-contraction level by comparing the EMG amplitude measured during maximal dorsiflexion between PF and dorsiflexors (DF). Other authors compared the PF EMG amplitude measured during maximal dorsiflexion with PF EMG during maximal plantarflexion to estimate the level of PF co-activation/co-contraction [3–5]. Second, the choice of the lateral gastrocnemius muscle (LG) to represent the PF muscles is questionable. As LG accounts for only 17–18% of the triceps surae volume [6] and that triceps surae contribution to the total plantarflexion moment ranges from ∼65% [7] to >88% [8], we contend that LG cannot be considered as representative of the PF muscles. Finally, the three muscles of the triceps surae are differently altered by aging. Although LG relative volume (% of the total triceps surae volume) is stable through the age, an increase and a decrease in relative volume is observed for the soleus and the MG muscle, respectively [6]. In other words, a similar change in co-activation among these three muscles will not produce a similar mechanical effect in terms of force production. This highlights the need of assessing each of these muscles to provide a complete picture of change in their behavior with aging.

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