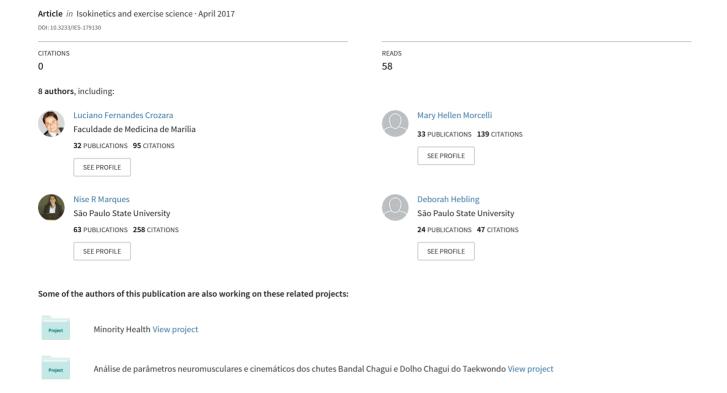
## Response to: ``Are muscle weakness and falls status really correlated in physically active women? A comment to Crozara et al. (2016)''



## Letter to the Editor

## Response to: "Are muscle weakness and falls status really correlated in physically active women? A comment to Crozara et al. (2016)"

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In our recent article [1] we found lower-extremity muscle activation and joint torque and power to be associated with falls in physically active older women. Our results showed that knee flexion-extension torque and power, ankle dorsiflexion power and rectus femoris activity during 90°/s movements were able to differentiate between younger and older women and were associated with falls in older women. In their letter to editor, Cattagni and colleagues raised the possibility that cognitive and balance impairments could have confounded our findings. We appreciate Cattagni and colleagues' interest in our work and the opportunity to discuss this important issue.

We agree that potential confounding variables should be controlled for. In our study, we assessed

cognitive status using the Mini Mental State Examination (MMSE) and evaluated balance using the Berg Balance Scale (BBS). The difference between fallers and non-fallers on MMSE (mean difference = 2) and BBS scores (mean difference = 1) were not clinically important even though statistically significant, and the mean scores classified the participants in both groups (fallers and non-fallers) as cognitively preserved [2] and having near-excellent functional balance [3]. Therefore, the findings cannot be attributable to cognitive and balance impairments in older women with fall history.

Cattagni and colleagues also proposed some methodological considerations on the absence of significant differences between young and older adults on ankle muscles co-contraction. The differences between our results and those from earlier studies [4–6] can be explained by the different assessments used. In our study we did isokinetic evaluations while the previous studies mentioned used isometric evaluations. In ad-

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dition, the differences may be related to the methodological approaches used to calculate the levels of cocontraction [7,8]. We used the method proposed by Winter [9] because it better represents the movement analyzed (i.e. pooled ankle plantarflexion and dorsiflexion) and it approximates real world conditions because knee and ankle agonist and antagonist muscle contraction characteristics change during functional tasks (e.g. walking). Co-contraction level estimates are related to the ability to control and coordinate joint movements [8,9]. The co-contraction level in the study cited by Cattagni and colleagues [4] was calculated using the ratio between the EMG activity of a muscle when acting as an antagonist and the EMG activity of the same muscle when acting maximally as an agonist. This ratio could be misleading because it does not include the agonist of the task of interest in the cocontraction calculation [7]. With respect to the lowerextremity muscles analyzed, we assessed only the rectus femoris, vastus lateralis, biceps femoris, tibialis anterior and lateral gastrocnemius because we had no additional EMG channels left to use with our current electromyographer. However, we agree with Cattagni and colleagues that an investigation of all triceps surae muscles could provide more complete information of potential disturbances on the ankle co-contraction level with aging. Thank you again, for contributing to the discussion and interpretation of our findings.

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