Effects of a 6-week treadmill training augmented by virtual reality on frailty in people with multiple sclerosis

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Background:

- Up to two thirds of people living with multiple sclerosis (MS) meet objective diagnostic criteria for frailty [1]. People with MS have a 15-fold higher risk of being frail compared to age-matched individuals without MS.

- Frailty within MS is associated with adverse clinical outcomes such as falls, when controlled for age, gender, and disability levels. There is a critical need to identify strategies to counteract frailty in this clinical population.

- The objective of this investigation was to examine the effects of a cognitive-motor rehabilitation intervention consisting of treadmill training augmented by virtual reality (Figure 1) compared to treadmill training alone, on frailty in people with MS.

Methods:

- Fifty-three people with relapsing-remitting MS [age=50.8 years (SD=9.2); 77.4% female; expanded disability status scale (EDSS) range=2.0-6.0] participated.

- Participants were randomized to treadmill training augmented by virtual reality (n=25) or to treadmill training alone (n=28). Both groups trained three times per week for six weeks.

- A 40-item frailty index, based on the deficit accumulation model, was taken as the main study outcome.

Results:

- Forty-five participants, 23 in the experimental group and 22 in the control group, completed the intervention and the pre- and post-training frailty assessments.

- Per-protocol repeated measures ANOVAs revealed that frailty index scores improved in both groups (time effect: p<0.001, η²=0.262).

- The frailty index decreased from 0.29±0.13 to 0.27±0.12 in the treadmill training alone group, and from 0.31±0.15 to 0.26±0.15 in the treadmill training augmented by virtual reality group (Figure 3). However, group by time interactions were not significant (p=0.119, η²=0.055).

Conclusions:

- The current study provided initial evidence that treadmill training with or without virtual reality may be a viable strategy to reduce frailty in pwMS. Interestingly, treadmill training augmented by virtual reality tended to have a greater effect in terms of frailty reduction (Δ~0.05) compared to treadmill training alone (Δ~0.02) as indicated by a clinically meaningful change, defined as a reduction greater than 0.03 in frailty index score [2].

References:
