

## **Effects of Massage Combined with Eccentric Resistance on Ankle Flexibility and Balance in Adults Aged 50-65 Years**

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**BACKGROUND** Reduced flexibility and balance are associated with aging and increased fall risk. The purpose of this study was to determine the effects a single eccentric resistance combined with massage treatment on ankle flexibility and balance in adults aged 50-65 years.

**METHODS** Thirty-one volunteers (26 women, 5 men;  $58.5 \pm 4.6$  yrs; ;  $84.6 \pm 22.7$  kg;  $166.1 \pm 8.2$  cm; mean  $\pm$  SD) had their balance measured with the FDA-approved Sway Balance<sup>TM</sup> mobile application (Sway Medical, Tulsa, OK) which uses the built-in tri-axial accelerometer within an iPhone or iPod Touch to measure postural sway. The Institutional Review Board of Wichita State University reviewed and approved the project according to the Federal Policy for the Protection of Human Subjects. Participants held the device against the chest while standing with feet together, in tandem, and on one foot for 10 sec each. Sway measures from each stance were compiled into a single score with 100 being perfect (no sway). In addition, ankle dorsi and plantar flexion flexibility were measured using a digital inclinometer. Participants then underwent a 2.5 min warm-up massage to each foot, ankle, and lower leg, a 2.5 min stripping massage (7/10 on a verbal pressure scale) on each tibialis anterior muscle while eccentrically resisting an elastic resistance band, and a similar 2.5 min massage with resistance on the gastrocnemius/soleus groups. After the 15-min massage intervention, balance and flexibility measures were repeated.

**RESULTS** Balance scores increased ( $p = 0.024$ ) 4.8% (pre:  $83.0 \pm 15.0$ ; post:  $87.0 \pm 11.0$ ). All measures of flexibility improved ( $p < 0.001$ ). There was a 15.4% increase in dorsiflexion, 9.6% increase in plantar flexion, and 12.5% increase in overall ankle ROM.

**CONCLUSION** Results indicate that combining eccentric resistance with massage improves balance and ankle flexibility in adults aged 50-65 yrs immediately post-intervention. Future research is needed to determine the effects in older populations, long term effects of this treatment, effects of multiple treatments, and the effects on fall incidence.