



Effects of High Whey Protein and Leucine Supplementation on Body Composition in Older Adults Engaged in Elastic Band Resistance Exercise: A Randomized Controlled Trial

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Abstract

This randomized controlled trial assessed the impact of whey protein supplementation combined with elastic band resistance training on body composition and muscle strength in older adults. Forty-five participants, aged 65 and above, were divided into two groups: one receiving whey protein and leucine supplements, and the other a carbohydrate-based supplement. Both groups engaged in resistance training three times weekly for 12 weeks. The experimental group showed a significant reduction in body fat ($p = .034$) compared to the control, but no significant differences were found in grip strength, muscle mass, or physical performance. The results suggest that while whey protein supplementation reduces body fat, its effect on sarcopenia-related outcomes is limited.

Introduction

With the increasing aging population in Taiwan, frailty prevention has become an urgent issue. Sarcopenia, a geriatric syndrome characterized by the loss of muscle strength, muscle mass, and low physical performance, is closely related to geriatric problems such as weakness, disability, falls, decreased quality of life, and increased mortality. Systematic reviews suggest that proper nutrition and physical exercise can effectively prevent frailty and promote physical function in older adults. The objective of this randomized controlled trial was to evaluate the combined effects of whey protein supplementation and elastic band resistance training on body composition and muscle strength in older adults.

Methods

Adults aged 65 years or older were recruited from the adult day care center and the cognitive impairment ward of the study hospital. Participants were randomly assigned to either an experimental group, which received a whey protein and leucine supplement, or a control group, which received a carbohydrate-based supplement without additional protein or amino acids. All participants engaged in elastic band resistance training three times per week for 40 minutes per session over a 12-week period. The Short Physical Performance Battery (SPPB), body composition, grip strength, and serum albumin levels were assessed at baseline and after 12 weeks. Group differences in all outcome variables post-intervention were assessed using analysis of covariance (ANCOVA) to adjust for any baseline variations.

Results

After the 12-week intervention, the experimental group ($n = 23$) demonstrated a significant reduction in body fat compared to the control group ($n = 22$) ($p = .034$) (Fig. 1). However, no statistically significant differences were found between the groups regarding nutritional status, grip strength, SPPB scores, body weight, or muscle mass. Although all participants ($n = 45$) showed improvements in grip strength ($p = .001$) (Fig. 2), SPPB scores ($p = .016$) (Fig. 3) and balance test ($p < .001$) (Fig. 4) from baseline following the 12-week resistance training, no significant changes in body composition were observed.

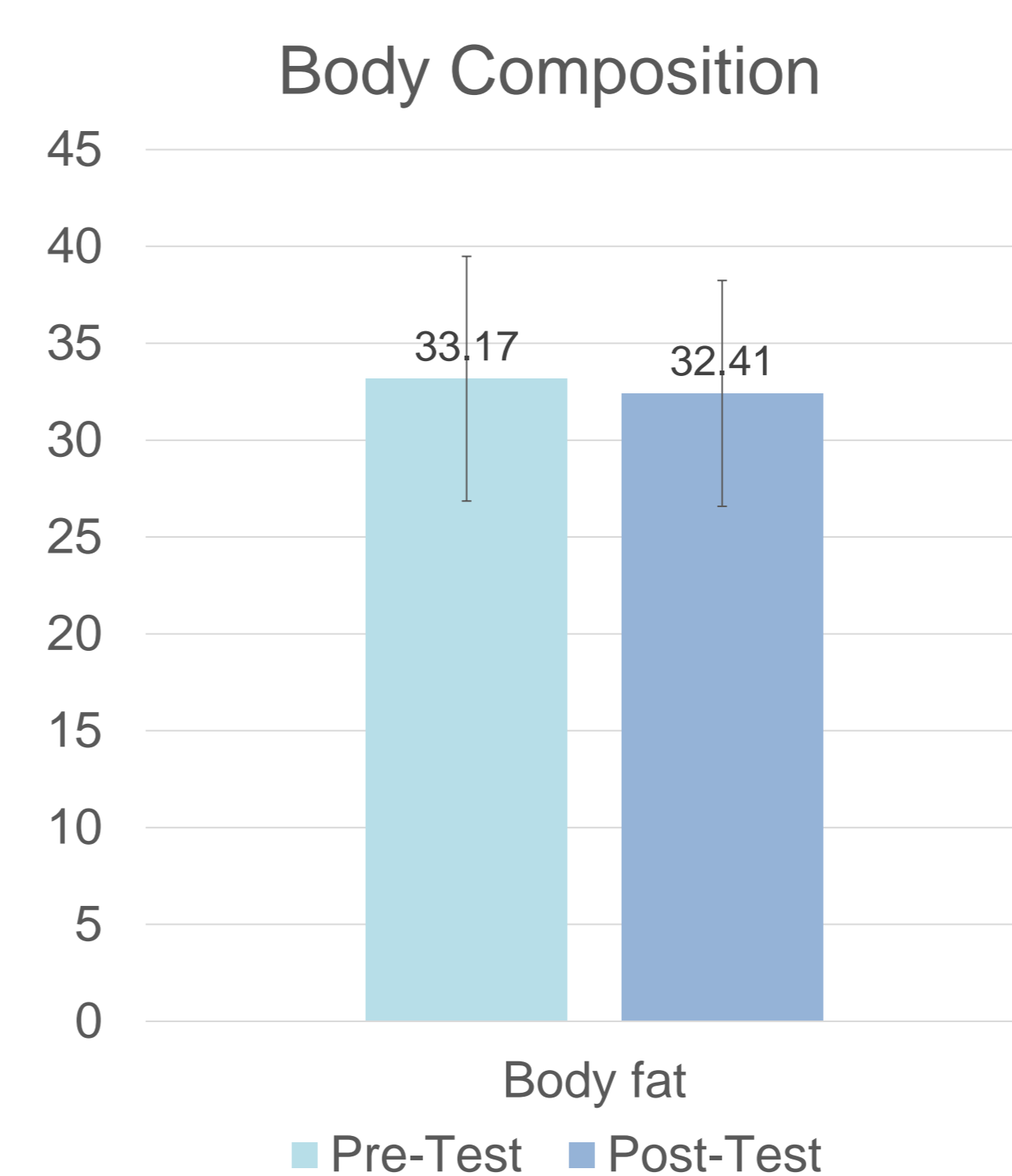


Fig.1 body fat changes of experimental group

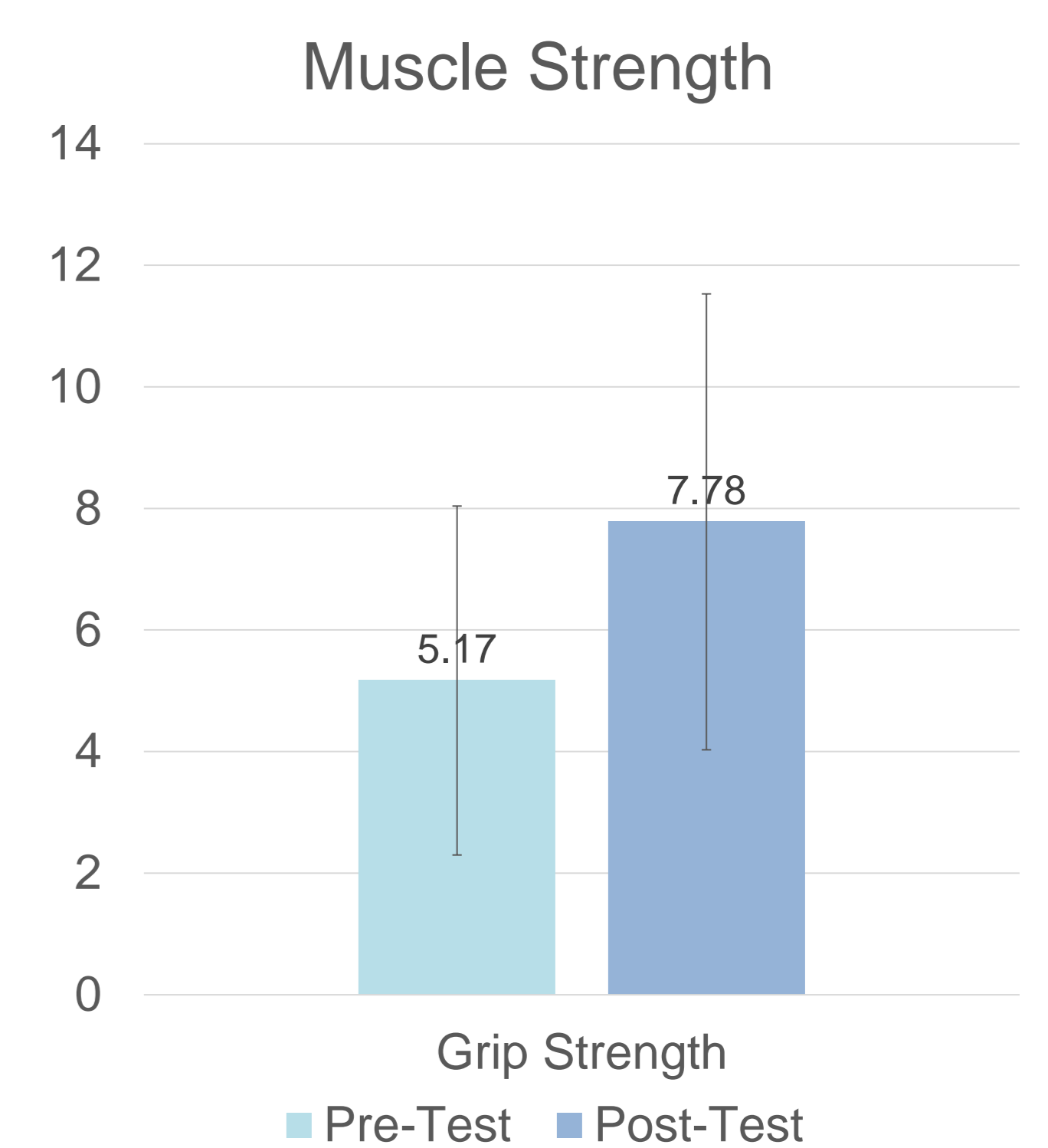


Fig.2 All participants showed improvements in grip strength.

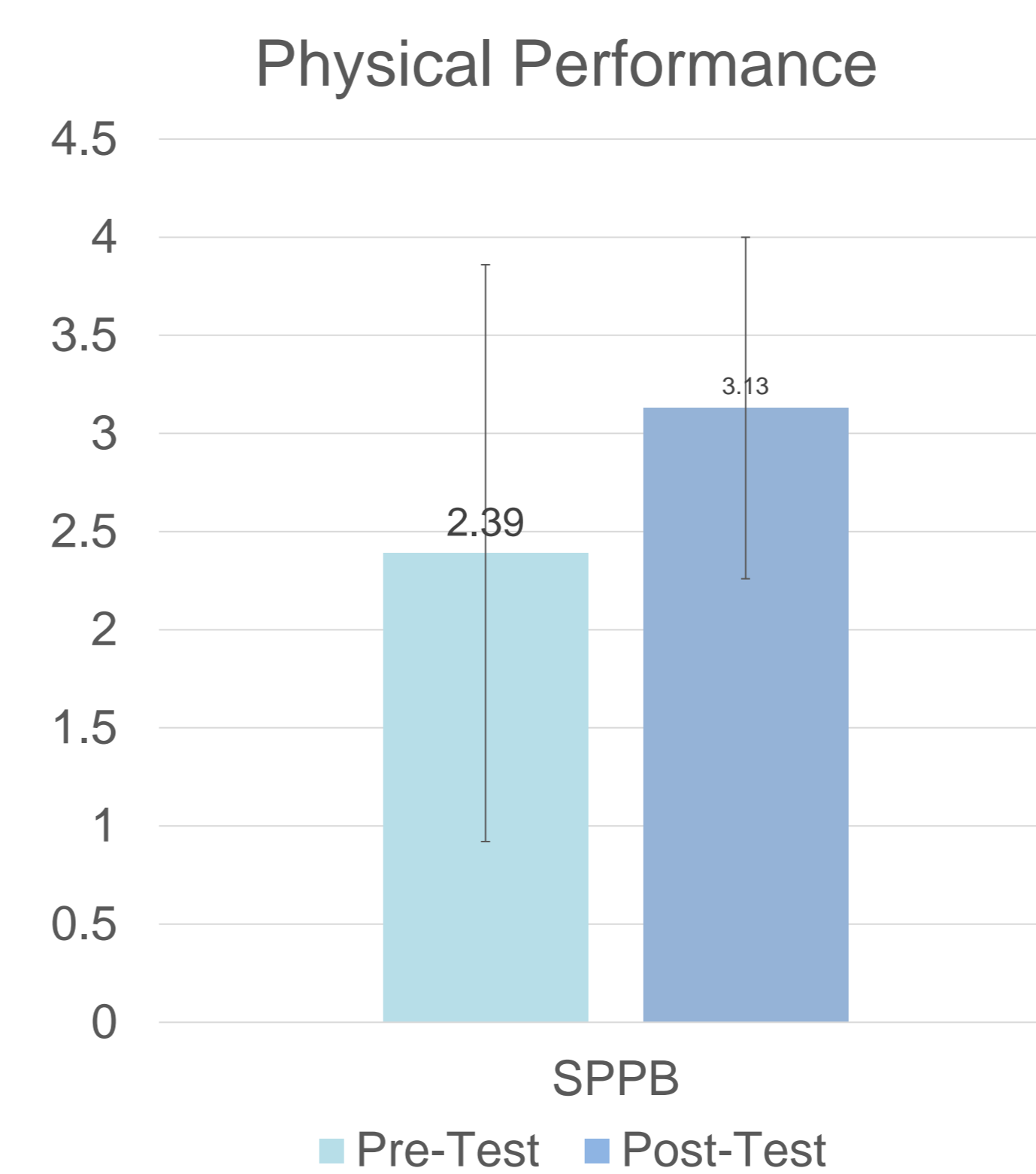


Fig.3 All participants showed improvements in Short Physical Performance Battery (SPPB) scores.

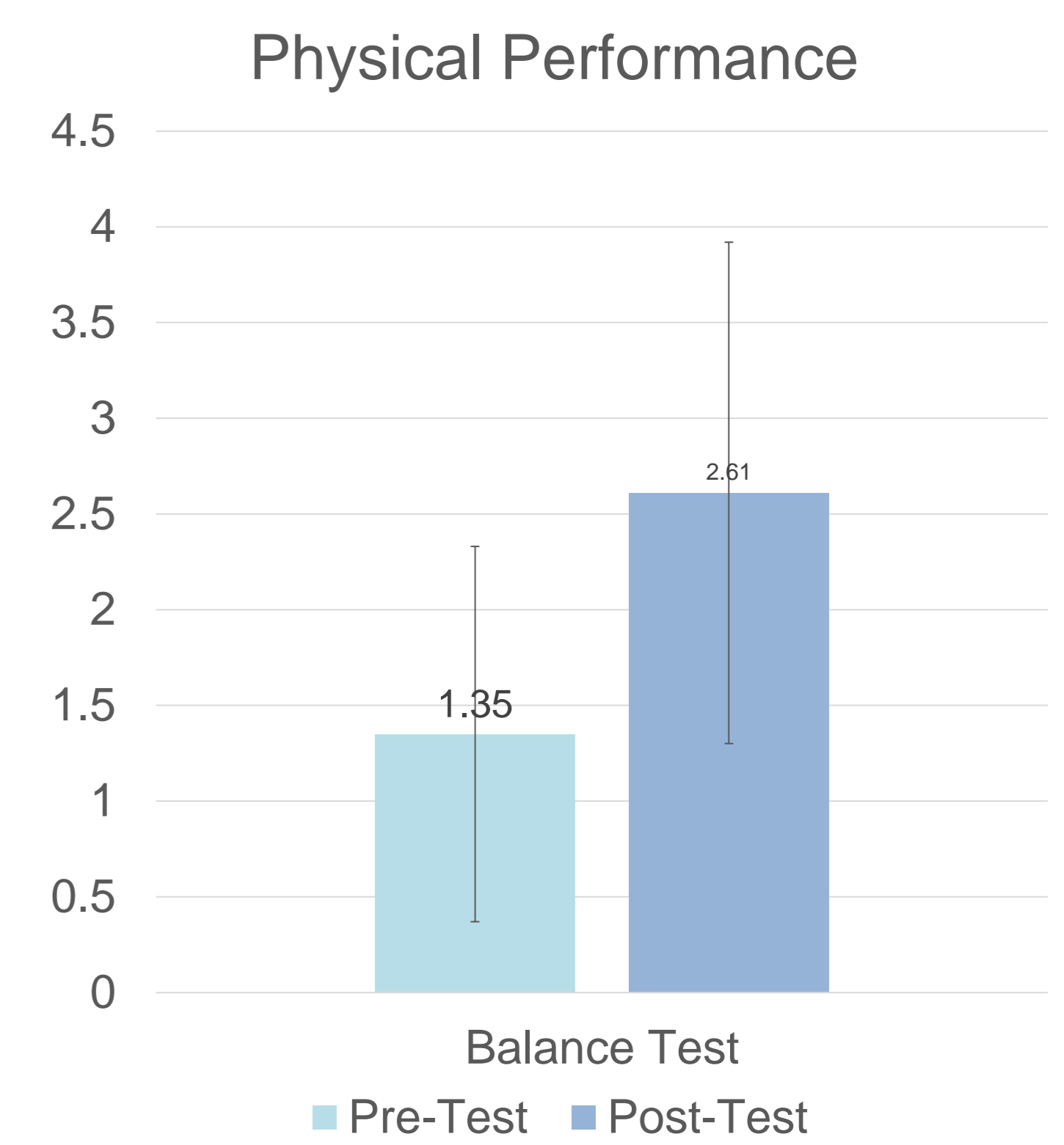


Fig.4 All participants showed improvements in balance test.

Conclusion

The 12-week elastic band resistance training combined with a whey protein and leucine supplement significantly reduced body fat among older adults. However, the absence of significant differences between the experimental and control groups in other measures, including nutritional status, grip strength, SPPB scores, body weight, and muscle mass, indicated that the overall impact of whey protein and leucine supplementation on sarcopenia-related outcomes may be limited. Further research with a larger sample size and participants specifically diagnosed with sarcopenia or malnutrition is necessary to fully understand the potential benefits of these nutritional and exercise interventions

