

サルコペニア治療を目的としたレジスタンス運動と
乳清たんぱく質の栄養摂取タイミングの有用性
— 栄養療法と運動療法のランダム化比較介入試験の検証 —

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**Effect of Timing of Whey Protein Supplementation After Resistance Exercise on
The Treatment of Sarcopenia Among Elderly: A Randomized Controlled Trial**

by

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ABSTRACT

To evaluate the effectiveness of a 24-week program of nutritional supplementation using whey protein ingested after resistance exercise, on increasing muscle mass and physical function among elderly with sarcopenia. We carried out a randomized

controlled pilot trial, in elderly with sarcopenia, aged 65-years of age or older, allocated to three groups of participants each: the exercise and whey protein supplementation group, the exercise group, and the whey protein supplementation group. A stratified randomization strategy was used for group allocation to achieve a comparable age and sex distribution among the groups. Sarcopenia was defined using the Asian Working Group for sarcopenia criteria, as follows: low hand grip strength or slow gait speed, and low skeletal muscle mass index. A 24-week program of resistance exercise, carried out twice per week, was combined with whey protein supplementation, containing 11.0g of protein and 2,300 mg of leucine. The nutrition intake for participants in all three experimental groups was adjusted to a level of at least 30.0 kcal/ kg ideal body weight/day of total energy intake, 1.2g/kg ideal body weight/day of protein intake, and more during the intervention period. Between-group differences in the pre- to post-intervention change in skeletal muscle mass and physical function were evaluated using an analysis of variance. The pre- to post-intervention increase in the skeletal muscle mass index was significantly higher for the three experimental groups (three group: $p < 0.05$). The pre- to post-intervention increase in the knee extension strength was significantly higher for the exercise and whey protein supplementation group and the exercise group, (exercise and whey protein group and exercise group: $p < 0.05$). However, We could not observed the increase in skeletal muscle mass index and knee extension strength was significantly greater for the exercise and whey protein supplementation group than for the exercise group. Whey protein supplementation, ingested after resistance exercise, could not be additional effective for the treatment of sarcopenia among elderly.

要 旨

本研究はレジスタンス運動直後の乳清たんぱく質の摂取がサルコペニアを有する高齢者の筋肉量や身体機能に与える影響を24週間の無作為化パイロット試験で検証した。サルコペニアに該当する高齢者を3群に割り当てた：レジスタンス運動+乳清たんぱく質摂取群、レジスタンス運動群、乳清たんぱく質摂取群。なお群分けは年齢や性別で層別化ランダム化し、各群均等に割り付けた。サルコペニアの判定はAsian Working Group for Sarcopeniaの診断基準に基づき握力または歩

行速度の低下、かつ四肢骨格筋量指数の低下ありとした。週2回のレジスタンス運動実施直後にたんぱく質が11.0g、ロイシンが2,300 mg含まれた乳清たんぱく質サプリメントを摂取するよう求めた。介入期間中は各群ともに少なくとも総エネルギー摂取量が30kcal/kg標準体重/日、総たんぱく質摂取量が1.2g/kg標準体重/日以上摂取できるよう食事管理を行った。介入後、全ての群で四肢の骨格筋量指数が有意に増加した(3群共に $p < 0.05$)。介入後、レジスタンス運動+乳清たんぱく質摂取群とレジスタンス運動群の膝伸展筋力は有意に増加した(レジスタンス運動+乳清た

んぱく質摂取群とレジスタンス運動群： $p<0.05$).
しかし、レジスタンス運動群と比べ、レジスタンス運動+乳清たんぱく質摂取群の四肢の骨格筋量指数と膝伸展筋力の増加率に有意な差はなかった。本研究ではレジスタンス運動後に摂取する乳清たんぱく質の併用介入を行ったが、高齢者のサルコペニア治療を目的とした更なる改善効果が得られなかった。