Higher Breakfast Protein Quality Is Associated With Reduced Incidence of Sarcopenia

Clinical Quandary
• Increasing the amount of protein intake is recommended as people age to counteract the effects of age-related sarcopenia; however, most older adults decrease their protein intake over time. Although sarcopenia is increasingly being recognized as an important geriatric syndrome in long-term care (LTC), little is known about the type or amount of protein intake that is best for the prevention and treatment of sarcopenia.

Clinical Question
• Does the amount and/or quality of protein intake at breakfast affect the development of sarcopenia in older adults, as measured by grip strength?


Bottom Line
In a study of community-dwelling older adults in Japan, higher intake of high-quality, bioavailable protein at breakfast was associated with 50% lower incidence of low-grip strength (a marker of sarcopenia), even after adjusting for baseline grip strength. There was no association between total daily, lunch, or dinner protein quality and grip strength, suggesting that breakfast protein is the most important for maintaining muscle strength and preventing sarcopenia. Although this study was performed in healthier community-dwellers, LTC residents are at high risk of sarcopenia, and safe interventions to reduce this risk are needed. LTC providers should consider increasing the highly bioavailable protein intake of LTC residents at breakfast as an intervention to prevent sarcopenia.

Summary
A recent meta-analysis of 59 randomized controlled trials of sarcopenia interventions found that physical activity and protein or nutrition supplementation were the most effective interventions for improving muscle strength. Multiple studies of exercise interventions in older adults and in LTC have shown consistent benefit, but less is known about the quality of protein supplementation specifically for the prevention and treatment of sarcopenia. This study explores the relationship between the type and amount of protein ingested at meals and grip strength, which is used to evaluate for the presence of sarcopenia.

The researchers enrolled people aged 60 and older between 2004 and 2012 who were participants in an ongoing longitudinal study of aging conducted every two years in people in the Aichi Prefecture of Japan. For this study, the researchers randomly sampled community-dwelling older adults and performed various geriatric assessments, including dietary intake and grip strength; 1,062 people had a baseline assessment; 1,006 had a follow-up assessment, and 701 were included in the final analysis. People were excluded from the analysis if they had missing data, already had poor grip strength at baseline, or had a condition that would cause low grip strength potentially unrelated to sarcopenia, such as stroke, arthritis, or Parkinson’s disease.

The 3-day average dietary protein intake at baseline was assessed by comparing a food diary with meal pictures and telephone interviews. Registered dieticians reviewed the protein intake and calculated the protein quality (i.e., its bioavailability) using a well-established scoring method called the Protein Digestibility Corrected Amino Acid Score (PDCAAS). The quality of protein intake was classified into tertiles of low (T1), middle (T2), and high (T3). The primary outcome was grip strength, but they also collected data on body mass index (BMI), daily total physical activity, and cognitive function using the Mini Mental State Examination (MMSE). The follow-up evaluations only included assessments of BMI and grip strength.

Similar to a previous study that was reviewed in Caring (“Peer-Led Pain Management Program to Relieve Chronic Pain,” 2022:23[1]:10), generalized estimating equations (GEE) were used to evaluate the association between PDCAAS and incident low grip strength. GEE is a statistical model that uses all available data even if some are missing (intention to treat) to see whether the intervention affects the respective outcome(s) over time. It models the average response among the population and accounts for both time and individual differences. In this study, they accounted for sex, age, follow-up time, grip strength at baseline, BMI, physical activity, MMSE score, education, smoking status, household annual income, comorbidities, PDCAAS values for lunch and dinner, and total calories and protein intake at all three meals.

Figure 1 shows the foods that were associated with significant baseline differences of consumption at breakfast between the low and high tertiles of PDCAAS intake. There were no statistically significant differences in the baseline breakfast consumption of meat, nuts, vegetables, or fruits between the PDCAAS tertiles. The results of adjusted analyses showed that across the eight years of follow-up (mean 6.9 years), the participants in the high tertile of PDCAAS at breakfast (higher quality protein intake) had a 50% lower risk (odds ratio) of developing low grip strength (sarcopenia). Interestingly, there was no association between low grip strength and total daily, lunch, or dinner protein quality. This suggests that protein intake (both amount and quality) at breakfast is the most important for preventing sarcopenia.

Figure 1. The low PDCAAS group at baseline had significantly different food consumption compared with the high PDCAAS group. For the high PDCAAS tertile, higher intake of foods are shown on the right, and lower intake foods are shown on the left.

The limitations of this study included (1) PDCAAS was only assessed at baseline, so changes in dietary protein intake over time were not considered in the analysis; (2) the enrolled cohort was healthier than those who were excluded, so they are not necessarily representative of a LTC population; (3) assessments of physical function were not performed at follow-up, so it is unclear if higher grip strength can be correlated with activities-of-daily-living preservation and independence.

Despite the study’s limitations, the evidence is sufficiently compelling to recommend increased high-quality protein intake at breakfast to LTC residents who are at risk of developing sarcopenia. Facility medical providers and dietitians should work together to develop both individualized and facility-wide interventions to improve the dietary intake of protein, such as beans, fish, eggs, and dairy, to meet residents’ health goals.

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