LETTER TO THE EDITOR

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EFFECT OF HIGH-INTENSITY EXERCISE AND PROTEIN SUPPLEMENTATION ON MUSCLE MASS IN ADL DEPENDENT OLDER PEOPLE WITH AND WITHOUT MALNUTRITION – A RANDOMIZED CONTROLLED TRIAL

Dear Editor,

The original article assessed the effect of high-intensity exercise and timed protein supplementation on the muscle mass and weight of very old aged people living in institutions (1). The trial failed to found any positive effects on muscle mass and body weight. This result contradicts many earlier studies (2-4) and may be due to the fact that the participants of this exercise regime obtained too little energy and protein to maintain their weight, let alone build muscle mass. Since people over 80 years of age are at major risk of malnutrition and poor energy and protein intake leading to weight loss (5-6), it seems reasonable to assume that the participants' energy and protein intake was therefore inadequate to compensate for the energy need caused by the high-intensity exercise. In addition, older people need more protein than younger people (7-8). It is recommended that older people require at least 1-1.2 g protein/body weight kg, and in some cases even 1.5-2 g (7-10). Furthermore, it has been suggested that increased dietary protein intake (up to 1.6 g protein/kg/d) may enhance the hypertrophic response to resistance exercise in older subjects (2). In a study conducted by Suominen et al. (11), some institutionalized residents had a very poor energy and protein intake of under 1000 kcal/day and 50 g/day, respectively.

Protein supplementation given to the intervention group contained only 14.8 g of protein and about 200 kcal of energy (1). This is far from a sufficient amount of energy and protein to build muscle or even to prevent muscle decline in older people, as Carlson et al. has mentioned. Since the participants had negative effects on weight and muscle mass at six months follow-up, it seems reasonable to assume that the exercise had an catabolic instead of an anabolic effect on their muscles, and they thus lost even more muscle mass. Although the subject-specific protein doses distributed in connection with the resistance training is not known, studies utilizing protein seem to indicate a plateau in muscle protein synthesis from the ingestion bolus between 20-40 g of protein (12). Similarly, in a study conducted by Symons et al. (13), 30 g of protein in the form of beef in a single meal resulted a maximum stimulation of skeletal muscle protein synthesis in both young and old subjects. A threefold increase in protein intake did not further stimulate protein synthesis.

Even though the nutritional status of the participants was assessed using Mini Nutritional Assessment [MNA] (14), the researchers did not evaluate their food and nutrient intake. According to the MNA results, 16% suffered from malnutrition and 65% were at risk of malnutrition. It is imperative that any

exercise trials involving very old institutionalized people examine food and nutrient intake as well.

It is no doubt important to explore the possibilities of involving very old people with various disabilities in exercise regimes that are later applicable to larger population groups in order to prevent muscle loss and maintain good health. However, the evaluation of energy, protein and other nutrient intake should be an essential part of these regimes, as should the implementation of nutritional intervention as a part of older people's good care (15). Various studies over the past years have shown that poor energy, protein and other nutrient intake are the major nutritional risks of institutionalized very old aged people with various disabilities (16-19). Therefore, it is even more important to compensate for the energy and protein consumed and required by the exercise, and to correct possible underlying nutritional deficiencies accordingly. More well-planned RCT studies on this subject are needed.

References

1. Carlsson M, Litbrand H, Gustafson Y, Lundin-Olsson L, Lindelöf N, Rosendahl E, Häglin L (2011) Effect of High-Intensity Exercise and Protein Supplementation on Muscle Mass in ADL Dependent Older People with and without Malnutrition – a randomized controlled trial. *J Nutr Health Aging* 15:554-560.
2. Evans W (2004) Protein nutrition, exercise and aging. *J Am Coll Nutr* 23:6015-6095.
3. Hunter GR, McGarthy JP, Bamman MM (2004) Effects of resistance training on older adults. *Sports Med* 34:329-348.
4. Chodzko-Zajko W (2009) Exercise and physical activity in older adults. *Medicine & Science in Sports & Exercise* 41:1510-1530.
5. Margetts BM, Thompson RL, Elia M, Jackson AA (2003) Prevalence of risk of undernutrition is associated with poor health status in older people in the UK. *Eur J Clin Nutr* 57:69-74.
6. Vikstedt T, Suominen MH, Muurinen S, Soini H, Pitkälä KH (2011) Nutritional status, energy, protein and micronutrient intake of older service house residents. *JAMDA* 12:302-7.
7. Wolfe R, Miller S, Miller K (2008) Optimal protein intake in the elderly. *Clin Nutr* 27:675-684.
8. Morley E, Argiles JM, Evans WJ, Shalender B, Cella D, Nicolaas EP et al (2010) Nutritional Recommendations for the Management of Sarcopenia. *JAMDA* 11:391-396.
9. Milne A, Avenell A, Potter J (2006) Meta-Analysis: Protein and energy supplementation in older people. *Ann Intern Med* 144:37-48.
10. Campbell WW (2007). Synergistic use of higher protein diets or nutritional supplements with resistance training to counter sarcopenia. *Nutr Rev* 65:416-422.
11. Suominen MH, Laine A, Routasalo P, Pitkälä K, Räsänen L (2004). Nutrient content of served food, nutrient intake and nutritional status of residents with dementia in a Finnish nursing home. *J Nutr Health & Aging* 4:234-238.
12. Moore DR, Robinson MJ, Fry JL, Tang JE, Glover EI, Wilkinson SB, Prior T, Tamopolsky MA, Phillips SM (2009) Ingested protein dose response of muscle and albumin protein synthesis after resistance exercise in young men. *Am J Clin Nutr* 89:161-168.
13. Symons TB, Sheffield-Moore M, Wolfe RR, Paddon-Jones D (2009) A moderate serving of high quality protein maximally stimulates skeletal muscle protein synthesis in young and elderly subjects. *J Am Diet Assoc* 109:1582-1586.
14. Guigoz Y, Lauque S, Vellas BJ (2002) Identifying the elderly at risk for malnutrition the Mini Nutritional Assessment. *Clin Geriatr Med* 18:737-757.
15. Donini LM, Savina C, Cannella C (2010) Nutritional interventions in the anorexia of aging. *J Nutr Health Aging* 14:494-496.
16. de Groot CPGM, van den Broek T, van Staveren W (1999) Energy intake and micronutrient intake in elderly Europeans: seeking the minimum requirement in the SENECA study. *Age Aging* 28:469-474.
17. Bates CJ, Benton D, Biesalski HK, Staehelin HB, van Staveren W, Stehle P, Suter PM, Wolfgram G (2002) Nutrition and Aging: A Consensus Statement. *J Nutr Health Aging* 6:103-116.
18. Wendland BE, Greenwood CE, Weinberg I, Young KW (2003) Malnutrition in institutionalized seniors: the iatrogenic component. *J Am Ger Soc* 51:85-90.
19. Suominen M, Muurinen S, Routasalo P, Soini H, Suur-Uni I, Peiponen A, Finne-Soveri H, Pitkälä KH (2005) Malnutrition and factors associated with it among aged residents in all nursing homes in Helsinki. *Eur J Clin Nutr* 59:578-583.