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Review

Does nutrition play a role in the prevention and management of sarcopenia?

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SUMMARY

There is a growing body of evidence that links nutrition to muscle mass, strength and function in older adults, suggesting that it has an important role to play both in the prevention and management of sarcopenia. This review summarises the discussions of a working group [ESCEO working group meeting 8th September 2016] that met to review current evidence and to consider its implications for preventive and treatment strategies. The review points to the importance of 'healthier' dietary patterns that are adequate in quality in older age, to ensure sufficient intakes of protein, vitamin D, antioxidant nutrients and long-chain polyunsaturated fatty acids. In particular, there is substantial evidence to support the roles of dietary protein and physical activity as key anabolic stimuli for muscle protein synthesis. However, much of the evidence is observational and from high-income countries. Further high-quality trials, particularly from more diverse populations, are needed to enable an understanding of dose and duration effects of individual nutrients on function, to elucidate mechanistic links, and to define optimal profiles and patterns of nutrient intake for older adults.

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1. Background

Healthy ageing is defined by the World Health Organisation as 'the process of developing and maintaining the functional ability that enables wellbeing in older age' [1], with functional ability made up of an individual's intrinsic capacity (a composite of all physical and mental capacities), their relevant environmental characteristics and the interactions between these. The WHO report on Ageing and Health, published in 2015, recognises the growing evidence of the importance of health-related behaviours, such as engaging in physical activity and maintaining adequate nutrition, as influences on intrinsic capacity in older age, and separate from effects on risk of non-communicable diseases. Their broader impact on intrinsic capacity is less extensively researched, but may be central to strategies to reverse or delay declines in functional ability, including conditions such as frailty [1].

Sarcopenia, the loss of muscle mass and physical function that occurs with advancing age, is a common condition that is associated with huge personal and financial costs [2,3]. Present in an estimated 50%–70% of frail individuals, it is widely recognised, now with an ICD code (ICD-10-CM) [4]. Loss of muscle mass, that results from the shrinking (atrophy) and elimination of muscle fibres, may be an expected component of the ageing process [5]. However, variation in the rates of decline in muscle mass and strength across the population [6] point to the influence of modifiable behavioural factors such as diet and lifestyle in the aetiology of sarcopenia, suggesting that these factors may be effective both for its prevention and treatment. This review documents the discussions of a working group [ESCEO working group meeting 8th September 2016] that reviewed current evidence that links diet to muscle mass, strength and physical function in older age, and considered the implications of this evidence for preventive and treatment strategies.

2. Ageing and nutrition

There is a significant decline in food and energy intake with increasing age, as energy needs decrease [7], amounting to an average fall of around 25% between the ages of 40 and 70 years [8]. Older adults may eat more slowly, consume smaller meals, and eat fewer snacks between meals than younger adults [8]. In a recent analysis of longitudinal intake data, Otsuka and colleagues showed that energy intakes fell in both men and women from their 40s–70s (Fig. 1), but notably, among men, the reduction was greater in the older age groups [9].

Declining food and energy intakes occur alongside changes in appetite and a lack of hunger, and have been described as the 'anorexia of ageing' [10]. The mechanisms are not fully understood but include a range of physiological, psychological and social factors that influence appetite and food consumption. Specific age-related changes include loss of acuity in taste, smell and sight, changes in the secretion and peripheral action of appetite hormones, effects on gastrointestinal motility, chewing and swallowing difficulties, as well as other effects of chronic disease that can affect food intake [8,10,11]. The negative consequences of these changes may be compounded by the effects of functional impairments that impact on ability to access and prepare food, psychological problems such as depression and dementia, as well as the social effects of living and eating alone [12].

Low food intakes and monotonous diets put older people at risk [13] because, as total food intake falls, for most nutrients there is a corresponding decline in intake [7]. Exact estimates of the prevalence of poor nutrition in older populations differ according to definitions used and the groups studied. However, a consistent

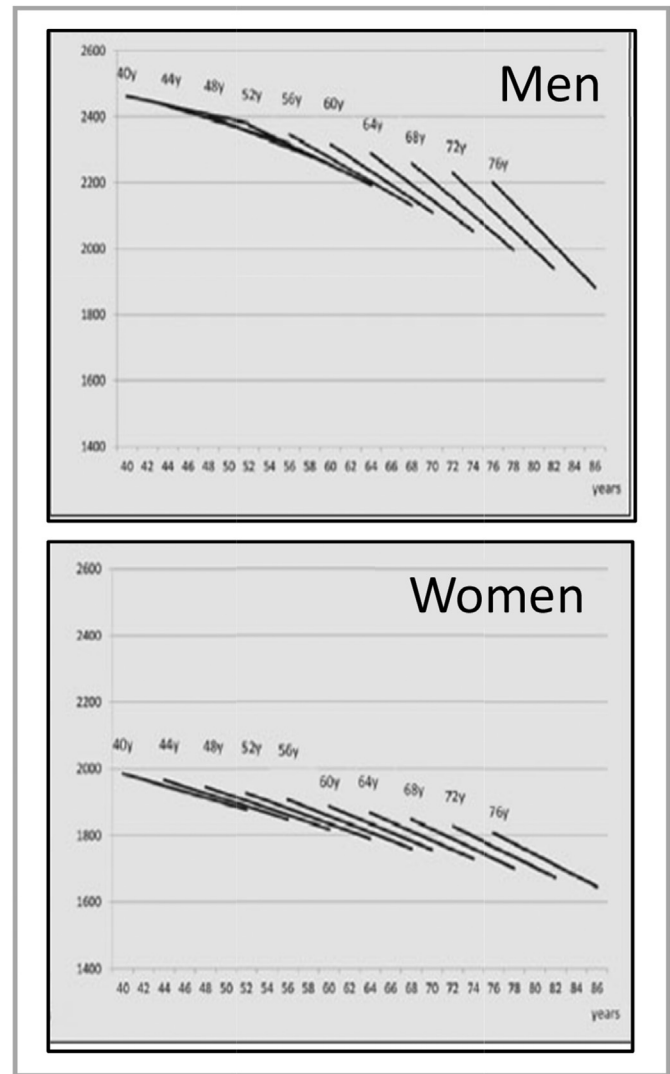


Fig. 1. Estimated linear changes in energy intake (kcal/day) in 922 men and 879 women over a 12-year follow-up period, according to (4-year) age group at baseline [9].

message from studies of community-dwelling adults is that poor nutrition is common in older age, with substantial numbers of older adults who are malnourished or at risk of malnutrition. For example, in a pooled analysis of data from 12 countries, approximately two-thirds of older study participants were identified as being at nutritional risk or malnourished [14]. The estimated economic costs of disease-related malnutrition are high [15,16]. Sarcopenia frequently co-exists with malnutrition in older patients [17], and poor nutritional status is associated with the onset of frailty [18]. Routine screening of nutritional status and early diagnosis of malnutrition in older adults is therefore essential, both in the community as well as in hospital settings. However, this may not be prioritised; for example, in the Survey of Health, Ageing and Retirement in Europe, a third of adults over the age of 80 years reported that they had not been weighed by their general practitioner [19]; and older adults commonly report that they do not receive advice on diet from their physician or other health professionals. The situation is worse in low and middle-income countries.

Declining food intakes in older age contribute to weight loss, with implications for muscle mass, strength and physical function

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