The term sarcopenia is barely more than 20 years old. Sarcopenia has been most recently defined by a group of scientists composing an international working group as “the age-associated loss of skeletal muscle mass and function,”¹ which adopted a definition put forward earlier by the author and his colleagues stating that sarcopenia refers specifically to “involuntary loss of skeletal muscle mass and consequently of strength.”² Those working in the field of geriatrics and in the care of the elderly may be curious about the origin of this term and may even wonder about the need for a current consensus definition some 20 years after the term was first applied to this important condition in aging in remarks at a meeting about the epidemiology of aging in Albuquerque, New Mexico in 1989.³ However, the phenomenon of loss of muscle strength, and even muscle mass, with aging was observed years earlier in 1931 when Critchley⁴ noted that muscle loss occurs with aging, and the process of loss of certain fiber types in human skeletal muscle over time was observed in studies of muscle biopsies, even after the first few decades of life.⁵ A dramatic age-associated decline in world weight-lifting records between 30 and 60 years of age that was attributable to loss of muscle strength and power, beginning as early as 35 years of age, was also observed.⁶ Truly, the history of sarcopenia is as old as the aging of man, even if the term sarcopenia is but 20 years old.

The meeting in Albuquerque, at which the author first used the term sarcopenia in the summary comments,³ was one effort to collect information about the population distribution of conditions associated with aging. Many of these functional changes with age were discussed by Nathan Shock⁷ based on his cross-sectional studies in Baltimore of declines in many different functions over the age span, including sensory, cardiovascular, respiratory, and renal function. The prevalence of some of these declines in older populations was described at the Albuquerque meeting, along with a strong emphasis on the loss of bone mineral mass with age, as a basis for the increasingly recognized problem of osteoporosis. Colleagues at the USDA Human

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Nutrition Research Center on Aging at Tufts University, especially William Evans, were interested in changes in body composition over time and others reflected on the relationship between a change in body weight and possibly lean mass affecting basal metabolic weight, as a basis for decline in appetite with age. There was also emerging evidence that a decline in muscle mass over time indicated by declining urinary creatinine was associated with declining physical activity and strength, as well as decline in basal metabolic rate. There was already evidence that some of the frailty and loss of mobility and balance concomitant with loss of muscle strength with aging was an increasingly recognized cause for admission to the hospital and nursing home care and general loss of independence. The author’s comments at that meeting were in the form of a question: why were we spending so much of our concentration on loss of bone mass when there was burgeoning evidence that the loss of muscle mass and strength might be every bit as important as a cause of disability among elders? The author proposed the term sarcopenia to capture the Greek meanings of “sarco” (flesh or muscle) and “penia” (loss). The author proposed somewhat jokingly that it might be necessary for there to be a Greek term for this condition in parallel with osteoporosis or osteopenia in order that it be taken seriously.

The issue of what will be taken seriously by the research community, the practicing community, and by funding sources is more than a trivial matter. As an example, we have seen a burst of interest in research in age-related cognitive decline when use of the term Alzheimer’s disease made this important and widespread phenomenon a disease and not just a concomitant of aging. So, we saw a rapid acceptance of the need for more research and concentration on age-related muscle decline when it had the more formal name sarcopenia. It is quite remarkable that within a year of the publication of the leading report, which first used the term sarcopenia, there was a call for research proposals on sarcopenia emanating from the US National Institute of Health (NIH) and particularly the National Institute on Aging. A workshop on sarcopenia at the NIH followed soon after. The first research program dedicated to the study of sarcopenia quickly followed at the Human Nutrition Research Center on Aging, called The Laboratory of Nutrition, Exercise, Physical Activity, and Sarcopenia.

Why is this history important and why is a consensus definition important? One answer may be that the phenomenon of age-related loss of muscle mass and strength has still not been embraced with the deserved priority by the geriatric practice community, even though the broader concept of frailty has been emphasized. Even as the evidence mounts that loss of muscle mass and function may reach levels where mobility and balance are so impaired and falls so prevalent that independence is seriously hampered and institutionalization required, the diagnosis and treatment of sarcopenia is not a standard part of the geriatric care repertoire in the United States, although there appears to be more acceptance in European geriatric circles. This circumstance may be partly caused by the fact that the verbal definition and even the etiologic definition of sarcopenia have not been matched by a consensus on which measurements need to be used in defining and diagnosing sarcopenia in the clinical setting. That process has been greatly added to by the consensus group that met in Rome in 2009, and that may be a major step in the direction of defining sarcopenia as a disease and condition that can be diagnosed and managed.

There is an additional challenge of understanding the cause and the direction of treatment for this condition and the extent to which the loss of function and mass is reversible. These challenges are continuing for both the research and, the clinical community; also needed is the adoption of the current consensus definition. My colleagues and I proposed a schema for considering the causes of sarcopenia that can also serve as a basis for interventions to ameliorate the effects of muscle loss
and weakness. The list of interacting factors hypothesized or accepted as elements in the etiology of sarcopenia are listed in Box 1. This list demands further elucidation and provides more targets for ongoing research.

We know from the pioneering work of Fiatarone and Fielding that resistance exercise, exercise with nutritional supplementation are modalities that can effect and reverse the muscle loss and substantially improve muscle strength and mobility and balance. If we are to further capture the attention of geriatric practitioners and others who care for the elderly, we must continue to advance our knowledge on both the etiology and treatment and the reversal of sarcopenia.

To a considerable extent, the advent of the term sarcopenia has contributed to the focus on this important condition and its effects on the quality of life and care of older persons. It is hoped that the advances in our understanding of the etiology and treatment of sarcopenia will further contribute to placing this diagnosis and treatment at a higher priority in the management of older persons and prevention of disability.

REFERENCES


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**Box 1**

**Etiologic factors in sarcopenia**

- Inactivity
- Increased muscle fat
- Insulin resistance
- Loss of alpha motor neurons
- Decreased dieting intake (of protein?)
- Increased interleukin-6
- Loss of estrogen or androgen
- Decreased growth hormone secretion