Accelerated loss of muscle mass and strength with aging, termed sarcopenia, represents both an individual problem of decreased mobility as well as a socio-economic burden by increasing risk of falls and subsequent injuries, especially if combined with decreased bone density and mass. The causes of sarcopenia are multifactorial, and include: age-related decline in physical activity, anabolic steroid hormones and growth factors, decreased energy intake and reduced muscle protein synthesis, nervous system degeneration, oxidative stress, and alterations in the immune system. However, the relative role of these factors remains largely unknown. The fact that the rate of muscle loss increases rapidly after transition into menopause suggests a strong coupling to changes in ovarian hormone status [1]. Similarly, it has been shown that menopause transition is also strongly accompanied by a reduction in leisure time physical activity.

It is, however, not an easy task to directly study the interplay and the relative influences of hormonal and mechanical muscle mass in the elderly. Several attempts within this area have been carried out over the past few years [2–4]. In this respect, the study by Sipilä et al. [5] in this issue of Clinical Science represents an important contribution to the field. Although the idea dealt with is not new, it illustrates a well-controlled approach to the topic, and addresses a direct comparison of exercise with hormones, where both interventions are carried out optimally. The study determines simple strength measurements, and expands on this by using a comprehensive set of measurements to characterize muscle function [5]. This underlines the fact that several studies combining exercise training with hormonal treatment are often heterogenous. If studies are carried out with the main focus on exercise, they often lack an optimal insight into the proper design with regards to hormonal treatment (often carried out by exercise physiologists). Alternatively, if the studies mainly focus on hormonal treatment, a suboptimal training protocol and reasonably simple determinations of muscle mass and strength (often carried out by clinicians) are performed. In the study by Sipilä et al. [5] a fruitful combination is achieved.

The fact that exercise, with regard to some parameters, has a similar effect to oestrogen supplementation, and the finding that exercise, in addition to hormonal treatment, resulted in additive or even synergistic effects on muscle mass and strength, illustrates the importance of physical loading on counteracting sarcopenia. Much attention has been given to hormonal treatment in relation to both bone and muscle in post-menopausal women, but the study by Sipilä et al. [5] supports the importance of looking more closely at the physical activity of post-menopausal women, and how the relative inactivity encountered by many elderly people can be counteracted.

Finally, the study stimulates further research within the borderline area between mechanical loading and pharmacological/nutritional treatment [5]. Similar interactions are now an important research topic not only with hormones, but also with supplementation (e.g. protein or creatine). Understanding this interplay represents a great scientific challenge in the attempt to interpret how exercise, in combination with other tools, can counteract age-related sarcopenia, and thus contribute to the prevention of disability, fall injuries and fractures in elderly individuals.

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REFERENCES