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# EDITORIAL

## SCREENING FOR SARCOPENIA

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*"Tell your readers to use it or lose it. If you don't use your muscles, they get weak. If you don't use your mind it begins to fail."*
*John Templeton*

Sarcopenia, derived from the Greek term meaning "poverty of flesh," was first described by Irwin Rosenberg in the 1980s (1). Originally conceived as a loss of muscle mass in an older adult, the definition evolved and in 2010, it was redefined as the loss of muscle function or strength in the presence of low lean body mass (2, 3). In 2018, it was officially recognized as a disease by the International Classification of Diseases – 10 (ICD-10) and an ICD-10 code was created for billing purposes (4). At the present time, the definition requires the presence of decreased grip strength or walking speed coupled with a measurement of lean mass, which is usually calculated by dual energy x-ray absorptiometry (DEXA). However, it has been recognized that normative values differ depending on the ethnicity of the individual (5). Recent studies have suggested that DEXA is an inaccurate measure of muscle strength, and that the D3-Creatine (D3-Cr) dilution is a more accurate measure of skeletal mass and may be more associated with health outcomes (i.e. functional status, falls, etc.) (6, 7).

There are two other forms of sarcopenia that are also widely recognized. The first is secondary sarcopenia, which occurs in persons with chronic diseases, e.g., diabetes mellitus, but does not meet the criteria for cachexia (8) The second is sarcopenic obesity, where the excess adipose tissue masks the loss of muscle, but yet the loss of muscle results in profound loss of strength and function (9). There are multiple causes of sarcopenia including inactivity, atherosclerosis, nerve dysfunction leading to muscle loss, cytokine excess occurring in inflammatory states, and loss of testosterone occurring in male hypogonadism (10). With aging, sarcopenia is a major cause of functional deterioration, hospitalization, falls, hip fracture, nursing home admission and overall mortality (11, 12).

Despite the clear deleterious effects of sarcopenia, the majority of clinicians appear unaware of its existence and rarely make the diagnosis (13). For busy clinicians to make a diagnosis they need simple screening tools that can be quickly

**Table 1**
SARC-F Screen for Sarcopenia

| Component | Question | Scoring |
|---|---|---|
| Strength | How much difficulty do you have in lifting and carrying 10 pounds? | None = 0<br>Some = 1<br>A lot or unable = 2 |
| Assistance in walking | How much difficulty do you have walking across a room? | None = 0<br>Some = 1<br>A lot, use aids, or unable = 2 |
| Rise from a chair | How much difficulty do you have transferring from a chair or bed? | None = 0<br>Some = 1<br>A lot or unable without help = 2 |
| Climb stairs | How much difficulty do you have climbing a flight of 10 stairs? | None = 0<br>Some = 1<br>A lot or unable = 2 |
| Falls | How many times have you fallen in the past year? | None = 0<br>1 – 3 falls = 1<br>> 4 falls = 2 |

Adapted from: Malmstrom TK, Morley JE. SARC-F: A simple questionnaire to rapidly diagnose sarcopenia. J Am Med Dir Assoc 2013;14:531.

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performed. In 2013, we developed the 5-item SARC-F as a simple questionnaire to detect persons at risk for sarcopenia (Table 1) (14). Subsequently, it has been shown to have high specificity to predict functional deterioration, hospitalization, quality of life, and mortality (15-33). It also appears to be a reasonable indicator of sarcopenia based on the consensus definitions of sarcopenia (34). The sensitivity of the SARC-F is not as good as its specificity, but can be improved by combining the questionnaire with a measurement of calf circumference (35, 36). Woo et al (37, 38) found that using only 3 items (strength, ability to climb stairs and need for assistance in walking) of the 5 item questionnaire improved the diagnostic area under the curve values and had the highest predictive value of adverse outcomes. Based on the available data, SARC-F appears to be an excellent, brief screening tool for sarcopenia that can be easily utilized in busy clinical practices.

Another rapid screen for sarcopenia is the Short Portable Sarcopenia Measure (SPSM) (39), developed in 2009. It takes approximately 12 minutes to complete and consists of 3 components: lean muscle mass measurements calculated from the Tanita scale's bioelectrical impendence program, grip strength adjusted for height, and 5 chair stands. The SPSM showed convergent, discriminant, and predictive validity when compared to DEXA measures of muscle mass and alternative measures of muscle function. The SPSM has been found to have more sensitivity than the SARC-F, but does take longer and requires equipment to administer (40).

Rossi et al (41) developed the 5-item Mini-Sarcopenia Risk Assessment (MRSA-5) in 2017, which asks questions regarding age, activity level, meal consumption, hospitalizations, and weight loss in the past year. It was found to have good sensitivity, but less specificity for diagnosing sarcopenia. The MRSA-5 was compared with the SARC-F for identifying sarcopenia in a population of Chinese community-dwelling elders and was found to have a similar diagnostic accuracy with better sensitivity, but less specificity than the SARC-F (42). This screening tool at the present time needs further validation of its diagnostic validation.

In 2014, Ishii et al (43) developed a sarcopenia screen using age, grip strength and calf circumference. This measurement, validated in Japanese community-dwelling elders, shows high accuracy (both sensitivity and specificity and positive and negative predictive values) for sarcopenia. Its usefulness may be limited because of the time-consuming complex calculations required to ascertain a score.

In conclusion, the SARC-F is the easiest available measure for screening in the clinic and requires no special equipment. It has been recommended for screening for sarcopenia by the European Working Group on Sarcopenia in Older People (44), the International Conference on Sarcopenia and Frailty Research (ICSFR) (34) and the Society of Sarcopenia, cachexia and Wasting Disorders (45). With the availability of a rapid screening test for sarcopenia, it is suggested that screening occur on a yearly basis in all adults 65 years and older. Those who screen positive should receive a course of physical therapy and then strongly be encouraged to remain in an exercise group for the rest of their life (46-48). Recent data supports the use of exercise therapy even when in the hospital (49). Furthermore, there is some data supporting the use of a leucine enriched high protein supplement for added results, and while the benefits are controversial, there is likely no harm (50-55). Additionally, persons who do not go in the sunlight and have a low bioavailable vitamin D should receive adequate vitamin D supplementation (56, 57).

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