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Short Commentary

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# Can Family Practitioners Help with the Early Diagnosis of Sarcopenia?

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## Abstract

Sarcopenia is a high prevalence age-related disorder, defined by involuntary loss of skeletal muscle mass combined with muscle weakness and consequent inability to execute activities of daily living. Furthermore, this clinical entity is a strong predictor of falls, disability and frailty, among other important geriatric morbidities, ultimately leading to a very poor quality of life and increased health care costs. However, Sarcopenia remains largely undiagnosed and undertreated. This editorial highlights the importance for effective methods of diagnosis and management of Sarcopenia by clinicians, particularly family practitioners. In fact, in order to avoid complications related to this condition, we propose that measurement of muscle strength (by measuring grip strength) should be part of patient evaluation as well other vital signs routine and annual checkup consultations.

**Keywords:** Sarcopenia; Family practitioners; Muscle atrophy; Muscle strength; Grip strength

## Commentary

Currently, Sarcopenia most accepted definition is an age-related loss of skeletal muscle mass and function, -and recognized as an important gradually disabling disease [1]. However, Sarcopenia remains largely undiagnosed and undertreated despite recent more widely accepted definitions and the CD-10-CM Diagnosis Code for billing care related to this condition. Strikingly, despite the new CD-10-CM code approved on the end of 2016, there are still no FDA-approved treatments for Sarcopenia [1,2].

The lack of proper and timely diagnosis of Sarcopenia hampers effective ways to treat and manage this condition. Unfortunately, we start to lose muscle mass and strength in our mid 30's; 20-30 years of untreated Sarcopenia leads to very serious consequences, such as the development metabolic disorders such as osteoporosis, diabetes, and even the life-threatening frailty syndrome [3,4].

Even if many questions remain unanswered about the pathophysiology of Sarcopenia, this should not restrict us from moving Sarcopenia to the forefront of clinical practice by recognizing Sarcopenia as a clinical entity for which treatments and interventions should be designed to limit its rather serious consequences [5-7]. Most practitioners will quickly recognize that they have never witnessed or made a diagnosis of Sarcopenia, despite its very high prevalence.

Perhaps we must remind ourselves that skeletal muscles are the largest organ system in the body, second only to water itself [8-10]. Furthermore, we and others have now conclusively demonstrated that skeletal muscles are potent endocrine organs through the secretion of myokines [11-16]. Myokines have an arrays on autocrine, paracrine, and endocrine effects, affecting multiple organs, particularly bones. Their concentration and quality seem crucial for optimal organism function [17,18].

Near the turn of the 20$^{th}$ century, life expectancy in the United States was ~49 years; it is now ~79 years. It is not an exaggeration to suggest that the real cost of Sarcopenia in the United States is in the hundreds of billions of dollars when accounting for both direct and indirect costs, since the previously estimated direct costs were of $18-30B dollars in 2004 [19], and in just 15 years have jumped to ~$50B dollars [20].

To advance the clinical practice of Sarcopenia, we must embrace the concept that age-related decreases in muscle strength result from a combination of loss of muscle mass (atrophy) and reduced muscle specific force (i.e. muscle force per unit of cross-

sectional area), suggesting reduced muscle quality. However, accumulating data show that it is principally the weakness that accompanies Sarcopenia, not the loss of muscle size *per se*, that contributes to disability and to the high health care costs in aging populations [21-26].

In the highly influential "Baltimore Longitudinal Aging Study", 786 humans followed longitudinally from 25 to 85+ years. The data showed that "muscle quality" during aging declines linearly in men and women starting in the mid-30s. The study reported substantial differences in muscle CSA/muscle strength at every age bracket (Figure 1). They reported that smaller cross sectional area, CSA, accounted for only about half of the 40% drop in force that occurred between ages 65-85 years. They concluded that interventions should be focused on improving functional capacity rather than muscle mass, because it is muscle quality and strength that appear to be the most important predictors of mobility, disability and other geriatric outcomes". Obviously, Sarcopenia is a multi-factorial condition, and it does not mean that we should not attempt to preserve muscle mass [27].

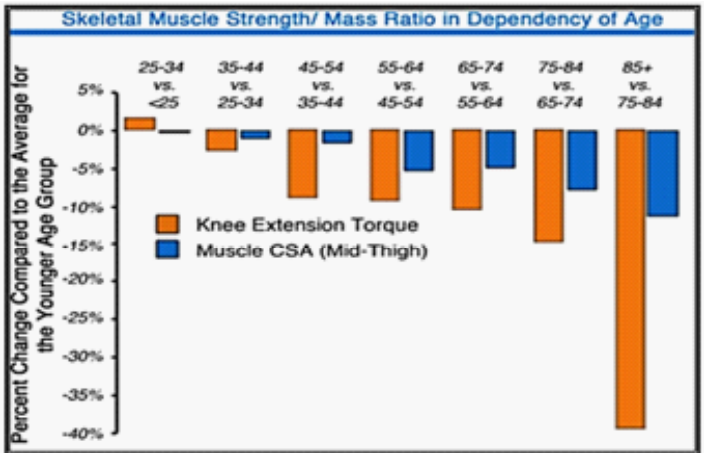


**Figure 1:** Skeletal Muscle Strength does not match Muscle Mass, pointing to the need of functional diagnosis and interventions. This figure is a composite replotting extracted from Figs. 1-2 of Moore et, al. [27]. The data derived from 786 subjects ages 25-85 in the Baltimore Longitudinal Aging Study (BLAS).

Clinicians need simple, quick, and effective ways to monitor health status (i.e., muscle strength is critical for health status), particularly family health practitioners. We propose that the simplest and most effective way to longitudinally monitor muscle strength is to utilize the very simple handgrip dynamometer to measure grip strength during the yearly annual checkups.

Grip force, is an indicator of upper extremity strength is the strongest predictor for overall muscle weakness, morbidity, nutritional status and even mortality [28]. Furthermore, grip force validation is extensive and we have solid data on normative values in the US for ages 25-85 [29]. Our research group previously reported that grip strength closely associated with the levels of a skeletal muscle specific protein, skeletal troponin T, and that both associated with balance and risk of falls in older adults [30-32].

Therefore, we know of the usefulness of grip strength as a biomarker of skeletal muscle function and beyond for overall health. There are many choices for dynamometers, including digital models, which are rather inexpensive and very easy to operate such as the Detecto Scale models. Likely one of the most used dynamometer is the Jamar.

We propose that family practitioners add 3-5 min to their annual checkup consultations to measure grip strength. In fact, this measurement could be part of the vital signs routine by RNs and Pas. Practitioners and patients within minutes would have a clear, concise, and objective value that is indicative of musculoskeletal health, morbidity and mortality risks. Based on our studies, we postulate that knowing that you are becoming weaker could be more impactful in leading to healthier life style changes. For the Practitioners, would mean the possibility of earlier interventions and preventing a host of much more complex diseases ranging from diabetes, osteoporosis and frailty syndrome.

Last, we predict that such simple measure would save lives, reduce chronic morbidity, and potentially save hundreds of millions in healthcare costs. After all, we all do want to live longer, but also stronger!

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