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Sarcopenia in aging: Epidemiology, pathophysiology, and new approaches to prevention and treatment (literature review)

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Abstract. Sarcopenia is a geriatric disorder characterised by progressive loss of skeletal muscle mass and deterioration of muscle function. It is a growing, often underdiagnosed health problem. Its prevalence in the elderly population is highly variable, ranging from 5% to 50% depending on gender, age, underlying conditions, and diagnostic criteria. Sarcopenia is diagnosed by the presence of low muscle mass combined with low muscle strength or low physical performance. There is no uniform approach to treatment or assessment, further complicating the diagnosis of sarcopenia. Treatment options for sarcopenia include non-pharmacological and pharmacological approaches. Non-pharmacological approaches include strength training and adequate nutrition. Of these two approaches, strength training is the standard non-pharmacological treatment for sarcopenia, supported by significant positive results. Certain dietary approaches, such as adequate protein intake, vitamin D, antioxidants, and long-chain polyunsaturated fatty acids, have also shown positive effects in

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combating sarcopenia. The U.S. Food and Drug Administration (FDA) has not approved any specific medications for the treatment of sarcopenia. Future research should focus on the biological mechanisms of sarcopenia and improved diagnostic approaches, such as biomarkers for early detection the development of consistently effective treatments, and the creation of sensitive indicators for predicting treatment response

Keywords: sarcopenia; definition; diagnosis; treatment; prevention

Introduction

Ageing is commonly understood as a progressive decline in body functions in old age. It is characterised by an indistinct onset and extremely variable development in different people. As in all known examples of human culture, the inevitable end of life has become a strong incentive to seek measures to delay it. Although significant progress has been made in increasing the average life expectancy, rejuvenation (or the preservation of youth) is still more of a concept than a reality [1-3].

The increase in life expectancy among those considered to be long-lived is not as impressive as the increase in life expectancy among those who previously died at a younger age. This achievement has been made possible due to improvements in living conditions, and the prevention and control of major health threats of the past, such as malnutrition and infectious diseases. In all post-industrial countries, and now in developing countries, this has led to a dramatic change in the age composition of the population [3]. Thus, the focus has shifted from life expectancy to healthy life expectancy to extend the years during which older people can remain independent, participate in society and contribute to it, instead of experiencing deterioration in their quality of life and consuming resources due to poor health.

To address these challenges, the World Health Organization (WHO) recently classified age-related disorders as diseases [2], which is intended to pave the way for the development of rational measures to slow down or even stop age-related deterioration of health. Among these conditions, sarcopenia stands out, which is characterised by a progressive decrease in skeletal muscle mass and strength. Although it has traditionally been associated with old age, recent evidence suggests that it can develop as early as middle age, before the age of 60 [3].

In an ageing population, sarcopenia has become a significant muscle disorder characterised by progressive loss of muscle mass, strength, and function. Chronic inflammation, oxidative stress, and mitochondrial dysfunction contribute to the development of sarcopenia and help explain its association with concomitant diseases such as type 2 diabetes mellitus, obesity, and neurodegenerative diseases [4]. Sarcopenia is believed to involve several pathophysiological processes such as denervation, mitochondrial dysfunction, inflammatory and hormonal changes, which can lead to adverse health effects, including falls, functional decline, weakness, and mortality due to decreased muscle mass [5]. This review focuses on the problem of sarcopenia, that is, a decrease in muscle function and mass, a characteristic feature of the phenotype of an ageing person. The authors chose sarcopenia because it is not an inevitable process that also occurs in healthy ageing people, but is accelerated by concomitant diseases, hospitalisation, and a sedentary lifestyle. The purpose of the study was to present data in the elderly, its epidemiology, pathophysiological mechanisms, prevention and treatment methods.

Materials and Methods

The literature search strategy began with compiling a list of key search terms: elderly, sarcopenia, muscle mass, frailty, and related keywords for relevant papers in English. Searches were conducted in PubMed, Web of Science, and Scopus databases, and manual searches for studies published from January 2015 to December 2024. A separate search for additional literature was conducted using Google. After a standardised assessment, this review included only studies that accurately identified sarcopenia in the elderly. From the entire list, 20 to 50 sources were selected for writing the review, which reported sarcopenia in people aged 65 years and older.

General information

Sarcopenia comes from the Greek words "*sarx*" (flesh, body) and "*penia*" (loss, poverty), literally meaning "loss of muscle mass", and describes age-related progressive loss of muscle mass and strength. The term "sarcopenia" was first coined by I.H. Rosenberg in 1989 to describe the age-related decrease in skeletal muscle mass and strength [4]. In 2000, In 2000, the WHO highlighted sarcopenia as a serious threat to independence and a risk factor for multiple diseases associated with old age, and drew attention to it, since it can be corrected through rational lifestyle changes. Sarcopenia is a disease with the ICD-10-CM (M62.84) code. Later, sarcopenia became the cornerstone of the clinical concept of "fragility", introduced to define the vulnerability of older people more broadly [1].

Sarcopenia is characterised by a progressive decrease in skeletal muscle mass and strength. Despite the fact that previously this pathology was mainly considered as characteristic of the elderly, contemporary studies indicate the possibility of its development before the age of 60 [3]. Common concomitant diseases associated with a higher prevalence of sarcopenia include diabetes mellitus (DM), cardiovascular diseases (CVD), heart failure (HF), cognitive decline (CD), and Alzheimer's disease (AD). Lifestyle factors such as physical activity, sleep patterns, and nutritional status also play an important role. In addition, environmental factors such as the continent or country of residence, differences between urban and rural areas, and living conditions (such as in a community or in institutions) may further contribute to the variability in prevalence. Sarcopenia contributes to adverse outcomes in the elderly, including functional decline, increased need for care, and mortality. Many of these related risk factors represent modifiable targets for intervention, providing opportunities to reduce disease burden and improve patient outcomes [2].

Epidemiology of sarcopenia

Theoretically, the prevalence of sarcopenia on different continents depends on various factors, including ethnicity, level of physical activity, eating habits, economic status, and the prevalence of certain diseases [1]. In addition, regional differences in the choice of diagnostic criteria may contribute to discrepancies in reported prevalence rates in the literature.

The second largest number of studies on the prevalence of sarcopenia have been conducted in Europe [6]. In these studies, the reported prevalence ranged from 1% (95% confidence interval (CI): 1%, updated criteria of the European Working Group on Sarcopenia in Older People (EWGSOP2)) to 33% (data from only one study, criteria of the Asian Working Group on Sarcopenia (AWGS2014)). Although the combined prevalence based on EWGSOP2 criteria is low at 1%, this estimate is based on only two studies. In contrast, the prevalence based on the AWGS2014 criteria is high at 33%, but it is based on data from only one study. Therefore, these extreme values require further research to determine if they accurately reflect the true prevalence. In European studies, three diagnostic criteria are most often used: the first EWGSOP1 diagnostic criteria (prevalence 22%, 95% CI: 19-26%), the definition of muscle mass (prevalence 29%, 95% CI: 22-37%), and the criteria of the Foundation of the National Institutes of Health (FNIH) (prevalence 11%, 95% CI: 5-17%).

Asia has the largest number of studies reporting the prevalence of sarcopenia [6], with prevalence estimates ranging from 9% (data from only one study, EWGSOP2 criteria) to 27% (95% CI: 20-33%, defined by muscle mass). Unlike in Europe, most Asian studies use the AWGS2014 criteria (prevalence 15%, 95% CI: 12-17%), followed by the definition of muscle mass (prevalence 27%, 95% CI: 20-33%), EWGSOP1 criteria (prevalence 21%, 95% CI: 14-29%) and FNIH criteria (prevalence 10%, 95% CI: 7-12%). Since there is a lot of data from Asia and Europe, a comparison was made between the two regions according to criteria that were used in at least five studies. The results showed that the cumulative prevalence is similar between Asia and Europe when applying the same diagnostic criteria. Comparative prevalence rates for each criterion are as follows: EWGSOP1: 22% (Europe) vs. 21% (Asia); FNIH: 11% (Europe) vs. 10% (Asia); and definitions of muscle mass: 29% (Europe) vs. 27% (Asia). The World Health Organisation states that 50 million people suffer from sarcopenia, and predicts that this number will reach 200 million over the next 40 years [2].

The prevalence of sarcopenia in the Kyrgyz Republic has not yet been studied. However, active steps are being taken to investigate the prevalence of major geriatric syndromes, including falling syndrome in wards of a social inpatient facility that used to be called a residential care home for the elderly [7,8]. The study determined the geriatric status of 206 patients in these facilities. Symptoms of senile asthenia of varying degrees were found in 95.6 ± 1.4% of patients (n = 197), and in the remaining 4.4 ± 1.4% of the subjects (n = 9), asthenia was not detected. Impaired general motor activity was observed in 41 (74.50 ± 5.77%) patients. However, violations of stability parameters were more pronounced, which were detected in 51 (92.70 ± 8.13%), and walking parameters in 48 (87.30 ± 6.82%) patients. The study of the prevalence of sarcopenia in patients aged 65 and older has already begun in the country and certain research materials have been collected, which will be published soon.

Pathophysiological mechanisms of sarcopenia

Since sarcopenia is inherently an age-related condition, understanding how ageing alters muscle homeostasis is essential to elucidate its mechanisms. Ageing acts as the biological background on which these structural and metabolic changes occur. Aging disrupts the balance between anabolic and catabolic pathways, leading to structural changes such as a decrease in the size and number of type 2 fibres, an increase in fat infiltration, and a decrease in the number of satellite cells responsible for replacing and repairing damaged muscle fibres [1]. This decrease is conditioned by changes in systemic signalling pathways, including transforming growth factor beta (TGF-β) and myogenin, which regulate the differentiation and activation of satellite cells. Other factors contributing to these changes include neuromuscular junction dysfunction, loss of motor units, chronic inflammation, and insulin resistance [3].

Sarcopenia also directly reduces the quality of life, as it is closely associated with chronic diseases such as type 2 diabetes mellitus (T2DM) and obesity. Most of the population is at risk of developing sarcopenia at some point in their lives [4]. Patients who may develop sarcopenia include the elderly, people who are underweight, and people with other chronic diseases. Moreover, people with T2DM are more susceptible to this disease, as it can worsen metabolic disorders and reduce the effectiveness of treatment [5]. Sarcopenia develops for various reasons and can be characterised as primary or secondary. Primary sarcopenia is mainly associated with age, whereas secondary sarcopenia is influenced by risk factors associated with muscle loss, such as sarcopenic obesity, cancer, malnutrition, and rheumatic diseases [6]. It is also important to emphasise the risk factors of primary sarcopenia as factors contributing to the development of secondary sarcopenia, since a sedentary lifestyle and physical inactivity are triggers of this condition, even at an early age [9].

These cumulative factors show that ageing not only causes sarcopenia, but also contributes to a broader systemic deterioration affecting various physiological systems beyond skeletal muscles. This connection establishes a biological continuum between muscle ageing and broader degenerative processes. Thus, it has been observed that hormonal changes associated with ageing cause loss of muscle mass, while androgens play a crucial role in maintaining cellular metabolic activity by suppressing catabolic processes and exerting an anti-inflammatory effect on peripheral tissues [10]. Consequently, low testosterone levels are associated with the pathophysiology and progression of age-related diseases such as sarcopenia, which makes hormone replacement therapy one of the main treatments for various pathologies [11].

Increasing evidence suggests that the mechanisms leading to muscle atrophy in sarcopenia, such as chronic inflammation, mitochondrial dysfunction, and hormonal imbalance, are also involved in neurodegenerative processes. Thus, the muscle-brain axis has become a critically important area in gerontology, linking functional decline with cognitive decline. On the other hand, it is known that ageing is still a crucial factor in the development of dementia, which is directly related to disability and mortality [12]. Other factors, such as genetic, socio-economic, and environmental factors, and physical activity and a balanced diet, are key determinants of cognitive impairment [1,13]. Gerontology offers molecular explanations for the pathophysiology of sarcopenia, senile infirmity, and cognitive decline, covering several age-related processes. Research shows that muscle mass can serve as a regulated biomarker in the prevention of dementia. In other words, neurodegenerative changes tend to occur with age and are associated with progressive and widespread skeletal muscle loss known as sarcopenia [14]. Parkinson's disease (PD), a motor disorder characterised by the death of dopaminergic neurons, has also been shown to be a change associated with impaired muscle function [15]. Thus, studies have shown the prevalence of sarcopenia in more than 50% of PD patients, which is associated with more severe progression, greater motor insufficiency and a high incidence of falls, and also affects non-motor symptoms [16]. Sarcopenia and neurodegenerative diseases are a serious socio-economic problem, leading to high health care costs, loss of functional independence and decreased labour productivity, which significantly impairs the quality of life. They overload public health systems, exacerbating social inequality.

Diagnosis and assessment

According to the existing definition and classification criteria established by the European Working Group on Sarcopenia in Older People, sarcopenia cannot be assessed using a single parameter. A comprehensive assessment of sarcopenia based on three key parameters – muscle mass, muscle strength, and muscle function – requires a structured assessment process using appropriate technological tools. As shown in Table 1, the presence of low muscle strength indicates a potential risk of sarcopenia. Sarcopenia can be diagnosed when low muscle strength is accompanied by a decrease in muscle mass or quality. Severe sarcopenia is confirmed in the presence of all three factors: decreased muscle strength, decreased muscle mass or quality, and functional disorders [9].

Table 1. Diagnostic criteria for sarcopenia according to EWGSOP2

Criteria met	Probable sarcopenia	Confirmed sarcopenia	Severe sarcopenia
Low muscle strength	Yes	Yes	Yes
Low muscle mass or low muscle quality	No	Yes	Yes
Skeletal muscle dysfunction	No	No	Yes

Source: systematised by the authors

Assessment of the mass and quality of skeletal muscles. R.N. Baumgartner *et al.* [10] proposed estimating the mass of skeletal muscles by dividing the mass of skeletal muscles of the extremities by the square of height (kg/m^2). According to this criterion, sarcopenia is considered diagnosed if the value is lower than 7.26 kg/m^2 in men and 5.45 kg/m^2 in women. Specialised methods are required to measure skeletal muscle mass, including dual-energy X-ray absorptiometry (DXA), bioimpedance analysis (BIA), computed tomography (CT), and magnetic resonance imaging (MRI) [11]. Among these methods, BIA is the most common due to its convenience and cost-effectiveness. Although DXA, CT, and MRI provide more accurate assessments, they are associated with higher costs and limited availability, making them less widely applicable in routine examinations. A comparison of these methods is presented in Table 2.

Table 2. Comparative analysis of technologies for assessing skeletal muscle mass and qualit

Technologies	Advantages	Limitations
Dual-energy X-ray absorptiometry	Evaluates the composition of the entire body and its individual segments. High reproducibility and accuracy. Non-invasive and safe method	High cost. Non-portable. Does not allow estimating the intramuscular fat content
Bioelectric impedance analysis	Inexpensive. Portable and convenient to use. Provides fast measurement	Lower accuracy. Depends on many factors (hydration level, posture, etc.)
Computer tomography	Standard for quantifying muscle mass. Determines the amount of intramuscular fat	Irradiation. Complicated operation. High cost of equipment
Magnetic resonance imaging	High accuracy of muscle quality analysis. Ability to visualise the entire body	Extremely high cost. Long service life. Limited availability

Source: created by the authors

Assessment of skeletal muscle strength. Grip strength is a fundamental indicator for assessing muscle function and overall physical performance, especially in the elderly. It can be measured using a manual dynamometer. A recent review study by R. Vaishya *et al*. [12] showed that grip strength thresholds tend to be lower in Asians, women, people with low levels of education, and sedentary populations. Low grip strength is associated with an increased risk of various diseases, including type 2 diabetes mellitus, cardiovascular disease, stroke, chronic kidney disease, liver disease, certain cancers, sarcopenia, and bone fractures. In addition, decreased grip strength correlates with higher rates of hospitalisation, poorer nutrition, increased overall mortality, and poorer quality of life. However, there is no generally accepted threshold value for determining low grip strength. The European Society for Clinical Nutrition and Metabolism (ESPEN) initially set diagnostic thresholds for sarcopenia at < 30 kg for men and <20 kg for women, based on skeletal muscle mass and function [13]. Recently, these thresholds have been revised and set at < 27 kg for men and < 16 kg for women [17].

Evaluation of skeletal muscle function. Skeletal muscle function can be assessed using a short battery of physical performance tests (SPPB), which includes tests for standing up from a sitting position, balance and walking, enabling indirect assessment of the level of physical activity using a scoring system. Studies of haemodialysis patients have shown that SPPB is a valuable risk stratification tool, as lower SPPB scores are significantly associated with higher overall mortality, general hospitalisation, and risk of hospitalisation related to cardiovascular diseases [18]. A systematic review conducted by S. Bhasin *et al*. [19], analysing 13 official statements on the assessment of sarcopenia, showed that both absolute grip strength and relative grip strength adjusted for weight are key indicators of decreased muscle activity. In elderly people living in the community, decreased grip strength and gait speed independently predict falls, self-reported activity limitations, hip fractures, and mortality. Walking speed < 0.8 m/s in a four-metre walking test was proposed as a criterion for impaired muscle function [20]. The Four-Metre Walking Test (4MWT) is a globally accepted standardised walking speed assessment for assessing lower limb muscle function, officially approved by EWGSOP2. Participants walk at their usual pace along a straight 4-metre track, with the countdown starting after the first step to eliminate any acceleration effects. According to this consensus guideline, a walking speed of less than 0.8 m/s serves as a diagnostic criterion for sarcopenic skeletal muscle dysfunction [9].

Prevention and treatment of sarcopenia

The study by S. Cacciatore *et al*. [21] showed that both dietary supplements and physical exercise play a significant role in the prevention and improvement of sarcopenia. Strength training combined with dietary supplements can effectively improve physical function and increase skeletal muscle strength in people with sarcopenia. It is important to note that these methods are not only effective, but also economically beneficial and practical, which makes them suitable for clinical use [22].

The possibility of including physical exercise and dietary interventions in daily life is well documented [23]. Physical exercises, especially strength training, are a simple and affordable type of intervention with minimal logistical requirements, which allows it to be adapted to the needs of different patients. This form of exercise requires minimal equipment and can be performed at home or in community centres, making it easily accessible to the elderly [24]. Dietary supplements, especially the intake of essential amino acids and β-hydroxy-β-methylbutyrate (HMB), can also be easily incorporated into the daily diet. These interventions are not only easy to apply, but also highly effective, which ensures long-term compliance, which is crucial for maintaining muscle mass and function in the elderly [14].

The combination of exercise and dietary supplements has demonstrated a synergistic effect: the study by M. Yamada *et al*. [25] showed that such a combined intervention provides better results in improving the condition of sarcopenia than any of the approaches individually. In addition, these interventions can significantly reduce the long-term burden on healthcare systems, delaying the onset of disability and improving the overall health of older people, allowing them to maintain greater independence and quality of life as they age [15].

Strength training is widely recognised as the most effective method of increasing muscle mass and strength in the elderly [26]. The study by S. Toselli *et al.* [16] revealed that high-intensity strength training is more effective than moderate or low-intensity training in increasing skeletal muscle strength in the elderly. However, the research by R. Nilwik *et al.* [27] showed that the decrease in muscle mass associated with sarcopenia is primarily due to atrophy of type 2 muscle fibres. C. Lim *et al.* [28] found that moderate- to low-intensity workouts slow down type 2 muscle fibre atrophy, and increase mitochondrial protein expression and remodelling, thereby improving skeletal muscle metabolism.

Although numerous studies have confirmed the effectiveness and mechanisms of strength training in the fight against sarcopenia, there is no standardised threshold value for the intensity of strength training. Determining the optimal parameters of strength training remains a key area of future research in the field of sarcopenia prevention. Aerobic exercises such as jogging and swimming have also proven effective in the prevention and treatment of sarcopenia. Although aerobic exercise does not significantly increase muscle mass, it improves mitochondrial function, promotes protein synthesis, reduces inflammation and oxidative stress [29], which together enhances muscle protein synthesis. Combining aerobic exercise and strength training has been shown to improve body composition, strength, and skeletal muscle function. Although the research results of this combined approach are not always consistent, it is potentially useful for people with sarcopenia [30]. P.T. Wen *et al.* [31] found that various types of exercises contribute to improving muscle strength. Therefore, it is recommended for the elderly to engage in intensive strength training in small amounts in combination with aerobic training. This approach stimulates type 2 muscle fibres in response to exercise and increases the density of mitochondria in skeletal muscles, thereby slowing the decline in muscle mass and preventing sarcopenia.

Nutrition intervention

Insufficient intake of nutrients is considered a potential factor contributing to the development of sarcopenia [32]. Research on nutrients associated with sarcopenia has mainly focused on proteins, vitamins, antioxidants, and long-chain polyunsaturated fatty acids [33]. Both EWGSOP and the International Working Group on Sarcopenia (IWGS) recommend supplementation of essential amino acids, in particular, leucine and its natural metabolite β-hydroxy-β-methylbutyrate (HMB), to enhance protein anabolism in skeletal muscles [34]. Vitamins also play a role in the prevention and treatment of sarcopenia. Studies show that vitamin D deficiency in the elderly is associated with impaired skeletal muscle function in the lower extremities. The level of vitamin D in blood serum negatively correlates with the proinflammatory cytokine IL-6 [33]. Vitamin B1 deficiency can lead to motor and sensory impairments, skeletal muscle atrophy, coordination disorders, and lower limb dysfunction, leading to gait disorders [35]. Vitamins C and E have antioxidant properties that neutralise free radicals and reduce skeletal muscle damage caused by oxidative stress. Severe vitamin C deficiency is associated with fatigue and weakness [35]. In addition to its antioxidant effect, vitamin E promotes protein synthesis, improves blood supply and delivery of nutrients to skeletal muscles, and improves the quality of muscle tissue [36].

Minerals are also essential for the prevention and treatment of sarcopenia, especially potassium, magnesium, selenium, calcium, and zinc [37]. Potassium ions help maintain the excitability of neurons and skeletal muscles, and their severe deficiency can lead to muscle weakness. Zinc, which is mainly stored in skeletal muscles, is necessary for normal metabolism and muscle function, participates in immune reactions, and plays a role in slowing down oxidative processes by neutralising free radicals. Magnesium helps relax skeletal muscles, improves their function, and participates in the synthesis of protein and adenosine triphosphate (ATP). It also reduces the effects of chronic inflammation on the body. Selenium, copper, manganese, and iron are components of metalloenzymes that neutralise endogenous free radicals formed during ageing. Manganese is necessary for protein and nucleic acid synthesis, and its deficiency can lead to malformations of skeletal muscles [35]. For the elderly, increasing the intake of high-quality protein, vitamin D, polyunsaturated fatty acids, and other macro- and micronutrients should be considered as part of a comprehensive strategy for the prevention and treatment of sarcopenia. Combining proper nutrition with strength training and aerobic exercise can not only increase skeletal muscle mass, but also reduce inflammation-induced muscle breakdown, improve muscle function, and effectively slow the onset and progression of sarcopenia [38]. However, current research on the combined effects of nutrition and exercise on sarcopenia remains controversial [39].

Conclusions

In the context of an ageing population, research into sarcopenia, which significantly affects the quality of life of older people, is becoming increasingly important to society. However, there is still no consensus on the exact age of onset of the disease, pathogenesis, assessment methods, or diagnostic criteria for sarcopenia. Existing studies in Kyrgyzstan do not contain assessment standards specifically adapted to the physical characteristics of the Kyrgyz population.

This review provided a systematic review of sarcopenia research, which will serve as a guideline for the development of clinical strategies for exercise and dietary intervention. Future research should focus on integrating national physical fitness monitoring data with the current consensus in sarcopenia research to establish assessment standards suitable for the population. Further studies should determine the age of onset of the disease, establish clinical screening criteria, and define thresholds for diagnostic parameters to refine the assessment of sarcopenia and intervention strategies.

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Conflict of Interest

The authors declare no conflict of interest.

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Карылык мезгилиндеги саркопения: эпидемиология, патофизиология жана алдын алуу жана дарылоонун жаңы ыкмалары (адабияттарга сереп)

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Аннотация. Саркопения – бул скелет булчуң массасынын прогрессивдүү жоголушу жана булчуң функциясынын начарлашы менен мүнөздөлгөн гериатриялык оору. Бул өсүп жаткан, көп учурда диагноз коюлбай калган ден соолук көйгөйү. Анын улгайган калк арасында таралышы өтө ар түрдүү, жынысына, жашына, негизги ооруларына жана диагностикалык критерийлерине жараша 5 % дан 50 % га чейин. Саркопения диагнозу булчуң массасынын төмөндүгү менен айкалышкан булчуң күчүнүн төмөндүгү же физикалык көрсөткүчтөрдүн төмөндүгү менен тастыкталат. Дарылоого же баалоого бирдиктүү мамиле жок, бул саркопения диагнозун ого бетер татаалдаштырат. Саркопенияны дарылоо жолдоруна фармакологиялык эмес жана фармакологиялык ыкмалар кирет. Фармакологиялык эмес ыкмаларга күч машыгуулары жана жетиштүү тамактануу кирет. Бул эки ыкманын ичинен күч машыгуулары саркопенияны дарылоонун стандарттуу фармакологиялык эмес ыкмасы болуп саналат жана олуттуу оң натыйжалар менен колдоого алынат. Белокту жетиштүү өлчөмдө кабыл алуу, D витамини, антиоксиданттар жана узун чынжырлуу поликаныкпаган май кислоталары сыяктуу айрым