

# The Theoretical and Practical Research of Traditional Chinese Medicine in the Prevention and Treatment of Sarcopenia

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**Abstract:** *Sarcopenia, as an age-related skeletal muscle mass and strength decline in the elderly syndrome, seriously affects the quality of life of patients. In recent years, with the aggravation of aging in China, the incidence of sarcopenia is gradually increasing. The research on sarcopenia in traditional Chinese medicine is also deepening, and relatively rich experience and results have been achieved. This paper summarizes and expounds the theoretical research and intervention methods of traditional Chinese medicine for sarcopenia by combing the relevant literature. The purpose of this paper is to discuss the current status of its theoretical research and to look forward to the future development trend, so that the etiology and mechanism of sarcopenia in TCM can be further explored and the treatment plan can be optimized, and more possibilities for the treatment of sarcopenia in TCM can be provided in the future research.*

**Keywords:** Sarcopenia, Traditional Chinese Medicine, Theoretical research, Intervention.

## 1. Introduction

Sarcopenia, also named as "Myopathy" is defined in the 2018 updated consensus on sarcopenia as "progressive, generalized loss of muscle mass and/or loss of muscle strength or muscle physiology associated with aging [1]." Sarcopenia can be categorized into primary and secondary types. Primary sarcopenia is caused by natural aging, while secondary sarcopenia is attributed to factors such as disease, inactivity, and malnutrition. Its development will increase the hospitalization rate and medical expenses of the elderly, seriously affect their daily living ability and quality of life, and even shorten their life expectancy. Due to the differences in evaluation methods and study populations in different regions, the prevalence of sarcopenia is statistically different. In general, the prevalence of sarcopenia in Europe is higher than that in Asia [2]. However, due to the increasing aging of China, sarcopenia will become a huge challenge for us in the future [3]. Studies have shown that the number of papers on sarcopenia in China in the past decade is lower than that in foreign countries. It is predicted that the future research on sarcopenia nutrition may focus on the nutritional guidance of sarcopenia combined with other diseases and the establishment of related standards [4]. Domestic research on sarcopenia is relatively late, and the understanding of sarcopenia is still in its infancy. In this regard, the 'Expert Consensus on the Diagnosis and Treatment of Sarcopenia in the Elderly in China', combined with the current situation of China, further clarifies the diagnosis and treatment norms suitable for elderly patients with sarcopenia, with a view to providing guidance for the relevant workers [5]. However, there are still some deficiencies in the diagnosis and treatment of sarcopenia in reality, such as poor adherence to exercise therapy in elderly patients and insufficient evidence of the efficacy of nutritional therapy [6]. Therefore, it is necessary to seek effective treatment means while strengthening the understanding of sarcopenia. Traditional Chinese medicine has its unique theoretical system for the understanding and treatment of diseases, which can provide new directions and

ideas for the diagnosis and treatment of sarcopenia.

## 2. Chinese Medicine Cognition of Sarcopenia

The understanding of muscle in traditional Chinese medicine began with the Huangdi Neijing, Miraculous Pivot · Channels mentioned that: The bones are the trunk, the veins are the camp, the tendons are the rigidity, and the flesh is the wall. Miraculous Pivot recorded: Those who are rough but not firm are tend to have arthritis. It can be seen that traditional Chinese medicine believes that muscle has the function of protecting internal organs and defending against external pathogens [7]. At the same time, muscle is mainly responsible for exercise, Miraculous Pivot also recorded: At twenty years of age, the blood and Qi are beginning to flourish, the muscles are growing, so it is good at skelp; at thirty years of age, the five organs are fixed, the muscles are firm, the blood is full, so it is good to walk slowly. Muscle is essential in the process of human growth. Modern research has shown a gradual decrease in muscle mass and strength after the age of 50, with total muscle mass decreasing by about 30 percent by the age of 80 [8]. Miraculous Pivot informs us, ".....At the age of seventy, the spleen qi is weak and the skin is withered." And A-B Classic of Acupuncture and Moxibustion mentioned: "skin begins to wither, limbs fail to lift". They all coincide with the results of modern research. There is no concept of sarcopenia in traditional Chinese medicine, but from the connotation of sarcopenia, most doctors attribute it to the category of "flaccidity syndrome or fleshy flaccidity" in traditional Chinese medicine [9]. Some doctors have also attributed it to the category of 'deficiency,' which is closely related to the spleen and kidney.

## 3. Theoretical Study on the Treatment of Myasthenia Gravis in Chinese Medicine

### 3.1 "Treating Flaccidity Only Taking Yang Brightness"

As asked in 'Plain Question': Why the five internal organs

make people impotent? Why treat flaccidity take Yangming alone? The answer is: Yangming is the reservoir of the five viscera and six bowels and the main source of moistening zongjin, the main function of which is to maintain the position of the bones and facilitate the joint activity. According to Zou Zijiu's commentary in "a guide to clinical practice with medical record", "Yangming is the head of all sinews. If Yangming is deficient, all sinews will relax, and if the sinews relax, they will not be able to bind the muscles and bones to move smoothly. This is a sign of weakness and muscle atrophy." The Yangming Meridian includes the Hand Yangming Large Intestine Meridian and the Foot Yangming Stomach Meridian, which essentially regulate the spleen and stomach to help qi and blood by stimulating it. Scholars have also explored the possibility of treating sarcopenia from the perspective of gut microbiota [10]. Research has shown that gut microbiota also plays an important role in the pathogenesis of sarcopenia. However, the possibility of treating sarcopenia from the perspective of the large intestine channel still requires a large number of clinical controlled trials for verification [11].

### 3.2 Spleen Qi Deficiency

The spleen governs the muscles. As mentioned in the Plain Question: "Spleen diseases, muscles and bones are devoid of qi for survival, to the point where they are rendered useless", Shudong Chen and others believe that spleen qi deficiency is the basis for the onset of sarcopenia, with muscle soaking being the key factor in the onset. The Plain Question informed us that the dampness of the earth is harmful to the skin, flesh, muscles and veins [12]. Muscle moistening has a similar mechanism to the modern 'intramuscular fat infiltration' and is closely related to the development of sarcopenia [13, 14]. Therefore, researchers suggest that the treatment of sarcopenia should be based on the theory of spleen and stomach. The spleen is the master of muscle, and the physiology and pathology of the spleen and muscle are closely related and affect each other. If the spleen is sick, the muscles and bones will have no qi to be produced. Similarly, the pathology of the muscle will also affect the spleen. As the sentence says, if the muscle paralysis is not relieved, the spleen will be affected by pathogenic factors at the same time. Wei Jing and others believed that deficiency of spleen qi was the basic pathogenesis of sarcopenia, and that the treatment should be based on the spleen, taking into account other organs [15]. It was found that Buzhong Yiqi Decoction was effective in improving the clinical symptoms of elderly patients with sarcopenia, and also showed some improvement in muscle mass, quantity and function [16]. Xuanxuan Ren observed the clinical efficacy of Bazhen Tang combined with basic intervention in the treatment of sarcopenia over a 12-week period, and found that the combination of Bazhen Tang and basic intervention was effective in improving the muscle strength and quality of the patients [17]. Animal studies have also reported that spleen-enhancing formulas such as Sijunzi Tang, Buzhong Yiqi Decoction, and Shen Ling Baizhu San have different degrees of ameliorative effects on skeletal muscle injury in rats with spleen deficiency [18]. The spleen is closely related to a number of systems including endocrine, immune, reproductive, and motor [19]. Hu Qi et al. found that spleen dysfunction can cause changes in mitochondrial structure and function, which in turn affects

skeletal muscle function, causing symptoms such as muscle weakness and weight loss [20].

### 3.3 Dual Deficiency of the Heart-spleen

Traditional Chinese medicine believes that "the heart generates blood, and blood generates spleen". The heart and spleen are closely linked physiologically and pathologically, so some researchers have suggested that sarcopenia and insomnia interact and that sleep disorders may affect muscle health [21]. Some modern studies have also shown that in addition to smoking [22] and alcohol consumption [23], which are risk factors for sarcopenia, sleep disorders are also potential risk factors for sarcopenia. Therefore, scholars have proposed to treat sarcopenia from the theory of heart-spleen, especially in patients with insomnia. However, the effect of sleep on sarcopenia has not been adequately studied [24].

### 3.4 Spleen-stomach Pivot

Traditional Chinese medicine believes that muscle is closely related to the spleen and stomach. The spleen and stomach are located in the middle energizer. The spleen governs the ascending movement of Qi, while the stomach facilitates the descending movement of Qi. These two organs serve as the pivotal points for regulating the ascending and descending movement of Qi in the five zang organs and six Fu organs. If the qi movement is unblocked, the Qi, blood and body fluid can be dispersed around the body, resulting in firm and robust muscles and bones. However, if there is a disturbance in the ascending and descending movement of Qi, the production of Qi and blood will be insufficient, and the distribution will be abnormal. This can cause the tendons to lose their moistening, resulting in weak muscles that are unable to function properly. Therefore, researchers proposed to use the theory of spleen ascending and stomach descending to slow down the progression of sarcopenia by strengthening the spleen and stomach, harmonizing the nutrient and defense, and taking into account other viscera and bowels [25]. Zhu Jianwei et al. believed that the key disease location of type 2 diabetes-related sarcopenia was the spleen, and spleen disease with 'abnormal pivot' is the core pathological link. They advocated that the early treatment should be mainly based on relieving depression and fortifying the spleen, and the late treatment should be mainly based on tonifying spleen and kidney [26]. It should be noted that there is a lack of direct efficacy and evidence support for the treatment of sarcopenia based on the theory of spleen stomach pivot.

### 3.5 Emphasis on Both Sinews and Bones

Some scholars have also treated sarcopenia from the theory of "equal emphasis on muscles and bones," that is, from the spleen and kidney, and proposed that strengthening the spleen and tonifying the liver and kidney is the key to the treatment of sarcopenia [27]. As an age-related disease, sarcopenia occurs in the tendons and muscles, and its occurrence and development are closely related to the spleen and kidneys [28]. Patients with sarcopenia who suffer from spleen and stomach weakness also have clinical manifestations of kidney deficiency syndrome. Therefore, in their treatment, it is important to simultaneously regulate both the spleen and kidney, and to nourish both qi and blood [29]. Wang Tao et al.

also classified sarcopenia as consumptive disease in traditional Chinese medicine. The mechanism of disease is senile renal failure and spleen and stomach deficiency. So the treatment is to fortify the spleen and tonify the kidney as the basis, tonify qi and replenish blood as the key [9]. Some researchers conducted a clinical randomized controlled trial on the treatment of sarcopenia with Bushen Jianpi Recipe. The basic group received resistance training and oral calcitriol capsules. The treatment group took Bushen Jianpi Recipe on the basis of the basic group. The results showed that the curative effect of the treatment group was better than the control group [30]. On the basis of Buzhong Yiqi Decoction, Wang Qi added Fructus Lycii, Fructus Schisandrae Chinensis and Herba Epimedii each 15g to treat type 2 diabetes mellitus with sarcopenia due to spleen and kidney deficiency, which can reduce the levels of IL-6, TNF -  $\alpha$  and caf to a certain extent, and has a positive effect on the improvement of muscle strength, muscle mass and muscle activity [31].

#### 4. Non Drug Intervention of Traditional Chinese Medicine in Sarcopenia

Cheng Yue et al. Summarized the evidence of non drug intervention for sarcopenia and found evidence in five aspects, including the type of exercise intervention, exercise intervention prescription, nutrition intervention, comprehensive intervention and health education. Among them, exercise intervention and comprehensive intervention had the highest level of evidence and recommendation. There is no evidence directly related to the intervention of traditional Chinese medicine, so the understanding and research of traditional Chinese medicine on sarcopenia need to be further strengthened [32].

##### 4.1 Comprehensive Health Management

Based on the theory of spleen stomach pivot, Zhu Jianwei carried out comprehensive management of type 2 diabetes mellitus population, including syndrome differentiation diet, Tai Chi and Gongyinj therapy, and established a health management mode with traditional Chinese medicine characteristics. Through clinical research, it was found that this comprehensive management model can improve the patient's glycated hemoglobin, muscle rate, and islet function to a certain extent. Improving these related factors has a positive effect on skeletal muscle health [33].

##### 4.2 TCM Exercise

Studies have shown that Tai Chi can effectively improve the lower limb muscle strength of patients with sarcopenia, improve lower limb function, and improve body balance [34]. Bone-building exercise based on five elements [35], Baduanjin [36] can improve muscle strength and balance in elderly patients with sarcopenia.

##### 4.3 Massage

Guided by the theory of "treating flaccidity only taking yang brightness", the researchers made a comparative study of meridian massage and traditional massage techniques (twelve potential of Yi Jin Jing), and found that meridian massage techniques based on Yang Ming meridians were superior to

traditional massage techniques in improving muscle strength. [37]

##### 4.4 Electro-acupuncture

Electroacupuncture can treat senile sarcopenia by improving the low inflammatory state, modulating hormone levels, influencing cellular autophagy and apoptosis, and modulating the ubiquitin-proteinase system. In the view of TCM, the key to the mechanism of the disease is the weakness and impotence of muscles and tendons. Therefore, acupoints are always selected from Yangming Meridian [38]. Animal experiments have proved that electroacupuncture at Yangming meridian points can promote the proliferation and differentiation of muscle cells, prevent limb muscle atrophy in rats, and the effect is better than that of non Yangming acupoints [39]. Clinical observation also shows that acupuncture at Yangming Meridian has good therapeutic effect [40].

##### 4.5 Shock Wave Therapy Combined with Acupoint Selection Along Meridians

Shock wave therapy guided by meridian theory of TCM is of great significance for the treatment of clinical diseases. For example, it has achieved good curative effect in the treatment of scapulohumeral peri-arthritis [41], and chronic plantar fasciitis [42]. Wu Yunyang used shock wave combined with acupoint selection along meridians to treat sarcopenia, and found that its effect was significantly better than that of simple enteral nutrition treatment [43].

#### 5. Summary and Outlook

It is feasible to treat sarcopenia with traditional Chinese medicine. Sarcopenia, as a comprehensive disease, seriously affects the quality of life of patients, and brings a heavy burden to families and society. Despite the lack of systematic theory and Research on the treatment of sarcopenia in traditional Chinese medicine, some traditional Chinese medicine treatment methods have achieved good results in clinical practice. These practices show that the treatment of sarcopenia in traditional Chinese medicine not only has theoretical support, but also shows its unique advantages and value in practical application. At present, the treatment of sarcopenia is mainly in the form of nutritional intervention, which is consistent with the theory of TCM treating sarcopenia from the spleen and stomach. Combined with the pathogenesis of sarcopenia and the theory of traditional Chinese medicine, the homologous substances of medicine and food have a certain research space in the drug intervention of sarcopenia. Therefore, TCM dietotherapy also has great potential in the treatment of sarcopenia, which is an important breakthrough in the treatment of sarcopenia by traditional Chinese medicine. We can also combine the research methods and means of modern medicine to carry out multidisciplinary cooperative research, so as to provide more scientific basis and clinical evidence for the treatment of sarcopenia.

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