

# Sarcopenia, obesity, and sarcopenic obesity: Unravelling the complex web.

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## Introduction

In an era where the global prevalence of obesity is on the rise, health-related concerns have become increasingly prominent. However, the complexities of the human body have revealed a multifaceted relationship between obesity and another condition known as sarcopenia. Moreover, the fusion of these two conditions has given rise to a new term, "sarcopenic obesity." In this article, we will explore the associations of sarcopenia, obesity, and sarcopenic obesity, highlighting the intricate web that links these three conditions and their profound impact on health.

Sarcopenia, a term coined by Irwin H. Rosenberg in 1989, refers to the age-related loss of skeletal muscle mass and function. It is a natural part of the aging process, with a gradual decline in muscle mass, strength, and quality starting in the fourth decade of life. However, sarcopenia is not limited to the elderly; it can also affect younger individuals, especially those with sedentary lifestyles. The consequences of sarcopenia are far-reaching and extend beyond musculoskeletal issues. Reduced muscle mass can lead to functional limitations, increased risk of falls, and a decreased quality of life [1].

On the other hand, obesity is a well-recognized global health concern. It is characterized by excessive body fat accumulation, which often results from a combination of genetic, environmental, and lifestyle factors. Obesity is associated with a wide array of health problems, including cardiovascular disease, type 2 diabetes, and various forms of cancer. The coexistence of sarcopenia and obesity in the same individual gives birth to the concept of sarcopenic obesity, which is an even greater health challenge.

The complex relationship between sarcopenia and obesity becomes evident when considering the physiological processes involved. Skeletal muscle is a metabolically active tissue that plays a crucial role in regulating energy balance. It accounts for a significant portion of daily energy expenditure and helps to maintain glucose and lipid homeostasis. When muscle mass decreases, as in sarcopenia, the body's ability to regulate metabolism is compromised. This often leads to a decrease in basal metabolic rate, making it easier to gain weight and harder to lose it. Conversely, obesity can exacerbate sarcopenia by inducing chronic inflammation, insulin resistance, and other metabolic abnormalities. The excess adipose tissue produces

inflammatory cytokines, which can negatively impact muscle tissue. This inflammatory state further contributes to muscle wasting, forming a vicious cycle. Additionally, individuals with obesity may have a more sedentary lifestyle, further accelerating muscle loss [2].

Sarcopenic obesity is not a mere additive problem; it is a synergistic one. The combination of muscle loss and excessive fat accumulation creates a scenario where the risk factors and complications of both conditions are amplified. People with sarcopenic obesity are more likely to experience physical disabilities, such as difficulties in walking and performing daily tasks. They also face an increased risk of developing chronic diseases, including heart disease, stroke, and diabetes. Furthermore, sarcopenic obesity is linked to a higher mortality rate than either condition alone. A study published in the American Journal of Clinical Nutrition found that individuals with sarcopenic obesity had a significantly higher risk of death compared to those with either sarcopenia or obesity alone. This underscores the severity of this condition and its implications for public health [3].

Identifying and diagnosing sarcopenic obesity can be challenging, as it requires a combination of assessments for muscle mass, muscle strength, and body fat. Dual-energy X-ray absorptiometry (DXA) is a widely used method to measure body composition, providing information on both muscle and fat mass. Handgrip strength is commonly used to assess muscle strength. Additionally, the SARC-F questionnaire, which evaluates physical function and strength, can help screen for sarcopenia.

Once identified, the management of sarcopenic obesity is a complex task. Treatment strategies often involve a multidisciplinary approach, combining nutrition, physical activity, and sometimes medical interventions. It's essential to address both the obesity component and the muscle loss to break the vicious cycle. Resistance training, a form of exercise that targets muscle strengthening, is a cornerstone in the management of sarcopenic obesity. Adequate protein intake is also crucial to support muscle growth and maintenance [4].

Beyond resistance training and nutrition, addressing the metabolic abnormalities associated with obesity is essential. Weight loss, achieved through a combination of dietary changes and increased physical activity, can improve metabolic health

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and alleviate some of the complications of obesity. However, it's important to aim for fat loss while preserving muscle mass, which can be a delicate balance to strike. In some cases, medical interventions may be necessary. Hormone replacement therapy, such as testosterone replacement in men, can help address muscle loss. Additionally, medications targeting insulin resistance and inflammation may be prescribed to manage the metabolic aspects of sarcopenic obesity.

Prevention is always preferable to treatment, and lifestyle modifications play a crucial role in preventing the development of sarcopenic obesity. Maintaining an active lifestyle, including regular exercise that incorporates resistance training, is essential. A balanced diet that ensures sufficient protein intake is equally important. Avoiding excessive calorie consumption and making healthy food choices can help prevent obesity. Finally, regular health check-ups can facilitate early detection and intervention, reducing the risk of developing sarcopenic obesity [5].

## Conclusion

In conclusion, the associations of sarcopenia, obesity, and sarcopenic obesity are deeply interconnected and present a significant challenge to public health. Sarcopenia and obesity are not standalone issues; they often coexist and fuel each other's progression. Sarcopenic obesity is associated with a higher risk of disability and mortality than either condition alone, making it a critical concern. Recognizing and addressing sarcopenic obesity requires a multifaceted approach that combines efforts to preserve and build muscle mass, reduce

body fat, and improve metabolic health. This involves lifestyle modifications, including regular physical activity, a balanced diet, and early detection through health screenings. As the global burden of obesity continues to grow, understanding the complexities of its relationship with sarcopenia becomes increasingly important. The synergy between these conditions underscores the necessity of comprehensive healthcare strategies that consider both muscle and fat mass in promoting health and longevity.

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