

# The Effectiveness of Body Composition Analysis Using Dual-Energy X-Ray Absorptiometry (DEXA) for Diagnosing Sarcopenia: Literature Review

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## OBJECTIVES

Sarcopenia is one of the physiological change associated with aging, which is defined as a loss of muscle mass, muscle strength and physical functions. As the elderly population has increased substantially, the prevalence of sarcopenia is increasing. This study aims to evaluate the effectiveness of body composition analysis using dual-energy x-ray absorptiometry (DEXA) for diagnosing sarcopenia.

## METHODS

As part of the new Health Technology Assessment (nHTA), we conducted a literature review to assess the effectiveness of DEXA in body composition analysis for diagnosing sarcopenia. We collected guidelines from the Guidelines International Network, National Institute for Health and Care Excellence, Agency for Health Research and Quality, Korean Medical Guideline Information Center, and six clinical society websites, as well as conducted additional manual searches.

## RESULTS

We reviewed 13 guidelines and articles on expert consensus from eight professional groups, including the European Working Group on Sarcopenia in Older People (EWGSOP), International Conference on Sarcopenia and Frailty Research (ICFSR), European Society of Clinical Nutrition and Metabolism (ESPEN), Foundation for the National Institutes of Health (FNIH), Asian Working Group for Sarcopenia (AWGS), Sarcopenia study group of Korean Geriatrics Society (KGS), International Society for Clinical Densitometry (ISCD), and International Working Group on Sarcopenia (IWGS).

All the professional groups recommended evaluating three factors - muscle mass, muscle strength, and physical performance - for the diagnosis of sarcopenia; the decrease in muscle mass should be measured using DEXA, and appendicular skeletal muscle mass (ASM) or appendicular lean mass (ALM) should be measured by the indicators adjusted for height or BMI.

The thresholds for muscle mass reduction were 6.43 - 7.26 kg/m<sup>2</sup> for men and 5.34 - 6.0 kg/m<sup>2</sup> for women in the case of height-adjusted ASM, 0.786 m<sup>2</sup> for men and 0.512 m<sup>2</sup> for women with BMI-adjusted ALM, and 7.23 kg/m<sup>2</sup> for men and 5.67 kg/m<sup>2</sup> for women with height-adjusted ALM.

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## CONCLUSIONS

Guidelines and articles published in eight professional groups in worldwide recommend the use of DEXA for for the diagnosis of sarcopenia. Therefore, DEXA is useful for diagnosing sarcopenia in patients with suspected sarcopenia.

The New Health Technology Assessment Committee determined Body Composition Analysis using DEXA in Sarcopenia to a safe and effective technique, and announced through the Korean Ministry of Health and Welfare bulletin No. 2019-265 (5 December 2019).

## Guideline Search Site

1. Guidelines International Network (GIN)
2. National Institute for Health and Care Excellence (NICE)
3. National Guideline Clearinghouse (NGC) by Agency for Health Research and Quality (AHRQ)
4. Korea Medical Guideline Information Center (KoMGI)
5. European Society for Clinical Nutrition and Metabolism (ESPEN)
6. American Society for Parenteral and Enteral nutrition (ASPEN)
7. Korean Society of Sarcopenia
8. Korean Geriatrics Society
9. Korean Society for Parenteral and Enteral Nutrition
10. Korean Society of Surgical Metabolism and Nutrition

## Guidelines

| Society | Guidelines   |
|---------|--|
| EWGSOP  | Cruz-Jentoft AJ et al (2019). Sarcopenia: revised European consensus on definition and diagnosis. <i>Age Ageing</i> .  |
|         | Cruz-Jentoft AJ et al (2010). Sarcopenia: European consensus on definition and diagnosis: Report of the European Working Group on Sarcopenia in Older People. <i>Age Ageing</i> .  |
| ICFSR   | Dent E et al (2018). International clinical practice guidelines for sarcopenia (ICFSR): screening, diagnosis and management. <i>J Nutr Health Aging</i> .  |
| ESPEN   | Cederholm T et al (2017). ESPEN guidelines on definitions and terminology of clinical nutrition. <i>Clin Nutr</i> .  |
| FNIH    | Chiles Shaffer N et al (2017). Agreement and predictive validity using less-conservative foundation for the National Institutes of Health Sarcopenia Project Weakness Cut points. <i>J Am Geriatr Soc</i> .                  |
|         | Studenski SA et al (2014). The FNIH sarcopenia project: rationale, study description, conference recommendations, and final estimates. <i>J Gerontol A Biol Sci Med Sci</i> .  |
| AWGS    | Chen LK et al (2016). Recent advances in sarcopenia research in Asia: 2016 update from the Asian Working Group for Sarcopenia. <i>J Am Med Dir Assoc</i> .   |
|         | Chen LK et al (2014). Sarcopenia in Asia: consensus report of the Asian Working Group for Sarcopenia. <i>J Am Med Dir Assoc</i> .  |
| KGS     | Jang HC (2018). How to Diagnose Sarcopenia in Korean Older Adults? <i>Ann Geriatr Med Res</i> .  |
|         | Kim KM et al (2015). Sarcopenia in Korea: prevalence and clinical aspects. <i>Journal of the Korean Geriatrics Society</i> .   |
| ISCD    | Kendler DL et al (2013). The official positions of the International Society for Clinical Densitometry: indications of use and reporting of DXA for body composition. <i>J Clin Densitom</i> .                               |
|         | Petak S et al (2013). The Official Positions of the International Society for Clinical Densitometry: body composition analysis reporting. <i>J Clin Densitom</i> .   |
| IWGS    | Fielding RA et al (2011). Sarcopenia: an undiagnosed condition in older adults. Current consensus definition: prevalence, etiology, and consequences. International working group on sarcopenia. <i>J Am Med Dir Assoc</i> . |