Sarcopenia:

qué es y dónde estamos

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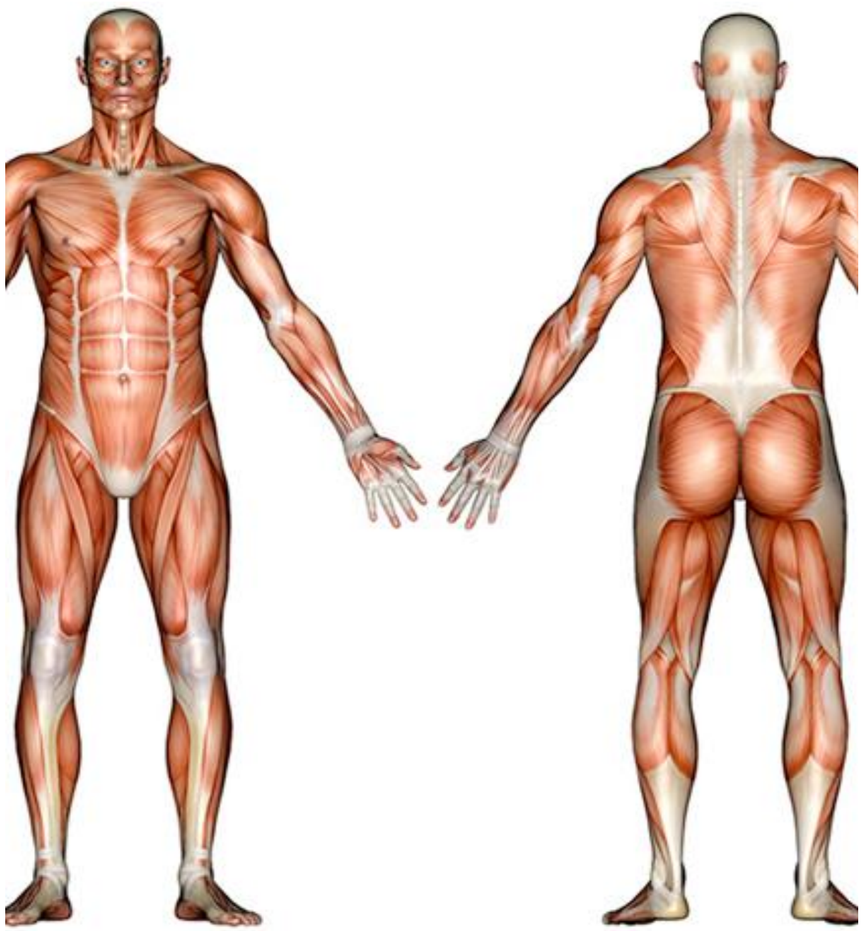
El músculo humano: el órgano olvidado

- 600 músculos en el cuerpo humano
- Músculo esquelético: 40-45% de la masa corporal total
- 55% de este músculo está en las piernas
- 50% de las proteínas del cuerpo están en los músculos

➢ movilidad

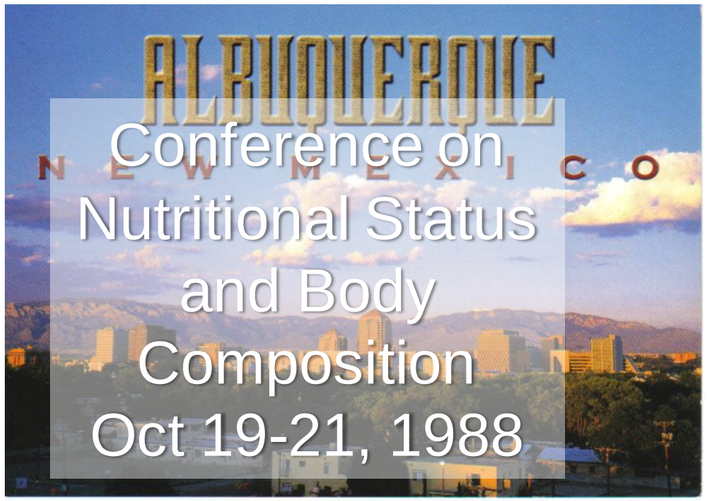
➢ regulación de las proteínas

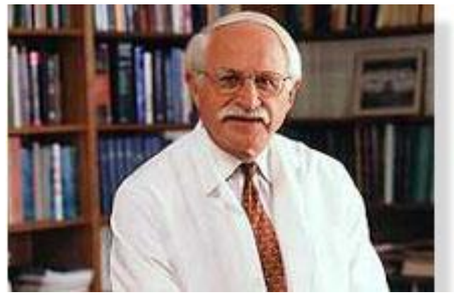
➢ regulación endocrina



Frontera WR et al. In: Physical Medicine&Rehabilitation. DeLisa JA (ed). LWW 2005

Sarcopenia: primeros pasos





- "No decline with age is as dramatic or potentially more significant than the decline in lean body mass. In fact, there may be no single feature of age-related decline more striking than the decline in lean body mass in affecting ambulation, mobility, energy intake, overall nutrient intake and status, independence and breathing."

- "I suggested that if this phenomenon were to be taken seriously, we had to give it a name. I proposed that the name for this phenomenon should be derived from the Greek."

Sarcopenia: primer acto científico

1st Workshop on Sarcopenia – NIA
September 19-21, 1994

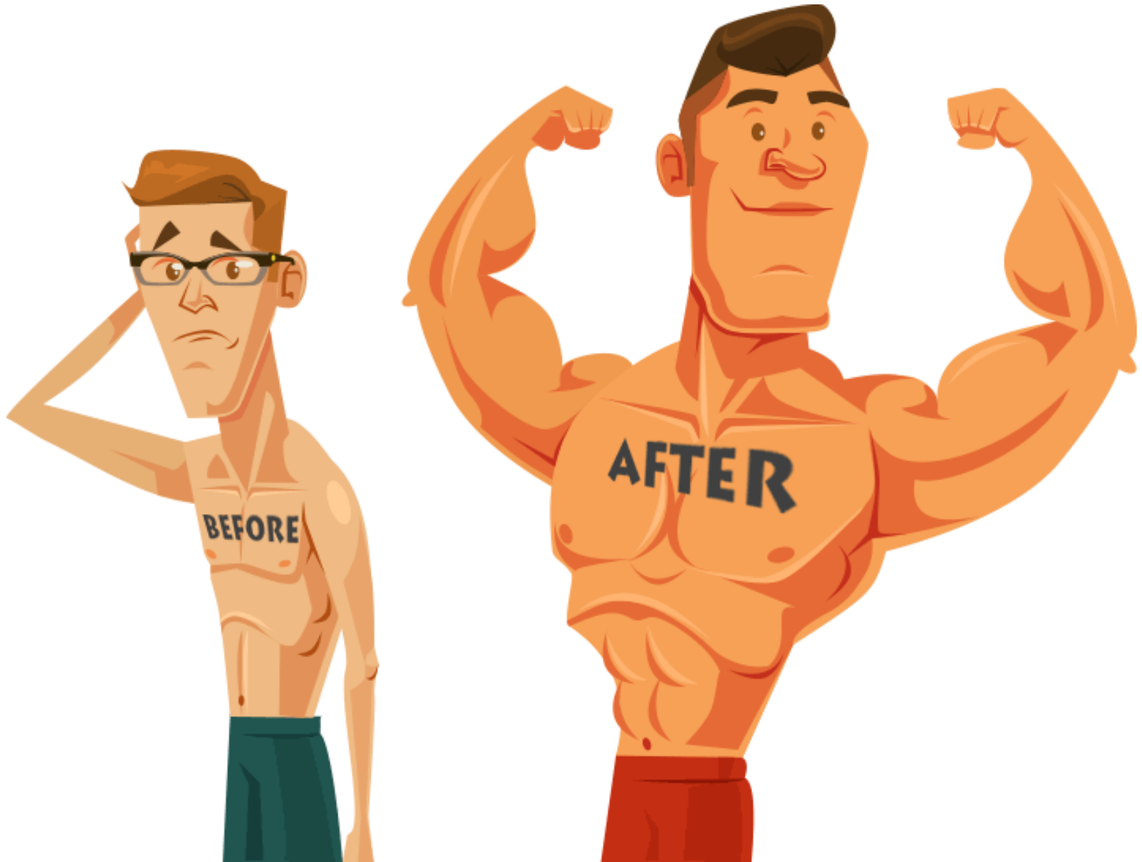
"Sarcopenia" es un nombre genérico para la pérdida de masa, calidad y fuerza del músculo esquelético, que puede causar fragilidad en las personas mayores.

Holloszy JO. Workshop on sarcopenia: muscle atrophy in old age. J Gerontol 1995.

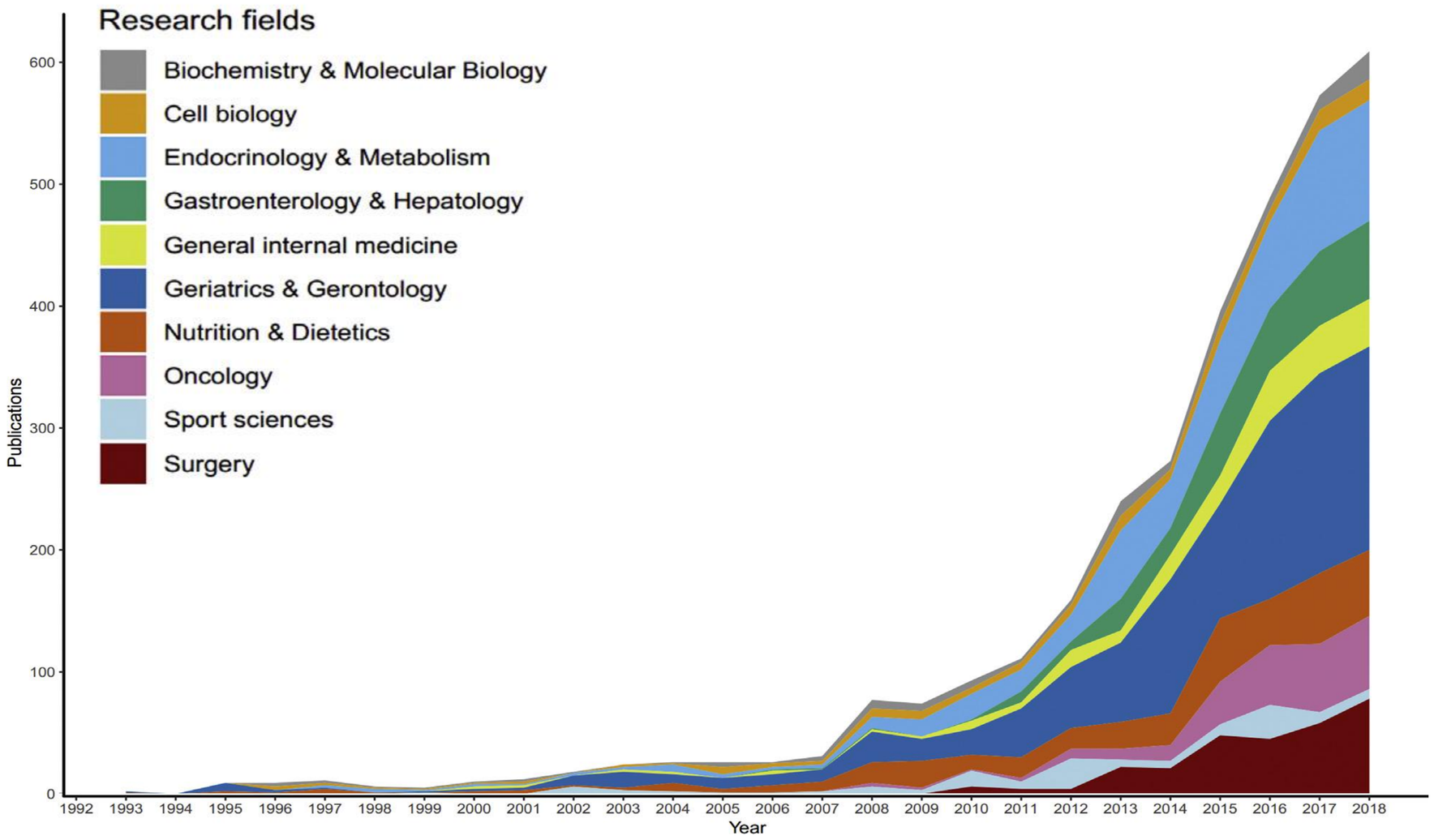
2010

Sarcopenia
≠
Baja masa muscular

Este año se da un **importante cambio** en el concepto de sarcopenia



Crecimiento en la investigación

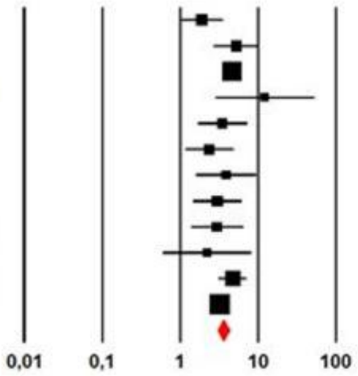


Yang M, Tan L, Li W. Landscape of Sarcopenia Research (1989–2018): A Bibliometric Analysis. J Am Med Dir Assoc. 2020 Mar;21(3):436-437.

Consecuencias de la sarcopenia

Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
Arango-Lopera, 2013	1,866	0,978	3,561	1,892	0,059
Bianchi, 2015	5,239	2,705	10,145	4,911	0,000
Cawthon, 2015	4,580	3,501	5,992	11,101	0,000
Cerri, 2015	12,133	2,815	52,300	3,348	0,001
Da Silva, 2014	3,462	1,661	7,216	3,314	0,001
Kim, 2014	2,360	1,153	4,833	2,349	0,019
Landi, 2012	3,873	1,572	9,542	2,943	0,003
Landi, 2013	2,992	1,465	6,111	3,008	0,003
Saka, 2015	2,964	1,364	6,441	2,743	0,006
Sanchez-Rodriguez, 2014	2,199	0,600	8,055	1,189	0,234
Vetrano, 2014	4,716	3,109	7,153	7,295	0,000
Woo, 2015	3,190	2,542	4,003	10,013	0,000
	3,596	2,957	4,373	12,821	0,000

Statistics for each study



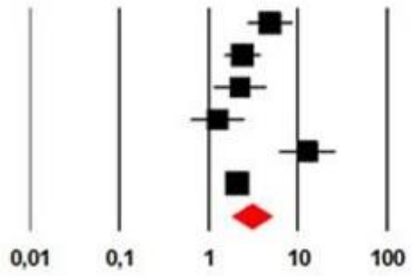
2A. Mortality and sarcopenia

Heterogeneity Q-value 16.05; df(Q) 11; p-value 0.14; I^2 31.4

* All ORs were crude ORs.

Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
Bianchi, 2015	4,890	2,677	8,931	5,164	0,000
Cawthon, 2015	2,420	1,495	3,917	3,597	0,000
Da Silva, 2014	2,260	1,124	4,545	2,287	0,022
Sanchez-Rodriguez, 2015	1,273	0,624	2,597	0,663	0,507
Tanimoto, 2013	12,820	6,059	27,125	6,671	0,000
Woo, 2015	2,100	1,591	2,772	5,239	0,000
	3,034	1,799	5,118	4,162	0,000

Statistics for each study



2B. Functional disability and sarcopenia

Heterogeneity Q-value 27.99; df(Q) 5; p-value <0.001; I^2 82.1.

* Only the OR reported in the Cawthon et al. study was age-adjusted. All other ORs were crude

Beaudart C, Zaaria M, Pasleau F, Reginster JY, Bruyère O. Health Outcomes of Sarcopenia: A Systematic Review and Meta-Analysis. PLoS One. 2017;12(1):e0169548.

La sarcopenia sale del ámbito de la geriatría

THE LANCET

Seminar

Sarcopenia

Alfonso J Cruz-Jentoft, Avan A Sayer

Lancet 2019; 393: 2636–46

This online publication has been corrected. The corrected version first appeared at thelancet.com on June 27, 2019

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Sarcopenia is a progressive and generalised skeletal muscle disorder involving the accelerated loss of muscle mass and function that is associated with increased adverse outcomes including falls, functional decline, frailty, and mortality. It occurs commonly as an age-related process in older people, influenced not only by contemporaneous risk factors, but also by genetic and lifestyle factors operating across the life course. It can also occur in mid-life in association with a range of conditions. Sarcopenia has become the focus of intense research aiming to translate current knowledge about its pathophysiology into improved diagnosis and treatment, with particular interest in the development of biomarkers, nutritional interventions, and drugs to augment the beneficial effects of resistance exercise. Designing effective preventive strategies that people can apply during their lifetime is of primary concern. Diagnosis, treatment, and prevention of sarcopenia is likely to become part of routine clinical practice.

Age and Ageing 2019; **48:** 16–31
doi: 10.1093/ageing/afy169
Published electronically 24 September 2018

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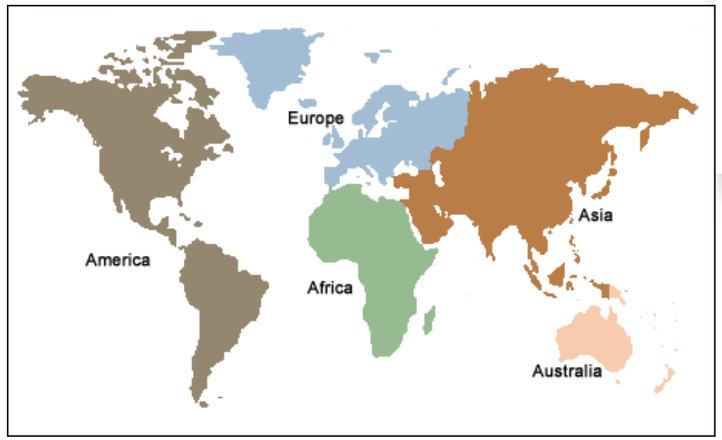

SPECIAL ARTICLE

Sarcopenia Definition: The Position Statements of the Sarcopenia Definition and Outcomes Consortium

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GUIDELINES

Sarcopenia: revised European consensus on definition and diagnosis

Alfonso J. Cruz-Jentoft[1], Gülistan Bahat[2], Jürgen Bauer[3], Yves Boirie[4], Olivier Bruyère[5], Tommy Cederholm[6], Cyrus Cooper[7], Francesco Landi[8], Yves Rolland[9], Avan Aihie Sayer[10], Stéphane M. Schneider[11], Cornel C. Sieber[12], Eva Topinkova[13], Maurits Vandewoude[14], Marjolein Visser[15], Mauro Zamboni[16], Writing Group for the European Working Group on Sarcopenia in Older People 2 (EWGSOP2), and the Extended Group for EWGSOP2

EWGSOP2

Definición de sarcopenia

- La sarcopenia es una enfermedad progresiva y generalizada del músculo esquelético que se asocia con un aumento del riesgo de sufrir consecuencias adversas como fracturas, incapacidad física y mortalidad.

Insuficiencia muscular

EWGSOP2

Definición operativa de sarcopenia

BAJA FUERZA MUSCULAR

+

BAJA MASA/ CALIDAD MUSCULAR

+

BAJO RENDIMIENTO FÍSICO

SARCOPENIA PROBABLE

SARCOPENIA CIERTA

SARCOPENIA GRAVE

EWGSOP2

Detección de casos de sarcopenia

- En l
  tier
  mar
  pes
  la s
- El E
  cas

Preguntas		Puntaje
Strength (Fuerza)	¿Qué tanta dificultad tiene para llevar o cargar 4.5 kg?	Ninguna = 0 Alguna = 1 Mucha o incapaz = 2
Assistance in walking (Asistencia para caminar)	¿Qué tanta dificultad tiene para cruzar caminando por un cuarto?	Ninguna = 0 Alguna = 1 Mucha, usando auxiliares o incapaz = 2
Rise from chair (Levantarse de una silla)	¿Qué tanta dificultad tiene para levantarse de una silla o cama?	Ninguna = 0 Alguna = 1 Mucha o incapaz sin ayuda = 2
Climb stairs (Subir escaleras)	¿Qué tanta dificultad tiene para subir 10 escalones?	Ninguna = 0 Alguna = 1 Mucha o incapaz = 2
Falls (Caídas)	¿Cuántas veces se ha caído en el último año?	Ninguna = 0 1-3 caídas = 1 4 o más caídas = 2

Puntuación total: _____

Interpretación
Alta probabilidad de sarcopenia = 4 o más probabilidades.
1, 2 ó 3 puntos = Baja probabilidad de sarcopenia.

nza cuando el paciente
nsación de debilidad,
la o pérdida de
nda hacer pruebas para

SARC-F para detectar

EWGSOP2

Puntos de corte

Test	Puntos de corte en hombres	Puntos de corte en mujeres	Referencias
Puntos de corte EWGSOP2 para definir la baja fuerza muscular			
Fuerza de prensión	<27 kg	<16 kg	Dodds, 2014[26]
Levantarse de la silla	>15 sec for 5 rises		Cesari, 2009[67]
Puntos de corte EWGSOP2 para definir la baja masa muscular			
ASM	< 20 kg	< 15 kg	Studenski, 2014[3]
ASM/height^2	< 7.0 kg/m^2	< 5.5 kg/m^2	Gould, 2014[125]

Puntos de corte

Test	Puntos de corte en hombres	Puntos de corte en mujeres	Referencias
Puntos de corte EWGSOP2 para definir el bajo rendimiento físico			
Velocidad de marcha	≤ 0.8 m/s		Cruz-Jentoft, 2010[1] Studenski, 2011[84]
SPPB	≤ 8 puntos		Pavasini, 2016[90] Guralnik, 1995[126]
TUG	≥ 20 s		Bischoff, 2003[127]
400m walk test	No completarlo o tardar ≥ 6 min en hacerlo		Newman, 2006[128]

Sarcopenia aguda y crónica

- Sarcopenia aguda: menos de 6 meses
  - Normalmente asociada a enfermedad o lesión aguda
- Sarcopenia crónica: dura ≥ 6 meses.
  - Asociada a enfermedades crónicas o progresivas
- Importancia de medir la sarcopenia a lo largo del tiempo.
- Puede facilitar la intervención precoz.

EWGSOP2

Sarcopenia aguda

Table 1. Factors and diagnostic tools concerning the diagnosis of acute sarcopenia

General aspects		
Patient factors Health conditions (pain, dyspnoea, delirium/dementia, reduced mobi lity/bed bound), intravenous lines, catheters, and patient refusal		
Staff/hospital factors Lack of time and staff, lack of knowledge, and no availability of equipm ent		
Measurements		
Muscle mass	DXA CT MRI BIA Ultrasound	DXA, CT, MRI: – Expensive, exposure to radiation, subject to availability, and patient's clinical status to be transferred to the facility DXA and BIA: – Influenced by hydration situation Ultrasound: – Nonuniversal cutoff points
Muscle strength	Hand dynamometer	Influenced by mental situation and uncontrolled pain
Physical performance	SPPB TUG Gait speed	Influenced by acute illness, comorbidities, and uncontrolled pain

Montero-Errasquín B, Cruz-Jentoft AJ. Acute sarcopenia. Gerontology. 2023;69(5):519-525.

Categorías de la sarcopenia

Envejecimiento	• Pérdida muscular relacionada con la edad
Enfermedad	• Inflamación (cáncer, enfermedad avanzada de órgano) • Artrosis • Enfermedades neurológicas
Inactividad	• Conducta sedentaria • Incapacidad física
Malnutrición	• Desnutrición o malabsorción • Anorexia por fármacos • Obesidad

Nuevo algoritmo

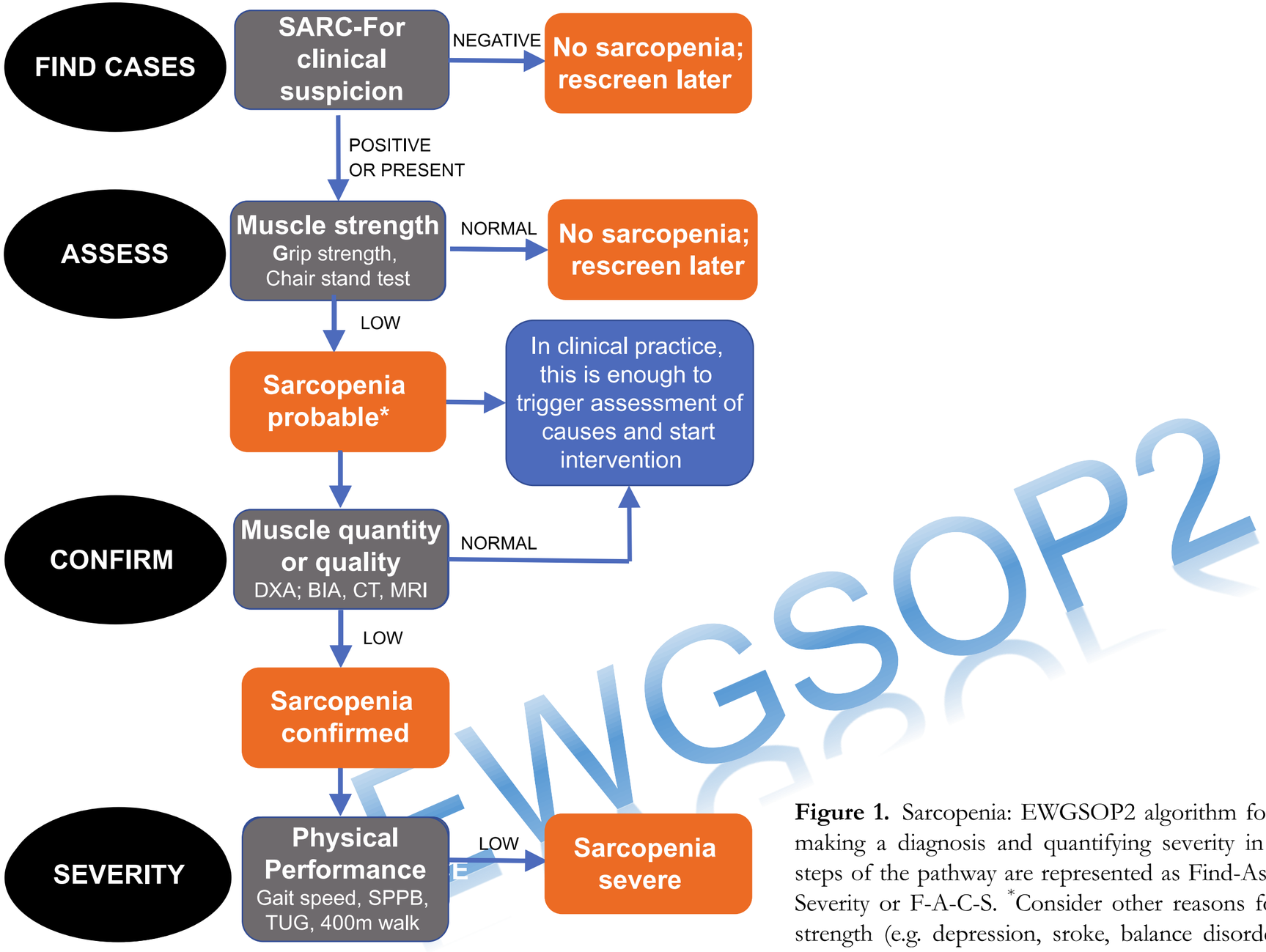

Figure 1. Sarcopenia: EWGSOP2 algorithm for case-finding, making a diagnosis and quantifying severity in practice. The steps of the pathway are represented as Find-Assess-Confirm-Severity or F-A-C-S. *Consider other reasons for low muscle strength (e.g. depression, stroke, balance disorders, peripheral vascular disorders).

ESPEN / EASO definition of sarcopenic obesity

Clinical Nutrition 41 (2022) 990–1000

Contents lists available at ScienceDirect

Clinical Nutrition

journal homepage: http://www.elsevier.com/locate/clnu

ESPEN Guideline

Definition and diagnostic criteria for sarcopenic obesity: ESPEN and EASO consensus statement☆

Lorenzo M. Donini [a, *], Luca Busetto [b], Stephan C. Bischoff [c], Tommy Cederholm [d], Maria D. Ballesteros-Pomar [e], John A. Batsis [f], Juergen M. Bauer [g], Yves Boirie [h], Alfonso J. Cruz-Jentoft [i], Dror Dicker [j], Stefano Frara [k], Gema Frühbeck [l], Laurence Genton [m], Yftach Gepner [n], Andrea Giustina [k], Maria Cristina Gonzalez [o], Ho-Seong Han [p], Steven B. Heymsfield [q], Takashi Higashiguchi [r], Alessandro Laviano [a], Andrea Lenzi [a], Ibolya Nyulasi [s], Edda Parrinello [a], Eleonora Poggiogalle [a], Carla M. Prado [t], Javier Salvador [u], Yves Rolland [v], Ferruccio Santini [w], Mireille J. Serlie [x], Hanping Shi [y], Cornel C. Sieber [z], Mario Siervo [aa], Roberto Vettor [b], Dennis T. Villareal [ab], Dorothee Volkert [z], Jianchun Yu [ac], Mauro Zamboni [ad], Rocco Barazzoni [ae, **]

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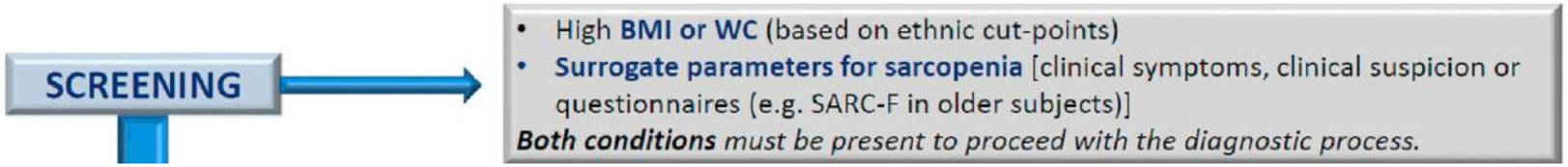
ESPEN / EASO definition of sarcopenic obesity



Donini LM, et al. Definition and diagnostic criteria for sarcopenic obesity: ESPEN and EASO consensus statement. Clin Nutr. 2022 Apr;41(4):990-1000.

¿Qué sucede en la práctica clínica real?

177 organizaciones en Reino Unido

104 (59%) responden sobre fragilidad

49 (28%) responden sobre sarcopenia

26 (53%) afirman que identifican la sarcopenia

19 (39%) usan alguna herramienta diagnóstica

3 (6%) usan criterios diagnósticos

Muscle mass (%)	Bioimpedance assessment	2 (11)
	Dual X-ray absorptiometry	3 (16)
	Computed tomography	2 (11)
	Magnetic resonance imaging	1 (5)
	Observation or anthropometry (%)	7 (37)
Muscle function (%)	Walk speed	16 (84)
	Grip strength	10 (53)
Questionnaire / history (%)		3 (16)
Number measuring muscle mass (%)		4 (21)
Number measuring muscle function (%)		18 (95)
Number measuring muscle mass AND muscle function (%)		4 (21)

Table 1. Tools used to identify sarcopenia (n=19 organisations).

Offord NJ et al. Current practice in the diagnosis and management of sarcopenia and frailty - results from a UK-wide survey. J Frailty Sarcopenia Falls. 2019 Sep 1;4(3):71-77.

¿Qué sucede en la práctica clínica real?

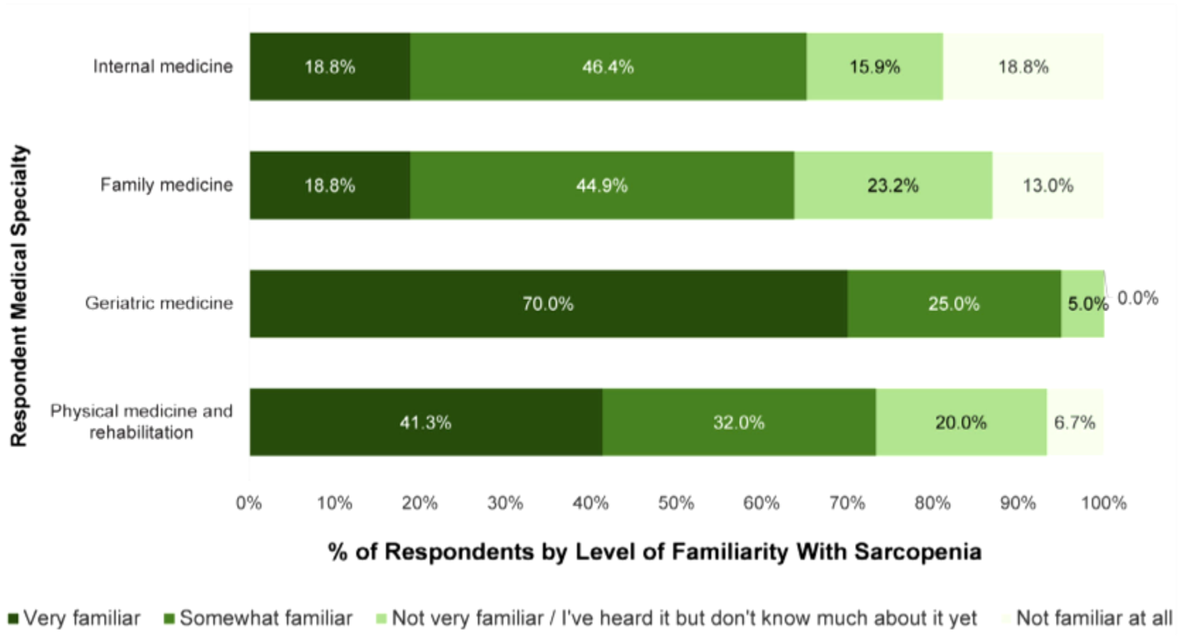


TABLE 1 Physicians' diagnostic techniques and diagnostic criteria for sarcopenia

Measurements used in diagnosis (select all that apply; $n = 248$)	**Percent**
Manual muscle testing strength scale	40%
Gait speed test results	39%
Grip strength test results (e.g., from a dynamometer)	35%
None-I do not use specific measurements to confirm a diagnosis.	21%
DEXA scan results	19%
Electrodiagnostic results	14%
CT/MRI results	10%
Ultrasound results	5%
Other	7%
N/A-I always defer to a specialist for diagnosis	1%
Diagnostic criteria (select one; $n = 246$)	
N/A-I do not typically use specific diagnostic criteria.	50%
Unsure which one applies to my criteria	27%
FNIH (Foundation for the National Institutes of Health)	14%
SSCWD (Society of Sarcopenia, Cachexia, and Wasting Disorders)	6%
EWGSOP (European Working Group on Sarcopenia in Older People)	4%
Other	0%

Guralnik JM et al. Limited physician knowledge of sarcopenia: A survey. J Am Geriatr Soc. 2023 May;71(5):1595-1602.

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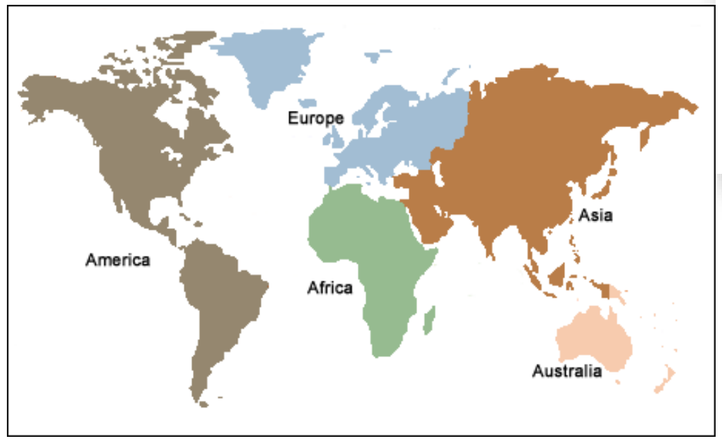

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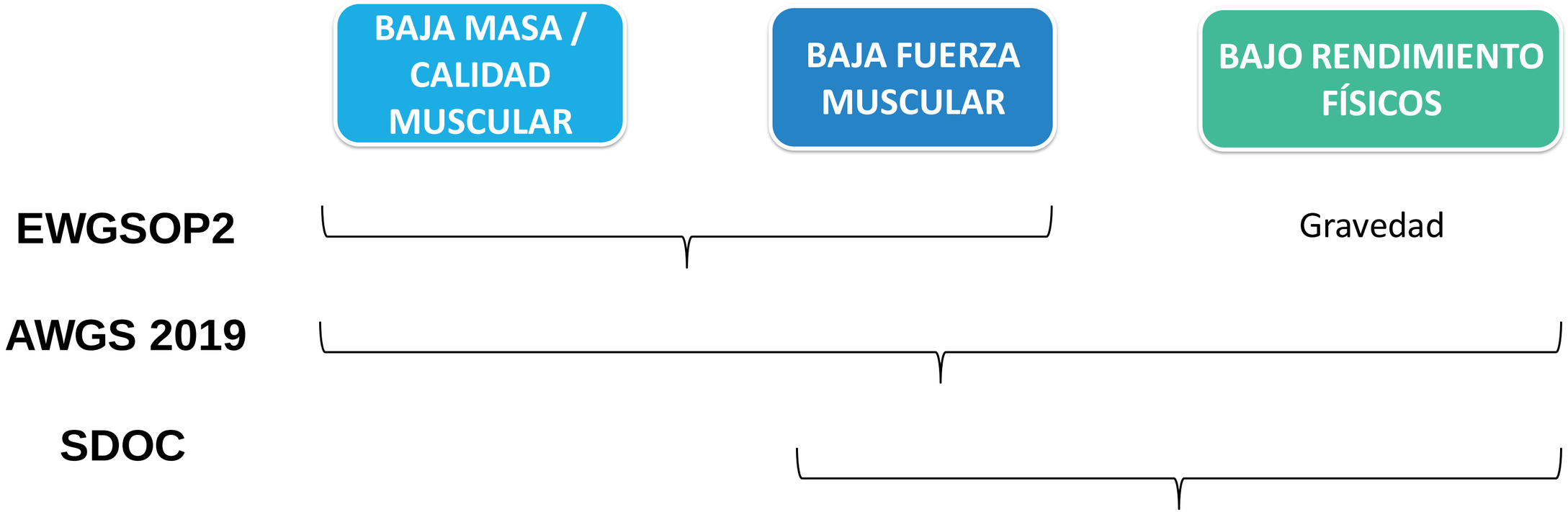
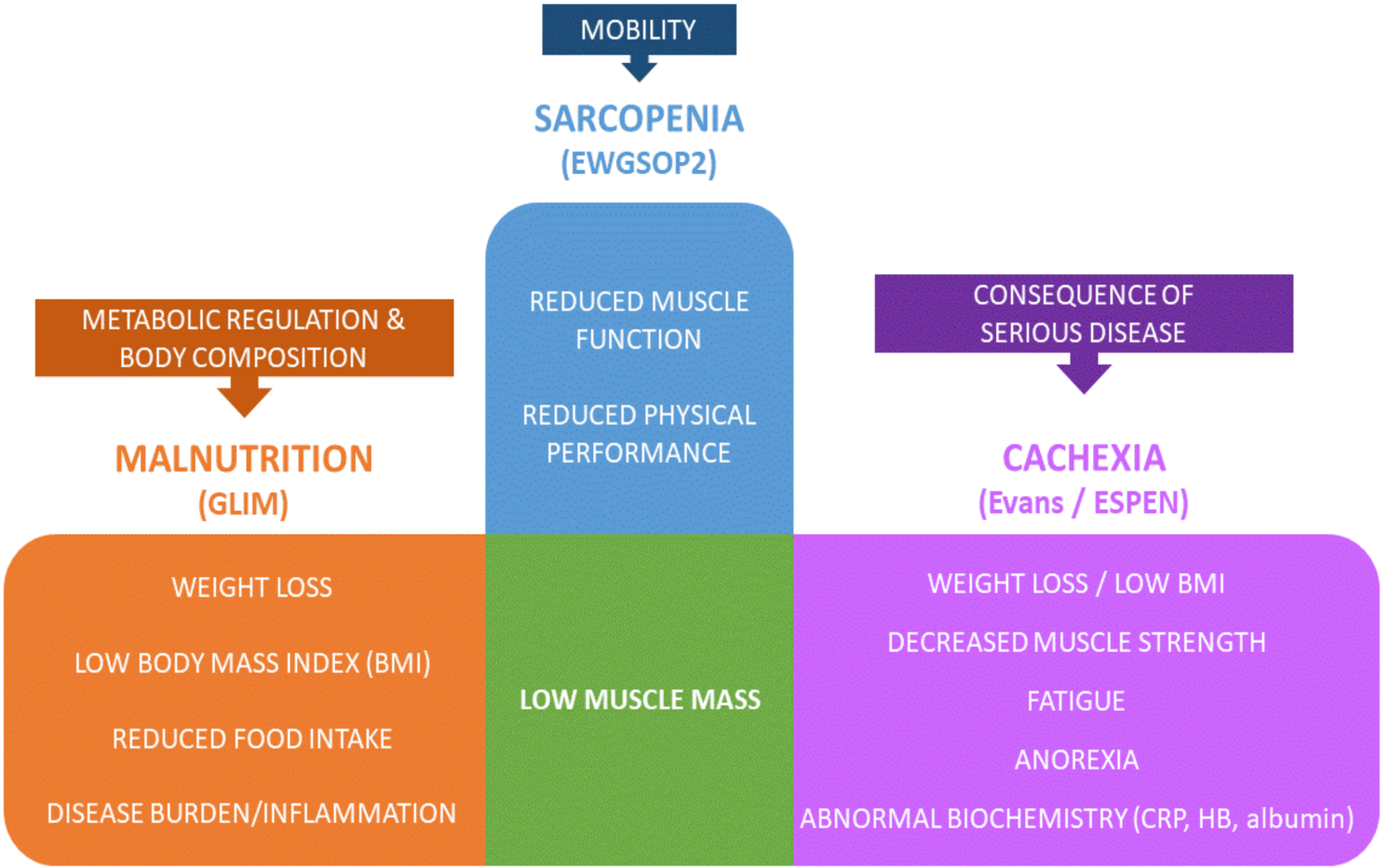
¿Qué elementos tienen la definiciones modernas de sarcopenia?



Definition	Muscle mass	Muscle strength	Physical performance	Cut-offs defined	Comment
EWGSOP (2010)	●	●	●		Insufficient evidence to propose cut-offs
IWGS (2011)	●		●	●	
SSCWD (2011)	●		●	●	Named “sarcopenia with limited mobility”
AWGS (2014)	●	●	●	●	Same as EWGSOP but adds cut-offs for Asia
FNIH (2014)	●	●		●	Uses physical performance as outcome
EWGSOP2 (2019)	●	●	●	●	Physical performance used for severity
AWGS (2019)	●	●	●	●	
SDOC (2019)		●	●	●	

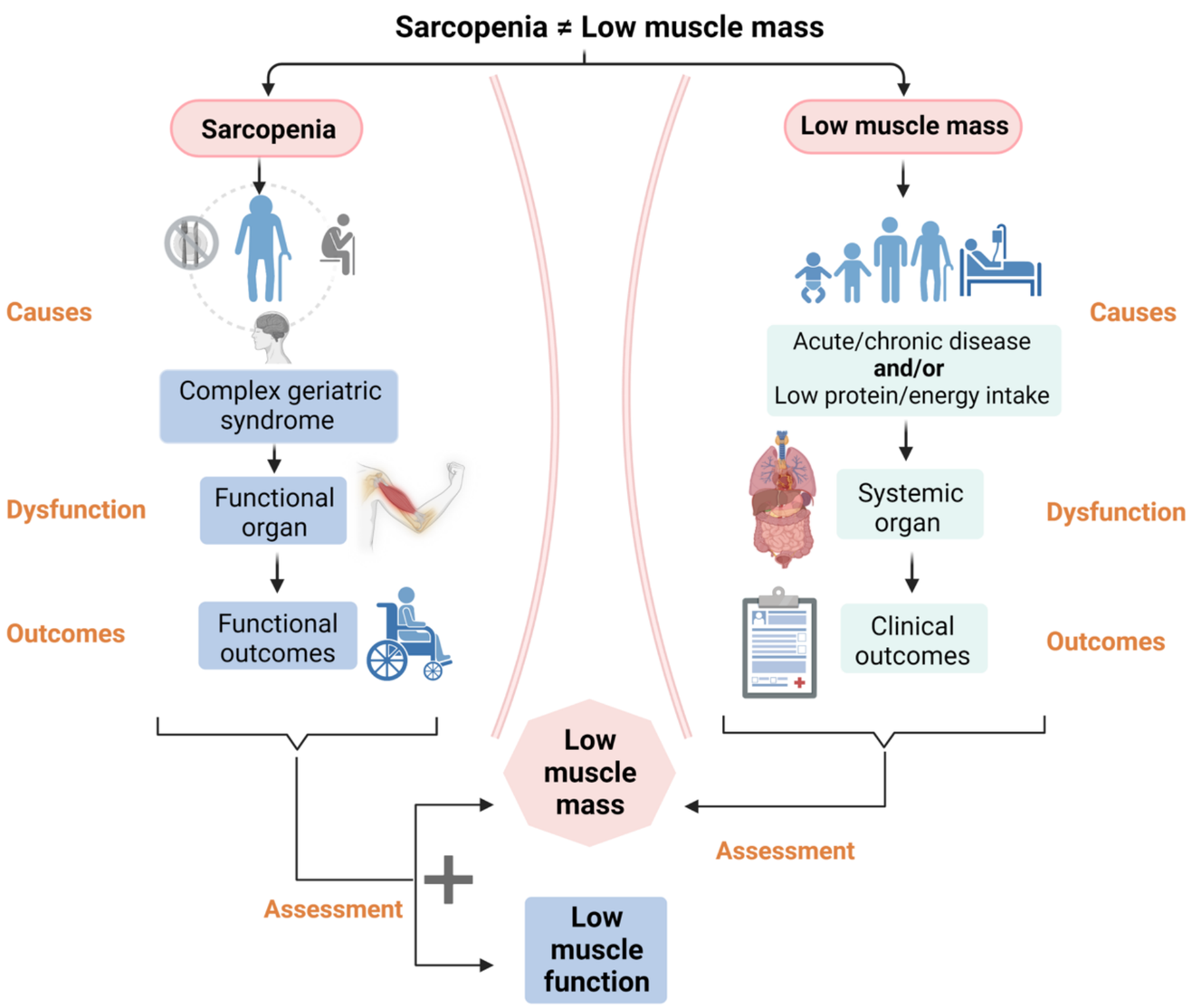
Adapted from Cruz-Jentoft AJ, Sayer AA. Sarcopenia. Lancet. 2019;393(10191):2636-2646.

La masa muscular en la encrucijada



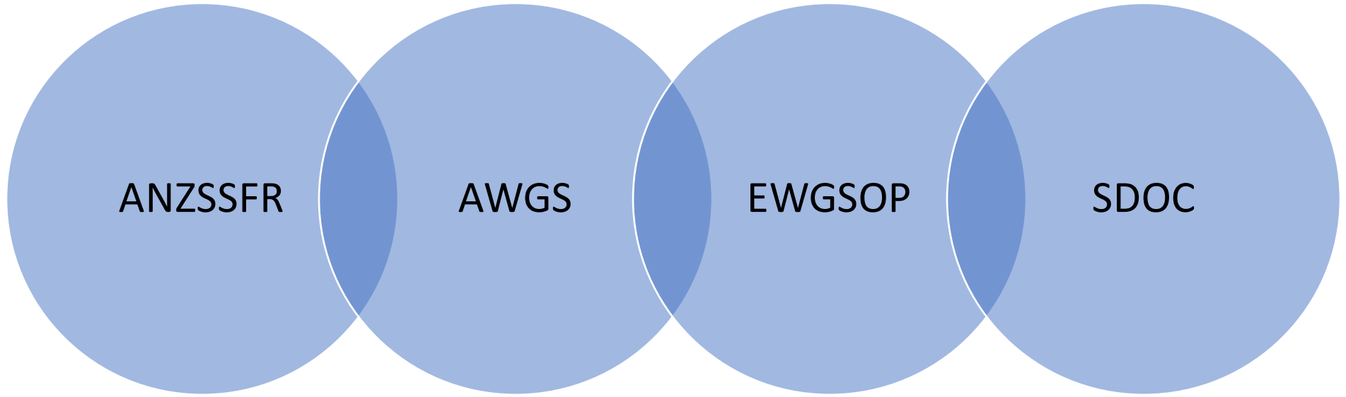
Sayer AA, Cruz-Jentoft A. Sarcopenia definition, diagnosis and treatment: consensus is growing. Age Ageing. 2022 Oct 6;51(10):afac220.

Sarcopenia ≠ Low muscle mass



Cruz-Jentoft AJ, Gonzalez MC, Prado CM. Sarcopenia ≠ Low Muscle Mass. Eur Geriatr Med 2023 (online first)

The GLIS initiative



GLOBAL LEADERSHIP INITIATIVE IN SARCOPENIA
GLIS

AGING IN MOTION
Advancing Research and Treatment of Sarcopenia

AGS Geriatrics Healthcare Professionals
Leading Change. Improving Care for Older Adults.

ASBMR®

AAFS
Asian Association for Frailty and Sarcopenia

Australian and New Zealand Society for Sarcopenia and Frailty Research

EASO

EuGMS
European Geriatric Medicine Society
Fostering geriatric medicine across Europe

eSCEO

ESPEN
European Society for Clinical Nutrition and Metabolism

INTERNATIONAL ASSOCIATION OF GERONTOLOGY AND GERIATRICS
Founded 1950

International Conference on Frailty & Sarcopenia Research

IOF International Osteoporosis Foundation

THE GERONTOLOGICAL SOCIETY OF AMERICA®

SCWD
SOCIETY ON SARCOPENIA, CACHEXIA & WASTING DISORDERS

¿Por qué GLIS?

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Clinical Nutrition

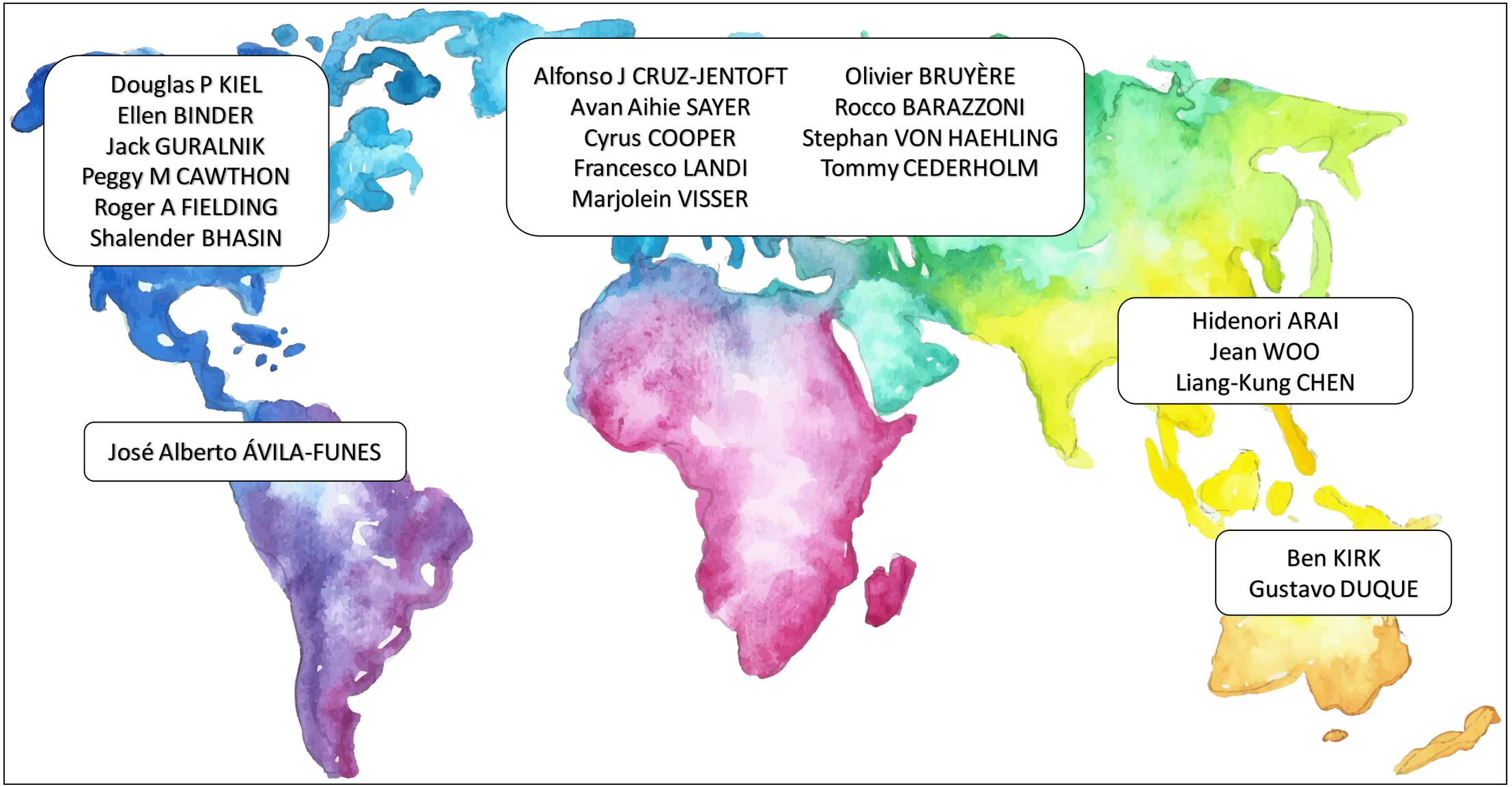
journal homepage: http://www.elsevier.com/locate/clnu

ESPEN Endorsed Recommendation

GLIM criteria for the diagnosis of malnutrition – A consensus report from the global clinical nutrition community☆

T. Cederholm [a, b, *, 1], G.L. Jensen [c, 1], M.I.T.D. Correia [d], M.C. Gonzalez [e], R. Fukushima [f], T. Higashiguchi [g], G. Baptista [h], R. Barazzoni [i], R. Blaauw [j], A. Coats [k, l], A. Crivelli [m], D.C. Evans [n], L. Gramlich [o], V. Fuchs-Tarlovsky [p], H. Keller [q], L. Llido [r], A. Malone [s, t], K.M. Mogensen [u], J.E. Morley [v], M. Muscaritoli [w], I. Nyulasi [x], M. Pirlich [y], V. Pisprasert [z], M.A.E. de van der Schueren [aa, ab], S. Siltharm [ac], P. Singer [ad, ae], K. Tappenden [af], N. Velasco [ag], D. Waitzberg [ah], P. Yamwong [ai], J. Yu [aj], A. Van Gossum [ak, 2], C. Compher [al, 2], GLIM Core Leadership Committee, GLIM Working Group[3]

GLIS steering committee



European Geriatric Medicine (2022) 13:1239–1244
https://doi.org/10.1007/s41999-022-00706-5

SPECIAL ARTICLE

Defining terms commonly used in sarcopenia research: a glossary proposed by the Global Leadership in Sarcopenia (GLIS) Steering Committee

Peggy M. Cawthon[1,2] · Marjolein Visser[3,4] · Hidenori Arai[5] · José A. Ávila-Funes[6] · Rocco Barazzoni[7] · Shalender Bhasin[8] · Ellen Binder[9,10] · Olivier Bruyère[11] · Tommy Cederholm[12,13] · Liang-Kung Chen[14,15,16] · Cyrus Cooper[17,18] · Gustavo Duque[19,20] · Roger A. Fielding[21] · Jack Guralnik[22] · Douglas P. Kiel[23] · Ben Kirk[24,25] · Francesco Landi[26] · Avan A. Sayer[27] · Stephan Von Haehling[28,29] · Jean Woo[30,31] · Alfonso J. Cruz-Jentoft[32]

Glosario

~~Muscle quality~~

Muscle density

A measure of the attenuation of X-rays through the muscle tissue expressed in Hounsfield units (HU).

Muscle texture

A measure of the spatial arrangement, contrast, and consistency of the greyscale pixels in the image.

~~Myos-teatosis~~

Many measures, not specific recommendation, need to specify the exact measure used.

Muscle specific force

Strength standardized to muscle size

Cawthon PM et al. Defining terms commonly used in sarcopenia research: a glossary proposed by the Global Leadership in Sarcopenia (GLIS) Steering Committee. Eur Geriatr Med. 2022 Dec;13(6):1239-1244.

GLIS: metodología

Método **Delphi** con escala Likert de 11 puntos, desde 0 (totalmente en desacuerdo) a 10 (totalmente de acuerdo)

107 participantes (edad media 54 años , 64% hombres) de **29 países** y 7 continentes/regiones.

GLIS: definición conceptual de sarcopenia

La sarcopenia es una enfermedad generalizada del **músculo esquelético**.

Su prevalencia aumenta con la **edad**.

La definición conceptual **no cambia** con el lugar de atención (p.ej. hospitalizados vs. pacientes externos), edad o comorbilidad (p. ej. ICC, ERC, cancer) y es la misma en clínica que en investigación.

La sarcopenia is potencialmente **reversible**.

Componentes de la sarcopenia:

- Masa muscular
- Fuerza muscular
- Fuerza muscular específica (fuerza/tamaño del músculo)

No hubo acuerdo en definir niveles de **gravedad** de la sarcopenia.

GLIS: definición conceptual de sarcopenia

Consecuencias de la sarcopenia:

- Empeoramiento del **rendimiento físico**
- Limitaciones de **movilidad** (caminar, tranferencias)
- **Caídas** y fracturas
- Incapacidad para hacer **AVD** básicas e instrumentales
- **Hospitalizaciones**, ingresos en residencias
- Mala **calidad de vida**
- Mayor **mortalidad**

Sarcopenia: guía clínica

INTERNATIONAL CLINICAL PRACTICE GUIDELINES FOR SARCOPENIA (ICFSR): SCREENING, DIAGNOSIS AND MANAGEMENT

E. DENT[1,2], J.E. MORLEY[3], A.J. CRUZ-JENTOFT[4], H. ARAI[5], S.B. KRITCHEVSKY[6], J. GURALNIK[7], J.M. BAUER[8], M. PAHOR[9], B.C. CLARK[10], M. CESARI[11,12], J. RUIZ[13], C.C. SIEBER[14], M. AUBERTIN-LEHEUDRE[15], D.L. WATERS[16], R. VISVANATHAN[17], F. LANDI[18], D.T. VILLAREAL[19], R. FIELDING[20], C.W. WON[21], O. THEOU[17,22], F.C. MARTIN[23], B. DONG[24], J. WOO[25], L. FLICKER[26], L. FERRUCCI[27], R.A. MERCHANT[28], L. CAO[29], T. CEDERHOLM[30], S.M.L. RIBEIRO[31], L. RODRÍGUEZ-MAÑAS[32], S.D. ANKER[33,34], J. LUNDY[35], L.M. GUTIÉRREZ ROBLEDO[36], I. BAUTMANS[37,38,39], I. APRAHAMIAN[40], J.M.G.A. SCHOLS[41], M. IZQUIERDO[42], B. VELLAS[43]

J Nutr Health Aging. 2018;22(10):1148-1161

Prevención y tratamiento de la sarcopenia

3. Physical Activity	3A. In patients with sarcopenia, prescription of resistance-based training may be effective to improve lean mass, strength and physical function	Strong	+++
4. Protein	4A. We recommend clinicians consider protein supplementation/a protein-rich diet for older adults with sarcopenia	Conditional	++
	4B. Clinicians may also consider discussing with patients the importance of adequate calorie and protein intake	Conditional	+
	4C. Nutritional (protein) intervention should be combined with a physical activity intervention	Conditional	++
5. Vitamin D	5A. Insufficient evidence exists to determine whether a Vitamin D supplementation regime by itself is effective in older adults with sarcopenia	Insufficient evidence	+
6. Anabolic Hormones	6A. The current evidence is insufficient to recommend anabolic hormones for the management of sarcopenia	Insufficient evidence	+
7. Pharmacologic Interventions	7A. Pharmacological interventions are not recommended as first-line therapy for the management of sarcopenia	Insufficient evidence	+
8. Research	8A.. Future international collaboration and large-scale RCTs focusing specifically on older people with sarcopenia are recommended	n/a	n/a

Definición de actividad física y ejercicio

Actividad física: cualquier movimiento del cuerpo producido por músculos esqueléticos que consume energía (kcal). En la vida diaria puede distinguirse la ocupacional, deportiva, doméstica y otras.

Ejercicio: un tipo de actividad física planificado, estructurado y repetitive que busca mejorar o mantener el estado de forma física.

Low physical activity No exercise	Low physical activity Exercise	High physical activity No exercise	High physical activity Exercise

Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public Health Rep. 1985 Mar-Apr;100(2):126-31.

Ejercicio de resistencia y parámetros musculares

Fuerza muscular *(fuerza máxima):* capacidad de un grupo muscular de ejercer una fuerza máxima contra resistencia en una única contracción (no dependiente del tiempo).

- Ej: levantar una vez un objeto pesado.
- Entrenamiento: movimientos lentos repetidos contra resistencia.

Potencia muscular *(explosividad):* gran producción de fuerza en un periodo de tiempo corto (dependiente del tiempo).

- Ej: salto vertical, patadas.
- Entrenamiento: repeticiones rápidas contra resistencia.

Durabilidad muscular *(repeticiones):* se mantiene una fuerza submáxima en un periodo de tiempo largo.

- Ej: saltos, bicicleta, natación.
- Entrenamiento: ejercicio aeróbico que estimula el consumo de energía.

ELSEVIER

JAMDA

journal homepage: www.jamda.com

Special Article

Evidence-based Recommendations for Optimal Dietary Protein Intake in Older People: A Position Paper From the PROT-AGE Study Group

Jürgen Bauer MD [a,*], Gianni Biolo MD, PhD [b], Tommy Cederholm MD, PhD [c], Matteo Cesari MD, PhD [d], Alfonso J. Cruz-Jentoft MD [e], John E. Morley MB, BCh [f], Stuart Phillips PhD [g], Cornel Sieber MD, PhD [h], Peter Stehle MD, PhD [i], Daniel Teta MD, PhD [j], Renuka Visvanathan MBBS, PhD [k], Elena Volpi MD, PhD [l], Yves Boirie MD, PhD [m]

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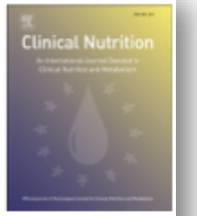
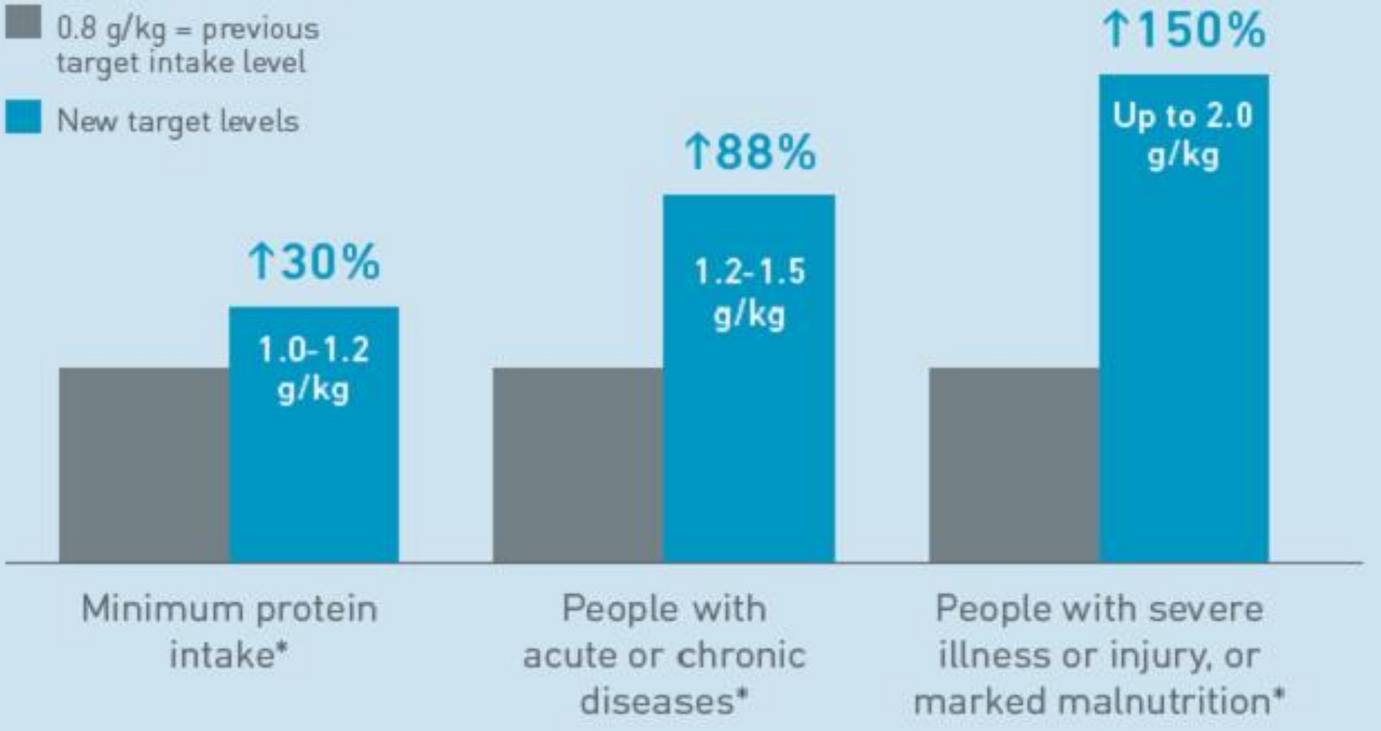


ESPEN endorsed recommendation

Protein intake and exercise for optimal muscle function with aging: Recommendations from the ESPEN Expert Group

Nicolaas E.P. Deutz [a,*], Jürgen M. Bauer [b], Rocco Barazzoni [c], Gianni Biolo [c], Yves Boirie [d], Anja Bosy-Westphal [e], Tommy Cederholm [f,g], Alfonso Cruz-Jentoft [h], Zeljko Krznariç [i], K. Sreekumaran Nair [j], Pierre Singer [k], Daniel Teta [l], Kevin Tipton [m], Philip C. Calder [n,o]

New recommendations call for higher protein intake (g per kg of bodyweight) in those aged >65 years[1]



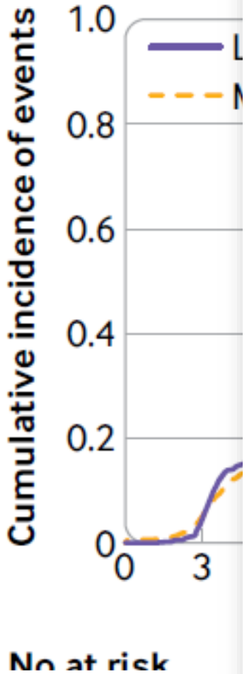
*Caution needed among those with severe kidney disease (i.e. estimated Glomerular Filtration Rate <30mL/min/1.73m²), calculating their needs differently.

The SPRINTT study has some answers

- ECA, intervención multicomponente vs educación sobre envejecimiento sano, hasta 36 meses
- 16 centros en 11 países europeos
- 1519 hombre y mujeres en la comunidad con 70+ años, fragilidad física y sarcopenia (SPPB 3 a 9)
- Intervención multicomponente: ejercicio de intensidad moderada 2 veces a la semana en el centro y hasta 4 a la semana en casa + consejo nutricional personalizado
- Variable primaria: discapacidad para la movilidad (incapacidad de caminar independientemente 400 m en <15 minutos).

SPRINTT
Sarcopenia & Physical fRailty IN older people: multi-componenT Treatment strategies

SPRINTT



Study	No with event/No in group (%) Multicomponent intervention	Lifestyle education	Hazard ratio (95% CI)	Hazard ratio (95% CI)	Interaction P value
Overall	283/605 (46.8)	316/600 (52.7)		0.78 (0.67 to 0.92)	
Sex					
Men	88/171 (51.5)	97/175 (55.4)		0.87 (0.65 to 1.17)	0.38
Women	195/434 (44.9)	219/425 (51.5)		0.75 (0.61 to 0.91)	
Race or ethnicity					
White	253/535 (47.3)	290/526 (55.1)		0.75 (0.63 to 0.90)	0.30
Other	1/7 (14.3)	4/8 (50.0)		0.23 (0.03 to 2.15)	
Age (years)					
<80	115/318 (36.2)	154/336 (45.8)		0.75 (0.59 to 0.96)	0.94
≥80	168/287 (58.5)	162/264 (61.4)		0.76 (0.61 to 0.95)	
History of CVD					
No	54/162 (33.3)	80/177 (45.2)		0.62 (0.44 to 0.89)	0.15
Yes	229/443 (51.7)	236/423 (55.8)		0.84 (0.69 to 1.01)	
History of diabetes					
No	216/474 (45.6)	236/461 (51.2)		0.82 (0.68 to 0.99)	0.40
Yes	67/131 (51.1)	80/139 (57.6)		0.70 (0.50 to 0.97)	
Gait speed (m/s)					
<0.8	226/450 (50.2)	248/444 (55.9)		0.79 (0.66 to 0.95)	0.96
≥0.8	57/155 (36.8)	68/156 (43.6)		0.78 (0.54 to 1.12)	

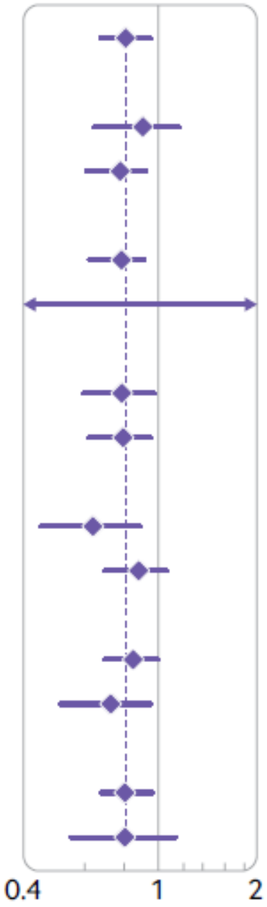


Fig 3 | Prespecified subgroup analyses in participants with baseline short physical performance battery (SPPB) score of 3-7. CVD=cardiovascular disease; CI=confidence interval

Bernabei R, et al; SPRINTT consortium. Multicomponent intervention to prevent mobility disability in frail older adults: randomised controlled trial (SPRINTT project). BMJ. 2022 May 11;377:e068788.

Fármacos para la sarcopenia

Medications for the treatment of sarcopenia : a review

Context

Sarcopenia
= loss of muscle mass and function

Widely prevalent and severe condition in older adults

Recognized as a disease
ICD -10-CM code M62.84

No drug currently approved

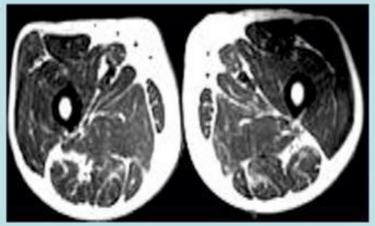
Yves Rolland *et al.* 2023
Metabolism, clinical and experimental

Results

Very few drug trials have targeted sarcopenic patients

Most drug trials were performed in elderly population with varying characteristics

Efficacy was tested separately on the clinical components of sarcopenia :



muscle mass

muscle strength

physical performances

- Testosterone
- Selective Androgen Receptor Modulators (SARMs)
- Estrogen
- Dehydroepiandrosterone (DHEA)
- Insulin-like Growth Factor-1 (IGF-1)
- Growth Hormone (GH)
- GH Secretagogue (GHS)
- drug targeting Myostatin/Activin receptor pathway
- Vitamin D
- Angiotensin Converting Enzyme inhibitors (ACEi)
- Angiotensin Receptor Blockers (ARBs)
- β-blockers

Conclusion

No drug translated into clinically relevant improvements on physical performance.

Rolland Y, Dray C, Vellas B, Barreto PS. Current and investigational medications for the treatment of sarcopenia. Metabolism. 2023 Jun 20:155597.

Diagnóstico y manejo de la sarcopenia

Mi enfoque personal (noviembre 2023)

Sospecharla y buscarla en la práctica clínica

↓

Diagnosticarla: comenzar con fuerza de prensión, usar criterios diagnósticos

↓

Identificar y tratar las causas subyacentes: enfoque sindrómico, uso de la VGI

↓

Acordar con el paciente la medida de resultado: rendimiento físico

↓

Ejercicio: prescribir ejercicio de resistencia o combinado

↓

Nutrición: asegurar ingesta de calorías y energía suficientes

↓

Fármacos: el futuro para malcumplidores, pero no están cerca

GRACIAS