Sarkopeni Değerlendirilmesinde Son Kriterler ve Nütrisyon Tedavisi

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Gülhane Tıp Fakültesi
İç Hastalıkları Ana Bilim Dalı
Ankara

Sarkopeni: Geriatrik sendrom

- İlerleyen yaşla birlikte kas kütlesi ve kas kuvvetinde kayıp.
  - Morley JE, et al. Sarcopenia. J Lab Clin Med 2001; 137: 231–43.

SKELETAL MUSCLE MASS IN MEN AND WOMEN

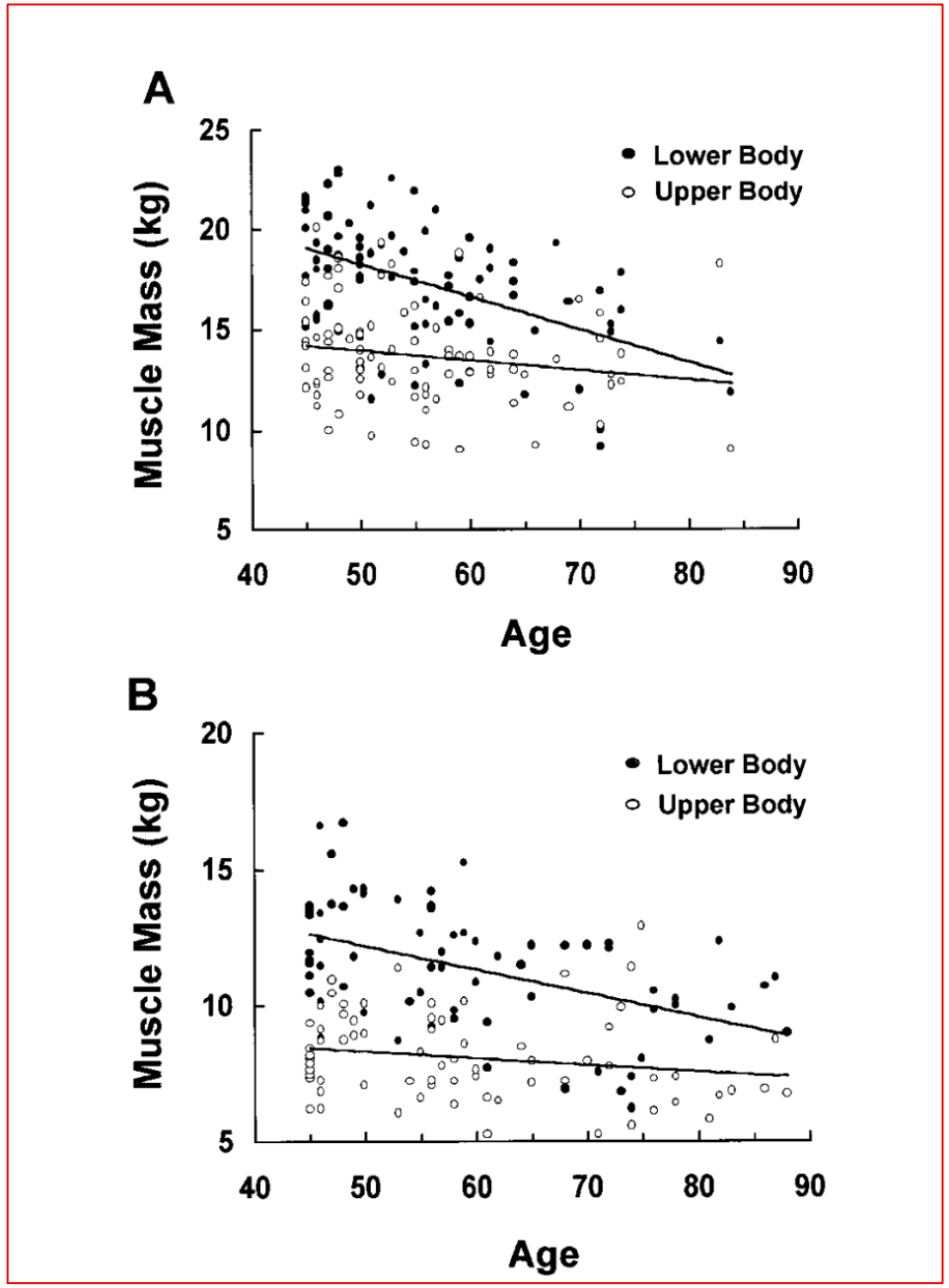
İskelet kası / VA, kg

Table 1. *Subject characteristics*

Gender and Age Range, yr	*n*	Weight, kg	Height, cm	BMI, kg/m^2	Total SM, kg	Relative SM, %	Lower Body, SM, kg	Upper Body, SM, kg
Women								
18–29	40	65.0 ± 16.8	164 ± 6	24.1 ± 5.3	21.8 ± 4.6	34.1 ± 5.7	12.5 ± 2.6	8.7 ± 2.6
30–39	63	73.6 ± 21.3	165 ± 7	27.0 ± 7.3	21.6 ± 3.7	30.6 ± 5.6	12.7 ± 2.5	8.5 ± 1.5
40–49	46	75.6 ± 17.1	162 ± 7	28.9 ± 6.0	21.4 ± 3.4	29.2 ± 5.0	12.7 ± 2.1	8.4 ± 1.3
50–59	21	72.7 ± 17.1	165 ± 8	26.8 ± 4.3	20.9 ± 3.4	29.1 ± 4.4	12.0 ± 2.0	8.3 ± 1.5
60–69	11	69.7 ± 16.8	162 ± 8	26.4 ± 5.6	18.4 ± 2.2	27.3 ± 4.6	10.5 ± 1.9	7.5 ± 1.5
70+	19	60.8 ± 12.2	157 ± 6	24.6 ± 4.9	18.0 ± 2.5	30.2 ± 4.7	9.7 ± 2.0	7.7 ± 2.1
All women	200	70.9 ± 18.2	163 ± 7	26.6 ± 6.2	21.0 ± 3.8	30.6 ± 5.5	12.2 ± 2.5	8.4 ± 1.8
Men								
18–29	66	79.9 ± 15.4	178 ± 7	25.3 ± 4.5	33.7 ± 5.8	42.3 ± 4.4	18.5 ± 3.3	14.3 ± 2.9
30–39	77	89.0 ± 17.0	176 ± 7	28.2 ± 4.9	34.0 ± 4.7	39.1 ± 5.0	18.7 ± 3.0	14.7 ± 2.2
40–49	64	90.9 ± 16.6	177 ± 7	28.9 ± 4.5	33.5 ± 5.5	37.1 ± 4.0	18.3 ± 3.0	14.1 ± 2.6
50–59	36	90.0 ± 14.0	176 ± 6	28.9 ± 4.0	31.4 ± 4.8	35.1 ± 3.4	17.3 ± 2.7	13.5 ± 2.5
60–69	14	90.1 ± 11.5	177 ± 5	28.6 ± 3.5	30.2 ± 3.1	33.8 ± 3.9	16.7 ± 2.2	12.8 ± 1.6
70+	11	78.8 ± 12.1	173 ± 8	26.5 ± 4.5	27.8 ± 3.4	36.0 ± 7.3	13.8 ± 2.9	13.5 ± 2.8
All men	268	87.1 ± 16.2*	177 ± 7*	27.7 ± 4.7*	33.0 ± 5.3*	38.4 ± 5.1*	18.1 ± 3.1*	14.1 ± 2.6*

Values are group means ± SD; *n*, no. of subjects. BMI, body mass index; SM, skeletal muscle; relative SM, body mass/SM mass. For determination of lower and upper body SM see METHODS. *Men significantly greater than women, $P < 0.01$.

Janssen I, Heymsfield SB, Wang ZM, Ross R. Skeletal muscle mass and distribution in 468 men and women aged 18-88 yr. J Appl Physiol (1985). 2000 Jul;89(1):81-8.



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Janssen I, Heymsfield SB, Wang ZM, Ross R. Skeletal muscle mass and distribution in 468 men and women aged 18-88 yr. J Appl Physiol (1985). 2000 Jul;89(1):81-8.

Olgu: D.

- Şik: Karams… …a isteği
- Hik: Yakınn… …zayıf insanların … …pa sarkopeni t… …ğine karar vermiş.

Table 4. Measurements of muscle mass, strength, and function in research and practice[a]

Variable	Research	Clinical practice
Muscle mass	Computed tomography (CT)	BIA
	Magnetic resonance imaging (MRI)	DXA
	Dual energy X-ray absorptiometry (DXA)	Anthropometry
	Bioimpedance analysis (BIA)	
	Total or partial body potassium per fat-free soft tissue	
Muscle strength	Handgrip strength	Handgrip strength
	Knee flexion/extension	
	Peak expiratory flow	
Physical performance	Short Physical Performance Battery (SPPB)	SPPB
	Usual gait speed	Usual gait speed
	Timed get-up-and-go test	Get-up-and-go test
	Stair climb power test	

[a]Please refer to the text for a description and references on these measurement techniques.

letgo

palio

Ana Sayfa > Araba > Sururi Mehmet Efendi > Sururi Mehmet Efendi içinde, satılık ikinci el 2001 Fiat Palio

₺18.500

2001 Fiat Palio

+1 ay

Araba detayları

Fiat > Palio > 2001 >

SUV | 202000km | Düz vites | Benzin | Arkadan İtiş

emin yetkin bu ilanına bir açıklama eklemedi: 2001 Fiat Palio

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Satıcıya mesaj at:

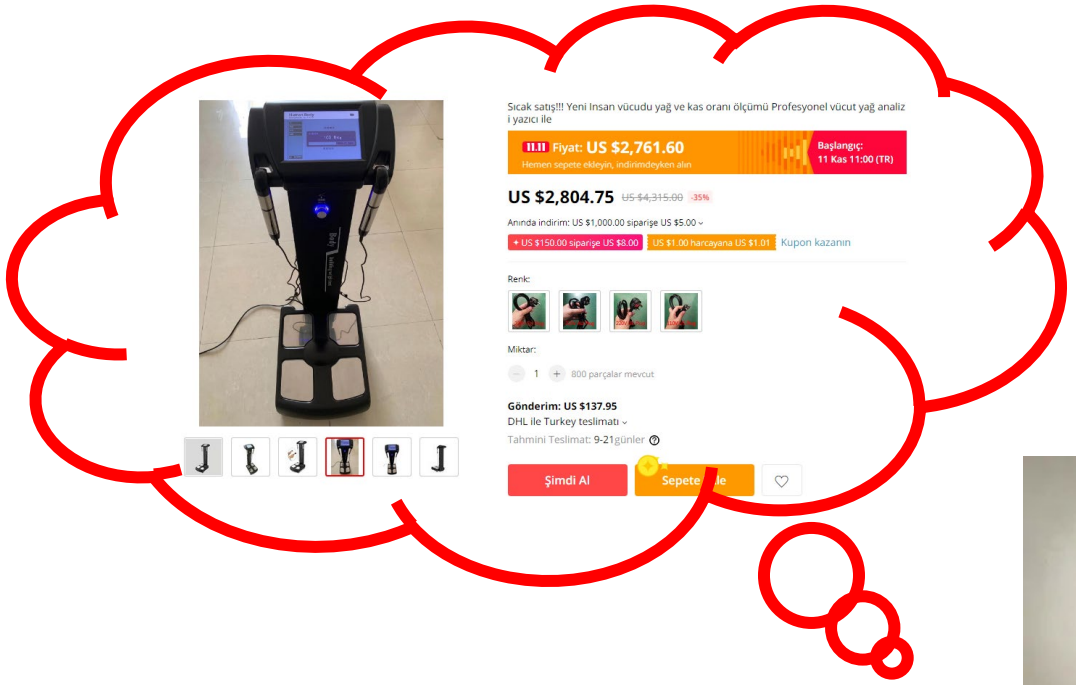
Hala satılık mı? | Fiyatta pazarlık payı var mı? | Ne durumda?

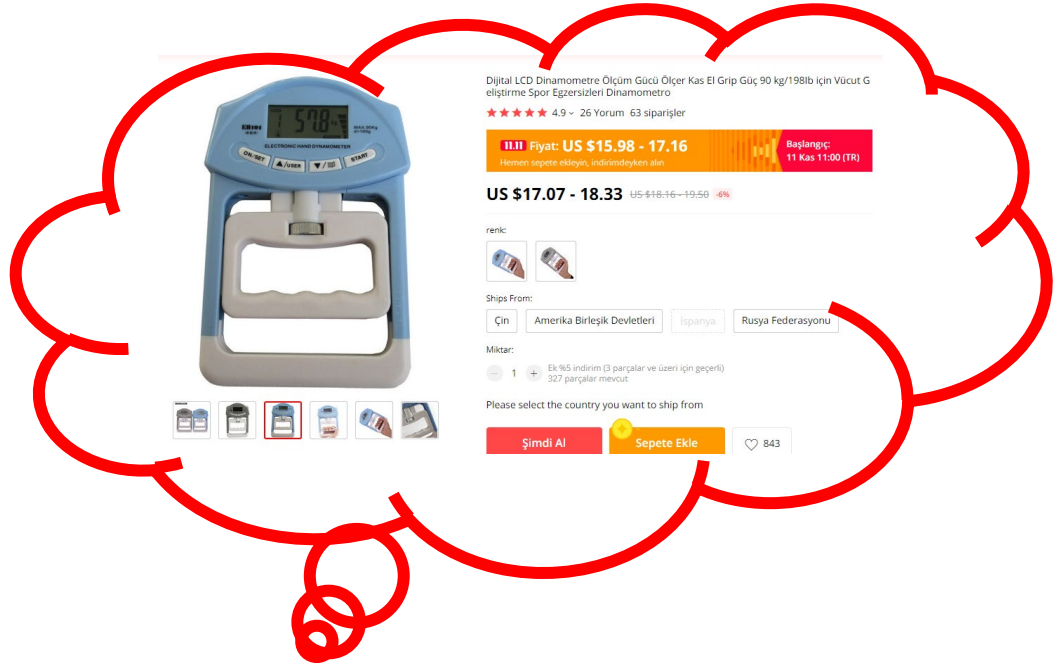
Olgu: D.Y.T., 30 y., kadın, diyetisyen

- Hik: 2014'te, ABD'de bir grubun sarkopeni varlığını anlamak ve birşeyler yapmak için kas kuvvetine bakmanın yeterli olduğunu bildirdiğini duyunca karamsarlık başlamış.
- FM doğal
- Ruhsal muayeneye ihtiyaç duyulmadı
- Tetkikleri 3 ay önce normal

Olgu: D.Y.T., 30 y., kadın, diyetisyen

- Hik: 2014’te, ABD’de bir grubun sarkopeni varlığını anlamak ve birşeyler yapmak için kas kuvvetine bakmanın yeterli olduğunu bildirdiğini duyunca karamsarlık başlamış.





letgo

Ana Sayfa

₺13.100

2.El Tanita Bc418

+1 ay

★★★★★

Satıcıya mesaj at:

Hala satılık mı? | Fiyatta pazarlık payı var mı? | Ne durumda?

Olgu: D.Y.T., 30 y., kadın, diyetisyen

- Hik: 2019'da, Avrupa önerisiyle de kas kuvvetine bakmanın sarkopeni için yeterli olduğu bildirilince uyku bozukluğu başlamış.
- Özellikle, sıkma kuvveti düşük olduğunda kas kütlesi normal bile olsa muhtemel sarkopeni olarak hastasını özenle beslemeye devam edeceği düşüncesi karmaşayı arttırmış.

Kriterler Tarihi!

Age and Ageing 2010; **39:** 412–423
doi: 10.1093/ageing/afq034
Published electronically 13 April 2010

REPORT

Sarcopenia: European consensus on definition and diagnosis

Report of the European Working Group on Sarcopenia in Older People

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[6]Istituto di Medicina Interna e Geriatria, Università Cattolica del Sacro Cuore, Roma, Italy
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[8]Département de Réhabilitation et Gériatrie, Hôpitaux Universitaires de Genève, Geneva, Switzerland
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[11]Geriatrická Klinika I Lékařská Fakulta, Univerzita Karlova v Praze, Prague, Czech Republic
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Endorsed by the European Geriatric Medicine Society (EUGMS), the European Society for Clinical Nutrition and Metabolism (ESPEN), the International Association of Gerontology and Geriatrics—European Region (IAGG-ER) and the International Association of Nutrition and Aging (IANA).

2010

Abstract

The European Working Group on Sarcopenia in Older People (EWGSOP) developed a practical clinical definition and consensus diagnostic criteria for age-related sarcopenia. EWGSOP included representatives from four participant organisations, i.e. the European Geriatric Medicine Society, the European Society for Clinical Nutrition and Metabolism, the International Association of Gerontology and Geriatrics—European Region and the International Association of Nutrition and Aging. These organisations endorsed the findings in the final document.

The group met and addressed the following questions, using the medical literature to build evidence-based answers: (i) What is sarcopenia? (ii) What parameters define sarcopenia? (iii) What variables reflect these parameters, and what measurement tools and cut-off points can be used? (iv) How does sarcopenia relate to cachexia, frailty and sarcopenic obesity?

For the diagnosis of sarcopenia, EWGSOP recommends using the presence of both low muscle mass + low muscle function (strength or performance). EWGSOP variously applies these characteristics to further define conceptual stages as 'presarcopenia', 'sarcopenia' and 'severe sarcopenia'. EWGSOP reviewed a wide range of tools that can be used to measure the specific variables of muscle mass, muscle strength and physical performance. Our paper summarises currently available data defining sarcopenia cut-off points by age and gender; suggests an algorithm for sarcopenia case finding in older individuals based on measurements of gait speed, grip strength and muscle mass; and presents a list of suggested primary and secondary outcome domains for research.

Once an operational definition of sarcopenia is adopted and included in the mainstream of comprehensive geriatric assessment, the next steps are to define the natural course of sarcopenia and to develop and define effective treatment.

Keywords: *sarcopenia elderly muscle strength muscle mass physical performance*

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

GUIDELINES

Sarcopenia: revised European consensus on definition and diagnosis

2019

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

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[8]Instituto di Medicina Interna e Geriatria, Università Cattolica del Sacro Cuore, Roma, Italy
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Abstract

Background: in 2010, the European Working Group on Sarcopenia in Older People (EWGSOP) published a sarcopenia definition that aimed to foster advances in identifying and caring for people with sarcopenia. In early 2018, the Working Group met again (EWGSOP2) to update the original definition in order to reflect scientific and clinical evidence that has built over the last decade. This paper presents our updated findings.

Objectives: to increase consistency of research design, clinical diagnoses and ultimately, care for people with sarcopenia.

Recommendations: sarcopenia is a muscle disease (muscle failure) rooted in adverse muscle changes that accrue across a lifetime; sarcopenia is common among adults of older age but can also occur earlier in life. In this updated consensus paper on sarcopenia, EWGSOP2: (1) focuses on low muscle strength as a key characteristic of sarcopenia, uses detection of low muscle quantity and quality to confirm the sarcopenia diagnosis, and identifies poor physical performance as indicative of severe sarcopenia; (2) updates the clinical algorithm that can be used for sarcopenia case-finding, diagnosis and

- 2000: European Union Geriatric Medicine Society (EUGMS)
  - 2009: Sarcopenia Working Group
    - European Society of Clinical Nutrition and Metabolism[ESPEN]
    - International Academy of Nutrition and Aging [IANA]
    - International Association of Gerontology and Geriatrics—European Region [IAGG-ER]
      - The European Working Group on Sarcopenia in Older People
        - 2010 konsensüsü (EWGSOP)
        - 2019 konsensüsü (EWGSOP2)

2010

Table I. Criteria for the diagnosis of sarcopenia

Diagnosis is based on documentation of criterion 1 plus (criterion 2 or criterion 3)

1. Low muscle mass
2. Low muscle strength
3. Low physical performance

Cruz-Jentoft AJ, et al. European Working Group on Sarcopenia in Older People. Sarcopenia: European consensus on definition and diagnosis: Report of the European Working Group on Sarcopenia in Older People. Age Ageing. 2010 Jul;39(4):412-23. doi: 10.1093/ageing/afq034.

Journals of Gerontology: MEDICAL SCIENCES
Cite journal as: J Gerontol A Biol Sci Med Sci 2014 May;69(5):547–558
doi:10.1093/gerona/glu010

Special Article

The FNIH Sarcopenia Project: Rationale, Study Description, Conference Recommendations, and Final Estimates

Stephanie A. Studenski,[1] Katherine W. Peters,[2] Dawn E. Alley,[3] Peggy M. Cawthon,[2] Robert R. McLean,[4,5] Tamara B. Harris,[6] Luigi Ferrucci,[6] Jack M. Guralnik,[3] Maren S. Fragala,[7] Anne M. Kenny,[8] Douglas P. Kiel,[4,5] Stephen B. Kritchevsky,[9] Michelle D. Shardell,[3] Thuy-Tien L. Dam,[10] and Maria T. Vassileva[11]

[1]Department of Internal Medicine, School of Medicine, University of Pittsburgh, Pennsylvania.
[2]California Pacific Medical Center Research Institute, San Francisco.
[3]Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore.
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Journals of Gerontology: MEDICAL SCIENCES
Cite journal as: J Gerontol A Biol Sci Med Sci 2014 May;69(5):576–583
doi:10.1093/gerona/glu012

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Journals of Gerontology: MEDICAL SCIENCES
Cite journal as: J Gerontol A Biol Sci Med Sci 2014 May;69(5):567–575
doi:10.1093/gerona/glu023

Cutpoints
Older

Peggy
Thuy-Tien L
Jack

Journals of Gerontology: MEDICAL SCIENCES
Cite journal as: J Gerontol A Biol Sci Med Sci 2014 May;69(5):559–566
doi:10.1093/gerona/glu011

Grip Strength

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Luigi Ferrucci,[9] Ste

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Journals of Gerontology: MEDICAL SCIENCES
Cite journal as: J Gerontol A Biol Sci Med Sci 2014 May;69(5):584–590
doi:10.1093/gerona/glu013

Special Article

An Evidence-Based Comparison of Operational Criteria for the Presence of Sarcopenia

Thuy-Tien Dam,[1] Katherine W. Peters,[2] Maren Fragala,[3] Peggy M. Cawthon,[2] Tamara B. Harris,[4] Robert McLean,[5,6] Michelle Shardell,[7] Dawn E. Alley,[7] Anne Kenny,[8] Luigi Ferrucci,[4] Jack Guralnik,[7] Douglas P. Kiel,[5,6] Steve Kritchevsky,[9] Maria T. Vassileva,[10] and Stephanie Studenski[11]

FNIH: Amaç

1. Klinik olarak anlamlı kas kuvveti kaybının derecesi nedir?
2. Kas kuvveti kaybı ile ilişkili olabilecek, klinik olarak anlamlı yağsız vücut ağırlığı azalma miktarı ne olmalıdır?
3. Oluşan kriterlerin (Kas kuvveti kaybı ve yağsız vücut ağırlığı azalması) ileride gelişebilecek mobilite azalmasını tahmin ettirici gücü nedir?
4. Oluşan kriterleri mevcut diğer kriterlerle karşılaştırma

Studenski SA, Peters KW, Alley DE, Cawthon PM, McLean RR, Harris TB, Ferrucci L, Guralnik JM, Fragala MS, Kenny AM, Kiel DP, Kritchevsky SB, Shardell MD, Dam TT, Vassileva MT. The FNIH sarcopenia project: rationale, study description, conference recommendations, and final estimates. J Gerontol A Biol Sci Med Sci. 2014 May;69(5):547-58. doi: 10.1093/gerona/glu010.

FNIH: İncelenen 8 gözlemsel kohort

1. Age, Gene/Environment Susceptibility-Reykjavik Study, IS
2. Boston Puerto Rican Health Study, US
3. Framingham Heart Study, US
4. Health Aging and Body Composition Study, US
5. Invecchiare in Chianti, IT
6. Osteoporotic Fractures in Men Study, US
7. Rancho Bernardo Study, US
8. Study of Osteoporotic Fractures, US

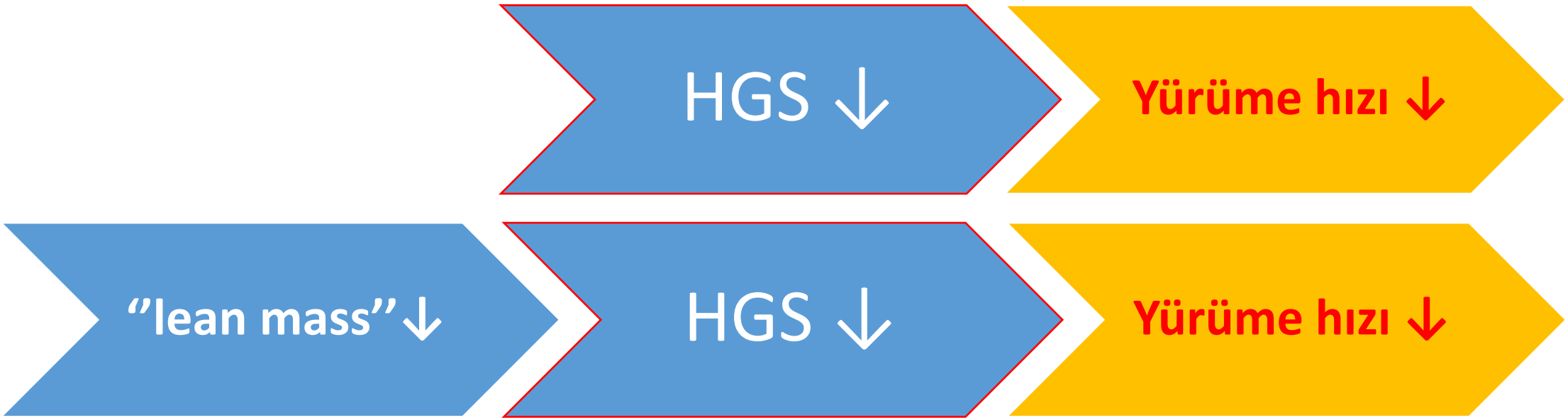
Studenski SA, Peters KW, Alley DE, Cawthon PM, McLean RR, Harris TB, Ferrucci L, Guralnik JM, Fragala MS, Kenny AM, Kiel DP, Kritchevsky SB, Shardell MD, Dam TT, Vassileva MT. The FNIH sarcopenia project: rationale, study description, conference recommendations, and final estimates. J Gerontol A Biol Sci Med Sci. 2014 May;69(5):547-58. doi: 10.1093/gerona/glu010.

FNIH: Özet

1. 26.625 olgu
2. %57 kadın, ortalama yaş= E: 75,2±6,1, K: 78.6±5.9
3. Azalmış HGS: E<26 kg, K: <16 kg
4. Azalmış ‘’lean mass’’: BMİ’e ayarlanmış apendiküler lean mass
   - E: <0.789, K: <0.512

Studenski SA, Peters KW, Alley DE, Cawthon PM, McLean RR, Harris TB, Ferrucci L, Guralnik JM, Fragala MS, Kenny AM, Kiel DP, Kritchevsky SB, Shardell MD, Dam TT, Vassileva MT. The FNIH sarcopenia project: rationale, study description, conference recommendations, and final estimates. J Gerontol A Biol Sci Med Sci. 2014 May;69(5):547-58. doi: 10.1093/gerona/glu010.

FNIH: Özet



McLean RR, Shardell MD, Alley DE, ve ark. Criteria for clinically relevant weakness and low lean mass and their longitudinal association with incident mobility impairment and mortality: the foundation for the National Institutes of Health (FNIH) sarcopenia project. J Gerontol A Biol Sci Med Sci. 2014 May;69(5):576-83. doi: 10.1093/gerona/glu012. (adaptasyon)

FNIH

Journals of Gerontology: MEDICAL SCIENCES
Cite journal as: J Gerontol A Biol Sci Med Sci 2014 May;69(5):591–594
doi:10.1093/gerona/glt208

Special Article

Skeletal Muscle Function Deficit: A New Terminology to Embrace the Evolving Concepts of Sarcopenia and Age-Related Muscle Dysfunction

Rosaly Correa-de-Araujo and Evan Hadley

U.S. Department of Health and Human Services, Division of Geriatrics and Clinical Gerontology, National Institute on Aging, National Institutes of Health, Bethesda, Maryland.

2010-EWGSOP

Table I. Criteria for the diagnosis of sarcopenia

Diagnosis is based on documentation of criterion 1 plus (criterion 2 or criterion 3)
1. Low muscle mass
2. Low muscle strength
3. Low physical performance

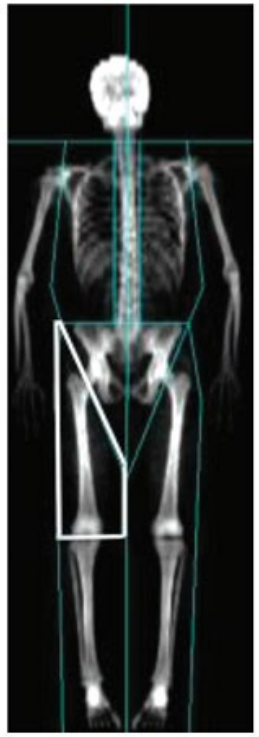
DXA: ‘’apendiküler kas kütlesi’’
BIA: ‘’iskelet kası kütlesi indeksi’’ (SMI)

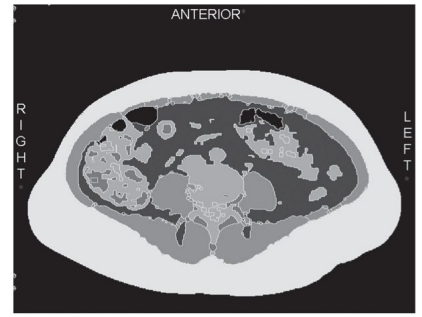
Cruz-Jentoft AJ, et al. European Working Group on Sarcopenia in Older People. Sarcopenia: European consensus on definition and diagnosis: Report of the European Working Group on Sarcopenia in Older People. Age Ageing. 2010 Jul;39(4):412-23. doi: 10.1093/ageing/afq034.

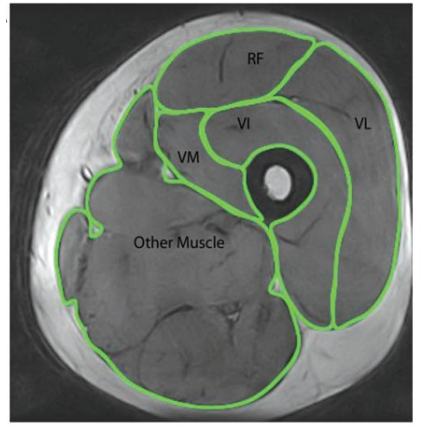

HASAN TUNCEL
SÖLEN KASET
SMI
KOLAY MI
SANIYORSUN

2010-EWGSOP: Kas kütlesi ölçümü şart!

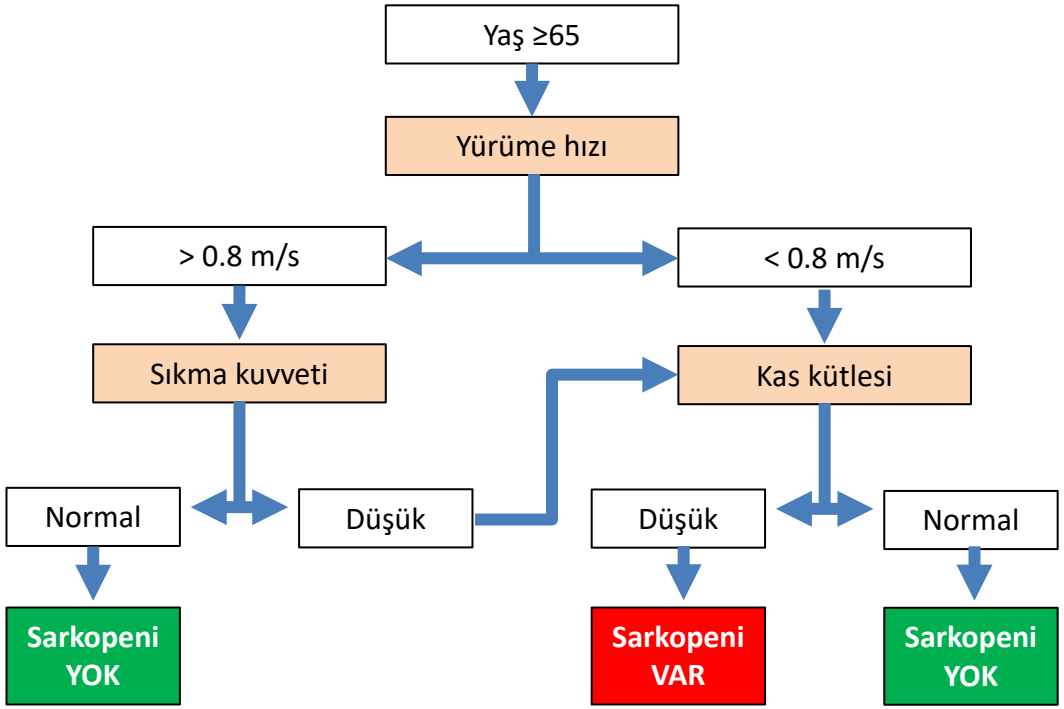
- Donanım yaygın değil.
- Ucuz değil.
- Kolay değil.
- Hesaplamalar karmaşık olabiliyor.
- Toplumsal farklar tam olarak bilinmiyor.



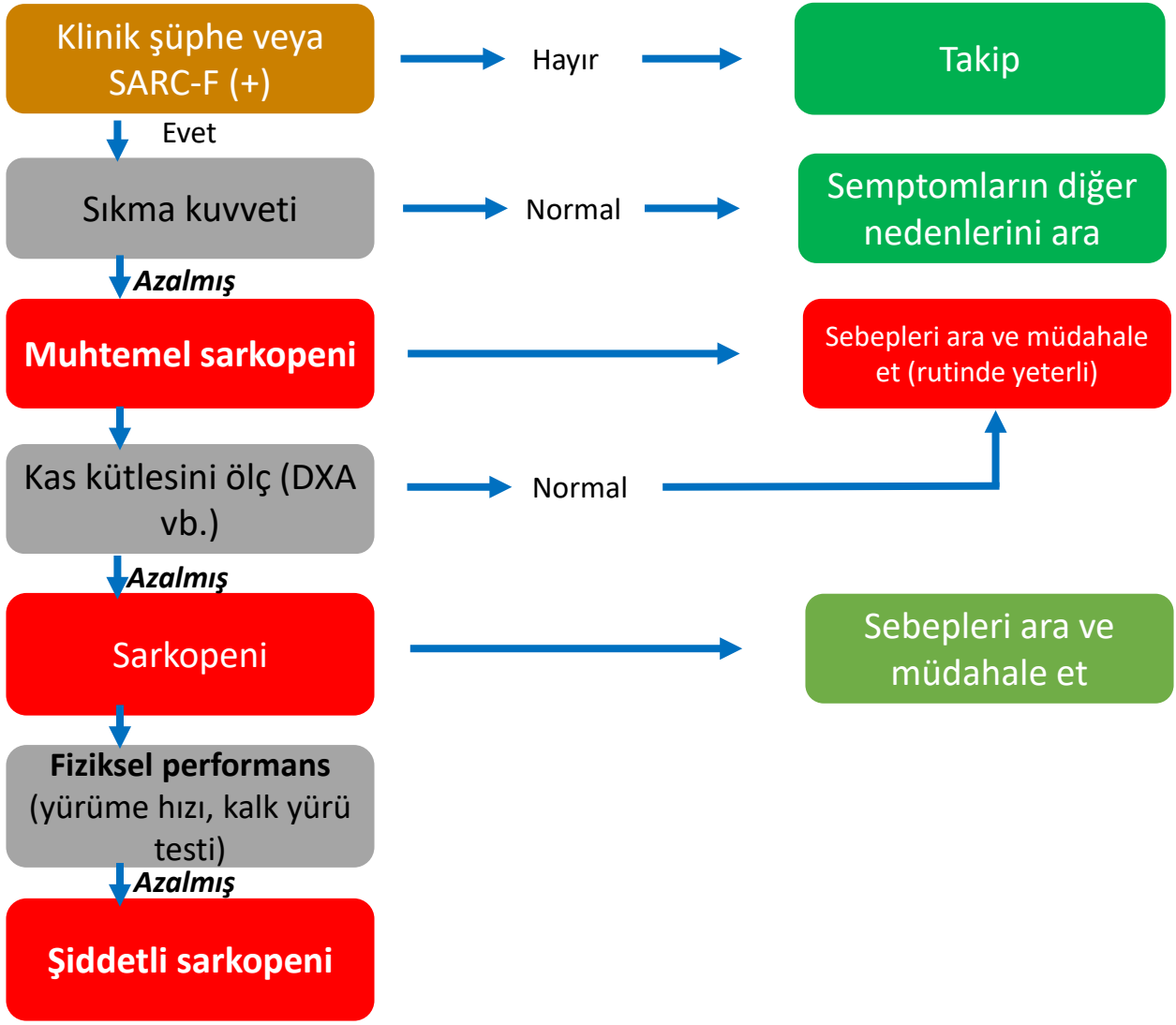




2010: EWGSOP



2019: EWGSOP2



Cruz-Jentoft AJ, et al. European Working Group on Sarcopenia in Older People. Sarcopenia: European consensus on definition and diagnosis: Report of the European Working Group on Sarcopenia in Older People. Age Ageing. 2010 Jul;39(4):412-23. (adaptasyon); Uyarlama: Cruz-Jentoft AJ, Bahat G, Bauer J, et al. Sarcopenia: revised European consensus on definition and diagnosis. Age Ageing. 2019 Jan 1;48(1):16-31.; Cruz-Jentoft AJ, Sayer AA. Sarcopenia. Lancet. 2019 29;393(10191):2636-2646.

Klinik şüphe veya SARC-F (+)

SARC-F

	Soru	Skor	
Kuvvet	4,5 kg lık bir ağırlığı kaldırmada ve taşımada ne kadar zorlanıyorsunuz?	Yok=0 Biraz= 1 Oldukça fazla veya hiç hiç yapamıyorum= 2	≥4 Sarkopeni
Yürürken yardım alma	Odada karşıdan karşıya geçerken ne kadar zorlanıyorsunuz?	Yok= 0 Biraz= 1 Çok fazla, yardımcı alet kullanıyorum veya hiç geçemiyorum= 2	
Sandalyeden kalkma	Yataktan veya sandalyeden ayrılırken ne kadar zorlanıyorsunuz?	Yok= 0 Biraz= 1 Oldukça fazla veya yardımsız yapamıyorum= 2	
Merdiven çıkma	Bir kat merdiven veya 10 merdiven basamağı çıkarken ne kadar zorlanıyorsunuz?	Yok= 0 Biraz= 1 Oldukça fazla veya hiç çıkamıyorum= 2	
Düşme	Son 1 yıl içinde kaç defa düştünüz?	Yok= 0 1-3 defa= 1; 4 veya daha fazla= 2	

Malmstrom TK, Morley JE.;Sarcopenia: The Target Population. J Frailty Aging. 2013;2(1):55-6. ; Malmstrom TK, Morley JE. SARC-F: a simple questionnaire to rapidly diagnose sarcopenia. J Am Med Dir Assoc 2013; 14: 531–32.

2019

Klinik şüphe veya SARC-F (+)

Uyarlama: Age Ageing. 2019;48(1):16-31; Lancet 2019; 393: 2636–46

Tedavi

Olgu: D.Y.T., 30 y., kadın, diyetisyen

- Şik.: Karamsarlık, uykuya dalmada zorlanma, sık sık atıştırma isteği
- Hik.: Bu süreçte, egzersizin üzerine besleme açısından ne yapılabileceği hakkında farklı farklı öneriler duyması da karamsarlığını arttırmış.

Kas kuvveti/kütlesinin iyileştirilmesi

Sarkopenide kas kuvveti/kütlesinin iyileştirilmesi

Okurken, aktarırken ve önerirken dikkat!

- Araştırma sarkopeni tanımına uyan olgular da mı yapılmış?
  - Kas kuvveti?
  - Kas kütlesi?
  - Fiziksel performans?
- Karşılaştırma neyle yapılmış?
- Uygulama miktarı/dozu?
- Takip var mı? Süresi?

Altta yatan nedeni düzeltmek!

Cruz-Jentoft AJ, et al. European Working Group on Sarcopenia in Older People. Sarcopenia: European consensus on definition and diagnosis: Report of the European Working Group on Sarcopenia in Older People. Age Ageing. 2010 Jul;39(4):412-23. doi: 10.1093/ageing/afq034.

Daha fazla

- Hareket
- Enerji
- Protein
- Amino asit
- Mineral
- Vitamin
- Diğer

J Nutr Health Aging. 2019;

EXERCISE INTERVENTIONS FOR THE PREVENTION AND TREATMENT OF SARCOPENIA. A SYSTEMATIC UMBRELLA REVIEW

D. BECKWÉE[1,2,3,4], A. DELAERE[2], S. AELBRECHT[2], V. BAERT[2], C. BEAUDART[5], O. BRUYERE[5], M. DE SAINT-HUBERT[6], I. BAUTMANS[2,4], ON BEHALF OF THE SARCOPENIA GUIDELINES DEVELOPMENT GROUP OF THE BELGIAN SOCIETY OF GERONTOLOGY AND GERIATRICS (BSGG)*

1. Rehabilitation Rese
3. Department of Rehabili
Amersfoort, The Netherla
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russel, Brussels, Belgium;
T University of Physiotherapy,
Namur, Belgium ; Institut de
arch (FRIA) departments, Vrije
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Geron s in their
Clinic Based on
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statem g of the
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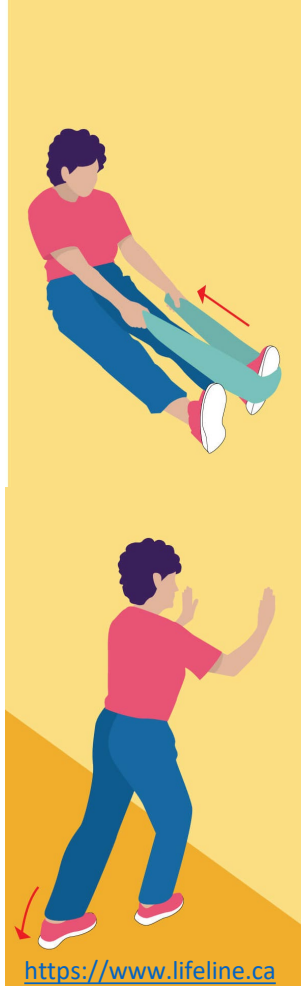
or me utritional
suppl tly, very
few s n quality
evider physical
perfor n appears
limite n muscle
strength. *Conclusion:* Since sarcopenia is affecting all skeletal muscles in the body, we recommend training the large muscle groups in a total body approach. Although low-intensity resistance training (≤50% 1RM) is sufficient to induce strength gains, we recommend a high-intensity resistance training program (i.e. 80% 1RM) to obtain maximal strength gains. Multimodal exercises and blood flow restriction resistance training may be considered as well.

Key words: Exercise, sarcopenia, muscle strength, muscle mass, physical performance.

- Egzersiz etkilidir!
- Çok yönlü egzersiz faydalıdır!
  - Direnç
  - Yürüme
  - Aerobik
  - Denge
  - Diğer



https://www.lifeline.ca

Protein & enerji

- Normal beslenen, toplumda yaşayan yaşlılar (≥65 yaş)
- Sarkopeni ayrımı ∅
- 3 yıl takip
- Protein miktarı ve kaynağı analizi+
- Olguların %29'u kilo kaybetti, %22'si kilo aldı, %49 sabit kaldı
- **Kilo kaybı olanlarda protein alımı göreceli fazla ise %40 daha az LM ve aLM kaybı oldu**
- **Kilo artışı olanlarda protein alımı daha fazla olanlarda LM artışı görüldü**
- **Hayvansal protein daha etkili**
- Kas kuvveti?
- Performans?

Dietary protein intake is associated with lean mass change in older, community-dwelling adults: the Health, Aging, and Body Composition (Health ABC) Study[1–3]

Denise K Houston, Barbara J Nicklas, Jingzhong Ding, Tamara B Harris, Frances A Tylavsky, Anne B Newman, Jung Sun Lee, Nadine R Sahyoun, Marjolein Visser, and Stephen B Kritchevsky for the Health ABC Study

ABSTRACT

Background: Dietary surveys suggest that many older, community-dwelling adults consume insufficient dietary protein, which may contribute to the age-related loss of lean mass (LM).

Objective: The objective of the study was to determine the association between dietary protein and changes in total LM and nonbone appendicular LM (aLM) in older, community-dwelling men and women.

Design: Dietary protein intake was assessed by using an interviewer-administered 108-item food-frequency questionnaire in men and women aged 70–79 y who were participating in the Health, Aging, and Body Composition study ($n = 2066$). Changes in LM and aLM over 3 y were measured by using dual-energy X-ray absorptiometry. The association between protein intake and 3-y changes in LM and aLM was examined by using multiple linear regression analysis adjusted for potential confounders.

Results: After adjustment for potential confounders, energy-adjusted protein intake was associated with 3-y changes in LM [β (SE): 8.76 (3.00), $P = 0.004$] and aLM [β (SE): 5.31 (1.64), $P = 0.001$]. Participants in the highest quintile of protein intake lost ≈40% less LM and aLM than did those in the lowest quintile of protein intake ($\bar{x} \pm$ SE: -0.501 ± 0.106 kg compared with -0.883 ± 0.104 kg for LM; -0.400 ± 0.058 kg compared with -0.661 ± 0.057 kg for aLM; P for trend < 0.01). The associations were attenuated slightly after adjustment for change in fat mass, but the results remained significant.

Conclusion: Dietary protein may be a modifiable risk factor for sarcopenia in older adults and should be studied further to determine its effects on preserving LM in this population. *Am J Clin Nutr* 2008;87:150–5.

accelerate this process (4). However, many older adults do not consume adequate amounts of dietary protein. Data from the 1996 Continuing Survey of Food Intake by Individuals showed that ≈40% of men and women aged ≥70 y consumed <100% of the recommended dietary allowance (RDA) for protein (0.8 $g \cdot kg^{-1} \cdot d^{-1}$), and ≈16% consumed <75% of the RDA (5). In addition to consuming inadequate amounts of total dietary protein, older adults may be at risk of consuming inadequate animal protein, a source of high-biological-value protein, because of age-associated factors including cost, difficulty in chewing, fear of consuming too much fat or cholesterol, and perceived intolerance of certain foods (6).

Although intervention studies have examined the effect of varying protein intake on changes in body composition and LM over short periods (7, 8), few observational studies have examined the association between dietary protein intake and body composition in older adults. In cross-sectional studies, protein intake was not associated with LM (9, 10). However, in a longitudinal study, Stookey et al (11) found that, among older Chinese adults, those with a higher protein intake lost less midarm muscle area over 4 y of follow-up.

Emerging evidence from intervention studies also suggests that dietary protein may affect the partitioning of fat and LM during intentional weight loss (12–14). This may have important implications for older adults, because weight tends to decline in

[1] From the Sticht Center on Aging, Wake Forest University School of Medicine, Winston-Salem, NC (DKH, BJN, JD, and SBK); the National Institute on Aging, Bethesda, MD (TBH); the University of Tennessee,

Protein & enerji

- Normal beslenen, toplumda yaşayan yaşlılar (70-79 yaş)
- Sarkopeni ayrımı ∅
- 5 yıl takip
- Protein miktarı ve kaynağı analiz edildi.
- **Protein miktarı ile kas kütlesi arasında ilişki yok**
- **Protein kaynağı ile kas kütlesi arasında ilişki yok**
- Kas kuvveti?
- Performans?

Dietary protein intake is not associated with 5-y change in mid-thigh muscle cross-sectional area by computed tomography in older adults: the Health, Aging, and Body Composition (Health ABC) Study

Amely M Verreijen,[1] Mariëlle F Engberink,[1] Denise K Houston,[2] Ingeborg A Brouwer,[3] Peggy M Cawthon,[4,5] Ann B Newman,[6] Frances A Tylavsky,[7] Tamara B Harris,[8] Peter JM Weijs,[1,9] and Marjolein Visser[3]

[1]Faculty of Sports and Nutrition, Amsterdam University of Applied Sciences, Amsterdam, Netherlands; [2]Sticht Center on Aging, Wake Forest School of Medicine, Winston-Salem, NC; [3]Department of Health Sciences, Faculty of Science, Vrije Universiteit Amsterdam, Amsterdam Public Health Research Institute, Amsterdam, Netherlands; [4]California Pacific Medical Center Research Institute, San Francisco, CA; [5]Department of Epidemiology and Biostatistics, University of California, San Francisco, San Francisco, CA; [6]Department of Epidemiology, University of Pittsburgh, Pittsburgh, PA; [7]Health Science Center, Preventive Medicine, University of Tennessee, Memphis, TN; [8]National Institute on Aging, Bethesda, MD; and [9]Nutrition and Dietetics, Department of Internal Medicine, Amsterdam University Medical Centers, Vrije Universiteit Amsterdam, Amsterdam, Netherlands

ABSTRACT

Background: A higher protein intake is suggested to preserve muscle mass during aging and may therefore reduce the risk of sarcopenia.

Objectives: We explored whether the amount and type (animal or vegetable) of protein intake were associated with 5-y change in mid-thigh muscle cross-sectional area (CSA) in older adults ($n = 1561$).

Methods: Protein intake was assessed at year 2 by a Block food-frequency questionnaire in participants (aged 70–79 y) of the Health, Aging, and Body Composition (Health ABC) Study, a prospective cohort study. At year 1 and year 6 mid-thigh muscle CSA in square centimeters was measured by computed tomography. Multiple linear regression analysis was used to examine the association between energy-adjusted protein residuals in grams per day (total, animal, and vegetable protein) and muscle CSA at year 6, adjusted for muscle CSA at year 1 and potential confounders including prevalent health conditions, physical activity, and 5-y change in fat mass.

Results: Mean (95% CI) protein intake was 0.90 (0.88, 0.92) g · kg^{-1} · d^{-1} and mean (95% CI) 5-y change in muscle CSA was −9.8 (−10.6, −8.9) cm^2. No association was observed between energy-adjusted total ($\beta = -0.00$; 95% CI: −0.06, 0.06 cm^2; $P = 0.982$), animal ($\beta = -0.00$; 95% CI: −0.06, 0.05 cm^2; $P = 0.923$), or plant ($\beta = +0.07$; 95% CI: −0.06, 0.21 cm^2; $P = 0.276$) protein intake and muscle CSA at year 6, adjusted for baseline mid-thigh muscle CSA and potential confounders.

Conclusions: This study suggests that a higher total, animal, or vegetable protein intake is not associated with 5-y change in mid-thigh muscle CSA in older adults. This conclusion contradicts some, but not all, previous research. This trial was registered at www.trialregister.nl as NTR6930. *Am J Clin Nutr* 2019;109:535–543.

Introduction

Indicators of low muscle mass and in particular low strength have been associated with functional decline and disability in older adults (1, 2). Previous studies have indicated that dietary protein intake affects protein synthesis and net protein balance in older adults. Therefore, an adequate protein intake may help to slow the process of age-related muscle loss (3, 4).

Muscle loss in older adults is associated with loss of sensitivity of the skeletal muscle to protein ingestion (5), insulin resistance, and a higher extraction of amino acids by splanchnic tissue, which results in a lower availability of amino acids for muscle protein synthesis (6). Thus, a higher protein intake may be necessary to reduce the loss of muscle mass with aging. These findings support recent suggestions (7) that the current Recommended Daily Allowance for protein for older adults of 0.8 g · kg body weight^{-1} · d^{-1} (8) potentially underestimates the true requirement.

Until now, only a few studies have investigated the relation between dietary protein intake and longitudinal changes in lean mass in older adults. Houston et al. (9) studied the relation

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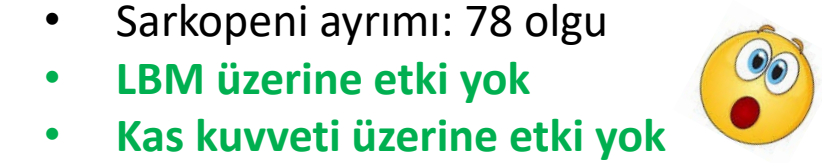
Address correspondence to AMV (e-mail: a.verreijen@hva.nl).

Abbreviations used: BCAA, branched-chain amino acid; COPD, chronic obstructive pulmonary disease; CSA, cross-sectional area; CT, computed tomography; DXA, dual-energy X-ray absorptiometry; EAA, essential amino

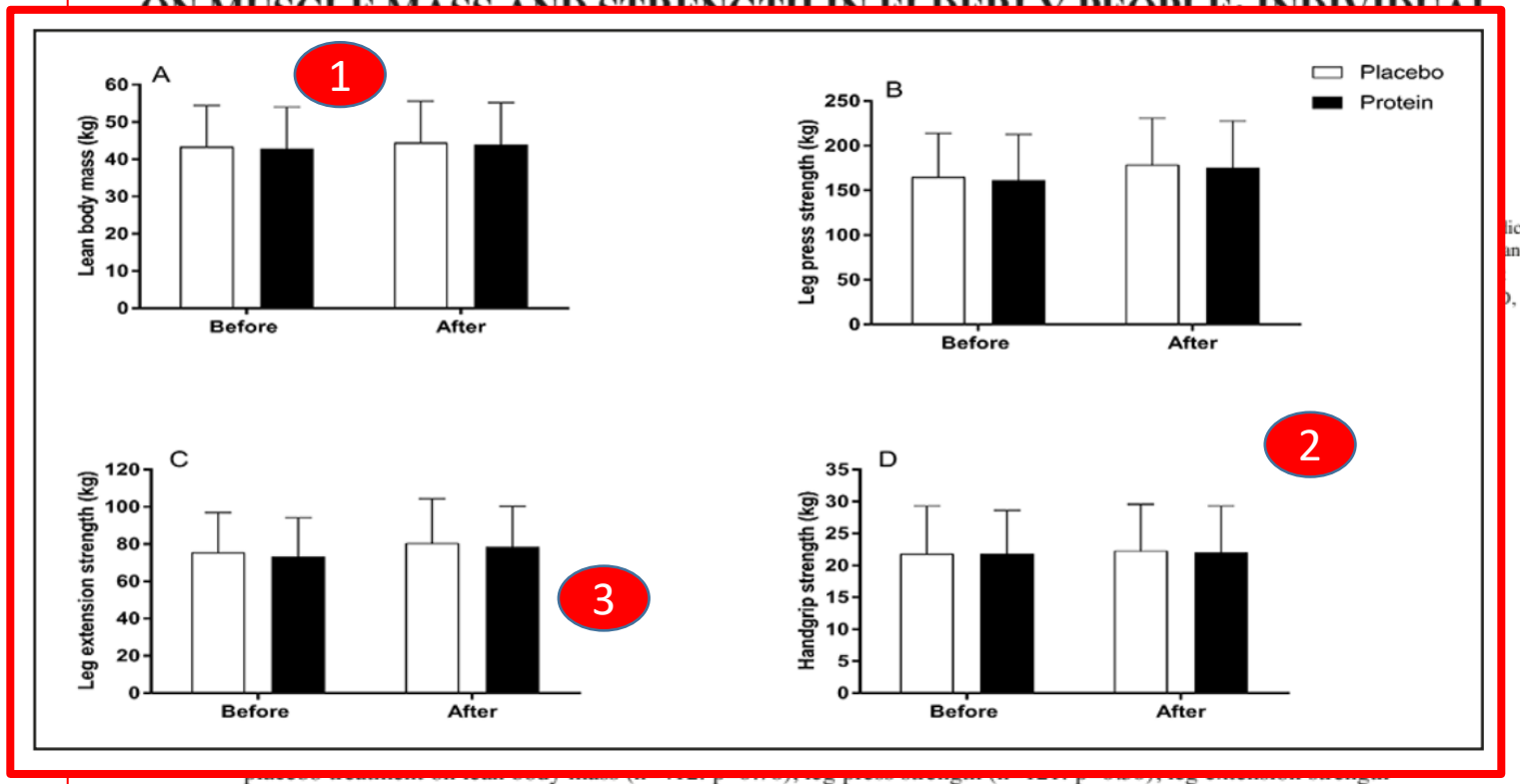
Aminonasit, meta-analiz

- 8 RKÇ
- N=486
- Yaş: 74,9
- Protein, aminoasit veya plasebo
- Doz: 6 - 30 g/gün, ortalama 23.9 g
- Tek aminoasit (lösin), EAA karışımı veya süt kaynaklı protein
- Kontrol grubu: eğitim, KH kapsülleri/içecekleri
- Takip süre: 84 - 730 gün
- Sarkopeni ayrımı: 78 olgu
- **LBM üzerine etki yok**
- **Kas kuvveti üzerine etki yok**
- Performans?



J Nutr Health Aging

THE IMPACT OF DIETARY PROTEIN OR AMINO ACID SUPPLEMENTATION



(n=121: p=0.16) and handgrip strength (n=318: p=0.37). *Conclusions:* There is currently no evidence to suggest that protein or amino acid supplementation without concomitant nutritional or exercise interventions increases muscle mass or strength in predominantly healthy elderly people.

Key words: Sarcopenia, dietary protein intake, lean body mass, performance, aging.

J Nutr Health Aging. 2017;21(9):994-1001. doi: 10.1007/s12603-017-0896-1.

Aminonasit + vitamin D

- N=24 (12 çalışma, 12 kontrol)
- Yaş: 71±4
- Doz: 20 g whey + 3 g lösin/gün + 800 IU vitamin D
- Plasebo (enerji değeri yok)
- Kahvaltı öncesi ek, 200 ml
- Egzersiz iki grupta benzer
- Takip süre: 6 hafta
- **Bacak ve total aLM artmış**
- **Kol LM, LBM, VA, HSG, performans değişimi iki grupta benzer**
- Sarkopeni bilgisi yok, VKİ 20-30 olan olgular!

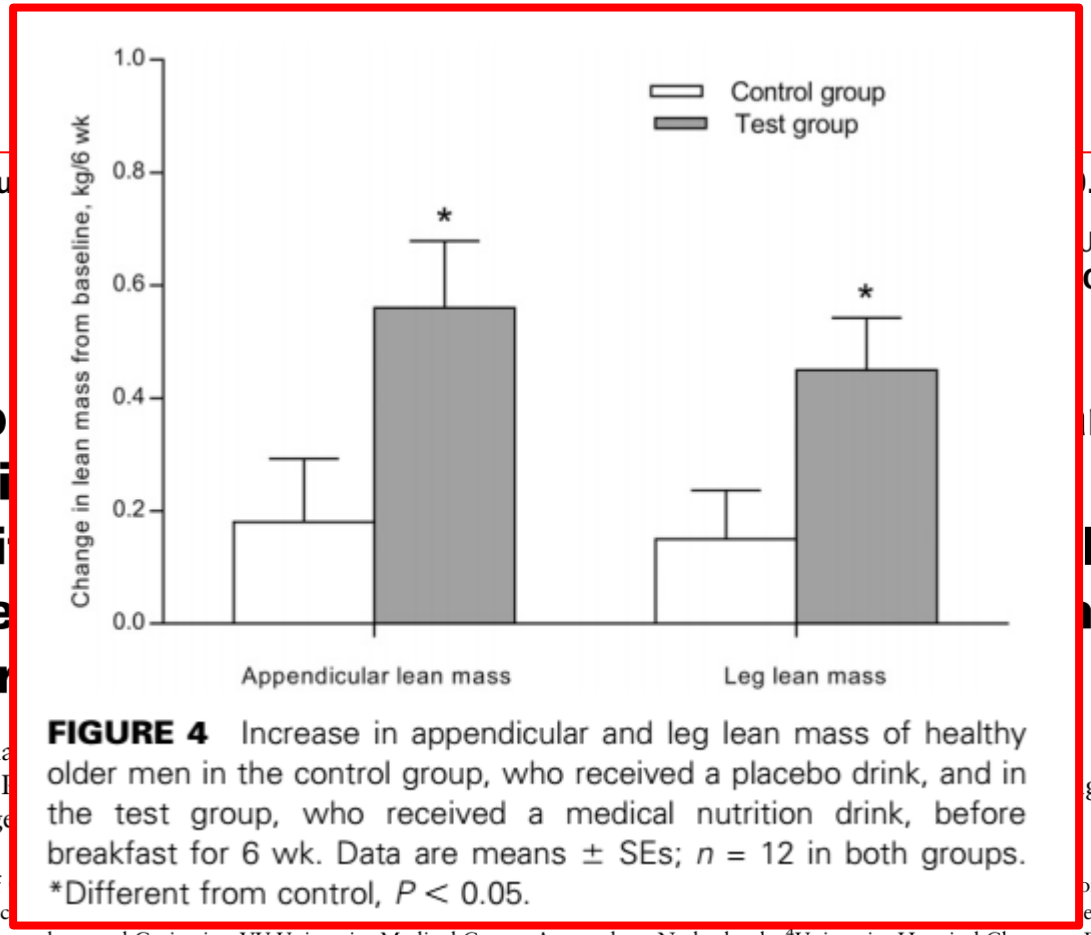


FIGURE 4 Increase in appendicular and leg lean mass of healthy older men in the control group, who received a placebo drink, and in the test group, who received a medical nutrition drink, before breakfast for 6 wk. Data are means ± SEs; n = 12 in both groups. *Different from control, $P < 0.05$.

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Journal of Nutrition
Optimal Nutrition

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Audrey Cha
Véronique I
Anke Bonge

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Ferrand, Franc
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edicine,
Section of Gerontology and Geriatrics, VU University Medical Center, Amsterdam, Netherlands; [4]University Hospital Clermont-Ferrand, Center for Research in Human Nutrition Auvergne, Clermont-Ferrand, France; [5]University of Clermont Auvergne, INRA, Human Nutrition Unit, Metabolism Exploration Platform, Clermont-Ferrand, France; and [6]University Hospital Clermont-Ferrand, Clinical Nutrition Unit, Clermont-Ferrand, France

Aminonasit + vitamin D

- Tamamı BIA-SMI ile sarkopenik olgular!
- Tamamı MNA-KF <12 olgular
- N=**380** (**184** çalışma, **196** kontrol)
- Yaş: 77,7
- Doz: 20 g whey proteini + 3 g lösin + 800 IU vitamin D + KH + yağ+ vitamin+ mineral (150 kcal)
- Plasebo (izokalorik) (KH + yağ)
- GÜNDE 2 DEFA, saşe
- Egzersiz iki grupta benzer
- Takip süre: 13 hafta
- **Apendiküler kas kütlesi daha fazla arttı**
- **Sandalyeden 5 defa kalkma için geçen süre çalışma grubunda daha iyi**
- **HSG, performans, dengede fark yok**

JAMDA 16 (2015) 740–747

ELSEVIER

JAMDA

journal homepage: www.jamda.com

Original Study

Effects of a Vitamin D and Leucine-Enriched Whey Protein Nutritional Supplement on Measures of Sarcopenia in Older Adults, the PROVIDE Study: A Randomized, Double-Blind, Placebo-Controlled Trial

Jürgen M. Bauer MD, PhD [a,*], Sjors Verlaan MSc [b,c], Ivan Bautmans PhD [d], Kirsten Brandt PhD [e], Lorenzo M. Donini MD, PhD [f], Marcello Maggio MD, PhD [g], Marion E.T. McMurdo MD, PhD [h], Tony Mets MD, PhD [d], Chris Seal PhD [e], Sander L. Wijers PhD [b], Gian Paolo Ceda MD [g], Giuseppe De Vito MD, PhD [i], Gilbert Donders MD, PhD [j], Michael Drey MD [k], Carolyn Greig PhD [l], Ulf Holmbäck PhD [m], Marco Narici PhD [n], Jamie McPhee PhD [o], Eleonora Poggiogalle MD [f], Dermot Power MD, PhD [p], Aldo Scafoglieri PhD [d], Ralf Schultz MD, PhD [q], Cornel C. Sieber MD [r], Tommy Cederholm MD, PhD [m]

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[b] *Nutricia Research, Nutricia Advanced Medical Nutrition, Utrecht, The Netherlands*

Özet

- Kas kuvvetine odaklanma daha yaygın kabul görmektedir
- Sarkopenik olgularda protein, aminoasit, vitamin, mineral vb desteğinin
  - Kas kuvveti
  - Kas kütlesi
  - Fiziksel performans

üzerine etkinliği güncel araştırma konusudur

- Egzersiz programları faydalıdır

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