

DOES NUTRITION PLAY A ROLE IN THE PREVENTION AND MANAGEMENT OF SARCOPENIA?

EUGMS-IOF-ESCEO Symposium

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International Osteoporosis
Foundation

CONFLICT OF INTEREST DISCLOSURE

I have no potential conflict of interest to report

LIFE COURSE CHANGES IN MUSCLE MASS AND STRENGTH

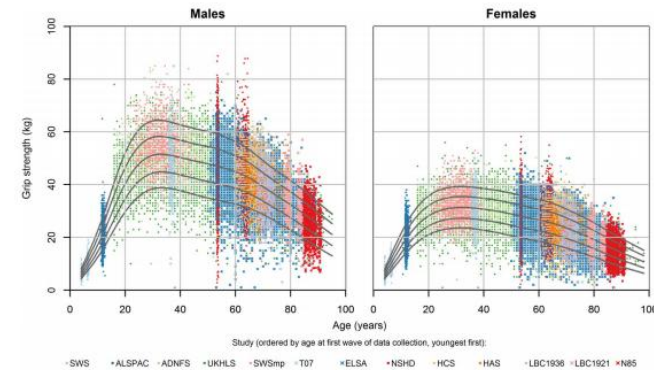
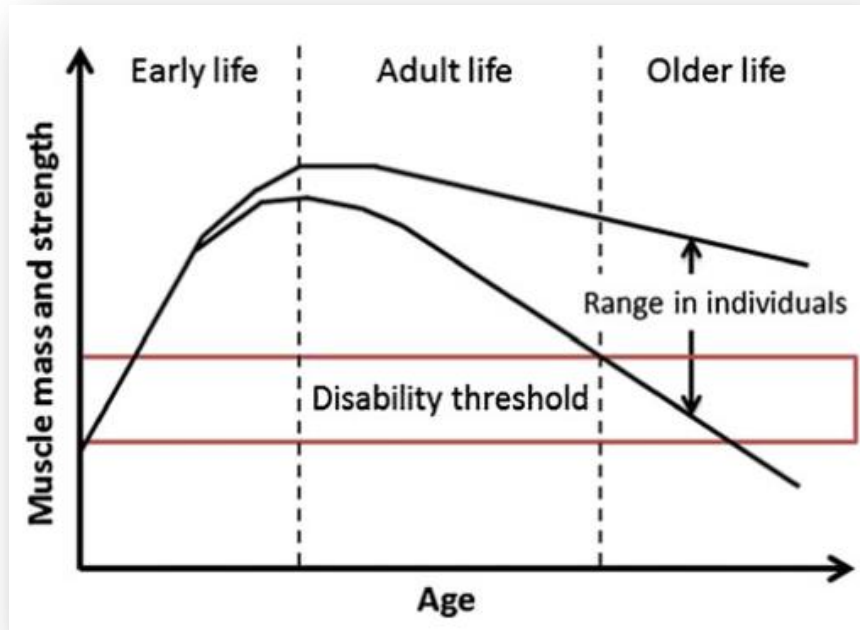


Figure 1. Cross-cohort centile curves for grip strength. Centiles shown: 10th, 25th, 50th, 75th and 90th. ADNFS Allied Dunbar National Fitness Survey, ALSPAC Avon Longitudinal Study of Parents and Children, ELSA English Longitudinal Study of Ageing, HAS Hertfordshire Ageing Study, HCS Hertfordshire Cohort Study, LBC1921 and LBC1936 Lothian Birth Cohorts of 1921 and 1936, N85 Newcastle 85+ Study, NSHD Medical Research Council National Survey of Health and Development, SWS Southampton Women's Survey, SWSmp mothers and their partners from the SWS, T-07 West of Scotland Twenty-07 Study, UKHLS Understanding Society: the UK Household Panel Study.

Table 4. Longitudinal changes in muscle fiber type and size and capillary density in older men after 12 yr

	1985–86	1997–98	Delta	%Change	PValue
Type I					
Percentage of all fibers	60 ± 9	40 ± 9	-20 ± 9		0.003
Mean fiber area, μm ²	4,190 ± 410	4,190 ± 990	0 ± 900	0 ± 22.2	0.995
Type II					
Percentage of all fibers	40 ± 9	60 ± 9	20 ± 9		0.003
Mean fiber area, μm ²	4,150 ± 670	3,980 ± 830	-170 ± 1,040	-2.5 ± 25.3	0.708
Capillary density, capillaries/fiber	1.39 ± 0.21	1.08 ± 0.13	-0.31 ± 0.28	-20.3 ± 20.7	0.043

Values are means ± SD for returning subjects (n=6) only.

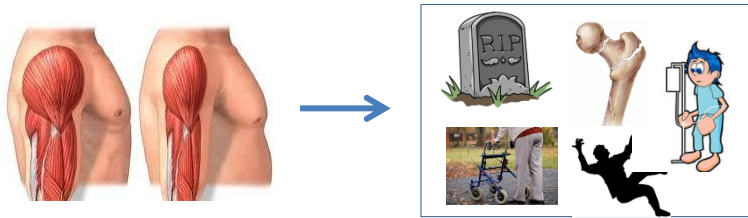
SARCOPENIA

- Progressive and generalized loss of *muscle mass* and muscle function (*muscle strength* and/or *physical performance*)
- ICD-10-CM code
- Prevalence of 1-29% in community-dwelling population; 14-33 % hospitalized population

Criteria	Muscle mass	Muscle function	
		Muscle strength	Physical performance
Baumgartner criteria	ASM/ ht ² > 2 SD below young healthy mean	X	X
European Society for Clinical Nutrition and Metabolism Special Interest Groups (ESPEN-SIG)	Percentage of muscle mass ≥ 2 SD below mean in young adults of the same sex and ethnic background	X	Gait speed: < 0.8 m/s or Reduced performance in any functional test used for comprehensive geriatric assessment
European Working Group on Sarcopenia in Older People (EWGSOP)	ALM/ht ² - Men: ≤ 7.23 kg/m ² - Women: ≤ 5.67 kg/m ²	Grip strength - Men : < 30kg - Women : < 20 kg	OR < 0.8 m/s
International Working Group on Sarcopenia (IWGS)	ALM/ht ² - Men: ≤ 7.23 kg/m ² - Women: ≤ 5.67 kg/m ²	X	Gait speed: < 1.0 m/s
Society of Sarcopenia, Cachexia and Wasting Disorders	ALM/ht ² > of 2 SD below the mean of healthy persons aged 20–30 years of the same ethnic group	X	Gait speed: ≤ 1.0 m/s or Walking distance < 400 m during a 6-min walk
Foundation of NIH Sarcopenia Project	ALM _{SMI} - Men : < 0.789 - Women : < 0.512	Grip strength - Men : < 26kg - Women : < 16 kg	X

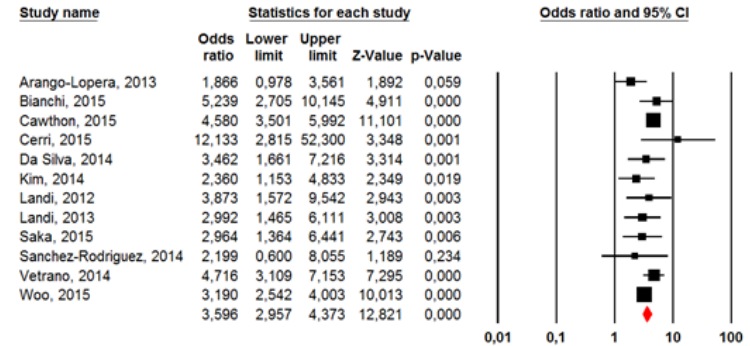
ASM/ ht² = ratio of appendicular skeletal muscle mass over height squared; ALM/ht² = ratio of appendicular lean mass over height squared; ALMBMI = ratio of appendicular lean mass over body mass index; SD standard deviation

CONSEQUENCES OF SARCOPENIA



17 prospective studies included in a RS and MA:

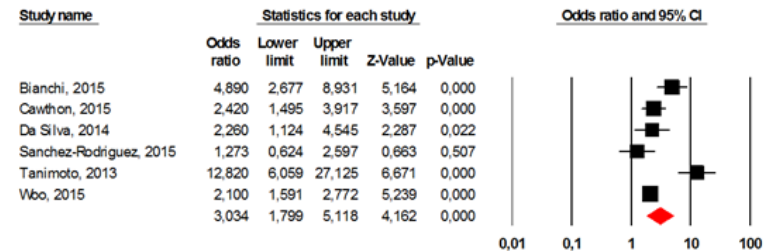
- 12 reported mortality as outcome
 - OR of 3,6 (95% CI 2,96-4,37)
- 6 reported functional decline as outcome
 - OR of 3,03 (95% CI 1,80-5,12)
- 2 reported falls as outcome
 - 2/2 studies found a significant association with sarcopenia
- 2 reported fractures as outcome
 - 1/2 study found a significant association with sarcopenia (+ low BMD)
- 2 reported length of hospitalization as outcome
 - 1/2 study found a significant association with sarcopenia
- 1 reported incidence of hospitalization
 - 1/1 reported a significant association with sarcopenia



A. Mortality and sarcopenia

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

* All ORs were crude ORs.



B. Functional disability and sarcopenia

Heterogeneity Q-value 27.99; $I^2(Q)$ 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

MANAGEMENT OF SARCOPENIA

Nutrition interventions: *Proteins, EAA, Creatine, Vit D, DHEA, Fatty acids*

Exercices interventions: *Aerobic exercise, Progressive resistance exercise, Flexibility, Balance*

Drugs: *in progress*

Table 3 Pharmacological agents in development with potential for treating sarcopenia

Mechanism of action	Drug name	Drug Developer	Indication sought	Study phase
I. Myostatin Antagonists				
Activin receptor trap	ACE-031	Acceleron	Duchenne muscular dystrophy	Phase 3 (trial terminated early)
Myostatin antibody	REGN-1033	Regeneron/Sanofi	Sarcopenia	Phase 2
	LY-2495655	Eli Lilly	Hip arthroplasty Elderly Fallers Cancer Cachexia	Phase 2
Activin receptor inhibitor	PF-06252616	Pfizer	Inclusion body myositis	Phase 1
	Bimagrumab (BMY338)	Novartis	Sarcopenia	Phase 2 and 3
			Hip fracture Cancer and COPD cachexia	Phase 2
II. Selective Androgen Receptor Modulators	Enobasarm (Ostarine)	GTx	Cancer Cachexia	Phase 3 (did not meet primary endpoint)
III. Skeletal Troponin Activators	Tirasemtiv	Cytokinetics	ALS	Phase 2,3
	CK-2017357		Myasthenia Gravis	



DOES NUTRITION PLAY A ROLE IN THE PREVENTION AND MANAGEMENT OF SARCOPENIA?

1. Role of Calcium and Vitamin D - *René Rizzoli* (Switzerland)
2. Role of proteins and other nutrients - *Marjolein Visser* (The Netherlands)
3. Interaction between nutrition and exercise - *Olivier Bruyere* (Belgium)