STRENGTH AMBASSADOR

Leading the Way in the Science of Nutrition and Strength

Understanding the impact of Sarcopenia in Frailty

Going from strength to strength

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This presentation has been sponsored by Abbott. Opinions that have been expressed are those of the speaker, and not necessarily those of Abbott.

Declaration of interests

Honoraria, Advisory Board, Educational Grant

Bayer, Pfizer, MSD, Astellas, Lilly, Internis, Flynn, Boehringer-Ingleheim, Ferring , Kyowa Kirin, Astellas, Vifor, BMS, Abbott

Session Focus

Sarcopenia

- New operational definition (**EWGSOP 2018)**
- Highly prevalent, overlap with frailty

Sarcopenia and Osteoporosis

- Often occur together
- Impact on falls, fractures, hospital admissions

Management

- Nutrition
- Exercise

Sarcopenia and frailty overlap

Criteria	Measures
1. Weight Loss	>10 lb (4.5kg) unintentionally in previous year
2. Muscle Weakness	Grip strength in lowest 20% of the population
3. Slowness	Gait speed in slowest 20% of the population
4. Exhaustion	Self reported Exhaustion
5. Low Activity	kcal/week in lowest 20% of the population

≥ 3 Frail
1- 2 Pre-frail

Sarcopenia

Fried et al. Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci 2001 Mar; 56: M146-56

Prevalence of sarcopenia in a population of nursing home residents according to their frailty status: results of the SENIOR cohort (Belgium)

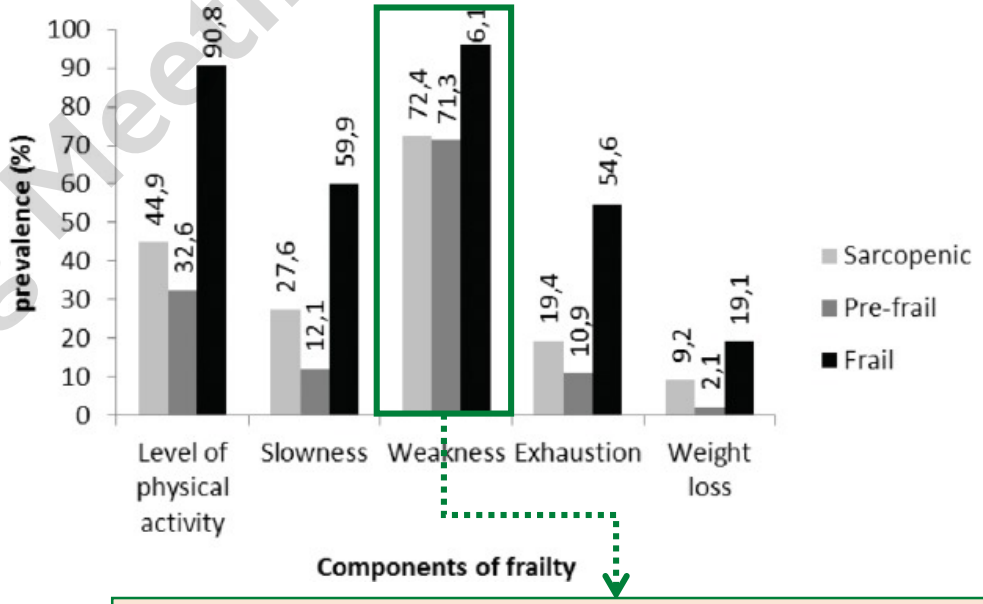
N= 662, 73% Women, Mean Age 83.2 ±8.99 years

Frailty Status	Sarcopenia
Robust	16.3 %
Pre-frail	39.9 %
Frail	**47 %**

Over 1/3rd of all nursing home residents are sarcopenic

Almost 1/2 of frail nursing home subjects are sarcopenic

Prevalence of each component of frailty among frail, pre-frail and sarcopenic subjects



Weakness was the **main component of frailty**, highest prevalence of sarcopenia in this group

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J Musculoskelet Neuronal Interact. 2017 Sep; 17(3): 209–217.

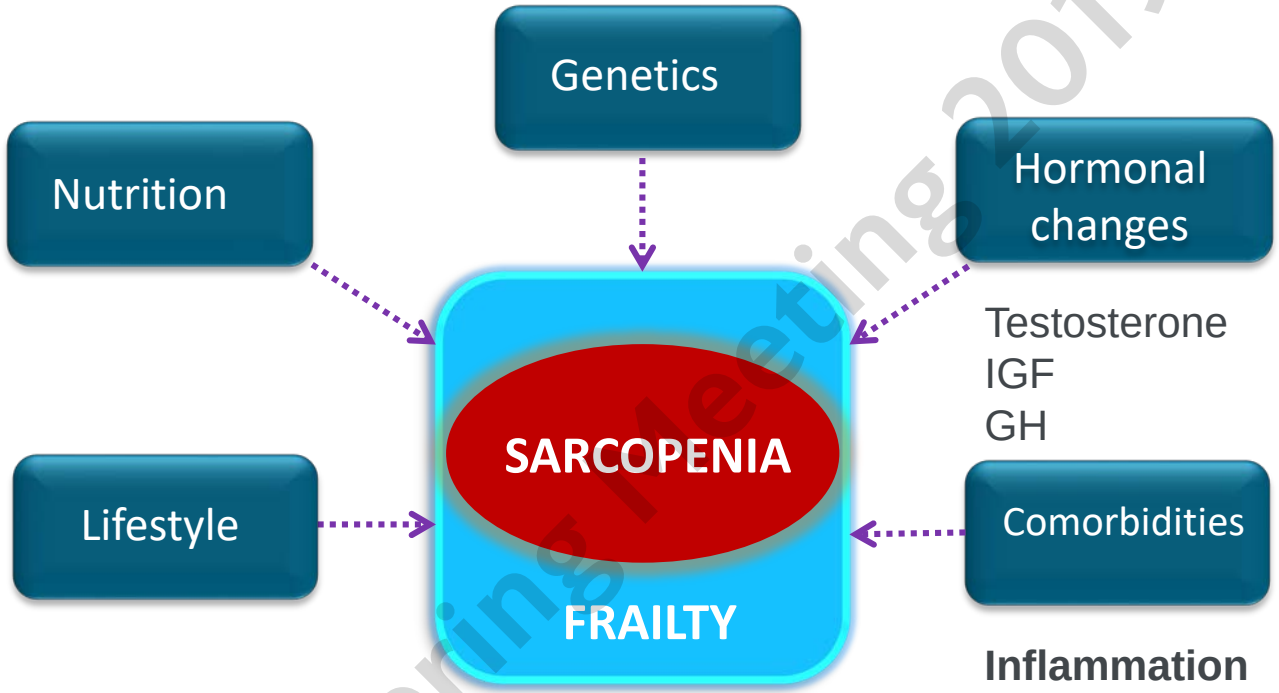
Prevalence of sarcopenia in community-dwelling older people in the UK using the European Working Group on Sarcopenia in Older People (EWGSOP) definition: findings from the Hertfordshire Cohort Study (HCS)

2 samples of community-dwelling HCS participants

1. Hertfordshire Sarcopenia Study (HSS) N = 103 (Men), Mean Age = 73 years **Sarcopenia diagnosis using:** Anthropometry grip strength physical performance measures **+ DXA** **Sarcopenia prevalence** Men = 6.8%	**2**. HCS N= 765 (Men),1022 (Women) Mean age = 67 years **Sarcopenia diagnosis using:** Anthropometry grip strength physical performance measures **No DXA** **Sarcopenia prevalence** Men = 4.6%, Women= 7.9%,

Age Ageing. 2013 May; 42(3): 378–384.

Sarcopenia and frailty share common aetiology



Testosterone
IGF
GH

Inflammation
Common determinant for chronic diseases sarcopenia and frailty[1]

https://doi.org/10.1016/j.mam.2016.06.001

Sarcopenia

Disease related malnutrition

Hospitalisation

Multi-factorial and Complex

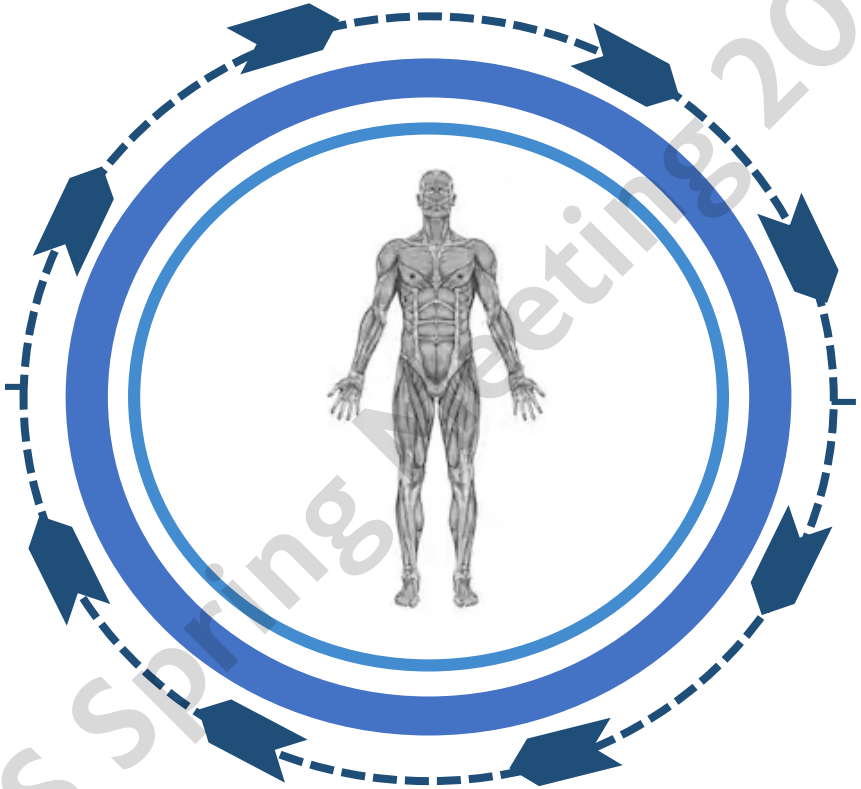
Anabolic resistance

Reduced blood Flow

Impaired regenerative capacity

Mitochondrial dysfunction

Insulin resistance



Muscle Mass
&
Function loss

Negative Health Outcomes

- Metabolic disorders
- Impaired function
- Disability
- Mortality
- Increased Hospital stay

J Nutr Health Aging (2018) 22: 664. https://doi.org/10.1007/s12603-018-0995-7

Contents lists available at ScienceDirect

Clinical Nutrition

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

Review

Falls among older adults with sarcopenia dwelling in nursing home or community: A meta-analysis

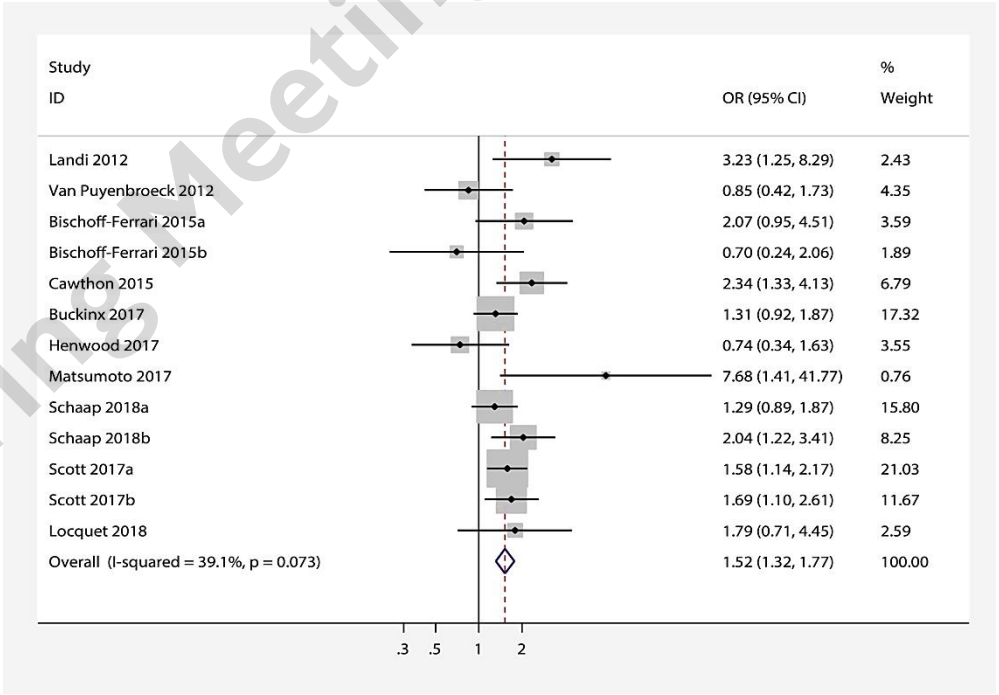
Sarcopenia is regarded as a risk predictor for falls in older adults

Clinical picture

- Poor muscle strength
- Slow Gait speed
- Poor balance
- Delayed reaction time

Possible explanations

- Loss of fast twitch muscle fibres
- Vitamin D deficiency



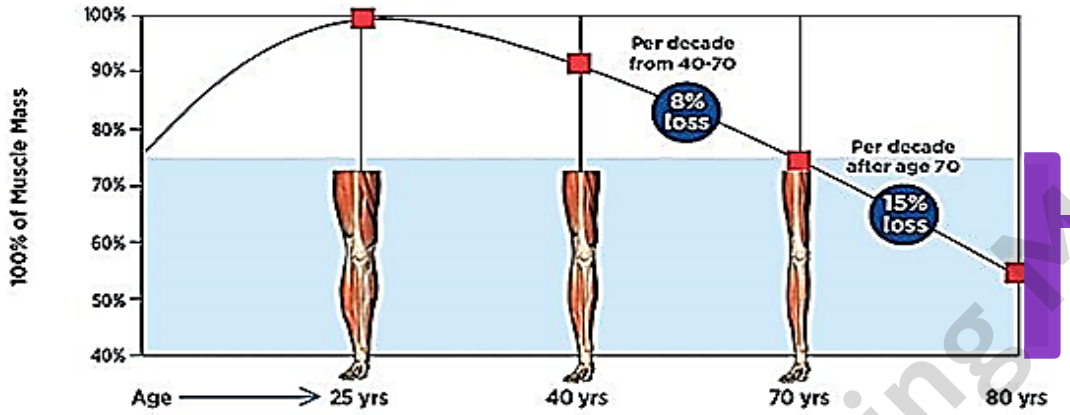
OR 1.52 (CI 1.32 – 1.77)

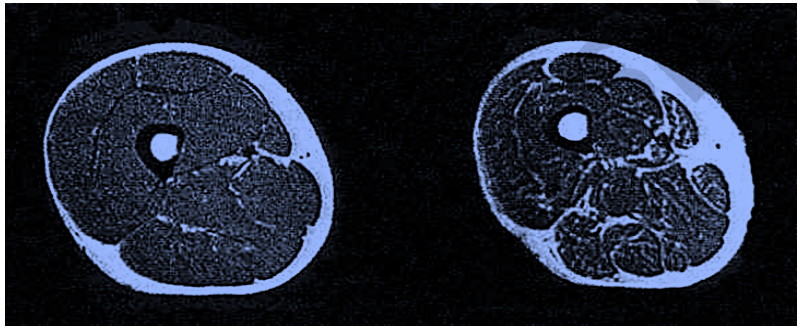
https://doi.org/10.1016/j.clnu.2019.01.002

Sarcopenia, frailty and falls

Muscle mass and strength loss after 50 years

- Loss of leg muscle mass 1-2% / year
- Loss of Strength 1.5-5% / year





Healthy Sarcopenia

Sarcopenia as a risk factor for falls in elderly individuals
(ilSIRENTE study)

Sarcopenic participants were over **X 3** more likely to fall

↓ Physical Activity

↑ Risk of Falls & Fractures

↓ Autonomy

Dependency
Hospital Admissions
Institutionalization
Death

Muscles Ligaments Tendons J 2013; 3: 346-50

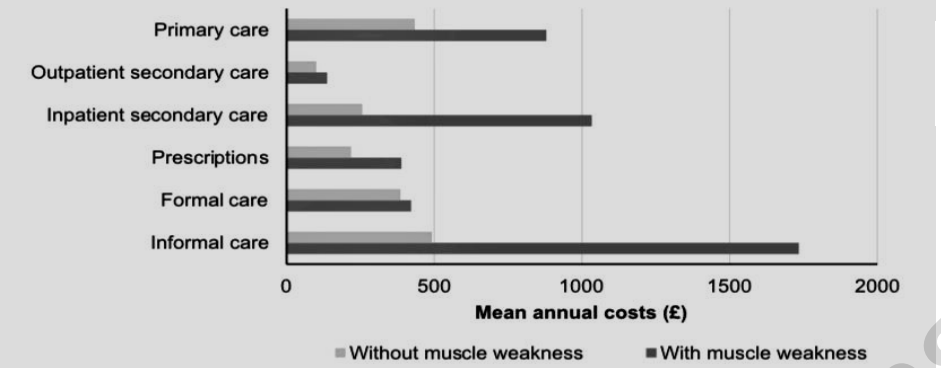
Calcified Tissue International
https://doi.org/10.1007/s00223-018-0478-1

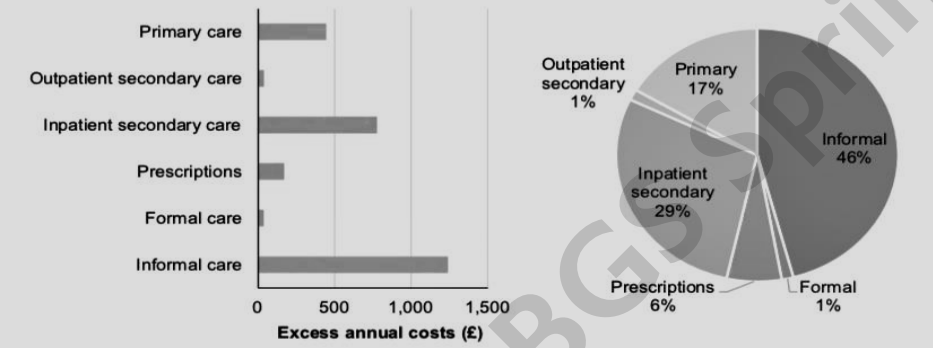
ORIGINAL RESEARCH

Health Care Costs Associated With Muscle Weakness: A UK Population-Based Estimate

Rafael Pinedo-Villanueva[1] · Leo D. Westbury[2] · Holly E. Syddall[2] · Maria T. Sanchez-Santos[1] · Elaine M. Dennison[2,3] · Sian M. Robinson[2,4] · Cyrus Cooper[2,4,5]

Received: 17 July 2018 / Accepted: 18 September 2018





£ 2.46 billion / Annum

UK population	65,648,100
UK population aged 70 years and older	8,177,500
UK population aged 70 years and older with muscle weakness*	8,177,500 × 11.1% = 907,703
Excess economic burden for health care in the UK	907,703 × £1429 = £1.30 billion
Excess economic burden for health and social care in the UK	907,703 × £2707 = £2.46 billion

*11.1% of the Hertfordshire Cohort Study participants had muscle weakness using the FNIH criteria (<26 kg for men and <16 kg for women). It is assumed that this prevalence is similar in the UK

Population estimates according to the Office for National Statistics

Muscle weakness was defined using low grip strength (<26 kg for men, <16 kg for women)

Revised operational definition of Sarcopenia
2018

Sarcopenia = muscle disease

Low Muscle strength is the primary parameter

Categories of Sarcopenia

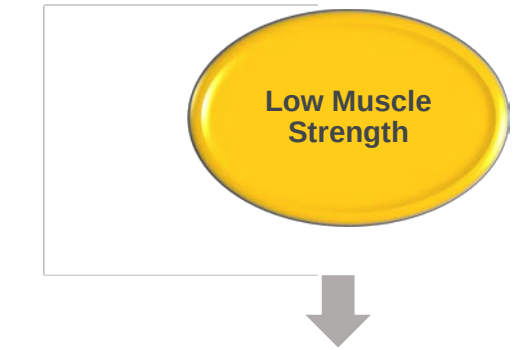
- *Primary / Secondary* (Disease, Inactivity, Malnutrition)
- *Acute* (<6 months) or *Chronic* (>6months)
- *Frailty* overlap

Sarcopenia has been overlooked & undertreated in mainstream practice

- What variables to measure ?
- How to measure them ?
- What cut-off points best guide diagnosis and treatment ?
- How to best evaluate effects of therapeutic interventions

Age Ageing. **2018;**48(1):16-31. doi:10.1093/ageing/afy169

Revised operational definition of Sarcopenia 2018



Strength	Men	Women
Grip	< 27 Kg	<16 Kg
Chair Stand	> 15 Seconds for five rises	

Probable Sarcopenia

Quantity	Men	Women
ASM	< 20 Kg	<15 kg
ASM / height^2	< 7.0 Kg / m^2	< 6.0 Kg / m^2

Confirmed Sarcopenia

Performance	Men + Women
Gait Speed	≤ 0.8 m/s
SPPB	≤ 8 point score
TUG	≥ 20 S
400 m Walk Test	≥ 6 min, for completion

Severe Sarcopenia

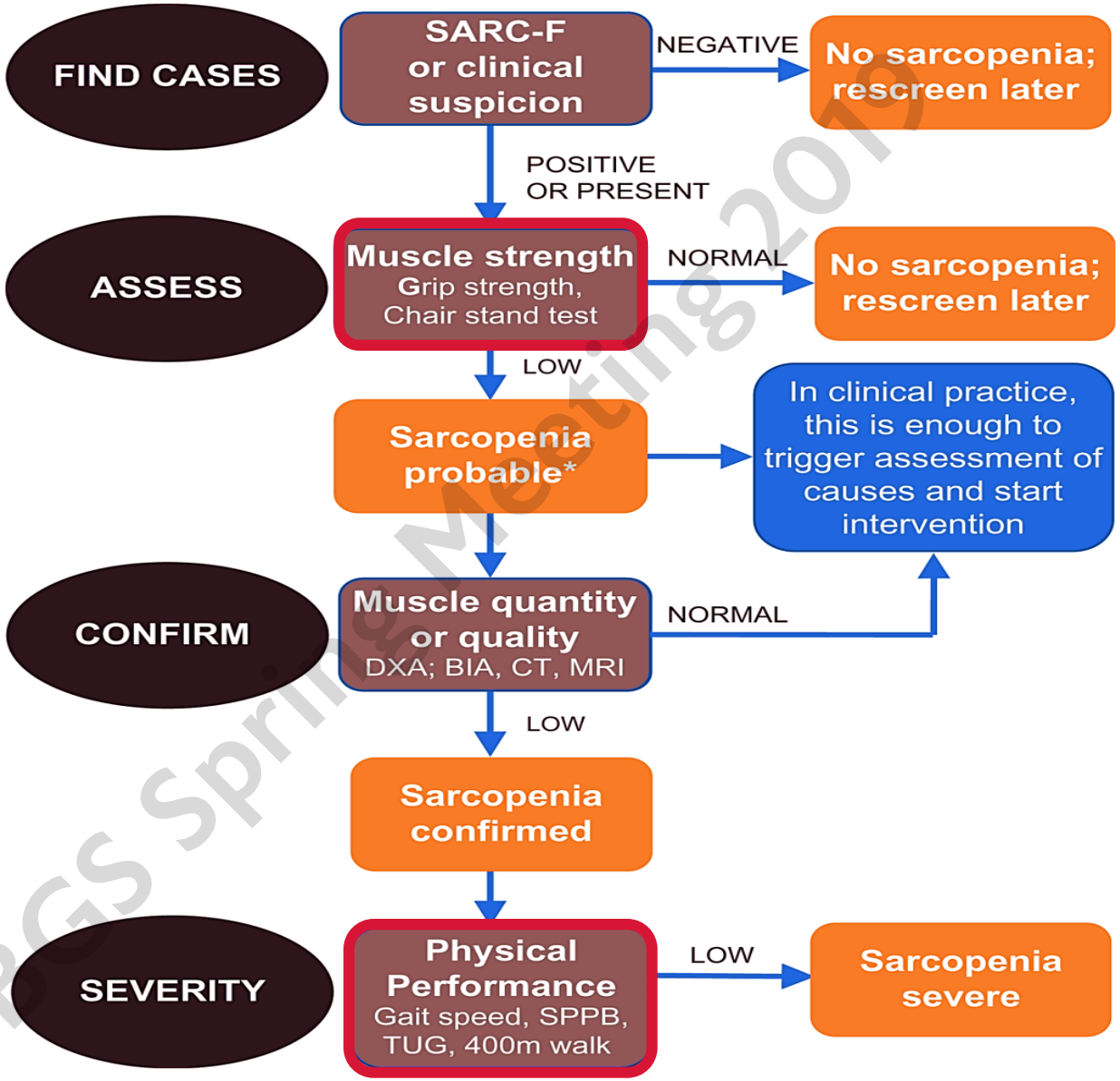
ASM = Appendicular Skeletal Mass
SPPB = Short Physical Performance Battery
TUG = Timed Up and Go

Age Ageing. **2018;**48(1):16-31. doi:10.1093/ageing/afy169

Sarcopenia

EWGSOP2 algorithm for case-finding

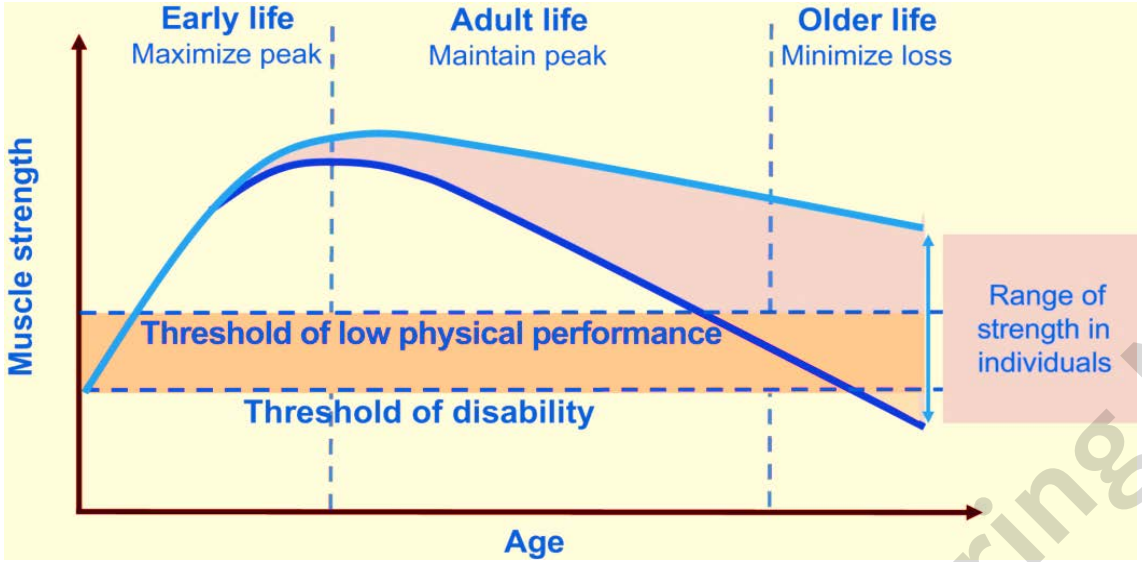
Find-Assess-Confirm-Severity (F-A-C-S)



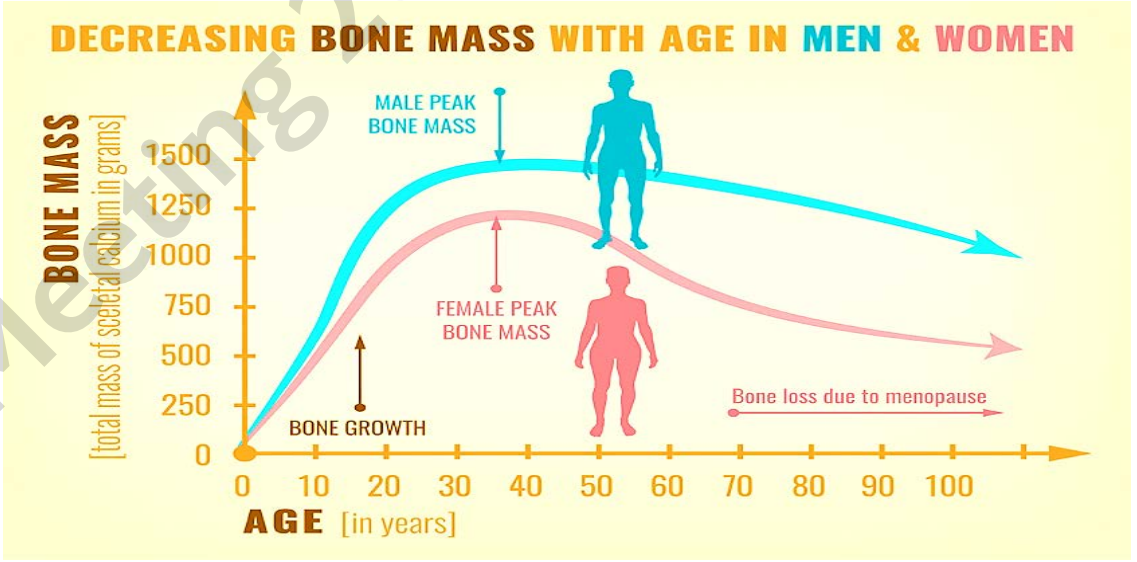
Age Ageing. **2018;**48(1):16-31. doi:10.1093/ageing/afy169

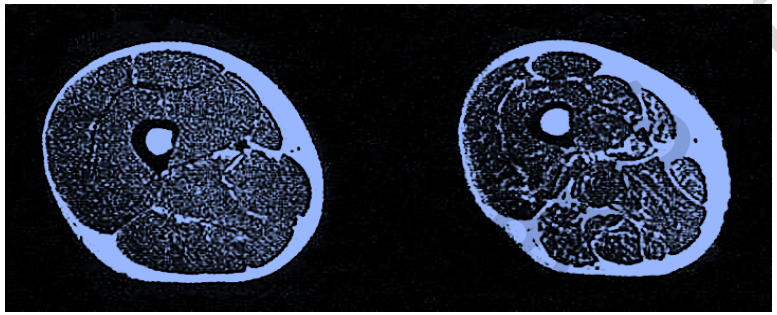
Sarcopenia and Osteoporosis may coexist

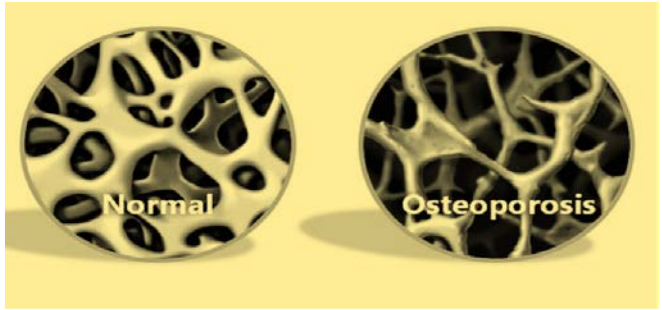
Muscle strength decline with age[1]



Bone mass decline with age



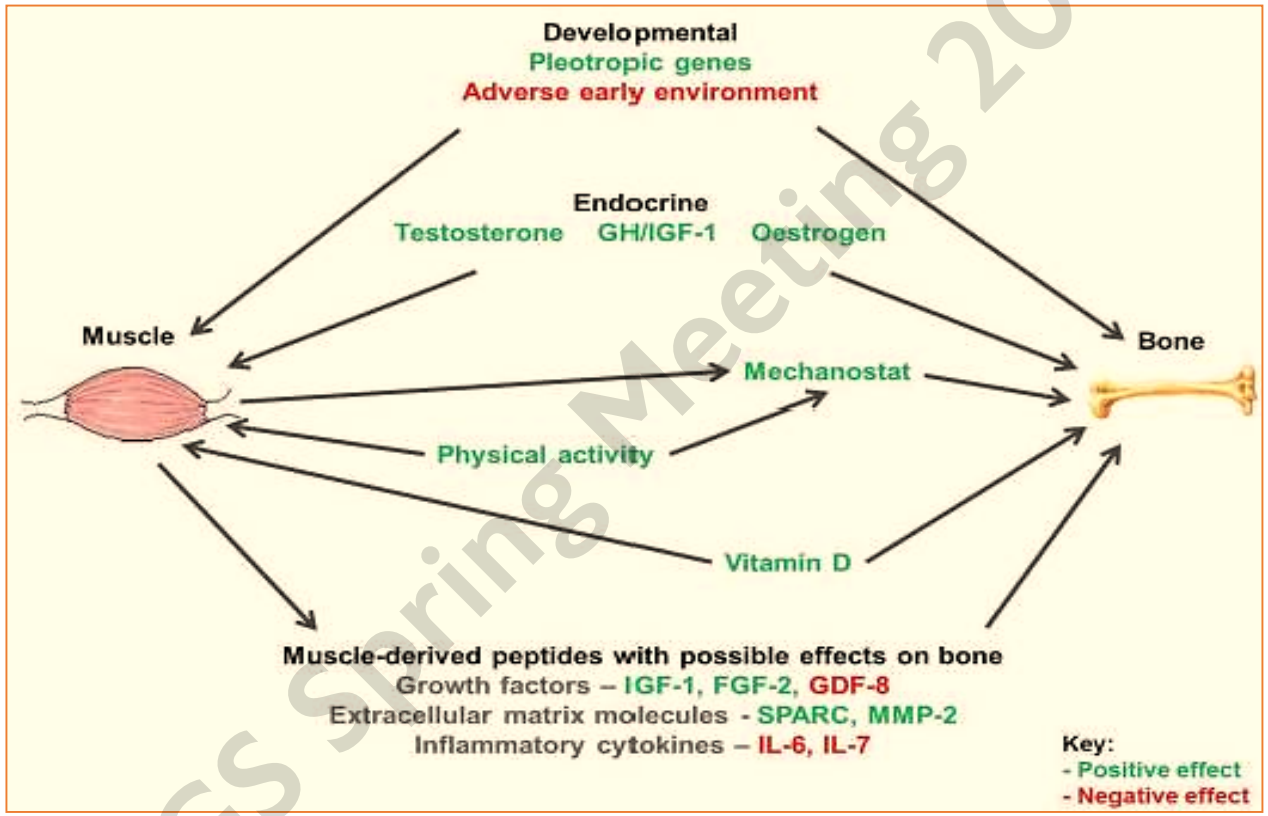




1. Age Ageing. 2018;48(1):16-31.doi:10.1093/ageing/afy169

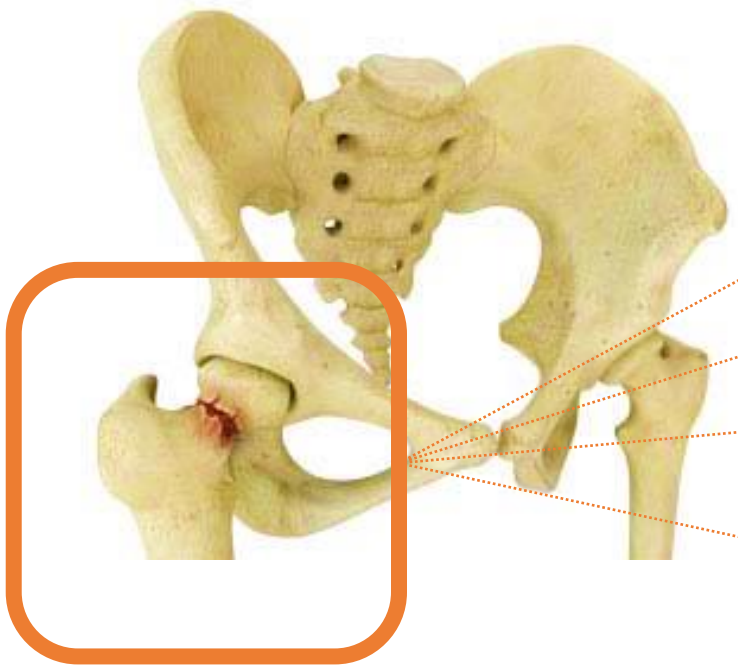
Sarcopenia and Osteoporosis go hand in hand

In one study 37% of patients with hip fracture had Sarcopenia[1]



Development of both osteoporosis and sarcopenia in later life are a common problem encountered as part of musculoskeletal aging[2]

1. Steihaug et al. BMC Geriatrics (2018) 18:65
2 Osteoporos Int 2012; 23: 1839-1848



- **Most common cause of serious injury and death following an accident in older people**
- Most of the deaths reflect high prevalence of comorbidities
- **Most common reason for older people to need emergency anaesthesia and surgery**
- Accounts for 1.5 M hospital bed days / year.
- At any one time , patients recovering from hip fracture still occupy over 3,600 hospital beds.
- **Average length of stay 20.0 days**

Eur J Clin Nutr. 2018 Jan;72(1):77-81. doi: 10.1038/ejcn.2017.72. Epub 2017 May 17.

Prevalence of malnutrition in a cohort of 509 patients with acute hip fracture: the importance of a comprehensive assessment.

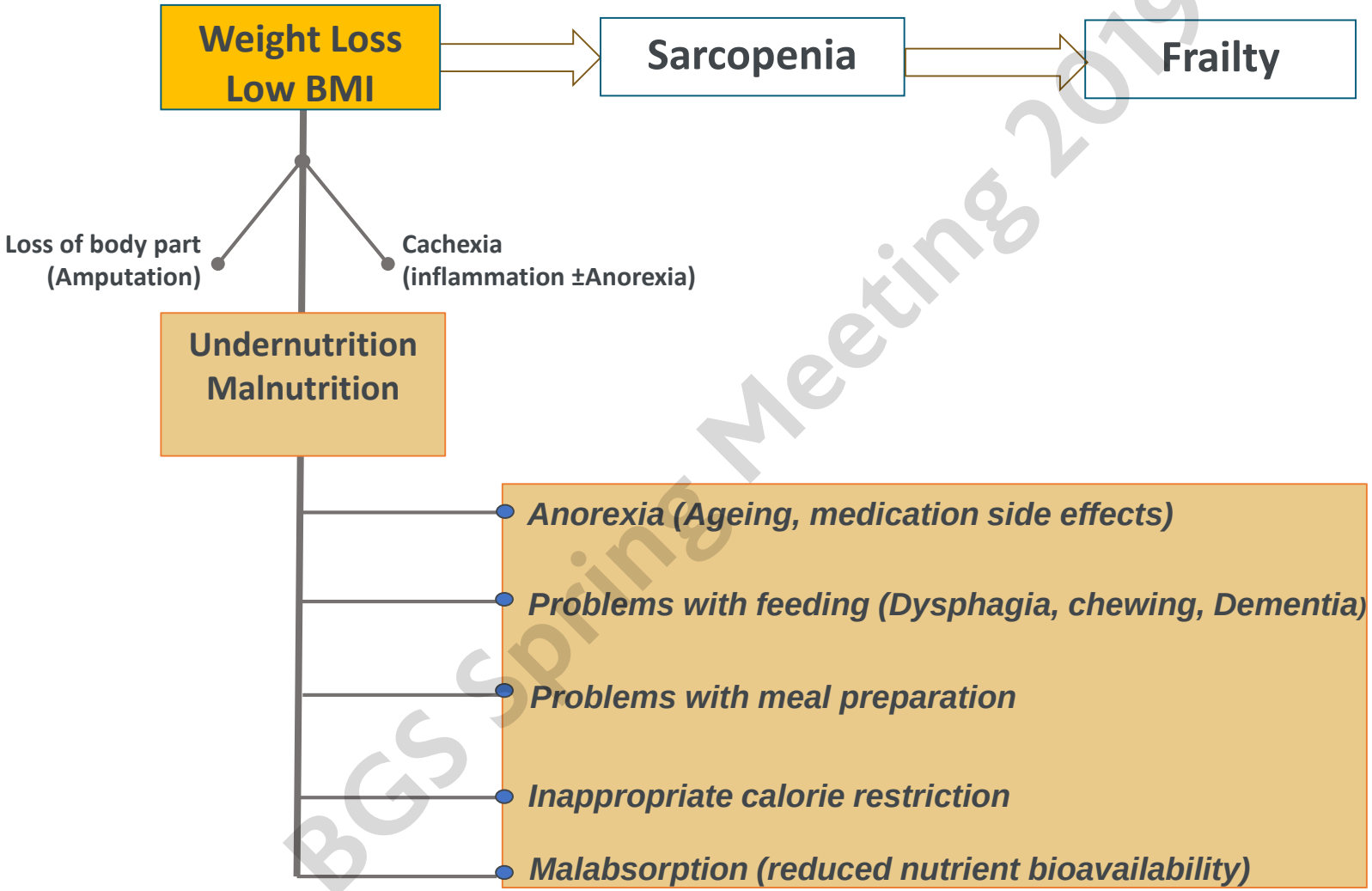
Díaz de Bustamante M[1], Alarcón T[1,2,3], Menéndez-Colino R[1,2], Ramírez-Martín R[1], Otero Á[2,3,4], González-Montalvo JI[1,2,3].

509 acute HF patients were included.
Mean age 85.6±6.9 years, 79.2% women

- 20.1% patients had a BMI <22 kg/m^2.
- 81.2% had protein malnutrition.
- 17.1% patients had both energy and protein malnutrition.
- Serum vitamin D was <30 ng/ml in 93% patients.
- The prevalence of sarcopenia was 17.1%.

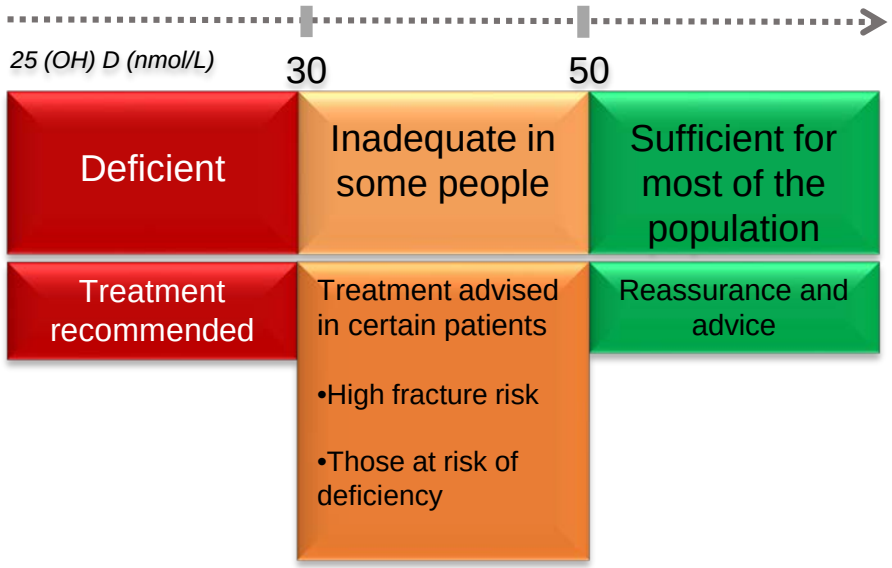
Vitamin D deficiency was present in 57.5% (n = 237)
Prevalence of vitamin D insufficiency was 34.5%, with only 8% of patients having normal vitamin D levels.[16]

Malnutrition in Older Person

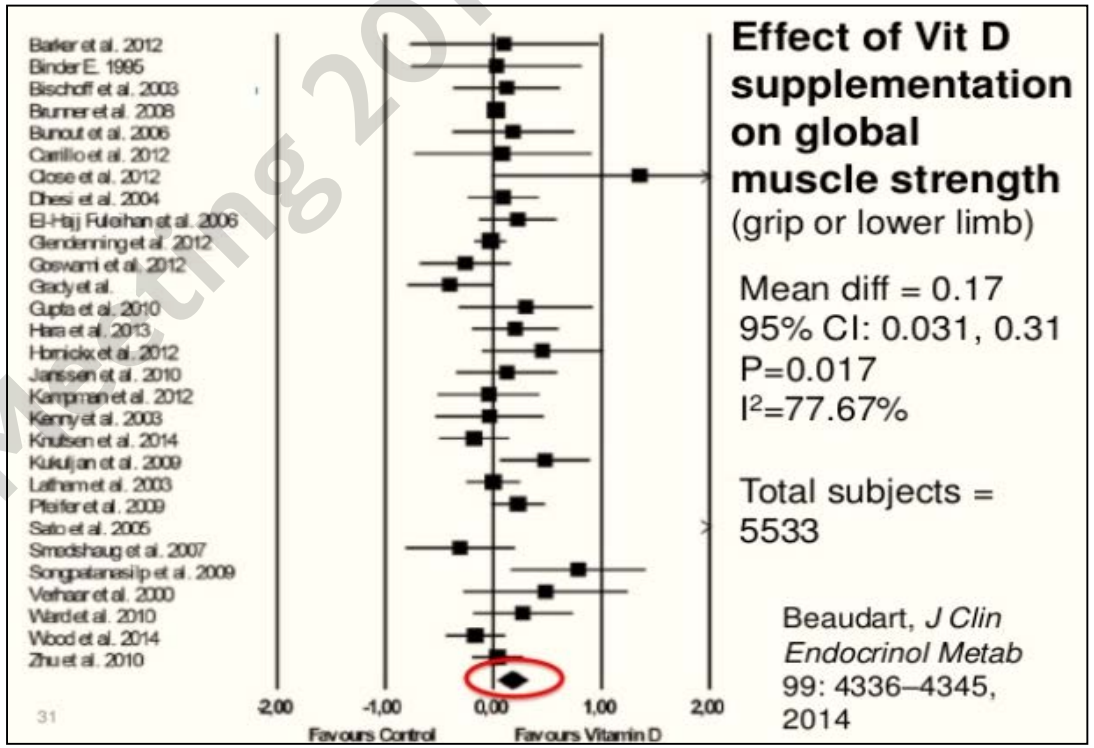


J Nutr Health Aging. **2018**;22(3):308-310

Effect of Vitamin D on muscle strength

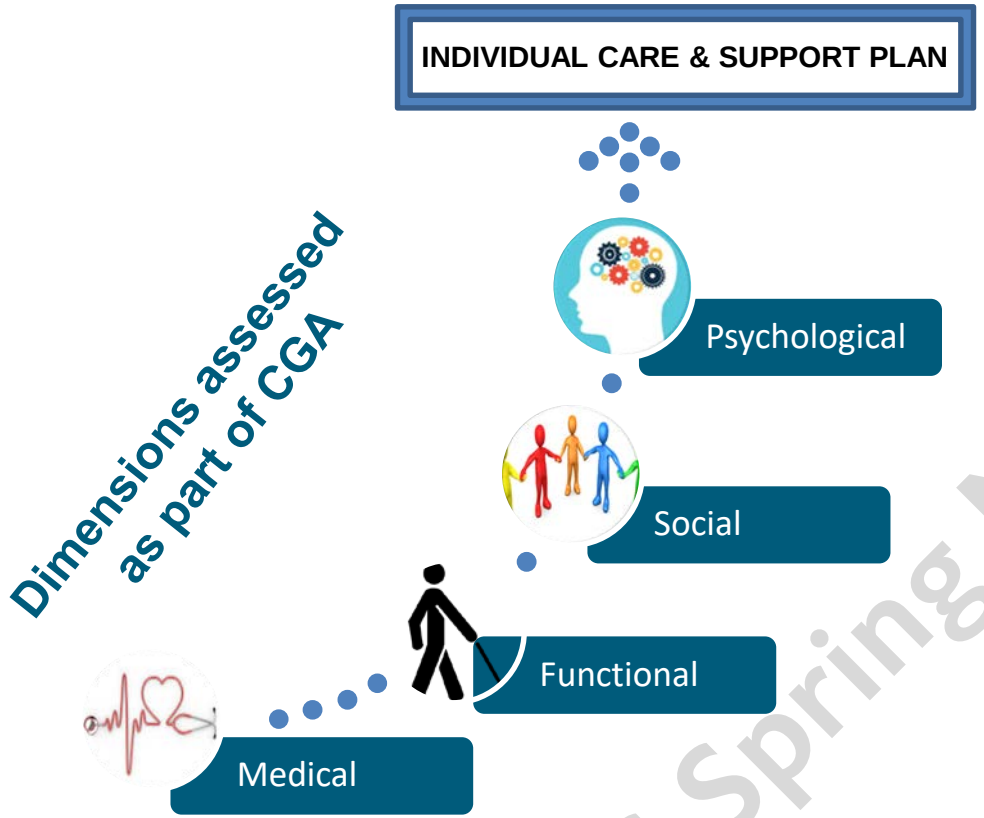


Adult at risk groups[1]	
People over 65 years of age	Thinning of the skin reduces the efficiency of vitamin D synthesis
People not exposed to a great deal of sunlight	Those who cover their skin Housebound or confined indoors for long periods
People with darker skin	People of African, African-Caribbean or South Asian origin (Darker skin pigments interfere with UV light getting to appropriate skin layer)



Oral vitamin D3 is the treatment of choice in vitamin D deficiency.

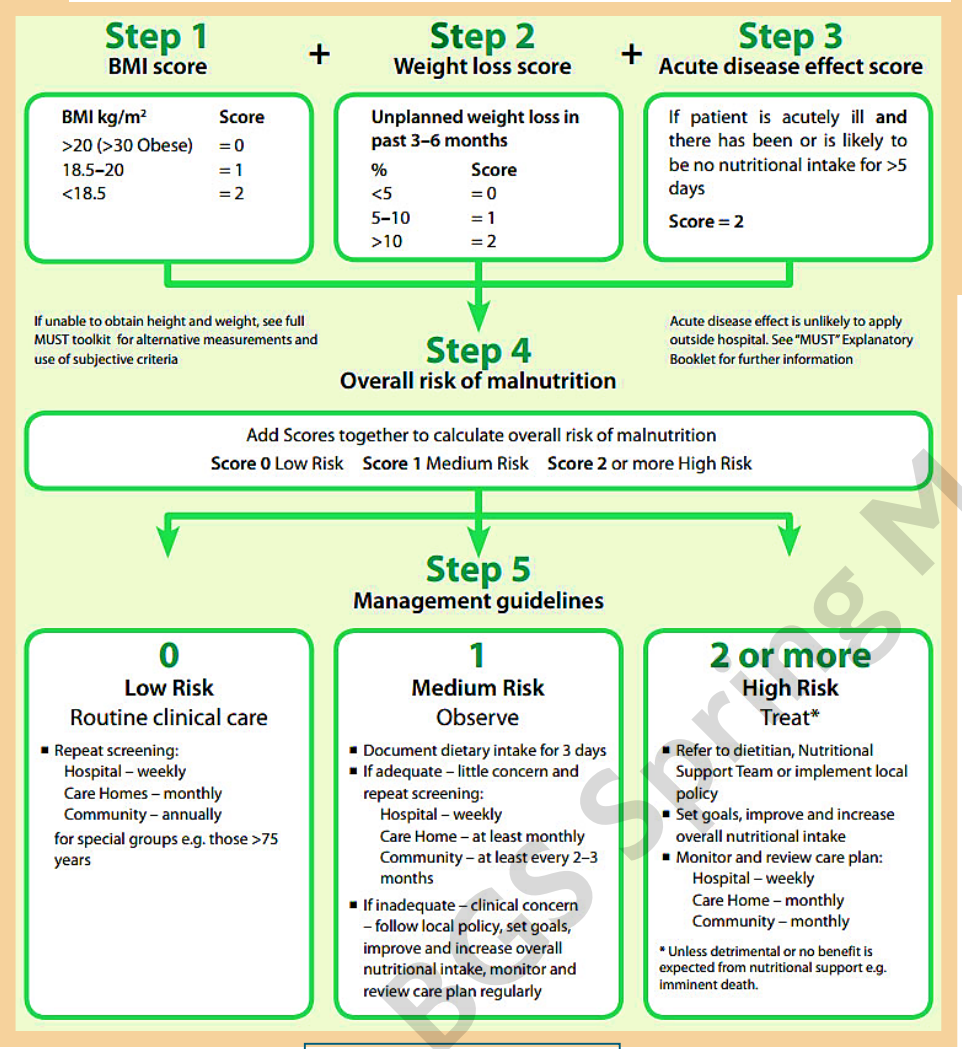
Comprehensive Geriatric Assessment (CGA) is considered gold standard for frailty assessment and management



Muscle Function and Nutritional Status integral part for assessing older people at risk of frailty and sarcopenia

1. MEDICAL ASSESSMENT
1a. Physical Examination
1b. Medication Review
1c. Nutrition Assessment
1d. Bone Health Assessment
1e. Pain Assessment
2. ASSESSMENT of FUNCTIONING
3. PSYCHOLOGICAL ASSESSMENT
3a. Cognitive Decline
3b. Deliruim
3c. Dementia
3d. Depression
4. SOCIAL ASSESSMENT
5. ENVIRONMENTAL ASSESSMENT
6. ADVANCE CARE PLANNING
7. SPIRITUAL WELBEING ASSESSMENT
8. SEXUALITY and INTIMACY ASSESSMENT

Malnutrition Universal Screening Tool (MUST)
" MUST do better"



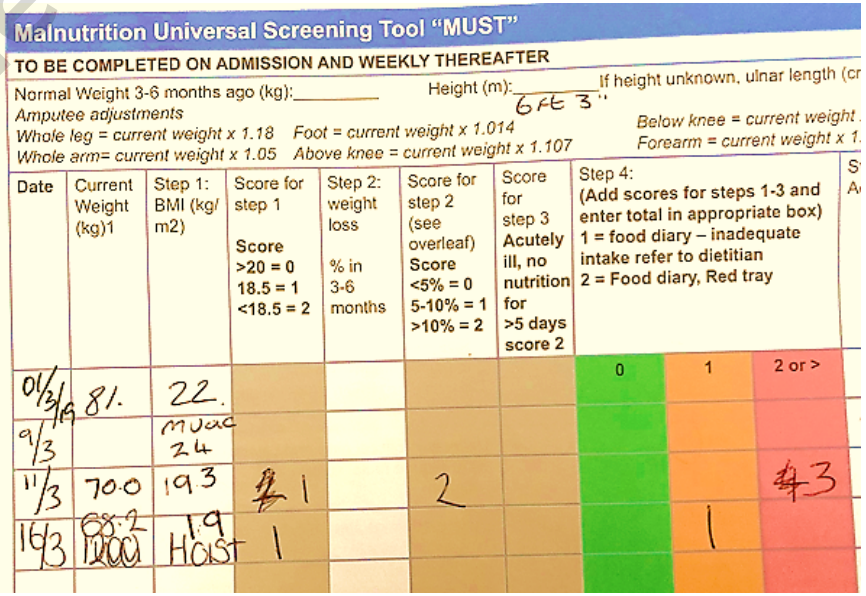
Endorsed by NICE Quality standard [QS24]

Challenges in effective use in hospital setting

- ❑ Training and Education
- ❑ Leadership (and ownership)
- ❑ Competing priorities
- ❑ High Patient Turnover
- ❑ High Staff Turnover

A poorly completed MUST example

A recently admitted man with empyema, prolonged inpatient stay and fall to hip fracture on ward:



High protein ONS are especially suitable for individuals with wounds, post-operative patients, some types of cancer and the elderly

PROTEIN ORAL NUTRITIONAL SUPPLEMENTATION FOR THE ELDERLY AND MALNOURISHED HOSPITAL PATIENT

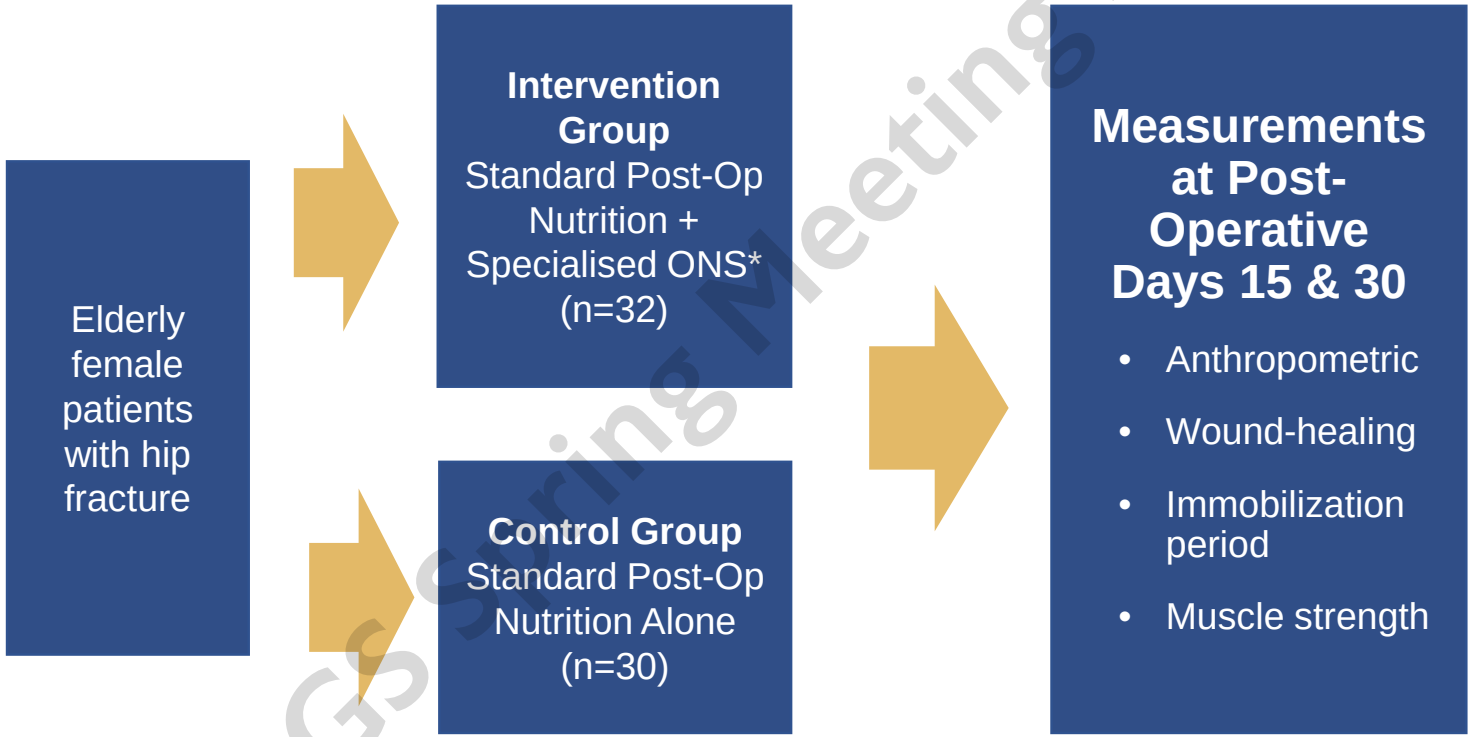
White Z (PhD), Kotze V (RD), Erasmus A (RD)
Department Human Nutrition, University of Pretoria

Medical Chronicle October 2016

MEDICAL CHRONICLE
The Doctor's Newspaper
www.medicalchronicle.co.za
Established 1965

Effect Of CaHMB, Protein And Vitamin D Supplementation On Post-operative Immobilization In Malnourished Older Adult Patients With Hip Fracture

A Randomized Controlled Study



* 2 x 220 ml servings / day Ensure Plus Advance

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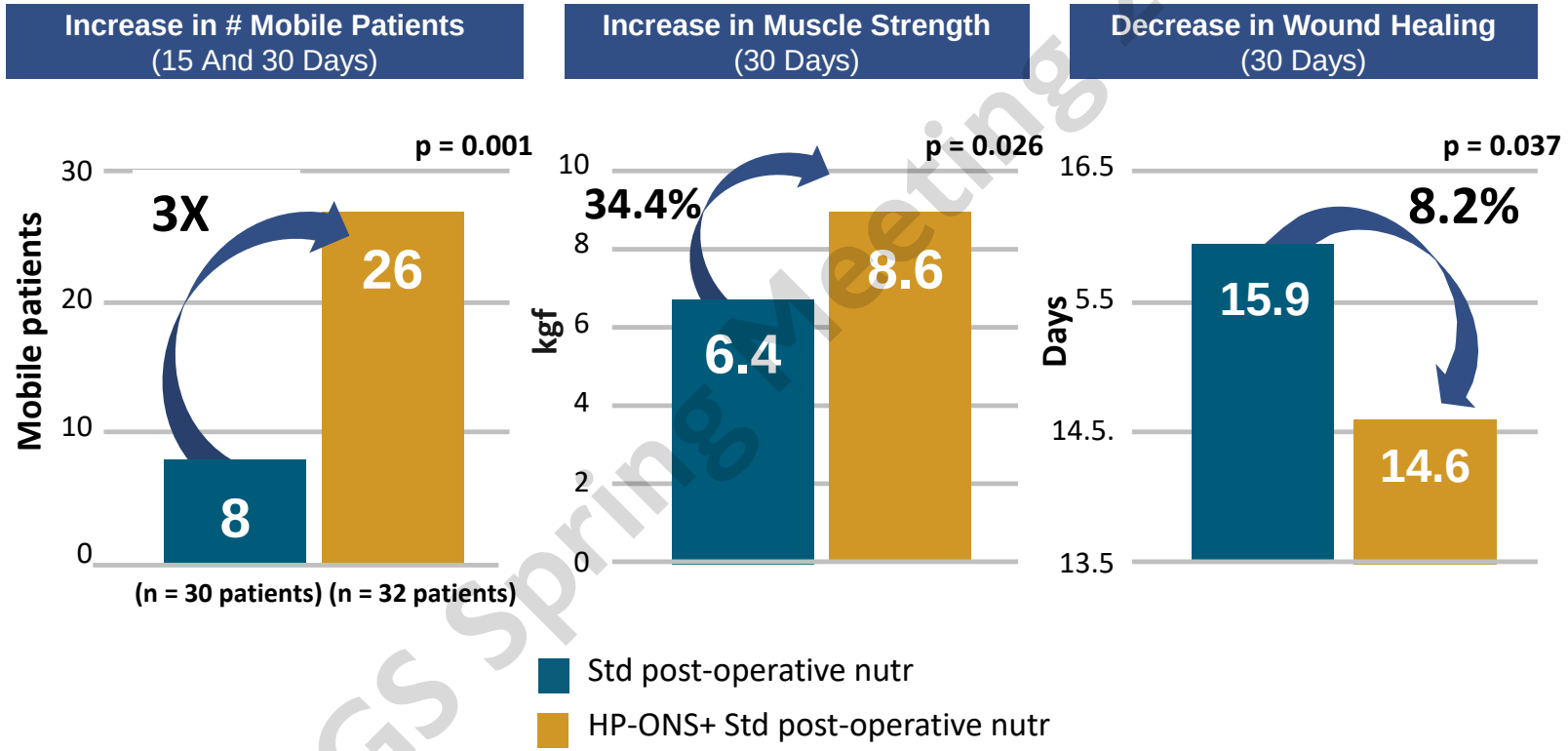
Ekinci O et al. Nutr Clin Pract. 2016; 31(6): 829-835.

Specialized ONS Improved Wound Healing and Mobility in Patients Undergoing Surgery For Hip Fracture



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Ekinci O et al. Nutr Clin Pract. 2016; 31(6): 829-835

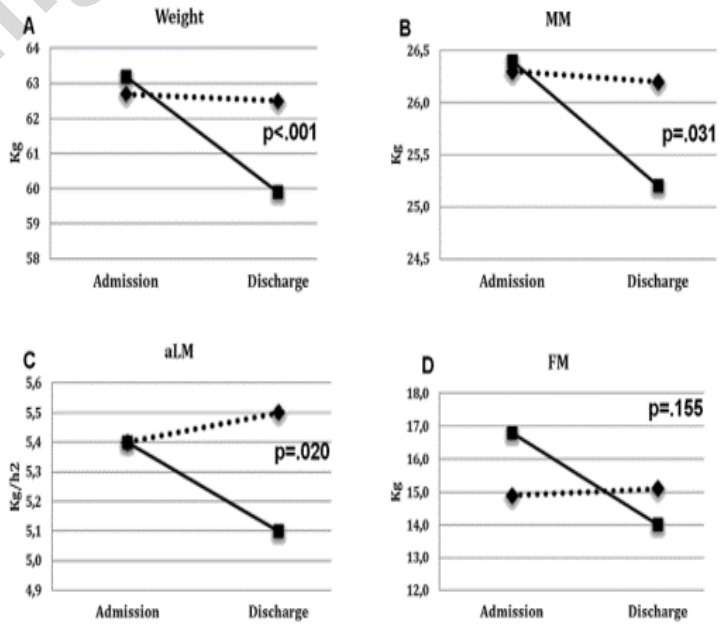
Effectiveness of Nutritional Supplementation
on Sarcopenia and Recovery in Hip Fracture Patients

Elderly patients with hip fracture admitted to rehabilitation therapy

Intervention Group
Standard Diet + 2/day Specialised ONS (n=49)

Control Group
Standard Diet (n=43)

Improved Muscle Mass & Reduced Onset of Sarcopenia in Hip Fracture Patients on Specialised ONS



Malafarina V et al. Maturitas. 2017 Jul;101:42-50.

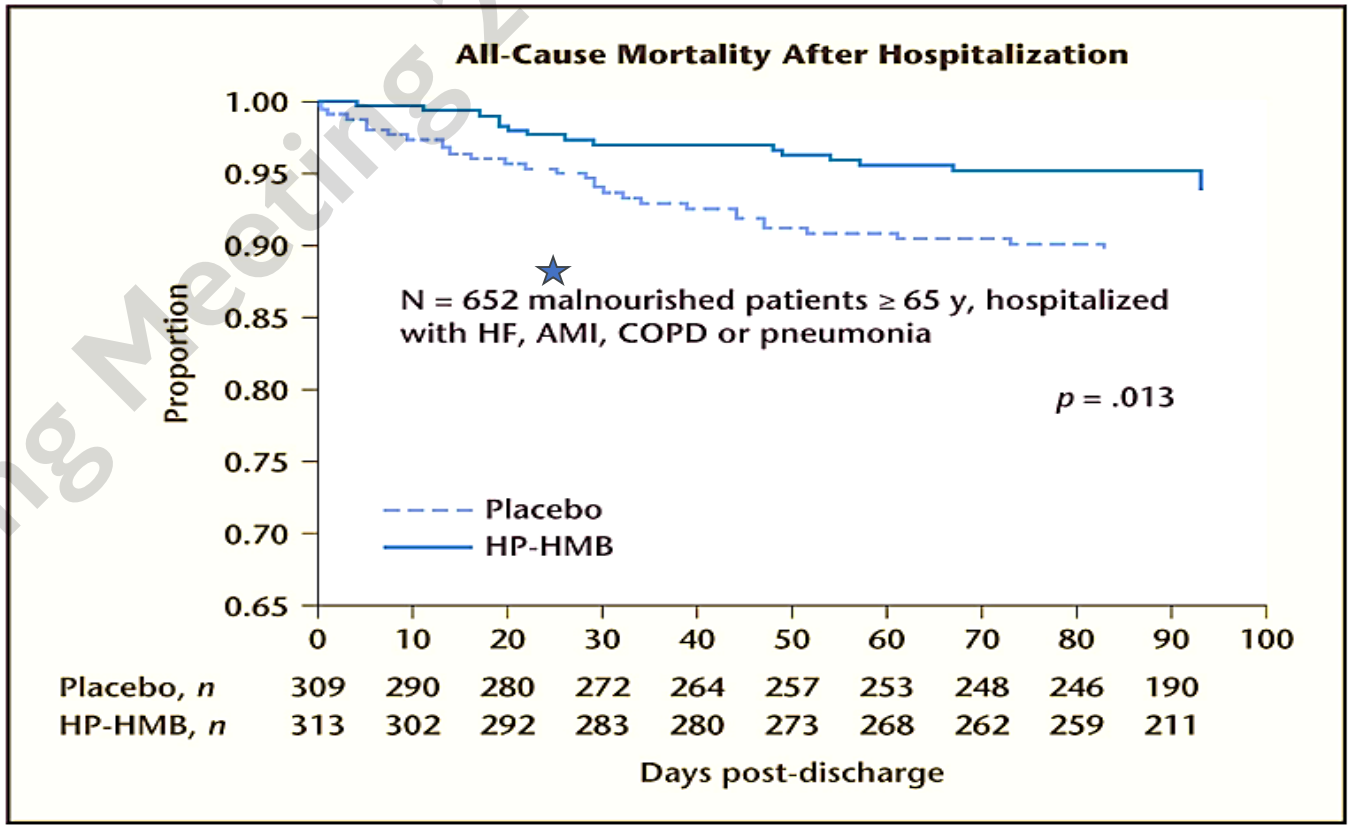
Nutritional Effect: Increased 90 day survival in hospitalized patients NOURISH Study (multi-centre, prospective, randomised, placebo controlled, parallel group, double blind)

Intervention Group received nutrient-dense drink (HP-HMB) twice daily, containing:

350 Cal, 20 g protein
11 g fat, 44 g carbohydrate
1.5 g Ca HMB, 160 IU Vitamin D

Higher odds of achieving

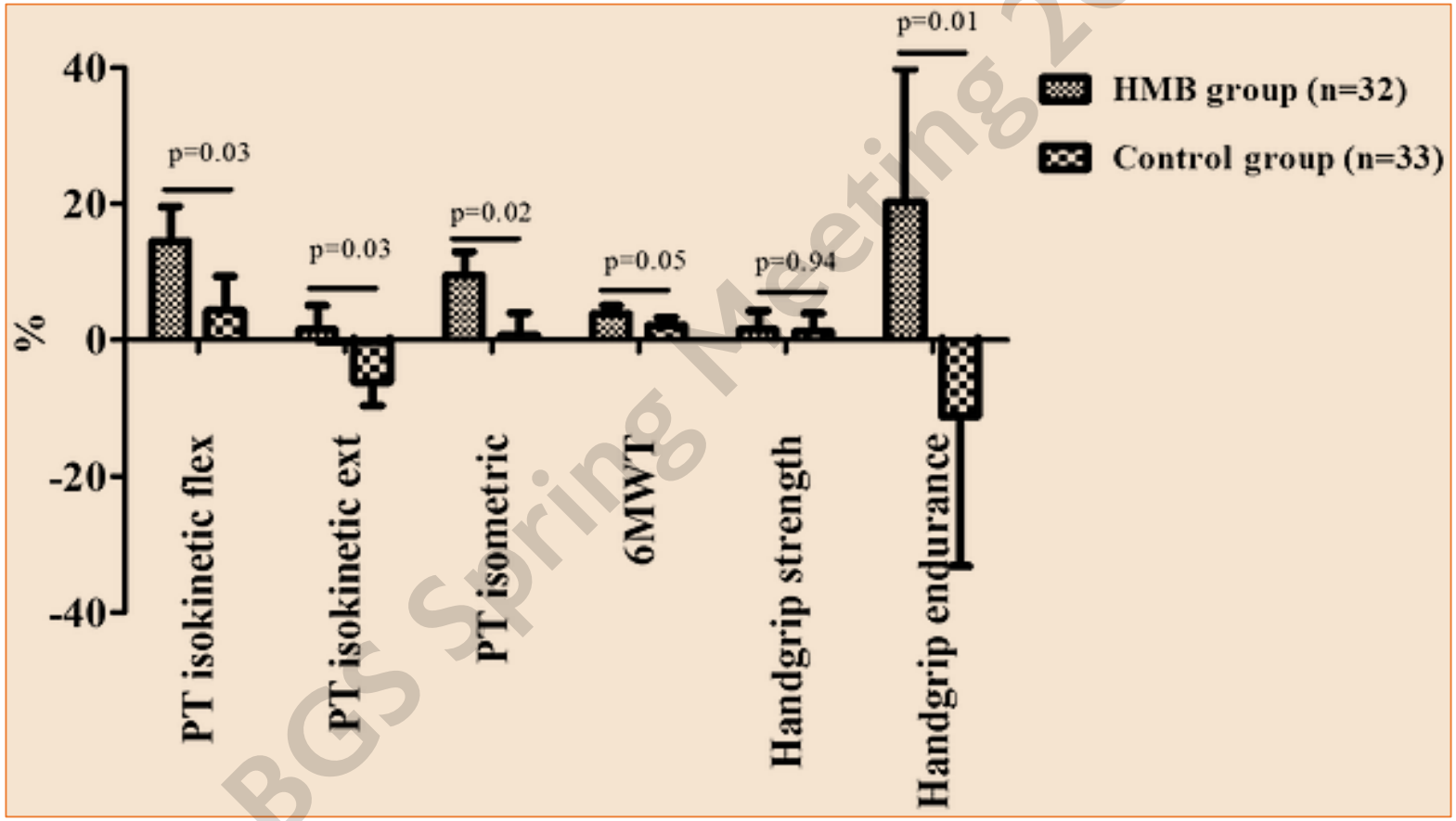
1. **Better SGA Nutritional Class** after 90 days (p=0.009)
2. **Day 30 body weight** (p=0.035)
3. **Serum 25 (OH) D concentration** at days 30 and 60 (p=0.035 and p=0.008)



★ Malnutrition assessed with Subjective Global Assessment (SGA)

Deutz NE et al; **NOURISH Study Group**. *Clin Nutr*. 2016;35:18-26.

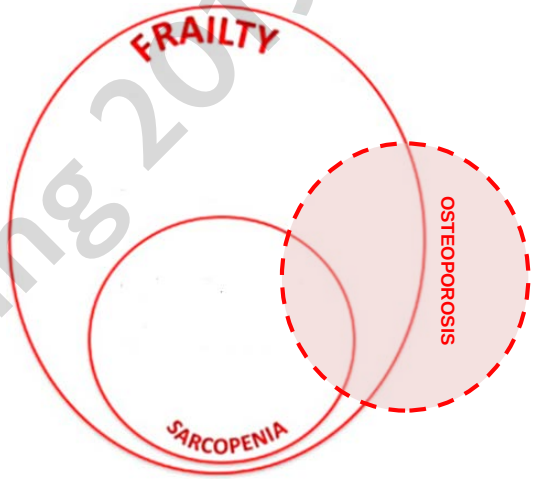
HMB supplementation for 8 weeks + mild training significantly improved muscle strength and performance parameters



Changes in secondary outcomes (as percentages) from baseline to follow-up by group.

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0141757

Conclusions



Diagnosing Sarcopenia

- Regard as Muscle Disease
- Muscle Strength is key
- New Operational Definition
- Diagnostic Algorithm

Management

- Enhancing Nutrition (especially protein)
- Resistance Exercise

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Thank you for listening

Questions

Comments