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The Joint Occurrence of Osteoporosis and Sarcopenia
(Osteosarcopenia): Definitions and Characteristics

Introduction

- Osteosarcopenia: concomitant presence of osteoporosis or osteopenia combined with sarcopenia.
- This **new geriatric syndrome** is associated with higher disability and rates of fracture and falls in older people compared with either disease alone.
- Severe Sarcopenia: concurrent presence of low muscle mass, physical performance, and strength, result in adverse outcomes including increased risk of falls.

The aim of study

- (1) determine the associations between osteosarcopenia and clinical outcomes and
- (2) examine the association of severity of bone (osteopenia or osteoporosis) and muscle (sarcopenia vs severe sarcopenia) with these clinical outcomes in community-dwelling older adults

Method

- This is a cross-sectional study of older adults (65 years old) who attended an assessment for falls and fracture risk at a clinic in Melbourne (Victoria, Australia).
- Inclusion criteria were as follows: ability to mobilize independently or with the use of gait aids,
- Mini-Mental State Examination score ($>18/30$),
- risk or history of falls and fractures (determined by general practitioner),
- willingness to attend the clinic (the participation was voluntary)

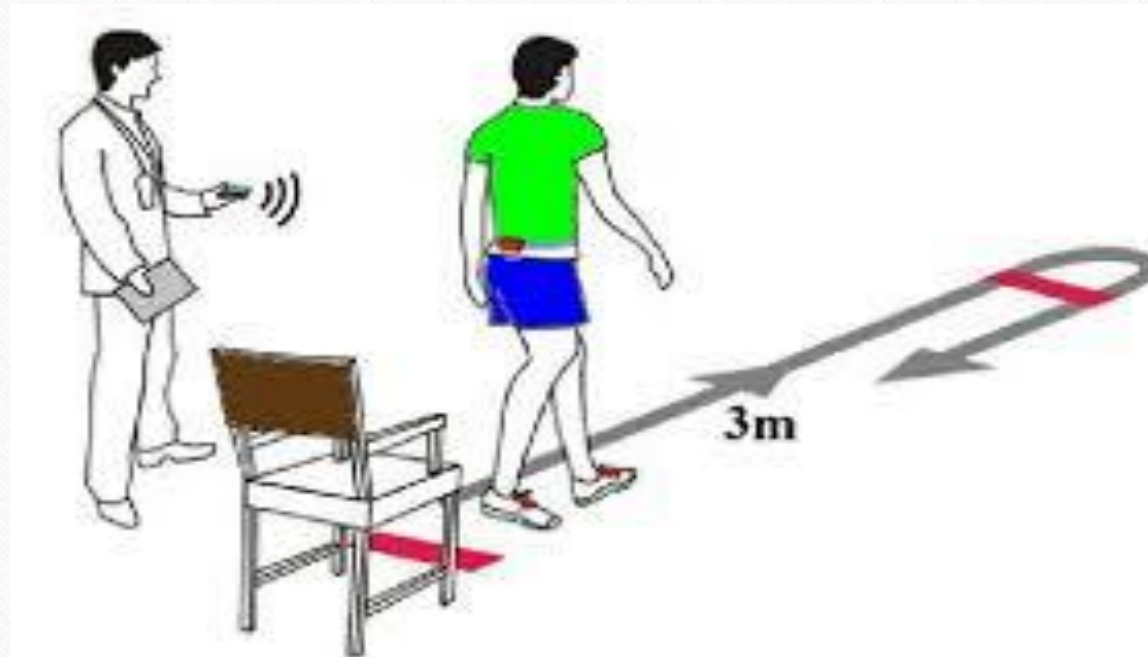
Physical performance

- Physical performance was evaluated by handgrip strength, gait speed, Timed Up and Go (TUG), 5 times sit-to-stand test, and Short Physical Performance Battery (SPPB)
- Handgrip strength
- Gait speed

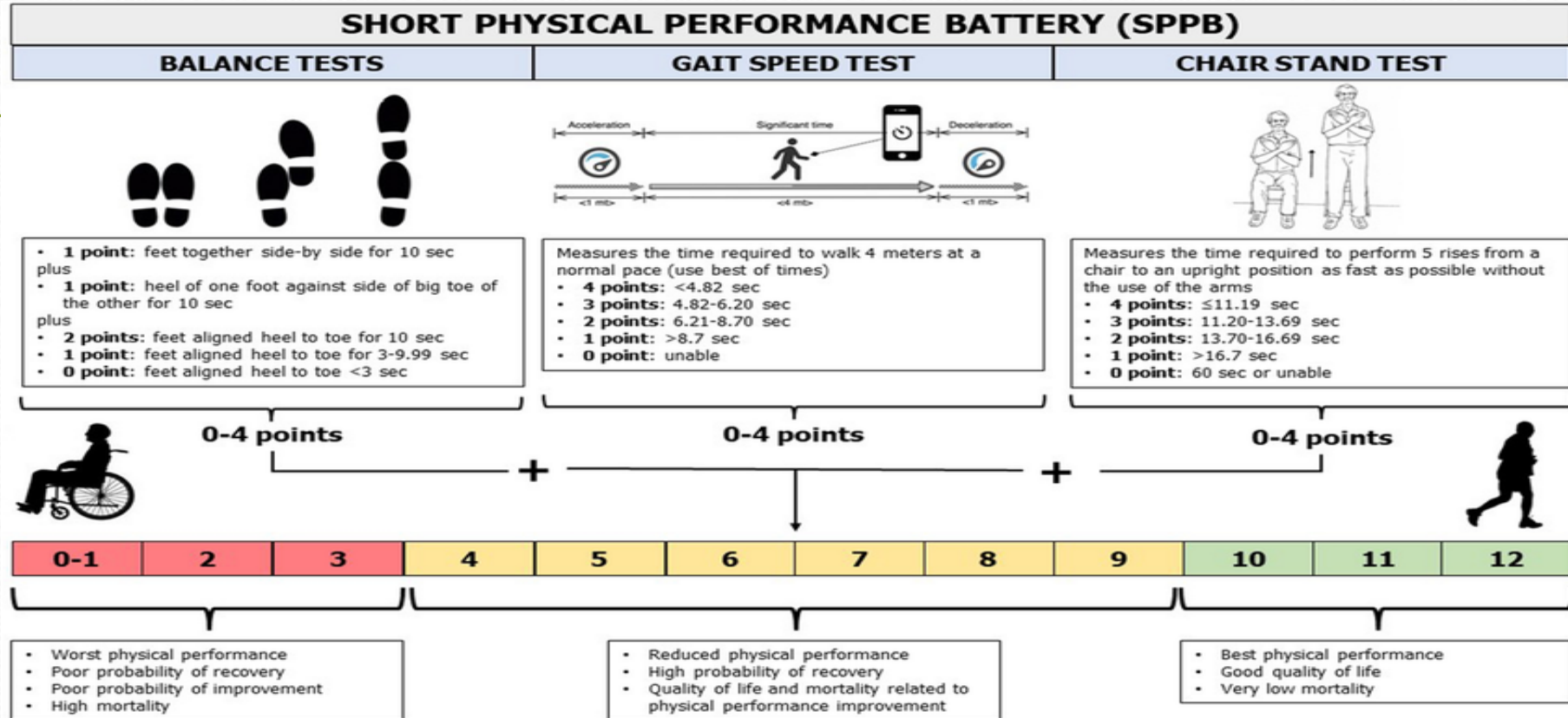
Handgrip strength



TUG



SPPB



Static balance

- assessed using the Balance Rehabilitation Unit (BRU; Medicaa, Uruguay), which provided results for limits of stability, center of pressure area, and sway velocity for 6 different conditions.



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- Self-reported falls (in the past year) and fractures (in the past 5 years), body mass index, and Charlson Age-Comorbidity Index were also assessed

Diagnosis of Osteosarcopenia

Table 1

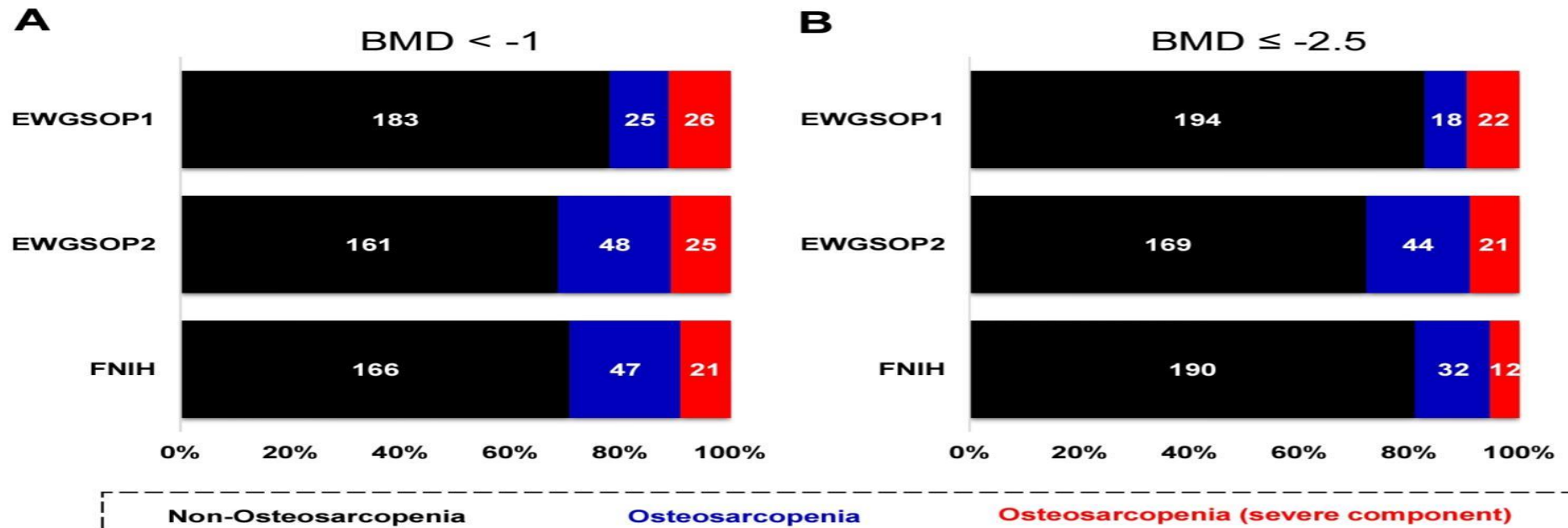
Different Cut-points Used to Identify Osteosarcopenia

Osteosarcopenia Definition	Low BMD	Low ALM		Low MS		Low PP
EWGSOP1	T score <-1	ASMI: <7.23 for men and <5.67 for women	AND	HGS: <30 kg for men and <20 kg for women	OR	GS ≤ 0.8 m/s
EWGSOP2		ASM: ≤20 kg for men and ≤15 kg for women		HGS: <27 kg for men and <16 kg for women		
FNIH		ASM/BMI: <0.789 for men and for <0.512 women		HGS: <26 kg for men and <16 kg for women		

ASM, appendicular skeletal mass; ASMI, appendicular skeletal mass index; BMI, body mass index; GS, gait speed; HGS, handgrip strength; MS, muscle strength; PP, physical performance.

Result

W. Sepúlveda-Loyola et al. / JAMDA xxx (2019) 1–6



Discussion

- osteosarcopenia greater impairments in strength, lower limb performance, and outcomes. but were also associated with higher rates of falls and fractures.
- Our findings suggest that the definition of the “osteo” component of osteosarcopenia (BMD <1 or 2.5) may not significantly affect clinical outcomes

Minimal Differences Between “Osteo” Definitions

- Despite the links between osteoporosis, fracture, and poor clinical outcomes, we did not find differences in fracture rates in osteopenic compared to osteoporotic classifications.
- Studies have reported discrepancies in reported fractures and BMD, with osteopenic older adults experiencing fracture rates similar to, and in some cases greater than, those diagnosed with osteoporosis.
- Given these findings, it appears the use of T scores lower than 1.0 to diagnose osteosarcopenic participants may be sufficient to capture those at greater risk of fractures

Osteosarcopenia With a Severe Sarcopenia Component

- overall increase in OR for all outcome measures for physical performance measures.
- Static and dynamic balance also displayed further declines in those presenting with osteosarcopenia with a severe sarcopenia component, although we failed to assess the OR for dynamic balance due to the large proportion (53% of participants) who were unable to complete the FSS test.

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- In regard to falls, compared with other groups, older persons diagnosed as osteosarcopenic with severe sarcopenia displayed a higher likelihood of falls ,but only study participants diagnosed using the EWGSOP2 definition provided significant results.
 - This study found participants diagnosed as osteosarcopenic according to the FNIH criteria presented with significantly greater fracture rate.

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- the greater distribution of overweight and obese older adults using the FNIH criteria (76%, compared to 18% and 38% using EWGSOP1 and EWGSOP2, respectively).
 - agreement with another study under the term “dysmobility syndrome” (combination of osteosarcopenia and overweight or obesity), a greater percentage of falls and fracture history has been reported.

Further Differences With Removal of Appendicular Lean Mass Measures

The reason of removal ALM

The combination of BMD , LMS, LPP

With the combination of these, we found even stronger associations with performance, balance, and falls when compared to severe sarcopenia. In particular, the OR for falls showed a significant association for all measures.

Limitation

- First, given the cross-sectional study design, we are unable to comment on causality.
- Second, as our study sample consisted primarily of women, this may skew results given that women have shown increased falls risk, however, results remained significant after adjustment for gender.
- Finally, majority of participants presented with a fall or fracture history, with 95% reporting a fall in the past year and 81% experiencing a fracture.

Conclusion

- Osteosarcopenia was strongly associated with **worse physical performance and falls and fractures** history in community-dwelling older adults.
- Osteosarcopenia with a severe sarcopenia component was associated with **increased falls** when based on EWGSOP2 and **fractures** when using the FNIH definition.