Recommendations for the standardization of the assessment of physical performance

Alfonso J. Cruz-Jentoft
Hospital Universitario Ramón y Cajal (IRYCIS)
Universidad Europea de Madrid
Madrid. Spain

An Objective Measure of Physical Function of Elderly Outpatients

The Physical Performance Test

David B. Reuben, MD, and Albert L. Siu, MD, MSPH

APPENDIX A: PHYSICAL PERFORMANCE TEST SCORING SHEET

	Physical Performance Test		
	Time	**Scoring**	**Score**
1. Write a sentence (whales live in the blue ocean)	_____sec*	≤10 sec = 4 10.5–15 sec = 3 15.5–20 sec = 2 >20 sec = 1 unable = 0	_____
2. Simulated eating	_____sec	≤10 sec = 4 10.5–15 sec = 3 15.5–20 sec = 2 >20 sec = 1 unable = 0	_____
3. Lift a book and put it on a shelf	_____ sec	≤2 sec = 4 2.5–4 sec = 3 4.5–6 sec = 2 >6 sec = 1 unable = 0	_____
4. Put on and remove a jacket	_____ sec	≤10 sec = 4 10.5–15 sec = 3 15.5–20 sec = 2 >20 sec = 1 unable = 0	_____
5. Pick up penny from floor	_____ sec	≤2 sec = 4 2.5–4 sec = 3 4.5–6 sec = 2 >6 sec = 1 unable = 0	_____
6. Turn 360 degrees	discontinuous steps continuous steps unsteady (grabs, staggers) steady	0 2 0 2	_____
7. 50-foot walk test	_____sec	≤15 sec = 4 15.5–20 sec = 3 20.5–25 sec = 2 >25 sec = 1 unable = 0	_____
8. Climb one flight of stairs†	_____sec	≤5 sec = 4 5.5–10 sec = 3 10.5–15 sec = 2 >15 sec = 1 unable = 0	_____
9. Climb stairs†	Number of flights of stairs up and down (maximum 4)		_____
TOTAL SCORE (maximum 36 for nine-item, 28 for seven-item)			_____ nine-item _____ seven-item

**For timed measurements, round to nearest 0.5 seconds.*
†Omit for seven-item scoring.

Write a sentence
Simulated eating
Lift a book, put on a shelf
Put on and remove jacket
Pick up penny from floor
Turn 360º
50-foot walk test
Climb flight of stairs
Climb stairs

J Am Geriatr Soc 1990

A Short Physical Performance Battery Assessing Lower Extremity Function: Association With Self-Reported Disability and Prediction of Mortality and Nursing Home Admission

Jack M. Guralnik,[1] Eleanor M. Simonsick,[1] Luigi Ferrucci,[2] Robert J. Glynn,[3] Lisa F. Berkman,[4] Dan G. Blazer,[5] Paul A. Scherr,[6] and Robert B. Wallace[7]

The Timed "Up & Go": A Test of Basic Functional Mobility for Frail Elderly Persons

Diane Podsiadlo, BScPT, and Sandra Richardson, MD

LOWER-EXTREMITY FUNCTION IN PERSONS OVER THE AGE OF 70 YEARS AS A PREDICTOR OF SUBSEQUENT DISABILITY

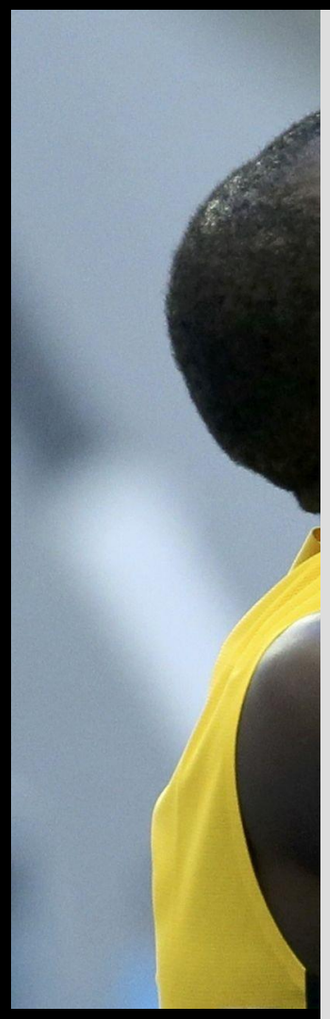
JACK M. GURALNIK, M.D., PH.D., LUIGI FERRUCCI, M.D., PH.D., ELEANOR M. SIMONSICK, PH.D., MARCEL E. SALIVE, M.D., M.P.H., AND ROBERT B. WALLACE, M.D.

J Gerontol Med Sci 1994
J Am Geriatr Soc 1991
N Engl J Med 1995

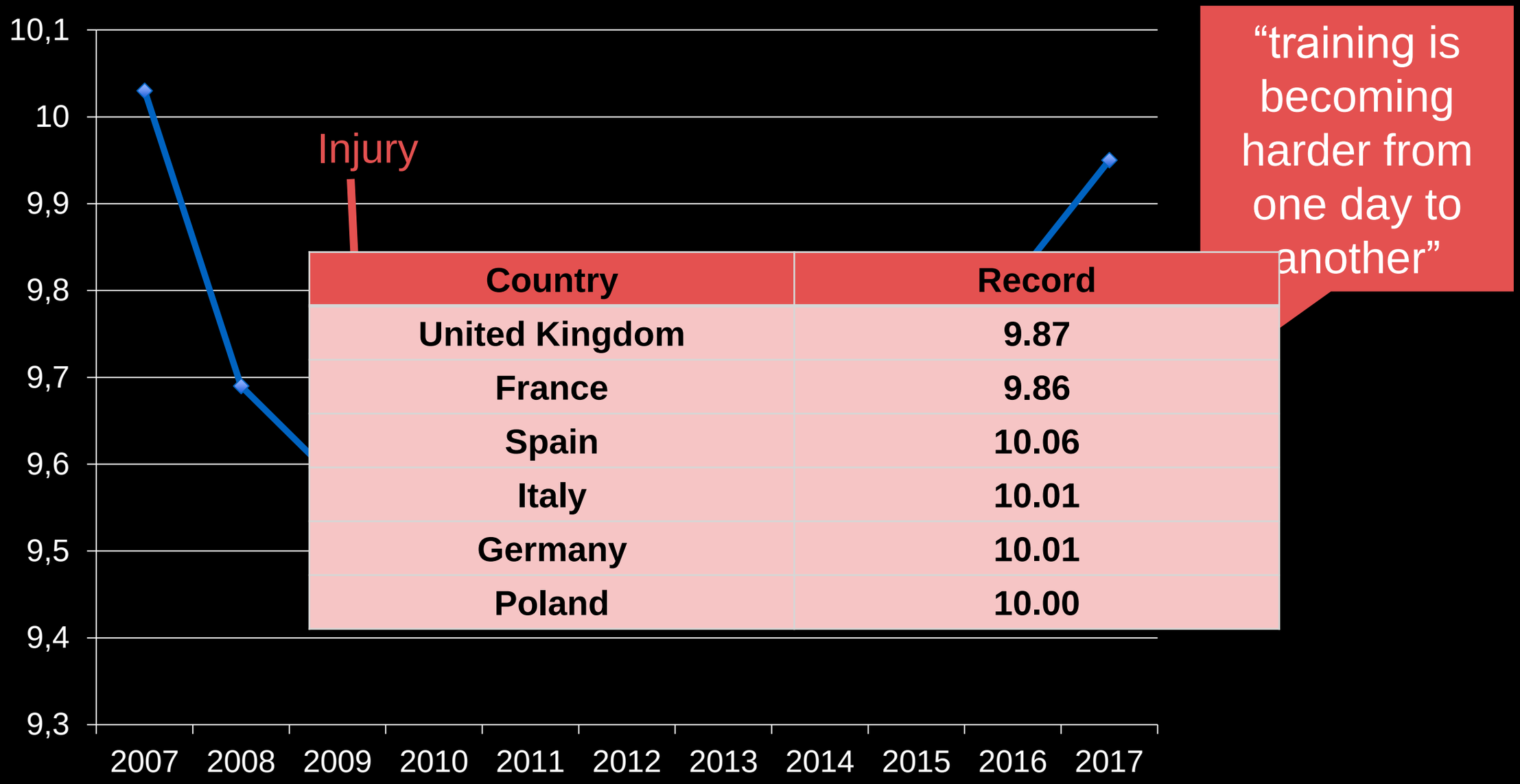
A modern view of physical performance

- No standardized definition
- Full body function
- Linked to movement, walking
- Multifactorial
- Pre-disability (final common pathway towards disability for many conditions?)
- Large range of results in any measure
- Depends on gender (race) (body frame)

The concept of physical performance



Bolt marks running 100 m



Country	Record
United Kingdom	9.87
France	9.86
Spain	10.06
Italy	10.01
Germany	10.01
Poland	10.00

"training is becoming harder from one day to another"

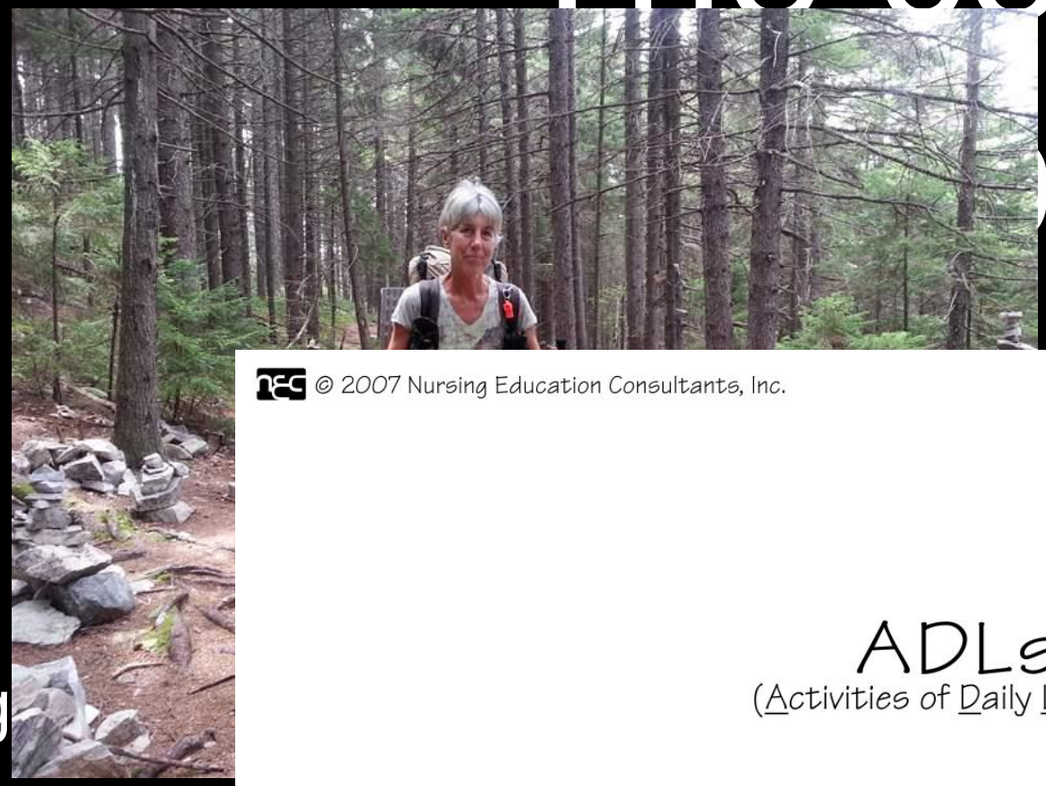
The concept of physical performance

Organ function (muscle strength, power)

Body function (physical performance)

Disability (ADLs)

The concept of performance

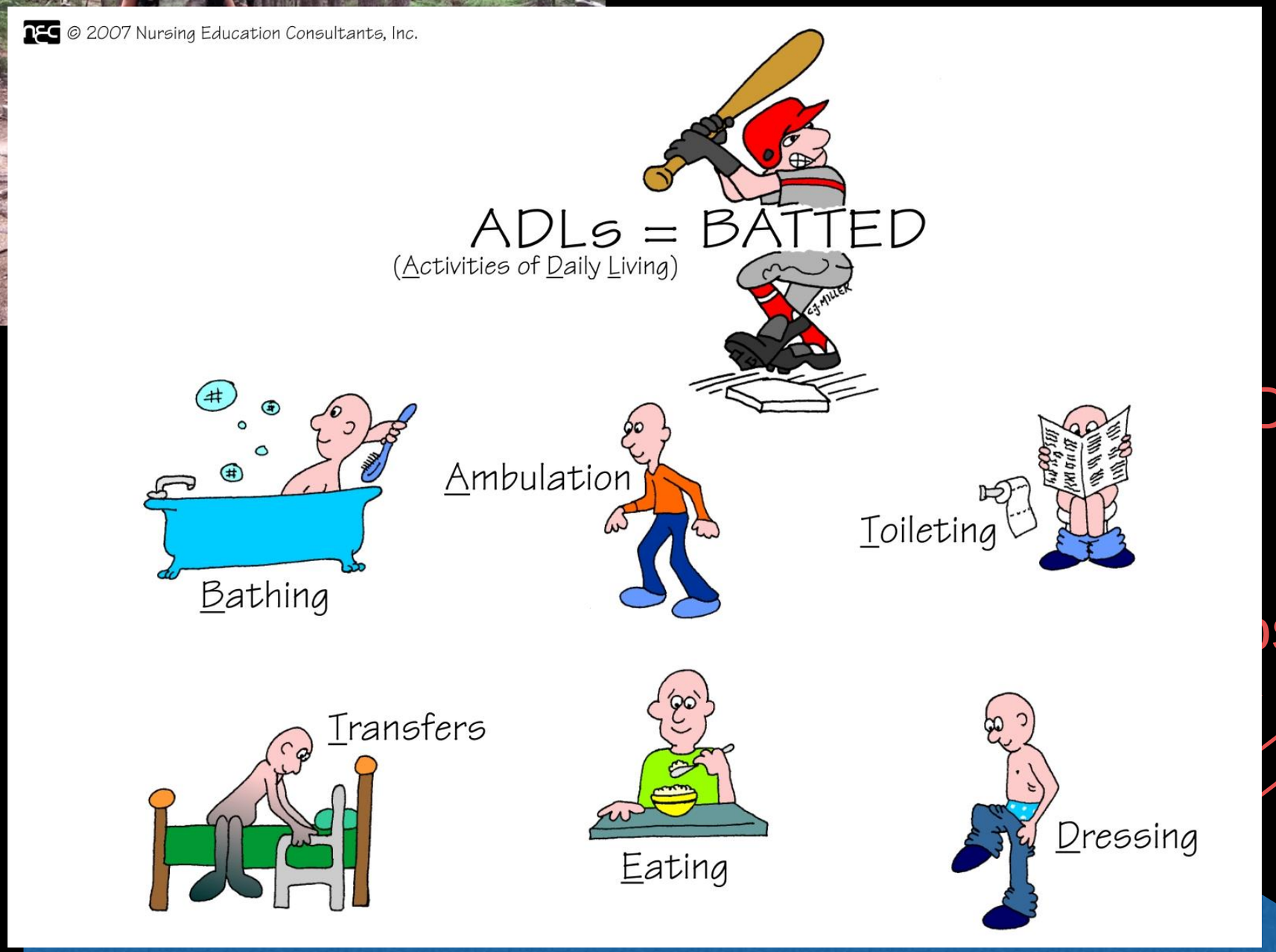


Hig

DL

oss of BADL

Low PP



Defining physical performance?

- Objectively measured capacity of an individual to perform a task, usually related to locomotion.

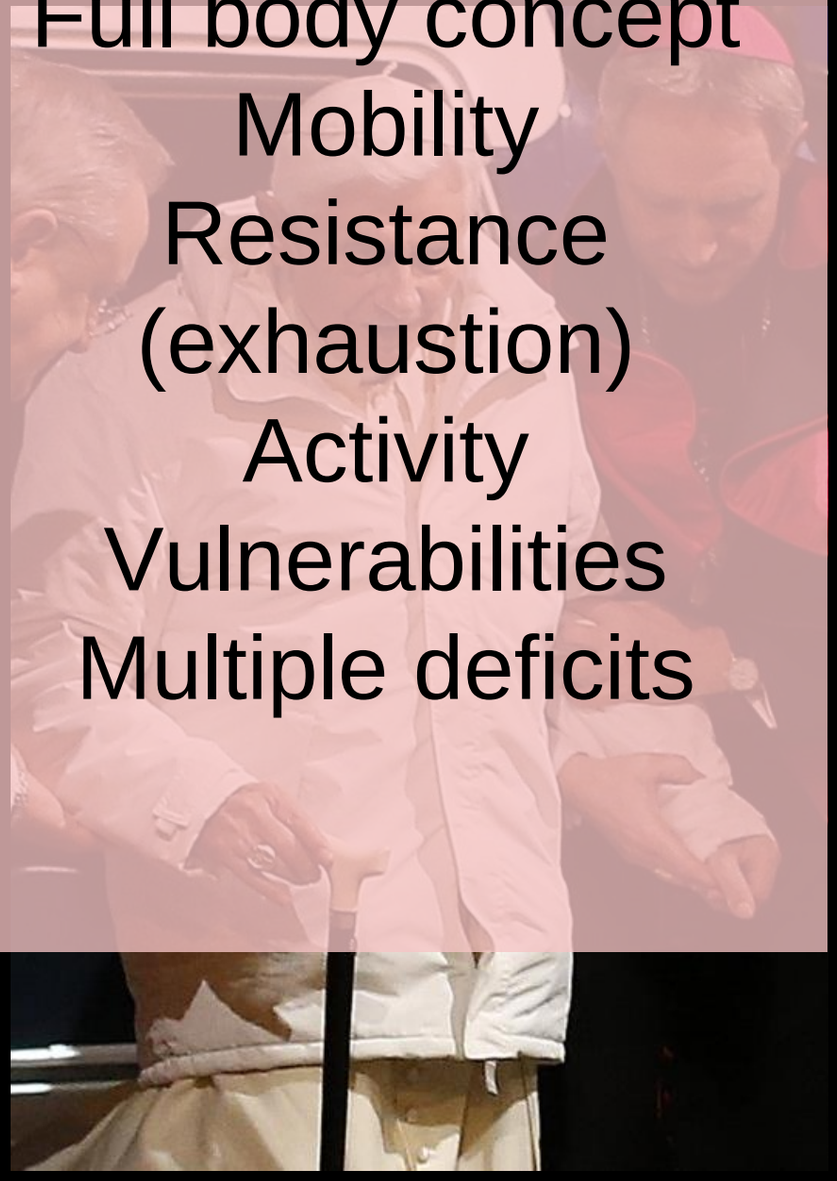
- Close to WHO functional ability = the combination of the intrinsic capacity of the individual, relevant environmental characteristics, and the interaction between the individual and these characteristics.

- Combines muscle function, neural integration, balance, endurance, cardiopulmonary function, integrity of bone/joints…

PP, frailty, sarcopenia

Physical frailty

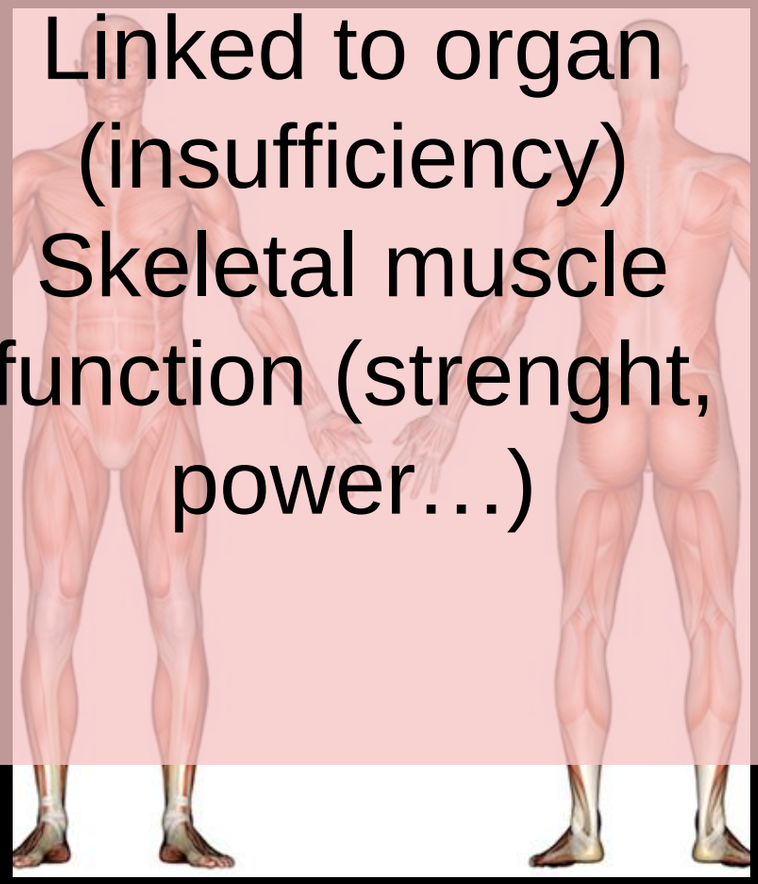
Full body concept
Mobility
Resistance (exhaustion)
Activity
Vulnerabilities
Multiple deficits



Physical performance

Sarcopenia

Linked to organ (insufficiency)
Skeletal muscle function (strenght, power…)



How to choose a measure

CRITERIA

- Applicability in clinical settings
  - equipment, cost, time, training
- Performance characteristics
  - reliability, responsiveness, reference values, sensitivity / specificity, MCSD
- Prognostic value (outcomes)
- Purpose
- Population, setting

Measuring physical performance

- SPPB
- Gait speed
- Timed Up&go
- 400 m walk
- 6 min walk
- Stair climb power test?
- Chair stand test?

Recommendations on physical performance

- Strong recommendation to clinicians to assess
- Gait speed is probably best in applicability
- Gait speed, SPPB and 400 m walk have most robust data on reliability
- Gait speed and SPPB have strongest evidence on links to outcomes

EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

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Research on frailty is currently an area in evolution, and several available instruments have been reviewed for this Reflection paper. The criteria that have been taken into account to identify the tools proposed in this document are: prognostic value of disability and mortality; validation status; feasibility of use across all therapeutic areas; ease of use; time required; ease of investigator's training; cost.

The Short Physical Performance Battery (SPPB) is identified as the instrument best fulfilling these criteria. If it is not feasible to assess baseline physical frailty by SPPB, then Gait Speed is an alternative instrument, but it should be noted that it is not as well validated and multifaceted as SPPB.
The other instruments were considered more difficult to routinely implement in a clinical trial context (see section 5).

see you in Berlin!

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Berlin, Germany - October 10/12, 2018

Thank you!

Saint Hieronymus
Caravaggio, 1605

SPPB

- 4 m track, ground marks, watch, chair
- Needs significant training
- 10 minutes
- Reference values available, linked to outcomes
- Fair sensitivity / specificity
- Good inter/intra-rater variability
- MCSD well defined & agreed
- Different elements linked with different outcomes

Gait speed (usual)

- 4 to 6 m track, ground marks, watch
- Training on when to start/stop measures
- 2-3 minutes
- Reference values available, linked to outcomes
- Probably good sensitivity/specificity
- MCSD 0.1 m/s (based on moderate evidence)
- Problem: floor effect

Timed Up&Go

- Chair with armrest, 3 m track, ground marks, watch
- Needs training (not complex)
- 2-3 minutes
- Reference values available, linked to outcomes
- Sensitivity better than specificity
- Excellent inter/intra-rater variability
- MCSD not well defined

400 m walk test

- 20 m track, ground marks/cones, watch, chair
- Training simple
- Up to 20 minutes to perform
- Reference values available, outcomes available (LIFE, SPRINTT)
- Fair sensitivity / specificity
- Good inter/intra-rater variability
- Data on MCSD available, inability to perform in 15 minutes used to define disability

6 min walk test

- Mostly used in cardiovascular and pulmonary medicine
- Little data in healthy older populations
- More dependent on resistance
- Not properly explored in Geriatrics

Stair climbing

- Free stairs
- Poorly standardized (up& down a given number of steps, maximum number of steps to symptoms…)
- Used in OA and pulmonary medicine
- No good data on outcomes in older people