NIHR | Newcastle Biomedical Research Centre

AGE Research Group

Is Sarcopenia a useful concept to consider in those who fall?

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@OlderTrialsProf

So the answer to the talk title is….

Maybe!

Sarcopenia – a recap

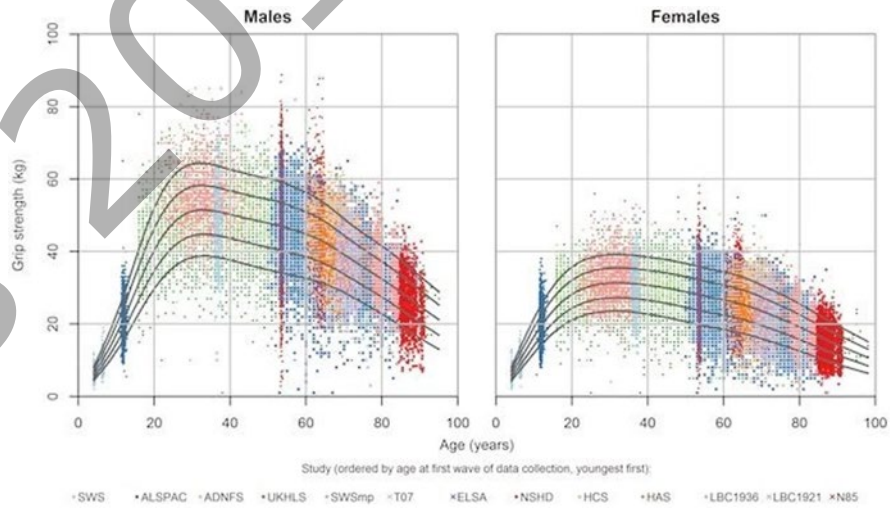
- Is the age-related loss of muscle mass and strength
- New EWGSOP guidelines (2018) have made diagnosis easier:
- Grip <27kg (M) or <16kg (F)

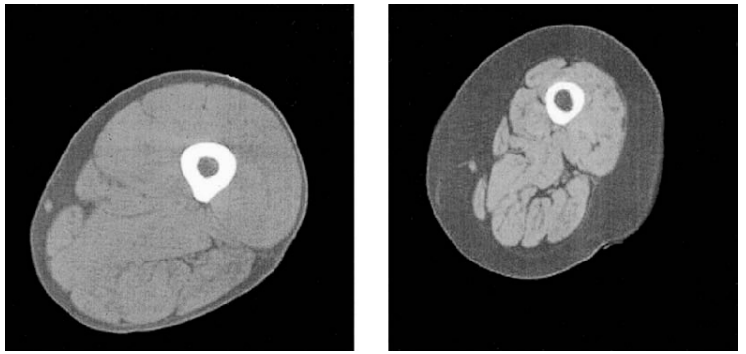
or

- Chair stand time >15s

= Probable Sarcopenia

Muscle mass measure confirms the diagnosis, but not essential to start treating the condition





Dodds R et al. PLoS One. 2014;9(12):e113637

Why might considering sarcopenia be useful?

- Many people who engage with falls services have sarcopenia
  - 10% in a UK falls service under old EWGSOP guidelines
  - Likely nearer 1 in 3 under EWGSOP2 guidelines

- Sarcopenia is associated with an increased risk of falls
  - Presarcopenia: 15% fell over 18 mths
  - Sarcopenia: 41% fell over 18 mths
  - Severe sarcopenia: 72% fell over 18 mths

Barnes KS et al. J Frailty Sarc Falls 2018;3:128-131
Gadelha AB et al. Arch Gerontol Geriatr. 2018;79:151-157

- Some groups (e.g. people with hip fracture) are highly likely to have sarcopenia
  - 37% on grip + anthropometry; 35% on EWGSOP2 grip strength (Serbia)

- And people with sarcopenia are also more likely to have osteoporosis

- Sarcopenia particularly causes loss of type II (fast-twitch) muscle fibres – key to enabling a response to loss of balance

Steihaug OM et al. PLoS One. 2017;12(9):e0184780.
Selakovic I et al. PLoS One. 2019;14(8):e0213223.

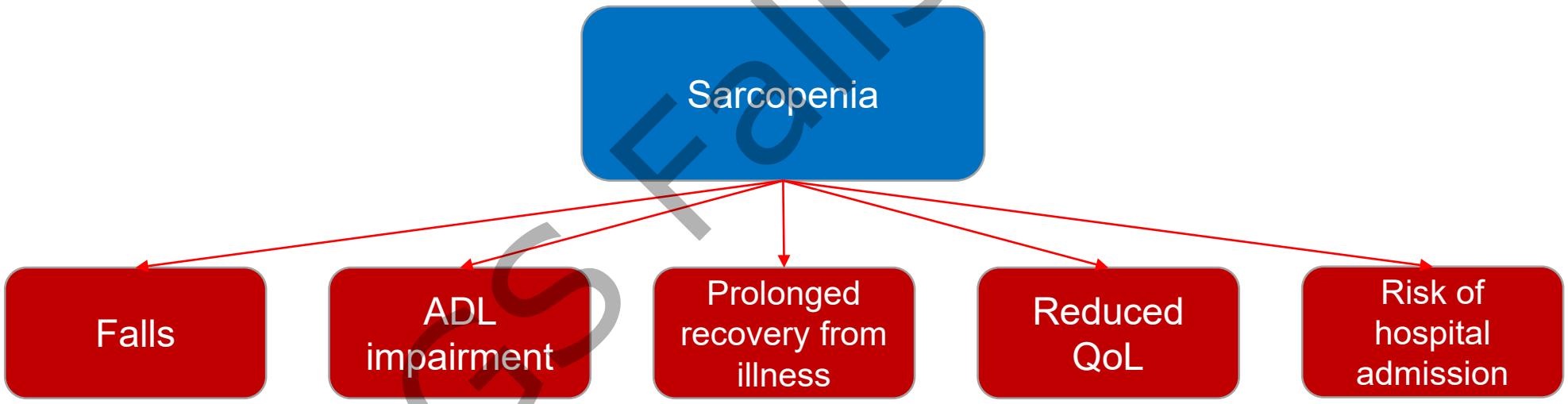
Why might it not add so much?

- Falls are not just about low muscle mass and strength
- Central and peripheral nervous system, eyes, ears, cardiovascular system
- Environment, opportunity

- And isn't ***strength*** and balance training a key intervention for falls prevention already?

What are we trying to achieve?

- Just reduce falls?
- Or improve physical function and quality of life more generally?
- Doesn't make sense to have a programme for falls, another for sarcopenia, another for frailty etc



What interventions work for sarcopenia?

- Resistance training
- Vitamin D
- Protein supplementation
  - More on all these later!

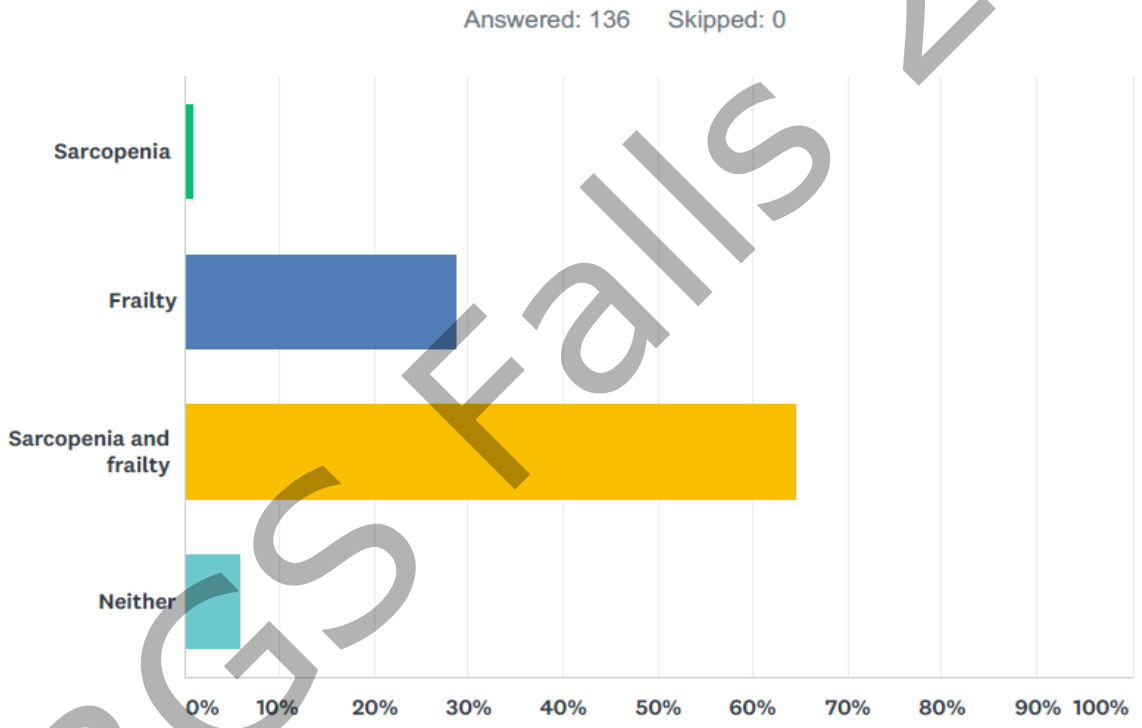
- Lots of other interventions starting to be tested at the moment

Cruz-Jentoft AJ et al. Age Ageing. 2014;43(6):748-59
Moore S et al. Physiotherapy 2019 (in press).

What do falls programmes deliver in the real world?

Survey of exercise practitioners asking about programme delivery to people with frailty or sarcopenia (n=136):

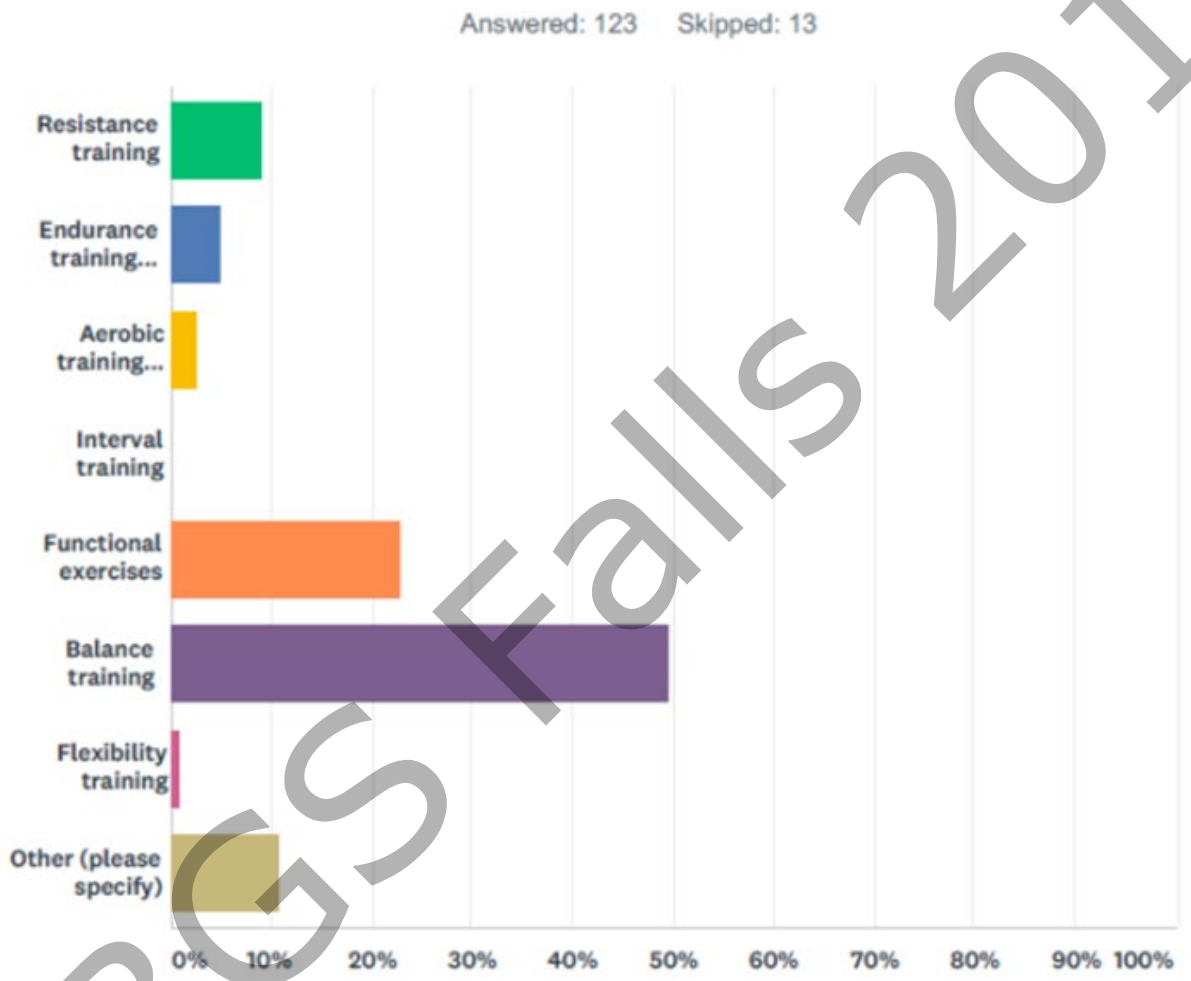
Q1 Do you run, prescribe, or deliver exercise programmes to people with:



Main purpose of programme:

Frailty	5 (4%)
Sarcopenia	1 (1%)
Frailty and sarcopenia	14 (10%)
Falls risk	81 (60%)
Physical performance	27 (20%)
All of the above	3 (2%)
Cardiac rehab	1 (1%)
Admission prevention	2 (1%)

Main focus of programmes is not sarcopenia…



And not all programmes measure relevant outcomes for sarcopenia

Outcome	% measuring this outcome
Grip strength	10%
SPPB	0%
Sit to stand	40%
TUAG	61%
None of the above	*26%*

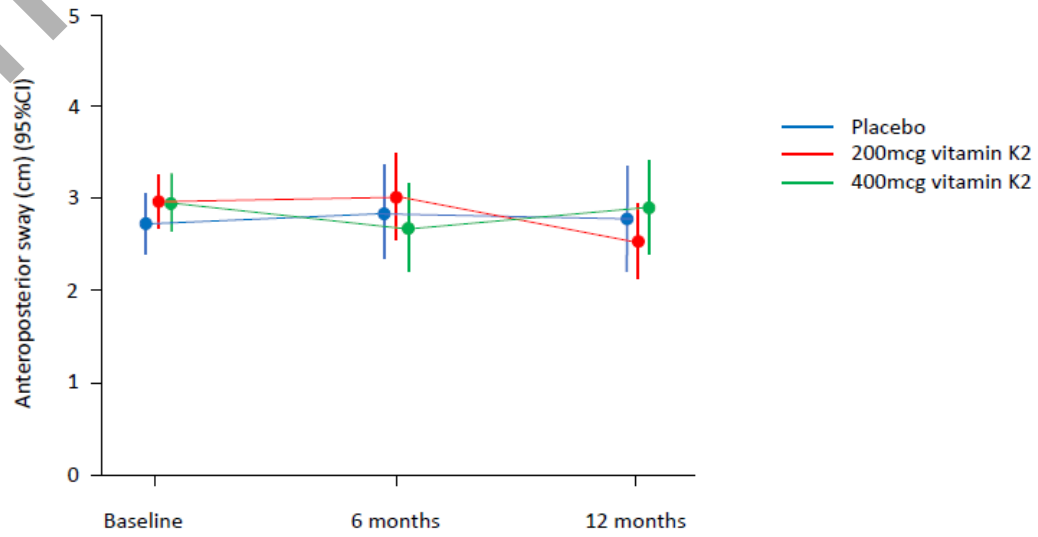
So how might a better understanding of sarcopenia help us prevent falls?

- Case finding
  - Grip strength is easy to measure; could this allow targeting of at-risk people who have not yet fallen?
- Public health
  - A focus on sarcopenia could drive early uptake of exercise to maintain strength and balance in mid-life / early older age
- New intervention types
  - Drugs for sarcopenia
  - Nutrition for sarcopenia
  - Better exercise programmes – greater efficacy

Vitamin K to improve postural sway

- KSWAY: 95 participants, median 3 falls in last year
- Mean age 75; 60% women. Mean SPPB 7.5
- 200mcg K2, 400mcg K2 or placebo daily for 1yr

- No effect on postural sway
- No effect on SPPB
- No reduction in falls

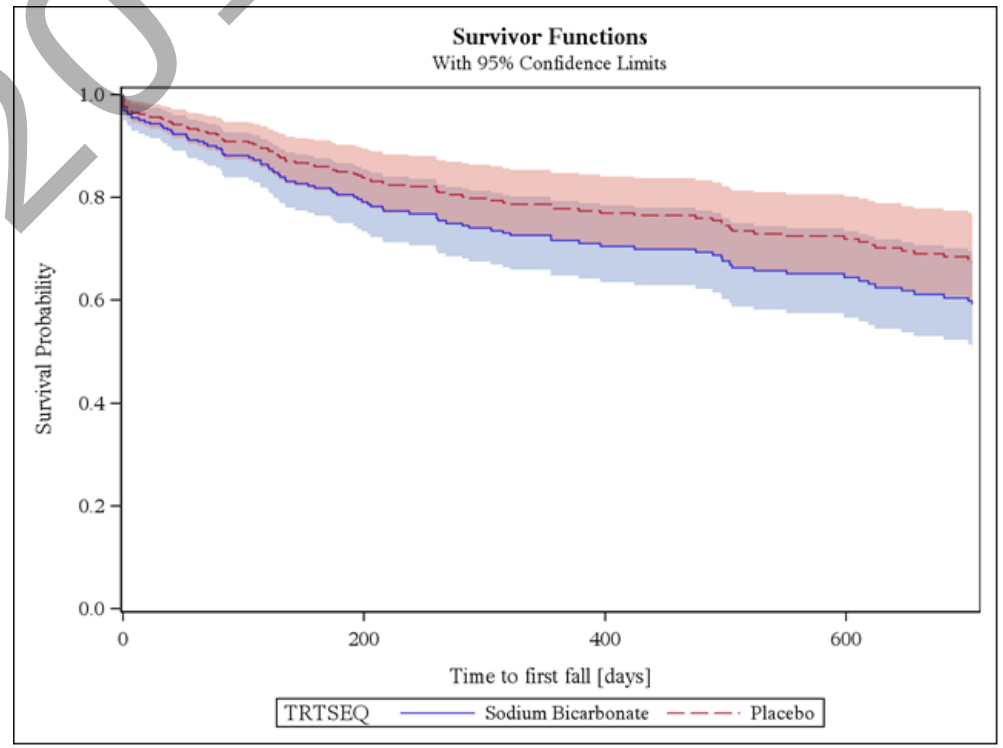


Witham MD et al. JAGS 2019; doi: 10.1111/jgs.16024.

Bicarbonate to improve physical function

- BiCARB trial
  - Older patients with CKD are at high risk of falls
  - Acidosis is common and related to impaired muscle function
  - Multicentre RCT; 300 patients aged 60 and over with CKD 4/5
  - 2 years of bicarbonate vs placebo

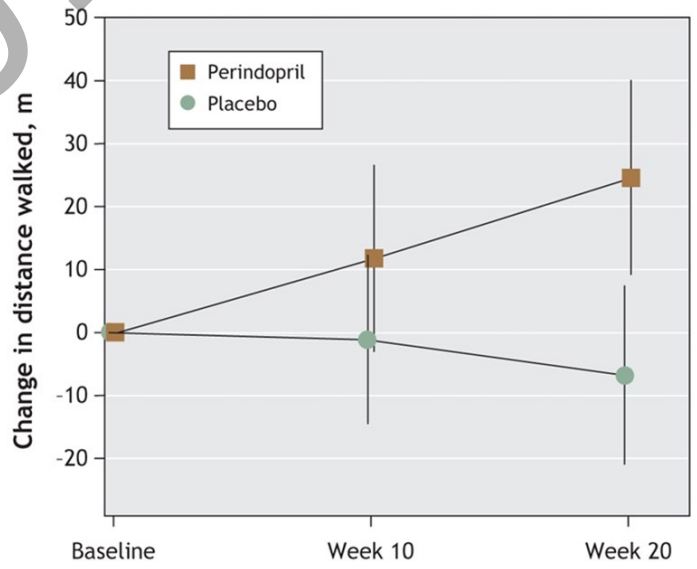
	Bicarbonate	Placebo
Number falling (%)	49 (32)	39 (26)
Number of falls	124	70
Falls rate per yr (95%CI)	0.99 (0.61-1.38)	0.72 (0.25-1.19)



Adjusted HR (95% CI): 1.43 (0.94-2.20); p=0.09

ACE inhibitors to treat sarcopenia and falls

- Perindopril:
  - ACEi associated with preserved physical function in longitudinal observational studies; lower risk of hip fracture in at least some observational studies
  - Improved six min walk in one RCT in older functionally impaired people
  - Fewer fall-related adverse events in this trial (10 vs 18)
  - Also fewer fractures on treatment in the HYVET trial (perindopril + indapamide)



	Between group change	p
6WT	+31m	0.003
TUAG	-1.3s	0.08
EQ5D	+0.087	0.04

Sumukadas D et al. CMAJ. 2007;177(8):867-74.
Peters R et al. Age Ageing. 2010;39(5):609-16.

- Perindopril did not improve postural sway or reduce falls in older people with a history of falls (RCT; 80 people; perindopril vs placebo for 15 wks)
- BUT – these people had better physical performance

- LACE trial is testing perindopril (and leucine) as treatments for sarcopenia
- Falls will be reported as a secondary outcome though not powered for this…

Sumukadas D et al. Age Ageing 2018;47(1):75-81.

Myostatin inhibitors

- Myostatin inhibitor trial
  - Given to people with at least 1 fall, aged >75, low muscle strength
  - Improved muscle mass and some (but not all) measures of physical performance
  - Stair climb and chair rise did improve (power measures)
  - Recommended a trial to prevent falls but unclear if this was progressed

- Myostatin inhibitors improve muscle mass in some trials, but less commonly improve muscle *strength*…

Becker C et al. Lancet Diabetes Endocrinol 2015;3:948-57

How might making a sarcopenia diagnosis help in practice?

- Measuring sarcopenia might focus attention on the need for resistance training
- Interesting comparisons with delirium here – *the word leads to the deed*

- Exercise programmes cannot just address falls – important as these are!
- Measuring muscle strength as an outcome might lead to improvements in the delivery of *effective doses* of exercise for sarcopenia

Concluding thoughts

- If all you are interested in doing is preventing falls, measuring sarcopenia may not add much
- Muscle is part of the problem though, and a better understanding of sarcopenia is likely to suggest new avenues for falls prevention
- If you are interested in improving overall health and function, sarcopenia is worth paying attention to
- Measurement is a start
- Sufficient resistance component is likely to be essential
- More work required on the optimum programme (dose, modality, frequency, duration) – watch this space

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