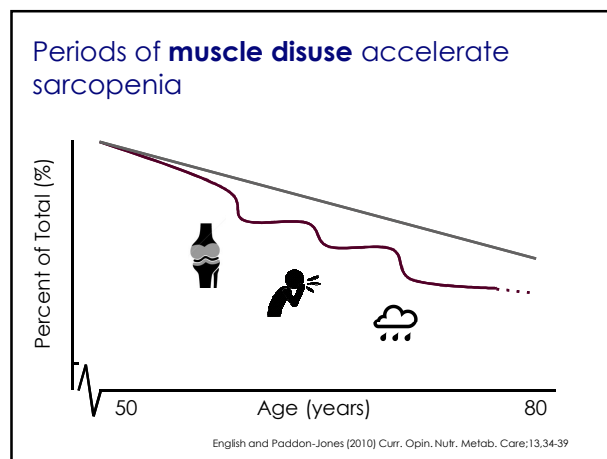
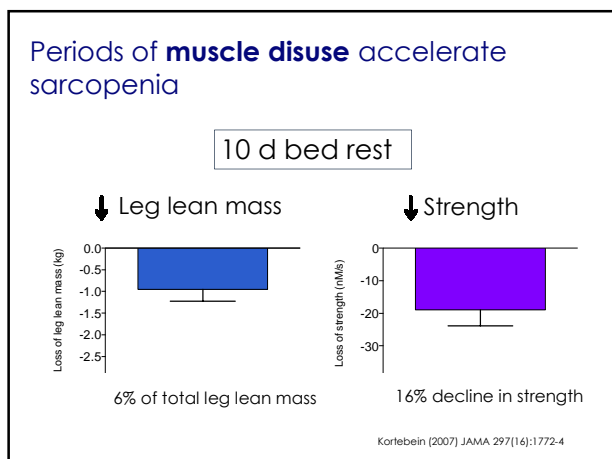
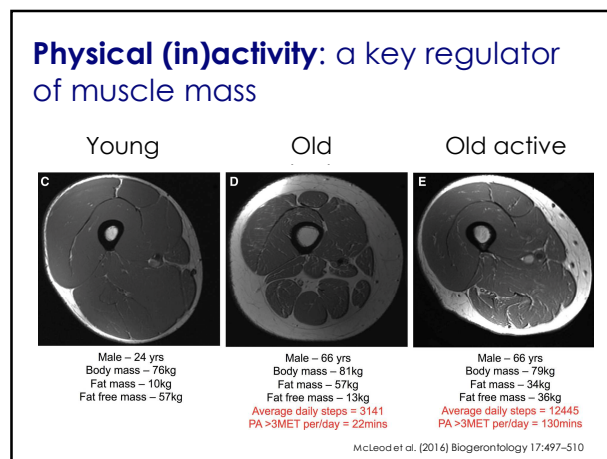
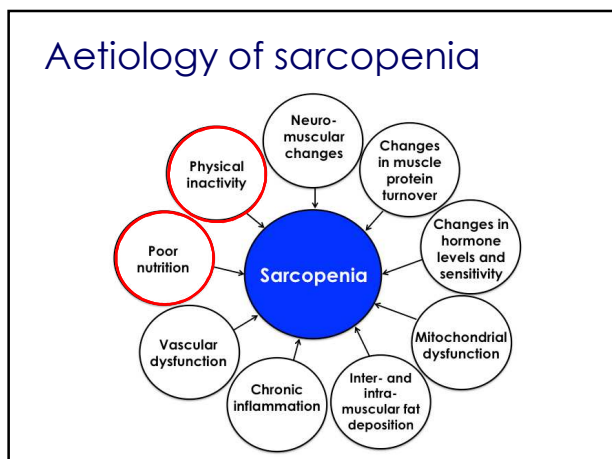
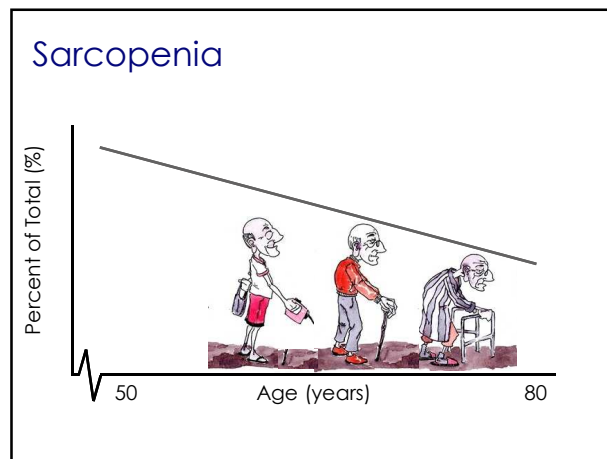



 UCD Institute of Food & Health
 Smart Science – Good Food

Combating sarcopenia – role of nutrition and physical activity

Caoileann Murphy, RD, MSc, PhD
 University College Dublin
www.ucd.ie/foodandhealth



Resistance exercise improves muscle mass, strength and physical performance in older adults

Med Sci Sports Exerc. 2011 Feb;43(2):249-58. doi: 10.1249/MSS.0b013e3181eb6265.

Influence of resistance exercise on lean body mass in aging adults: a meta-analysis.
Peterson MD¹, Sen A, Gordon PM.

Ageing Res Rev. 2010 Jul;9(3):226-37. doi: 10.1016/j.arr.2010.03.004. Epub 2010 Apr 10.

Resistance exercise for muscular strength in older adults: a meta-analysis.
Peterson MD¹, Rhea MR, Sen A, Gordon PM.

Cochrane Database Syst Rev. 2009 Jul 8;(3):CD002759. doi: 10.1002/14651858.CD002759.pub2.

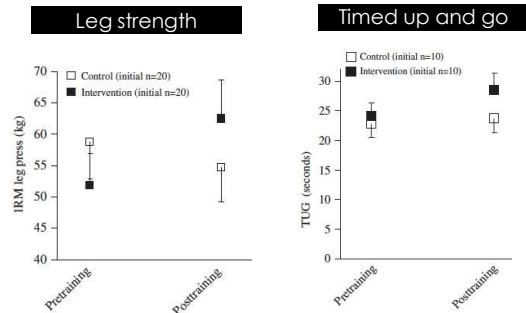
Progressive resistance strength training for improving physical function in older adults.
Liu CJ¹, Latham NK.

Disabil Rehabil. 2011;33(2):87-97. doi: 10.3109/09638288.2010.487145. Epub 2010 May 17.

Can progressive resistance strength training reduce physical disability in older adults? A meta-analysis study.

Liu CJ¹, Latham N.

Resistance exercise works, even in the oldest old



Serra-Rexach et al. (2011) J Am Geriatr Soc. 59:594-602

Resistance exercise to **treat** sarcopenia?

J Nutr Health Aging. 2018;22(10):1148-1161

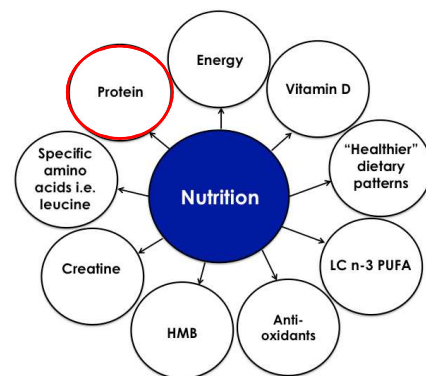
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INTERNATIONAL CLINICAL PRACTICE GUIDELINES FOR SARCOPENIA (ICFSR): SCREENING, DIAGNOSIS AND MANAGEMENT

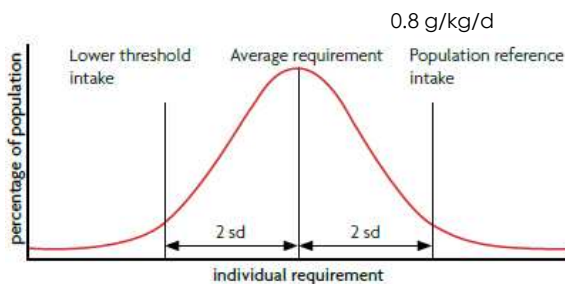
Recommendation 3: Physical Activity (Resistance-Based Training)

In patients with sarcopenia, prescription of resistance-based training can be effective to improve muscle strength, skeletal muscle mass and physical function. (Grade: strong recommendation, moderate certainty of evidence)

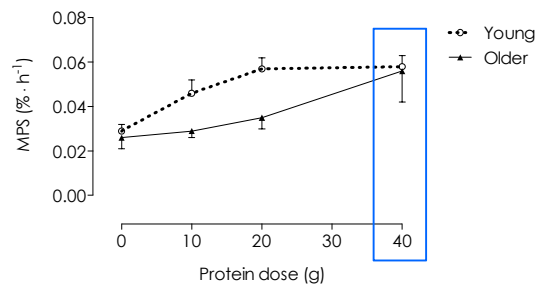
Nutrition and sarcopenia



Dietary protein: Recommended Daily Allowance (RDA)

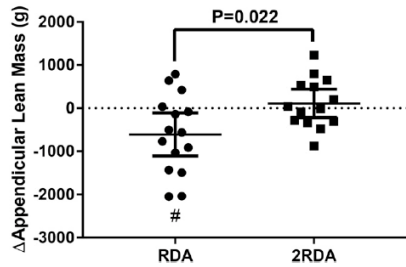


Dietary protein intake and MPS dose response



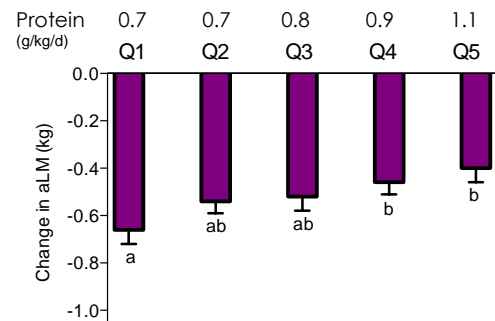
Adapted from Moore et al. (2015) J Gerontol A Biol Sci Med Sci. 70(1):57-62

RCT: 10-wk consuming RDA (0.8 g protein/kg/d) resulted in appendicular lean mass loss in older adults



Mitchell et al. (2017) Am J Clin Nutr 106:1375-83

Loss of lean mass attenuated in older adults consuming higher protein intakes



Houston et al. (2008) Am J Clin Nutr 87:150-5



Special Article

Evidence-Based Recommendations for Optimal Dietary Protein Intake in Older People: A Position Paper From the PROT-AGE Study Group

Jürgen Bauer MD^{1,*}, Gianni Biolo MD, PhD², Tommy Cederholm MD, PhD³, Matteo Cesari MD, PhD⁴, Alfonso J. Cruz-Jentoft MD⁵, John E. Morley MB, BCh⁶, Stuart Phillips PhD⁷, Cornel Sieber MD, PhD⁸, Peter Stehle MD, PhD⁹, Daniel Teta MD, PhD¹, Renuka Viswanathan MBBS, PhD¹⁰, Elena Volpi MD, PhD¹

1.0 – 1.2 g protein/kg/d in healthy older adults
1.2 – 1.5 g protein/kg/d acute or chronic illness
1.5 – 2.0 protein g/kg/d severe illness/injury/malnutrition

ESPEN endorsed recommendation

Protein intake and exercise for optimal muscle function with aging: Recommendations from the ESPEN Expert Group



Nicolaas E.P. Deutz^{11,*}, Jürgen M. Bauer¹², Rocco Barazzoni¹³, Gianni Biolo¹⁴, Yves Boirie¹⁵, Anja Bosy-Westphal¹⁶, Tommy Cederholm¹⁷, Alfonso Cruz-Jentoft¹⁸, Zeljko Krznaric¹⁹, K. Sreekumaran Nair²⁰, Pierre Singer²¹, Daniel Teta²², Kevin Tipton²³, Philip C. Calder²⁴

Dietary protein in **treatment** of sarcopenia?

J Nutr Health Aging. 2018;22(10):1148-1161

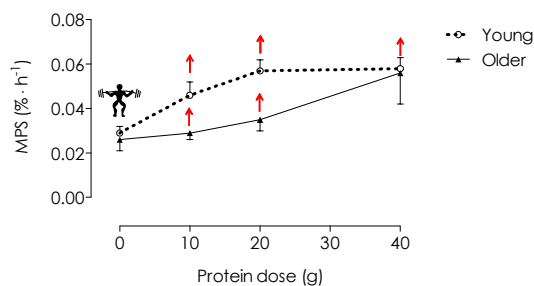
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INTERNATIONAL CLINICAL PRACTICE GUIDELINES FOR SARCOPENIA (ICFSR): SCREENING, DIAGNOSIS AND MANAGEMENT

Recommendation 4: Protein Supplementation

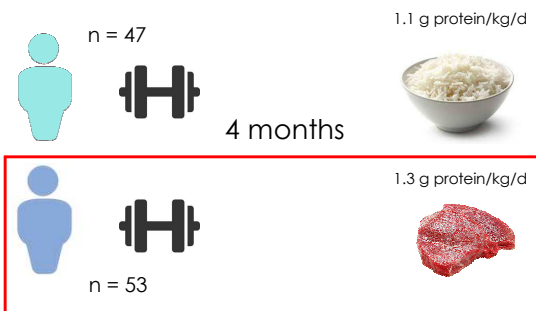
We recommend that clinicians consider protein supplementation/a protein-rich diet for older adults with sarcopenia (Grade: conditional recommendation; low certainty of evidence)

Resistance exercise **sensitises** muscle to protein intake



Adapted from Moore et al. (2015) J Gerontol A Biol Sci Med Sci. 70(1):57-62

Higher protein intake during resistance training in older adults



Daly et al. (2014) Am J Clin Nutr 99:899-910

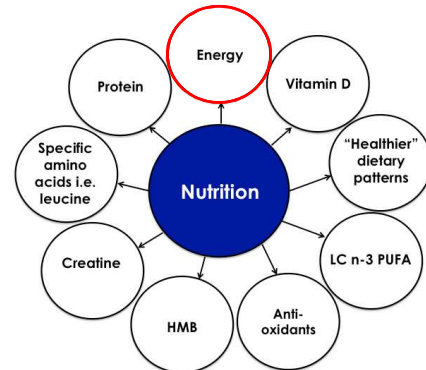
Combined dietary protein and resistance training in **treatment** of sarcopenia

J Nutr Health Aging, 2018;22(10):1148-1161
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INTERNATIONAL CLINICAL PRACTICE GUIDELINES FOR SARCOPENIA (ICFSR): SCREENING, DIAGNOSIS AND MANAGEMENT

Nutritional (protein) intervention should be combined with a physical activity intervention (Grade: conditional, low certainty of evidence)

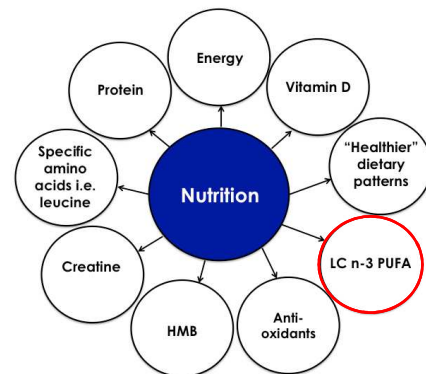
Nutrition and sarcopenia



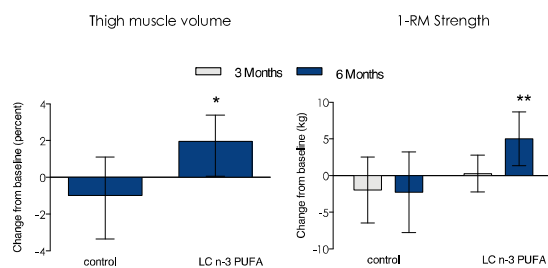
Energy intake and sarcopenia



Nutrition and sarcopenia

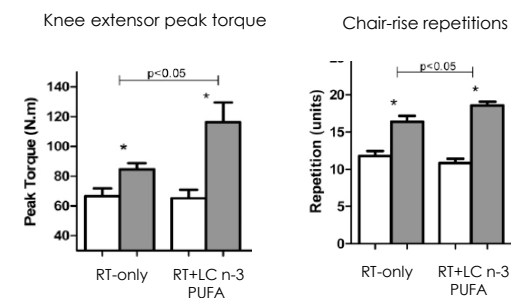


RCT: **LC n-3 PUFA** improves muscle mass, strength and function in sedentary older adults



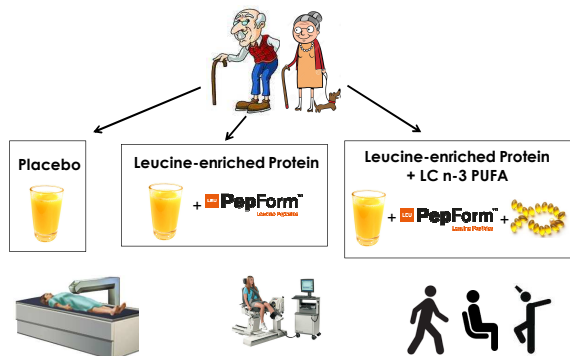
Smith et al. (2015) Am J Clin Nutr 102:115-22.

Randomised trial: **LC n-3 PUFA** improves RT-induced gains in strength and function in older women

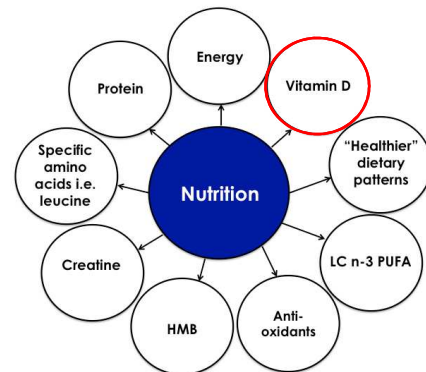


Rodacki et al. (2012) Am J Clin Nutr 95:428-36.

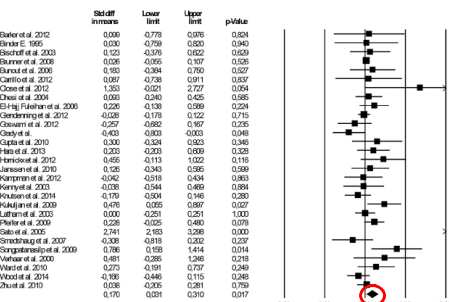
NUTRIMAL nutrition intervention study



Nutrition and sarcopenia



Meta-analysis: vitamin D supplementation improves strength



Beaudart et al. (2014) J Clin Endocrinol Metab 99(11):4336-4345

Vitamin D to treat sarcopenia?

J Nutr Health Aging. 2018;22(10):1148-1161

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INTERNATIONAL CLINICAL PRACTICE GUIDELINES FOR SARCOPENIA (ICFSR): SCREENING, DIAGNOSIS AND MANAGEMENT

Recommendation 5: Vitamin D

*Insufficient evidence exists to determine whether a Vitamin D supplementation regime by itself is effective in older adults with sarcopenia (Grade: **no recommendation; very low certainty of evidence**)*

Take home points

- Resistance training is the most effective strategy to prevent and treat sarcopenia
 - Strong recommendation ICFSR
- Periods of inactivity may contribute to the development and progression of sarcopenia
 - Physical activity levels decline dramatically during hospitalisation
- Aim for energy balance (unless weight loss intentional)



Take home points

- Adequate protein intake essential for prevention and treatment of sarcopenia
 - Combine with physical activity
- Emerging evidence for role of LC n-3 PUFA and adequate vitamin D
- The quality of supporting evidence for the management of sarcopenia was low
 - Research needed!



