Get a Grip: The Exploration of Emotional, Cognitive and Physical Strength as Markers of Health

April 26th 2019

Stuart Phillips, PhD
Jim White, RD, ACSM EX-P

BEEF
Funded by
the Beef Checkoff.

STUART PHILLIPS, PHD, FACN, FACSM

- Tier 1 Canada Research Chair in Skeletal Muscle Health.
- Director of Physical Activity Centre of Excellence (PACE) and McMaster Centre for Nutrition, Exercise, and Health Research.
- Professor in kinesiology and adjunct professor in the School of Medicine at McMaster University.
- Research focused on the impact of nutrition and exercise on human skeletal muscle protein turnover, and diet- and exercise-induced changes in body composition.

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JIM WHITE, RD, ACSM EX-P

- Nationally recognized registered dietitian nutritionist, past spokesperson for the Academy of Nutrition and Dietetics and an American College of Sports Medicine Exercise Physiologist

- Owner of three Jim White Fitness and Nutrition Studios, three medical nutrition therapy practices and a workplace wellness corporation

- Quoted in thousands of publications and featured in hundreds of television and radio segments nationwide with experience conducting seminars, interviews and appearances all around the country

- Enjoys giving back through his very own non-profit, the LIFT Fitness Foundation, which focuses on creating a foundation of wellness to empower individuals in need.

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- Former consultant: Nestec AS – Nestlé SA
- Former consultant: Ajinomoto

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Objectives

- Discuss established and emerging markers of health and how strength in all its forms across the lifecycle can support independence for an aging population.

- Understand evidence-based research supporting the role of nutrition and physical activity for improved strength outcomes in younger and middle-aged adults as they age.

- Translate the research into practical application - applying physical activity and nutrition guidelines such as strength training and inclusion of high-quality protein foods in a healthy dietary pattern – to support physical fortitude and mental strength.

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A beginner's guide to aging well: living in a kingdom of wellness

Stuart M. Phillips, Ph.D., FCAHS, FACN, FACSM

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Over the past 100 years we have added an additional 30 years to life expectancy

WHAT WILL YOUR LAST 10 YEARS LOOK LIKE?

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Active aging

Active ageing is the process of ***optimizing opportunities for health, participation and security in order to enhance quality of life as people age.*** It applies to both individuals and population groups.

The word "active" refers to ***continuing participation in social, economic, cultural, spiritual and civic affairs, not just the ability to be physically active or to participate in the labour force.*** Older people who retire from work, ill or live with disabilities can remain active contributors to their families, peers, communities and nations. ***Active ageng aims to extend healthy life expectancy and quality of life for all people as they age.***

"Health" refers to physical, mental and social well being as expressed in the WHO definition of health. ***Maintaining autonomy and independence for the older people is a key goal in the policy framework for active ageing.***

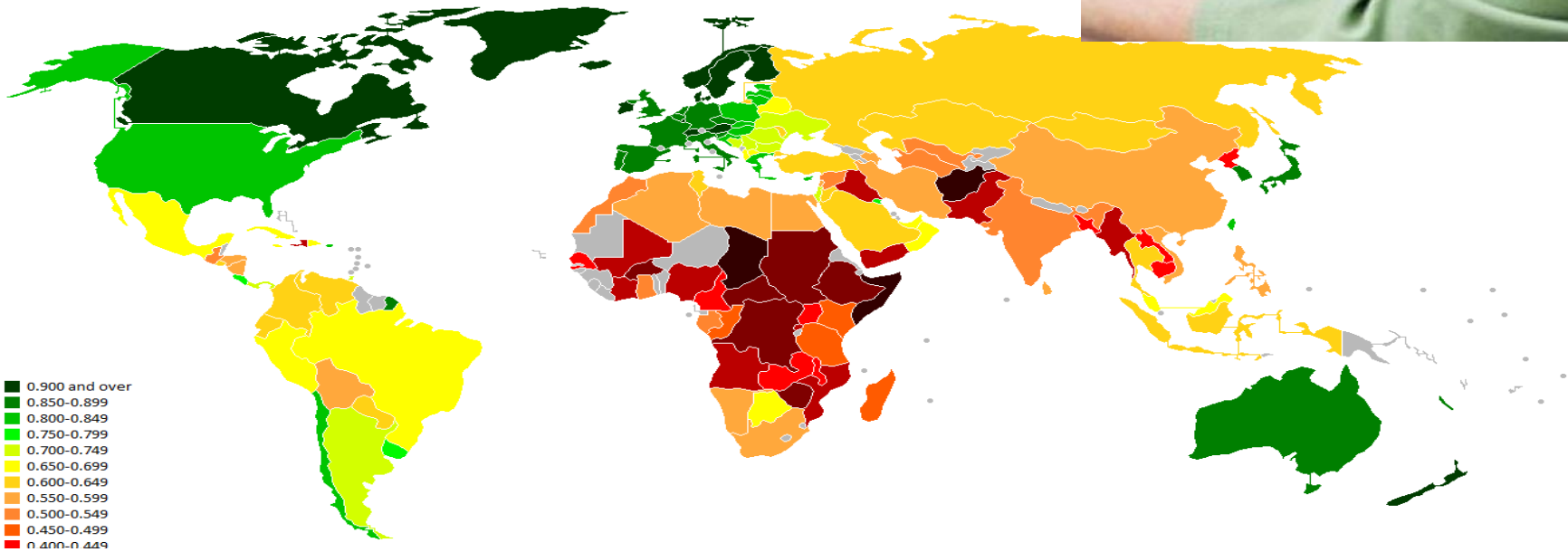
http://www.who.int/ageing/active_ageing/en/index.html

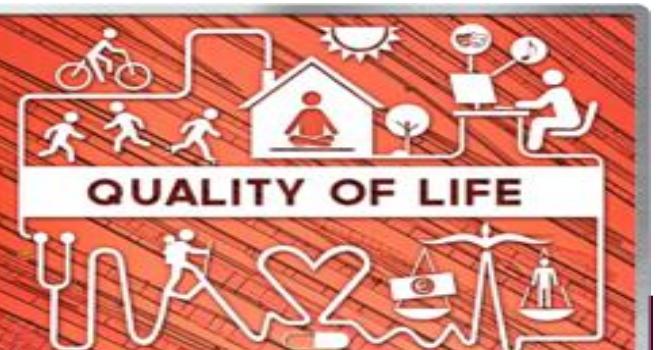
A nice definition, but what does it mean?

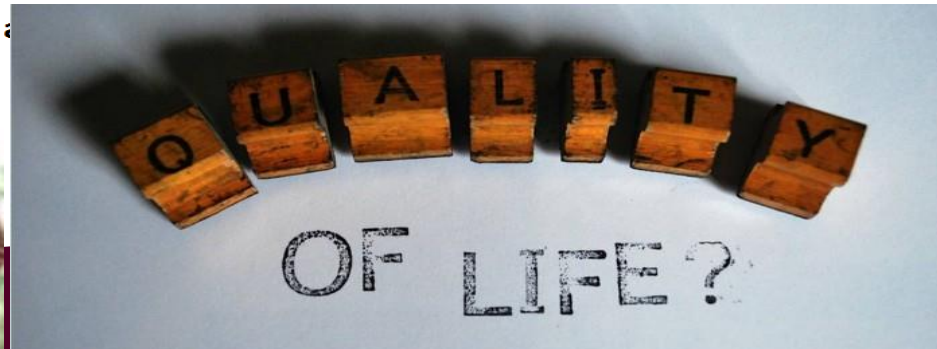
- Health
- Quality of life
- Healthy life expectancy
- Participation
- Autonomy
- Independence

RATE OF MORTALITY… 100%

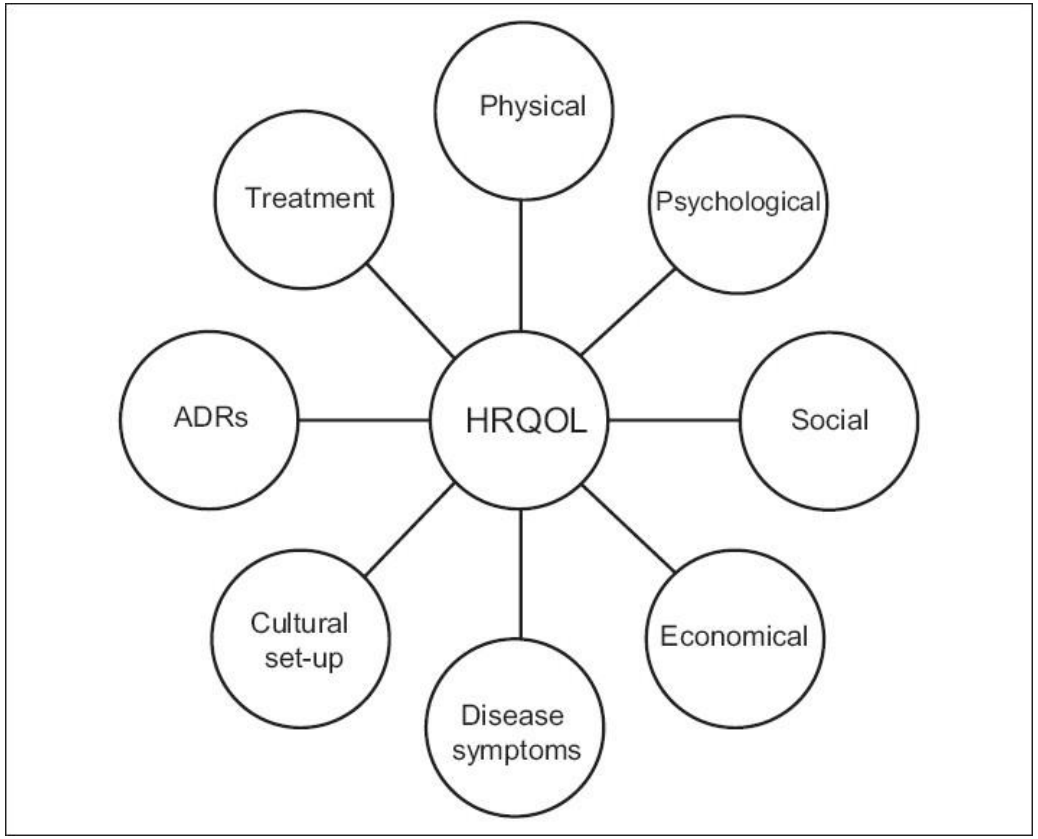
Quality of Life







Which of these chronic diseases are associated with reduced HRQL?



1. Cancer
2. Heart disease
3. Stroke
4. Lung disease
5. Diabetes
6. …

What if…

- There were treatments that would lower risk and reduce symptom progression and, in some cases, be an effective treatment for all known chronic diseases: cancer, cardiovascular disease, stroke, type 2 diabetes, Alzheimer's, dementia…
- It would work regardless of age, sex, race, and risk… Has a large evidence base on which to base recommendations… could save the healthcare system billions of dollars and cost comparatively little in return
- The side-effect profile of this treatment includes better prognoses for a variety of unrelated ailments including depression, dementia (all-cause and Alzheimer's), self-efficacy, and suicide incidence
- If all of this came in a pill would you take it?


exercise
lifestyle
easy
healthy
take
time
gym
health
weight
way
body
positive
necessary
supplement
fitne
work
taking
tores
stores
vitamins
happy
easily
dedicated
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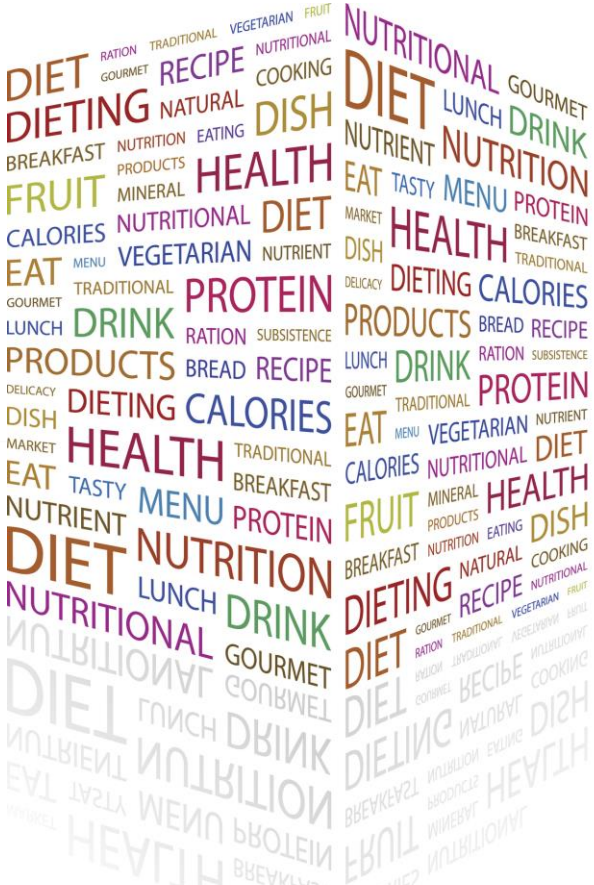
gluten free food
celiac disease
diet
autoimmune disease
protein complex
genetic
grains
tapioca
pasta
bread
treatment
digestive tract
potatoes
millet
corn
rye
oats
wheat
quinoa
gluten intolerant
gluten allergy
small intestine
vitamin B
fiber
rice
starch
food fad
cereal
barley


FOOD
HEALTHY DIET
NUTRITION
COOKING
ANTIOXIDANT
INGREDIENTS
WEIGHT LOSS
CALORIES
DETOX
DISH
BALANCE
ACTIVE
MEAL
RECIPE
NUTRITIONIST
GROCERY
NUTRIENT
VITAMINS
FITNESS
PLAN


vegetarianism
meat consumption
animal rights
health
ethics
lifestyle
benefits
protein source
vegetarian diet
veganism
philosophy
nutrition
whole grains
Hinduism
seafood
animal cruelty
animal slaughter
plant-based protein
vegetables
fruit
seaweed
tofu
beans


DIET
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VEGETARIAN
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PRODUCTS
BREAD
CALORIES
NUTRITION
LUNCH
MENU
TASTY
EAT
NUTRIENT
BREAKFAST
GOURMET
RATION
TRADITIONAL


weight loss
overweight
health
diet
eating habits
eating disorder
underweight
fashion
pharmaceuticals
malnutrition
anorexia nervosa
low-fat diet
metabolism
body mass
obesity
appearance
crash dieting
workout
fitness
fatigue
yo-yo effect
digestion
carbs
illness

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Aging well… reimagined

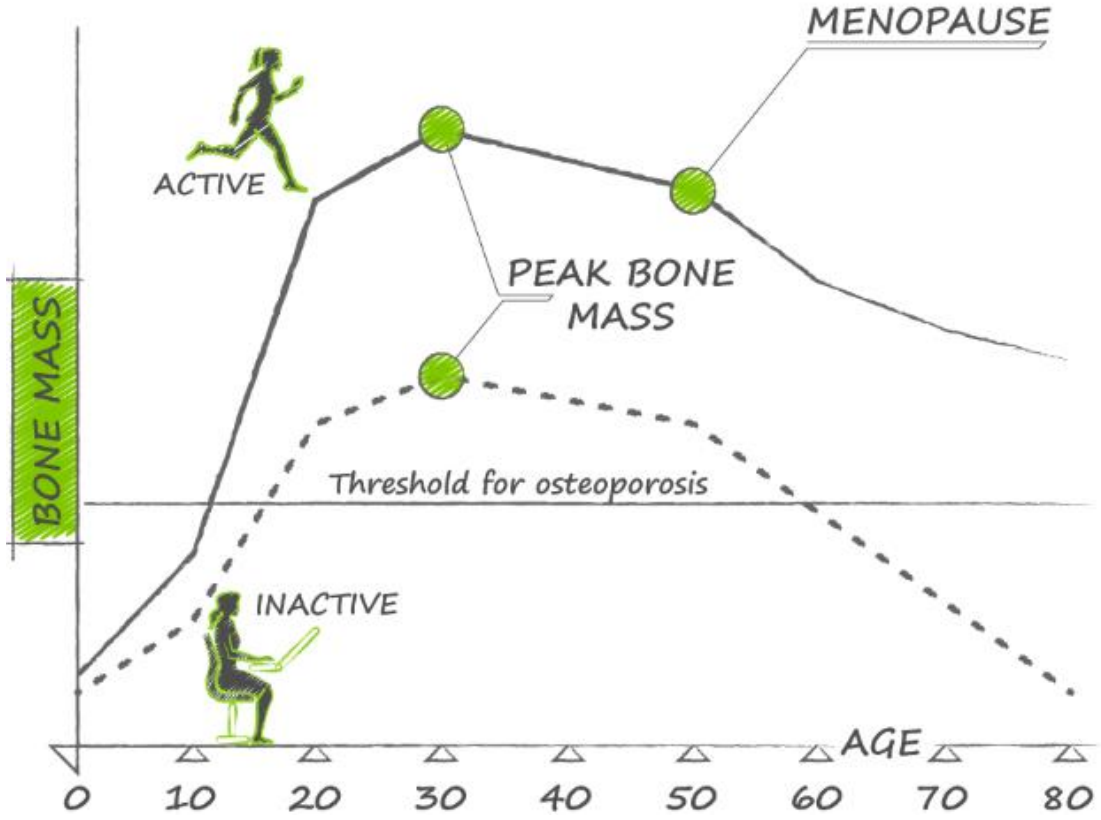
Jack LaLanne 1914 - 2011


EXERCISE IS KING.
NUTRITION IS QUEEN.
PUT THEM TOGETHER &
YOU'VE GOT A KINGDOM.
• JACK LALANNE •

Who sits on the throne?

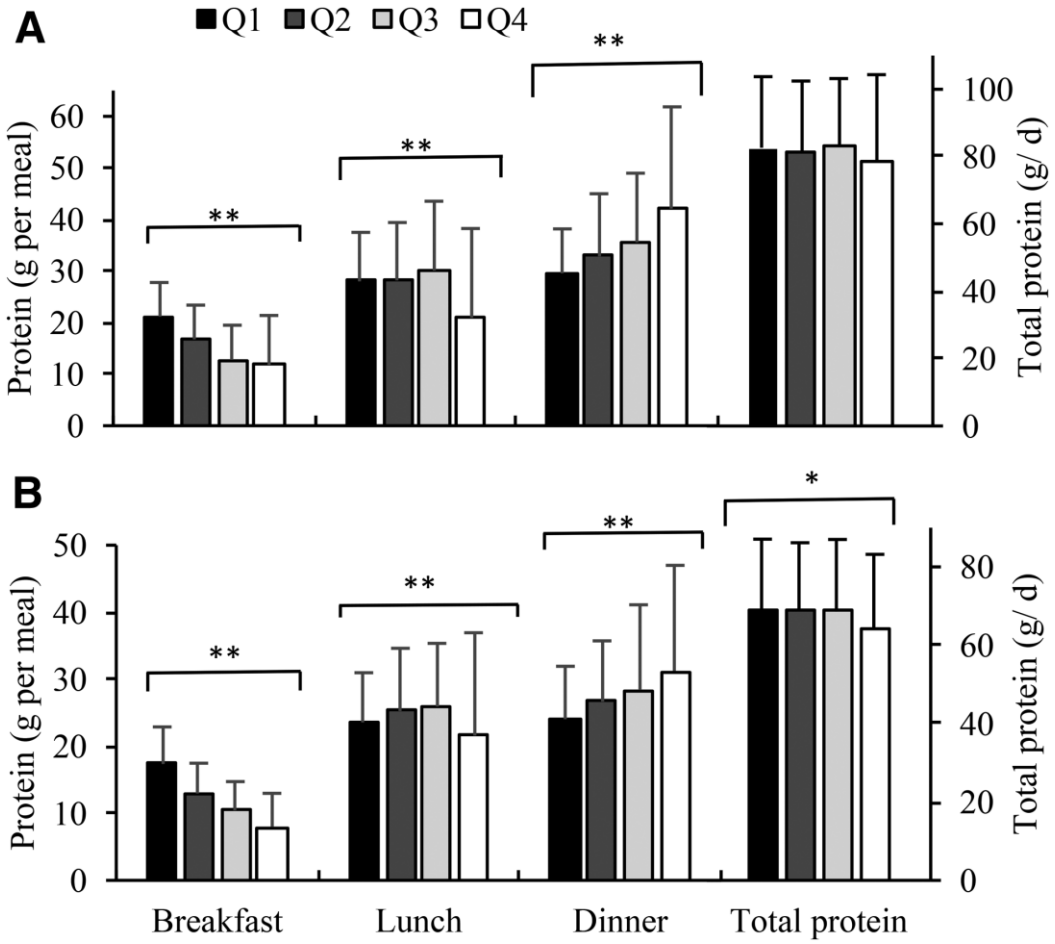
- Fitness and strength come from the gym
- Weight is gained or lost in the kitchen (restaurant)
- Exercise is a forgiver of many sins…
- The Kingdom is in harmony when they rule side-by-side

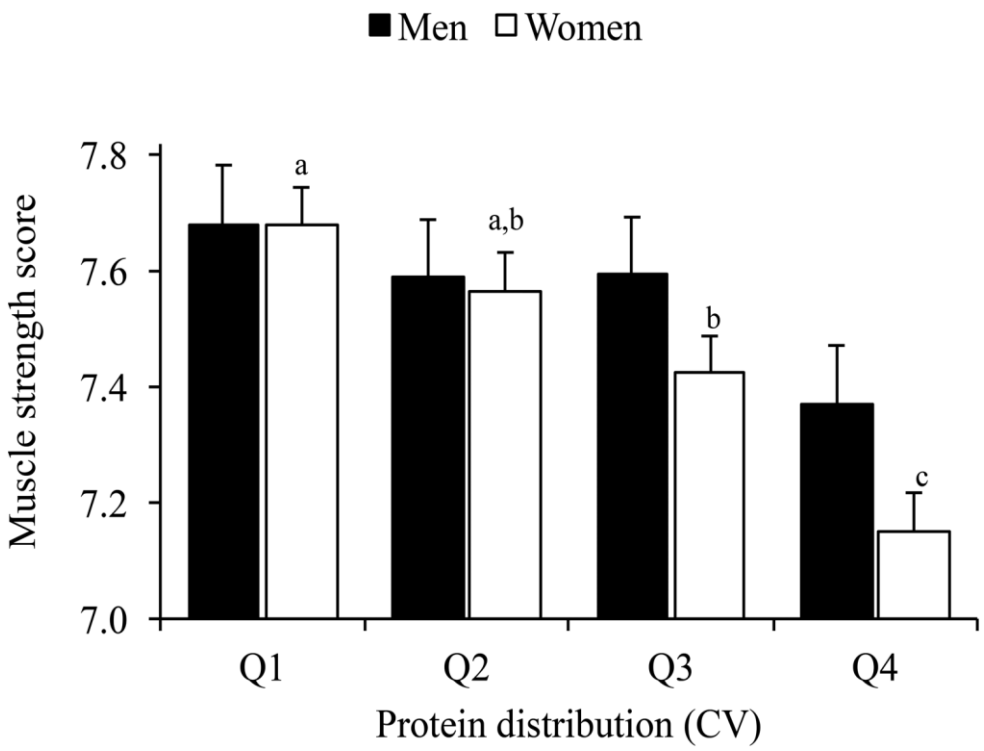
Osteoporosis: achieve higher peak bone mass to protect against loss



https://www.wellnessgarage.ca/blog/osteoporosis-bone-health-part-2

Osteoporosis, Sarcopenia: similar message





The American Journal of Clinical Nutrition, Volume 106, Issue 1, July 2017, Pages 113–124,
https://doi.org/10.3945/ajcn.116.146555

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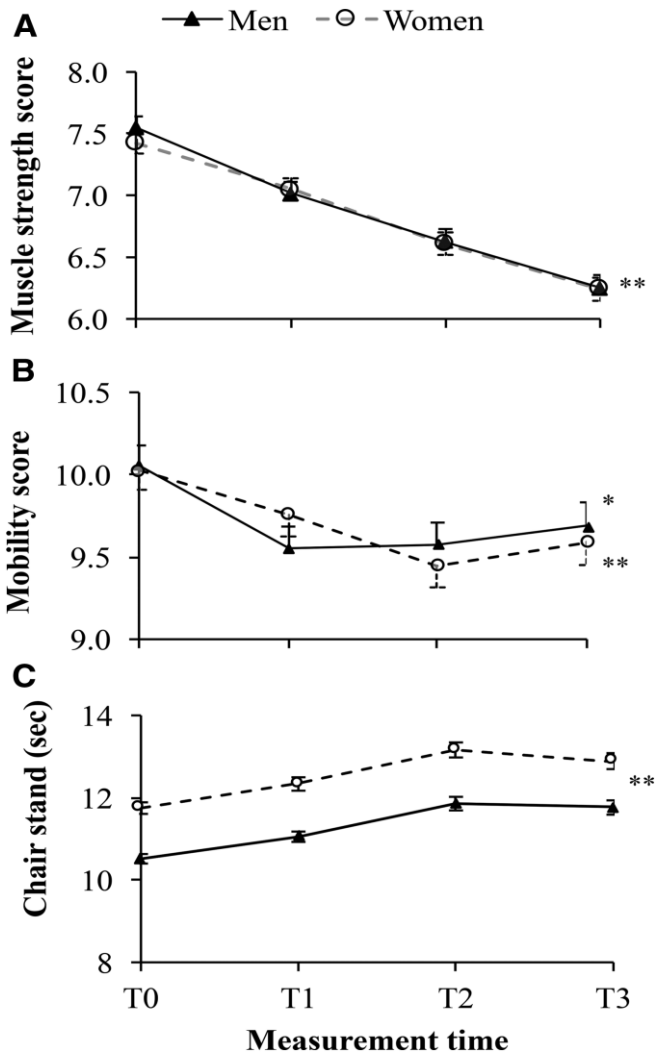

The American Journal of Clinical Nutrition, Volume 106, Issue 1, July 2017, Pages 113–124,
https://doi.org/10.3945/ajcn.116.146555

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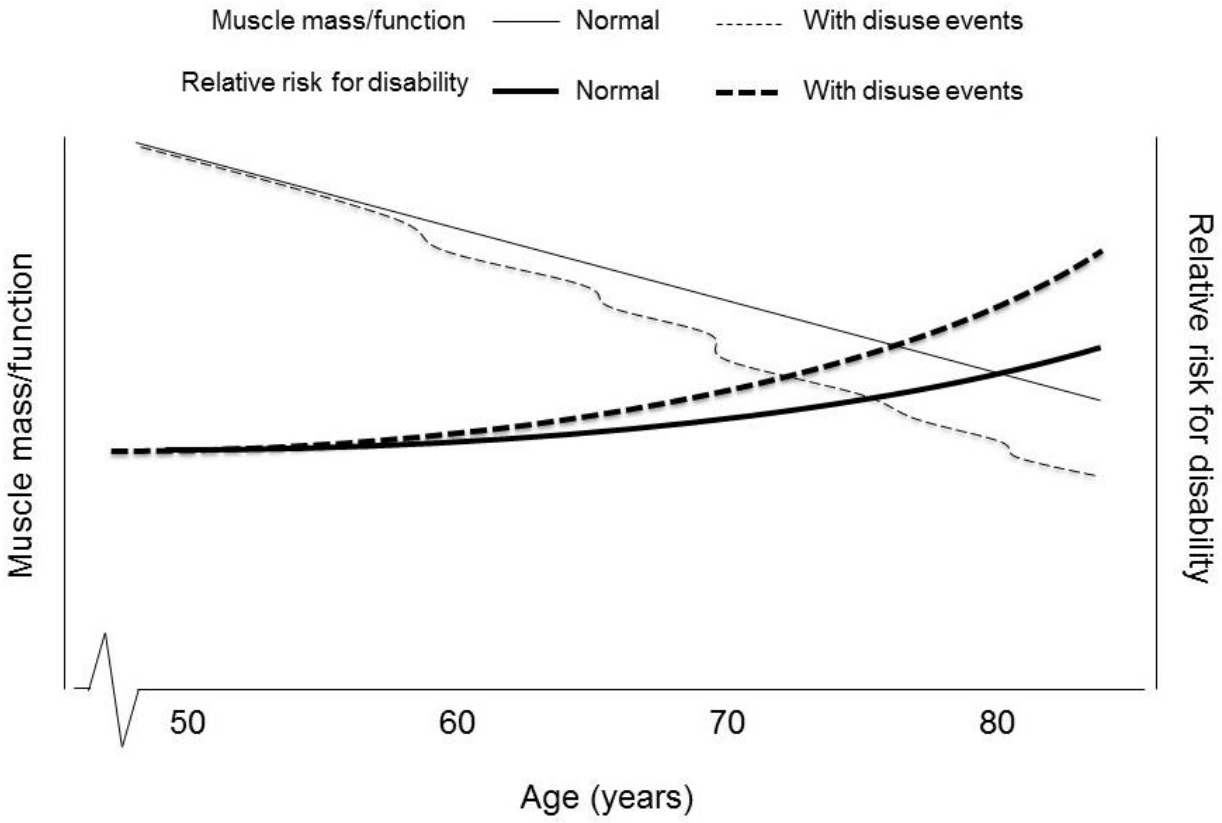
Age-related declines in muscle mass and function with disuse



MUSCLE DISUSE AS A PIVOTAL PROBLEM IN SARCOPENIA-RELATED MUSCLE LOSS AND DYSFUNCTION

K.E. Bell, M.T. von Allmen, M.C. Devries, S.M. Phillips

J Frailty Aging 2016;5(1):33-41

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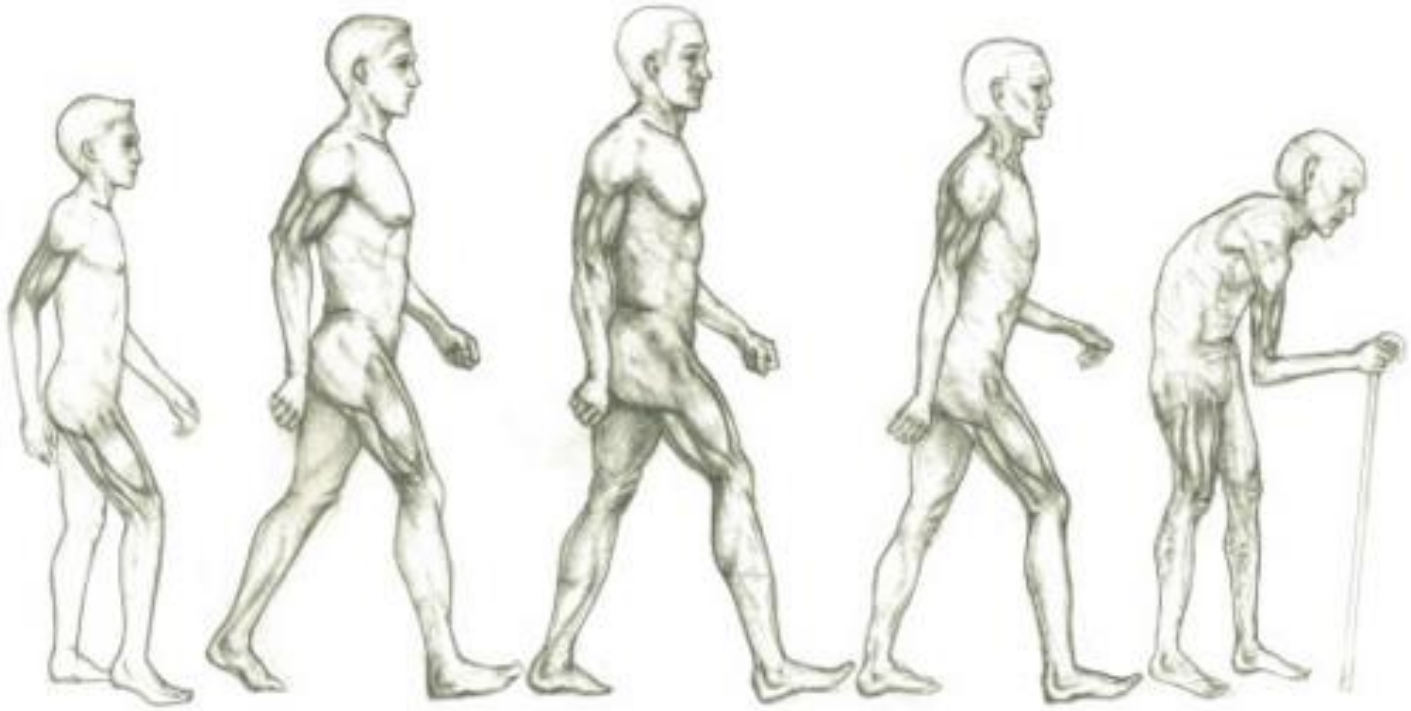
It is easier to mitigate decline than it is to reverse loss #start #early (preferably lifelong)



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Protein

1. The older we get the more this macronutrient becomes important for MSK health
2. Nutrient-dense proteins are important
3. Protein will not…
4. Putting it all together and living in the kingdom

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Older persons and the protein landscape

- Aging is associated with reduced food intake, predisposing to energy-protein undernutrition[1]
- Muscle area, & strength, decreased in older subjects fed a weight maintaining diet containing the protein RDA[2,3]
- Older adults may *need* more protein than the RDA: 1.0-1.2g/kg/d to maintain muscle mass and even greater benefit may be seen with higher intakes[4,5]
- Older adults are *not* consuming these intakes![5,6]

1 Morley, J. E. *et al.* Nutritional recommendations for the management of sarcopenia. *J Am Med Dir.Assoc.* **11**, 391-396 (2010).
2 Campbell, W. W. *et al.* Dietary protein adequacy and lower body versus whole body resistive training in older humans. *J.Physiol* **542**, 631-642 (2002).
3 Mitchell, C. J. *et al.* The effects of dietary protein intake on appendicular lean mass and muscle function in elderly men: a 10-wk randomized controlled trial. *Am J Clin Nutr* **106**, 1375-1383, doi:10.3945/ajcn.117.160325 (2017).
4 Bauer, J. *et al.* Evidence-Based Recommendations for Optimal Dietary Protein Intake in Older People: A Position Paper From the PROT-AGE Study Group. *Journal of the American Medical Directors Association* **14**, 542-559, doi:10.1016/j.jamda.2013.05.021 (2013).
5 Traylor, D. A., Gorissen, S. H. & Philips, S. M. Protein Requirements and Optimal Intakes in Aging: Are We Ready to Recommend More Than the RDA? *Advances in nutrition (Bethesda, Md.)* **9**, 171, doi:https://doi.org/10.1093/advances/nmy003 (2018).
6 Fulgoni, V. L., III. Current protein intake in America: analysis of the National Health and Nutrition Examination Survey, 2003-2004. *Am.J Clin.Nutr.* **87**, 1554S-1557S (2008).

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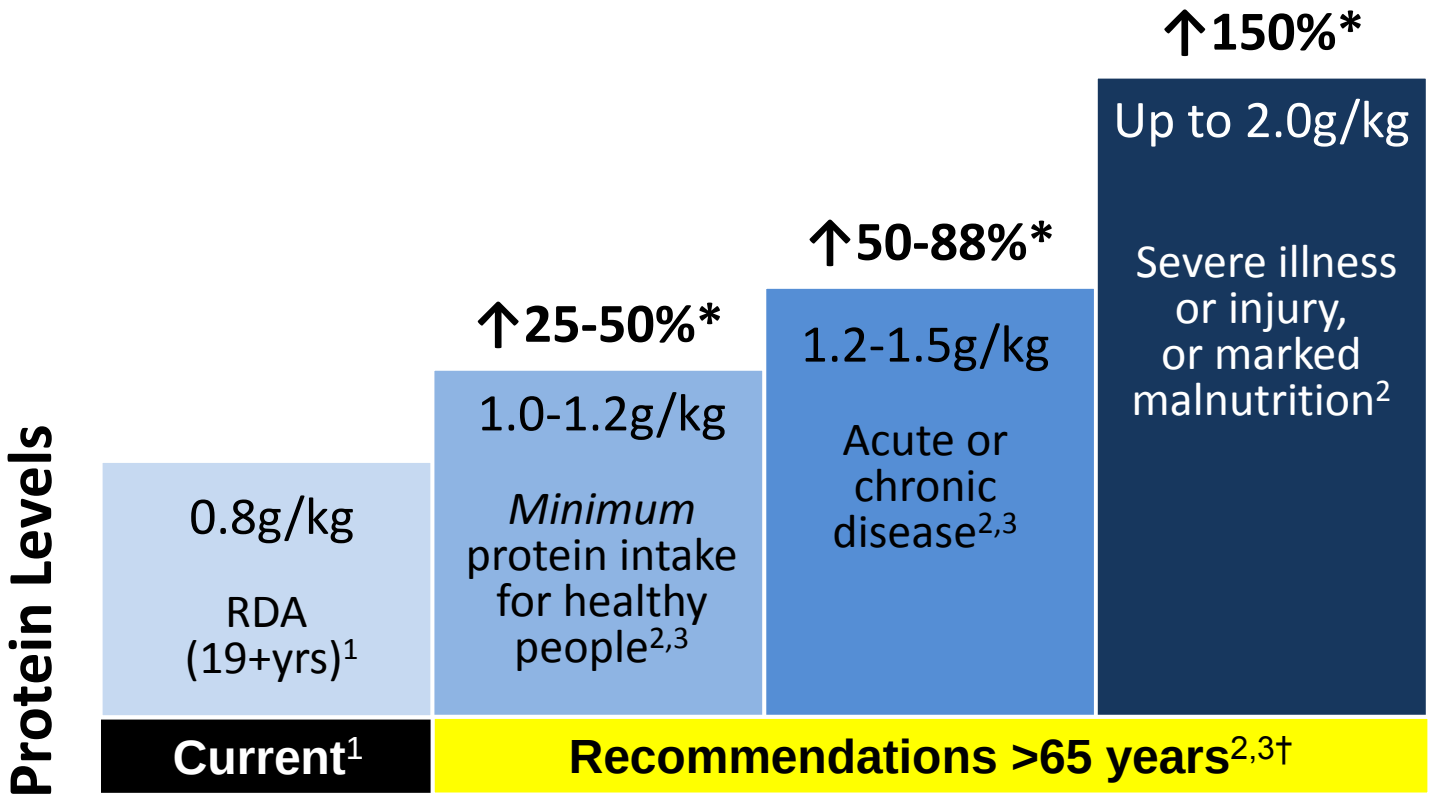
New Recommendations from International Expert Groups Call for Higher Protein Intake* in Older Adults



*increase above current Protein RDA[1]

†Older people with severe kidney disease who are not on dialysis may need to limit protein intake.

1. *DRIs for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients).* National Academy of Sciences. Institute of Medicine, 2005.
2. Bauer J et al. Evidence-based Recommendations for Optimal Dietary Protein Intake in Older People: A Position Paper From the PROT-AGE Study Group. *JAMDA*. 2013;14:542-59.
3. Deutz NEP et al. Protein intake and exercise for optimal muscle function with aging: Recommendations for the ESPEN Expert Group. *Clinical Nutrition. Clin Nutr.* 2014; 33(6): 929-36.

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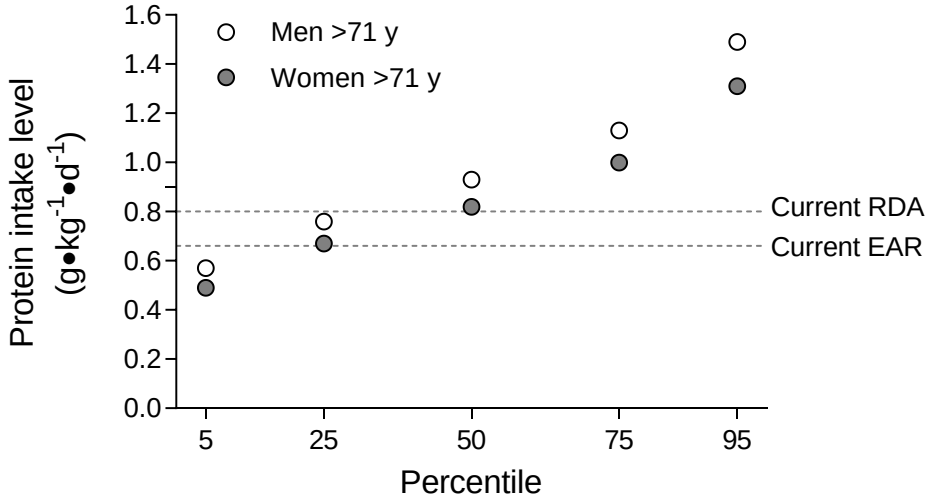
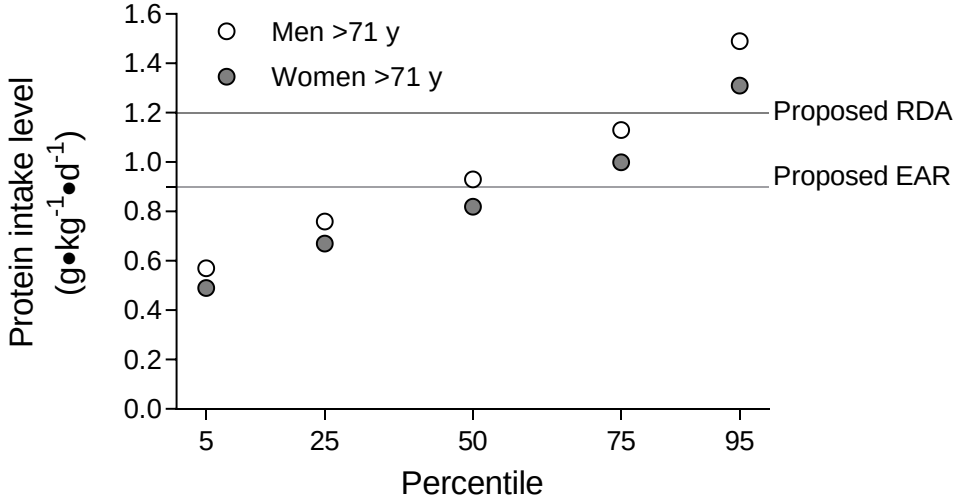
Perspective: Protein Requirements and Optimal Intakes in Aging: Are We Ready to Recommend More Than the Recommended Daily Allowance? FREE

Daniel A Traylor, Stefan H M Gorissen, Stuart M Phillips

Advances in Nutrition, Volume 9, Issue 3, May 2018, Pages 171–182,
https://doi.org/10.1093/advances/nmy003





Berner LA, Becker G, Wise M, Doi J. Characterization of dietary protein among older adults in the United States: amount, animal sources, and meal patterns. *J Acad Nutr Diet* 2013;113(6):809–15.

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Observational studies showing a positive relationship between protein intake and lean mass (and function)

1. Gray-Donald K, St-Arnaud-McKenzie D, Gaudreau P, Morais JA, Shatenstein B, Payette H. Protein intake protects against weight loss in healthy community-dwelling older adults. J Nutr (2014) 144:321-326.
2. Gregorio L, Brindisi J, Kleppinger A, Sullivan R, Mangano KM, Bihuniak JD, Kenny AM, Kerstetter JE, Insogna KL. Adequate dietary protein is associated with better physical performance among post-menopausal women 60-90 years. J Nutr Health Aging (2014) 18:155-160.
3. Isanejad M, Mursu J, Sirola J, Kroger H, Rikkonen T, Tuppurainen M, Erkkila AT. Association of protein intake with the change of lean mass among elderly women: The Osteoporosis Risk Factor and Prevention - Fracture Prevention Study (OSTPRE-FPS). J Nutr Sci (2015) 4:e41.
4. Isanejad M, Mursu J, Sirola J, Kroger H, Rikkonen T, Tuppurainen M, Erkkila AT. Dietary protein intake is associated with better physical function and muscle strength among elderly women. Br J Nutr (2016) 115:1281-1291.
5. Sahni S, Mangano KM, Hannan MT, Kiel DP, McLean RR. Higher Protein Intake Is Associated with Higher Lean Mass and Quadriceps Muscle Strength in Adult Men and Women. J Nutr (2015) 145:1569-1575.

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Evidence? Meta-analyses of intervention trials

1. Donaldson, A. I. C. *et al.* Effect of nonmeat, high-protein supplementation on quality of life and clinical outcomes in older residents of care homes: a systematic review and meta-analysis. *Nutr Rev* **77**, 116-127, doi:10.1093/nutrit/nuy061 (2019).
2. Hidayat, K. *et al.* Effects of Milk Proteins Supplementation in Older Adults Undergoing Resistance Training: A Meta-Analysis of Randomized Control Trials. *J Nutr Health Aging* **22**, 237-245, doi:10.1007/s12603-017-0899-y (2018).
3. Liao, C. D. *et al.* Effects of protein supplementation combined with resistance exercise on body composition and physical function in older adults: a systematic review and meta-analysis. *Am J Clin Nutr* **106**, 1078-1091, doi:10.3945/ajcn.116.143594 (2017).
4. Tieland, M. *et al.* The Impact of Dietary Protein or Amino Acid Supplementation on Muscle Mass and Strength in Elderly People: Individual Participant Data and Meta-Analysis of RCT's. *J Nutr Health Aging* **21**, 994-1001, doi:10.1007/s12603-017-0896-1 (2017).
5. Veronese, N. *et al.* Effect of nutritional supplementations on physical performance and muscle strength parameters in older people: A systematic review and meta-analysis. *Ageing Res Rev* **51**, 48-54, doi:10.1016/j.arr.2019.02.005 (2019).

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Take home points

- More protein from dietary sources lead to better retention or, with exercise, gains in lean body mass
- Preservation of function or increases in function not consistently seen

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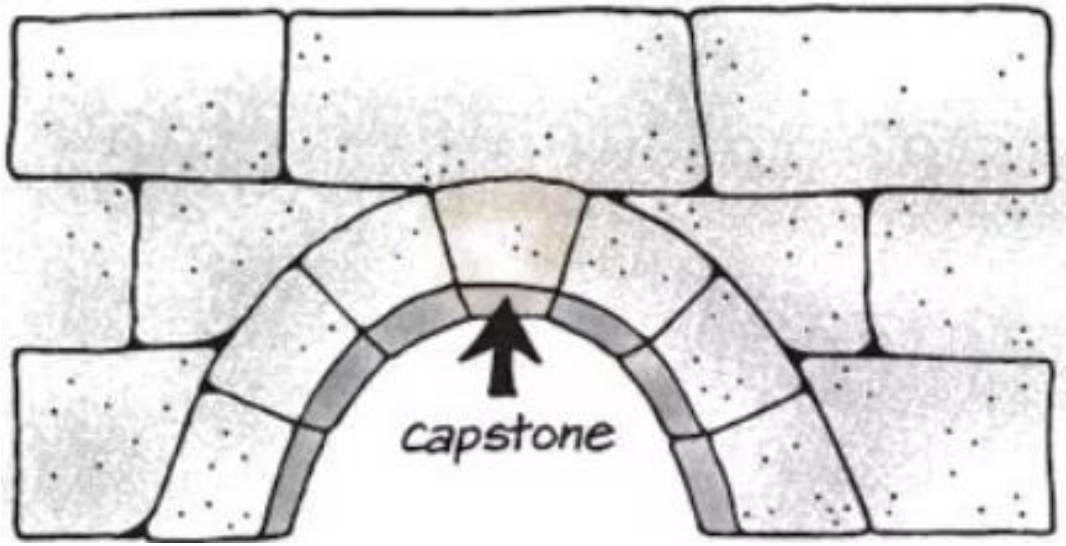
Nutrient-dense protein as a capstone principle in dietary planning in aging



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Why Protein-Containing Foods?

- Consumption of protein at levels above the RDA at optimal levels may have benefits
- Within the context of the current protein sources consumption of ***nutrient-rich*** protein foods increases overall diet quality and contributes to nutrient adequacy
- Without ingestion of ***nutrient-rich sources of protein*** it is difficult, particularly within current dietary practices, to achieve intakes of many nutrients

What Nutrients?

- Shortfall nutrients – promote increased intakes: Calcium, Vitamin D, Potassium, Fiber, Iron, Folate, and Vitamin B12
- Excess nutrients – promote decreased intakes: Sodium, Solid fats (saturated and *trans* fatty acids), Sugars, and Refined grains
- Importantly, ***reduce energy intake*** – *consume less energy-dense and nutrient-poor foods ('empty calories')* and more ***nutrient-dense foods***

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Nutrient-dense foods

- Lean meats and Poultry*
- Fat-free or Low-fat Milk and Dairy*
- Eggs*
- Seafood*
- Beans and Peas (legumes)
- Vegetables and Fruits
- Whole grain foods
- Nuts and Seeds

* Good – Excellent sources of protein *and* amongst the top 10 protein-containing foods (NHANES 2007-2010) currently consumed by Americans

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Nancy R Rodriguez
Introduction to Protein Summit 2.0: continued exploration of the impact of high-quality protein on optimal health

Heather J Leidy, Peter M Clifton, Arne Astrup, Thomas P Wycherley, Margriet S Westerterp-Plantenga, Natalie D Luscombe-Marsh, Stephen C Woods, and Richard D Mattes
The role of protein in weight loss and maintenance

Donald K Layman, Tracy G Anthony, Blake B Rasmussen, Sean H Adams, Christopher J Lynch, Grant D Brinkworth, and Teresa A Davis
Defining meal requirements for protein to optimize metabolic roles of amino acids

Douglas Paddon-Jones, Wayne W Campbell, Paul F Jacques, Stephen B Kritchevsky, Lynn L Moore, Nancy R Rodriguez, and Luc JC van Loon
Protein and healthy aging

Stuart M Phillips, Victor L Fulgoni III, Robert P Heaney, Theresa A Nicklas, Joanne L Slavin, and Connie M Weaver
Commonly consumed protein foods contribute to nutrient intake, diet quality, and nutrient adequacy

Nancy R Rodriguez and Sharon L Miller
Effective translation of current dietary guidance: understanding and communicating the concepts of minimal and optimal levels of dietary protein

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Protein will not…

- Cause you to lose bone mass

Dietary protein and bone health: a systematic review and meta-analysis from the National Osteoporosis Foundation FREE

Marissa M Shams-White, Mei Chung, Mengxi Du, Zhuxuan Fu, Karl L Insogna, Micaela C Karlsen, Meryl S LeBoff, Sue A Shapses, Joachim Sackey, Taylor C Wallace, Connie M Weaver

The American Journal of Clinical Nutrition, Volume 105, Issue 6, June 2017, Pages 1528–1543, https://doi.org/10.3945/ajcn.116.145110

- Cause your kidneys to fail

Changes in Kidney Function Do Not Differ between Healthy Adults Consuming Higher- Compared with Lower- or Normal-Protein Diets: A Systematic Review and Meta-Analysis

Michaela C Devries, Arjun Sithamparapillai, K Scott Brimble, Laura Banfield, Robert W Morton, Stuart M Phillips

The Journal of Nutrition, Volume 148, Issue 11, November 2018, Pages 1760–1775, https://doi.org/10.1093/jn/nxy197

- Give you cancer

WHAT TO DO?

ACTIVITY: for the uninitiated

- Find an activity you like such as walking, swimming, or cycling (outdoors)
- Minutes count — increase your activity level 10 minutes at a time. Every little bit helps (outdoors)
- Active time can be social time — look for group activities or classes in your community, or get family or friends to be active with you (outdoors)
- Get stronger!
- Activity in Green and Blue spaces do more for your mental wellbeing than exercise indoors!

NUTRITION: for the uninitiated

- Eat real foods
- Eat nutrient-rich sources of protein
- Eat more protein at breakfast
- Variety!
- Cook at home and eat around a table
- Enjoy food!!!

The barriers/misconceptions

- Common misconception: to reap health benefits, vigorous, intense, and ‘draining’ exercise is *necessary*
- An exaggerated fear, enhanced by cognitive dissonance, of the risks of physical activity? Headline: 50k people run NYC marathon, man dies of heart attack…
- Exercise is good for many aspects of health but it is NOT a vaccine!
- An overriding sense that nutritional health requires subscription to a counter-culture dietary regime that runs opposite to what we know #goscience
- Nutrition is linked to many chronic diseases, and like exercise is (for some) a modifiable risk factor, but it is more than just health…
- Food should be pleasurable

Why don’t we try and live in this kingdom?

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THANK YOU

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Translating the Research into Practical Application

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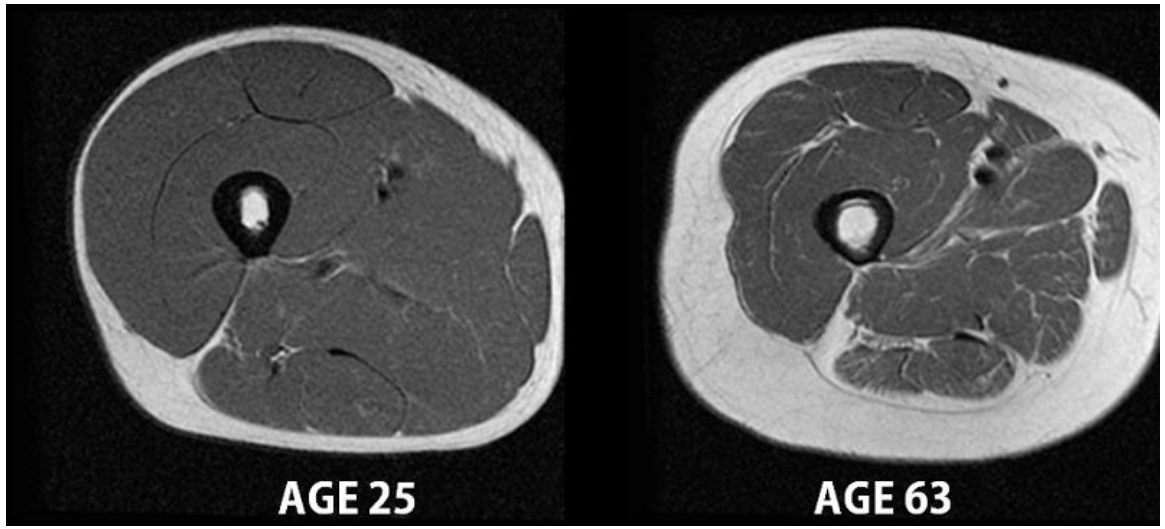
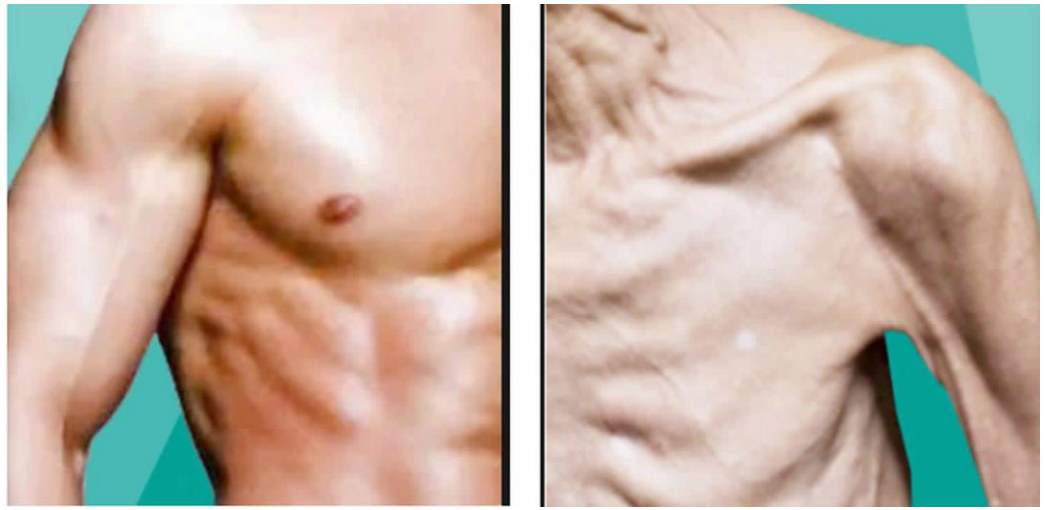
“STRENGTH AND GROWTH COME ONLY THROUGH CONTINUOUS EFFORT AND STRUGGLE.”

- Napoleon Hill

After age 40, an untrained individual can lose up to 8% of their muscle mass each decade.

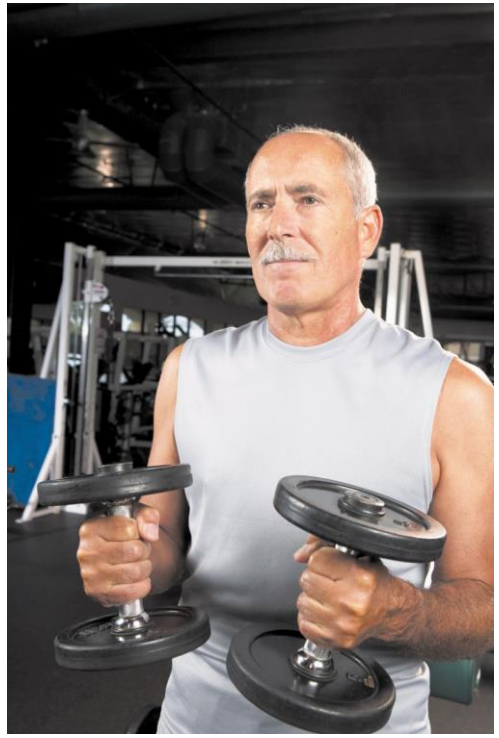




"If you don't use it, you lose it"

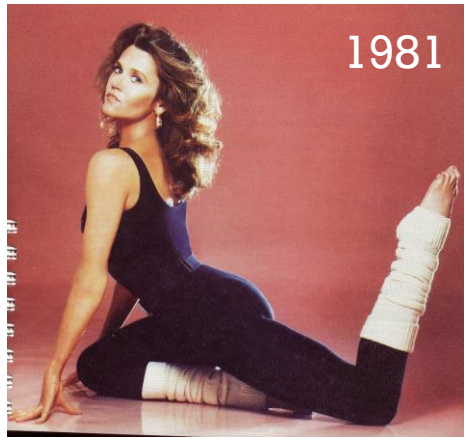
J Am Geriatr Soc. 2003 Mar;51(3):323-30.
Http://www.jbc.org/content/early/2015/09/03/jbc.M115.681445

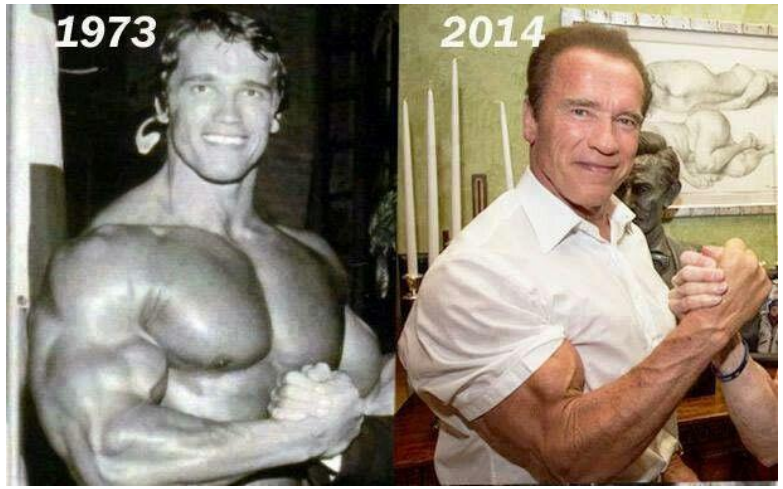
Muscle strength begins to decline by 1-3% each year following age 50



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3940510/

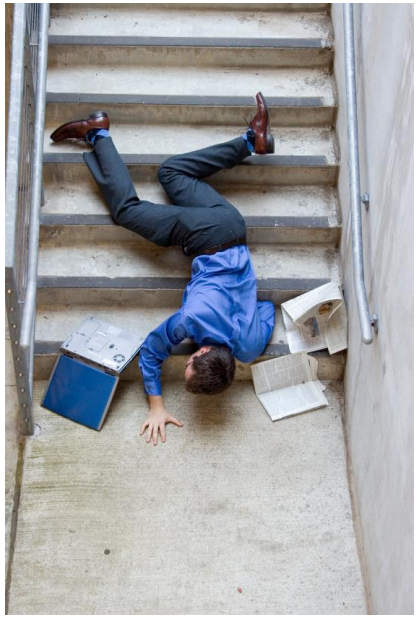
Studies show by strength training and maintaining muscle mass you can slow down the process of muscle decline.





https://www.ncbi.nlm.nih.gov/pubmed/22030953

“It’s very hard to build muscle and easy to lose it”



FOUR CORNERSTONES
OF EATING TO SUPPORT
STRENGTH

One: Anchor Your Plate with Protein

Two: Pair Your Protein with Plants

Three: Focus on Fiber-rich Carbs

Four: Fuel Recovery to Be Stronger

PROTEIN'S ROLE IN A HEALTHY LIFESTYLE

Part of a Healthy Diet

Weight Mgmt

Building Muscle

Increased Energy

Keeps Me Full Longer

Leidy HJ, et al. The role of protein in weight loss and maintenance. Am J Clin Nutr 2015;101:1320S-9S.
Paddon-Jones D, et al. Protein and healthy aging. Am J Clin Nutr 2015;101:1339S-45S.
Paddon-Jones D, et al. Protein, weight management, and satiety. Am J Clin Nutr. 2008;87:1558S-61S.

Percent Daily Value* of Key Nutrients that Support Strength in Common Protein Foods

	Large Scrambled Egg	3 ounces Chicken Thigh Meat, Cooked	3 ounces Chicken Breast Meat, Cooked	1/2 cup Quinoa, Cooked	3 ounces Beef, Cooked (composite of retail cuts)
Protein	12%	42%	53%	8%	51%
Zinc	4%	11%	6%	7%	39%
Iron	4%	5%	5%	8%	14%
Vitamin B_{12}	8%	6%	5%	0%	41%
Riboflavin (B_2)	13%	11%	6%	6%	14%
Niacin (B_3)	<1%	26%	59%	2%	25%
Vitamin B_6	4%	20%	26%	6%	24%
Selenium	20%	33%	34%	4%	38%

*The Daily Value (DV) refers to the amount of a nutrient needed for a healthy adult on a 2,000-calorie diet. The %DV is the percent of a nutrient's Daily Value provided by a serving of food.

Source: US Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. USDA National Nutrient Database for Standard Reference, Legacy. Version Current: April 2018. Internet: /nea/bhnrc/ndl, NDB #s: scrambled egg - 01332, chicken thigh meat - 05098, chicken breast meat - 05064, quinoa - 20137, beef - 13364

Leucine for the win!!!

1 scoop of whey=2.5 g

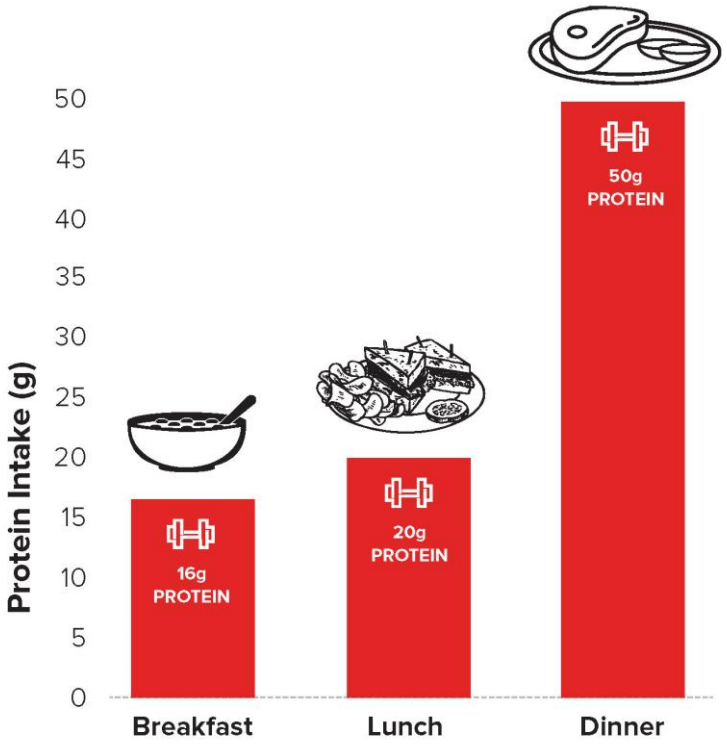
1 cup of cottage cheese= 2.9 g

4 oz of beef=3.2 g

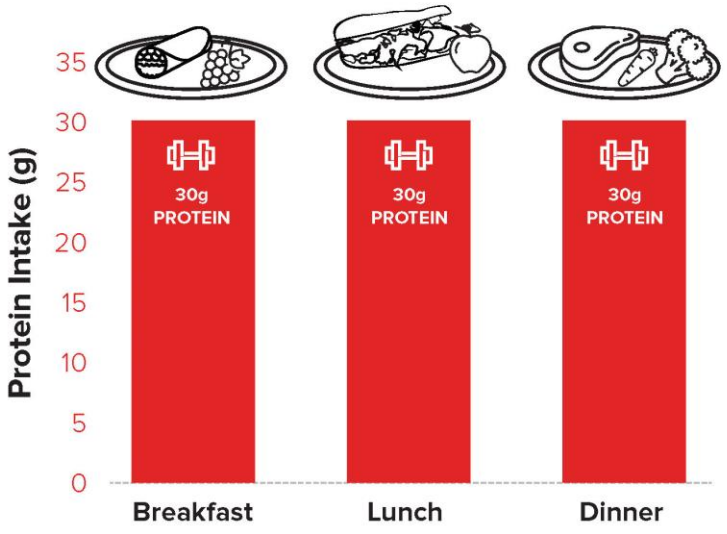
Norton LE, Layman DK, Bunpo P, Anthony TG, Brana DV, Garlick PJ. The leucine content of a complete meal directs peak activation but not duration of skeletal muscle protein synthesis and mammalian target of rapamycin signaling in rats. J Nutr. 2009;139(6):1103-1109. 52. –
Norton LE, Layman DK. Leucine regulates translation initiation of protein synthesis in skeletal muscle after exercise. J Nutr. 2006;136(2):533s-537s.

Supports muscle protein synthesis and maintenance

Typical Daily Protein Intake Pattern



Evenly Distributed Daily Protein Intake Pattern



Mamerow MM, Mettler JA, English KL, et al. Dietary protein distribution positively influences 24-h muscle protein synthesis in healthy adults. J Nutr. 2014;144(6):876-880.
Agriculture USDo. Energy intakes: percentages of energy from protein, carbohydrate, fat, and alcohol, by gender and age, what we eat in America, NHANES 2009–2010. 2012. 2012; www. ars.usda.gov/ba/bhnrc/fsrg. Accessed October 9th, 2018.
Symons TB, Sheffield-Moore M, Wolfe RR, Paddon-Jones D. A moderate serving of high quality protein maximally stimulates skeletal muscle protein synthesis in young and elderly subjects. J Am Diet Assoc. 2009;109(9):1582-1586.

PROTEIN STACKING

Protein Content of a Traditional Breakfast*

8 oz juice: 0g

Two slices wheat toast with butter: 6g

Two scrambled eggs: 12g

Piece of fruit: 0g

Total Protein: 18g

Protein Content of a Protein-stacked Breakfast: Fajita Scramble with Milk*

Two scrambled eggs: 12g

2 oz leftover cooked ground beef crumbles: 16g

½ cup leftover sautéed pepper and onions: 4g

½ cup frozen shredded hash browns: 2g

Total Protein: 34g

25-30 GRAMS PROTEIN BOOSTING SNACKS

1 scoop of protein powder

1 cup of cottage cheese

3 oz of beef jerky

1 cup of Greek yogurt and nuts

3 hardboiled egg whites and 2 eggs

3 oz can of tuna

Homemade 25+ g protein bar

High protein waffles with peanut butter and milk

WHAT DOES 25 GRAMS OF PROTEIN LOOK LIKE?

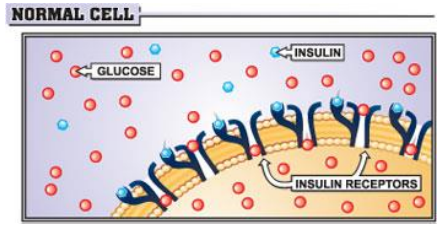
	AMOUNT	CALORIES	PROTEIN
Quinoa	3 cups	666	25g
Peanut Butter	6.5 tbsp	613	25g
Black Beans	1 2/3 cups	379	25g
Edamame	1 1/3 cups	249	25g
Beef	3 ounces	173	25g

PHYSICAL ACTIVITY FOR BUILDING STRENGTH

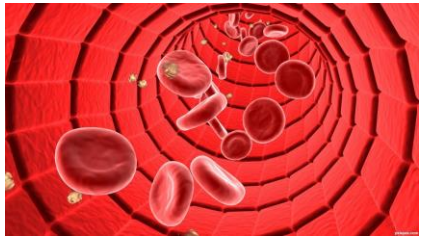
- Fitness tips for improved physical strength and recovery.

EXERCISE IMPROVES YOUR BODY'S USE OF PROTEIN FOR GREATER STRENGTH

Improved insulin sensitivity

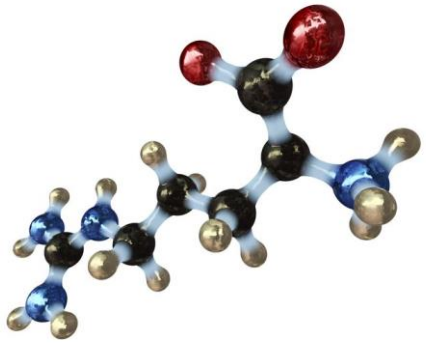


Improved blood flow



Sustained muscle-building

More efficient use of protein



Aragon AA, Schoenfeld BJ, Wildman R, et al. International society of sports nutrition position stand: diets and body composition. Journal of the International Society of Sports Nutrition. 2017;14:16.
Moore DR, Tang JE, Burd NA, Rerecich T, Tarnopolsky MA, Phillips SM. Differential stimulation of myofibrillar and sarcoplasmic protein synthesis with protein ingestion at rest and after resistance exercise. J Physiol. 2009;587(Pt 4):897-904
Richter EA, Hargreaves M. Exercise, GLUT4, and skeletal muscle glucose uptake. Physiol Rev. 2013;93(3):993-1017

IMPROVED PHYSICAL STRENGTH

Physical strength is the ability of a person to exert force on **physical** objects using muscles.

Strength Measured by:

- 1 Rep Max/Predicted (RM) Tests
- Push up (Max) Test
- Handgrip Strength Test
- Plank Test
- Isometric Wall Squat (Timed)

http://www.unm.edu/~rrobergs/478PredictionAccuracy.pdf
https://www.ncbi.nlm.nih.gov/pubmed/19031334
Brzycki, M. (1993). Strength testing: Predicting a one-rep max from reps to fatigue. Journal of Physical Education, Recreation, and Dance, 64, 1, 88–90.

TIPS FOR IMPROVED PHYSICAL STRENGTH

Resistance Exercise

- Adults should train each major muscle group **two or three days a** week using a variety of exercises and equipment.
- **Load:** 60-70% 1RM for novice to intermediate, 80% for advanced
- **Sets: Two to four sets** of each exercise will help adults improve strength and power.
- **Volume: 8-12 repetitions** for novice to intermediate; **1-8 repetitions** for advanced
- **Rest period: 2-3 min for higher intense exercises** that use heavier loads; **1-2 minutes between the lower intense exercises** with light loads

*It is recommended that a 2-10% increase in the load be applied when the individual can comfortably perform the current workload for one to two repetitions over the desired number on two consecutive training sessions.

https://www.prescriptiontogetactive.com/app/uploads/resistance-training-ACSM.pdf

IMPROVED RECOVERY

Exercise recovery involves a number of post-**exercise** steps that are essential for any **exercise** regime, regardless of fitness level, the type of physical activity or the **exercise** intensity.

- Tissue repair
- Function restoration
- Muscle recovery
- Psychological recovery (contemplation, relaxation and rejuvenation)

TIPS ON IMPROVED RECOVERY

Warming down after exercise

Warming down involves 5–10 minutes of extra exercise after the main exercise is completed to prevent muscle stiffening.

Post-exercise stretching should begin within 10 minutes of finishing exercise

- Hold post-exercise stretches for at least 30 seconds per stretch;
- Stretch slowly
- Breathe out at as you ease into the stretch.

Dawson B, Cow S, Modra S, Bishop D, Stewart G. Effects of immediate post-game recovery procedures on muscle soreness, power and flexibility levels over the next 48 hours. *J Sci Med Sport*. 2005; 8(2): 210-21
Rhea MR, Alvar BA, Burkett LN. Medicine and Science in Sports and Exercise, 2003, Jul.;35(3):0195-9131.

TIPS ON IMPROVED RECOVERY

For optimal strength development, one to two rest days between strength training sessions

Rhea MR, Alvar BA, Burkett LN. Medicine and Science in Sports and Exercise, 2003, Jul.;35(3):0195-9131.

COGNITIVE AND EMOTIONAL SUPPORT FOR BUILDING AND MAINTAINING STRENGTH

- Connections with family and friends
- Sleep
- Stress

https://www.nichd.nih.gov/health/topics/sleep/conditioninfo/sleep-disorders
https://www.apa.org/news/press/releases/stress/2017/state-nation.pdf

SOCIOECOLOGICAL MODEL (SEM)

Connections (family, friends, etc.)

1. Interpersonal
2. Community
3. Organizational

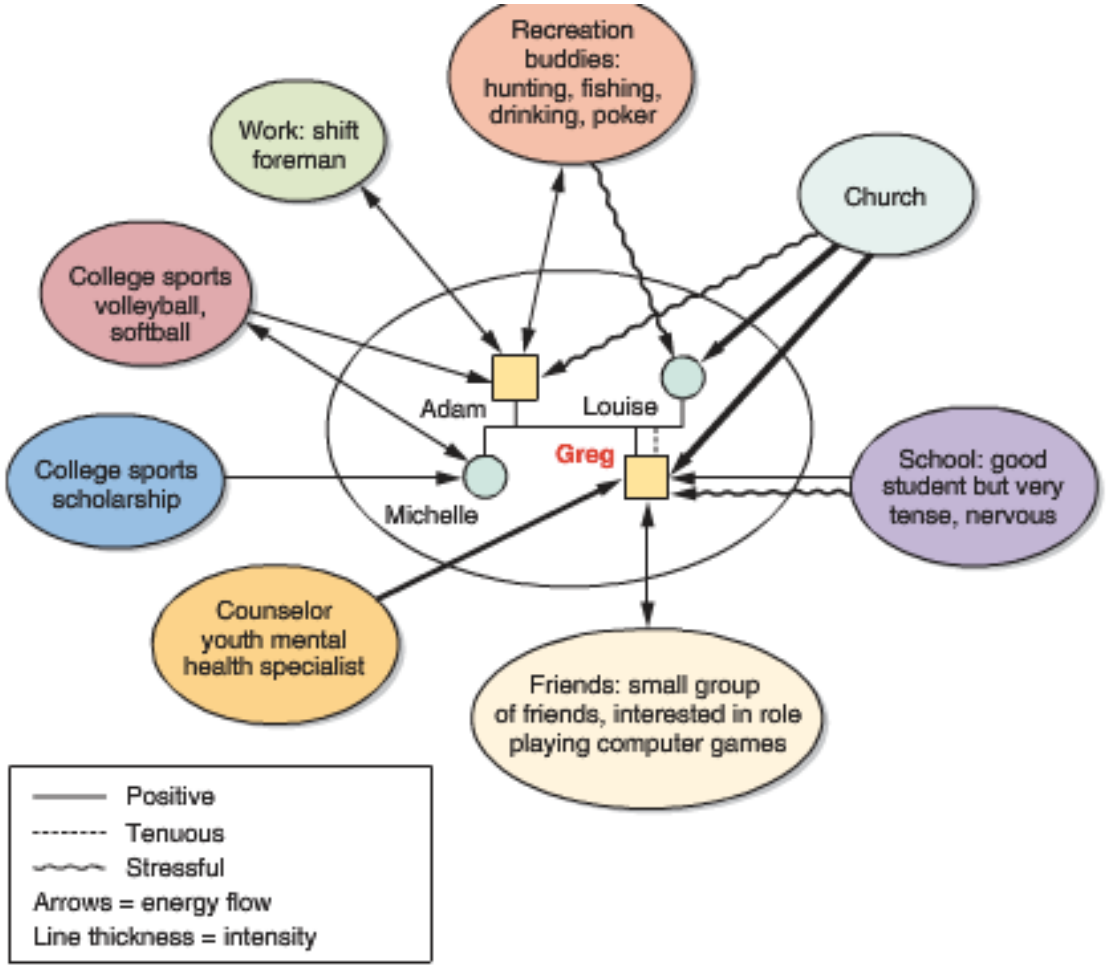


FIGURE 7.10. Sample eco-map. Adapted with permission from Kennedy V. Ecomaps. *MAI Review*. 2010;3:1–12.

https://pdfs.semanticscholar.org/4b62/b89b2990d0dc7ba744eb258f72e61520a070.pdf

IMPLICATIONS OF SLEEP DEPRIVATION VERSUS QUALITY SLEEP

Sleep Deprivation:

- ↓ Growth hormone
- ↓ Energy levels
- ↓ Immune system
- ↓ Testosterone
- ↑ Increase in cortisol
- ↑ Obesity

Quality Sleep:

- ↓ Fatigue
- ↑ Mood
- ↑ Reaction time
- ↑ Regulates metabolism
- ↑ Anti inflammatory properties when prolactin released
- ↑ Muscle repair

Reilly T, Piercy M. The effect of partial sleep deprivation on weight-lifting performance. *Ergonomics*. 1994; 37(1): 107-15.
https://www.ncbi.nlm.nih.gov/pubmed/9415946
https://www.ncbi.nlm.nih.gov/pubmed/21632481

STRESS REDUCTION TECHNIQUES

- Meditate
- **Get a massage**
- Yoga
- Tai Chi
- Acupuncture
- Listening to music
- Aromatherapy
- **Try deep breathing exercises**
- Stress inoculation
- Keeping a Journal
- Prayer
- Visual imagery
- Warm Epsom salt bath
- Acupressure
- Volunteer Work
- Hobbies
- **Time management**
- Playing with pets
- Shopping
- Therapy
- Behavioral modification
- Assertiveness training

COGNITIVE AND EMOTIONAL SUPPORT FOR BUILDING AND MAINTAINING STRENGTH

Case Studies

CASE STUDY

Meet Jennifer

State: Adult-Weight loss

Before

After

STATS

- **Weight Loss:** 75 lbs
- **Timeframe:** 11 months
- **Muscular Strength:** Pushups 20 starting, 75 ending
- **Mental Stamina:** Improved all her relationships at work, able to withstand long hours as an auto mechanic.

CASE STUDY

Jennifer's Favorite High-Protein Recipe – Leftover Steak Breakfast Hash | Yields 3 servings

- 9 ounces leftover cooked steak, cut into very small pieces
- 1 sweet potato, peeled and cut into small cubes
- ½ lb brussels sprouts, cut in half and ends removed
- 1 red pepper, cut into chunks
- 1 small onion, diced
- 2 Tbsp minced garlic
- 5 washed white button mushrooms, chopped or sliced
- 1 Tbsp olive oil
- 1 tsp cayenne pepper
- 1 tsp paprika
- Salt and pepper to taste

1. In a large skillet, heat olive oil on medium-high
2. Add sweet potatoes and brussels sprouts to skillet and cover for 5 minutes. Uncover and cook, stirring frequently, for another 5 minutes.
3. Add peppers, onions, and garlic to skillet and cook uncovered for 8-10 minutes, stirring occasionally.
4. Add mushrooms and steak and cook until both are heated through.
5. Season with cayenne pepper, paprika, and salt and pepper if desired. Stir and serve.

CASE STUDY

Meet Mark

State: Special Populations, Disease State

Before

After

STATS

- **Weight Loss:** 101 lbs+
- **Timeframe:** 2 years
- **Muscular Strength:** Plank 30 second initial, 4 minute current
- **Mental Stamina:** Improved QOL, Decreased severe stress in his life, Traveled for the first time to see daughter across country.
- **Health Status:** Went off his cholesterol and blood pressure medications, off C-pap machine and no more episodes of vertigo.

CASE STUDY

Sample Meal Plan

Mark's Meal Plan - BEFORE

- **Breakfast:** Cheese grits with butter and a muffin
- **Snacks:** Skipped
- **Lunch:** 12 inch sub with chips and 20 oz mountain dew
- **Dinner:** Lasagna with Caesar salad
- **Late night snack:** Ben and Jerry's Ice cream, chips, cookies
- 3 beers/ night

Total: 90 grams of protein

Mark's Meal Plan – AFTER

- **Breakfast:** 1 cup plain nonfat Greek yogurt, ¼ cup low-sugar granola (plain), 6 almonds, ½ sliced banana
- **Snacks:** 1 cup of cottage cheese with 1 serving of pineapple or 1 smoothie with 1 scoop of whey protein, banana, 1 tbsp almond butter
- **Lunch:** Lean burger - 4 oz 96% lean beef, 1 slice alpine lace cheese, 1/8 avocado slice, lettuce, tomato with whole wheat bun and baby carrots.
- **Dinner:** 4 oz salmon, 1.5 cups cooked quinoa and 1 cup of broccoli spears
- **Late night snack:** 1 cup Halo Top chocolate ice cream

150 grams of protein

CASE STUDY

Meet Lynn

State: Later Years

Before

After

STATS

- **Weight Lost:** 72 lbs
- **Timeframe:** 1.5 years
- **Muscular Strength:** Is able to do step ups with 10 lbs
- **Mental Stamina:** Started dating again, more confidence, traveling, decreased depression, works out 5 days/ week.

CASE STUDY

Meet Lynn

State: Later Years

"The need for many seniors to lose weight and shape up has been in the news lately. In one story, a doctor doubts "whether you're going to see people lose 50 to 100 pounds as they're older." Oh, really? This senior has lost over 70 pounds since first waddling in to see a dietitian and personal trainer— with borderline diabetes — less than a year ago.

It hasn't always been easy but my dietitian managed to change my eating habits so I don't miss the bad old stuff; and we keep tweaking the plan so it's something I can live with permanently. My dietitian taught me that incorporating ***protein helps to build and maintain my muscle****. Not only that, but it helps continue the fight against type-2 diabetes and osteoporosis, all pesky diseases that seem to be more prominent in my mature stage of life."*

PRACTICAL APPLICATIONS/ TAKEAWAYS FOR RDS

- Exercise
  - 2-3 days of strength training per week for strength and muscle growth
  - Warm down 5-10 minutes after exercise session
  - Stretch for 10 minutes after exercise session
  - Aim for 1-2 rest days a week for muscle recovery

- Nutrition
  - Shoot for 30 grams of protein per meal
  - Protein stack your breakfast to meet your needs

- Sleep
  - Aim for 7-9 hours of sleep each night

- Connections
  - Engage in activities that build relationships and social connections

RESOURCES

- The Academy Position Paper – Nutrition and Athletic Performance
- Smart Ways to Make Physical Activity Part of Your Day
- ACSM Position Stands - Exercise and Physical Activity for Older Adults
- ACSM Position Stands - Progression Models in Resistance Training for Healthy Adults
- Strength: The Field Manual
- Farm to Gym Workout
- Strength Recipes

Q&A

- Q&A