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ON HEALTHY AGEING

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Weight Management: The Challenges

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Questions answered today

Is aging associated with changes of body fat and muscle distribution?

Is weight loss good for the elderly*?

What sort of diet should an elderly* follow if he/she needs to lose weight?

*Elderly: ≥ 65 years old

Aging and body compositional changes



Aging and body compositional changes

Sarcopenia

The loss of skeletal muscle mass and strength that occurs in concert with biological aging.

By the 7th decade of life, maximal voluntary contractile strength of muscles decrease by 20-40%:

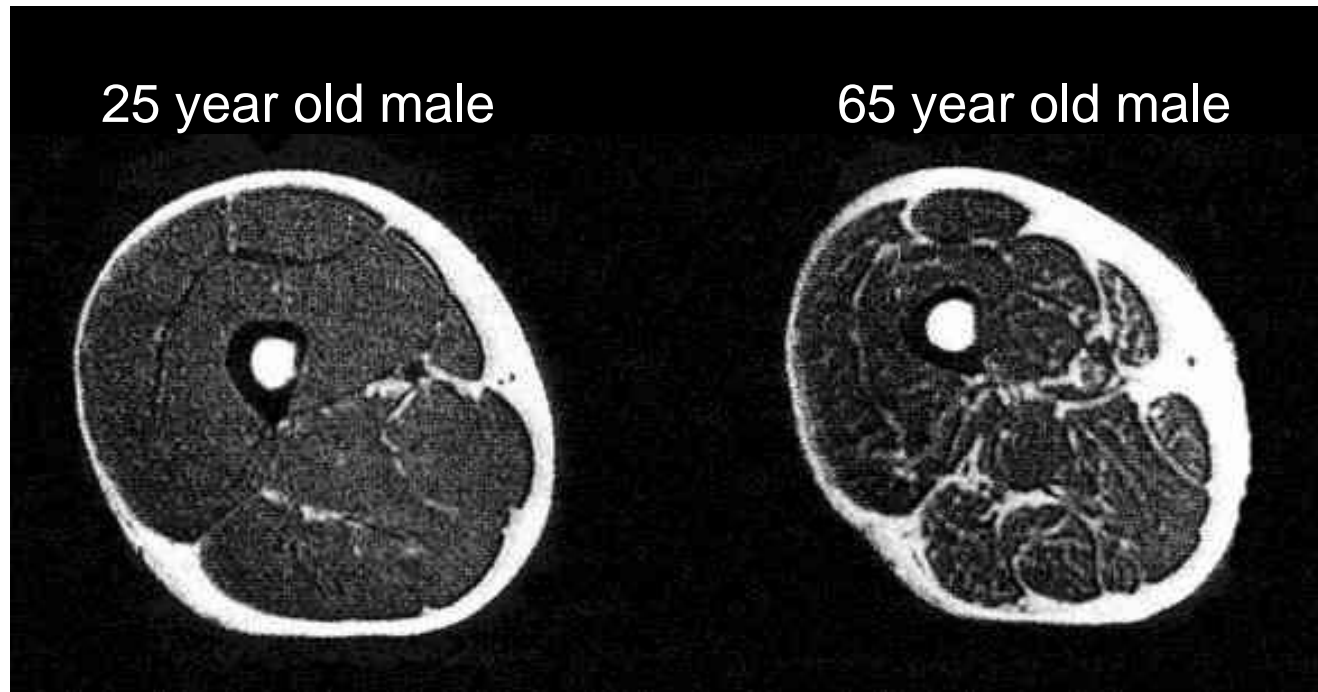
Decreased muscle mass

Decreased muscle quality (strength per unit muscle mass)

Up to 30% of those \geq 60 years old have sarcopenia.

Ref: Doherty TJ. 2003. Invited review: aging and sarcopenia. J of Applied Physiology. 95(4):1717-1727.

Aging and body compositional changes



Sarcopenia seen in the magnetic resonance image of a cross section of a 25-year-old man's thigh (LEFT,) and another age 65 (RIGHT). Fat, in white, surrounds skeletal muscle encircling the bone. Notice that although the thighs are of similar size, the older man's shows a substantial loss of muscle and a growing buildup of fat around and through the muscle.

Aging and body compositional changes

Preferential increase in abdominal fat, in particular visceral fat, combined with a decrease in lower body subcutaneous fat.

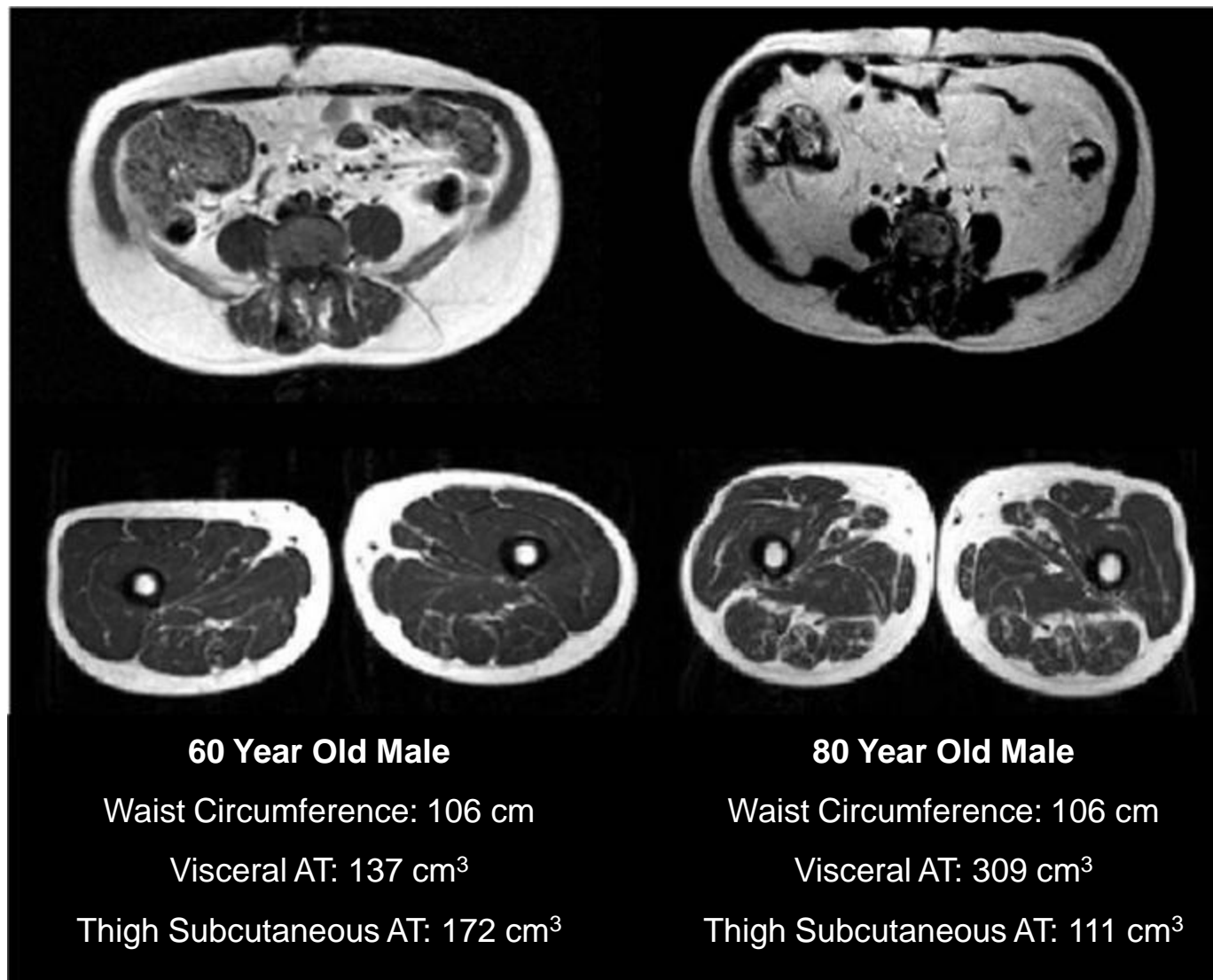
Increased fat deposition in heart, liver and skeletal muscle.

Increased fat content within bone marrow.

Age-associated body compositional changes cannot be detected by simple anthropometric measures alone.

Ref: Jennifer L. Kuk et al. 2009. Age-related changes in total and regional fat distribution. Ageing Research Reviews. 8(4):339-348.

Aging and body compositional changes

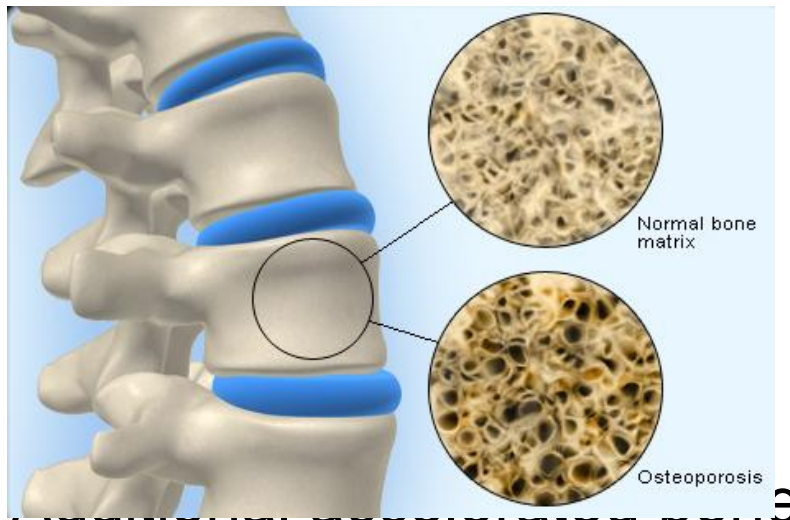


Ref: <http://www.obesitypanacea.com>

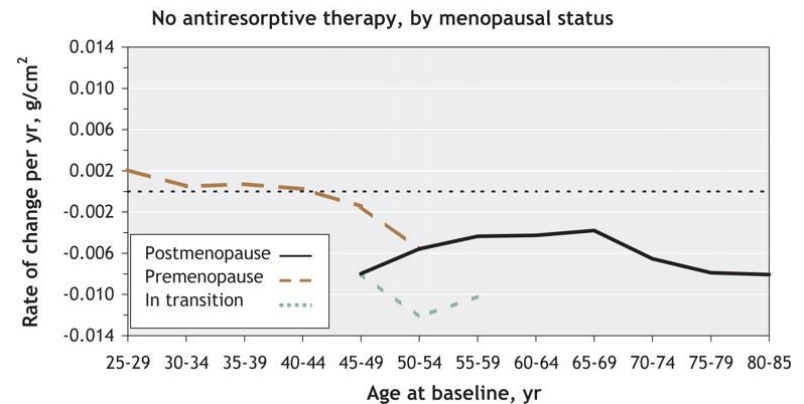
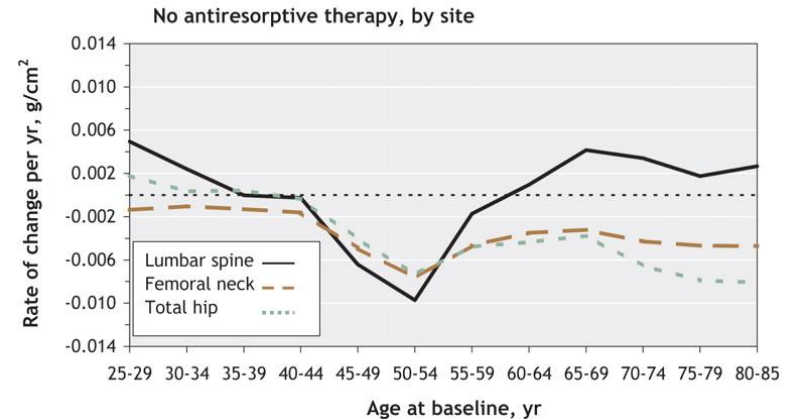
1st World Congress on Healthy Ageing, 20th Mar 2012

Aging and body compositional changes

Bone mineral density (BMD) decreases with age



loss from age 70 onwards.



Ref: Berger C et al. 2008. Change in bone mineral density as a function of age in women and men and association with the use of antiresorptive agents. CMAJ. 178:1660-1668.

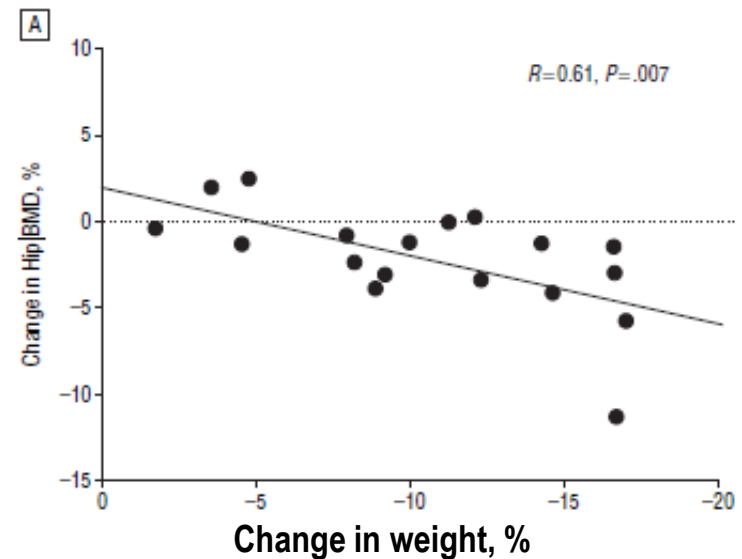
Weight loss and bone density

Weight loss can have adverse effects on bone mineral density

Increased body weight is associated with decreased osteoporosis and hip fractures in older men and women:

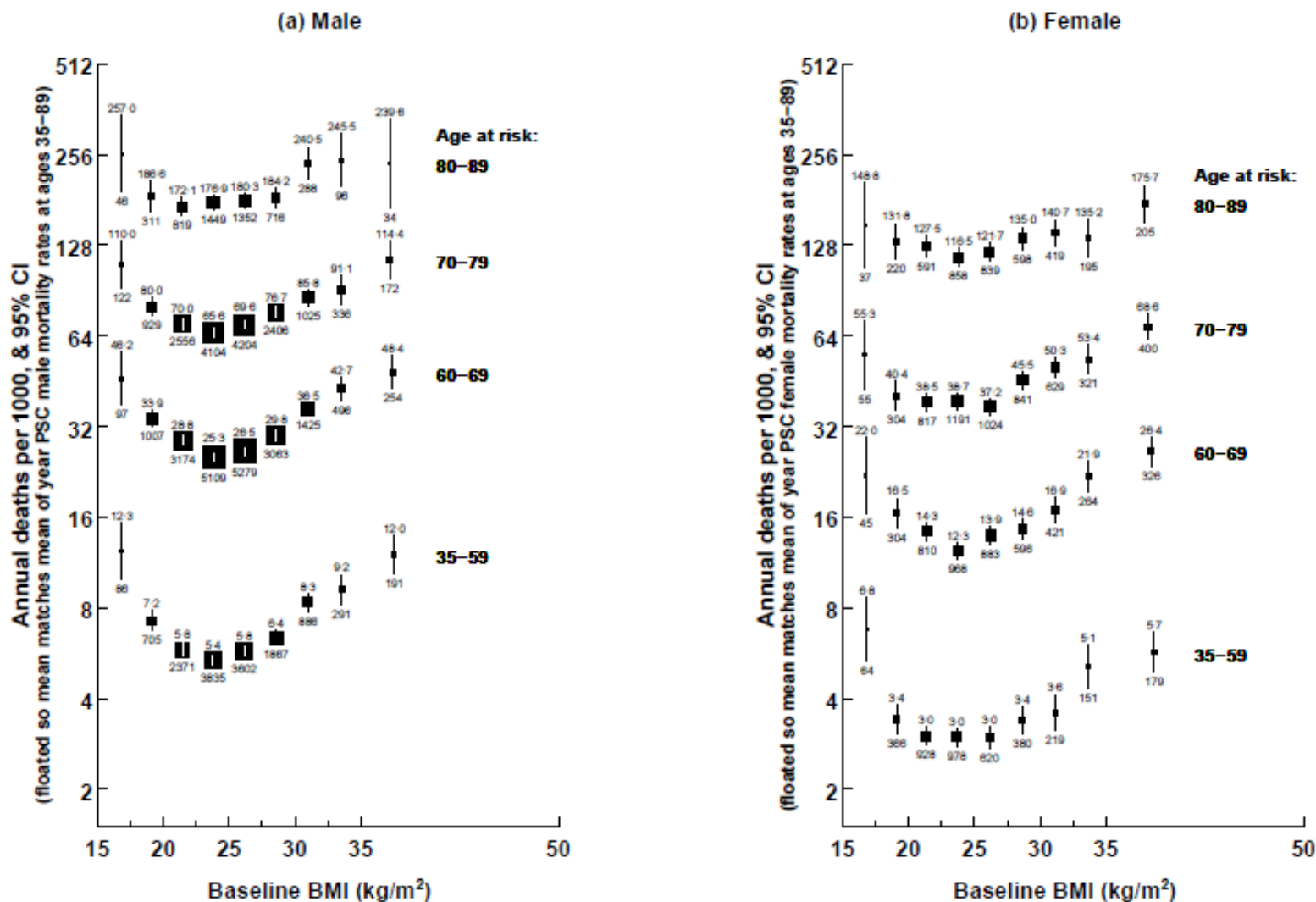
Increased skeletal loading

Increased levels of bone active hormones



Ref: Villareal DT et al. 2006. Bone Mineral Density Response to Caloric Restriction–Induced Weight Loss or Exercise-Induced Weight Loss A Randomized Controlled Trial. *Arch Intern Med.* 166:2502-2510

All-cause mortality vs BMI, by age at risk



Ref: Supplement to: Prospective Studies Collaboration. Body-mass index and cause-specific mortality in 900 000 adults: collaborative analyses of 57 prospective studies. *Lancet* 2009; published online March 18. DOI:10.1016/S0140-6736(09)60318-4.

Benefits of modest weight loss in the obese elderly

Improvement in risk factors after weight loss

May relieve catabolic conditions of ageing.

Ease mechanical burden on weak joints and muscles to increase mobility.

J-curve association between BMI and all cause mortality still present, but less pronounced with age

Ref: Miller and Wolfe. 2008. The danger of weight loss in the elderly. The Journal of Nutrition, Health and Aging. 12(7):487-491.

Considerations before weight loss intervention in elderly:

Sarcopenia – Weight loss only by caloric restriction to be avoided in sarcopenic obesity?

More visceral fat, more intra-muscular fat, more intra-organ fat

Reductions in bone density

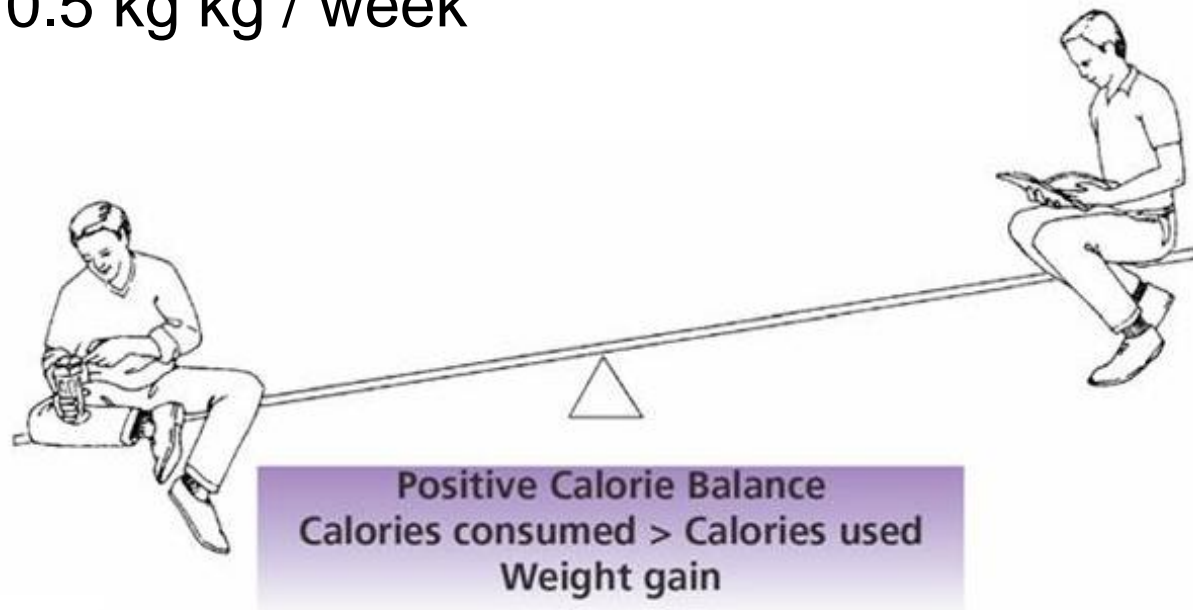
J-curve association between BMI and all cause mortality still present, but less pronounced with age

Calories for weight loss

Modest reduction in energy intake

Reduction of 500kcal to 750kcal from baseline calories


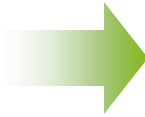


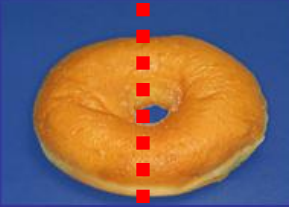

Energy deficit of 500 kcal/day will induce weight loss of 0.5 kg / week



Calories for weight loss

What does 500 kcal look like in terms of food?

- ~ 170 kcal reduction per meal (3 meals / day)

	Fried rice (1 plate): 508 kcal		Fried rice (2/3 plate): 339 kcal	Energy savings: 169 kcal
	Teh Tarik (2 glasses): 426 kcal		Teh Tarik (1 glass): 213 kcal	Energy savings: 213 kcal
	Doughnut (1 piece): 268 kcal		Doughnut (1/2 piece): 134	Energy savings: 134 kcal

Protein needs during weight loss

FAO/WHO/UNU estimated protein needs for elderly adults at 0.6g per kg body weight

Extrapolations from studies conducted in healthy young men

Recent evidence identified that elderly adults need 0.8g to 1.0g of protein per kg body weight to maintain nitrogen equilibrium (from nitrogen balance studies)

High requirement despite decreased muscle mass

Probable lower efficiency of dietary protein utilization

Ref: Campbell et al. 1994. Increased protein requirements in elderly people: new data and retrospective reassessments. Am J Clin Nutr. 60:501-509.

Other dietary needs during weight loss

A high-dairy protein, high-calcium diet minimizes bone turnover during weight loss in overweight adults → 2400mg dietary calcium/day.

Meta-analysis of 29 RCTs on elderly supports use of calcium and vitamin D supplementation to prevent osteoporosis:

≥ 1200mg Calcium/day

≥ 800 IU vitamin D/day



1 glass milk ~
500mg Calcium



3 oz wild salmon~
600 IU vit D

Ref:

Bowen J et al. 2004. Human Nutrition and Metabolism: A High Dairy Protein, High-Calcium Diet Minimizes Bone Turnover in Overweight Adults during Weight Loss *J. Nutr.* 134: 568

Benjamin MP Tang et al. 2007. Use of calcium or calcium in combination with vitamin D supplementation to prevent fractures and bone loss in people aged 50 years and older: a meta-analysis. *Lancet.* 370: 657–66

Other dietary needs during weight loss

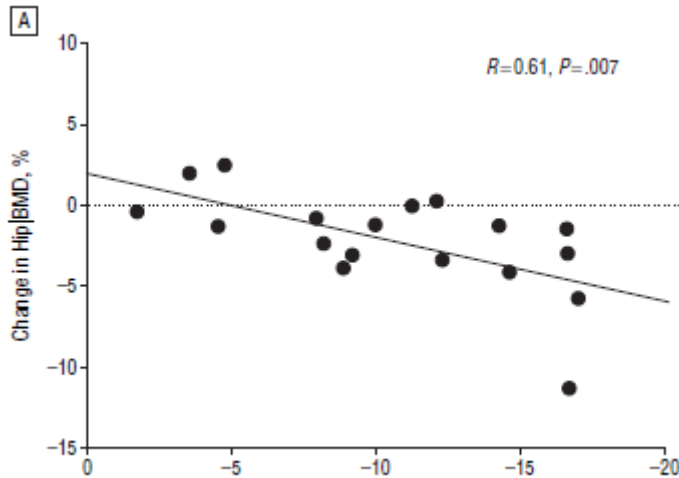
Potassium, magnesium, and fruit and vegetable intakes associated with greater bone density in elderly men and women

Hypothesis that alkaline-producing dietary components contribute to maintenance of BMD.



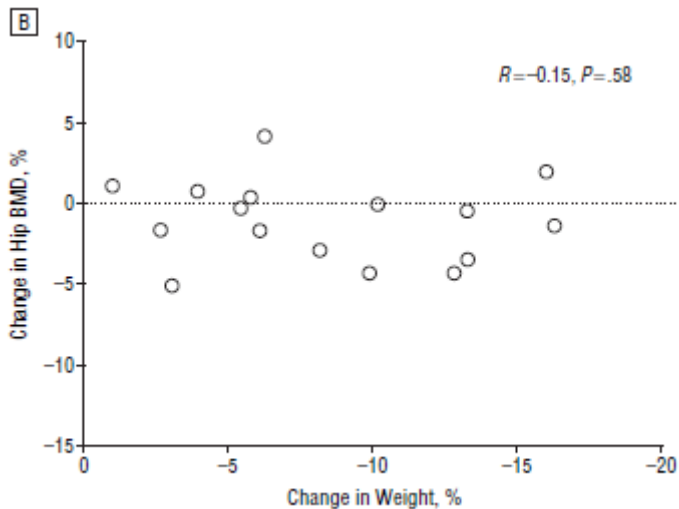
Ref: Tucker KL et al. 1999. Potassium, magnesium, and fruit and vegetable intakes are associated with greater bone mineral density in elderly men and women *Am J Clin Nutr* 69(4):727-736

Exercise during weight loss



Aerobic exercise helps decrease visceral AT.

Resistance / strength-training



Maintains LBM and muscle strength

Important adjunct to weight loss interventions in the elderly

Ref: Villareal DT et al. 2006. Bone Mineral Density Response to Caloric Restriction–Induced Weight Loss or Exercise-Induced Weight Loss A Randomized Controlled Trial. *Arch Intern Med.* 166:2502-2510

Exercise during weight loss

Exercise prescription for elderly by AAFP:

Cardiovascular



Moderate aerobic activity for a combined total of \geq 30 minutes, most days of the week.

Strength training



A single set of 10 to 15 reps using 8 to 10 different exercises, 2 to 3 times per week.

Balance & flexibility



Stretch major muscle groups once per day after exercise.

Ref: Nied RJ and Franklin B. 2002. Promoting and Prescribing Exercise for the Elderly. Am Fam Physician 65:419-26,427-8

Sample menu plan for weight loss

60kg female, 65 years old, Obese with BMI >30

Energy needs

1800 kcal *minus* 500 kcal = 1300 kcal

Protein needs

1g per kg body weight = 60g

Other nutrients

1500 mg Calcium/day

1000 IU vitamin D/day

1300kcal menu plan for weight loss

BF

Whole meal bread, toasted (2 slices) with butter and jam
 High calcium milk *for elderly* (1 cup)

S

Orange (1 medium)
 Crackers (5 small)

L






Mihun soup, mihun (1 Chinese Rice Bowl)
 - Shredded chicken meat (1 palm size)
 - Green leafy veg (½ cup)

S

Grapes (~ 10 grapes)
 High calcium milk for elderly (1 cup)

D

Brown rice, steamed (1 Chinese Rice Bowl)
 Fried fish / Ikan kembung (1 medium)
 Stir-fried spinach (½ cup)
 Stir-fried mix-vegetables (½ cup)

Food	Number of daily servings
Milk & dairy products	2 
Meat, Fish, Poultry, or Equivalent	2 
Vegetables	3 
Fruit	2 
Rice, noodles, bread, cereals, tubers	4 ½ 

Protein: ~ 60 g

Calcium: 1800 mg

Vitamin D: 1200 IU
(from milk only)

In summary

Position statement of the American Society for Nutrition and NAASO to manage obesity in older adults:

Referral to a dietitian with experience

Modest reduction in energy intake (500 to 750 kcal/day)

1.0g/kg high quality protein

Multivitamin and mineral supplement to meet 1500 mg Calcium/day and 1000 IU vitamin D/day

Regular physical activity

Thank You!



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