



Telehealth for Falls and Fracture
Prevention Implementation Trial

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Educational Module 3



**Nutrition for Optimal
Bone and Muscle Health**

Effects of Calcium and Vitamin D

- The effects of **calcium supplementation** or increased **dairy consumption** on **bone health** are **modest**.
 - *May slow or prevent bone loss, but mostly in the older people who have low habitual intakes but has little effect on fracture prevention.*
- **Vitamin D supplementation** alone **does not** prevent bone loss nor reduce the risk of osteoporotic fractures.
- The **combination** of **calcium + vitamin D** is **recommended** for those at risk for deficiency and those unable to meet daily requirements from dietary sources, and can result in a modest reduction in fracture risk.



The Royal Australian College of General Practitioners and Osteoporosis Australia. Osteoporosis prevention, diagnosis and management in postmenopausal women and men over 50 years of age. 2nd edn. East Melbourne, Vic: RACGP, 2017. * Is dependent on serum 25-hydroxyvitamin D concentration.



How Much Calcium is Needed?

Recommended Calcium Intakes

<i>Adults</i>	RDI
Men	
19–30 yr	1,000 mg/day
31–50 yr	1,000 mg/day
51–70 yr	1,000 mg/day
>70 yr	1,300 mg/day
Women	
19–30 yr	1,000 mg/day
31–50 yr	1,000 mg/day
51–70 yr	1,300 mg/day
>70 yr	1,300 mg/day

Daily recommendation increases as calcium is less effectively absorbed from the intestine and more can be lost through the kidneys.




Dietary Sources of Calcium

Refer to the TeleFFIT
website for a list of the
Calcium Content of
Common Foods



Food Source	Calcium
Milk, whole (200 ml)	236 mg
Milk, almond (200 ml)	90 mg
Yoghurt, natural (200 g)	300 mg
Hard & soft cheese (30 g)	240 mg
Soft cheese (30 g)	240 mg
Sardines in oil, canned (60 g)	240 mg
Oysters (100 g)	132 mg
Broccoli (120 g, raw)	112 mg
Silverbeet (100 g)	87 mg
Carrots (120 g, raw)	36 mg
Red beans (80 raw/200 cooked)	93 mg
Orange (150 g)	60 mg
Figs, dried (60 g)	96 mg
Tofu (120 g)	126 mg
Almonds (30 g)	75 mg





Meeting Daily Calcium Needs (~1300 mg/d)



To achieve ~1300 mg/d of calcium

- 4 slices of bread (64 mg)
- 2 slices of cheese (323 mg)
- 1 tub of yoghurt (390 mg)
- 2 glasses of milk (570 mg)

or

Breakfast: 1 cup milk with your porridge, cereal, toast or as a smoothie.

Morning tea: 200g yoghurt with fruit.

Lunch: Canned salmon with bones or sardines tossed through an Asian slaw salad.

Afternoon tea: Handful of almonds with 1-2 dried figs.

Dinner: Firm Tofu stir-fry with rice or noodles or chicken, broccoli and cheese baked in the oven.

Factors influencing **Calcium Absorption**

- Inadequate vitamin D
- Phytates (found in cereals, bran, soy beans, seeds); binds to calcium in the intestine and decrease its absorption
- Oxalates (found in spinach, rhubarb, walnuts): binds to calcium and makes calcium unavailable for absorption
- Caffeine, alcohol and salt
- Low dietary protein



The absorption of calcium is about 30% from dairy and fortified foods (e.g. orange juice, tofu, soymilk), which is considerably higher than from certain leafy green vegetables.



Calcium Supplements

- An extra **500 - 600 mg of calcium per day** is sufficient for most people to achieve their appropriate daily calcium intake.
 - *Single calcium tablet containing 500-600 mg of calcium.*
 - *Best to take calcium supplements with or after meals (absorption increased by 10 - 30%).*
- Body can best **handle about 500 mg of calcium at one time** from food and/or supplements. If taking 1000-1200 mg, a divided dose best.
- **No marked difference** in the absorption of calcium from supplements and dietary sources (excluding foods rich in phytates or oxalates).



Sources of Vitamin D

Diet

- Few foods contain vitamin D or are fortified with vitamin D.

Good food sources: fatty fish (wild salmon, herring, mackerel), liver and eggs and sun-dried shiitake mushrooms and fortified foods (margarine and some milk products) or fortified milk or soy products.



Sunlight

- Up to 95% of our vitamin D comes from exposure to sunlight.
Summer: a few minutes most days ► Winter: 2-3 hours per week.



Supplements

- Vitamin D supplements are cheap, and usually come in a dose of 1000IU. Many multi-vitamins contain vitamin D, but not in the amount required for preventing or treating deficiency.



Vitamin D Recommendations

To Prevent Vitamin D Deficiency

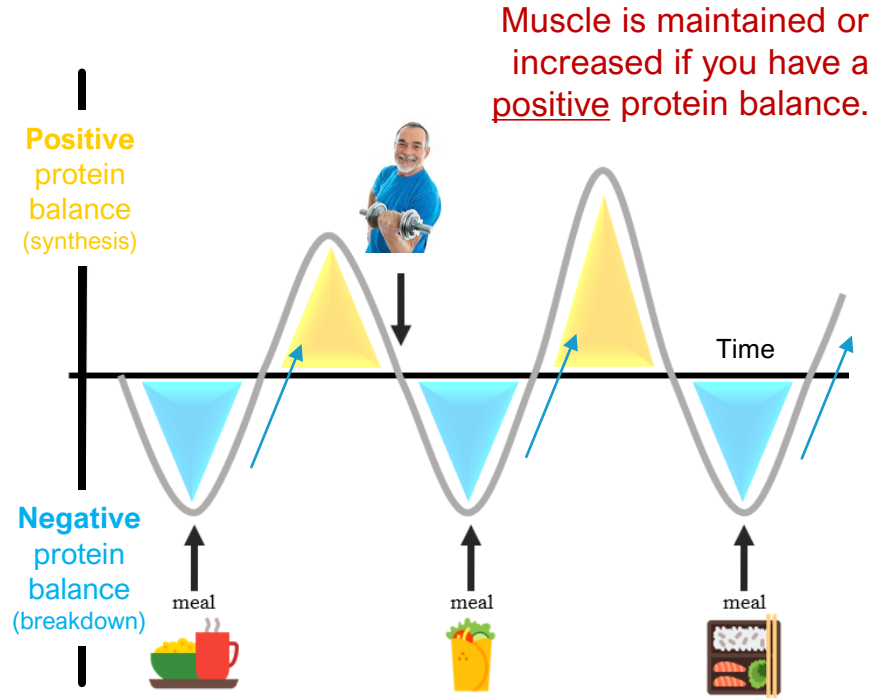
- At least **600 IU** (15 μg) per day for adults aged ≤ 70 years
- At least **800 IU** (20 μg) per day for adults aged > 70 years
- Sun avoiders or people who are at high risk of deficiency may require **1000–2000 IU** per day



* For people with a diagnosed deficiency, greater amounts may be needed, possibly in conjunction with calcium – your doctor or other health professional will advise you.

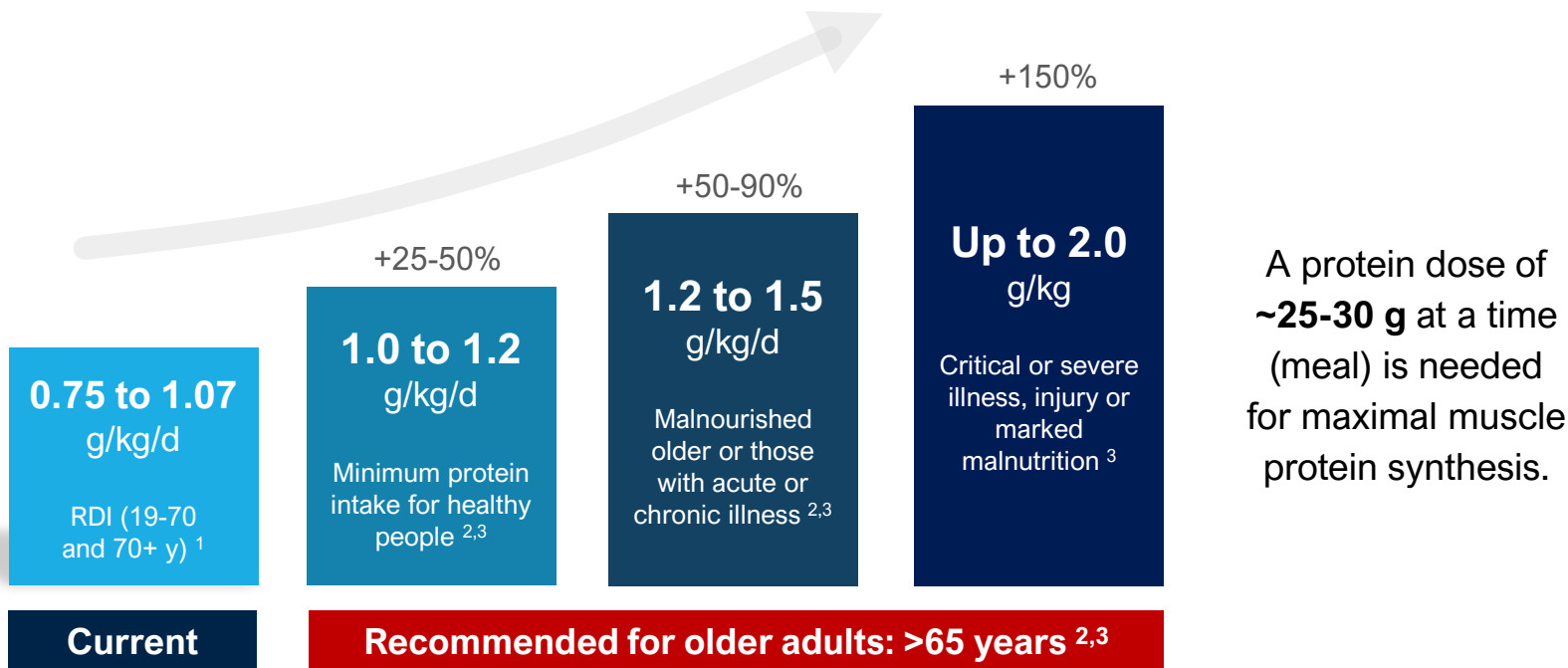
Dietary Protein: *Why Is It Important?*

- **Proteins** are made up of '*building blocks*' called **amino acids**, which the body uses to build and repair tissues (e.g. muscle, bone, skin and most body parts and tissues).
- **Muscles** are in a **constant state of turnover** - repair (breakdown) and synthesis (build up).
- During the day, your muscle protein balance continuously fluctuates **becoming positive after a meal**.



Adapted from <https://www.veohtu.com/protein.html>

Dietary Protein Recommendations



1 NHMRC Dietary Guidelines; 2 Deutz et al. Clin Nutr 2014; 3 Bauer J et al, JAMDA 2013; 4 Churchward et al. Sports Med 2016

Foods High in Protein

(Recommend a food first approach)



Lean beef
33 g per 150 g (raw)



Chicken
33 g per 150 g (raw)



White fish
30 g per 150 g (raw)



Tofu
12 g per 100 g



Tuna
19 g per 95 g can



Milk
10 g per cup



High protein milk
15 g per cup



Mixed nuts
7 g per 30 g



High protein yoghurt
15 g per 170 g



Cheese
9 g per 35 g



Eggs
8 g per large egg



Legumes
7 g per half cup

<https://blog.totalwellbeingdiet.com/au/2020/12-fantastic-protein-foods/>

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Protein Intake

~1.2 - 1.5 g/kg/d

Based on an average 72 kg women

Breakfast

- Two eggs 12 g
- 2 slices mixed grain bread (toast) 6 g
- 1 tub of yoghurt 10 g

Snack

- Coffee with milk 1 g
- Handful of mixed nuts 8 g

Lunch

- Ham and cheese on sandwich 20 g
- Mixed grain bread 6 g
- Teddy bear biscuits 2.5 g

Snack

- Coffee with milk 1 g
- Banana 1.5 g

Dinner

- Beef, sirloin steak (80g) 18 g
- Baked potato (1), peas (1/2 cup) and carrots 9 g
- Glass of red wine 0 g

Total

95 g (~1.2 g/kg)