Skeletal Care Academy

Supporting Bone Health in Oncology

The Importance of Calcium and Vitamin D for Bone Health

Calcium

Calcium, a mineral in the body, is required for several important functions, including:[1,2]

- Bone and teeth strength
- Muscle contraction
- Nerve transmission
- Enzyme activity
- Cell membrane formation
- Hormone secretion
- Blood clotting

The recommended intake of calcium is 1.2–1.5 g/day[3]

Vitamin D

Vitamin D, a fat-soluble vitamin, promotes calcium absorption in the gut and maintains adequate levels of calcium and phosphate in the blood. It is also needed for bone growth and bone remodeling.[1]

The recommended intake of vitamin D is 800 IU/day[3]

Bone remodelling

Most, 99%, of the body's calcium supply is stored in the bones and teeth where it supports their structure and function.[1] The bone is a living dynamic tissue and is continuously remodeling with constant resorption and deposition of calcium into new bone. Old bone is resorbed by osteoclasts ('bone eaters') and new bone is formed by osteoblasts ('bone builders').[4]

Calcium and vitamin D deficiency

A low blood level of calcium, hypocalcaemia, is usually caused from medical issues e.g. renal failure, surgical removal of the stomach and use of certain treatments e.g. diuretics, bisphosphonates, or denosumab.

A lack of vitamin D can cause bones to become thin, brittle, or misshapen and can result in hypocalcaemia. Symptoms of hypocalcaemia are dependent on blood calcium levels and include:[6]

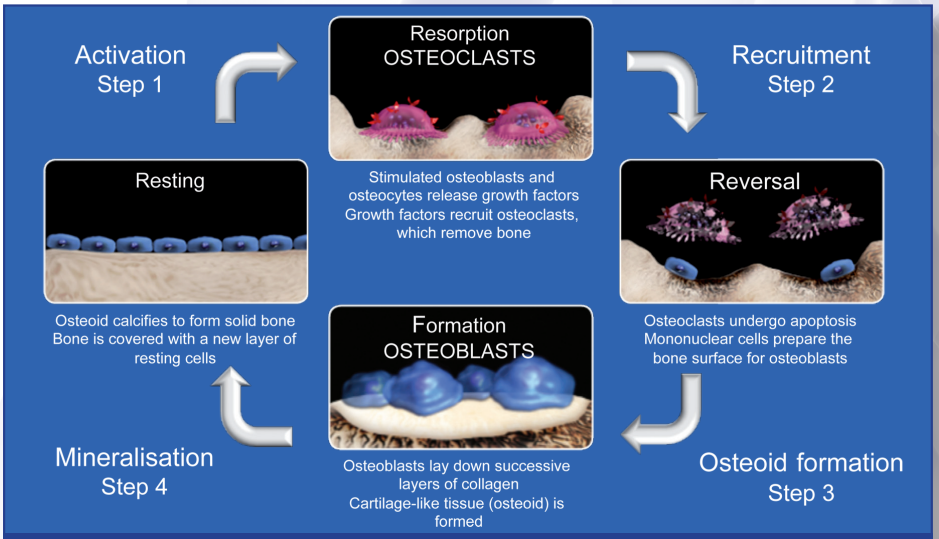
- Numbness and tingling in the fingers
- Muscle cramps
- Convulsions
- Lethargy
- Poor appetite
- Abnormal heart rhythms

Supplementation

National nutrition surveys have shown most people do not get enough calcium in their diet and supplements are needed.[7,8]

Good dietary sources of calcium include:[2]

- Dairy products e.g. milk and cheese
- Green leafy vegetables e.g. broccoli and cabbage (not spinach)
- Fish that includes the bones e.g. sardines and pilchards
- Bread and fortified flour products
- Nuts
- Soya beans and drinks (with added calcium)
- Tofu



The four stages of bone remodelling[5]

The recommended intake of calcium is 1.2–1.5 g/day

Sources of vitamin D:[9]

- Sunlight on the skin
- Oily fish e.g. sardines and salmon
- Eggs
- Fortified breakfast cereals and fat spreads
- Powdered milk

Supplementation is particularly important when taking a medication that lowers the calcium levels in the blood.

REFERENCES

1. Dietary Reference Intakes for Calcium and Vitamin D. Washington, DC: National Academy Press, 2010.
2. http://www.nhs.uk/Conditions/vitamins-minerals/Pages/Calcium.aspx
3. Michaud LB and Goodin S. *Am J Health Syst Pharm* 2006;63:534-46.
4. Seeman E and Delmas PD. *N Engl J Med* 2006;354:2250-61.
5. Raisz L. *J Clin Invest* 2005;115:3318-25.
6. Abramson EC, et al. *Bone Miner* 1990;161-69.
7. NIH Office of Dietary Supplements. Dietary supplement factsheet: calcium. Available at http://dietary-supplements.info.nih.gov/factsheets/calcium.asp
8. NIH Office of Dietary Supplements. Dietary supplement factsheet: vitamin D. Available http://ods.od.nih.gov/factsheets/vitamind.asp
9. http://www.nhs.uk/Conditions/vitamins-minerals/Pages/Vitamin-D.aspx

Supported by AMGEN Oncology

DMO-IHQ-AMG-025-2012-September-NP