# Cal-Mag SAP

*Science-based calcium, magnesium, and vitamin $D_3$ for bone health**

Bone mass and vitamin-D synthesis decrease with aging and inactivity in women and men. Reducing bone loss delays the onset of weakness, thus lowering fracture risk. Peak bone mass is determined by genetics, body weight, weight-bearing activity, and intake of nutrients composing the bone matrix and/or regulating its metabolism. Adequate calcium intake is important to prevent bone resorption and osteoporosis, and higher magnesium intakes have been positively associated with bone mineral density.* Vitamin $D_3$ is essential for maintaining calcium levels and increases calcium absorption from the intestine.*

## SUPPLEMENT FACTS

**Serving Size:** 1 Capsule

| | Amount Per Serving | % Daily Value |
|---|---|---|
| Vitamin D (vitamin $D_3$) | 2.5 mcg (100 IU) | 25% |
| Calcium (from 458 mg of calcium citrate) | 110 mg | 11% |
| Magnesium (from 468 mg of magnesium citrate) | 75 mg | 19% |

**Daily Value not established

**Other ingredients:** Hypromellose, purified water, and vegetable magnesium stearate.

**This product is non-GMO and vegetarian friendly.**

**Contains no:** Gluten, soy, wheat, eggs, dairy, yeast, citrus, preservatives, artificial flavour or colour, or sugar.

**Cal-Mag SAP** (calcium, magnesium, vitamin $D_3$) contains 120 capsules per bottle.

## DIRECTIONS FOR USE

**Adults: Take 1 capsule three times daily** or as directed by your healthcare practitioner. Take with food a few hours before or after taking other medications or natural health products.

3 capsules provide 330 mg of elemental calcium, 225 mg of elemental magnesium, and 300 IU of vitamin $D_3$.

**WARNING:** Consult your healthcare practitioner before taking if you are pregnant or breast-feeding.

## INDICATIONS

**Cal-Mag SAP** can help:

- Support maintenance of bone strength and health when independently consumed three times daily.*
- Maintain calcium levels and improve calcium absorption from the intestine.*

## ELEMENTAL DOSES

Recommended calcium and magnesium intakes are expressed in elemental value (see Table 1 on next page). **Cal-Mag SAP** provides 330 and 225 mg/d of elemental calcium and magnesium, respectively. Guaranteed doses to complement dietary intakes of these minerals.

## FORM TO GUARANTEE SAFETY, EFFICACY, AND MAXIMIZED ABSORPTION

**Cal-Mag SAP** provides a 3:2 ratio of calcium to magnesium plus vitamin $D_3$ to give you balanced support in maintaining strong, healthy bones.

Vitamin D promotes calcium absorption and bone mineralization. Research demonstrates that calcium and magnesium are better absorbed when bound to citrate compared to carbonate. Thus, **Cal-Mag SAP** contains calcium citrate, magnesium citrate, and vitamin $D_3$ to optimize absorption and efficacy.

## PURITY, CLEANLINESS, AND STABILITY

All ingredients listed for each **Cal-Mag SAP** lot number have been tested by an ISO 17025–accredited third-party laboratory for identity, potency, and purity.

*** These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.**


Scientific Advisory Panel (SAP): adding nutraceutical research to achieve optimum health

NFH®

351, Rue Joseph-Carrier, Vaudreuil-Dorion, Quebec, J7V 5V5
T 1 866 510 3123 • F 1 866 510 3130 • nfh.ca

*For healthcare professional use only.*

## BONE HEALTH AND OSTEOPOROSIS

Bone, part of the human skeleton, is a hard connective tissue made up of cells embedded in a matrix of minerals and collagen fibres. These fibres are rich in calcium but also contain carbonate, sodium citrate, and magnesium.

Bone composition changes considerably as we age. The rate of bone loss with aging is approximately 1% per year in men and women.[1] With increasing age, bone activity and vitamin D synthesis also decrease and these, coupled with low calcium intake, result in an increase in parathyroid hormone (PTH), stimulating bone resorption and promoting bone demineralization. Loss of bone health in this process can result in the development of osteoporosis (osteopenia), a prevalent disease in Western society and a serious concern among older women in particular, but also among men.

While genetic, aging, ethnic and other factors affecting bone health cannot be eliminated, lifestyle and diet can positively influence bone mineral density and reduce bone loss.

## CALCIUM, MAGNESIUM, AND VITAMIN D: PHYSIOLOGIC FUNCTIONS AND DIETARY INTAKES

With respect to nutrition, optimizing bone health can be easily achieved through adequate intakes of calcium and vitamin D, as well as other micronutrients including magnesium, potassium, vitamin C, and vitamin K, among others.[2]

**Table 1. Dietary Reference Intakes (Men, Women)[3, 4]**

| | RDA | UL |
|---|---|---|
| **Calcium** | 1000 to 1200 mg/d depending on age | 2500 mg/d |
| **Magnesium** | 310 to 420 mg/d depending on age | 350 mg/d |
| **Vitamin D** | 200 to 400 IU/d depending on age | 2000 IU/d |

RDA = Recommended Daily Allowance; UL = Tolerable Upper Limit; d = day; IU = International Units

**Note:** Calcium and magnesium intakes are expressed in elemental values. To convert IU/d to g/d, divide by 40.

**Calcium** — Calcium is one of the main bone-forming minerals with an appropriate supply to bone being essential at all stages of life.[5] Calcium also plays an essential role in blood clotting, muscle contraction, nerve transmission, and bone and tooth formation.[3]

Calcium is present in milk, cheese, yogurt, corn tortillas, calcium-set tofu, Chinese cabbage, kale and broccoli.[3] Calcium intakes are expected to be low in individuals restricting total energy intakes, consuming foods with reduced calcium density, and in those with lactose intolerance.[1] Calcium needs can increase depending on health and lifestyle. For example, net calcium absorption is reduced in amenorrheic women,[3] and some data suggest high protein intake increases calcium requirements.[3] For most premenopausal and postmenopausal/lactating women consuming 500 to 600 mg/d of calcium from diet, supplementing with 400 and 800 mg/d of calcium, respectively, is suggested in order to achieve recommended intake levels (see Table 1) for these groups (1000 mg/d and 1200 to 1500 mg/d, respectively).[6] Supplement needs may be as high as 1000 mg/d of calcium in normal individuals if dietary calcium intakes are very low.[5]

**Magnesium** — Magnesium is a cofactor for enzyme systems,[3] existing as a matrix constituent involved in skeletal formation and growth.[1] Dietary magnesium comes from green leafy vegetables, unpolished grains, nuts, meat, starches, and milk.[3]

Despite its prevalence in these foods, many individuals have magnesium intakes in the US falling below recommended levels (see Table 1), and individuals with poor diets; intestinal disease; being treated with diuretics, chemotherapy or estrogens; and alcoholics are more likely to require supplemental magnesium.[2, 7] It is recommended that calcium and magnesium supplementation be combined in a ratio of 2:1 or lower to avoid relative magnesium deficiency[7] and possible constipation secondary to high calcium intakes.[2]

**Vitamin $D_3$ —** Vitamin $D_3$ is also known as cholecalciferol. Vitamin $D_3$ is modified in the liver and kidney to produce 1,25-dihydroxycholecalciferol (calcitriol), the most active metabolite of vitamin D.

The function of vitamin D is to maintain serum calcium and phosphorus concentrations[4] through regulating calcium absorption from the intestine or calcium resorption from bone, as needed.[1] Vitamin D is found in the diet in flesh and liver oils from fish and seals, eggs from hens fed vitamin D, fortified milk products, and fortified cereals.[4] Vitamin D can be synthesized in the body following sun exposure, but at latitudes above 40° N, such as in Canada and many parts of the US, and below 40° S, its endogenous synthesis is absent during the winter months.[1] In addition, supplemental vitamin D may be required for patients on glucocorticoid therapy.[4]

## CALCIUM AND MAGNESIUM BIOAVAILABILITY

Efficiency of calcium absorption generally follows intake but increases with higher intake[8] and is regulated to adjust to greater calcium needs.[1] Calcium absorption progressively decreases with aging.[1]

Magnesium absorption also follows intake but differs from calcium in that its absorption is not influenced by vitamin D.[9] External factors such as dietary fibre, phytate, oxalate, caffeine, fat, and phosphorus decrease calcium absorption, and protein, sodium, chloride and acid ash increase calcium excretion.[1] Similarly, vitamin $B_6$ depletion and increased zinc and dietary fibre intake have been linked with decreased magnesium absorption.[9]

## SAFETY OF CALCIUM, MAGNESIUM AND VITAMIN $D_3$

Canadian and US federal standards have set recommended dietary allowances (RDA) and tolerable upper limits (UL) for effective and safe lifelong consumption of calcium, magnesium and vitamin D (Table 1).

It is suggested that very high daily doses of calcium could pose a safety concern because of the risk for hypercalciuria and kidney stones, imbalance of the calcium-to-magnesium ratio,[6] as well as reduced intestinal absorption of zinc.[10] Other adverse effects of excessive calcium consumption include milk alkali syndrome and renal insufficiency.[3]

There is no evidence of adverse effects from the consumption of naturally occurring magnesium in foods.[3] Adverse effects from magnesium-containing supplements may induce osmotic diarrhea.[3]

Adverse effects of excessive vitamin-D consumption include elevated plasma 25(OH) D concentration, causing hypercalcemia.[4]

## NUTRITION THERAPY IN RISK OF OSTEOPOROSIS

Osteoporosis often goes undetected until the condition is advanced and fracture or severe, chronic back pain occurs. Epidemiological research of populations with average calcium intakes below recommended levels (see Table 1) and populations at risk of osteoporotic fracture suggest that declining calcium intake or intakes under 400 to 500 mg/d significantly increase osteoporotic fracture risk.[5] Further, positive correlations between each of calcium and magnesium intake and bone mineral content (BMC) and bone mineral density (BMD) are reported,[5] where protection associated with calcium intake is seen in older white men and women, in premenopausal white women, and in Japanese American men and women, but not in older black men and women.[2, 11] In contrast to these findings, multiple other epidemiological studies have failed to show comparable associations.[5]

With respect to calcium supplementation and osteoporosis, most trials have involved postmenopausal women. The findings of two meta-analyses[12, 13] combining the results of supplement trials were that calcium supplementation with and without vitamin D had a positive influence on stopping or slowing bone loss after the first year[12] and a positive influence on bone mineral density after more than one year.[13]

Other research supports that normal populations with low calcium intakes supplement 1000 mg/d of calcium to lower hip fracture risk by 24%,[5] that aging women supplement with calcium to maintain bone,[14] and that it be emphasized to patients receiving osteoporosis therapy that they ensure adequate intakes of calcium and vitamin D.[2]

There have been fewer osteoporosis-related clinical trials using magnesium supplementation.[2] It is suggested that supplementation of calcium with limited amounts of magnesium may improve bone mineralization,[6] but overall, observational and clinical trial data for magnesium intake and its benefit for bone density or fractures are inconclusive. The most prominent effects following magnesium supplementation have occurred in magnesium-depleted individuals.[2]

## REFERENCES

1. Branca, F. and S. Vatueña. "Calcium, physical activity and bone health — building bones for a stronger future." *Public Health Nutrition* Vol. 4, No. 1A (2001): 117–123.
2. Nieves, J.W. "Osteoporosis: the role of micronutrients." *The American Journal of Clinical Nutrition* Vol. 81, No. 5 (2005): 1232S–1239S.
3. Institute of Medicine. *Dietary Reference Intakes: Elements* (2001) • http://www.iom.edu/~/media/Files/Activity%20Files/Nutrition/DRIs/DRI_Elements.pdf
4. Institute of Medicine. *Dietary Reference Intakes: Vitamins* (2001) • http://www.iom.edu/~/media/Files/Activity%20Files/Nutrition/DRIs/DRI_Vitamins.pdf
5. Prentice, A. "Diet, nutrition and the prevention of osteoporosis." *Public Health Nutrition* Vol. 7, No. 1A: 227–243.
6. Celotti, F. and A. Bignamini. "Dietary calcium and mineral/vitamin supplementation: a controversial problem." *The Journal of International Medical Research* Vol. 27, No. 1 (1999): 1–14.
7. Seelig, M.S. "Increased need for magnesium with the use of combined oestrogen and calcium for osteoporosis treatment." *Magnesium Research* Vol. 3, No. 3 (1990): 197–215.
8. Weaver, C.M. and R.P. Heany. "Calcium", in *Modern Nutrition in Health and Disease*, Ninth Edition. Shils, M.E., J.A. Olson, M. Shike, and A.C. Ross, eds. Philadelphia, Pennsylvania, USA: Lippincott, Williams & Wilkins, 1999: p. 141–155.
9. Shils, M.E. "Magnesium", in *Modern Nutrition in Health and Disease*, Ninth Edition. Shils, M.E., J.A. Olson, M. Shike, and A.C. Ross, eds. Philadelphia, Pennsylvania, USA: Lippincott, Williams & Wilkins, 1999: p. 169–192.
10. Abrams, S.A. and S.A. Atkinson. "Calcium, magnesium, phosphorus and vitamin D fortification of complementary foods." *The Journal of Nutrition* Vol. 133, No. 9 (2003): 2994S–2999S.
11. Ryder, K.M., et al. "Magnesium intake from food and supplements is associated with bone mineral density in healthy older white subjects." *Journal of the American Geriatrics Society* Vol. 53, No. 11 (2005): 1875–1880.
12. Mackerras, D. and T. Lumley. "First- and second-year effects in trials of calcium supplementation on the loss of bone density in postmenopausal women." *Bone* Vol. 21, No. 6 (1997): 527–533.
13. Shea, B., et al. "Meta-analyses of therapies for postmenopausal osteoporosis. VII. Meta-analysis of calcium supplementation for the prevention of postmenopausal osteoporosis." *Endocrine Reviews* Vol. 23, No. 4 (2002): 552–559.
14. McKane, W.R., et al. "Role of calcium intake in modulating age-related increases in parathyroid function and bone resorption." *The Journal of Clinical Endocrinology and Metabolism* Vol. 81, No. 5 (1996): 1699–1703.





*For healthcare professional use only.*