Calcium Supplementation—Strong Bones and a Healthy Heart

Calcium is the most abundant mineral in the body and is integral in processes such as vascular and muscle function, nerve transmission, intracellular signaling and hormonal secretion.[1] However, only about 1% of the body's calcium stores are used for these.[1] The remaining 99% of the body's calcium is stored in bones and teeth to help maintain their structural strength.[1] and to provide reserves to maintain levels in the blood, muscles and intercellular fluid.

The Recommended Dietary Allowance for calcium is as follows:

Age	Male	Female	Female Pregnant or Lactating
1-3 years	700 mg	700 mg	
4-8 years	1,000 mg	1,000 mg	
9-13 years	1,300 mg	1,300 mg	
14-18 years	1,300 mg	1,300 mg	1,300 mg
19-50 years	1,000 mg	1,000 mg	1,000 mg
51-70 years	1,000 mg	1,200 mg	
71+ years	1,200 mg	1,200 mg	

While calcium in the diet can primarily be found in dairy products and green leafy vegetables, many Americans are not consuming enough calcium through their diets alone. Specifically, many teenagers (ages 9-18) women (ages 51-70) and both men and women (ages 70+) are not meeting their RDA for calcium.[3] For this reason, calcium supplements become important to help Americans meet their calcium needs.

Calcium and Bone Health

It is known that calcium with its co-actor, Vitamin D, is essential in maintaining bone health with a resultant decrease in the risk of development of osteoporosis [5]. Osteoporotic fractures are a growing health care problem with an estimated lifetime risk for 50-year old Caucasians of at least 40% for women and 13% for men.[4]

Vitamin D status is a factor that effects intestinal absorption of calcium and is essential for maintaining adequate levels of calcium in the body. A recent meta-analysis of clinical trials in adults aged 50-years or older found that calcium supplementation or combined calcium and vitamin D supplementation reduced the relative risk of fractures by 12%.[6] Maintaining adequate calcium intake through dietary sources and supplements is a safe and effective strategy for reducing risk of developing of osteoporosis.[7] In fact, numerous studies have found that calcium supplementation may slow or delay bone loss at common fracture sites such as the hip and spine.[4,7-12]

Beyond Bone Health

Over the past two decades there has been a growing body of evidence to suggest that the use of calcium[13-19] or calcium plus vitamin D[20-22] supplements may lead to a number of health benefits beyond bone health maintenance. Some of these other health benefits include supporting heart health, maintaining healthy blood sugar levels and supporting healthy, normal cell growth. Several clinical trials and meta-analyses have demonstrated that calcium supplementation may improve lipid levels[-17] and blood pressure.[18-19] This may be due to calcium's ability to bind fat and bile in the intestines leading to a reduced level of fat absorption. [16,23]

Does Calcium Supplementation Raise the Risk of Heart Attacks?

The current evidence suggesting that calcium supplementation increases heart attacks is too weak to justify a change in prescribing habits.[25] In fact, there is ample evidence to support that calcium supplementation is safe and has no negative effect on heart health. This evidence includes:

- A systematic review concluded calcium supplements have minimal cardiovascular effects and that vitamin D at moderate to high doses alone or in combination with calcium may reduce cardiovascular risk.[26]
- Calcium supplementation at 1200 mg/day did not significantly increase the risk of atherosclerotic vascular disease in elderly women. Further analysis suggests that calcium supplementation may reduce the risk of hospitalization and mortality in patients with preexisting atherosclerotic cardiovascular disease.[27]
- Calcium supplementation at 1 g/day significantly decreased systolic blood pressure in post menopausal women.[29]

- A study of men in the Health Professionals Follow-up Study found that neither dietary or supplemental intakes of calcium in men of the highest quintile (median = 1377 mg/day) were associated with the risk of ischemic heart disease.[30]
- Calcium/vitamin D supplementation had no effect on cardiovascular risk in healthy post menopausal women over a 7-year period.[31]

So What Should Health Professionals Do?

The evidence is certain that calcium supplementation is an important public health measure for promotion of healthy strong bones, reductions in the risk of occurrence of osteoporotic fractures and its complications. Given the many benefits of calcium supplementation coupled with the lack of convincing evidence regarding risk to heart health, health professionals can be assured that calcium supplementation is safe, effective and appropriate and should recommend calcium supplements without hesitation.

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