

FROM THE FAMILY PRACTICE INQUIRIES NETWORK

Do calcium supplements prevent postmenopausal osteoporotic fractures?

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■ EVIDENCE-BASED ANSWER

Calcium supplementation (1000–1200 mg daily) decreases menopause-related bone loss and reduces the rate of vertebral and non-vertebral fractures. Calcium is more efficacious in conjunction with vitamin D (700–800 IU daily), particularly in elderly patients, who have a high rate of vitamin D deficiency (strength of recommendation: **A**, based on randomized controlled trials).

■ EVIDENCE SUMMARY

Calcium supplementation lessens bone loss in postmenopausal women. One double-blind, randomized controlled trial included healthy women who were 6 or more years postmenopausal and had a dietary intake of less than 400 mg of calcium per day.¹ Women who received daily calcium citrate (500 mg) for 2 years had significantly less bone loss at the spine, hip, and radius than women taking placebo. In addition, calcium carbonate supplementation maintained bone density at the hip and radius but not the spine when compared with placebo. This dose of calcium was not associated with better outcomes in women within the first 5 years after menopause, but the dose was less than most generally recommended ranges.

Another randomized controlled trial of healthy women, postmenopausal for at least 3 years, showed that calcium supplementation at 1000 mg per day for 2 years decreased bone density loss in the hip and eliminated loss in the spine.² The effect may be greatest in the first year of supplementation and less in subsequent years.³

Several studies have shown calcium supplementation has a beneficial effect on reducing fractures in postmenopausal women. A randomized controlled trial of healthy, community-dwelling people 65 years of age and older (55% women) showed daily supplementation with 500 mg calcium and 700 IU vitamin D for 3 years

decreased nonvertebral fractures vs. placebo (response rate [RR]=0.54; 95% confidence interval [CI], 0.12–0.77; number needed to treat [NNT]=15).⁴

Another randomized controlled trial of elderly ambulatory women showed that supplementation with 1200 mg calcium and 800 IU vitamin D per day for 18 months decreased hip fractures (RR=0.26; 95% CI, 0.03–0.44; NNT=48) and other nonvertebral fractures (RR=0.25; 95% CI, 0.09–0.38; NNT=26).⁵

A third randomized controlled trial in post-menopausal women with low calcium intake and previous vertebral fractures showed that 1200 mg of calcium supplementation reduced the incidence of additional fractures (RR=0.23).⁶

Not all studies agree. The Study of Osteoporotic Fractures showed no beneficial effect of calcium supplements on fracture risk. This cohort study found that calcium supplements were actually associated with an increased risk of hip fracture (RR=1.5; 95% CI, 1.1–2.0) and vertebral fracture (RR=1.4; 95% CI, 1.1–1.9).⁷

Observational studies like this are subject to bias; reviews of the more rigorous randomized trials support calcium supplementation in order to decrease the risk of vertebral fracture by approximately 35% and nonvertebral fractures by approximately 25%.^{8,9} Daily supplementation of calcium (500–1200 mg) along with vitamin D (700–800 IU) is the regimen best supported by the evidence. Since the absorption of calcium decreases with single doses above 500 mg, the studies that used 1000–1200 mg of calcium split the daily doses.¹⁰

■ RECOMMENDATIONS FROM OTHERS

Guidelines have been published by the National Osteoporosis Foundation (1999),¹¹ the National Institutes of Health Consensus Development Panel on Osteoporosis (2000),¹² and others, all recommending 1200–1500 mg of elemental calcium and 400–800 IU of vitamin D be taken daily through a combination of diet and supplementation. The United States Preventive Services Task Force¹³ recommends that 1000–1500 mg of calcium be used daily; they make no specific recommendation regarding vitamin D supplementation.

CLINICAL COMMENTARY

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Calcium and vitamin D are the foundation of osteoporosis treatment and prevention.

Nearly every trial evaluating the use of antiresorptive and anabolic agents for the treatment and prevention of osteoporosis have evaluated these therapies in combination with calcium and vitamin D. As evaluated in this clinical inquiry, studies have also demonstrated benefit of these agents together in the absence of other medications.

Clinicians should ensure adequate dosing of calcium and vitamin D in all patients they are evaluating for osteoporosis treatment and prevention.

Clinicians should remember some people do get a significant portion of their daily

nutritional requirements through diet, and incorporation of calcium and vitamin D as a part of a healthy diet should be the first recommendation. Checking the vitamin D content of a patient's multivitamins is also important to avoid added expense.

Use of calcium citrate should be recommended for the elderly and those with achlorhydria, as acid is necessary to absorb the less expensive calcium carbonate. There is no evidence at this time suggesting a need to recommend other calcium salts.

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