



Vitamin D and Fracture Prevention: Not what it's cracked up to be?

CLINICAL QUESTION

Does vitamin D prevent fragility fractures?

BOTTOM LINE

Vitamin D alone does not prevent fractures regardless of dose, vitamin D status or previous fracture. The combination of calcium and vitamin D might reduce the risk of total fractures from 11.5% to 10.9% and hip fractures from 1.8% to 1.5% over 9-84 months, but this benefit may be limited to women in long-term care. Adding calcium increases risk of renal calculi (2.1% to 2.5%).

EVIDENCE

- Eight systematic reviews¹⁻⁸ of 7-36 randomized controlled trials (RCTs); 34,000-76,000 mostly community-dwelling women: some with previous fracture, established osteoporosis or metabolic bone disease, followed 9-84 months.
- Vitamin D versus placebo/no treatment:
 - Total fracture:¹⁻⁸ No difference.
 - Hip fracture:^{1-5,8} No difference. One systematic review⁷ (varying high doses) suggested slightly higher risk in women (1.2% versus 0.9%).

- Total or hip fractures:
 - High dose (>800 IU): Three systematic reviews^{1,4,8} showed no difference, one⁷ showed increased risk (described above) and one⁶ showed benefit, but no absolute numbers reported.
 - Baseline vitamin D level <50 nmol/L¹ or previous fracture:² No difference.
- Vitamin D-calcium combination versus placebo:
 - Total fracture: 10.9% versus 11.5% (placebo), number needed to treat (NNT)=167.² Others showed similar.^{3,5,6} One systematic review did not report largest RCT.¹
 - Removing two RCTs of women in long-term care: Results no longer statistically different.²
 - Hip fracture:² 1.5% versus 1.8% (placebo), NNT=333.
 - Two systematic reviews found similar;^{3,5} one found no difference.⁸
 - Total or hip fracture:
 - Baseline vitamin D <50 nmol/L¹ or previous fracture:^{1,2} No difference.
- Adverse events:
 - Vitamin D alone: None.²
 - Combination: No difference in mortality or gastrointestinal effects;² renal calculi increased (2.5% versus 2.1% placebo).⁷
- Limitations: Disproportionate number of smaller positive studies, skewing results towards favouring vitamin D.^{2,4} Randomization process and concealment uncertain.²

CONTEXT

- Calcium alone has no effect on the risk of total or hip fracture.^{1,8}
- Osteoporosis Canada: Supplementation with vitamin D and calcium is unlikely to have clinically important benefit if diet contains adequate calcium.⁹
- Measuring vitamin D levels routinely is unnecessary. No RCTs have evaluated treating to a target vitamin D level to prevent fractures.¹⁰

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