

Protective effect of total and supplemental vitamin C intake on the risk of hip fracture—a 17-year follow-up from the Framingham Osteoporosis Study

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Abstract

Vitamin C may play a role in bone health. In the Framingham Study, subjects with higher total or supplemental vitamin C intake had fewer hip fractures and non-vertebral fractures as compared to subjects with lower intakes. Therefore, vitamin C may have a protective effect on bone health in older adults.

Introduction: Dietary antioxidants such as vitamin C may play a role in bone health. We evaluated associations of vitamin C intake (total, dietary, and supplemental) with incident hip fracture and non-vertebral osteoporotic fracture, over a 15- to 17-year follow-up, in the Framingham Osteoporosis Study.

Methods: Three hundred and sixty-six men and 592 women (mean age 75 ± 5 years) completed a food frequency questionnaire (FFQ) in 1988–1989 and were followed for non-vertebral fracture until 2003 and hip fracture until 2005. Tertiles of vitamin C intake were created from estimates obtained using the Willett FFQ, after adjusting for total energy (residual method). Hazard ratios were estimated using Cox-proportional hazards regression, adjusting for covariates.

Results: Over follow-up 100 hip fractures occurred. Subjects in the highest tertile of total vitamin C intake had significantly fewer hip fractures (P trend = 0.04) and non-vertebral fractures (P trend = 0.05) compared to subjects in the lowest tertile of intake. Subjects in the highest category of supplemental vitamin C intake had significantly fewer hip fractures (P trend = 0.02) and non-vertebral fractures (P trend = 0.07) compared to non-supplement users. Dietary vitamin C intake was not associated with fracture risk (all $P > 0.22$).

Conclusion: These results suggest a possible protective effect of vitamin C on bone health in older adults.