Vitamin K and Bone Health: An Updated Systematic Review and Meta-analysis

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INTRODUCTION

Previous research suggests some forms of vitamin K may prevent loss of bone mineral density (BMD), and possibly reduce fracture incidence⁴. Indeed, a recent systematic review and meta-analysis⁵ showed a marked overall benefit for vitamin K2 supplementation in reducing fracture risk. However, the evidence is not conclusive, with some studies showing no effect of vitamin K on bone health³.

AIMS

• The purpose of this study was to update the systematic review and meta-analysis that we published in 2007.
• This meta-analysis examined the effect of both vitamin K1 and vitamin K2 (menaquinone-4 and menaquinone-7) on bone turnover, BMD and fracture risk.
• This update was undertaken in the light of key vitamin K supplementation studies completed in the last 30 months.

METHODS

• The Cochrane Library (1994-2009) and EMBASE (1980-2009) databases were searched for all relevant cross-sectional, longitudinal and supplementation studies.
• Thirty three studies were included in the systematic review and seven in the meta-analysis.

RESULTS

Vitamin K1 Systematic Review
Results for vitamin K1 suggested a significant negative correlation with undercarboxylated osteocalcin (ucOC), but mixed results for total osteocalcin (OC), and bone resorption markers.

Meta-Analysis
• The meta-analysis of supplementation trials supported the above results, showing a significant effect of vitamin K1 supplementation on reducing ucOC (p<0.00001, Z=8.75, weighted mean difference=95% CI (-68.54 to -43.45)) and increased BMD (combined sites) (p=0.004, Z=3.86, weighted mean difference=95% CI (1.24-6.48)). Fracture risk could not be analysed here due to lack of complete data.

DISCUSSION

• However, no effect on bone resorption markers was found for any study type in this review.
• Meta analysis
  • These results were supported by the vitamin K2 supplementation studies meta-analysis which showed a reduction in ucOC (p<0.00001, Z=8.75, weighted mean difference=95% CI (-68.54 to -43.45)) and increased BMD (combined sites) (p=0.004, Z=3.86, weighted mean difference=95% CI (1.24-6.48)). Fracture risk could not be analysed here due to lack of complete data.

REFERENCES