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Dietary Protein Intake above the Current RDA and Bone Health: A Systematic Review and Meta-Analysis.

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Abstract

Dietary intake of **protein** is fundamental for optimal acquisition and maintenance of bone across all life stages; however, it has been hypothesized that intakes above the current recommended dietary allowance (RDA) might be beneficial for bone health. We utilized the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines when preparing and reporting this **systematic review** and meta-analysis. A literature search strategy through April 11, 2017, was developed for the following 3 databases: PubMed, Ovid Medline, and Agricola. Included studies were those randomized controlled trials and prospective cohort studies among healthy adults ages 18 and older that examined the relationships between varying doses of **protein** intake at or above the current U.S. RDA (0.8 g/kg/d or 10%-15% of total caloric intake) from any source on fracture, bone mineral density (BMD)/bone mineral content (BMC), and/or markers of bone turnover. Twenty-nine articles were included for data extraction (16 randomized controlled trials [RCTs] and 13 prospective cohort studies). Meta-analysis of the prospective cohort studies showed high vs low **protein** intakes resulted in a statistically significant 16% decrease in hip fractures (standardized mean difference [SMD] = 0.84, 95% confidence interval [CI], 0.73, 0.95; $I^2 = 36.8\%$). Data from studies included in these analyses collectively lean toward the hypothesis that **protein** intake above the current RDA is beneficial to BMD at several sites. This **systematic review** supports that **protein** intakes above the current RDA may have some beneficial role in preventing hip fractures and BMD loss. There were no differences between animal or plant **proteins**, although data in this area were scarce. Larger, long-term, and more well-controlled clinical trials measuring fracture outcomes and BMD are needed to adequately assess whether **protein** intake above the current RDA is beneficial as a preventative measure and/or intervention strategy for osteoporosis. Key teaching points: • • Bone health is a multifactorial musculoskeletal issue, and optimal **protein** intakes are key in developing and maintaining bone throughout the life span. • • Dietary **protein** at levels above the current RDA may be beneficial in preventing hip fractures and BMD loss. • • Plant vs animal **proteins** do not seem to differ in their ability to prevent bone loss; however, data in this area are scarce. • • Larger, long-term RCTs using women not using hormone replacement therapy (HRT) are needed to adequately assess the magnitude of impact that **protein** intakes above the RDA have on preventing bone loss.

KEYWORDS: Protein; bone; bone density; calcium; fractures

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