



## Nutrition and Bone Health in Women

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### Abstract

Nutrition is an important factor that can help prevent bone loss and fractures. In the form of four original pieces and one systematic review, this Special Issue highlights some recent hopeful advancement in nutrition and women's bone health. Overall, significant features of the relationship between different nutrients and women's bone health are given through high-quality study designs that include both randomised clinical trials and observational studies, all of which are led by top nutritional and clinical researchers. Vallibhakara and colleagues investigated the efficacy of nutritional vitamin E supplementation in osteopenic postmenopausal women using a randomised, double-blind, placebo-controlled clinical trial with intention-to-treat analysis. This study looked at bone health by tracking changes in bone turnover indicators after 12 weeks of supplementation. The majority of research participants had adequate nutritional condition (mean BMI 22 kg/m<sup>2</sup>), and both groups reported great adherence.

Keywords: bone health, women bones, women nutrition

## INTRODUCTION

Nutrition is an important factor that can help prevent bone loss and fractures. In the form of four original pieces and one systematic review, this Special Issue highlights some recent hopeful advancement in nutrition and women's bone health. Overall, significant features of the relationship between different nutrients and women's bone health are given through high-quality study designs that include both randomised clinical trials and observational studies, all of which are led by top nutritional and clinical researchers. Vallibhakara and colleagues investigated the efficacy of nutritional vitamin E supplementation in osteopenic postmenopausal women using a randomised, double-blind, placebo-controlled clinical trial with intention-to-treat analysis. This study looked at bone health by tracking changes in bone turnover indicators after 12 weeks of supplementation. The majority of research participants had adequate nutritional condition (mean BMI 22 kg/m<sup>2</sup>), and both groups reported great adherence [1]. For 12 weeks, participants in the trial were given 400 IU of mixed tocopherol on a daily basis. (Nat E®, Mega Lifesciences Public Company Limited, Samutprakarn, Thailand) The tablets contained 20% delta-tocopherol, 1% beta-tocopherol, 62 percent gamma-tocopherol, and 10% alpha-tocopherol. While there was no significant difference between the vitamin E and placebo arms at baseline and after 12 weeks of supplementation for the bone turnover markers CTX and PINP, the mean difference in the bone resorption marker CTX from baseline to 12 weeks was significantly different between the vitamin E and placebo groups (0.003 0.09 and 0.121 0.15, respectively (p 0.001). Vallibhakara and colleagues suggest that the beneficial effect of vitamin E supplementation on bone health in postmenopausal women may be targeted towards slowing the increase in the bone resorption marker (CTX), which may represent the mitigation of bone loss through antiresorptive activity, because the bone formation markers in both groups were not significantly different in this study. Moschonis and colleagues investigated the effects of vitamin D-enriched cheese on serum PTH concentrations and selected

biomarkers of bone remodelling in early or late postmenopausal women with adequate or insufficient vitamin D at baseli, following up on their previous studies on the consumption of reduced-fat Gouda cheese fortified with vitamin D<sub>3</sub> and its efficacy in reducing the prevalence of winter vitamin D deficiency in a population of postmenopausal women in Greece [2]. Their novel technique demonstrates the value of traditional dietary supplements and its potential benefit for female bone metabolism [3]. The effect of Gouda-type cheese fortified with vitamin D<sub>3</sub> on serum concentrations of certain calcitropic hormones (i.e., 25(OH)D, PTH), bone formation (i.e., OC, PINP), and bone resorption markers (i.e., TRAP-5b) in postmenopausal women was investigated in a randomised, controlled, single-blinded (i.e., blinded to study participants In early postmenopausal women with vitamin D deficiency, the intervention recommended utilising vitamin D-enriched Gouda cheese effectively improved serum 25(OH)D concentrations, avoided PTH rise, and reduced bone resorption. The authors speculate that the reduction in bone resorption reported in women with vitamin D deficiency may reflect a promising nutrient-based approach to improving vitamin D status in these women, as well as positive changes in bone metabolism that may be protective against the bone loss that occurs after menopause. Fatty acids are important nutrients for health, and various studies have found a link between fatty acid intake and bone mineral density (BMD). Total PUFA intake, particularly n-3 and n-6 PUFA, increases BMD and even lowers the risk of fracture, according to strong evidence from observational studies [4]. In a study of Spanish postmenopausal women, Roncero-Martin and colleagues looked at the relationships between serum levels of different PUFAs (n-6 and n-3), MUFAs, and SFAs and bone density as measured by quantitative bone ultrasound (QUS), peripheral quantitative computed tomography (pQCT), and dual-energy X-ray absorptiometry (DXA). Using logistic regression analysis, independent risk variables for low BMD (T-score 1) were identified [5]. Fatty acids are important nutrients for health, and various studies have found a link between fatty acid intake and bone mineral density (BMD). Total

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may improve bone health, particularly in postmenopausal women, and they open the door to exciting research into the relationship between the consumption of these foods and the risk of osteoporosis from an experimental standpoint. The groundbreaking research given in this Special Issue is accompanied by a detailed assessment of the scientific literature, which provides a thorough background on plant-derived chemicals that may be used to enhance bone health in perimenopausal and postmenopausal women. The review includes both *in vitro* and *in vivo* research as well as clinical trials for drugs with antiosteoporotic properties. A full biochemical and clinical assessment of phytoestrogens and other botanicals' possible effects is provided. These botanicals evaluated, according to Supski and colleagues, are a large source of bioactive chemicals, many of which are awaiting additional investigation for their potential therapeutic effects on bone health, particularly for the treatment and prevention of osteoporosis [7]. Osteoporosis affects an estimated 10 million people in the United States, with about 8 million of them or 80 percent being women. Chronic bone loss causes osteoporosis, which results in weak, easily fractured bones. The most common fractures are those of the spine, hip, and wrist. All women, regardless of age, should take precautions to safeguard their bones. Osteoporosis causes nearly half of all women over the age of 50 to break a bone. It is possible to improve your bone health and reduce your fracture risk by taking the appropriate actions and receiving proper care. Our staffs at The Spine Institute of Southeast Texas led by board-certified orthopaedic surgeon Thomas Jones II, MD, diagnoses and treat a wide range of spine disorders [8]. Women are more likely than men to acquire weak bones as a result of osteoporosis. This means that women must take extra precautions to keep their bones healthy throughout their lifetimes. The process of breaking down old bone and replacing it with new bone tissue is known as bone remodelling. Bone remodelling happens at a faster rate during adolescence and young adulthood, which keeps bones robust. Women's bone loss is accelerated by the significant fall in oestrogen that occurs beyond the age of 50. Within the first five to seven years after menopause, women can lose

up to 20% of their bone mass. Osteoporosis develops when your body loses too much bone mass or fails to produce enough new bone. Bone can be compared to a honeycomb [9]. Due to poor bone density, the gaps in the bones of women with osteoporosis are greater than in healthy bone. As a result, bones become weak and brittle, making them susceptible to fracture. Your pelvis and the bottom of your spine are connected by the sacroiliac joints. Women's sacroiliac joint disorders are a prevalent cause of low back discomfort. The sacroiliac joints are tiny, and women's sacroiliac joints are smaller than men's.

Shock absorption is provided by these joints, which shift weight from the upper body to the hips and legs. Low bone density can induce sacroiliac joint dysfunction by weakening the joint or causing other alterations. A common symptom is low back ache [10]. Components of the spine, such as the facet joints, might deteriorate when women lose bone mineral density. Facet joint disorders become more common as people get older. Facet joint breakdown is frequently caused by osteoarthritis of the spine.

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