

CIGARETTE SMOKING AND BONE METABOLISM IN POSTMENOPAUSAL WOMEN

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Abstract

Cigarette smoking is a risk factor for increased bone mineral density (BMD) loss and osteoporosis but the mechanisms are not well understood. Despite uncertainty over the role of tobacco use in bone health, researchers have suggested several mechanisms by which smoking may affect osteoporosis risk. In postmenopausal women, smoking may speed the breakdown (metabolism) of estrogen, resulting in lower estrogen levels and increased bone loss and risk of fracture. Other suggestions for the mechanism of smoking's effect on bone include smokers' lower body weight, decreased physical activity, decreased absorption of calcium, increased alcohol intake and other nutritional deficiencies, resistance to the hormone calcitonin (which suppresses bone resorption), and direct effects of tobacco on bone cells. The aim of this study was to examine the relationship between smoking and bone mineral density, calcium absorption, and biochemical indices related to bone and mineral metabolism. We report a study in 80 postmenopausal women aged 44-74 years, divided in two groups: smokers and nonsmokers. Height, weight, BMI, age at menarche, years since menopause in case of postmenopausal women, history of disease, and fracture, if any, were recorded. BMD assessment was done using Quantitative Ultrasound (QUS) and T-scores were calculated. Serum levels of osteocalcin, C-terminal telopeptide of type I collagen and calcium were measured. Bone mineral density (BMD) was 11% lower (-1.96 ± 0.46 vs -1.74 ± 0.71) in smokers compared with nonsmokers. Also it has been found that levels of calcium in postmenopausal women who smoke were lower. A significant increase in bone remodeling markers, serum osteocalcin ($32 \text{ ng/ml} \pm 13.01$ vs $18.94 \text{ ng/ml} \pm 8.12$) and serum C-terminal telopeptide of type I collagen (CTX), ($0.480 \text{ ng/ml} \pm 0.268$ vs $0.2776 \text{ ng/ml} \pm 0.169$) was seen in smokers compared with nonsmokers. These results suggest that smoking lowers bone mineral density, and is a result of decreased calcium absorption and increased bone resorption.

Keywords: *Osteoporosis, smoking, postmenopausal women, bone turnover markers*