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Perspective

The Importance of Soy Bioactive Compounds in Osteoporosis Prevention and Treatment

Anitha Rai*

Department of Sports and Physical Fitness, University of Hyderabad, Hyderabad, India

DESCRIPTION

Osteoporosis is a skeletal disorder characterized by weakened bones; which puts people at risk for fractures from unknown injuries or from little damage insufficient to break a healthy bone. Bone mineral content and bone quality are the two key factors of bone strength. The interaction of two important variables-the maximum quantity of bone developed during youth (known as the peak bone mass, or PBM) and the rate of future bone loss-determines an individual's bone mineral content. The size and strength of the bones develop throughout childhood, and adolescence, and are typically completed in the 20s.

Once peak bone mass is attained during the third decade of life, a continuous remodelling process keeps bone architecture in place. When osteoblasts enter the resorption pit created by osteoclast removal of old bone, it is filled with new bone by osteoclasts. At menopause, the relative importance of these processes changes, and women often experience a rapid phase of bone loss that starts two to three years before the end of menstruation and lasts for up to five years after. Many other factors are linked to increased fracture risk, despite the fact that the rapid period of bone loss and the lowered circulating oestrogen concentrations seen after menopause are the main causes of the process. The use of specific drugs, advanced age, a family history of osteoporotic fracture, and past fragility fracture are among these risk factors. In addition, chronic low vitamin D and calcium intake, low body weight, excessive consumption of animal protein, insufficient consumption of plant protein, soybean isoflavones, and n-3 PUFA are predictors of bone loss and fracture risk in early postmenopause.

Despite the fact that Hormone Replacement Therapy (HRT) might lessen the loss of oestrogen that occurs during menopause and so address concerns about osteoporosis, there is still a great deal of interest in alternatives to HRT, particularly nutritional options. In respect to bone health, phytoestrogens have attracted a lot of attention in this regard. Ipriflavone, a synthetic isoflavone, has been shown in studies to successfully stop bone loss in postmenopausal women. Observations of significantly fewer hip fractures in Asian women than in Caucasian women led to an interest in a possible relationship between phytoestrogens and osteoporosis risk. In general, strong favourable relationships between soy intake in pre-and postmenopausal women and BMD have been shown in a large body of observational research, with only a few studies finding no association. Studies assessing BMD have discovered the beneficial effects of soy and soy isoflavones on the BMD of the lumbar spine. Less consistency has been found in the biomarkers of bone production and resorption; some have found positive benefits on bone health, while others have found no significant effects or effects that are too small to be clinically relevant.

Selected Estrogen Receptor Modulators (SERMs), such as raloxifine, have been demonstrated to be effective in preventing bone loss or boosting bone mass. A group of non-steroidal chemicals known as SERMs bind to and interact with oestrogen receptors. It has been said that soy isoflavones are naturally occurring SERMs with benefits for bone similar to those of raloxifene without adverse effects. Preventing postmenopausal bone mineral loss and lowering estrogen-related risks can both be accomplished by combining soy isoflavones with reduced oestrogen levels. Future studies must use isolated phytoestrogens or combinations of substances that have been structurally defined and standardised. Additionally, more studies are required to determine whether ipriflavone is effective in preventing the loss of BMD, and it is still too early to suggest it as a supplement for osteoporosis patients.

Correspondence to: Anitha Rai, Department of Sports and Physical Fitness, University of Hyderabad, Hyderabad, India, E-mail: anitha.rai23@gmail.com

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