Herbs to Help Strengthen Bones

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According to the U.S. National Osteoporosis Foundation, 10 million people over the age of 50 have the disease and about 80 percent are women.¹ A further 34 million are at risk due to low bone mass (osteopenia).

Hence, 55 percent of the population over 50 years of age either have osteoporosis or are at risk. This is a serious public health issue and raises the question of whether there is any evidence that herbs can help strengthen bones. Fortunately, there is a growing body of research on the role that herbs can play in helping patients with osteopenia and even osteoporosis.

The vast majority of epidemiological and clinical research on the role of plants in osteoporosis treatment and prevention has focused on phytoestrogenic plant compounds. Data strongly suggest that ingesting phytoestrogenic compounds produces a lower incidence of osteoporosis and bone fractures, as well as menopausal symptoms such as hot flashes.² Most of this research has been on soy isoflavones. However, other plants may also be important, including those that can act as alternative sources of isoflavones.

Red Clover

In a randomized, double-blind clinical trial, women ages 49 to 65 received isoflavones from red clover extract (43.5 mg/day) or placebo for 12 months.³ The daily dose of isoflavones consisted of 26 mg biochanin A, 16 mg formononetin, 1 mg genistein and 0.5 mg daidzein. Loss of lumbar spine bone-mineral content and bone mineral density (BMD) was significantly lower in the women taking the isoflavones than in those taking the placebo. There were no significant differences between groups with respect to changes in dietary intakes of calcium and vitamin D over the 12-month period.

This preparation (at a similar dosage) was evaluated in a trial of the same design in women ages 35 to 70 with a family history of breast cancer. Treatment was administered for three years. Bone mineral densities of the lumbar spine and femur were not significantly affected. However, more than 80 percent of the women in the study were premenopausal, and the potential bone loss could be expected to be less than in postmenopausal patients. The effect on BMD was, in fact, a secondary objective of this study.⁴
An earlier clinical study investigated the effect of several doses of isoflavones from red clover extract taken daily for six months. Compared to baseline, doses of 57 mg/day and 85.5 mg/day increased BMD of the proximal radius and ulna in postmenopausal women. Participants received calcium (1,000-1,200 mg/day) in a supplement throughout the study. Due to the short trial duration, and therefore the potentially small changes in BMD, the forearm was assessed, as it provides higher precision in these circumstances.5

Kudzu

*Pueraria lobata* (known as kudzu or kuzu) is a prolific vine that covers much of the southeastern United States and is one of the richest sources of isoflavones. Animal studies support the use of kuzu for the prevention and treatment of poor bone density.6-7

Black Cohosh

Black cohosh has been shown to have favorable effects on bone metabolism. An experimental model was designed to understand the mechanism behind this activity and to compare its effects with estrogen and testosterone.8 This study suggests that the bone-sparing effect of black cohosh is mediated by inhibition of osteoclast activity. RANK (receptor activator of nuclear factor kappa B) and its ligand RANKL largely regulate osteoclast activity and bone breakdown. Crosslaps (or Ratlaps in rats), the cross-linked collagens (telopeptides) are markers of bone degradation. Black cohosh, estradiol (E2) and testosterone (T) were given to castrated rats of both sexes. Both E2 and black cohosh reduced levels of Ratlaps, but only in the females. The authors suggested that the bone-sparing effect of black cohosh is therefore partly mediated by inhibition of osteoclast activity.

In contrast, the metabolic marker for bone formation, bone-specific alkaline phosphatase, was significantly increased by black cohosh in a clinical study.9 Therapeutic effects of a black cohosh extract were compared to conjugated estrogens and placebo in postmenopausal women. The trial involved 62 patients and was a double-blind, randomized, placebo-controlled study, with around 20 subjects in each group. This finding indicates an increased activity of the osteoblast cells, which are responsible for bone formation. Bone-specific alkaline phosphatase remained unchanged in the placebo and estrogen groups.

*Epidemium*
The aerial parts of several species of *Epimedium*, including *Epimedium sagittatum* and *E. brevicornum* (also known as *Epimedium brevicornu*), are used in traditional Chinese medicine.\(^{10-11}\) In the West it is often known as horny goat weed. *Epimedium is said to strengthen bones.*\(^ {12} \) It is used for a large number of applications, including weakness of the limbs and lower back, rheumatic pain and hypertension of menopause.\(^ {10,11} \) Flavonoids, in particular icariin (a flavonol glycoside), are major constituents of medicinal *Epimedium*.\(^ {13} \)

One clinical trial evaluated a daily dose of icariin (60 mg, extracted from *Epimedium*), daidzein (15 mg) and genistein (3 mg) in late postmenopausal women. Bone mineral density was maintained in the femoral neck and lumbar spine at both 12 months and 24 months. In contrast, the placebo group experienced a significant decrease. Nonskeletal factors (muscle force coefficient of the lower limb and the dynamic balance coefficient) related to the femoral neck were also significantly increased from baseline at 24 months for the treatment group. These factors did not change in the placebo group. Both the placebo and treatment groups received supplemental calcium (300 mg/day).\(^ {14-15} \)

**Herbs and Exercise**

Isoflavone phytoestrogens appear to combine synergistically with exercise, which is often recommended for increasing BMD, possibly by stimulating estrogen receptors. However, the increases in BMD are often small with exercise alone. Isoflavone intake and walking exercise over one year in postmenopausal Japanese women exhibited a trend for a greater effect on prevention of bone loss at the total hip and the neck of the femur.\(^ {16} \) The trial involved 136 postmenopausal women and was randomized and placebo-controlled. BMD, fat mass, serum lipid, and serum and urinary isoflavone concentrations were assessed. Patients were divided into four groups: placebo, walking (45 minutes/day, three days/week) with placebo, isoflavone intake (75 mg of isoflavone conjugates/day) or combination of isoflavone plus walking.

The combined intervention showed a trend for a greater effect on BMD at the hip and neck of femur than either intervention by itself. Serum HDL concentration significantly increased at 12 months after the combined intervention. Significant reduction in fat mass in the whole body and the trunk were observed at three, six and 12 months, and in the legs and arms at six and 12 months.

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References

1. See www.nof.org/osteoporosis/diseasefacts.html.

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