

## Herbal Medicine for General and Disuse Osteoporosis

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### Introduction

Osteoporosis and its risks to fractures are aging problems of major concern. Apart from proper preventive or specific treatment, herbal supplements are becoming more and more popular, particularly in Asian countries. Since the appearance of medical reports about fracture complications resulting from prolonged and high doses of bisphosphonates, specialists become more cautious in their recommendations on the management of osteoporosis [1]. The aging group of people and para-menopausal gender naturally will look for supplements as a preventive measure [2].

Herbal supplements aiming at the bone health are plentiful. The selection criteria have advanced beyond traditional beliefs and classic records to modern screening using biological platform studies on bone metabolism.

### Phytotherapy for Osteoporosis

Since 20 years ago, much research on phytotherapy for osteoporosis has been performed and around 30 herbs have gained popularity. The six most frequently used herbs are: *Herba epimedii* (Yín Yáng Huò), *Fructus psoraleae* (Bǔ Gǔ Zhī), *Radix rehmanniae* (Shēng Dì Huáng), *Rhizoma drynariae* (Gǔ Sui Bǔ), *Herba cistanches* (Ròu Cōng Róng) and *Cortex eucommiae* (Dù Zhòng).

The phytoestrogens in the herbal preparations, viz. certain flavones, isoflavones, flavanones, flavonols, coumestans and lignans, could be playing an important role in the protection of postmenopausal bone loss [3-5]. The effects of phytoestrogens have already been reported in both laboratory studies and clinical trials. Studies in ovariectomized rats have shown that the known phytoestrogens such as coumestrol, genistein, and daidzein can reduce bone loss [4,5]. Specific molecules like icariin in *H. epimedii* (Yín Yáng Huò) and isopsoralen in *F. psoraleae* (Bǔ Gǔ Zhī) have been found to have estrogen-like effects and may become new phytoestrogens for future research [6].

### Platform Studies

Most animal studies on osteoporosis involve an artificial creation of menopause by ovariectomy. However, an innovative new model could be utilized. Using a special animal model of unloading the hind limbs, the effects of some herbs on controlling regional, disuse osteoporosis have been studied. The special animal model has been created for quasi-weightless studies relevant to post-operative off-weight situations and the special occasions of space flights. These studies demonstrated the loss of bone mineral density resulting from weightlessness could be reduced while phytotherapy was administered during the tail suspension period [7]. The exact mechanisms are not

known but it is assumed that boosting of osteoblastic activities could be the explanation [8,9].

### Clinical Studies

Xu reported in 2009 that 63 randomized control trials (RCTs) on the use of Phytotherapy had been conducted in China. Treatment duration of the 14 included trials ranged from 1 to 6 months. The authors compared the results of herbal treatment with those of hormonal treatment and reported that the prevention of bone loss was about the same, while adverse effects were not important. However, these studies could be criticized because of their short treatment durations and imperfect study designs [6].

One carefully planned randomized, double-blind, placebo-controlled clinical study utilizing 3 herbs popular for osteoporosis (ELP) is worth quoting. A total of 150 women who experienced menopause for at least one year, with osteopenia were included.

The BMD of the lumbar spine was assessed at baseline and 6 and 12 months after treatment, using a Hologic type 4500 DEXA machine. Secondary endpoints included peripheral quantitative computed tomography (pQCT) measurements of the distal tibia and an analysis of the quality of life (SF-36 questionnaire).

The spine BMD of the ELP group was increased by 0.69% in subjects with more than ten years duration of menopause. In contrast, the placebo group of the same stratum decreased by 0.61% (P=0.067). pQCT measurement of the distal tibia also showed improvement in the treatment group.

The hip BMD of the ELP group remained unchanged over twelve months treatment, whereas the placebo group decreased by 0.22%. In the subjects with more than ten years duration of menopause, the hip BMD increased by 0.21%, compared with a decrease of 0.52% in the placebo group.

It is believed that the phytotherapy has obvious maintenance effects on the BMD of bones [10,11].

### Conclusion

Pharmaceuticals used for the treatment of osteoporosis aim at quick and specific responses. However, a proportion of user might respond too well and over hardening of the cortical components of the long bone might result, leading to odd fractures at unusual sites [12,13]. On the other hand, herbal treatment is supportive but slow. It offers prevention and maintenance rather than quick-active treatment. Apparently herbal treatment could be a free optional choice for those under the threat of osteoporosis.

Going one step further, one could discuss about the addition of special herbs in the general prevention of osteoporosis. We all know that balanced nutrition, exercises and sunlight are essential for bone health. What about adding specific bone protective herbs to popular food consumption like milk? An early clinical trial on the addition of one osteoprotective herb *Fructus Ligustri Lucidi* has given very impressive results and further studies are indicated [14].

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