

Herbs for Osteoporosis and Bone Health

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If you are a Caucasian American woman over 50 in America, your chances of having a healthy skeleton are slipping away every year, just like your bones. Your lifetime chance of a fracture from osteoporosis is right around 50%.

Far from being an older person's disease, osteoporosis can, and does, strike at any age. Literally, 'porous bones', osteoporosis is a progressive degeneration of the skeleton. Bone structure, density and strength all decline. Bone tissues gradually lose mineral, especially calcium, and become brittle, fragile and tend to break easily.¹ Osteoporosis does occur, though, as part of the aging process. After about age 35, human bone structure becomes less dense. In osteoporosis, however, bone weakness trumps normal bone loss from aging and bone becomes exceptionally thin from mineral loss and poor quality protein matrix.

This disorder develops to a significant degree in nearly 25 percent of white, Asian and brown-skinned women after menopause. (Black women luck out, though. They have greater bone density, which lessens their osteoporosis risk.)

Overall, a woman's lifetime hip fracture risk is equal to the combined total risk of breast, uterine, and ovarian cancer. One-fourth of those who were ambulatory before their hip fracture require long-term care afterward. By 50 years from now, Americans 65 or older will make up 25% of the population, and they'll be mostly women, making osteoporosis a major public health concern. However, it's not inevitable, as osteoporosis is, to a great extent, preventable and treatable.²

Studies indicate that silicon plays a role in bone development, may enhance bone mineralization, and may promote calcium deposition in bone. Horsetail (*Equisetum spp.*), which contains the mineral, is a traditional joint medicine, and research shows it to be an effective natural treatment for osteoporosis. In an Italian randomized trial, 122 women took placebo, no treatment, horsetail dry extract or a horsetail-calcium combination. After 40, 80, and 365 days, both the horsetail and calcium groups had a statistically significant improvement in bone density.³ In 2012, Portuguese scientists tested a horsetail extract for its effect on bone loss. They concluded that the herb helped reduce bone destruction.⁴ In a companion study, they also found that the horsetail extract excited human osteoblasts (bone building cells) to regenerate bone.⁵ Use horsetail herb in capsules at a dose of 5 grams per day.

To help restore the damaged bone tissue, consider Chinese teasel root (Xu Duan, *Dipsacus asper*), which is a mainstay of Chinese herbal joint therapy. It's the main herb used there to heal traumatic injury and has broad benefit for the musculoskeletal system and for pain. Xu means connect, and duan means severed; the herb reconnects damaged bones or severed tendons. In 2012, Chinese scientists reported that a tea containing Xu Duan stimulated new bone growth.⁶ Use up to 15 grams per day as powder in capsules or brewed into tea.

Astragalus root is a popular Chinese herb here in America. We think of this tasty root as an immune support remedy, but it has many other uses in Traditional Chinese Medicine. In Asia, Astragalus is considered a general health enhancing remedy, especially for increasing stamina and strength of muscles and bones. To test this traditional use, Korean researchers, in 2013, fed experimental female menopausal animals a diet deficient in calcium and then measured their bone mass. Then they fed the rodents Astragalus extract, calcium or a combination of the two nutrients. The combination of calcium supplement, plus the Astragalus treatment was more protective for bone loss than either treatment alone.⁷ The scientists surmised that a combination of the herb, along with calcium, would be effective in maintaining bone mass in postmenopausal women. Astragalus root is tasty, so it makes a good tea. Brew up to 30 grams of the dry, chopped root into water and enjoy the tea each day as a bone and stamina building beverage.

¹ <http://www.osteoporosis.org>

² About Osteoporosis www.osteomark.com

³ Corletto F. [Female climacteric osteoporosis therapy with titrated horsetail (*Equisetum arvense*) extract plus calcium (osteosil calcium): randomized double blind study]. *Miner Ortoped Traumatol* 1999;50:201-206.

⁴ Cell Prolif. 2012 Dec;45(6):566-76. doi: 10.1111/j.1365-2184.2012.00848.x.

Inhibition of human in vitro osteoclastogenesis by *Equisetum arvense*.

Costa-Rodrigues J, Carmo SC, Silva JC, Fernandes MH.

Source

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Abstract

OBJECTIVES:

Equisetum arvense has long been used in traditional medicines to treat different disorders, including bone pathologies. In this study a hydromethanolic extract of *E. arvense* was assessed for its effects on human osteoclastogenesis.

MATERIALS AND METHODS:

Osteoclast precursors were maintained in non-stimulated and stimulated (presence of M-CSF and RANKL) conditions, or in co-cultures with osteoblasts. Cell cultures were treated with 0.00016-0.5 mg/ml of a hydromethanolic *E. arvense* extract.

RESULTS:

The extract did not affect spontaneous osteoclastogenesis. In osteoclast precursors committed to osteoclastogenesis (stimulated or co-cultured with osteoblasts), *E. arvense* caused dose-dependent inhibitory effect that became statistically significant at concentrations ≥ 0.004 mg/ml. This was observed using different osteoclast differentiation and activation markers. Cell response was associated with changes in relative contribution of MEK and NF κ B signalling pathways, as well as PGE2 production. As there were differences in the response of osteoclast precursors maintained in the presence of inductive factors, or co-cultured with osteoblastic cells, it seems that *E. arvense* extract had the ability to modulate osteoclastogenesis, either by acting directly on osteoclast precursor cells, and/or via osteoblasts.

CONCLUSIONS:

Equisetum appeared to have a negative effect on human osteoclastogenesis, which is in line with its putative beneficial role in pathophysiological conditions associated with increased osteoclastic activity, and might suggest potential utility for treatment with bone regeneration strategies.

⁵ Cell Prolif. 2012 Aug;45(4):386-96. doi: 10.1111/j.1365-2184.2012.00826.x. Epub 2012 Jun 1.

Equisetum arvense hydromethanolic extracts in bone tissue regeneration: in vitro osteoblastic modulation and antibacterial activity.

Bessa Pereira C, Gomes PS, Costa-Rodrigues J, Almeida Palmas R, Vieira L, Ferraz MP, Lopes MA, Fernandes MH.

Source

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Abstract

OBJECTIVES:

Equisetum arvense preparations have long been used to promote bone healing. The aim of this work was to evaluate osteogenic and antibacterial effects of *E. arvense* hydromethanolic extracts.

MATERIALS AND METHODS:

Dried aerial components of *E. arvense* were extracted using a mixture of methanol:water (1:1), for 26 days, yielding three extracts that were tested (10-1000 μ g/ml) in human osteoblastic cells: E1, E2 and EM (a mixture of E1 and E2, 1:1). Cell cultures, performed on cell culture plates or over hydroxyapatite (HA) substrates, were assessed for osteoblastic markers. In addition, effects of the extracts on *Staphylococcus aureus* were addressed.

RESULTS:

Solution E1 caused increased viability/proliferation and ALP activity at 50-500 μ g/ml, and deleterious effects at levels ≥ 1000 μ g/ml. E2 inhibited cell proliferation at levels ≥ 500 μ g/ml. EM presented a profile between those observed with E1 and E2. In addition, E1, E2 and EM, 10-1000 μ g/ml, inhibited expansion of *S. aureus*. Furthermore, E1, tested in HA substrates colonized with osteoblastic cells, causing increase in cell population growth (10-100 μ g/ml). E1 also exhibited antibacterial activity against *S. aureus* cultured over HA.

CONCLUSIONS:

Results showed that *E. arvense* extracts elicited inductive effects on human osteoblasts while inhibiting activity of *S. aureus*, suggesting a potentially interesting profile regarding bone regeneration strategies.

⁶ J Ethnopharmacol. 2012 Jun 1;141(2):642-6. doi: 10.1016/j.jep.2011.09.003. Epub 2011 Sep 10.

Effects of traditional Chinese medicine on bone remodeling during orthodontic tooth movement.

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Source

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Abstract

ETHNOPHARMACOLOGICAL RELEVANCE:

Dipsacus asper Wall (*Dipsacaceae*), *Salvia miltiorrhiza* (*Salvia*) and *Drynaria fortunei* (*Drynaria*) have been traditionally used in Chinese medicine as the main ingredient of many formulations for the treatment of cardiovascular and inflammatory diseases.

AIM OF THE STUDY:

This study was aimed to evaluate the effect of the traditional Chinese medicine (TCM) Dipsacaceae, Salvia and Drynaria on bone remodeling during orthodontic tooth movement (OTM).

SETTING:

This study was conducted in School of Stomatology, Shandong University between 2009 and 2010 [Jinan, Shandong, China].

MATERIALS AND METHODS:

Ninety-six eight-week-old female SPF Wistar rats 180-200 g were selected and randomly divided into four groups of 24: Dipsacaceae group, Salvia group, Drynaria group and control group. Animal models for orthodontic tooth movement were then established which consisted of a closed coil spring ligated to the upper first molar and incisors, exerting a force of 40 g during the experimental period. Rats in the TCM groups were given Dipsacaceae, Salvia and Drynaria decoction respectively by intragastric administration 6 g/kg/day and the control group were given normal saline 3 ml. The rats were sacrificed in batch on the 7th, 14th, 21st and 28th days after orthodontic treatment. Slices from periodontium of the upper first molar were observed under optical microscope. Neovascularization, new bone formation and osteoclast number were observed.

RESULTS:

The upper first molars were drawn mesial by the force. Telangiectasia and new bone formation in periodontal tissue were significantly in the TCM groups compared with the control group. Application of orthodontic forces in the experimental teeth showed a significant increase ($P < 0.05$) of osteoclast number in the TCM group when compared with the control group. In addition, the number of osteoclast had no significant differences among the TCM groups ($P > 0.05$). Osteoclast number in the TCM group and the control group were 10.12 ± 0.058 , 10.13 ± 0.022 , 10.09 ± 0.047 and 9.55 ± 0.045 , respectively.

CONCLUSIONS:

These findings suggest that the TCM decoction are beneficial to the alveolar bone remodeling by promoting osteoclast differentiation during OTM.

⁷ Biol Trace Elem Res. 2013 Jan;151(1):68-74. doi: 10.1007/s12011-012-9527-1. Epub 2012 Nov 9.

Effects of Astragalus membranaceus with supplemental calcium on bone mineral density and bone metabolism in calcium-deficient ovariectomized rats.

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Source

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Abstract

It has been reported that Astragalus membranaceus, an Asian traditional herb, has an estrogenic effect in vitro. To examine the possible role of A. membranaceus extract with supplemental calcium (Ca) on bone status in calcium-deficient (LCa) ovariectomized (OVX) rats, a total of 48 female rats were divided into six groups: (1) normal control, (2) sham operation with LCa (sham-LCa), (3) OVX with LCa (OVX-LCa), (4) A. membranaceus supplementation with OVX-LCa (OVX-MLCa), (5) Ca supplementation with OVX (OVX-Ca), and (6) A. membranaceus and Ca supplementation with OVX (OVX-MCa). A. membranaceus ethanol extract (500 mg/kg BW) and/or Ca (800 mg/kg BW) were administered orally for 8 weeks along with a Ca-deficient diet. Results revealed that Ca supplementation with or without A. membranaceus extract significantly improved bone mineral density, biomechanical strength, and ash weight of the femur and tibia in OVX rats. High Ca with A. membranaceus combination supplementation significantly increased the ash weight of the femur and tibia and decreased urinary Ca excretion compared with supplementation of Ca alone. Uterine weight was not changed by A. membranaceus administration in OVX rats. These results suggest that A. membranaceus extract combined with supplemental Ca may be more protective against the Ca loss of bone than A. membranaceus or supplementation of Ca alone in calcium-insufficient postmenopausal women.