Nature’s Solution to Bone Health
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Osteoporosis remains as a distressing condition that frequently affects postmenopausal women because of the abrupt cessation of ovarian hormones. The postmenopausal period typically occupies one-third of a woman’s life, with more than 45 million women in the U.S. alone, now in the postmenopausal phase [1]. In the U.S., a conservative estimate is that, nearly half of all women over the age of 50 will suffer an osteoporosis-related fracture, resulting in at least 2 million fractures a year, including painful vertebral fractures. Hence, osteoporosis-related fractures are an enormous public health concern, with immense socioeconomic implications. The loss of bone begins to decline during the perimenopausal years [2]. Animal studies as well as randomized controlled trials have indicated that, estrogen administration prevents bone loss, caused by ovarian hormone deficiency. Although the exact mechanisms by which estrogen deficiency deleteriously affects bone remains unclear, this damaging condition is directly associated with elevated levels of pro-inflammatory cytokines [3]. Age-associated increases in oxidative stress play an important role in the regulation of bone metabolism. Isomura and colleagues [4] demonstrated that oxidative stress is involved in the pathogenesis of osteoporosis, in iron-overloaded ovariectomized (Ovx) rats. This was evidenced by higher urinary levels of 8-hydroxy-2’-deoxyguanosine, an oxidative stress biomarker, and urinary deoxypyridinoline, a bone resorption biomarker, but lower concentrations of serum bone-specific alkaline phosphatase, a marker of bone formation, when compared to young Sham-operated rats. The estrogen-deficient and chronic inflammatory states, promote an increase in reaction oxygen species, which eventually results in the stimulation of osteoclastogenic maturation molecules, such as macrophage colony-stimulating factor and receptor activator of nuclear factor-xB ligand, to increase bone resorption [3].

Despite the availability of drug therapies, a considerable number of women still prefer safe and feasible alternatives, such as functional foods and dietary supplements to conventional therapeutics. Compounds in fruits and vegetables that are protective against bone loss, have not been extensively investigated. Indeed, there is a need for further research on the impact of phenolic compounds found in such foods, on bone metabolism. Of these compounds, Rutin, a flavonoid found commonly in plums and various berries, has been reported to inhibit Ovx-induced bone loss in a rat model [5]. Other phenolics in the form of polyphenols in dried plums or prunes, have also been shown to have bone protective effects [6,7]. The findings from our studies [8-10] as well as others [11,12] suggest that, dried plum among fruits is the most efficacious, in regard to the prevention and reversal of bone loss. The same view is confirmed by Mühlbauer and colleagues [13,14], who examined the effects of 60 fruits and vegetables on bone. They indicated that onion among vegetables, and prune among fruits, were the most potent. Seemingly, we are presented with the choice of either consuming plenty of onion or about 8 to 10 prunes per day. The positive effects of onion and dried plum on bone cannot be solely attributed to their ability, of creating a favorable effect on an acid/base balance, as is the case with consuming a diet rich in fruits and vegetables. Their effects are most likely related to their bioactive compounds, which may profoundly affect bone metabolism [15].

Though the consumption of fruits and vegetables, for general well-being is encouraged; in terms of bone health, not all fruits high in phytochemicals are likely to offer the same benefits. For instance, while dried plum and perhaps blueberry exert bone protective effects [16] in our observations [9], the same statement may not be true for other fruits rich in polyphenols such as raisins and dates. We are considering preliminary at this point and await confirmation. With respect to the reversal of bone loss, and or its maintenance, however, it appears that nature has designed dried plum with just the right composition. The question still remains as to, what component of dried plum is responsible for such beneficial effects and the answer may be the fruit in its whole form.

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References


