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**File: ■ Yerba Maté (*Ilex paraguariensis*)
■ Postmenopausal Women
■ Bone Mineral Density**

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RE: Yerba Maté Consumption over Time Preserves Bone Mineral Density in Postmenopausal Women

Conforti A, Gallo ME, Saraví FD. Yerba maté (*Ilex paraguariensis*) consumption is associated with higher bone mineral density in postmenopausal women. *Bone*. September 3, 2011; [epub ahead of print]. doi:10.1016/j.bone.2011.08.029.

Osteoporosis, characterized in part by low bone mineral density (BMD) and frequent fractures, affects women worldwide. An infusion of yerba maté (*Ilex paraguariensis*) leaves and stems is commonly consumed in Latin America. Yerba maté contains caffeine, a compound thought to contribute to low BMD, higher bone loss, and increased fracture risk; however, both green and black teas (*Camellia sinensis*) have been found to positively impact BMD, perhaps due to other compounds present. As lifestyle factors such as diet may influence osteoporosis and BMD in particular, this observational, cross-sectional study investigated the impact of yerba maté consumption on BMD. In particular, it was hypothesized that yerba maté consumption would negatively impact BMD due to caffeine content, and the BMD of the lumbar spine and the femoral neck of yerba maté consumers were compared to those of non-consumers.

Women included consumed 1 L of yerba maté daily for 5 years as a traditional preparation and were compared with non-drinkers matched in age and years postmenopause. Women were excluded if they had early menopause (<45 years old), were current or past smokers, consumed more than 3 cups of coffee or tea daily, drank more than 50 g of alcohol a week, or were on hormone replacement therapy (HRT). Also, women that had biphosphonate treatment longer than 6 months, who were being treated with corticosteroids, or had any health issue that affected calcium metabolism were excluded. Power was calculated at n=142 to detect a 5% difference in femoral neck BMD with a power of 0.80 and an alpha of 0.05. A nutrition survey was utilized to assess calcium intake, and urine was measured to detect excretion of calcium and phosphate. In addition, body mass index (BMI) was calculated for all patients, and BMD was measured by dual energy X-ray absorptiometry.

A total of 146 women were enrolled in the study. There were no significant differences in age, time since menopause, height, BMI, and calcium intake or excretion, phosphate

excretion, or frequency of low-impact bone fractures between yerba maté drinkers and non-drinkers; however, yerba maté drinkers had a significantly higher BMI by 1.1 kg/m² than non-drinkers (P=0.0294). When BMD was assessed between groups, it was found that yerba maté drinkers had significantly higher (9.7%) median lumbar spine BMD (0.952 g/cm² vs. 0.858 g/cm², P<0.0001). Similarly, the median femoral neck BMD of the yerba maté drinkers was significantly greater (6.2%) than the non-drinkers (0.817 g/cm² vs. 0.776 g/cm², P=0.0002).

Linear regression analysis was used to compare lumbar spine BMD to femoral neck BMD for both groups. The relationship was significant for both groups (P<0.0001) but not significantly different between groups. Linear regression analysis of age vs. both lumbar spine and femoral neck BMD revealed no significant differences between the slopes of the groups. A multiple regression model revealed a significant negative association with years of menopause vs. lumbar spine BMD (P<0.0001) and significant positive associations vs. BMI (P<0.0496) and yerba maté drinking (P<0.0001). When analyzing femoral neck BMD vs. age, a significant negative association was observed (P<0.0001), but positive associations were reported with BMI (P<0.0001) and yerba maté consumption (P<0.0028). The r² for lumbar spine BMD was 0.1573 (P<0.0001) and 0.1592 (P<0.0001) for femoral neck BMD.

On the basis of the reported results indicating that yerba maté had a positive effect on BMD, the original hypothesis of yerba maté decreasing BMD was rejected. Yerba maté is widely consumed in Argentina, Brazil, Paraguay, and Uruguay and mostly found to have beneficial health effects such as antioxidant and anticancer properties. Despite this, consuming very hot yerba maté has been found to be correlated with certain oral cancers.

This study reports a 9.7% and 6.2% higher lumbar spine and femoral neck BMD in yerba maté drinkers than non-drinkers, respectively, as compared with 4.3% and 4.7% higher BMD in the lumbar spine and femoral neck BMD of Chinese tea drinkers. This suggests that yerba maté may potentially be a more effective dietary factor for improving BMD than tea. It is discussed that this study may not reflect osteoporosis in the wider population and only reports results for a specific demographic. Although the calcium content of yerba maté leaves, as well as the content of both calcium and fluoride in the local water is argued to be negligible, other bioactive compounds reported to be present in yerba maté may have played a role in the bioactivity reported here.

—Amy C. Keller, PhD

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