

**Potassium citrate supplementation results in sustained improvement in calcium balance in older men and women.**

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The dietary acid load created by the typical Western diet may adversely impact the skeleton by disrupting calcium metabolism. Whether neutralizing dietary acid with alkaline potassium salts results in sustained improvements in calcium balance remains controversial. In this randomized, double-blind, placebo-controlled study, 52 men and women (mean age  $65.2 \pm 6.2$  years) were randomly assigned to potassium citrate 60 mmol/d, 90 mmol/d, or placebo daily with measurements of bone turnover markers, net acid excretion, and calcium metabolism, including intestinal fractional calcium absorption and calcium balance, obtained at baseline and at 6 months. At 6 months, net acid excretion was significantly lower in both treatment groups compared to placebo and it was negative, meaning subjects' dietary acid was completely neutralized ( $-11.3$  mmol/d on 60 mmol/d;  $-29.5$  mmol/d on 90 mmol/d,  $p < 0.001$  compared to placebo). At 6 months, 24-hour urine calcium was significantly reduced in persons taking potassium citrate 60 mmol/d ( $-46 \pm 15.9$  mg/d) and 90 mmol/d ( $-59 \pm 31.6$  mg/d) compared with placebo ( $p < 0.01$ ). Fractional calcium absorption was not changed by potassium citrate supplementation. Net calcium balance was significantly improved in participants taking potassium citrate 90 mmol/d compared to placebo ( $142 \pm 80$  mg/d on 90 mmol/d versus  $-80 \pm 54$  mg/d on placebo;  $p = 0.02$ ). Calcium balance was also improved on potassium citrate 60 mmol/d, but this did not reach statistical significance ( $p = 0.18$ ). Serum C-telopeptide decreased significantly in both potassium citrate groups compared to placebo ( $-34.6 \pm 39.1$  ng/L on 90 mmol/d,  $p = 0.05$ ;  $-71.6 \pm 40.7$  ng/L on 60 mmol/d,  $p = 0.02$ ) whereas bone-specific alkaline phosphatase did not change. Intact parathyroid hormone was significantly decreased in the 90 mmol/d group ( $p = 0.01$ ). Readily available, safe, and easily administered in an oral form, potassium citrate has the potential to improve skeletal health. Longer-term trials with definitive outcomes such as bone density and fracture are needed.