Abstract

PURPOSE:
Exercise-induced sweat calcium losses have been reported as substantial in male athletes. The first aim of the study was to quantify the increase in 24-h total dermal calcium losses and the net changes in calcium retention in active sportswomen after a 1-h strenuous exercise session. A second aim was to determine the effectiveness of calcium supplementation to offset any calcium loss.

METHODS:
Twenty-six premenopausal sportswomen completed three 8-d intervention phases in a randomized-order, crossover design. The three phases were placebo+no exercise (control), placebo+exercise, and 400 mg of calcium as calcium carbonate (TUMS Ultra) twice daily+exercise. The supervised exercise was 1 h.d(-1) cycling at 65-70% of heart rate reserve. A controlled diet of approximately 450 mg.d(-1) of calcium and 24-h pooled urine and fecal collections allowed determination of calcium balance on days 5-8 of each phase. Twenty-four-hour dermal collections were made at the end of each phase using a whole-body washdown procedure.

RESULTS:
Exercise increased (P<0.05) dermal calcium losses (means+/-SD, 92+/-49 vs 79+/-31 mg.d(-1) in the nonexercise intervention period), which was no longer significant (P=0.14) when calcium supplementation was provided (83+/-49 mg.d(-1)). Higher (P<0.01) urinary calcium excretion during calcium supplementation is suggestive of higher net calcium absorption. Exercise did not affect urinary calcium excretion indicating lack of compensation for dermal losses. Net calcium retention was positive only during the exercise+calcium supplementation intervention period.

CONCLUSIONS:
Calcium supplementation can correct for negative calcium balance attributable to low calcium dietary intake and additional dermal losses from exercise.