

Timing of calcium and vitamin D supplementation may affect how bone adapts to exercise

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Taking calcium and vitamin D before exercise may influence how bones adapt to exercise, according to a new study. The results will be presented on Tuesday at The Endocrine Society's 95th Annual Meeting in San Francisco.

"The timing of [calcium supplementation](#), and not just the amount of supplementation, may be an important factor in how the skeleton adapts to exercise training," said study lead author Vanessa D. Sherk, PhD, postdoctoral research fellow at the University of Colorado Anschutz Medical Campus. "Further research, however, is needed to determine whether the timing of calcium supplementation affects the skeletal adaptations to exercise training."

Previous research has shown that a year of intense training is associated with substantial decreases in [bone mineral density](#) among competitive road cyclists. Experts believe that this kind of exercise-induced bone loss could be related to the loss of calcium during exercise. As blood calcium levels drop, the parathyroid gland produces excess [parathyroid hormone](#), which can mobilize calcium from the skeleton.

In this study, investigators found that an exercise-induced decrease in blood calcium occurred whether [calcium supplements](#) were taken before or after exercising. Pre-exercise supplementation, however, resulted in less of a decrease. Although not statistically significant, parathyroid

hormone levels increased slightly less among cyclists who took calcium before exercising.

"These findings are relevant to individuals who engage in [vigorous exercise](#) and may lose a substantial amount of calcium through sweating," Sherk said. "Taking calcium before exercise may help keep blood levels more stable during exercise, compared to taking the supplement afterwards, but we do not yet know the long-term effects of this on [bone density](#)."

The timing of calcium supplementation did not cause a difference in blood levels of a compound that is a biological indicator of bone loss. Both the before- and after-[exercise groups](#) exhibited 50-percent increases in the level of this compound, called CTX, for collagen type-1 C-telopeptide.

Study participants included 52 men aged 18 to 45 years. Investigators randomly assigned participants to take 1,000 milligrams of calcium and 1,000 international units of vitamin D either 30 minutes before or one hour after exercise. The exercise comprised a simulated 35-kilometer time trial, and participants wore skin patches to absorb sweat.

Investigators measured blood levels of calcium and [parathyroid](#) hormone before and immediately after exercise. They also measured CTX before and 30 minutes after exercise. They used pre- and post-body weight, adjusted for fluid intake, combined with the calcium measured in the sweat from the skin patches, to estimate the amount of calcium lost through the skin during exercise.

Provided by The Endocrine Society

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