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The Effects of 50k Ultramarathon Running on Quadriceps Torque and Circulating Inflammatory Calprotectin.

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Ultramarathon running has increased in popularity over the past decade. However, the effects of prolonged running on novel circulating inflammatory factors, such as calprotectin, and their relationship to muscle strength are not completely understood. **Purpose:** Determine the effects of prolonged running on quadriceps strength and plasma calprotectin levels and examine the relationship between these two factors. **Methods:** Trained men and women (n=11) age 39 ± 7 years participated in a 50-kilometer(k) trail run consisting of five 10k laps. Seated knee extensor force was measured before the race, after each lap, immediately post-race and 24h post-race using a hand-held dynamometer. Quadriceps torque (N.m.) was calculated by multiplying tibial length by force. Blood was drawn 30 minutes after participants finished eating their pre-race meal, after the first lap (10k), within 60 minutes of finishing the race and 24h post-race. Plasma calprotectin was measured using an enzyme-linked immunosorbent assay (ELISA). **Results:** Quadriceps torque did not significantly change from pre-race to lap 1 ($P=0.64$), but significantly declined post-race (-10%; $P=0.047$) and returned to pre-race values by 24h post-race ($P=0.1$). Compared with lap 1, quadriceps torque declined significantly by lap 2 (-9%; $P=0.024$) but remained unchanged from lap 2 through post-race (between -10 and -8% from lap 2 through post-race; $P>0.05$ for each timepoint). Plasma calprotectin increased 63% at lap 1 ($P=0.003$), 83% post-race ($P=0.001$), and returned to pre-race values 24h post-race ($P=0.66$). Pre-race calprotectin levels directly correlated with quadriceps torque at lap 1 ($r=0.627$, $P=0.023$), post-race ($r=0.771$, $P=0.005$) and 24h post-race ($r=0.767$, $P=0.006$). Plasma calprotectin levels 24h post-race directly correlated with 24h post-race quadriceps torque ($r=0.604$; $P=0.04$). **Conclusion:** Athletes participating in a 50k ultramarathon experienced an acute decline in quadriceps torque that coincided with an acute increase in plasma calprotectin concentrations. Both torque and plasma calprotectin returned to pre-race values after 24h. The relationships between calprotectin levels and muscle torque before, during, and after the race suggest a potential novel role for calprotectin in muscle recovery from an ultramarathon.

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