

**Andersson H, Raastad T, Nilsson J, Paulsen G, Garthe I, Kadi F. Neuromuscular fatigue and recovery in elite female soccer: effects of active recovery. Med Sci Sports Exerc. 2008 Feb;40(2):372-80.**

## **Abstract**

### **PURPOSE:**

To investigate the time course of recovery from neuromuscular fatigue and some biochemical changes between two female soccer matches separated by an active or passive recovery regime.

### **METHODS:**

Countermovement jump (CMJ), sprint performance, maximal isokinetic knee flexion and extension, creatine kinase (CK), urea, uric acid, and perceived muscle soreness were measured in 17 elite female soccer players before, immediately after, 5, 21, 45, 51, and 69 h after a first match, and immediately after a second match. Eight players performed active recovery (submaximal cycling at 60% of HR<sub>peak</sub> and low-intensity resistance training at < 50% 1RM) 22 and 46 h after the first match.

### **RESULTS:**

In response to the first match, a significant decrease in sprint performance (-3.0 +/- 0.5%), CMJ (-4.4 +/- 0.8%), peak torque in knee extension (-7.1 +/- 1.9%) and flexion (-9.4 +/- 1.8%), and an increase in CK (+ 152 +/- 28%), urea (15 +/- 2), uric acid (+ 11 +/- 2%), and muscle soreness occurred. Sprint ability was first to return to baseline (5 h) followed by urea and uric acid (21 h), isokinetic knee extension (27 h) and flexion (51 h), CK, and muscle soreness (69 h), whereas CMJ was still reduced at the beginning of the second match. There were no significant differences in the recovery pattern between the active and passive recovery groups. The magnitude of the neuromuscular and biochemical changes after the second match was similar to that observed after the first match.

### **CONCLUSION:**

The present study reveals differences in the recovery pattern of the various neuromuscular and biochemical parameters in response to a female soccer match. The active recovery had no effects on the recovery pattern of the four neuromuscular and three biochemical parameters