Circadian rhythms influence muscular voluntary strength among athletic performance, and muscle contractile properties have a circadian variation for short-term exercise. Leptin is a hormone which assists in the regulation of body weight and energy homeostasis. To date, little is known about the effects of circadian rhythm and acute exercise on leptin levels in human. This study examined the time-of-day (TOD) effects in muscle contractile properties during acute exhaustive short-term isokinetic eccentric exercise, and the serum leptin levels after exhaustive short term eccentric exercise.

Healthy non-obese male subjects (n=27) volunteered in the study and performed a single bout of exhaustive eccentric exercise with 100 maximal voluntary contractions of 120°/sec angular velocities of eccentric extensor muscles of the knee in a isokinetic dynamometer. The exercise protocol was used in the morning time at 8 A.M. and/or afternoon time at 4.30 P.M. on different days. Blood samples were collected at baseline and immediately after exercise. The exercise tests and blood sample collection was repeated after 7-10 days in the different time of the day. Eccentric extensor muscle torque and work parameters were recorded for each contraction and these values were used to compare the variations of muscle work efficiency and torque values with TOD. Serum levels of leptin hormone at baseline and immediately after the exercise were determined by ELISA tests.

The results of this study indicate that maximal torque values of the knee eccentric extensor muscles were not significantly affected by TOD, whereas the maximal amount of work performed by knee eccentric extensors during single repetition and total work values were significantly higher in the evening time than in the morning. Serum leptin levels were significantly decreased after eccentric short time exercise, but no effect of diurnal variation on serum leptin was observed.

In conclusion, the diurnal variations during short-term isokinetic exhaustive eccentric exercise seem to reflect on the extensor muscle work capacity with good contractile work efficiency in the evening time. In addition, a single bout of short-term exhaustive eccentric exercise decreased the levels of serum leptin in non-obese male subjects, but serum leptin seems not to have a diurnal variation.

Keywords: Muscle, Leptin, Exercise