TACSM Abstract

The Effects of Summer Training on Neuromuscular Performance in Semi-Professional Soccer Players

[1]JAN-JOSEPH S. ROLLOQUE; [2]KATHRYN E. SOUTHALL; [1]RUBEN E. MOYA; [3]TRAVIS ANDERSON; [1]KELLY B. ELLIOTT; [2]KEALEY J. WOHLGEMUTH; [2]MCKENZIE M. HARE; [3]WILLIAM M. ADAMS, FACSM; [2]JACOB A. MOTA; [1]YASUKI SEKIGUCHI

[1]Sports Performance Laboratory; Department of Kinesiology and Sport Management, Texas Tech University, Lubbock, Texas;
[2]Neuromuscular and Occupational Performance Laboratory; Department of Kinesiology and Sport Management, Texas Tech University, Lubbock, Texas;
[3]Department of Sports Medicine, United States Olympic & Paralympic Committee, Colorado Springs, Colorado;

Category: Masters

Advisor / Mentor: Sekiguchi, Yasuki (Yasuki.Sekiguchi@ttu.edu)

ABSTRACT

While training load (TL) and heat exposure have been shown to independently influence neuromuscular performance, these combined effects have not been fully explored. **PURPOSE**: To investigate the effects of summer soccer training on neuromuscular performance in semi-professional male soccer players. **METHODS**: 21 semi-professional male soccer players (age: 21.4 ± 1.9 years; mass: 77.3 ± 7.0 kg; height: 179.2 ± 6.4 cm) visited the laboratory on two occasions separated by three weeks of training. During each visit, ultrasound imaging was collected to determine muscle cross-sectional area (CSA) of the dominant rectus femoris (RF) and vastus lateralis (VL). Maximal voluntary contractions (MVCs) of the dominant leg extensors and flexors were performed to calculate peak torque (PT) and rate of torque development (RTD). Muscle excitation of the RF, VL, and biceps femoris was assessed using electromyographic root mean squared (EMG_{RMS}) calculations during each MVC. Internal and external TL metrics were collected via GPS-enabled accelerometers during all practices and matches. Linear regression models were used to assess the association between accumulative TL on the changes in neuromuscular performance during three weeks of summer training. **RESULTS**: Lower cumulative maximal accelerations (ACC_{MAX}) and decelerations (DEC_{MAX}) were associated with higher PT in the RF during extension (β = -285, p = 0.007; β = -272, p = 0.026, respectively). However, greater cumulative ACC_{MAX} and DEC_{MAX} were associated with higher PT in the VL during extension (β = 175, p = 0.016; β = 162, p = 0.012, respectively). Additionally, a greater cumulative total distance covered (TD) was associated with lower PT in the VL during flexion (β = -0.09, p = 0.004). Greater cumulative ACC_{MAX} and DEC_{MAX} were associated with higher EMG_{RMS} in the VL during flexion (β = 119, p = 0.026; β = 130, p = 0.029, respectively). No significant relationships were observed between other TL measures with RF and VL CSA and RTD. **CONCLUSION**: Changes in muscle excitation and force production characteristics in the RF and VL muscles were exhibited after a three-week training period during the summer. This suggests that three-week TL, in combination with heat exposure, may influence the risk of injury and performance of semi-professional soccer athletes.