TACSM Abstract

The Effects of Blue Light Exposure on Measures of Lower-Body Strength and Power

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Category: Masters

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ABSTRACT

Recently blue light exposure at night has received negative attention due to its ability to interrupt the sleep-wake cycle through reducing melatonin production and increasing alertness. However, when individuals are exposed to blue light in the morning a number of positive benefits have been observed such as; decreases in depressive symptoms, increases in cognitive function, decreases in reaction time, and increases in alertness. **PURPOSE**: The purpose of this study was to determine if blue light exposure in the early morning was capable of increasing measures of lower-body strength and power. **METHODS**: A repeated measures crossover design was used to determine differences in performance. Nineteen participants completed all data collection. Nine male (age = 20.3 ± 0.8 yrs., height = 174 ± 2.2 cm, weight = 71.6 ± 5.7 kg) and ten female (age = 21.4 ± 0.5 yrs., height = 166.2 ± 2.3 cm, weight = 69.5 ± 5.6 kg) participants completed 2 trials with a minimum of 72 hours between each trial. Participants arrived to the laboratory between 0600 and 0900 within 30 minutes of waking for each trial. For each trial, participants completed a 30-minute warmup period consisting of 15 minutes of passive rest and 15 minutes of cycling. The treatment trial received blue light exposure during the entirety (30 minutes) of the warm up while the control trial was exposed to minimal florescent lighting. Blue light exposure was in the form of glasses that emit 100 lux at approximately 468 nm wavelength of blue light. Following the warm up, researchers measured dynamic knee extensor torque (10 repetitions of isokinetic knee extension and flexion at 180 and 300° / sec) and peak isometric knee extensor strength with an isokinetic dynamometer (Biodex Medical Systems Inc. Shirley, NY). Countermovement vertical jump (Jump USA Vertec, Sunnyvale CA) was also measured following the completion of dynamometer testing with participants completing 3 maximal efforts with 1 minute of rest between each. A repeated measures MANOVA was conducted to analyze lower-body performance measures. **RESULTS**: While blue light exposure resulted in increases in performance for each measured variable (peak torque 180°/sec - 100.8 ± 8.3 vs. 94.4 ± 8.6 N*m; peak torque 300°/sec - 82.2 ± 6.7 vs 76.2 ± 7.4 N*m; vertical jump 50.89 ± 2.46 vs. 48.12 ± 2.4 cm), no significant ($p > 0.05$) differences were observed between the blue light trial and the control trial. **CONCLUSION**: Recent research has hypothesized a potential benefit of blue light exposure with regard to performance finding mixed results. Although increases in performance were found, results from this study were unable to find significant increases in lower body strength and power. Future research may focus on individuals who habitually exercise in the early morning, or athletes who are accustomed to performing under less than ideal circumstances.