

Impact of Six-Minute Walk or Rest Break during Extended GamePlay on Executive Function in First Person Shooter Esport Players

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Abstract : Background: Guidelines for the maintenance of health of esports players and the cognitive changes that accompany competitive gaming are understudied. Executive functioning is an important cognitive skill for an esports player. The relationship between executive functions and physical exercise has been well established. However, the effects of prolonged sitting regardless of physical activity level have not been established. Prolonged uninterrupted sitting reduces cerebral blood flow. Reduced cerebral blood flow is associated with lower cognitive function and fatigue. This decrease in cerebral blood flow has been shown to be offset by frequent and short walking breaks. These short breaks can be as little as 2 minutes at the 30-minute mark and 6 minutes following 60 minutes of prolonged sitting. The rationale is the increase in blood flow and the positive effects this has on metabolic responses. The primary purpose of this study was to evaluate executive function changes following 6-minute bouts of walking and complete rest mid-session, compared to no break, during prolonged gameplay in competitive first-person shooter (FPS) esports players. Methods: This study was conducted virtually due to the Covid-19 pandemic and was approved by the New York Institute of Technology IRB. Twelve competitive FPS participants signed written consent to participate in this randomized pilot study. All participants held a gold ranking or higher. Participants were asked to play for 2 hours on three separate days. Outcome measures to test executive function included the Color Stroop and the Tower of London tests which were administered online each day prior to gaming and at the completion of gaming. All participants completed the tests prior to testing for familiarization. One day of testing consisted of a 6-minute walk break after 60-75 minutes of play. The Rate of Perceived Exertion (RPE) was recorded. The participant continued to play for another 60-75 minutes and completed the tests again. Another day the participants repeated the same methods replacing the 6-minute walk with lying down and resting for 6 minutes. On the last day, the participant played continuously with no break for 2 hours and repeated the outcome tests pre and post-play. A Latin square was used to randomize the treatment order. Results: Using descriptive statistics, the largest change in mean reaction time incorrect congruent pre to post play was seen following the 6-minute walk (662.0 (609.6) ms pre to 602.8 (539.2) ms post), followed by the 6-minute rest group (681.7(618.1) ms pre to 666.3 (607.9) ms post), and with minimal change in the continuous group (594.0(534.1) ms pre to 589.6(552.9) ms post). The mean solution time was fastest in the resting condition (7774.6(6302.8)ms), followed by the walk condition (7929.4 (5992.8)ms), with the continuous condition being slowest (9337.3(7228.7)ms). the continuous group 9337.3(7228.7) ms; 7929.4 (5992.8) ms 774.6(6302.8) ms. Conclusion: Short walking breaks improve blood flow and reduce the risk of venous thromboembolism during prolonged sitting. This pilot study demonstrated that a low intensity 6 -minute walk break, following 60 minutes of play, may also improve executive function in FPS gamers.

Keywords : executive function, FPS, physical activity, prolonged sitting

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