The Cooling Effect of Cryotherapy on Power and Accuracy in the Pitching Arms of Baseball Players


Abstract

As the human body does work, energy is released in the form of heat. The ability to perform the same action repeatedly and at the same intensity requires energy to be maintained. By preserving energy in sports, a reduction of injuries and an increase in performance duration would most likely be observed. More specifically in sports, for 200 years of baseball history, the pitcher has attempted to keep their arm warm during resting intervals of a game, in belief this would help sustain their level of performance. This study attempted to overturn this view. I hypothesized that by cooling their arm between innings, pitchers' power and energy levels would be preserved and that their accuracy would be maintained. In this experiment, the levels of performance were quantified by measuring the velocity of a thrown baseball and recording whether it entered the target net. Players were observed and velocity recorded as they threw for five innings from a flat ground into a net behind home plate. Each inning the subject threw 17 pitches and then rested with a thermoregulating upper body garment. Three test subjects threw for five innings from a flat ground into a net behind home plate. Each inning the subject threw 17 pitches and then rested. During this 10.5 minute resting interval (average time of rest between innings), 8.5 minutes were used to run chilled (≈ 8˚C) water through the garment, 1.5 minutes for water at normal physiological temperature (≈ 35.2˚C), and 0.5 minutes were used to put on and take off the garment. For the noncooling treatment, water at normal physiological temperature was run through the garment for 10 minutes. Average pitch speed per inning for cooling and noncooling was compared along with an accuracy component of whether or not the pitch entered the net. For the first subject, cooling appeared to indicate that velocity decreased at a lower rate while accuracy was worse. For the second subject, the non-treatment seemed to elicit a slower decline in velocity over the pitched innings while the cooling treatment showed a higher rate of accuracy. However, the slopes of the lines of best fit for the velocity and accuracy graphs of the first and second test subjects fell within the standard deviations per inning, indicating no effect. For the final test subject, cooling did not demonstrate an effect for velocity or accuracy. In summary, this study did not illustrate a positive effect of cooling the arm during resting intervals to prolong endurance or accuracy. Another study involving more subjects with a sleeve made of a thinner material with a higher concentration of tubing in the arm, shoulder, and elbow area only would further evaluate the use of cryotherapy for pitching in baseball.

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