SWACSM Abstract

Biomechanical Indicators of Water Jump Performance

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ABSTRACT

During the course of the steeplechase track event athletes pass through one water jump obstacle per each of seven laps. There are many different elements of technique that can be used to improve maintenance of horizontal velocity through each obstacle. **PURPOSE**: This study investigated which biomechanical factors were correlated with higher ratios of exit velocity to approach velocity while negotiating the water jump obstacle. **METHODS**: Biomechanical data were gathered from the steeplechase event for both men and women at the USATF Outdoor Championships and Olympic Trials. Data were included from 2011 through 2023. Biomechanical data were measured from recorded video using Dartfish video analysis software. Knee and hip angles, time of stepping on the barrier, and take off and landing distances were measured at key points of the movement along with approach and exit velocities. These velocities were measured through 2m sections prior to the barrier and after leaving the water pit. A stepwise linear regression tested for correlations between the exit to approach velocities to a variety of biomechanical measurements. **RESULTS**: The predictor variables for both men and women were the same, including: landing distance, pushoff angle, and barrier time normalized to average velocity (Women R^2=0.290, $p<0.001$; men R^2=0.236, $p<0.001$). Additional factors that approached significance for the women's data $p<0.10$, included takeoff distance and angle of knee when the runner's hip is directly above the barrier (knee at crouch). **CONCLUSION**: According to our data, steeplechase athletes can improve horizontal velocity maintenance through the water jump obstacle by landing further from the barrier into the water, extending more at the knee while pushing off the barrier, and spending less time on the barrier. While previous research showed women lose more velocity during the water jump, the correlated factors were the same and were even entered into the model in the same order showing coaches and athletes the importance of where to focus their technique improvements.