

BIOMECHANICAL INDICATORS OF STEEPLECHASE HURDLE SUCCESS

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ABSTRACT

The steeplechase is a long-distance running event that requires competitors to jump over 28 hurdles and 7 water jumps over the course of the race. This frequent jumping means that hurdling technique is important and the ability to maintain speed over the barriers can help a runner succeed. **PURPOSE:** To determine which variables predict maintenance of speed while hurdling in the steeplechase. **METHODS:** Data were collected at the USATF outdoor championships and Olympic Trials from 2011 to 2023 for both men and women. A Sony video camera running at 120 Hz was used to evaluate several aspects of the runner's mechanics as well as their horizontal velocity before jumping and after landing. The ratio of exit to approach velocity was taken and used as our measure of how successful the jump was, a ratio closer to one means they lost less velocity when jumping over the hurdle. A stepwise linear regression was done for both men and women and was used to determine which variables best predicted hurdle success. **RESULTS:** Men and women had slightly different variables that predicted successful hurdling. The model for women had an R^2 of 0.179 ($p < 0.001$). For men the R^2 was 0.060 ($p < 0.001$). Both models included increased takeoff distance and greater knee flexion angle at takeoff as beneficial. Both models also included the lead knee extension when going over the hurdle, but it was a negative relationship in women and a positive relationship in men. The model for the men also included a less extended hip at takeoff. The model for the women added the clearance of the hip over the hurdle. **CONCLUSION:** Coaches should focus on having athletes take off a little farther from the barrier and working to have a more flexed knee at takeoff. Men and women have differing hurdling techniques in the steeplechase. While some of the same variables are important, there are also distinct differences. When coaching athletes these differences in technique should be accounted for.