TACSM Abstract

Effect of Block Design on Rotational Characteristics of a Swim Start

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ABSTRACT

Start block design in swimming had received little attention in the literature until the introduction of the kick plate. De Jesus et al. (2022) and Beretic et al. (2012) concluded that use of the kick plate provided advantages primarily in reducing block time and generating greater horizontal takeoff velocity and flight distance. This previous work has not considered how block design may affect the rotational characteristics of a swim start. **PURPOSE:** The purpose of this study was to examine the effect of start block design on the rotational characteristics of a swim start. **METHODS:** Fourteen university-level competitive swimmers (21.1±2.1 yrs, 1.79±0.08 m, 75.6±11.8 kg) completed three maximal effort swim starts under each of four conditions, flat block with no kick plate, flat block with a kick plate, inclined block with no kick plate and inclined block with a kick plate. Temporal and kinematic variables and angular momentum were measured for each start using a two-dimensional video analysis. **RESULTS:** Use of an inclined block significantly ($p<0.05$) reduced block time by 4%, reduced time to 5m by 2.2% and reduced vertical velocity at entry by 4.9% compared to a flat block. Use of a kick plate significantly ($p<0.05$) reduced block time by 3.4%, reduced time to 5m by 3.4%, increased horizontal velocity at takeoff by 3.7%, increased horizontal velocity at entry by 2.7% and increased the body orientation angle at takeoff by 2.7% compared to not using a kick plate. Neither block inclination nor use of a kick plate affected airborne whole body angular momentum. **CONCLUSION:** These data support using an inclined block platform and kick plate to improve start performance and suggest that experienced swimmers can adapt the rotational characteristics of their start to different conditions.