

EFFECTS OF STARTING BLOCK WIDTH SPACING ON SPRINTING KINEMATICS

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INTRODUCTION: This study examined the effect of relative lateral foot placement when using modified Fusion starting blocks on the sprint running kinematics for the first four steps out of the blocks.

METHODS: Eight females from the Indiana State University Track and Field team performed three 30 m sprint starts from a modified Fusion I starting block. These starting blocks were made in a doublewide configuration to accommodate a variety of foot placements. Foot placements were determined by relative hip to ankle angle. Experimental hip-ankle angles were $\pm .087$ rad (wide/narrow) and, 0 rad (neutral). The sprinters were recorded at 60 Hz with four cameras, body markers were identified, and floor markers were placed at one-meter intervals. Markers were digitized, transformed, and digitally filtered at 7 Hz using the Ariel APAS. Kinematic variables of horizontal velocity and lateral deviation from linear footpaths were analyzed for width, stride, and trial factors with an ANOVA with repeated measures.

RESULTS: The horizontal velocities during 3 sprint trials using 3 foot widths for strides 1 to 4 were examined and significant differences were found to exist for the foot width ($p = .06$) and strides out of the blocks ($p = .000$). Significant differences were found between lateral deviations of linear footpaths for the 3 foot/block widths ($p = .02$) during the first four steps. The results are shown in Tables 1 & 2 and graphically illustrated in Figures 1 & 2.

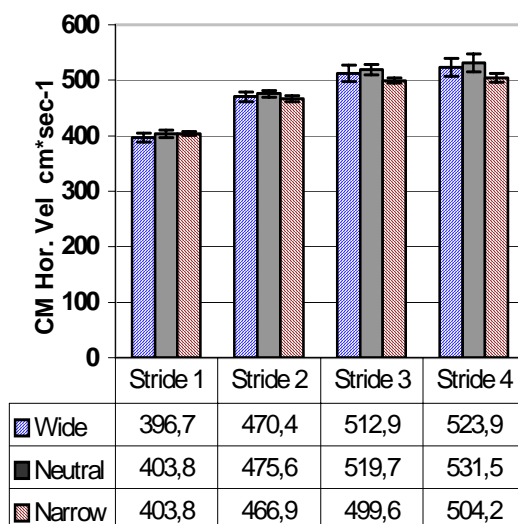


Figure 1: Horizontal Velocities with 3 Widths for Strides 1-4 during 3 Trials

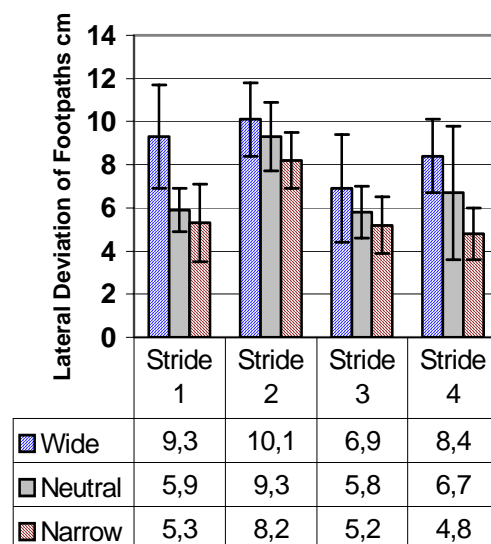


Figure 2: Footpath Absolute Lateral Deviations with 3 Widths for Strides 1-4

CONCLUSIONS: Post hoc analyses found that the runners' linear footpaths deviated laterally significantly less during the first four strides with the narrow foot/block spacing than the other block conditions. However, post hoc analyses of the horizontal velocities found that it was significantly faster starting with the neutral foot/block condition.