

原 著

## 円盤投げにおける身体合成重心速度が投てき記録と動作に及ぼす影響

### The Effects of Translational Velocity of the Center of Mass on Throwing Movement and Performance in Discus Throw

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#### Abstract

The purpose of this study was to investigate relationships between the translational velocity of the center of mass of including thrower and discus (CM) and the throwing distance or the movements in discus throw. Subjects were 19 male discus throwers selected from the 11th World Championships in Athletics in Osaka and the 91st Japan Track and Field National Championships, and also in experimental trials. The throwing movements were recorded by two or three digital video cameras (60 Hz). From the video data of trials when each athlete had thrown the longest distance, three-dimensional coordinates of their body landmarks and the center of the discus were calculated with the direct linear transformation method. The throwing movements were divided into six instants and analyzed.

In the results, the translational velocity of CM at left-foot-takeoff (L-off) and right-foot-touch-down (R-on) were recognized as a negative correlation with the throwing distance. And also,  $\Delta$ translational velocity of CM during first single-support phase (SS1) showed a negative correlation with the throwing distance. Significant negative correlations were found between the rotational velocity of hip at L-off, the trunk torsion angle at R-on and the translational velocity of CM at same instants.

These results indicate that the larger acceleration of translational velocity of CM during SS1 is not necessary for throwers in order to obtain longer throwing distance in discus throw. And, the thrower should kick the ground not to accelerate the translational velocity of CM, but to increase the rotational velocity of hip during SS1.

キーワード 円盤投げ, 投てき, 身体重心, 捻転

discus throw, throwing, center of mass, torsion

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