

競歩選手における肩腰動作の位相遅延と円滑性

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Phase Delay and Smoothness of Shoulder - Hip Motions in Race Walkers

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Abstract

The purpose of this study was to investigate the relationship between shoulder-hip coordination patterns and the fluctuation of the upper body in race walkers. Twelve male participants with different skill levels walked on a treadmill at a speed equal to 70 %, 80 %, 90 %, and 100 % of their best speeds in a 10,000m walk. Horizontal yaw angles and the angular velocities of shoulders and hips, as well as the vertical yaw angles of the line drawn from the vertex to the midpoint of the hips were calculated as motion indices. Significant features in the movements of skilled race-walkers were: (1) the motion angle of the upper body on the frontal plane was in dynamical stability, (2) compared to the hips, the cyclic motion of the shoulders was phase delayed, (3) the fluctuation of shoulders was smaller and the shoulder-hip variance ratio was about 0.6, and (4) the motion of hips was larger and smoother. It was concluded that initially acquiring a smooth hip motion as a learning strategy, would reduce the perturbed sway of the shoulders and the upper body.

Key words: intrinsic dynamics, dynamical stability, phase delay, shoulder-hip variance ratio