COMPARISON OF TURN TECHNIQUES IN PERFORMING THE BASKET WITH HALF TURN TO HANDSTAND ON PARALLEL BARS

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INTRODUCTION: The basket with half turn to hand stand is performed in competition by male gymnasts on the parallel bars. The turn techniques in performing this maneuver are classified into two types. The early turn technique resembles a cast with half turn to support. The late turn technique looks like a basket to handstand on one rail followed by a half turn backward in a handstand. The former technique can improve the difficulty value by increasing the turn. The purpose of this study was to compare the different turn techniques in performing the basket with half turn to handstand on the parallel bars.

METHODS: Four senior male gymnasts (early turn: 2, late turn: 2) competing nationally were asked to perform the basket with half turn to handstand. The performances were videotaped using two digital video cameras (60 Hz) from a lateral view and a diagonal view of the front. Twenty-two body landmarks (right and left third MP, wrist, elbow, shoulder, toe, heel, ankle, knee and hip, and vertex, midpoint of tragions, suprasternale, lower end of thorax) were digitized. Three dimensional coordinates were synchronized and reconstructed using the method of Yeadon and King (1999). The coordinates were filtered with cut-off frequencies ranging from 3.4 to 5.4 Hz, and the center of mass and moment of inertia of each segment and of the whole body were estimated using the body segment inertia parameters of a Japanese athlete model (Ae, 1996).

RESULTS AND DISCUSSION: Figure 1 shows horizontal and vertical velocities of the center of gravity. Vertical lines in the graphs represent rotation angles of the line hand to center of gravity from the vertical position (handstand) and the instants of releasing and re-grasping the bar. Upward and downward peak velocities were similar in value. The late type of turn had a peak of backward velocity around 90 deg., but the early type of turn had a relatively constant backward velocity until 90 deg. Forward velocity of the early type of turn was greater than that of the late type of turn. This result shows that kinetic energy of the center of gravity, acting like a pendulum, was used more effectively in the early type of turn than in the late type.

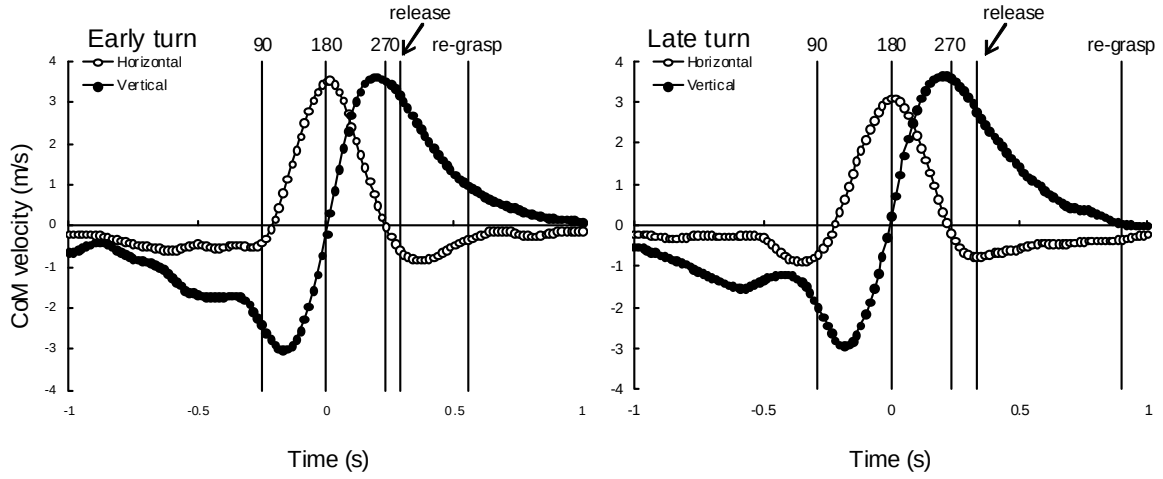

Figure 1 Horizontal and vertical velocities of the center of gravity.