

BIOMECHANICAL STUDY OF THE TRANSITION TECHNIQUE OF EXCELLENT MALE SHOT-PUTTERS

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INTRODUCTION: All sports events have undergone many innovations during the 100 years development of Olympic Games. In particular track and field events, in which skill development is much more obvious, have been characterized by rapid improvements in human performance. Within the field events, the shot put is a complex event that has prompted many skill innovations from throwing in place to side sliding shot putting, to back sliding throwing, and to rotational shot putting. The outcomes of all these innovations seem to add to the duration of the acceleration phase, which then increase the velocity of release. Because shot put belongs to "cast events", According to trajectory principles, its descriptive mechanical formula is $S = v_0^2 \sin 2\alpha / g$ with S being affected by the velocity of release. So the key to improving performance in the shot put is to increase its velocity of release. Building of the velocity of the shot begins at the slide stage, and then it passes to the transition stage to transform the velocity into motion of the shot put at release. So skill in the transition phase is very important during throwing the shot put. How to minimize the loss of velocity during the throw is the aim of the present study with a particular emphasis on the transition skill.

METHODS: The study utilized elite Chinese male shot-putters. Research methods included documentary, statistical and videotape analysis using two JVC GR-DVL9800 mini camcorders mounted on the back of circle and the left side. The entire event was recorded after which the local and international shot-putters were compared.

RESULTS AND DISCUSSION: The results show that the local elite shot-putters had serious deficiencies with the transition phase of shot putting. Firstly, the angle of the right foot pedal was greater during sliding phase (average of 74°), leading to a reduction in shot velocity of 2.67 m/s during the transition compared to 2.8 m/s when utilizing a model technique. Secondly, the local shot putters did not control their upper body well prior to release of the shot put. In the transition phase, the upper body opened earlier reducing the length of time for shot acceleration and therefore decreasing the velocity of the shot put at release.

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