KINEMATIC ANALYSIS OF U.S. DECATHLETE SHOT PUT PERFORMANCE

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The purpose of this study was to analyze selected kinematic parameters describing shot put performances of elite U.S. decathletes. The obtained information would provide baseline data of decathlete shot put performance in the initial year of the current quadrennium upon which subsequence performances of these same decathletes could be evaluated. A secondary purpose was to correlate the selected kinematic parameters with put distance.

During the 1989 TAC Championships, the trials of 13 decathletes in the shot put event were videotaped by an AG-160 Panasonic camcorder positioned perpendicular to the movement path of the athlete across the ring. Mean height and weight values for the group were 1.87 m and 83.92 kg, respectively. The best put for each decathlete (mean distance = 13.66 m) was analyzed on the Peak Performance Motion Measurement system at 60 Hz using a 15 segment model. The glide technique was used by 11 athletes with the spin move being preferred by the two other decathletes.

The digitized data were smoothed; selected temporal, linear displacement, and angle measurements were calculated. Mean values for shot velocity, angle of projection, and height at the time of release were 9.35 m/s, 42.5 degrees, and 1.97 m, respectively. None of these three variables describing projectile motion was significantly related to shot put distance.

Both shot horizontal displacement during the propulsion phase and the total movement sequence correlated negatively with distance (-.47 and -.52, respectively). Times for the drive phase and total movement of the put sequence also correlated negatively (-.50 and -.55, respectively) with put distance.

These findings suggest that (1) the lack of significant statistical relationships between put distance and projectile motion variables are not surprising considering the small, homogenous sample, and (2) the observed negative correlations between temporal measures with put distance reflect the importance of the force component in the impulse-momentum relationship in this event.