

ANALYSIS OF DROP JUMPS WITH AND WITHOUT CONTROL OF CONTACT TIME

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The purpose of this study was to compare drop jumping from various heights with and without controlling for contact time. Twenty healthy individuals performed drop jumps from various. Preliminary EMG, power, and kinematic results showed some changes in motion patterns when controlling for contact time. Those patterns, however, did not significantly alter the height jumped.

KEY WORDS: drop jumping, control time, EMG, kinematics

INTRODUCTION: Drop jumping techniques have been the subject of a number of investigations. They are, in part, distinguished on the basis of either shorter or longer contact times (Bobbert, 1990). Drop jumping performance between subjects depends on the technique used including drop height and length of contact time. The purpose of this study was to analyze and compare drop jumping from various heights with and without controlling for contact time.

METHODS: Twenty physical education male students participated in the study. The subjects performed maximal drop jumps from 20, 30, 40 and 50 cm under two conditions a) three jumps with no control of contact time and b) seven trials with control time feedback. In each condition, the drop jumps producing the greatest height were selected for further analysis. Video data were collected at 60 Hz and analyzed utilizing the Ariel Performance Analysis System (APAS). Vertical ground reaction forces were collected using a Kistler force plate. EMG data from the rectus femoris, biceps femoris and gastrocnemius muscles were also collected. Paired t-tests were used for statistical analysis.

RESULTS AND DISCUSSION: Preliminary results (Table 1) show significant differences in mechanical power, knee joint angular velocity, and hip and ankle joint angles at touchdown.

Table 1 Power, EMG, Temporal, & Kinematic Results.

Variable	Without Feedback	With Feedback
Power (Watts)	5272 (\pm 3213)	8646 (\pm 2948)*
Knee J. ang. vel. (deg/sec)	364 (\pm 102.7)	303 (\pm 162.8) *
Hip J. contact angle (deg)	155 (\pm 14.4)	151 (\pm 14.9) *
Ankle J. contact angle (deg)	133 (\pm 8.6)	137(\pm 8.8)*
Height Jumped (cm)	27.19 (\pm 6.89)	28.83 (\pm 6.21)
Gastrocnemius (mV)	0.758 (\pm 0.098)	0.763 (\pm 0.08)
Time of contact (msec)	273.35 (\pm 101.08)	306.5 (\pm 118.18)

Note: Reported EMG activity refers to the concentric phase of the muscular contraction.

Eccentric EMG activity differences were also not significant. *p < 0.05

Height jumped, although increased as the time of contact increased, did not alter significantly. EMG results indicate no significant changes in muscle activity, for all three muscles, as result of altering the time of contact. On the basis of these results, it is suggested that control of the contact time in drop jumps has minimal effects on the height of jump.

REFERENCES:

Bobbert, M.F. (1990). Drop jumping as a training method for jumping ability, *Sports Medicine*, 9, 7-22.