THE VARIABILITY OF VERTICAL GROUND REACTION FORCE DATA IN COUNTERMOVEMENT JUMP

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INTRODUCTION: Jumping landing force is a common interest of sport scientists because it could directly reflect the impact on the lower extremities. The aim of this study is to test the variability of jumping landing GRF parameters (Peak landing force and rate to the peak) in real-like jumping situation.

METHODS: A force platform (Kistler) and a Yardstick (SWIFT) were used to test for the landing peak force during a real-like jump landing motion, the experiment setup are in the Figure 1. 15 male subjects (age 20.53 ± 1.36 yrs, body weight 155.97 ± 16.39 lbs, height 179.4 ± 6.03 cm, basketball year 8.68 ± 1.86 yr and number of practicing hour per week 6.5 ± 1.82 hr) were recruited from the basketball team players of the Chinese University of Hong Kong. The procedure of this study was 1) determine the maximum jumping height (MH) of each subject with Yardstick, 2) 95% of maximum jumping height was set to be a jumping target for individual subject, and 3) After wearing the reference shoe, each subjects performed 10 trials of which touched their own jumping target. The peak landing force and rate to peak landing force of 10 trials of each subject were measured. Coefficient of Variation (CV) was used to determine the variability of the peak jump landing force and rate to peak landing force. $CV = \frac{SD}{Mean} \times 100\%$

RESULTS AND DISSCUSSION: It was found that the overall coefficient of variation (CV) of peak landing force (below 15%) was much smaller than the rate to the peak in the Figure 2. The mean and SD of CV of the peak force and the rate to the peak was 6.51± 2.83 % and 11.67± 8.05 % respectively. Peak landing force was less variability than the rate to peak and it was considered as acceptable because the CV was less than 12.5% (White R. et al, 1999).

CONCLUSION: It was suggested that peak landing force could be used in countermovement jump landing studies because this variability was good. And this real-like setup could help to have better interaction among the subject, shoe and floor.

Figure 1 Experiment setup.

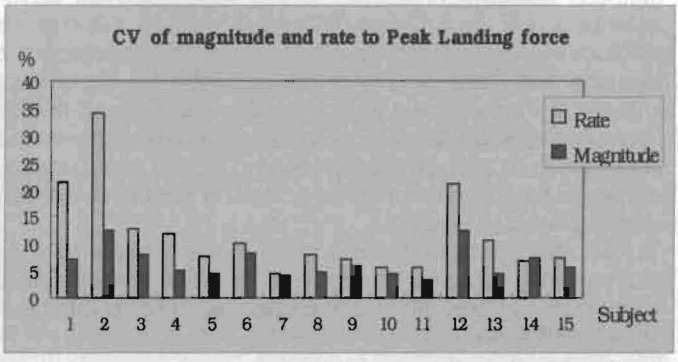

Figure 2 CV of peak landing force and rate to the peak

References: White R, Agouris I, Selbie RD and Kirkpatrick M (1999). The variability of force platform data in normal and cerebral palsy gait *Clinical Biomechanics*,14(3), 185-192.