

VALIDATION OF A PORTABLE FORCE PLATE TO ASSESSING JUMPING AND LANDING PERFORMANCE

Mark Walsh¹, Kevin Ford², Kyle Bangen¹, Greg Myer² and Timothy Hewitt²

¹Department of Physical Education, Health and Sports Studies,
Miami University, Oxford, Ohio, USA

²Sports Medicine Biodynamics Center and Human Performance Laboratory,
Division of Molecular Cardiovascular Biology, Cincinnati Children's Hospital Research
Foundation, Cincinnati, OH, USA

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INTRODUCTION: Jumping and landing tasks are commonly used to examine various parameters regarding performance (Arampatziz et al. 2001) and injury (Hewitt et al. 2005). Traditionally jumping tasks have been used to measure a variety of neuromuscular factors regarding performance. Landings have been studied extensively with respect to factors related to injury. It is commonly accepted that the standard force platform is the most commonly used and considered the 'gold standard' for measuring ground reaction force during jumping and landing tasks.

One potential aspect which limits the use of a force platform is that they are typically mounted to the ground to prevent any unrelated vibrations from affecting the force measurement. The portability of these devices is difficult and measurements are normally restricted to a laboratory setting. Another possible factor that could affect the data collected by a portable force plate is the difference in surface height between the ground and the force plate. Therefore, the dimensions of a portable force platform should be large enough to accommodate the given maneuver without changes in performance. Therefore, the purpose of this study was to validate the force measurements of a new portable force platform during two jumping/landing tasks by comparing the measurements to a traditional laboratory mounted force platform. A secondary purpose was to establish the reliability of the portable force platform. If the validity and reliability of the portable force platform are confirmed, this will provide a device that can assess a variety of measurements in field (non laboratory) situations. We hypothesize that the force and temporal measurements between the two instruments would not be different.

METHODS: Thirty two physically active college students volunteered to participate in this study. Their mean (\pm SD) age, mass, and height were 21.0 ± 1.1 years, 70.0 ± 15.3 kg, and 68.1 ± 4.4 cm. The parameters examined during both the drop vertical jump and drop landing were peak landing force and time-to-peak landing force. In addition, during the drop vertical jump the peak takeoff force and time-to-peak takeoff force were also calculated.

A portable force plate (Accupower, AMTI, data collection rate: 400 Hz) and a Bertec force plate (6090-15, Bertec, data collection rate: 1200 Hz) were used to collect data.

The subjects all performed 3 drop landings and 3 drop vertical jumps from a height of 31 cm onto each of the two plates. The order in which the subjects performed each task on each of the force platforms was randomized for each subject.

For the drop landing no instructions were given on how to land. For drop jumps the subjects were instructed to jump to their maximal height immediately after landing. The trials were accepted if both feet left the drop box and landed on the platform at approximately the same time.

RESULTS: Initial results indicate that the portable plate is probably both a reliable and valid tool for the collection of ground reaction force.

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