

# EFFECT OF SPORT ACTIVITY ON COUNTER MOVEMENT JUMP PARAMETERS IN JUVENILE STUDENTS

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**KEY WORDS:** counter movement jump, arm-swing, variability.

**INTRODUCTION:** The counter movement jump (CMJ) is a commonly used method in performance diagnostics to measure leg power (Frick et al., 1991). The use of arm movements during jumping can increase the release velocity and thereby the jump height (e.g. Harman et al., 1990, Gerodimos et al., 2008). Despite the consensus, that arm-swing enhances the performance in the CMJ, still disagreement exists which jumping technique (with or without arm-swing) should be used in performance diagnostics. Marcovic et al. (2004) showed a good reliability for squat jump (SJ) and CMJ without arm-swing for physical education students, who had sufficient experience in explosive activities such as jumping. In contrast, for untrained individuals both, the use and the avoidance of the arm-swing can lead to differences in the jumping performance. The fixation of the arms at the hips might be unfamiliar and might cause variability in jump height. Unskilled use of the arm-swing, however, can lead to differences in jump height (Marcovic et al., 2004). To our knowledge, limited research has been done regarding the difference in variability between the two jumping techniques (with or without arm-swing). Therefore, one aim of this study was to describe differences between these two jumping techniques under consideration of the athletic experience. Furthermore, a specific focus should be set on the variability of the different jumps for experienced (more than 6 hours sports activity a week) compared with less experienced individuals, which may give some more information about the application of these two methods to the performance diagnostics.

**METHODS:** 380 students ( $12.7 \pm 2.0$  yrs,  $47.9 \pm 12.7$  kg) of the secondary school category participated in this study. They were divided in two groups. The first group included athletic experienced students participating in special sports programs (more than 6 hours a week), and the second group consisted of students with less or nearly no special sports experience. All subjects were asked to perform three maximum vertical jumps while using an arm-swing (CMJA) and afterwards while holding their arms at the hip (CMJ). The instruction in both conditions was to jump as high as possible. Vertical ground reaction forces were measured with a divided force plate ("Leonardo Force Platform", 800 Hz). Jump height (h), maximum force and coefficient of variance (cv) were calculated. t-tests and ANOVA were used for statistical analysis.

**RESULTS AND DISCUSSION:** CMJAs show significantly greater jump heights compared to CMJ ( $\Delta h = 3.3 \text{ cm} \pm 2.1$ ). This corresponds with previously reported results (e.g. Harman et al., 1990, Gerodimos et al., 2008). Jump height of the experienced group was higher than the jump height of the less experienced group (CMJA:  $\Delta h = 5.0 \text{ cm}$ , CMJ:  $\Delta h = 3.8 \text{ cm}$ ). The variability of the jump height is higher for CMJA compared with CMJ ( $\Delta cv = 1.4\% \pm 5.8$ ). The experienced group shows lower variability than the less experienced group (CMJA:  $\Delta cv = -1.8\%$ , CMJ:  $\Delta cv = -1.0\%$ ).

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