# LATERALITY IN VERTICAL JUMPS

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**KEY WORDS:** laterality, vertical jump.

**INTRODUCTION:** Laterality is a widely investigated phenomenon in motor activities. Various studies deal with the functional dominance of one limb or one side of the body in sports (e.g. Fischer, 1988, Oberbeck, 1989). One common method for the identification of lateral differences in the lower limbs is the single-leg vertical jump (e.g. Stephens, 2005). In order to reduce the risk of injury and the coordinative demand Impellizzeri et al. (2007) and Newton et al. (2006) proposed a double-leg vertical jump force test for the assessment of bilateral strength asymmetry. The focus of these studies was set on the strength imbalance between the right and left leg using the maximum force as the relevant factor. Further parameters to describe lateral differences were neglected and still little is known about the coherence between laterality and jumping performance. Therefore, the aim of this study was to investigate laterality in established double-leg vertical jumps in performance diagnostics, such as the counter movement jump (CMJ), squat jump (SJ) and drop jump (DJ).

**METHODS:** 12 male and female athletic athletes (16.8 ± 2.9 yrs, 1.75 ± 0.08 m, 62.1 ± 6.6 kg) participated in this study. All subjects were experienced in vertical jumps. After a short warm-up consisting of jogging on a treadmill each subject performed six DJ from a height of 20 cm, six SJ and six CMJ with the arms akimbo. In all conditions the instruction was to jump as high as possible. Vertical ground reaction forces were measured with two, side-by-side, force plates (AMTI, 1000 Hz). Kinematic data were recorded using ten infrared-cameras for three-dimensional analysis (Vicon, 200 Hz). In addition to the singular dynamic and kinematic parameters, the process of the complete jump will be analysed separately for both legs. All results are described by a laterality index $LI = 100\ (r - l)/(r + l)$.

**RESULTS AND DISCUSSION:** Regarding the vertical ground reaction forces, first results for the CMJ show lateral differences during the jump, e.g. in the maximum force (3.9 ± 2.1%), and in the previous stance phase. There is a small correlation between maximum force and jump height ($r = 0.54$). A higher minimum force of one leg leads to a higher explosive force and a higher momentum in the CMJ. Nearly all subjects show a small variability in their jumps with individual movement patterns. The kinematic data as well as the data of SJ and DJ is not yet available.

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