

ABSTRACT

Thesis: Biomechanical Analysis of a Backward Somersault Landing and Drop Landing in Female Gymnasts

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In gymnastics, females are often afflicted with lower extremity injuries during the landing phase of a backward rotating skill. The purpose of this study was to assess the efficacy of using a drop landing and backward somersault landing to compare and contrast the kinetic and kinematic differences between the two tasks in order to determine if a drop landing is a suitable representative task to analyze when examining landing injury mechanisms. Eleven female NCAA Division I gymnasts (age 19.3 ± 0.9 yrs; body height 1.66 ± 0.05 m; body mass 61.36 ± 6.02 kg) were recruited to perform drop landings and backward somersaults. Two force plates along with a 3D movement analysis system were used to collect kinetic and kinematic data. A repeated measures ANOVA was used to examine the differences in the variables with the significance level set at 0.05. There were mechanical differences and significance found between the peak vertical ground reaction forces, loading rate, kinetic and kinematic variables in the sagittal and frontal planes during the two tasks. It is evident that results may underestimate the effect of gymnastics landing impacts on risk of lower extremity injury because of the mechanical differences and significance found between the two tasks.