

## ABSTRACT

### A kinematic analysis of calcaneal eversion and ankle dorsiflexion in a contemporary dancer's demi-plié

**BACKGROUND:** Dancing requires a high range of motion in the foot as well as a good shock absorbing system formed by the foot and ankle joints. Although there is a broad consensus in dance that excessive calcaneal eversion can cause injury and should be avoided, calcaneal eversion is discussed controversially in the dance literature. An increased research focus on the biomechanics of dance, particularly research pertaining to the foot and ankle joints, might help to resolve this controversy. **OBJECTIVES:** The study's main purpose was to generate hitherto lacking kinematic data of calcaneal eversion in a dancer's demi-plié. **METHODS:** Thirty-two contemporary dancers performed three trials in two different conditions: demi-plié in parallel and in turned-out positions. The motion capture system FASTRAK was used to measure calcaneal eversion and foot and lower leg alignment during demi-plié. Ethical approval of the research design was granted by the ethics committee of the Faculty of Human Sciences for this descriptive study. **RESULTS:** Maximal calcaneal eversion in turned-out demi-pliés was  $3.36^{\circ} \pm 4^{\circ}$  and total range of motion (i.e., maximal minus minimal angle) of calcaneal eversion was  $3.73^{\circ} \pm 1.42^{\circ}$ , where the large standard deviations indicate substantial variability across participants. Calcaneal eversion was significantly different between turned-out ( $3.36^{\circ} \pm 4^{\circ}$ ) and parallel ( $1.17^{\circ} \pm 4.06^{\circ}$ ) demi-pliés, as was the alignment of lower leg and foot, where the lower leg tracked more medially relative to the foot during turned-out pliés. Crucially, both the magnitude of calcaneal eversion and its temporal coupling with ankle dorsiflexion were highly variable across participants. **CONCLUSIONS:** Average calcaneal eversion is a poor indicator of the role calcaneal eversion plays in the demi-plié of contemporary dancers. Rather the temporal coupling between calcaneal eversion and ankle dorsiflexion needs to be considered.

#### Lecture Presentation

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#### Recommend Reading:

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