BIOMECHANICAL FACTORS CONTRIBUTING TO EFFECTIVE TURNING
Divya Ramakrishnan, Antonia Zaferiou, Jill McNitt-Gray
USC Biomechanics Research Laboratory
Department of Biomedical Engineering, Biological Sciences
University of Southern California, CA, USA E-mail: dramakri@usc.edu

INTRODUCTION
Maintenance of balance is essential to daily life (1,2,3). Although tasks can vary from turn to turn, maintaining balance can be particularly challenging for older adults (3). Effective turning involves both dynamic and static aspects of the center of mass (CM) as well as control of the CM relative to the base of support (2). Understanding how each leg contributes to both balance regulation and linear and angular impulse generation during each phase of the turning task is essential for improving turn performance. In dance, as in sport, a ballet dancer must push off of one leg onto a stance leg serving as the base of support during the turn. In a pique turn, the push leg generates forces at the foot/surface interface so that the CM translates onto a straight single turning leg. This is achieved by generating a laterally directed reaction force in relation to the starting body position. After the completion of the turn, the goal of the pique turning task is for the CM trajectory to continue in the same direction so that a second turn can be initiated along the same CM trajectory. Hypothesis: Successful and unsuccessful performance of pique turns involving progressive increases in degree of rotation would be differentiated by the phase of successful turns. The hypothesis was tested at the whole body level using biomechanical data (muscle activation surface electromyography and kinematics measured with forceplates) during pique turns performed by an experienced ballet dancer.

METHODS
• Experienced ballet dancer (8-8 years of pointe training) volunteered to participate.
• The dancer performed a series of pique turns requiring varying degrees of rotation as normally done during her dance performances.
• Turns initiated with each foot supported by a forceplate (Kistler, 1200Hz). Body segment kinematics (100 Hz or 60 Hz) were captured simultaneously in the frontal, sagittal, and transverse planes.
• Reaction force-time characteristics and EMG activation patterns were then compared between 1 and US pique turns each requiring 70–100% of rotation.

Data and Results

CONCLUSIONS

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E-mail: dramakri@usc.edu