COMPUTATIONAL BIOMECHANICS HELPS TO IMPROVE THE SHIFTING MOVEMENT IN VIOLIN PLAYING

Denis Mosconi, Industry Department – Federal Institute of Sao Paulo, denis.mosconi@ifsp.edu.br

Paulo E. Luckman, Music Department – State University of Maringa, peluckman2@uem.br

Adriano A. G. Siqueira, Center of Engineering Applied to Healthy – University of Sao Paulo, siqueira@sc.usp.br

Abstract. One of the movements performed by the violinist is the shifting of position, which is characterized by the translation of the left hand in order to play notes in different places that would not be accessible if the hand was fixed. The purpose of this work was to use computational simulation in biomechanics to understand the movement performed during the shifting, as well as its implications related to joint torque and muscle activation. The main results obtained refer to the trajectory of movement and the speed involved, which allow the musician to plan the change properly, guaranteeing both artistic and technical quality, in addition to avoiding sudden reactions that could compromise the safety of the shoulder and elbow joints.

Keywords: Biomechanical Simulation. Human Neuromusculoskeletal Model. OpenSim. Predictive Simulation