

# Mechanical Engineering Thesis Defense

## Quantification of Bilateral Ankle Stiffness in Frontal Plane during Standing for Varying Weight Distributions

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### Abstract

Chronic ankle instability (CAI) is caused by the failure to get into treatment and rehabilitation after suffering an acute ankle sprain which is the most common injury of the ankle joint. Typical clinical assessment on ankle sprain is done under unloaded conditions although ankle sprain occurs during active or passive weight loading. Modelling ankle mechanical impedance in frontal plane under active or passive weight loadings is one of the ways to quantify the ankle stability which would be helpful for clinical assessment of ankle sprain. Patients with Chronic Ankle Instability suffer from gait asymmetry, and the descriptions of the asymmetry ratio vary widely throughout the research community. Bilateral ankle stiffness could be the better representation of the gait asymmetry as it summarizes the passive structure and active muscle contractions as a whole by modelling the underlying mechanics of the bilateral ankle. The objective of this study was to characterize bilateral ankle impedance or stiffness in frontal plane during standing under different weight loadings. Here we reported the bilateral difference in ankle stiffness in frontal plane between dominant and non-dominant ankle as well as the sex difference in bilateral stiffness for varying weight distributions.



April 10, 2023; 11 AM; ECG G227;

Zoom Link: <https://asu.zoom.us/j/6222521575>