HANDS-FREE BALANCE PROTOCOL AND DEVELOPMENT OF AN IPHONE APP FOR SELF-ASSESSMENT

A Master's Thesis Defense in Mechanical Engineering California Polytechnic State University, San Luis Obispo

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Tuesday June 3rd, 2025, 7:30 AM. Building 192, Room 132

Zoom Meeting ID: 827 0581 1450 or https://calpoly.zoom.us/j/82705811450

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For many clinical populations, the measurement of balance (i.e., postural stability) is a critical task. Previous studies have agreed that smartphone balance assessment is a valid technique that can be significantly correlated with force plate measurements and is sensitive enough to distinguish between various balance poses, but many balance assessment protocols require uncommon equipment or the use of hands during assessment. These limit accessibility of balance assessment. To eliminate the need for hands or any additional equipment, this study assessed the use of a smartphone recording the root mean square of 3D acceleration magnitude. The goal of the study was to determine if acceleration recordings taken from a pants pocket or shirt pocket were sufficiently sensitive to identify differences in balance poses of increasing difficulty, and if those measurements were correlated with previously validated methods. An iPhone app was also developed to allow users to self-assess balance without any additional equipment.