**Development of a clinically usable assessment tool for static standing balance**

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**Abstract**

**Background:** Falls are a serious issue among individuals with deteriorated motor abilities such as post-stroke patients and the elderly. Assessments of balance ability are critical for providing adequate therapies and predicting risks of falls. In the static balance assessment, the postural sway is quantified using a force plate and a motion capture system. However, the force plate and the motion capture involves significant setup, processing, and cost, which is not always feasible in a clinical setting. **Objective:** The aim of this project is to develop a clinically usable assessment tool for static standing balance that is both accessible and cost-effective, through the use of a Wii Balance Board and IMU sensor. **Method:** A group of 14 subjects were asked to stand on a force plate with motion capture markers on their body for two trials of 70 seconds under three quiet standing conditions (i.e., eyes open, eyes closed, and mental task). The force plate data was analyzed to identify the best parameters for differentiating between the three conditions. The motion capture data was used to identify the most optimal position to place an IMU sensor. **Results:** The results showed that COM acceleration in the anterior-posterior direction was the most statistically significant indicator of differences between the three conditions, while the motion capture data suggested that a position 10% of the trunk above the ASIS markers would be the most optimal position to place an IMU sensor. **Conclusion:** The clinical system will take into account these results to assess balance.