

## **Development of a Clinically Usable Assessment Tool for Walking Balance**

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Individuals with deteriorated motor abilities such as the elderly and post-stroke patients often suffer from difficulties in walking. These problems can greatly affect the safe mobility of individuals, likely resulting in falling. Assessments of walking balance are critically important for providing adequate therapies and predicting risks of falls to avoid actual incidents. Gait analyses using motion capture systems and force plates are accurate, while they are not easily usable in clinical setting, i.e., they are time consuming and require a lot of setup to administer. Thus, the purpose of this study was to develop a clinically usable assessment tool for walking balance. Force plate and motion capture data were collected from a group of 14 participants under four walking conditions (natural, arms restricted, following metronome and performing Stroop test) for 12 minutes. This data was analyzed to identify gait parameters and determine the optimum location for an Inertial Mass Unit (IMU) to identify gait dynamics. The center of mass data from the motion capture of subjects were compared to virtual marker points to evaluate the differences of the two systems, suggesting that a position 7% above the Anterior Superior Iliac Spine (ASIS) markers would be the optimal and easy-to-be-used position to place an IMU. Using this, we will develop a system using a single IMU and possibly two ankle markers to moderately reproduce the information provided by the motion capture system. Hardware development is currently in progress and the final system will provide clinicians with a simple, accessible tool to easily assess walking balance of patients.