

Accelerometers as an ecologic tool to measure mobility: feasibility and reliability.

Dr. Francesco Negrini¹, Dr. Giulio Gasperini², Dr. Marina Gaffuri², Ing. Luciana Magoni², Pt. Davide Proserpio², Pt. Davide Liberali², Dr. Franco Molteni²

¹Istituto Ortopedico Galeazzi, Milano, Italy, ²Valduce Hospital - Villa Beretta Rehabilitation Center, Costa Masnaga (LC), Italy

Introduction

Recent development of new technologies can help monitor mobility of stroke patients. Accelerometers seem particularly useful for this task as they are small, light and easy to carry.

Purpose

Choose and validate an accelerometer to evaluate ecologic mobility of stroke patients;

Evaluate if the measure obtained correlates with some of the most widely used tests to evaluate mobility.

Method

We used a commercial low budget tri-axial accelerometer. In the first phase of our study we evaluated 10 healthy subjects and 43 patients who had a stroke. We positioned the accelerometers in 5 positions on every subject and we performed 4 clinical tests: 10 meters walking test, 50 meters walking test, 6 minutes walking test, Timed up and go (TUG). During the execution of the tests a trained operator measured the steps made by the patients using a mechanic step counter. We then calculated the Interclass Coefficient Correlation between the steps counted by the accelerometers and manually by the operator.

In the second phase we gave the accelerometer to 9 patients to use in their everyday life for ten days and check the correlation of the obtained measures with the 4 tests mentioned above.

Results

The accelerometers could be used reliably for stroke patients walking faster than 0.8 m/sec if worn on the healthy ankle (ICC>0,8).

The only test that correlated with the ecologic mobility of the patients was the TUG.

Conclusion

There is a need for tools able to evaluate the patients even outside of the classic rehabilitative setting and this accelerometer can be valid to measure ecologic mobility on selected high performance patients.

Common clinical test don't correlate with ecologic mobility, and are not sufficient, by themselves, to monitor the performance of stroke patients.