

"Gait-&Balance-Box"

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"Gait-&Balance-Box"

A prototype to standardize clinical walk and balance tests

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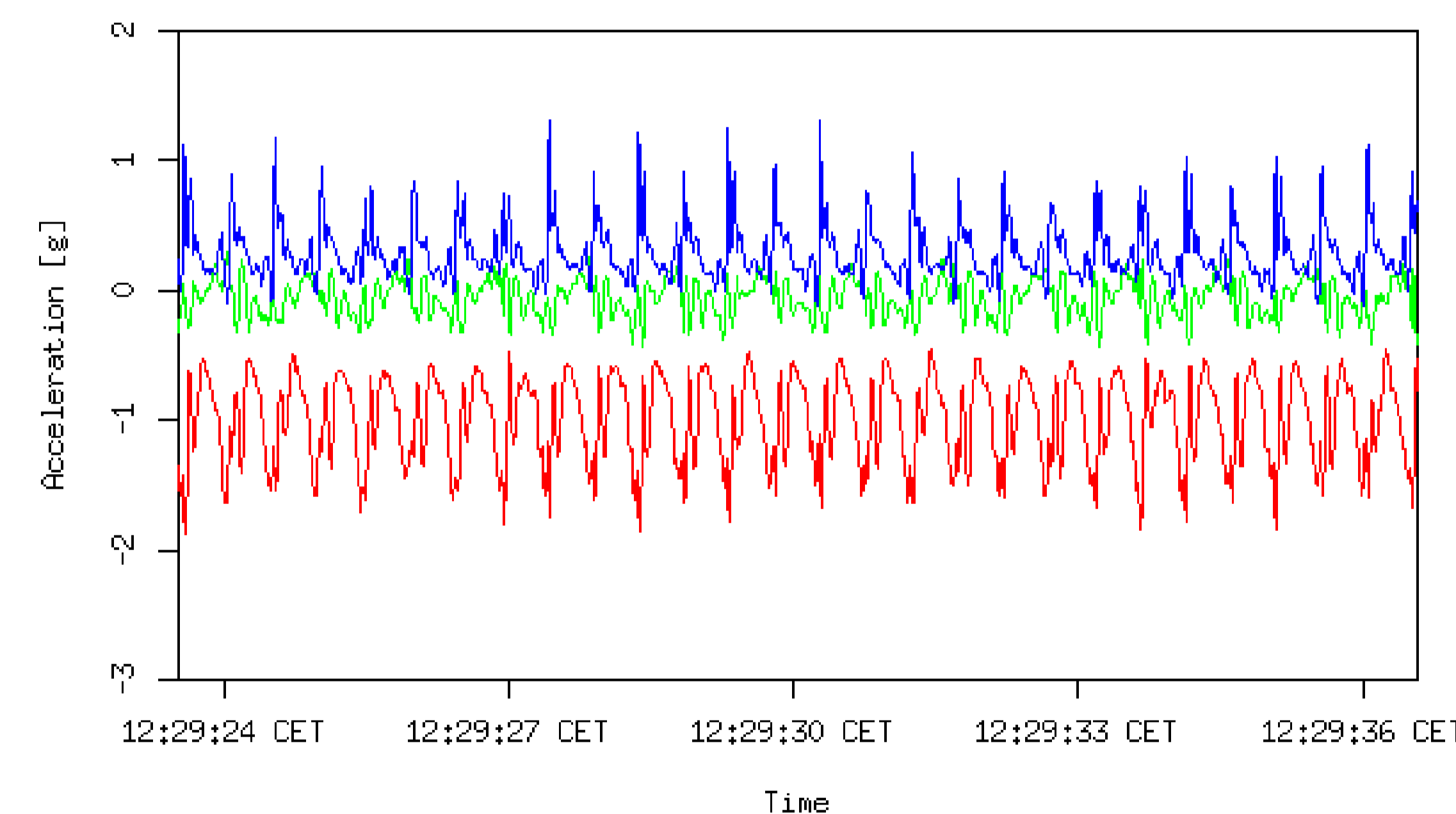
Abstract

The "Gait-&Balance-Box" suggests a standardization for clinical walk and balance tests with the aim to improve quality, applicability and comparability. Heart of the patient monitoring is the actibelt-blue, an autonomous wireless accelerometer that is worn like a belt. The actibelt sends the acceleration data via blue-tooth to a tablet that provides direct analysis of the human motion. The box can be quickly unfolded into a mobile gait lab using 2 light barriers to perform walking test. The acceleration measurement plus the duration for the fixed walking distance are combined to an enhanced 4-meter walk test

Measurement

Acceleration

- monitoring of human acceleration vectors with an actibelt[©]
- 100 3D-acceleration values per second
- sensor is directly attached to the hip (body center of mass)
- acceleration data sent in realtime via blue-tooth to a tablet
- online analysis with always newest algorithms
- Unix timestamp provides relation of every acceleration vector to a 10 milliseconds period in the chosen timezone



Gait duration

- 4-meter walk distance with a light barrier at start and end point
- test begins automatically by passing the start line and stops by passing the end point
- the provided analysis of the fixed walk distance can also be integrated in longer walk tests

Clinical applications

The software on the tablet can be used in three different ways:

- Balance test
- Automatic 4-meter walk test
- Manual 4-meter walk test

Balance test

In this application the horizontal hip-movement in two dimensions is monitored for 10 seconds. The projection in a coordinate system provides a quick visualization of the balance quality. This measurement can be used to monitor lots of standardized clinical balance tests (e.g Romberg Tests)

Automatic 4-meter walk test

The patient is asked to wear an actibelt that has a blue-tooth connection to the "Gait-&Balance-Box". Without further instructions he is told to start walking somewhere before the start line in his normal pace. The Gait-&Balance-Box merges the acceleration data with the signals from the light barriers and returns the analysis result on the tablet screen. Extracted parameters are:

- walking speed
- step length
- step ratio

Manual 4-meter walk test

The walking test can also be started and stopped manual on the tablet independent from the light barriers. This makes the System even more flexible and portable.

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Links:

www.trium.de

www.thehumanmotioninstitute.org

www.actibelt.com