

# A device to prevent falls in the elderly

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Credit: Alain Herzog

The EPFL spin-off Gait Up just put an extremely thin motion sensor on the market. It can detect the risk of a fall in an older person and is equally useful for sports and physical therapy.

Falls are a major problem for the elderly. "We found that each year, one third of adults over age 65 experience a fall. One third of those falls have an impact on the patient's health and autonomy," says Benoit Mariani, one of the founders of Gait Up. The sensors developed by the company, an EPFL spin-off, accurately measure and quantify the [gait](#) of a patient to detect the risk of a loss of balance during [daily activities](#).

For most of us, there is nothing more commonplace than walking – a gesture that most can't even remember learning. However, several important parameters come into play and make precise adjustments to

create a smooth gait. The sequencing of contact between the ground to the heel and then the toes, the fluidity that connects the movements, the direction of the feet – there are so many details that can become inoperable with age, illness, or accident. Currently, these motor faculties are only being evaluated by visual observation.

Physilog, a device developed by Gait Up that is only 9 mm thick, enables a quantitative evaluation of gait parameters. According to its designers, it is the thinnest mobile sensor of its kind in the world. Recently commercialized, it is usable by everyone. It works like a miniature laboratory through inertial sensors, such as accelerometers and gyroscopes, with other tiny sensors. It starts with the mere press of a finger. This microtechnological device can record in one minute ten spatiotemporal gait parameters associated with fall risk, which are then analyzed. Specific algorithms have been developed for comparison with the normal values of the population and, thereby, detecting problems.

Both very light and attached to the curve of the foot, it is available in several versions depending on the needs of the purchaser: athletic, research, or medical. These devices are the result of many years of research of EPFL's Laboratory of Movement Analysis and Measurement in collaboration with the University Hospital of Lausanne, whose Laboratory of Movement Analysis was provided with nine cameras to dissect movement before reconstructing it in 3D. Several sports, such as ski jumping and swimming, have already benefited from the results of this research, especially in understanding performance parameters.

Provided by Ecole Polytechnique Federale de Lausanne

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