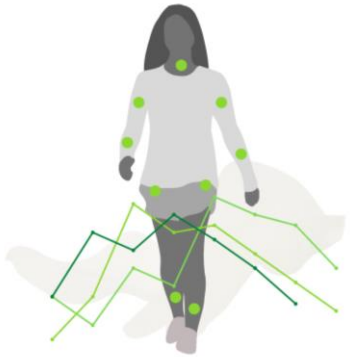
CTBT
Centre for Transfer of Biomedical Technology

TECHNOLOGY SUMMARY

Gait Quality Monitoring



Technology owner

University Hospital Hradec Králové

Inventor (s)

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IPR status

CZ Patent application PV 2021/331, future PCT application

Stage of Development

Prototype testing in progress

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Background

Multiple sclerosis (MS) is the most common cause of neurological disability in young and middle-aged people. MS has a physical, psychological and financial impact on patients and their families. Up to 85 % of patients with MS identify gait disorders as a major problem. The ability to monitor the development of the disorder over time is highly valued diagnostic measure. Falling because of old age, neurological disorders, movement disorders and injuries can be predicted by the assessment of change in gait quality.

Description of the Invention

A set of wearable sensors and the first computing unit – assessing the overall gait quality in real time while walking, providing immediate feedback to the user or the physician. Subsequently, the second unit identifies several gait disorders, their extent and probable cause. In both cases, the evaluation is performed using machine learning modules. Both approaches show relatively great robustness of the approach used and the relative simplicity of computer performance, especially in the near future. For general use the first step processing can warn patients or elderly people on the probability of falling.

Advantages

- Simple, easy to use, yet reliable and robust
- Automatic evaluation – no expert needed for daily use
- Decision support for expert physician
- No multiple joint sensors and expensive SW/HW needed
- No laboratory assessment distortion, but real world – normal activity view

Potential Applications

Worldwide increasing incidence of MS was estimated to be 2.8 million people in 2020, in developed countries is double to triple incidence. Can be helpful for many other neurological or movement diseases and elderly in general.

1) Non-MD/Diag. device – wearable “fall prediction”
2) Diagnostic – wearable – good/bad gait indicator
3) Diagnostic – wearable + mobile/tablet - gait disorder type and severity analyser and classifier.