Clever soles helping diabetics make safe strides

High-tech shoes that counter one of the most painful and debilitating effects of diabetes are being trialled, thanks to a collaboration between University of Queensland physiotherapy senior lecturer Dr Anna Hatton and UK-Danish health-tech company Walk With Path (WWP).

The latest phase of the project, in which prototype shoe insoles are tested by volunteers in the laboratory, was funded by a grant from the Global Connections Fund (GCF).

High blood sugar levels mean many people with diabetes suffer long-lasting nerve damage. The condition, known as diabetic peripheral neuropathy, occurs most often in feet and legs and results in numbness and pain.

In severe cases, patients have difficulty walking and are at increased risk of foot ulcers and injuries caused by falls.

Dr Hatton and WWP have developed app-controlled vibrating panels designed to fit inside shoes. These insoles, which contain custom-printed circuits allied with a range of sensors, provide robust and reliable feedback to wearers who are no longer able to rely on their own nervous systems.

The emitted vibrations enable people with diabetic neuropathy to better adjust to terrain in real time, helping them stabilise balance and gait, greatly reducing the risk of falls and injury. The devices also transmit data to a smart phone app, allowing users to analyse and adapt walking actions to further improve efficiency and safety.

“Since receiving the GCF bridging grant, we have advanced the design of a vibrating insole,” said Dr Hatton.

“We’ve been able to reduce the thickness of the insoles, and added a new material layer, which helps minimise foot ulcers.”

When ready for market, the system will be presented under the name PathFeel.

Testing of the devices began through a University of Queensland trial in late 2019, with the first cohort of users reporting positive results.

“Our project marks the first step in creating a viable new treatment option to enhance balance and walking ability in adults with diabetic peripheral neuropathy, helping people to remain active and independent for longer,” said Dr Hatton.

Dr Hatton and WWP are currently working on variations of vibratory insoles, experimenting with thickness, shape, water resistance and compliance with existing orthotics.

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High-tech shoes that make walking easier & safer for diabetics are being trialled by @UQ_News physiotherapist Anna Hatton & @walkwithpath, thanks to a grant from the @IndustryGovAu Global Connections Fund
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The project, PathFeel: Vibrotactile insoles to enhance mobility and activity in neuropathy, is a 2018 recipient of a Global Connections Bridging Grant, part of the Global Innovation Strategy in the National Innovation and Science Agenda. This program is administered by the Australian Academy of Technology and Engineering with the support of its expert Academy Fellows network.