

# Socks give seniors an impulse to get walking

New device that guides gait aims to lower risk of falls and enhance mobility of the elderly

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Mr Dang Hook Daik used to enjoy venturing out of the house. He would take the train to Chinatown and Jurong to visit his friends thrice a week or head to Bukit Batok for physiotherapy weekly.

But he was stricken with Parkinson's disease four years ago and fell five times in the last two years because the tremors that came with the disease made it hard for him to walk properly.

"I don't walk too much now because I am afraid to fall," said Mr Dang, 83. The former businessman lives in a one-room rental flat in Queenstown. He said one fall left him with fractures in his arms and face, and his vision was affected.

Last Thursday, Mr Dang tried out a pair of special socks at the Lion Be-

frienders' senior activity centre near his block, which he visits regularly. He could walk more easily and confidently as electrical impulses from the socks "zapped" him to remind him which foot to lift and put in front of the other. It is believed to be the first device worldwide to use electrical stimuli and vibration to guide elderly persons.

"Many studies have shown that one's gait affects risks of falls and impacts the degree of social isolation and quality of life of the elderly, so we hope this device will help get the seniors out of their houses more," said Dr Matthew Chua from the Institute of Systems Science at the National University of Singapore (NUS), who is the principal investigator of the project.

Parkinson's sufferers and seniors with motor difficulties sometimes freeze their steps abruptly or shuffle their feet, and such problematic walking patterns increase the likelihood of tripping and falling. For the elderly, some falls can be fatal.

The device works based on pressure sensors. Once Mr Dang lifts his right foot, pressure sensors in that foot will detect a fall in pressure and electrical stimuli will cause vibration on his left leg, cueing him to put that foot down next.

"The coordinating of the gait cycle happens in two ways – consciously and subconsciously," said Dr Chua, adding that the electrical impulse also stimulates the brain automatically to move the feet.

After walking for half an hour with the socks on, Mr Dang gave his verdict. "It really helps me walk better but the vibration needs to be stronger for me to feel it more easily. Wearing socks may also be too hot in Singapore's weather."



Mr Dang Hook Daik (at right) tries on the socks fitted with electronic sensors that help correct his gait. With him is Dr Matthew Chua from NUS. Mr Dang was able to walk more easily and confidently as the socks "zapped" him to remind him which foot to lift and put in front of the other.

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SONG TAO

STEPS TO A BETTER QUALITY OF LIFE

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**DR MATTHEW CHUA**, from the National University of Singapore and principal investigator of the project.

Dr Chua said his team is tweaking the design of the device so it can be worn more conveniently as an ankle instead of socks. It also will be made wireless to prevent tripping over the wires that are connected

to a microcontroller in the socks. Gait devices are used by seniors in countries such as the United States. Those devices, however, work based on light or sound and some elderly persons may be too

self-conscious to wear them.

Besides the NUS team who are working on the prototype of the device, the National University Hospital will also be providing medical insights and patient trial evaluations.

Later this year, 20 seniors from Lion Befrienders will get to wear the device for a month to test it. Another 30 will join the pilot next year. Data will be collected from the pilot to determine how effective the device is in improving their walking movements and quality of life.

The aim is to eventually commercialise the product.

Ms Myca Tan, acting executive director of Lions Befrienders, said some seniors do not venture out much as they are more prone to sustaining falls. "As a result, these falls cause them to lose confidence in their mobility, and discourage them from attending social events."

Said Dr Chua: "Social isolation is a key worry among the elderly population because it may result in them having poorer emotional well-being. Having a more mobile elderly (population) will also alleviate the load placed on caregivers and families."

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