

Robotic sock may help cut risk of blood clots in veins

By **SAMANTHA GOH**

NATIONAL University of Singapore researchers have invented a robotic sock that they hope will reduce the risk of deep vein thrombosis (DVT) in bedridden or immobile patients.

DVT, the generation of blood clots in a person's veins, can become life-threatening if it reaches the heart or lungs.

For bedridden patients who cannot move their limbs, the risk level of DVT can be 13 per cent to 18 per cent – much higher than the average rate of up to about 0.1 per cent for regular people.

The cotton sock is connected to soft, light actuators – motors that control the sock's movements – made of silicon rubber, which are based on a “push and pull” mechanism.

A wireless pump-valve control system stimulates ankle-joint motions and blood flow in the patient's leg.

As the sock is made of soft materials, it will not put excessive force on the patient's limbs.

Current hospital DVT treatments involve anti-coagulation drugs to prevent blood clotting and mechanical

methods such as compression devices or compression stockings to stimulate blood flow.

However, pharmaceutical drugs have detrimental side effects, such as a higher risk of excessive bleeding, which may be fatal for haemorrhagic stroke patients.

Other mechanical treatments have not demonstrated significant reduction in DVT risks, and the robotic sock is said to offer a safer alternative.

“Given its compact size, simple design and ease of use, the soft robotic sock can be adopted in hospital wards and rehabilitation centres for on-bed applications or even at home for bedridden patients,” said Assistant Professor Raye Yeow from the NUS Department of Biomedical Engineering.

The sock has yet to be tested in a hospital environment. A pilot clinical trial on 30 National University Hospital stroke patients will be held between next month and August.

Prof Yeow said the effectiveness of the robotic sock will be assessed based on the ankle-joint motion and venous blood flow before, during and after the exercise.

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