Resembling a sleek knee brace used by Batman in the movie, The Dark Knight Rises, a new aid called X-Brace offers a leg up to those who suffer from knee problems.

The lighter and more robust knee brace, which is targeted at the elderly, was developed in a collaboration between a local engineering firm, knee surgeons and 3D printing specialists from Nanyang Technological University (NTU).

Knee braces are typically prescribed to elderly patients to alleviate the burden on their joints, and assist patients who have undergone knee surgery, such as for torn ligaments.

Dr Jeffrey Chew, an orthopaedic surgeon at the Centre for Orthopaedics, said a common condition among elderly patients is knee osteoarthritis – wear and tear of the knee joints – which affects 40 per cent of people above 70.

“Knee osteoarthritis can significantly affect quality of life, causing daily pain, weakness and instability,” he said at a media preview of the knee brace yesterday.

Conventional knee braces weigh around 3kg and are designed to restrict one’s movement by preventing the knee from bending beyond a certain angle, he said.

“So we wanted to create a knee brace which is lighter, but also provides the patient with support when they move, especially for those who have difficulty standing up, walking or climbing stairs due to weak and painful knees,” he added.

In 2017, Dr Chew approached Mr Fabian Ong, executive director of local engineering firm Delsson Singapore, to come up with a design. Delsson worked with NTU on the prototyping process and product design iterations using 3D printing.

The team eventually reduced the weight of the brace to around 720g – 30 per cent lighter than the traditional exoskeleton knee brace. It is made of plastic, instead of the typical metal orthopaedic braces that weigh more than 3kg.

The brace can be customised to each patient’s needs.

At least 10 people have tried the brace so far, one of whom is Madam Teo Lee Lee, 72, who has osteoarthritis and needed two knee replacements last year.

After surgery, her right leg was still very weak and she had difficulty walking. None of the conventional knee braces worked for her, until she tried X-Brace.

“I feel a lot more confident walking with the brace and have less difficulty standing up, compared with before,” said the retiree.

The brace is expected to be available on the market soon for $1,000 – equivalent to the cost of conventional knee braces – though the price may differ depending on the user’s needs.

The team is working on its next product iteration – to lower the weight of the brace to 600g by incorporating a sleeker design that can be worn under one’s clothes.

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