

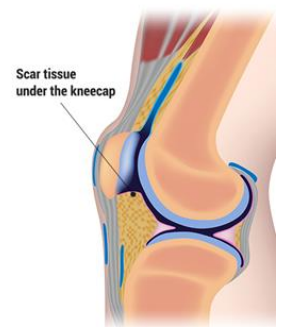
Self-Treatment Assisted Knee *flexion* (STAK) Tool

Opportunity

A novel device allowing home-based, high-intensity stretching for patients with arthrofibrosis of the knee with promising results from pilot clinical trials

The problem

Arthrofibrosis of the knee is a condition commonly occurring after total knee replacement or fracture of the proximal tibia or distal femur when extensive, tight scar tissue forms around the joint. Tendons around the joint frequently stiffen and the joint capsule can tighten and shrink. Motion is severely restricted and patients may even permanently lose the ability to bend and flex the knee, with significant impact on quality of life. Patients may experience severe pain and have difficulties in completing simple daily activities such as sitting, walking and climbing stairs.



Arthrofibrosis is responsible for around 28 per cent of hospital readmissions following total knee replacement¹. Revision surgery for arthrofibrosis is both expensive for the NHS and traumatic for the patient. However, the alternatives are limited. Manipulation can be performed, but this requires general anaesthetic, is not always successful and has risks attached to it. Improvement in range-of-movement has been noted from use of continuous passive motion (CPM), however, CPM devices are typically expensive and cumbersome, and require clinic appointments for treatment by trained staff.

The solution

A unique collaboration between a University Hospitals of Leicester physiotherapist and a patient with arthrofibrosis has resulted in a low-cost, portable device – the **Self-Treatment Assisted Knee *flexion* (STAK) Tool**. The STAK Tool is currently undergoing clinical trials at the University Hospitals of Leicester NHS Trust. The average improvement in range of movement is 33°.

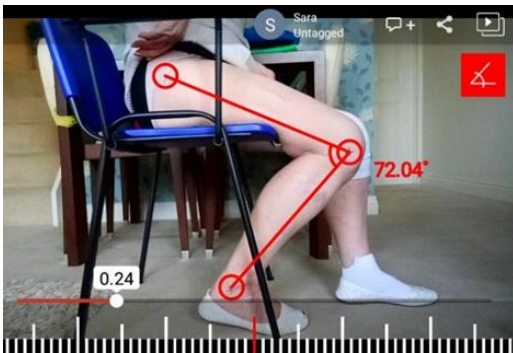
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Example of change in knee range of movement following use of the STAK Tool

Novelty and advantages

The STAK tool has a number of advantages:

- Low-cost production
- Simple to use
- Enables patients to stretch effectively independently at home
- Straightforward to clean/disinfect
- Unique anchorage system that can be used with any household chair
- Self-motivating - patients record and monitor progress

1 [Clin Orthop Relat Res.](#)
 2014 Jan; 472(1): 181–187

2 American Association of
 Orthopedic Surgeons

Market

Arthrofibrosis affects between 5-10 percent of patients following total knee replacement. Currently, over 600,000 knee replacement procedures are performed in the US each year. This is estimated to grow to 3.5 million procedures² as ageing and obesity impact upon joint health. UK estimates also have significant implications, predicting 1,219,362 TKR a year in 2035 (Culliford et al. 2015).

The increasing rate of anterior cruciate ligament repairs will also result in a higher number of arthrofibrosis sufferers. There are currently no low-cost, effective devices available on the market for the treatment of arthrofibrosis that enable the patient to perform a high-intensity stretch. The STAK tool provides a unique opportunity to enter the substantial home rehabilitation market and reduce the economic burden on the healthcare system.

Market readiness

A final prototype has been developed at University Hospitals of Leicester NHS Trust and is undergoing clinical trials prior to CE-marking. The device is straightforward to manufacture. We are seeking a commercial partner to assist with market entry and manufacture.

>> A patent application GB2546965 (A) has been granted.

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