O007

A way to reduce manipulations under anaesthetic the STAK tool: a stretching device to treat arthrofibrosis following total knee replacement

S. Aspinall [1,2,*], S. Hignett [3], S. Godsiff [2], P. Wheeler [1,2], D. Fong [1]

[1] *Loughborough University, School of Sports, Exercise and Health Science, Loughborough, United Kingdom*
[2] *University Hospitals of Leicester, Orthopaedics, Leicester, United Kingdom*
[3] *Loughborough University, School of Design, Loughborough, United Kingdom*

Key-Words: Medical stretching device, Knee, Arthrofibrosis

Purpose: Medical stretching devices for home use in the treatment of arthrofibrosis are used in the USA, however none are currently available in the NHS or EU. Around 109,000 total knee replacements (TKR) are performed each year in the UK and 600,000 in the USA. Due to obesity and longevity this is expected to increase six-fold by 2030 (Culliford 2015, Fayaz 2011). Approximately 10% of cases develop arthrofibrosis, which has a debilitating effect on patientsbasic everyday activities. This study evaluates a new home medical stretching device called the STAK Tool in the treatment of arthrofibrosis.

Methods: 31 patients following TKR (mean 10.5 weeks) who failed routine postoperative rehabilitation, having less than 85° flexion (mean 64.57°, range 44°–84°) were recruited. Five patients had undergone manipulations under anaesthetic (MUA) which had not been successful (mean flexion 61.97°, range 44°–77.9°). The first 17 patients were allocated to the intervention group receiving 8 weeks standard treatment plus independent stretching using the STAK Tool at home for up to 60 mins a day. The following 14 patients were allocated to the control group and received standard treatment alone over 8 weeks. WOMAC and Oxford knee scores were collected at all time points.

Results: The STAK Tool intervention group gained a mean increase in knee flexion of 30° (range 12°–50°). This was a statistically significant increase ($p < 0.001$). The control group patients receiving standard treatment increased knee flexion by 7°(range -7°-36°) ($p < 0.01$).The STAK group demonstrated significantly greater gains in knee flexion and outcome scores than the control group ($p < 0.001$). No patients suffered any complications as a result of using the STAK. Two patients withdrew from the study at an early stage. All patients found the STAK Tool'perfectly acceptable' on a 7 point likert scale and said they would recommend it to a friend. Patients' reported improvement in function and a feeling of being in control of their rehabilitation. The STAK group demonstrated significant increases in WOMAC (change 20.8 and Oxford Knee Scores 7.7 ($p < 0.001$). The control group did not demonstrate significant increases in their WOMAC Scores (change 4.9 and Oxford Knee Scores 3.9 ($p < 0.29$).

Conclusion(s): Improvements in knee flexion compare favourably with Bonutti's (2010) research using the JAS Device in USA where patients achieved a mean increase in knee flexion of 25° (range 8°–82°). The results compare favourably with patients following MUA. Published results following MUA demonstrate mean increases in ROM of 26.5 (range 0°–80°) (Ipach 2011). However MUA is not without risk and can result in complications (Yercan 2006) and gains are not always maintained (Blevins and Sculco 2018; Gu et al., 2018). This study indicates that the STAK Tool would be of benefit in clinical practice.

Implications: This study suggests the STAK may offer a new, cost effective treatment for arthrofibrosis.

Funding acknowledgements: £6500 from University Hospitals of Leicester NHS Trust

https://doi.org/10.1016/j.physio.2020.03.011

O008

An investigation of the ability of wearable technology to aid physiotherapists in assessing jump-landing movement compared to video recording

T. Alsaedi [1], M. Felemban [1], M. Alsaedi [1], K. Button [1,2,3], M. Al-Amri [1,2,*]

[1] *Cardiff University, School of Healthcare Sciences, Cardiff, United Kingdom*
[2] *Cardiff University, Biomechanics and Bioengineering Versus Arthritis Centre, Cardiff, United Kingdom*
[3] *Cardiff & Vale University Health Board, Physiotherapy Department, Cardiff, United Kingdom*

Key-Words: Validity, Sensor, Avatar

Purpose: Functional movement assessment is essential in screening individuals for risk of injury and planning physiotherapy. The Landing error scoring system (LESS) is a valid and reliable paper-based tool used in assessing the risk of knee injury, which requires evaluating multiple joints across two planes using two video cameras, whilst participants land from a jump. The LESS involves of 17 items concern detecting any faulty movements (errors), then counting these errors as an overall score of the LESS. This is seldom used in physiotherapy clinics and sport fields because of the space required to place cameras, lack of obtaining related clinical movement outcomes objectively, and the privacy of the subjects. Wearable sensors which quantify accurate clinical movement outcomes and generate a 3D avatar recording could be a potential tool for movement analysis in physiotherapy. This study aimed to compare avatar to video recording in assessing jump-landing movements.