#886 - Clinical Study / Free Papers

Slider®-A Novel Device For Remote Tracking Of Physiotherapy Exercises In Patients With Osteoarthritis Of The Knee: An Early Report

Orthopaedics / Knee & Lower Leg / Joint Replacement - Primary

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Background

The waiting times for total knee replacements are over six months in the UK, EU and Australia with many patients waiting over a year. This leads to significant deterioration in the quality of life and increased frailty. Although closely supervised pre-operative physiotherapy (Prehab) has been shown to partially mitigate this problem, the demand for physiotherapy services has outstripped the supply. This mismatch has been made worse by the recent Covid pandemic. Printed information, app-based videos and wearables have been introduced to compensate for this discrepancy. However, concerns remain about usability, lack of patient engagement, objective tracking of patient engagement, the need for calibration/special positioning, lack of force measurement, and complications arising from contact with the user's skin. The latter especially so with wearables.

A novel device, Slider®, was designed by patients, physiotherapists, and surgeons to address these concerns.

Objectives

A Real-World Validation (RWV), funded by the Lancashire Health MATTERS programme, which is part funded from European Regional Development Fund (ERDF) monies, evaluated the response of patients awaiting knee replacement surgery to the use of Slider®.

Study Design & Methods

Slider® is a patented novel smart disc-shaped device 15cm in diameter with a force plate on its upper surface. A Lidar and optical sensors track heel motion in three dimensions. The force plate measures the downward force on the heel on Slider®, like that of a gait lab. The patient places their heel resting unrestricted on Slider®. As the patient moves their heel with Slider®, it tracks movements in the horizontal plane. When the heel is lifted off Slider® and its vertical position is tracked. Algorithms calculate the angle of knee flexion. The data is sent via Bluetooth to an app on the user's smartphone/tablet. The app shows the user in real time how they are doing the exercises. Specially designed games actively encourage and record user engagement. Activity data is securely sent online in real time to the clinician. If the patient's progress deviates from the pathway, an exception notification

is sent to the patient and the clinician.
15 patients on the UK National Health Service (NHS) waiting list for knee replacements at a major teaching hospital were non-randomly chosen. They used the Slider® for two weeks and then completed an online questionnaire on usability and acceptability.

Results
Results:
73% found Slider® easy to learn to use. 93% of the patients were satisfied. 100% found that Slider® provided for their pre-operative physiotherapy needs. All agreed that they would use Slider® again. None of the patients had safety concerns or experienced adverse effects.

Conclusions
This Real World Validation was carried out on pre-operative patients with osteoarthritis of the knee. It has measured the usability and acceptability of Slider®. It established Slider® as an effective tool for patients having knee replacements to perform pre-operative physiotherapy exercises in a self-managed manner outside the hospital environment.