



## Poster Abstract – Scientific Meeting – 20<sup>th</sup> March 2015

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### An Innovative Tool to Measure Movement in Space

As orthopaedic surgeons, we often struggle to accurately capture and record our patients' range of movement, particularly around complex joints such as the shoulder. **BPMphysio** is a non-invasive novel technology that uses wireless accelerometers to measure movement within space and presents the data as easy-to-understand, animated graphics. Previously, the huge potential of this technology has been limited to elite athletes and our aim was to test how it might be used within the clinical environment. To investigate how feasible the sensors and software are to set up and use during busy shoulder clinics. To establish whether our patients find the technology acceptable and perceive any benefit from using it. And lastly to test how accurate and reproducible the measurements are, when compared to our existing tools – goniometers and visual estimation.

This feasibility study included ten consecutive patients listed for a total shoulder replacement in our clinic, over a one month period. Each patient had three different measurements recorded on their affected shoulder using the **BPMphysio** tool – shoulder abduction, forward flexion and external rotation. The measurements were performed in a standardised manner by three trained operators to try to minimise confounding scapular-thoracic and spinal movements. The maximal range of movement from three attempts was recorded.

All of our patients, regardless of age, were keen to engage with this new technology and were fascinated by the clear visualisation of their restricted movement on the software avatar. As clinicians we found the measurements to be reproducible between different operators, comparable to our existing goniometers and considerably more accurate than our usual visual measurements.

This work has demonstrated **BPMphysio** to be a feasible, acceptable and reliable tool to capture joint movement within the clinical environment. In the era of patient-reported outcome measures, we hope this technology will add another dimension to the assessment of outcome after total shoulder replacement, and in particular to assess movement required for functional tasks. Our patients are keen to see the software used as a motivational tool during physiotherapy and we are also exploring whether there might be a role for assessing reproducibility of movement within medicolegal practice.