However at present hip simulators only replicate the walking pattern of a young person without a hip replacement. In reality the hip implants are used by older people who have had hip replacements and who do more activities than walking.

To make the testing more relevant during activities other than normal walking were performed; such as stair climbing, sit to stand and fast walking.

The information that we gather data collecting will help to make a more robust testing regime and therefore make a stronger more resilient hip implant.

The data will also be used to develop a virtual human computer model. This model will be used to understand what happens at the surface of the implant during different activities and in different populations of patients.

Patient Involvement
The work taking place at Chapel Allerton Hospital is part of the Leeds Musculoskeletal Biomedical Research Unit which is a department within the Leeds Teaching Hospital NHS Trust. The department is the location for international biomechanical and orthopaedic research and uses patient participation groups to mould the research so that it is patient orientated research and with patient care at the centre of it. If you are interested in helping to shape future research then please do not hesitate to contact Susan Smith on +44(0)113 3924474.
The worldwide cost of artificial joints currently exceeds €14 billion a year. Total joint replacements, particularly of the hip and also the knee, represent one of the most successful and common surgical interventions, giving a new lease of life to those whose mobility has declined, and relieving persistent joint pain. This success has led to an unprecedented rise in the number of procedures being undertaken, increasingly on younger patients. The number of revision procedures are also increasing. Revisions can occur due to a number of reasons, including as loosening of the implant and or damage sustained through excess weight being applied. These factors are driving a demand for longer lasting implants and a reduction in failure rates.

LifeLongJoints is the next stage in the fast-changing world of hip replacements. The project began on 1st April 2013 and runs until 31st March 2018. Of the total project costs of €18 million, project funding of €13 million is contributed by the EU’s Framework 7. The project unites 14 research institutes and industry partners in Denmark, Germany, Sweden, Switzerland and the UK and is coordinated by the University of Leeds.

Leeds Teaching Hospital Trust is tasked with collecting hip movement and hip force data from patients who have had total hip replacements in either one or both hips.

The computer models use the information that we collect from the patient to calculate joint angles and contact force between the femur and the pelvis. The data is then used to drive a newly developed hip simulator.

The hip simulator is a machine which moves and loads a hip implant in the same way a hip is used in the human body.