

## *Scientific summary (Scientific report)*

### *a. Scientific aims*

To design and test a new disease-course altering treatment for hip osteoarthritis (OA), by evaluating (1) the extent to which hip load could be modulated by changing external biomechanical parameters with assistance from real-time biofeedback during walking in people with hip OA; (2) which biomechanical parameter(s) were most effective for increasing hip load in people with hip OA; (3) associated changes in pain and physical function following 6-weeks of walking using a prescribed personalised load modification strategy in people with hip OA; and (4) the extent to which people with hip OA considered personalised load modification a feasible and acceptable treatment.

### *b. Scientific achievements*

We integrated our newly developed real-time biofeedback technology to personalise and enhance motor learning and have shown, for the first time, that people with hip OA can modulate hip load by as much as 12% through movement retraining with assistance from visual biofeedback. This finding is particularly significant because increasing joint load by even 5% may be enough to stimulate cartilage health. We have also identified which biomechanical parameters are most effective for increasing hip load, and critically, shown that many patients who implemented their personalised load modification strategy while walking for 6-weeks reported clinically important improvements in hip pain and function. Results from this pilot study support the feasibility of personalised hip loading retraining using real-time biofeedback technology for management of hip OA.

### *c. Problems*

We did not encounter any problems aside from COVID-19 related restrictions. We were unable to collect data for 6-months due to government and university regulations.

### *d. Dissemination*

A manuscript is currently being finalised and will be submitted in the coming weeks to *Osteoarthritis and Cartilage Open*. Study results have been accepted for an oral presentation at the XXVIII congress of the International Society of Biomechanics (originally planned to take place in Sweden, now a digital congress 25-29 July 2021). An abstract has also been submitted to the Australasian Biomechanics Conference (ABC12) (outcome pending) planned for 5-7 December 2021 in Adelaide, SA.