

# Use of GaitSmart to monitor the recovery process to normal mobility for patients undergoing TKR, THR and ACL reconstruction

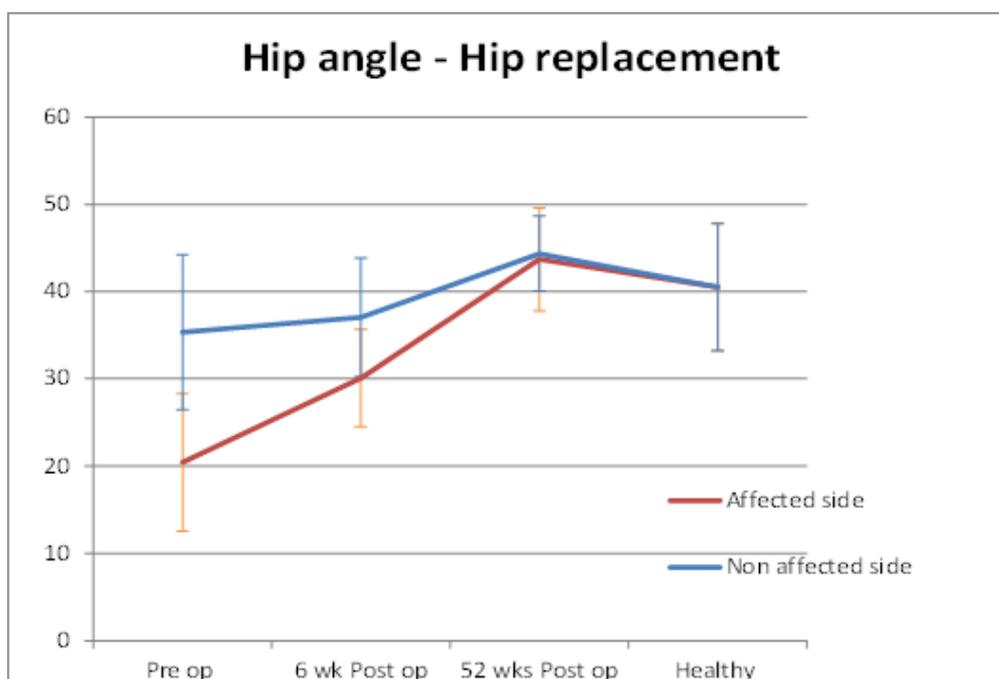
## Introduction

At the current time the mobility of a patient undergoing TKR, THR or ACL reconstruction is not measured before the operation or during the recovery process. It is therefore difficult to assess if the individual is making good progress or whether further intervention is required. In order to understand how people recover from these operations the mobility of a number of people was monitored using GaitSmart. The results of the key indicators for the different conditions are presented in graphical form over the timespan of one year.

## Hip replacement

The main aspect of a person's gait that alters when the hip joint fails, normally due to hip osteoarthritis (OA), is the hip range of motion (ROM). The affected side typically has very poor ROM, half of that for a healthy person and the unaffected side is also often below that of a normal healthy person. Six weeks after surgery the gait should improve significantly, with the hip ROM on the affected side increasing by around 50%. In the UK, no further monitoring is done until the 1 year check, by which time the person should have resumed a normal gait and the hip ROM should be symmetric and comparable to the healthy average.

The 6 week check provides an excellent opportunity of assessing mobility, empowers the patient and provides motivation for them to continue. If mobility is not improving then more focused rehabilitation can be provided. Additional 3 and 6 month checks help ensure the rehabilitation programme is correct or needs further adaptation.



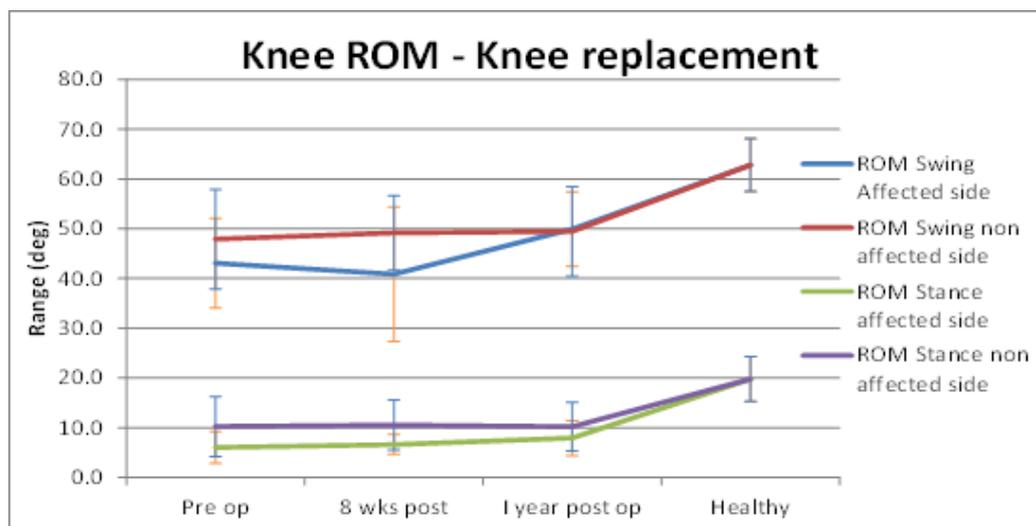
Sample size approx. 60 at pre, 6 wk post op and healthy. 52 wks only sample size of 3. Monitored at the RNOH London. Average and Standard Deviation shown.

## Knee replacement

The main aspect of a person's gait that alters when the knee joint fails, normally due to knee osteoarthritis (OA), is the knee range of motion (ROM) and the stance flexion. The affected side typically has very poor ROM, two thirds of that for a healthy person and the unaffected side is only slightly higher. Eight weeks after surgery the gait is comparable to the pre-op condition. In the UK, no further monitoring is done until the 1 year check, by which time the person should have resumed a normal gait and the knee ROM should be symmetric and comparable to the healthy average. However, from the UK study, it appears that patients do improve their gait in terms of knee ROM, but do not obtain a comparable gait when compared to the healthy reference. Furthermore the flexion on stance, which is one of the early indicators of knee OA, shows little improvement over the year and remains significantly different to a healthy reference. This may be due to the lack of training, as the person has learnt to walk with a straight leg, as this reduced the pain on the damaged knee when on load.

The lack of resumption of a normal gait may be due to the cohort chosen, where the patient often has other underlying conditions.

The 8 week check provides some opportunity of assessing mobility, empowers the patient and provides incentive for them to continue. However, it is considered that additional 3 and 6 month checks would help ensure the rehabilitation programme was correct or needs further adaptation. This could possibly improve the outcomes for some patients.

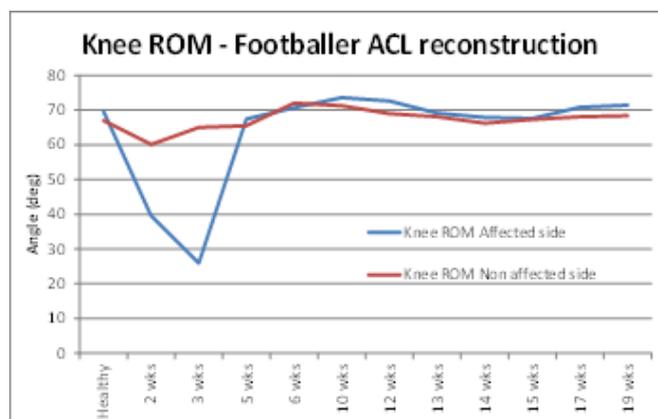
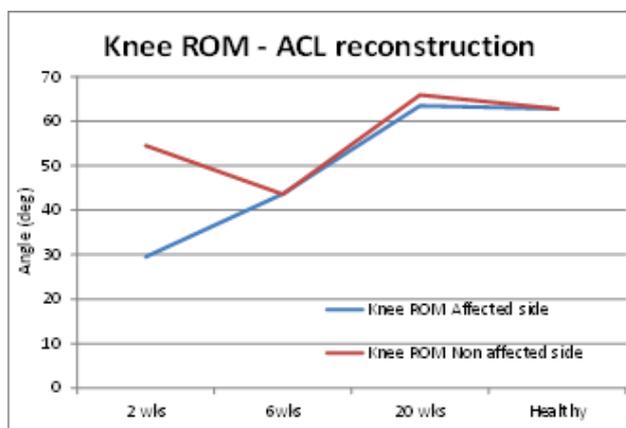


*Sample size approx. 25 at pre, 8 wk and 1 yr post op and healthy. Monitored at Exeter NHS. Average and Standard Deviation shown.*

## ACL Reconstruction

The main aspect of a person's gait that alters when the ACL has ruptured and requires reconstruction is the knee range of motion (ROM). The affected side typically has very poor ROM, half of that for a healthy person whilst the unaffected side may be similar to that of a normal healthy person. For a normal person not involved in sports, six weeks after surgery the gait should improve significantly, with the knee ROM on the affected side increasing by around 50%. For footballers, and other people with a profession in sports, the recovery process is quicker, with a normal gait resumed within 6 weeks.

The 6 week check therefore provides an excellent opportunity of assessing mobility in normal patients, empowers the patient and provides motivation for them to continue. If mobility is not improving then more focused rehabilitation can be provided. Additional 3 and 6 month checks help ensure the rehabilitation programme is correct or needs further adaptation. For the sports person, the monitoring should be weekly and should continue once they are in training as this can re-introduce the asymmetry.



*Typical examples provided for an individual not competing in sports, measured at the London Knee Clinic and a young league football player, measured at Southend United Football ground. In the first example their own healthy reference is not available whereas in the second it is their own healthy value used.*



GaitSmart is revolutionising sensor based motion analysis, allowing you to better understand the biomechanics of mobility. **Mobility is life.**  
GaitSmart is a product of ETB

