

# Motor Learning Laboratory



We perform gait analyses in the Motor Learning Lab

## What is Gait Analysis?

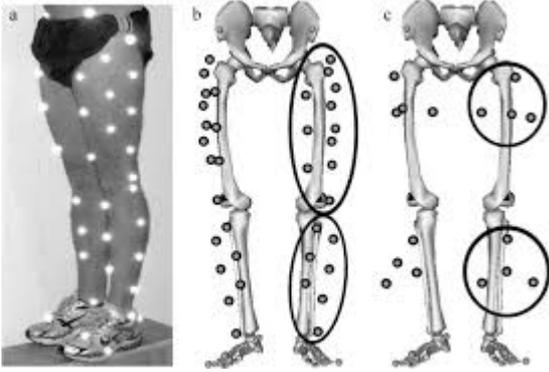
'Gait Analysis' is a clinical term meaning the formal measurement of a walking pattern.

## Where is a gait analysis performed at the RNOH?

We perform gait analyses in the Motor Learning Lab.

## What is the Motor Learning Lab?

The Motor Learning Lab (MLL) is a new facility in the RNOH therapies department. The MLL features new state-of-the-art equipment for gait analysis (the GRAIL system supplied by Motek Medical). This includes a treadmill, useful for functional assessments. The lab also includes a 180° surround screen onto which we project an environment while you walk. This gives an interactive feel to the gait analysis session.



**What should I expect?**

The gait analysis procedure involves a clinical assessment of your joint and muscles by a specially trained physiotherapist. This is to look at your range of movement and your muscle strength.

We then stick small reflective markers on your legs using sticky tape as shown in the photograph. After we have finished the set up, we will ask you to walk on our treadmill for up to 15 minutes. You are free to rest at any time. The whole process may take between one and two hours.

### **What is the most important piece of technology used in the RNOH Motor Learning Lab?**

The RNOH MLL is proud to be one of the first users in the UK of the Motek Medical Grail system. We use 10 cameras around the room to track the position of the small reflective markers. By measuring the exact position of the markers attached to your legs, we can calculate the movement at your hips, knees and ankles. We call this the joint angle. We can also measure the forces through the ground each time you take a step. This allows us to calculate the power generated by the muscles in your legs.

### **What are the advantages of the treadmill based system compared to traditional over-ground data collection?**

- We can collect the data faster. We can collect as much data in two minute walking as we could in one hour in the previous lab
- We can measure steady-state walking. Previously the length of the walkway meant that this was not always possible
- We can vary the speed and incline of the treadmill in an objective way to investigate the effect of this on the gait pattern
- We can provide real-time feedback during the assessment
- We can provide a more objective analysis to allow us to detect more subtle changes in the gait

### **Why are marker positions better than videos?**

Walking patterns are complex. It is often easy to see that someone's gait pattern is not typical, but difficult even for a trained clinician to accurately diagnose which joints are primarily responsible and why. By using the position of the markers on your legs we are able to reconstruct the movement as a virtual stick figure. This allows us to compare your movement patterns with those recorded from other people who have no difficulties with their walking.

### **What else do we measure?**

Sometimes we may also want to measure your muscle activations. We measure these using small surface electrodes, which we attach to the skin with sticky tape. When your muscles contract they generate a small electrical potential which is measured by the electrodes.

### **What is it all for?**

We aim to measure walking patterns in a comprehensive, reliable manner within a friendly and relaxed environment. Referring clinicians are provided with our considered interpretations of these measurements to determine deviations, help evaluate previous interventions and allow informed choices to be made about future treatments such as surgery and/or therapy.

### **What happens afterwards?**

There are no results of your analysis on the day. A full report will be compiled and sent to your referring clinician for discussion at your next appointment.

### **Laboratory Staff**

Miss D Eastwood FRCS (Consultant Orthopaedic Surgeon)

Mr M. Thornton (Manager)

Ms R. Delaney (Specialist Physiotherapist)

Miss R Richards (Movement Analyst)

### **Consultants' guide to the Motor Learning Lab**

#### **External Referrals**

External clinical referrals should be made to:

#### **Rachel Dalton (Head of Therapies)**

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