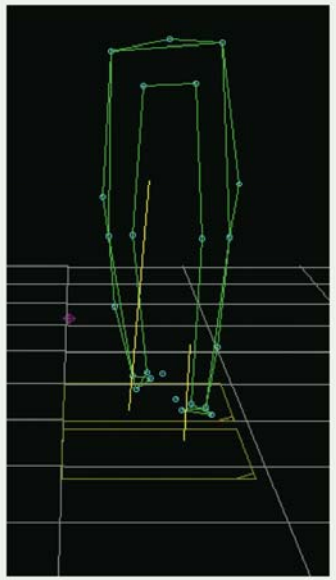
Requirements for gait analysis

Patients referred for gait analysis are requested to bring loose fitting shorts and a crop top/singlet as well as their normal footwear, walking aid and/or orthosis as required. Changing facilities are available. Patients need to be able to walk 10m independently, and will be required to undertake multiple 10m walking trials with rests as necessary. All walking sessions will also be videotaped. Depending on the level of analysis requested, the length of sessions can vary between half an hour to 3 hours.



Gait Analysis

For further information contact:

Rehabilitation Sciences Research Centre

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Tel: (03) 9490 7647

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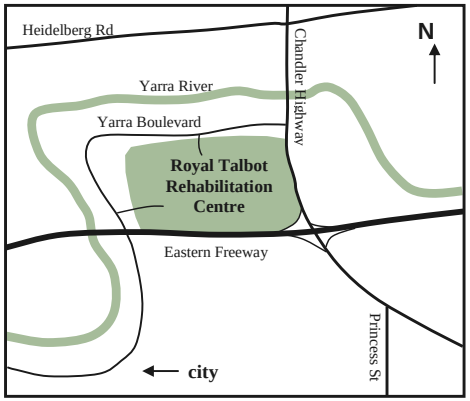
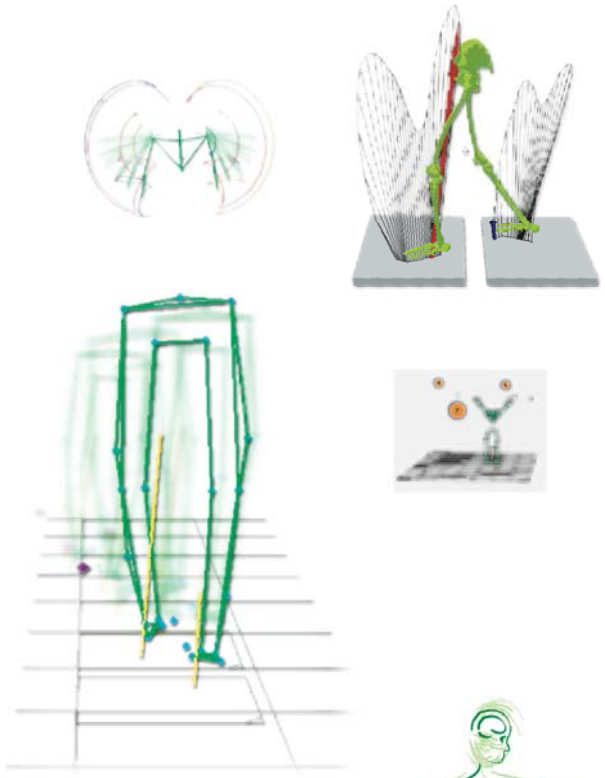
http://www.physioth.unimelb.edu.au/rsrc



Melways Ref: p45, A1 *(Parking is available)*

MOVEMENT ANALYSIS

THE UNIVERSITY OF MELBOURNE



Rehabilitation Sciences research centre

Austin Health

The Movement Laboratory

The University of Melbourne's Rehabilitation Sciences Research Centre is located at the Royal Talbot campus of Austin Health. The Centre incorporates a state-of-the-art Movement Laboratory equipped with a Vicon 460 three-dimensional motion analysis system, AMTI force plates, PowerLab16-channel data acquisition system, a Noraxon 8-channel telemetered electromyographic (EMG) system, an instrumented gait walkway (GAITRite) and a Kin-Com isokinetic dynamometer.

Clinical Movement Analysis

The clinical application of movement analysis is a collaborative process between the referring health professional and Movement Laboratory staff, in which information including the patient's symptoms, the physical examination, and laboratory-generated data are combined for clinical decision-making for overall patient management.

Referrals for Movement Analysis

Referrals of patients for movement analysis will be accepted from medical practitioners, physiotherapists, prosthetists, orthotists and other health practitioners at Austin Health and other health services in the north-eastern region of Melbourne. The service is not subsidised and a fee will be charged for all patients. Referring health practitioners will be required to complete an application form, briefly detailing the patient's history and the presenting problem, and to send a videotape of the patient's walking/movement pattern. All referrals will be reviewed by the staff involved with the movement analysis service and a decision made as to whether, and what type of, analysis is appropriate in each case. If movement analysis is indicated, an appointment will be made for the patient to attend the Laboratory. The referring practitioner will be invited to participate in a reporting meeting where the data will be discussed, interpreted, and recommendations made. A full report, including all analyses, will be provided to the referring practitioner.

How is movement analysis performed?

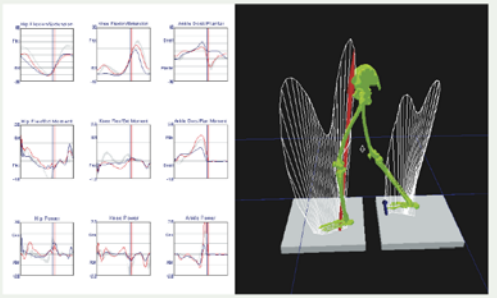
A session of 3-dimensional movement analysis usually takes 1½ to 3 hours in the Laboratory, depending on the patient and the level of analysis requested. Following standard anthropometric measurements, reflective markers (14mm spheres) are attached to specific landmarks on the body. Six high-speed infrared cameras record the spatial coordinates of the reflective markers, which are used to derive the spatio-temporal aspects of the movement (e.g. speed, joint angles). These data can be compared with age-matched reference data when this is available.

Gait analysis systems

We employ two methods to analyse gait.

1. The GAITRite walkway system.
Shown in the figure BELOW. This is a portable instrumented carpet that can be used in either a laboratory or field setting. The walkway is 4m long x 0.6m wide x 6mm high and contains 13,824 sensors. Up to forty-one basic gait measures such as walking speed and step length are immediately available upon the completion of a walk across the mat. Assessment using this system takes about half an hour.

The GAITRite walkway system



Three-dimensional gait analysis.

2. Three-dimensional gait analysis.
This method uses a high speed 3-dimensional motion analysis system combined with force measurement devices embedded in the ground. These systems allow the collection of complex information such as push-off force, landing force and limb movements. A session of 3-dimensional gait analysis usually takes 1½ to 3 hours in the Laboratory, depending on the patient and the level of analysis requested. Standard anthropometric measurements (height, leg length, hip width) and other clinical tests are undertaken. Reflective markers (14mm spheres) are attached to specific landmarks on the body. The patient then performs several walking trials along a 10m walking track. Six high-speed infrared cameras send out infrared light (which you are unable to see) that bounces off the reflective markers and back to the cameras. The spatial coordinates of the reflective markers are used to derive the spatio-temporal aspects of gait (e.g. speed, step length, step time, joint angles). These data are then combined with force plate data to calculate net moments around each joint. The magnitude and timing of these variables is plotted relative to key events in the gait cycle and can be compared with age-matched reference data where available. A stick figure representing the person and a summary report about a person's gait (as shown above) can be produced.