

Walking requires the interaction of many different muscles and bones. Gait analysis enables scientists to study these complex movements in a patient and compare them to normal walking patterns.



This series of leaflets highlights the science and the scientists behind some widely used medical techniques.

They are produced by the Institute of Physics and Engineering in Medicine. To find out more about Medical Physics or Clinical or Biomedical Engineering, or to request free leaflets or posters in this series, contact us:

Tel: 01904 610821

Email: office@ipem.ac.uk

www.ipem.ac.uk

 @ipemnews

 Institute of Physics and Engineering in Medicine

IPEM
Institute of Physics and
Engineering in Medicine

Institute of Physics
and Engineering in Medicine
Fairmount House
230 Tadcaster Road
York YO24 1ES

Registered in England and Wales (No. 3080332).
Registered Charity (No. 1047999)

The techniques described in this leaflet are only suitable in certain cases and some are not yet widely available. If you need gait analysis, your doctor will advise you.

This leaflet was produced with the help of IPEM's Rehabilitation and Biomechanics Special Interest Group.

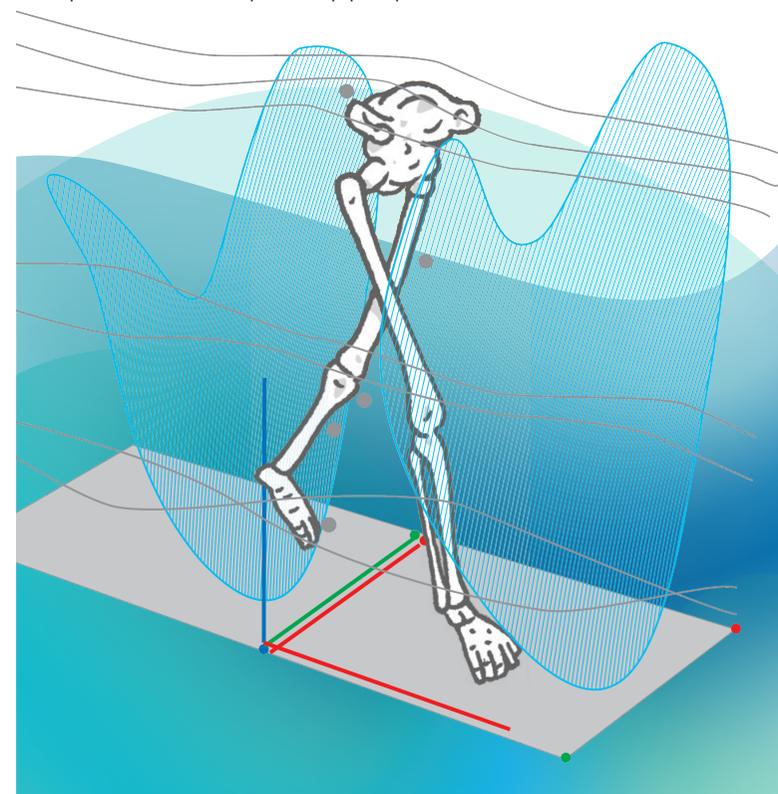
March 2023

IPEM
Institute of Physics and
Engineering in Medicine

The Science & The Scientists

Improving mobility with gait analysis

A variety of conditions and injuries can lead to problems with walking and balance. Gait analysis specialists study walking scientifically, using three-dimensional video tracking and other techniques, so that they can assess the problem and plan appropriate treatment.



The Science

Clinical Scientists in the gait analysis team work closely with physiotherapists, orthopaedic surgeons and artificial limb specialists. First, they measure the patient's range of motion at each leg joint and test their muscle tone and strength.

They then place reflective markers at specific landmark points on the patient's body, such as the ankle bone. As the patient walks along a special walkway, infra-red cameras track the position of the markers in three dimensions.

A computer analyses the information that has been collected. It can display the information in graphs or build computer simulations of the patient walking. The computer can also show how the patient's skeleton moves as it walks or how forces pass through the body.

This information is useful for assessing mobility problems across a wide range of conditions, such as multiple sclerosis, cerebral palsy, osteoarthritis and limb loss. It can help determine the cause and severity of a walking problem.

They then place reflective markers at specific landmark points on the patient's body, such as the ankle bone. As the patient walks along a special walkway, infra-red cameras track the position of the markers in three dimensions.

Gait analysis may be needed to help decide on corrective treatment or therapies. For example, it may be used to help plan surgery for children with cerebral palsy, or with amputees to help improve the comfort or fit of an artificial leg.

The Scientists

Clinical Scientists and clinical engineers

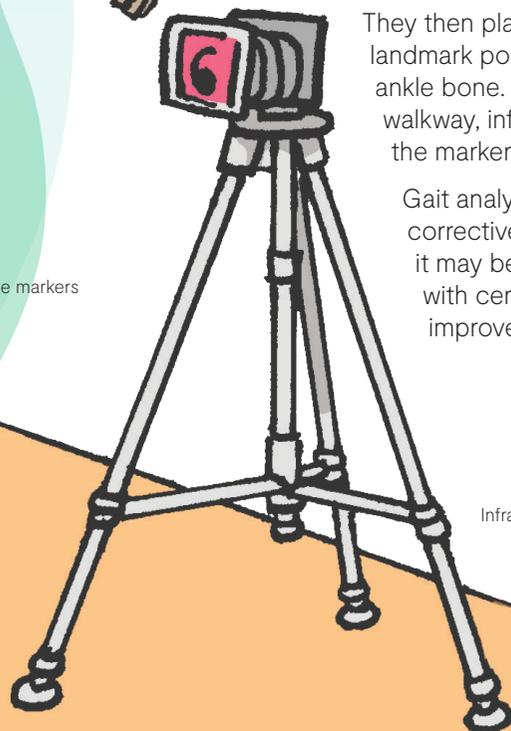
manage, calibrate and use the equipment in the gait laboratory. They interact with the patient during the gait analysis assessment and analyse the data that is collected. Their clinical work is conducted as part of a multi-disciplinary team that includes physiotherapists, orthopaedic surgeons and artificial limb specialists. Some of them conduct projects to develop and test new technologies, for example, to evaluate new artificial limbs.

Clinical technologists work on inputting and complex processing of gait analysis data, and are involved in the maintenance of all the equipment in the lab. They may also assist the clinical team with physical assessments.

Gait analysis can also be used to improve the running technique and performance of athletes.



Reflective markers



Infra-red camera

Sensors in the floor of the walkway can measure the forces exerted during walking

