



When told about the revolutionary new gait analysis technology located at Buckhurst Hill's *Holly House Hospital*, as a runner myself, I had initially envisaged an exciting opportunity to experience first-hand a ground-breaking facility that previously only elite athletes had access to. What I was to discover however, was in fact a surprising revelation.

**T**his ground-breaking technology was introduced to the UK by *Run3D* and scientists at Oxford University, having been developed in Canada. *Holly House Hospital* has become the first UK hospital to introduce 3D Gait Analysis. *Holly House Podiatric Surgeon Trevor Prior* described this as 'one of the most exciting advances in gait assessment.' Having worked with gait-related facilities for 25-years, "what this effectively does," explains Trevor, "is bring the high-tech expensive gait lapse to the high street. It's relevant to whether you're an elite athlete, a Sunday runner, or just a walker."

Now boasting the ability to treat UK patients more effectively, it's a technology which can decipher through the uncertainty and get straight to the point when it comes to bone and joint injuries. Here they have the unique ability to

discover the biomechanical function, usually impossible to detect with the naked eye.

The way a person runs can be the root cause of injury. Biomechanics can identify the cause of such injuries and then develop programmes that target the treatment and help prevent such injuries in the future.

As a fairly frequent runner, pounding the asphalt on a regular basis, it's fair to say that my running footwear and I have become familiar acquaintances over recent years. Proficient with anything from 10k's to half marathons, a niggling intermittent pain in the left knee, which I'd continuously put down to 'runner's knee,' had always put me off negotiating the task of a full-blown marathon distance of 26 miles. So I was intrigued to see what this technology could discover.

### **The process**

After negotiating a range of muscle strength tests on the medical bench, it

wasn't long before Trevor was meticulously attaching numerous strategically placed cluster marker sensors, akin to the *Vicon* system, which transforms Andy Serkis into Gollum or helps replicate Gareth Bale's tricks and turns for the latest *FIFA* computer game. Placed on each foot, ankle, calf, knee, hip and the lower back, these clusters get related to anatomical markers, to be calibrated with the cameras as accurately as possible.

Using infrared cameras, 3D Gait Analysis is able to precisely measure the joint angles and rotations of in my case, my hips, knees and ankles in the three planes of human movement. A computer programme then processes the vital information and the analysis measures lower-limb biomechanics then compares it to a database of around 700-800 runners.

In doing so, whether ideal, excessive or reduced, you'll establish where you fall in terms of the 'normal' range of movement, making a comparison to data accumulated over in the University of Calgary.

Entered into the database, with details such as height, weight, recreational habits and frequency, fitted with a neutral running shoe, I was ready to go. I began with a steady walking pace of 2 mph, followed by a leisurely jog of 5 mph, whilst precise data was collated.

"During that short space of time, you have three cameras recording at 200 hz, 200 frames per second," Trevor reveals. "Run for a minute and you have 60 x 200 data points. On a video camera it's not possible to measure rotations because it's 2D. Here using three cameras, you can reference 3D."

Such 3D imaging, allows the experts to recognise immediately where the root of the problem lies, enabling a much more targeted treatment. An in-depth look at a patient's running style will see if there are any biomechanical imbalances that can be amended. Whereas in the past, much time and money might have been wasted, locating even the tiniest problem area will no-doubt help patients in the long run.

Patients tend to utilise gait analysis to help manage their injury, providing another layer of diagnosis to help identify the cause with precision, or alternatively people come at it from a performance enhancement point of view, wanting to be faster.

### Findings

Whilst a post-gait analysis biomechanical assessment would later confirm the revelation that my right leg is longer than my left and the hips balance with a 4mm left raise, it was the unique 3D gait analysis assessment which would instantly highlight a dysfunction around my left hip and pelvis. Trevor explained how such discrepancies in their movement can predispose to stress type injury. Once the problem was identified, then the team at *Holly House* suggest an appropriate rehabilitation programme.

### Remedy

Having been present throughout both the biomechanical assessment and the 3D Gait Analysis, former GB gold medal winning Paralympian and physiotherapist for twenty-odd years, Noel Thatcher, outlined his prognosis for a suggested remedy.

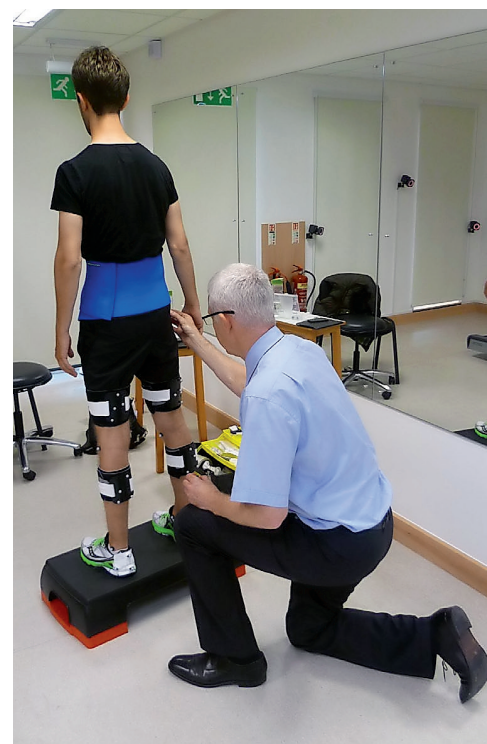
"Remember that around 80% of running injuries are due to overload, so careful build up of your training is very important. It is always a good idea to have a post



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run/gym stretching routine for the major muscle groups." As far as exercises to improve my glute strength, he recommended three exercises composed of side and front planks, which have good science behind them, to activate the appropriate muscles.

The potential to prove as relevant to the recreational runner as the elite and anyone from a walker to a golfer, my encounter with *Holly House's* 3D Gait Analysis was certainly enlightening. So if you suffer from recurring sports injuries, enjoy running or recreational walking, or just want to optimise your mobility or training, then this technology could prove really beneficial. Now fully informed about the cause of my knee problem, I can take steps to ensure that I can keep on running.



Nick Dines undergoing strategic marker placement

### FIND OUT MORE

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