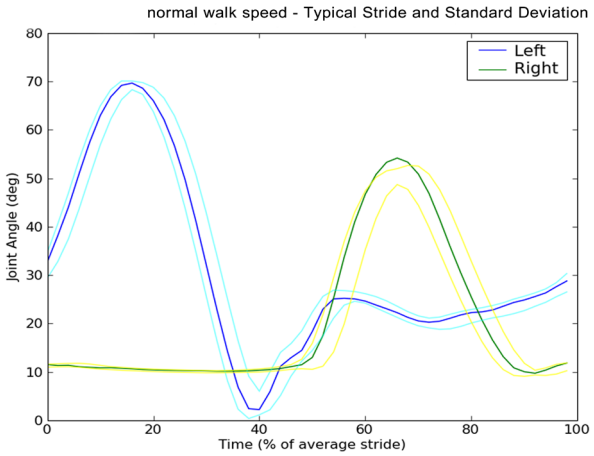
PEGASUS

INNOVATIVE MOTION PRODUCTS

Revolutionary Gait Analysis

Benefits

- Perfect research tool to measure gait characteristics in a natural environment
- Allows measurement at different cadence and on different terrains for several hours outdoor assessment.
- Clinical application to assess and quantify the treatment strategy.
- Quantification of benefit of a particular intervention through therapy or provision of a device.
- Allows for easy data collection and statistical validation.
- Offers a vastly lower cost alternative to the gait lab.
- Minimal set-up time (unlike video-based systems).
- High through-put and productivity are possible.
- Frees the tester to concentrate on analysis rather than test supervision.
- Current and archived data can be compared, for an objective assessment of changes in gait.
- CSV output to allow input to other programs.
- Operates for a whole day on one battery charge.
- Provides the following measurements;



Stride duration (seconds).

Temporal phasing left to right leg (% of stride).

Knee flexion angle with time for left and right leg (degrees).

Limb segment angle with time, calf or thigh in both the sagittal and coronal planes.

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THE ETB-PEGASUS GAIT ANALYSIS SYSTEM ‘HG-1’

What is the Gait Analysis System?

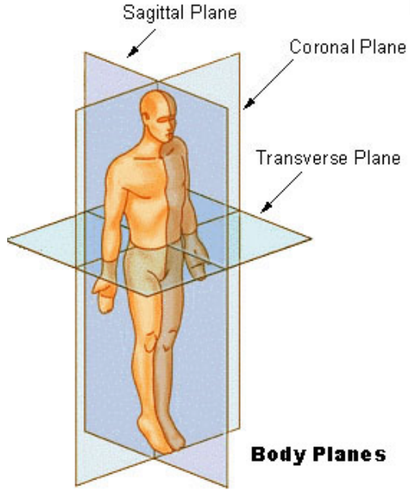
The system consists of four inertial sensors, leg straps, notebook PC and software analysis, all supplied in an attractive case.

Carrying out a test

The straps are attached and the sensors placed in the strap pockets. The wearer stands still for 5 seconds to calibrate the sensors and then the test begins. Each test can have an appropriate protocol; it can be just level walking, or can include stair climbing and descent.

Analysing data

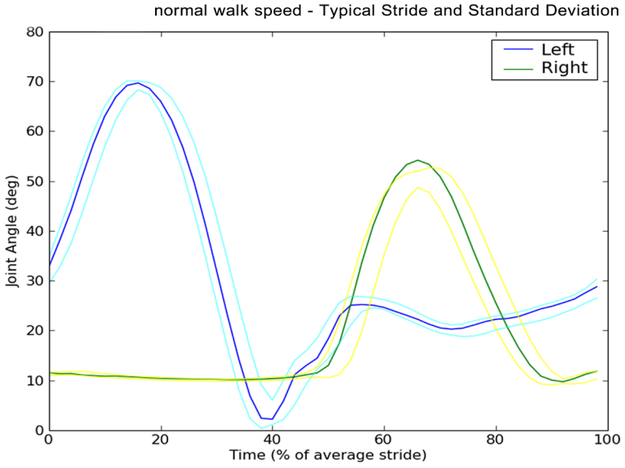
The sensor data is processed and all the parameters automatically presented, simply by connecting the sensors to the notebook and selecting “Analyse”.



Knee flexion

An example of a person walking on level ground is shown at the foot of the page. This shows the left and right knee angles over a period of 12 strides, the stride duration and the relative phasing between the left and right leg.

The plot directly below shows the typical stride from the yellow region chosen, plus the standard deviation. From this it is clear that the left and right legs straighten at the end of the swing phase, with the angle close to zero. The right leg remains almost straight throughout the stance phase at around 5 degrees, whereas the left knee flexes during load.

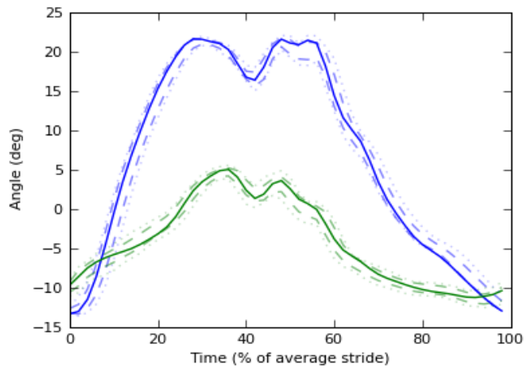


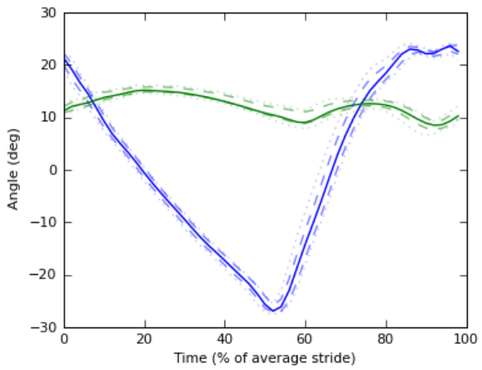
The statistics for the highlighted region are produced as a table, shown on the left.
The average stride duration is 1.23s, which is quite slow for a normal person, with a 5% variation. The relative phasing between the left and right leg is 49%, only 1% lower than the 50% expected for a symmetric gait.

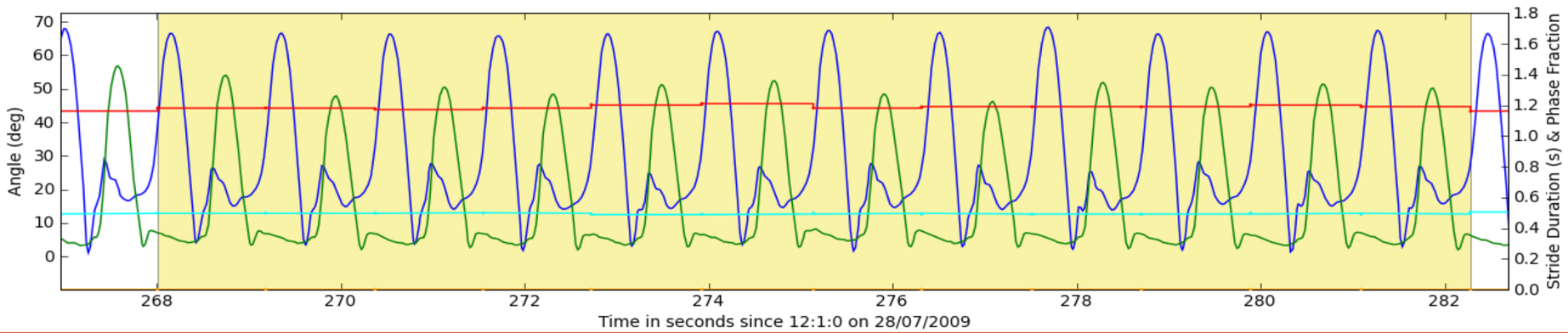
Automatically Generated Summary Table			
Strides	12		
Average Duration (s)	1.19		
Minimum Duration (s)	1.17		
Maximum Duration (s)	1.21	Left	Right
Average Phase %		0.00	49.00
Minimum Phase %		0.00	49.00
Maximum Phase %		0.00	50.00
Typical Peak to Peak (deg)		63.99	47.63
Minimum Peak to Peak (deg)		62.43	43.51
Maximum Peak to Peak (deg)		66.09	50.75

The person tested had considerably less flexion on the right leg than the left.

Thigh and Calf motion

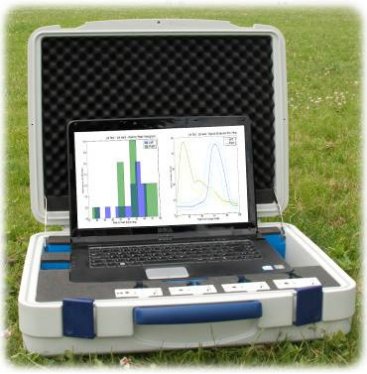






In this example above the left and right thigh angle for a typical stride is plotted, together with the standard deviation (dotted lines). The sagittal (blue line) and coronal angles (green line) are shown on one plot for the left thigh and a second plot for the right thigh. Similar graphs are also produced for the calf.

A summary of the findings for the example provided

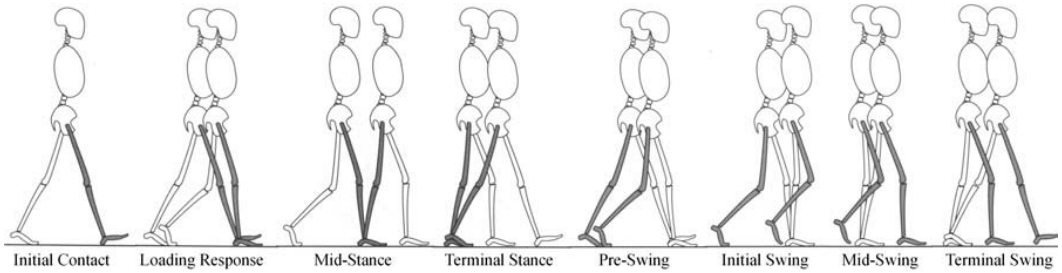


The person tested has a full right leg prosthesis. From the knee flexion angle analysis it can be seen that the right knee flexes less than the left knee in the swing phase. In the stance phase the right knee does not flex, whereas the left knee does. The left knee flexion of 64 degrees is typical of a healthy subject, whereas the right knee flexion of 48 degrees is noticeably less. When the analysis is broken down to the calf and thigh segments it is clear that the right thigh profile is different to that expected from a person with a normal gait, whereas the left thigh closely resembles a normal gait profile. There is greater retraction in the swing phase on the right thigh.

Some Applications

ETB's products give accurate and repeatable numerical information not currently otherwise obtainable across a wide spectrum of activities;

- *Research, education, colleges, universities:* a far greater depth of research is possible simply due to being able to use the system in real life situations, not constrained by gait labs or rooms in hospitals.
- *Diagnosis:* measurement of the gait profile to determine whether the patient has a normal symmetric gait pattern.
- *Monitoring:* after surgery (knee, hip et al), monitoring of recovery to ensure the patient is doing well, allowing for early corrective treatment. Also applies to amputees, e.g., whether the prosthetics are adjusted correctly and so not affecting the good leg.
- *Training:* teaching people how to move more efficiently and effectively, e.g., training the elderly and to help prevent falls injuries, or elite sports people who are looking for that extra 1% in performance.



London Knee Clinic
London Bridge Hospital

London Knee Clinic** (www.londonkneeclinic.com) **are using it for pre and post monitoring of knee operations.

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Blatchford** (www.blatchford.co.uk)**are using it to determine and evaluate outcome measures.

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