Gait analysis dedicated to Health Care

Locometrix® received a prize at the National Competition for the Creation of Innovative Companies Paris 1999 and 2001

www.locometrix.com
The LOCOMETRIX device

This new gait analysis system is based on technology which is used in the aerospace industry: the measurement of accelerations. The apparatus includes three accelerometers, a microprocessor which records locomotor movement next to the centre of gravity.

The walking test

The apparatus which is incorporated in an elastic belt is attached around the waist of the patient. This process takes less than one minute. The walking test can be carried out anywhere, for example in a long corridor, in a gymnasium, or on a stadium concourse.

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Important measurements related to Gait Quality

An innovative software for very informative gait variables

- **Stride frequency**: its decrease gives an early prediction of Locomotor disorders
- **Left and right symmetry index**: a global index for asymmetrical pathology
- **Gait regularity**:
  - a major indicator of Gait Quality
  - independent of age and gender until the age of 70y
  - correlated to clinical indices, gait regularity allows the grading of the gravity and severity of gait disorders
  - major predictor of falling in elderly people
- **Medio-lateral instability**: the complementary measurement of gait regularity
- **Gait constraints**: the measure of the shock energy over the median lumbar region
- **Walking economy**: The total mechanical power allowed to calculate burnt calories

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Example of a walking test: Faller patient

Patient
77 year old man, healthy and active, with a recent history of a fall.

Stride Pattern
Excellent walking speed, with a normal stride frequency and stride length.

Stride coordination
- Right and left steps are symmetric,
- Poor coordination characterized by a low regularity (239; normal value > 300).

Energy assessment
- The total mechanical power is normal.

Conclusion
The rehabilitation program has to take into account the decrease of the regularity, and to reinforce the stride coordination by means of proprioceptive exercises.

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Main validated applications

- **For Rehabilitation**
  Locometrix provides precise information according to gait abnormalities and gait adaptation mechanisms. Locometrix allows a more specific rehabilitation.

- **For Gait deterioration and risk of fall**
  Locometrix highlights the characteristics of gait deterioration: loss of speed, decrease of cadence and/or regularity. Physical activity programs can be individually adapted.

- **For Obesity**
  Locometrix assesses the walking economy according to walking speed. More effective training programs can be prescribed to the patient.

- **For Hip and Knee osteoarthritis**
  - Locometrix precisely measures the gait function.
  - Locometrix provides a better understanding of gait adaptation.
  - Locometrix can be applied after total hip or knee replacement.

- **For Neurological diseases**
  Locometrix grades and subgroups neurological diseases such as Parkinson’s Disease, fibromyalgia, dementia… A better follow up can be achieved.

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Main publications

- Reference data for normal subjects obtained with an accelerometric device. Gait and Posture, 2002; 16: 124-34
- Analyse des troubles de la marche par une méthode accélérométrique dans la maladie de Parkinson. Revue Neurologique, 2003; 159: 786-9

Main customer references

Medical applications
Hospital Pontchaillou, Neurological and Rehabilitation Department, France
Clinic of Valmont, Neurological and Rehabilitation Department, Switzerland

Sports
University of Evry, Exercise Physiology Laboratory, France
National Rugby training center, Marcoussis, France

Pharmaceutical Company
Pierre Fabre Medicament, France

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