Data Analysis

Many different parameters, such as the duration, frequency, stride length and number of steps, as well as gait cycle variability, speed, walking and running phases, the angle of the foot, ground clearance and circumduction, can be evaluated using the RehaGait Analyzer (Pro) software.

Angle Curves

Analysis results

Reference data

For these parameters, a reference database (n= 1860 healthy volunteers, depending on age (5-95 years) and body height (1,18m - 2,06m) of normal gait pattern is implemented in the RehaGait Analyzer (Pro) software. The alignment with the reference data enables a simple, fast and accurate assessment of patient´s gait pattern.

Bipedal Parameters

For all bipedal parameters, indices of **symmetry** are calculated and shown graphically. Additionally, the symmetry of gait phases in the **course of time** is shown. The kinematics of **foot height**, **circumduction** and **joint angles** are displayed graphically and a reference value dependent score allows a fast and clear assessment of selected gait parameters. The **3D view** provides the option to look at patients gait pattern from different perspectives. With the **video function**, the patient can be filmed during a measurement.

It is possible to assess the current gait of the patient objectively and to identify changes in the gait pattern in the **therapy progression** by regularly repeated measurements. Moreover, one therapist can compare two measurements (pre-post comparison) of one patient within few seconds.

Studies/Evidences

Validity and reliability of a portable gait analysis system for measuring spatiotemporal gait characteristics: comparison to an instrumented treadmill

Donath L., Faude O., Lichtenstein E., Nüesch C., Mündermann A.
J Neuroeng Rehabil. 2016 Jan 20;13:6. doi: 10.1186/s12984-016-0115-z

Spatiotemporal gait parameters during dual task walking in need of care elderly and young adults. A cross-sectional study

Agner S., Bernet J., Brülhart Y., Radlinger L., Rogan S.
Z Gerontol Geriatr. 2015 Dec;48(8):740-6. doi: 10.1007/s00391-015-0884-1. Epub 2015 Apr 16

**Amplitude-oriented exercise in Parkinson's disease:
a randomized study comparing LSVT-BIG and a short training protocol**

Ebersbach G., Grust U., Ebersbach A., Wegner B., Gandor F., Kühn AA
J Neural Transm (Vienna). 2015 Feb;122(2):253-6. doi: 10.1007/s00702-014-1245-8. Epub 2014 May 29

Inertial sensor based reference gait data for healthy subjects

Schwesig R., Leuchte S., Fischer D., Ullmann R., Kluttig A.
Gait & Posture 33 (2011), Issue 4, 673–678, Elsevier 2011

Reliability of the novel gait analysis system RehaWatch

Schwesig R., Kauert R., Wust S., Becker S., Leuchte S.
Biomedizinische Technik/Biomedical Engineering. ISSN (Online) 1862-278X, ISSN (Print) 0013-5585, DOI: 10.1515/bmt.2010.025, March 2010

Validation of Hasomed's new, innovative gait analysis system RehaWatch

Derlien S., Böhme B., Leistritz L., Smolenski U.C.
Springer-Verlag, Manuelle Medizin August 2010, Volume 48, Issue 4 pp 254-259

Reference Values for Gait using Outcomes of the Gait Analysis System RehaWatch

Hofmann M., Adolf D., Liedecke W. Congress Lecture [3347] Abstract [522], Topic: Related Rehabilitation, 13th ISPO World Congress (2010), Leipzig

Gait phase detection and step length estimation of gait by means of inertial sensors

Negaard N.-O., Andres S., Kauert R., Schauer T., Raisch J.
Conference-Paper (2005), Prague, Czech Republic

HASOMED

RehaGait®

Analyzer (Pro)

intuitive use

quick and easy report

RehaGait Analyzer (Pro)

mobile and objective gait analysis

objective, valid, reliable location-independent

analysis also for short distances free walking path

automatic analysis of gait parameters

cost-efficient comparison of measurements

helps detecting fall risk data export

reference values

mobile 3D Analysis

Mobile Gait Analysis

Gait analysis with RehaGait

Clinical gait analysis is the process by which quantitative information is collected to aid in understanding the etiology of gait abnormalities and in treatment decision-making. This process is facilitated through the use of different technologies. Essential to the process is the interpretation of these data by experts with substantial knowledge in normal and pathologic gait.

The goal of clinical gait analysis is to assist in treatment decision-making. Clinical gait analysis is a process whereby gait characteristics are measured, abnormalities are identified, causes are postulated, and treatments are proposed.

It is important to appreciate that while quantitative gait analysis does use technology, it does not replace the human observer. Rather, clinical gait analysis serves as an adjunct to aid in understanding - more precisely and at times more accurately - visual impressions of a patient's gait impairment.

Through the thoughtful use of technology, quantitative gait analysis provides an opportunity to enhance the details of complex movement patterns.
Treatment decision-making by clinical gait analysis is always made in the context of the clinician's experience and related to the management of the particular patient disorder. Quantitative gait analysis does not dictate clinical treatment.

In reference to the topic, the RehaGait Analyzer (Pro) can be used as a tool for the analysis of gait disorders and clinical quality management. The RehaGait Analyzer (Pro) will ensure the assessment of gait quality and the evaluation of therapy progress. It serves as a support of (Gait) therapy quality management and reports therapeutic outcomes in an easy and clearly represented way.

In this way, therapy of neuromuscular and skeletal diseases are assessed, controlled and reported with quantitative data.

Application Fields

RehaGait Analyzer (Pro) is focused on applications for: [1]

· **Neurologic indications**
· **Orthopedic indications**
· **Musculoskeletal indications**

Measurements can be made anywhere

RehaGait is able to measure patients with the above mentioned indications and you should focus on the following indication related parameters:

Hemiplegic Gait (Stroke)

The patient stands with unilateral weakness on the affected side, arm flexed, adducted and internally rotated. Leg on same side is in extension with plantar flexion of the foot and toes. The patient will hold his or her arm to one side and drags his or her affected leg in a semicircle (circumduction) due to weakness of distal muscles (foot drop) and extensor hypertonia in lower limb.

Parkinson Gait

In this gait, the patient will have rigidity and bradykinesia. He or she will be stooped with the head and neck forward, with flexion at the knees. The whole upper extremity is also in flexion with the fingers usually extended. The patient walks with slow little steps known at marche a petits pas (walk of little steps). Patient may also have difficulty initiating steps.

Diplegic Gait

Patients have involvement on both sides with spasticity in lower extremities worse than upper extremities. The patient walks with an abnormally narrow base, dragging both legs and scraping the toes. This gait is seen in bilateral periventricular lesions, such as those seen in cerebral palsy. There is also characteristic extreme tightness of hip adductors which can cause legs to cross the midline referred to as a scissors gait.

Ataxic Gait (cerebellar)

Most commonly seen in cerebellar disease, this gait is described as clumsy, staggering movements with a wide-based gait. While standing still, the patient's body may swagger back and forth and from side to side, known as titubation. Patients will not be able to walk from heel to toe or in a straight line.

Myopathic Gait

Hip girdle muscles are responsible for keeping the pelvis level when walking. If you have weakness on one side, this will lead to a drop in the pelvis on the contralateral side of the pelvis while walking (Trendelenburg sign). With bilateral weakness, you will have dropping of the pelvis on both sides during walking leading to waddling. This gait is seen in patient with myopathies, such as muscular dystrophy.

Neuropathic Gait

Typically unsteady, gait in neuropathic disorders is often high-stepping, this being an almost diagnostic feature. Patients may fall over if asked to close their eyes. Neuropathic disorders can arise from: Diabetes, Alcoholism, HIV, Toxin exposure, Metabolic abnormalities, Vitamin deficiency, Adverse effects of certain drugs, 32-70% of all peripheral neuropathies are idiopathic.

1 http://stanfordmedicine25.stanford.edu/the25/gait.html

Benefits

Gait quality

Detailed analysis supplies information on the functional aspects of patient´s ability to walk.

Ensure a high quality treatment

The progress and the outcome of treatment can be documented during the rehabilitation process. Reports illustrate how the patient is progressing and helps to recommend the type and duration of further intervention.

Supply walking aids

Select and adjust suitable walking aids and their proper use. An objective comparison of gait patterns helps to provide patients with the right care.
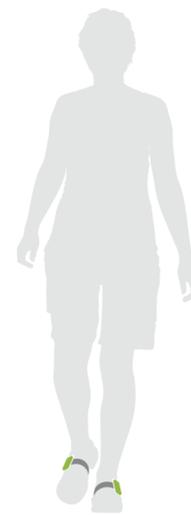
Supply health/insurance companies

Use the RehaGait Analyzer (pro) Report to show the benefit of clinical treatment and prove your treatment with patients gait data.
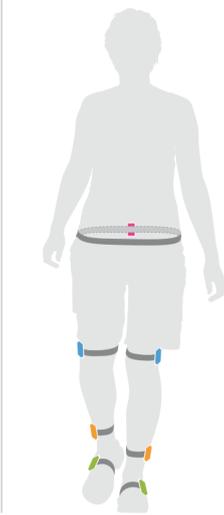

Goals

**create target-oriented & individual therapy plans
measure, identity, analyze and assess disorders**

RehaGait Analyzer   ## RehaGait Analyzer Pro

RehaGait Analyzer	Features	RehaGait Analyzer Pro
+	Stride frequency	+
+	Stride length	+
+	No. of steps	+
+	Spatial & temporal gait cycle variability	+
+	Speed	+
+	Walking phases	+
+	Running phases	+
+	Angle of foot	+
+	Ground clearance	+
+	Circumduction	+
-	Ankle joint angle	+
-	Knee joint angle	+
-	Hip joint angle	+
Scope of delivery		
1	Windows Tablet (Main unit) + accessories	1
2	MotionSensors	7
1	charging device for sensors + accessories	1
2	charging adapter for MotionSensor	7
2	foot straps (size 34-48/ EU)	2
-	shank Straps	2
-	thigh Straps	2
-	trunk Strap	1
1	transport case	1
1	User Manual	1
1	RehaGait analysis software for MS Windows	1