pedography

Pedography with emed® systems:

A standing or walking body generates ground reaction forces under the feet. These ground reaction forces are caused by gravitation and the velocity of the body. When a patient stands on both feet without moving, all forces should be vertical and distributed over the two feet. The distribution of the force is dependent on the posture and foot structure of the patient. The ground reaction forces during walking or running are higher due to the acceleration and deceleration of the body mass. Under dynamic conditions both vertical and horizontal ground reaction forces occur. However, the vertical force provides the largest contribution of the foot-ground's total force.

When measuring the pressure distribution under the foot, the distribution of the local, vertical ground reaction forces can be calculated by multiplying the surface area of the region of interest by the local pressure. Collection of the dynamic load distribution, also in combination with videography or EMG throughout the gait cycle is called pedography.

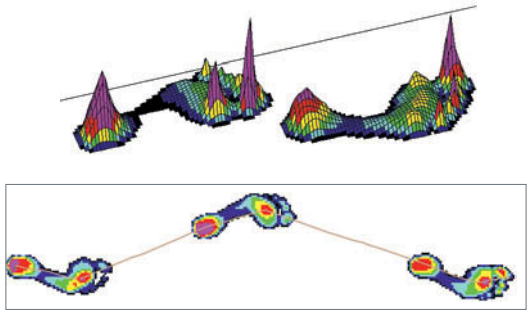
Pedography can be performed either when a patient walks barefoot across the emed® platform which has been placed on the floor, or with pedar® measuring insoles, which are placed within the shoes of the patient.

With the emed® platform measurement the dynamic load distribution under the feet provides information about the foot structure and function, as well as the gait. Therefore, foot deformities and gait malfunction can be detected during analysis of the barefoot pressure data.

The pedar® in-shoe measurement provides accurate information about the function of the foot in combination with the function of the shoe and the shoe insert.

During pedography analysis the foot is divided into anatomical areas and landmarks of interest. Comparisons can be performed, either intraindividually, pre and post treatment, or interindividually with matched control groups. Comprehensive pedographic reports based on these comparisons are generated by the novel software for easy information exchange between the foot care specialists.

The novel pedography systems provide not only accurate load pressure measurements, but also a complete analysis of the foot function during stance and dynamic gait.



emed®-xl multi steps

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emed®

xl platform

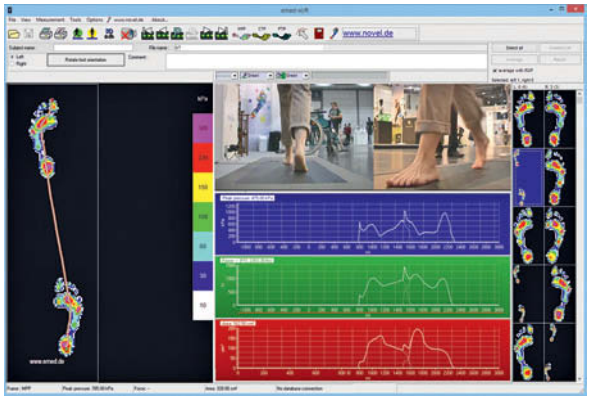
emed®-xl

The emed® pedography platforms provide accurate, reliable information for the analysis of foot function and diagnosis of foot pathologies. The platforms measure dynamic pressure distribution during the stance phase of gait.

To capture this information it is very important that the platform can accurately measure the local force and local pressure. The ideal pressure platform will have a spatial resolution of four sensors per square centimetres in which each sensor is individually calibrated. The data is acquired at a fast measurement rate to be able to adequately capture the biomechanical components of the stance phase. These measurements produce a large number of data points in which sophisticated software is needed for analysis. To describe both foot function and complete gait analysis, a long platform is needed to capture parameters of the entire gait cycle.

For this combined application, novel has developed the extra-long emed®-xl platform. As with the existing emed® platforms, the emed®-xl also works with calibrated capacitive sensors. This feature of the platforms provides the basis for novel's worldwide reputation of precision, accuracy, and reproducibility.

The extra-long platform has a sensor resolution of 4 sensors/cm^2 and contains more than 25,000 sensors. With an overall sampling rate of 2.5 million sensors per second, it attains a frame rate of 100 Hz. At a length of 1.44 meters, emed®-xl can record two or three consecutive steps of a patient.
The emed®-xl is the first system to capture pressure data for dynamic gait analysis without compromising high spatial resolution or accuracy. In addition to the frequently reported parameters of pedography, the emed®-xl data can be used to calculate various gait parameters such as step width, temporal step sequence, asymmetries, and projection of the centre of gravity. The emed®-xl platform connects directly to a PC or Mac running under Windows via the USB interface. A sync out signal allows for the synchronisation of 3D motion analysis, EMG, etc. Additionally, it is possible to combine two emed®-xl platforms back-to-back or side-to-side to capture either long or broad measuring areas.



emed®-xl recorder software

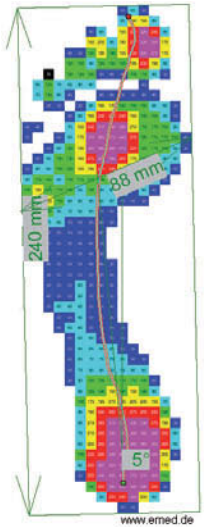
Technical data of the emed®-xl platform:	
external dimensions (mm)	1,529 x 504 x 21
sensor area (mm)	1,440 x 440
number of sensors	25,344
resolution (sensors/cm^2)	4
accuracy (% ZAS)	5
frequency (Hz)	100
pressure range (kPa)	10 - 1,270
pressure threshold (kPa)	5
cable length (m)	5

Characteristics of the emed®-xl platform

- utilizes fully calibrated, capacitive sensors
- sensor resolution of 4 sensors/cm^2
- collects at 100 Hz
- can be lengthened by modular extensions (back-to-back or side-to-side)
- connects directly to the PC via USB
- runs on current Windows 7 or 8 operating systems
- provides a TTL sync pulse for synchronisation of 3D motion analysis systems or EMG
- is compatible with novel scientific analysis software

Applications for the emed®-xl platform

- gait analysis of **foot function and spatiotemporal parameters** for populations such as stroke, PD, geriatric, pathological etc.
- **running biomechanics** – decreased targeting necessary
- **children's gait assessment** – multiple foot strikes reduces the number of trials required



pressures values