

Gait Analysis System

for
Rodents



Mouse Specifics, Inc. presents **DigiGait™**

the

High-Performance Digital Imaging System

for spatial and temporal indices of gait
at adjustable walking speed and belt inclination.

The instrument is completely turnkey with acquisition and analysis software
for accurate assessment of treadmill and overground locomotion.

Applications

Neurodegeneration • Neuropathy • Arthritis • Pain
Spinal cord injury • Drug toxicity • Aging
Parkinson's • Huntington's • ALS • Lysosomal storage disease

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Features of DigiGait™, the Patented Treadmill

Walking Compartments for Mice and Rats



The walking compartments are easily interchangeable to evaluate gait in small and large animals. Each compartment is constructed of clear polycarbonate with adjustable front and rear walls. Wall locations are adjustable for a lane length of 3.0" (7.6 cm) for neonatal mice, to 24" (61 cm) for large rats and guinea pigs. The compartments are interchangeable in less than one minute.



Crystal Clear Walking Surface

The **DigiGait™** treadmill belt is a clear, easily cleaned polymer bonded endless loop. The material provides excellent traction at walking and high running speeds. The transparent treadmill belt maximizes the efficiency of the camera and image processing software to identify paw contact with the treadmill surface at all walking and running speeds.

Widely Applicable

- ✓ Gait dynamics in mice, rats, and guinea pigs
- ✓ Treadmill and overground locomotion
- ✓ Analysis of coordination
- ✓ Walking and running
- ✓ Horizontal and incline
- ✓ Multiple speeds

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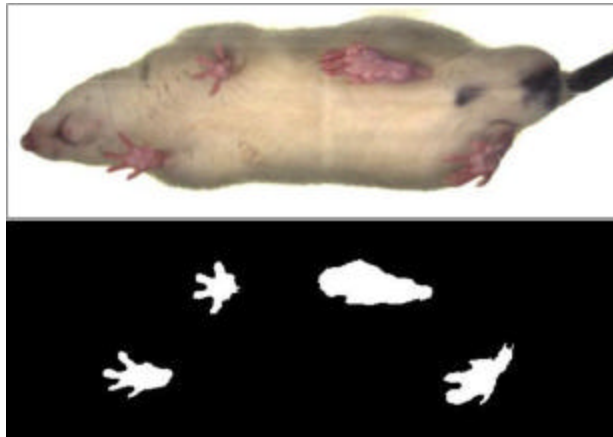
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DigiGait™ Imaging System Description



DigiGait™ performs ventral plane videography of rodents walking on a motorized transparent treadmill belt. A high-speed digital video camera continuously images the underside of the walking animals. **DigiGait™** software generates “digital paw prints” and dynamic gait signals, representing the temporal record of paw placement relative to the treadmill belt. The gait signal of each limb comprises the stride duration, which includes the stance duration when the

paw of a limb is in contact with the walking surface, plus the swing duration when the paw of the same limb is not in contact with the walking surface. Stance duration is subdivided into braking duration (increasing paw contact area over time) and propulsion duration (decreasing paw contact area over time). More than twenty gait indices are reported, including the sciatic functional index (SFI), stance factor, and the step-sequence pattern.



DigiGait™ is delivered and installed completely, including the now-patented treadmill with the transparent treadmill belt, digital imaging hardware and software, high-intensity no-flicker lighting, and walking compartments for mice and rats. The incline of **DigiGait™** is fixed at horizontal, but can be tilted for uphill or downhill walking. Belt speed is adjustable over the range of 0 to 100 cm/s with 0.1 cm/s resolution. The option to control walking speed improves reliability and reproducibility of gait indices.

High-torque Motor with Speed Control

DigiGait™ is controlled by a DC-motor with no variability induced by alternating currents. The treadmill belt speed is variable from 0 to 100.0 cm/s. The speed display in cm/s provides a precise range of walking speeds. The motor driven treadmill belt ensures that a sufficient number of strides are obtained at desired walking or running speeds.

Material Specification

The animal contacts PVC and polycarbonate material when walking within the treadmill compartment. The compartments are transparent to continuously monitor the animal from multiple angles. The treadmill housing is manufactured from non-corroding aluminum. Industrial castor wheels facilitate transfer between laboratories.

Electrical Specification

DigiGait™ is available 115VAC/60Hz & 230V/50Hz.
Treadmill motor: DC, ¼ HP; Torque: 45 lb-in;
Speed: 100.0 cm/s; adjustable with digital display.
Lighting: 90-250 VAC; 25 kHz; 5000K color temperature.

Physical Specification

Overall height: 36" (92 cm)
Overall width: 36" (92 cm)
Overall depth: 9" (23 cm)

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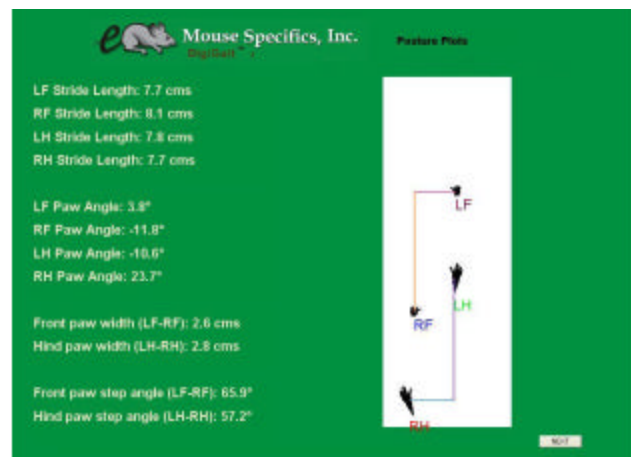
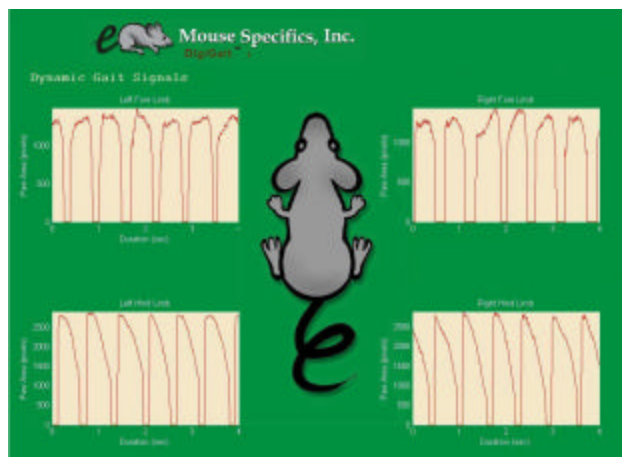
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DigiGait™ Imaging & Analysis Software

Included imaging and analysis software AUTOMATICALLY quantifies spatial and temporal indices of gait in walking or running animals. No markers are used. Unlike other video tracking software, the user is not required to manually outline or identify the regions of interest. Rather, one graphical user interface empowers the user to maximize the contrast between the animals' paws and the background, enabling the study of mice, rats and guinea pigs of any strain and coat color. Paw placement of each limb is identified throughout the gait cycle at up to 150 frames per second. Outputs of the analysis are dynamic gait signals for each limb and a plot of the animal's posture. Twenty-five gait indices are reported in spreadsheet-ready format, including stance, swing, braking, propulsion, cadence, step sequence, regularity index, and the sciatic functional index.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Study Name	Side	Axis	Swing (ms)	%Swing (%)	%Brake (%)	%Propel (%)	%Stance (%)	Stride (ms)	Stride Length (cm)	Paw Angle (deg)	Stance (cm)	Step Sequence	Paw Area (sq. cm)
2														
3	Rat e5 treated	Left	Fore	0.102	20.8	43.4	35.8	79.2	0.489	7.7	3.8	2.6	Alternate	0.54
4	Rat e5 treated	Right	Fore	0.127	24	26.8	49.2	76.0	0.529	8.1	-11.8	-	Alternate	0.51
5	Rat e5 treated	Left	Hind	0.140	26.8	13.2	60.0	73.2	0.521	7.8	-10.6	2.8	Alternate	1.52
6	Rat e5 treated	Right	Hind	0.098	19.9	11.0	69.1	80.1	0.492	7.7	23.7	-	Alternate	1.59
7														
8														

Selected Publications

The DigiGait™ technology has been described in numerous publications, including:

1. Gait dynamics in trisomic mice: quantitative neurological traits of Down syndrome. *Physiol Behav.* 2004; 82: 381-9.
2. Gait analysis detects early changes in transgenic SOD1(G93A) mice. *Muscle Nerve.* 2005; 32: 43-50.
3. Transgenic inhibition of Nogo-66 receptor function allows axonal sprouting and improved locomotion after spinal injury. *Mol Cell Neurosci.* 2005; 29: 26-39.

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