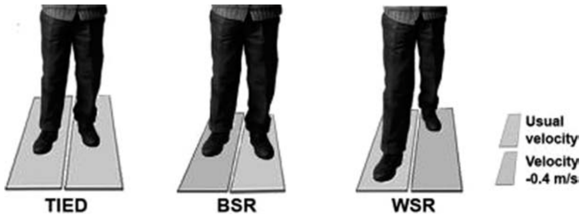

FIG. 1 (524).

sponding to the fastest leg run 0.4 m/s slower. The bilateral coordination of gait was assessed by the Phase Coordination Index (PCI).

Results: During tied condition, the step lengths of the slowest and fastest leg were respectively 26.5±3.0 and 34.9±3.9 cm (p=ns) with a fastest/slowest ratio of 1.3±0.5. During the BSR condition these values resulted respectively 31.1±4.9 cm, 29.9±4.0 cm (p=ns) and 1.1±0.8 (p=0.03 vs. *tied*), thus revealing a more symmetric gait as compared to the tied condition. During WSR, these values were respectively 22.5±2.5 cm, 41.0±2.8 cm (p=0.0003) e 1.8±0.2 (P=0.002 vs *tied*), thus revealing a more asymmetric gait. However, when examining the bilateral coordination of the lower limbs, gait was significantly more coordinated during WSR than during tied (p=0.05) or BSR (p=0.02): the PCI values were 39.8±10.3, 47.3±10.7, and 52.3±11.5, respectively. As a consequence the global performance of gait resulted improved during the WSR as compared to the tied condition: stride length increased from 61.0±5.0 to 64.1±5.9 cm (p=0.05) whereas cadence decreased from 147±17 to 118±9 steps/min (p=0.04).

Conclusions: Our findings reveal that during normal gait (tied) the locomotor system reduces the step length of the less affected side in order to preserve the symmetry between legs. In fact, during the WSR condition, in spite of the increased asymmetry, gait improves in terms of stride length and coordination.

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Gait analysis using a wearable accelerometer system: Comparison between control subjects and patients with Parkinson's disease

D. Maquet, J.-L. Croisier, F. Robert, S. LeScanf,
C. Rodriguez de la Cruz, T. Bury, G. Garraux (Liege, Belgium)

Objective: To examine specific gait parameters using a wearable accelerometer system in PD patients as compared with normal individuals.

Background: Walking is one of the most universal human activities and disorders of gait are one of the most cumbersome symptoms in Parkinson's disease (PD). Quantitative gait analysis using external devices is particularly relevant to detect and characterize walking disorders, particularly in patients with neurological diseases.

Methods: Ten PD patients (mean age: 63±9 years and body mass index: 23±3 kg/m^2) and 10 control subjects (mean age: 64±9 years and body mass index: 24±2 kg/m^2) were included in the study. PD patients were studied on medication. Mean disease duration was 8 years and mean score on Hoehn & Yahr scale was 2 Participants were asked to walk at their comfortable speed under standardized experimental conditions in a 40 m-long hospital corridor. The gait analysis system used in this study (Locometrix^{TM}) included an acceleration sensor, a recording device and a software for signal processing. The sensor was composed of two accelerometers placed perpendicularly and was incorporated into a semi-elastic belt placed over the L3-L4 intervertebral space. We extracted the following gait parameters during a 20-second period of stabilized walking: stride frequency, stride length, stride regularity (similarity of cranio-caudal movements over successive strides) and step symmetry (similarity of left and right cranio-caudal movements). Walking speed was also measured.

Results: Walking speed and stride length were significantly lower in PD patients in comparison with healthy controls (Table 1). Stride regularity and step symmetry were also altered in the PD group but this difference did not reach statistical significance.

Conclusions: Although this study is limited by a small sample size, our preliminary results showed that quantitative gait parameters can be easily studied in PD patients using a wearable accelerometer system. This approach still needs to be validated in PD but opens interesting perspectives to track modifications of quantitative gait parameters associated with disease progression and to evaluate more accurately the effects of specific therapeutic interventions.

TABLE 1 (525).

Gait parameters	Controls	PD	p value
Walking speed (m/s)	1.39 ± 0.19	1.16 ± 0.3	0.05
Stride frequency (Hz)	0.92 ± 0.04	0.92 ± 0.1	NS
Stride length (m)	1.51 ± 0.18	1.26 ± 0.26	0.02
Stride regularity (au)	270 ± 47	239 ± 67	NS
Step symmetry (au)	214 ± 52	185 ± 79	NS

m=meters; s=seconds; au =arbitrary unit; NS=not significant.

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Ambulatory monitoring of energy expenditure and physical activity levels using the SenseWear Armband^{TM} system in Parkinson's disease

C. Rodriguez de la Cruz, T. Bury, S. Le Scanff, F. Robert, D. Maquet, J.-L. Croisier, G. Garraux (Liege, Belgium)

Objective: To monitor physical activity levels and energy expenditure in daily life using the ambulatory SenseWear Armband^{TM} system in Parkinson's disease (PD) patients and control subjects.

Background: One goal of therapeutic interventions in PD is to improve the level of mobility and physical activity during daily life but these important outcomes remain difficult to quantify with a high accuracy.

Methods: We recruited 11 PD patients (mean age: 63.33±7.81 years and B.M.I.: 25.1±3.24 kg/m2) and 11 control subjects (mean

TABLE 1 (526). *Parameters derived from 24h ambulatory SenseWear Armband^{TM} recordings*

	Controls	PD	P value
TEE	2286 ± 563	2336±584	NS
0-1 MET			
EE (cal)	687±166	894±224	NS
Time (min)	658±163	768±179	NS
1-2 MET			
EE (cal)	392±119	560±176	NS
Time (min)	408±163	424±211	NS
2-3 MET			
EE (cal)	562±155	361±121	0.002
Time (min)	222±74	147±55	0.01
3-6 MET			
EE (cal)	628±557	506±442	NS
Time (min)	150±103	100±80	NS
>6MET			
EE (cal)	17±20	12±4	NS
Time (min)	2.2±2.4	6±7	NS
Number of steps	7563±3194	5279±1820	0.045

TEE=total energy expenditure (EE); cal=calories; min=minutes.