Nordic walking in adults with Parkinson's Disease.

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Background: Parkinson's disease (PD) is a neurodegenerative disease affecting postural instability and gait, and consequently quality of life.
Traditional therapies such as subthalamic nucleus deep brain stimulation (STN-DBS) and medication improve some motor symptoms. However, they have no or negative effect on postural instability and falling rates in patients with PD. Therefore, alternative therapies must be considered.

Objectives: To determine the effect of Nordic walking poles (NWP) on gait patterns in PD. It is expected that NWP will improve gait patterns in PD patients by increasing gait stability.

Participants

- 12 healthy older adults (CTL), 8 female, 4 male, mean age: 68.0 ± 6.4 years.
- 11 adults with PD, 3 female, 8 male, mean age: 62.0 ± 11.7 years.
- PD group mean disease duration: 6.3 ± 3.9 years.

Methods

- Gait pattern was assessed after a 6 weeks independent Nordic walking training.
- Gait analysis was performed on a 5 metre walkway (Vicon) with eight 3-dimensional cameras and two force platforms.
- Gait pattern was also assessed using accelerometry for 6 min on a 25 m pathway (APDM).
- Gait was performed at a self-selected speed, with (WP) and without poles (NP).

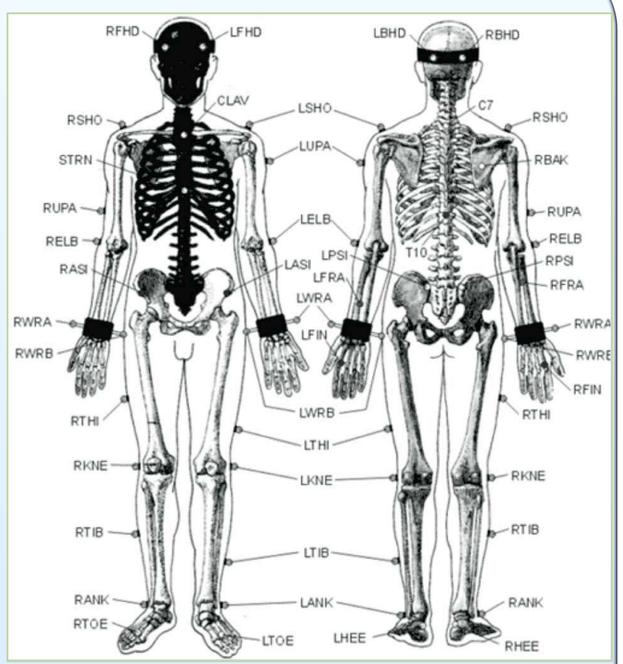


Figure 1. Anthropometric model for gait analysis

- Measures: Gait spatial-temporal variables, power generation/absorption at the hip, knee and ankle.

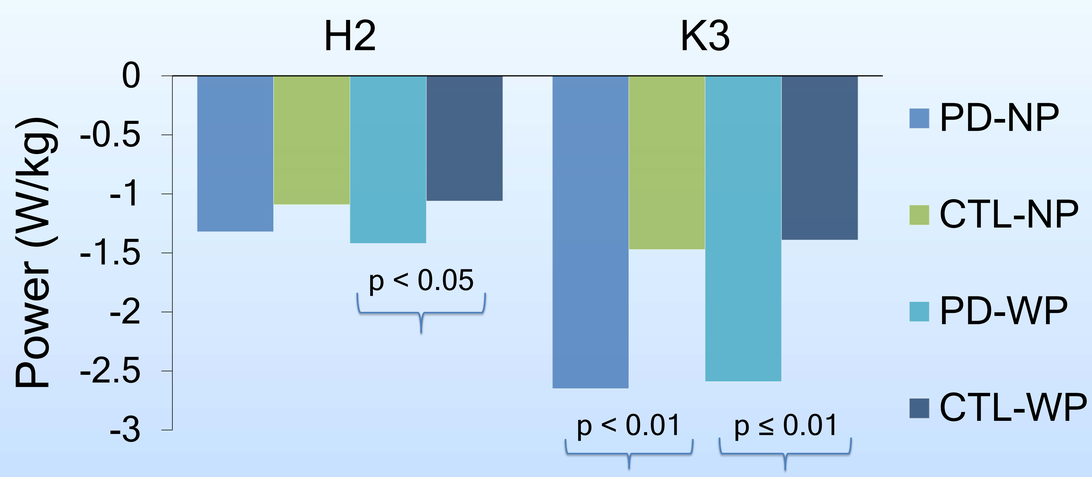
Results

		Stride Length (m)		Gait Speed (m/s)		Cadence (steps/min)	
		NP	WP	NP	WP	NP	WP
6min walking task	PD	1.46 ± 0.11	1.49 ± 0.12	1.42 ± 0.12	1.40 ± 0.11	117.08 ± 8.18	113.21 ± 8.22
	CTL	1.41 ± 0.14	1.46 ± 0.15	1.38 ± 0.22	1.35 ± 0.25	116.86 ± 10.96	109.95 ± 12.85
5m walking task	PD	1.34 ± 0.16	1.43 ± 0.16	1.27 ± 0.19	1.31 ± 0.19	112.25 ± 10.57	107.62 ± 10.06
	CTL	1.34 ± 0.22	1.42 ± 0.19	1.27 ± 0.22	1.27 ± 0.21	112.53 ± 8.70	106.31 ± 7.82

Table 1. Spatial temporal characteristics of gait. Values presented are averages of the group and for 3 trials.

- No significant difference was found between PD and CTL groups, for either the 5m or 6min walking tasks.
- Future data analyses will be done to compare results from the 6min and 5m walking tasks.

Figure 2. Mean peak power absorption.



- Significant differences between PD and CTL were found during mid-stance at the hip (H2) and pre-swing at the knee (K3), Fig.2.
- No differences were seen between the PD and CTL groups at the ankle.
- No differences were seen within the groups in NP or WP.

Compared to older adults, individuals with PD increased power absorption:

1. With the knee extensors, during the pre-swing phase (K3) with and without poles.

- **Independently of the walking condition, postural instability in Individuals with PD may increase the need to control the forward progression of the leg during the swing phase.**

2. With the hip flexors during mid-stance (H2) when walking with poles.

- **Walking with poles could provide more stability and therefore allow to increase H2 and transfer energy for the swing phase (H3).**

Walking with poles seems to be beneficial in some aspects of gait patterns in individuals with PD.

Longer training period or supervised training sessions could be shown to further improve gait patterns and walking stability.

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