

Remote and personalised monitoring of motor and nonmotor symptoms of Parkinson's disease: a single centre review of Parkinson's KinetiGraph

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OBJECTIVE

Using PKG (Parkinson's KinetiGraph) recordings, we investigate if objective measurements scores of bradykinesia, dyskinesia and immobility correlate with recent past history of clinically significant events in Parkinson's disease (PD) patients, specifically cause of hospitalisation if any

BACKGROUND

Currently, clinical and motor monitoring of PD is based on clinical examination, scales and patient completed diaries. The PKG provides objective information on patients motor symptoms and allows remote monitoring¹. We present a snapshot dataset from an ongoing worldwide PKG registry (Fig. 1) in PD patients, led by King's NPF Center of Excellence.

METHODS

Patients were included when PKG recording was performed at the discretion of the treating neurologist. We collected baseline standard PKG parameters (BKS, DKS, FDS, PTI) and attempted to see if there was any patterns of baseline information that dictates consequent treatment. We also looked at any relationship with previous, but recent hospitalization or serious clinical events (3yrs).

Table 1: Patient demographics

	Mean	SD
Age (yrs)	64.25	10.56
Age of PD Onset (yrs)	54.41	11.26
Duration of disease (yrs)	9.64	6.39

Table 2: PKG scores

	Mean	SD
BK50	27.27 ↑↑	8.09
DK50	5.26 ↑	11.02
FDS	8.83 N	4.74
PTI	12.11 ↑↑	12.50

BK50: Bradykinesia score, percentile 50, controls 18.60;
 DK50: Dyskinesia score, percentile 50, controls 4.30
 FDS: Fluctuation score, controls 7.8 to 12.8
 PTI: Percent time immobile, controls ≤ 5%

BK50 bradykinesia score 50; DK50 dyskinesia score 50; FDS fluctuation score; PTI percent time immobile; NPF National Parkinson Foundation; PD Parkinson's disease; PKG Parkinson KinetiGraph; SD standard deviation; yrs years

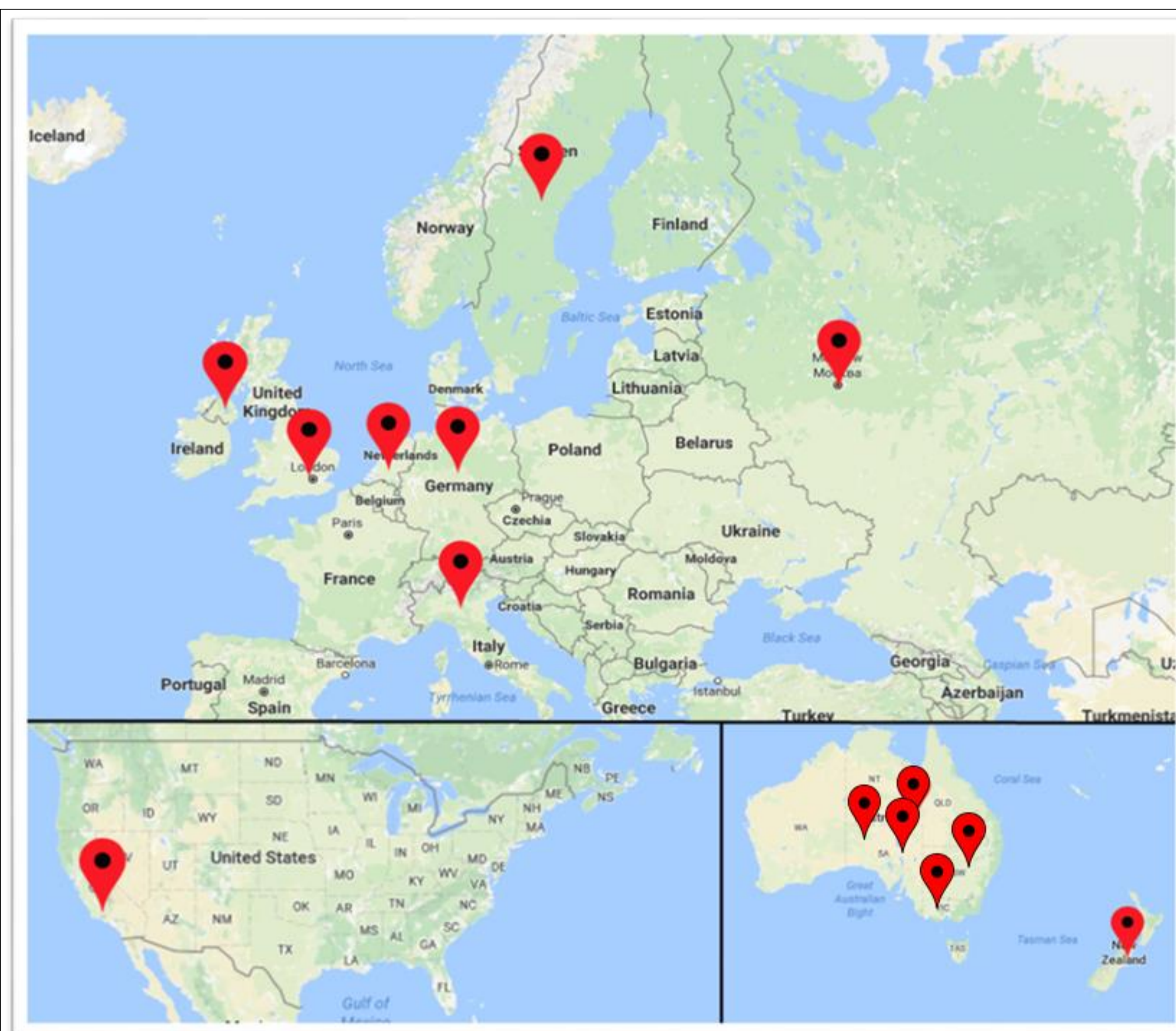


Figure 1: PKG Worldwide registry

Figure 1: Worldwide PKG data registry led by King's NPF Center of Excellence.

Figure 2: shows the PKG wearable device.

Figure 3: shows an example of one of the plots provided by the PKG output.



Figure 2: PKG device

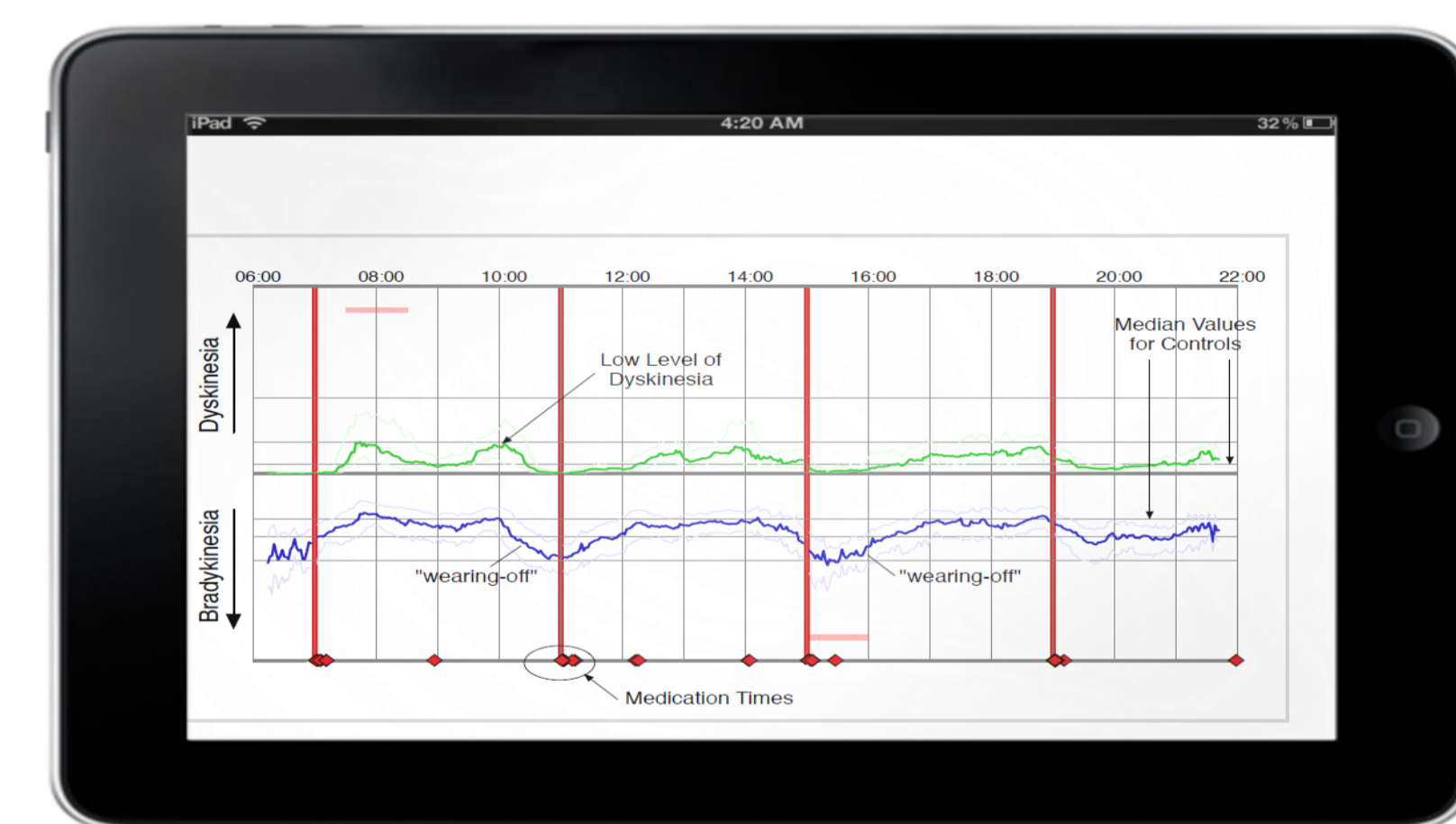


Figure 3: PKG output

RESULTS

84 patients had performed PKG objective measurement (mean age of PD onset 54.41 years, mean disease duration 9.64 years). PKG measures across several centers showed high rates of BKS (27.27) and PTI (12.11) and marginally raised rates of DKS (5.26). There was a weak link between PTI increase and falls. FDS scores appeared normal. There was no significant correlation between motor symptoms as measured by BK50 and FDS, and history of significant falls or infection. However, our preliminary results showed a mild correlation between falls and PTI that was statistically significant.

CONCLUSIONS

This preliminary survey of baseline PKG measures in unselected PD suggests a trend toward high levels of BK and PTI (suggestive of sleep episodes²). Low DKS and normal FDS suggest that patients may be under treated with levodopa based therapies. Increased PTI scores also suggest under-treatment, primarily of sleep dysfunction². The correlation of high PTI and falls merit further investigation.

ACKNOWLEDGEMENTS: PKG Worldwide registry: United Kingdom, Germany, Italy, Sweden, Netherlands, Russia, United States and Australia

REFERENCE: 1. Griffiths, R.I., Kotschet, K., Arfon, S., *et al.* (2012) Automated Assessment of Bradykinesia and Dyskinesia in Parkinson's disease. *J Parkinsons Disease*, 2, 47-55.
2. Klingelhoefer, L., Rizos, A., Sauerbier, A., McGregor, S., Martinex-Martin, P., Reichmann, H., Horne, M., Chaudhuri, K.R. (2016) Night-time sleep in Parkinson's disease- the potential use of Parkinson's KinetiGraph: a prospective comparative study. *Eur J Neurol*. 23, 1275-1288