1. Introduction

Parkinson's disease (PD) is a neurodegenerative disease which causes gait dysfunction in patients, amongst other symptoms. There is no cure; the way in which PD is measured in clinical trials of potential neuroprotective therapies uses "snapshot" clinician-patient interactions which do not capture the hour-by-hour fluctuations in symptoms and slow progression. Mobility ability is linked to quality of life in PD. Mobility-related outcomes could be functionally-relevant digital biomarkers in PD.

2. Results

Analysis of the video data, labelled second-by-second by human raters, shows the promise of mobility-related activities as markers of symptom progression in PD. Sit-to-stand (STS)\(^1\), turning of gait\(^2\) and room-to-room transition\(^3\) duration all can differentiate between the ON and OFF (withholding symptom improving medications) medication states in PD, and between PD and control (see figure 2 for STS). Furthermore, there are strong correlations between STS duration/speed, and turning duration/number of steps taken to turn (figure 1), and the gold-standard clinical rating scale scores.

3. Conclusions

Mobility-related parameters from real-world data show promise as digital biomarkers of disease progression in PD.

Larger datasets for longer periods of time are needed for fine-tuning of algorithms to automatically detect and quantify mobility-related activities in diverse naturalistic settings of people's own homes.

References


Figure 1. Correlations between turning of gait parameters and the gold-standard clinical rating scale score (MDS-UPDRS III)

Figure 2. Illustration of average STS speed (m/s) in control participants compared to participants with PD ON and OFF medications

Figure 3. Illustration of average STS speed (m/s) in control participants compared to participants with PD ON and OFF medications