Technological visuo-cognitive training in Parkinson's disease: Preliminary findings from a pilot randomised controlled trial

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BACKGROUND

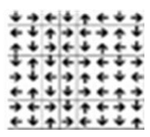
- **Visuo-cognitive dysfunction is common in Parkinson's disease (PD) and relates to gait impairments and increased falls risk.**
- **There is currently no pharmacological treatment for visuo-cognitive impairments in PD.**
- **Alternative strategies are needed to address these non-motor symptoms given their negative impact on quality of life.**
- **Novel technologies have potential to deliver multimodal rehabilitation of visuo-cognitive dysfunction, but more research is required to determine their feasibility in PD [1].**

OBJECTIVE

To determine the feasibility and preliminary efficacy of a home-based, technological visuo-cognitive training (TVT) intervention using a mobile application and exercise with stroboscopic glasses compared to standard care in people with PD.

METHODS

- 40 people with PD were recruited (30 male, 10 female; age 69.4±9.2yrs; disease duration 6.5±6.1yrs).



Baseline assessment in Gait Laboratory (week 0)

Randomisation (n=40)

Home-based TVT Intervention (weeks 1-4)

Participants received twice weekly visits lasting approx. one hour from a physiotherapist over four weeks.

Each session included a series of visuo-cognitive training drills performed on a mobile tablet device and exercises whilst wearing stroboscopic glasses.

Activities were supervised at all times by a qualified physiotherapist from the research study team.

On the final visit, a semi-structured interview was conducted to explore participants' experiences of the technological intervention.

Home-based Standard care Intervention (weeks 1-4)

Participants received twice weekly visits lasting approx. one hour from a physiotherapist over four weeks.

Each session included a series of paper-based visuo-cognitive training tasks and seated game activities plus exercises under normal visual conditions.

Activities were supervised at all times by a qualified physiotherapist from the research study team.

Follow-up assessment in Gait Laboratory (week 5)

OUTCOMES

Primary outcomes: feasibility of study design and intervention.

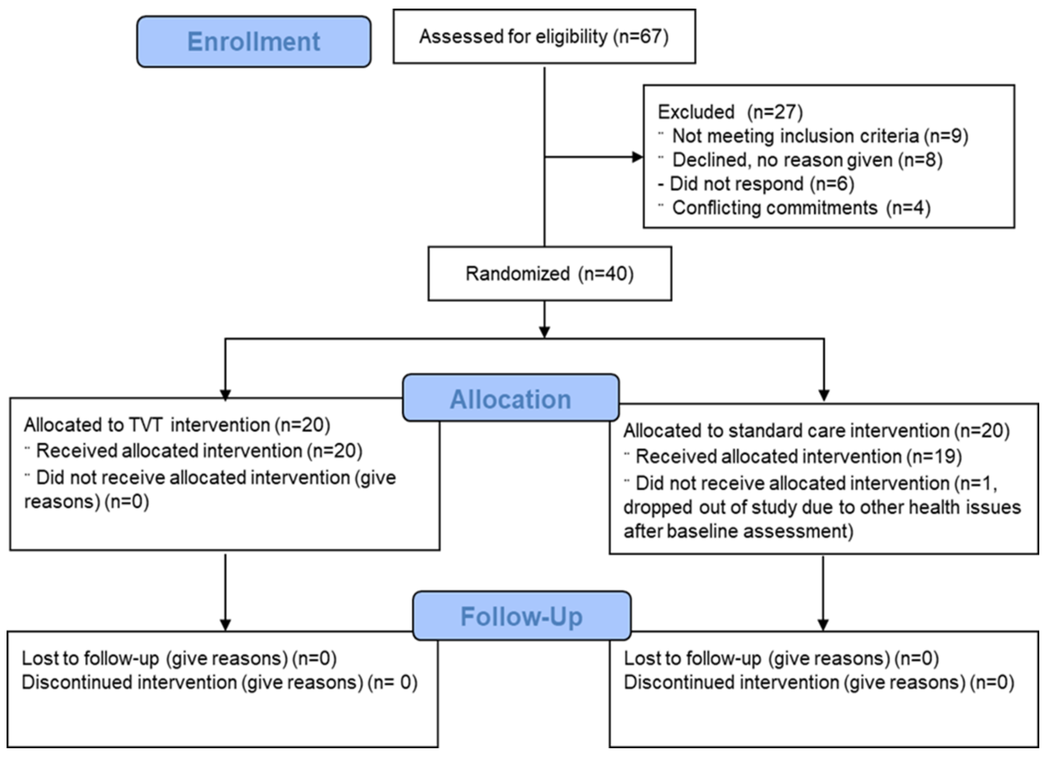
Exploratory outcomes: cognitive assessments, mobility/gait tests and measures of visual function.

RESULTS

Feasibility outcomes

- **Recruitment rate 60%** (40/67)
- **Retention rate 98%** (39/40)
- Adherence to both arms of the intervention was **high (**98% of in TVT group and 96% in standard care group).

Consort diagram illustrating flow of participants



Exploratory outcomes

- There were **significant improvements** with medium effect sizes in both groups when comparing pre and post values for **cognition** (executive function) and **functional mobility**.
- Gait parameters also improved within each group, although not significantly.
- No between group differences were observed.

CONCLUSIONS AND FUTURE WORK

Our findings suggests that home-based TVT with a physiotherapist is feasible in people with PD and could provide a novel approach to addressing cognitive dysfunction and mobility in this population.

REFERENCE: [1] Das J, Morris R, Barry G, Vitorio R, Oman P, McDonald C, Walker, R., Stuart, S. (2022) Exploring the feasibility of technological visuo-cognitive training in Parkinson's: Study protocol for a pilot randomised controlled trial. PLoS ONE 17(10): e0275738.

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