



# Feasibility, safety and outcomes of playing Kinect Adventures!<sup>TM</sup> for people with Parkinson's disease: a pilot study

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# Objectives

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To assess the **feasibility, safety** and **outcomes** of playing **Microsoft Kinect Adventures™** for people with **Parkinson's disease** in order to guide the design of a **randomised clinical trial**.

# Design

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Single-group, blinded trial.

# Setting

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Rehabilitation Center of São Camilo University, Brazil.

# Participants

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- ✓ Seven patients (six males, one female)
- ✓ Parkinson's disease (Hoehn and Yahr Stages 2 and 3)

# Interventions

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- Fourteen 60-minute sessions
- Three times per week
- Four games of Kinect Adventures!™.



Space Pop



20,000 Leaks



Reflex Ridge



River Rush

# Main outcome measures

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## **Feasibility** outcome:

- patients' game performance

## **Safety** outcome:

- adverse events

## **Clinical** outcomes:

- 6-minutewalk test
- Balance Evaluation System Test
- Dynamic Gait Index
- Parkinson's Disease Questionnaire (PDQ-39).

# Results

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Table 1  
Patients' characteristics at baseline ( $n = 7$ ).

Characteristics	Mean (SD)
Age (years)	72 (9)
Hohen and Yahr stage	2.1 (0.6)
UPDRS	33.6 (9.8)
Mini Mental Examination (score)	26.3 (3.1)
Berg Balance Scale (score)	50.4 (3.1)
Gender	6 males, 1 female

# Results

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Table 2  
Performance of patients on games.

Primary feasibility outcome: score	First training session, mean (SD)	Last training session, mean (SD)	Mean difference (SD) [95% CI]
Space Pop	151 (36)	198 (29)	-47 (7) [-79 to -15]
20,000 Leaks	76 (29)	105 (12)	-30 (7) [-62 to 2]
Reflex Ridge	182 (37)	224 (22)	-42 (9) [-80 to -4]
River Rush	46 (18)	77 (22)	-32 (4) [-189 to -115]

# Results

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Table 3  
Performance of patients before and after training.

Scale	Before training mean (SD)	After training mean (SD)	Mean difference (SD) [95% CI]	ES	<i>n</i>
BESTest	74.1 (12.7)	88.9 (14.8)	14.1 (5.8) [-0.7 to 29.0]	1.1	10
DGI	19.8 (1.9)	22.3 (1.9)	2.4 (1.3) [0.4 to 4.5]	1.3	7
6MWT	399.3 (72.4)	429.5 (90.6)	30.1 (31.1) [-57.8 to 118.1]	0.3	48
PDQ-39	27.8 (8.3)	22.34 (7.7)	-5.5 (5.6) [-14.1 to 3.1]	0.7	15

BESTest, Balance Evaluation System Test; DGI, Dynamic Gait Index; 6MWT, 6-minute walk test; PDQ-39, Parkinson's Disease Questionnaire 39; UPDRS, Unified Parkinson's Disease Rating Scale; CI, confidence interval; SD, standard deviation; ES, effect size calculated for a paired *t*-test; *n*, sample size required to see a significant difference (assuming alpha of 0.05, power of 0.8 and 0.5 correlation between pre- and post-test values).



# Conclusion

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- ✓ Kinect-based training was **safe and feasible (Stages 2 and 3 Parkinson's disease)**:
  - ✓ in a **rehabilitation centre setting**;
  - ✓ under the **supervision** of, and received **initial instruction** from, a **physical therapist**.
- ✓ Participants **improved their scores** on all the trained games
- ✓ **No serious adverse events** occurred during training.
- ✓ **Improvements** were noted across **all domains of the ICF**:
  - **body functions** (cardiopulmonary endurance)
  - **activities** (balance and gait)
  - **participation** (quality of life)
    - *the results for the 6MWT and DGI were not clinically meaningful.*