

GAME-BASED MOBILITY TRAINING AND MOTIVATION OF SENIOR CITIZENS



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COFUNDING



PARTNERS



ARE SERIOUS GAMES PROMOTING MOBILITY AN ATTRACTIVE ALTERNATIVE TO CONVENTIONAL SELF-TRAINING FOR ELDERLY PEOPLE?

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Exercise 1:



Sitting upright, lift heels and tip toes alternatively.

Repetitions: 3 X 12



Exercise 4:



Touch each red spot with one foot.



Exercise 1:



Walk 5 meters on tip toes and back on heels.



Exercise 2:



Sitting upright, move



Exercise 5:



Arms crossed, step sideways on a line.



Exercise 2:



Exercise 3:



... with left foot
... ft.

Repetitions:
2 x 10 (for each side)



In step position, throw a ball from one hand to the other.



one foot



However, the compliance of elderly people to execute self-exercise programs varies considerably. These programs are often prematurely stopped.

(Phillips, Schneider et al., 2004; Burdea, 2002; Robertson et al., 2010; Rego et al., 2010).



Study objectives

- To determine whether elderly people in rehabilitation setting show **higher adherence** to self-exercise programs when using computer-based games than when performing conventional exercises.
- To analyze **mobility improvement** according to the mode of exercising.



Study design

- single blind, **randomized controlled trial** with two parallel-groups (conventional self-training exercises vs exergame self-training exercises).
- double-site conducted study



**Valens Rehabilitation Clinics
(Switzerland)**



**O+Berri Instituto Vasco de
Innovacion Sanitaria (Spain)**



Participants' inclusion

Inclusion Criteria

- + 65 years old.
- Ability to walk independently over 20 meters, with or without walking aids.
- Self-training prescribed by the doctor.
- Informed signed consent form.

Exclusion Criteria

- Cognitive impairment (MMSE score <26).
- Other limiting disorders hampering the practice of computer-based games.

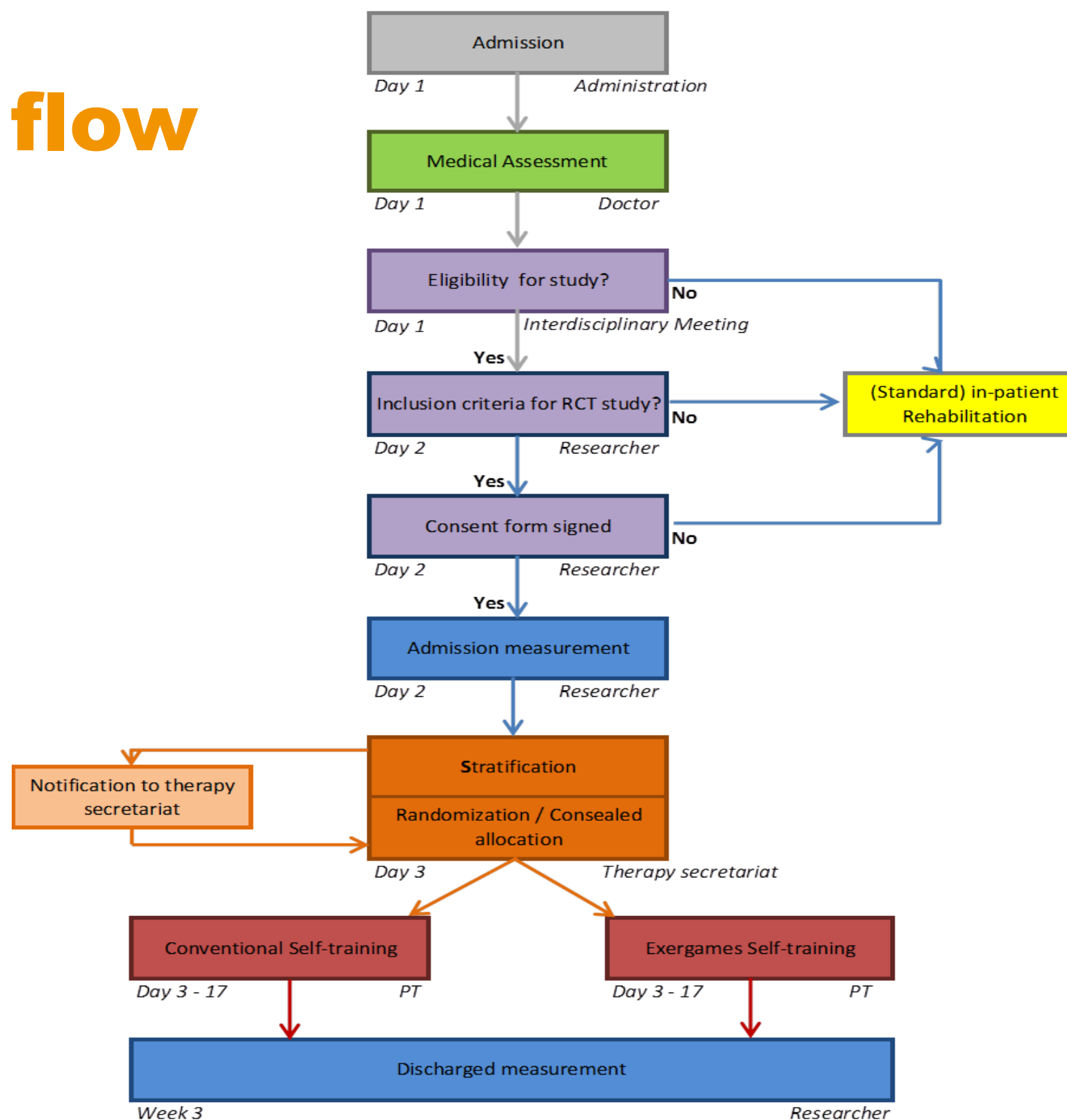


Bias reduction

- **Stratification:** participants are stratified in 4 groups according to their balance capacities (Berg Balance Score ≤ 44 or ≥ 45) and according to their computer skills (computer experience yes or no).
- **Randomization:** Within the strata, patients are randomly assigned to one of the 2 groups (intervention vs control) with Microsoft Excel.
- **Single blinding:** examiner is not informed of the group allocation. Independent dynamic mobility measurements.



Study flow





Outcome measures

1. Primary outcome:

Intensity of the performed self-training program is collected in a logbook during the whole intervention phase.

- frequency (quantity in number of sessions)
- duration (time in minutes) of self- training sessions

2. Secondary outcomes:

Mobility capacities are tested at pre- and post-intervention.

- The Berg Balance Scale (BBS)
- self-perceived Fall Efficacy Scale (FES-I)
- ActiGraph®



Measurement methods - 1

- pro forma logbook

Date of today:

How many times have you performed the self-training program today?

	Length (in minutes)	Comments, problems encountered
1. Self-training		
2. Self-training		
3. Self-training		
4. Self-training		

For how many minutes did you specifically go for walking today?

How many steps did you walk today according to the FitBit?

How many floors did you go up today according to the FitBit?

How motivated were you for the self-training today?

no motivation low motivation some motivation high motivation huge motivation

Did you have fun during the self-training program today?

no fun a little fun some fun lots of fun extremely fun



Measurement methods - 2

- **Berg Balance Scale** measures the objective balance capabilities of the patient. It also serves as baseline for the exercise level. It tests the ability to keep balance in various standard activities (Berg et al., 1992).
- **Falls Efficacy Scale** measures the subjective level of concern about falling during social and physical activities (Lomas-Vega et al., 2012; Dias et al., 2006).



Measurement methods - 3

- **ActiGraph® Mobility Tracker** assesses mobility by a tri-axial accelerometer measuring

Local Dynamic Stability (Wollerheim et al., 2010).

- It has been advocated as an early indicator of risk for falls

(Hilfiker et al., 2013).





Time flow of interventions

			Week 1					Week 2					
Entry	1 day after entry	2 days for instructions	1	2	3	4	5	6	7	8	9	10	End
Check inclusion criteria	Test 1	I 1 I 2	Serious games promoting mobility										Test 2
		I 1 I 2	Conventional self-training										
	T1		Logbook (from day 1 to day 10)										T2



Level 1 self-training

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Exercise 1:



Sitting upright, lift heels and tip toes alternatively.

Repetitions: 3 X 12



Exercise 2:



Sitting upright, move foot forwards and backwards alternatively („wipe“)

Repetitions: until tired



Exercise 3:



Sitting upright, reach with the right foot as far as possible to the right. The same with left foot to the left.

Repetitions: 2 x 10 (for each side)





Level 2 self-training



Exercise 4:



Touch each red spot with one foot.



Exercise 5:



Arms crossed, step sideways on a line.



Übung 6:



Arms crossed, do cross steps on a line.



Übung 7:



In step position, throw a ball from one hand to the other.



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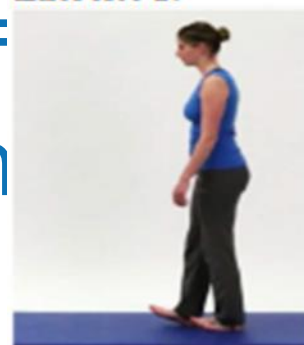
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Level 3 exercises



Exercise 1:



Walk 5 meters on tip toes and back on heels.



Exercise 2:



Walk on a line



Exercise 3:



Touch each red spot with one foot





Discussion

- To our knowledge this study is the first to compare conventional self-training programs with serious games among elderly persons.
- Results of this study will provide insight into the effectiveness of exergames promoting mobility and contribute to our understanding of the motivational potential of exergames in elderly people.



**Thank you very much
for your attention**

Questions?