Balance rehabilitation among an elderly population using Xbox Kinect : a pilot study

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INTRODUCTION

With the actual aging of the population, **falls** among the elderly has become a major concern for health care professionals. One major component of falls prevention is **balance training**, which could be achieved using the Xbox Kinect®. This video game platform uses motion sensors to capture participants' movements and to provide visual feedback. Although it is meant for recreational purposes, it **has potential to be a great home-based tool for balance rehabilitation**.

OBJECTIVES

1. Assess the efficacy of the Xbox Kinect as a single tool for balance training for the elderly
2. Measure the elderly's interest in this approach

METHODS

- **N** = Elderly (> 65 years old) with balance deficits admitted at the day hospital of the CSSS-IUGS
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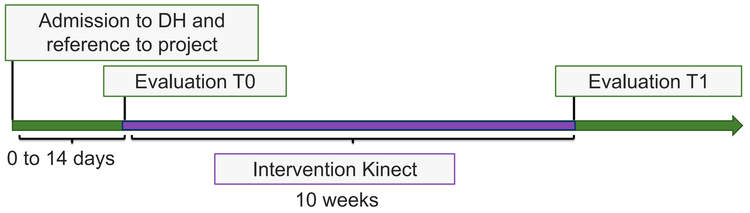
Inclusion criteria	Exclusion criteria
• BBS score 41-52/56 or if patient fell at least once during the last 6 months • 3MS score > 65/100	• Any physical or mental incapacity, or medical contraindication, limiting participation

- **Independent variable :** Kinect intervention
  10 weeks program, 2x/week, 30 min /session
- **Dependent variables**
  Berg Balance Scale (BBS): /56, 14 items
  Timed Up and Go (TUG): seconds
  Sit-to-Stand (STS): seconds, 5 repetitions
  Walking speed: meters/seconds, 5 meters
  ABC scale: %, 15 items
  Modified ÉSAT (satisfaction): /55, 3 scales



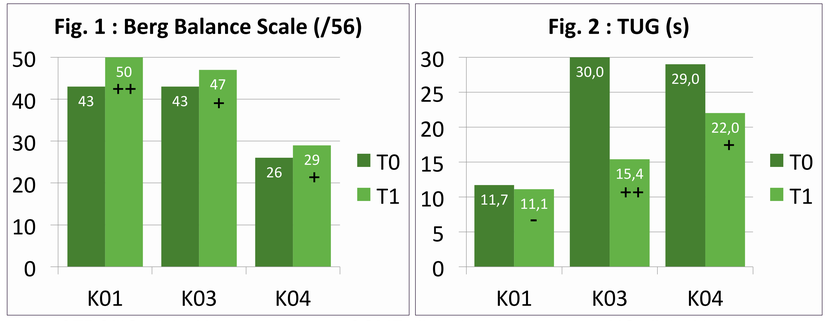
RESULTS

Table 1 : Sample description

	K01	K02	K03	K04
Sex	Female	Female	Female	Female
Age	82	78	80	92
Dominance	Right	Right	Right	Right
Living alone	Yes	Yes	Yes	Yes
# of falls in the last 6 months	3	4	4	1

No notable change was noted in STS, Walking Speed and ABC scale.

Figures 1 to 2 : Differences observed in clinical variables (T0-T1)



++ : STRONG clinical improvement, + : SOME clinical improvement, - : NO clinical improvement

Table 2 : Modified ESAT (Satisfaction) scores at T1

Modified ESAT (/55)					
		ESAT (technology, /15)	ESAT (intervention, /30)	ESAT (services, /10)	ESAT (total, /55)
K01	T1	15	28	10	53
K03		13	29	8	50
K04		13	24	8	45

DISCUSSION

- Using video games could be a useful tool to improve balance. These results are similar to other studies' results (Lai and al.)
- Our study showed small but relevant improvements in physical variables such as balance (BBS) and functional mobility (TUG).
- Other results showed less notable changes (STS, Walking Speed, ABC scale) which is not surprising because the Xbox Kinect® games do not work on those specifically.
- All patients showed great satisfaction towards the Kinect Intervention.
- Participant K04 showed less improvements, because of a lack of attendance and motivation to complete all the sessions and initial values were also low.

Limits:

- No control group, small sample size and potential selection bias
- Confounding bias: some patients also received occupational therapy consisting partially of balance physical therapy-like interventions
- Cognitive impairments were the most frequent reason why patients were not referred or included in the study

In a society where the access time to a rehabilitation program is in constant increase and with an aging population at risk of falling we can see the benefit in the future of a Xbox Kinect® home based program to improve balance.

REFERENCES

Lai, C. H. and al. (2013), GaitPosture,

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