

EFFECTS OF GAME BASED VIRTUAL REALITY ON HEALTH RELATED QUALITY OF LIFE IN CHRONIC STROKE PATIENTS: A RANDOMIZED CONTROLLED STUDY

an article critique by Monica Tay

CLINICAL BOTTOM LINE

The use of virtual reality using video capture of upper limb movements could be an effective, complimentary intervention in occupational therapy in the treatment of manual dexterity in patients with multiple sclerosis.

CITATION AND DOI NUMBER

Waliño-Paniagua, C.N., Gómez-Calero, C., Jiménez-Trujillo, M.I., Aguirre-Tejedor, L., Bermejo-Franco, A., Ortiz-Gutiérrez, R.M., & Cano-de-la-Cuerda, R. (2019). Effects of a game-based virtual reality video capture training program plus occupational therapy on manual dexterity in patients with multiple sclerosis: A randomized controlled trial. *Journal of Healthcare Engineering*, 10(3), 1-7. doi: 10.1155/2019/9780587

RCT=the golden standard!

RESEARCH OBJECTIVE, DESIGN TYPE, LEVEL OF EVIDENCE

- Design Type: Randomized controlled trial
- Single-blinded: this increases the strength of the study
- Level I evidence
- Objective: To examine and analyze the effects of an occupational therapy intervention combined with virtual reality on manual skills in people with multiple sclerosis, as compared with conventional occupational therapy approaches.

PARTICIPANT SELECTION

- Nonprobabilistic sampling of consecutive cases: this is a weakness of the study
- Inclusion criteria:
 - Diagnosis of MS with over two years evolution
 - Scores: Kurtzke Expanded Disability Status Scale (EDSS): 3.5-6; "Pyramidal Function" section of EDSS: ≤ 4 ; "Mental Functions" section of EDSS: ≤ 2 ; Mini-Mental Test: ≥ 24 ; Modified Ashworth scale – Muscle Tone: ≤ 2
 - With stable medical treatment during at least the 6 months prior to the intervention
 - Absence of cognitive decline; ability to understand instructions
- Exclusion criteria:
 - Diagnoses of another neurological illness or musculoskeletal disorder
 - Diagnoses of a cardiovascular, respiratory, or metabolic illness, or other conditions that may interfere with study
 - Having a flare-up or hospitalization in the last 2 months prior to or during the study
 - Receiving cycle of steroids or treatment with botulinum toxin in the 6 months prior to or during the study
 - Presence of visual disorders noncorrected by optical devices

Patients recruited from an MS patient association

MENU



PAUSE



PLAY



QUIT GAME

INTERVENTION AND CONTROL GROUPS

Control group: (n=8); 4 male and 4 female
Received conventional OT treatment: 20 sessions during which subjects performed activities for training manipulative and functional dexterity of the upper limb aimed at ADLs

Experimental group: (n=8); 4 male and 4 female
Received conventional OT treatment as well as 20 VR treatment sessions during which they performed exercises with video capture of the upper limb movements

Good ratios of males to females!

RESULTS

Intragroup Pre-Post Comparison:

Control: Statistically significant differences regarding: "writing with the nondominant hand" ($p=0.018$) and "picking up small common objects with the dominant hand" ($p=0.012$)

Experimental: Statistically significant differences regarding: "Picking up small common object with nondominant hand" and "number of correctly placed pegs with nondominant hand" ($p=0.036$); ($p=0.078$)

Intragroup Pre-Post Comparison:

No statistically significant differences found ($p>0.05$)

LIMITATIONS

- Some participants had changes in dominance due to their impairment; their results were not isolated and therefore may have skewed the data.
- The inclusion criteria "ability to understand instructions" seems to be subjective, as no criteria was included. This allows potential bias in the selection of participants.
- There was no script for the interventions; testing is a threat to the internal validity, and reactivity is a threat to external validity.
- The study was not incentivized, and 5 participants displayed noncompliance; mortality is a threat to the internal validity.
- It is unknown if the OTs administering the OT+VR treatments were trained in how to use the VR technology.
- The outcome measures may reflect compromised interrater reliability, as there was no mention of how they were timed; they were not recorded.

OUTCOMES

- Purdue Pegboard Test (PPT): assessment of fine manual dexterity, gross dexterity, and coordination
- Jebsen-Taylor Hand Function Test (JTT): determines the hand's functional capacity
- Grooved Pegboard Test (GPT): evaluates manipulative dexterity
- Descriptive analysis of the quantitative variables performed resulting in mean, standard deviation, and range
- Nonparametric: Wilcoxon and Mann-Whitney U tests used

CONCLUSIONS

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