PubMed Effectiveness of a low-cost virtual reality system for children with dev

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Effectiveness of a low-cost virtual reality system for children with developmental delay: a preliminary randomised single-blind controlled trial.

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Abstract

OBJECTIVES: Physical and occupational therapists have started to use the Nintendo Wii™ gaming **system** with adults and **children** as part of their regular treatment. Despite the growing use of the Wii and trend towards evidence-based practice, limited evidence is available on the **effectiveness** of **virtual reality** using the Wii for **children** with **developmental delay**. The purpose of this study was to determine the feasibility and **preliminary effectiveness** of a **low-cost** gaming **system** for young **children** with **developmental delay**.

STUDY DESIGN: Single-blind, **randomised controlled trial**.

PARTICIPANTS AND SETTING: Forty **children** with **developmental delay** (age 39 to 58 months) who attended a segregated or integrated preschool participated in this study. All **children**'s parents read and signed an informed consent form approved by the institutional review board. **Children** were assigned at random to an experimental (Wii) group (n=20) or a control group (n=20).

INTERVENTION: Two weekly sessions for 10 weeks using Nintendo Wii Sports™ and Nintendo Wii Fit™, including balance, strength training and aerobics games.

MAIN OUTCOME MEASURES: Participants were evaluated 1 week before and 1 week after the programme by a blinded investigator. Primary outcomes were gait speed, timed up and go test, single leg stance test, five-times-sit-to-stand test, timed up and down stairs test, 2-minute walk test and grip strength. The Gross Motor Function Measure (GMFM) was used to assess gross motor skills.

RESULTS: The two groups were homogenous regarding all parameters at baseline. The Wii training was feasible and enjoyable for those in the experimental group. There were no adverse effects or injuries reported over 267 training sessions. Comparison of groups following the intervention indicated that the experimental group showed significant improvements compared with the control group in single leg stance test {mean difference 1.03 [standard deviation (SD) 1.7], 95% confidence interval (CI) 0.2 to 1.9; P=0.017}, right grip strength [mean difference 1.11 (SD 1.84), 95% CI 0.15 to 2.06; P=0.024] and left grip strength [mean difference 0.90 (SD 1.67), 95% CI 0.03 to 1.77; P=0.043]. Although changes in other outcome measures were not significant between the study groups, there were trends towards greater improvements in the experimental group compared with the control group.

CONCLUSION: This study supports use of the Wii as a feasible, safe and potentially effective therapeutic tool to augment the rehabilitation of young **children** with **developmental delay**. The potential application of the Wii to increase the intensity of therapy or as a rehabilitation tool in **children**'s homes and rural settings is an area worthy of investigation. The promising results of this

study suggest that further studies are warranted to validate the potential benefits of a **low-cost** commercially available gaming **system** as a treatment strategy to supplement rehabilitation of **children** with disabilities.

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