

Virtual Reality for Stroke Rehabilitation

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The use of virtual reality programs specifically designed for stroke rehabilitation is increasing as is the use of commercial video game devices in clinical settings. This review is an update of our review published first in 2011 and then in 2015.¹

Objectives

The primary objective of this review was to examine the efficacy of virtual reality compared with an alternative intervention or no intervention on upper limb function and activity. Our secondary objective was to examine the efficacy on gait and balance, global motor function, cognitive function, activity limitation, participation restriction, quality of life, and adverse events.

Methods

We searched the Cochrane Stroke Group Trials Register (April 2017), CENTRAL, MEDLINE, Embase, and 7 additional databases as well as trials registries. We included randomized and quasi-randomized trials of virtual reality in adults after stroke. The primary outcome of interest was upper limb function and activity. Two review authors independently selected trials, extracted data, and assessed risk of bias with input from a third author to moderate disagreements when required.

Main Results

A total of 72 trials (with 2470 participants) were included in the review. This review includes 35 new studies in addition to the studies included in the previous version of this review (published in 2015). Most studies involved small sample sizes and interventions varied in terms of both the goals of treatment and the virtual reality program or device used. Although there are a relatively large number of randomized controlled trials, the evidence remains mostly low quality when rated using the GRADE system because of the risk of bias in the studies and inconsistent findings between studies. Control groups in the included studies usually received either no therapy or conventional therapy which was provided by an occupational therapist or physiotherapist. Primary outcome: when virtual reality was compared with the same dose

of conventional therapy the results were not statistically significant for upper limb function (standardized mean difference, 0.07; 95% confidence interval, -0.05–0.20; 22 studies, 1038 participants, low-quality evidence). However, when virtual reality was used to supplement usual care (thereby providing participants in the intervention group with a higher dose of therapy), there was a statistically significant difference between groups (standardized mean difference, 0.49; 95% confidence interval, 0.21–0.77, 10 studies, 210 participants, low-quality evidence). Secondary outcomes: when compared with conventional therapy approaches there were no statistically significant effects for gait speed or balance. Results were statistically significant for the activities of daily living outcome (standardized mean difference, 0.25; 95% confidence interval, 0.06–0.43; 10 studies, 466 participants, moderate-quality evidence); however, we were unable to pool results for cognitive function, participation restriction, or quality of life. There were few adverse events experienced in the 23 studies which reported on this and adverse events were relatively mild. There was a trend suggesting that customized virtual reality programs were preferable to commercial game products, however, these findings were not statistically significant (Figure).

Implications for Practice

We found that virtual reality therapy may not be more effective than conventional therapy for upper limb outcomes, but there is low-quality evidence that virtual reality may be used to improve outcomes in the absence of other therapy interventions after stroke. Clinicians who currently have access to virtual reality programs should be reassured that their use as part of a comprehensive rehabilitation program seems reasonable, taking into account the patient's goals, abilities, and preferences.

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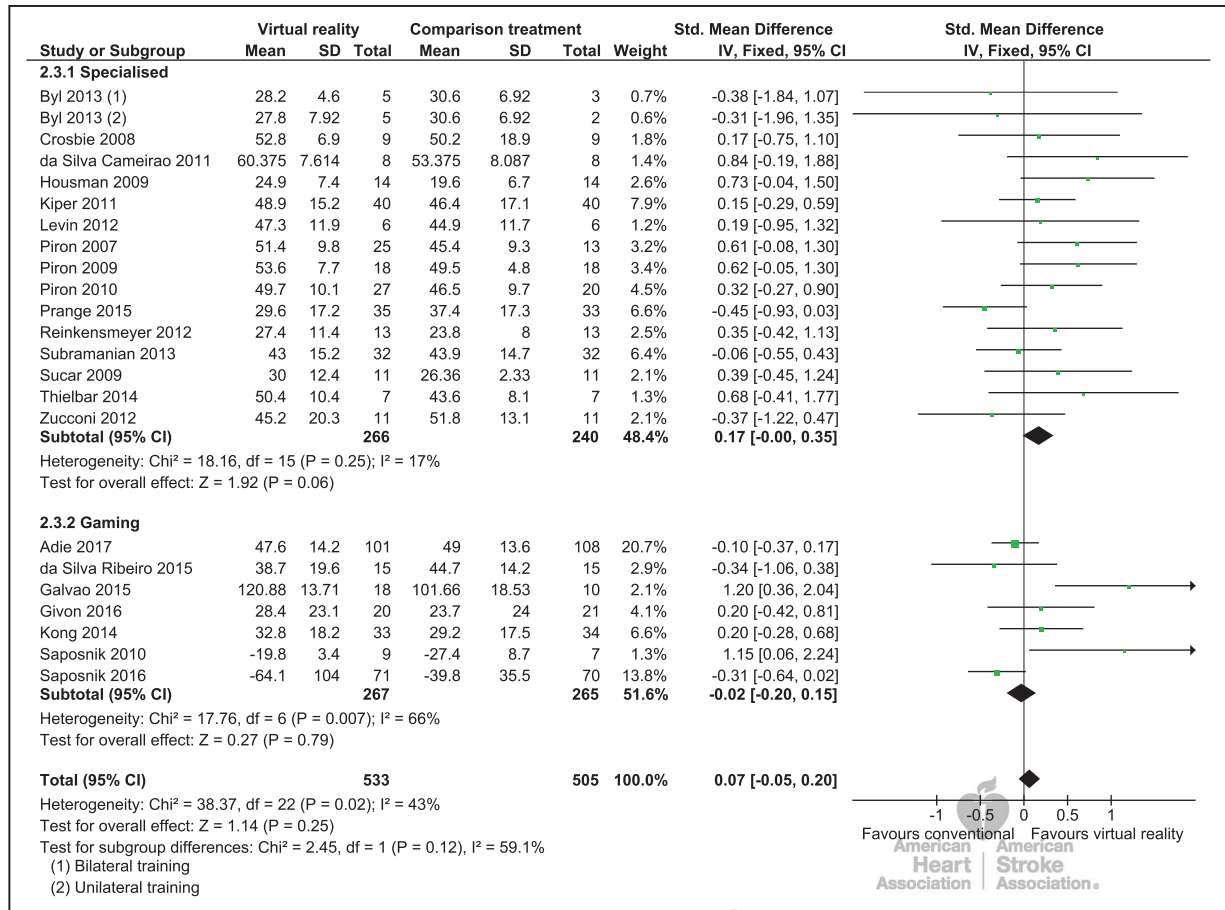


Figure. Virtual reality versus conventional therapy: upper limb function: subgroup analyses, specialized, or gaming program. CI indicates confidence interval.

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None.

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