Introduction

Working memory (WM) is the cognitive ability to retain limited information for a short time while one has to manipulate its use. It is closely associated with attention and is required for updating information, for thinking and problem-solving, and is needed in most mental activities.

WM impairment is one of the most common symptoms after acquired brain injury. The patients report the difficulties as impaired concentration, “losing the thread”, and “not being good at juggling many balls”. The problems affect returning to work, study results, and daily functioning.

From a clinical perspective and from a theoretical point of view it is important to study whether it is possible to train WM in patients whose WM impairment is pronounced and one of a few remaining symptoms after acquired brain injury.

Purpose

Study short- and long-term transfer effects of a computerized WM training program for patients suffering from working memory deficits after acquired brain injury.

Research design

A controlled experimental study with a crossover design.

Subjects

A consecutive sample of 21 subjects suffering from acquired brain injury, 10 men (48%) and 11 women (52%). Mean age 43.2 years, time since injury/illness onset 37 months, education 12.7 years. The subjects were randomly selected into two groups where one group served as controls to control for test-retest effects and for spontaneous cognitive improvement.

Procedure

All subjects trained daily for five weeks in the computer WM task program QM*. They were followed-up at four and 20 weeks after the training by verbal and visual neuropsychological WM tests, 20 weeks after training by self-rated WM related activities, health-related quality of life and overall health.

Results

- No training effect from test-retesting or spontaneous cognitive improvement over time
- Significant improvement in the trained Working Memory (QM) tasks (Table 1)
- Significant improvements in neuropsychological WM-test results at four and twenty weeks after training compared to baseline (Table 2)
- Improvement in the subjects’ self-rated WM related activities, health-related quality of life and overall health.
- Rated health-related quality of life did not change twenty weeks after training (Table 3)
- Rated overall health increased twenty weeks after training (Table 3)

Conclusions

Structured and intense computerized Working Memory training with QM improves subjects’ cognitive functioning as measured by neuropsychological WM-demanding tests, rated WM-related activities (occupational performance, satisfaction with performance) and overall health.

The training probably has an impact on the rehabilitation outcome, returning to work, as well as on daily activities for individuals with verified WM impairments.