Origins of RehaCom®

In 1988 researchers in Germany were developing computerised systems for the diagnosis of the cognitive impairments that so often follow a stroke or TBI (traumatic brain injury). This was in the early days of personal computing as well as the first attempt to apply this type of technology to cognitive rehabilitation. Research in the area of computer-aided diagnosis led to the desire to create a complete therapy tool to be able to treat cognitive impairments with computer technology. This is how RehaCom® started.

In 1992, RehaCom® became reality as a product with the first clinically tried and tested training modules. It became the foundation for the company Hasomed GmbH which has now grown to employ almost a hundred people. Today, RehaCom® is accepted as Europe's leading system for computerised cognitive rehabilitation and millions of patients around the world have used it. It has evolved with the collaboration of therapists and many scientific experts. RehaCom® has continued to evolve over the years as its effectiveness has been demonstrated in all rehabilitation phases.

More and more professionals are convinced that RehaCom® can help them provide for patients who need cognitive training; whether those patients use RehaCom® in a clinic, private practice or at home, we believe you will be impressed with the results.

RehaCom® Today

RehaCom has evolved in Germany over 25 years with input from Neuropsychologists, Therapists and Computer Scientists to the point where it is used by 95% of clinics. It is unique in that the cognitive toolset it offers is:

- precisely aligned with specific cognitive deficits - 26 training modules organised in groups such as attention training, executive function, memory, visual field and visuo-motor co-ordination training
- designed to be appropriate for both acute and long term use because of the vast range of challenge presented by the software - from very simple to very challenging.
- training material automatically adapts to the user’s level of performance and can be fine tuned by the therapist - so the task presented is never too difficult nor too easy
- “screening” modules can detect impairments and suggest relevant training modules
- can be delivered face to face or via internet supervision for home-based training
• supports most languages (more than 21)
• self-documenting - exhaustive details of user performance are maintained
• inexpensive

In deploying RehaCom® the developers have always believed that a therapist should always lead the therapy. He or she works with the patient as always and offers structure, motivation and feedback on progress - **using RehaCom® as the toolkit for the job**. As with any tool, the very least the user can expect is greater efficiency and effectiveness in carrying out the task.

For clients RehaCom® can be challenging and rewarding. For the best possible effect sustained effort is necessary. That’s the reason why there is ideally always a therapist involved.

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**What has driven the adoption of RehaCom®**

Healthcare delivery challenges and the growing evidence in support of cognitive rehabilitation have contributed to the adoption of RehaCom® in many countries. This adoption commenced with German speaking countries but is no longer restricted to these.

The challenges faced by many rehabilitation centres are typically

- **Financial** - budgets are tight
- **Growing demand** - the number of incidents of acquired brain injury are increasing and it is necessary to somehow treat more patients than ever before
- **Availability of staff** - therapists and neuropsychologists are essential to the delivery of cognitive rehabilitation but are not growing in step with the increasing demand for services.
- **Complexity** - the spectrum of conditions that must be managed is often very wide and the severity of cognitive disorder is also highly varied. Consequently the therapist’s role is varied complex and demanding.

Rehabilitation is in great need of tools that can make therapist’s jobs more efficient, effective and less stressful. In the area of cognitive rehabilitation, RehaCom® is such a tool.

**RehaCom is not the Answer to cognitive rehabilitation it is an Enabler**

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**Does RehaCom® work?**

Initial questions about RehaCom® are usually based on the strength of the research evidence base and upon whether improvements in training performance can convert into “real world” gains. Let’s first consider what’s in the intervention “armoury”.

In general the intervention types we have available to bring about positive change are as follows: (Cicerone 2000)

- **Restitution** - to reinforce, strengthen or re-establish previously learned patterns of behaviour
- **Internal compensation** - to establish new patterns of cognitive activity through compensatory cognitive mechanisms for impaired neurological systems
• **External compensation** - establishing new patterns of activity through the use of external aids

• **Adaptation** - enabling patients to adapt to their disability in order to improve their overall level of functioning and quality of life.

Of course RehaCom® does not impact on all the positive threads of intervention types, but neither does anything else we have available. Surely it’s the therapist’s role to apply a range of interventions based on the best available evidence and clinical judgment.

It appears that historical approaches to the management of cognitive deficits differed between the UK and Germany. For example, in Germany, clinical practice accepted the premise that restitution was often possible whilst in the UK greater weight was placed on compensation strategies. In effect, therapy in Germany doesn’t rely on one approach any more than therapists in the UK would.

**RehaCom® is an interventional assistant that is designed to contribute to the achievement of functional change in the user.**

Can this be proven? Well this is very hard in a formal sense because there are so many factors that make research a challenge. For example, we don’t fully know how the "dose" impacts on efficacy - but then we don’t know this in other types of intervention either.

Certainly clinical experience over more than 25 years shows RehaCom® to be an **effective enabler of cognitive rehabilitation**. Of course it is not a "silver bullet" and should be considered and used as a tool that is deployed to create positive change.

*Cicerone, KD et al 2011*


*Arch Phys med Rehabil 2011: 92: 519-30*

*Cicerone, KD et al 2000*

Evidence based cognitive rehabilitation: recommendations for clinical practice.

*Arch Phys med Rehabil 2000: 81: 1596-615*

This second review by Cicerone et al offers a number of evidence based recommendations for cognitive rehabilitation (p 1610)

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**The General Issues of Determining Effectiveness**

Most categories of human disorder including acquired brain injury are not homogenous in their origin, presentation or course of progression. This alone makes the issue of determining the effectiveness of any therapeutic intervention extremely difficult.

To meaningfully draw a connection between “a cause” (the therapeutic intervention) and “the effect” (the benefit or outcome) we need to minimise the influence of other confounding factors. The heterogeneous nature of brain injured persons, even with the same clinical “label”, means that finding a robust trial design is difficult. Most rehabilitation trials of a physical intervention will be “single blinded” because the patient will experience the assignment - it would be impossible, for example, to deliver sham training with RehaCom®.

**RehaCom® is a tool to aid with cognitive training - it is not a replacement for a therapist.**
Do we know everything about how this tool should be used? Of course not.

In a general sense, principles of motor learning to aid training in rehabilitation are much discussed but no one has complete understanding of these matters. For example, task oriented therapy and providing greater intensity and duration of practice and feedback are often promoted as useful steps, however we really don’t know the optimal strategy for make such changes in an intervention.

In addition, the context in which therapy is provided is likely to matter but this is not well understood - for example, home training versus training in a clinic is possible with RehaCom® but we do not really know whether one approach is better than another to improve community-biased activities.

**What about plasticity?** This term is widely used but in itself is not a meaningful basis for the deployment of an intervention. If a behaviour becomes more skilled, learning and alterations in synaptic efficacy are certainly likely. Brain - behavioural relationships remain difficult to define with any certainty. Researchers would say that plasticity adaptations are not automatically surrogates for rehabilitation efficacy.

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**Memory training**

Memory retraining is an area that until recently had less support due to lack of large trial data. The idea that memory can be improved through some form of mental exercise or practice underlies a number of cognitive retraining approaches to memory rehabilitation. In the domain of working memory there is evidence that computerised training can increase working memory capacity in both healthy volunteers (adults and children) with ADHD and in acquired brain injury. The key issue for studies of cognitive training is whether there is evidence of transfer of training to both close and more distant forms of task than those used as part of the training. Evidence of the transfer of this training is mixed, but in some well-designed studies there is evidence of such transfer to other working memory tasks and to reasoning tasks.

The intensity of training that has produced positive effects has tended to be 30-40 minutes per day, five days per week for five weeks (15 hours)

In relation to long term memory there has been less support for memory training techniques bringing about changes in underlying memory processes or impacting upon everyday remembering. Barbara Wilson, in relation to a wide population of brain injured persons long suggested that “memory training” could not be recommended as appropriate clinical practice. Jon Evans¹ has suggested that the issue may be that there have been fewer large scale, well-designed studies of memory retraining and thus the preference for compensation strategies may be based on the absence of evidence for an effect rather than evidence of absence of an effect.

**A Comment on Evidence and Effectiveness**

“Half of all diseases can be considered untreatable and for the other half the drugs only work half the time and with major side-effects - imagine a car that starts only half the time and whose brakes often don't work.”

Severin Schwan, CEO of Roche in “Roche Digests Genentech: Back to the Lab” writing in the Economist, December 10, 2009

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¹ Textbook of Neural Repair and Rehabilitation, Vol 2, Section 6 p478 “Memory dysfunction”
RehaCom training modules

ATTENTION TRAINING GROUP
- NEW - Alertness Training (ALTA)
- Acoustic Responsiveness (AKRE)
- Reaction Behaviour (REVE)
- Ability to Respond (REA1)
- Vigilance (VIGI)
- Spatial Operations (RAUM)
- Two-Dimensional Operations (VRO1)
- Spatial Operations 3D (RO3D)
- Visuo-Constructive Ability (KONS)
- Attention and Concentration (AUFM)
- Divided Attention (GEAU)
- Divided Attention 2 (GEA2)

EXECUTIVE FUNCTIONS
- Shopping (EINK)
- Plan a Holiday (PLAN)
- Logical Reasoning (LODE)
- Calculating (CALC)

MEMORY TRAINING
- Working Memory (WOME)
- Topological Memory (MEM0)
- Physiognomic Memory (GESI)
- Memory for Words (WORT)
- Figural Memory (BILD)
- Verbal Memory (VERB)

TRAINING OF VISUAL FIELD
- Saccadic Training (SAKA)
- Exploration (EXPL)
- Overview and Reading (ZIHL)
- Visual Restitution Training (RESE)

VISUO-MOTORIC COORDINATION
- Visuo-Motoric Coordination (WISO)
Literature by Application Area

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Stroke/Visual Field


BACKGROUND: Homonymous visual field defects (HVFDs) are one of the most common consequences of stroke. Compensatory training encourages affected individuals to develop more efficient eye movements to improve function. However, training is typically supervised, which can be time consuming and costly.

OBJECTIVE: To develop and evaluate the efficacy and feasibility of an unsupervised reading and exploration computer training for individuals with HVFDs.

METHODS: Seventy individuals with chronic HVFDs were randomly assigned to 1 of 2 groups: intervention or control. The former received 35 hours of reading and exploration training, and the latter received 35 hours of control training. Visual and attentional abilities were assessed before and after training using perimetry, visual search, reading, activities of daily living, the Test of Everyday Attention, and a Sustained Attention to Response task.

RESULTS: Eighteen individuals failed to complete the training; analyses were conducted on the remaining 28 intervention and 24 control group participants. Individuals in the intervention group demonstrated significant improvements in the primary outcomes of exploration (12.87%, 95% confidence interval [CI] = 8.44% to 17.30%) and reading (18.45%, 95% CI = 9.93% to 26.97%), which were significantly greater than those observed following the control intervention (exploration = 4.80%, 95% CI = 0.09% to 9.51%; reading = 1.95%, 95% CI = -4.78% to 8.68%). Participants in the intervention group also reported secondary subjective improvements, although these were not matched by objective gains in tasks simulating activities of daily living. CONCLUSIONS: Home-based compensatory training is an inexpensive accessible rehabilitation option for individuals with HVFDs, which can result in objective benefits in searching and reading, as well as improving quality of life.

2014O3: 10.1177/1545968313503219


*Frontiers in systems neuroscience. 2014; 8*

Symptoms of visuospatial neglect occur frequently after unilateral brain damage. Neglect hampers rehabilitation progress and is associated with reduced quality of life. However, existing treatment methods show limited efficacy. Transcranial direct current stimulation (tDCS) is a neuromodulatory technique, which can be used to increase or decrease brain excitability. Its combination with conventional neglect therapy may enhance treatment efficacy. A 72-year-old male with a subacute ischemic stroke of the right posterior cerebral artery suffering from visuospatial neglect, hemianopia, and hemiparesis was treated with biparietal tDCS and cognitive neglect therapy in a double-blind, sham-controlled single-
case study. Four weeks of daily treatment sessions (5 days per week, 30 min) were started 26 days post-stroke. During week 1 and 4 the patient received conventional neglect therapy, during week 2, conventional neglect therapy was combined once with sham and once with real biparietal tDCS. Week 3 consisted of daily sessions of real biparietal tDCS (1 mA, 20 min) combined with neglect therapy. Outcome measures were assessed before, immediately after, as well as 1 week and 3 months after the end of treatment. They included subtests of the Test for Attentional Performance (TAP): covert attention (main outcome), alertness, visual field; the Neglect-Test (NET): line bisection, cancelation, copying; and activities of daily living (ADL). After real stimulation, covert attention allocation toward left-sided invalid stimuli was significantly improved, and line bisection and copying improved qualitatively as compared to sham stimulation. ADL were only improved at the 3-month follow-up. This single-case study demonstrates for the first time that combined application of tDCS and cognitive training may enhance training-induced improvements in measures of visuospatial neglect and is applicable in a clinical context.

2014

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4179329/


BACKGROUND AND PURPOSE: Compensatory and restorative treatments have been developed to improve visual field defects after stroke. However, no controlled trials have compared these interventions with standard occupational therapy (OT).

METHODS: A total of 45 stroke participants with visual field defect admitted for inpatient rehabilitation were randomized to restorative computerized training (RT) using computer-based stimulation of border areas of their visual field defects or to a computer-based compensatory therapy (CT) teaching a visual search strategy. OT, in which different compensation strategies were used to train for activities of daily living, served as standard treatment for the active control group. Each treatment group received 15 single sessions of 30 minutes distributed over 3 weeks. The primary outcome measures were visual field expansion for RT, visual search performance for CT, and reading performance for both treatments. Visual conjunction search, alertness, and the Barthel Index were secondary outcomes.

RESULTS: Compared with OT, CT resulted in a better visual search performance, and RT did not result in a larger expansion of the visual field. Intragroup pre-post comparisons demonstrated that CT improved all defined outcome parameters and RT several, whereas OT only improved one. CONCLUSIONS: CT improved functional deficits after visual field loss compared with standard OT and may be the intervention of choice during inpatient rehabilitation. A larger trial that includes lesion location in the analysis is recommended.

2012OS: 10.1177/1545968311425927


2015-03-06 Page 8 of 128


The aim of this randomised, double-blind study was to investigate the therapeutic effectiveness of left-hand electrical stimulation for patients with post-stroke left visuo-spatial neglect.

Utilised the RehaCom® system.

2009O3: 10.1080/09602010802268856
http://www.tandfonline.com/doi/abs/10.1080/09602010802268856

5. Schinzel J, Schwarzlose L, Dietze H et al. Efficacy of vision restoration therapy after optic neuritis (VISION study):

*Study protocol for a randomized controlled trial*. Trials. 2012; 13: 94.

Background: Optic neuritis is a frequent manifestation of multiple sclerosis. Visual deficits range from a minor impairment of visual functions through to complete loss of vision. Although many patients recover almost completely, roughly 35% of patients remain visually impaired for years, and therapeutic options for those patients hardly exist. Vision restoration therapy is a software-based visual training program that has been shown to improve visual deficits after pre- and postchiasmatic injury. The aim of this pilot study is to evaluate whether residual visual deficits after past or recent optic neuritis can be reduced by means of vision restoration therapy.

Methods/design: A randomized, controlled, patient- and observer-blinded clinical pilot study (VISION study) was designed to evaluate the efficacy of vision restoration therapy in optic neuritis patients. Eighty patients with a residual visual deficit after optic neuritis (visual acuity ≤0.7 and/or scotoma) will be stratified according to the time of optic neuritis onset (manifestation more than 12 months ago (40 patients, fixed deficit) versus manifestation 2 to 6 months ago (40 patients, recent optic neuritis)), and randomized into vision restoration therapy arm or saccadic training arm (control intervention). Patients will be instructed to complete a computer-based visual training for approximately 30 minutes each day for a period of 6 months.

Saccadic training with RehaCom®

2012O1:
http://www.biomedcentral.com/content/pdf/1745-6215-13-94.pdf
**ADHD**

1. Amann F, Frölich J, Breuer D, Banaschewski... T. Evaluation of a computer-based neuropsychological training in children with Attention-Deficit Hyperactivity Disorder (ADHD).

*NeuroRehabilitation. 2013; 32, No 3: 555-562.*

**BACKGROUND:** We report the effects of a computer-based neuropsychological training in children with Attention-Deficit Hyperactivity Disorder (ADHD). We hypothesized that a specific training focusing on attentional dysfunction would result in an improvement of inattention, observable in test performance, behavior and performance during experimental school lessons and in parent and teacher ratings of the related core symptom.

**METHOD:** We chose a within-subject-control-design with a 4 week baseline period and subsequent 12 to 15 weekly training-sessions. 30 children (6 to 13 years old) with a diagnosis of ADHD (ICD 10: F 90.0) and no other comorbidities participated in the study.

**RESULTS:** The training revealed significant improvement in training parameters of the neuropsychological training and in the symptoms of inattention and deportment as rated during experimental school lessons. However, generalization of training effects as measured by parent and teacher ratings was not detected.

**CONCLUSIONS:** We conclude that neuropsychological training could be helpful as one adjunct module in the complex treatment of ADHD but to prove clinical value, similar training programs must focus more strongly on individually existing neuropsychological deficits. Training programs should be more intensive and should eventually be combined with home based training access.

201310.3233/NRE-130877


*Neuropsychology. 2009; 23: 40.*

Traumatic brain injury (TBI) frequently affects both the basic and the superordinate components of attention; deficits vary according to patient age. This study evaluated the efficacy of a specific remediation intervention for attention. Sixty-five TBI patients (aged 6?18 years) with attention deficit were assessed at baseline and at 1-year follow-up: 40 patients received attention-specific neuropsychological training for 6 months, and the control group comprised 25 patients. Cognitive assessment included a Wechsler Intelligence Scale (e.g., A. Orsini, 1993) and the Continuous Performance Test II (CPT II; C. K. Conners, 2000). The Vineland Adaptive Behavior Scales (VABS; S. Sparrow, D. Balla & D. V. Cicchetti, 1984) was administered to assess the treatment’s ecological validity. At baseline, all patients presented with a mild intellectual disability and pathological scores on the CPT II. At follow-up, significant differences were found between the 2 groups on the CPT II and VABS: The clinical group improved more than the control group. Specific remediation training for attention, including a combination of a process-specific approach and
metacognitive strategies, significantly improved attention performance. Improvement in attention skills also affected adaptive skills positively. (PsycINFO Database Record (c) 2012 APA, all rights reserved)

Tasks on RehaCom® and Attention and Concentration. Computer tasks included RehaCom® for patients aged 8–18 years and Attention and Concentration (Di Nuovo, 1992) for patients aged 6–8 years.

2009O1:
http://psycnet.apa.org/journals/neu/23/1/40/


Background: Pharmacotherapy using stimulants has emerged as a primary mode of treatment for attention deficit hyperactivity disorder (ADHD). However, these stimulants often do not ameliorate all the problems (especially attentional problems) that these children experience. Considering this, the use of non-pharmacological treatments that are designed to improve attention and other cognitive abilities need to be empirically investigated.

Aim and Objectives: To study the efficacy of cognitive retraining (CR) techniques in management of ADHD. Materials and Methods: Pre and post-intervention study design was used with 20 children, ages 7 to 11 years, diagnosed with (ADHD). Treatment and wait list control groups (n=10) were matched for age, sex, and medication status. Both groups completed pre- and post-intervention assessment batteries that included psychometric measures of sustained attention, selective attention (Digit Vigilance task), focused attention (Colour Trails Test), divided attention (Triads Test), a measure of academic efficiency (Grade Level Assessment Device, GLAD), and behavioral rating scales (ADHDT). Intervention comprised of 36 hours of cognitive retraining activities aimed to enhance selective, sustained and divided attention. SPSS version17.0 was used for descriptive and analytical statistical analysis.

Results: The mean change from baseline for sustained attention (errors), focused attention and selective attention was significantly greater in the CR group than in wait list control group (p<0.05). The mean change from baseline was significant higher for divided attention in the CR group than in wait list control group (p<0.01). Post intervention, the mean academic performance of the subjects of CR group was found to be higher than in the wait list control group.

Conclusion: Cognitive retraining aimed at enhancing attention carries the potential of enhancing attention of children with ADHD along with improving their academic performance. It also reduces the severity of reported behavioral manifestations of inattention–impulsivity (German J Psychiatry 2011; 14(2): 55-59).

2011O2:
http://www.gjpsy.uni-goettingen.de/gjp-article-rajender.pdf

KEY POINTS

Cognitive training approaches, such as working memory training (WMT), are being increasingly used to target both the symptoms and the underlying neuropsychological deficits in patients with attention-deficit/hyperactivity disorder (ADHD). The rationale of these approaches is both biologically plausible and supported by basic cognitive neuroscience.

There are now 14 randomized controlled trials (RCTs) with ADHD outcomes (8 published in the past 2 years or so).

At present, given the inconsistency of extant findings, more evidence from well-blinded trials is required before cognitive training can be supported as a frontline treatment of ADHD.

Evidence in relation to improved neuropsychological function maybe more positive, but additional research is required.

Future research should focus on ways to improve the content and implementation, and increase the scope, of these potentially important therapeutic approaches.

Utilised RehaCom® Attention, memory, executive functions, visuomotor

Multiple Sclerosis


   Background: There is controversial information on the efficacy of cognitive rehabilitation in multiple sclerosis (MS).

   Objective: The objective of this paper is to test a home-based computerized program for retraining attention dysfunction in MS.

   Methods: Relapsing-remitting patients who failed > 2 tests of attention on an extensive neuropsychological battery were randomized to specific or nonspecific computerized training (ST, n-ST), in one-hour sessions, twice a week for three months. Outcome measures included neuropsychological assessment, depression, fatigue, everyday activities and a visual analogue scale assessing attentive performance (VAS). Assessments were repeated after the interventions and after a further three months. Statistical analysis included the analysis of variance (ANOVA) for repeated measures.

   Results: Eighty-eight out of 102 randomized patients completed the study (69 women, age 40.9 ± 11.5 years, disease duration 13.0 ± 8.7 years, Expanded Disability Status Scale score 2.7 ± 1.5). Fifty-five patients were randomized to ST, 33 to n-ST. A benefit of the ST was observed on the Paced Auditory Serial Addition Test (p < 0.002). However, patient self-report did not reveal differences between ST and n-ST patient groups.

   Conclusion: Although our program trained different attention components, we could detect some improvements exclusively on tasks of sustained attention. Moreover, patient self-perceived results may be independent of the training program.

   2014O1: 10.1177/1352458513501571
   http://msj.sagepub.com/content/20/1/91.short


   BACKGROUND: We report the effects of a computer-based neuropsychological training in children with Attention-Deficit Hyperactivity Disorder (ADHD). We hypothesized that a specific training focusing on attentional dysfunction would result in an improvement of inattention, observable in test performance, behavior and performance during experimental school lessons and in parent and teacher ratings of the related core symptom.

   METHOD: We chose a within-subject-control-design with a 4 week baseline period and subsequent 12 to 15 weekly training-sessions. 30 children (6 to 13 years old) with a diagnosis of ADHD (ICD 10: F 90.0) and no other comorbidities participated in the study.
RESULTS: The training revealed significant improvement in training parameters of the neuropsychological training and in the symptoms of inattention and deportment as rated during experimental school lessons. However, generalization of training effects as measured by parent and teacher ratings was not detected.

CONCLUSIONS: We conclude that neuropsychological training could be helpful as one adjunct module in the complex treatment of ADHD but to prove clinical value, similar training programs must focus more strongly on individually existing neuropsychological deficits. Training programs should be more intensive and should eventually be combined with home based training access.

201310.3233/NRE-130877


In contrast to previous studies based on the use of the RehaCom® software we applied a five-session protocol, centered in “logical thinking”, “attention and concentration”, “reaction behaviour”, “plan a day”, and “divided attention”; this more extended programme probably allowed a better training of attentive functions and processing speed.

2015O1: 10.1007/s00415-014-7528-z


Background. Although a growing body of evidence has highlighted the role of cognitive rehabilitation (CR) in the management of cognitive dysfunctions in multiple sclerosis (MS), there is still no evidence for a validated therapeutic approach. Objective. We propose a new therapeutic strategy characterized by a computer-based intensive attention training program in MS patients with predominant attention deficits. We aim to investigate the effectiveness of our rehabilitation procedure, tailored for those with impaired abilities, using functional magnetic resonance imaging (fMRI). Methods. Using a doubleblind randomized controlled study, we enrolled 12 MS patients, who underwent a CR program (experimental group), and 11 age–gender–matched MS patients, who underwent a placebo intervention (control group). fMRI was recorded during the execution of a cognitive task broadly used for assessing attention abilities in MS patients (paced visual serial addition test). Results. Significant effects were detected both at a phenotypic and at an intermediate phenotypic level. After CR, the experimental group, in comparison with
the control group, showed a specific enhanced performance in attention abilities as assessed by the Stroop task with an effect size of 0.88, which was associated with increased activity in the posterior cerebellar lobule and in the superior parietal lobule. Conclusions. Our study demonstrates that intensive CR tailored for those with impaired abilities affects neural plasticity and improves some aspects of cognitive deficits in MS patients. The reported neurophysiological and behavioral effects corroborate the benefits of our therapeutic approach, which might have a reliable application in the clinical management of cognitive deficits in MS.

2013O4: 10.1177/1545968312465194


Purpose
To evaluate brain changes after cognitive rehabilitation in patients with clinically stable relapsing-remitting (RR) multiple sclerosis (MS) by using neuropsychologic assessment and structural and functional magnetic resonance (MR) imaging techniques.

Materials and Methods
The study was conducted with approval of the involved institutional review boards. Written informed consent was obtained from each participant. Twenty patients with RR MS and cognitive deficits at baseline were randomly assigned to undergo treatment (n = 10), which entailed computer-assisted cognitive rehabilitation of attention and information processing and executive functions, or to serve as a control subjects (n = 10) without cognitive rehabilitation. All patients underwent a standardized neuropsychologic assessment and MR imaging at baseline and after 12 weeks. Changes in gray matter (GM) volumes on three-dimensional T1-weighted images and changes in normal-appearing white matter (NAWM) architecture on diffusion-weighted images were assessed. Changes in functional activity at functional MR imaging during the Stroop task and at rest were also investigated by using linear models.

Results
As compared with their performance at baseline, the patients in the treatment group improved at tests of attention and information processing and executive functions. Neither structural modifications to GM volume nor modifications to NAWM architecture were detected at follow-up in both groups. Functional MR imaging demonstrated modifications of the activity of the posterior cingulate cortex (PCC)/precuneus and dorsolateral prefrontal cortex (PFC) during the Stroop task, as well as modifications of the activity of the anterior cingulum, PCC and/or precuneus, left dorsolateral PFC, and right inferior parietal lobule at rest in the treatment group compared with the control group. In the treatment group, functional MR imaging changes were correlated with cognitive improvement (P <.0001 to.01).

Conclusion
Rehabilitation of attention and information processing and executive functions in RR MS may be effected through enhanced recruitment of brain networks subserving the trained functions.

On an individual basis, treatment group patients underwent intensive computer-assisted cognitive rehabilitation of attention, information processing, and executive functions for 12 weeks, performed by using a software that is part of the RehaCom® package.

2012O3: 10.1148/radiol.11111299
http://pubs.rsna.org/doi/full/10.1148/radiol.11111299


*Mult Scler.* 2010

We evaluated a rehabilitation programme for executive deficits in multiple sclerosis patients by comparing outcome scores of a cognitive intervention group (CIG; n = 11) with those of a placebo group (n = 14) and an untreated group (n = 15). Executive functioning and verbal learning improved significantly more in the CIG. The treatment effect on verbal learning was still present at 1-year follow-up. Baseline brain atrophy, quantified by the brain parenchymal fraction, was associated with treatment effects for one aspect of executive functioning. Consequently, cognitive intervention may be beneficial and baseline brain atrophy has some predictive value in determining treatment outcome for executive functioning.

Patients trained on 5 days per week for 40 minutes a day, using the subtest reaction capacity of the RehaCom® software (Hasomed; 2006). Patients had to respond fast and accurately to visual stimuli.

2010
http://msj.sagepub.com/content/early/2010/07/08/1352458510375440.abstract


OBJECTIVE: To evaluate the efficacy of a computer-based intensive training program of attention, information processing and executive functions in patients with clinically-stable relapsing–remitting (RR) multiple sclerosis (MS) and low levels of disability.

Study group underwent intensive neuropsychological treatment for 3 consequetive months on an individual basis. The software tasks Plan a Day and Divided Attention were used as part of RehaCom®.

201010.1016/j.jns.2009.09.024

Cognitive impairment (CI) is a serious complication of multiple sclerosis (MS), and the domains affected are well established, but new affected domains such as theory of mind are still being identified. The evidence that disease-modifying therapies (DMTs) improve and prevent the development of CI in MS is not solid. Recent studies on the prevalence of CI in MS among people treated with DMT, although not as solid as studies completed prior to DMT introduction, suggest that CI remains a problem even among people on DMTs and that CI occurs frequently even at the very earliest stages of MS. Functional MRI studies and studies using diffusion tractography show that the impact of lesions on cognition depends on the particular cortical networks affected and their plasticity. Cognitive rehabilitation and L-amphetamine appear promising symptomatic treatments for CI in MS, while, cholinesterase inhibitors and memantine have failed, and data on Ginkgo and exercise are limited. We need more work to understand better CI in MS and develop treatments for this serious complication of MS.

A smaller study comparing subjects assigned to a 6-week cognitive intervention using the RehaCom® software (n011), placebo (n014), or no treatment (n015) found significant improvements in executive functioning and verbal learning after 6 weeks of training. 
201205: 10.1007/s11910-012-0294-3


OBJECTIVE: To evaluate the efficacy of a computer-based intensive training program of attention, information processing and executive functions in patients with clinically-stable relapsing-remitting (RR) multiple sclerosis (MS) and low levels of disability.

DESIGN, PATIENTS AND INTERVENTIONS: A total of 150 patients with RR MS and an Expanded Disability Status Scale (EDSS) score of < or =4 were examined. Information processing, working memory and attention were assessed by the Paced Auditory Serial Addition Test (PASAT) and executive functions by the Wisconsin Card Sorting Test (WCST). Twenty patients who scored below certain cut-off measures in both tests were included in this double-blind controlled study. Patients were casually assigned to a study group (SG) or a control group (CG) and underwent neuropsychological evaluation at baseline and after 3 months. Patients in the SG received intensive computer-assisted cognitive rehabilitation of attention, information processing and executive functions for 3 months; the CG did not receive any rehabilitation.

SETTING: Ambulatory patients were sent by the MS referral center.

OUTCOME MEASURES: Improvement in neuropsychological test and scale scores.

RESULTS: After rehabilitation, only the SG significantly improved in tests of attention, information processing and executive functions (PASAT 3" p=0.023, PASAT 2" p=0.004, WCSTte p=0.037), as well as in depression scores (MADRS p=0.01). Neuropsychological
improvement was unrelated to depression improvement in regression analysis.

CONCLUSIONS: Intensive neuropsychological rehabilitation of attention, information processing and executive functions is effective in patients with RR MS and low levels of disability, and also leads to improvement in depression.

2010O1-2: 10.1016/j.jns.2009.09.024


The software used (plan a day and divided attention) were part RehaCom® package which provides a special keyboard with large button, which limits the interference of motor and coordination impairments and expertise on computer use.


Background: Specific cognitive rehabilitation in multiple sclerosis (MS) resulted to be effective compared to no treatment. So far the possible role of an aspecific psychological intervention on cognition has not been investigated.

Objective: The aim of the SMICT RCT was to compare the efficacy of a specific cognitive training with an aspecific psychological intervention in relapsing-remitting MS patients.

Methods: From a sample of 150 patients, with the same disability and immunomodulatory therapy, submitted to neuropsychological examination, 45 impaired in at least one test were included and 41 randomized to have either a specific cognitive training for the impaired function (22) or to an aspecific psychological intervention (19) for 4 months, starting after baseline examination. Neuropsychological tests and functional scales were administered at baseline and 1 year later.

Results: After 1 year, the mean number of pathological tests was significantly lower in the specific treatment group, compared to the aspecific group. Memory and attention/speeded information processing functions were mostly improved. Depression and quality of life were not different between groups at follow up.

Conclusion: Our study demonstrates that an intensive and domain specific cognitive approach results to be more effective than aspecific psychological intervention in patients with MS.
Treatment was administered according to the impaired neuropsychological function: Plan a Day software of the RehaCom® suite was used if a patient resulted impaired in EF (that is if his/her poor score was in the Stroop test or in the COWA P or COWA/C.  

2015  


This study aimed to assess the efficacy and specificity of direct computer-assisted memory retraining (CR) in MS patients, in comparison to non-specific retraining, while controlling for severity of impairment, psychiatric symptoms and retest effects. Sixty patients with definite MS and a stable clinical condition were selected. All were assessed neuropsychologically and divided into three matched groups. One group received an 8-week specific CR programme (SCRP) and another received a non-specific 8-week CR programme (NCRP) to retrain attention; a third (control) group received no treatment. After the programmes were completed, all patients were reexamined with the same test battery. Patients were impaired on all 11 memory and attention tests at baseline. Those who received SCRP improved on 7 memory outcome measures, compared to only 1 in the NCRP group and none in the control group. Attention training had no significant effect on relevant outcome measures. Some non-retrained patients showed deterioration of cognitive performance at retest. These results indicate that direct memory training in MS patients is effective in the short-term and is specific. In selected cases, benefits extended to everyday life activities.  

The programmes employed were part of RehaCom® (RehaCom®, Computer-aided procedures for cognitive rehabilitation, a computer-based cognitive retraining system widely used in German-speaking countries.  

1998O6:  
http://link.springer.com/article/10.1007/BF00539601

*Neuropsychiatric Dysfunction in Multiple Sclerosis.* 201277. 

Precise details of rehabilitative methodology are lacking in most studies, with the exception of those that used programs included in the RehaCom® system [14–16].  

2012  
http://books.google.com/books?hl=en&lr=&id=vLZfWtLxnucC&oi=fnd&pg=PA77&dq=RehaCom®&ots=k3UjuHicyP&sig=kRC2CtdQLDAvfBghQj--Qesbvk

Treated group patients received an intensive computer-assisted cognitive rehabilitation of attention, information processing and executive functions for 12 weeks, using the software part of the RehaCom® package

2014O6: 10.1177/1352458513505692
http://msj.sagepub.com/content/20/6/686.short


Computerized cognitive training programs, such as RehaCom® and CogniFit, could improve cognitive performance in MS. CogniFit was evaluated in a study of 107 patients with MS, 59 of whom were assigned to cognitive training [123].

2012O11: 10.1517/13543784.2012.716036

*Cochrane Database Syst …. 2014*

**Main results**

Twenty studies (986 participants; 966 MS participants and 20 healthy controls) fulfilled the inclusion criteria. The mean age of the participants was 44.6 years, mean length of education was 12.3 years and 70% of the participants were women. Most of the participants had a relapsing-remitting course of disease. The mean Expanded Disability Status Scale score was 3.2 and the mean duration of disease was 14.0 years.

On the basis of these studies, we found low-level evidence that neuropsychological rehabilitation reduces cognitive symptoms in MS. Cognitive training was found to improve memory span (standardised mean difference (SMD) 0.54, 95% confidence interval (CI) 0.20 to 0.88, P = 0.002) and working memory (SMD 0.33, 95% CI 0.09 to 0.57, P = 0.006). Cognitive training combined with other neuropsychological rehabilitation methods was found to improve attention (SMD 0.15, 95% CI 0.01 to 0.28, P = 0.03), immediate verbal memory (SMD 0.31, 95% CI 0.08 to 0.54, P = 0.008) and delayed memory (SMD 0.22, 95% CI 0.02 to 0.42, P = 0.03).

There was no evidence of an effect of neuropsychological rehabilitation on emotional functions. The overall quality, as well as the comparability of the included studies, was relatively low due to methodological limitations and heterogeneity of interventions and outcome measures. Although most of the pooled results in the meta-analyses yielded no significant findings, 18 of the 20 studies showed some evidence of positive effects when the studies were individually analysed.
Authors’ conclusions

This review found low-level evidence for positive effects of neuropsychological rehabilitation in MS. The interventions and outcome measures included in the review were heterogeneous, which limited the comparability of the studies. New trials may therefore change the strength and direction of the evidence.

2014


Context: Cognitive compromise is one of the main contributing factors to activity and participation restrictions in people with multiple sclerosis (MS). Computer-aided programs are used for retraining memory and attention, but data on the efficacy of these interventions are scarce. Objective: To assess the efficacy of computer-aided retraining of memory and attention in people with MS impaired in these abilities. Design and setting: Randomized, double-blind, controlled trial. Participants: Outpatients (n=82) with subjective complaints of poor attention or memory, confirmed by a score <80th percentile in at least two tests of the Brief Repeatable Battery of Neuropsychological Tests (BRBNT). Interventions: Participants were randomized to two computer-assisted retraining interventions: memory and attention (study arm), and visuo-constructional and visuo-motor coordination (control arm). Both groups received 16 training sessions over 8 weeks. Outcome measures: Improvement of 20% or more in at least two BRBNT test scores at 8 weeks compared to baseline (primary end point). Changes in depression and health-related quality of life. Results: An improvement occurred in 45% of study patients vs. 43% of control patients (odds ratio 1.07, 95% confidence interval 0.44–2.64).

The training program was RehaCom®, a software package for use with a special keyboard that limits the interference of motor and coordination impairments. The study treatment consisted of the RehaCom® memory, and attention retraining procedures.


http://www.sciencedirect.com/science/article/pii/S0022510X04001285


The specific neuropsychological training in which the treated group participated consisted of a direct functional training (RehaCom® computer training) of the two cognitive areas which were most severely affected.

2005O21-22: 10.1007/s00508-005-0470-4

http://link.springer.com/article/10.1007/s00508-005-0470-4

This study was designed in an attempt to determine whether computer-assisted cognitive retraining was anymore effective in remediating the cognitive sequelae of severe closed head injury than were comparable noncomputerized cognitive treatment techniques. The experimental group was comprised of 17 severe closed head injured patients and the noncomputerized control group had 17 patients. Each group received 20 hours of cognitive therapy over a four to six week period. The analysis revealed that on all measures there was a significant improvement in the level of performance on the experimental and the control subjects at the time of the posttreatment assessment compared to the pretreatment assessment.

1988O3:


We evaluated evidence for the effectiveness of cognitive rehabilitation methods to improve outcomes for persons with traumatic brain injury (TBI). A search of MEDLINE, HealthSTAR, CINAHL, PsycINFO, and the Cochrane Library produced 600 potential references. Thirty-two studies met predetermined inclusion criteria and were abstracted; data from 24 were placed into evidence tables. Two randomized controlled trials and one observational study provided evidence that specific forms of cognitive rehabilitation reduce memory failures and anxiety, and improve self-concept and interpersonal relationships for persons with TBI. The durability and clinical relevance of these findings is not established. Future research utilizing control groups and multivariate analysis must incorporate subject variability and must include standard definitions of the intervention and relevant outcome measures that reflect health and function.

1999O3: 10.1097/00001199-199906000-00008

This study examined the efficacy of computer-assisted cognitive rehabilitation (CACR) in persons with traumatic brain injury (TBI). Twenty persons with TBI who received hierarchically based CACR following inpatient neurorehabilitation were compared to a control group of twenty persons with TBI matched for age, education, days in coma and time between testing. The control group received traditional outpatient therapies including OT, PT and Speech Therapy. The difference between pre- and post-treatment neuropsychological test scores was used to measure improvements in the domains of attention, visual spatial ability, memory and problem solving. The Computer Assisted Cognitive Rehabilitation Therapy group made statistically significant gains in cognitive/intellectual functioning on 16 neuropsychological test measures while the Traditional Therapy group make statistically significant gains on 7 measures.

1997O3:


Objective: To establish evidence-based recommendations for the clinical practice of cognitive rehabilitation, derived from a methodical review of the scientific literature concerning the effectiveness of cognitive rehabilitation for persons with traumatic brain injury (TBI) or stroke.

Conclusions: Overall, support exists for the effectiveness of several forms of cognitive rehabilitation for persons with stroke and TBI. Specific recommendations can be made for remediation of language and perception after left and right hemisphere stroke, respectively, and for the remediation of attention, memory, functional communication, and executive functioning after TBI. These recommendations may help to establish parameters of effective treatment, which should be of assistance to practicing clinicians.

200010.1053/apmr.2000.19240

Archives of physical medicine and rehabilitation. 2009; 90: S52-S59.

Objective

To evaluate the methodological quality of research on cognitive rehabilitation after traumatic brain injury (TBI).

Data Sources

Secondary analysis of studies identified in prior systematic reviews of cognitive rehabilitation.

Study Selection

Randomized controlled trials (RCTs) and observational studies involving exclusively or primarily participants with TBI.

Data Extraction
Criteria for evaluating methodological quality were adapted from prior reviews of rehabilitation research. These criteria were modified to be relevant to cognitive rehabilitation research. Sixteen criteria for evaluating the quality of RCTs were applied: 8 relating to the internal validity of studies, 5 descriptive criteria, and 3 statistical criteria. Twelve of these criteria were used to evaluate non-RCT observational studies.

Data Synthesis

Thirty-two RCTs and 21 observational studies were independently reviewed and rated by 2 of the authors. Initial agreement between raters for individual studies ranged from 57% to 100%. Interrater reliabilities based on the kappa statistic indicated moderate to substantial agreement.

Conclusions

Several high-quality RCTs support the effectiveness of interventions for attention, communication skills, and executive functioning after TBI. Several high-quality observational studies support the effectiveness of comprehensive-holistic rehabilitation after TBI, including improvements in participation outcomes. The proposed criteria appear useful for evaluating the quality of research on cognitive rehabilitation and improving the design and reporting of future research in this area.

2009O11: 10.1016/j.apmr.2009.05.019


Background

Rehabilitation of impaired cognitive functions begins to be considered a standard component of medical care after acquired brain injury. Indeed, many evidences support the effectiveness of the two major categories of techniques, i.e. the traditional and computer-assisted ones, which are widely used in cognitive rehabilitative treatment.

Objective

Aim of this study is to evaluate the effects of pc – cognitive training in brain injury patients.

Methods

We studied 35 subjects (randomly divided into two groups), affected by traumatic or vascular brain injury, having attended from January 2010 to December 2012 the Laboratory of Robotic and Cognitive Rehabilitation of IRCCS Neurolesi of Messina. Cognitive impairment was investigated through psychometric battery, administered before (T0) and two months (T1) after the cognitive pc-training, which was performed only by the experimental group, in addition to conventional treatment. Statistical analysis was performed using Wilcoxon test with a p < 0.01.

Results

At time T0, all patients showed language deficits and cognitive alterations in visual attention and memory abilities. After the rehabilitation program we noted a global
improvement in both the groups. However, at T1, the experimental group showed a
greater cognitive improvement than the control group, with significant differences in
nearly all the neuropsychological tests performed.

Conclusions

Our data suggest that cognitive pc-training may be a promising methodology to optimize
the rehabilitation outcomes following brain injury.

2014O3: 10.1016/j.dhjo.2014.04.003

7. Fernandez E, Bringas ML, Salazar S, Rodriguez D, Garcia ME, Torres M. Clinical
impact of RehaCom® software for cognitive rehabilitation of patients with acquired
brain injury.


We describe the clinical impact of the RehaCom® computerized cognitive training
program instituted in the International Neurological Restoration Center for rehabilitation
of brain injury patients. Fifty patients admitted from 2008 through 2010 were trained over
60 sessions. Attention and memory functions were assessed with a pre- and post-
treatment design, using the Mini-Mental State Examination, Wechsler Memory Scale and
Trail Making Test (Parts A and B). Negative effects were assessed, including mental fatigue,
headache and eye irritation. The program’s clinical usefulness was confirmed, with 100% of
patients showing improved performance in trained functions.

2012O4:
cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=23154316

8. Friedl-Francesconi H, Binder H. [Training in cognitive functions in neurologic
rehabilitation of craniocerebral trauma].


This study evaluates a new cognitive rehabilitation therapy for patients after severe head
injury. In addition to the standard neurological rehabilitation therapy, one group was
trained by the Wiener Determinationsgerat (WDT), a second group was treated by the new
program RehaCom®, while a third group received only conventional neurological
rehabilitation therapy. The three groups each consisted of 12 patients; two groups
received 20 sessions of training, each lasting 40 minutes. At the beginning as well as after
the therapy a psychological test battery was applied, consisting of HAWIE, TULUC,
AACHENER APHASIETEST, and BENTON-Test. They were also tested by a specific
neuropsychological battery regarding hemispheric specialization. RehaCom® showed
significantly higher values on the HAWIE as well as on BENTON-Test than the other two
groups. RehaCom® also improved in right-hemispheric dimensions while WDT group did
not improve in attention. Right-hemispheric training was more effective than attentional
stimulation.

1996O1:
Zeitschrift fur .... 1996


Traumatic brain injury (TBI) frequently affects both the basic and the superordinate components of attention; deficits vary according to patient age. This study evaluated the efficacy of a specific remediation intervention for attention. Sixty-five TBI patients (aged 6?18 years) with attention deficit were assessed at baseline and at 1-year follow-up: 40 patients received attention-specific neuropsychological training for 6 months, and the control group comprised 25 patients. Cognitive assessment included a Wechsler Intelligence Scale (e.g., A. Orsini, 1993) and the Continuous Performance Test II (CPT II; C. K. Conners, 2000). The Vineland Adaptive Behaviour Scales (VABS; S. Sparrow, D. Balla & D. V. Cicchetti, 1984) was administered to assess the treatment’s ecological validity. At baseline, all patients presented with a mild intellectual disability and pathological scores on the CPT II. At follow-up, significant differences were found between the 2 groups on the CPT II and VABS: The clinical group improved more than the control group. Specific remediation training for attention, including a combination of a process-specific approach and metacognitive strategies, significantly improved attention performance. Improvement in attention skills also affected adaptive skills positively. (PsycINFO Database Record (c) 2012 APA, all rights reserved)

Tasks on RehaCom® - Attention and Concentration. Computer tasks included RehaCom® for patients aged 8–18 years and Attention and Concentration (Di Nuovo, 1992) for patients aged 6–8 years.

2009O1:
http://psycnet.apa.org/journals/neu/23/1/40/


The purpose of this study was to clinically validate a new modality of cognitive rehabilitation services based on telemedicine systems (PREVIRNEC platform) for persons with moderate or severe traumatic brain injury (TBI). Patients and Methods. Eighty patients with moderate or severe TBI; mean age: 36.1 years (SD= 18.19 years) received a 10-week cognitive rehabilitation (5 sessions-week). Differences between pre- and post-treatment neuropsychological test scores were used to measure patient’s improvements in the domains of attention, memory and executive functions. Patients were divided in two groups based on the Competency Rating Scale (PCRS; adequate or inadequate everyday competence) post-rehabilitation score. Results. Patients showed significant cognitive
improvement after the application of the computerized cognitive rehabilitation program. Significant differences were observed between both groups on the number of highly-performed tasks during cognitive treatment, in the attention (p=0.026) and executive (p=0.040) execution. Conclusions. The cognitive rehabilitation program based on telemedicine systems (PREVIRNEC platform) improves attention, memory, and executive functions, as well as in patient’s everyday competence.

2010
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5756537


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2010
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5756537


Computers have increased the scope and duration of cognitive rehabilitation. They enable head trauma rehabilitation specialists to address dynamic (real-time) aspects of information processing (speed, efficiency, multiple events). Computer programs can be designed to encourage improved therapeutic practices. Features, such as customised menus and the wide availability of portable, hard-disk computer systems permit the establishment of home-based computer-augmented cognitive rehabilitation programs, which allow an aggressive pursuit of restoration of function through exercise and practice. Computers are being used as mental prostheses and productivity tools, rather than as drillmasters, and thus they transform survivors of brain injury into executives. While computers have changed clinical practice, their inherent modifiability encourages clinicians in turn to change and direct them.
Direct attention training (DAT) and metacognitive strategy instruction have been employed to treat the cognitive deficits associated with traumatic brain injury (TBI) in children and are supported by an emerging evidence base (e.g., Butler et al., 2008; Galbiati et al., 2009; Luton, Reed-Knight, Loiselle, O’Toole, & Blount, 2011; van’t Hooft et al., 2007). The importance of treatment intensity is well established for DAT (Sohlberg et al., 2003), yet restrictions in the delivery and funding of rehabilitation services, the availability of well-trained interventionists, and access by geographic locale remain critical barriers to the provision of intensive services. Computer-delivered treatments that incorporate a home practice component address the gulf between the intensive, daily practice suggested by the efficacy research and these clinical delivery constraints. The purpose of this paper is to (a) review the literature evaluating the integration of DAT and metacognitive facilitation to treat children and adolescents with traumatic brain injury (TBI); (b) present the rationale and description of a computerized program, Attention Improvement Management (AIM); (c) detail the program components; and (d) present outcome data from three pilot participants who completed the intervention. A specific and growing subset of children with TBI have attention impairments following mild brain injuries or concussions (Schatz & Scolaro Moser, 2011) and served as the pilot participants in this study. Pilot participants demonstrated clinically meaningful improvements on attention outcome measures and generalization of the metacognitive strategies trained within the program to contexts outside of therapy, including both academic and social settings. Though initial results are promising, further research is needed to evaluate the efficacy of the AIM intervention to treat the attention and executive function impairments associated with pediatric TBI.

“Cognitive exercises, including computer-assisted strategies, have been used to improve specific neuropsychological processes, predominantly attention, memory, and executive skills. Both randomized controlled studies and case reports have documented the success of these interventions using intermediate outcome measures. Certain studies using global outcome measures also support the use of computer-assisted exercises in cognitive rehabilitation.” (For a copy of the full NIH Consensus Statement, call 1-888-NIH-CONSENSUS [888-644-2667])


Abstract 1. The present study provides a meta-analysis of cognitive rehabilitation literature (K= 115, N= 2,014) that was originally reviewed by KD Cicerone et al.(2000, 2005) for the purpose of providing evidence-based practice guidelines for persons with acquired brain.

2009O1:

17. Schuster B. Rehabilitation of TBI using RehaCom®.


As cognitive disorders are the most frequent consequences of brain damage, the need of therapeutic instruments for patients with traumatic head and brain injuries is rather great. Special computer-aided therapeutic procedures have been particularly developed for this area with the aim to influence cognitive deficiencies, above all, in the fields of attention, memory, and problem solving. RehaCom® dates back to 1986. The training with a computer brings about the following advantages: individualisation, adaptation, continuity, case control, flexibility, disorders specific training, confirmation/feedback, standardised conditions, efficiency and economy, appropriate input device. The possible training dimensions are: Attention, ability to concentrate and vigilance. Memory and learning ability. Logical thinking. Spatial imagination. Reactive behaviour. Visual-motor coordination. Visual-constructive abilities. Problem solving and strategy development. Field of vision. Studies of effectiveness shows transfer effect of first order (Training effect: Pre-post-comparison with tests measuring the same function as the training procedure), transfer effect of second order (Generalisation effect: Pre-post-comparison with tests measuring other function as have been trained), transfer effect of third order (effect on activities of daily life).

2002


*Brain Inj*. 2003; 17: 701-713.

Objective: The presented case study describes the beneficial results of the neuropsychological rehabilitation of a gunshot victim, even with late initialisation of the therapy--over 1 year after head trauma. Design: A case study of DE, a victim with bilateral damage of the parietal-occipital regions of the brain due to a gunshot. Methods: Neuropsychological rehabilitation, first preceded by an initial neuropsychological examination (standard psychological tests: WAIS-R, RAVLT, Rey's CFT, BVRT and clinical
experiments tailored to DE's condition), was initiated 1 year after trauma. The rehabilitation programme consisted of computer-based tasks, paper-and-pencil exercises, and occupational therapy. The patient's progress was assessed as improvement in performance in standardised tests and computer-based tasks. Results: DE was diagnosed with complex cognitive deficits syndrome, including visual associative agnosia, apraxia, visuospatial and constructive disorders and linguistic defects. After 1 year of rehabilitation the patient's functioning significantly improved as measured by psychological tests and computer-based tasks (p < 0.05) as well as the evaluation of the patient's quality of life. Conclusions: The case study demonstrates beneficial effects of neurorehabilitation even initialised at the so-called 'late stage' after a brain injury.

Utilising the VIGI procedure from RehaCom® is a training of vigilance. Each of the above tasks from RehaCom® has several difficulty levels.

2003O8: 10.1080/0269905031000088621
http://informahealthcare.com/doi/abs/10.1080/0269905031000088621

Clinical Practice in Pediatric Psychology. 2014; 2: 263.

Galbiati and colleagues (2009) completed a study on 65 participants (with 25 as nontreated controls) with TBI, ages 6–18 years, utilizing a computerized attention intervention RehaCom® and Attention and Concentration [Di Nuovo, 1992]).

2014O3: 10.1037/cpp0000072


In a multi-center European approach, the efficacy of the AIXTENT computerised training programs for intensity aspects (alertness and vigilance) and selectivity aspects (selective and divided attention) of attention was studied in 33 patients with brain damage of vascular and traumatic etiology. Each patient received training in one of two most impaired of the four attention domains. Control tests were performed by means of a standardised computerised attention test battery (TAP) comprising tests for the four attention functions. Assessment was carried out at the beginning and at the end of a four week baseline period and after the training period of 14 one-hour sessions. At the end of the baseline phase, there was only slight but significant improvement for the most complex attention function, divided attention (number of omissions). After the training, there were significant specific training effects for both intensity aspects (alertness and vigilance) and also for the number of omissions in the divided attention task. The application of inferential single case procedures revealed a number of significant improvements in individual cases after specific training of alertness and vigilance problems. On the other hand, a non specific training addressing selectivity aspects of attention lead either to improvement or deterioration of alertness and vigilance
performance. The results corroborate the findings of former studies with the same training instrument but in patients with different lesion aetiologies

200310.1024/1016-264X.14.4.283


Does specific therapy for patients with cognitive disorders that occur after traumatic brain injury (TBI) produce a specific and obvious improvement in quality of life? The medical literature on this question is voluminous but this review is limited to 20 relevant publications.

First there are chapters, reviews, and editorials that sound a clarion call for action. There can be no disagreement that the loss of intellect and subsequent personality changes in patients with TBI are catastrophic. Unlike other neurologic disease, TBI compounds the basic neurologic infirmity with the prospect of 30 to 40 more years of disabled life. The burden for families and in many cases the eventual burden to society has received attention from medical economists

Stroke


OBJECTIVE: We conducted a systematic review and meta-analysis to identify the effect of computer-based cognitive rehabilitation (CBCR) on improving cognitive functions in patients with stroke.

METHODS: Researchers performed a literature search using computerised databases such as the Cochrane Database, EBSCO (CINAHL), PsycINFO, PubMed and Web of Science. The following keywords were used: stroke, computer-based, cognitive rehabilitation, and others. The methodological quality was evaluated. Statistical heterogeneity and standardised mean difference were used to compute the overall effect size and that of subgroups. Also publication bias of the selected studies was analysed.

RESULTS: Twelve studies met the inclusion criteria including a total of 461 stroke survivors. Among studies, six RCT studies were rated as high methodological quality. Overall effect size was medium 0.54, and the 95 % confidence interval was 0.33–0.74. The effect sizes of acute and chronic phase of stroke were both 0.54. They can be interpreted as medium effect size and were statistically significant. The statistical heterogeneity and publication bias were not significant.

CONCLUSION: The present study provides evidence that CBCR is effective on improving cognitive function after stroke. We recommend conducting meta-analysis on subgroups of CBCR programs in further studies.

201310.3233/NRE-130856


Objective: To establish evidence-based recommendations for the clinical practice of cognitive rehabilitation, derived from a methodical review of the scientific literature concerning the effectiveness of cognitive rehabilitation for persons with traumatic brain injury (TBI) or stroke.

Conclusions: Overall, support exists for the effectiveness of several forms of cognitive rehabilitation for persons with stroke and TBI. Specific recommendations can be made for remediation of language and perception after left and right hemisphere stroke, respectively, and for the remediation of attention, memory, functional communication, and executive functioning after TBI. These recommendations may help to establish parameters of effective treatment, which should be of assistance to practicing clinicians.

200010.1053/apmr.2000.19240


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Rehabilitation of impaired cognitive functions begins to be considered a standard component of medical care after acquired brain injury. Indeed, many evidences support the effectiveness of the two major categories of techniques, i.e. the traditional and computer-assisted ones, which are widely used in cognitive rehabilitative treatment.

Objective

Aim of this study is to evaluate the effects of pc – cognitive training in brain injury patients.

Methods

We studied 35 subjects (randomly divided into two groups), affected by traumatic or vascular brain injury, having attended from January 2010 to December 2012 the Laboratory of Robotic and Cognitive Rehabilitation of IRCCS Neurolesi of Messina. Cognitive impairment was investigated through psychometric battery, administered before (T0) and two months (T1) after the cognitive pc-training, which was performed only by the experimental group, in addition to conventional treatment. Statistical analysis was performed using Wilcoxon test with a p < 0.01.

Results

At time T0, all patients showed language deficits and cognitive alterations in visual attention and memory abilities. After the rehabilitation program we noted a global improvement in both the groups. However, at T1, the experimental group showed a greater cognitive improvement than the control group, with significant differences in nearly all the neuropsychological tests performed.

Conclusions

Our data suggest that cognitive pc-training may be a promising methodology to optimize the rehabilitation outcomes following brain injury.

2014O3: 10.1016/j.dhjo.2014.04.003

4. Doppelmayr M, Nosko H, Pecherstorfer T, Fink A. An attempt to increase cognitive performance after stroke with neurofeedback. 

Biofeedback. 2007; 35: 126-130.

The clinical rehabilitation program that is commonly applied includes computer training with either RehaCom® or Cogpack. Both programs are designed to train attention, vigilance, language, and memory. In addition.

2007O4:

The aim of this study was to explore and describe how adult outpatients with acquired brain damage and referred to occupational therapy perceive computer training with the RehaCom® programs, in order to evaluate the method of treatment as a tool in the rehabilitation of persons with cognitive disorders. By using focus-group discussions as a qualitative method of research when analysing the result, five themes with corresponding categories emerged, describing a development of understanding and learning about capacities. Themes describing how the participants could apply strategies to overcome shortcomings in daily occupations and the therapeutic role of the occupational therapist were identified as well. The result shows that a computer training program such as RehaCom® can be used as an educational tool, for example, to guide a person who is trying to adopt compensatory strategies to avoid overload by taking pauses. It was found that anything the participants learned was also applicable to occupational performance in daily life.

200210.1080/11038120260246950
http://informahealthcare.com/doi/abs/10.1080/11038120260246950


We describe the clinical impact of the RehaCom® computerized cognitive training program instituted in the International Neurological Restoration Center for rehabilitation of brain injury patients. Fifty patients admitted from 2008 through 2010 were trained over 60 sessions. Attention and memory functions were assessed with a pre- and post-treatment design, using the Mini-Mental State Examination, Wechsler Memory Scale and Trail Making Test (Parts A and B). Negative effects were assessed, including mental fatigue, headache and eye irritation. The program’s clinical usefulness was confirmed, with 100% of patients showing improved performance in trained functions.

2012O4:


This study examined the effects of computer-assisted cognitive rehabilitation in a group of 16 brain-damaged patients. Therapeutic effectiveness was assessed by improvement on
computer tasks, the results of neuropsychological tests and quality of life ratings.
Participants suffered from mild to moderate attention and memory problems or aphasia.

The procedure involved baseline assessment (pretest), a 15-week course of therapy conducted twice a week (30 hours in total) and posttest. Neuropsychological tests assessing attention, memory and language problems and quality of life ratings were administered twice: in pre- and posttests. Twelve healthy controls were also examined twice (with a 15-week interval) using the same battery of neuropsychological tests. The RehaCom® program and the Polish computer therapy program for aphasics called Afa-System were used for rehabilitation. The computer-assisted rehabilitation tasks were selected individually for each patient. The results showed significant improvement on computer-assisted tasks in all brain damaged subjects. However, none or very little improvement was observed on neuropsychological tests and quality of life ratings. The results of the study confirm the importance of using different types of measures to estimate the effectiveness of computer-assisted neuropsychological rehabilitation as well as the necessity of applying various kinds of therapy to improve cognitive, emotional and social functioning in brain-damaged patients.

201301:


This study evaluated the effectiveness of a computer-based cognitive retraining (CBCR) program on improving memory and attention deficits in individuals with a chronic acquired brain injury (ABI). Twelve adults with a chronic ABI demonstrating deficits in memory and attention were recruited from a convenience sample from the community. Using a quasi-experimental one-group pretest–post test design, a significant improvement was found in both memory and attention scores post-intervention using the cognitive screening tool. This study supported the effectiveness of CBCR programs in improving cognitive deficits in memory and attention in individuals with chronic ABI. Further research is recommended to validate these findings with a larger ABI population and to investigate transfer to improvement in occupational performance that supports daily living skills.

201304:


Background
Rehabilitation of impaired cognitive functions begins to be considered a standard component of medical care after acquired brain injury. Indeed, many evidences support the effectiveness of the two major categories of techniques, i.e. the traditional and computer-assisted ones, which are widely used in cognitive rehabilitative treatment.

Objective

Aim of this study is to evaluate the effects of pc – cognitive training in brain injury patients.

Methods

We studied 35 subjects (randomly divided into two groups), affected by traumatic or vascular brain injury, having attended from January 2010 to December 2012 the Laboratory of Robotic and Cognitive Rehabilitation of IRCCS Neurolesi of Messina. Cognitive impairment was investigated through psychometric battery, administered before (T0) and two months (T1) after the cognitive pc-training, which was performed only by the experimental group, in addition to conventional treatment. Statistical analysis was performed using Wilcoxon test with a $p < 0.01$.

Results

At time T0, all patients showed language deficits and cognitive alterations in visual attention and memory abilities. After the rehabilitation program we noted a global improvement in both the groups. However, at T1, the experimental group showed a greater cognitive improvement than the control group, with significant differences in nearly all the neuropsychological tests performed.

Conclusions

Our data suggest that cognitive pc-training may be a promising methodology to optimize the rehabilitation outcomes following brain injury.

2014O Issue 3: 10.1016/j.dhjo.2014.04.003


Cognitive impairment is a well-known consequence of acquired brain injuries, including stroke. Computerised cognitive training (CCT) is a rehabilitation approach intended to enhance cognitive functioning. It is unclear whether CCT leads to generalised cognitive improvements in daily life functioning, or if the subjects improve performance only on the exercises involved in the training. The current study explores whether fractional anisotropy (FA), a measure of white matter microstructure, may serve as an indirect biological indicator of enhanced neuropsychological functioning, particularly working memory, following CCT. The findings suggest a possible relationship between changes in FA measures and working memory.

2012O2: 10.1080/13554794.2011.568501
http://www.tandfonline.com/doi/abs/10.1080/13554794.2011.568501


2008O2:


In a multicenter European approach, the efficacy of the AIXTENT computerised training programs for intensity aspects (alertness and vigilance) and selectivity aspects (selective and divided attention) of attention was studied in 33 patients with brain damage of vascular and traumatic aetiology. Each patient received training in one of two most impaired of the four attention domains. Control tests were performed by means of a standardised computerised attention test battery (TAP) comprising tests for the four attention functions. Assessment was carried out at the beginning and at the end of a four week baseline period and after the training period of 14 one-hour sessions. At the end of the baseline phase, there was only slight but significant improvement for the most complex attention function, divided attention (number of omissions). After the training, there were significant specific training effects for both intensity aspects (alertness and vigilance) and also for the number of omissions in the divided attention task. The application of inferential single case procedures revealed a number of significant improvements in individual cases after specific training of alertness and vigilance problems. On the other hand, a non specific training addressing selectivity aspects of attention lead either to improvement or deterioration of alertness and vigilance performance. The results corroborate the findings of former studies with the same training instrument but in patients with different lesion aetiologies

200310.1024/1016-264X.14.4.283


In patients with alertness deficits due to right hemispheric vascular brain damage, training induced changes in the individual functional networks involved in intrinsic alertness were assessed in a longitudinal positron emission tomography (PET)/fMRI activation study. Patients were trained by administering the alertness routine of the AIXTENT computerised attention training or, in the control condition, by using a computerised training of verbal and topological memory. Before and after the training, both a PET/fMRI and a neuropsychological assessment were carried out. In this paper, we are presenting four patients after alertness training: three, whose alertness performance improved significantly after training, and one, who did not improve. In the patients showing behavioural improvement, the PET/fMRI activation after training revealed partial restitution of the right hemisphere (RH) functional network known to subserve intrinsic
alertness in normal subjects, especially in the right dorsolateral or medial frontal cortex. For the patient without behavioural improvement, the PET activation after training showed an increase of activation only in the left hemisphere. Out of the four patients in the memory training control group only one showed significant improvement of alertness. Another patient had an increase of right frontal activation after the training but this did not correspond to behavioural improvement. In a control group of six normal participants, repetition of the alertness activation paradigm in fMRI revealed a decrease of right frontal and parietal activation from the first to a second measurement after 3 weeks, in contrast to the observed training induced effects in the patients.

2004O4: 10.1016/j.neuropsychologia.2003.09.001


Computer-based cognitive assessment programs for children have recently become increasingly popular. This assessment tool has many advantages over traditional assessment approaches including the option of offering an immediate feedback, the ability to systematise delivery of the test items and to modify the difficulty level and the ability to quantify progress.

Purpose: the purpose of the study is to establish a reference baseline for the cognitive skills among Egyptian school-aged children.

Method: This study is a cross-sectional prospective design. A sample of 223 healthy children of both sexes, of age ranged from 6-12 years, from urban areas' elementary schools in Upper Egypt were recruited.

Results: RehaCom® program tool produced a separate progress report for the individual progress of every child. Conclusions: Based on the study's results the executive function ability was the first to initiated followed by the logical reasoning and finally the topological memory and vigilance.

201410.1007/978-3-319-09891-3_7
http://link.springer.com/chapter/10.1007/978-3-319-09891-3_7

2. Pokorski M, Borecki L, Jernajczyk U. Psychological Fitness in Young Adult Video Game Players.

*CURRENT TOPICS IN CHILDREN'S LEARNING AND COGNITION*. 2012123.

Cognitive functions were investigated using sets of neuropsychological assessment tools that consisted of various thinking, memory, intelligence, and visual-spatial ability measures, such as the RehaCom® (Hasomed GmbH, Magdeburg, Germany), the Vienna Test System.

Panel A - Visual working memory of video games players vs. non-players assessed with a RehCom BILD Tes ($\chi^2=30.5; P<0.001$); Panel B - Logical reasoning assessed with a RehaCom®LODE Test (data distributed on 3-degree Likert scale, $\chi^2=33.3; P<0.001$).

2012
http://disde.minedu.gob.pe/xmlui/bitstream/handle/123456789/1526/Current_Topics_in_Children_s_Learning_and_Cognition.pdf?sequence=1#page=133

Establishing a Baseline Value of Cognitive Skills among School-Aged Children in Upper Egypt Using Computer Based Cognitive Assessment RehaCom® Program

264239548_Brain_Informatics_and_Health/links/53d531980cf220632f3d5512.pdf
Schizophrenia

1. An SK, Oh BH, Hyun MH, Yoo KJ. The effect of attention training using computer-aided cognitive rehabilitation program (RehaCom®) in chronic schizophrenics.


OBJECTIVE: The authors study evaluated the effect of a cognitive rehabilitation program designed to enhance the attention skill of chronic schizophrenics.

METHODS: Dependent variables included measures of perceptual sensitivity and response criterion derived from the Vigilance test of Vienna test system. Each of 10 subjects received 10 sessions of repeated training with computer-aided cognitive rehabilitation program(RehaCom®). Eleven subjects were assigned to a control group. All subject were rated on measures of positive and negative symptoms before training.

RESULTS: Significant changes on the outcome measures were observed following attention training.

CONCLUSION: It is suggested that cognitive rehabilitation with chronic schizophrenics should stress the possibility of remediating deficiencies in basic abilities, such as attention.


2. Bellucci DM, Glaberman K, Haslam N. Computer-assisted cognitive rehabilitation reduces negative symptoms in the severely mentally ill.


Thirty-four-day treatment program clients diagnosed with schizophrenia or schizoaffective disorder were randomly assigned to a computer-assisted cognitive rehabilitation (CACR) group or a wait-list Control group. CACR clients received 16 CACR sessions over an 8-week period. Measures of cognitive functioning, negative symptoms and self-esteem were administered at the beginning and end of this period. CACR clients showed greater improvement in cognitive functioning (verbal memory and attention) and negative symptoms. Symptom reduction was not mediated by raised self-esteem. CACR’s effects may go beyond cognitive remediation to include some of the most disabling and refractory clinical features of schizophrenia.


Psychiatry Res. 2011; 192: 160-166.
Cognitive remediation therapy (CRT) is a non biological treatment that aims to correct cognitive deficits through repeated exercises. Its efficacy in patients with schizophrenia is well recognised, but little is known about its effect on cerebral activity. Our aim was to explore the impact of CRT on cerebral activation using functional magnetic resonance imaging (fMRI) in patients with schizophrenia. Seventeen patients and 15 healthy volunteers were recruited. Patients were divided into two groups: one group received CRT with RehaCom®(R) software (n=8), while a control group of patients (non-CRT group) received no additional treatment (n=9). The three groups underwent two fMRI sessions with an interval of 3months: they had to perform a verbal and a spatial n-back task at the same performance level. Patients were additionally clinically and cognitively assessed before and after the study. After CRT, the CRT group exhibited brain over-activations in the left inferior/middle frontal gyrus, cingulate gyrus and inferior parietal lobule for the spatial task. Similar but nonsignificant over-activations were observed in the same brain regions for the verbal task. Moreover, CRT patients significantly improved their behavioural performance in attention and reasoning capacities. We conclude that CRT leads to measurable physiological adaptation associated with improved cognitive ability. Trial name: Cognitive Remediation Therapy and Schizophrenia. http://clinicaltrials.gov/ct2/show/NCT01078129. Registration number: NCT01078129.


Rehabilitation programs integrating cognitive remediation (CR) and psychosocial rehabilitation are often implemented as they seem to yield greater improvements in functional outcome than stand alone treatment approaches. Mechanisms underlying synergistic effects of combining CR with psychosocial interventions are not fully understood. Disentangling the relative contribution of each component of integrated programs might improve understanding of underlying mechanisms. In the present study we compared the efficacy of two components of our rehabilitation program [the Neurocognitive Individualised Training (NIT) and the Social Skills Individualised Training (SSIT)].

Seventy-two patients with schizophrenia or schizoaffective disorder were randomly assigned to one of two treatment groups. Changes in cognitive, psychopathological and real-world functioning indices after 6 and 12 months were compared between the two groups.

After both 6 and 12 months, NIT produced an improvement of attention, verbal memory and preservative aspects of executive functioning, while SSIT produced a worsening of visuo-spatial memory and attention and no significant effect on the other cognitive domains. As to the real-world functioning, NIT produced a significant improvement of interpersonal relationships, while SSIT yielded a significant improvement of QLS instrumental role subscale.
According to our findings, cognitive training is more effective than social skills training on several cognitive domains and indices of real-world functioning relevant to subject’s relationships with other people. Integrated approaches might target different areas of functional impairment but should be planned carefully and individually to fully exploit the synergistic potential.

Neurocognitive Individualised Training (NIT). NIT is based on a computer-assisted cognitive rehabilitation program, RehaCom®, developed by the HASOMED GmbH (Inc., Ltd) in Magdeburg, Germany.

2013O1:

5. Cochet A, Saoud M, Gabriele S et al. [Impact of a new cognitive remediation strategy on interpersonal problem solving skills and social autonomy in schizophrenia].

INTRODUCTION: Despite recent developments, the impact of pharmacotherapy on social autonomy and interpersonal problem solving skills in patients with schizophrenia remains limited, with consequences in terms of socio-professional functioning. Indeed, independently of the positive, negative and/or disorganization symptoms, functional deficits in patients with schizophrenia rely mainly on various cognitive impairments.

OBJECTIVES: To determine the impact of a new Cognitive Remediation Strategy on interpersonal problem solving skills, social autonomy and symptoms in patients with schizophrenia.

METHODS: Thirty patients with schizophrenia were enrolled in a program consisting of 14 training sessions of 4 cognitive functions (attention/concentration, topological memory, logical reasoning, executive functions) using the RehaCom® software. Measurements of attention (Continuous Performance Test, CPT), memory (Rivermead Behavioural Memory Test, RBMT) and executive functions (Wisconsin Card Sorting Test, WCST) as well as interpersonal problem solving skills (Assessment of Interpersonal Problem-Solving Skills, AIPSS) and social autonomy (Social Autonomy Scale, EAS) and finally schizophrenia symptoms (Positive And Negative Syndrom Scale, PANSS) were undertaken at the beginning and the end of the 14 remediation meetings.

RESULTS: Cognitive functions, interpersonal problems solving skills, social autonomy and symptoms were significantly improved by the Cognitive Remediation Strategy. CONCLUSION: Our results confirm the therapeutic impact of a Cognitive Remediation Strategy among 30 schizophrenic patients stabilised on clinical, therapeutic and functional levels. The question of the long-term maintenance of such improvements still requires further investigation.

2006O2 Pt 1: 10.1016/S0013-7006(06)76144-9

OBJECTIVE: There is considerable interest in cognitive remediation for schizophrenia. Our study aimed to evaluate, in a large sample of patients with schizophrenia, the interest of a computer-assisted cognitive remediation program on cognitive performances of patients as well as in clinical and functional outcome. METHOD: Seventy-seven patients with remitted schizophrenia were randomly assigned to 14 2-hours individual sessions of computer-assisted cognitive remediation (n=39) or a control condition (n=38). Remediation was performed using RehaCom® (R) software. Four procedures were chosen to train four cognitive functions involved in different stages of the information processing: attention/concentration, working memory, logic, and executive functions. Primary outcomes were remediation exercise metrics, neuropsychological composites (episodic memory, working memory, attention, executive functioning, and processing speed), clinical and community functioning measures. RESULTS: Cognitive performances concerning Attention/vigilance, verbal working memory and verbal learning memory and reasoning/problem solving improved significantly in the remediation condition when no difference was reported in the control condition between the 2 assessments. However, there were no significant benefits of cognitive remediation on non-verbal working memory and learning and speed of processing or functional outcome measures. CONCLUSIONS: Cognitive remediation for people with schizophrenia was effective in improving performance, but the benefits of training did not generalise to functional outcome measures. Long term follow-up studies are needed to confirm the maintenance of such improvements.

2011O2-3: 10.1016/j.schres.2010.10.023

Tunis Med. 2009; 87: 660-663.

BACKGROUND: Despite progress in chemo-therapeutics, schizophrenia remains a chronic disease with occurrence of residual symptoms and drug resistance in 60% of the cases. Besides, cognitive impairment is frequent and highly correlated to social dysfunction seen in patients with schizophrenia. Several cognitive remediation programs have been elaborated. RehaCom® is one of such programs. Aim of the study is to evaluate through a case control the efficiency of RehaCom® towards cognitive functions. METHODS: This program has been administered to a patient suffering from undifferentiated schizophrenia which was ameliorated after drug therapy considering positive symptoms but still was complaining from cognitive deficits causing social withdrawal. RESULTS: After following the remediation program, the patient was ameliorated considering its negative symptoms as attested by an amelioration of the PANSS negative score and considering its cognitive performances on memory, attention and executive functions. We have also noticed an improvement in his self-esteem and his quality of life. CONCLUSION: This first trial of a cognitive remediation program among our patients suffering from schizophrenia using RehaCom® was encouraging. Enlarging its use and designing controlled studies will be the next step of our study.

2009O10:


Treatment programs initially developed to help brain-damaged patients are used as remediative modalities by some clinicians. For example, REHA-COM®, which is a computer-assisted program, has been shown to have positive outcomes [30].

9. Galderisi S, Piegari G, Mucci A et al. Social skills and neurocognitive individualized training in schizophrenia: comparison with structured leisure activities.

*European archives of psychiatry and clinical neuroscience. 2010; 260: 305-315.*

Patients attended weekly 2-h sessions for 6 months (48 h). The individualized Neurocognitive Training component of the SSANIT is based on a computer-assisted cognitive rehabilitation program, RehaCom®, developed by the HASOMED GmbH (Inc., Ltd) in Magdeburg.

2010O4:


**BACKGROUND:** Cognitive remediation is frequently based on computerized training methods that target different cognitive deficits. The aim of this article was to assess the efficacy of computer-assisted cognitive remediation (CACR) in schizophrenia and to determine whether CACR enables selective treatment of specific cognitive domains.

**METHOD:** A meta-analysis was performed on 16 randomized controlled trials evaluating CACR. The effect sizes of differences between CACR and control groups were computed and classified according to the cognitive domain assessed. The possible influences of four potential moderator variables were examined: participants’ age, treatment duration, weekly frequency, and control condition type. To test the domain-specific effect, the intended goal of each study was determined and the effect sizes were sorted accordingly. The effect sizes of the cognitive domains explicitly targeted by the interventions were then compared with those that were not.

**RESULTS:** CACR enhanced general cognition with a mean effect size of 0.38 [confidence interval (CI) 0.20-0.55]. A significant medium effect size of 0.64 (CI 0.29-0.99) was found for Social Cognition. Improvements were also significant in Verbal Memory, Working Memory,
Attention/Vigilance and Speed of Processing with small effect sizes. Cognitive domains that were specifically targeted by the interventions did not yield higher effects than those that were not. CONCLUSIONS: The results lend support to the efficacy of CACR with particular emphasis on Social Cognition. The difficulty in targeting specific domains suggests a ‘non-specific’ effect of CACR. These results are discussed in the light of the possible bias in remediation tasks due to computer interface design paradigms.

2011O1: 10.1017/S0033291710000607

Deficits in executive functioning are closely related to the level of everyday functioning in patients with schizophrenia. However, many existing neuropsychological measures are limited in their ability to predict functional outcome. To contribute towards closing this gap, we developed a computer-based test of planning ability (“Plan-a-Day”) that requires participants to create daily activity schedules in a simulated work setting. Eighty patients diagnosed with schizophrenia were tested with Plan-a-Day and a battery of cognitive ability tests. Plan-a-Day showed satisfactory psychometric properties in terms of consistency, reliability, and construct validity. Compared to other neuropsychological tests used in this study, it also demonstrated incremental validity with regard to the Global Assessment of Functioning. The Plan-a-Day approach, therefore, seems to represent a valid alternative for measuring planning ability in patients with executive function deficits, occupying a middle ground between traditional neuropsychological tests and real-life assessments.
Program consisting of occupational therapy, physiotherapy, social skills training, and—for half of the sample—computer-based training of basic cognitive abilities (memory, reaction speed, continuous attention) using the RehaCom® training package (Hasomed GmbH, Germany).
2011O02: 10.1017/S1355617710001712
http://archiv.ub.uni-heidelberg.de/volltextserver/15446/1/Holt_etal_2011_PAD_JINS.pdf

INTRODUCTION: Schizophrenic patients present cognitive dysfunctions which are regarded to be one of endophenotypical markers predisposing to schizophrenia. Currently, schizophrenia can be treated as a neurodegenerative and neurodeveloping disease with genetic background.
OBJECTIVE: Assessment of the possible positive effect of neuropsychological rehabilitation in schizophrenia, in patients presenting cognitive dysfunctions. An additional aim was to
verify the hypothesis that some genetic polymorphisms can be a prognostic factor for success in neuropsychological rehabilitation.

MATERIAL AND METHODS: 41 participants and 40 control subjects were randomly selected. Both groups had the diagnosis of paranoid schizophrenia. Cognitive functions were checked with the Wisconsin Card Sorting Test, Trail Making Test, and Stroop Test at the beginning and end of the experiment. In the research group, each patient trained with the rehabilitation programme RehaCom®, whereas the control group did not receive such training. Genes COMT rs4680 and BDNF rs6265 were analysed in the genetic part of study. RESULTS: RehaCom® procedures appear to be useful in the neuropsychological rehabilitation of cognitive dysfunctions in patients diagnosed with schizophrenia. The research group showed a moderate improvement in the training programmes. Analysis of parameters obtained in the neuropsychological tests showed a slight improvement in both groups. At the present time, analysis of the polymorphisms of genes cannot be treated as a prognostic factor for the success of neuropsychological rehabilitation because statistical analyses showed few dependences with little statistical significance. CONCLUSIONS: Cognitive rehabilitation produces moderate improvement in cognitive functioning.

201301:


Objective: The aim of this study was to evaluate the efficacy of a computer – based training program of attention, memory and executive functions in enhancing neuropsychological performances as well as functional outcome in clients with schizophrenia.

Method: A total of 15 clinically stable out patients with Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) criteria for schizophrenia, diagnosed with different types of schizophrenia: paranoid, disorganized, residual, based on DSM- IV-TR were selected to participate in this study. All patients were randomly selected using a conventional sampling method and assigned to 60 hours individual sessions of computer – assisted cognitive remediation (CACR). This was a pre- experimental study with pretest and posttest in a single group. Cognitive functions were checked with Continuous Performance Test (CPT), Wechsler Adult Intelligence Scale (Wds) and Prospective and Retrospective Memory Questionnaire (PRMQ). The symptoms of patients were measured with the Positive and Negative Syndrome Scale (PANSS). Remediation was performed utilizing the RehaCom® software. Patients received the cognitive remediation program including attention, concentration and working memory. All participants were followed up after an interval of one month and three months. Data were analyzed using repeated measures analysis.

Result: After 3 months, the findings showed that patients’ scores improved in the time factor. Also, a significant improvement favoring cognitive remediation was found in several cognitive measures including Reaction Time (F = 4015p<.05, Eta = 0.242), Wds (F =
Conclusion: Computer-assisted cognitive remediation training program was effective in improving the performance of schizophrenic patients. CACR did not have any effects on the positive and negative symptoms. Long-term follow-up studies are needed to confirm the maintenance of such improvements.

2014O4:

Perhaps most exciting in this literature is an increasing number of computerised interventions that adjust automatically to the patients’ abilities and increase in difficulty as they progress while requiring minimal staff input and expertise (eg, Cogniplus, COGPAK, RehaCom®).
2013
http://books.google.com/books?hl=en&lr=&id=py-sl9tpMoAC&oi=fnd&pg=PA183&dq=RehaCom®&ots=7M_9RY20Ww&sig=IJsFvDpSvQV_D8sxhasAkaNgqY

2014O2:
http://link.springer.com/article/10.1007/s40501-014-0011-8

16. Reeder C, Wykes T. DEVELOPING COGNITIVE REMEDIATION THERAPY - LESSONS FROM THE FIELD OF SCHIZOPHRENIA.
Cognitive Remediation Therapy (CRT) for Eating and Weight Disorders. 2014207.
2014
http://books.google.com/books?hl=en&lr=&id=twjEBAAAQBAJ&oi=fnd&pg=PA207&dq=RehaCom®&ots=bldedHR2Om&sig=fPaHaoXQ2CV8y~9vvig04EAVos

*BMC psychiatry*. 2011; 11: 73.

Both groups. Participants were engaged in 10 training sessions of computer-based cognitive exercises either targeting planning and problem solving or basic cognition. The platform for all computer based exercises was the RehaCom® system (Hasomed GmbH, Germany).

2011O1:
http://www.biomedcentral.com/1471-244X/11/73


Average treatment attendance was 8.4 of 10 sessions. Both training regimes were implemented with the RehaCom® Software Package (Hasomed GmbH, Germany). Each session lasted 45 min and took place in small groups.

2014O04:
http://journals.cambridge.org/abstract_S1355617714000162

19. Royer A, Grosselin A, Bellot C et al. Is there any impact of cognitive remediation on an ecological test in schizophrenia?


Introduction. Cognitive deficits are commonly reported in schizophrenia and have a significant impact on the daily life of patients and on their social and work inclusion. Cognitive remediation therapies (CRT) may enhance the capabilities of schizophrenia patients. Although social and work integration is the ultimate goal of CRT, previous studies have failed to carry out a detailed assessment of the effects on everyday life.

Methods. Fifty-nine schizophrenia patients were randomised into two groups (remediation or usual treatment) to test the effects of a new remediation programme, which included both rehearsal and strategy learning, on cognitive functions. An ecological test was used to evaluate its transfer to daily living skills.

Results. Cognitive improvements are revealed in CRT patients, mainly in memory and executive functions. Patients showing some deficiencies to perform the ecological test had better scores after the CRT. Moreover, they significantly improve their social activity scores.

Conclusions. CRT would facilitate mental load monitoring by enhancing or reallocating cognitive resources, facilitating the patient’s organisation and autonomy. The rehearsal learning approach improves the ability to carry out automatic operations that are less demanding in terms of cognitive resources, thereby increasing the resources available for acquisition and efficient use of strategies provided during the strategy learning approach.

A computerised training programme (RehaCom® software; Schuhfried Company) was used. The exercises were repetitive (i.e., restitution approach)
20. Sablier J, Stip E, Franck N. [Cognitive remediation and cognitive assistive technologies in schizophrenia].


BACKGROUND: Cognitive impairments are a core feature in schizophrenia. They impact several cognitive abilities but most importantly attention, memory and executive functions, consequently leading to great difficulties in everyday life. Most schizophrenia patients need assurance and require assistance and help from care workers, family members and friends. Family members taking care of a patient have additional daily work burden, and suffer psychological anguish and anxiety. Therefore, improving cognitive functions in schizophrenia patients is essential for the well-being of patients and their relatives. Reducing these deficits may decrease the economic burden to the health care system through lower numbers of hospital admissions and shorter hospitalisation periods, for example. Cognitive rehabilitation was developed to address the limited benefits of conventional treatments on cognitive deficits through the use of assistive technology as a means of enhancing memory and executive skills in schizophrenia patients.

OBJECTIVE: To provide clinicians with comprehensive knowledge on cognitive trainings, programs of remediation, and cognitive assistive technologies.

METHOD: Literature review. A search in the electronic databases (PubMed, EMBASE, Index Medicus) for recent articles in the last 10 years related to cognitive remediation published in any language using the words: cognitive and remediation or rehabilitation and schizophrenia, and a search for chapters in psychiatry and rehabilitation textbooks.

RESULTS: We found 392 articles and 112 review paper mainly in English. First, we identified cognitive remediation programs that were beneficial to schizophrenia patients. Programs available in French (IPT, RECOS, and RehaCom®) and others (CET, NET, CRT, NEAR, APT and CAT) were identified. In addition, since memory and executive function impairments could be present in people without schizophrenia, we reviewed inventories of cognitive assistive technologies proven to enhance cognitive skills in other populations. Finally, we present a review of recent studies testing innovative devices developed to assist schizophrenia patients.

DISCUSSION: First, we found several cognitive programs proven to be effective with schizophrenia patients, but only three were validated in French. It could be useful to adapt other programs for French-speaking populations. Unfortunately, we found that very few of the existing cognitive assistive technologies are proposed to be used with schizophrenia patients. In fact, most of the available cognitive orthoses were tested primarily in people with neurological injuries (for example, various memory impairments caused by traumas), and in elderly illnesses (like Alzheimer disease). Devices for patients with mental deficits (e.g., mental retardation) were developed later, and only very recently explored for use in schizophrenia. As a result of an international collaboration between France and Canada, currently a tool called MOBUS is being tested. This technology aims at improving the autonomy of schizophrenia patients, by helping them plan and remember their daily activities. Furthermore, it encourages patient-caregiver communication, and permits monitoring patients’ subjective reports of their symptoms. The use of cognitive assistive technologies is not meant to isolate patients by replacing the human element of relatives.
and caregivers by a machine. On the contrary, they offer a sense of security and they improve interpersonal relationships by permitting enhanced autonomy and greater self-confidence. Finally, a literature review of cognitive remediation in schizophrenia emphasises the importance of a structured application of the technique in order for it to succeed. First, it is crucial to detect the impairments that will be targeted in each patient presenting a specific pattern of impairments. For this purpose, validated and customised neuropsychological tests are required. Then, cognitive remediation programs must be customised to each patient's needs in order to motivate the patient to participate. Finally, long-term effects must be assessed in order to verify whether reinforcement is needed. Following these steps, most of the studies show an improvement in the well-being of patients with schizophrenia. These recommendations are also suitable for the cognitive remediation programs, as for treatments with cognitive assistive devices. An important hurdle facing the advance of cognitive assistive technology programs is that different research groups work individually without a coordinated effort to improve and validate the existing programs. **CONCLUSION:** Schizophrenia treatments must take into account not only patients' symptoms, but also the associated cognitive deficits which constitute an important factor in their social problems. It has been shown that several cognitive remediation programs are efficient in schizophrenia. New technologies complement the benefits of such programs, and support pharmacological treatments and psychotherapies.

2009O2: 10.1016/j.encep.2008.02.010

1. Bußmeier B. Studies on vigilance in psychotic patients of a day-care clinic. diss.fu-berlin.de. 2007;

_Doctoral Thesis_

Studies on vigilance were conducted in 83 psychotic patients, who took part in the computer-assisted vigilance training RehaCom® of the company Hasomed within the scope of a naturalistic study during their psychiatric treatment at a day-care clinic. This training, which takes the form of the simulation of work on an assembly line in a factory, aims to train the patient to be able to maintain attention over a longer period while having to respond to items under time-critical conditions. In the process, the level of difficulty is adapted according to the patients performance. The patients underwent a total of six sessions of vigilance training three times per week in two consecutive weeks. All patients improved their training performance during the six training days. In accordance with the adapted performance targets, four different progression types were differentiated: 16 patients (19 %) showed an optimal progression, in the case of 44 patients (53 %) there was an average progression, 16 patients (19 %) showed a below average progression and seven patients (8 %) were assessed as a fluctuating progression type. 84.34 % reached the maximum possible level of difficulty within the six training days. There were clear differences with regard to the point in time at which the highest level of difficulty was reached. Differentiated analysis was possible by assessing the speed of the increase in performance. Within the scope of criteria set by the patients themselves, 47 % showed no problems in vigilance and 53 % showed moderate to severe problems in vigilance. Gender, age, educational level, diagnosis, negative symptomatology and general psychopathology had no significant effect on the results. Positive symptomatology and neuroleptic medication did have a significant effect on the results. Patients with high to very high positive symptomatology achieve their best result significantly later than patients with low positive symptomatology. Patients who were receiving a conventional neuroleptic drug alone or in combination with an atypical drug achieved poorer results than patients who were receiving only an atypical neuroleptic drug. The computer-assisted vigilance training RehaCom® of the company Hasomed is suitable for training and for diagnosing problems in vigilance in psychotic patients, although it would be advisable to raise the level of difficulty of the vigilance training.

2007


Le fait que le panneau de contrôle comprenne seulement quelques touches et une manette rend l’utilisation de REHA-COM® adaptée aux patients souffrant de troubles moteurs ou incapables d’utiliser un clavier classique. 14]; Puhr U. Effektivität der RehaCom®-Programme .

201203:
3. García-Fernández L, Pérez-Maciá V, Pérez-Martín… J.

EPA-1775–Cognitive remediation in first psychosis episodes. does it improve functioning? European …. 2014

Our aim is to evaluate if a computerised cognitive remediation program (RehaCom®) improves cognition, and therefore insight, functioning and quality of life in early stages of psychosis. A randomized open label prospective.

2014


AIM: Reduced cognitive insight has been associated with psychotic symptoms, in particular with the presence of delusions; however, there is little information about whether such reductions are present in at-risk individuals prior to the onset of threshold psychotic symptoms.

METHOD: We conducted a cross-sectional comparison of cognitive insight (as indexed by the Beck Cognitive Insight Scale) in 62 help-seeking individuals at clinical high risk for psychosis, Fifty-nine individuals with schizophrenia-spectrum disorders and 37 healthy controls (HC). In patients, we evaluated associations of insight with positive symptoms, including later transition to psychosis in high-risk patients.

RESULTS: Individuals with schizophrenia reported significantly higher self-certainty scores than the at-risk patients and HCs, with the at-risk patients scoring intermediate to the individuals with schizophrenia and controls. Similarly, individuals with schizophrenia scored significantly higher on self-reflectiveness, with no differences between the at-risk patients and controls. In individuals with schizophrenia, delusions were significantly correlated with self-certainty. In at-risk patients, cognitive insight was not associated with positive symptom severity and did not differentiate those at-risk patients who later developed psychosis from those who did not. However, post hoc analyses suggested that at-risk patients with marked unusual thought content (approaching threshold psychosis) had lower self-reflectiveness; whereas those with high suspiciousness had significantly higher self-certainty.

CONCLUSIONS: The findings are discussed in the context of normal developmental processes occurring during adolescence, their putative links to neurobiological functioning, and their implications for treatment and future research.

2014O2: 10.1111/eip.12023


Perhaps most exciting in this literature is an increasing number of computerized interventions that adjust automatically to the patients’ abilities and increase in difficulty as they progress while requiring minimal staff input and expertise (e.g., Cogniplus, COGPAK, RehaCom®).

http://books.google.com/books?hl=en&lr=&id=pysL9tpMoAC&oi=fnd&pg=PA183&dq=RehaCom*&ots=7M_9RY20Ww&sig=IJsFvDpSvQV_D8sxhasAkaNgqY
Dementia


**OBJECTIVES:** This study was to evaluate the effects of cognitive rehabilitation training on the cognitive decline of elderly dementia patients.

**METHODS:** Each of 20 subjects received 16 session of repeated training with computer-aided cognitive rehabilitation program (RehaCom®). Cognitive function of all subjects were evaluated by K-DRS, K-BNT, K-MMSE and GDS before and after the training.

**RESULTS:** Significant improvement of attention and memory was observed following RehaCom®. There was no significant change in visuospatial memory, executive function, and conceptualization.

**CONCLUSION:** It is suggested that cognitive rehabilitation training with elderly dementia patients can be useful to ameliorate the cognitive decline and to enhance motivation and self-esteem.

2003O4:

2. Oh BH, Kim YK, Kim JH, Shin YS. The effects of cognitive rehabilitation training on cognitive function of elderly dementia patients.


**OBJECTIVES:** This study was to evaluate the effects of cognitive rehabilitation training on the cognitive decline of elderly dementia patients. **METHODS:** Each of 20 subjects received 16 session of repeated training with computer-aided cognitive rehabilitation program (RehaCom®). Cognitive function of all subjects were evaluated by K-DRS, K-BNT, K-MMSE and GDS before and after the training. **RESULTS:** Significant improvement of attention and memory was observed following RehaCom®. There was no significant change in visuospatial memory, executive function, and conceptualization. **CONCLUSION:** It is suggested that cognitive rehabilitation training with elderly dementia patients can be useful to ameliorate the cognitive decline and to enhance motivation and self-esteem.

2003O4:

http://www.koreamed.org/SearchBasic.php?RID=0055JKNA/2003.42.4.514&DT=1


*Journal of Neurology, Neurosurgery & Psychiatry.* 2006; 77: 1116-1121.

A randomised pilot study to assess the efficacy of an interactive, multimedia tool of cognitive.
Parkinson’s Disease


Attention training was performed using the package RehaCom® - tests, consisting of 12 individual 1-h sessions over a six-week period.

2014O8:
1. Cherniack EP. Not just fun and games: applications of virtual reality in the identification and rehabilitation of cognitive disorders of the elderly. 

PURPOSE: To outline the evidence in the published medical literature suggesting the potential applications of virtual reality (VR) for the identification and rehabilitation of cognitive disorders of the elderly. METHOD: Non-systematic literature review. RESULTS: VR, despite its more common usage by younger persons, is a potentially promising source of techniques useful in the identification and rehabilitation of cognitive disorders of the elderly. Systems employing VR can include desktop and head-mounted visual displays among other devices. Thus far, published studies have described VR-based applications in the identification and treatment of deficits in navigational skills in ambulation and driving. In addition, VR has been utilised to enhance the ability to perform activities of daily living in patients with dementia, stroke, and Parkinson’s Disease. Such investigations have thus far been small, and unblinded. CONCLUSIONS: VR-based applications can potentially offer more versatile, comprehensive, and safer assessments of function. However, they also might be more expensive, complex and more difficult to use by elderly patients. Side effects of head-mounted visual displays include nausea and disorientation, but, have not been reported specifically in older subjects.

2011 O4: 10.3109/17483107.2010.542570

2. Garcia Marin J, Felix Navarro K, Lawrence E.

Serious games to improve the physical health of the elderly: A categorization scheme. 

This paper aims to provide a snapshot of the current status in the field of serious games for improving the physical health of the elderly. This work covers recent research projects for stroke rehabilitation and for falls prevention where user-center design methodologies were applied in order to satisfy this audience. A classification of the most relevant work in this area is provided along with a brief description of the platform, technology required and user-center design principles applied. At the end the authors compared the most relevant work found and used a system called RehaCom® as a reference. This work complements and extends previous classifications.

2011

*The Effects of Computerized Cognitive Rehabilitation with White Noise on Memory and Attention in Elderly.* 2013

In Korea, a cognitive rehabilitation program using a computer has been spotlighted since 2000. The frequently used programs are COMCOG, RehaCom®, Captain’s log, and PSS CogRehab.

2013


[Purpose] This study examined the effects of computer-aided cognitive rehabilitation (CACR) training and balance exercise on elderly individuals’ cognitive and visual perception. [Subjects] Thirty healthy subjects aged between 65 and 80 participated in this study. They were randomly and equally assigned to either a CACR training group (TG) or a balance exercise group (BEG). [Methods] Subjects’ cognitive functions and visual perception were measured using the Korean mini-mental state examination (MMSE-K) and the motor-free visual perception test (MVPT-3), respectively. For intervention methods, the TG received interval vision training using the RehaCom® program, a Cognitive Rehabilitation Computer Program derived the Vienna Test System, and vision composition training with attention training programs for 30 minutes, 3 times per week, for 6 weeks. The BEG training consisting of warm-up exercises, main exercises, and cool-down exercises, for 50 minutes, 3 times per week, for 6 weeks. [Results] Both the TG and the BEG saw their MMSE-K and MVPT-3 scores significantly increase after the interventions, but the two groups showed no significant differences. [Conclusion] Given that the effects of CACR training were similar to those of the balance exercise training, we consider CACR training is a viable treatment method for preventing the decrease of cognitive function among the elderly.

2012ONo. 9 October:

http://jlc.jst.go.jp/DN/JST.JSTAGE/jpts/24.885?from=Google

5. Lee YM, Jang C, Bak IH, Yoon JS. 

*Effects of Computer-assisted Cognitive Rehabilitation Training on the Cognition and Static Balance of the Elderly.*


[Purpose] The purpose of this study was to investigate the effects of a six-week-long computer-assisted cognitive rehabilitation training program on the improvement of cognition and balance abilities of the elderly. [Subjects] Thirty healthy elderly people, aged 65 to 80, were randomly assigned either to the training group (n=15) or the control group (n=15). [Methods] Cognitive functions were evaluated using MMSE-K, and the BioRescue AP 153 (RMINGENIERIE, France) was used to examine subjects’ changes in static balance. [Results] The MMSE-K score showed a significant change over the course of the treatment...
period in the training group, but not in the control group. The sway area and sway path length decreased significantly in the training group, but it did not show any changes in the control group. [Conclusion] Computer-assisted cognitive rehabilitation training is an effective intervention method for the improvement of the cognition and balance abilities of the elderly.

2013O11:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3881481/


RehaCom® [17] and PSS CogRehab [18] are cognitive rehabilitation programs (only for problem resolution), the former is for users with brain damage, while the latter is not only for this type of users but also for users with cognitive impairment.

2011OSeGAH:


Background/aims

It has been shown that cognitive training might help to protect against age-related cognitive decline. Our aim was to evaluate the efficacy of a computerized cognitive training application and its near transfer effects on the cognitive status of older adults.

Methods

Performance on the 7-Minute Screen at baseline and at the end of the program was analyzed by using a pre-post design. Adults aged 55 and older (n = 101; mean age ± standard deviation: 68.97 ± 5.81 years) with and without memory impairments were trained.

Results

Significant improvements after the training program were found in memory, visuo-spatial and verbal fluency abilities, regardless of age, gender or education. Moreover, participants without significant memory impairments and those with Age-Associated Memory Impairment gained from the program more than subjects with mild cognitive impairment.

Conclusion
Computerized cognitive training programs, such as Telecognitio®, may be used as a practical and valuable tool in clinic to improve cognitive status.

**2013O4:** 10.1007/s40520-013-0070-5


*Proceedings of the National Academy of Sciences. 2006; 103: 12523-12528.*

Normal aging is associated with progressive functional losses in perception, cognition, and memory. Although the root causes of age-related cognitive decline are incompletely understood, psychophysical and neuropsychological evidence suggests that a significant contribution stems from poorer signal-to-noise conditions and down-regulated neuromodulatory system function in older brains. Because the brain retains a lifelong capacity for plasticity and adaptive reorganisation, dimensions of negative reorganisation should be at least partially reversible through the use of an appropriately designed training program. We report here results from such a training program targeting age-related cognitive decline. Data from a randomised, controlled trial using standardised measures of neuropsychological function as outcomes are presented. Significant improvements in assessments directly related to the training tasks and significant generalisation of improvements to nonrelated standardised neuropsychological measures of memory (effect size of 0.25) were documented in the group using the training program. Memory enhancement appeared to be sustained after a 3-month no-contact follow-up period. Matched active control and no-contact control groups showed no significant change in memory function after training or at the 3-month follow-up. This study demonstrates that intensive, plasticity-engaging training can result in an enhancement of cognitive function in normal mature adults.

**2006O33:**

http://www.pnas.org/content/103/33/12523.full


OBJECTIVES: This study was to evaluate the effects of cognitive rehabilitation training on the cognitive decline of elderly dementia patients. METHODS: Each of 20 subjects received 16 session of repeated training with computer-aided cognitive rehabilitation program (RehaCom®). Cognitive function of all subjects were evaluated by K-DRS, K-BNT, K-MMSE and GDS before and after the training. RESULTS: Significant improvement of attention and memory was observed following RehaCom®. There was no significant change in visuospatial memory, executive function, and conceptualisation. CONCLUSION: It is suggested that cognitive rehabilitation training with elderly dementia patients can be useful to ameliorate the cognitive decline and to enhance motivation and self-esteem.

**2003O4:**

http://www.koreamed.org/SearchBasic.php?RID=0055JKNA/2003.42.4.514&DT=1
The purpose of the present study was to assess the impact of the RehaCom® software as a cognitive remediation therapy in performance of fine motor skills in children with Down syndrome.

Background: Cognitive remediation therapy (CRT) is a non biological treatment that aims at correcting cognitive deficits through repeated exercises. Its efficacy in patients with Down syndrome is not well recognized yet, as children with Down syndrome have visual-perceptual dysfunction as a result of limited sensory experience from the lack of normal motor control. Objective: The purpose of the present study was to assess the impact of the RehaCom® software as a cognitive remediation therapy in performance of fine motor skills in children with Down syndrome. Methods: Twenty-six children with Down syndrome with age ranged between seven and ten years participated in this study. All those children showed average intelligence level. First, evaluation of fine motor dysfunction by Peabody Developmental Measuring Scale 2 (PDMS-2) and the visual perceptual test reaction duration (maximal and minimal) was detected for each child. Then, children were divided into two equal groups: a control and a study group. Therapy program for enhancing fine-motor skills was given to the two groups. In addition, children within the study group received Visual-perceptual integrative therapy program (RehaCom®). Post treatment evaluation was done after three months. Results: At the end of treatment, children within the study groups showed significant improvement with regard to grasping, fine-motor quotient and maximum and minimal reaction time of visual perceptual test performance (P<0.05). Conclusion: Visual-perceptual training improves fine-motor skills performance in children with Down syndrome. Key words: Visual perception, Cognition, Hand skills, Down syndrome.

2014O1:

Telehealth


The purpose of this study was to clinically validate a new modality of cognitive rehabilitation services based on telemedicine systems (PREVIRNEC platform) for persons with moderate or severe traumatic brain injury (TBI). Patients and Methods. Eighty patients with moderate or severe TBI; mean age: 36.1 years (SD= 18.19 years) received a 10-week cognitive rehabilitation (5 sessions-week). Differences between pre- and post-treatment neuropsychological test scores were used to measure patient’s improvements in the domains of attention, memory and executive functions. Patients were divided in two groups based on the Competency Rating Scale (PCRS; adequate or inadequate everyday competence) post-rehabilitation score. Results. Patients showed significant cognitive improvement after the application of the computerized cognitive rehabilitation program. Significant differences were observed between both groups on the number of highly-performed tasks during cognitive treatment, in the attention (p=0.026) and executive (p=0.040) execution. Conclusions. The cognitive rehabilitation program based on telemedicine systems (PREVIRNEC platform) improves attention, memory, and executive functions, as well as in patient’s everyday competence.

2010

http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5756537
Epilepsy surgery is a valuable treatment option for patients with pharmacoresistant epilepsy, but seizure freedom is often achieved at the cost of cognitive impairments caused by surgery. The aim of this study was to investigate the short-term effects of cognitive rehabilitation on memory outcome after temporal lobe epilepsy surgery.

Methods

Two groups of patients who underwent temporal lobe resection, one followed (n = 55) and one not followed (n = 57) by postoperative rehabilitation, were evaluated with respect to memory and attention before and 3 months after temporal lobe surgery. The groups came from different epilepsy centers, but were largely matched with respect to age, sex, type of surgery, and seizure outcome.

Results

After surgery, 78% of the patients were seizure-free. Repeated-measures MANOVA revealed a significant “side × surgery” effect on verbal recognition and a “rehabilitation × surgery” effect on verbal learning and recognition. There were no effects for loss in verbal delayed recall or figural memory. Detailed analyses indicated gains as a result of rehabilitation, particularly after right temporal lobe surgery. Attention generally improved. The risk of manifesting losses in verbal memory was about four times higher without than with rehabilitation.

Conclusions

Rehabilitation can counteract the verbal memory decline that is normally seen after temporal lobe resection. Its positive effects were evident particularly with respect to the more cortically associated aspects of verbal learning rather than to the mesial aspects of long-term consolidation/retrieval. Figural memory was not affected at all, and attention improved independent of rehabilitation. Interestingly, left temporal lobe-resected patients, who were most in need of an efficacious rehabilitation, profited less than right temporal lobe-resected patients, indicating that left-sided surgery may reduce the capacity needed for efficient training of verbal memory. Thus, rehabilitation has a positive effect on memory outcome, but its usefulness for risk groups and the question of whether training should be performed after or possibly before surgery are debatable. Further research should also address different interventions, longer-term outcome, and the carryover effects on everyday functioning.

Patients attended, on average, four to five sessions per week. Cognitive exercises used a modified form of Riglings Reha Service and Hasomed’s RehaCom®, both multimedia cognitive rehabilitation software designed for use with individuals with compromised brain function.

2008O3: 10.1016/j.yebeh.2007.11.010
http://www.epilepsybehavior.com/article/S1525-5050(07)00435-0/abstract
Working Memory


Objective

Epilepsy surgery is a valuable treatment option for patients with pharmacoresistant epilepsy, but seizure freedom is often achieved at the cost of cognitive impairments caused by surgery. The aim of this study was to investigate the short-term effects of cognitive rehabilitation on memory outcome after temporal lobe epilepsy surgery.

Methods

Two groups of patients who underwent temporal lobe resection, one followed (n = 55) and one not followed (n = 57) by postoperative rehabilitation, were evaluated with respect to memory and attention before and 3 months after temporal lobe surgery. The groups came from different epilepsy centers, but were largely matched with respect to age, sex, type of surgery, and seizure outcome.

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2008O3: 10.1016/j.yebeh.2007.11.010

http://www.epilepsybehavior.com/article/S1525-5050(07)00435-0/abstract


Memory training in combination with practice in semantic structuring and word fluency has been shown to improve memory performance. This study investigated the efficacy of a working memory training combined with exercises in semantic structuring and word fluency and examined whether training effects generalize to other cognitive tasks.

Methods. In this double-blind randomized control study, 36 patients with memory impairments following brain damage were allocated to either the experimental or the active control condition, with both groups receiving 9 hours of therapy. The experimental group received a computer-based working memory training and exercises in word fluency and semantic structuring. The control group received the standard memory therapy provided in the rehabilitation center. Patients were tested on a neuropsychological test battery before and after therapy, resulting in composite scores for working memory; immediate, delayed, and prospective memory; word fluency; and attention.

Results. The experimental group improved significantly in working memory and word fluency. The training effects also generalized to prospective memory tasks. No specific effect on episodic memory could be demonstrated.

Conclusion. Combined treatment of working memory training with exercises in semantic structuring is an effective method for cognitive rehabilitation of organic memory impairment.

2015O1: http://nnr.sagepub.com/content/29/1/33.short

4. Sonuga-Barke E, Brandeis D, Holtmann M, Cortese S.

Computer-based Cognitive Training for Attention-Deficit/Hyperactivity Disorder.

KEY POINTS

Cognitive training approaches, such as working memory training (WMT), are being increasingly used to target both the symptoms and the underlying neuropsychological deficits in patients with attention-deficit/hyperactivity disorder (ADHD). The rationale of these approaches is both biologically plausible and supported by basic cognitive neuroscience.

There are now 14 randomized controlled trials (RCTs) with ADHD outcomes (8 published in the past 2 years or so).

At present, given the inconsistency of extant findings, more evidence from well-blinded trials is required before cognitive training can be supported as a frontline treatment of ADHD.

Evidence in relation to improved neuropsychological function maybe more positive, but additional research is required.

Future research should focus on ways to improve the content and implementation, and increase the scope, of these potentially important therapeutic approaches.

Utilised RehaCom® Attention, memory, executive functions, visuomotor

http://www.researchgate.net/profile/Samuele_Cortese/publication/264644984_Computer-based_Cognitive_Training_for_Attention-
5. Spahn V, Kulke H, Kunz M, Thöne-Otto… A. Is the Neuropsychological Treatment of Memory Specific or Unspecific?


Primary objective and research design: In order to analyze whether neuropsychological memory therapy acts specifically on the memory domain or in a more generalized fashion on further cognitive domains, 27 patients with organic memory deficits due to different etiologies (cerebrovascular, traumatic, infectious, etc.) were randomly assigned to two different memory treatment programs and investigated for changes in memory and attention. Methods and procedures: Patients treated by a specific computer-based training of story recall (Training of Verbal Memory, TVM) were compared to a group in which compensational strategies for everyday memory problems were trained (Memory Therapy in Groups, MTG). Both therapies were conducted over 12 to 15 sessions, 4–5 times per week, in addition to standard program of neurorehabilitation. Training effects were assessed for verbal and figural memory (Verbal Learning Test, Nonverbal Learning Test) and for attention (Alertness and Divided Attention in Test Battery of Attentional Performance). Results and conclusions: Both treatment groups resulted in improvement in tests of memory but not attention. This finding provides good evidence for the assumption of specificity of effects in neuropsychological treatment of memory.

2010O4: 10.1024/1016-264X/a000019

http://www.psycontent.com/index/E8H370626026J570.pdf


Computer-based cognitive assessment programs for children have recently become increasingly popular. This assessment tool has many advantages over traditional assessment approaches including the option of offering an immediate feedback, the ability to systematize delivery of the test items and to modify the difficulty level and the ability to quantify progress.

Purpose: the purpose of the study is to establish a reference baseline for the cognitive skills among Egyptian school-aged children.

Method: This study is a cross-sectional prospective design. A sample of 223 healthy children of both sexes, of age ranged from 6-12 years, from urban areas’ elementary schools in Upper Egypt were recruited.

Results: RehaCom® program tool produced a separate progress report for the individual progress of every child. Conclusions: Based on the study's results the executive function ability was the first to initiated followed by the logical reasoning and finally the topological memory and vigilance.

201410.1007/978-3-319-09891-3_7
http://link.springer.com/chapter/10.1007/978-3-319-09891-3_7


BACKGROUND: Homonymous visual field defects (HVFDs) are one of the most common consequences of stroke. Compensatory training encourages affected individuals to develop more efficient eye movements to improve function. However, training is typically supervised, which can be time consuming and costly.

OBJECTIVE: To develop and evaluate the efficacy and feasibility of an unsupervised reading and exploration computer training for individuals with HVFDs.

METHODS: Seventy individuals with chronic HVFDs were randomly assigned to 1 of 2 groups: intervention or control. The former received 35 hours of reading and exploration training, and the latter received 35 hours of control training. Visual and attentional abilities were assessed before and after training using perimetry, visual search, reading, activities of daily living, the Test of Everyday Attention, and a Sustained Attention to Response task.

RESULTS: Eighteen individuals failed to complete the training; analyses were conducted on the remaining 28 intervention and 24 control group participants. Individuals in the intervention group demonstrated significant improvements in the primary outcomes of exploration (12.87%, 95% confidence interval [CI] = 8.44% to 17.30%) and reading (18.45%,
95% CI = 9.93% to 26.97%), which were significantly greater than those observed following the control intervention (exploration = 4.80%, 95% CI = 0.09% to 9.51%; reading = 1.95%, 95% CI = –4.78% to 8.68%). Participants in the intervention group also reported secondary subjective improvements, although these were not matched by objective gains in tasks simulating activities of daily living. CONCLUSIONS: Home-based compensatory training is an inexpensive accessible rehabilitation option for individuals with HVFDs, which can result in objective benefits in searching and reading, as well as improving quality of life.

2014O3: 10.1177/1545968313503219

Background: There is controversial information on the efficacy of cognitive rehabilitation in multiple sclerosis (MS).
Objective: The objective of this paper is to test a home-based computerized program for retraining attention dysfunction in MS.
Methods: Relapsing–remitting patients who failed > 2 tests of attention on an extensive neuropsychological battery were randomized to specific or nonspecific computerized training (ST, n-ST), in one-hour sessions, twice a week for three months. Outcome measures included neuropsychological assessment, depression, fatigue, everyday activities and a visual analogue scale assessing attentive performance (VAS). Assessments were repeated after the interventions and after a further three months. Statistical analysis included the analysis of variance (ANOVA) for repeated measures.
Results: Eighty-eight out of 102 randomized patients completed the study (69 women, age 40.9 ± 11.5 years, disease duration 13.0 ± 8.7 years, Expanded Disability Status Scale score 2.7 ± 1.5). Fifty-five patients were randomized to ST, 33 to n-ST. A benefit of the ST was observed on the Paced Auditory Serial Addition Test (p < 0.002). However, patient self-report did not reveal differences between ST and n-ST patient groups.
Conclusion: Although our program trained different attention components, we could detect some improvements exclusively on tasks of sustained attention. Moreover, patient self-perceived results may be independent of the training program.
2014O1: 10.1177/1352458513501571
http://msj.sagepub.com/content/20/1/91.short

BACKGROUND: We report the effects of a computer-based neuropsychological training in children with Attention-Deficit Hyperactivity Disorder (ADHD). We hypothesized that a specific training focusing on attentional dysfunction would result in an improvement of inattention, observable in test performance, behavior and performance during experimental school lessons and in parent and teacher ratings of the related core symptom.

METHOD: We chose a within-subject-control-design with a 4 week baseline period and subsequent 12 to 15 weekly training-sessions. 30 children (6 to 13 years old) with a diagnosis of ADHD (ICD 10: F 90.0) and no other comorbidities participated in the study.

RESULTS: The training revealed significant improvement in training parameters of the neuropsychological training and in the symptoms of inattention and deportment as rated during experimental school lessons. However, generalization of training effects as measured by parent and teacher ratings was not detected.

CONCLUSIONS: We conclude that neuropsychological training could be helpful as one adjunct module in the complex treatment of ADHD but to prove clinical value, similar training programs must focus more strongly on individually existing neuropsychological deficits. Training programs should be more intensive and should eventually be combined with home based training access.

201310.3233/NRE-130877

5. An SK, Oh BH, Hyun MH, Yoo KJ. The effect of attention training using computer-aided cognitive rehabilitation program (RehaCom®) in chronic schizophrenics.


OBJECTIVE: The authors study evaluated the effect of a cognitive rehabilitation program designed to enhance the attention skill of chronic schizophrenics.

METHODS: Dependent variables included measures of perceptual sensitivity and response criterion derived from the Vigilance test of Vienna test system. Each of 10 subjects received 10 sessions of repeated training with computer-aided cognitive rehabilitation program(RehaCom®). Eleven subjects were assigned to a control group. All subject were rated on measures of positive and negative symptoms before training.

RESULTS: Significant changes on the outcome measures were observed following attention training.

CONCLUSION: It is suggested that cognitive rehabilitation with chronic schizophrenics should stress the possibility of remediating deficiencies in basic abilities, such as attention.

1997O1:


This study was designed in an attempt to determine whether computer-assisted cognitive retraining was anymore effective in remediating the cognitive sequelae of severe closed head injury than were comparable noncomputerized cognitive treatment techniques. The experimental group was comprised of 17 severe closed head injured patients and the noncomputerized control group had 17 patients. Each group received 20 hours of cognitive therapy over a four to six week period. The analysis revealed that on all measures there was a significant improvement in the level of performance on the experimental and the control subjects at the time of the posttreatment assessment compared to the pretreatment assessment.

1988O3:


Thirty-four-day treatment program clients diagnosed with schizophrenia or schizoaffective disorder were randomly assigned to a computer-assisted cognitive rehabilitation (CACR) group or a wait-list Control group. CACR clients received 16 CACR sessions over an 8-week period. Measures of cognitive functioning, negative symptoms and self-esteem were administered at the beginning and end of this period. CACR clients showed greater improvement in cognitive functioning (verbal memory and attention) and negative symptoms. Symptom reduction was not mediated by raised self-esteem. CACR's effects may go beyond cognitive remediation to include some of the most disabling and refractory clinical features of schizophrenia.

2003O2-3:


Cognitive training has been an accepted therapeutic intervention in the areas of psycholinguistics and special education for learning disability in children and adults for several decades. Current controversy revolves around the questions of “faddism,” the potential to effect meaningful change in a neurologically stable individual, and the use of the computer as synonymous with cognitive rehabilitation.

A cognitive impairment is a consequence of a structural lesion that may be measured. Neuropsychologic testing enables us to identify that specific impairment that is a consequence of the structural deficit. Brain injury results in impaired function of localized
higher-order sensory and motor function corresponding to these well-defined anatomic structures, but it also results in a variety of functions that are not clearly localized, such as the abilities to abstract and to reason. The first step in the process of rehabilitation is to identify the specific deficits.

1990O2: 10.1001/archneur.1990.00530020127025


*J Neurol.* 2015; 262: 91-100.

In contrast to previous studies based on the use of the RehaCom® software we applied a five-session protocol, centered in “logical thinking,” “attention and concentration”, “reaction behavior”, “plan a day”, and “divided attention”; this more extended programme probably allowed a better training of attentive functions and processing speed.

2015O1: 10.1007/s00415-014-7528-z


*Psychiatry Res.* 2011; 192: 160-166.

Cognitive remediation therapy (CRT) is a non biological treatment that aims to correct cognitive deficits through repeated exercises. Its efficacy in patients with schizophrenia is well recognized, but little is known about its effect on cerebral activity. Our aim was to explore the impact of CRT on cerebral activation using functional magnetic resonance imaging (fMRI) in patients with schizophrenia. Seventeen patients and 15 healthy volunteers were recruited. Patients were divided into two groups: one group received CRT with RehaCom®(R) software (n=8), while a control group of patients (non-CRT group) received no additional treatment (n=9). The three groups underwent two fMRI sessions with an interval of 3 months: they had to perform a verbal and a spatial n-back task at the same performance level. Patients were additionally clinically and cognitively assessed before and after the study. After CRT, the CRT group exhibited brain over-activations in the left inferior/middle frontal gyrus, cingulate gyrus and inferior parietal lobule for the spatial task. Similar but nonsignificant over-activations were observed in the same brain regions for the verbal task. Moreover, CRT patients significantly improved their behavioural performance in attention and reasoning capacities. We conclude that CRT leads to measurable physiological adaptation associated with improved cognitive ability. Trial name: Cognitive Remediation Therapy and Schizophrenia. http://clinicaltrials.gov/ct2/show/NCT01078129. Registration number: NCT01078129.

11. Borecki L, Tolstych K, Pokorski M. NON-EDUCATIONAL VIDEOGAMES IN EMOTIONAL, COGNITIVE AND ANTI-STRESS TRAINING.
BIOPHILIA. 2011

Eysenck’s EPQ-R was used to assess personality, selected tests of Dr. Schufried’s Vienna TestSystem, Hasomed’s RehaCom® and Wechsler’s WAIS-R to assess cognitive functioning and Endler’s and Parker’s Coping Inventory for Stressful Situations to assess coping with stress.

2011
http://jlc.jst.go.jp/DN/JST.JSTAGE/ibra/1.4_21?from=Google

Frontiers in systems neuroscience. 2014; 8

Symptoms of visuospatial neglect occur frequently after unilateral brain damage. Neglect hampers rehabilitation progress and is associated with reduced quality of life. However, existing treatment methods show limited efficacy. Transcranial direct current stimulation (tDCS) is a neuromodulatory technique, which can be used to increase or decrease brain excitability. Its combination with conventional neglect therapy may enhance treatment efficacy. A 72-year-old male with a subacute ischemic stroke of the right posterior cerebral artery suffering from visuospatial neglect, hemianopia, and hemiparesis was treated with biparietal tDCS and cognitive neglect therapy in a double-blind, sham-controlled single-case study. Four weeks of daily treatment sessions (5 days per week, 30 min) were started 26 days post-stroke. During week 1 and 4 the patient received conventional neglect therapy, during week 2, conventional neglect therapy was combined once with sham and once with real biparietal tDCS. Week 3 consisted of daily sessions of real biparietal tDCS (1 mA, 20 min) combined with neglect therapy. Outcome measures were assessed before, immediately after, as well as 1 week and 3 months after the end of treatment. They included subtests of the Test for Attentional Performance (TAP): covert attention (main outcome), alertness, visual field; the Neglect-Test (NET): line bisection, cancelation, copying; and activities of daily living (ADL). After real stimulation, covert attention allocation toward left-sided invalid stimuli was significantly improved, and line bisection and copying improved qualitatively as compared to sham stimulation. ADL were only improved at the 3-month follow-up. This single-case study demonstrates for the first time that combined application of tDCS and cognitive training may enhance training-induced improvements in measures of visuospatial neglect and is applicable in a clinical context.

2014
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4179329/
Rehabilitation programs integrating cognitive remediation (CR) and psychosocial rehabilitation are often implemented as they seem to yield greater improvements in functional outcome than stand alone treatment approaches. Mechanisms underlying synergistic effects of combining CR with psychosocial interventions are not fully understood. Disentangling the relative contribution of each component of integrated programs might improve understanding of underlying mechanisms. In the present study we compared the efficacy of two components of our rehabilitation program [the Neurocognitive Individualized Training (NIT) and the Social Skills Individualized Training (SSIT)].

Seventy-two patients with schizophrenia or schizoaffective disorder were randomly assigned to one of two treatment groups. Changes in cognitive, psychopathological and real-world functioning indices after 6 and 12 months were compared between the two groups. After both 6 and 12 months, NIT produced an improvement of attention, verbal memory and perseverative aspects of executive functioning, while SSIT produced a worsening of visuo-spatial memory and attention and no significant effect on the other cognitive domains. As to the real-world functioning, NIT produced a significant improvement of interpersonal relationships, while SSIT yielded a significant improvement of QLS instrumental role subscale.

According to our findings, cognitive training is more effective than social skills training on several cognitive domains and indices of real-world functioning relevant to subject’s relationships with other people. Integrated approaches might target different areas of functional impairment but should be planned carefully and individually to fully exploit the synergistic potential.

Neurocognitive Individualized Training (NIT). NIT is based on a computer-assisted cognitive rehabilitation program, RehaCom®, developed by the HASOMED GmbH (Inc., Ltd) in Magdeburg, Germany.

2013O1:

14. Bußmeier B. Studies on vigilance in psychotic patients of a day-care clinic. dissfu-berlinde. 2007;

Doctoral Thesis

Studies on vigilance were conducted in 83 psychotic patients, who took part in the computer-assisted vigilance training RehaCom® of the company Hasomed within the scope of a naturalistic study during their psychiatric treatment at a day-care clinic. This training, which takes the form of the simulation of work on an assembly line in a factory, aims to train the patient to be able to maintain attention over a longer period while having to respond to items under time-critical conditions. In the process, the level of difficulty is adapted according to the patients performance. The patients underwent a total of six
sessions of vigilance training three times per week in two consecutive weeks. All patients improved their training performance during the six training days. In accordance with the adapted performance targets, four different progression types were differentiated: 16 patients (19%) showed an optimal progression, in the case of 44 patients (53%) there was an average progression, 16 patients (19%) showed a below average progression and seven patients (8%) were assessed as a fluctuating progression type. 84.34% reached the maximum possible level of difficulty within the six training days. There were clear differences with regard to the point in time at which the highest level of difficulty was reached. Differentiated analysis was possible by assessing the speed of the increase in performance. Within the scope of criteria set by the patients themselves, 47% showed no problems in vigilance and 53% showed moderate to severe problems in vigilance. Gender, age, educational level, diagnosis, negative symptomatology and general psychopathology had no significant effect on the results. Positive symptomatology and neuroleptic medication did have a significant effect on the results. Patients with high to very high positive symptomatology achieve their best result significantly later than patients with low positive symptomatology. Patients who were receiving a conventional neuroleptic drug alone or in combination with an atypical drug achieved poorer results than patients who were receiving only an atypical neuroleptic drug. The computer-assisted vigilance training RehaCom® of the company Hasomed is suitable for training and for diagnosing problems in vigilance in psychotic patients, although it would be advisable to raise the level of difficulty of the vigilance training.

2007


OBJECTIVES: This study was to evaluate the effects of cognitive rehabilitation training on the cognitive decline of elderly dementia patients.

METHODS: Each of 20 subjects received 16 session of repeated training with computer-aided cognitive rehabilitation program (RehaCom®). Cognitive function of all subjects were evaluated by K-DRS, K-BNT, K-MMSE and GDS before and after the training.

RESULTS: Significant improvement of attention and memory was observed following RehaCom®. There was no significant change in visuo spatial memory, executive function, and conceptualization.

CONCLUSION: It is suggested that cognitive rehabilitation training with elderly dementia patients can be useful to ameliorate the cognitive decline and to enhance motivation and self-esteem.

2003O4:

We evaluated evidence for the effectiveness of cognitive rehabilitation methods to improve outcomes for persons with traumatic brain injury (TBI). A search of MEDLINE, HealthSTAR, CINAHL, PsycINFO, and the Cochrane Library produced 600 potential references. Thirty-two studies met predetermined inclusion criteria and were abstracted; data from 24 were placed into evidence tables. Two randomized controlled trials and one observational study provided evidence that specific forms of cognitive rehabilitation reduce memory failures and anxiety, and improve self-concept and interpersonal relationships for persons with TBI. The durability and clinical relevance of these findings is not established. Future research utilizing control groups and multivariate analysis must incorporate subject variability and must include standard definitions of the intervention and relevant outcome measures that reflect health and function.

1999O3: 10.1097/00001199-199906000-00008


Background. Although a growing body of evidence has highlighted the role of cognitive rehabilitation (CR) in the management of cognitive dysfunctions in multiple sclerosis (MS), there is still no evidence for a validated therapeutic approach. Objective. We propose a new therapeutic strategy characterized by a computer-based intensive attention training program in MS patients with predominant attention deficits. We aim to investigate the effectiveness of our rehabilitation procedure, tailored for those with impaired abilities, using functional magnetic resonance imaging (fMRI). Methods. Using a doubleblind randomized controlled study, we enrolled 12 MS patients, who underwent a CR program (experimental group), and 11 age-gender–matched MS patients, who underwent a placebo intervention (control group). fMRI was recorded during the execution of a cognitive task broadly used for assessing attention abilities in MS patients (paced visual serial addition test). Results. Significant effects were detected both at a phenotypic and at an intermediate phenotypic level. After CR, the experimental group, in comparison with the control group, showed a specific enhanced performance in attention abilities as assessed by the Stroop task with an effect size of 0.88, which was associated with increased activity in the posterior cerebellar lobule and in the superior parietal lobule. Conclusions. Our study demonstrates that intensive CR tailored for those with impaired abilities affects neural plasticity and improves some aspects of cognitive deficits in MS patients. The reported neurophysiological and behavioral effects corroborate the benefits of our therapeutic approach, which might have a reliable application in the clinical management of cognitive deficits in MS.

2013O4: 10.1177/1545968312465194

*Neurological Sciences.* 2014; 35: 1173-1180.

Attention training was performed using the package RehaCom® - tests, consisting of 12 individual 1-h sessions over a six-week period.

201408: 


*NeuroRehabilitation.* 2013; 32, No 2: 359-368. 

OBJECTIVE: We conducted a systematic review and meta-analysis to identify the effect of computer-based cognitive rehabilitation (CBCR) on improving cognitive functions in patients with stroke.

METHODS: Researchers performed a literature search using computerized databases such as the Cochrane Database, EBSCO (CINAHL), PsycINFO, PubMed and Web of Science. The following keywords were used: stroke, computer-based, cognitive rehabilitation, and others. The methodological quality was evaluated. Statistical heterogeneity and standardized mean difference were used to compute the overall effect size and that of subgroups. Also publication bias of the selected studies was analysed.

RESULTS: Twelve studies met the inclusion criteria including a total of 461 stroke survivors. Among studies, six RCT studies were rated as high methodological quality. Overall effect size was medium 0.54, and the 95 % confidence interval was 0.33–0.74. The effect sizes of acute and chronic phase of stroke were both 0.54. They can be interpreted as medium effect size and were statistically significant. The statistical heterogeneity and publication bias were not significant.

CONCLUSION: The present study provides evidence that CBCR is effective on improving cognitive function after stroke. We recommend conducting meta-analysis on subgroups of CBCR programs in further studies.

201310.3233/NRE-130856 


This study examined the efficacy of computer-assisted cognitive rehabilitation (CACR) in persons with traumatic brain injury (TBI). Twenty persons with TBI who received hierarchically based CACR following inpatient neurorehabilitation were compared to a control group of twenty persons with TBI matched for age, education, days in coma and time between testing. The control group received traditional outpatient therapies
including OT, PT and Speech Therapy. The difference between pre- and post- treatment neuropsychological test scores was used to measure improvements in the domains of attention, visual spatial ability, memory and problem solving. The Computer Assisted Cognitive Rehabilitation Therapy group made statistically significant gains in cognitive/intellectual functioning on 16 neuropsychological test measures while the Traditional Therapy group made statistically significant gains on 7 measures.

1997O3:


PURPOSE: To outline the evidence in the published medical literature suggesting the potential applications of virtual reality (VR) for the identification and rehabilitation of cognitive disorders of the elderly.

METHOD: Non-systematic literature review.

RESULTS: VR, despite its more common usage by younger persons, is a potentially promising source of techniques useful in the identification and rehabilitation of cognitive disorders of the elderly. Systems employing VR can include desktop and head-mounted visual displays among other devices. Thus far, published studies have described VR-based applications in the identification and treatment of deficits in navigational skills in ambulation and driving. In addition, VR has been utilised to enhance the ability to perform activities of daily living in patients with dementia, stroke, and Parkinson's Disease. Such investigations have thus far been small, and unblinded.

CONCLUSIONS: VR-based applications can potentially offer more versatile, comprehensive, and safer assessments of function. However, they also might be more expensive, complex and more difficult to use by elderly patients. Side effects of head-mounted visual displays include nausea and disorientation, but, have not been reported specifically in older subjects.

2011O4: 10.3109/17483107.2010.542570


Objective: To establish evidence-based recommendations for the clinical practice of cognitive rehabilitation, derived from a methodical review of the scientific literature concerning the effectiveness of cognitive rehabilitation for persons with traumatic brain injury (TBI) or stroke.

Conclusions: Overall, support exists for the effectiveness of several forms of cognitive rehabilitation for persons with stroke and TBI. Specific recommendations can be made for remediation of language and perception after left and right hemisphere stroke, respectively, and for the remediation of attention, memory, functional communication,
and executive functioning after TBI. These recommendations may help to establish parameters of effective treatment, which should be of assistance to practicing clinicians.

200010.1053/apmr.2000.19240


Objective: To update our clinical recommendations for cognitive rehabilitation of people with traumatic brain injury (TBI) and stroke, based on a systematic review of the literature from 2003 through 2008.

Data Sources: PubMed and Infotrieve literature searches were conducted using the terms attention, awareness, cognitive, communication, executive, language, memory, perception, problem solving, and/or reasoning combined with each of the following terms: rehabilitation, remediation, and training for articles published between 2003 and 2008. The task force initially identified citations for 198 published articles.

Study Selection: One hundred forty-one articles were selected for inclusion after our initial screening. Twenty-nine studies were excluded after further detailed review. Excluded articles included 4 descriptive studies without data, 6 nontreatment studies, 7 experimental manipulations, 6 reviews, 1 single case study not related to TBI or stroke, 2 articles where the intervention was provided to caretakers, 1 article redacted by the journal, and 2 reanalyses of prior publications. We fully reviewed and evaluated 112 studies.

Data Extraction: Articles were assigned to 1 of 6 categories reflecting the primary area of intervention: attention; vision and visuospatial functioning; language and communication skills; memory; executive functioning, problem solving and awareness; and comprehensive-holistic cognitive rehabilitation. Articles were abstracted and levels of evidence determined using specific criteria.

Conclusions: There is substantial evidence to support interventions for attention, memory, social communication skills, executive function, and for comprehensive-holistic neuropsychologic rehabilitation after TBI. Evidence supports visuospatial rehabilitation after right hemisphere stroke, and interventions for aphasia and apraxia after left hemisphere stroke. Together with our prior reviews, we have evaluated a total of 370 interventions, including 65 class I or Ia studies. There is now sufficient information to
support evidence-based protocols and implement empirically-supported treatments for cognitive disability after TBI and stroke.

http://www.researchgate.net/publication/


Archives of physical medicine and rehabilitation. 2009; 90: S52-S59.

Objective

To evaluate the methodological quality of research on cognitive rehabilitation after traumatic brain injury (TBI).

Data Sources

Secondary analysis of studies identified in prior systematic reviews of cognitive rehabilitation.

Study Selection

Randomized controlled trials (RCTs) and observational studies involving exclusively or primarily participants with TBI.

Data Extraction

Criteria for evaluating methodological quality were adapted from prior reviews of rehabilitation research. These criteria were modified to be relevant to cognitive rehabilitation research. Sixteen criteria for evaluating the quality of RCTs were applied: 8 relating to the internal validity of studies, 5 descriptive criteria, and 3 statistical criteria. Twelve of these criteria were used to evaluate non-RCT observational studies.

Data Synthesis

Thirty-two RCTs and 21 observational studies were independently reviewed and rated by 2 of the authors. Initial agreement between raters for individual studies ranged from 57% to 100%. Interrater reliabilities based on the kappa statistic indicated moderate to substantial agreement.

Conclusions

Several high-quality RCTs support the effectiveness of interventions for attention, communication skills, and executive functioning after TBI. Several high-quality observational studies support the effectiveness of comprehensive-holistic rehabilitation after TBI, including improvements in participation outcomes. The proposed criteria appear useful for evaluating the quality of research on cognitive rehabilitation and improving the design and reporting of future research in this area.

2009O11: 10.1016/j.apmr.2009.05.019
26. Cochet A, Saoud M, Gabriele S et al. [Impact of a new cognitive remediation strategy on interpersonal problem solving skills and social autonomy in schizophrenia].
INTRODUCTION: Despite recent developments, the impact of pharmacotherapy on social autonomy and interpersonal problem solving skills in patients with schizophrenia remains limited, with consequences in terms of socio-professional functioning. Indeed, independently of the positive, negative and/or disorganization symptoms, functional deficits in patients with schizophrenia rely mainly on various cognitive impairments.
OBJECTIVES: To determine the impact of a new Cognitive Remediation Strategy on interpersonal problem solving skills, social autonomy and symptoms in patients with schizophrenia.
METHODS: Thirty patients with schizophrenia were enrolled in a program consisting of 14 training sessions of 4 cognitive functions (attention/concentration, topological memory, logical reasoning, executive functions) using the RehaCom® software. Measurements of attention (Continuous Performance Test, CPT), memory (Rivermead Behavioural Memory Test, RBMT) and executive functions (Wisconsin Card Sorting Test, WCST) as well as interpersonal problem solving skills (Assessment of Interpersonal Problem-Solving Skills, AIPSS) and social autonomy (Social Autonomy Scale, EAS) and finally schizophrenia symptoms (Positive And Negative Syndrome Scale, PANSS) were undertaken at the beginning and the end of the 14 remediation meetings.
RESULTS: Cognitive functions, interpersonal problems solving skills, social autonomy and symptoms were significantly improved by the Cognitive Remediation Strategy.
CONCLUSION: Our results confirm the therapeutic impact of a Cognitive Remediation Strategy among 30 schizophrenic patients stabilised on clinical, therapeutic and functional levels. The question of the long-term maintenance of such improvements still requires further investigation.
2006O2 Pt 1: 10.1016/S0013-7006(06)76144-9

27. d'Amato T, Bation R, Cochet A et al. A randomized, controlled trial of computer-assisted cognitive remediation for schizophrenia.
OBJECTIVE: There is considerable interest in cognitive remediation for schizophrenia. Our study aimed to evaluate, in a large sample of patients with schizophrenia, the interest of a computer-assisted cognitive remediation program on cognitive performances of patients as well as in clinical and functional outcome.
METHOD: Seventy-seven patients with remitted schizophrenia were randomly assigned to 14 2-hours individual sessions of computer-assisted cognitive remediation (n=39) or a control condition (n=38). Remediation was performed using RehaCom® (R) software. Four procedures were chosen to train four cognitive functions involved in different stages of the information processing: attention/concentration, working memory, logic, and executive functions. Primary outcomes were remediation exercise metrics, neuropsychological composites (episodic
memory, working memory, attention, executive functioning, and processing speed), clinical and community functioning measures. RESULTS: Cognitive performances concerning Attention/vigilance, verbal working memory and verbal learning memory and reasoning/problem solving improved significantly in the remediation condition when no difference was reported in the control condition between the 2 assessments. However, there were no significant benefits of cognitive remediation on non-verbal working memory and learning and speed of processing or functional outcome measures. CONCLUSIONS: Cognitive remediation for people with schizophrenia was effective in improving performance, but the benefits of training did not generalize to functional outcome measures. Long term follow-up studies are needed to confirm the maintenance of such improvements.

2011O2-3: 10.1016/j.schres.2010.10.023


Background

Rehabilitation of impaired cognitive functions begins to be considered a standard component of medical care after acquired brain injury. Indeed, many evidences support the effectiveness of the two major categories of techniques, i.e. the traditional and computer-assisted ones, which are widely used in cognitive rehabilitative treatment.

Objective

Aim of this study is to evaluate the effects of pc – cognitive training in brain injury patients.

Methods

We studied 35 subjects (randomly divided into two groups), affected by traumatic or vascular brain injury, having attended from January 2010 to December 2012 the Laboratory of Robotic and Cognitive Rehabilitation of IRCCS Neurolesi of Messina. Cognitive impairment was investigated through psychometric battery, administered before (T0) and two months (T1) after the cognitive pc-training, which was performed only by the experimental group, in addition to conventional treatment. Statistical analysis was performed using Wilcoxon test with a p < 0.01.

Results

At time T0, all patients showed language deficits and cognitive alterations in visual attention and memory abilities. After the rehabilitation program we noted a global improvement in both the groups. However, at T1, the experimental group showed a greater cognitive improvement than the control group, with significant differences in nearly all the neuropsychological tests performed.

Conclusions

Our data suggest that cognitive pc-training may be a promising methodology to optimize the rehabilitation outcomes following brain injury.

_Tunis Med._ 2009; 87: 660-663.

BACKGROUND: Despite progress in chemo-therapeutics, schizophrenia remains a chronic disease with occurrence of residual symptoms and drug resistance in 60% of the cases. Besides, cognitive impairment is frequent and highly correlated to social dysfunction seen in patients with schizophrenia. Several cognitive remediation programs have been elaborated. RehaCom® is one of such programs. Aim of the study is to evaluate through a case control the efficiency of RehaCom® towards cognitive functions. METHODS: This program has been administered to a patient suffering from undifferentiated schizophrenia which was ameliorated after drug therapy considering positive symptoms but still was complaining from cognitive deficits causing social withdrawal. RESULTS: After following the remediation program, the patient was ameliorated considering its negative symptoms as attested by an amelioration of the PANSS negative score and considering its cognitive performances on memory, attention and executive functions. We have also noticed an improvement in his self-esteem and his quality of life. CONCLUSION: This first trial of a cognitive remediation program among our patients suffering from schizophrenia using RehaCom® was encouraging. Enlarging its use and designing controlled studies will be the next step of our study.


Treatment programs initially developed to help brain-damaged patients are used as remediative modalities by some clinicians. For example, REHA-COM®, which is a computer-assisted program, has been shown to have positive outcomes [30].


_Archives of physical medicine and rehabilitation._ 1993:531-536.

Our primary aim of this trial is to evaluate the synergistic effect of acupuncture and RehaCom® cognitive training on cognitive dysfunction after stroke. Method/Design: A randomized controlled trial of 2 x 2 factorial design will be conducted in the Rehabilitation Hospital Affiliated to.
32. Doppelmayr M, Nosko H, Pecherstorfer T, Fink A. An attempt to increase cognitive performance after stroke with neurofeedback.

*Biofeedback. 2007; 35: 126-130.*

The clinical rehabilitation program that is commonly applied includes computer training with either RehaCom® or Cogpack. Both programs are designed to train attention, vigilance, language, and memory. In addition.

2007O4:


*Bull Fac Ph Th Cairo Univ. 2014; Vol. 19*

The purpose of the present study was to assess the impact of the RehaCom® software as a cognitive remediation therapy in performance of fine motor skills in children with Down syndrome.

Background: Cognitive remediation therapy (CRT) is a non biological treatment that aims at correcting cognitive deficits through repeated exercises. Its efficacy in patients with Down syndrome is not well recognized yet, as children with Down syndrome have visual-perceptual dysfunction as a result of limited sensory experience from the lack of normal motor control. Objective: The purpose of the present study was to assess the impact of the RehaCom® software as a cognitive remediation therapy in performance of fine motor skills in children with Down syndrome. Methods: Twenty-six children with Down syndrome with age ranged between seven and ten years participated in this study. All those children showed average intelligence level. First, evaluation of fine motor dysfunction by Peabody Developmental Measuring Scale 2 (PDMS-2) and the visual perceptual test reaction duration (maximal and minimal) was detected for each child. Then, children were divided into two equal groups: a control and a study group. Therapy program for enhancing fine-motor skills was given to the two groups. In addition, children within the study group received Visual-perceptual integrative therapy program (RehaCom®). Post treatment evaluation was done after three months. Results: At the end of treatment, children within the study groups showed significant improvement with regard to grasping, fine-motor quotient and maximum and minimal reaction time of visual perceptual test performance (P<0.05). Conclusion: Visual-perceptual training improves fine-motor skills performance in children with Down syndrome. Key words: Visual perception, Cognition, Hand skills, Down syndrome.

2014O1:

34. **Eriksson M, Dahlin-Ivanoff S. How adults with acquired brain damage perceive computer training as a rehabilitation tool: A focus-group study.**


The aim of this study was to explore and describe how adult outpatients with acquired brain damage and referred to occupational therapy perceive computer training with the RehaCom® programs, in order to evaluate the method of treatment as a tool in the rehabilitation of persons with cognitive disorders. By using focus-group discussions as a qualitative method of research when analysing the result, five themes with corresponding categories emerged, describing a development of understanding and learning about capacities. Themes describing how the participants could apply strategies to overcome shortcomings in daily occupations and the therapeutic role of the occupational therapist were identified as well. The result shows that a computer training program such as RehaCom® can be used as an educational tool, for example, to guide a person who is trying to adopt compensatory strategies to avoid overload by taking pauses. It was found that anything the participants learned was also applicable to occupational performance in daily life.

200210.1080/11038120260246950
http://informahealthcare.com/doi/abs/10.1080/11038120260246950

35. **Fernandez E, Bringas ML, Salazar S, Rodriguez D, Garcia ME, Torres M. Clinical impact of RehaCom® software for cognitive rehabilitation of patients with acquired brain injury.**


We describe the clinical impact of the RehaCom® computerized cognitive training program instituted in the International Neurological Restoration Center for rehabilitation of brain injury patients. Fifty patients admitted from 2008 through 2010 were trained over 60 sessions. Attention and memory functions were assessed with a pre- and post-treatment design, using the Mini-Mental State Examination, Wechsler Memory Scale and Trail Making Test (Parts A and B). Negative effects were assessed, including mental fatigue, headache and eye irritation. The program’s clinical usefulness was confirmed, with 100% of patients showing improved performance in trained functions.

2012O4:

36. **Filippi M, Riccitelli G, Mattioli F et al. Multiple sclerosis: effects of cognitive rehabilitation on structural and functional MR imaging measures?an explorative study.**


Purpose
To evaluate brain changes after cognitive rehabilitation in patients with clinically stable relapsing-remitting (RR) multiple sclerosis (MS) by using neuropsychologic assessment and structural and functional magnetic resonance (MR) imaging techniques.

Materials and Methods

The study was conducted with approval of the involved institutional review boards. Written informed consent was obtained from each participant. Twenty patients with RR MS and cognitive deficits at baseline were randomly assigned to undergo treatment (n = 10), which entailed computer-assisted cognitive rehabilitation of attention and information processing and executive functions, or to serve as a control subjects (n = 10) without cognitive rehabilitation. All patients underwent a standardized neuropsychologic assessment and MR imaging at baseline and after 12 weeks. Changes in gray matter (GM) volumes on three-dimensional T1-weighted images and changes in normal-appearing white matter (NAWM) architecture on diffusion-weighted images were assessed. Changes in functional activity at functional MR imaging during the Stroop task and at rest were also investigated by using linear models.

Results

As compared with their performance at baseline, the patients in the treatment group improved at tests of attention and information processing and executive functions. Neither structural modifications to GM volume nor modifications to NAWM architecture were detected at follow-up in both groups. Functional MR imaging demonstrated modifications of the activity of the posterior cingulate cortex (PCC)/precuneus and dorsolateral prefrontal cortex (PFC) during the Stroop task, as well as modifications of the activity of the anterior cingulum, PCC and/or precuneus, left dorsolateral PFC, and right inferior parietal lobule at rest in the treatment group compared with the control group. In the treatment group, functional MR imaging changes were correlated with cognitive improvement (P <.0001 to.01).

Conclusion

Rehabilitation of attention and information processing and executive functions in RR MS may be effected through enhanced recruitment of brain networks subserving the trained functions.

On an individual basis, treatment group patients underwent intensive computer-assisted cognitive rehabilitation of attention, information processing, and executive functions for 12 weeks, performed by using a software that is part of the RehaCom® package.

201203: 10.1148/radiol.11111299
http://pubs.rsna.org/doi/full/10.1148/radiol.11111299


We evaluated a rehabilitation programme for executive deficits in multiple sclerosis patients by comparing outcome scores of a cognitive intervention group (CIG; n = 11) with those of a placebo group (n = 14) and an untreated group (n = 15). Executive functioning and verbal learning improved significantly more in the CIG. The treatment effect on verbal
learning was still present at 1-year follow-up. Baseline brain atrophy, quantified by the brain parenchymal fraction, was associated with treatment effects for one aspect of executive functioning. Consequently, cognitive intervention may be beneficial and baseline brain atrophy has some predictive value in determining treatment outcome for executive functioning.

Patients trained on 5 days per week for 40 minutes a day, using the subtest reaction capacity of the RehaCom® software; Hasomed; 2006). Patients had to respond fast and accurately to visual stimuli.

2010

http://msj.sagepub.com/content/early/2010/07/08/1352458510375440.abstract

38. Flavia M, Stampatori C, Zanotti D, Parrinello... G. Efficacy and specificity of intensive cognitive rehabilitation of attention and executive functions in multiple sclerosis.


OBJECTIVE: To evaluate the efficacy of a computer-based intensive training program of attention, information processing and executive functions in patients with clinically-stable relapsing–remitting (RR) multiple sclerosis (MS) and low levels of disability.

Study group underwent intensive neuropsychological treatment for 3 consecutive months on an individual basis. The software tasks Plan a Day and Divided Attention were used as part of RehaCom®.

201010.1016/j.jns.2009.09.024


Der Anteil der Patienten, die nach Schädel-Hirn-Trauma, nach Hirninfarkt etc. psychische und psychomotorische Leistungsbeeinträchtigungen besitzen und die im subakuten bzw. postoperativen Stadium dringend behandlungsbedürftig sind, hat deutlich zugenommen.

1991Os1:


40. Franck N. Remediation cognitive en psychiatrie.

Le fait que le panneau de contrôle comprenne seulement quelques touches et une manette rend l'utilisation de REHA-COM® adaptée aux patients souffrant de troubles moteurs ou incapables d'utiliser un clavier classique. 14; Puhr U. Effektivität der RehaCom®-Programme in....

2012O3:

41. Friedl-Francesconi H, Binder H. [Training in cognitive functions in neurologic rehabilitation of craniocerebral trauma].


This study evaluates a new cognitive rehabilitation therapy for patients after severe head injury. In addition to the standard neurological rehabilitation therapy, one group was trained by the Wiener Determinationsgerat (WDT), a second group was treated by the new program RehaCom®, while a third group received only conventional neurological rehabilitation therapy. The three groups each consisted of 12 patients; two groups received 20 sessions of training, each lasting 40 minutes. At the beginning as well as after the therapy a psychological test battery was applied, consisting of HAWIE, TULUC, AACHENER APHASIETEST, and BENTON-Test. They were also tested by a specific neuropsychological battery regarding hemispheric specialization. RehaCom® showed significantly higher values on the HAWIE as well as on BENTON-Test than the other two groups. RehaCom® also improved in right-hemispheric dimensions while WDT group did not improve in attention. Right-hemispheric training was more effective than attentional stimulation.

1996O1:

42. Friedl-Francesconi H, Binder H. Functional cognitive training in neurological rehabilitation of severe head injury.

*Zeitschrift fur .... 1996*

1996

43. Fuchsberg A. Computer-assisted cognitive rehabilitation. 2003

In order to achieve a high ecological validity, in the RehaCom® procedure Vigilance, the patient works as a high-quality controller at the end of a manufacturing line in a factory (drink and/or canned food production. The procedure can also be used without the RehaCom panel.

2003


*Neuropsychology. 2009; 23: 40.*

Traumatic brain injury (TBI) frequently affects both the basic and the superordinate components of attention; deficits vary according to patient age. This study evaluated the efficacy of a specific remediation intervention for attention. Sixty-five TBI patients (aged 6–18 years) with attention deficit were assessed at baseline and at 1-year follow-up: 40 patients received attention-specific neuropsychological training for 6 months, and the control group comprised 25 patients. Cognitive assessment included a Wechsler Intelligence Scale (e.g., A. Orsini, 1993) and the Continuous Performance Test II (CPT II; C. K. Conners, 2000). The Vineland Adaptive Behaviour Scales (VABS; S. Sparrow, D. Balla & D. V. Cicchetti, 1984) was administered to assess the treatment’s ecological validity. At baseline, all patients presented with a mild intellectual disability and pathological scores on the CPT II. At follow-up, significant differences were found between the 2 groups on the CPT II and VABS: The clinical group improved more than the control group. Specific remediation training for attention, including a combination of a process-specific approach and metacognitive strategies, significantly improved attention performance. Improvement in attention skills also affected adaptive skills positively. (PsycINFO Database Record (c) 2012 APA, all rights reserved)

Tasks on RehaCom® and Attenzione e Concentrazione. Computer tasks included RehaCom® for patients aged 8–18 years and Attenzione e Concentrazione (Di Nuovo, 1992) for patients aged 6–8 years.

2009O1: http://psycnet.apa.org/journals/neu/23/1/40/

45. Galderisi S, Piegari G, Mucci A et al. Social skills and neurocognitive individualized training in schizophrenia: comparison with structured leisure activities.

*European archives of psychiatry and clinical neuroscience. 2010; 260: 305-315.*

Patients attended weekly 2-h sessions for 6 months (48 h). The individualized NeurocognitiveTraining component of the SSANIT is based on a computer-assisted cognitive rehabilitation program, RehaCom®, developed by the HASOMED GmbH (Inc., Ltd) in Magdeburg.


The purpose of this study was to clinically validate a new modality of cognitive rehabilitation services based on telemedicine systems (PREVIRNEC platform) for persons with moderate or severe traumatic brain injury (TBI). Patients and Methods. Eighty patients with moderate or severe TBI; mean age: 36.1 years (SD= 18.19 years) received a 10-week
cognitive rehabilitation (5 sessions-week). Differences between pre- and post-treatment neuropsychological test scores were used to measure patient’s improvements in the domains of attention, memory and executive functions. Patients were divided in two groups based on the Competency Rating Scale (PCRS; adequate or inadequate everyday competence) post-rehabilitation score. Results. Patients showed significant cognitive improvement after the application of the computerized cognitive rehabilitation program. Significant differences were observed between both groups on the number of highly-performed tasks during cognitive treatment, in the attention (p=0.026) and executive (p=0.040) execution. Conclusions. The cognitive rehabilitation program based on telemedicine systems (PREVIRNEC platform) improves attention, memory, and executive functions, as well as in patient’s everyday competence.

2010
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5756537


This paper aims to provide a snapshot of the current status in the field of serious games for improving the physical health of the elderly. This work covers recent research projects for stroke rehabilitation and for falls prevention where user-center design methodologies were applied in order to satisfy this audience. A classification of the most relevant work in this area is provided along with a brief description of the platform, technology required and user-center design principles applied. At the end the authors compared the most relevant work found and used a system called RehaCom® as a reference.

This work complements and extends previous classifications.

2011

48. García-Fernández L, Pérez-Maciá V, Pérez-Martín… J. EPA-1775–Cognitive remediation in first psychosis episodes. does it improve functioning?
European …. 2014

Our aim is to evaluate if a computerized cognitive remediation program (RehaCom®) improves cognition, and therefore insight, functioning and quality of life in early stages of psychosis. A randomized open label prospective.

2014

 eChallenges. 20101-10.
The purpose of this study was to clinically validate a new modality of cognitive rehabilitation services based on telemedicine systems (PREVIRNEC platform) for persons with moderate or severe traumatic brain injury (TBI). Patients and Methods. Eighty patients with moderate or severe TBI; mean age: 36.1 years (SD= 18.19 years) received a 10-week cognitive rehabilitation (5 sessions-week). Differences between pre- and post-treatment neuropsychological test scores were used to measure patient’s improvements in the domains of attention, memory and executive functions. Patients were divided in two groups based on the Competency Rating Scale (PCRS; adequate or inadequate everyday competence) post-rehabilitation score. Results. Patients showed significant cognitive improvement after the application of the computerized cognitive rehabilitation program. Significant differences were observed between both groups on the number of highly-performed tasks during cognitive treatment, in the attention (p=0.026) and executive (p=0.040) execution. Conclusions. The cognitive rehabilitation program based on telemedicine systems (PREVIRNEC platform) improves attention, memory, and executive functions, as well as in patient’s everyday competence.

2010

http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5756537

Computers have increased the scope and duration of cognitive rehabilitation. They enable head trauma rehabilitation specialists to address dynamic (real-time) aspects of information processing (speed, efficiency, multiple events). Computer programs can be designed to encourage improved therapeutic practices. Features, such as customised menus and the wide availability of portable, hard-disk computer systems permit the establishment of home-based computer-augmented cognitive rehabilitation programs, which allow an aggressive pursuit of restoration of function through exercise and practice. Computers are being used as mental prostheses and productivity tools, rather than as drillmasters, and thus they transform survivors of brain injury into executives. While computers have changed clinical practice, their inherent modifiability encourages clinicians in turn to change and direct them.

1992O3:

http://journals.lww.com/headtraumarehab/Abstract/1992/09000/The_computer_in_cognitive_rehabilitation__It_s_not.5.aspx

Technological advances over the past decade have given rise to the development of multiple computer-assisted cognitive rehabilitation programs. While results of investigations examining the efficacy of such techniques have been mixed, a positive trend for utilization of these procedures has been demonstrated. This review provides a discussion of the progression of research in this area, from anecdotal studies to controlled
empirical investigations. Methodological shortcomings are examined and directions for future research in computer-assisted cognitive rehabilitation suggested.

http://iospress.metapress.com/index/f2x32uqy9h71kfw.pdf

52. Grynszpan O, Perbal S, Pelissolo A et al. Efficacy and specificity of computer-assisted cognitive remediation in schizophrenia: a meta-analytical study.


**BACKGROUND:** Cognitive remediation is frequently based on computerized training methods that target different cognitive deficits. The aim of this article was to assess the efficacy of computer-assisted cognitive remediation (CACR) in schizophrenia and to determine whether CACR enables selective treatment of specific cognitive domains.

**METHOD:** A meta-analysis was performed on 16 randomized controlled trials evaluating CACR. The effect sizes of differences between CACR and control groups were computed and classified according to the cognitive domain assessed. The possible influences of four potential moderator variables were examined: participants’ age, treatment duration, weekly frequency, and control condition type. To test the domain-specific effect, the intended goal of each study was determined and the effect sizes were sorted accordingly. The effect sizes of the cognitive domains explicitly targeted by the interventions were then compared with those that were not.

**RESULTS:** CACR enhanced general cognition with a mean effect size of 0.38 [confidence interval (CI) 0.20-0.55]. A significant medium effect size of 0.64 (CI 0.29-0.99) was found for Social Cognition. Improvements were also significant in Verbal Memory, Working Memory, Attention/Vigilance and Speed of Processing with small effect sizes. Cognitive domains that were specifically targeted by the interventions did not yield higher effects than those that were not.

**CONCLUSIONS:** The results lend support to the efficacy of CACR with particular emphasis on Social Cognition. The difficulty in targeting specific domains suggests a ‘non-specific’ effect of CACR. These results are discussed in the light of the possible bias in remediation tasks due to computer interface design paradigms.


**Objective**

Epilepsy surgery is a valuable treatment option for patients with pharmacoresistant epilepsy, but seizure freedom is often achieved at the cost of cognitive impairments caused by surgery. The aim of this study was to investigate the short-term effects of cognitive rehabilitation on memory outcome after temporal lobe epilepsy surgery.

**Methods**

2015-03-06
Two groups of patients who underwent temporal lobe resection, one followed (n = 55) and one not followed (n = 57) by postoperative rehabilitation, were evaluated with respect to memory and attention before and 3 months after temporal lobe surgery. The groups came from different epilepsy centers, but were largely matched with respect to age, sex, type of surgery, and seizure outcome.

Results

After surgery, 78% of the patients were seizure-free. Repeated-measures MANOVA revealed a significant “side × surgery” effect on verbal recognition and a “rehabilitation × surgery” effect on verbal learning and recognition. There were no effects for loss in verbal delayed recall or figural memory. Detailed analyses indicated gains as a result of rehabilitation, particularly after right temporal lobe surgery. Attention generally improved. The risk of manifesting losses in verbal memory was about four times higher without than with rehabilitation.

Conclusions

Rehabilitation can counteract the verbal memory decline that is normally seen after temporal lobe resection. Its positive effects were evident particularly with respect to the more cortically associated aspects of verbal learning rather than to the mesial aspects of long-term consolidation/retrieval. Figural memory was not affected at all, and attention improved independent of rehabilitation. Interestingly, left temporal lobe resected patients, who were most in need of an efficacious rehabilitation, profited less than right temporal lobe resected patients, indicating that left-sided surgery may reduce the capacity needed for efficient training of verbal memory. Thus, rehabilitation has a positive effect on memory outcome, but its usefulness for risk groups and the question of whether training should be performed after or possibly before surgery are debatable. Further research should also address different interventions, longer-term outcome, and the carryover effects on everyday functioning.

Patients attended, on average, four to five sessions per week. Cognitive exercises used a modified form of Riglings Reha Service and Hasomed’s RehaCom®, both multimedia cognitive rehabilitation software designed for use with individuals with compromised brain function

2008O3: 10.1016/j.yebeh.2007.11.010
http://www.epilepsybehavior.com/article/S1525-5050(07)00435-0/abstract


Deficits in executive functioning are closely related to the level of everyday functioning in patients with schizophrenia. However, many existing neuropsychological measures are limited in their ability to predict functional outcome. To contribute towards closing this gap, we developed a computer-based test of planning ability (“Plan-a-Day”) that requires participants to create daily activity schedules in a simulated work setting. Eighty patients diagnosed with schizophrenia were tested with Plan-a-Day and a battery of cognitive ability tests. Plan-a-Day showed satisfactory psychometric properties in terms of consistency, reliability, and construct validity. Compared to other neuropsychological tests used in this study, it also demonstrated incremental validity with regard to the Global
Assessment of Functioning. The Plan-a-Day approach, therefore, seems to represent a valid alternative for measuring planning ability in patients with executive function deficits, occupying a middle ground between traditional neuropsychological tests and real-life assessments.

Program consisting of occupational therapy, physiotherapy, social skills training, and—for half of the sample—computer-based training of basic cognitive abilities (memory, reaction speed, continuous attention) using the RehaCom® training package (Hasomed GmbH, Germany).

2011O02: 10.1017/S1355617710001712
http://archiv.ub.uni-heidelberg.de/volltextserver/15446/1/Holt_etal_2011_PAD_JINS.pdf


Background
Cognitive therapies are intended to improve basic cognitive functions, whatever the cause of the deficiency may be. Children and adolescents with various cognitive deficits are treated with behavioural therapeutic and computer-supported training programs. We here report the first meta-analysis of the efficacy of such programs.

Methods
We systematically searched the Medline, Embase, PsycINFO, PSYNDEX, and ERIC databases to find pertinent publications for a meta-analysis of cognitive training programs that are used in children and adolescents to improve attention, memory, and executive performance (primary goals) as well as behavior/psychopathology, intelligence, and school performance (secondary goals). The mean differences between the treatment and control groups are given here as standard deviation (SD) scores.

Results
1661 potentially relevant publications were found, including 22 studies that were considered in the meta-analysis, 17 of which were randomized controlled trials. The target variables were measured with more than 90 different testing techniques. The overall effects of cognitive training on attention (SD 0.18, 95% CI –0.11–0.47) and executive function (SD 0.17, 95% CI –0.12–0.46) were consistently small. A relatively strong effect was found on memory performance (0.65 SD, 95% [-0.12–1.42), albeit with marked heterogeneity (I 2= 82%) owing to two studies. The largest effect was found in the area of behavior and psychopathology (SD 0.58, 95% CI 0.31–0.85), but this last figure is derived mainly from studies that lacked an active control group.

Conclusion
Cognitive therapies for children and adolescents have generally favourable, but probably nonspecific effects on behaviour. On the other hand, the specific effects, however, were weak overall. Therapeutic benefit has been demonstrated only for certain individual types of therapy for specific indications.

2013O39:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3804756/
In Korea, a cognitive rehabilitation program using a computer has been spotlighted since 2000. The frequently used programs are COMCOG, RehaCom®, Captain's log, and PSS CogRehab
2013

RehaCom® (HASOMED GmbH, Germany), which is a Cognitive Rehabilitation/Brain Performance Training system, was also used to assess Attention and concentration in behavioral task performance. This study had a randomized controlled trial design.
Purpose] This study examined whether the alpha rhythm sleep alters the EEG activity and response time in the attention and concentration tasks. [Subjects and Methods] The participants were 30 healthy university students, who were randomly and equally divided into two groups, the experimental and control groups. They were treated using the Happy-sleep device or a sham device, respectively. All participants had a one-week training period. Before and after training sessions, a behavioural task test was performed and EEG alpha waves were measured to confirm the effectiveness of training on cognitive function. [Results] In terms of the behavioural task test, reaction time (RT) variations in the experimental group were significantly larger than in the control group for the attention item. Changes in the EEG alpha power in the experimental group were also significantly larger than those of the control group. [Conclusions] These findings suggest that sleep induced using the Happy-sleep device modestly enhances the ability to pay attention and focus during academic learning
2013O12: 10.1589/jpts.25.1515
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3885828/

Early Interv Psychiatry. 2014; 8: 130-137.
AIM: Reduced cognitive insight has been associated with psychotic symptoms, in particular with the presence of delusions; however, there is little information about whether such reductions are present in at-risk individuals prior to the onset of threshold psychotic symptoms. METHOD: We conducted a cross-sectional comparison of cognitive insight (as indexed by the Beck Cognitive Insight Scale) in 62 help-seeking individuals at clinical high risk for psychosis, Fifty-nine individuals with schizophrenia-spectrum disorders and 37 healthy controls (HC). In patients, we evaluated associations of insight with positive symptoms, including later transition to psychosis in high-risk patients.

2015-03-06  Page 96 of 128
RESULTS: Individuals with schizophrenia reported significantly higher self-certainty scores than the at-risk patients and HCs, with the at-risk patients scoring intermediate to the individuals with schizophrenia and controls. Similarly, individuals with schizophrenia scored significantly higher on self-reflectiveness, with no differences between the at-risk patients and controls. In individuals with schizophrenia, delusions were significantly correlated with self-certainty. In at-risk patients, cognitive insight was not associated with positive symptom severity and did not differentiate those at-risk patients who later developed psychosis from those who did not. However, post hoc analyses suggested that at-risk patients with marked unusual thought content (approaching threshold psychosis) had lower self-reflectiveness; whereas those with high suspiciousness had significantly higher self-certainty. CONCLUSIONS: The findings are discussed in the context of normal developmental processes occurring during adolescence, their putative links to neurobiological functioning, and their implications for treatment and future research.

2014O2: 10.1111/eip.12023

59. Kojek E, Bolewska A. The effectiveness of computer-assisted cognitive rehabilitation in brain-damaged patients.

This study examined the effects of computer-assisted cognitive rehabilitation in a group of 16 brain-damaged patients. Therapeutic effectiveness was assessed by improvement on computer tasks, the results of neuropsychological tests and quality of life ratings. Participants suffered from mild to moderate attention and memory problems or aphasia.

The procedure involved baseline assessment (pretest), a 15-week course of therapy conducted twice a week (30 hours in total) and posttest. Neuropsychological tests assessing attention, memory and language problems and quality of life ratings were administered twice: in pre- and posttests. Twelve healthy controls were also examined twice (with a 15-week interval) using the same battery of neuropsychological tests. The RehaCom® program and the Polish computer therapy program for aphasics called Afa-System were used for rehabilitation. The computer-assisted rehabilitation tasks were selected individually for each patient. The results showed significant improvement on computer-assisted tasks in all brain damaged subjects. However, none or very little improvement was observed on neuropsychological tests and quality of life ratings. The results of the study confirm the importance of using different types of measures to estimate the effectiveness of computer-assisted neuropsychological rehabilitation as well as the necessity of applying various kinds of therapy to improve cognitive, emotional and social functioning in brain-damaged patients.

2013O1:

Clinical impact of RehaCom® software for cognitive rehabilitation of patients with acquired brain injury.


http://dl.acm.org/citation.cfm?id=2729502


Direct attention training (DAT) and metacognitive strategy instruction have been employed to treat the cognitive deficits associated with traumatic brain injury (TBI) in children and are supported by an emerging evidence base (e.g., Butler et al., 2008; Galbiati et al., 2009; Luton, Reed-Knight, Loiselle, O’Toole, & Blount, 2011; van’t Hooft et al., 2007). The importance of treatment intensity is well established for DAT (Sohlberg et al., 2003), yet restrictions in the delivery and funding of rehabilitation services, the availability of well-trained interventionists, and access by geographic locale remain critical barriers to the provision of intensive services. Computer-delivered treatments that incorporate a home practice component address the gulf between the intensive, daily practice suggested by the efficacy research and these clinical delivery constraints. The purpose of this paper is to (a) review the literature evaluating the integration of DAT and metacognitive facilitation to treat children and adolescents with traumatic brain injury (TBI); (b) present the rationale and description of a computerized program, Attention Improvement Management (AIM); (c) detail the program components; and (d) present outcome data from three pilot participants who completed the intervention. A specific and growing subset of children with TBI have attention impairments following mild brain injuries or concussions (Schatz & Scolaro Moser, 2011) and served as the pilot participants in this study. Pilot participants demonstrated clinically meaningful improvements on attention outcome measures and generalization of the metacognitive strategies trained within the program to contexts outside of therapy, including both academic and social settings. Though initial results are promising, further research is needed to evaluate the efficacy of the AIM intervention to treat the attention and executive function impairments associated with pediatric TBI.

2012O3: 10.1044/nnsld22.3.90


[Purpose] This study examined the effects of computer-aided cognitive rehabilitation (CACR) training and balance exercise on elderly individuals’ cognitive and visual perception. [Subjects] Thirty healthy subjects aged between 65 and 80 participated in this study. They were randomly and equally assigned to either a CACR training group (TG) or a balance exercise group (BEG). [Methods] Subjects’ cognitive functions and visual perception were measured using the Korean mini-mental state examination (MMSE-K) and the motor-free visual perception test (MVPT-3), respectively. For intervention methods, the TG received interval vision training using the RehaCom® program, a Cognitive Rehabilitation Computer Program derived from the Vienna Test System, and vision composition training with attention training programs for 30 minutes, 3 times per week, for 6 weeks. The BEG training consisting of warm-up exercises, main exercises, and cool-down exercises, for 50 minutes, 3 times per week, for 6 weeks. [Results] Both the TG and the BEG saw their MMSE-K and MVPT-3 scores significantly increase after the interventions, but the two groups showed no significant differences. [Conclusion] Given that the effects of CACR training were similar to those of the balance exercise training, we consider CACR training is a viable treatment method for preventing the decrease of cognitive function among the elderly.

2012O No. 9 October:

http://jlc.jst.go.jp/DN/JST.JSTAGE/jpts/24.885?from=Google


[Purpose] The purpose of this study was to investigate the effects of a six-week-long computer-assisted cognitive rehabilitation training program on the improvement of cognition and balance abilities of the elderly. [Subjects] Thirty healthy elderly people, aged 65 to 80, were randomly assigned either to the training group (n=15) or the control group (n=15). [Methods] Cognitive functions were evaluated using MMSE-K, and the BioRescue AP 153 (RMINGENIERIE, France) was used to examine subjects’ changes in static balance. [Results] The MMSE-K score showed a significant change over the course of the treatment period in the training group, but not in the control group. The sway area and sway path length decreased significantly in the training group, but it did not show any changes in the control group. [Conclusion] Computer-assisted cognitive rehabilitation training is an effective intervention method for the improvement of the cognition and balance abilities of the elderly.

2013O11:

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3881481/


This study evaluated the effectiveness of a computer-based cognitive retraining (CBCR) program on improving memory and attention deficits in individuals with a chronic acquired brain injury (ABI). Twelve adults with a chronic ABI demonstrating deficits in memory and attention were recruited from a convenience sample from the community. Using a quasi-experimental one-group pretest–posttest design, a significant improvement was found in both memory and attention scores postintervention using the cognitive screening tool. This study supported the effectiveness of CBCR programs in improving cognitive deficits in memory and attention in individuals with chronic ABI. Further research is recommended to validate these findings with a larger ABI population and to investigate transfer to improvement in occupational performance that supports daily living skills.

2013O4:


65. Łojek E, Bolewska A. The effectiveness of computer-assisted cognitive rehabilitation in brain-damaged patients. 


This study examined the effects of computer-assisted cognitive rehabilitation in a group of 16 brain-damaged patients. Therapeutic effectiveness was assessed by improvement on computer tasks, the results of neuropsychological tests and quality of life ratings. Participants suffered from mild to moderate attention and memory problems or aphasia. The procedure involved baseline assessment (pretest), a 15-week course of therapy conducted twice a week (30 hours in total) and posttest. Neuropsychological tests assessing attention, memory and language problems and quality of life ratings were administered twice: in pre- and posttests. Twelve healthy controls were also examined twice (with a 15-week interval) using the same battery of neuropsychological tests. The RehaCom® program and the Polish computer therapy program for aphasics called Afa-System were used for rehabilitation. The computer-assisted rehabilitation tasks were selected individually for each patient. The results showed significant improvement on computer-assisted tasks in all brain damaged subjects. However, none or very little improvement was observed on neuropsychological tests and quality of life ratings. The results of the study confirm the importance of using different types of measures to estimate the effectiveness of computer-assisted neuropsychological rehabilitation as well as the necessity of applying various kinds of therapy to improve cognitive, emotional and social functioning in brain-damaged patients.

2013O1: 10.2478/ppb-2013-0004


RehaCom® [17] and PSS CogRehab [18] are cognitive rehabilitation programs (only for problem resolution), the former is for users with brain damage, while the latter is not only for this type of users but also for users with cognitive impairment.

2011OSeGAH:


Cognitive impairment (CI) is a serious complication of multiple sclerosis (MS), and the domains affected are well established, but new affected domains such as theory of mind are still being identified. The evidence that disease-modifying therapies (DMTs) improve and prevent the development of CI in MS is not solid. Recent studies on the prevalence of CI in MS among people treated with DMT, although not as solid as studies completed prior to DMT introduction, suggest that CI remains a problem even among people on DMTs and that CI occurs frequently even at the very earliest stages of MS. Functional MRI studies and studies using diffusion tractography show that the impact of lesions on cognition depends on the particular cortical networks affected and their plasticity. Cognitive rehabilitation and L-amphetamine appear promising symptomatic treatments for CI in MS, while, cholinesterase inhibitors and memantine have failed, and data on Ginkgo and exercise are limited. We need more work to understand better CI in MS and develop treatments for this serious complication of MS.

A smaller study comparing subjects assigned to a 6-week cognitive intervention using the RehaCom® software (n=11), placebo (n=14), or no treatment (n=15) found significant improvements in executive functioning and verbal learning after 6 weeks of training.

2012O5: 10.1007/s11910-012-0294-3


Background

Rehabilitation of impaired cognitive functions begins to be considered a standard component of medical care after acquired brain injury. Indeed, many evidences support
the effectiveness of the two major categories of techniques, i.e. the traditional and computer-assisted ones, which are widely used in cognitive rehabilitative treatment.

Objective

Aim of this study is to evaluate the effects of pc – cognitive training in brain injury patients.

Methods

We studied 35 subjects (randomly divided into two groups), affected by traumatic or vascular brain injury, having attended from January 2010 to December 2012 the Laboratory of Robotic and Cognitive Rehabilitation of IRCCS Neurolesi of Messina. Cognitive impairment was investigated through psychometric battery, administered before (T0) and two months (T1) after the cognitive pc-training, which was performed only by the experimental group, in addition to conventional treatment. Statistical analysis was performed using Wilcoxon test with a \( p < 0.01 \).

Results

At time T0, all patients showed language deficits and cognitive alterations in visual attention and memory abilities. After the rehabilitation program we noted a global improvement in both the groups. However, at T1, the experimental group showed a greater cognitive improvement than the control group, with significant differences in nearly all the neuropsychological tests performed.

Conclusions

Our data suggest that cognitive pc-training may be a promising methodology to optimize the rehabilitation outcomes following brain injury.

2014OIssue 3: 10.1016/j.dhjo.2014.04.003

69. Lynch W. Selecting patients and software for computer assisted cognitive retraining. 

“Cognitive exercises, including computer-assisted strategies, have been used to improve specific neuropsychological processes, predominantly attention, memory, and executive skills. Both randomized controlled studies and case reports have documented the success of these interventions using intermediate outcome measures. Certain studies using global outcome measures also support the use of computer-assisted exercises in cognitive rehabilitation.” (For a copy of the full NIH Consensus Statement, call 1-888-NIH-CONSENSUS [888-644-2667])

199201:
http://consensus.nih.gov

70. Mak M, Samochowiec J, Tybura P et al. The efficacy of cognitive rehabilitation with RehaCom® programme in schizophrenia patients. The role of selected genetic polymorphisms in successful cognitive rehabilitation. 
INTRODUCTION: Schizophrenic patients present cognitive dysfunctions which are regarded to be one of endophenotypical markers predisposing to schizophrenia. Currently, schizophrenia can be treated as a neurodegenerative and neurodeveloping disease with genetic background.

OBJECTIVE: Assessment of the possible positive effect of neuropsychological rehabilitation in schizophrenia, in patients presenting cognitive dysfunctions. An additional aim was to verify the hypothesis that some genetic polymorphisms can be a prognostic factor for success in neuropsychological rehabilitation.

MATERIAL AND METHODS: 41 participants and 40 control subjects were randomly selected. Both groups had the diagnosis of paranoid schizophrenia. Cognitive functions were checked with the Wisconsin Card Sorting Test, Trail Making Test, and Stroop Test at the beginning and end of the experiment. In the research group, each patient trained with the rehabilitation programme RehaCom®, whereas the control group did not receive such training. Genes COMT rs4680 and BDNF rs6265 were analysed in the genetic part of study.

RESULTS: RehaCom® procedures appear to be useful in the neuropsychological rehabilitation of cognitive dysfunctions in patients diagnosed with schizophrenia. The research group showed a moderate improvement in the training programmes. Analysis of parameters obtained in the neuropsychological tests showed a slight improvement in both groups. At the present time, analysis of the polymorphisms of genes cannot be treated as a prognostic factor for the success of neuropsychological rehabilitation because statistical analyses showed few dependences with little statistical significance.

CONCLUSIONS: Cognitive rehabilitation produces moderate improvement in cognitive functioning.

2013O1:


Background/aims
It has been shown that cognitive training might help to protect against age-related cognitive decline. Our aim was to evaluate the efficacy of a computerized cognitive training application and its near transfer effects on the cognitive status of older adults.

Methods
Performance on the 7-Minute Screen at baseline and at the end of the program was analyzed by using a pre-post design. Adults aged 55 and older (n = 101; mean age ± standard deviation: 68.97 ± 5.81 years) with and without memory impairments were trained.

Results
Significant improvements after the training program were found in memory, visuo-spatial and verbal fluency abilities, regardless of age, gender or education. Moreover, participants without significant memory impairments and those with Age-Associated Memory Impairment gained from the program more than subjects with mild cognitive impairment.

Conclusion

Computerized cognitive training programs, such as Telecognitio®, may be used as a practical and valuable tool in clinic to improve cognitive status.


1991O1: 10.1080/13854049108401837
http://www.tandfonline.com/doi/pdf/10.1080/13854049108401837

The software used (plan a day and divided attention) were part RehaCom® package which provides a special keyboard with large button, which limits the interference of motor and coordination impairments and expertise on computer use.
2012O4:

OBJECTIVE: To evaluate the efficacy of a computer-based intensive training program of attention, information processing and executive functions in patients with clinically-stable relapsing-remitting (RR) multiple sclerosis (MS) and low levels of disability.
DESIGN, PATIENTS AND INTERVENTIONS: A total of 150 patients with RR MS and an Expanded Disability Status Scale (EDSS) score of < or =4 were examined. Information processing, working memory and attention were assessed by the Paced Auditory Serial Addition Test (PASAT) and executive functions by the Wisconsin Card Sorting Test (WCST). Twenty patients who scored below certain cut-off measures in both tests were included in this double-blind controlled study. Patients were casually assigned to a study group (SG) or a control group (CG) and underwent neuropsychological evaluation at baseline and after 3 months. Patients in the SG received intensive computer-assisted cognitive
rehabilitation of attention, information processing and executive functions for 3 months; the CG did not receive any rehabilitation.

SETTING: Ambulatory patients were sent by the MS referral center.

OUTCOME MEASURES: Improvement in neuropsychological test and scale scores.

RESULTS: After rehabilitation, only the SG significantly improved in tests of attention, information processing and executive functions (PASAT 3" p=0.023, PASAT 2" p=0.004, WCSTte p=0.037), as well as in depression scores (MADRS p=0.01). Neuropsychological improvement was unrelated to depression improvement in regression analysis.

CONCLUSIONS: Intensive neuropsychological rehabilitation of attention, information processing and executive functions is effective in patients with RR MS and low levels of disability, and also leads to improvement in depression.

201001-2: 10.1016/j.jns.2009.09.024


Background: Specific cognitive rehabilitation in multiple sclerosis (MS) resulted to be effective compared to no treatment. So far the possible role of an aspecific psychological intervention on cognition has not been investigated.

Objective: The aim of the SMICT RCT was to compare the efficacy of a specific cognitive training with an aspecific psychological intervention in relapsing-remitting MS patients.

Methods: From a sample of 150 patients, with the same disability and immunomodulatory therapy, submitted to neuropsychological examination, 45 impaired in at least one test were included and 41 randomized to have either a specific cognitive training for the impaired function (22) or to an aspecific psychological intervention (19) for 4 months, starting after baseline examination. Neuropsychological tests and functional scales were administered at baseline and 1 year later.

Results: After 1 year, the mean number of pathological tests was significantly lower in the specific treatment group, compared to the aspecific group. Memory and attention/speeded information processing functions were mostly improved. Depression and quality of life were not different between groups at follow up.

Conclusion: Our study demonstrates that an intensive and domain specific cognitive approach results to be more effective than aspecific psychological intervention in patients with MS.

Treatment was administered according to the impaired neuropsychological function: Plan a Day software of the RehaCom® suite was used if a patient resulted impaired in EF (that is if his/her poor score was in the Stroop test or in the COWA P or COWA/C.

2015
This study aimed to assess the efficacy and specificity of direct computer-assisted memory retraining (CR) in MS patients, in comparison to non-specific retraining, while controlling for severity of impairment, psychiatric symptoms and retest effects. Sixty patients with definite MS and a stable clinical condition were selected. All were assessed neuropsychologically and divided into three matched groups. One group received an 8-week specific CR programme (SCRP) and another received a non-specific 8-week CR programme (NCRP) to retrain attention; a third (control) group received no treatment. After the programmes were completed, all patients were reexamined with the same test battery. Patients were impaired on all 11 memory and attention tests at baseline. Those who received SCRP improved on 7 memory outcome measures, compared to only 1 in the NCRP group and none in the control group. Attention training had no significant effect on relevant outcome measures. Some non-retrained patients showed deterioration of cognitive performance at retest. These results indicate that direct memory training in MS patients is effective in the short-term and is specific. In selected cases, benefits extended to everyday life activities.

The programmes employed were part of RehaCom® (RehaCom®, Computer-aided procedures for cognitive rehabilitation - a computer-based cognitive retraining system widely used in German-speaking countries that.

http://link.springer.com/article/10.1007/BF00539601

BACKGROUND AND PURPOSE: Compensatory and restorative treatments have been developed to improve visual field defects after stroke. However, no controlled trials have compared these interventions with standard occupational therapy (OT).

METHODS: A total of 45 stroke participants with visual field defect admitted for inpatient rehabilitation were randomized to restorative computerized training (RT) using computer-based stimulation of border areas of their visual field defects or to a computer-based compensatory therapy (CT) teaching a visual search strategy. OT, in which different compensation strategies were used to train for activities of daily living, served as standard treatment for the active control group. Each treatment group received 15 single sessions of 30 minutes distributed over 3 weeks. The primary outcome measures were visual field expansion for RT, visual search performance for CT, and reading performance for both treatments. Visual conjunction search, alertness, and the Barthel Index were secondary outcomes.

RESULTS: Compared with OT, CT resulted in a better visual search performance, and RT did not result in a larger expansion of the visual field. Intragroup pre-post comparisons demonstrated that CT improved all defined outcome parameters and RT several, whereas
OT only improved one. CONCLUSIONS: CT improved functional deficits after visual field loss compared with standard OT and may be the intervention of choice during inpatient rehabilitation. A larger trial that includes lesion location in the analysis is recommended.

2012O5: 10.1177/1545968311425927

78. Mohammadi MR, Keshavarzi Z, Talepasand S. The Effectiveness of Computerized Cognitive Rehabilitation Training Program in Improving Cognitive Abilities of Schizophrenia Clients.

Objective: The aim of this study was to evaluate the efficacy of a computer – based training program of attention, memory and executive functions in enhancing neuropsychological performances as well as functional outcome in clients with schizophrenia.

Method: A total of 15 clinically stable out patients with Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) criteria for schizophrenia, diagnosed with different types of schizophrenia: paranoid, disorganized, residual, based on DSM-IV-TR were selected to participate in this study. All patients were randomly selected using a conventional sampling method and assigned to 60 hours individual sessions of computer – assisted cognitive remediation (CACR). This was a pre- experimental study with pretest and posttest in a single group. Cognitive functions were checked with Continuous Performance Test (CPT), Wechsler Adult Intelligence Scale (Wds) and Prospective and Retrospective Memory Questionnaire (PRMQ). The symptoms of patients were measured with the Positive and Negative Syndrome Scale (PANSS). Remediation was performed utilizing the RehaCom® software. Patients received the cognitive remediation program including attention, concentration and working memory. All participants were followed up after an interval of one month and three months. Data were analyzed using repeated measures analysis.

Result: After 3 months, the findings showed that patients’ scores improved in the time factor. Also, a significant improvement favoring cognitive remediation was found in several cognitive measures including Reaction Time (F = 4015p<.05, Eta = 0.242), Wds (F = 11.806, p<.05, Eta =.48) PRMQ1(F = 3.314, p<.05, Eta = 0.20) PRMQ7(F = 2.85, p<.05, Eta = 0.18).

Conclusion: Computer-assisted cognitive remediation training program was effective in improving the performance of schizophrenic patients. CACR did not have any effects on the positive and negative symptoms. Long- term follow-up studies are needed to confirm the maintenance of such improvements.

2014O4:

79. Moreno J, Saldana D. Use of a computer-assisted program to improve metacognition in persons with severe intellectual disabilities.
Metacognition and self-regulation are processes extremely relevant to education of persons with intellectual disabilities. They play a central role in specific limitations, such as outer-directedness and lack of strategy transfer, and are related to desirable educational objectives such as self-determination. Although computer-assisted training has shown to be successful in training specific abilities and general cognitive processes, interventions of this nature centering on metacognitive development are rare. A computer-assisted program aimed in this direction is presented. It was applied to 21 adolescents and young adults with a mean IQ of 36. Metacognitive scores improved for this group at posttest relative to pretest to a degree significantly different from gains found in an equivalent control group. Improvement was clear from the first sessions of the intervention and was maintained at a 6-month follow-up.


80. **Nocentini U, Caltagirone C. Rehabilitation in Multiple Sclerosis 10.**

*Neuropsychiatric Dysfunction in Multiple Sclerosis.* 201277.

Precise details of rehabilitative methodology are lacking in most studies, with the exception of those that used programs included in the RehaCom® system [14–16].

2012
http://books.google.com/books?hl=en&lr=&id=vLZfWtLxnuC&oi=fnd&pg=PA77&dq=RehaCom®&ots=k3UjuHicyP&sig=kRC2CtdQLDAvbfqghQj--Qesbvk


*Neurocase.* 2012; 18: 139-151.

Cognitive impairment is a well-known consequence of acquired brain injuries, including stroke. Computerized cognitive training (CCT) is a rehabilitation approach intended to enhance cognitive functioning. It is unclear whether CCT leads to generalized cognitive improvements in daily life functioning, or if the subjects improve performance only on the exercises involved in the training. The current study explores whether fractional anisotropy (FA), a measure of white matter microstructure, may serve as an indirect biological indicator of enhanced neuropsychological functioning, particularly working memory, following CCT. The findings suggest a possible relationship between changes in FA measures and working memory.

2012O2: 10.1080/13554794.2011.568501
http://www.tandfonline.com/doi/abs/10.1080/13554794.2011.568501
82. O’Rourke S. Risk assessment and management with clients with cognitive impairment.


Perhaps most exciting in this literature is an increasing number of computerized interventions that adjust automatically to the patients’ abilities and increase in difficulty as they progress while requiring minimal staff input and expertise (eg, Cogniplus, COGPAK, RehaCom®).

2013

http://books.google.com/books?hl=en&lr=&id=py-sL9tpMoAC&oi=fnd&pg=PA183&dq=RehaCom®&ots=7M_9RY20Ww&sig=IJsFvDpSvQV_D8sxhasAkaNgqY

83. Oh BH, Kim YK, Kim JH, Shin YS. The effects of cognitive rehabilitation training on cognitive function of elderly dementia patients.


OBJECTIVES: This study was to evaluate the effects of cognitive rehabilitation training on the cognitive decline of elderly dementia patients. METHODS: Each of 20 subjects received 16 session of repeated training with computer-aided cognitive rehabilitation program (RehaCom®). Cognitive function of all subjects were evaluated by K-DRS, K-BNT, K-MMSE and GDS before and after the training. RESULTS: Significant improvement of attention and memory was observed following RehaCom®. There was no significant change in visuospatial memory, executive function, and conceptualization. CONCLUSION: It is suggested that cognitive rehabilitation training with elderly dementia patients can be useful to ameliorate the cognitive decline and to enhance motivation and self-esteem.

2003O4:

http://www.koreamed.org/SearchBasic.php?RID=0055JKNA/2003.42.4.514&DT=1


Treated group patients received an intensive computer-assisted cognitive rehabilitation of attention, information processing and executive functions for 12 weeks, using the software part of the RehaCom® package

2014O6: 10.1177/1352458513505692

http://msj.sagepub.com/content/20/6/686.short


Computerized cognitive training programs, such as RehaCom® and CogniFit, could improve cognitive performance in MS. CogniFit was evaluated in a study of 107 patients with MS, 59 of whom were assigned to cognitive training [123].

2012O11: 10.1517/13543784.2012.716036

86. Pokorski M, Borecki L, Jernajczyk U. Psychological Fitness in Young Adult Video Game Players.
CURRENT TOPICS IN CHILDREN’S LEARNING AND COGNITION. 2012123.
Cognitive functions were investigated using sets of neuropsychological assessment tools that consisted of various thinking, memory, intelligence, and visual-spatial ability measures, such as the RehaCom® (Hasomed GmbH, Magdeburg, Germany), the Vienna Test System.
Panel A - Visual working memory of video games players vs. non-players assessed with a RehCom BILD Tes ($\chi^2=30.5; P<0.001$); Panel B - Logical reasoning assessed with a RehaCom®LODE Test (data distributed on 3-degree Likert scale, $\chi^2=33.3; P<0.001$).
2012
http://disde.minedu.gob.pe/xmlui/bitstream/handle/123456789/1526/
Current_Topics_in_Children_s_Learning_and_Cognition.pdf?sequence=1#page=133

In the visuo-spatial scanning training aimed at active and purposeful exploration of the visual field, the following programmes from the RehaCom® computerised system.
2009O3: 10.1080/09602010802268856
http://www.tandfonline.com/doi/abs/10.1080/09602010802268856

Background: Pharmacotherapy using stimulants has emerged as a primary mode of treatment for attention deficit hy- peractivity disorder (ADHD). However, these stimulants often do not ameliorate all the problems (especially atten- tional problems) that these children experience. Considering this, the use of non-pharmacological treatments that are designed to improve attention and other cognitive abilities need to be empirically investigated.
Aim and Objectives: To study the efficacy of cognitive retraining (CR) techniques in management of ADHD. Materials and Methods: Pre and post-intervention study design
was used with 20 children, ages 7 to 11 years, diagnosed with (ADHD). Treatment and wait list control groups (n=10) were matched for age, sex, and medication status. Both groups completed pre- and post-intervention assessment batteries that included psychometric measures of sustained attention, selective attention (Digit Vigilance task), focused attention (Colour Trails Test), divided attention (Triads Test), a measure of academic efficiency (Grade Level Assessment Device, GLAD), and behavioural rating scales (ADHDT). Intervention comprised of 36 hours of cognitive retraining activities aimed to enhance selective, sustained and divided attention. SPSS version17.0 was used for descriptive and analytical statistical analysis.

Results: The mean change from baseline for sustained attention (errors), focused attention and selective attention and was significantly greater in the CR group than in wait list control group (p<0.05). The mean change from baseline was significant higher for divided attention in the CR group than in wait list control group (p<0.01). Post intervention, the mean academic performance of the subjects of CR group was found to be higher than in the wait list control group.

Conclusion: Cognitive retraining aimed at enhancing attention carries the potential of enhancing attention of children with ADHD along with improving their academic performance. It also reduces the severity of reported behavioural manifestations of inattention–impulsivity (German J Psychiatry 2011; 14(2): 55-59).


90. Reeder C, Wykes T. DEVELOPING COGNITIVE REMEDIATION THERAPY - LESSONS FROM THE FIELD OF SCHIZOPHRENIA.

Cognitive Remediation Therapy (CRT) for Eating and Weight Disorders. 2014207.


http://books.google.com/books?hl=en&lr=&id=twjEBAAAQBAJ&oi=fnd&pg=PA207&dq=RehaCom*&ots=bIdedHR2Om&sig=fPaHaoXQ2CV8y--9vvig04EAVos
91. Rego P, Moreira PM, Reis LP. A Survey on Serious Games for Rehabilitation. 
5th DSIE’10 Doctoral Symposium in …. 2010
A presentation on the topic of “serious games for rehabilitation”. Includes a section on 
RehaCom®
2010
http://paginas.fe.up.pt/~dsie10/presentations/session 7/A Survey on Serious Games for 
Rehabilitation.pdf

92. Rego PA, Moreira PM, Reis LP. Natural user interfaces in serious games for 
rehabilitation. Information Systems and …. 20111-4.
This paper addresses research development regarding the adoption of natural user 
interfaces (NUI) in the Serious Games for Rehabilitation area of application. From previous 
studies, we identified as a research opportunity the potential benefits of the adoption of 
more natural interaction modalities. This paper describes the main problems and how 
serious games and NUI can benefit the process of rehabilitation. We describe our recent 
work on this subject, including the design of a game prototype using alternative (in 
respect to the conventional WIMP) interaction. We conducted a playability study in order 
to make it possible to evaluate and measure the benefits of the newer forms of interaction. 
From the results study, we concluded that the introduction of the natural interaction 
modalities has increased the attractiveness and intuitiveness of the prototyped Serious 
Game. Lastly, we report some conclusions and identify research opportunities and open 
problems in this area.
2011
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5974331

93. Rego P, Moreira PM, Reis LP. Serious games for rehabilitation: A survey and a 
classification towards a taxonomy. 2010;
We also describe a particular Serious Game for Rehabilitation, RehaCom®, as a case 
study. Finally, the paper presents some challenges and research opportunities in this area. 
In Section 6, a reference system - RehaCom® System - is described.
2010OCISTI:
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5556674

94. Richter KM, Modden C, Eling P, Hildebrandt H. Working memory training and 
semantic structuring improves remembering future events, not past events. 
Conflicting Interests - The author(s) declared the following potential conflicts of interest 
with respect to the research, authorship, and/or publication of this article: Kim Merle
Richter received funding of Hasomed, Inc (Magdeburg), which sells the RehaCom® cognitive training.

2015O1:
http://nnr.sagepub.com/content/29/1/33.short


Neurorehabil Neural Repair. 2014

Objectives. Memory training in combination with practice in semantic structuring and word fluency has been shown to improve memory performance. This study investigated the efficacy of a working memory training combined with exercises in semantic structuring and word fluency and examined whether training effects generalize to other cognitive tasks.

Methods. In this double-blind randomized control study, 36 patients with memory impairments following brain damage were allocated to either the experimental or the active control condition, with both groups receiving 9 hours of therapy. The experimental group received a computer-based working memory training and exercises in word fluency and semantic structuring. The control group received the standard memory therapy provided in the rehabilitation center. Patients were tested on a neuropsychological test battery before and after therapy, resulting in composite scores for working memory; immediate, delayed, and prospective memory; word fluency; and attention. Results. The experimental group improved significantly in working memory and word fluency. The training effects also generalized to prospective memory tasks. No specific effect on episodic memory could be demonstrated. Conclusion. Combined treatment of working memory training with exercises in semantic structuring is an effective method for cognitive rehabilitation of organic memory impairment.

2014
http://nnr.sagepub.com/content/early/2014/04/01/1545968314527352.abstract


Average treatment attendance was 8.4 of 10 sessions. Both training regimes were implemented with the RehaCom® Software Package (Hasomed GmbH, Germany). Each session lasted 45min and took place in small groups.

2014O04:
http://journals.cambridge.org/abstract_S1355617714000162


BMC psychiatry. 2011; 11: 73.
Both groups. Participants were engaged in 10 training sessions of computer-based cognitive exercises either targeting planning and problem solving or basic cognition. The platform for all computer based exercises was the RehaCom® system (Hasomed GmbH, Germany).

2011O1:
http://www.biomedcentral.com/1471-244X/11/73


Abstract 1. The present study provides a meta-analysis of cognitive rehabilitation literature (K= 115, N= 2,014) that was originally reviewed by KD Cicerone et al.(2000, 2005) for the purpose of providing evidence-based practice guidelines for persons with acquired brain.

2009O1:

Cochrane Database 2014

Main results

Twenty studies (986 participants; 966 MS participants and 20 healthy controls) fulfilled the inclusion criteria. The mean age of the participants was 44.6 years, mean length of education was 12.3 years and 70% of the participants were women. Most of the participants had a relapsing-remitting course of disease. The mean Expanded Disability Status Scale score was 3.2 and the mean duration of disease was 14.0 years.

On the basis of these studies, we found low-level evidence that neuropsychological rehabilitation reduces cognitive symptoms in MS. Cognitive training was found to improve memory span (standardised mean difference (SMD) 0.54, 95% confidence interval (CI) 0.20 to 0.88, P = 0.002) and working memory (SMD 0.33, 95% CI 0.09 to 0.57, P = 0.006).
Cognitive training combined with other neuropsychological rehabilitation methods was found to improve attention (SMD 0.15, 95% CI 0.01 to 0.28, P = 0.03), immediate verbal memory (SMD 0.31, 95% CI 0.08 to 0.54, P = 0.008) and delayed memory (SMD 0.22, 95% CI 0.02 to 0.42, P = 0.03).

There was no evidence of an effect of neuropsychological rehabilitation on emotional functions. The overall quality, as well as the comparability of the included studies, was relatively low due to methodological limitations and heterogeneity of interventions and outcome measures. Although most of the pooled results in the meta-analyses yielded no significant findings, 18 of the 20 studies showed some evidence of positive effects when the studies were individually analysed.

Authors’ conclusions
This review found low-level evidence for positive effects of neuropsychological rehabilitation in MS. The interventions and outcome measures included in the review were heterogeneous, which limited the comparability of the studies. New trials may therefore change the strength and direction of the evidence.


100. Royer A, Grosselin A, Bellot C et al. Is there any impact of cognitive remediation on an ecological test in schizophrenia?


**Introduction.** Cognitive deficits are commonly reported in schizophrenia and have a significant impact on the daily life of patients and on their social and work inclusion. Cognitive remediation therapies (CRT) may enhance the capabilities of schizophrenia patients. Although social and work integration is the ultimate goal of CRT, previous studies have failed to carry out a detailed assessment of the effects on everyday life.

**Methods.** Fifty-nine schizophrenia patients were randomised into two groups (remediation or usual treatment) to test the effects of a new remediation programme, which included both rehearsal and strategy learning, on cognitive functions. An ecological test was used to evaluate its transfer to daily living skills.

**Results.** Cognitive improvements are revealed in CRT patients, mainly in memory and executive functions. Patients showing some deficiencies to perform the ecological test had better scores after the CRT. Moreover, they significantly improve their social activity scores.

**Conclusions.** CRT would facilitate mental load monitoring by enhancing or reallocating cognitive resources, facilitating the patient’s organisation and autonomy. The rehearsal learning approach improves the ability to carry out automatic operations that are less demanding in terms of cognitive resources, thereby increasing the resources available for acquisition and efficient use of strategies provided during the strategy learning approach.

A computerised training programme (RehaCom® software) was used. The exercises were repetitive (ie, restitution approach)


100. Sablier J, Stip E, Franck N. [Cognitive remediation and cognitive assistive technologies in schizophrenia].


**BACKGROUND:** Cognitive impairments are a core feature in schizophrenia. They impact several cognitive abilities but most importantly attention, memory and executive functions, consequently leading to great difficulties in everyday life. Most schizophrenia patients need assurance and require assistance and help from care workers, family members and friends. Family members taking care of a patient have additional daily work burden, and suffer psychological anguish and anxiety. Therefore, improving cognitive functions in schizophrenia patients is essential for the well-being of patients and their relatives. Reducing these deficits may decrease the economic burden to the health care sector.
system through lower numbers of hospital admissions and shorter hospitalisation periods, for example. Cognitive rehabilitation was developed to address the limited benefits of conventional treatments on cognitive deficits through the use of assistive technology as a means of enhancing memory and executive skills in schizophrenia patients.

OBJECTIVE: To provide clinicians with comprehensive knowledge on cognitive trainings, programs of remediation, and cognitive assistive technologies.

METHOD: Literature review. A search in the electronic databases (PubMed, EMBASE, Index Medicus) for recent articles in the last 10 years related to cognitive remediation published in any language using the words: cognitive and remediation or rehabilitation and schizophrenia, and a search for chapters in psychiatry and rehabilitation textbooks.

RESULTS: We found 392 articles and 112 review paper mainly in English. First, we identified cognitive remediation programs that were beneficial to schizophrenia patients. Programs available in French (IPT, RECOS, and RehaCom®) and others (CET, NET, CRT, NEAR, APT and CAT) were identified. In addition, since memory and executive function impairments could be present in people without schizophrenia, we reviewed inventories of cognitive assistive technologies proven to enhance cognitive skills in other populations. Finally, we present a review of recent studies testing innovative devices developed to assist schizophrenia patients.

DISCUSSION: First, we found several cognitive programs proven to be effective with schizophrenia patients, but only three were validated in French. It could be useful to adapt other programs for French-speaking populations. Unfortunately, we found that very few of the existing cognitive assistive technologies are proposed to be used with schizophrenia patients. In fact, most of the available cognitive orthoses were tested primarily in people with neurological injuries (for example, various memory impairments caused by traumas), and in elderly illnesses (like Alzheimer disease). Devices for patients with mental deficits (e.g., mental retardation) were developed later, and only very recently explored for use in schizophrenia. As a result of an international collaboration between France and Canada, currently a tool called MOBUS is being tested. This technology aims at improving the autonomy of schizophrenia patients, by helping them plan and remember their daily activities. Furthermore, it encourages patient-caregiver communication, and permits monitoring patients’ subjective reports of their symptoms. The use of cognitive assistive technologies is not meant to isolate patients by replacing the human element of relatives and caregivers by a machine. On the contrary, they offer a sense of security and they improve interpersonal relationships by permitting enhanced autonomy and greater self-confidence. Finally, a literature review of cognitive remediation in schizophrenia emphasizes the importance of a structured application of the technique in order for it to succeed. First, it is crucial to detect the impairments that will be targeted in each patient presenting a specific pattern of impairments. For this purpose, validated and customised neuropsychological tests are required. Then, cognitive remediation programs must be customised to each patient’s needs in order to motivate the patient to participate. Finally, long-term effects must be assessed in order to verify whether reinforcement is needed. Following these steps, most of the studies show an improvement in the well-being of patients with schizophrenia. These recommendations are also suitable for the cognitive remediation programs, as for treatments with cognitive assistive devices. An important hurdle facing the advance of cognitive assistive technology programs is that different research groups work individually without a coordinated effort to improve and validate the existing programs.
CONCLUSION: Schizophrenia treatments must take into account not only patients’ symptoms, but also the associated cognitive deficits which constitute an important factor in their social problems. It has been shown that several cognitive remediation programs are efficient in schizophrenia. New technologies complement the benefits of such programs, and support pharmacological treatments and psychotherapies.

2009O2: 10.1016/j.encep.2008.02.010


Background: Optic neuritis is a frequent manifestation of multiple sclerosis. Visual deficits range from a minor impairment of visual functions through to complete loss of vision. Although many patients recover almost completely, roughly 35% of patients remain visually impaired for years, and therapeutic options for those patients hardly exist. Vision restoration therapy is a software-based visual training program that has been shown to improve visual deficits after pre- and postchiasmatic injury. The aim of this pilot study is to evaluate whether residual visual deficits after past or recent optic neuritis can be reduced by means of vision restoration therapy.

Methods/design: A randomized, controlled, patient- and observer-blinded clinical pilot study (VISION study) was designed to evaluate the efficacy of vision restoration therapy in optic neuritis patients. Eighty patients with a residual visual deficit after optic neuritis (visual acuity ≤0.7 and/or scotoma) will be stratified according to the time of optic neuritis onset (manifestation more than 12 months ago (40 patients, fixed deficit) versus manifestation 2 to 6 months ago (40 patients, recent optic neuritis)), and randomized into vision restoration therapy arm or saccadic training arm (control intervention). Patients will be instructed to complete a computer-based visual training for approximately 30 minutes each day for a period of 6 months.

Saccadic training RehaCom®,
2012O1:
http://www.biomedcentral.com/content/pdf/1745-6215-13-94.pdf

102. Schulze F, Weber P. Hirnleistungstraining mit RehaCom®. Computer helfen heilen und leben:
As cognitive disorders are the most frequent consequences of brain damage, the need of therapeutic instruments for patients with traumatic head and brain injuries is rather great. Special computer-aided therapeutic procedures have been particularly developed for this area with the aim to influence cognitive deficiencies, above all, in the fields of attention, memory, and problem solving. RehaCom® dates back to 1986. The training with a computer brings about the following advantages: individualisation, adaptation, continuity, case control, flexibility, disorders specific training, confirmation/feedback, standardised conditions, efficiency and economy, appropriate input device. The possible training dimensions are: Attention, ability to concentrate and vigilance. Memory and learning ability. LOG-ical thinking. Spatial imagination. Reactive behaviour. Visual-motor coordination. Visual-constructive abilities. Problem solving and strategy development. Field of vision. Studies of effectiveness shows transfer effect of first order (Training effect: Pre-post-comparison with tests measuring the same function as the training procedure), transfer effect of second order (Generalisation effect: Pre-post-comparison with tests measuring other function as have been trained), transfer effect of third order (effect on activities of daily life).

2003


Brain Inj. 2003; 17: 701-713.

Objective: The presented case study describes the beneficial results of the neuropsychological rehabilitation of a gunshot victim, even with late initialisation of the therapy—over 1 year after head trauma. Design: A case study of DE, a victim with bilateral damage of the parietal-occipital regions of the brain due to a gunshot. Methods: Neuropsychological rehabilitation, first preceded by an initial neuropsychological examination (standard psychological tests: WAIS-R, RAVLT, Rey's CFT, BVRT and clinical experiments tailored to DE's condition), was initiated 1 year after trauma. The rehabilitation programme consisted of computer-based tasks, paper-and-pencil exercises, and occupational therapy. The patient's progress was assessed as improvement in performance in standardised tests and computer-based tasks. Results: DE was diagnosed with complex cognitive deficits syndrome, including visual associative agnosia, apraxia, visuospatial and constructive disorders and linguistic defects. After 1 year of rehabilitation the patient's functioning significantly improved as measured by psychological tests and computer-based tasks (p < 0.05) as well as the evaluation of the patient's quality of life. Conclusions: The case study demonstrates beneficial effects of neurorehabilitation even initialised at the so-called 'late stage' after a brain injury.

Utilising the VIGI procedure from RehaCom® is a training of vigilance. Each of the above tasks from RehaCom® has several difficulty levels.

2003O8: 10.1080/0269905031000088621

http://informahealthcare.com/doi/abs/10.1080/0269905031000088621


2008O2:


Clinical Practice in Pediatric Psychology. 2014; 2: 263.

Galbiati and colleagues (2009) completed a study on 65 participants (with 25 as nontreated controls) with TBI, ages 6–18 years, utilising a computerised attention intervention RehaCom® and Attention and Concentration [Di Nuovo, 1992]).

2014O3: 10.1037/cpp0000072


Context: Cognitive compromise is one of the main contributing factors to activity and participation restrictions in people with multiple sclerosis (MS). Computer-aided programs are used for retraining memory and attention, but data on the efficacy of these interventions are scarce. Objective: To assess the efficacy of computer-aided retraining of memory and attention in people with MS impaired in these abilities. Design and setting: Randomised, double-blind, controlled trial. Participants: Outpatients (n=82) with subjective complaints of poor attention or memory, confirmed by a score <80th percentile in at least two tests of the Brief Repeatable Battery of Neuropsychological Tests (BRBNT). Interventions: Participants were randomised to two computer-assisted retraining interventions: memory and attention (study arm), and visuo-constructional and visuo-motor coordination (control arm). Both groups received 16 training sessions over 8 weeks. Outcome measures: Improvement of 20% or more in at least two BRBNT test scores at 8 weeks compared to baseline (primary end point). Changes in depression and health-related quality of life. Results: An improvement occurred in 45% of study patients vs. 43% of control patients (odds ratio 1.07, 95% confidence interval 0.44–2.64).

The training program was RehaCom®, a software package for use with a special keyboard that limits the interference of motor and coordination impairments. The study treatment consisted of the RehaCom® memory, and attention retraining procedures.


http://www.sciencedirect.com/science/article/pii/S0022510X04001285

KEY POINTS

Cognitive training approaches, such as working memory training (WMT), are being increasingly used to target both the symptoms and the underlying neuropsychological deficits in patients with attention-deficit/hyperactivity disorder (ADHD). The rationale of these approaches is both biologically plausible and supported by basic cognitive neuroscience.

There are now 14 randomized controlled trials (RCTs) with ADHD outcomes (8 published in the past 2 years or so).

At present, given the inconsistency of extant findings, more evidence from well-blinded trials is required before cognitive training can be supported as a frontline treatment of ADHD.

Evidence in relation to improved neuropsychological function maybe more positive, but additional research is required.

Future research should focus on ways to improve the content and implementation, and increase the scope, of these potentially important therapeutic approaches.

Utilised RehaCom® Attention, memory, executive functions, visuomotor


109. Spahn V, Kulke H, Kunz M, Thöne-Otto… A. Is the Neuropsychological Treatment of Memory Specific or Unspecific?


Primary objective and research design: In order to analyse whether neuropsychological memory therapy acts specifically on the memory domain or in a more generalised fashion on further cognitive domains, 27 patients with organic memory deficits due to different etiologies (cerebrovascular, traumatic, infectious, etc.) were randomly assigned to two different memory treatment programs and investigated for changes in memory and attention. Methods and procedures: Patients treated by a specific computer-based training of story recall (Training of Verbal Memory, TVM) were compared to a group in which compensational strategies for everyday memory problems were trained (Memory Therapy in Groups, MTG). Both therapies were conducted over 12 to 15 sessions, 4–5 times per week, in addition to standard program of neurorehabilitation. Training effects were assessed for verbal and figural memory (Verbal Learning Test, Nonverbal Learning Test) and for attention (Alertness and Divided Attention in Test Battery of Attentional Performance). Results and conclusions: Both treatment groups resulted in improvement in tests of memory but not attention. This finding provides good evidence for the assumption of specificity of effects in neuropsychological treatment of memory.

2010O4: 10.1024/1016-264X/a000019

In a multicenter European approach, the efficacy of the AIXTENT computerized training programs for intensity aspects (alertness and vigilance) and selectivity aspects (selective and divided attention) of attention was studied in 33 patients with brain damage of vascular and traumatic etiology. Each patient received training in one of two most impaired of the four attention domains. Control tests were performed by means of a standardized computerized attention test battery (TAP) comprising tests for the four attention functions. Assessment was carried out at the beginning and at the end of a four week baseline period and after the training period of 14 one-hour sessions. At the end of the baseline phase, there was only slight but significant improvement for the most complex attention function, divided attention (number of omissions). After the training, there were significant specific training effects for both intensity aspects (alertness and vigilance) and also for the number of omissions in the divided attention task. The application of inferential single case procedures revealed a number of significant improvements in individual cases after specific training of alertness and vigilance problems. On the other hand, a non specific training addressing selectivity aspects of attention lead either to improvement or deterioration of alertness and vigilance performance. The results corroborate the findings of former studies with the same training instrument but in patients with different lesion etiologies.

200310.1024/1016-264X.14.4.283


In patients with alertness deficits due to right hemispheric vascular brain damage, training induced changes in the individual functional networks involved in intrinsic alertness were assessed in a longitudinal positron emission tomography (PET)/fMRI activation study. Patients were trained by administering the alertness routine of the AIXTENT computerized attention training or, in the control condition, by using a computerized training of verbal and topological memory. Before and after the training, both a PET/fMRI and a neuropsychological assessment were carried out. In this paper, we are presenting four patients after alertness training: three, whose alertness performance improved significantly after training, and one, who did not improve. In the patients showing behavioural improvement, the PET/fMRI activation after training revealed partial restitution of the right hemisphere (RH) functional network known to subserve intrinsic alertness in normal subjects, especially in the right dorsolateral or medial frontal cortex. For the patient without behavioural improvement, the PET activation after training showed an increase of activation only in the left hemisphere. Out of the four patients in the memory training control group only one showed significant improvement of alertness.
Another patient had an increase of right frontal activation after the training but this did not correspond to behavioural improvement. In a control group of six normal participants, repetition of the alertness activation paradigm in fMRI revealed a decrease of right frontal and parietal activation from the first to a second measurement after 3 weeks, in contrast to the observed training induced effects in the patients.
Cognitive rehabilitation refers to a set of interventions that aim to improve a person's ability to perform cognitive tasks by retraining previously learned skills and teaching compensatory strategies. Cognitive rehabilitation begins with a thorough neuropsychological assessment to identify cognitive strengths and weaknesses and the degree of change in cognitive ability following a brain injury. The conclusions of the assessment are used to formulate appropriate treatment plans. Common interventions for improvements in attention, memory, and executive function, as well as the nature of comprehensive programs, which combine treatment modalities, are reviewed. Cognitive rehabilitation is effective for mild-to-severe injuries and beneficial at any time post-injury. Sufficient evidence exists supporting the efficacy and effectiveness of cognitive rehabilitation, which has become the treatment of choice for cognitive impairments and leads to improvements in cognitive and psychosocial functioning.


120. Vita A, De Peri L. 13 Symptoms, thought disorders and cognitive remediation treatment in schizophrenia. Brain Evolution, Language and Psychopathology in Schizophrenia. 2013212. d’Amato et al.(2011) investigated 77 patients with remitted schizophrenia, who were randomly assigned to fourteen two-hour individual sessions of CACR (n= 39) or to a control condition (n= 38). Remediation was performed using RehaCom® software. 2013 http://books.google.com/books?hl=en&lr=&id=eDwVAgAAQBAJ&oi=fnd&pg=PA212&dq=RehaCom®&ots=3S1LSy9wxe&sig=lZfYF3WH9I-8_f1H-nfsNPzYEEw

121. Volpe BT, McDowell FH. The efficacy of cognitive rehabilitation in patients with traumatic brain injury. Arch Neurol. 1990; 47: 220-222. Does specific therapy for patients with cognitive disorders that occur after traumatic brain injury (TBI) produce a specific and obvious improvement in quality of life? The medical literature on this question is voluminous but this review is limited to 20 relevant publications. First there are chapters, reviews, and editorials that sound a clarion call for action. There can be no disagreement that the loss of intellect and subsequent personality changes in patients with TBI are catastrophic. Unlike other neurologic disease, TBI compounds the basic neurologic infirmity with the prospect of 30 to 40 more years of disabled life. The burden for families and in many cases the eventual burden to society has received attention from medical economists 1990O2: 10.1001/archneur.1990.00530020128026. http://archneur.jamanetwork.com/article.aspx?articleid=589894
Rego et al. [92] proposed a classification designed to properly distinguish and compare eight serious games for rehabilitation systems with respect to their fundamental characteristics. They also described a particular serious game for rehabilitation, RehaCom®, as a case study.

2013O4:

Yang S, Ye H, Huang J et al. The synergistic effect of acupuncture and computer-based cognitive training on post-stroke cognitive dysfunction: a study protocol for a randomized controlled trial of 2 x 2 factorial design.

BACKGROUND: Stroke is one of the most common causes of cognitive impairment. Up to 75% of stroke survivors may be considered to have cognitive impairment, which severely limit individual autonomy for successful reintegration into family, work and social life. The clinical efficacy of acupuncture with Baihui (DU20) and Shenting (DU24) in stroke and post-stroke cognitive impairment has been previously demonstrated. Computer-assisted cognitive training is part of conventional cognitive rehabilitation and has also shown to be effective in improvement of cognitive function of affected patients. However, the cognitive impairment after stroke is so complexity that one single treatment cannot resolve effectively. Besides, the effects of acupuncture and RehaCom® cognitive training have not been systematically compared, nor has the possibility of a synergistic effect of combination of the two therapeutic modalities been evaluated. Our primary aim of this trial is to evaluate the synergistic effect of acupuncture and RehaCom® cognitive training on cognitive dysfunction after stroke.

METHOD/DESIGN: A randomized controlled trial of 2 x 2 factorial design will be conducted in the Rehabilitation Hospital Affiliated to Fujian University of Traditional Chinese Medicine. A total of 240 patients with cognitive dysfunction after stroke who meet the
eligibility criteria will be recruited and randomized into RehaCom® training group, acupuncture group, a combination of both or control group in a 1:1:1:1 ratio. All patients will receive conventional treatment. The interventions will last for 12 weeks (30 min per day, Monday to Friday every week). Evaluations will be conducted by blinded assessors at baseline and again at 4, 8 and 12 weeks. Outcome measurements include mini-mental state examination (MMSE), Montreal cognitive assessments (MoCA), functional independence measure scale (FIM) and adverse events.

DISCUSSION: The results of this trial are expected to clarify the synergistic effect of acupuncture and RehaCom® cognitive training on cognitive dysfunction after stroke. Furthermore, to confirm whether combined or alone of acupuncture and RehaCom® cognitive training, is more effective than conventional treatment in the management of post-stroke cognitive dysfunction.

TRIAL REGISTRATION: Chinese Clinical Trial Registry: ChiCTR-TRC-13003704.

201410.1186/1472-6882-14-290


Evidence-Based Complementary and Alternative Medicine. 2014; 2014

2.2. Experimental Design. 2.2.1. Integrated Cognitive Therapy. All ischemic stroke patients received CACR training from RehaCom® software, which consists of training programs related to attention, memory, and executive functions.

2014


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This article is the second part of a systematic review of studies on occupational therapy–related intervention for people with multiple sclerosis (MS). The objective of this systematic review was to critically appraise and synthesize the applicable findings to address the following focused question: What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice for people with multiple sclerosis? Part 1 (Yu & Mathiowetz, 2014) reviewed evidence for the effectiveness of activity- and participation-based interventions for people with MS. In contrast to the top-down approach, enabling occupational performance can be achieved through remediating impaired personal abilities. Therefore, Part 2 focuses on occupational therapy interventions targeting impairment. Studies included in this review focused on improving client factors and performance skills in people with MS, including cognition, emotional regulation, and motor and praxis skills.
Study of home-based intervention. Solari et al. (2004) compared the effects of 8 wk of RehaCom®memory and attention retraining with RehaCom® visuoconstructional and visuomotor coordination retraining. Both groups showed immediate improvement.

http://ajot.aota.org/article.aspx?articleid=1863112


*Bulletin of Faculty of Physical Therapy. 2009; 14*

While Practicing a bimanual activity in the second month of training. 1- Training of cognitive task: It was conducted by use of RehaCom® system (Computer-assisted cognitive rehabilitation - 2009O1:


130. ZIHL J. Eye movement patterns in hemianopic dyslexia.


Homonymous parafoveal field loss impairs reading at the visual-sensory level. To elucidate the role of parafoveal visual field in reading, reading eye movements were recorded, by means of an infra-red registration technique, in 50 patients with homonymous hemianopia and visual field sparing ranging from 1° to 5°; for comparison, a group of 25 normal subjects was studied. The degree of reading impairment in patients was found to depend on the extent of visual field sparing. Patients with right-sided loss of parafoveal visual field were more impaired than patients with left-sided loss. Eye movement reading patterns paralleled this observation. Left-sided field loss mainly impairs return eye movements to the beginning of a line, while right-sided field loss is characteristically associated with prolonged fixations times, reduced amplitudes of saccades to the right, and many regressive saccades. The analysis of the durations of fixations, and the amplitudes of saccadic eye shifts to the right, and their mutual dependencies, suggests that the perceptual window (‘reading span’) is altered: its spatial size is reduced, while its temporal extent is increased. The analysis of reading eye movements in 20 patients, who were treated for their hemianopic reading disorder, revealed, in part, a normalization of the eye movement pattern after treatment, indicating that the lost parafoveal field region can be successfully substituted by oculomotor adaptation. Our observations underline the importance of the parafoveal visual field for reading and support the hypothesis of a serial interplay between sensory-perceptual and cognitive factors in reading. Furthermore, reading eye movements appear to be guided primarily by parafoveal information processing; however, eye movement patterns show relative plasticity with respect to ‘local’ adaptation when the parafoveal field region is lost. This adaptation can best be explained by a change of the perceptual window which appears to be guided mainly by top-down influences. As to the brain lesion which may be responsible for the lack of effective oculomotor compensation, damage to the occipital white matter appears the most crucial condition because it may disconnect visual cortical areas, and interrupt subcortical-cortical connections which are part of a neural network subserving directed visual attention and associated saccadic eye shifts.

Abstract – This study examined oculomotor scanning behaviour in 60 patients suffering from homonymous hemianopia due to post-geniculate damage. Eye movements were recorded using an infra-red recording technique during performance of a visual searching task. In 24 patients (40%) scanning behaviour was found to be normal; the remaining 60% showed significantly increased search times. Detailed analysis of patients’ eye movements revealed that the pronounced slowing of visual scanning was mainly due to the disordered spatial organisation of scanning not only in the affected, but also, to a lesser degree, in the intact hemifield. CT and NMR examination revealed that additional damage to the ipsilateral posterior halamus or the parieto-occipital cortex results in impaired spatial organisation of visual scanning. A smaller group of patients (n = 14) with impaired visual scanning was treated to improve the spatial organisation of visual exploration. After training, all patients showed a significant improvement in visual searching, indicating that successful oculomotor adaptation can substitute the lost visual hemifield. It is argued that impaired visual scanning in hemianopic patients is mainly caused by visual spatial disorientation which also affects spatial integration of visual information processing.