The following section gives a short description of studies for effectiveness for some of the above named procedures.

Regel, H. & Fritsch, A. (AUFM, GEAU, VIGI, REA1, WORT, MEMO, VERB and BILD) Center for Neurological Therapy, Magdeburg, Germany

120 NEUROLOGICAL PATIENTS (STROKE, CLOSED HEAD INJURY) participate in this study. The pre-post design uses the following tests: TAP and Diagnostic Inventory for Cerebral deficits. In the eight weeks between pre and post testing, patients train with one or more of the following programs: ATTENTION & CONCENTRATION, DIVIDED ATTENTION, VIGILANCE, REACTIVITY, MEMORY FOR WORDS, TOPOLOGICAL MEMORY, VERBAL MEMORY and FIGURAL MEMORY.

The investigation sample was split into three groups: Group 1 (patients under 60 years without an speech disorder and/or hemiparesis) show improvement of performance in 83% of all variables. Group 2 (patients under 60 years with speech disorders and motor disorders) show significant improvement of performance in 57% of all variables. Group 3 (patients over 60 years and disorders in all areas) show improvement in 50% of all variables. Because of the long period between traumatic event and therapy spontaneous remission can be excluded. Regel postulate three areas where improvement of performance can be shown. χ Transfer effect of first order (Training effect): Pre-post-comparison with tests measuring the same function as the training procedure (Training for attention, improvement of performance measured with attention test e.g. d2 or Cognitrone).

• Transfer effect of second order (Generalization effect): Pre-post-comparison with tests measuring other function as have been trained (Training of attention, improvement of performance measured with memory tests).
• Transfer effect of third order (effect on activities of daily living): Attention and/or memory training helps the patient to manage demands of daily living. This effect is hard to conceive by psychometric procedures.

Results show significant positive effects of first order. For the moment the quantitative evidence for the effect of third order are not available but qualitative ovservations show positive tendency. This study is published in: Regel, H. & Fritsch, A. (1997) Evaluationsstudie zum computergestützten Training psychischer Basisfunktionen. Final paper of a supported research work. Bonn: Kuratorium ZNS.
Puhr, U., University of Vienna (AUFM, GEAU, LODE, MEMO, WORT)

By means of 97 patients with APOPLEXY the effectiveness of the procedures ATTENTION & CONCENTRATION, DIVIDED ATTENTION, LOGICAL MEMORY, TOPOLOGICAL MEMORY and MEMORY FOR WORDS was investigated.

With the following test of the Vienna Test System (SCHUHFRIED GmbH) cognitive performance deficits were diagnosed: Coloured Progressive Matrices (logical reasoning), Cognitrone (attention), Verbal Learning Test, Nonverbal Learning Test and Corsi’s-Block-Tapping-Test (visuo-spatial memory span). According to the diagnosed deficit two of the above named procedures were applied, each for 10 session to 15 minutes. To determine treatment effects the performances of the two test times were evaluated with the LLTM (Linear Logistic Test Model by Rasch). This calculation showed significant transfer effects of first and third order (by Regel). A transfer effect of second order (generalization effect) was not found. This study is published in: Puhr, U. (1997). Effektivität der RehaCom-Verfahren Aufmerksamkeit & Konzentration, Geteilte Aufmerksamkeit, Topologisches Gedächtnis, Logisches Denken und Wortgedächtnis in der neuropsychologischen Rehabilitation. Dissertation at the University of Vienna, Department for Psychology.

Friedl-Francesconi, H., Maria Theresien Schlössel, Neurological Hospital of the City of Vienna, Austria (AUFM, VIGI, BILD, MEMO, VRO1)

12 patient with DEMENTIA in a mild state have been tested with a neuropsychological test battery, to determine remaining cognitive function or remaining achievement potential corresponding to age norms. The test battery consists of nine Subtests: Selective Reminding and Recognition (Demenztest by Kessler), Block Designs (WISC), AKT (Concentration test for aged by Gatterer) and some Subtest (labyrinth, digit span, trail-making, word list I and II) of the NAI (Test Inventory by Oswald and Fleischmann for psychology of aging). According to the measured remaining cognitive abilities two of the following procedures were selected: ATTENTION & CONCENTRATION, TOPOLOGICAL MEMORY, FIGURAL MEMORY and TWODIMENSIONAL OPERATIONS. Each patient underwent 15 sessions to 40 minutes. The test battery was presented before the first and after the last session. The cognitive dimensions visual short-term memory, sustained attention and information processing speed improve significant. This study is published in: Hinterhuber, H. (Hrsg.) (1995). Dementielle Syndrome. Innsbruck: Integrative Psychiatrie VIP, S. 86-91. The second study evaluates cognitive rehabilitation therapy with REHACOM for patients after SEVER HEAD INJURY. In addition to the standard neurological rehabilitation, one group was trained by the Vienna Determination Unit, a second group was treated by REHACOM (TOPOLOGICAL MEMORY and TWO-DIMENSIONAL OPERATIONS), while a third group received only conventional neurological rehabilitation. The three groups each
Effectiveness studies

Ott-Chervet, C., Rüegger-Frey, B. (et al.) Geriatric Hospital and Rehabilitation Center Zurich (AUFM, VIGI, WORT, MEMO)

The effectiveness of a computer-aided training within an individual setting is evaluated in the current study. The question whether the cognitive and/or emotional state of participants can be improved by a computer training is assessed by comparison of pre- and post testing. The 28 GERIATRIC PATIENTS with an average age of 81 and mean MMSE of 26 points, participating in this study, were matched based on identical cognitive performance in the "Syndromkurztest (SKT)". A nine hours computer training held over a period of three weeks focused on ATTENTION & CONCENTRATION, VIGILANCE, TOPOLOGICAL MEMORY and MEMORY FOR WORDS. Results show that patients generally improved their performance in all training programs, meaning that tasks of a higher level were more easily solved. However, these results cannot be generalized with respect to all programs or all patients involved. Effect sizes were computed based on the test data. Superiority of the experimental group was established in psychomotor skill measured by means of a German version of the Trailmaking Test (ZVT-G). This result is considered positive because psychomotor skill is one of the fundamental parameters of human behavior tending to decline with age. Regarding the variable memory the experimental group achieved better results storing the specific items but did not always recognize them in the very precise form thus causing a higher number of false positive answers. However, as far as other tested variables like attention, concentration and emotional state are concerned no relevant differences in favor of the experimental group could be ascertained. This study is published in: Zeitschrift für Gerontopsychologie und –psychiatrie, 11, Heft 1, S. 13-23.
Effectiveness studies

Preetz, N., University of Magdeburg, Germany (AUFM, VIGI, MEMO, WORT)

Preetz compared the effectivity of the REHACOM with those of mnemo techniques. 30 patients with VASCULAR BRAIN DAMAGES were involved in this study. The 15 patients of the training group had deficits in cognitive abilities. The patients of the control group had no cognitive deficits. The following cognitive functions have been examined: memory, concentration, intellectual ability, mental flexibility and reactivity. A questionnaire for state and one for the locus of control have also been presented. Each patients of the training group trained for about 16 hours with the following procedures: ATTENTION & CONCENTRATION, VIGILANCE, TOPOLOGICAL MEMORY and MEMORY FOR WORDS. Before and after every training session the patients rated their current state. The main results of the cognitive tests are:

- increase of performance of the trained function for patients of the training group
- transfer to other, than trained function (generalization effect) for patients of the training group
- no significant changes in the control group

The evaluation of the questionnaires leads to the following results:
- patients of the training group feel less handicapped after the training
- their state was less negative
- no significant changes for the control group


Höschel, K. et al., University Hospital Göttingen, Germany (AUFM, VIGI, MEMO, REA1, BILD, WORT)

This study examines the possibilities of a delayed rehabilitation with REHACOM on 7 patients with CRANIOCEREBRAL TRAUMA. The trauma happened 2 to 10 years ago. Main point of interest were attention and memory function. The attention function has been tested with sub tests of the TAP (divided attention, reaction shift, inter-modal matching, visual scanning) and with sub test of the FWIT (color-wordreading, color-line-naming and interference conditions). Selective reminding, Pair-association- learning-test and sub test of the WMS-R (Logical Memory, Visual Reproduction and Digit Span) have been taken to examine the memory functions. All patients showed light to severe deficits of attention and memory. Each patient underwent 5 to 6 session with the following
Effectiveness studies

procedures: ATTENTION & CONCENTRATION, VIGILANCE, REACTIVITY, FIGURAL MEMORY, TOPOLOGICAL MEMORY and MEMORY FOR WORDS. In the post-test the results of divided attention, reaction shift and Selective Reminding were significant better then in the first test. In a third testing between 24 and 29 weeks after the last training session the effects of the training were still existing. This study is published in: Zeitschrift für Neuropsychologie 7 (1996), Heft 2, S. 69-82.

Polmin, K. et al., University Hospital of Neurology, Graz, Austria (AUFM, BILD)

By means of 30 patients with acute APOPLEXY and impairment of attention and memory functions the effectivitiy of the REHACOM procedures ATTENTION & CONCENTRATION and FIGURAL MEMORY has been examined. In the experimental group 60% of the patient showed an improvement of the cognitive abilities for a short period and 70% of the patients showed an increase of attention and memory functions for a longer period. Only 22% of the control group had a training effect of short duration and 17% of long duration.

Wenzelburger, K.T. (AUFM, MEMO) University Tübingen

This study was done in the framework of a dissertation at Psychiatric Clinic at the University of Tübingen with three groups of 18 male ALCOHOL DEPENDENT PATIENTS (randomized matching method). The pre- post design uses the following neuropsychological test battery: LPS (short form), Alcoholism Questionnaire, Trailmaking Test B, Benton-Test, Revisions-Test and Beck’s Depression Inventory. Group one – “Game-Group” received 4 times 45 minutes of a parlor game. Group two – “REHACOM” trained 4 times 45 minutes with ATTENTION & CONCENTRATION and with TOPOLOGICAL MEMORY. The control group receive standard therapy. The result of this study: Only the visual shortterm memory (measured with the Benton-Test) has been positively influenced by REHACOM. This study is published in: Wenzelburger, K.T. (1996). Veränderung und Trainierbarkeit kognitiver Funktionen bei alkoholabhängigen Patienten im Entzug – eine kontrollierte Verlaufsstudie. Dissertation at the Medical Department of the Eberhard- Karls University Tübingen.
Effectiveness studies

Pfleger, U., University of Graz, Austria (AU FM, MEMO)

The effectiveness of REHACOM for therapy cognitive deficits caused by schizophrenia was investigated on 28 patients with CHRONIC SCHIZOPHRENIC DISORDERS. The cognitive profile was apprehended by the following tests: MWT (multiple choice word-power test), SKT, d2 and some scales of the LPS. Additional some self and assessment rating scales were applied (Reisberg scales, NOSIE and SANS). 14 patients of the training group absolved in a time span of 3 to 7 weeks, 3 times a week 20 minutes of computer-aided cognitive training (ATTENTION & CONCENTRATION and TOPOLOGICAL MEMORY). 14 patients of the control group receive conventional therapy program. In the final investigation all patients of the training group showed an increase in the test performances. Significant values have been calculated for the Scores of SKT and MWT. A generalization effect was not found. Obviously the training had no effects on the self-rating scales. But the scores of the assessment rating showed positive effects. This study is published in: Pfleger, U. (1996). Computerunterstützes kognitives Trainingsprogramm mit schizophrenen Patienten. Münster/New York: Waxmann – Internationale Hochschulschriften, Bd. 204

Beckers, K., Center for Neurological Therapy, Düsseldorf, Germany (AU FM, VIGI, MEMO)

This study was carried out with 6 patients with CRANIOCEREBRAL TRAUMA. The cognitive abilities have been determined with WAIS-R, WMS-R, RBMT, d2 and Vienna Determination Unit. All 6 patients had severe attention and memory deficits. Every patient trained 9 times 20 minutes with each of the following procedures: ATTENTION & CONCENTRATION, VIGILANCE and TOPOLOGICAL MEMORY. A comparison of the two test times (before and after all training sessions) showed a significant increase of the performance in the WMS-R. A single case evaluation lead to the following results: The effects of a specific computer-aided cognitive training are most evident in test measuring the same function as the procedure trains. Each training improves only the indented cognitive dimension and has no global effect on other functions.

Diebel, A. et. al. Socialpediatric Center, Magdeburg (AU FM)

This study investigates the effectivity of the REHACOM procedure ATTENTION & CONCENTRATION in the therapy of CHILDREN. The program has been evaluated on healthy children of different age groups. Main variable was the maximum “Level of difficulty” reached in all sessions, which showed significant differences between age groups. Pupils benefit more from the training than nursery-school children. This study is published in: Diebel, A., Feige, C., Gedorsch, J., Goddemeier, A., Schulze F. & Weber, P. Computergestützes Aufmerksamkeits- und Konzentrationstraining bei gesunden Kindern. In Praxis der Kinderpsychologie und Kinderpsychiatrie, 1998, 47, S. 641-656.
This study deals with the question if cognitive deficits, found by alcoholics at the beginning of an alcohol de-conditioning treatment, can be improved with cognitive rehabilitation. 20 ALCOHOL ADDICTED men run through a three week "detoxification" treatment at the Psychiatric Clinic of the University of Tübingen. At the beginning and at the end of the treatment the memory and attention performance has been examined with the following tests: LPS (short form), Alcoholism Questionnaire, Trailmaking Test B, Benton-Test, Revisions- Test. Patient training 8 times for 40 minutes with ATTENTION & CONCENTRATION and TOPOLOGICAL MEMORY. General the results show that patients improve their performance in the neuropsychological tests and in the training. Factor effects for both performances are patient’s age and the degree of alcohol addiction. This study is published in: Liewald, A. (1996). Computerunterstütztes kognitives Training mit Alkoholabhängigen in der Entgiftungsphase. Dissertation at the Medical Department of the Eberhard-Karls University Tübingen.