

Computer-administered Cognitive Remediation in a Frame of Holistic Neuropsychological Rehabilitation: FORAMENRehab Programs

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Introduction

Neuropsychological rehabilitation should address many facets of a brain injured individual, treat him or her in a holistic frame of reference with appropriate techniques and strategies for cognitive, emotional, and societal skills while increasing awareness and understanding of the new self [1]. The main elements of the holistic approach include the promotion of therapeutic community, cognitive retraining and psychotherapy carried out in individual and group settings, supported work or educational trials, family education and therapeutic assistance, as well as follow-up procedures. The effectiveness of systematic and holistic neuropsychologically oriented TBI-rehabilitation programs in enhancing patients' productivity status has been supported by uncontrolled studies and a few studies with control groups [2,3,4,5].

Cognitive rehabilitation is traditionally considered an important part of rehabilitation of the brain injured patients. Cognitive rehabilitation is defined as a systematic, functionally oriented service of therapeutic activities that is based on assessment and understanding of the patient's brain-behavioral deficits. Specific interventions may have various approaches, including practising and reestablishing the impaired functions; reinforcing the use of preserved functions; teaching cognitive compensatory strategies for impaired functions; establishing the use of external compensatory devices such as electronic memory aids; enabling persons to adapt to their cognitive disability by fostering insight and understanding into their cognitive strengths and weaknesses. Regardless of the form of intervention, the aim of cognitive rehabilitation is to improve the person's functioning in their everyday lives.

Computer-administered cognitive rehabilitation

The continuous challenge to neuropsychology is to develop new methods for assessment and rehabilitation, and the critical evaluation of these methods. To quote George Prigatano [1] "... new techniques for the remediation of disturbed higher cerebral functioning should constantly be under development, while still attending to patients' personal experiences and helping them adjust to their neuropsychological deficits in the context of interpersonal situations." According to the recommendations of evidence-based studies, computer-based interventions that include active therapist involvement to foster insight into cognitive strengths and weaknesses, to develop compensatory strategies, and to facilitate the transfer of skills into real-life situations may be used as part of a multi-modal intervention for cognitive deficits [6].

The computer-assisted methods focus on neuropsychological processes using computerized exercises that train different cognitive functions instead of traditional paper-and-pencil drill. However, there seems to be an obvious lack of theoretically and clinically based rehabilitation software worldwide.

Developing the FORAMENRehab -cognitive rehabilitation programs

The work of our team started due to practical reasons. In the early 1990's we systematically surveyed rehabilitation software available in the United States and Europe. However, most of them lacked theoretical background, were rather limited in their amount of "exercises", as well as in their possibilities to modify the parameters. Also the graphical user interface and other technical details seemed to be already old-fashioned and difficult to handle. An additional problem while using these programs with the neurological patients was the foreign language. Our project started in the middle of 1990's and the first module was presented in December 2000.

The substance and theoretical background of the FORAMENRehab cognitive rehabilitation programs has been on our responsibility. We work as clinical neuropsychologists in the nationwide rehabilitation centre for neurological patients, the Käpylä Rehabilitation Centre, which treats annually about 400 brain injured patients. The idea to start to develop computerized cognitive remediation programs emerged from the above mentioned practical needs and our personal interest. In practice the project has totally been carried out outside our working hours. However, it has been possible to test its usability and functioning in our clinical work. The project has been time-consuming, but very inspiring. The prerequisite for managing the project has been

smooth co-operation between us and a highly professional and committed multimedia expert.

FORAMENRehab -cognitive software is a tool for cognitive rehabilitation to be used as a part of a holistic neuropsychological rehabilitation approach. In our own clinical practice the software is used as one part of neuropsychological rehabilitation. It is used systematically in the cognitive group of the INSURE-program (the Individualized Neuropsychological Subgroup Rehabilitation program for Traumatically Brain Injured Patients) which has been described in detail elsewhere [7]. The goal of the cognitive group is to compensate for the cognitive symptoms. The practical significance of injury-related changes in information-processing skills, persistence, energy levels, attentional processes and reasoning is considered in terms of recovery, compensation and personal functional obstacles. Rehabilitation software and lectures are used to demonstrate cognitive changes and to make the logic of them clearly understandable.

FORAMENRehab software provides an easy to handle and efficient graphical user interface operating in Windows environment. The menu structure, toolbar and icons are illustrative and the help screens provide information, so the program is usable even without the help of the clinician. Each program has a clear written instruction on the screen as well as a model animation. The parameters of each program can be modified to adjust to a particular user. The results are presented both in written and graphical forms and can be printed. They can also be saved to file and compared with the previous results.

FORAMENRehab modules

Rehabilitation interventions should include training with different stimulus modalities, levels of complexity, and therapist activities providing monitoring and feedback [6]. FORAMENRehab modules are based on the theories and models of cognitive functioning as well as on the studies of recovery. The first module which was published in 2000 was designed for the disturbances of attention. This year we published the second module for the remediation of memory disturbances. At the moment our team works on the modules of disturbances of visual perception and problem solving.