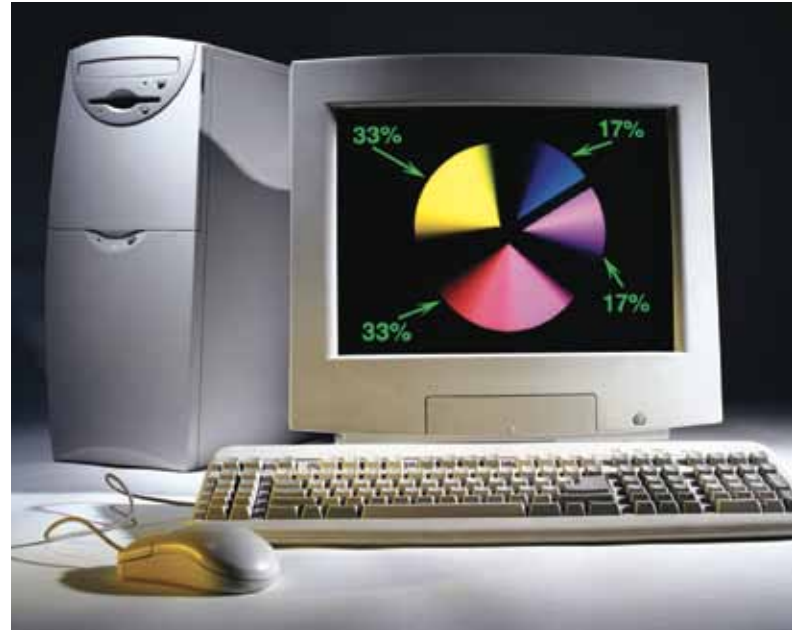


Hi-Tech Cognitive Retraining

We live in an age of technology and everywhere we look, we see it in use: iPods, DVD players, camera phones, digital voice recorders; the list goes on and on. We also see the technology trend in remediation of cognitive-linguistic disorders. Computers and assistive technologies are becoming commonplace in therapy for individuals who have suffered an acquired brain injury (ABI). More than 73% of rehabilitation centers report use Computer-Assisted Cognitive-Retraining (CACR) programs. These programs utilize principals of cognitive rehabilitation—a therapeutic process of increasing or improving an individual's capacity to process and use incoming information. This includes methods to restore cognitive function and to train compensatory techniques (Sohlberg and Mateer, 1989).

Current computer programs have evolved from game machines such as Atari to sophisticated instruments that deal with complex strategy and abstract thinking. Initially in therapy, use of these systems was restricted to developing reflexes and visuomotor coordination. Now they facilitate a myriad of cognitive and language tasks. Current programs target specific deficit areas such as: Attention/ concentration, impulsivity, distractibility, eye-hand coordination, thinking/ performance speed, cognitive endurance, learning/memory, visual tracking/scanning, planning/organization, sequencing, inattention/neglect, reasoning/abstraction, problem solving, quality control/self-monitoring and spatial analysis/ synthesis. The development of diverse programs was required because TBI cognitive-linguistic disorders vary from person to person and no single program could remediate a multitude of deficits. Though cognitive-linguistic problems vary, they are amongst the most debilitating a person can suffer, whether mild or severe, and require specialized and highly organized CACR programming.

The most successful programs have made inroads improving attention, visual processing and reasoning/problem solving. Most memory programs have tended to involve practice drills, which try to increase the amount of information a person can recall. The problem with memory programs is that they have shown little to no carry-over to functional capabilities. While the individual may have scored well on the computer task, it does not necessarily translate to improved functioning outside of the computer-training task. Further, certain aspects of language are not amenable to computerized retraining such as pragmatics or speech, due to the



need for interaction between clinician and patient (Falconer). To obtain advantageous outcomes with CACR, careful planning and analysis of performance data must be observed. Selection of appropriate software programs is crucial. The clinician must understand why a particular program is being used and how it fits into the patient's current treatment model. This process involves clinical merit evaluation. If the program is sound, clinicians must decide what type of cognitive process it addresses and determine where it fits in the treatment hierarchy. To facilitate this process, a series of clinical and administrative questions should be answered to determine a CACR's use. (Matthews et. al, 1991, Sohlberg & Mateer, 1989)

The current CACR trend is moving away from a process specific approach (targeting a discreet deficit area) to targeting commonly impaired activities of daily living (LoPresti et.al, 2004). Targeted activities include driving, everyday math skills, name & face recall, and remembering to carryout future assignments. Further, emphasis is on technology as a cognitive prosthesis that functions as reminding system, recording or storage system, electronic scheduling or planning system. The target becomes multi-dimensional with outcome objectives increasing functional problem solving—generalized into a variety of everyday tasks. Though great promise and much hope is seen for CACR, in general, the literature has not shown it to be superior to traditional (non computer) cognitive rehabilitation approaches. CACR is

Clinical Considerations:

1. Does the accompanying literature clearly define the objectives of the program?
2. Does the program address what it claims to address?
3. Is the reinforcement and feedback immediate, friendly and appropriate?
4. Is the program interesting?
5. Are the instructions easy to follow?
6. Are appropriate and useful data collected and analyzed?
7. Where would the program fit within the treatment model?
8. How much supervision is needed?

Administrative Considerations:

1. Is the program free of bugs and technological problems?
2. Is extra equipment needed to run the programs?
3. Can screen advance be controlled?
4. Can the clinician add unique content to the program so that additional stimuli will be available?
5. Can software be returned after an initial review period?

Hi-Tech Cognitive Retraining *continued*

generally effective in improving measure of attention in specific skill training rather than general training that is not focused on designated tasks or deficit types (Park & Ingles, 2001). However, some studies have failed to demonstrate significant differences in post treatment gains when compared to controls not using computers (Chen, 1997). Further, single subject design or anecdotal small group studies with poor control groups defined much of the research (Cicerone et. al, 2000). More robust and well-designed efficacy studies are clearly needed.

Despite questions regarding large-scale clinical efficacy, researchers generally agree that use of technology to augment traditional therapies should continue to be explored and encouraged. As we begin to understand more about brain functioning, and as the technological world continues to blossom with new and imaginative ideas and devices, CARC programs as a clinical assistive device are here to stay. ❖

Computer Assisted Cognitive Retraining Advantages

Advantages for Clinicians

(Sohlerg & Mateer)

1. Consistent, often adjustable, rate of stimulus presentation
2. Automatic collection and tabulation of performance data
3. Efficient administration of tedious practice tasks
4. Objective feedback
5. Free clinician to observe and record valuable qualitative data

Advantages for the individual

(Falconer)

1. Increase self-esteem
2. Help prepare for employment
3. Provide leisure activity
4. Provide ways for injured individuals to interact with peers
5. Opportunity to work independently
6. Tend to attend for longer periods of time
7. Report feeling the computer is less critical of poor performance

Hi-Tech Cognitive Retraining *continued*

Written by Angie McCalla, MS, CCC-SLP, CBIS
Speech & Language Pathologist at Rainbow Rehabilitation
Centers, Inc.

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RainbowVisions Magazine
Rainbow Rehabilitation Centers, Inc.
5570 Whittaker Road, Ypsilanti, MI 48197, USA
E-mail: rainbowvisions@rainbowrehab.com

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