

Specialty Recognition in Neurogenic Speech, Language  
and Cognitive Disorders: Training Needs of  
Speech-Language Pathologists Regarding the Cognitive  
Rehabilitation of Closed Head Injured Persons

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It is timely to address the role of speech-language pathologists in the rehabilitation of head injured persons, as well as the training that students should experience in order to prepare them for this role. Many of our colleagues in other disciplines have begun to define roles for professionals in their respective areas. Included in my discussion will be some of the specifications established by the American Board of Clinical Neuropsychology and The American Congress of Rehabilitation Medicine which I feel are relevant to Speech-Language Pathology.

One major difference with the head injured population compared with patients with left or right cerebrovascular accidents is that head injured persons comprise a much younger group. Most head injured people are between the ages of 10 and 29 years of age (Figure 1).

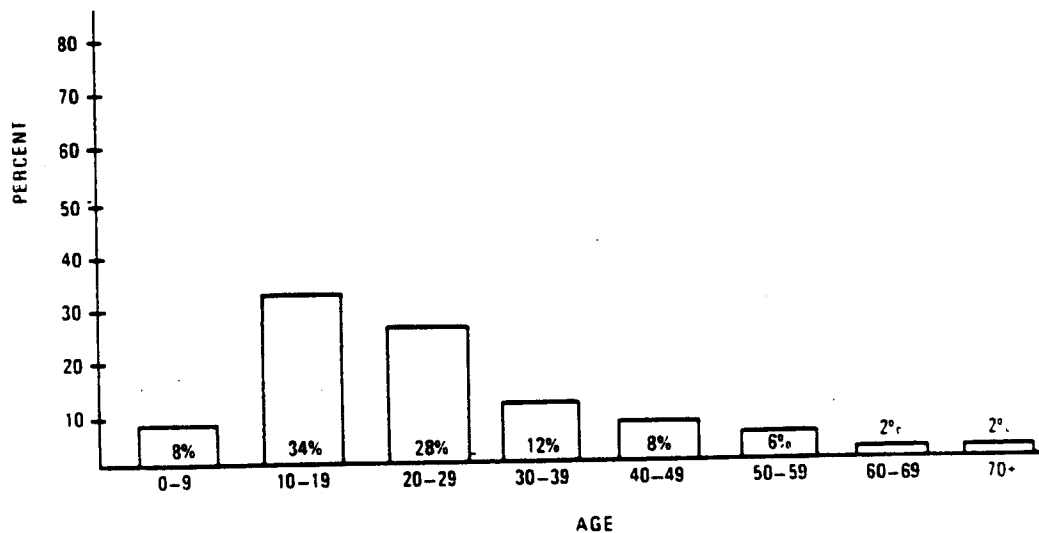


Figure 1. Overall age distribution of the head injured population (In Rosenthal et al., 1984).

In addition, this patient group tends to recover for longer periods of time (Table 1). Because of this long recovery period, head injured persons are in need of flexible, innovative treatment programs. For example, a variety of different types of programs with step-down costs as expenses decrease is important if all necessary treatment is to be provided. Treatment in acute settings is extremely expensive due to larger staff-to-patient ratios and other high overhead expenses, yet outpatient services with lower overhead expenses should cost less as should day programs with cost reducing features (group treatment, lower staff-to-patient ratios and the utilization of a greater number of therapy assistants and fewer professional staff members). Head injured clients could benefit from transitional living, day treatment, day care, supervised living, outpatient, vocational,

educational, support, long-term care, and support group programs. Treatment goals appropriate to each type of therapy programs generally differ. Clinicians must be capable of establishing treatment goals which are appropriate to each setting and revising those goals as a patient moves through the recovery process. Unfortunately, at the present time, it is difficult to find all the various types of necessary programs in one geographic area.

Table 1. Recovery periods following head trauma (Lemay and Geschwind, 1978).

Age (Years)	Recovery Period
< 5	Decades
20 - 40	5 - 6 Years
40 - 60	2 Years
> 60	9 Months

Clinicians working with head injured persons must be able to identify and develop treatment regimes for functional goals which involve behaviors which will make a difference in the way each person functions in his or her environment. Third party payers are interested in how treatment can save them money in the long run. For example, third party payers would be extremely interested in treatment given to a young head injured housewife which would eventually eliminate the need for a home health care attendant. This would reduce health care costs significantly because, without treatment, this housewife might utilize an assistant for decades. My experiences dealing with many different teams of professionals representing various disciplines reveal that speech-language pathologists are not as capable as professionals in other disciplines in the specification of goals relating to appropriate functional outcomes. This certainly should be a focus of student training.

Because head injury can result in discrete focal lesions and, more typically, widespread diffuse damage, it is important for speech-language pathologists to have a good background in neuroanatomy, neuropathology, neurophysiology, pathophysiology, neurochemistry, and neuropharmacology. Neuroanatomical structures most susceptible to damage secondary to closed head injury and resulting neurobehavioral sequela are summarized in Table 2. Although the picture is complicated because of involvement of several structures and many corresponding behavioral disturbances, a general understanding of these behaviors is essential to enable clinicians to utilize appropriate diagnostic and treatment techniques for behaviors which directly or indirectly impair an individual's ability to communicate.

Three major categories of neurobehavioral sequela post closed head injury include attentional disorders, information processing difficulties and cognitive deficits. Attentional disorders include disturbances in arousal secondary to reticular formation lesions: unilateral attentional disorders such as neglect and global disorders of attention, a term coined by Geschwind (1982) referring to "confusional states" due to decreased coherence of

thought and/or action. Deficits experienced by head trauma patients which can be attributed to attentional disorders include perseveration, or inability to appropriately shift the focus of attention, disinhibition and distractibility, or inability to appropriately inhibit the shifting of the focus of attention, impulsivity, or failure to attend to salient information, and stimulus boundedness, or tendency to respond to some salient property of the stimulus and fail to remain oriented to the task.

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 Table 2. Neuroanatomical structures most susceptible to damage secondary to closed head injury and resulting neurobehavioral sequela.  
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Structure	Behavior
Right parietal and frontal areas	Confusion
Anterior frontal and temporal areas	Memory, general cognition, organization and emotion
Anterior inferior temporal areas	Selective attention
Hippocampus	Verbal learning, and recent memory
Amygdala	Motivation, and affect
Brain stem	Sleep, learning, and memory
Diffuse axonal injury of white matter	Global attention
Thalamus	Sensory reception and interpretation, disinhibition, and hyperactivity
Frontal lobes	Personality changes, and initiative

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 Information processing refers to the analysis and synthesis of information in sequential steps. Guildford and Hoepfner (1971) suggested that there are four kinds of information; figural or concrete information, symbolic or abstract information, semantic or meaningful information and behavioral or pragmatic information. Even a mild disturbance in the ability to process information, such as that experienced by individuals with post concussion syndrome, can result in fairly significant behavioral disturbances years later. These disturbances can lead to marital problems, inability to hold jobs, etc. Higher-level head injured persons tend to be most impaired with regard to the processing of pragmatic information. Clinicians must be prepared to identify and deal with pragmatic behaviors. Prior to discharge, treatment should focus on situationally appropriate behavior, eye contact, turn taking, initiation of conversation, use of gestures, appropriate affect, speed of response, appropriate posture, appropriate rate, appropriate intonation, and appropriate social distance.

Another information processing consideration is the way in which information is processed by each hemisphere of the brain. Clinicians should be made aware of the cerebral dominance literature, including visual half-field studies and tachistoscopic research; dichotic studies in which two different messages are sent simultaneously, one message to each ear, dichaptic studies requiring the simultaneous feeling of different shapes, one with each hand; writing posture which suggests left handedness; sex differences and the affect of normal aging. Clinicians should also have knowledge of various stimulus factors which affect information processing such as meaningfulness, verbal versus nonverbal, and mode of presentation (simultaneous versus sequential).

Cognition has been defined by Davis (1973) as "a mental process or faculty by which knowledge is acquired" implying that the acquisition of certain concepts might affect the way in which information is processed. Speech-language pathologists have always diagnosed and treated cognitive processes during the treatment of language disturbances in both children and adults. For example, work on naming must begin with concept development, including identification of objects, identification of important relationships, identification of new concepts by noting similar, stable, and salient characteristics, and finally attachment of a name or word. Language treatment is not focused on mere naming of items because the ability to communicate effectively requires cognitive skills, linguistic skills, and pragmatic skills. Students must be aware of the cognitive development literature. Whether cognitive processes break down in the same way that they develop has not yet been determined. Knowledge of normal developmental stages provides a starting point. For example, our colleagues in the area of cognitive development tell us that children learn physical space or concrete terms such as "a long stick" before they are able to deal with temporal space terms such as "a long time." One might consider this when attempting to rehabilitate cognition.

A regulation established by the American Congress of Rehabilitation Medicine, which has been accepted by CARF, states that all clinicians treating closed head injured patients must be informed about the effects of medications on behavior in order to report any behavioral changes to prescribing physicians. A few of the drugs administered to head injured people, along with their behavioral affects, are summarized in Table 3.

Clinicians should be aware of neurodiagnostic procedures that might be experienced by their patients. These procedures include electroencephalography and evoked responses, computerized axial tomography, arteriography, pneumoencephalography, cisternography, regional cerebral blood flow studies, positron emission tomography (PET), The Wada-Rasmussen technique, and The Doppler technique.

Clinicians must have a clear understanding of rehabilitation medicine, the roles and training of other rehabilitation allied health professionals and interdisciplinary treatment approaches.

The greatest gains in head injury rehabilitation are often made as a result of an interdisciplinary team approach. For example, a cognitive deficit causing difficulty with sequencing of information might best be treated during a functional activity such as transferring from a wheelchair to a bed possibly. CARF now requires that the following professionals serve as a primary core team in brain injury programs -- physician, rehabilitation nurse, physical therapist, occupational therapist, social worker, speech and language pathologist, clinical psychologist/neuropsychologist and therapeutic recreation specialist. In addition, formal arrangements must be made for

respiratory therapy, vocational services, audiology, dentistry, orthotics, prosthetics, dietetics/nutrition, education, drivers' education, rehabilitation engineering, pharmacy services, and creative arts therapy.

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Table 3. Chemotherapeutic approaches to behavior following closed head injury.

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**Neurotransmitters**  
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Acetylcholine: Makes memories endure.  
Serotonin: Regulates appetite.  
Norepinephrine and Serotonin: Treats depression, facilitates memory.  
Dopamine: Affects motivation.

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**Anticholinesterase Agents**  
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Neostigmine  
Galanthamine  
Dextroamphetamine  
- Decrease behavioral disinhibition  
- Decrease apathy  
- Increase alertness  
- Increase responsiveness

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**Antipsychotic Drugs**  
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Chlorpromazine (Thorazine)  
Haloperidol (Haldol)  
Lithium  
- Decrease delusional behavior, mood swings, combative behavior

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In order to completely evaluate head injured patients, speech-language pathologists must be capable of evaluating more traditional areas including speech, fluency, voice, language, dysphasia, nonvocal communication, and hearing. In addition, assessments must be made of cognition, information processing, and attention, using tests which evaluate arousal, alertness, reception, perception, discrimination, organization, recall and higher-level thought processes (convergent thinking, deductive reasoning, inductive reasoning, and divergent thinking). Standards established by the American Congress of Rehabilitation Medicine (CARF) also require a pretreatment disability rating via the Rappaport Disability Rating Scale as part of the evaluation process. Completion of the scale necessitates the assignment of scores for arousability/awareness; responsiveness (eye opening, verbalization and best motor response); cognitive ability for self-care

activities including feeding, toileting, grooming; dependance on others; level of functioning; and psychosocial adaptability and employability. This scale attempts to address functional issues during the evaluation process itself. Clinicians assign scores ranging from 0-30 with 0 indicating no disability and 30 indicating death (Rappaport, 1982).

Following the evaluation, known prognostic indicators and premorbid behaviors should be considered for the establishment of appropriate long-range goals. Known prognostic indicators include length of coma, post-traumatic amnesia, age, location and extent of brain damage, seizures, and medical complications. Assessment of premorbid behaviors is also important with head injured individuals. A large number of head injured clients are males who tend to take risks, including dangerous operation of motor vehicles, substance abuse and so on. These factors, along with motivation, academic skills, family support, etc. are of significant importance in programs aimed toward career selection and return to meaningful employment.

Cognitive rehabilitation has been defined as reinforcement and strengthening of previously-learned patterns of decision making, problem solving and responding, or the establishment of new patterns of cognitive activity as compensatory mechanisms for neurologic systems too impaired for functional return to occur. As with other types of clients treated by speech-language pathologists, structured therapy must include the steps outlined in Table 4. Failure to adequately analyze all task components in order to provide for controlled client success in treatment will usually result in the client's failure to succeed. Careful analysis must be made of the number and types of discriminations required, memory load, complexity of stimuli, presentation rate, response time, and so on. All factors must be considered in order to plan treatment which will gradually increase in difficulty. In addition to this, all tasks should be related to functional, meaningful activities. This will improve client motivation and will increase awareness of deficits.

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Table 4. Hierarchy of steps required during structured therapy.  
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1. Define skill considering:
  - Level of education
  - Age
  - Occupation
  - Interest
  - Personality
2. Analyze all segments of skill.
3. Develop hierarchy of steps to accomplish each segment.
4. Plan techniques to achieve each segment - consider learning style.
5. Train to established criterion.
6. Continually evaluate and revise program.

Behavior modification treatment techniques must be integrated with programs in occupational therapy, physical therapy and speech/language therapy according to CARF standards for head injury rehabilitation. Behavior modification treatment is also of great value when dealing with associated behaviors which interfere with progress toward established goals, such as irritability/agitation, frustration, confusion/disorientation, denial of limitation/lack of insight, mood swings, disinhibition, impulsivity, hyperactivity, distractibility and perseveration.

Group treatment is also extremely beneficial with head injured clients to increase their ability to develop meaningful goals, share feelings and needs, obtain peer review, provide peer support, increase social interaction, increase self-monitoring skills in more natural communication environments, increase self-esteem and increase self-motivation. Group treatment is particularly beneficial in the treatment of pragmatic deficits, denial, goal setting, and problem solving. Clinicians must be trained to serve as group facilitators. Quite often clinicians merely provide individual treatment in a group setting, which does not provide for maximum benefit from the group treatment session.

Non-verbal communication devices often benefit head injured clients. Clinicians should be familiar with the types of available equipment and should be able to utilize the equipment, taking into account both cognitive and physical limitations.

Computers are also utilized frequently with the head injured population. Younger head injured clients, in particular, are generally motivated to work with computers. Clinicians should be well-versed in computer use and should be aware of available programs. Since aides often work with patients during computer treatments, clinicians should know how to appropriately use aides. However, cognitive remediation cannot occur utilizing only a computer and an aide. Computers are merely tools, as are workbooks. All computer treatments should be under the direction and supervision of a certified clinician. Third-party payers have and will continue to look for cost-effective ways to provide treatment. It would be extremely unfortunate if third party payers would only cover cognitive rehabilitation if it were done by an aide on a computer.

Since head injury rehabilitation is a relatively new treatment area, it is important for clinicians to be willing and able to conduct research. Knowledge of single-subject designs is of particular value with the head injured population because of the wide variety of neurological lesions and resulting behaviors.

The American Congress of Rehabilitation Medicine recently established a task force on head injury. A subcommittee of this task force is developing standards for cognitive rehabilitation, acute programs, academically oriented programs, behavioral programs, day care programs, day treatment programs, residential programs and vocational programs. These standards include a definition and specifications for admission criteria, training and supervision, program descriptions, assessments, treatment structure, documentation, discharge criteria, program evaluation, representation to the public, responsibilities to the professional community and responsibilities to the client's family. The standards for cognitive rehabilitation and acute programs have been completed and have been accepted as standards by CARF.

In 1978, an International Neuropsychology Society task force was established to begin to look at clinical issues in neuropsychology. The following paragraph taken from meeting minutes clarifies the major issue:  
"... broadening the professional capabilities of the specialty beyond the

traditional diagnostic and assessment roles into the domain of remediation of function through therapeutic interventions appears to have been established, e.g. assessment of cognitive functions for the formulation of rehabilitation strategies." In 1985, procedures were in place for credentialing neuropsychologists via the granting of a diplomat status. Specific requirements are presented in Table 5. The American Board of Clinical Neuropsychology has recently revealed plans for the preparation of a manual for third-party payers regarding the scope and practice of clinical neuropsychology. The danger of neuropsychology credentialing to other allied health professionals would be with regard to claims that only credentialled neuropsychologists should be paid for services such as cognitive rehabilitation. Another danger would be a stipulation that requires neuropsychology supervision of cognitive rehabilitation services provided by other professionals. This has been supported by some neuropsychologists as is apparent in the following statement by Gloag (1985). "Since there are not enough clinical psychologists to give training to the many head injured people who need some help, much of the actual training can be given by other staff, notably occupational and speech therapists... Thus, the need is for psychologists to work out in detail the approaches and techniques to be used for each person and study the response, with changes of strategy as needed."

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Table 5. Eligibility Criteria for the diplomat status in neuropsychology as established by the American Board of Clinical Neuropsychology, Inc., 1985.

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1. Doctoral degree in psychology from a regionally accredited university.
2. Membership in American Psychological Association or Canadian Psychological Association.
3. Licensed or certified at the level of independent practice in some state or province.
4. Five years of postdoctoral professional experience in psychology which may include: clinical service, research, teaching and administration.
5. Three or more years of clinical neuropsychological experience defined as follows: equivalent of at least one year of full time supervised clinical neuropsychology experience at the post doctoral level, equivalent of at least one year of additional experience as a clinical neuropsychologist and in the absence of any supervised clinical experience, the equivalent of three years of unsupervised postdoctoral experience as a clinical neuropsychologist.
6. Successful completion of a written and oral examination.

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In 1986, The Veterans Administration formed a multidisciplinary task force to identify the roles of team members in Veteran Hospitals. This committee will meet next month. Finally, the American Speech-Language-Hearing Association has formed two groups--a Cognition and Language



Subcommittee of the Committee on Language to define the role of speech-language pathologists in cognitive/language retraining, and the Committee on Interpersonal Relationships to ensure the appropriate participation of speech-language pathologists and audiologists. These committees will meet over the next few months.

In conclusion, it appears that a plan to address professional issues in the area of head injury rehabilitation is needed and should include specifications of the role of speech-language pathologists, the curriculum needed to prepare clinicians to meet this role, necessary clinical experiences, methods to verify competencies, a consensus regarding the need for credentialing, and if credentialing is indicated, specification of how that should occur.