



HEALTHSOUTH
Western Kentucky Rehabilitation Hospital




Functional and Cognitive Rehabilitation after Traumatic Brain Injury

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Domains of Concern in Rehabilitation


- Medical Stability (goal being acute hospital discharge ASAP to right setting with right rehabilitation program)
- Understanding of Cognitive Deficits
- Understanding of Behavioral Issues
- Physical Performance Deficits
- Patient's Living Environment
- Prevention of Complications (from cognitive/behavioral/immobility factors)



Definition

- Traumatic Brain Injury (TBI) is an injury to the head or brain caused by externally inflicted trauma.
 - Traumatically induced structural injury and/or physiological
 - Disruption of brain functions as a result of an external force.
- TBI may be caused by a bump, blow, or jolt to the head, by acceleration or deceleration forces without impact, or by blast injury or penetration to the head that disrupts the normal function of the brain.

Institute of Medicine of the National Academies, Department of Defense



- A diagnosis of TBI is based on acute injury parameters
 - Mild TBI
 - Moderate/Severe TBI.
- These definitions apply to the initial severity of impairment, and do not necessarily define or describe the degree of subsequent impairment or disability.






Table A. Criteria used to classify TBI severity⁷

Criteria	Mild	Moderate	Severe
Structural Imaging	Normal	Normal or abnormal	Normal or abnormal
Loss of Consciousness	< 30 minutes	30 minutes to 24 hours	>24 hours
Alteration of Consciousness/Mental State	A moment to 24 hours	>24 hours	>24 hours
Post-traumatic Amnesia	0-1 day	>1 and <7 days	>7 days
Glasgow Coma Scale (best available score in 24 hours)	13-15	9-12	3-8
Abbreviated Injury Severity Scale	1-2	3	4-6




Physical Impairments

- Speech, vision, hearing, other sensory impairments
- Headaches
- Lack of coordination
- Muscle spasticity
- Paralysis
- Seizure disorders
- Problems with sleep
- Dysphagia
- Dysarthria (articulation and muscular/motor control of speech)




Functional Deficits

- Attention
- Memory
- Problem Solving
- Impulsivity
- Initiation
- Communication
- Hearing/Central Auditory Processing
- Vision
- Activity Tolerance




Cognitive Impairments

- Short- and long-term memory deficits
- Slowness of thinking
- Problems with reading and writing skills
- Difficulty maintaining attention / concentration
- Impairments of perception, communication, reasoning, problem solving, planning, sequencing and judgment
- Lack of motivation or inability to initiate activities



Behavioral Impairments


- Mood swings
- Denial
- Depression and/or anxiety
- Lowered self esteem
- Sexual dysfunction
- Restlessness and/or impatience
- Inability to self-monitor, inappropriate social responses
- Difficulty with emotional control and anger management
- Inability to cope
- Excessive laughing or crying
- Difficulty relating to others
- Irritability and/or anger
- Agitation
- Abrupt and unexpected acts of violence
- Delusions, paranoia, mania



Mechanisms of Functional Recovery

- Recovery is believed to occur at multiple levels (from alterations in biochemical processes to alterations in family structure)
- Resolution of Temporary Factors
- Neuronal Regeneration
- Synaptic Alterations
- Functional Substitution
- Learning of New Skills


Whyte, Rosenthal 1993



Mechanisms of Functional Recovery


- Reduction of Diaschisis, the reduction in function of remote areas of brain connected to the damaged areas, begins to reverse during early stages of recovery.
- Compensation: The attempt to use alternate strategies to substitute impaired functions, and adaptive neuroplasticity are mechanisms that begin early and continue long after the injury.
- Neuroplasticity, use-dependent modulation of the functional organization of cortical brain representations is a normal brain capacity that facilitates learning of motor and cognitive skills over a lifetime. The same capacity that is necessary for experience-based learning in the uninjured brain appears to be an important mechanism for brain reorganization and recovery of function after brain injury. The molecular and cellular mechanisms of neuroplasticity are being intensively investigated

Nudo RJ, Dancusse N. Neuroscientific basis for occupational and physical therapy interventions. In Zaker ND, Katz DI, Zafonte RD. *Brain injury medicine*. New York: Demos; 2006.




Element of Time

- Recovery/adjustment occurs over a trajectory of weeks, months, and years
- Rehabilitation interventions depend on amount of time since injury onset




Medical Stability Issues

- Neurological (seizure prophylaxis, agitation)
- Cardiovascular (central dysautonomias, HTN, orthostasis)
- Pulmonary (aspiration, impaired cough)
- Gastrointestinal (swallowing, dehydration, nutrition, GI bleeding, bowel incontinence, elevated LFTs)




Medical Stability Issues

- Dermatologic (pressure sores, rashes)
- Hematological (anemia, coagulopathy)
- Endocrine (pituitary-SIADH/DI, immobilization, hypercalcemia)
- Genitourinary (infection, incontinence)




Treatment Settings for Rehabilitation Management


- Acute Care Hospital
- Acute Inpatient Rehabilitation Hospitals
- Skilled Nursing Facilities
- Outpatient Rehabilitation Services
- Home Health Services




- The aim of physical rehabilitation is to:
 - Aid the recovery of normal functioning as far as possible
 - Provide compensatory strategies to minimize the negative impact of the symptoms that persist (ie, to increase independence through the facilitation of motor control and skills).
- There is strong evidence that demonstrates the effectiveness of this approach in improving functional independence.




- Restoration of functions that can be restored and learning how to do things differently when functions cannot be restored to pre-injury level.




- **Cognitive and communication problems** that result from traumatic brain injury vary from person to person. These problems depend on many factors which include an individual's personality, pre-injury abilities, and the severity of the brain damage.
- **Cognitive functions** refer to what or how much (e.g., How much does s/he know? What can s/he do?). So long as the executive functions are intact, a person can sustain considerable cognitive loss and still continue to be independent, constructively self-serving, and productive.




- When **executive functions** are impaired, the individual may no longer be capable of satisfactory self-care, of performing remunerative or useful work on his or her own, or of maintaining normal social relationships regardless of how well preserved are his or her cognitive capacities -- or how high his or her scores on tests of skills, knowledge, and abilities.



- Moreover, cognitive deficits usually involve specific functions or functional areas; impairment in executive functions tend to show up globally, affecting all aspects of behavior.
- **Executive functions** consist of those capacities that enable a person to engage in independent, purposive, self-serving behavior successfully. They differ from cognitive functions in a number of ways. Questions about executive functions ask how or whether a person goes about doing something (e.g., Will s/he do it and, if so how?)




- Physical effects of the injury may include:
 - Loss of motor control: both speed and coordination
 - Abnormal muscle tone and movements, including spasticity and tremors
 - Impaired bladder and bowel control
 - Seizures
 - impairments of vision, hearing, smell and/or taste
 - impairments in the ability to produce speech
 - significant fatigue, both physical and cognitive
 - Impaired stamina and endurance.




Functional Deficits

- Mobility
 - Recovering mobility is an important goal for people who are immobile following a TBI.
- Both urinary and fecal incontinence are common following severe TBI. This can be distressing, socially disruptive and can hinder progress in other areas of rehabilitation.
- Post-TBI sensory (visual or hearing) disturbance may exacerbate disorientation and confusion, or impact on higher cognitive function.
- Pain
 - Frequently under-diagnosed in people with TBI, therefore specially adapted assessment tools or the skills of a speech-language therapist and family/whānau and carers may be required to elicit symptoms accurately.




Functional Deficits

- Communication impairments following a TBI and may require speech-language therapy as an intervention.
- Difficulties in activities of daily living should be assessed and an individual treatment program should be developed and implemented.
- Sleep difficulties and fatigue
- Return to employment or an alternative occupation is a primary goal and a central factor in the restoration of the quality of life for people with TBI.
- Strong evidence that vocational rehabilitation improves vocational outcomes for people with TBI in securing sustainable employment or alternative occupation, and is cost effective.
- Impaired sexual functioning




Living Environment


- Physical (stairs, bathroom layout, community for resource availability)
- Social (intimate, family, friend, and community relationships - help or hindrance)
- Financial Supports (personal, community)



- Maintaining an upright posture helps to prevent osteopenia, loss of muscle bulk and normal cardiovascular and autonomic responses.
- Aiding sitting and standing will also promote normal postural tone, proprioceptive information and maintain range and alignment of joints.



- Impaired Sitting Balance
 - Should have timely provision of an appropriate wheelchair and suitable supportive seating package, with regular review of the seating system as their needs change.
 - Age-appropriate supportive seating and wheelchairs should be provided for children and young people.
 - People with complex postural needs should be referred to a specialist interdisciplinary team which includes expertise in specialist seating.
 - People with mobility problems should be considered for appropriate walking or standing aids.



- The following should be considered as an adjunct to conventional therapy:
 - Treadmill training with partial bodyweight support
 - Strength training
 - Gait re-education
 - Exercise training.

The Benefits of Exercise Post Injury

- Those who exercise had fewer physical, emotional and cognitive complaints. E.g. sleep problems, irritability, forgetting and being disorganized
- Non-exercisers complained of more cognitive problems or symptoms than those who exercise
- Exercisers with TBI were less depressed, viewed themselves as healthier, often engaged in school, work, and “got around” the community more freely
- Exercisers had more severe brain injuries than the non-exercisers, suggesting that a severe injury does not prevent engaging in exercise


TBI Consumer Report # 2 TBI Central MT, Sinai Model Program

Spasticity

- Trial of botulinum toxin A (BTX-A) may be considered for the treatment of focal spasticity in adults with TBI.
- Trial of intrathecal baclofen for the treatment of severe spasticity in adults or children with traumatic brain injury may be considered, but should be carefully monitored for possible complications, including pump malfunction.
- Trial of tizanidine may be considered, particularly for spasticity of the lower extremities.


Spasticity

- A RCT of the use of BTX-A to treat adults (including people with TBI) presenting with focal hypertonia affecting upper or lower limbs found that the intervention group had better scores on many scales than the placebo control group, although the goal attainment scale score in both groups was similar at 12 weeks. It was concluded that selective use of BTX-A can result in improvements in range of movement and focal disability in spasticity of the lower limbs.
- A longitudinal study of BTX-A in children found earlier improvement in less complex motor control tasks (hand tapping) and pinch force tasks, but improvement in more complex, forward-reaching tasks occurred much later or not at all, and concluded that although BTX-A reduced tone and increased range of movement of the spastic upper extremity, the degree of motor improvement is dependent upon the complexity of the task. There is limited evidence for the effectiveness of BTX-A in children with lower limb spasticity from cerebral palsy.
- For both adults and children, repeated treatments are likely to be required as BTX-A effects generally last no longer than two to three months.




Intrathecal baclofen

- A meta-analysis of studies on the effectiveness of intrathecal baclofen for severe spasticity found positive effect sizes for all studies in all diagnostic groups, including TBI.
- The cumulative overall success rate of intrathecal baclofen was estimated to be 78.1%, and at an average of 1.8 years after implantation
- Mean current dosage level was 246 mcg/day (SD:192).




- However, a small controlled trial of intrathecal baclofen in children and young people aged between four and 19 at the start of the trial found that although there was a favourable outcome in all participants, with the greatest benefit being a reduction of lower limb tone and caretakers noting improved muscle tone, behaviour, sitting and general ease of care, significant complications were reported including
 - Hypotension,
 - Bradycardia
 - Apnea
 - Sedation
 - Mechanical pump complications
 - CSF fistula
 - Local infection and meningitis
- The study lacked the power to determine whether the complications noted were due to the intrathecal baclofen.



Cognitive Dysfunction


- It may occur across the lifespan and may be associated with a wide range of clinical conditions.
- Cognitive dysfunction can be transient or permanent, progressive or static, general or specific, and of different levels of severity affecting individuals in different domains of their lives.
- Even subtle cognitive impairments consistently influence social participation, subjective well-being, academics, employment, and functional performance across different ages and populations
- Most often, cognitive impairments are categorized by severity or clinical conditions that causes the dysfunction (i.e., by diagnostic group).

(Foster et al., 2011; Fritelli et al., 2009; Wadley, Okonkwo, Crowe, & Ross-Meadows, 2008). Most often, cognitive impairments are categorized by severity (mild or major neurocognitive disorder, American Psychiatric Association, 2000) or clinical conditions that causes the dysfunction (i.e., by diagnostic group).



Cognitive rehabilitation interventions for persons with stroke, traumatic brain injury (TBI), and dementias have the most robust empirical support

Cicerone et al., 2011; Goltz, 2009; Rohling, Faust, Beverley, & Demakis, 2009




Cognitive Rehab

Cognitive rehabilitation should include:


- in the acute phase, management in a structured and distraction-free environment and targeted programs for those with executive difficulties
- Attempts to improve attention and information-processing skills
- Teaching compensatory techniques
- Use of external memory aids.

- Trial-and-error learning should be avoided in people with memory impairment.
- A trial of methylphenidate may be considered for adults or children with traumatic brain injury who have deficits in the speed of mental processing or attention deficit hyperactivity disorder secondary to traumatic brain injury.
- A trial of donepezil hydrochloride may be considered for adults with traumatic brain injury who have deficits in memory and sustained attention.



Cognitive Rehab


- Toglia's Dynamic Interactional Model
- Cognitive rehabilitation model of Katz and Averbach
- Neuro-functional Approach



Cognitive Remediation

- De-emphasis on computer software
- De-emphasis on rote retraining exercises
- More naturalistic approach in real-world, community environment training
- More holistic approaches produce most convincing outcome data


J Whyte, M Rosenthal 1993 in DeLisa JA et al *Rehabilitation Medicine: Principles & Practice* 825



Toglia's Dynamic Interactional Model

- Developed for persons with stroke or TBI but is relevant to many people with cognitive dysfunction, including children with attention deficit hyperactivity disorder and adolescents
- The Dynamic Interactional Model utilizes multiple activities in a variety of contexts to help individuals understand performance problems and develop strategies to enhance occupational performance.
- The overall goal of multi-contextual intervention is to help the client gain more control over symptoms by efficiently and independently using strategies for information processing.


Cermak & Macz, 2011; Isman, 2011; Toglia, Johnston, Goverover, & Dain, 2010



Cognitive rehabilitation model of Katz and Averbach

- Focuses on enhancing retained cognitive abilities, the development of self-awareness, and the use or remedial cognitive-training strategies (targeting specific areas of cognitive function such as visual perception, visual-motor organization, and thinking operations), learning strategies (interventions designed to help the client develop learning strategies), and remedial strategies (to develop basic ADLs).


Averbach & Katz, 2011



Allen's Cognitive Disabilities Model

- It has been applied to persons with dementia, TBI, and severe mental health disorders.
- The cognitive disabilities model provides a way to describe deficits arising from damage in the physical or chemical structures of the brain and producing observable limitations
- The Allen battery of assessments provides tools that are used to predict what a person will be able to do (level, mode, patterns) across multiple domains of functioning; identifies the assistance that he or she will require, including safety considerations; and guides appropriate communication and teaching methods when appropriate


Allen et al., 1992; Kelhofner, 2009



Neuro-Functional Approach


- The client and therapist collaboratively select specific performance goals.
- A task analysis is developed, and a "constraint" model is used to establish the client's specific strengths and limitations and construct specific interventions to allow learning to take place (e.g., "cue experimentation" to determine the types of cues the client needs to be successful).
- Automatic behavioral routines are viewed as the foundation of effective functional and behavioral competencies for all individuals. Interventions are specifically tailored to the client's abilities and are experiential.
- Evidence from social psychology, learning theory, errorless learning, self-generation, and over-learning literature is used in the design of task-specific skill-retraining programs.

Giles, 2010, 2011; Giles & Clark-Wilson, 1993; Parrish & Oddy, 2007; Vanderploeg et al., 2008




Case Study


- Chloe, age 19, had sustained a TBI 2 years ago when she collided with a tree while skiing.
- GCS 8 at scene and was intubated.
- Injuries included a right basilar skull fracture, bilateral subarachnoid hemorrhage, a mandibular fracture, and a fractured right wrist. Transported via medical helicopter to a Level 1 trauma center.
- Six weeks later, Chloe was transferred to a subacute rehabilitation hospital where she received occupational therapy, physical therapy, and speech and language therapy for 1 month before being discharged home.



- Two years post injury, Chloe has been unable to hold a job and lives at home with her mother.
- Chloe's most recent neuropsychological evaluation indicated significant impairments in visual and verbal memory and processing speed as well as in verbal comprehension.
- Deficits also were noted in executive functioning, including problem solving, and planning and organization.




- Chloe recently was approved to receive services through her state's Brain Injury Medicaid Waiver program.
- This program provides support staff for individuals who meet specified financial and functional criteria so that individuals who have sustained a severe brain injury can remain in the community rather than be institutionalized.
- Approved to have support staff 8 hours per day while her mother was at work. An occupational therapy consult was ordered to provide input to the program.




Occupational Profile

- Chloe's daily activities consist primarily of watching TV and occasionally completing simple household chores assigned by her mother.
- Chloe uses her smart phone to text message her mother more than 30 times a day, asking repetitive questions and for reassurance.
- Chloe states that she feels anxious and does not know what to do.
- Chloe states that the memory book that she was asked to use "made her look stupid"; however, she verbalizes that she "can't remember anything."
- Prior to her injury, Chloe was very active and was on the softball and volleyball teams at school. She also liked to cook but no longer does so because she "burns stuff." Chloe stated that she loves animals and wants to be a veterinarian.




Analysis of Occupational Performance'


- The occupational therapist administered several measures of functional cognition and observed Chloe plan, shop for, and prepare a simple meal.



- Chloe required moderate cueing when making the grocery list and at the grocery store to proceed to the next step of the task.
 - Required reorientation to the task twice because she stated she could not remember what she was doing.
 - She was able to use the list, locate needed items, and pay for items appropriately, although she reported being anxious throughout the shopping trip and rechecked the list multiple times.
 - She was able to make the sandwich without cueing but required a verbal cue to turn off the stove.




- Goal Setting: Chloe and her mother agreed that developing strategies to manage Chloe's memory deficits would have the largest impact on her functional status. A list of goals was established:
 - Chloe will refer to her smart phone to determine the next activity in her day with minimal cues from staff.
 - Chloe will refer to her smart phone to determine the next step of IADL tasks with minimal cues from staff.
 - Chloe will refer to her smart phone to determine the next steps in each task in a volunteer position at local animal shelter with minimal cues from staff.




- **Intervention Approach:** Occupational therapy was provided as a weekly consultative service and was a collaboration among the therapist, Chloe, and her support staff.
- A compensatory approach using an electronic memory aide was chosen, as Chloe was already comfortable with the use of her smart phone and regarded this device as socially acceptable.
- Chloe's staff were instructed to enter her daily schedule into the calendar of the smart phone each morning.
- Chloe was then cued at the completion of each task to check her calendar and determine what activity she should do next.


Gentry, Wallace, Kvarfoth, & Lynch, 2008



- When Chloe was comfortable with using the calendar function, a task management application was added to the phone.
- The occupational therapist worked with staff to enter step-by-step instructions for IADLs that initially required moderate verbal cueing from staff.
- Staff then cued Chloe to check the next step in the phone rather than helping her with tasks.




- When Chloe was comfortable with using the smart phone for familiar tasks, the therapist worked with her and her staff to program steps for tasks undertaken as part of a volunteer job at a local animal shelter.
- **Outcome:** After 6 months the Brain Injury Medicaid Waiver program hours were decreased from 8 hours per day to 4 hours per day because Chloe was now using the smart phone to guide her through IADLs. However, through the frequent repetition of task performance the same way each day, Chloe is relying less on the phone with no increase in errors.
- Text messages to her mother have decreased from 30 messages per day to 3 per day. Chloe volunteers 15 hours per week at the local animal shelter and rarely reports feeling anxious. Any new tasks need to be programmed into the smart phone and monitored for the first few weeks. Chloe has learned that for any new tasks she must rely on her smart phone.




Predictors of Outcome after TBI

- GCS within 24 hrs of Injury
- Length of Coma
- Duration of PTA



GCS

- Score of 3-8: Severe Injury
- 9-12: Moderate Injury
- 13-15: Mild Injury
- Best Motor Response best acute predictor of outcome



Post-Traumatic Amnesia

- Less than 5 mins: Very Mild
- 5-60 mins: Mild
- 1-24 hrs: Moderate
- 1-7 days: Severe
- 1-4 weeks: Very severe
- Great than 4 weeks: Extremely severe


Other Indicators

- Age
- Rate of early Recovery
- Time
- Postcoma use of Phenytoin

Interventions	Injury type	Study, year	Key findings	Level of evidence
Acupuncture	TBI	Wong et al., 2013 [46]	Insufficient evidence for effectiveness and safety of acupuncture in the acute treatment and/or rehabilitation of TBI.	I
	TBI	Bland et al., 2011 [47]	Limited evidence to support the effectiveness of PT in improving balance and gait in functionally mild-to-moderate individuals with TBI.	I
Physical therapy	TBI	Hasset et al., 2008 (edited 2009) [44]	Insufficient evidence to support the effectiveness of fitness training in improving cardio-respiratory fitness in persons with TBI.	I
	TBI	Lane-Brown and Tate, 2009 [49]	No evidence for use of interventions for apathy such as cranial electrotherapy stimulation in persons with TBI.	I
Psychological interventions	TBI	Soo and Tate, 2007 (edited 2009) [50]	Moderate evidence for effectiveness of CBT for treatment of acute stress disorder following mild TBI, and combination of CBT and neurorehabilitation for treatment of general anxiety symptoms for mild to moderate TBI.	I
	TBI	Snell et al., 2009 [50]	Limited evidence to support the selection of active treatments for mild TBI, although patient education approaches may be beneficial in the early stages.	I
	TBI	De Silva et al., 2009 [51]	Insufficient evidence for psychological interventions for prevention of disability following traumatic physical injury.	I
	TBI	Rohling et al., 2009 [27]	Strong evidence for effectiveness of attention training after TBI, and for language and visuospatial training for aphasia and neglect syndromes after stroke.	I
	TBI	Fann et al., 2009 [52]	Insufficient evidence to support practice recommendations regarding any of the psychotherapeutic or rehabilitation interventions for depression following TBI.	I
	TBI	Kennedy et al., 2008 [53]	Strong evidence that meta cognitive strategy instruction should be used in adults with TBI. Insufficient evidence for trained verbal reasoning and multi-tasking in improved function.	I
Hyperbaric oxygen therapy (HBOT)	TBI	Bennett et al., 2012 [25]	Strong evidence for HBOT as adjunctive therapy in reduction of risk of death in TBI, but insufficient evidence that HBOT improves outcomes (GOS) in survivors.	I
Hyperventilation therapy	TBI	Roberts and Sothmann, 1987 (updated 2009) [54]	Limited evidence for any potential benefits or harm that might result from hyperventilation therapy in improving patient outcomes in persons with TBI.	I
Sensory stimulation programmes	Head injury	Lombardi et al., 2002 (edited 2006) [55]	Limited evidence to support, or refute the effectiveness of multisensory programmes in patients with coma and vegetative state.	I


Hypothermia therapy	TBI	Georgios and Manara, 2013 [56]	No evidence of benefit of primary therapeutic hypothermia on mortality or neurological morbidity. Hypothermia was associated with cerebrovascular disturbances on re-warming and possibly with pneumonia in adult patients.	I
	TBI/Stroke	Haris et al., 2012 [57]	Insufficient evidence non-invasive head cooling may be beneficial for improving functional outcomes.	I
	TBI	Saitaka and Yamakita, 2012 [58]	The specific hypothermia (32-34 °C) is shown to have beneficial effect in controlling intracranial hypertension in patients with severe TBI.	I
	TBI	Sytenham et al., 2009 [59]	No evidence that hypothermia is beneficial in the treatment of head injury.	I
	TBI	Savara et al., 2008 [60]	No evidence to support the use of moderate cooling (32°C-37.5 °C) therapies after TBI in improving patient outcomes.	I
Nutritional support	TBI	Yang et al., 2013 [28]	Early initiation of nutrition showed significant reduction in the rate of mortality, poor outcome, and rhinitis complications. It appears that parenteral nutrition is superior to enteral nutrition in improving outcomes.	I
Vocational rehabilitation	Head injury	Perel et al., 2008 [61]	Limited evidence to suggest that should be considered the best practice approach to vocational rehabilitation in people with TBI.	I
Educational intervention	ATLS training for ambulance crews	Jayaraman and Sethi, 2010 [62]	No evidence that ATLS for ambulance crews cuts death rates or decreases disability in injured people.	I
	ATLS for hospital staff	Jayaraman and Sethi, 2009 [64]	Insufficient evidence that ATLS programmes improve knowledge of hospital staff and no evidence that ATLS for hospital staff reduces death and disability of injured patients.	I
Speech and language therapy	TBI/Stroke	Sellers et al., 2005 (edited 2009) [65]	No evidence that speech and language therapy in improving dysarthria following non-progressive brain injury (TBI/Stroke).	I

Chang and Khan, J Neurol Neurophysiol 2013; 5:1



Treatment of TBI


- Aim to stabilize the medical and rehabilitation issues
- Prevent secondary complications
- Restore functional abilities
- Provide adaptive equipment to enhance functional independence and social reintegration into the community.
- Cognitive remediative therapies remain the cornerstone of TBI rehabilitation.
- Parenteral nutrition is superior to enteral nutrition; and early initiation of nutrition showed reduction in mortality and sepsis in TBI with improved survival and disability outcomes.



Return to Work


- Reported unemployment rates vary widely, from 10–99 percent
- Most samples show about a 30 percent return to employment; although a 2003 study by Kreutzer and his colleagues found in that 42 percent were employed and 34 percent were stably employed three years after their injury date.
- TBI Model Systems researchers established that early neuropsychological testing appeared to be useful for predicting outcome after injury.

(Cifu, 1997; Gollhofer, 1998)




Factors Affecting Employment

- Physical Changes
- Cognitive Changes
- Arousal
- Attention and Concentration
- Memory
- Executive Functioning
- Abstract thinking and conceptualization
- Psychosocial issues



Objective of Rehabilitation Team

- Assisting the person to resume and value the role of worker
- Facilitating self-worth and self-image through graded experiences providing a balance of challenge and success
- Improving work skills related to the actual job: Physical, cognitive, technical, social (interaction with peers, ability to take direction from a supervisor) and executive skills (self-monitoring, evaluation of work completed, problem solving, initiation and motivation)
- Acting as a liaison between the workplace, insurance companies, government agencies and the worker
- Educating employers and the public of the value of workers with differing abilities



Resources

- www.biaa.org
- www.tbims.org
- www.nabis.org
- www.braintrauma.org
