

Traumatic brain injury

Traumatic brain injury (TBI) is a common neurological condition that can have significant emotional and cognitive consequences. Neurological injury is classified on the basis of initial clinical status by the Glasgow Coma Scale, and also by the type and location of the brain injury. Based on this, head injuries are usually classified as mild, moderate or severe.

Cognitive and Emotional changes following TBI

A head injury not only affects physical function and mobility, but often has an impact on cognition (thinking and reasoning abilities) and emotional function. Cognitive deficits may include impairment of processing speed, attention, memory, language, visuo-perceptual function, executive functions (e.g. organization and planning) and so forth, depending on the location and severity of the injury. Emotional problems may include depression, anxiety, anger and personality change. These cognitive and emotional changes have a profound impact on the survivor's functioning and it may be difficult for caregivers to understand and cope with these changes. The move from overcoming physical impairments to overcoming psychological and cognitive deficits is the most challenging, but a critical, part of the recovery process.

Cognitive problems following TBI

Processing speed

Processing Speed is one of the measures of cognitive efficiency or cognitive proficiency. It involves the ability to automatically and fluently perform relatively easy or over-learned cognitive tasks. It relates to the ability to process information quickly, without intentional thinking through. Patients who suffered a head injury often find that although they are still able to perform many tasks they used to before the head injury, it now takes them longer to do so.

Attention and Concentration

There is no standard, universally accepted definition of the term "attention." However, most psychologists agree that the brain has inherent limitations to the amount of information it can process at any one time. The brain can function effectively only if there is a means to select specific information for further processing. This selection process is known as attention. Following TBI, many patients complain of difficulty in maintaining attention, that is, remaining focussed on a task they want to perform. They may also find that they struggle to concentrate for extended periods of time, which may affect their ability to perform at work.

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Language and Communication problems

Patients who have suffered a TBI may present with language and communication problems that significantly impair their ability to live independently. Survivors may have trouble finding the words they need to express an idea or explain themselves through speaking. It may be an effort for them to understand both written and spoken messages. They may have difficulty with spelling, writing, and reading, as well. Other problems include difficulty with social communication, such as taking turns in conversation, maintaining a topic of conversation, using an appropriate tone of voice, interpreting the subtleties of conversation (e.g., the difference between sarcasm and a serious statement) and keeping up with others in a fast-paced conversation.

Memory

Memory problems frequently accompany TBI. Neurologists and neuropsychologists refer to memory problems as amnesic disorders. Amnesia is often described by two terms, anterograde and retrograde amnesia.

Anterograde amnesia is characterised by an inability to retain ongoing events. Essentially it refers to difficulty in learning new material even though the patient is able to understand and repeat it. This condition commonly improves over time, but damage to certain areas of the brain may cause lasting amnesia.

Retrograde amnesia refers to difficulty in recalling events which happened before the head injury. Thus the patient may not recall events that happened weeks, or even months before the TBI. Over time, retrograde amnesia shrinks so that the patient is able to recall events much closer to the injury, although a small gap in memory may remain.

Visuo-perceptual function

Visual and perceptual function may be affected in various ways after TBI. Perceptual problems may include difficulty recognizing visual material such as shapes, objects or familiar faces. This may be complicated by problems with vision, including double vision, restricted field of view or problems co-ordinating the muscles that control eye movements. Some individuals may not be able to judge the distance between themselves and objects. This can lead to all kinds of problems in daily life, such as banging into pieces of furniture or not being able to judge when it is safe to cross the road. Occasionally, people have what is called unilateral neglect. This means that they ignore or neglect one side of space.

Executive function

Executive function refers to the ability to plan actions to reach a goal, to use information flexibly and to think abstractly. These “higher-order” cognitive abilities are very important in day to day life and are unfortunately often impaired following TBI. Patients may find it more effortful to plan and organize tasks. They may have difficulty in self-evaluating their work and recognizing mistakes. Individuals often seem disorganized and need the assistance of families and friends to complete complex tasks. They also may have difficulty solving problems, and they may react impulsively (without thinking first) to situations, which could lead to problems in their relationships with others.

The importance of neuropsychological assessment

A neuropsychological assessment involves the evaluation of brain functioning through structured and systematic behavioural observation.

Neuropsychological tests are used by psychologists with special training and experience in the administration and interpretation of these types of measures. These tests are designed to examine a variety of cognitive abilities, including speed of information processing, attention, memory, language, visuo-spatial ability and executive functions, which are necessary for goal-directed behaviour.

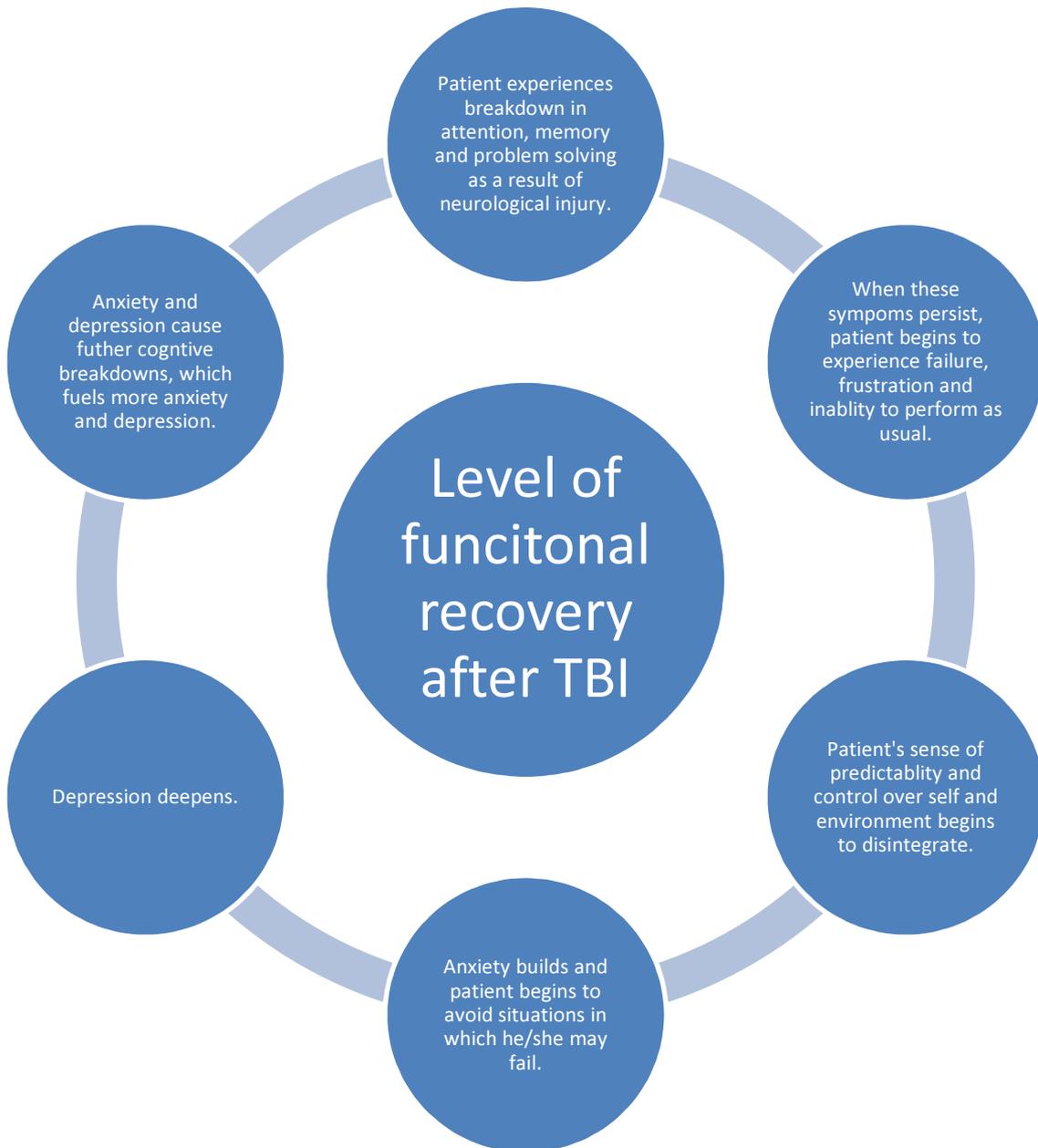
By testing a range of cognitive abilities and examining patterns of performance in different cognitive areas, neuropsychologists can make inferences about underlying brain function.

A neuropsychological assessment is important in the management of TBI as it allows for the identification of strengths and weaknesses. Knowing which areas of cognitive functioning are impaired can assist the development of appropriate compensatory strategies by the patient with the assistance of the rehabilitation team. A better understanding of what the patient struggles with can also assist the family and work colleagues in supporting the patient better rather than placing unrealistic demands on him or her.

Changes in emotions and behaviour following TBI

The response of the individual to the presence of primary neuropsychological and physical deficits will largely determine how functionally disabled the person will become. A chain of events could lead to severe emotional difficulties which could have a profound impact on the patient's ability to cope thereby exacerbating primary deficits. This chain of events is illustrated below:

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Depression

Feeling hopeless and depressed after a head injury is to some extent a natural reaction. However, in some cases depression may be so severe that it has an impact on the survivor's ability to engage in the rehabilitation process and affect his/her day to day functioning. Clinical depression is the most frequently occurring psychiatric disorder after TBI and is associated with poor functional outcome in TBI survivors. Studies have shown that patients with post-TBI depression are significantly more impaired than patients without depression in terms of their ability to perform activities of daily living (such as washing, dressing and cooking) after injury.

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Depression following TBI is often under-diagnosed by doctors due to a lack of awareness of this disorder and because of overlap in the physical symptoms of TBI and the symptoms of depression. It is important for caregivers and survivors to be aware of the symptoms of depression so that it can be treated appropriately.

Symptoms to look out for include:

- Depressed mood or tearfulness nearly every day.
- Loss of interest in activities that the person previously found pleasurable.
- Significant changes in weight or appetite.
- Significant changes in sleep pattern.
- Feelings of worthlessness or inappropriate guilt.
- Recurrent thoughts of death or suicide or suicide attempts.

If you suspect that a TBI survivor is suffering from depression, it is best to discuss it with your doctor, a psychologist, social worker or other trained mental health professional. Several anti-depressant medications have been found to be effective in managing depression post TBI. Many TBI survivors may also benefit from psychotherapy to work through the various losses entailed by having a head injury.

Anxiety

As in the case of depression, some anxiety after a head injury is a natural response. Survivors may often worry about changes in the living arrangements (due to the need for continual care) or in their financial status (due to being unable to work and provide for their families), for example. However, anxiety may sometimes become overwhelming and lead to a decrease in functioning or interfere with the rehabilitation process.

Post-Traumatic Stress Disorder (PTSD) is a type of anxiety disorder which commonly occurs after exposure to traumatic situations which involved the threat of injury or death. Symptoms include the following:

1. "Reliving" the event, which disturbs day-to-day activity

- Flashback episodes, where the event seems to be happening again and again
- Repeated upsetting memories of the event
- Repeated nightmares of the event
- Strong, uncomfortable reactions to situations that remind you of the event

2. Avoidance

- Emotional "numbing," or feeling as though you don't care about anything
- Feeling detached
- Being unable to remember important aspects of the trauma
- Having a lack of interest in normal activities
- Avoiding places, people, or thoughts that remind you of the event

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- Feeling like you have no future

3. *Arousal*

- Difficulty concentrating
- Startling easily
- Having an exaggerated response to things that startle you
- Feeling more aware (hypervigilance)
- Feeling irritable or having outbursts of anger
- Having trouble falling or staying asleep

Patients who have suffered a TBI often have no or little recall of the event that caused their injury and it was once thought that patients with TBI could not develop PTSD. However, we now know that PTSD can occur even when there is a loss of consciousness for the event. Thus a patient who was involved in a car accident, for example, may find him/herself hyper-aroused in, and avoidant of, situations that are similar to the trauma event even though he/she may have no memory of the event.

As in the case of depression, patients with severe anxiety may benefit from medication and/or psychotherapy to relieve symptoms and to improve coping.

Anger and Aggression

Survivors of TBI often experience intense feelings of anger and/or irritability. This may at times result in problematic behaviours such as aggression, which can be very frightening for family members. Examples of aggressive behaviour include verbal outburst with minimal provocation and aggression towards self, others or inanimate objects when frustrated in attaining goals due to physical or cognitive limitations. Anger management and self-awareness training can assist in managing anger and aggression following TBI.

Personality change

Even a person who makes a “good” recovery after TBI may go through some personality changes. Personality changes are often an exaggeration of the person's pre-injury personality in which personality traits become intensified. Some changes can be quite striking. It may be, for example, the head injury survivor used to be easy going, energetic, and thoughtful and now seems easily angered, self-absorbed, and unable to show enthusiasm for anything. Underlying psychiatric disorders (such as depression) or cognitive problems (such as executive dysfunction) may be the reason for the changes in personality observed by family members and friends. This highlights the need for a professional assessment in cases of dramatic personality change after a head injury.