

Traumatic Brain Injury

Presented By:

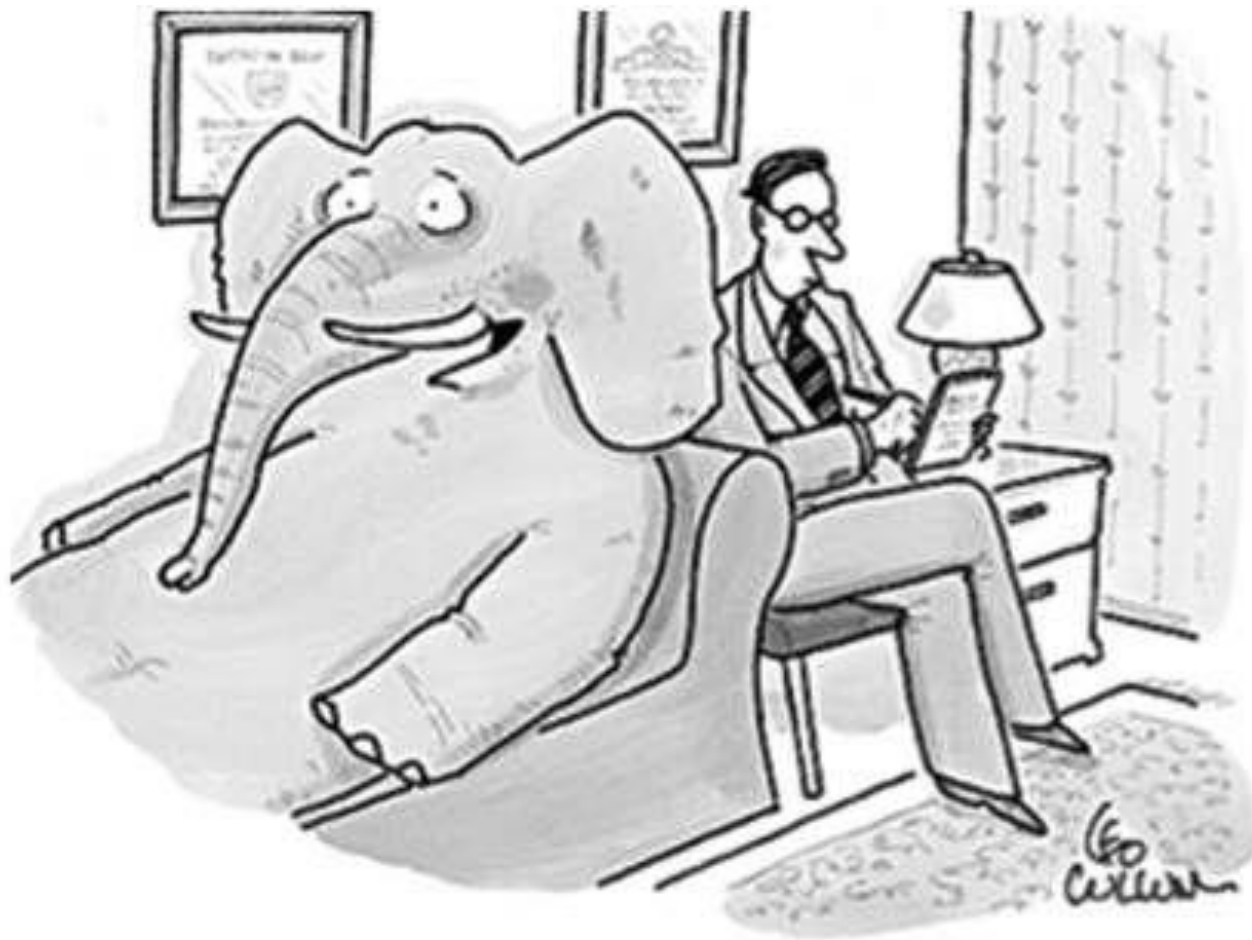


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"AFTER TUMBLING DOWN, JACK HAS A FEAR
OF GOING UP THE HILL EVER AGAIN."



*"I'm right there in the room, and no
one even acknowledges me."*

Phineas Gage

Phineas Gage (1823-1860)

Case study: In a work accident, a metal rod shot up through Phineas Gage's skull, destroying his eye and part of his frontal lobes.

After healing, he was able to function in many ways, but his personality changed; he was rude, odd, irritable, and unpredictable.



Possible explanation:

Damage to the frontal lobes could result in loss of the ability to suppress impulses and to modulate emotions.



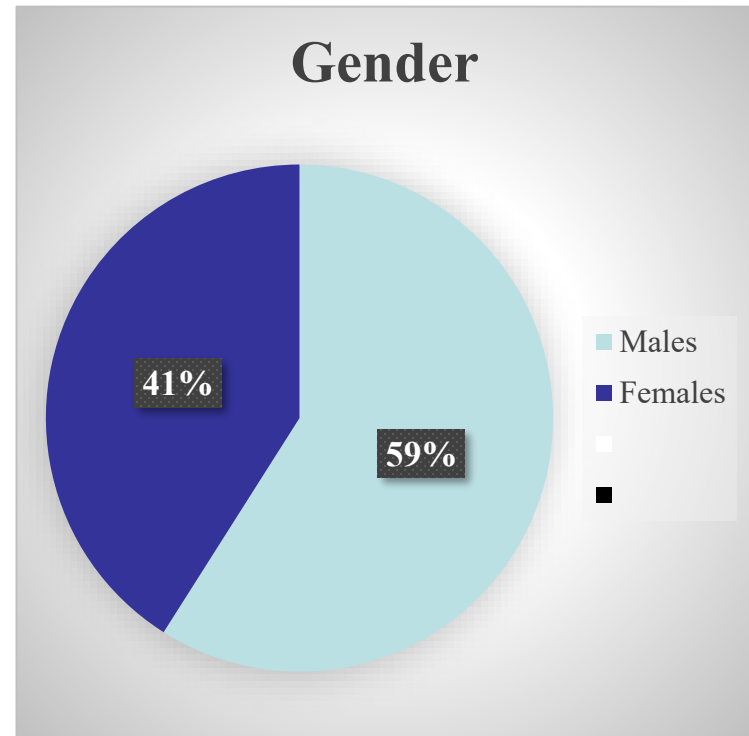
The Accident

On September 13, 1848, twenty-five-year-old Phineas Gage was working with a blasting crew when he was in an accident that drove a tamping iron through his head. The rod entered through the left cheekbone, past his eye, and out the top of his head. He survived the trauma, but exhibited significant behavioral changes.



TBI by Gender

- Males Sustain 59% of TBI's □
- Females Sustain 41% of TBI's



In other words, males sustain 1.5 times as many brain injuries as females. Males have higher rates of Hospitalization, Death and Emergency Department Visits

What Is A Traumatic Brain Injury? (TBI)

TBI is an insult to the brain, not of a degenerative or congenital nature but caused by *an external physical force*, that may produce a diminished or altered state of consciousness which results in an impairment of cognitive abilities or physical functioning. It can also lead to a disturbance of behavioral or emotional functioning. These impairments may be temporary or permanent and cause partial or total functional disability.



Causes of TBI

- Motor Vehicle Accidents
- Falls
- Gunshot wounds
- Sports injuries
- Workplace injuries
- Child Abuse
- Domestic violence
- Military actions
- Other injuries caused by trauma

The Stats on TBI

- Every 23 seconds one person in the U.S. sustains a TBI...or 1.4 million Traumatic Brain Injuries occur *every* year
- 235,000 people are hospitalized each year with TBI
- 80,000-90,000 Americans experience the onset of a long-term disability following TBI each year
- The actual number of people with TBI is higher. TBI's are often not reported.



Number of People Each Year in Our Area with Traumatic Brain Injury Related

	Emergency Room Visits	Hospitalizations	Deaths
Dutchess	1,620	509	39
Orange	2,498	318	39
Rockland	2,217	251	35
Sullivan	522	68	15
Ulster	1,260	238	24
Westchester	5,368	872	94
All New York	120,409	19,368	2,279

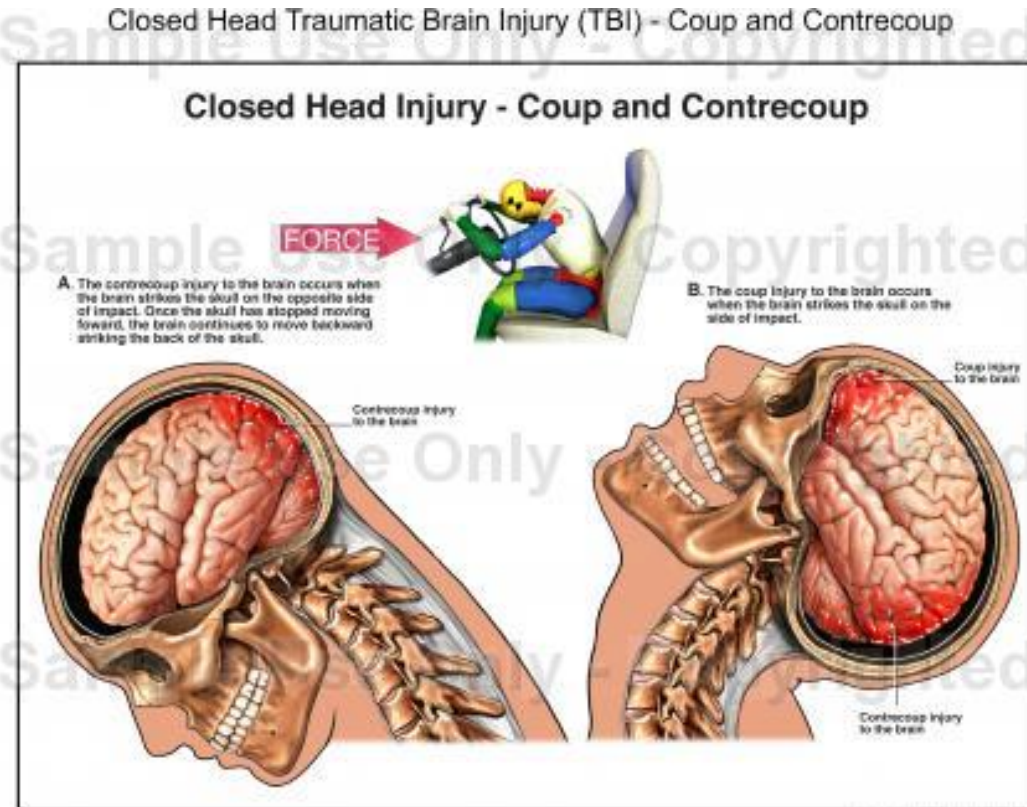
NYSDOH 2010-2012 mean incidents/yr reported February 2014



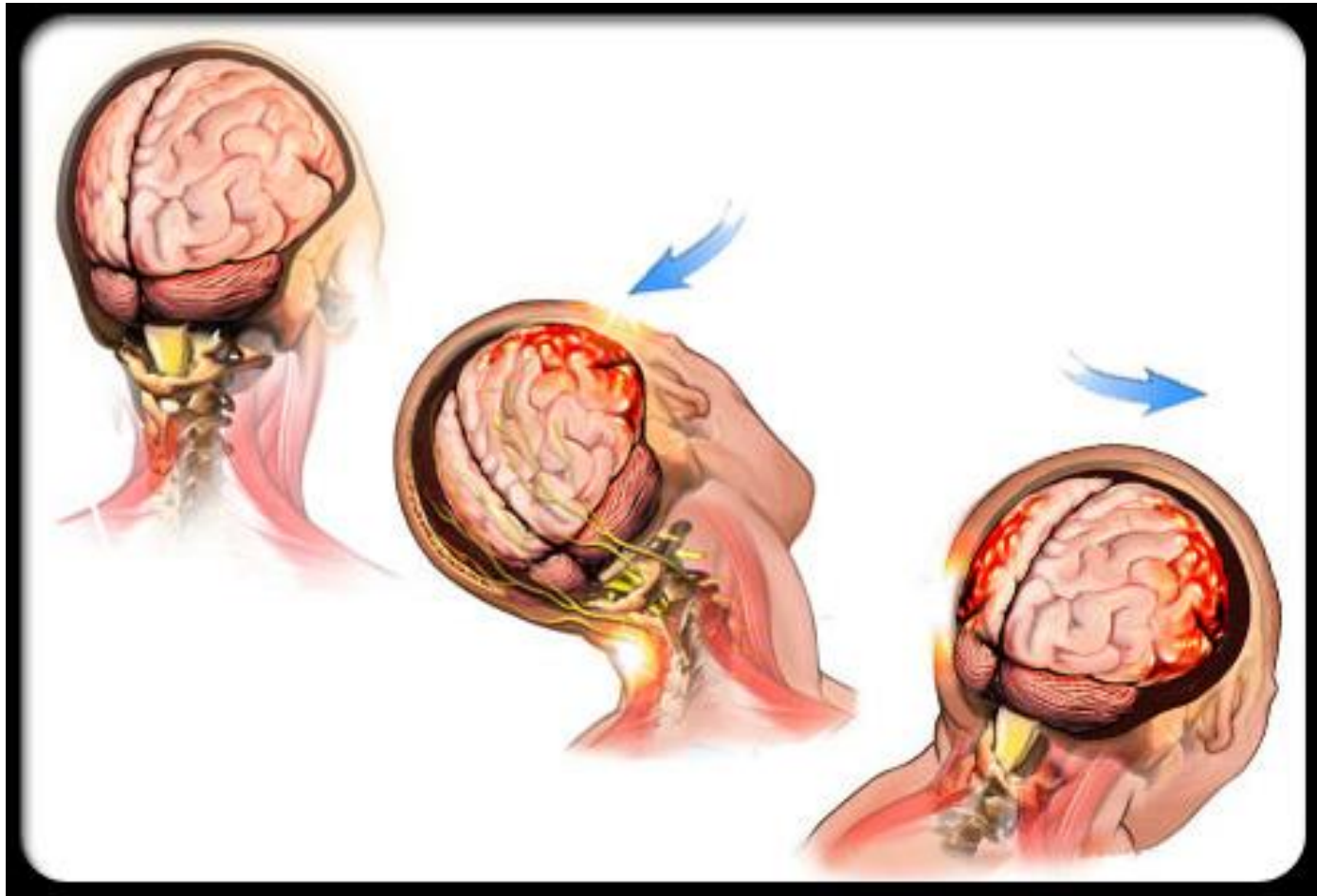
How does a Traumatic Brain Injury Happen?

After a sudden jolt or bang, the result can be...

- ***Coup-Contracoup***: Injury at the site of impact and on the opposite side from the movement of the brain against the skull (either front to back or side to side)

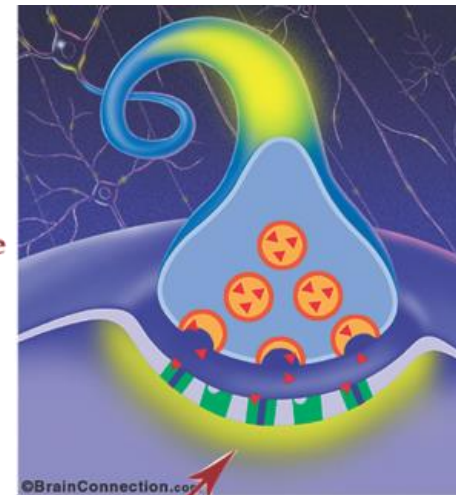
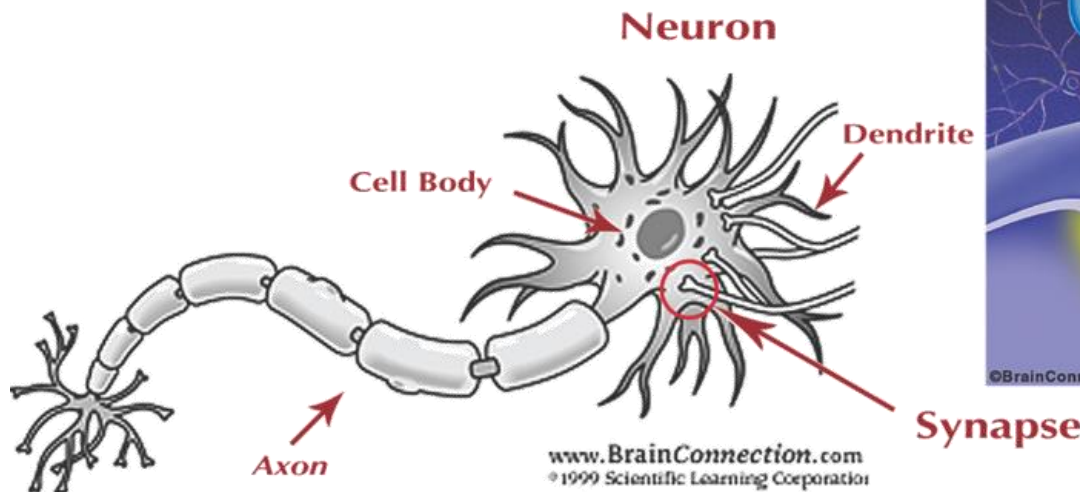


How does a Traumatic Brain Injury Happen (continued)?



Neurons

- Neurons: the billions and billions of tiny brain cells making up the nervous system
- **Glial** ("glue"): non-communicating cells support and nourish the neurons.
- Three main parts of the neuron:



Mechanisms of Traumatic Brain Injury

- Diffuse Axonal injuries: Delicate nerve tissues rip, tear, and stretch
 - Swelling: Brain tissue swells preventing blood and CSF circulation
-
- **Hematoma: Accumulation of blood causing pressure**
 - **Hydrocephalus: Blockage of Cerebrospinal Fluid causing pressure**
 - **Anoxia & Hypoxia: Oxygen deprivation from suffocation, drowning, blood loss, or cardiac failure that kills brain cells**
 - **Hemorrhages: Major bleeding from when the brain rubs against the inside of the skull, which is ragged with sharp bony ridges**

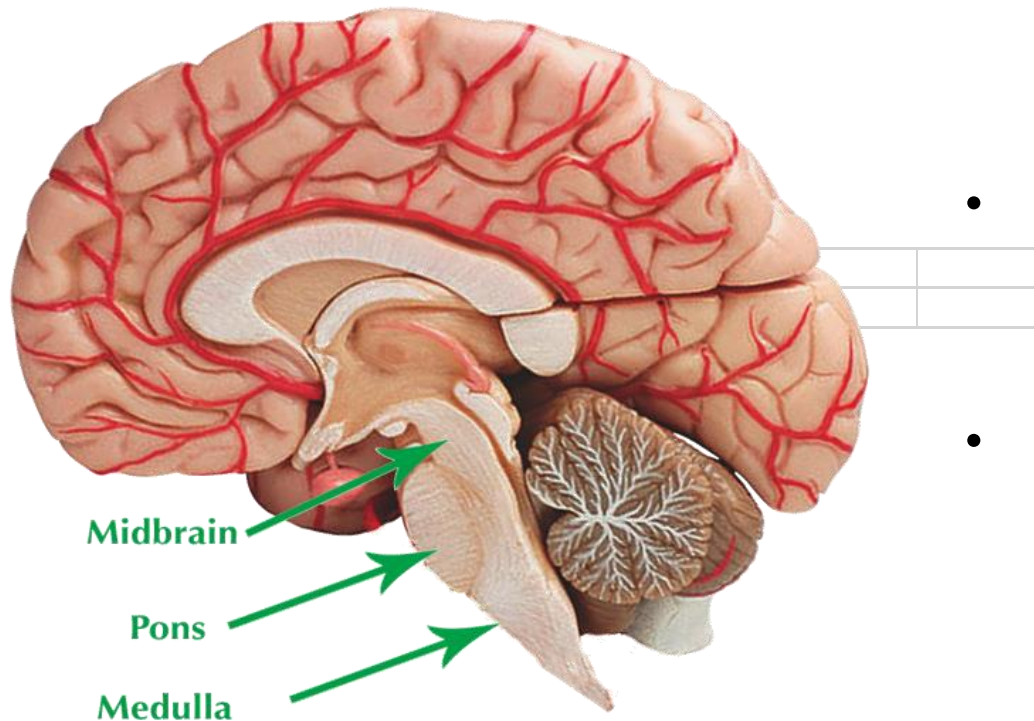
TBI Severity

Traumatic Brain Injuries are classified according to mild, moderate and severe injuries. ☐

- 80% are mild
- 10-30% are moderate
- 5-25% are severe

Concussion: mild TBI that often goes undiagnosed as such

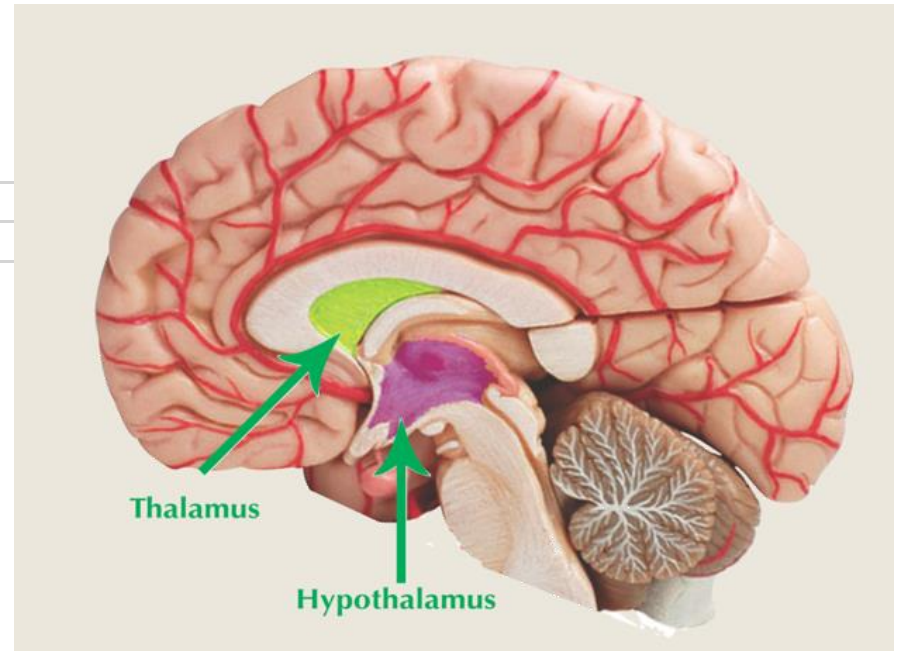
Brain Stem



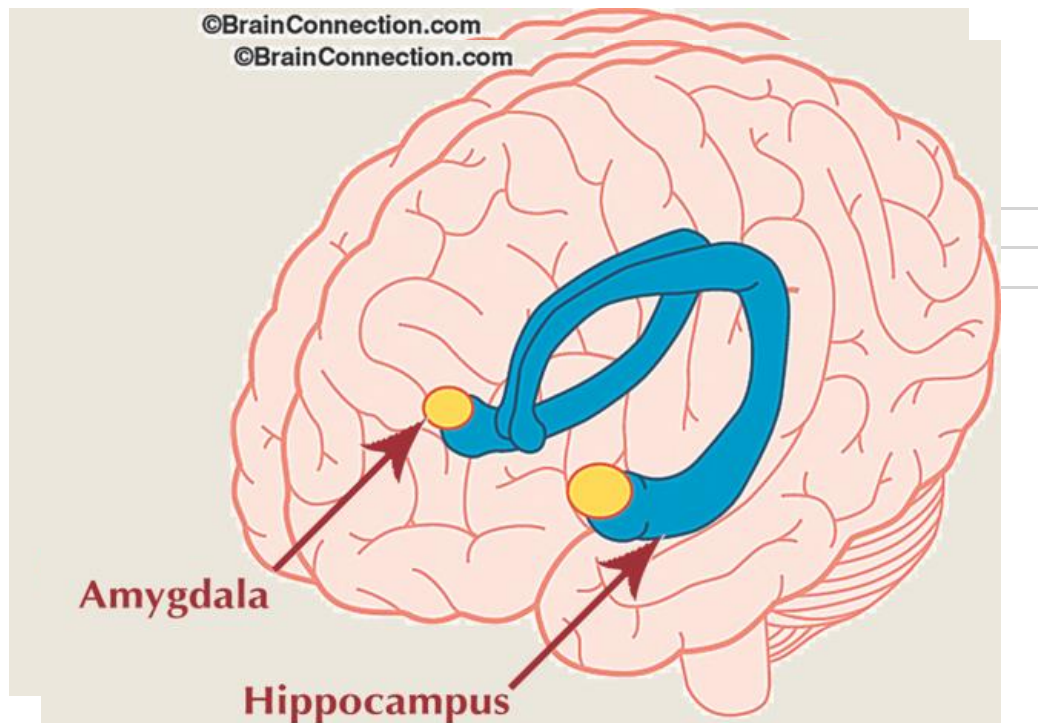
- Midbrain
 - Alertness & arousal
 - Elementary forms of seeing & hearing
- Pons
 - Facial movement & sensation, hearing, & coordinating eye movements
- Medulla
 - Basic living functions
 - Vital to life and death
 - Controls involuntary functions like breathing, heart-rate, blood pressure, swallowing, vomiting and sneezing.

Thalamus and Hypothalamus

- Thalamus
 - Major relay station for incoming and outgoing sensory information
 - The input for every sense (except smell) travels through the thalamus
- Hypothalamus
 - Control center for hunger, thirst, sexual response, endocrine level & temperature regulation.
 - Controls complex responses like anger, fatigue, memory and calmness.



Limbic System

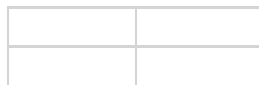


- Limbic System
 - Houses basic elemental drives, emotions and survival instincts.
 - Injury to the limbic system can result in serious problems with basic emotional perceptions, feelings & responses.
 - Behavior and mood can be very erratic

Limbic System

- Amygdala

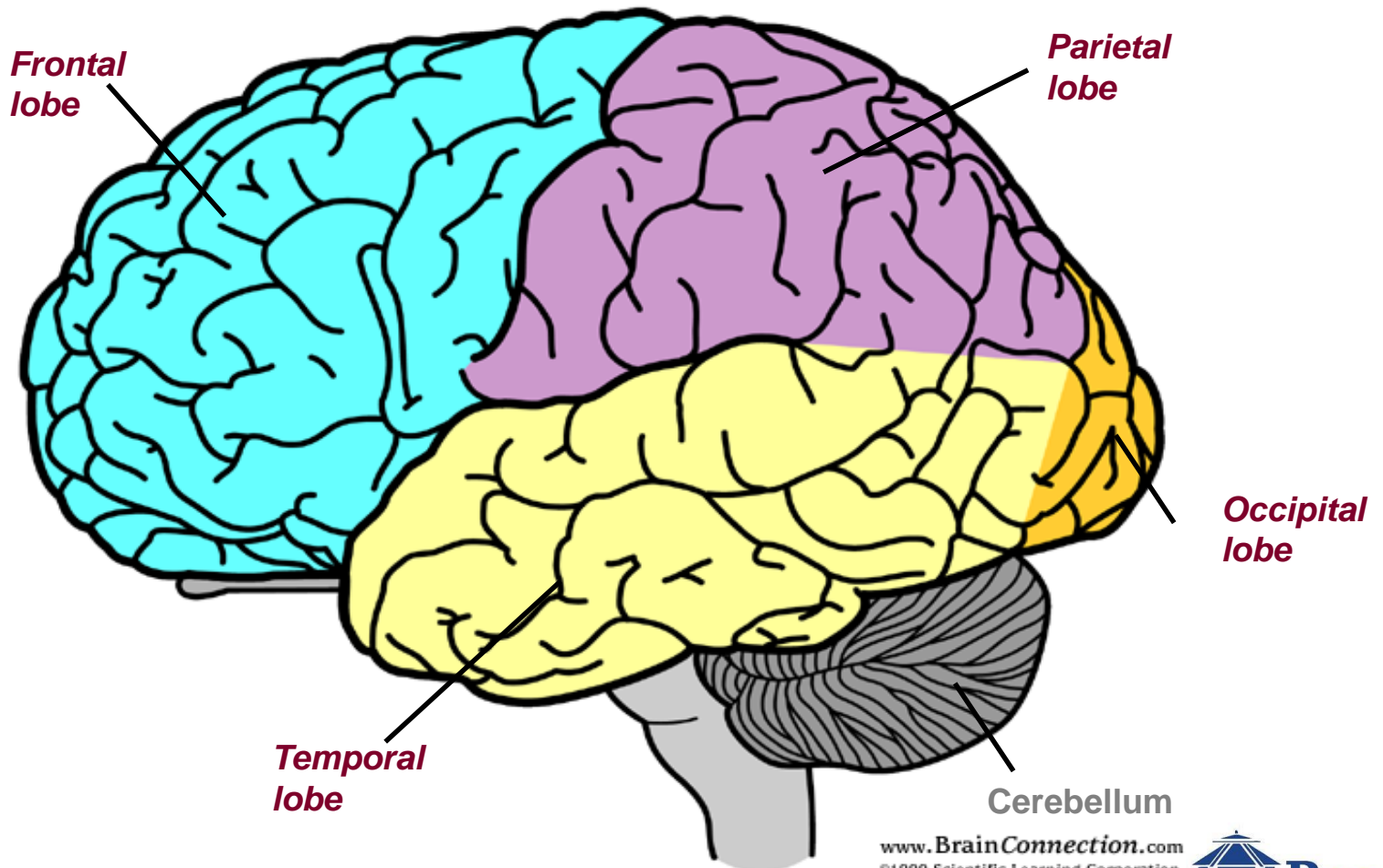
- Fight or flight structure
- The front door to our emotions
- When perceptions reach the cerebral cortex, it is transmitted to the amygdala to be evaluated for emotional content



- Hippocampus

- Associated with memory functions
- Injury can result in problems with short term memory, and turning short term memories into long term memories
- Disrupts the encoding and retrieval of long term memory

Lobes of the Brain

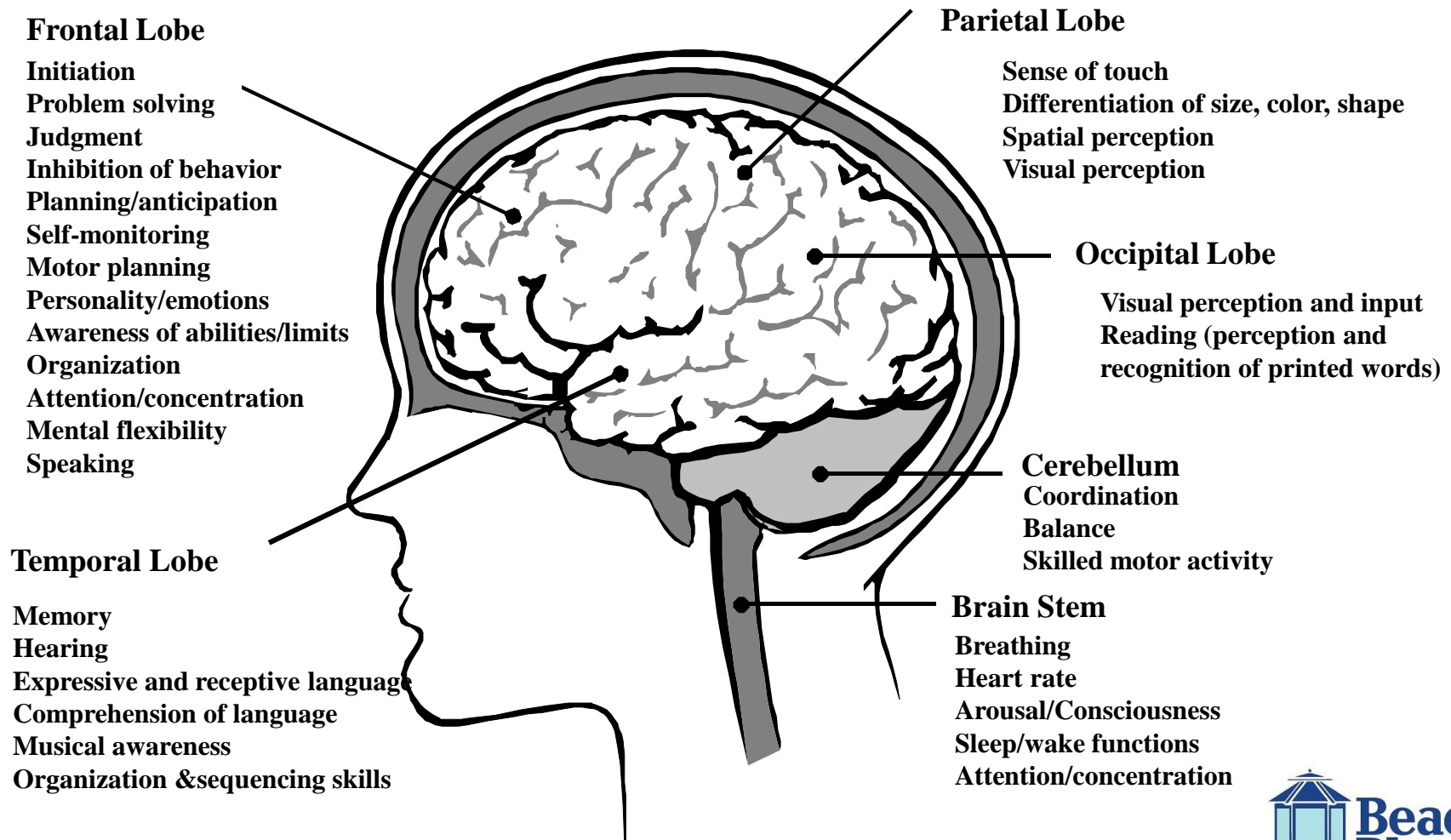


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American Academy of Certified Brain Injury Specialists



Brain & Behavior Relationships



Common TBI Symptoms

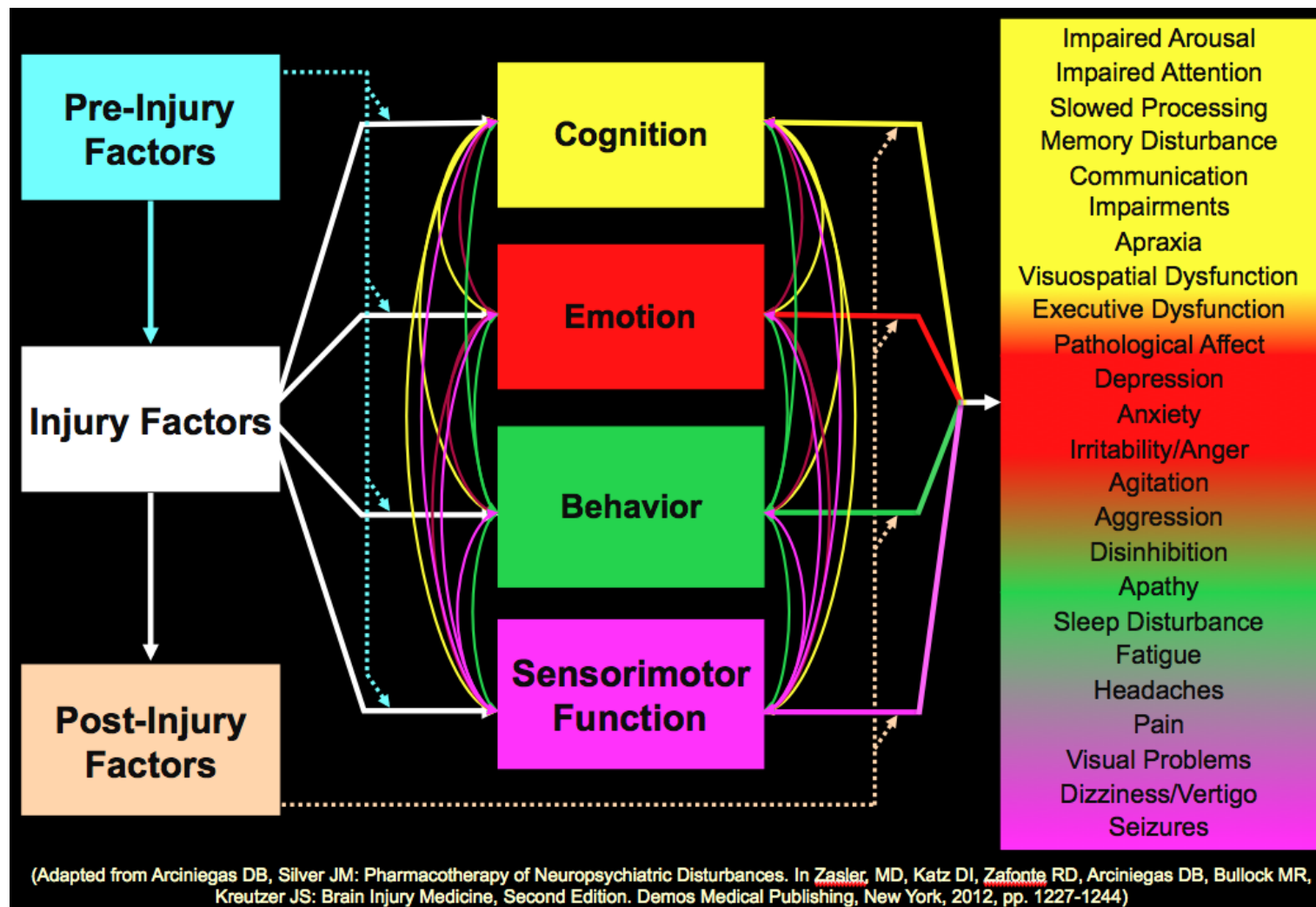
- Headaches
- Memory Deficits- usually short term memory
- Word Finding Difficulty
- Fatigue
- Changes in Emotion- flat, amplified, lack of inhibitions, trouble analyzing social situations
- Changes in Sleep
- Impulsiveness
- Concentration
- Overload-

Brought on by large crowds, lots of noise, or information presented too quickly. Inability to process external environment

Fatigue

Rise in emotions

Before and After



Functional Impacts of Brain Injury

- Effective Rehabilitation is based on the specific needs of the individual
- Brain Injury can effect how a person feels, thinks, acts and relates to others
- Many people who have survived a TBI have impairments in several areas.
 - While Broken bones eventually heal cognitive, sensorimotor and behavioral deficits can result in lifelong changes in how an individual functions in society. Any one of the functional changes can effect every aspect of a person's life.

(Essential Brain Injury Guide)



Functional Impacts of Brain Injury

- Memory Impairments
 - Sometimes considered one of the most disabling consequences of TBI. Can affect learning, retention and using new information. Can affect ability to live independently.
- Cognitive Impairments
 - Can affect activities of daily living such as hygiene, eating, household management, community reintegration.
- Executive Functioning Impairments
 - Refers to the ability to plan, initiate, direct and monitor one's activities. Involves planning, creating, organizing, evaluating and initiating activities.
 - Impaired executive functioning can lead to post-injury behavior greatly different from pre- injury. (e.g. Overstimulation →yelling)

Functional Impacts of Brain Injury

- Impairments in initiation
 - Person not beginning an important activity unless prompted
 - Work problems, hygiene, interpersonal relationships, safe living situation can all be affected.
- Speech and language impairments
 - Repetition of words or phrases, word finding difficulties, disorganized communication (written/spoken), incomplete or incoherent expression of thoughts are common post-TBI.
 - Receptive and/or expressive difficulties
 - Sensorimotor impairments- can vary according to where brain injury occurs
 - Can be localized or generalized
 - If in combination (e.g. visual and auditory or vision and balance can be especially debilitating)

Other changes in thinking

- Lack of awareness of deficits (anosognosia)
- Confusion x 3
- Distractability
- Reduced ability to pay attention
- Difficulty with changes in routing
- Difficulty with basic calculation
- Difficulty sequencing
- Difficulty knowing what is important
- Impaired abstract thinking
- Perseveration
- Difficulty with cause and effect
- Impaired safety awareness
- Poor insight
- Lack of empathy



Sensorimotor Impairments

- Variations in weight or body temp, appetite
- Constipation/incontinence
- Headaches, seizures
- Paralysis or paresis
- Balance or coordination problems (ataxia)
- Spasticity/flaccidity
- Decreased endurance
- Chronic pain
- Swallowing difficulties (dysphagia)
- Vision problems or impaired depth perception
- Involuntary eye movements (nystagmus)
- Photophobia, sonophobia
- Ringing in ears (tinnitus)
- Impairment in smelling (anosmia) or taste
- Increased sensitivity to touch

Behavioral and Emotional Changes

- Ability to respond to requests
- Aggression/property destruction
- Yelling, angry outbursts
- Self injury
- Decreased frustration tolerance
- Lability of mood
- Depression
- Impulsivity, hyperactivity
- Inappropriate sexual behavior
- Immature, self focused behavior
- Hoarding
- Decreased sensitivity to others
- Paranoia – or real?
- Anxiety, trauma



Traumatic Brain Injury and Post Traumatic Stress Disorder

TBI and Mental Health Issues

- Prevalence rates for psychiatric disorders are high after TBI. Depression rates have been reported in 14 to 77% of patients
- Substance abuse 5 to 28%
- PTSD 3 to 27%
- Other anxiety disorders 3 to 28%
- Mild TBI appears to *increase* the risk for PTSD



Depression and TBI

- Depression is a common problem after TBI. About half of all people with TBI are affected by depression within the first year after injury. Even more (nearly two-thirds) are affected within seven years after injury. In the general population, the rate of depression is much lower, affecting fewer than one person in 10 over a one-year period. More than half of the people with TBI who are depressed also have significant anxiety.



Depression and TBI

- **What causes depression after TBI?**
- Many different factors contribute to depression after TBI, and these vary a great deal from person to person.
- **Physical changes in the brain due to injury.** Depression may result from injury to the areas of the brain that control emotions. Changes in the levels of certain natural chemicals in the brain, called neurotransmitters, can cause depression.

Depression and TBI

- **Emotional response to injury.** Depression can also arise as a person struggles to adjust to temporary or lasting disability, losses or role changes within the family and society.
- **Factors unrelated to injury.** Some people have a higher risk for depression due to inherited genes, personal or family history, and other influences that were present before the brain injury.

Traumatic Brain Injury and Post Traumatic Stress Disorder

Correlation Between PTSD and TBI

- Research suggests that PTSD is more likely following TBI Incidence 13%-27%
- Prevalence 3%-59%
 - (Bryant, 2000)
- Previously researchers argued that PTSD following a head injury was not possible due to memory loss, but many of those hypotheses have not been supported by the data

Beacon Place Services

- Structured Day Program
- Case Management
- On site and In-home Counseling
 - Individual and family treatment to address
 - Problematic issues and behaviors
 - Adjustment to life with a TBI
 - Goals/Activities/Obstacles affecting daily living
 - Maintaining or improving cognitive ability
 - Developing memory aids, strategies and skills



Beacon Place Services cont'd

- On site and In-home Counseling continued
 - Medication management
 - Social skills development, helping with communication skills

Beacon Place

Medicaid Waiver Services

- Structured Day Program
 - In community helps the client to improve or maintain skills and live as independently as possible
- Service Planning
 - Develops plan and goals together with participant
 - Helps participant choose service providers and supports, participant is the one who decides service planner and service provider



Beacon Place

Medicaid Waiver Services

- Community Integration Counseling
 - Assists the client with managing the emotional difficulties with living in the community, dealing with altered abilities and long term goals, changed roles and other concerns
- Positive Behavioral Intervention and Support
 - Addresses concerns that may put person at risk for not being able to remain in community- deals with behavioral problems and changing behavioral to be more successful



Beacon Place Services

- Independent Living*
- Helps person live as independently as possible.
- may include help with self-care, task completion, medication management, problem solving, running household and money management.



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