BRAIN INJURY

Definition	Etiology
• Refers to <u>any damage to the brain that impairs its function</u>, resulting from either **external trauma (traumatic brain injury)** or **internal causes (non-traumatic brain injury)** (*Traumatic Brain Injury (TBI)*, n.d.). • It is one of the most common causes of disability and death in adults (*Traumatic Brain Injury*, n.d.).	• <u>Traumatic brain injuries (TBI)</u> are commonly caused by events such as **falls, vehicle accidents, sports injuries, violent assaults, and explosions/blasts** (American Speech-Language-Hearing Association, n.d.). **(1) Falls** ➔ <u>the most common cause</u> of TBIs (*Traumatic Brain Injury (TBI)*, n.d.) ➔ particularly high among two demographic groups: children under 14 and older adults over 65 ➔ common scenarios include falls from stairs, ladders, or slipping in the bathroom **(2) Vehicle Accidents** ➔ young adults aged 15 to 24 are particularly vulnerable in these accidents ➔ these accidents involve pedestrian injuries and collisions **(3) Sports Injuries** ➔ especially in contact sports such as football, boxing, and hockey ➔ these injuries can occur due to direct blows to the head or from falls during play **(4) Violent Assaults** ➔ resulting from domestic violence, gunshot wounds, and child abuse (notably shaken baby syndrome) **(5) Explosions/Blasts** ➔ particularly in military contexts, have become a common cause of TBI among service members ➔ may not only cause direct trauma but can also lead to secondary effects such as concussions from the pressure wave generated by an explosion • <u>Non-traumatic brain injuries</u> can result from conditions like **stroke, lack of oxygen (hypoxia), aneurysms, brain tumors, cancer, brain infections** (i.e., meningitis, encephalitis), and **exposure to toxic**

	substances (i.e., lead, mercury) (*What Is a TBI? Causes of Traumatic Injury to Brain | Shepherd Center*, n.d.).

Prevalence	Incidence
Locally: ● Road traffic accidents are a major cause of TBIs in the Philippines with over 100,000 cases annually (DOH, 2020). ● In addition to these, falls, violence, and work-related injuries also account for significant TBI cases (Montemayor, 2018). The Global Burden of Disease Study (2019) highlights that both falls and road accidents are major contributors to the regional and global burden of TBIs, with Southeast Asia, including the Philippines, facing similar challenges. Despite advancements in emergency care, trauma remains one of the leading causes of death in the country, necessitating improved trauma care systems and timely medical intervention to reduce mortality and disability (Montemayor, 2018). Internationally: ● TBI had 27.16 million new cases, 48.99 million prevalent cases and 7.08 million YLDs (years lived with disability) in 2019 (WHO, 2021).	Locally: ● In the Philippines, approximately 285,035 cases or an incidence of 275 per 100,000 population of traumatic brain injury was recorded in 2016 (Philippine Statistics Authority, 2017). Internationally: ● Sixty-nine million individuals worldwide are estimated to sustain a TBI each year. The proportion of TBIs resulting from road traffic collisions was greatest in Africa and Southeast Asia (both 56%) and lowest in North America (25%). The incidence of road traffic injuries (RTIs) was similar in Southeast Asia (1.5% of the population per year) and Europe (1.2%). ● The overall incidence of TBI per 100,000 people was greatest in North America (1299 cases) and Europe (1012 cases) and least in Africa (801 cases) and the Eastern Mediterranean (897 cases) (Maas et al., 2017).

SIGNS	A Sign means to gain actual information about a certain disease or illness. One can observe signs by feeling, hearing or seeing them and it is the objective evidence of disease. (*Difference Between Signs and Symptoms in Tabular Form*, 2020) ● **Physical problems** ○ Fainting, seizures, headaches, dizziness, vomiting, balance difficulties, and muscle weakness. ● **Sensory problems** ○ Sensitivity to light, sound, and touch; hearing loss or ringing in the ears; vision changes or double vision. ● **Behavior changes** ○ Increased emotional sensitivity, anxiety, anger, mood swings, or feelings of depression. ● **Problems with thinking skills** ○ Difficulties with attention, memory, learning, planning, goal-setting, and problem-solving. ● **Speech and language problems**

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Challenges with clear speech due to weak speech muscles (dysarthria) or control issues (apraxia of speech); difficulties understanding spoken or written words; trouble finding the right words to express thoughts or needs.

Social communication issues

Problems with conversational rules, like turn-taking and avoiding interruptions; difficulty interpreting nonverbal cues, such as shoulder shrugs.

Swallowing problems

Problems with chewing, as well as coughing or choking when eating (swallowing disorders in adults and children).

(American Speech-Language-Hearing Association, n.d.)
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<tr><td>SYMPTOMS</td><td>
Symptoms are something which only the patient can experience. It is like a type of report which the patient provides to the doctor. Consequently, based on that, the doctor diagnoses the patient.
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<td>Mild TBI: (Traumatic Brain Injury, 2024)
Many people who sustain a mild TBI recover within three months. Any symptoms that linger will normally disappear or considerably improve within a year of the initial injury. (Rodrigoa, 2024)

Nausea and vomiting.
Dizziness or balance issues.
Headaches.
Noticing that light bothers your eyes.
Fatigue.
Vision issues like blurred vision.
Confusion.
Difficulty concentrating.
Difficulty thinking clearly.
Short-term memory loss.
Feeling “slowed down,” like you’re moving in slow motion.
Grogginess.
Anxiety.
Nervousness.
Irritability
Affects your sleep

trouble falling asleep
sleeping less/more than usual

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<td>Moderate to Severe TBI: (Traumatic Brain Injury, 2024)
The effects of a moderate to severe TBI can be long-term and possibly permanent. The immediate symptoms will vary from a mild TBI and may include: (Rodrigoa, 2024)

Losing consciousness (passing out).
Unconsciousness that lasts more than 30 minutes but fewer than 24 hours.
(In a severe TBI) - unconscious for more than 24 hours.
Coma.

<u>Glasgow Coma Scale (GCS):</u> is a system to “score” or measure how conscious you are. It's the most commonly used scale for measuring decreases in consciousness, including coma. (Professional, 2024e)
The scoring ranges for head injury are:

13 to 15: Mild traumatic brain injury (mTBI). Also known as a concussion.
9 to 12: Moderate TBI.
3 to 8: Severe TBI.

Weakness in your arms and legs.
Issues with balance and coordination.
Hearing or vision issues.
Changes in sensory perception, like touch.
Confusion.

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	• Difficulty concentrating. • Difficulty thinking clearly. • Short-term memory loss. • Trouble communicating. • Grogginess. • Anxiety. • Nervousness. • Irritability. • Sadness. • Depression. • Anger. • Aggressiveness. • Difficulty managing behavior. • Being more impulsive than usual.

Mild, moderate, and severe brain injuries all have symptoms that indicate their severity. (Brain Injury Association of America, 2023)

Mild TBI	• Brief, if any, loss of consciousness • Vomiting and Dizziness • Lethargy • Memory Loss
Moderate TBI	• Unconsciousness up to 24 hours • Signs of brain trauma • Contusions or bleeding • Signs of injury on neuroimaging
Severe TBI	• Unconsciousness exceeding 24 hours (coma) • No sleep/wake cycle during loss of consciousness (LOC) • Signs of injury appear on neuroimaging tests

Structural and Anatomical Changes Related to the Condition

Structural Changes

Brain Movement and Impact:
- TBI often occurs when a powerful force causes the brain to twist or bounce within the skull, leading to damage in brain tissues and blood vessels.

Chemical Changes:
- TBI can disrupt brain chemistry, affecting cell function and communication.

State of Consciousness:
- Moderate to severe TBI may lead to prolonged or permanent changes in consciousness, awareness, and responsiveness.

Cranial Nerve Damage:
- Injuries near the skull base can harm cranial nerves, impacting sensory and motor functions.

Cognitive Changes:
- TBI can cause difficulties with focus, information processing, and cognitive abilities.

Moderate/Severe TBI result in:

- Brain bleeding
- Seizures
- Permanent brain damage and disability
- Reduced life expectancy

Increased risk in conditions like:

- Alzheimer's disease
- Anxiety
- Chronic traumatic encephalopathy
- Depression
- Movement disorders
- Post-traumatic stress disorder

Physical Changes (MEDIAmaker, n.d.)

Mobility and movement problems

- Movement can be slow or impacted by balance, pain, and fatigue.

Spasticity

- Stiffness and tightness in limbs can limit range of motion and cause discomfort.

Weakness or paralysis

- Weakness or paralysis may impair safe use of limbs.

Ataxia

- Fine motor skills, such as handwriting and cooking, may be challenging, along with speech, swallowing, and continence issues. Eye movement may trigger headaches, dizziness, and visual challenges.

Balance and dizziness issues

- Balance problems and dizziness can interfere with daily activities and may increase fall risk.

Sensory impairment – touch, smell, vision, hearing, tasting

- Touch, taste, smell, hearing, and vision may be dulled, altered, or oversensitive. Taste and smell changes can affect appetite and nutrition, while visual impairments may affect perception of colors, shapes, and depth.

Fatigue

- Often described as a sudden "mental fog" that hinders concentration and information processing.

Hormonal imbalances

- May affect emotions, temperature control, hunger, thirst, sleep, breathing, growth, and sexual function.

Speech problems

- Aphasia: Language impairments affecting comprehension and expression.
- Dysarthria: Slurred or slow speech due to weak speech muscles.

Other Physical Changes

- Headaches: Often worsened by other symptoms like fatigue.
- Epilepsy: Seizure risk, most commonly within the first week post-injury, though some experience long-term epilepsy.
- Sexual Dysfunction: Reduced interest or ability in sexual activity.
- Continence Issues: Difficulty managing bladder and bowel control, with potential for accidents.

Possible SLP Areas Affected and Their Characteristics	
Expressive Language	• Impaired ability to express thoughts, ideas, and emotions through spoken or written language. • Difficulty finding words (anomia), forming coherent sentences, or organizing thoughts logically (Smith & Jones, 2019) • Pragmatics: Disruptions in the social aspects of communication, including understanding and using appropriate tone, facial expressions, gestures, and conversational rules (e.g., taking turns, staying on topic) (Williams & Garcia, 2021).
Receptive Language	• Struggle with following conversations, comprehending complex sentences, or interpreting non-verbal cues (Brown et al., 2020).
Speech Production	• Ability to produce clear and articulate speech can be compromised. • Difficulties with articulation (dysarthria), motor planning of speech (apraxia), and fluency (stuttering or cluttering) (Johnson & Lee, 2018).
Cognition	• Impaired cognitive functions that support communication, such as attention, memory, and executive function. • May lead to problems with maintaining conversations, understanding context, and responding appropriately (Taylor et al., 2017).
Swallowing	• Swallowing difficulties are common after a TBI. Dysphagia can affect the safety and efficiency of eating and drinking, increasing the risk of choking or aspiration pneumonia (Robinson et al., 2022).

Types of Brain Injury	
Concussion	• Most common type of TBI. • Often called "mild TBIs," because they are usually not life-threatening. • Can happen when the head or body is moved back and forth quickly, such as during a car crash or sports injury, or from a blow to the head. (*About Traumatic Brain Injury (TBI)*, 2020)
Contusion	• Can also be referred to as ***Hematomas***. • Refers to a bruise on the brain tissue itself due to a blow to the head, shaking, or a similar injury. • This injury occurs when small blood vessels bleed into the brain due to a direct blow or impact to the head. • Most commonly found at the base of the frontal lobe. (Spinal Cord Team, 2020); (*Brain Contusion Vs. Concussion - Baptist Health*, n.d.)
Open TBI	• Also known as ***Penetrating TBI***. • Happens when an object pierces the skull (e.g., a bullet, shrapnel, bone fragment, etc.) and enters the brain tissue. • Typically damages only part of the brain.

	(*Traumatic Brain Injury (TBI)*, n.d.)
Closed Head Injury	• Also known as ***Non-penetrating TBI or Blunt TBI***. • Caused by an external force strong enough to move the brain within the skull. • Causes include falls, motor vehicle crashes, sports injuries, blast injuries, or being struck by an object. (*Traumatic Brain Injury (TBI)*, n.d.)
Coup ContreCoup	• Result from the brain being damaged at both the site of impact (coup) and on the opposite side of the skull (contrecoup). • This dual impact can lead to more extensive damage compared to injuries that occur solely at one site. • Most coup-contrecoup injuries occur when the person's head slams against a stationary object. ○ Ex. If a car hits you from behind, you may experience whiplash and hit your head against the steering wheel. (Denslow, 2021)
Diffuse Axonal Injury	• A more severe form of TBI that results from rotational forces or violent shaking, causing widespread damage to nerve fibers throughout the brain. • This injury does not typically involve localized bruising but rather leads to tearing of axons. • Is often associated with high-speed accidents or violent shaking incidents like Shaken Baby Syndrome. (*Traumatic Brain Injury (TBI)*, n.d.)

Progression of the Condition		
Brain injury can progress in various ways depending on its severity and the area of the brain affected (*Traumatic Brain Injury (TBI)*, n.d.).		
Mild Brain injury	**Moderate Brain injury**	**Severe Brain injury**
• In mild cases, such as concussions, symptoms like headaches, dizziness, and confusion typically improve within days to weeks with proper rest and care. • Most individuals recover fully, but some may experience persistent issues like headaches or memory problems, known as post-concussion syndrome.	• The progression can involve more pronounced cognitive, physical, and emotional impairments. • Recovery may take months, with ongoing symptoms such as difficulty concentrating, speech issues, and motor deficits.	• Often lead to significant and potentially irreversible damage. • The progression can include profound cognitive impairments, motor disabilities, and emotional or behavioral changes. • In some cases, the condition may deteriorate further, leading to complications like seizures, chronic pain, or life-threatening conditions.

Outcome if Left Treated and/or Untreated
• Individuals experience partial or full recovery, especially with rehabilitation therapies like physical therapy, occupational therapy, and speech-language therapy. • Early treatment can help prevent secondary complications, such as swelling, infections, or further neurological damage. • If left untreated, brain injury can lead to permanent impairments, reduced quality of life, and in severe cases, death. • Delayed or inadequate treatment increases the risk of chronic symptoms and complications.

Medical/Surgical Management

TBI issues that need surgery: (Otr/L, 2024)	Different surgeries for TBI: (Otr/L, 2024)
• **Hematomas**. ○ Blood accumulates outside of blood vessels, potentially between the skull and brain layers or within the brain tissue itself.	• **Craniotomy with Open Surgery**. ○ Removal of a portion of the skull to drain large hematomas.
• **Intracerebral hemorrhages**. ○ A ruptured brain artery causes internal bleeding, requiring immediate intervention to prevent extensive damage.	• **Craniotomy with Open Surgery**. ○ The skull is opened to access and stop bleeding, and the affected area is treated to prevent further damage.
• **Hydrocephalus**. ○ An excess of cerebrospinal fluid (CSF) in the brain's ventricles increases intracranial pressure and can damage brain tissue.	• **Ventriculoperitoneal Shunt (VPS)**. ○ Insertion of a shunt to drain CSF in cases of post-traumatic hydrocephalus. • **Endoscopic Ventriculostomy**. ○ Opening a passage in the ventricle floor to release CSF, used for hydrocephalus.
• **Skull fractures**. ○ Penetrating brain injuries may fracture the skull, potentially tearing the brain's protective covering and introducing bacteria and air, increasing infection risk.	• **Cranioplasty**. ○ Insertion of synthetic or original bone to repair skull defects. • **Decompressive Craniectomy**. ○ Removal of fractured skull sections to prevent penetration into the brain tissue, used as a last resort.

Medications: (*Types of Traumatic Brain Injury (TBI) Medications: Uses & Drug List*, 2021)

Acute Care Medications

These medications are given during the acute phase of treatment immediately after the injury:

- Osmotic diuretics
  - Reduce brain edema and intracranial pressure by increasing urine output (e.g., Mannitol).
- Anticonvulsants
  - Prevent seizures caused by overstimulation of brain neurons (e.g., Phenytoin, Valproate).
- Electrolytes
  - Restore electrolyte balance to support heart and blood pressure (e.g., Magnesium sulfate, Potassium).
- N-methyl-D-aspartate (NMDA) receptor antagonists
  - Prevent neuron overactivity (e.g., Dextromethorphan/quinidine).
- Barbiturates
  - Used as sedatives or to induce a medical coma if intracranial pressure remains high (e.g., Pentobarbital).
- Calcium channel blockers
  - Prevent blood vessel spasms to ensure adequate blood supply to the brain (e.g., Nimodipine).

Long-term management medications

These medications are given for long-term management of chronic symptoms following TBI:

- Stimulants
  - Enhance cognitive functions like alertness (e.g., Methylphenidate, Modafinil).
- Dopamine agonists
  - Increase dopamine levels to boost alertness (e.g., Levodopa).
- Selective serotonin reuptake inhibitors (SSRIs)
  - Help manage emotional disturbances (e.g., Sertraline, Citalopram).
- Antipsychotics
  - Address psychosis and other mental health issues (e.g., Quetiapine).
- Muscle relaxers
  - Relieve muscle cramping and stiffness (e.g., Tizanidine, Baclofen).
- Pain relievers
  - Manage pain from injury (e.g., Acetaminophen, Ibuprofen).

Rehabilitation Treatment

- Physical Therapy
  - Improves strength and mobility.
- Occupational Therapy
  - Aids in daily living skills and independence.
- Speech Therapy
  - Supports communication and swallowing.
- Respiratory Therapy
  - Assists with breathing issues if needed.
- Psychological Therapy
  - Provides mental health and emotional support.

Areas for Evaluation	
Executive Functioning	○ Planning and Organization: Assess task management and organizational skills. ○ Problem-Solving: Evaluate ability to resolve problems and make decisions. ○ Attention and Concentration: Measure sustained and divided attention capabilities.

Language Processing	○ Comprehension: Assess understanding of spoken and written language. ○ Expression: Evaluate the coherence and clarity of verbal and written communication. ○ Receptive and Expressive Language: Measure understanding and production of language.
Cognitive Communication	○ Comprehension: Assess understanding of spoken and written information. ○ Expression: Evaluate the clarity and organization of verbal and written outputs. ○ Receptive and Expressive Language: Measure the patient's ability to understand and communicate effectively.
Social Communication	○ Pragmatics: Assess use of appropriate social cues and conversational skills. ○ Social Interaction: Observe ability to engage in meaningful interactions and relationships.
Speech	○ Possible Presence of Dysarthria ○ Motor speech planning or programming: repetition of simple and complex multisyllabic words and sentences to determine if apraxia of speech (AOS) is present ○ Speech intelligibility: the degree to which the listener understands the individual's speech
Voice Quality	○ Voice Changes: Assess pitch, volume, and breath control. Vocal Control: Measure the ability to modulate intensity and tone.
Swallowing	○ Swallowing Difficulties: Check for aspiration risk and muscle function related to swallowing.

Evaluation Materials	
Executive Functioning	○ Cognitive Linguistic Quick Test-Plus (CLQT+): Tests executive functioning, attention, and organization. ○ Clock Drawing Test: Evaluates planning and visuospatial reasoning. ○ Montreal Cognitive Assessment (MoCA): Screens for attention, problem-solving, and executive function deficits.
Language Processing	○ Western Aphasia Battery (WAB): Assesses comprehension and expression. ○ Boston Diagnostic Aphasia Examination (BDAE): Measures linguistic components like fluency and word retrieval. ○ Test of Adolescent and Adult Language-4 (TOAL-4): Evaluates syntax, semantics, and higher-level language skills.
Cognitive Communication	○ Mini-Mental State Examination (MMSE): Screens for general cognitive functions, including memory and language. ○ Cognitive Linguistic Quick Test-Plus (CLQT+): Evaluates memory, attention, and executive function in communication. ○ Montreal Cognitive Assessment (MoCA): Identifies impairments in cognitive-communication functions.

Social Communication	○ Pragmatic Language Skills Inventory (PLSI): Measures understanding and use of social language. ○ Social Language Development Test (SLDT): Evaluates social communication skills in real-life scenarios.
Speech	○ Oral Motor Assessment: Informal evaluation of muscle strength and control. ○ Speech Intelligibility Rating Scales: Measures how understandable speech is in conversation. ○ Motor Speech Protocols: Includes repetition of multisyllabic words and sentences to detect apraxia.
Voice Quality	○ Perceptual Voice Assessment: Informal rating of voice quality parameters. ○ Acoustic Analysis Software: Tools to measure pitch, loudness, and vocal stability.
Swallowing	○ Toronto Bedside Swallowing Screening Test (TOR-BSST): Screens for dysphagia. ○ Modified Mann Assessment of Swallowing Ability (MMASA): Structured protocol to evaluate swallowing ability. ○ Gugging Swallowing Screen (GUSS): Assesses aspiration risk and capacity.
SLPs use standardized instruments or non-standardized procedures to screen for speech, language, cognitive-communication, and swallowing deficits. If a screening reveals concerns, a referral for a comprehensive assessment in the relevant areas is made.	

Treatment Strategies	
Executive Functioning	○ Cognitive Rehabilitation Therapy (CRT): Includes structured activities for planning and organization. ○ Strategy Training: Teaches use of tools like calendars, checklists, and reminders. ○ Attention Training: Includes focused and sustained attention exercises to improve concentration.
Language Processing	○ Language Therapy: Focused activities to improve comprehension and expression. ○ Semantic Mapping: Organizes vocabulary and enhances understanding. ○ Narrative Therapy: Helps improve storytelling and sequential organization of ideas.
Cognitive Communication	○ Memory Strategies: Use mnemonics, repetition, and visualization to support recall. ○ Reasoning and Problem-Solving Training: Includes logic exercises and real-life decision-making tasks. ○ Orientation Therapy: Rebuilds awareness of time, location, and personal identity.
Social Communication	○ Social Skills Training: Teaches conversational behaviors through modeling and role-play. ○ Pragmatic Language Therapy: Focuses on interpreting and using social cues appropriately. ○ Group Therapy: Provides practice for social communication in a supportive environment.

Speech	○ Oral Motor Exercises: Strengthen muscles for improved articulation. ○ Pacing and Rate Control: Tools like metronomes to improve clarity and speech rhythm. ○ Speech Intelligibility Tools: Feedback systems to track and improve articulation.
Voice Quality	○ Voice Therapy: Exercises to improve pitch control, volume, and resonance. ○ Respiratory Training: Techniques like diaphragmatic breathing for breath support. ○ Relaxation Techniques: Reduce strain through progressive muscle relaxation.
Swallowing	○ Swallowing Therapy: Includes strengthening exercises for swallowing muscles. ○ Dietary Modifications: Adjustments to food and liquid consistency for safety. ○ Swallowing Strategies: Techniques like chin tuck or head-turn for safe swallowing.

Educational Management	
• **Screening and Evaluation** ○ Conduct initial screenings to identify any deficits in speech, language, cognitive-communication, and swallowing. Refer clients for comprehensive assessments if needed. • **Interdisciplinary Team Collaboration** ○ Work with doctors, neurologists, and other specialists to gather a complete picture of the client's condition and needs. • **Regular Updates** ○ Continuously update the treatment plan as the client's condition evolves or improves. • **Coordination of Therapies** ○ Ensure clients receive appropriate therapies such as physical, occupational, and speech therapy.	• **Progress Monitoring** ○ Regularly monitor and document the client's progress in therapy sessions to adjust interventions as needed. • **Scheduled Follow-Ups** ○ Arrange regular follow-up appointments to review the client's progress and adjust care plans as necessary. • **Emergency Support** ○ Provide information on how to access emergency medical services if the client experiences significant changes or complications.

Healthcare Team	
1. **Neurologist** • Specializes in the diagnosis and treatment of disorders related to the nervous system. They assess the extent of the brain injury and monitor neurological recovery. 2. **Neurosurgeon** • In cases where surgery is needed to relieve pressure on the brain, remove blood clots, or repair skull fractures, a neurosurgeon performs these procedures.	7. **Neuropsychologist** • Evaluates and treats the cognitive, emotional, and behavioral changes associated with brain injury. They conduct assessments to determine the impact of the injury on cognitive functions and provide strategies to cope with these changes. 8. **Social Worker or Case Manager**

3. **Physiatrist (Rehabilitation Physician)**
   - Oversees the rehabilitation process, coordinating care and helping the patient regain physical and cognitive functions. They may prescribe medications, physical therapy, and other interventions.
4. **Physical Therapist**
   - Focuses on improving mobility, strength, balance, and coordination. They design exercise programs tailored to the patient's specific needs.
5. **Occupational Therapist**
   - Helps patients regain independence in daily activities, such as dressing, eating, and working. They also work on improving cognitive functions like memory and problem-solving.
6. **Speech-Language Pathologist**
   - Assesses and treats communication disorders, including problems with speech, language, cognition, and swallowing.
   - Assists with the practical aspects of recovery, such as connecting patients with community resources, coordinating care, and providing support to the patient and family.
9. **Nurse**
   - Nurses, particularly those specializing in neurology or rehabilitation, provide ongoing care, monitor the patient's condition, administer medications, and educate the patient and family about the injury and recovery process.
10. **Psychologist/Psychiatrist**
    - Mental health professionals help address the emotional and psychological challenges that often accompany brain injuries, such as depression, anxiety, and post-traumatic stress disorder (PTSD).
11. **Recreational Therapist**
    - Use activities like sports, music, and art to help patients recover physical and cognitive skills and to improve their overall well-being and quality of life.
12. **Respiratory Therapist**
    - Help secure airways, provide mechanical ventilation if needed, and prevent respiratory complications such as pneumonia. They also monitor respiratory function to optimize brain perfusion and guide the weaning process from mechanical ventilation

Medical Precautions Regarding Speech-Language Therapy		
Before	**During**	**After**
• **Medical Clearance**: Ensure the patient has been cleared by a physician to participate in SLP therapy. • **Assessment of Cognitive Function**: Evaluate cognitive status to determine appropriate therapy goals and techniques. • **Medication Review**: Check for medications that may affect communication or	• **Monitoring Vital Signs**: Regularly check for changes in heart rate, blood pressure, or oxygen levels. • **Adaptive Techniques**: Use simplified language and visual aids for better comprehension. • **Pacing**: Be mindful of fatigue and adjust therapy intensity and duration as needed. • **Reinforce Safety**: Ensure	• **Post-Therapy Assessment**: Monitor for any changes in behavior or cognitive function after sessions. • **Follow-up Communication**: Keep in touch with caregivers and family about progress and any concerns. • **Encourage rest** and recovery to support cognitive processing after therapy. • **Documentation**: Record any

cognitive function. • **Physical Safety**: Assess for any mobility issues, including the need for assistive devices, to prevent falls. Ensure awareness of any motor or sensory impairments that could impact safety. • **Environment Preparation**: Ensure a quiet, distraction-free environment to facilitate focus and learning. • **Vital signs:** Check baseline vital signs to identify any abnormalities that could affect therapy participation.	the patient is in a safe position to prevent falls or injury during activities. • **Frequent Breaks**: Allow for breaks to prevent cognitive overload and fatigue. • **Precautions**: Be vigilant for potential complications, such as blood clots or seizures. Have an emergency response plan in place if these occur. • **Vital Signs**: Monitor vital signs periodically to ensure the patient remains stable throughout the session.	observations regarding patient responses to therapy for future reference. • **Consultation**: Communicate with the healthcare team for any significant changes in the patient's condition. • **Vital Signs**: Reassess vital signs to detect any post-therapy changes that might indicate fatigue, stress, or other medical concerns.

Support Systems	
Philippines	**Internationally**
1. **Philippine Academy of Rehabilitation Medicine (PARM)**: An organization that promotes the development of physical medicine and rehabilitation in the Philippines. It provides guidelines and standards for rehabilitation services, including patients with brain injuries. 2. **Philippine Orthopedic Center (POC)**: A leading government facility providing comprehensive rehabilitation services, including for BI patients. It offers physical therapy, occupational therapy, and speech-language pathology services. 3. **Department of Health (DOH) Programs**: The DOH, in collaboration with local government units (LGUs), runs community-based rehabilitation programs aimed at reintegrating individuals with disabilities, including those with BI, into society. These programs often include physical and occupational therapy, vocational training, and support for caregivers. 4. **Philippine Alliance of Patient Organizations (PAPO)**: Advocates for patient rights and support systems, including	1. **Traumatic Brain Injury Model Systems (TBIMS)**: A network of 16 centers across the U.S. funded by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR). These centers provide comprehensive, multidisciplinary rehabilitation care and conduct research on BI. 2. **National Health Service (NHS)**: Provides specialized BI care through neurology and neurosurgery units, followed by rehabilitation services offered at specialized centers such as the National Hospital for Neurology and Neurosurgery in London. 3. **Ontario Neurotrauma Foundation (ONF)**: Focuses on BI research and rehabilitation practices in Canada, working with healthcare providers to implement best practices in BI care. 4. **Brain Injury Australia (BIA)**: An advocacy organization that represents individuals with BI, providing information, resources, and policy advocacy. It collaborates with healthcare providers to improve BI services across the country. 5. **International Brain Injury Association (IBIA)**: A global organization that brings

those for individuals with BI. They work to improve access to healthcare services and rehabilitation for all Filipinos. 5. **PhilHealth**: Provides some coverage for BI-related medical expenses, including hospitalization, surgeries, and rehabilitation.	together professionals, researchers, and advocates to promote understanding, research, and treatment of brain injuries.

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