Traumatic Brain Injury

A mild traumatic brain injury is frequently referred to as a concussion. It is a brain injury caused by a blow to the head or violent shaking of the head and body. It can occur with or without loss of consciousness.

Common mTBI Symptom Categories

- Vision Problems
- Light Sensitivity
- Sound Sensitivity
- Headaches
- Vertigo/ Dizziness
- Difficulty Concentrating
- Memory Problems
- Emotional Changes
- Extreme Fatigue
- Limited Activity Tolerance

Your brain is your control center. It perceives the world through your senses, processes that data, and creates your thoughts, physical response, and emotional response to that information. Because your brain is central to every aspect of a person, the symptoms of a TBI can impact all areas of your life.

What Happens During a mTBI?!

Within the skull, the brain floats in a protective suspension of cerebrospinal fluid. Trauma occurs when either a direct impact or whiplash effect causes the brain to move inside the head and bump against the skull. The brain bumping within the skull can cause injuries not just at the site of impact but on the opposite side of the brain as well. As a result, neurons are damaged and the brain may bruise. This neuron damage causes chemical changes within your brain. These chemical changes can make your brain more sensitive to any increased stress or injury until it recovers.

https://www.concussionalliance.org/what-happens-to-your-brain#why-does-a-concussion-give-me-symptoms

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Mild TBI - Steps to Recovery

STEP 1:

Always consult your doctor first! Your doctor will need to assess you for major injuries that require medical attention. You can start with urgent care or the ER in an emergency. If you remain symptomatic for an extended period of time, then look for specialized care such as a neurologist who specializes in TBI or a physical medicine and rehabilitation doctor (physiatrist).

STEP 2:

Rest for 1-2 days after a concussion. This rest is essential to give your brain time to heal. What does the rest look like?! Take it easy mentally and physically. Avoid or cut down on screen time. (Limit texting, watching TV, and using social media.) You should limit physical activity as well.

STEP 3:

Identify your symptoms and the trigger for your symptoms. Keep a journal of the activities you complete each day and how they make you feel. Using this journal you can identify triggers that make you feel overwhelmed.

STEP 4:

Learn about your brain battery! You need to focus on staying within your brain's energy limits. This means only performing activities that will allow you to recover with 20-30 minutes of rest. Prioritize frequent rest breaks. Pushing through fatigue and needing multiple days or multiple weeks to recover after a task can increase the time it will take you to heal.

STEP 5:

Gradually increase your activity level. After you have mastered staying within your brain's energy limits, you can gradually begin to gently expand your activity tolerance with small challenges!

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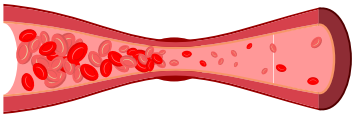
Mild TBI - Rest is Best!

Many people report that their brain injury makes them feel foggy, tired, overwhelmed, and extremely fatigued. That is because it takes a lot of energy for your brain to heal after an injury.

Brain Injury Energy Crisis



Decreased Blood Flow

During an mTBI, Potassium ions exit the neuron, while Calcium ions rush into the cell. When the Calcium enters, it causes the blood vessels to constrict. This results in decreased blood supply to the brain. This diminished cerebral blood flow causes decreased energy within the brain.

Decreased Energy Production

The resulting chemical imbalance after an mTBI can also cause damage to the energy-producing center of the brain cells' mitochondria. This means even less energy is available to your brain.

Increased Energy Demand

In addition to less available energy for the brain, an injured brain needs more energy than normal to heal. Your brain, eager to repair itself, will prioritize all energy towards recovery which means you have less energy available for daily life, activities, and thinking.

This energy crisis means what used to be normal sensory input in daily life (sounds, bright lights, etc) thinking, problem-solving, and emotional situations, now all feel much more overwhelming and out of control.

To explain this to someone who hasn't experienced a mTBI before, think of it as not sleeping for a full week, having a cold, starting the first day of a new job, and having 40 house guests all at the same time. With so many demands on the brain, everything feels extremely overwhelming.

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Concussion Cascade

A Metabolic Stress Response

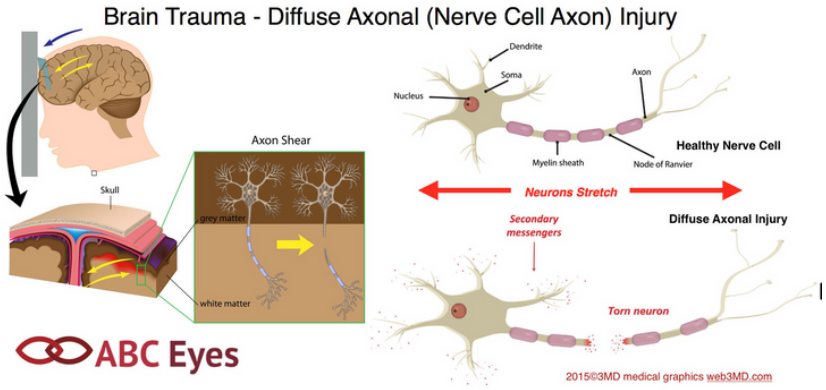
After a concussion or brain injury, the brain may respond by interpreting certain triggers (increased heart rate, cognitive challenges, and anxiety) as danger or stress, and those triggers can cause negative metabolic reactions in the brain. This is also called a concussion cascade. It's the feeling you get after a concussion that causes you to need to rest or sleep. It is the "brain fog" and low energy that follows a particularly busy or challenging day when recovering.

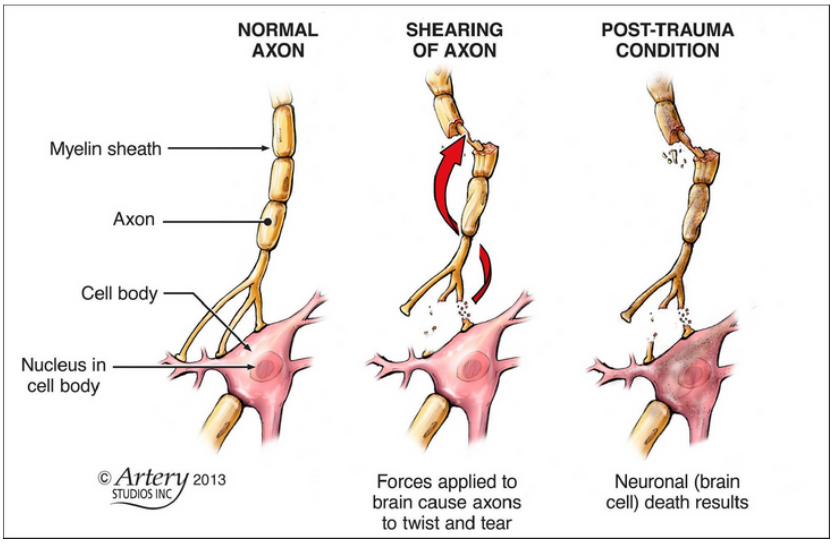
Some studies show that the brain, in response to the added stress, continues to release potassium, causing a rush of calcium to enter the brain and a metabolic chain reaction. This chain reaction interferes with the function of the neurons as well.

At Galaxy, we have found that following a protocol that limits the amount of time spent participating in activities that may elicit a stress response may be key to the brain being able to heal.

KNOWLEDGE IS POWER.

Learning how to identify your symptoms and activities that can trigger a concussion cascade, will help you to better protect yourself and give your brain the time and space it needs to heal, while still challenging it to regain function. This is a great balancing act and requires trained professionals to help guide you on your way to recovery.





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Concussion Cascade Triggers

There are 3 things that can trigger metabolic changes in the brain following a brain injury:

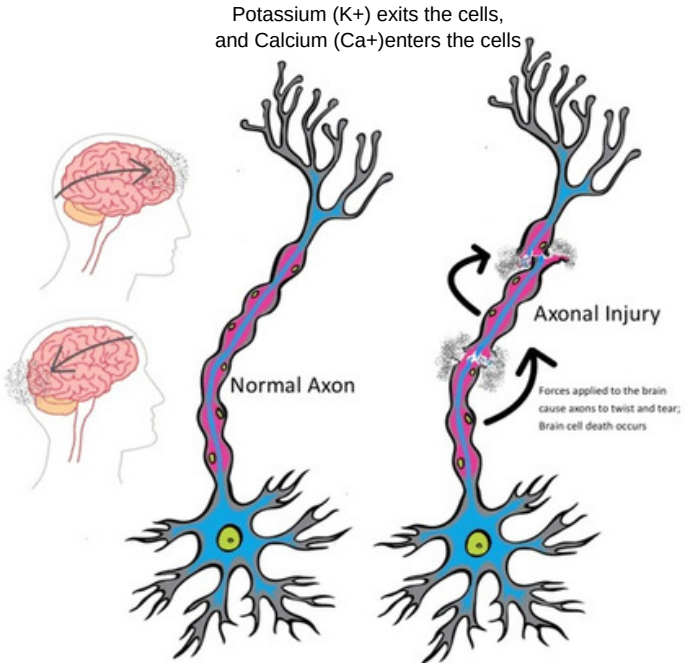
Anxiety- Fight or Flight Response:
Internal anxiety (worrying about your memory, abilities, sensory overstimulation, masking your deficits, etc.) can contribute to triggering a stress response that may harm your brain health. Learning your personal triggers for anxiety and working with your therapist on a "**just right challenge**" will decrease your risk of triggering a concussion cascade. The goal of therapy is to decrease your overall anxiety while safely building your tolerance for activities.

Heart Rate- Know Your Healthy Range for Recovery:
For some people, exercise can trigger an increase in their concussion symptoms. Working with a therapist to determine the ideal heart rate zone for the activity will help you to gradually increase your physical activity while avoiding a concussion cascade.

Cognitive Load (Almost All Activities):
Cognitive load refers to tasks that make your brain think. This includes school, work, problem-solving, watching TV, social media, caring for children, having a conversation, paying the bills, etc. During initial recovery, limit your cognitive load to 1 hour a day. Over time as symptoms decrease, time spent doing cognitive tasks can increase. If you **"push through"** a task, and then feel like your symptoms have gotten worse the next day, it is likely the cognitive challenge was too much, and pushing through caused a metabolic stress response in your brain. Work with your therapist to determine the right type and the right amount of activity.

Symptoms to Monitor:

Headaches
Nausea
Dizziness
Balance problems
Mental Fog/ Fatigue
Light Sensitivity



mTBI Symptom Checklist

Identifying your symptoms and monitoring those symptoms is the first step in taking control after a mTBI. Circle all of the symptoms that you experience.

PHYSICAL SYMPTOMS:

- ★ headaches
- ★ nausea or vomiting
- ★ fatigue or drowsiness
- ★ balance problems/unsteady gait
- initial feeling of being dazed or confused
- dizziness
- dizziness when looking up/down
- dizziness when rolling in bed
- difficulty talking
- motion sickness
- difficulty sleeping
- sexual dysfunction/changes

Cognitive Symptoms:

- ★ brain feels foggy and tired
- difficulty knowing how to start a task
- difficulty with problem-solving
- difficulty multitasking
- difficulty planning your day
- difficulty remembering
- difficulty with decision-making
- difficulty with time management
- memory problems
- difficulty concentrating

COMMUNICATION PROBLEMS:

- ★ difficulty understanding conversations
- difficulty speaking or writing
- inability to organize thoughts & ideas
- difficulty understanding written words
- anxiety with conversations
- difficulty following stories

VISUAL SYMPTOMS:

- ★ eye fatiuge/difficulty with eye tracking
- ★ feel overwhelmed with lots of visual input (riding in a car, grocery store, etc)
- lights feel too bright (especially fluorescent lights)
- difficulty scanning to find items
- difficulty with reading- words may "jump" on a page
- difficulty with depth perception
- feel overwhelmed when using the computer

AUDITORY SYMPTOMS:

- ★ sounds are overwhelming
- hear everything and unable to focus on the important sounds
- hard to follow conversations
- unable to tune out background noise
- family gatherings, church, ball games, and crowded places are overstimulating
- shut down/become flooded when people talk too loudly
- everything sounds extremely loud
- ringing in the ears (tinnitus)

EMOTIONAL SYMPTOMS:

- ★ overwhelmed/anxiety/heart racing
- mood changes/mood swings
- depression
- social avoidance
- lack of empathy for others
- irritability

★ Starred items are the most common symptoms and are the ideal symptoms to track for monitoring/management (next page)

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The 3 Batteries of Energy After a Brain Injury

The goal is to only use your 24 hour battery!

Recharge Time = 24 Hours

Your goal is to only perform tasks that will allow you to wake up the next day with a reasonable amount of energy and mental clarity.

Only using energy from battery A will allow your brain sufficient energy for healing.

Recharge Time = 2-3 Days

Battery B is a protective battery for you. It allows you to push through when you can't avoid it.

If you have to use this battery, allow yourself 2-3 days of limited activity to recover.

Recharge Time = Up to 2 Weeks

This battery should only be used in extreme circumstances. When you use battery C you will feel like you have had a major setback in your recovery.

In the extreme circumstance where you have to dip into battery C, allow yourself up to two weeks of extra rest to reover.

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Elliot, C. (2015) *The Ghost Inside My Brain: How a Concussion Stole My Life and How the New Science of Brain Plasticity Helped Me Get It Back*

Monitor Your Symptoms

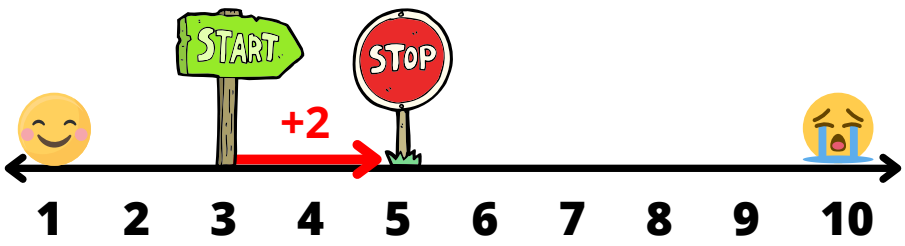
Now that you have identified your symptoms, you will want to **identify the top 1-3 symptoms to monitor that impact you the most when you are fatigued.**

(Tip: Choose ★ starred items from the previous page from different categories.)

1. _____
2. _____
3. _____

A good guide for monitoring your symptoms is to rate them on a 1-10 scale. 1 meaning you feel great almost "normal" and 10 meaning you are completely overwhelmed and can't go on.

Your goal is to STOP AND REST when your symptoms have a change of 2 points for the first week. Any rapid increase in symptoms can trigger a metabolic stress response (chemical change) in your brain.



How often should you monitor these symptoms? Perform this check-in first thing in the morning and then hourly throughout the day (you can set an alarm for reminders!) If alarms feel too overwhelming, then perform the check-in first thing in the morning, at meal times, and before/after each task throughout the day.

Your goal is to have consistent self-check-ins to proactivity take rest breaks before becoming overly tired. (You are saving your energy for your brain to heal!)

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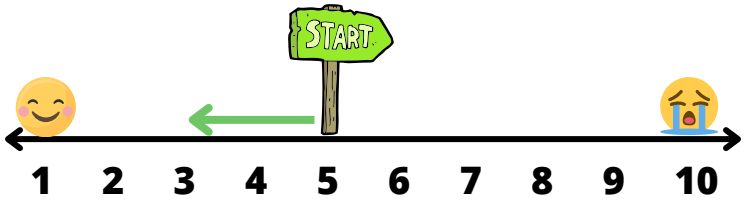
How to Rest



What does resting look like?! Rest will differ per person, level of fatigue, and situation. It is recommended to have a plan for how to rest when you are starting an activity or leaving the house. Do you need to set a timer to rest 20 minutes after starting an activity? Do you need to speak with your family about having a designated place to rest during an event? Having a plan for rest means you will be able to succeed and your brain will thank you!

Identify activities that are the most restorative for you by circling them.

HIGHLY RESTORATIVE:

- take a nap
- find a private room to relax
- deep breathing exercises
- relax in a bathtub
- sensory deprivation
  (remove yourself from sights & sounds)

MODERATELY RESTORATIVE:

- go for a walk
- guided meditation
- unplug from technology
- eat or drink
- listen to soothing music
- wear sunglasses/earplugs

If your rest has decreased your symptom rating, you can resume some activity. Using proactive rest breaks will eventually build your stamina for activities!

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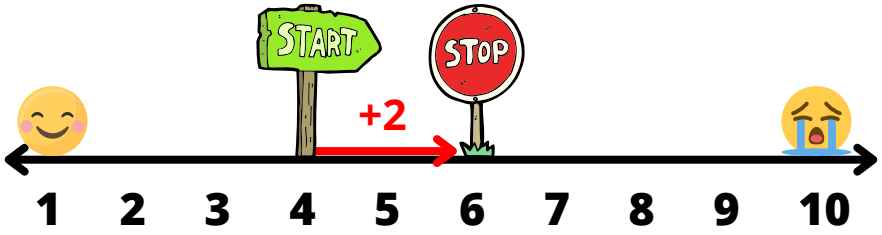
Week 1: Symptom Journal

This first week, you want to track your symptoms. Your goal is to:

1. learn your baseline (average) symptom/energy level when you wake up each day
2. limit the change in that symptom/energy level to 2 points
3. pay attention to how long it takes to recover after an activity

IMMEDIATELY STOP AND REST IF YOU HAVE A 2-POINT INCREASE IN YOUR SYMPTOMS



Activity or Time of Day	Before	During	After	Recovery Time

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Symptom Journal

What is your average symptom/energy level when you woke up last week: _____

What is your symptom/energy level this morning: _____

If this morning's symptom number is the same as your average number from last week or lower, you can allow your symptoms to increase 3-4 points before stopping to rest. (Today is a "good" symptom day.)

If your morning symptom number is higher than your average number from last week then limit your symptom number increase to 2-3 points. (Today is a "bad" symptom day)

Activity or Time of Day	Before	During	After	Recovery Time
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

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Identify Strategies

Many of your symptoms and triggers may have remediation exercises or compensatory strategies that your therapist can teach you. Make a list of the symptoms that impact your life the most to discuss with your therapist.

Symptoms/Triggers	Therapist Recommended Strategies
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Notes:

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How to Increase Endurance

Now that you know how to monitor your symptoms and take proactive rest breaks, you can gradually start to increase your tolerance for activities. While your number one goal is to stay within your battery A and to be able to rest and recover from activities in under 24 hours, ultimately your goal is to get back to life! Here are some strategies you can use to increase your activity tolerance.

Prioritize and let go! During this time you can't do everything so prioritize the things that are important to you! There might be times you have to ask others for help.

Learn when you have your "good time" of the day and plan the most important activities for that time. Many people find that the morning, especially between 9 am and noon, is the time with the most energy and mental clarity. Plan out your days so you can complete priority tasks during that time!

Use sensory blocking tools on a limited basis to give yourself more tolerance for challenging activities. If you are sound sensitive, you can purchase ear plugs to wear if you really need to attend a family gathering. If you have light sensitivity, you can wear a hat or sunglasses to a store. Remember to use these tools selectively. Overuse of these tools can increase your sensitivity due to the lack of exposure to auditory and visual sensations.

Take proactive rests to prepare for events. For important appointments or events, you might need to take a few hours rest before or even a full day of rest before going. Resting before a big event allows you to recharge your brain battery for optimal performance.

Use organization to save brain energy! Organization is one of the best ways to conserve your brain energy! Organization allows you to rely less on memory and in-the-moment problem-solving.

- Use a planner to organize and prioritize your day
- Plan snacks and meals in advance
- Use alarms for reminders and lists to help you remember
- Organize your closet/cabinets with labels so you can locate things easily
- Plan and layout your outfits for a day

Advocate for yourself and ask for help! You can't do everything and still give your brain the time to recover. Reach out to family and friends for assistance with overwhelming tasks!

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Goal. Plan. Do. Review.

Goal:

What do I want to accomplish: _____

Why do I want to do this: _____

Plan:

Materials/Equipment

1. _____
2. _____
3. _____

Steps/Tasks

1. _____
2. _____
3. _____

Prediction:

How well will I do? How much will I get done?

Self rating: 1 2 3 4 5 6 7 8 9 10

Do:

What problems might arise?

1. _____
2. _____
3. _____

Formulate solutions!

1. _____
2. _____
3. _____

Review:

How did I do?

Self rating: 1 2 3 4 5 6 7 8 9 10

What worked?

1. _____
2. _____
3. _____

What didn't work?

1. _____
2. _____
3. _____

What will I try differently next time?_____

_____

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