

Traumatic Brain Injury Recovery Protocol

Clinical Protocol to Support Brain Health and Function*



Traumatic brain injury (TBI) results from a physical or penetrating head injury that disrupts normal brain functioning.^{1,2} TBI is a leading cause of death and long-term disability worldwide across all ages.³ TBI is classified as mild, moderate, or severe.² Mild TBI, also known as a concussion, accounts for 80% of TBI cases.^{1,2} The neurological consequences of TBI depend on injury severity, location, frequency, sex, age, genetics, and individual comorbidities.⁴ TBI symptoms can include coma, cognitive impairment, behavioral issues, headaches, dizziness, and neuropsychiatric symptoms that may persist for months or years after the event.^{1,5}

TBI disrupts the homeostatic volume of intracranial compartments in the skull, resulting in a cascade of compensatory mechanisms, such as swelling and changes in cerebral blood flow.⁶ Primary and secondary injuries to the central nervous system and blood-brain barrier occur.^{5,6} Primary injuries relate directly to the injury and are acute and largely irreversible.⁵ Secondary injuries may develop over hours to years, involving excitotoxicity, mitochondrial dysfunction, oxidative stress, lipid peroxidation, neuroinflammation, axon degeneration, and apoptotic cell death.^{5,6}

Therapeutic interventions may potentially attenuate secondary injuries.⁵ Improper treatment of secondary injuries may result in secondary insults, such as hypotension, seizures, or edema.³ TBI treatment is complex, will vary widely and must be adjusted based on the nature and severity of the case.² Complete recovery may take weeks, months, or years.¹

This clinical protocol is designed to help support TBI recovery through lifestyle techniques, diet, and specific nutrients shown to promote brain health and function.*

Diagnostic Biomarkers and Clinical Indicators of Traumatic Brain Injury

- Detailed neurological exam by the trauma or emergency room staff to determine severity, including but not limited to evaluating the level of consciousness, altered mental status, post-traumatic amnesia, and Glasgow coma scale.^{1,6}
- Neuroimaging (CT, MRI, DTI, SPECT) and neuromonitoring to measure anatomical or physiological parameters.¹
- Glial fibrillary acidic protein and ubiquitin C-terminal hydrolase (UCH-L 1) biomarkers to assess astrocyte and neuronal damage.^{1,7}

Therapeutic Diet and Nutritional Considerations

- Advise patients to consume anti-inflammatory, antioxidant-rich foods and health-promoting nutrients, such as protein,⁸ curcumin,^{8,9} omega-3-fats,^{7,10-13} magnesium,⁸ and vitamin D.^{7,8,12,14} TBI is associated with an overproduction of oxidative stress and inflammation.^{3,13}
- Encourage dietary intake of probiotics (such as yogurt, kefir, and miso), prebiotics (such as garlic and onion), and dietary fiber (such as fruits and vegetables) to support the gut. TBI disrupts the gut-brain axis and is associated with developing intestinal barrier dysfunction and an gut dysbiosis after the injury.^{4,11,15,16}
- Consider education on healthy dietary and nutritional needs. TBI patients may have feeding intolerance, decreased body weight, or transient loss of appetite.^{7,17}

Lifestyle Interventions

- Educate patients to routinely visit their specialized health-care team and rehabilitation treatment centers due to the multidisciplinary nature of brain injuries.¹⁸
- Recommend physical therapy, occupational therapy, massage therapy, or personalized exercise programs to patients. TBI puts individuals at an elevated risk of disability, physical pain, or inactivity.¹⁹
- Encourage psychotherapy and long-term support groups to offer support and education in the treatment of TBI. Supportive caregivers and family members have been shown to promote recovery in TBI patients.¹⁸
- Provide information on healthy sleep habits with suggestions on how to improve sleep quality and duration. Insomnia, difficulty falling asleep, and frequent awakening are common after TBI.¹



Supplement Protocol

Primary Support:



GPC Liquid

Dose	2 dropperfuls 2 times daily	Duration	Ongoing as needed
Formula Highlights	GPC, or glycerophosphocholine, is a supportive nutrient for the brain, kidneys, muscles, testes, and other organs, and it is a building block for cell membrane phospholipids.* Without the presence of this nutrient in the brain, individuals could not think, sleep, or remember. GPC Liquid is a good choice when higher doses of GPC are desired, and the dropper is calibrated to allow for easy titration. GPC has a naturally delicious, sweet taste on its own, so no additional sweeteners were added to this product. GPC Liquid may be clinically beneficial for brain health.*		

Brain Vitale™

Dose	2 capsules twice daily	Duration	Ongoing as needed
Formula Highlights	Brain Vitale™ is a unique formulation designed to optimize brain function and support healthy cognition, mood, and memory.* It contains a comprehensive array of brain-supportive nutrients, including acetyl-L-carnitine, L-alpha-glycerolphosphorylcholine, phosphatidylserine, Ginkgo biloba (standardized to contain 24% ginkgo flavonglycosides and 5.4% terpene lactones), and citicoline. Also included is a unique coffee fruit concentrate extracted from the whole coffee cherry, including the flesh of the berry that surrounds the coffee bean and contains several distinctive compounds not found in the coffee beans themselves. Brain Vitale™ provides building blocks for brain phospholipids, crucial structural components of the synapses of neurons, and it is formulated to help assist with various aspects of brain health, such as cell energy production, mitochondrial support, and antioxidant protection.* Brain Vitale™ may support healthy brain function.*		

OmegaAvail™ Hi-Po Liquid

Dose	1 tsp 2 to 3 times daily with meals	Duration	Ongoing as needed
Formula Highlights	OmegAvail™ Hi-Po Liquid is our highest concentration omega-3 fatty acid formula in liquid form, providing 1,500 mg eicosapentaenoic acid (EPA) and 1,500 mg docosahexaenoic acid (DHA) per 1-teaspoon serving in a 1:1 ratio. This formula is optimal for long-term supplementation to support the foundational needs of omega-3. A balanced 1-to-1 ratio of EPA to DHA is similar to that found naturally in seafood. Omega 3 fatty acids may be clinically relevant by promoting brain development and function and may potentially help to attenuate the effects of oxidative stress.*		

NeuroMag™

Dose	3 to 6 capsules per day	Duration	Ongoing as needed
Formula Highlights	NeuroMag™ features the unique, patented, chelated mineral Magtein® that contains magnesium that is chelated to threonic acid (magnesium L-threonate). This highly bioavailable form of magnesium is formulated to promote brain concentrations of magnesium.* Magnesium L-threonate is an ionophore, which has the ability to transport magnesium ions across lipid membranes, including those of brain cells. Magtein® is superior to other forms of magnesium at entering through the blood-brain barrier.* NeuroMag™ may support cognitive function, memory, and overall brain health.*		

Curcum-Evail® 400

Dose	2 softgels daily with meals	Duration	Ongoing as needed
Formula Highlights	Curcum-Evail® is a highly bioavailable curcuminoid formulation containing three bioactive, extensively researched curcuminoids. Curcumin is derived from turmeric (<i>Curcuma longa</i>), which is used both medicinally and as a spice. Curcumin supports healthy metabolism, cellular function, and healthy cardiovascular and neurological functions. It also supports a healthy response to oxidative stress and a normal inflammatory response within the body.* Designs for Health's proprietary Evail™ emulsification technology is designed to enhance the bioavailability and absorption of bioactive ingredients. The Evail™ process uses a quillaja extract, along with delta- and gamma-tocotrienols and medium-chain triglycerides (MCTs) to support absorption.*		

Secondary Support:

Cannab-FS™ 600

Dose	2 mL daily	Duration	Ongoing as needed
Formula Highlights	Cannab-FS™ 600 is offered in a liquid form, infused in a base of organic, cold-pressed hemp seed oil. It also contains natural terpenes, aromatic compounds from the hemp plant that work synergistically with phytocannabinoids, which are the beneficial compounds naturally found in the aerial parts of hemp, complementing their health-promoting properties. Additional terpenes are also included for taste enhancement. In this product, 100% of the hemp flowers come from American farms grown under the Farm Bill. Contains <0.3% THC. Cannab-FS™ 600 provides 600 mg per bottle of full-spectrum phytocannabinoids and yields 20 mg of active phytocannabinoids per 1 mL serving (1 dropperful). Cannab-FS™ 600 may help promote neurological health and support normal pain responses.*		

For a list of references cited in this document, please visit:

<https://www.designsforhealth.com/api/library-assets/literature-reference---traumatic-brain-injury-recovery-support-protocol-references>

Dosing recommendations are given for typical use based on an average 150 pound healthy adult. Health-care practitioners are encouraged to use clinical judgement with case-specific dosing based on intended goals, subject body weight, medical history, and concomitant medication and supplement usage. Any product containing botanical substances has the potential for causing individual sensitivities, appropriate monitoring, including liver function tests (LFT) is recommended.

For considerations regarding herb-drug and nutrient-drug interactions, please refer to reliable, evidence-based resources such as the Natural Medicine Database or Stargrove MB, Treasure J, McKee DL. *Herb, Nutrient, and Drug Interactions: Clinical Implications and Therapeutic Strategies*. St. Louis, MO: Mosby-Elsevier; 2008.

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*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.