HEALTHCARE PROVIDERS TOOLKIT REFERENCE INFORMATION

USE THE LINKS BELOW TO VIEW A SPECIFIC RESOURCE

Concussion Management Protocol Recommendation – 2 visit minimum concussion protocol with information on management, patient education, referrals, and ongoing monitoring

Link to The Guideline: Center for Disease Prevention and Control Guideline on the Diagnosis and Management of Mild Traumatic Brain Injury in Children, Jama Pediatrics online September 2018 and CDC's 5 Key Recommendations from the Guideline

CDC Mild Traumatic Brain Injury Guidelines for Adults, to help improve diagnosis, treatment, and outcomes for adults with mild TBI

CDC mTBI Pediatric Guideline Supplemental Documents

CDC Diagnosis Recommendations at a Glance – an overview of all the diagnostic recommendations from the pediatric guideline

CDC Prognostic Recommendations at a Glance – an overview of all of the prognostic recommendations from the pediatric guideline

CDC Management and Treatment at a Glance – an overview of the management and treatment recommendations from the pediatric guideline

CDC Pediatric mTBI Guideline Checklist - checklist of best mTBI practice in pediatrics

American Congress of Rehabilitation Medicine (ACRM) Tip Card - When Your Patient is Living with Brain Injury

TN Return to Learn / Return to Play: Concussion Management Guidelines – good information about TN sports concussion law, steps to return a child to the classroom and steps for gradual return to play

Brain Links Flyer – given to families to call Brain Links to request a training at their child's school. Also use Brain Links additional resources

Sample 504/IEP Accommodations and Modifications in the Classroom for a Student with Traumatic Brain Injury – from cbirt.org. See also tnstep.org for TN Special education assistance for families

Job Accommodations Network Flyer – flyer for information on help for work accommodations. Also here is a link to a document for brain injury – specific accommodations: https://askjan.org/publications/Disability-Downloads.cfm?publid=226605

Six Types of Concussion Infographic and Fact Sheet

CDC Online Training for Healthcare Providers - Earn free CME, CNE, and CEU credits

Research Summary and References



CONCUSSION MANAGEMENT PROTOCOL

RECOMMENDATION: 2 VISIT MINIMUM

INITIAL VISIT

SYMPTOM EVALUATION AND PATIENT EDUCATION:

- ACE Acute Concussion Evaluation (Physician/Clinician Office version)
- * A Symptom Scale (Age-appropriate version)
- * A Symptom Scale (Parent/Adult Patient fill out in office)
- A Symptom Scale (Parent/Adult Patient take home)
- * ACE Care Plan (Return to school or work version)
- * CDC Return to School Letter
- When Concussion Symptoms Aren't Going Away (Age-appropriate version)
- Any other educational materials or symptom tracker as needed

Send home an additional parent or adult version of a symptom scale to track symptoms over the next 4 weeks. This helps to understand what symptoms/behaviors to look for. Send home a letter to the school or work with recommendations. Research indicates that supports are more likely to be implemented if recommended by the healthcare professional.

With concussion diagnosis, recommend follow up visit in 4 weeks **if any symptoms or any new behaviors** since injury are present. Bring completed form to next visit.

4 WEEK POST INJURY VISIT

IF SYMPTOMS PERSIST OR NEW BEHAVIORS ARE PRESENT, CONSIDER THE FOLLOWING REFERRALS:

- * A specialized concussion treatment center
- ж А neurologist
- * A symptom-specific specialist (e.g. neuro-ophthalmologist)
- 💥 A brain trauma rehabilitation center

- * A neuropsychological evaluation
- * TEIS (if child is under 3 years old)
- * School district (3-5 years old)
- * School (5 years and over)

Note: Schools may not provide all the treatments needed. Research indicates that supports are more likely to be implemented if recommended by the healthcare professional.

YEARLY CHECK-UPS

ASK ABOUT:

* Any residual concussion symptoms

Any changes in school or work performance





https://www.tndisability.org/brain





Brain Links is supported by the Administration for Community Living (ACL) of the U.S. Department of Health and Human Services under Grant No. 90TBSG0024-01-00 and in part by the TN Department of Health, Traumatic Brain Injury Program.

CENTERS FOR DISEASE CONTROL AND PREVENTION GUIDELINE ON THE DIAGNOSIS AND MANAGEMENT OF MILD TRAUMATIC BRAIN INJURY AMONG CHILDREN

FULL REPORT

* https://jamanetwork.com/journals/jamapediatrics/article-abstract/2698456

Offering 19 sets of clinical recommendations that cover diagnosis, prognosis, and management and treatment, the CDC Pediatric mTBI Guideline is applicable to healthcare providers in all practice settings. The CDC Pediatric mTBI Guideline outlines specific actions healthcare providers can take to help young patients and their parents/caregivers, including five key practice-changing recommendations.

5 KEY RECOMMENDATIONS

- 1. Do not routinely image pediatric patients to diagnose mTBI.
- 2. Use validated, age-appropriate symptom scales to diagnose mTBI.
- 3. Assess for risk factors for prolonged recovery, including history of mTBI or other brain injury, severe symptom presentation immediately after the injury, and personal characteristics and family history (such as learning difficulties and family and social stressors.)
- 4. Provide patients and their parents/caregivers with instructions on returning to activity customized to their symptoms.
- 5. Counsel patients and their parents/caregivers to return gradually to non-sports activities after no more than a 2-3 days of rest.











Brain Links is supported by the Administration for Community Living (ACL) of the U.S. Department of Health and Human Services under Grant No. 90TBSG0024-01-00 and in part by the TN Department of Health, Traumatic Brain Injury Program.

Heads Up to Clinicians:



A part of CDC's "Heads Up" Series

This Guideline is based on the 2008 Mild TBI Clinical Policy for adults, which revises the previous 2002 Clinical Policy. To help improve diagnosis, treatment, and outcomes for patients with mild TBI, it is critical that you become familiar with this guideline. The guideline is especially important for clinicians working in hospital-based emergency care.

Inclusion Criteria: This guideline is intended for patients with non-penetrating trauma to the head who present to the ED within 24 hours of injury, who have a Glascow Coma Scale (GCS) score of 14 or 15 on initial evaluation in the ED, and are \geq 16 years old.

Exclusion Criteria: This guideline is not intended for patients with penetrating trauma or multisystem trauma who have a GCS score of < 14 on initial evaluation in the ED and are < 16 years old.

Please turn over.

What You Need to Know:

This guideline provides recommendations for determining which patients with a known or suspected mild TBI require a head CT and which may be safely discharged.

Here are a few important points to note:

- → There is no evidence to recommend the use of a head MRI over a CT in acute evaluation.
- → A noncontrast head CT is indicated in head trauma patients with loss of consciousness or posttraumatic amnesia in presence of specific symptoms.
- → A noncontrast head CT should be considered for head trauma patients with no loss of consciousness or posttraumatic amnesia in presence of specific symptoms.
- → Even without a loss of consciousness or amnesia, a patient could still have an intracranial injury. Identifying those patients at risk is key.
- → A patient with an isolated mild TBI and a negative CT is at minimal risk for developing an intracranial lesion and may be safely discharged.

- Discuss discharge instructions with patients and give them a discharge instruction sheet to take home and share with their family and/or caregiver. Be sure to:
 - Alert patients to look for postconcussive symptoms (physical, cognitive, emotional, and sleep) since onset of symptoms may not occur until days after the initial injury.
 - Instruct patients on what to expect, what to watch for, and when it is important to return immediately to the emergency department.
 - Emphasize that getting plenty of rest and sleep is very important after a concussion, as it helps the brain to heal. Patients should gradually return to their usual routine only after they start to feel better.
 - Inform patients to visit CDC's website at www.cdc.gov/ Concussion.



The Four Critical Questions and Recommended Courses of Action:

Following are the four questions and the recommended course of action for each that are addressed in the 2008 Clinical Policy. Clinical findings and strength of recommendations regarding patient management were made according to the following criteria:

Level A recommendations: Generally accepted principles for patient management that reflect a high degree of clinical certainty.

Level B recommendations: Recommendations for patient management that may identify a particular strategy or range of management strategies that reflect moderate clinical certainty.

Level C recommendations: Other strategies for patient management that are based on preliminary, inconclusive, or conflicting evidence, or in the absence of any published literature, based on panel consensus.

1. Which patients with mild TBI should have a noncontrast head CT scan in the ED?

Level A recommendations: A noncontrast head CT is indicated in head trauma patients with loss of consciousness or posttraumatic amnesia only if one or more of the following is present: headache, vomiting, age > 60 years old, drug or alcohol intoxication, deficits in short-term memory, physical evidence of trauma above the clavicle, posttraumatic seizure, GCS score < 15, focal neurologic deficit, or coagulopathy.

Level B recommendations: A noncontrast head CT should be considered in head trauma patients with no loss of consciousness or posttraumatic amnesia if there is a focal neurologic deficit, vomiting, severe headache, \geq 65 years old, physical signs of a basilar skull fracture, GCS score < 15, coagulopathy, or a dangerous mechanism of injury.*

*Dangerous mechanism of injury includes ejection from a motor vehicle, a pedestrian struck, and a fall from a height of > 3 feet or 5 steps.

Level C recommendations: None specified.

2. Is there a role for head MRI over noncontrast CT in the ED evaluation of a patient with acute mild TBI?

Level A recommendations: None specified.

Level B recommendations: None specified.

Level C recommendations: None specified.

3. In patients with mild TBI, are brain-specific serum biomarkers predictive of an acute traumatic intracranial injury?

Level A recommendations: None specified.

Level B recommendations: None specified.

Level C recommendations: In mild TBI patients without significant extracranial injuries and a serum S-100B level < $0.1 \mu g/L$ measured within 4 hours of injury, consideration can be given to not performing a CT.**

**This test has not yet received Food and Drug Administration (FDA) approval for clinical use in the United States.

4. Can a patient with an isolated mild TBI and a normal neurologic evaluation result be safely discharged from the ED if a noncontrast head CT scan shows no evidence of intracranial injury?

Level A recommendations: None specified.

Level B recommendations: Patients with an isolated mild TBI who have a negative head CT scan result are at minimal risk for developing an intracranial lesion and therefore may be safely discharged from the ED.***

***There are inadequate data to include patients with a bleeding disorder, who are receiving anticoagulation therapy or antiplatelet therapy, or who have had a previous neurosurgical procedure in this population.

Level C recommendations: Patients with mild TBI discharged from the ED should be informed about postconcussive symptoms.

To view the full clinical policy or for more information about brain injury and concussion, please visit: www.cdc.gov/TraumaticBrainInjury • www.acep.org/TraumaticBrainInjury

This fact sheet is part of the Centers for Disease Control and Prevention's (CDC) "Heads Up" series of publications and is based on the 2008 Clinical Policy: Neuroimaging and Decisionmaking in Adult Mild Traumatic Brain Injury in the Acute Setting, jointly produced by CDC and ACEP.

CDC PEDIATRIC MTBI GUIDELINE Diagnostic Recommendations



This handout for healthcare providers describes diagnosis-related recommendations contained in the CDC Pediatric mTBI Guideline.



GOAL OF THE CDC mTBI GUIDELINE

The goal of the CDC Pediatric Mild Traumatic Brain Injury (mTBI) Guideline is to help healthcare providers take action to improve the health of their pediatric patients with mTBI. To do this, the Guideline consists of 19 clinical recommendations that cover diagnosis, prognosis, and management and treatment. These recommendations are applicable to healthcare providers working in: inpatient, emergency, primary, and outpatient care settings.

The Guideline was developed through a rigorous process guided by the American Academy of Neurology methodology and 2010 National Academy of Sciences methodology for the development of evidence-based guidelines. An extensive review of scientific literature, spanning 25 years of research, formed the basis of the Guideline.

mTBI in children

Childrens' developing brains are more vulnerable to mTBI because:



Their axons are not as well-myelinated.



They are more susceptible to chemical and metabolic changes.

RECOMMENDATIONS FOR THE DIAGNOSIS OF mTBI

Six sets of diagnostic recommendations are included in the Guideline. These recommendations focus on:



Neuroimaging



Neuropsychological tools



Serum Biomarkers



NEUROIMAGING

Computed Tomography (CT)

Clinical evaluation of a child with possible mTBI includes balancing the likelihood of potentially devastating complications of a more severe injury against the risks associated with a head CT.

- Healthcare providers **should not** routinely obtain a head CT for diagnostic purposes in children with mTBI.
- Healthcare providers **should** use validated clinical decision rules to identify children with mTBI at low risk for intracranial injury (ICI), in whom a head CT is not indicated, as well as children who may be at higher risk for clinically important ICI, and therefore may warrant a head CT. Existing decision rules combine a variety of factors that, when assessed together, may increase the risk for more serious injury. Such risk factors include the following:
 - Age < 2 years old
 - Loss of consciousness
 - Severe mechanism of injury
 - Vomitina
 - Amnesia
- Clinical suspicion for skull fracture
- Severe or worsening headache
- Nonfrontal scalp hematoma
- Glasgow Coma Score < 15
- For children diagnosed with mTBI, healthcare providers **should** discuss the risk of a pediatric head CT in the context of risk factors for ICI with the patient and his/her family.



USE VALIDATED CLINICAL DECISION RULES TO IDENTIFY ICI

It is critical to rule out ICI while avoiding unnecessary risks related to exposure from a head CT. Strong clinical evidence indicates that use of clinical decision rules are effective in identifying children at low risk for ICI.

Magnetic Resonance Imaging (MRI)

There is currently insufficient evidence to recommend the use of brain MRI in the diagnosis of mTBI in children.

• Healthcare providers **should not** routinely use MRI in the acute evaluation of cases of suspected or diagnosed mTBI.

Single Photon Emission Computed Tomography (SPECT)

Insufficient evidence currently exists to recommend the use of SPECT in the diagnosis of mTBI in children.

• Healthcare providers **should not** use SPECT in the acute evaluation of cases of suspected or diagnosed mTBI.

Skull X-rays

CT is better at detecting intracranial injuries, and in the instances where CT is not available, validated clinical decision rules are better than skull X-rays when screening patients with increased risk for ICI.

- Skull X-rays should not be used in the diagnosis of pediatric mTBI.
- Skull X-rays **should not** be used in the screening for ICI.

CDC PEDIATRIC MTBI GUIDELINE Diagnostic Recommendations



EXAMPLES OF VALIDATED SCALES INCLUDE, BUT AREN'T LIMITED TO:

- Post-Concussion Symptom Scale
- Health and Behavior Inventory
- Post-Concussion Symptom Inventory
- Acute Concussion Evaluation

NEUROPSYCHOLOGICAL TOOLS

Symptom Scales

There are several validated tools that can be applied quickly and inexpensively.

 Healthcare providers **should** use an age-appropriate, validated symptom rating scale as a component of the diagnostic evaluation in children presenting with acute mTBI.

Computerized Cognitive Testing

There is insufficient evidence to determine whether baseline testing in children better identifies mTBI as compared to postinjury scores alone.

• Healthcare providers **may** use validated, ageappropriate computerized cognitive testing in the acute period of injury as a component of the diagnosis of mTBI.

Standardized Assessment of Concussion (SAC)

There is insufficient evidence to support the use of the SAC in the diagnosis of children with mTBI.

SERUM BIOMARKERS

Serum Biomarkers

There is insufficient evidence to currently recommend any of the studied biomarkers for the diagnosis of mTBI in children.

• Healthcare providers **should not** perform these tests outside of a research setting at this time for the diagnosis of children with mTBI.



Take action to improve the health of your young patients with mTBI.

To view all 19 sets of recommendations, including those that cover prognosis and management/treatment, and to learn more about the CDC Pediatric mTBI Guideline, visit **www.cdc.gov/HEADSUP**.



CDC PEDIATRIC MTBI GUIDELINE **Prognostic Recommendations**



This handout for healthcare providers describes prognosis-related recommendations contained in the CDC Pediatric mTBI Guideline.



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The goal of the CDC Pediatric Mild Traumatic Brain Injury (mTBI) Guideline is to help healthcare providers take action to improve the health of their pediatric patients with mTBI. To do this, the Guideline consists of 19 clinical recommendations that cover diagnosis, prognosis, and management and treatment. These recommendations are applicable to healthcare providers working in: inpatient, emergency, primary, and outpatient care settings.

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mTBI in children

Symptoms of mTBI generally fall into four categories:

Somatic
 Cognitive
 Mood/Affective
 Sleep

Symptom resolution:



Experience symptoms one month post-injury



Experience symptoms

three months post-injury

5%

Experience symptoms one year post-injury

RECOMMENDATIONS FOR THE PROGNOSIS OF mTBI

Five sets of prognostic recommendations are included in the Guideline. These recommendations focus on:



Counseling patients on prognosis



Evaluating for premorbid conditions



Assessing for risk factors



Use of tools for predicting prognosis



Interventions for poor prognosis



CDC PEDIATRIC MTBI GUIDELINE Prognostic Recommendations

GENERAL HEALTHCARE PROVIDER COUNSELING OF PROGNOSIS

Evidence suggests education and clear communication from healthcare providers can optimize outcomes.

- Healthcare providers **should** counsel patients and families that the large majority (70-80%) of children with mTBI do not show significant difficulties that last more than 1-3 months post-injury.
- Healthcare providers **should** counsel patients and families that although some factors predict an increased or decreased risk for prolonged symptoms, each child's recovery from mTBI is unique and will follow its own trajectory.



PROGNOSIS RELATED TO PREMORBID CONDITIONS

There is an increased risk of delayed recovery or prolonged symptoms associated with certain premorbid conditions in children with mTBI.

- Healthcare providers **should** assess the premorbid history of children either prior to an injury, as a part of pre-participation athletic examinations, or as soon as possible post-injury in children with mTBI, to assist in determining prognosis.
- Healthcare providers **should** counsel children and families completing pre-participation athletic examinations, and children with mTBI and their families, that recovery from mTBI might be delayed in those with:
 - Premorbid histories of mTBI
 - Lower cognitive ability (for children with an intracranial lesion)
- Learning difficulties
- Increased pre-injury symptoms (such as headache disorders)
- Neurological or psychiatric disorder
- Family and social stressors

ASSESSMENT OF CUMULATIVE RISK FACTORS AND PROGNOSIS

Evidence indicates that a variety of demographic and injury-related factors predict outcomes in pediatric mTBI.

- Healthcare providers **should** screen for a variety of known risk factors for persistent symptoms in children with mTBI.
- Healthcare providers may use validated prediction rules, which combine information about multiple risk factors for persistent symptoms, to provide prognostic counseling to children with mTBI evaluated in emergency department settings.

FACTORS ASSOCIATED WITH POOR PROGNOSIS:

- Older children or adolescents
- Children of Hispanic ethnicity
- Children from a lower socioeconomic status
- Children with more severe presentations of mTBI (including those associated with an intracranial injury)
- Children who report a higher level of acute postconcussion symptoms
- Children with a neurological or psychiatric disorder
- Children with learning difficulties
- Children with family and social stressors

CDC PEDIATRIC MTBI GUIDELINE Prognostic Recommendations



ASSESSMENT TOOLS AND PROGNOSIS

Healthcare providers can more effectively counsel patients with mTBI when they have assessed risk factors for outcomes and recovery. However, there is no single assessment tool to predict outcomes.

- Healthcare providers **should** use a combination of tools to assess recovery in children with mTBI.
- Healthcare providers should use validated symptom scales to assess recovery in children with mTBI.
- Healthcare providers **may** use validated cognitive testing (including measures of reaction time) to assess recovery in children with mTBI.
- Healthcare providers may use balance testing to assess recovery in adolescent athletes with mTBI.



INTERVENTIONS FOR mTBI WITH POOR PROGNOSIS

While most symptoms of mTBI resolve within 1-3 months, some children are at risk for persistent symptoms or delayed recovery. Children who are at higher risk for delayed recovery are more likely to need further intervention.

- Healthcare providers **should** monitor children with mTBI who are determined to be at high risk for persistent symptoms based on premorbid history, demographics, or injury characteristics.
- For children with mTBI whose symptoms do not resolve as expected with standard care (i.e., after 4-6 weeks), healthcare providers **should** provide or refer for appropriate assessments or interventions.

> Take action to improve the health of your young patients with mTBI.

To view all 19 sets of recommendations, including those that cover diagnosis and management and treatment, and to learn more about the CDC Pediatric mTBI Guideline, visit **www.cdc.gov/HEADSUP**.





This handout for healthcare providers provides an overview of the management and treatment-related recommendations contained in the CDC Pediatric mTBI Guideline.



GOAL OF THE CDC mTBI GUIDELINE

The goal of the CDC Pediatric Mild Traumatic Brain Injury (mTBI) Guideline is to help healthcare providers take action to improve the health of their pediatric patients with mTBI. To do this, the Guideline consists of 19 clinical recommendations that cover diagnosis, prognosis, and management and treatment. These recommendations are applicable to healthcare providers working in: inpatient, emergency, primary, and outpatient care settings.

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mTBI in children

While most have a good recovery, some children experience both acute and long-term problems that affect them:

Cognitively



Physically



Psychologically

RECOMMENDATIONS FOR TREATMENT AND MANAGEMENT OF mTBI

Eight sets of management and treatment recommendations are included in the Guideline. These recommendations focus on:



General areas of treatment for patients and families



Symptom and problem-specific treatments





Counsel patients to return gradually to non-sports activities after no more than 2-3 days of rest.

GENERAL AREAS OF TREATMENT FOR PATIENTS AND FAMILIES

Health outcomes can generally be optimized through patient education and behavior modification. In addition, evidence suggests that rest, or reduction in cognitive and physical activity, is beneficial immediately following mTBI. This should be followed shortly after the injury with a gradual return to activity.

Patient and Family Education and Reassurance

- In providing education and reassurance to the family, the healthcare provider **should** include the following information:
 - Warning signs indicating a more serious injury
 - Expected course of symptoms and recovery
 - Instructions on monitoring post-concussive symptoms
 - Prevention of further injury
 - Management of cognitive and physical activity, or rest
 - Instructions regarding return to school and return to play or recreation
 - Clear healthcare provider follow-up instructions from a healthcare provider

Cognitive and Physical Rest and Aerobic Treatment

Collaboration among healthcare providers, schools, and families should be coordinated to gradually adjust interventions and return the child to full participation without worsening symptoms.

- Healthcare providers **should** counsel patients to observe more restrictive physical and cognitive activity during the first several days following mTBI in children.
- Following these first several days, healthcare providers **should** counsel patients and families to resume a gradual schedule of activity that does not exacerbate symptoms, with close monitoring of symptom expression (number, severity).
- Following the successful resumption of a gradually increased schedule of activity, healthcare providers **should** offer an active rehabilitation program of progressive reintroduction of noncontact aerobic activity that does not exacerbate symptoms, with close monitoring of symptom expression (number, severity).
- Healthcare providers **should** counsel patients to return to full activity when they return to premorbid performance if they have remained symptom-free at rest, and with increasing levels of physical exertion.

Return to school and play plans can be found at www.cdc.gov/HEADSUP.

Psychosocial and Emotional Support

Evidence suggests that social support (both tangible help and emotional involvement) contributes to healthy behaviors, and improved overall quality of life.

 Healthcare providers may assess the extent and types of social support (e.g., emotional, informational, instrumental, appraisal) available for children with mTBI, and emphasize social support as a key element in the education of caregivers and educators.

Return to School

- To assist children returning to school following mTBI, medical and school-based teams **should** counsel the student and family regarding the process of gradually increasing the duration and intensity of academic activities as tolerated, with the goal of increasing participation without significantly exacerbating symptoms.
- Return to school protocols **should** be customized based on the severity of postconcussion symptoms in children with mTBI as determined jointly by medical and school-based teams.
- For any student with prolonged symptoms that interfere with academic performance, school-based teams **should** assess the educational needs of that student and determine the student's need for additional educational supports, including those described under pertinent federal statutes.
- Postconcussion symptoms and academic progress in school should be monitored collaboratively by the student, family, healthcare provider, and school teams, who jointly determine which modifications or accommodations are needed to maintain an academic workload without significantly exacerbating symptoms.
- The provision of educational supports **should** be monitored and adjusted on an ongoing basis by the school-based team until the student's academic performance has returned to pre-injury levels.
- For students who demonstrate prolonged symptoms and academic difficulties despite an active treatment approach, healthcare providers **should** refer the child for a formal evaluation by a specialist in pediatric mTBI.

70 - 80% of children with mTBI will demonstrate functional recovery by 1-3 months.



Healthcare providers should identify and tailor treatment plans/referrals to address:

- Acutely worsening headache: consider neuroimaging
- Chronic headache: nonopioid analgesia (monitor for overuse), multidisciplinary evaluation
- Vestibulo-ocular dysfunction: vestibular rehabilitation
- Worsening sleep problems: sleep hygiene, sleep specialist
- Cognitive impairment: treatment directed at etiology, neuropsychological evaluation
- Emotional dysfunction: psychotherapeutic evaluation and treatment

SYMPTOM OR PROBLEM-SPECIFIC TREATMENT AND MANAGEMENT

Post-traumatic Headache Treatment and Management

Painful headaches are one of the most common symptoms in children after mTBI and may require intervention.

- Healthcare providers in the emergency department should clinically observe and consider obtaining a head CT in children presenting with a severe and worsening headache, along with other symptoms or risk factors, following mTBI to evaluate for ICI requiring further management in accordance with validated clinical decision making rules.
- Children undergoing observation periods for headache with acutely-worsening symptoms **should** undergo emergent neuroimaging.
- Healthcare providers and caregivers should offer nonnarcotic analgesia to children with a painful headache following acute mTBI, but also provide counseling to the family regarding the risks of analgesic overuse, including a rebound headache.
- There is insufficient evidence to recommend the administration of 3% hypertonic saline as a treatment for an acute headache following mTBI in children. Healthcare providers **should not** administer this medication to children with mTBI for treatment of symptoms outside of a research setting at this time.
- Chronic headache following mTBI is likely to be multifactorial; therefore, healthcare providers **should** refer children with chronic headache after mTBI for multidisciplinary evaluation and treatment, with consideration of analgesic overuse as a contributory factor.

Vestibulo-ocular Motor Dysfunction

Dizziness is another potentially debilitating symptom of mTBI, and limited evidence suggests that early vestibular physical therapy may benefit patients experiencing dizziness.

• Healthcare providers **may** refer children with subjective or objective evidence of persistent vestibulo-ocular motor dysfunction following mTBI to a program of vestibular rehabilitation.

Sleep Treatment and Management

Sleep disturbances after mTBI are common and may exacerbate ongoing problems. Adequate sleep has been shown to improve overall health and should be an important part of treatment for children with mTBI.

- Healthcare providers **should** provide guidance on proper sleep hygiene methods to facilitate recovery from pediatric mTBI.
- If sleep problems emerge or continue, despite appropriate sleep hygiene measures, healthcare providers **may** refer children with mTBI to a sleep disorder specialist for further assessment.



Cognitive Impairment Treatment and Management

Problems with attention, memory and learning, response speed, and other cognitive impairment can occur following mTBI. These disturbances can result in significant problems with learning in school, or social interactions.

- Healthcare providers **should** attempt to determine the etiology of cognitive dysfunction within the context of other mTBI symptoms.
- Healthcare providers **should** recommend treatment for cognitive dysfunction that reflects its presumed etiology.
- Healthcare providers **may** refer children with persisting complaints related to cognitive function for a formal neuropsychological evaluation to help determine etiology, and to recommend targeted treatment.



Take action to improve the health of your young patients with mTBI.

To view all 19 sets of recommendations, including those that cover diagnosis and prognosis, and to learn more about the CDC Pediatric mTBI Guideline, visit **www.cdc.gov/HEADSUP**.



CDC PEDIATRIC MTBI GUIDELINE Checklist



For healthcare providers treating children 18 years of age and younger

HEALTHCARE PROVIDERS SHOULD:

ASSESS.

Conduct a physical examination to identify findings that:

- Suggest more severe TBI (e.g., hemotympanum, pupillary asymmetry).
- May impact management of mTBI (e.g., concurrent injuries or baseline deficits, oculomotor dysfunction).
- Suggest other contributions to symptoms (e.g., dehydration, cervical tenderness, scalp hematoma).

Do not image routinely (including CT & MRI).

Use validated clinical decision rules predicting risk for more severe injury
 to determine need.

Assess symptoms using validated scales. Consider cognitive and balance testing. •••••

Conduct a history to identify risk factors for poor prognosis using validated • • • • • prediction rules.

COUNSEL.

Provide information about:

- Warning signs that injury may be more serious. • • •
- Typical recovery course.
- How to prevent further injury.
- Gradual re-introduction of activity that does not worsen symptoms.
- The need for social and emotional support.

Offer clear instructions (preferably verbal and written) on return to activity, including school and sports, customized to the patient's symptoms.

- After a few days of rest (2-3 days), begin light activity & then gradually re-introduce regular activities (not inclusive of sports) that do not significantly worsen symptoms.
- Assess school-related needs & monitor progress in collaboration with parents and school professionals.
- Once back to regular non-sports activities (including school), patient can begin return to sports using a standard progression with gradually increasing levels of physical exertion.
- No return to contact sports activity until symptom-free with exertion • • (including without the use of pain medication).

REFER.

Identify and tailor treatment plans/referrals to address: • • • • •

- Chronic headache
 — non-opioid analgesia (monitor for overuse), multi-disciplinary evaluation.
- Vestibulo-ocular dysfunction -> vestibular rehabilitation.
- Worsening sleep problem ->> sleep hygiene, sleep specialist.
- Cognitive impairment → treatment directed at etiology, neuropsychological evaluation.

A combination of risk factors that may indicate need for neuroimaging include:

- Age < 2 years old
- · Recurrent vomiting
- Loss of consciousness
- Severe mechanism of injury
- Severe or worsening headache
- Amnesia
- Non-frontal scalp hematoma
- Glasgow Coma Score < 15
- Clinical suspicion for skull fracture

Examples of validated scales include, but aren't limited to:

- Post-Concussion Symptom Scale
- Health and Behavior Inventory
- · Post-Concussion Symptom Inventory
- Acute Concussion Evaluation

Factors associated with poor prognosis:

- Older age (older children/adolescents) or Hispanic ethnicity
- Lower socio-economic status
- History of intracranial injury
- Premorbid histories of mTBI or increased pre-injury symptoms
- Neurological or psychiatric disorder
- Learning difficulties or lower cognitive ability
- Family and social stressors

Parents should watch for warning signs:

- A headache that gets worse & does not go away
- Significant nausea or repeated vomiting
- Increased confusion, restlessness, or agitation
- · Slurred speech, drowsiness, or inability to wake up
- Weakness, numbness, or decreased coordination
- Loss of consciousness, convulsions, or seizures

Steps in a return to play progression generally include:

Step 1: Return to regular non-sports activities Step 2: Light aerobic exercise

- Step 3: Sport-specific exercise
- Step 4: Non-contact training drills
- Step 5: Full contact practice
- Step 6: Return to sport

:..

:..

Refer patients whose symptoms do not resolve as expected with standard care after 4-6 weeks.





WHEN YOUR PATIENT IS LIVING WITH BRAIN INJURY

A tip card for physicians treating individuals living with chronic brain injury sequelae

Key points about brain injury (BI):

- BI can affect every aspect of an individual's functioning, leaving some with lifelong challenges.
- BI can be traumatic (TBI) or non-traumatic.
- Injury severity (mild, moderate, severe) does not necessarily predict long-term outcome.
- Many sequelae are difficult to see and therefore may be easy to misinterpret (e.g. lack of initiation, cognitive overload, difficulty recognizing social cues).
- Each injury is unique, like a thumbprint.
- Improvements can occur after initial recovery; re-engagement in therapeutic activities may be beneficial even years post-injury.

Common Sequelae and Subsequent Life Challenges

Areas of Functioning	Specific Sequelae	Subsequent Life Challenges
Motor	Motor planning; coordination; balance; spasticity	Driving/ transportation
Sensory	Changes in vision, hearing, taste, smell or tactile sensation; visual field loss; unilateral neglect; temperature regulation	Following health/wellness recommendations
Cognitive	Attention; concentration; organization; new learning; initiation; memory; problem-solving; judgement; self-awareness; cognitive overload	Relationships, sexuality
Communication	Expressive and receptive communication; dysarthria; tangential speech; following social rules; understanding social cues	Making friends Employment Return to school
Emotional	Regulating emotions; flat affect; easily overstimulated/overwhelmed; increased risk for depression, anxiety and suicidal ideation	Having a sense of meaning in life Behavioral health
Fatigue and Sleep	Physical and emotional fatigue; sleep patterns	Substance use/ misuse



WHEN YOUR PATIENT IS LIVING WITH BRAIN INJURY

A tip card for physicians treating individuals living with chronic brain injury sequelae
[CONTINUED]

Interacting with Patients Living with Brain Injury

- Encourage the patient to bring a written list of questions and concerns to the appointment.
- Plan extra time for the appointment to allow for cognitive or communication challenges.
- Encourage the patient to bring a friend/family member to the appointment as a historian/note-taker if needed.
- Encourage compensatory strategies, including
 - o Writing notes in a smartphone or notebook/day-planner organizer;
 - o Using a med-minder; setting alarms on smartphone.
- Find ways to repeat information during the appointment; summarize at the end.
- Have the patient repeat instructions back to you repeat, rehearse, review.
- Provide reminders by email.
- Provide a written summary of the appointment; email a copy of the summary.
- If the patient becomes overwhelmed, model calmness (sit back, take a breath, relax); slow down the information flow; ask how he/she is doing and if they have questions; switch to a lighter topic.
- Encourage an organized approach to wellness (a handout on wellness after BI can be found at https://www.archives-pmr.org/article/S0003-9993(18)30177-1/pdf).
- Encourage socialization and productive activity (support groups, community classes, volunteering).
- Provide resources for support, education and advocacy.

Community Resources - Support, Education, Advocacy

- Brain Injury Association of America <u>www.biausa.org</u>
- United States Brain Injury Alliance <u>www.usbia.org</u> Most states have either a state brain injury association or alliance, offering support groups, resources, education and advocacy. Links to these websites can be found at the two resources above.
- Model Systems Knowledge Translation Center for TBI <u>https://msktc.org/tbi</u>
- Center for Disease Control <u>https://www.cdc.gov/traumaticbraininjury</u>
- Brainline <u>https://www.brainline.org/</u>
- American Stroke Association <u>www.stroke.org</u>
- National Association of State Head Injury Administrators <u>www.nashia.org</u>

This tip card was prepared with support from the American Congress of Rehabilitation Medicine (ACRM), by members of the ACRM Chronic Brain Injury Task Force:

Lenore Hawley, MSSW, LCSW, CBIST (Craig Hospital); Summer L. Ibarra, Ph.D., ABPP-RP (Franciscan Health); Wendy Waldman, BSW, CBIST (Rehabilitation Hospital of Indiana); Tiffany Armstrong, MSN, RN, CRRN, CBIS (Madonna Rehabilitation Hospitals); Tasnia Iqbal, CBIS (University of Iowa, Carver College of Medicine); Flora M Hammond, MD, (Indiana University School of Medicine, Rehabilitation Hospital of Indiana)



Return to Learn/Return to Play: Concussion Management Guidelines

Tennessee Department of Health | August 2020



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This document has been created/edited/reviewed by the following people:

Tim Lee, MHA, MS, ATC, Vanderbilt Sports Concussion Center

Alex Diamond, DO, MPH, Vanderbilt Sports Medicine/Vanderbilt Sports

Concussion Center/Program for Injury Prevention in Youth Sports

Gary Solomon, PhD, Clinical Neuropsychologist, Vanderbilt Sports Concussion Center

Paula Denslow, CBIS, Director, Brain Links, Tennessee Disability Coalition

Wendy Ellmo, MS, CCC-SLP, BCNCDS, Brain Links, Tennessee DisabilityCoalition

Lori Paisley, Executive Director, Coordinated School Health, TN Department of Education

Derese Methvin, EdS, RN, BSN, Coordinated School Health, TN Department of Education

Andrew Gregory, MD, Vanderbilt Sports Concussion Center

Carolina Clark, MD, MPH, Child Health Medical Consultant, TN Department of Health

Morgan F. McDonald, MD, FAAP, FACP, Assistant Commissioner, Director, Division of Family Health and Wellness, TN Department of Health

Michelle D. Fiscus, MD, FAAP, Deputy Medical Director, Chronic Disease and Injury Prevention, Health Promotion, TN Department of Health

Rachel Heitmann, MS, Section Chief, Injury Prevention and Detection TN Department of Health

Jean Doster, MS, Past Director, Traumatic Brain Injury Program, TN Department of Health

Ashley Bridgman, MS, Director, Traumatic Brain Injury Program, TN Department of Health

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Table of Contents

Section 1: Education

What is a Concussion/TBI?	4
Why are Concussions/TBI a Big Deal?	5
Signs and Symptoms of Concussion	6
Prevention	7

Section 2: Return to Learning

Concussion Management Team	8
The Concussion Management Process (Example)	10
Returning to School	11
Classroom Strategies for Concussion Recovery	12
Symptoms Checklist	13
When and How to Write a 504 Plan	14

Section 3: Return to Play

Law Return to Play	15
Tennessee State Sports Concussion	15
Law Return to Play Decisions	16
Graduated Return to Play Plan	16
Section 4: Deferences	
Section 4. References	17
Section 5: Additional Resources	17
Section 6: Appendices	
A. Cognitive Activity Monitoring Log	18

		-
Β.	Authorization of Release of Medical Information	19
C.	School Accommodations	20
D.	Return to Play	21 - 22

What is a Concussion?

Concussion/TBI

A concussion is a type of traumatic brain injury, or TBI, is caused by a bump, blow or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth. This sudden movement can cause the brain to bounce around or twist in the skull, creating changes in the brain, and sometimes stretching and damaging the brain cells (CDC, 2015).

Aside from the elderly, children and adolescents are among those at greatest risk for concussion. The potential for a concussion in young people is greatest during activities where collisions can occur, such as during physical education class, playground time or sports activities. However, concussions can happen any time a student's head comes into contact forcefully with a hard object, such as a floor, desk or another student's head or body. Proper recognition and response to concussion can prevent further injury and help with recovery (CDC, 2015).

Medical providers may describe a concussion as a "mild" brain injury because concussions are usually not life-threatening. Even so, the effects of a concussion can be serious (CDC, 2015).

Traumatic brain injury is a serious public health problem in the United States. Each year, traumatic brain injuries contribute to a substantial number of deaths and cases of permanent disability. In 2014, 2.5 million TBIs occurred either as an isolated injury or along with other injuries (CDC, 2015).



Why are Concussions a Big Deal?

A concussion can occur from an impact to the body or the head. The most common cause of a concussion is a whiplash type injury, involving a rapid acceleration of the head.

Most concussions (90 percent) occur <u>without</u> loss of consciousness. Concussions can occur in any sport or during regular daily activities.

A "ding," "getting your bell rung" or what seems to be a mild bump, blow or jolt to the head can be serious and can change the way the brain normally works (CDC, 2013).

Because of changes in the neurophysiology of the brain, symptoms may continue to develop over the next few days following an injury.

After a concussion, among other effects, nerve cells and connections within the brain become stressed, resulting in the possible breaking of some connections between different brain areas and limiting the ability of the brain to process information efficiently and quickly (Molfese, 2013).

These changes can lead to a set of symptoms affecting the student's cognitive, physical, emotional and sleep functions, which may result in reduced ability to do tasks at home, at school or at work. Concussions can have an impact on the student's ability to learn in the classroom. Tracking symptoms tells a big part of the story during recovery.

During this time of recovery, returning to play before symptoms have resolved incurs the risk of further injury, and returning to full-time academics before symptoms have cleared can result in prolonged recovery time.

As the chemistry of the brain returns to normal, the symptoms begin to subside and for most people, they resolve within one to four weeks. During the recovery period, monitor students for full resolution of symptoms and refer for further evaluation or treatment if needed.

Ignoring the symptoms and trying to "tough it out" often makes symptoms worse.

Second Impact Syndrome may occur when a brain already injured takes another blow or hit before the brain recovers from the first, usually within a short period of time (hours, days or weeks). A repeat concussion can slow recovery or increase the likelihood of having long-term problems. In rare cases, repeat concussions can result in edema (brain swelling), permanent brain damage and even death (CDC, 2013).

(Adapted from Return to Learn, 2014)

Signs and Symptoms of Concussions

The signs and symptoms of concussion can show up right after an injury or may not appear or be noticed until hours or a few days after the injury. Be alert for any of the following signs or symptoms. Also, watch for changes in how the student is acting or feeling, if symptoms are getting worse or if the student just "doesn't feel right" (CDC, 2015).

Signs Reported by the Student:

Emotional:

- Irritability
- Sadness
- More emotional than usual
- Nervousness

Physical:

- Headache or "pressure"in head
- Nausea or vomiting
- Balance problems or dizziness
- Fatigue or feeling tired
- Blurry or double vision
- Numbness or tingling
- Does not "feel right"

Signs observed by staff:

- Appears dazed or stunned
- Is confused about events
- Answers questions slowly
- Repeats questions
- Can't recall events prior to thehit, bump or fall
- Can't recall events after thehit, bump or fall
- Loses consciousness (evenbriefly)
- Shows behavior or personality changes
- Forgets class schedule or assignments

Cognitive:

- Difficulty thinking clearly
- Difficulty remembering or concentrating
- Feeling slowed down
- Feeling sluggish, hazy or foggy

Sleep:

- Drowsy
- Sleeps less than usual
- Sleeps more than usual
- Has trouble falling asleep (Only ask sleep symptoms if injury occurred prior to date reported)

Danger Signs:

Be alert for symptoms that worsen over time. A student should be seen in the emergency department right away if s/he has:

- One pupil that is larger than the other
- Drowsiness or cannot be awakened
- A headache that gets worse and does not go away
- Weakness, numbness or decreased coordination
- Repeated vomiting
- Slurred speech
- Seizures
- Difficulty recognizing people or places
- Increased confusion, restlessnessor agitation
- Unusual behavior
- Loss of consciousness

Prevention

A concussion is a traumatic brain injury that can be prevented in many cases. Being an active participant in sports and engaging in physical activity does place student-athletes at higher risk for injury; however, there are preventive measures that schools can take. This section is intended to remind school districts about the importance of prevention. Schools should:

- Conduct periodic safety reviews of common play/sporting areas
- Provide appropriate and adequate staffing for sporting events and recess
- Provide appropriate access to protective gear (helmets, mouth guards)
- Provide appropriate fitting of protective gear
- Design guidelines and enforcement of appropriate and fair rules and techniques (CDE, 2014)

Design, Implement and Review a school-wide "concussion action plan" for all school staff and faculty. Know what to do BEFORE a student/athlete has an injury.

Implement Safe Stars Initiative

The Safe Stars initiative recognizes youth sports leagues throughout Tennessee for providing the highest level of safety for their youth athletes. Safe Stars consists of three levels: gold, silver and bronze, and involves implementation of policies around topics such as concussion education, weather safety and injury prevention.

Safe Stars' goal is to provide resources and opportunities for every youth sports league to enhance their safety standards. The criteria for achieving recognition as a Safe Stars league has been developed by a committee of health professionals dedicated to reducing sports-related injuries among youth.

To learn more please visit:

www.tn.gov/health/health-program-areas/fhw/vipp/safe-stars-initiative.html.



Concussion Management Team

Once a concussion has been diagnosed by a health care professional, managing the concussion is best accomplished by creating a support system for the student. Communication and collaboration among parents, school personnel, coaches, athletic trainers and health care providers is essential for the recovery process. This support system oversees the return to academics and return to play process. A medical release signed by the parents allows for two-way communication between the school personnel and the health care provider (McAvoy, 2012, Return to Learn, 2014).



Each school district creates a concussion management policy that incorporates:

- Knowledge about concussions as a mild traumatic brain injury
- Training for all coaches, athletes, parents and school staff members about concussion management
- A Concussion Management Team with a designated Concussion Management Team Point Person
 - The Concussion Management Point Person may be the school nurse, the
 504 designee, a guidance counselor or an administrator. Choose the
 individual that works best for your school's situation.

The Concussion Management Team

Members may include:

Neuropsychologists

Physician Assistant

School Administrator or

Physicians

Parents

Designee

Coach

Teacher

Athletic Director

Athletic Trainer

Speech Language

Pathologist Nurse

Practitioner

School Nurse

School Psychologist

School Counselor

Occupational Therapist

Physical Therapist

Student-Athlete

(Return to Play, 2014)



The Concussion Management Process

This is an example of the concussion management process that includes best practice components for all students.

Student Sustains a Concussion	 Remove from physical activity (P.E., recess, athletics, etc.) Notify parents
Concussion Management Team Point Person is Notified	 CMT Point Person will notify the student's teachers, counselor, school nurse, parent/ guardian, coach, athletic trainer
is Notified	
CMT Records Collection	 The CMT will collect pertinent information regarding student's recovery (symptom checklist, school accommodations, medical release forms, etc.) The CMT Point Person should maintain all recordscollected The CMT Point Person is responsible for maintaining communication with parents, school nurse and health care providers
Return to Learn	 The student's academic accommodations will decrease as the symptoms begin to resolve
Symptom Free	 Record collection from CMT indicates the student is symptom-free without medications Student is no longer requiring academic accommodations in the classroom
Return to Play	 Under guidance of health care provider, athlete may return to play gradually (graduated RTP guidelines) Completion of graduated RTP protocol without return of symptoms is required for full medical clearance

Returning to School

The student may return to school when symptoms are tolerable and manageable, **as long as the school is making appropriate accommodations for the student**. The school must understand concussions and the necessary academic accommodations in order to facilitate returning students to the learning environment.

Key points:

- If symptoms prevent the student from concentrating on mental activities for ten minutes or less, complete cognitive rest is required. The student should be kept home from school with limited external stimulation (texting, watching TV, playing video games, etc.) or driving. In some, but not all, cases these stimulating activities may worsen the symptoms of concussion.
- If symptoms allow the student to concentrate on mental activities for up to 20 minutes or less, parents should consider keeping the student home from school, but may allow increased time periods of external stimulation as long as symptoms do not get worse.
- See Cognitive Activity Monitoring Log in Appendix A

When the student can tolerate 30 minutes of light mental activity, parents can consider returning him or her to the classroom. Best practices suggest: (a) parents communicate with the school and sign **a medical release of information (See Appendix B)** for the school to communicate with the health care provider, and (b) implement the appropriate academic accommodations provided by the treating health care provider and concussion management team.

Academic Accommodations: See School Accommodations Template in Appendix C

The balance between the student's medical and academic needs should be closely coordinated between school personnel and the health care provider. Each concussed student can have different symptoms, a different level of severity and a different recovery. Academic accommodations should be tailored to the specific needs of the individual student (McAvoy, 2014). Certain symptoms lend themselves to certain interventions. Especially in the acute phase of the concussion (one-four weeks), interventions should be applied generously in the classroom setting. Symptoms may be worse in some classes than in others. Teachers are encouraged to apply any intervention that is needed for the student based on the symptoms (McAvoy, 2015).



Classroom Strategies for Concussion Recovery

Symptom	School Setting Adjustment
Headache	 Frequent breaks Reduce exposure to specific aggravators: brightlights/computer work/noisy environment Rest periods if needed in nurse's office or quiet environment
Dizziness	 Allow student to put head down on desk Give student early dismissal from class to avoid crowed hallways
Visual Problems: Light Sensitivity, Double Vision, Blurry Vision	 Reduce exposure to computers, light boards, videos Reduce brightness on screens Allow student to wear hat/sunglasses Consider use of audio books Turn off fluorescent lights Seat student closer to the center of the classroom (blurry vision) Have school nurse cover one eye with a patch for students with double vision
Noise Sensitivity	 Allow student to have lunch in a quiet area with one classmate Limit/avoid band, choir, shop classes Consider use of ear plugs Allow early dismissal from classto avoid noisy hallways Avoid noisy gyms/sporting events
Difficulty Concentrating or Remembering	 Avoid testing or completingmajor projects during recovery Allow extra time to complete non-standardized tests Postpone standardized testing Consider one test per dayduring exams Consider use of notes, a note taker or reader for oral testing
Sleep Disturbance	 Allow for late start or short dayto catch up on sleep Allow rest breaks in a quiet area

Adapted from: Halstead, M.E., McAvoy, K., Devore, C.D., Carl, R., Lee, M., Logan, K. (2013). Return to learning following a concussion. American Academy of Pediatrics. 132: 5, 948-957.doi:10.1542/peds.2013-2867

Symptoms Checklist

In most cases, symptoms may be the primary way to know when and how a concussion is getting better. Since the report of symptoms can be quite subjective, it is helpful to use a rating scale. The rating scale can act as a common language for everyone involved in managing the concussion. Most concussion management programs utilize a symptom scale with a 0 to 6 rating scale (0 = not present; 6 = most severe).

Name:______Date:_____

Date of Injury:_____

Symptom	None	M	ild	Mod	erate	Se	vere
Headache	0	1	2	3	4	5	6
Nausea	0	1	2	3	4	5	6
Vomiting	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
Sleeping more than usual	0	1	2	3	4	5	6
Sleeping less than usual	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Sensitive to light	0	1	2	3	4	5	6
Sensitive to noise	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervous/Anxious	0	1	2	3	4	5	6
Feeling more emotional	0	1	2	3	4	5	6
Numbness or tingling	0	1	2	3	4	5	6
Feeling like in a fog	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Visual problems	0	1	2	3	4	5	6
Total Symptoms Score							

The Graded Symptoms Checklist is recommended by the National Athletic Trainers Association (Casa et al., 2012). The 0 to 6 symptoms scale is commonly used by various tests: ImPACT and SCAT3.

(Adapted from Colorado, 2014)

When and How to Write a 504 Plan

Typically, 90 percent of kids with concussions will recover within four weeks of their injuries. If a student has not resolved from a concussion within the typical three to four week time frame, it may be prudent to begin to look at a more "targeted" approach. (McAvoy and Eagan, 2015). If a 504 Plan is indicated, the 504 designee (CMT Point Person) at the school should set up a meeting with all the necessary members of the concussion management team (teachers, parents, counselors, administrators, school nurse, etc.). When writing a 504 Plan, one must identify what the most problematic symptoms are which will let you know which interventions to use in your plan. There are certain conditions or "modifiers" of concussion that we know may prolong the recovery process. Those modifiers are:

- A history of migraine headacheor family history of migraines
- A pre-existing headache disorder
- ADHD

- A history of previous concussions
- Learning disability
- A history of anxiety and depression
- Sleep disorder

Be specific in the writing you 504 Plan. Do not write a plan "for concussion"; use the phrasing, "Section 504 Plan for X (specified symptom) secondary to concussion.

2/01/10/02/	
Section 504 Plan for Headaches secondary	 Head down on the desk in classroom
to a concussion	 Pass to leave room to visit nurse
	Able to take medications in school clinic
Section 504 Plan for Slowed Processing	Appropriate Interventions:
Speed secondary to a concussion	Extended time on in-class assignments
	Extended time on tests
Section 504 Plan for Convergence	Appropriate Interventions:
Insufficiency secondary to a concussion	Teacher or peer notes printed out
	 In-class and homework on paper
	instead of computer screens whenever
	possible
(MacAvoy & Eagan Brown, 2015)	Books on tape

There should also be an overall medical and education plan addressing the following questions:

How long do we expect the symptoms to linger?
Is the student still being treated for his/her concussion/symptoms?
Do we expect the student to fully recover?
What are the medical interventions being used?
What side effect should we expect?

Remember:

- Only a small percentage of students with a concussion will need a 504Plan.
- A Release of Medical Information Form will be needed for the school to communicate with the medical provider (Appendix B).
- When the Concussion Management Team works together to identify the underlying cause(s) for the prolonged recovery, addresses those areas, supports the student with academic accommodations, monitors the progress and adjusts the plan as needed, full recovery is possible (McAvoy and Eagan- Brown, 2015.

Return to Play

Tennessee Sports Concussion Law

In April 2013, Tennessee became the 44th state to pass a sport concussion law designed to reduce youth sports concussions and increase awareness of traumatic brain injury.

The legislation, <u>Public Chapter 148</u>, has three key components:

- □ To inform and educate coaches, youth athletes and their parents and require them to sign a concussion information form before competing.
- □ To require removal of a youth athlete who appears to have suffered a concussion from play or practice at the time of the suspected concussion.
- □ To require a youth athlete to be cleared by a licensed health care professional before returning to play or practice.

Both public and private school sports and recreational leagues for children under age 18 that require a fee are affected by the law. The law covers all sports. This website contains all the resources coaches, youth athletes and parents need to fulfill the intent of the law.

See more at: https://www.tn.gov/health/health-program-areas/fhw/vipp/tbi/tn-sports-concussion.html

(TN Sports Concussion Law, 2013)

Within the school setting, any student who shows signs or symptoms of a concussion should be removed from physical activity (recess, physical education, dance class, etc.), and needs to be cleared medically before returning to physical activity. Medical providers approved to clear children for return to play from concussion are as follows:

- □ Medical Doctor (MD)
- □ Osteopathic Physician (DO)
- □ Clinical Neuropsychologist (PhD) with concussion training
- Physician Assistant (PA) with concussion training who is a member of a health care team supervised by a Tennessee licensed medical doctor or osteopathic physician.

See Return to Play Example, Appendix D

Return to Play Decisions

- According to the Concussion in Sport Group-4 Guidelines (2013), any child who is suspected of having a concussion should be removed from play and should not return to play that day.
- No return to sport should be considered until the child has returned to school successfully. A successful return to school would mean they no longer are in need of school accommodations.
- □ Children should not be returning to physical activity if they are still experiencing concussion symptoms, unless otherwise directed by their treating health care provider.
- ☐ Children should not be taking any medications to mask concussion symptoms in the graduated return to play process
- □ A graduated return to play process is recommended to be performed by the child with symptom monitoring at each step (McCrory, 2013).

Gradual Return to Play Plan

Return to play should occur in gradual steps beginning with light aerobic exercise only to increase your heart rate (e.g., stationary cycle); moving to increasing your heart rate with movement (e.g., running); then adding controlled contact if appropriate; and finally return to sports competition. Pay careful attention to your symptoms and your thinking and concentration skills at each stage or activity. After completion of each step without recurrence of symptoms, you can move to the next level of activity the next day under the direction of your health care provider. Move to the next level of activity only if you do not experience any symptoms at the present level. If your symptoms return, let your health care provider know, and await further instructions.

Day 1: Low levels of physical activity (i.e., symptoms do not come back during or after the activity). This includes walking, light jogging, light stationary biking and light weightlifting (low weight – moderate reps, no bench, no squats).

Day 2: Moderate levels of physical activity with body/head movement. This includes moderate jogging, brief running, moderate intensity on the stationary cycle, moderate intensity weightlifting (reduce time and or reduced weight from your typical routine).

Day 3: Heavy non-contact physical activity. This includes sprinting/running, high intensity stationary cycling, completing the regular lifting routine, non-contact sport specific drills (agility – with three planes of movement).

Day 4: Sports-specific practice.

Day 5: Full contact in a controlled drill or practice.

Day 6: Return to competition.

(TN Sports Concussion Law, 2013)

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- 2. Centers for Disease Control and Prevention-Basic Information about Traumatic Brain Injury and Concussion. <u>www.cdc.gov/traumaticbraininjury/basics.html</u>
- 3. Colorado Department of Education Concussion Management Guideline (2014). <u>www.cde.state.co.us/healthandwellness/concussionguidelines7-29-2014-0</u>
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Additional Resources:

- 1. Brain Links http://tndisability.org/brain
- 2. Center on Brain Injury Research & Training. <u>https://cbirt.org</u>
- 3. Colorado Kids with Brain Injury. https://cokidswithbraininjury.com/
- 4. Get Schooled on Concussions: Return to Learn. <u>www.getschooledonconcussions.com/</u>

Appendix A

Cognitive Activity Monitoring (CAM) Log

Name_

Parent/ Teacher:_____

DATE							
TIME							
	Home	Home	Home	Home	Home	Home	Home
LOCATION (circle one)	School	School	School	School	School	School	School
	Geneor	Genoor	Genoor	OUTION	Genoor	Genoor	00100
COGNITIVE ACTIVITY:							
COONTINE ACTION 1							
DURATION:							
•							
SYMPTOM (PRE/POST)	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10
SYMPTOM (PRE/POST) HEADACHE	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10
SYMPTOM (PRE/POST) HEADACHE FATIGUE	Rate 0-10	Rate 0-10	Rate 0-10 / /	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10
SYMPTOM (PRE/POST) HEADACHE FATIGUE CONCENTRATION	Rate 0-10	Rate 0-10 / /					
SYMPTOM (PRE/POST) HEADACHE FATIGUE CONCENTRATION PROBLEMS	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10
SYMPTOM (PRE/POST) HEADACHE FATIGUE CONCENTRATION PROBLEMS IRRITABILITY	Rate 0-10///	Rate 0-10					
SYMPTOM (PRE/POST) HEADACHE FATIGUE CONCENTRATION PROBLEMS IRRITABILITY FOGGINESS	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10
SYMPTOM (PRE/POST) HEADACHE FATIGUE CONCENTRATION PROBLEMS IRRITABILITY FOGGINESS LIGHT/ NOISE SENSITIVITY	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10
SYMPTOM (PRE/POST) HEADACHE FATIGUE CONCENTRATION PROBLEMS IRRITABILITY FOGGINESS LIGHT/ NOISE SENSITIVITY Other:	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10	Rate 0-10

Appendix B

Authorization of Release of Medical Information for Concussion

School Name:	
Patient Name:	Date of Birth:
Address:	
City:	State:Zip:
Social Security #:	
I hereby authorize:	
Name of Person/Organizatio	on Disclosing PHI
To release the following information to (School Re Name:	eceiving PHI) School: Title:
Address:	
Phone:	Fax:
Email:	
Information to be shared:	
 Medical records pertaining to concussion cal Progress Notes Other: 	 are o Academic Accommodations Forms o Mental/Behavioral health records

The Information may be disclosed for the following purpose(s) only:

- Continued Treatment
- At the request of the patient/legal guardian

I understand that by voluntarily signing this authorization:

- I authorize the use of my protected health information as described above for the purpose(s) listed.
- I have the right to withdraw permission for the release of my information. If I sign this authorization to use or disclose information, I can revoke this authorization at any time. The revocation must be made in writing to the person/organization disclosing the information and will not affect information that has already been used or disclosed.
- I have a right to receive a copy of the authorization.

Unless revoked or otherwise indicated, the authorization's automatic expiration date will be one year from

the date of my signature or upon the occurrence of the following event:______

Signature of Patient/Legal Representative

Date

Description of Legal Representatives Authority

Appendix C

The Tennessee Department of Health School Accommodations Template for Concussion

Patient/Student:	Date:
Please excuse the above named patient fro	om school today due to a medical appointment.
The student has sustained a concussion ar	nd is currently under the care of his or her
physician and/or	
the undersigned. S/he is not permitted to	participate in any contact sport activity until
formally cleared by his or her physician an	id/or the undersigned.
Please consider the following concussion-r	related recommendations:
Gym Class recommendations: No gym class	
Restricted gym class as specified:	
Recommended Academic accommodation Untimed tests	ns:
Open note/open book or oral tests	
Tutoring	
Reduced workload when possible	
15 minute rest breaks from class ev	eryhour(s)
Modified/reduced homework assigr	nments
Extended time on homework/projec	:ts
Tape record class lectures	
Should not return to school until co	ncussion symptoms are resolved
Otherrecommendations:	
The patient/student will be re-evaluated or	1:
Healthcare Provider Name:	Address:
Signature:	

Appendix D

CONCUSSION RETURN TO PLAY

Athle	te's Name:	Date of Birth:			
Date	of Injury:				
This	return to play is based on today's evaluation	Date of Evaluation:			
Care	Plan completed by:				
Retu	irn to thisoffice date/time:				
Return to School date:					
 RETURN TO SPORTS INFO: Athletes should not return to practice or play the same day that their injuryoccurred. Athletes should never return to play or practice if they still have ANY symptoms – serious injury or death (although rare) can result Athletes, be sure that your coach and/or athletic trainer are aware of your injury, symptoms and have the contact information for the health care provider treating your concussion. Please initial: The athlete reports that he/she has no symptoms while participating in daily activities at this time. 					
I have education the athlete and parents/guardian about the dangers of returning to play before symptoms have cleared.					
The following are the return to sports recommendations at this time: (Please initial any recommendations selected) PHYSICAL EDUCATION CLASS:Do NOT return to PE class at this time. (See "Return to this office date/time" above).					

_____Student MAY return to PE class after completion of Gradual Return to Play Plan (on back). **SPORTS:**

_____Do NOT return to sports practice or competition at this time.

_____May GRADUALLY return to sports **activities** following the Gradual Return to Play Plan described on the back, under the supervision of the health care professional for your school orteam.

_____May be advanced back to **competition** after successful completion of the Gradual Return to Play Plan described on the back and after a **phone conversation** with treating health care provider.

_____Must **return to the treating healthcare provider** for final clearance to return to competition after completing the Gradual Return to Play Plan. (See "Return to this office date/time" above).

_____All steps of Return to Play Plan have been completed successfully. Cleared for full participation in all activities without restriction.

____No concussion suspected, cleared for full participation without a gradual return to play plan.

Appendix D

Treating Health Care Provider Information (Please print or stamp):

Provider's Name:	_Provider's Office Phone:
Provider's Signature:	_Office Address:

Please check:

____Medical Doctor (MD) w/ concussion training

____Osteopathic Physician (DO)

____Clinical Neuropsychologist w/ concussion training

____Physician Assistant (PA who is a member of a health care team supervised by a Tennessee licensed medical doctor or osteopathic physician.*

*Clearance by a PA is not accepted by the Tennessee Secondary School Athletic Association.

GRADUAL RETURN TO PLAY PLAN

Return to play should occur in gradual steps beginning with light aerobic exercise only to increase your heart rate (e.g. stationary cycle); moving to increasing your heart rate with movement (e.g. running); then adding controlled contact if appropriate; and finally return to sports competition.

Pay careful attention to your symptoms and your thinking and concentration skills at each stage of activity. After completion of each step **without recurrence of symptoms and no pain medication**, you can move to the next level of activity the next day. <u>Move to the next level of activity only if you do not experience any symptoms at the present level</u>. If your symptoms return, let your health care provider know, return to the first level of activity and restart the program gradually. This Gradual Return to Play process is for your own safety. Returning to play while still experiencing symptoms can result in serious injury or death. It is critical that you honestly report your symptoms to your doctor, coach and health care professional at the school.

GRADUAL RETURN TO PLAY PLAN:

"Day 1" means first day cleared to participate in Gradual Return to Play Plan, not first day after injury.

Day 1: Low levels of physical activity (i.e. symptoms do not come back during or after the activity). This includes walking, light jogging, light stationary biking and light weightlifting (low weight – moderate reps, no bench, no squats).

Day 2: Moderate levels of physical activity with body/head movement. This includes moderate jogging, brief running, moderate intensity on the stationary cycle, moderate intensity weightlifting (reduced time and or reduced weight from your typical routine).

Day 3: Heavy non-contact physical activity. This includes sprinting/running, high intensity stationary cycling, completing the regular lifting routine, non-contact sport-specific drills (agility with 3 planes of movement). **Day 4:** Sports-specific practice.

Day 5: Full contact in a controlled drill or practice.

Day 6: Return to competition.

Adapted from the *Acute Concussion Evaluation Care Plan* from the Center for Disease Control and Prevention (<u>https://www.cdc.gov/injury/</u>), the *TSSAA Concussion Return to Play* form (<u>https://cms-files.tssaa.org/documents/tssaa/forms/Concussion-Return-to-Play-Form-updated-12.2019.pdf</u>) and the *TN Return to Learn/Return to Play: Concussion Management Guidelines*. All medical providers are encouraged to review the sites if they have questions regarding the latest information on the evaluation and care of a youth athlete following a concussion injury.

Brain Links

Enriching the lives of Tennesseans with traumatic brain injury by training and empowering the professionals serving them.

The Need

Traumatic Brain Injury (TBI) is a complex diagnosis that can pose long-term challenges both for the person and the professionals serving him or her. **67.9** Tennesseans of all ages experience a traumatic brain injury each day

We Can Help

Brain Links is a statewide team of brain injury specialists. We equip professionals to better serve people with TBI with current, research-based training and tools.

We'll work with your schedule & continuing education unit needs. Our services are provided *at no cost*.

For more info contact Brain Links at: 615-515-8616 or tbi@tndisability.org



Brain Links is supported by the Administration on Community Living (ACL) of the U.S. Department of Health and Human Services under Grant No. 90TBSG0024-01-00 and in part by the Tennessee Department of Health, Traumatic Brain Injury Program.

We Provide:

Evidence-based TBI trainings tailored to your discipline

Certificates for educational credits

Toolkits for screening, symptom tracking, reference, parent education and communication with schools

Assistance with goal writing and treatment plan development support for rehabilitation, direct service support and related services

Educational resources including parent-friendly educational materials

Resources for return to home, school or work settings





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UNIVERSITY OF OREGON

504/IEP Accommodations & Modifications in the Classroom for a Student with a Traumatic Brain Injury

Student:	Teacher:	Grade: Date: _	Birth Date:				
Presenting Concerns:							
Persons Responsible for Providing Selected Items:							
Directions: Circle the challenges that affect your child or student. Check the accommodations that may be helpful.							
Environment	Method of Instruction	Behavioral Needs	Assistive Technology				
 Post class rules 	 Repeat directions 	 Early interventions for situations 	 Multimedia software 				
 Post daily schedule 	 Circulate teacher around room 	that may escalate	 Electronic organizers 				
 Give preferential seating 	 Provide visual prompts 	 Teach expected behavior 	 Shortcuts on computers 				
 Change to another class 	 Provide immediate feedback 	 Increase student academic success 	 Concept mapping software 				
 Change schedule (most difficult in 	• Point out similarities to previous	rate	 Accessibility options on computer 				
morning)	learning & work	 Learn to recognize signs of stress 	 Proofreading programs 				
 Eliminate distractions (visual, 	 Use manipulative materials 	• Give non-verbal cues to discontinue	 Alternative keyboards 				
auditory & olfactory)	 Teach to current level of ability 	behavior	 Voice output communication 				
 Modify length of school day 	(use easier materials)	 Reinforce positive behavior 	devices and reminders				
 Provide frequent breaks 	 Speak clearly 	 Set goals with student 	 Enlarged text or magnifiers 				
 Provide a quiet work place 	 Pre-teach or reteach 	 Use social opportunities as rewards 	 Recorded text & books 				
 Maintain consistent schedule 	 Use peer tutor or partner 	 Teach student to use advance 	 Specialized calculators 				
 Provide system for transition 	 Use small group instruction 	organizers at beginning of lesson	 Picture & symbol supported 				
	 Use simple sentences 	 Role play opportunities 	software				
Transitions	 Use individualized instruction 	• Use proactive behavior management	 Talking spell checker & dictionary 				
 Specified person to oversee 	 Pause frequently 	strategies	 Computer for responding & 				
transition between classes or end	 Use cooperative learning 	 Daily/weekly communication with 	homework				
of day	 Encourage requests for 	parents	 Use of communication devices 				
 Advanced planning for transition 	clarification, repetition, etc.	 Modification of non-academic tasks 	 Word predicting programs 				
between grades/schools	 Use examples relevant to 	(e.g., lunch or recess)	 iPad/tablet 				
• Modified graduation requirements	student's life	 Time & place to regroup when upset 	 Smart Phone 				
 Assistance with identifying post- 	 Demonstrate & encourage use of 	 Additional structure in daily routine 					
secondary supports	technology	 Frequent specific feedback about 					
 Identification of community 		behavior					
, resources for persons with brain							
injury .							

cbirt



504/IEP Accommodations & Modifications in the Classroom for a Student with a Traumatic Brain Injury

Memory Deficits

- Monitoring planner (check-off system)
- Written & verbal directions for tasks
- o Posted directions
- Frequent review of information
- Strategy for note taking during long reading assignment
- Provide a copy of notes
- Open book or note tests
- Reminders for completing & turning in work
- Repetition of instructions by student to check for comprehension

Visual Spatial Deficits

- o Large print materials
- Distraction free work area
- Modified materials (e.g., limit amount of material presented on single page, extraneous picture)
- Graphs & tables provided to student
- Use of math & reading template or guide

Gross Motor/Mobility Difficulties

- Priority in movement (e.g., going first or last)
- $\circ \quad \text{Adaptive physical education} \\$
- Modified activity level for recess
- o Special transportation
- $\circ \quad \text{Use of ramps or elevators} \\$
- Restroom adaptations
- Early release from class
- Assistance with carrying lunch tray, books, etc.
- Escort between classes
- o Alternative evacuation plan
- o Simple route finding maps & cues

Attention

- Visual prompts
- Positive reinforcement
- Higher rate of task change
- o Verbal prompts to check work

Organizational Skills

- Study guide or timeline
- Daily calendar for assignments & tasks (digital or written)
- Instructions in using a planner or app
- Provide color-coded materials
- High-lighted materials to emphasize important or urgent information

Academic Progress

- Assigned person to monitor student's progress
- Contact person (home & school)
- Weekly progress report (home & school)

Fine Motor Difficulties

- Copy of notes provided
- Oral examinations
- Note-taker for lectures
- Scribe for test taking
- Recorded lectures

Curriculum

- Reduce length of assignments
- Change skill or task
- Modify testing type or setting
- Allow extra time
- Teach study skills
- Teach sequencing skills
- o Teach memory strategies
- Write assignments in daily log
- o Teach peers how to be helpful

Fatigue

- Reduced schedule
- Planned rest breaks
- Schedule arranged for high cognitive demand tasks to be followed by less stressful coursework

Processing Delays

- Complex direction broken into steps
- o Repetition of pertinent information
- Cueing student to question prior to asking
- Use of precise language

Other Considerations

Home/School Relations

- o School counseling
- Scripts about the injury & hospitalization
- Schedule regular meetings for all staff to review progress & maintain consistency
- Schedule parent conferences every
- Parent visits/contact
- o Home visits

Disability Awareness

- Explain disabilities to other students
- o Teach peers how to be helpful
- $\circ \quad \text{Training for school staff} \quad$

This checklist serves as a starting point for identifying student needs and developing appropriate accommodations. Because rapid changes take place after a brain injury, the plan must be frequently reviewed and updated to meet the changing needs of the student. Be sure to review and change the plan as frequently as needed.





Connect with JAN

Email: jan@AskJAN.org Online chat at AskJAN.org Phone: 800.526.7234 (voice) • 877.781.9403 (TTY)

JAN is funded by a contract with the Office of Disability Employment Policy, U.S. Department of Labor.



Under the Americans with Disabilities Act (ADA), an accommodation is considered any modification or adjustment to a job or work environment that enables a qualified person with a disability to apply for or perform a job.

Accommodations are highly cost effective.

Data collected by JAN reveal that **59 percent of accommodations cost nothing**, while the median, one-time expenditure for those that do is \$500—an expense that most employers report pays for itself many times over through reduced insurance and training costs and increased productivity.

JAN is the leading source of free, expert, and confidential guidance on workplace accommodations and the ADA.

> Ask us. We can help! AskJAN.org



CONCUSSION CLINICAL TRAJECTORIES

A Model for Understanding Assessment, Treatment and Rehabilitation

COGNITIVE/FATIGUE

Cognitive difficulties include decreased concentration, increased distractibility, difficulty learning/retaining new information or decreased multitasking abilities. Sometimes accompanied by increased fatigue as the day progresses.

VESTIBULAR

Impairments of the vestibular system - the balance center of the brain - affect one's ability to interpret motion, coordinate head and eye movements, or stabilize vision upon head movement.

OCULAR

Ocular dysfunction occurs when the movement of the eyes in tandem, or binocular eye movement, is affected. This may result in difficulties bringing the eyes together, or moving one's eyes to track motion.

POST-TRAUMATIC MIGRAINE

Post-traumatic migraine symptoms include headaches, nausea, and/or sensitivity to light or noise.

CERVICAL

Sometimes, the concussive blow affects the extra-cranial region including the neck and/or spinal cord. An injury of this type may lead to ongoing headaches.

ANXIETY/MOOD

This occurs when someone has a hard time turning his or her thoughts off, being particularly ruminative, of suffering from excessive worry or concern.



UPMC LIFE CHANGING MEDICINE

SIX TYPES OF CONCUSSION



FACTS

- * Symptoms will be broad and generalized during the first week following concussion and will generally include symptoms like headache and fatigue.
- * After the first week, if symptoms persist, they will tend to fall into one of the 6 clinical trajectories.
- st There could be more than one trajectory type present.
- * Specific trajectory and outcome depends on several factors:
 - Direction of force (linear vs. rotational)
 - Location of impact
 - Amount of force involved
 - Pre-injury risk factors

ACTIVE TREATMENT

Research is showing that active, specialized treatment – focused on specific symptoms – helps the brain recover from injury.

- * Neuropsychology
- * Vestibular Physical Therapy
- * Exertional Physical Therapy
- * Physical Medicine and Rehabilitation
- * Neuro-optometry/ Neuro-ophthalmology
- 🔻 Orthopedist

RISK FACTORS (which may delay recovery)

- * History of prior concussions
- * Motion sickness
- * Visual problems
- * Learning or attention issues

* Neurosurgery

- 🔻 Neuroradiology
- * Chiropractic
- * Cognitive Therapy/ Speech Language Pathology

- Migraine history
- Gender (female)
- * Age (younger children tend to take longer to recover)

Source: Kontos, A.P. Collins, M.W., (2018). Concussion: A Clinical Profile Approach to Assessment and Treatment.











Brain Links is supported by the Administration for Community Living (ACL) of the U.S. Department of Health and Human Services under Grant No. 90TBSG0024-01-00 and in part by the TN Department of Health, Traumatic Brain Injury Program.

CDC'S ONLINE TRAINING FOR HEALTHCARE PROVIDERS

HEADS UP

HEADS UP to Healthcare Providers is a free online training developed by CDC and the American Academy of Pediatrics. The goal of the training is to provide an overview of the evidence-based recommendations outlined in the CDC Pediatric mTBI Guideline and to equip healthcare providers with practical strategies to integrate these recommendations into clinical practice.

WHAT YOU WILL LEARN

By the end of the training, you will be prepared to:

- st Discuss what happens to the brain during and after an mTBI
- * Identify at least three best practices related to diagnosis of mTBI
- * Devise an appropriate management plan for pediatric patients with mTBI
- * Describe prevention strategies for pediatric mTBI

FOLLOW THE URL TO BEGIN

HTTPS://WWW.CDC.GOV/HEADSUP/PROVIDERS/TRAINING/











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Research Summary and References Support for the Toolkit

TOOLKIT

This toolkit, and specifically the *Concussion Management Protocol*, were developed based on the research summarized below. The research supports educating practitioners (rationale for the **Reference** section), properly evaluating, monitoring and referring patients (rationale for the **In-Office** section) and properly educating those with mTBI/ TBI (rational for the **Send-Home** sections).

CHILDREN:

Healthcare providers outside hospitals are on the front lines:

Most (82%) of those 0 to 17 years will seek initial care with their primary care physician (Arbogast, et al., 2016). Since most of our incidence data comes from Emergency Department's (ED's), we are significantly underestimating the extent of the TBI issue (Study included over 8,000 patients).

The very young are frequently not diagnosed or treated:

The newest pediatric mTBI guidelines recommend using an age-appropriate validated concussion scale (Lumba-Brown, et al., 2018), but one does not exist yet that focuses on children five and under. We must look for additional signs in children five years and under. For this age range, parents endorse the typical symptoms from the ACE, but in answer to an open-ended question, 82% also reported additional symptoms (Suskauer, et al., 2018), including:

- Appetite changes
- * Behavioral dysregulation
- * Decreased engagement

- Bladder incontinence (Enuresis)
- Increased dependence
- * Stomachaches

* Disrupted sleep

The study also concluded that it is important to monitor behavior dysregulation over time. At first, parents saw disengagement, and then behavior dysregulation emerged and persisted. Behavioral dysregulation was among most commonly reported symptoms and was still present at the time of the evaluation (over one month post).

Children with TBI may develop or have ongoing concerns and should be monitored (for years):

They are more likely to have a variety of health/academic issues compared to those with no TBI (Haarbauer-Krupa, Lee, et al., 2018). The highest prevalence are:

- * Learning disorders
- * ADD/ADHD
- * Speech Language problems

- * Developmental delay
- Anxiety
- * Bone, joint or muscle problems

Children with mild (Taylor, 2015) and moderate and severe (Schwartz, 2003) injuries are more at risk for persistent behavior problems. The risk rises with severity of the mTBI and younger age at injury. Even in children whose injuries were significant enough to show skull or brain tissue damage on imaging, only one-fourth received any rehabilitations services afterward and only one-fourth received a neuropsychological assessment. None of the children received early intervention or special education preschool services after their TBI (Haarbauer-Krupa, Lundine, et al., 2018). This study concludes:

Healthcare providers should provide information to parents on what to watch for and long term implications.

- * Healthcare providers should make appropriate referrals at the time of diagnosis.
- * Referral to rehabilitation can help with transition to preschool.

Another study (Niedzwecki, et al., 2018) concluded that even though children did not receive inpatient care, some will still benefit from rehabilitation for subsequent problems, including memory and learning issues (that were not pre-existing).

This study also found that medical issues at the time of injury, like elevations or depressions of Intracranial pressure (ICP), unstable blood pressure, unstable oxygenation, delayed nutrition or seizures, can impact the child's IQ at 12 months.

The study's recommendation for trauma treatment is that rehab services be included early in the continuum – this would include consultation early in the ICU or acute care settings and referrals to an outpatient concussion clinic.

In the first year after injury, a substantial portion of children with moderate or severe TBI have unmet or unrecognized healthcare needs, with cognitive services being most frequent among these. Because of this finding, the authors recommended that cognition be screened in the primary care setting (Slomine, et al., 2006).

Reason for unmet needs:

- Lack of a physician's recommendation or referral
- * Failure of parent follow-up
- Ҟ Cost
- * Not provided in the school settings

Children with all levels of impairment had educational needs, while those with less severe injuries were at greater risk of being underserved (Kingery, et al., 2017).

Earlier age at time of injury produces more functional impairment (Taylor, et al., 2015). The more severe the injury and the younger age at injury, the greater the need for monitoring and follow up (Anderson, Catroppa, Dudgeon, 2006; Anderson, Catroppa, Haritou, 2006).

On the first visit, provide educational materials, accommodations for return to school and recommend a follow up visit (at which time appropriate referrals can be made):

Many children did not even visit a healthcare provider in the year following their injury (Slomine, et al., 2006).

Ongoing family support is important:

Family support is important because those with family dysfunction/poor coping, the child had greater dysfunction (Schwartz, 2003; Anderson, Catroppa, Dudgeon, et al., 2006; Taylor, 2008).

Families also reported needing information, emotional support and access to community-based services (Jones, 2017).

Schools need the support/recommendations of healthcare providers:

Teachers are not adequately trained to identify brain injuries and issues related to them (Davies, et al., 2013).

On specialized testing, children with TBI tend to show specific patterns of deficit that will not be revealed through standard special education testing. A neuropsychological evaluation will pick up these patterns. In a study of mild complicated TBI (with orthopedic controls), children who were injured before age 6 and were about 5 years post injury were tested. Both groups were within normal limits on most cognitive, language and reading measures; but they had some differences in verbal IQ, receptive

language and reading comprehension. The biggest differences were in pragmatic language (which leads to social issues), story retell, and word fluency (Haarbauer-Krupa, King, et al., 2019).

Schools will not provide all of what a child needs (Niedzwecki, 2018). Schools are only required to provide those services that directly relate to academics.

The gap in academic achievement widens over time (compared with non-injured classmates) (Ewing-Cobbs, 2006; Farmer, 1997; Taylor & Yeates, 2002; Todis & Glang, 2008; Todis, Glang, Bullis, et al., 2011; Wagner, et al., 2006). So, if children with TBI do not qualify for services at first, they should be referred again if they continue to have difficulties.

"Children who receive systematic transition services a part of their medical care are more likely to be identified for specialized support services at school, such as speech therapy (Haarbauer-Krupa, Ciccia, et al., 2017).

Use of the ACE tools (screening tool and Care Plan) "increased patient follow-up and improved recall of and adherence to ED discharge recommendations (Zuckerbraun, 2014)."

Pediatric Guideline:

Also see the CDC Pediatric Guideline (Lumba-Brown, et al., 2018) on mTBI in this toolkit for 19 sets of recommendations, with these 5 key take away points:

- 1. Do not routinely image pediatric patients to diagnose mTBI.
- 2. Use validated, age-appropriate symptom scales to diagnose mTBI.
- 3. Assess risk factors for prolonged recovery, including history of mTBI or other brain injury, severe symptom presentation immediately after the injury, and personal characteristics and family history (such as learning difficulties and family and social stressors).
- 4. Provide patients and their parents with instructions on returning to activity customized to their symptoms.
- 5. Counsel patients and their parents/caregivers to return gradually to non-sports activities after no more than 2-3 days of rest.

Consequences of brain injury for all ages:

Once a person has one brain injury, the risk for another increases, and the risk increases with each subsequent injury. A person with a brain injury is also more likely to be incarcerated (or involved with the criminal justice system) (Farrer & Hedges, 2011; Shiroma, et al., 2012; Williams, et al., 2010; Im, et al., 2014), to have psychiatric issues ((McCarthy, et al., 2006; Kaponen, et al., 2002; Zgaljardic, et al., 2015), to be involved with substance abuse (Kreutzer, et al., 1996), and to be socially isolated (Morton & Wehman, 1995; Hawthorne, et al., 2009). Long-term psychiatric disorders are associated with greater risk for substance abuse (Zgaljardic, et al., 2015). Prior TBI has been identified as a potential contributing factor to domestic violence (Romero-Martinez & Moya-Albiol, 2013). Not surprisingly, TBI is found in female victims of domestic violence (Corrigan, et al., 2001).

ADULTS

Follow up and education are important:

Findings from a study (Seabury, et al., 2018) of follow-up care that was provided to people at 11 Level 1 trauma centers across the country:

- Less than half received TBI educational material at discharge or saw a health care practitioner within 3 months after injury.
- * Only 27% were called by 2 weeks.
- Follow-up care varied by site, from 19% to 72%.

- For those with a positive CT scan, over one-third had not seen a medical practitioner for followup.
- Even among those with 3 or more moderate to severe post-concussive symptoms, only about half saw a medical practitioner within 3 months.
 - Of those that did, 80% reported that it was helpful. The majority saw a general practitioner and 38% saw a neurologist. Only 15% reported visiting a clinic specializing in TBI care.

A few conclusions from the paper:

- * "Failure to follow-up with patients could have adverse consequences, as simply providing educational materials to patients with mTBI is associated with improved outcomes."³⁵
- "Our findings reveal the consequences that may result from the absence of systems of follow-up care for patients with mTBI and concussion. They also highlight an apparent lack of appreciation by many clinicians of the substantial symptom and life burdens experienced by a significant proportion of patients with injuries labeled mild."

Use of the ACE tools (screening tool and Care Plan) "increased patient follow-up and improved recall of and adherence to ED discharge recommendations (5-21 year olds) (Zuckerbraun, 2014)."

Unmet Needs:

Poor psychosocial health was reported by a substantial portion in a study at one year post injury TBI may cause decades lasting vulnerability to psychiatric illness in some individuals. They were most susceptible to depression, delusional disorders and personality disturbances. This study highlights the importance of psychiatric follow up even decades (30 years) later (Kaponen, et al., 2002). Heinemann found unmet needs at 7 years. The most prevalent were improving memory and problem solving, increasing income and improving job skills (Heinemann, et al., 2002).

Also see the Updated Mild Traumatic Brain Injury Guideline for Adults in this toolkit.

Model of 6 types of concussion and active treatments (pediatric and adult):

There is now a great body of evidence supporting the 6 types of concussion and the active treatments for each type. A good resource to start with is *Concussion: A Clinical Profile Approach to Assessment and Treatment* by Kontos and Collins (2018) and *A comprehensive, targeted approach to the clinical care of athletes following sport-related concussion* (Collins, et al., 2013).

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TRAUMATIC BRAIN INJURY/CONCUSSION

CHANGES TO WATCH FOR OVER TIME:

- Headaches
- Changes in sleep patterns
- Fatigue
- Changes in vision
- Balance, coordination changes, dizziness
- Mood swings, gets mad easily
- Changes in personality
- Not feeling like themselves
- Trouble with attention and thinking
- Memory problems, especially short term
- Depression/Anxiety
- Difficulty handling stress
- Inappropriate behavior
- Grades dropping, falling behind in class
- Changes in work performance





Bringing together professionals to recognize the far-reaching and unique nature of brain injury and to improve services for survivors.





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