

CDC: Pediatric Concussion: What You Need To Know

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Clinical Context

Mild traumatic brain injury or concussion in children created a marked and increasing public health burden, accounting for more than 2 million outpatient visits and nearly 3 million emergency department (ED) visits from 2005 to 2009. Postconcussive symptoms may last longer than 2 weeks or even longer than 3 months in some children, resulting in impaired physical, cognitive, and psychological function.

Although consensus guidelines are available for mTBI management in adults, there have not previously been any broad, evidence-based, clinical guidelines developed in the United States regarding diagnosis, prognosis, and management/treatment of pediatric mTBI. The CDC therefore commissioned a comprehensive review of scientific evidence on pediatric mTBI and issued evidence-based recommendations for healthcare professionals (HCPs), using a rigorous scientific process. The 19 included recommendations were each assigned a level of obligation (must, should, or may) according to confidence in the evidence, and they target HCPs in primary care, outpatient specialty, inpatient, and emergency care settings in the United States who provide care for children 18 years and younger with mTBI.

Study Synopsis and Perspective

The CDC has issued the first evidence-based clinical guideline in the United States for diagnosing and managing concussion or mTBI from all causes in children. The guidance includes 19 sets of recommendations on the diagnosis, prognosis, and management/treatment of pediatric mTBI.

Several previous guidelines in the field have been consensus-based, and some have focused on only sports concussion or only adults.

Co-author Matthew J. Breiding, PhD, team lead, division of unintentional injury prevention, CDC, Atlanta, Georgia, told *Medscape Medical News* that limiting the duration of rest in the first days after an injury is one of the most important messages of the guideline.

Providers should counsel patients "to return gradually to nonsports activities after no more than 2 to 3 days of rest," he said.

Rest has been central to treating mTBI and a way to prevent another, potentially worse, TBI, but there is little evidence on the best time to start rest and optimal duration, he explained.

"While some scientific findings indicate that rest or reduction in cognitive and physical activity is beneficial immediately following mTBI, there is also evidence to suggest that limiting cognitive and physical activity beyond several days can worsen symptoms," Dr Breiding said.

The guideline was published online September 4 in *JAMA Pediatrics*.^[1]

Most Comprehensive Review of Pediatric mTBI

The guideline, called for by Congress and written by lead author Angela Lumba-Brown, MD, and the Pediatric Mild Traumatic Brain Injury Guideline Workgroup of the CDC, was based on a systematic literature review that covered 25 years of research.^[2] Recommendations were drafted using American Academy of Neurology methods.

Researchers used a broad definition of mTBI for the guideline.

"Specifically, pediatric patients were included with Glasgow Coma Scale scores of 13 to 15 with or without the complication of intracranial injury on neuroimaging and regardless of potentially requiring a hospital admission and/or neurosurgical intervention," they wrote.

Dr Breiding says the guideline "represents the most comprehensive review of pediatric mTBI scientific evidence to date and provides evidence-based recommendations for healthcare professionals caring for children."

It also applies to patients, caregivers, school professionals, and sports programs, he added.

He prioritized these key recommendations for providers:

- Refrain from routinely imaging children to diagnose mTBI. Clinical evaluation of the child with possible mTBI should weigh multiple risk factors for further injury against the risks associated with radiation exposure and possible sedation, according to the guidelines.
- Use validated, age-appropriate symptom scales in diagnosis. For instance, the Standardized Assessment of Concussion should not be the only one used to diagnose mTBI for children aged 6 to 18 years.
- Assess for and treat postconcussive symptoms, including headache, dizziness, and irritability, as well as cognitive and physical symptoms.

- Assess risks for sustained recovery, including history of mTBI or other brain injury, severe symptoms immediately after the injury, and personal characteristics and family history, such as learning difficulties and family and social stressors.
- Provide instructions about returning to activity appropriate for patients' symptoms. For example, providers should advise patients to resume full activity "when they return to pre-morbid performance if they have remained symptom-free at rest and with increasing levels of physical exertion," the guideline stated.

Mild Traumatic Brain Injury in Kids Is Not Benign, Needs Follow-Up

Two neurosurgery experts praised the authors but wrote in an accompanying editorial that widespread adoption of the CDC guideline faces a major hurdle in the United States without a standardized system of care for adults or kids who have had a TBI.

Michael McCrea, PhD, ABPP, department of neurosurgery, Medical College of Wisconsin, Milwaukee, and Geoff Manley, MD, PhD, department of neurosurgery, University of California in San Francisco, noted: "A 2018 report indicated that nearly half of patients with mTBI treated at major level I trauma centers had no medical follow-up following discharge, even those with persistent symptomatology. Our ultimate goal, both in pediatric and adult populations, should be the deployment of a precision medicine approach to TBI that accounts for all factors known to influence the acute, subacute, and chronic phases of mTBI and which is harnessed to a multidisciplinary care delivery system."

The guidelines come in light of a gradual understanding over 2 decades by providers and the public that mTBI is not a benign condition as once thought but has lasting physical, neuropsychiatric, and cognitive effects that affect quality of life and functional ability, Drs McCrea and Manley wrote.

They noted, "Pediatric mTBI is now recognized as a major public health problem, bringing nearly 1 million children to US emergency departments annually."

HCPs, parents, and others can learn more about mTBI, including signs and symptoms and how to safely return to school and sports, at the CDC HEADS UP website.⁽⁴⁾

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Recommended Highlights

- The 19 sets of recommendations address best practices for mTBI imaging, symptom scales, cognitive testing, and standardized assessment for diagnosis; history and risk factor assessment, monitoring, and counseling for prognosis; and patient/family education, rest, support, return to school, and symptom management for treatment.
- The CDC has created concise, user-friendly, guideline implementation materials and plans to make updates as the body of evidence grows.
- Clinicians should use the single-term mTBI, defined as an acute brain injury from external physical forces including ≥ 1 of the following: confusion or disorientation, loss of consciousness for ≤ 30 minutes, posttraumatic amnesia ≤ 24 hours, and/or other transient neurological abnormalities such as focal signs, symptoms, or seizure; and Glasgow Coma Scale score (GCS) 13-15 after 30 minutes postinjury or when seen for health care.
- Routine head computed tomography (CT) or magnetic resonance imaging (MRI) to diagnose mTBI is unwarranted; clinicians should weigh multiple risk factors for further injury (age < 2 years; vomiting; loss of consciousness; severe mechanism of injury; severe or worsening headache; amnesia; nonfrontal scalp hematoma; GCS < 15 ; clinical suspicion for skull fracture) against the risks for radiation exposure and possible sedation.
- Single-photon emission computed tomography (SPECT), skull radiographs, or biomarkers (outside of a research setting) should not be used for acute evaluation of suspected or diagnosed mTBI.
- Diagnosis should use validated, age-appropriate symptom scales, including scales other than the Standardized Assessment of Concussion for children aged 6-18 years.
- These include the Graded Symptom Checklist for children ≥ 6 years, the Post-Concussion Symptom Scale in a computerized neurocognitive battery for high school athletes, and the Health and Behavior Inventory and the Post-Concussion Symptom Inventory for children younger than high school age.
- Clinicians should evaluate risks for delayed recovery, such as history of mTBI or other brain injury, intracranial lesion, cognitive impairment, severe symptoms immediately after injury, neurological or psychiatric disorder, and personal characteristics and family history, including learning problems and family and social stressors.
- Clinicians should advise patients and families that 70%-80% of children with mTBI do not have significant difficulties lasting $> 1-3$ months after injury but that each child's recovery from mTBI is unique and follows its own course.
- To assess recovery, clinicians may use validated cognitive testing in children and/or balance testing in adolescent athletes.
- Children whose symptoms do not resolve as expected with standard care (within 4-6 weeks) should undergo appropriate assessments and/or interventions.
- The family should be counseled about warning signs of more serious injury, description of injury and expected course, monitoring postconcussive symptoms, preventing further injury, managing cognitive and physical

activity/rest, return to play/recreation and school, and follow-up instructions.

- A key recommendation is that children should gradually return to nonsports activities after no more than 2-3 days of rest because evidence suggests that longer limitation of cognitive and physical activity may worsen symptoms.
- Patients should restrict physical and cognitive activity during the first several days after mTBI, then resume a gradual schedule of activity that does not exacerbate symptoms, with close monitoring of symptoms.
- After patients successfully resume gradually increasing activity, clinicians should offer an active rehabilitation program with progressive reintroduction of noncontact aerobic activity that does not exacerbate symptoms.
- Instructions about return to physical and academic activities should consider patients' symptoms, with resumption of full activity when they return to premorbid performance and are symptom-free at rest and with increasing levels of physical exertion.
- Clinicians may evaluate the extent and types of available social support to children with mTBI and advise caregivers and educators that social support is a key element.
- Return-to-school protocols and the need for additional educational supports should be customized according to the severity of postconcussion symptoms and determined jointly by medical and school-based teams.
- Children with prolonged symptoms and academic difficulties despite active treatment should be formally evaluated by a specialist in pediatric mTBI.
- Using validated clinical decision-making rules, clinicians in the ED should consider head CT in children with severe headache, particularly when associated with other risk factors and worsening headache.
- Children with painful headache may receive ibuprofen or acetaminophen, but the family should be counseled regarding the risks for analgesic overuse, including rebound headache.
- Except in a research setting, children with acute headache should not be treated with 3% hypertonic saline.
- Children with chronic headache after mTBI should be referred for multidisciplinary evaluation and treatment, with consideration of analgesic overuse as a contributory factor.
- Children with evidence of persistent vestibulo-oculomotor dysfunction may be referred for vestibular rehabilitation.
- Clinicians should provide guidance on proper sleep hygiene methods.
- Children with emerging or continuing sleep problems despite appropriate sleep hygiene may be referred to a sleep disorder specialist.
- Clinicians should attempt to determine the etiology of cognitive dysfunction within the context of other mTBI symptoms and should recommend treatment for cognitive dysfunction that reflects its presumed etiology.
- Children with persistent cognitive dysfunction may be referred for a formal neuropsychological evaluation to help determine the cause and recommend targeted treatment.

Clinical Implications

- According to new CDC guidelines by Lumba-Brown and colleagues for pediatric mTBI, routine head CT or MRI to diagnose mTBI is unwarranted; the clinician should weigh multiple risk factors for further injury against the risks for radiation exposure and possible sedation before considering these tests.
- Children should gradually return to nonsports activities after no more than 2 to 3 days of rest because evidence suggests that longer limitation of cognitive and physical activity may worsen symptoms.
- Implications for the Healthcare Team: The CDC has created concise, user-friendly, guideline implementation materials and plans to make updates as the body of evidence grows.

CME Test

References

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