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Considerations for Athletic Trainers: A Review of Guidance on Mild Traumatic Brain Injury Among Children From the Centers for Disease Control and Prevention and the National Athletic Trainers' Association

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The Centers for Disease Control and Prevention recently published an evidence-based guideline, "Diagnosis and Management of Mild Traumatic Brain Injury (mTBI) Among Children." The guideline has many applications for athletic trainers. The following commentary provides considerations for athletic trainers regarding the guideline in conjunction with the current National Athletic Trainers' Association position statement "Management of Sport Concussion" and the "Consensus Statement on Concussion in Sport—The 5th International Conference on Concussion in Sport Held in Berlin, October 2016."

In the fall of 2018, the Centers for Disease Control and Prevention (CDC) published an evidence-based guideline, "Diagnosis and Management of Mild Traumatic Brain Injury (mTBI) Among Children" (CDC Pediatric mTBI Guideline; http://www.cdc.gov/HEADSUP).[1] The CDC Pediatric mTBI Guideline was created to inform health care providers about mTBI and to support a paradigm shift from consensus to evidence-based recommendations for this injury. The CDC Pediatric mTBI Guideline clearly identified mTBI as a public health concern in children and outlines the need for more comprehensive approaches to care and management. It also highlighted that providing clinical guidance to health care providers is critical to improving the health and safety of this vulnerable population. The primary purpose of the CDC Pediatric mTBI Guideline was to supply recommendations concerning mTBI diagnosis, prognosis, management, and treatment among children (aged 18 years and under) to health care providers in all practice settings (eg, emergency care, primary care, inpatient, and outpatient settings).

The CDC Pediatric mTBI Guideline was developed with input from the Pediatric mTBI Guideline Workgroup, a federal advisory committee workgroup under the National Center for Injury Prevention Control's Board of Scientific Counselors composed of leading experts on the topic. Fields represented were athletic training, emergency medicine, family medicine, neurology, neuropsychology, neurosurgery, nursing, pediatrics, physical therapy, school health, and sports medicine. A rigorous systematic review[2] of the evidence was conducted to summarize pediatric mTBI research from the previous 25 years. Clinical recommendations were drafted on the basis of this evidence using a modified Grading of Recommendations, Assessment, Development and Evaluations (GRADE) method developed by the American Academy of Neurology.[3] Through this modified GRADE process, authors assigned a level of confidence (*high*, *moderate*, *low*, or *very low*) and 1 of the action levels to each recommendation:

- Level A: (Must do) Almost all patients in almost all circumstances would want the recommendation followed.
- Level B: (Should do) Most patients in most circumstances would want the recommendation followed.
- Level C: (May do) Some patients in some circumstances would want the recommendation followed.
- Level R: Do only in a research setting.

Six important clinical questions guided the systematic review of the evidence that served as the foundation for the CDC Pediatric mTBI Guideline's 19 sets of clinical recommendations. One important note is the use of the term *mTBI*. Although *concussion*, *minor head injury*, and *mTBI* are frequently used interchangeably, they have different connotations for families, researchers, and health

care professionals, which may result in misinterpretation. Therefore, the CDC Pediatric mTBI Guideline recommended the clinical use of the single term *mTBI*.[1]

Mild traumatic brain injuries are common among youth and high school athletes. Caused by a hit or jolt to the head or body that causes the head and brain to move rapidly back and forth, an mTBI is believed to trigger neuronal dysfunction involving a cascade of ionic, metabolic, and physiological events that ultimately produce functional impairments.[4–7] Although most athletes recover within 2 to 4 weeks of injury,[8] some experience prolonged physical symptoms and difficulty with learning, thinking, behavior, and emotion regulation.[8,9] Recovery time has been shown to be longer in adolescents than in young adults.[10] These problems can limit a child's ability to participate in regular activities such as school and physical exercise, which are important components of a child's life.

Each year, more than 800 000 children seek care for TBI, including mTBI, in US emergency departments.[11] This estimate includes patients with TBI who were treated and released. Thus, it is likely that this estimate primarily consists of patients diagnosed with mTBI. However, this estimate does not account for children with mTBI seen in other health care settings[12] (eg, primary care, urgent care, and specialty care facilities), nor does it account for patients with mTBIs that go unreported and untreated. More recent researchers have explored self-reported mTBI. For example, in a recent CDC study,[13] as many as 2.5 million high school students reported having had a sport- or physical activity–related concussion within the past 12 months. In addition, a study[14] in the field setting identified 39.8 concussions per 100 000 athlete-exposures annually.

Athletic trainers are primary health care providers for millions of young athletes nationwide with respect to the implementation and reinforcement of the practices recommended in the CDC Pediatric mTBI Guideline. Athletic trainers also play a key role in their communities regarding concussion education and can share the CDC Pediatric mTBI Guideline with other sports health care team members, parents, coaches, and schools. The following is an overview of the aspects of the CDC Pediatric mTBI Guideline that athletic trainers (ATs) can consider for their practices. It is important to note that the CDC Pediatric mTBI Guideline reinforces many constructs in the National Athletic Trainers' Association's (NATA's) sport concussion position statement[15] and the "Consensus Statement on Concussion in Sport."[8] The recommendations in the CDC Pediatric mTBI Guideline and the NATA position statement are compared in Table 1.

OVERVIEW AND APPLICATION FOR ATHLETIC TRAINERS

Six important clinical questions regarding mTBI diagnosis, prognosis, management, and treatment outlined in the systematic review provided the framework for the 19 sets of recommendations in the CDC Pediatric mTBI Guideline. Key topics relevant to ATs in the recommendations are imaging, assessment tools, patient and family education, determining the risks for prolonged recovery, and returning to activity (including sports and treatment strategies) and school. Available CDC resources that may aid in applying these guidelines in various clinical settings are provided in Table 2. Note that the CDC Pediatric mTBI Guideline did not supersede either the NATA position statement on concussion[15] or the "Consensus Statement on Concussion in Sport"[8] but was meant to complement them in order to improve the management of children with mTBI.

Imaging

Imaging techniques were discussed in the first recommendation sets. The CDC Pediatric mTBI Guideline recommendations highlighted the importance of avoiding routine imaging (including skull radiographs, computed tomography scans, single-photon emission computed tomography scans, and magnetic resonance imaging) for diagnostic purposes in pediatric patients with suspected mTBI. Instead, the CDC recommendations stated that imaging should be used only if deemed necessary on the basis of validated clinical decision rules, such as those developed by the Pediatric Emergency Care Applied Research Network.[16] These decision rules seek to identify patients at risk for intracranial bleeding or other more serious injuries. The CDC recommendations regarding mTBI are consistent with those in both the NATA position statement[15] and the "Consensus Statement on Concussion in Sport"[8] concerning the inability of current imaging techniques to diagnose concussion. Although ATs cannot order imaging, they are often tasked with educating families or responding to inquiries about these approaches and decisions. The CDC Pediatric mTBI Guideline and supporting evidence can help ATs to educate patients and families appropriately about the role of imaging in mTBI diagnosis. The tools listed in Table 2 may be useful resources for ATs' educational purposes.

Assessment Tools

The recommendations in the CDC Pediatric mTBI Guideline related to concussion-assessment tools were consistent with those in the NATA position statement[15] and the "Consensus Statement on Concussion in Sport."[8] For example, the CDC Pediatric mTBI Guideline recommended a multimodal concussion-assessment model that includes validated symptom scales, neurocognitive tests, and balance tests. This approach reinforced the recommendations of the NATA position statement[15] and the "Consensus Statement on Concussion in Sport"[8] regarding the multimodal concussion-assessment process and the many domains that may be affected by mTBI. No tool should be used in isolation to diagnose an mTBI, and all tools should be used to support the clinical examination, which is the criterion standard for diagnosis; a comprehensive assessment battery has been shown to be much more sensitive to mTBI.[17,18]

The CDC recommendations also supported the continued use of an age-validated and appropriate symptom checklist for mTBI evaluation in children.[19,20] Gioia et al[19] outlined the properties of various checklists, which may help guide ATs in selecting appropriate tools.[18]

A similar recommendation reiterates that ATs should use valid, reliable, and age-appropriate neurocognitive tests and familiarize themselves with the test properties. Few differences in the effectiveness of commonly used neurocognitive tests were evident, but early administration after

Table 1. The CDC Pediatric Mild Traumatic Brain Injury Guideline Summary and Relationship to the NATA Position Statement on Sport Concussion Continued on Next Page

Topic (Recommendation[s])	Summary of CDC Recommendations[1]	Level of Confidence	Action Level[a]	Corresponding NATA Position Statement Recommendation(s)[15]
Imaging (1–4)	• No routine use of CT or MRI for diagnosis	Moderate	B	NA: ATs cannot order imaging, but they can assist in educating the patient and family about the role and value of imaging in diagnosis
	• Use decision rules to determine use of CT	Moderate	B	
	• Do not use skull radiographs or SPECT for acute evaluation or diagnosis	Moderate	B	
Assessment (5, 6)	• Use age-appropriate, validated measures (eg, symptom scales, cognitive tests)	Symptom scales: moderate	B	31: ATs should use age-appropriate, validated concussion-assessment tools in younger populations
		Cognitive tests: moderate	C	32: ATs should assess postconcussion symptoms in pediatric patients using age-validated, standardized symptom scales and formal input from supervising adults
	• Do not use the SAC as the sole diagnostic tool	Moderate	B	15: ATs should diagnose concussions through clinical evaluations supported by assessment tools
				16: If a rapid concussion assessment is needed, ATs can use the SAC with a motor-control and symptom-scale evaluation
	• Do not use biomarkers for diagnosis outside of research applications	High	R	NA: ATs cannot conduct blood or cerebrospinal fluid testing but can use this information to educate and inform stakeholders and families regarding the insufficient clinical utility of these markers
Patient and family education (7)	• Counsel patients and families that most children do not have difficulty beyond 1–3 mo after mTBI	Moderate	B	2: ATs should ensure appropriate parental and coach education on key aspects of concussion management (eg, prevention, mechanism, recognition, referral, physical and cognitive restrictions, appropriate return to sport, and ramifications of improper management)
				7: ATs should document the athletes' and parents' understanding of concussion signs and symptoms and the athlete's responsibility to report
Determining the risk for prolonged recovery (8, 9)	• Complete premorbid history assessment preinjury or as soon as possible postinjury	Moderate	B	3: ATs should document any potential modifying factors that could delay normal return to play postconcussion
				10: ATs should complete baseline examinations with athletes at high risk for concussion before the competitive season
				12: Baseline examinations should include a variety of clinical assessments: in particular, clinical history and symptom checklist
	• Counsel families of children with certain comorbidities that recovery may be delayed	Moderate	B	15: ATs should diagnose concussions through clinical evaluations supported by assessment tools and consider the results when predicting mTBI prognosis
	• Screen for risk factors for persistent symptoms	Moderate	B	
	• May use validated decision rules for emergency department patient counseling	High	C	

Table 1. Continued From Previous Page

Topic (Recommendation[s])	Summary of CDC Recommendations[1]	Level of Confidence	Action Level[a]	Corresponding NATA Position Statement Recommendation(s)[15]
Return to activity (10–14)	• Use a combination of tools: eg, validated symptom scales, cognitive tests, and balance tests to assess recovery	Combined tools: moderate	B	17: ATs should administer a daily focused examination to monitor the concussion recovery
		Symptom scales: moderate	B	12: Baseline examinations should consist of a variety of clinical assessments, including a clinical history and symptom checklist
		Cognitive testing: moderate	C	15: ATs should diagnose concussions through clinical evaluations supported by assessment tools
		Balance testing: moderate	C	32: ATs should assess postconcussion symptoms in pediatric patients using age-appropriate, standardized symptom scales and formal input from supervising adults
				3: ATs should document any potential modifying factors that could delay normal return to play after concussion. Although not specifically cited, premorbid medical history, demographics, and injury history should be considered.
	• Monitor children at risk for persistent symptoms and refer if symptoms do not resolve as expected with standard care	Monitor: high	B	23: ATs should carefully monitor athletes with persistent symptoms that do not resolve in a normal progression and who may benefit from other therapies
		Refer: moderate	B	
	• Educate patients and families about warning signs, prevention, and key management strategies for physical activity and rest, return to play, and follow-up	High	A	2: ATs should ensure appropriate parent and coach education on key aspects of concussion management (eg, prevention, mechanism, recognition, referral, physical and cognitive restriction, appropriate return to participation, and ramifications of improper management)
	• Provide information regarding initial rest followed by gradual reintegration into activities and offer an active rehabilitation program	Initial rest: moderate	B	9: ATs should properly document all aspects of concussion management, including evaluations, treatments, return-to-play progression, and physician communications
		Gradual activity: moderate	B	
		Active rehabilitation: high	B	39: ATs should instruct patients to avoid physical or mental exertion that exacerbates symptoms during the acute stage of concussion injury
				40: ATs should ensure that concussed athletes are excused from physically demanding team activities and any activity requiring physical exertion until full medical clearance is obtained
	• Inform patients and families that return to full activities should only be allowed when clinical assessment performance is at premorbid levels and patients are symptom free at rest and exertion	Moderate	B	22: ATs should only begin the physical-exertion progression after the athlete demonstrates a normal clinical examination, concussion-related symptom resolution, and preinjury scores on motor-control and neurocognitive function tests
	• Assess social support	Moderate	C	
Return to learn (15)	• Counsel patients and families about gradual return to school	Moderate	B	8: ATs should maintain regular communication with the managing physician regarding the athlete's status after concussion
				34: ATs should work with administrators and teachers to construct and approve appropriate academic accommodations as part of the concussion-management plan
	• Customize protocols to symptom severity and as jointly determined by the medical and school-based teams	Moderate	B	39: ATs should instruct patients to avoid physical or mental exertion that exacerbates symptoms during the acute stage of concussion injury
	• Assess needs of patients with prolonged symptoms for educational supports	High	B	41: School administrators, counselors, and teachers should be made aware of an athlete's injury and academic accommodations during recovery
	• Monitor postconcussion symptoms and academic progress	High	B	
	• Support should be adjusted as needed on an ongoing basis and children with persistent symptoms and academic difficulties despite an active treatment approach should be referred for a formal evaluation by a pediatric TBI specialist	Adjust supports: moderate	B	
		Refer: moderate	B	

Table 1. Continued From Previous Page

Topic (Recommendation[s])	Summary of CDC Recommendations[1]	Level of Confidence	Action Level[a]	Corresponding NATA Position Statement Recommendation(s)[15]
Severe or persistent dysfunction (16–19)	• Observe and consider head CT in children presenting with severe headache associated with other risk factors for more severe TBI in accordance with validated clinical decision rules	High	B	23: ATs cannot order imaging, but they should carefully monitor and appropriately refer patients with persistent symptoms that do not resolve in a normal progression 21: ATs should review each patient's medical history after injury; patients with multiple previous concussions, developmental disorder, or psychiatric disorder may benefit from referral to a neuropsychologist
	• Use emergent neuroimaging for patients under observation for headache with acutely worsening symptoms	High	B	
	• Offer nonopioid analgesia for patients with painful headache and counsel patients and families about overuse	Moderate	B	36: ATs should instruct patients to avoid medications other than acetaminophen after an acute concussion, and all current medications should be reviewed by a physician
	• Do not administer 3% hypertonic saline for headache outside the research setting	Moderate	R	
	• Refer patients with chronic headache to a headache specialist	High	B	
	• Refer patients with persistent vestibulo-oculomotor dysfunction to a vestibular-therapy program	Moderate	C	
	• Provide patient guidance on sleep hygiene to facilitate recovery	Moderate	B	38: ATs should inform patients and families that there is typically no need to wake the patient during the night unless instructed by a physician, because rest is currently the best practice for concussion recovery
	• Refer patients with persistent sleep problems to a sleep disorder specialist	Moderate	C	
	• Attempt to determine the cause of cognitive dysfunction and refer for a formal cognitive evaluation	Determine cause: moderate Evaluate and treat: high	B C	

Abbreviations: AT, athletic trainer; CDC, Centers for Disease Control and Prevention; CT, computed tomography; MRI, magnetic resonance imaging; mTBI, mild traumatic brain injury; NA, not applicable; NATA, National Athletic Trainers' Association; SAC, Standardized Assessment of Concussion; SPECT, single-photon emission computed tomography; TBI, traumatic brain injury.

[a] Through the modified Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) process, the CDC assigned an action level to each recommendation: Level A: (Must do) Almost all patients in almost all circumstances would want the recommendation followed; Level B: (Should do) Most patients in most circumstances would want the recommendation followed; Level C: (May do) Some patients in some circumstances would want the recommendation followed; Level R: Do only in a research setting. The level of confidence was based on the workgroup's assessment of the cogency of the rationale supporting each recommendation and was assigned on the basis of 5 domains: rationale is logical, evidence statements are accurate, axioms are true, related evidence is strong and applicable, and internal inferences logically follow. Levels are *high*, *moderate*, *low*, or *very low*.

Table 2. The CDC Implementation Resources for the Pediatric mTBI Guidelines

Key Topic	CDC Pediatric mTBI Guideline Recommendation(s)[1]	Implementation Resources Available from the CDC
Imaging	1–4	Not applicable; see the Pediatric Emergency Care Applied Research Network decision rules[a]
Assessment	5–6	"Acute Concussion Evaluation"[b] "CDC Pediatric mTBI Guideline," checklist[b]
Patient and family education	7	"Caring for Your Child's Concussion" (patient discharge instructions)[b] "How Can I Help My Child Recover After a Concussion?" (recovery tips for parents)[b] "CDC HEADS UP" campaign (online trainings and educational tools)[c]
Determining risk for prolonged recovery	8, 9	"CDC Pediatric mTBI Guideline," checklist[b]
Return to activity	10–14	"Caring for Your Child's Concussion" (patient discharge instructions)[a] "How Can I Help My Child Recover After a Concussion?" (recovery tips for parents)[b] "CDC HEADS UP" campaign (information for parents, coaches, and athletes)[c]
Return to learn	15	Letter to schools to be completed by health care providers[b] "CDC HEADS UP to Schools" initiative[c]
Severe or persistent dysfunction	16–19	"CDC Pediatric mTBI Guideline," checklist[b]

Abbreviations: CDC, Centers for Disease Control and Prevention; mTBI, mild traumatic brain injury.

[a] http://www.pecarn.org.

[b] https://www.cdc.gov/traumaticbraininjury/PediatricmTBIGuideline.html.

[c] https://www.cdc.gov/HEADSUP.

an mTBI was emphasized. The CDC Pediatric mTBI Guideline also stated that even though the Standardized Assessment of Concussion and neurocognitive tests are useful concussion-assessment tools, they do not alone provide the comprehensive information ATs need to make appropriate clinical decisions and therefore should not be used in isolation. The Standardized Assessment of Concussion is a mental-status assessment that is most sensitive within the first 48 hours of injury[20,21]; it should not be used as a primary marker of recovery beyond this point. The CDC Pediatric mTBI Guideline did not extensively expand on other measures. However, according to the NATA position statement[15] and the "Consensus Statement on Concussion in Sport,"[8] balance, coordination, and motor-control assessments such as the Balance Error Scoring System are an integral part of the concussion evaluation and the standard of care for ATs. In addition, unlike the NATA position statement, the CDC Pediatric mTBI Guideline did not take a stand on baseline testing. Thus, ATs should follow best practices and mandates within their setting concerning baseline testing and determine whether it should be part of the protocol at their institution.

With respect to testing biomarkers for diagnosing concussion, the CDC Pediatric mTBI Guideline stated that blood and cerebrospinal fluid biomarkers are not yet ready for clinical use. Although some studies[22,23] suggested biomarkers that might be useful in the future, none are available for use outside of the research setting. Athletic trainers can help to dispel myths presented in news stories and via social-media outlets and Web sites about the use of biomarkers for mTBI diagnosis. Overall, ATs should confirm that the tools and measures used in their clinical practice are valid, reliable, and age appropriate.[24–26]

Patient and Family Education

Oftentimes, ATs are asked to educate athletes, parents, coaches, and school professionals about mTBI. Education specifically reinforcing the likelihood of positive outcomes after mTBI in children is therefore highlighted in the CDC Pediatric mTBI Guideline recommendations.[27] Athletic trainers can also convey that despite factors that may increase the risk of prolonged recovery or persistent sequelae, every athlete's mTBI recovery is different. They can help inform the development and support the implementation of a customized plan for a pediatric athlete's return to school and activity after an mTBI. Activity plans may include daily symptom monitoring, suggestions for daily activities to pursue and avoid, and communication with teachers or other school personnel to adapt educational needs to the patient's symptoms.

Similar to the NATA position statement[15] and the "Consensus Statement on Concussion in Sport,"[8] the CDC Pediatric mTBI Guideline offered advice on educating athletes and their families about warning signs and other home care instructions. Education provided to families improved patient follow-up and access to school-based accommodations during recovery.[28]

Determining the Risk for Prolonged Recovery

The CDC Pediatric mTBI Guideline supported the use of preseason evaluations as a critical opportunity to identify athletes with medical histories that may indicate those at increased risk for concussion. In particular, ATs can help identify athletes with medical histories that may increase their risk for persistent symptoms after mTBI through preseason screening for an mTBI history, lower cognitive ability, neurologic or psychiatric disorder, learning difficulty, increased preinjury stress, and family and social stress. In many cases, ATs have regular contact

Figure. Concussion information for athletes and families.

with athletes after injury and know their athletes' histories and previous experiences well. This important information and other contextual factors can be used by health care providers to inform their mTBI management and treatment plans.

Return to Activity (Including Sports)

Health care providers including ATs can take action to support the recovery and return-to-activity (for both sports and nonsports) process for athletes. The CDC recommendations supported current protocols in the NATA position statement[15] and the "Consensus Statement on Concussion in Sport"[8] to observe an initial period of physical and cognitive restriction (but not complete or strict rest) in the acute phase after mTBI. After this initial period, the CDC recommendations advised counseling patients to resume activities that do not exacerbate symptoms. After a gradual resumption of activity, a progressive reintroduction to aerobic exercise can be implemented under close supervision. During this process, patients should also be counseled that full return to activity can only occur when they remain asymptomatic at rest and with exertion. It is important to note that the appropriate duration of rest and return-to-activity timing are not well understood. "Active rehabilitation" approaches after mTBI are becoming more common; however, clinical trials are necessary to validate the most appropriate age-specific protocols. Furthermore, patients should be fully returned to school before pursuing a full return to physical activity. The "Consensus Statement on Concussion in Sport"[8] expanded on these concepts of rehabilitation and activity beyond the discussion in the NATA position statement[15] and is an essential resource for ATs.

When a patient's symptoms do not resolve after 4 to 6 weeks of the standard of care, health care providers should refer him or her to specialists in accordance with symptoms. Referrals may include but are not limited to a headache specialist, sleep specialist, neurologist, or neuro-

psychologist for appropriate assessments or interventions (or both) that may aid in the return to activity. The interventions may be academic, social, psychological, or physical or in other areas deemed clinically appropriate. In support, ATs can help monitor daily symptoms and perform specific screenings and assessments that may be part of the battery (eg, balance testing, visual-vestibular screening) throughout the recovery and treatment process with the goal of the patient's safe return to activity.

Return to Learn or School

The management and treatment recommendations in the CDC Pediatric mTBI Guideline expanded on many intervention recommendations in the NATA position statement[15] and the "Consensus Statement on Concussion in Sport."[8] The CDC provided an extensive set of recommendations regarding the return-to-school process and psychosocial considerations that may be useful to ATs. For example, customized return-to-school and return-to-activity plans based on patient symptoms can help guide ATs assisting with the recovery process. As noted earlier, Table 1 provides an outline of the key recommendations. Table 2 suggests resources that may be useful in implementing return-to-learn strategies.

Severe or Persistent Dysfunction

The CDC Pediatric mTBI Guideline offers information regarding the use of a multidisciplinary team to help better understand etiologic and treatment paradigms for both severe and persistent dysfunction. These patients may experience chronic headaches, vestibulo-ocular dysfunction, and cognitive dysfunction. Athletic trainers are often the individuals tasked with daily assessment and recovery monitoring. According to the NATA position statement[15] and the "Consensus Statement on Concussion in Sport,"[8] an important step for patients with both severe and persistent dysfunction is appropriate and timely referral to appropriate specialists for suitable assessments and interventions.

SUMMARY AND CONCLUSIONS

The CDC Pediatric mTBI Guideline reinforced many of the best practices related to mTBI response and management outlined in the NATA position statement[15] and the "Consensus Statement on Concussion in Sport."[8] Athletic trainers play an integral role in the health care of children with mTBI and are often in a position to use many of these recommendations and refer athletes for follow-up care as needed. Clinical recommendations, such as those outlined in the CDC Pediatric mTBI Guideline, will only promote athlete safety if applied on a large scale. Earlier authors[29,30] found that although ATs valued guidelines, the education and uptake of guidelines and implementation tools by ATs was limited. Therefore, the CDC created free and publicly available educational tools to support ATs' use and implementation of the CDC Pediatric mTBI Guideline. These tools include online training via continuing education, as well as handouts for athletes and families (Figure). To access the CDC Pediatric mTBI Guideline and educational tools, visit http://www.cdc.gov/HEADSUP.

DISCLAIMER

The findings and conclusions in this manuscript are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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