

Viewpoint

The Speech-Language Pathologists' Role in Mild Traumatic Brain Injury for Early Childhood-, Preschool-, and Elementary School-Age Children: Viewpoints on Guidelines From the Centers for Disease Control and Prevention

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Purpose: Traumatic brain injury (TBI) impacts millions of children each year, with those between birth and 4 years of age being 1 of the highest incidence groups. To address gaps in service provision specifically for children with mild TBI (mTBI), the Centers for Disease Control and Prevention (CDC) recently released guidelines for providers.

Method: The goal of this commentary is to deliver viewpoints on the application of the CDC guidelines directly to speech-language pathology clinical practice, with special attention paid to assessment, symptom monitoring, and intervention using a family-centered approach to care for infants, toddlers, preschoolers, and early elementary students with mTBI.

Results: In all pediatric practice settings, speech-language pathologists (SLPs) are a critical component of the care team for children who experience mTBI and should participate in symptom monitoring, assessment, intervention, education, and advocacy for this population.

Conclusions: SLPs can use the CDC guidelines to advocate for their role in the care of young children with mTBI. In addition, SLPs can use the guidelines to create a framework for clinical care provision when working with young children with mTBI. Much work is needed to advance evidence-based practices for this population, and dissemination of current clinical practices could help to close this gap.

Traumatic brain injury (TBI) impacts at least 1.8 million children annually in the United States (Haarbauer-Krupa, Lee, Bitsko, Zhang, & Kresnow-Sedacca, 2018). Children between birth and 4 years of age are among the highest incidence groups to experience a TBI (Taylor, Bell, Breiding, & Xu, 2017), with falls and

nonaccidental head trauma being the most common mechanisms of injury for these young children. For pediatric patients seen in the emergency department, one in 220 will be diagnosed with a mild TBI (mTBI; Meehan & Mannix, 2010). In 2004, the World Health Organization Collaborating Centre Task Force on Mild Traumatic Brain Injury (Carroll, Cassidy, Holm, Kraus, & Coronado, 2004), along with several other stakeholders, recommended the following definition for mTBI: “an acute brain injury resulting from mechanical energy to the head from external physical forces including: (1) one or more of the following: confusion or disorientation, loss of consciousness for 30 minutes or less, posttraumatic amnesia for less than 24 hr, and/or other transient neurological abnormalities such as focal signs, symptoms, or seizure; (2) Glasgow Coma Scale score of 13–15 after 30 minutes postinjury or later upon presentation for healthcare” (Carroll et al., 2004, p. 115). Whereas most children with a single mTBI will make a full recovery within 1–3 months (Barlow et al., 2010),

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Editor-in-Chief: Julie Barkmeier-Kraemer

Editor: Kristie Spencer

Received December 19, 2018

Revision received February 12, 2019

Accepted February 20, 2019

https://doi.org/10.1044/2019_AJSLP-18-0295

Disclosure: The authors have declared that no competing interests existed at the time of publication.

approximately 14%–21% will demonstrate persistent symptoms that may last months after the injury (Barlow et al., 2010; Yeates et al., 2009).

Children with TBI have a higher occurrence of other health conditions, including learning disability, attention-deficit/hyperactivity disorder, and speech and language disorder (Haarbauer-Krupa, Lee, et al., 2018). Given the collective risk of TBI in children and the pairing of TBI with speech, language, cognitive, and learning challenges, it is likely that speech-language pathologists (SLPs) in all pediatric settings (e.g., schools, medical clinics) will have children with mTBI on their caseloads. According to American Speech-Language-Hearing Association's (ASHA) Scope of Practice for the Speech-Language Pathologist, the SLP has the appropriate training to be included in the assessment and treatment of children with mTBI, as well as taking part in "prevention, advocacy, education, administration, and research" (ASHA, 2016).

General guidance exists for evidence-based assessment and treatment practices for moderate-to-severe pediatric TBI (e.g., ASHA Practice Portal; Mei et al., 2018). Yet, there has been limited attention paid to rehabilitative guidelines specific to mTBI in children. To address the gaps in identification, assessment, and treatment that specifically exist in pediatric mTBI, the Centers for Disease Control and Prevention (CDC) recently released guidelines for the management of this population (Lumba-Brown et al., 2018a). These guidelines are based on the best available literature (Lumba-Brown et al., 2018b) and provide specific recommendations for diagnosis, prognosis, and treatment/management for children who sustain an mTBI (see Lumba-Brown et al., 2018a, for specific recommendations and supporting literature). Though an important step in managing children who sustain an mTBI, these guidelines were not written to address the involvement of specific professionals or to provide focused attention on the impact of mTBI in particular pediatric age groups. Therefore, the goal of this commentary is to discuss the application of the CDC guidelines directly to speech-language pathology clinical practice, with special attention paid to assessment, symptom monitoring, and intervention using a family-centered approach to care. We will specifically focus on application of the CDC guidelines as they relate to young children with mTBI (i.e., through elementary school) and provide suggestions to SLPs advocating for their involvement with this population.

Application to Clinical Practice

Assessment and Symptom Monitoring

The CDC's acute assessment recommendations highlight the need to use age-appropriate and validated symptom rating scales and cognitive testing to aid in the diagnosis of mTBI during the acute and chronic recovery phases. Psychometric evidence for the use of symptom scales in children younger than school age is weak compared to the evidence for older school-age children and adolescents (Gioia, Schneider, Vaughan, & Isquith, 2009; Gronwall,

Wrightson, & McGinn, 1997). Self-reporting symptoms are inherently problematic for young children (ages 0–5 years) who are not yet able to describe their symptoms to their parents or medical providers or evaluate changes they may be experiencing in their own abilities following such an injury. In addition, it is unclear if symptom reporting using the checklists commonly administered to older children and adults underestimates the rate of postinjury impairment in young children. For example, it is possible that adult proxies (parents or teachers) who complete these forms may have lower expectations for younger children or may be unable to detect the subtle differences that can occur following an mTBI (Bernard, McKinlay, Krieser, Testa, & Ponsford, 2017). It is also important to note that, for children who have experienced mTBI due to nonaccidental head trauma, symptom reporting may be withheld by care providers for a number of complex reasons (A. Paul & Adamo, 2014).

Bernard and colleagues recently published findings (Bernard et al., 2017; Bernard, Ponsford, McKinlay, McKenzie, & Krieser, 2016) that discuss the use of a structured interview for parents of preschool-age children who experienced an mTBI as an alternative or a supplement to traditional symptom monitoring inventories. Within these articles, the researchers highlighted the importance of including a trained professional in the interview process. For the SLP working with toddlers and preschool-age children, the use of such a structured interview to evaluate symptoms should be considered. Specifically, interview prompts that focus on eating and sleep patterns, changes in mood (e.g., amount of crying, the ability to be comforted/soothed), and regression in speech, language, and play abilities (Bernard et al., 2016, 2017) could be most informative to gather information about young children post-mTBI.

In addition to symptom identification and progress monitoring using dynamic approaches, the SLP may conduct in-depth assessment for those children who are found to have prolonged symptom presentation outside the normal window of recovery (1–3 months). Just as in symptom monitoring, psychometrically appropriate assessment tools for young children, specifically those with mTBI, have yet to be developed. Given this gap, the SLP could use assessments that have been used in young children with acquired brain injury broadly, including the Bayley Scales of Infant and Toddler Development (Bayley, 2006; Engelmann & Jordan, 2012) and the Vineland Adaptive Behavior Scales (Engelmann & Jordan, 2012; Sparrow, Cicchetti, & Saulnier, 2016). Some tools exist, which have been used in children with mTBI: the Mullen Scales of Early Learning (Bassan et al., 2007; Keenan, Hooper, Wetherington, Nocera, & Runyan, 2007; Mullen, 1995) and the Glasgow Coma Outcome Scale–Pediatric Revision (Beers et al., 2012). Regardless of whether normative data are or are not available for young children with mTBI, these measurements may provide objective, descriptive data regarding performance on a variety of developmentally appropriate tasks and thus, combined with interview and parent/caregiver report, may

assist in informing treatment plans. However, it is important to note that the measures mentioned above may not be sensitive to the more subtle deficits associated with mTBI, an issue that has been noted in the adult TBI literature and warrants consideration in the pediatric mTBI population (Levin & Diaz-Arrastia, 2015).

Assessment and Symptom Monitoring in Medical and Clinical Settings

For the SLP in a pediatric medical setting, knowledge and skills in the area of cognition and language allow the SLP to play a unique role in assessing and/or monitoring young children with mTBI. Because of an SLP's specialized training in functional assessment of cognition, language, and speech, he or she can provide critical consultation with physicians and other health care team members. The SLP can also support and coordinate with the early intervention and/or school-based educational team for children who are in formal school settings and are experiencing prolonged symptomatology.

Preschool-age children with mTBI are most likely to enter the health care system through the emergency department (Arbogast et al., 2016), so the treating physician must ensure that these children are then connected to a professional who can provide sufficient monitoring during the recovery period. For younger children who are not yet enrolled in elementary school, monitoring of symptoms after an emergency department visit would appear to fall to the pediatrician, particularly because children in this age group are less likely to be referred to a specialty medical clinic or other professional familiar with acquired brain injury (Spaw et al., 2018). However, in a recent study, pediatricians indicated that they did not believe they were the best clinicians to provide specific, long-term monitoring for children who were seen at the hospital following mTBI (Keenan, Bratton, & Dixon, 2016). Furthermore, pediatricians reported concerns because other appropriate clinicians (e.g., neuropsychologists) were not readily accessible (Keenan et al., 2016). The SLP working in a medical setting could be a critical provider to fill this gap between acute hospital care and follow-up monitoring in the community and home settings.

Children who experience a mild, moderate, or severe TBI before entering formal schooling are not likely to be identified in preschool settings or to receive support services at least 1 year after injury (Haarbauer-Krupa, Lundine, DePompei, & King, 2018). The SLP, therefore, can play a crucial role in educating caregivers about the need for monitoring once official medical care has been completed. SLPs can encourage parents/guardians to watch for some specific mTBI-related cognitive symptoms, including changes in the child's ability to attend to common tasks and remember new information, sleep problems, or increased anxiety. In addition, SLPs should include screening questions that ask about mTBI when taking a case history for a developmental language or speech evaluation, because parents/guardians may not think to include this information if they are not specifically asked. We know that children with

TBI (of all severity levels) tend to have a higher incidence of co-occurring language and learning problems (Haarbauer-Krupa, Lee, et al., 2018), so gathering this information is important as we seek to understand better the potential impacts of an mTBI on developmental processes (Moser, Davis, & Schatz, 2018) and aid with children's transition to traditional school settings.

Assessment and Symptom Monitoring in School-Based Settings

SLPs in educational settings are most likely to encounter children with mTBI with the beginning of formal schooling. Although this might occur in the preschool setting for those that receive itinerant services, it is more likely that the SLP would encounter children with mTBI in kindergarten and early elementary school. In the early grades in particular, SLPs are well suited to identify any lingering effects of mTBI as early as possible by monitoring children's functional performance in developmentally appropriate activities. This is especially true for children who are already receiving speech-language services due to other diagnoses. In these situations, the SLP has the benefit of understanding the young child's baseline performance on cognitive-communication tasks in order to contextualize any change in function. The ability to reference the child's baseline is critically important given how little is known regarding recovery trajectory for young children who experience an mTBI. In cases where the SLP is familiar with a student, the SLP might be the first professional to note the impacts of the injury and initiate an evaluation.

To capture children who are not currently receiving school-based or itinerant speech-language pathology services, the SLP should be an immediate and active member of a school's return-to-learn team (CDC, 2017). When a student is identified as having experienced an mTBI, the SLP can utilize appropriate symptom monitoring tools or language/cognitive assessments to monitor academic performance and socioemotional behaviors in school and recommend accommodations and/or intervention when appropriate. As a part of the school-based team, the school SLP can also facilitate discussions among other health care providers (e.g., physicians, nurses) and parents. Training and availability support the idea that SLPs would be valuable members of school-based teams for students with mTBI. SLPs may be more available and accessible in early intervention and school settings (ASHA, 2018) compared to school psychologists (Jimerson, Stewart, Skokut, Cardenas, & Malone, 2009) and neuropsychologists who specialize in pediatrics (Baron, Wills, Rey-Casserly, Armstrong, & Westerveld, 2011).

Long-Term Monitoring, Recovery, and Prognostic Outcomes

The CDC guidelines relating to prognosis and recovery trajectory postinjury identify the need to educate patients and families that most children will recover fully following an mTBI and that parents should expect a return to baseline performance between 1 and 3 months (Lumba-Brown et al., 2018a). It is also important, however, to note that

the CDC guidelines highlight the role of premorbid risk factors that appear to be related to prolonged recovery. Risk factors include, but are not limited to, preexisting speech, language, and learning disorders (Lumba-Brown et al., 2018a) and potentially socioeconomic status (Keenan et al., 2007). Furthermore, although this recovery trajectory has been documented in the literature for school-age children and adolescents, very little is known about how very young children (infants, toddlers, and preschoolers) recover from mTBI (Bernard et al., 2016; Moser et al., 2018), making recovery prognostication of the young child with mTBI particularly challenging.

Very young children are in rapid and variable states of developmental change and have minimal “baseline” behaviors upon which to rate performance. Rapid development, paired with the limited understanding of the impact of mTBI on brain development in young children, makes dynamic and functional assessment practices rooted in a developmental framework particularly important. As the SLP may be the most consistent person providing services for the child, other than the classroom teacher, the SLP is in a truly unique position to support documentation of symptom resolution and impact of the mTBI during the first months following an injury.

Treatment: Family-Centered Care

The CDC’s treatment recommendations highlight the need for individualized treatment planning with collaborative teams and the specific importance of academic accommodations for children post-mTBI.

Toddlers and Preschool Children

For toddlers and preschool-age children who experience mTBI, there are few specific evidence-based recommendations regarding management and treatment. Currently, the ability to manage cognition, language, and behavior of preschool-age children who experience mTBI is limited because (a) the developmental consequences that may (or may not) be associated with an mTBI experienced during these years are not fully understood and (b) sensitive, validated assessment tools to document changes and deficits in this age group are lacking. Based on the best available evidence at this time, SLPs involved in work with young children who have experienced an mTBI should consider principles of family-centered early intervention (e.g., Iversen, Shimmel, Ciacara, & Prabhakar, 2003; Tomasello, Manning, & Dulmus, 2010). This approach aligns both with the CDC recommendations for collaborative and individualized intervention (Lumba-Brown et al., 2018a) and best practice in early childhood intervention broadly (D. Paul & Roth 2011). In a family-centered model, the SLP could serve as a facilitator for the family, providing needed education to guide monitoring of later development, teaching strategies to complete functional daily routines in the home, and assisting in identifying medical and allied health providers to address specific concerns as they arise.

Elementary School–Age Students

For children who are of school age when they experience an mTBI, several resources outline important steps needed when returning a child to school (e.g., Center on Brain Injury Research and Training; CDC, 2017; see also the complementary article in this issue that focuses on older school-age students). In cases where a student has returned to school with persistent symptoms requiring modifications or accommodations of the academic environment, the SLP is an important and practical member of the team. The school-based SLP has a strong understanding of functional modifications that can be made to curricular activities for students with language and learning problems. In cases where children exhibit prolonged symptoms or the inability to return to preinjury levels of educational support, the SLP would be the appropriate person to begin formal assessment of language and cognitive abilities, referring to other professionals as needed.

For students with mTBI who are already receiving speech-language pathology services for other concerns, it is important for the clinician to consider adjusting the intervention approach to account for changes in cognitive performance that is likely different from baseline. For example, consider a child who struggles with expressive vocabulary and then suffers an mTBI and associated deficits, including difficulties attending in distracting environments. This additional impacting factor would require the clinician to scaffold attention to continue to support the original expressive vocabulary goal. In addition, the SLP can educate the classroom teacher regarding behavioral cues that could indicate a young student is experiencing symptom exacerbation and create an opportunity for the student to take a break (e.g., going to the drinking fountain, going to the nurse’s office to briefly rest in a less stimulating environment). The SLP can also scaffold a young student’s ability to self-monitor symptoms through the teaching and use of a key phrase such as “I don’t feel good” or “I’m tired.” The use of such a phrase can serve several purposes, such as allowing the young student to identify when support is needed, to practice self-directed requests for simple environmental changes that would support classroom success, and to allow for real-time documentation of symptom resolution in the academic setting.

Advocacy

SLPs should use the guidelines developed by the CDC as a starting point to advocate for their participation in mTBI programs in all practice settings and to advocate for their role on interdisciplinary teams for students who return to school after mTBI. The speech-language pathology community should continue to educate pediatricians, coaches, school nurses, and early childhood providers on the scope of practice and knowledge and skills that SLPs can bring to the mTBI management process and highlight how their specialized training can help facilitate care for young children who experience an mTBI. Such advocacy efforts should occur at the local and national levels to

support the inclusion of SLPs in the assessment and treatment of young children following mTBI.

Future Directions

The publication of the CDC guidelines is a critical first step in improving care of children with mTBI. It is, however, starkly apparent that much work is needed to truly understand the impact of mTBI on infants, toddlers, preschoolers, and young school-age children in both the short and long terms following injury. Research that specifically explores the speech, cognitive, and communication needs for young children who experience persistent symptoms after the typical recovery period is virtually unexplored (Bernard et al., 2017; Moser et al., 2018). As a result, evidence-based guidelines regarding the most efficacious and appropriate symptom monitoring, testing, and intervention practices are unavailable to clinicians in medical and school settings working with this population. At this time, ASHA provides practice evidence (e.g., ASHA Practice Portal) for moderate-to-severe pediatric TBI but has not yet published supportive materials for mild injuries. Without the development and evaluation of assessments and treatments specifically designed for this age group and injury characteristics, best practice cannot be implemented.

At this time, a variety of resources exist to educate and manage children following sports-related injury (e.g., CDC Heads Up Program); however, we must improve our understanding of how other injury mechanisms (e.g., falls, motor vehicle accidents, playground injury, abuse) might impact outcomes particularly for young children (Taylor et al., 2017). In addition, the varying nature of language and cognitive development during this peak time of growth makes the monitoring and management of young children with mTBI especially challenging, but also critically important because of the potential for an injury to impact a child during a critical stage of development.

Finally, various issues exist related to the long-term monitoring of young children post-mTBI. The challenges associated with long-term monitoring begin at the time of hospital care with inconsistent reporting practices. To address this, identifying patients who may be in need of services—either through medical chart reviews or school-based documentations (e.g., preschool and day care intake forms)—will facilitate validated efforts to monitor symptoms and development long term (Arbogast et al., 2016). However, without appropriate baseline measurements of functioning, accurate and objective monitoring of change and prolonged symptoms may be difficult at best. An appropriate solution may be researched, aimed at understanding current clinical practices in a variety of settings and among collaborative rehabilitative teams to document clinical outcomes and specific services that appear to positively affect the recovery trajectory. Despite the challenges ahead, the application of the CDC guidelines to speech-language pathology practice provides a point of guidance and illumination as we work to improve the lives of children with mTBI.

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