

Concussion Competencies

Concussion Competencies:

*A Framework for School-Based
Concussion Management*

By

Arthur Maerlender,
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and Jonathan Lichtenstein

Cambridge
Scholars
Publishing



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This book first published 2020

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

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ISBN (10): 1-5275-4215-7

ISBN (13): 978-1-5275-4215-0

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Acknowledgements

The authors are grateful to the following people for their help and support with whom this would not have been possible.

To Laura Halvorsen, PsyD who provided fantastic editorial assistance; Todd Caze, MA, MEd for sharing his insights and data on ASI; Colleen Syron and Syron Design for amazing graphic design; and our friends at the Brain Injury Associations and Alliances. We want to specifically thank Peggy Reisher (Nebraska) and Steve Wade (New Hampshire) for belief and support in the need to help the brain injured and who gave us insights into a way to approach the topic. We would not have completed this without the encouragement of our many colleagues, and especially Bob Conder, Ted Davis and Cindy Pahr who helped to keep us believing we had something to contribute. Thank you to the students, teachers, and allied health professionals who have helped us understand what is needed in the way of information about concussions. Finally, we want to acknowledge Adam Rummens and CSP for their patience.



BACKGROUND

I. INTRODUCTION

Medical training is appropriately focused on the acute, emergent status of recently injured patients. However, once neurological emergency has been ruled out, the vast amount of time and effort dedicated to patient care is allotted to behavioral interventions, i.e., managing and monitoring the patient. In short, concussion management is behavioral management. As a form of secondary prevention, the aim of concussion management is prevention of a second injury; a prolonged recovery; and all other domains of risk associated with the aftermath of a concussion — social, psychological, medical, and behavioral.

There is considerable research on knowledge transfer and the effect of learning programs in concussion education (Mrazik et al. 2015; C. F. Providenza and Johnston 2009; C. Providenza et al. 2013).

Knowledge transfer refers to the methods of education. However, what knowledge should be transferred (taught) is largely undefined in practice and the literature.

Competencies are a combination of attributes such as knowledge, skills and attitudes that enable an individual to perform a set of tasks to an appropriate standard. Competencies offer a shared language for defining what is required of a profession.

Core competencies have been used to redefine curricula across the major health professions in recent decades. Competency-based education is felt to improve individual performance, enhance communication and coordination across courses and programs, and provide an impetus for faculty development, curricular reform, and leadership in educational innovation. In addition, explicitly specified, action oriented behavioral competencies can significantly enhance learning and assessment outcomes. It also can serve as the basis for certification processes (Calhoun, Ramiah, Weist, & Shortell, 2008).

In medical education, and in health promotion competency-based education is a means for improving learner and patient outcomes (Carraccio et al., 2016, p. 648), as well as informing advocacy for health promotion, building capacity in the workforce, developing and revising education courses, and providing a framework for credentialing (Moynihan et al, 2015). Thus, the work of defining and refining core knowledge competencies is important to the development of any field of practice and study.

This competency-based behavioral curriculum is the outgrowth of many years of experience managing concussions across a variety of settings, including schools, hospitals, and outpatient clinics. At their most specific, state statutes and laws require training in identification and management of concussions for school personnel. However, limited curricula exist that address details of those processes to ensure staff are sufficiently prepared to function effectively. The competencies presented in this curriculum are informed by the first author's work on the Institute of Medicine's Committee on Sports-Related Concussion in Youth. This committee's work was the basis for a thorough review of peer-reviewed research on concussions through 2013 (Institute of Medicine (IOM) and National Research Council (NRC). 2013).

The Competencies presented are arranged in three broad categories:

I. Biological aspects of Concussion

1. Basic Neuroanatomy
2. Biomechanics of Injury
3. Concussion Basics

II. Behavioral Factors

4. Risk Factors
5. Prevention and Concussions
6. Evaluation & Assessment Practices
7. Best Practices for Testing
8. Post-Acute & Chronic Treatment Approaches

III. Programmatic Considerations

9. Individual Recovery & Role of the School
10. Concussion Management Programming

II. DEVELOPMENT OF THE COMPETENCIES

The development of competencies grew out of several projects designed to effectively prepare individuals involved with identifying and managing youth with concussion. The authors conducted a study on the use of these ten knowledge competencies as they relate to the behavioral management of concussion in schools. Trainings with school personnel were conducted using these competencies as learning objectives as the focus of the presentations. The use of the competencies served to streamline the education of the key stakeholders, to establish clear roles and responsibilities for the varying constituents and to equip individuals working with students following a concussion with the relevant knowledge to optimize outcomes. The majority of participants, were school allied health professionals working as related service providers in the schools where the trainings occurred, judged the use of the competencies to be informative and useful to their practice. Survey results both immediately following the training and at a 5-month follow-up were conducted. The greatest gains in knowledge were noted by those participants self-reporting the least amount of knowledge pre-training. Participants also ranked the perceived value and relative importance of each of the ten competencies.

Coincident with the writing of this book, the American Academy of Pediatrics (AAP) formed a consensus panel to help identify areas that needed to be addressed in pediatric concussion, particularly in regards to institutional initiatives (Giois et al 2016). The results of the process identified important elements of concussion programs and calls for enhanced professional development and training. The important topics identified were: the neurophysiology of mTBI, the effects of mTBI in school, recovery from mTBI, program or institutional policy considerations, forming interdisciplinary teams and the different "constituency" roles, injury identification, assessment and progress monitoring protocols, the evaluation of mTBI symptom status, academic, physical, and emotional interventions and "accommodations," and coordination of medical-to-school communication. Although the AAP was produced and published independently of this volume, it speaks directly to the rationale for setting these Competencies as they fit nicely into the framework presented here.

There are many stakeholders involved in concussion management. From our experience, we believe that all personnel working with students do not need the same level or type of information to demonstrate best practices in returning those students to the classroom and their prior level of performance. The development of competencies for specific personnel

would streamline processes while ensuring appropriate education. A broad corpus of knowledge that is not medically focused is clearly needed (Appendix 1). The competencies are organized into three broad categories (sections).

III. WHY FOCUS ON SCHOOLS?

The competencies were seen as a way to establish categories of knowledge that accurately pinpoint the skills and performance required of key stakeholders in the educational setting. Further, school-based management of concussion has distinct advantages that can be leveraged. Although public schools are often over-burdened with regulations and requirements regarding practice, concussion management in schools is effective for several reasons:

- Concussions affect school performance
- Nursing services are available at many schools. Nurses, as licensed health-care professionals, may provide assistance to students recovering from concussion
- Athletic trainers are available at many schools. Athletic trainers provide a first-responder service for sports-related concussions
- Concussion management requires regular monitoring. This monitoring is more easily accomplished in schools as students are already in attendance there
- Schools already have established behavioral approaches to address students with disabilities

This last point is an important one. Teachers and educators are already familiar with addressing student needs from a behavioral perspective. Such familiarity may come from general classroom experience and from working within specific models such as Response to Intervention (RTI; Fletcher, Francis, Morris, & Ryan, 2005) and Positive Behavioral Support (PBS; Carr & Sidenar, 2002; Gresham, McIntrye, Olson-Tinker, Dolstra, McLaughlin, & Van, 2004; Öğülmüş & Vuran, 2016). While these programs tend to focus on developmental and behavioral issues, their presence in school culture creates a consistent environment and a level of training that may be suited for concussion management. This familiarity could mitigate stressors associated with incorporating additional programming for students.

RESPONSE TO INTERVENTION (RTI)

The aim of Response to Intervention (RTI) is to improve student academic skills within the regular education setting; that is, without having to engage in the lengthy disability identification process. This type of intervention reduces the need for full clinical evaluations for students and staff procedures that are lengthy and expensive. In RTI, the student body is screened for performance on basic skills. Students are subsequently categorized into one of three levels of performance based on their percentile ranks from the screening. Students who are identified as “at-risk” receive enhanced regular education instruction, including additional time for instruction and minor programmatic changes. Should those students demonstrate progress with enhanced instruction, they continue with this instruction until they are able to meet curricular requirements without them. Such students are said to have responded to the intervention. Students scoring below the 10th percentile may require more in-depth clinical assessment, as they are possibly in need of specialized instruction (special education services through an IEP). When students face struggles in the return-to-learn process, their challenges can be addressed in a similar manner to the RTI model. The student’s needs in the classroom environment are assessed and appropriate adjustments are made. Management is altered depending upon the child’s response to ongoing monitoring. If the child is not responding to those adjustments, a more in-depth clinical assessment is provided to best direct care.

POSITIVE BEHAVIORAL SUPPORT (PBS)

Positive Behavioral Support (PBS) has become the most utilized and effective method of behavioral management in schools. PBS is rooted in behavior analysis; it focuses on prevention, active supervision, pre-correction, and explicit timing. It is primarily used to teach and manage maladaptive or problematic behaviors, although these methods can also facilitate language acquisition. This approach can be used when addressing common behavioral challenges associated with returning to learning after concussion.

WHAT ARE BEHAVIORAL APPROACHES IN SCHOOLS?

Response to Intervention (RTI)

- Based on screening, implement interventions
- Monitor
- If intervention works, continue
- If not, more in-depth clinical assessment

Positive Behavioral Support (PBS)

- ‘Anticipatory management’: look for opportunities for R+ (ABA)
- Identify antecedents and intervene before the chain starts
- Assessment of current behaviors critical
- Provide alternative behaviors to known contingencies

Concussion RTI

- Based on screening assessments to identify progress
- Monitor
- Adjust management based on response
- If not improving, more in-depth assessment

Concussion PBS

- Assess behavior and responses frequently
- Identify risks and positive responses
- Provide alternative (“replacement”) behaviors

IV. SCHOOL PROGRAMS AS ACUTE AND POST ACUTE “CLINICS”

Broadly speaking, concussion clinics serve two main functions: providing acute care services, or services immediately following an injury, and providing post-acute services, services occurring at some point later in recovery to those who do not recover in an expected amount of time. Some clinics provide both acute and post-acute services; others specialize in just one. Because school athletic programs are on the front line of the incidence of concussion, they often are in a position to identify acute or on-field injuries. Coaches, athletic trainers, and/or on-field medical staff may be in a position to identify these injuries. In this way, schools may provide some services commonly associated with acute care clinics.

Post-acute management may also be provided in the school setting. After an injury has been identified or diagnosed, school-based sports programs have an obligation to ensure athletes are returned to play as safely as possible. Athletic trainers, who are responsible for managing sports related injuries

including concussions, are more commonly part of school sports programs. Lastly, teachers and other school personnel will also need to manage the students as they return to the classroom after concussion.

ACUTE CLINICS

The vast majority of sports concussions are managed through school-based programs or clinics that mirror some professional league services. These programs are typically managed by certified athletic trainers (AT), with some oversight by a sports medicine or orthopedic doctor and consultation with other specialists. In most states, ATs are licensed to provide sports-medicine services under this supervision.

School-based clinics are designed to identify the injury and prevent further injury or prolonged recovery, primarily through management of activity levels in school and athletics. Thus, schools frequently identify and/or manage a large number of student athletes who are returning to both school and the playing field. Further, community medical professionals often rely on school procedures for post-injury and return-to-play assessments.

Consensus guidelines from several professional organizations converge on the idea that once student athletes have been diagnosed with a concussion, they should not return to athletics until their injury-related symptoms, cognition, and balance have returned to normal. Many school programs and some free-standing or medical clinics provide baseline testing as a means to enhance post-injury assessment.

Neuropsychologist Jeffrey Barth developed the concept of baseline testing for athletes. Baseline scores are obtained pre-season so they may be compared with testing done after an injury has occurred. Comparing the results of these tests facilitates decision-making regarding recovery.

All return-to-play guidelines recommend the athlete complete a series of increasingly challenging physical tests without return of symptoms before final clearance to play. These progressive physical tests are known as the step- wise progression. Recent recognition of the preeminence of academics to athletics for the student athlete has informed the guideline that returning to full classroom functioning, or return to learn, should be a prerequisite to returning to competition, or return to play.

All consensus statements agree that an interdisciplinary team of experts should oversee the return-to-play and return-to-learn processes. Ruling out other medical complications and assessing symptoms is typically within the

realm of physicians; conducting cognitive and neuropsychological testing, assessing affective status, and overseeing behavior management are the responsibilities of neuropsychologists; assessing balance and neuromuscular and vestibular function is the province of physical therapists and other specially trained allied health professionals. Visual functioning should be evaluated after a diagnosis of concussion; occupational therapists, optometrists, and neuro-ophthalmologists are experts in this area.

POST-ACUTE CLINICS

A service many post-acute clinics provide — but that school-based clinics typically do not — is the treatment of patients whose recovery is more complex and/or patients with a diagnosis of post-concussion syndrome (PCS). Estimates indicate that 70-90 percent of individuals recover from concussions within two to four weeks, with younger students taking the longest. Those individuals who don't recover in the typical time frame often experience a range of persistent symptoms, such as headache, dizziness, lethargy, poor sleep, difficulty reading or visual problems, cognitive complaints, anxiety, and depression. Young people are at school every day so their symptoms are often observable and managed more easily.

Searching the internet for concussion clinics will yield everything from physicians who offer ImPACT testing (computerized neuropsychological testing) to comprehensive programs that are part of large medical centers. The most well-known is the University of Pittsburgh Medical Center Sports Medicine Concussion Program (UPMC), which has served as the model for many concussion clinics. At UPMC, after a concussion has occurred, a neuropsychologist initially examines the patient for symptoms, cognition, and balance. Other models may have a registered nurse or athletic trainer complete the initial evaluation. The depth and quality of this evaluation are critical. Most importantly, a detailed history is also obtained. If indicated following the interview and examination, a referral is made for further assessment and treatment of any dysfunctional system. Emotional responses, behavior, cognition, headache, vestibular and neuromuscular difficulties, or vision problems may indicate dysfunction of a system.

In sum, the time course of concussion resolution is rapid, but the risks of repeat injury or prolonged recovery make close supervision and management important prevention strategies. Schools are where young people are every day, providing a location with already established processes through which students can be observed and managed. Thus, schools present the best and most consistent opportunity for active management of concussion.

V. MANUAL LAYOUT

We have attempted to make this manual user-friendly. At the beginning of each chapter specific learning objectives are identified. These learning objectives are felt to be the most important aspects of the text for the reader. These objectives were the focus of the knowledge test referred to in the study above. Key points are found at the end of each chapter that reinforces the learning objectives. Vignettes are sprinkled throughout to highlight concepts and enhance comprehension. These vignettes are taken from our own clinical cases and experiences. While intended primarily as a manual, it has served as a textbook for some classes.

Knowledge needs differ. A unique feature of this text is the identification of Constituent Competencies found in the table below. These Constituent Competencies indicate minimum specific knowledge elements that key personnel need to safely return students to the classroom and playing field following a concussion. The full chart of Constituent Competencies is listed in the Appendices. Each chapter begins with a Constituent Competencies chart specific to the information contained in the chapter (see Appendix II).

ICON KEY

	School Board/Superintendent/Principal
	Athletic Director/Coach
	LHP/Schl Nurse/Anc Health/AT (LHP = Licensed Healthcare Professional, Schl Nurse = School Nurse, Anc health = Ancillary healthcare - school-based OT, PT, SLP, Psychologist, Counselor, Special Ed, AT= Athletic Trainer)
	Teacher
	Parent/Caretaker/Student

EXAMPLE
CONSTITUENT

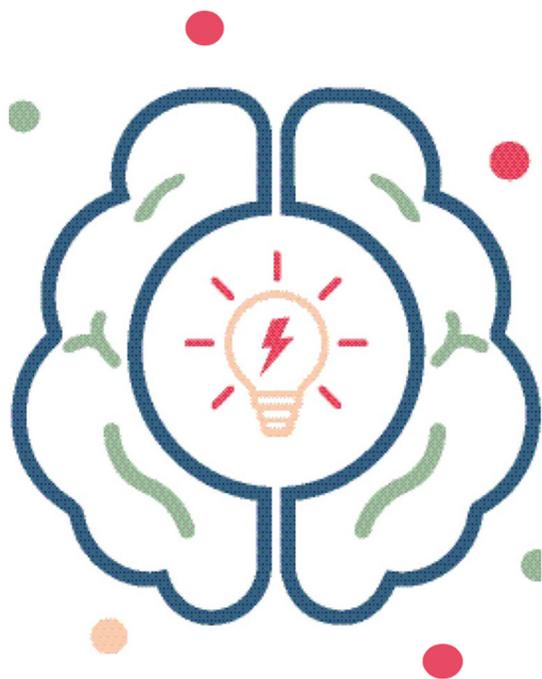


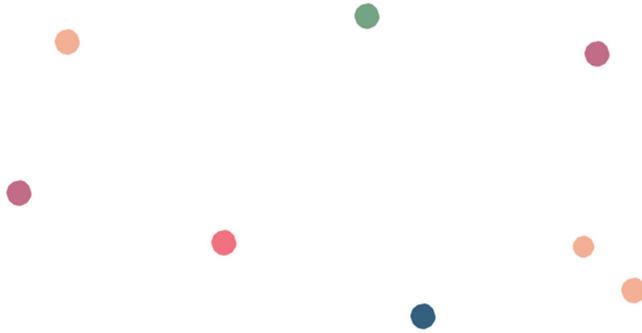
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II. Development of Competencies					  
III. Why focus on Schools?					
IV. Types of "Clinics"					

SECTION 1:

BIOLOGICAL ASPECTS OF CONCUSSION

Competencies 1, 2 & 3





COMPETENCY 1

Basic Neuroanatomy

This Competency discusses the building blocks of the brain — neurons and axons — and how these structures transmit information through the brain. It covers the different cortical lobes, functions of the brain, and ways in which the brain changes through developmental stages.



LEARNING OBJECTIVES:

- I. Be familiar with the general anatomy of the brain
- II. Identify the purpose of the functioning networks of the uninjured brain
- III. Understand critical periods of brain development and the impact of injury at different times

COMPETENCY 1 Basic Neuroanatomy



-
- I. What is the Brain?
 - II. Brain Development
 - III. Brain Development
Before and After Injury



Why is this important?

It can be easy to ignore an injury that cannot be seen. The basic dilemma of brain injury is that it is invisible, but manifests in behavioral changes that interfere significantly with functioning. Understanding some of the basics of neuroanatomy can inform the understanding of behavior when an injury is not visible. What is unseen is not necessarily uninjured.