

# Community Partnerships for Youth Concussion Care: Power of the Medical Neighborhood

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# Objectives

1. Articulate knowledge of post-concussion evaluation & management to maximize primary care services to “typical” concussions
2. Introduce a clinical pathway for the management of the “typical” concussion recovery
3. Describe tools to assist concussion evaluation and management
4. Contribute to Return to School process in collaboration with local schools’ Concussion Management Team (CMT)
5. Identify conditions to refer to concussion specialist

**\*\*Offer opportunities for additional, in-depth training via Concussion Academy Skill Training (CAST) Program**



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**SIGN UP!**

# Concussion as ADHD in 1980

## ADHD

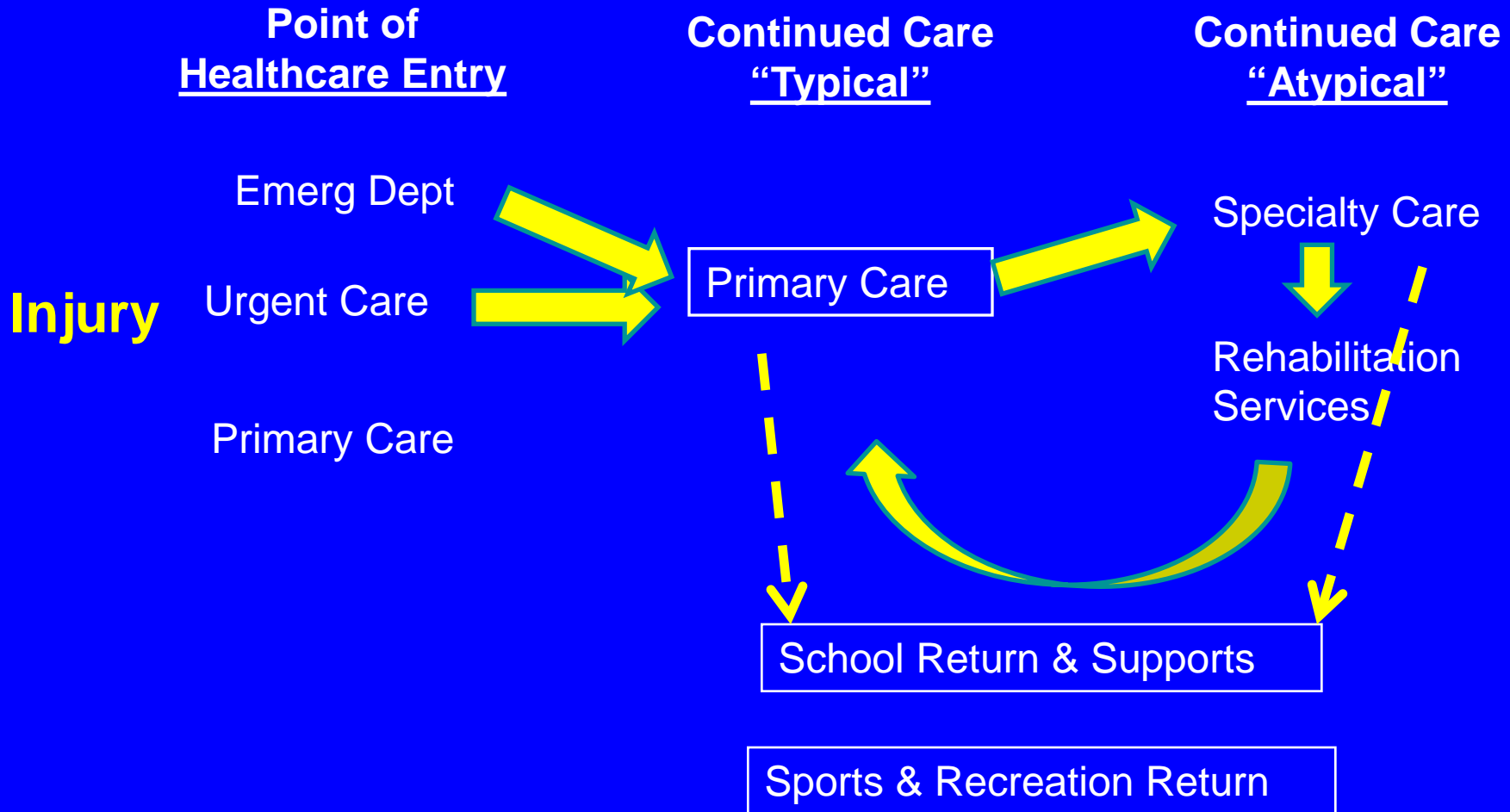
- 1980: Most kids were evaluated and treated by specialists
- 2016: Most kids treated by primary care physicians
  - ◆ Refer Complex Cases

## Concussion

- Pre-2016: Care is more variable. More ED/ Urgent Care/ specialists
- 2016+: Most kids treated by primary care physicians
  - ◆ Refer Complex Cases



# Concussion's Medical Neighborhood



# Concussion is a Traumatic Brain Injury





# Consensus statement the 4th International in Sport

American Academy  
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN™

Paul McCrory,  
Jiří Dvořák,  
Karen Johansen,  
Brian W. Bock,  
Kevin Guskiewicz,  
James Kissel,  
David Marley,  
Kathryn S.

## Clinical Report—Sport-Related Concussion in Children and Adolescents

Mark E. Halstead, MD, Kevin D. Walter, MD, and THE  
COUNCIL ON SPORTS MEDICINE AND FITNESS

### KEY WORDS

concussion, sports, head injury, mild traumatic brain injury,  
return to play, athletes, second-impact syndrome,  
postconcussion syndrome

### ABBREVIATIONS

CIS—concussion in sport  
LOC—loss of consciousness  
SAC—Standardized Assessment of Concussion  
BESS—Balance Error Scoring System  
SCAT2—Sport Concussion Assessment Tool 2  
CT—computed tomography

The guidance in this report does not indicate an exclusive  
course of treatment or serve as a standard of medical care.  
Variations, taking into account individual circumstances, may be  
appropriate.

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this publication.

### PREAMBLE

This paper is  
a consensus document  
developed by the  
2nd (Prague)  
International  
in Sport and  
International  
held in Zurich

The new  
document is  
designed to  
provide a  
practical under-  
standing of  
concussion in  
children and  
adolescents  
and to provide  
guidance to  
healthcare  
providers and  
athletes.

While age-  
appropriate  
messages  
and author  
acknowledg-  
ement is  
evolving,  
the return  
to play (RT  
to play) clinical  
judgment  
Readers are

the Zurich Consensus document  
Recognition Tool (CRT), the SAC  
Assessment Tool V.3 (SCAT3),  
SCAT3 card and none are subject  
provided they are not altered in  
content or format. The

FROM THE AMERICAN ACADEMY OF PEDIATRICS

Guidance for the Clinician in  
Rendering Pediatric Care

## abstract

FREE

Sport-related concussion is a “hot topic” in the media and in medicine.  
It is a common injury that is likely underreported by pediatric and  
adolescent athletes. Football has the highest incidence of concussion,  
but girls have higher concussion rates than boys do in similar sports.  
A clear understanding of the definition, signs, and symptoms of con-  
cussion is necessary to recognize it and rule out more severe intracra-  
nial injury. Concussion can cause symptoms that interfere with school,  
social and family relationships, and participation in sports. Recogni-  
tion and education are paramount, because although proper equip-  
ment, sport technique, and adherence to rules of the sport may de-  
crease the incidence or severity of concussions, nothing has been  
shown to prevent them. Appropriate management is essential for re-  
ducing the risk of long-term symptoms and complications. Cognitive  
and physical rest is the mainstay of management after diagnosis, and  
neuropsychological testing is a helpful tool in the management of con-  
cussion. Return to sport should be accomplished by using a progres-  
sive exercise program while evaluating for any return of signs or symp-  
toms. This report serves as a basis for understanding the diagnosis  
and management of concussion in children and adolescent athletes.  
*Pediatrics* 2010;126:597–615

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► Additional material is  
published online only. To view  
these files please visit the  
journal online (<http://dx.doi.org/10.1136/bjsports-2013-092313>).

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# Concussion/ mTBI

## Definition

- **A concussion (or mild traumatic brain injury)** is defined as a
  - ◆ complex pathophysiologic process affecting the brain,
  - ◆ induced by traumatic biomechanical forces secondary to direct or indirect forces to the head.



CDC Heads Up: Brain Injury in Your Practice (2007)

# Concussion/ mTBI

## Definition

- Disturbance of brain function is related to:
  - ◆ neurometabolic dysfunction, rather than structural injury
  - ◆ typically associated with normal structural neuroimaging findings (i.e., CT scan, MRI).
- Concussion may or may not involve a loss of consciousness (LOC). (<10%)



# Concussion/ mTBI

## Definition

- Concussion results in a constellation of symptoms:
  - ◆ physical, cognitive, emotional and sleep-related.
- Duration of symptoms are variable may last for as short as several minutes and last as long as several days, weeks, months or even longer in some cases.



# Anatomical Timeline of a Concussion

## Defining the Key Factors

C. Risk Factors

A. Injury Characteristics

B. Symptom Assessment

### CONCUSSION

Pre-Injury Risks

**Retro-grade Amnesia**  
20-35%

LOC  
<10%

**Antero-grade Amnesia**  
25-40%

**Neurocog/ balance dysfx & Post-Concuss Sx's**

Sec-Hrs

Sec-Min

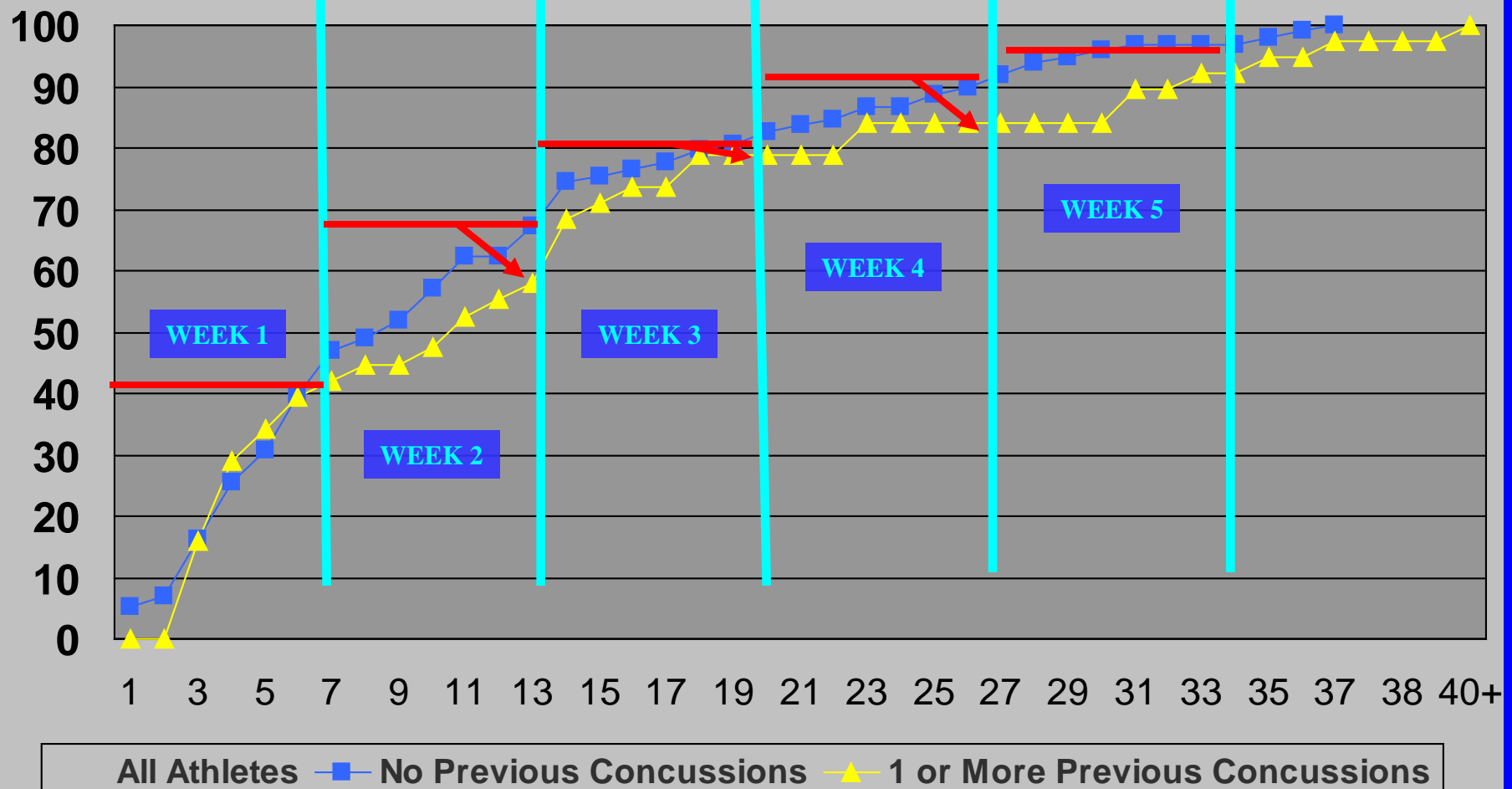
Sec-Hrs

Hours - Days - Weeks+



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# Recovery From Concussion: How Long Does it Take?



N=134 High School athletes

Collins et al., 2006, Neurosurgery

# **Primary Care Clinical Pathway Concussion Management**

# CHOP/ CDC study

## Original Investigation

### Point of Health Care Entry for Youth With Concussion Within a Large Pediatric Care Network

Kristy B. Arbogast, PhD; Allison E. Curry, PhD; Melissa R. Pfeiffer, MPH; Mark R. Zonfrillo, MD, MSCE; Juliet Haarbauer-Krupa, PhD; Matthew J. Breiding, PhD; Victor G. Coronado, MD, MPH; Christina L. Master, MD

- 8083 patients with diagnosed concussions
- First visit point of entry
  - ◆ Primary care = 81.9%
  - ◆ ED = 11.7%
  - ◆ Specialty care = 5.7%
- Age variation: 0-4 yrs 52% to ED, > 75% 5-17 to PC
- Insurance status: Medicaid 37% to ED, pvt 7% to ED

# Triggers to Concussion Evaluation

1



2

Blunt force or deceleration/  
acceleration event

Alteration of consciousness  
or mental status

**Blow/ Force to  
Head/ Body**

**Change in Function/  
Behavior/ Performance**

## Post-Concussion Signs & Symptoms

Physical	Cognitive	Emotional	Sleep
Headache	Concentrate	Irritability	More
Fatigue	Memory	Emotional	Less
Balance/ Dizziness	Speed of Thinking	control Sadness	Cannot



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# (Phone) Triage- Mild TBI SCREEN

1. Was there a blunt force to the head and/or did the head move back and forth with a lot of force (like whiplash)?

No — No Trigger 

Yes – Next Question

2. Was there a change in mental status (e.g., confusion, dazed, disoriented, or poor memory for events around the injury) or a change in the level of consciousness (seemed out of it, not responding as you normally do)?

No — No Trigger 

Yes - Trigger, consider Mild TBI; complete ACE

**D. RED FLAGS** for acute emergency management: Refer to the emergency department with sudden onset of any of the following:

- |                          |  |  |                                    |
|--------------------------|--|--|------------------------------------|
| * Headaches that worsen  | * Looks very drowsy/ can't be awakened | * Can't recognize people or places     | * Neck pain                        |
| * Seizures               | * Repeated vomiting                    | * Increasing confusion or irritability | * Unusual behavioral change        |
| * Focal neurologic signs | * Slurred speech                       | * Weakness or numbness in arms/legs    | * Change in state of consciousness |

# Acute Concussion Evaluation (ACE) Sport Concussion Assessment Tool, 3<sup>rd</sup> Ed. (SCAT-3)

Downloaded from bpn.bmj.com on March 13, 2013: Published by group bpn.com

SCAT3™

Sport Concussion Assessment Tool – 3rd Edition

For use by medical professionals only

Name

Date/Time of Injury:

Date of Assessment:

Scoutmaster:

What is the SCAT3?

The SCAT3 is a standardized tool for evaluating injured athletes for concussion and can be used in athletes aged from 13 years and older. It supersedes the original SCAT and the SCAT2 published in 2005 and 2009, respectively, for younger persons, ages 13 and under, please use the Child SCAT3. The SCAT3 is designed for use by medical professionals. If you are not qualified, please use the Sport Concussion Recognition Tool. Previous baseline testing with the SCAT3 can be helpful for interpreting post-injury test scores.

Specific instructions for use of the SCAT3 are provided on page 3. If you are not familiar with the SCAT3, please read through these instructions carefully. This tool may be helpful copied in its current form for distribution to individuals, teams, groups, organizations, any nation or any institution in a digital form (e.g. e-mails approved by the Concussion Sport Group).  
NOTE: The diagnosis of a concussion is a clinical judgment, ideally made by a medical professional. The diagnosis of SCAT3 should not be used solely to make, or exclude, the diagnosis of concussion in the absence of clinical judgement. An athlete may have a concussion even if their SCAT3 score is "normal".

What is a concussion?

A concussion is a disturbance in brain function caused by a direct or indirect force to the head. It results in a variety of non-specific signs and/or symptoms (some associated with head and most others does not involve loss of consciousness). Concussion should be suspected in the presence of any one or more of the following:

- Symptoms (e.g., headache), or
- Physical signs (e.g., unsteadiness), or
- Impaired brain function (e.g., confusion), or
- Abnormal behaviour (e.g., change in personality).

SIDELINE ASSESSMENT

Indications for Emergency Management

NOTE: It is the best practice to have a SCAT3 performed with a more skilled brain injury professional. Any of the following warrants consideration of activating emergency personnel and urgent transportation to the nearest hospital:

- Glasgow Coma Scale less than 15.
- Deteriorating mental status.
- Potential spinal injury.
- Progressive, worsening symptoms or new neurologic signs.

Potential signs of concussion?

If any of the following signs are observed after a direct or indirect blow to the head, the athlete should stop participation, be evaluated by a medical professional and should not be permitted to return to sport the same day if a concussion is suspected.

Any loss of consciousness? ☐ Y ☐ N  
 "If so, how long?" ☐ Y ☐ N  
 Balance or motor coordination (sway, dizziness, loss of balance, etc.) ☐ Y ☐ N  
 Disorientation or confusion (ability to respond appropriately to questions) ☐ Y ☐ N  
 Loss of memory ☐ Y ☐ N  
 "If so, how long?" ☐ Y ☐ N  
 Tactile or other hyper/sensitivity ☐ Y ☐ N  
 Head or neck pain ☐ Y ☐ N  
 Visible facial injury in combination with any of the above: ☐ Y ☐ N

1 Glasgow coma scale (GCS)

Best eye response (E)

No eye opening	1
Eye opening in response to pain	2
Eye opening to speech	3
Eye opening spontaneously	4

Best verbal response (V)

No verbal response	1
Incomprehensible sounds	2
Inappropriate words	3
Confused	4
Oriented	5

Best motor response (M)

No motor response	1
Extension to pain	2
Abnormal flexion to pain	3
Flexion/Withdrawal to pain	4
Normal flexion to pain	5
Obeys commands	6

Glasgow Coma score (E + V + M)

of 15

SCAT3 can be used only if the patient is of subsequent professional.

2 Maddocks Score<sup>1</sup>

"I am going to ask you a few questions, please give answers carefully and give your best effort."

Modified Maddocks questions (1 point for each correct answer)

What were we all at today?	0	1
What time is it now?	0	1
What day is it today?	0	1
What month is it now?	0	1
When were you last here? (where?)	0	1
Do you know me in the past game?	0	1

Maddocks score

of 6

Maddocks score is used to define degrees of concussion and is not used for prognostic.

Notes: Mechanisms of Injury (not the what happened?):

Any athlete with a suspected concussion should be REMOVED FROM PLAY, medically assessed, monitored for deterioration (i.e., should not be left alone) and should not drive a motor vehicle until cleared to do so by a medical professional. The athlete diagnosed with concussion should be returned to sports participation on the day of injury.



# Primary Care Clinical Pathway

	Event	Action	Tools	Communication
1	Injury via Phone Call	Triage - Determine if ED visit is necessary	Two Trigger Questions (Blow, S&S)	To Family: <u>ED</u> (positive Red Flags) or <u>Office</u> (negative Red Flags)
			ACE CDC Red Flags	
2	Office Visit 1 - Diagnosis	Assess suspected concussion Establish diagnosis	<i>Acute Concussion Evaluation (ACE)</i>	To Family, School: Symptom Checklist
3	Office Visit 1 - Management	Develop management strategy	<i>ACE Home/School Instructions</i>	To Family: Education about diagnosis & reinjury risks, early symptom-based management guidance
		School: Return date, symptom profile	<i>ACE Return to School Letter</i>	School - provide letter re: return date & symptom profile
		Sports/ PE/ Recreation	<i>ACE Home/School Instructions</i>	To Family: Athletics/ PE/ Recess/ Rec. - No return / risk activity until medical clearance

# Primary Care Clinical Pathway

	Event	Action	Tools	Communication
4	Office Visit - Follow Up	Monitor symptoms, exertional response to management	<i>Post-Concussion Symptom Inventory-PCSI</i> (Parent, Student)	<b>To Family:</b> ACE Care Plan with updated symptom profile
		Home Management guidance	<i>ACE Care Plan</i>	<b>To Family:</b> activity management; decisions to increase tolerable cognitive/school, social, physical activity
		School progress update	<i>School Symptom Monitor</i>	<b>To School:</b> ACE Care Plan w updated symptom profile, input on accommodations & adjustments
5	Office Visit - Clearance	<b>Assess for full recovery</b> 1. No symptoms at rest/ no medication use to manage symptoms 2. No return of symptoms with typical physical and cognitive activities 3. Cognitive functions at typical baseline 4. Normal balance and coordination 5. No other medical/neuro complaints	* <i>PCSI</i> (Student, Parent) * <i>Medical Clearance for Gradual Return</i> -- Full Return follows completion of grad RTP program * <i>Gradual Return to Sport</i> guide	<b>To Family:</b> counsel on gradual return process <b>To School:</b> clearance to return to PE <b>To Sport:</b> clearance to begin gradual Return to Play protocol; monitor until Final Clearance

# Acute Concussion Evaluation (ACE) Key Elements

- A. Define Injury Characteristics
- B. Assess for Symptoms (22) (Lovell & Collins, 1998)
- C. Identify Risk Factors for Prolonged Recovery
- D. Red Flags for Neurological Deterioration
- E. Establish the Diagnosis
- F. Plan Follow-Up Action / Referral



# Acute Concussion Evaluation (ACE)

## A. Injury Characteristics

Injury Description

Cause

Amnesias (retrograde, anterograde)

Loss of Consciousness (LOC), Seizures

Early Signs

<b>A. Injury Characteristics</b>	Date/Time of Injury	Sept. 7, 2008	Reporter: <input type="checkbox"/> Patient <input checked="" type="checkbox"/> Parent <input type="checkbox"/> Spouse <input type="checkbox"/> Other
1. Injury Description <b>Fell to ground, hit head on ground, kneed in right temporal region; dazed initially but continued to play with bad headache. Felt sluggish and confused.</b>			
1a. Is there evidence of a forcible blow to the head (direct or indirect)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown			
1b. Is there evidence of intracranial injury or skull fracture? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown			
1c. Location of Impact: <input type="checkbox"/> Frontal <input type="checkbox"/> Lft Temporal <input checked="" type="checkbox"/> Rt Temporal <input type="checkbox"/> Lft Parietal <input type="checkbox"/> Rt Parietal <input checked="" type="checkbox"/> Occipital <input type="checkbox"/> Neck <input type="checkbox"/> Indirect Force			
2. Cause: <input type="checkbox"/> MVC <input type="checkbox"/> Pedestrian-MVC <input type="checkbox"/> Fall <input type="checkbox"/> Assault <input checked="" type="checkbox"/> Sports (specify) <b>basketball</b> <input type="checkbox"/> Other			
3. <b>Amnesia Before (Retrograde)</b> Are there any events just BEFORE the injury that you/ person has no memory of (even brief)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Duration			
4. <b>Amnesia After (Anterograde)</b> Are there any events just AFTER the injury that you/ person has no memory of (even brief)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Duration			
5. <b>Loss of Consciousness:</b> Did you/ person lose consciousness? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Duration			
6. <b>EARLY SIGNS:</b> <input checked="" type="checkbox"/> Appears dazed or stunned <input type="checkbox"/> Is confused about events <input checked="" type="checkbox"/> Answers questions slowly <input type="checkbox"/> Repeats Questions <input type="checkbox"/> Forgetful (recent info)			
7. <b>Seizures:</b> Were seizures observed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Detail			

# Acute Concussion Evaluation (ACE)

## B. Symptom Checklist

**B. Symptom Check List\*** Since the injury, has the person experienced any of these symptoms any more than usual today or in the past day?  
 Indicate presence of each symptom (0=No, 1=Yes). \*Lovell & Collins, 1998 JHTR

PHYSICAL (10)		COGNITIVE (4)		SLEEP (4)			
Headache	0 <u>1</u>	Feeling mentally foggy	0 <u>1</u>	Drowsiness	0 <u>1</u>		
Nausea	0 <u>1</u>	Feeling slowed down	0 <u>1</u>	Sleeping less than usual	0 <u>1</u> N/A		
Vomiting	0 <u>1</u>	Difficulty concentrating	0 <u>1</u>	Sleeping more than usual	0 <u>1</u> N/A		
Balance problems	0 <u>1</u>	Difficulty remembering	0 <u>1</u>	Trouble falling asleep	0 <u>1</u> N/A		
Dizziness	0 <u>1</u>	<b>COGNITIVE Total (0-4)</b>	<u>4</u>	<b>SLEEP Total (0-4)</b>	<u>2</u>		
Visual problems	0 <u>1</u>	<div style="border: 2px solid green; padding: 5px;"> <b>Exertion:</b> Do these symptoms <u>worsen</u> with:                      Physical Activity <u>  </u> Yes <u>  </u> No <u>✓</u> N/A                      Cognitive Activity <u>✓</u> Yes <u>  </u> No <u>  </u> N/A                 </div>					
Fatigue	0 <u>1</u>					<b>EMOTIONAL (4)</b>	
Sensitivity to light	0 <u>1</u>					Irritability	0 <u>1</u>
Sensitivity to noise	0 <u>1</u>					Sadness	0 <u>1</u>
Numbness/Tingling	0 <u>1</u>					More emotional	0 <u>1</u>
		Nervousness	0 <u>1</u>	<div style="border: 2px solid cyan; padding: 5px;"> <b>Overall Rating:</b> How <u>different</u> is the person acting compared to his/her usual self? (circle)                      Normal 0 1 2 <u>3</u> 4 5 6 Very Different                 </div>			
<b>PHYSICAL Total (0-10)</b>	<u>5</u>	<b>EMOTIONAL Total (0-4)</b>	<u>1</u>				
(Add Physical, Cognitive, Emotion, Sleep totals) <b>Total Symptom Score (0-22)</b>							
				<u>12</u>			

# Acute Concussion Evaluation (ACE)

## C. Risk Factors for Protracted Recovery

### C. Risk Factors for Protracted Recovery (check all that apply)

Concussion History? Y ___ N ___	✓	Headache History? Y ___ N ___	✓	Developmental History	✓	Psychiatric History
Previous # 1 2 3 4 5		Prior treatment for headache		Learning disabilities		Anxiety
Longest symptom duration Days___ Weeks___ Months___ Years___		History of migraine headache ___ Personal ___ Family_____		Attention-Deficit/ Hyperactivity Disorder		Depression
If multiple concussions, less force caused reinjury? Yes___ No___				Other developmental disorder_____		Sleep disorder
						Other psychiatric disorder _____

List other comorbid medical disorders or medication usage (e.g., hypothyroid, seizures)\_\_\_\_\_

**Research findings have linked these risk factors to longer periods of recovery**



# Pediatric Assessment and Management of Concussions

Gerard A. Gioia, PhD

Concussions and mild traumatic brain injuries have become more widely recognized and understood during the past 5 to 10 years. Earlier and more active evaluation and management of this brain injury is necessary to reduce risk to the developing child and adolescent. Pediatricians play a central role in the evaluation and management of concussions and should develop a working understanding of the injury and its clinical manifestations.

An individualized approach to evaluation and management by the pediatrician requires the development of a skillset to define the characteristics of the injury, conduct a full assessment of post-concussion symptoms, and define any risk history that may modify recovery.

This evaluation forms the basis of concussion treatment, which involves the active management of the child's



and performance, and sports/recreational activities. The Acute Concussion Evaluation (ACE) and ACE Care Plan, published in the CDC's "Heads Up: Concus-

knowledge of the patient's post-injury status. Without the pediatrician's active and informed involvement, service coordination is not likely to be as effective, result-

# Tracking Recovery with Child & Parent Symptom Reports

## Post-Concussion Symptom Inventory (PCSI)

### Child Report

- Age 5-7 – 5 items
- Age 8-12 – 17 items
- Age 13-18 – 21 items

### Parent Report

- Age 5-18 – 20 items

### Assesses:

- 4 symptom categories
- Pre- and Post-Injury ratings to identify injury-specific effects

Developmentally sensitive

Psychometric support

Included in the NIH CDE toolkit

Used worldwide

#### Psychometric Characteristics of the Postconcussion Symptom Inventory in Children and Adolescents

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Accepted 11 March 2014



Post-Concussion Symptom Inventory for Children (PCSI-C)  
Pre/Post Version 5 to 12

Name:	Today's date:	Birthdate:	Age	Grade:
-------	---------------	------------	-----	--------

Instructions: We would like to know if you have had any of these symptoms before your injury. Next, we would like to know if these symptoms have changed after your injury.

I am going to ask you to tell me about your symptom at two points in time - Before the Injury and Yesterday / Today. Interviewer: Please circle only one answer.

	0 = No	1 = A little
1	Have you had headaches? Has your head hurt?	
2	Have you felt sick to your stomach or nauseous?	
3	Have you felt dizzy? (like things around you were spinning)	
4	Have you felt grumpy or irritable? (like you were in a bad mood)	
5	Has it been hard for you to pay attention to what you were doing, like homework or chores, listening to someone, or playing a game?	
<i>Continue if age 8 or older</i>		
6	Have you felt more drowsy or sleepy <u>than usual</u> ?	
7	Have bright lights bothered you <u>more than usual</u> ? (like sunlight, when you looked at lights, or watched TV)	
8	Have loud noises bothered you <u>more than usual</u> ? (like talking, when you heard sounds, watched TV, or listened to music)	
9	Have you had any balance problems or have you felt like you were going to fall? (like when you walk, run or stand?)	
10	Have you felt sad?	
11	Have you felt nervous or worried?	
12	Have you felt like you are moving more slowly?	
13	Have you felt like you are thinking more slowly?	
14	Has it been hard to think clearly?	
15	Have you felt more tired <u>than usual</u> ?	
16	Has it been hard for you to remember things? (like places you have gone)	
17	Have things looked blurry?	

**All Ages- Do you feel “different” tha**

PC

Subsc:  
(Age 8-1

Authored / Developed by: Gioia, Janu



**Post-Concussion Symptom Inventory (PCSI)  
Self-Report Assessment Form  
Pre and Post-Injury Report  
Ages 13-18**

Patient Name: \_\_\_\_\_ Today's date: \_\_\_\_\_  
 Birthdate: \_\_\_\_\_ Age: \_\_\_\_\_

**Instructions:** We would like to know if you have had any of these symptoms before your injury. Next, we would like to know if these symptoms have changed after your injury. Please rate the symptom at two points in time- Before the

You can. Do not skip any items. Circle the number to tell us how much of a

n 3 = Moderate problem      6 = Severe problem

	<b>Before the Injury/ Pre-Injury</b>							<b>Current Symptoms/ Yesterday and Today</b>							
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
rting)	0	1	2	3	4	5	6		0	1	2	3	4	5	6
ks	0	1	2	3	4	5	6		0	1	2	3	4	5	6
	0	1	2	3	4	5	6		0	1	2	3	4	5	6
n usual	0	1	2	3	4	5	6		0	1	2	3	4	5	6
ou feel ry (not	No Difference	0	1	2	3	4	Major Difference								

*Circle your rating with "0" indicating "Normal" (No Difference) and "4" indicating "Very Different" (Major Difference).*



Post-Concussion Symptom Inventory (PCSI-P)  
Parent Report Form  
Pre and Post-Injury

Student's Name: \_\_\_\_\_ Today's date: \_\_\_\_\_  
 Birthdate: \_\_\_\_\_ Age/ Grade: \_\_\_\_\_  
 Person Completing Form: \_\_\_\_\_ Relation: Mother \_\_\_\_\_ Father \_\_\_\_\_ Other \_\_\_\_\_

**Instructions:** We would like to know if your child had problems with these symptoms before their injury. Next, we would like to know if these symptoms have changed after the injury. Please rate the problem at two points in time- **Before the Injury/ Pre-Injury** and **Current Symptoms/ Yesterday and Today**.

Please answer all the items the best that you can. Do not skip any items. Circle the number to tell us how much of a problem this symptom has been for your child.

0 = Not a problem    3 = Moderate problem    6 = Severe problem

		Before the Injury/ Pre-Injury						Current Symptoms/ Yesterday and Today							
1	Complains of headaches	0	1	2	3	4	5	6	0	1	2	3	4	5	6
2	Complains of nausea	0	1	2	3	4	5	6	0	1	2	3	4	5	6
3	Has balance problems	0	1	2	3	4	5	6	0	1	2	3	4	5	6
4	Appears or complains of dizziness	0	1	2	3	4	5	6	0	1	2	3	4	5	6
5	Appears drowsy	0	1	2	3	4	5	6	0	1	2	3	4	5	6
6	Sleeping <u>more than usual</u>	0	1	2	3	4	5	6	0	1	2	3	4	5	6
7	Sensitivity to light	0	1	2	3	4	5	6	0	1	2	3	4	5	6
8	Sensitivity to noise	0	1	2	3	4	5	6	0	1	2	3	4	5	6
9	Acts irritable	0	1	2	3	4	5	6	0	1	2	3	4	5	6
10	Appears sad	0	1	2	3	4	5	6	0	1	2	3	4	5	6
11	Acts nervous	0	1	2	3	4	5	6	0	1	2	3	4	5	6
12	Acts more emotional	0	1	2	3	4	5	6	0	1	2	3	4	5	6
13	Acts or appears mentally "foggy"	0	1	2	3	4	5	6	0	1	2	3	4	5	6
14	Has difficulty concentrating	0	1	2	3	4	5	6	0	1	2	3	4	5	6
15	Has difficulty remembering	0	1	2	3	4	5	6	0	1	2	3	4	5	6
16	Has or complains of visual problems (blurred vision, double vision)	0	1	2	3	4	5	6	0	1	2	3	4	5	6
17	Appears more tired or fatigued	0	1	2	3	4	5	6	0	1	2	3	4	5	6
18	Becomes confused with directions or tasks	0	1	2	3	4	5	6	0	1	2	3	4	5	6
19	Appears to move in a clumsy manner	0	1	2	3	4	5	6	0	1	2	3	4	5	6
20	Answers questions more slowly <u>than usual</u>	0	1	2	3	4	5	6	0	1	2	3	4	5	6
PCSI Total Symptom Score		Pre-Injury _____						Post-Injury _____							

In general, to what degree is your child acting "differently" than before the injury (not acting like himself or herself)?

No Difference   0   1   2   3   4   Major Difference

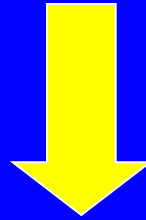
Circle your rating with "0" indicating "Normal" (No Difference)  
and "4" indicating "Very Different" (Major Difference)

# Concussion Management



Children's National

# **Concussion Management**



**Protect/ Restrict further Risk  
Managed Activity/ Gradual  
Reintroduction  
Symptom Monitor**

# General Principles of Recovery

- No additional forces to head/ brain
- Get good sleep
- Managing/ facilitating physiological recovery
  - ◆ Not over-exerting body or brain
  - ◆ Avoid activities that produce symptoms



## Ways to over-exert

- Physical
- Cognitive! (concentration, learning, memory)
- (Emotional)

# PEDIATRICS

## Benefits of Strict Rest After Acute Concussion: A Randomized Controlled Trial

Danny George Thomas, MD, MPH<sup>a</sup>, Jennifer N. Apps, PhD<sup>b</sup>, Raymond G. Hoffmann, PhD<sup>a</sup>, Michael McCrea, PhD<sup>c</sup>, Thomas Hammeke, PhD<sup>b</sup>

were recruited. Participants underwent neurocognitive, balance, and symptom assessment in the ED and were randomized to strict rest for 5 days versus usual care (1–2 days rest, followed by stepwise return to activity). Patients completed a diary used to record physical and mental

There was no clinically significant difference in neurocognitive or balance outcomes. However, the intervention group reported more daily postconcussive symptoms (total symptom score over 10 days, 187.9 vs 131.9,  $P < .03$ ) and slower symptom resolution.

**CONCLUSIONS:** Recommending strict rest for adolescents immediately after concussion offered no added benefit over the usual care. Adolescents' symptom reporting was influenced by recommending strict rest.

# Managed Activity

## Concussion in Sports: Postconcussive Activity Levels, Symptoms, and Neurocognitive Performance

Cynthia W. Majerske, MD, MS\*; Jason P. Mihalik, MS, CAT(C), ATC†; Dianxu Ren, PhD\*; Michael W. Collins, PhD\*; Cara Camiolo Reddy, MD\*; Mark R. Lovell, PhD\*; Amy K. Wagner, MD\*

**Objective:** To examine the role postinjury activity level plays in postconcussive symptoms and performance on neurocognitive tests in a population of student-athletes.

# Not too Little, Not Too Much

(80 males, 15 females; age =  $15.88 \pm 1.35$  years) were retrospectively assigned to 1 of 5 groups based on a postinjury activity intensity scale.

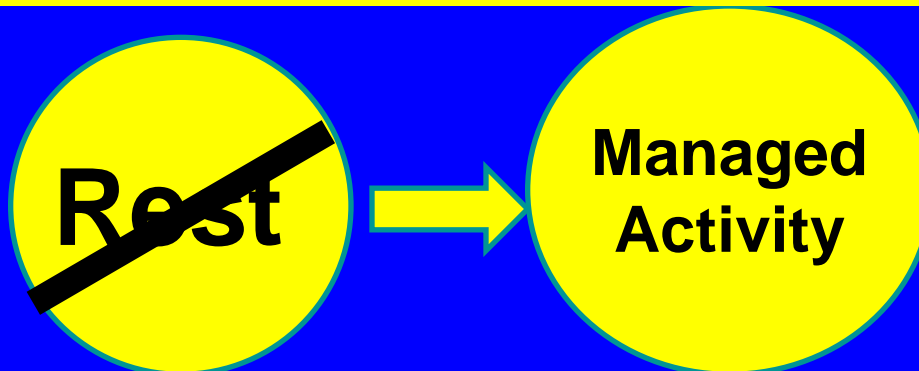
**Results:** Level of exertion was significantly related to all outcome variables ( $P < .02$  for all comparisons). With multivariate analysis, activity intensity remained significant with respect to visual memory ( $P = .003$ ) and reaction time ( $P < .001$ ).

**Conclusions:** Activity level after concussion affected symptoms and neurocognitive recovery. Athletes engaging in high levels of activity after concussion demonstrated worse neurocognitive performance. For these tasks, those engaging in moderate levels of activity demonstrated the best performance.

# Active Recovery Management

## Key Messages

- You will get better.
- You will improve and recover.
- You have control of your activity.
- Your efforts to control your activity and time will pay off.
- Find your “sweet spot” of activity.





# Standardized Acute Injury Instructions for Home and School

Emergency  
Department

Urgent Care

Pediatrician

## ACE POST-CONCUSSION HOME/ SCHOOL INSTRUCTIONS



You have been evaluated for a suspected concussion.  
Following these instructions can prevent further injury and help recovery.

**WHEN TO SEEK CARE URGENTLY**  
Seek care quickly if symptoms worsen or if there are any behavioral changes.  
Also, watch for any of the following Danger Signs:

Headaches that worsen	Very drowsy, can't be awakened	Can't recognize people or places
Seizures	Repeated vomiting	Loss of consciousness
Neck pain	Slurred speech	Unusual behavior
Unusual behavior change	Significant irritability	Worsening symptoms

If you observe any of the above danger signs, contact your doctor immediately or return to the Emergency Department.

**SYMPTOMS**  
It is common to have concussion symptoms. There are four types of symptoms: physical, cognitive, emotional, and sleep. Keep track of them and record them.

	Cognitive	Emotional	Sleep
Physical Symptoms	Feeling mentally foggy	Irritability	Drowsiness
Balance Problems	Feeling slowed down	Sadness	Sleeping less than usual
Nausea/ Vomiting	Difficulty remembering	More emotional	Sleeping more than usual
Sensitivity to light or noise	Difficulty concentrating	Nervousness	Trouble falling asleep
Balance Problems			

**RETURNING TO DAILY ACTIVITIES**  
The key to recovery is sleeping, resting physically and mentally, and avoiding activities that *might* cause head injury.

- **Avoid:**
  - Physical activities that produce concussion symptoms, as this might increase the recovery time.
  - Lengthy mental activities requiring concentration (ie. Homework, schoolwork, job-related work, and extended video game playing) as these activities worsen symptoms and prolong recovery.
- **Sleep:** Get good sleep and take naps if tired. No late nights or sleepovers. It is NOT necessary to wake up periodically.
- The injured person should not participate in **ANY** high risk activities that might result in head injury until

Soon to be Updated



# Ongoing Prescriptive Management

## ACUTE CONCUSSION EVALUATION (ACE) CARE PLAN

Gerard Gioia, PhD<sup>1</sup> & Micky Collins, PhD<sup>2</sup>  
<sup>1</sup>Children's National Medical Center  
<sup>2</sup>University of Pittsburgh Medical Center

Patient Name: \_\_\_\_\_  
DOB: \_\_\_\_\_ Age: \_\_\_\_\_  
Date: \_\_\_\_\_ ID/MR# \_\_\_\_\_  
Date of Injury: \_\_\_\_\_

You have been diagnosed with a concussion (also known as a mild traumatic brain injury). This personal plan is based on your symptoms and is designed to help speed your recovery. Your careful attention to it can also prevent further injury.

## ACE Care Plan

Symptom definition

Reinforcing Balanced Activity-Exertion

Sleep recommendations

Emotional response

Guidance on Return to:

- Daily Activities
- School
- Physical Activity/ Sport

- 6) 2. Take daytime naps or rest breaks when you feel tired or fatigued.
3. **Limit physical activity as well as activities that require a lot of thinking or concentration. These activities can make symptoms worse.**
- Physical activity includes PE, sports practices, weight-training, running, exercising, heavy lifting, etc.
  - Thinking and concentration activities (e.g., homework, classwork load, job-related activity).
4. Drink lots of fluids and eat carbohydrates or protein to main appropriate blood sugar levels.
5. **As symptoms decrease, you may begin to gradually return to your daily activities. If symptoms worsen or return, lessen your activities, then try again to increase your activities gradually.**

# Concussion's Effects on School Learning



# Return to Life in School

- School:
  - Kid's Major "Job" is new learning/ acquiring knowledge
  - Practicing incompletely learned knowledge (HW)
  - Mental and physical exertion is essential to new learning/ practice

ALSO: Social with peers

- Interacting with teachers
- Managing the environment
- Academic pressure



## Medical-School Partnership in Guiding Return to School Following Mild Traumatic Brain Injury in Youth

Gerard A. Gioia, PhD<sup>1</sup>

### Abstract

Mild traumatic brain injury is recognized as a prevalent and significant risk concern for youth. Appropriate school return is particularly challenging. The medical and school systems must be prepared partners to support the school return of the student with mild traumatic brain injury. Medical providers must be trained in assessment and management skills with a focused understanding of school demands. Schools must develop policies and procedures to prepare staff to support a gradual return process with the necessary academic accommodations. Ongoing communication between the family, student, school, and medical provider is essential to supporting recovery. A systematic gradual return to school process is proposed including levels of recommended activity and criteria for advancement. Targets for intervention are described with associated strategies for supporting recovery. A 10-element Progressive Activities of Controlled Exertion (PACE) model for activity-exertion management is introduced to manage symptom exacerbation. A strong medical-school partnership will maximize outcomes for students with mild traumatic brain injury.

Journal of Child Neurology

1-16

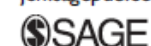
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# Heads Up to Schools: KNOW YOUR CONCUSSION ABCs

**A**ssess  
the  
situation

**B**e alert for  
signs and  
symptoms

**C**ontact a  
health care  
professional



## Heads Up to Schools: KNOW YOUR CONCUSSION ABCs

Assess  
the  
situation

Be alert for  
signs and  
symptoms

Contact a  
health care  
professional



## Signs and Symptoms of a Concussion

A concussion is caused by a bump, blow, or jolt to the head. Concussions can also occur from a fall or blow to the body that causes the head to move rapidly back and forth. Even what seems to be a mild bump to the head can be serious. Be alert for **any** of the following signs and symptoms.

### SIGNS OBSERVED BY SCHOOL PROFESSIONALS

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

### SYMPTOMS REPORTED BY THE STUDENT

#### Thinking/Remembering

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

#### Physical

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

#### Emotional

- Irritable
- Sad
- More emotional than usual
- Nervous

#### Sleep\*

- Drowsy
- Sleeps *less* than usual
- Sleeps *more* than usual
- Has trouble falling asleep

\*Only ask about sleep symptoms if the injury occurred on a prior day.



## What can school professionals do?

### Know your Concussion ABCs:

**A**—Assess the situation

**B**—Be alert for signs and symptoms

**C**—Contact a health care professional

May 2010

For more information and to order additional materials  
FREE-OF-CHARGE, visit: [www.cdc.gov/Concussion](http://www.cdc.gov/Concussion)


U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
CENTERS FOR DISEASE CONTROL AND PREVENTION



# What kinds of school problems are you having SINCE YOUR INJURY?

Ransom et al. (2015)

Type of Problem	Elementary (n=42)	Middle (n=78)	High School (n=120)
Headaches interfering	53%	73%	71%
Can't pay attention	47%	58%	66%
Feeling too tired	53%	61%	52%
Homework taking much longer	35%	48%	63%*
Difficulty understanding material	29%	46%	54%
Difficulty studying for tests	18%	36%	53%*
Difficulty taking Notes	18%	17%	35%*
Average # reported Mn (SD)	2.53 (2.1)	3.37 (1.7)	3.92 (2.1)



\* Significant ( $p < .05$ ) difference across grade level



# Key Medical-School Questions

## Medical 1° Role

- (1) When should the student return to school? How long should they remain out of school?
- (2) When the student returns to school, should it be for a full day or partial day?
  - If a partial day is recommended, how and when should they transition into a full day?

## School 1° Role

- (3) What types of in-school accommodations should the student receive and for how long?
- (4) What tools are available to guide Return to School planning?

# Medical Provider's Role: Return to School

1. **Conduct initial medical evaluation to assist with school management plan**
  - Definition of student's symptom profile
  - Ongoing monitoring of symptom status through to recovery
2. Student symptom profile communicated to the school CMT by the medical provider in a standardized manner (ACE Return to School Letter) facilitating the school management plan
3. Assist with referral for additional medical/rehabilitation needs





# Medical → School Handoff

## ACE POST-CONCUSSION RETURN TO SCHOOL LETTER

Dear School Staff:

\_\_\_\_\_ sustained a concussion on \_\_\_\_\_. Every concussion is different and recovery typically can take between several days to several weeks. While it is important for the student to return to school as soon as they can tolerate, the key to assisting recovery is to manage their physical and cognitive activity. Too much cognitive or physical activity can make symptoms worse and possibly prolong recovery, while too little activity can unnecessarily create anxiety and cause him/her to fall behind in their school work. As symptoms resolve and the student's learning/cognitive functioning returns to normal, they can gradually progress to their normal school day.

The student is currently reporting the following symptoms. They should be viewed as the targets for classroom adjustments using the **Symptom Targeted Accommodation & Management Plan**.

PHYSICAL				
<input type="checkbox"/> Headaches	<input type="checkbox"/> Visual problems	<input type="checkbox"/> Balance Problems	<input type="checkbox"/> Sensitivity to noise	<input type="checkbox"/> Vomiting
<input type="checkbox"/> Fatigue	<input type="checkbox"/> Dizziness	<input type="checkbox"/> Sensitivity to light	<input type="checkbox"/> Nausea	<input type="checkbox"/> Numbness/ tingling
THINKING/COGNITIVE				
<input type="checkbox"/> Feeling mentally foggy	<input type="checkbox"/> Problems remembering	<input type="checkbox"/> Feeling slowed down	<input type="checkbox"/> Problems concentrating	
SOCIAL/EMOTIONAL				
<input type="checkbox"/> Irritability/ easily angered	<input type="checkbox"/> Nervousness	<input type="checkbox"/> Sadness	<input type="checkbox"/> Feeling more emotional	

Do any of the symptoms worsen with: Physical activity ☐ Yes ☐ No ☐ N/A  
Cognitive activity ☐ Yes ☐ No ☐ N/A

Based on the current symptoms, he/she is ☐ permitted to return to school. OR ☐ is excused for \_\_\_\_ days. Please see the Gradual Return to School (RTS) guide (on back) for guidance on recommended levels of activity in school and criteria to move to the next stage. As general guidance, the student can return to school when:

- (1) They can concentrate on school work for 30 minutes before symptoms worsen significantly, AND
- (2) Symptoms reduce or disappear with cognitive rest breaks, allowing return to activity.

The student requires the following physical restrictions until cleared by a health professional:

- \* No physical activity during recess
- \* No PE class
- \* No Contact Sports
- Other \_\_\_\_\_



## Symptom Targeted Accommodation & Management Plan (STAMP)

Below, please see the symptoms they are currently experiencing. To promote recovery, the student will be provided with the following classroom accommodations that support their academic learning and performance:

Symptom (check)	Functional school problem	Accommodation/ management strategy (select)
<b>Cognitive Symptoms</b>		
<input type="checkbox"/> Attention & concentration difficulties	Short focus on lecture, classwork, homework	Shorter assignments (odd/even problems, requiring outline or bullet points instead of full written responses) Break down tasks and tests into chunks/segments Lighter work load: Max. nightly homework (including studying): ____ min
<input type="checkbox"/> Working memory (short-term memory)	Trouble holding instructions, lecture, reading material, thoughts in mind during tasks	Repetition Written instructions Provide student with teacher generated class notes
<input type="checkbox"/> Memory consolidation/ retrieval	Retaining new information Accessing learned information	Smaller chunks/segments to learn, repetition Recognition cues
<input type="checkbox"/> Processing speed	Unable to keep pace with work load Slower reading/writing/calculation Difficulty processing verbal information effectively	Allowances for extended time to complete coursework, assignments, tests Reduce/slowdown verbal information and check for comprehension
<input type="checkbox"/> Fatigue	Decreased arousal, mental energy; trouble thinking clearly, formulating thoughts	Rest breaks during classes Homework, and examinations in quiet location
<b>Physical Symptoms</b>		
<input type="checkbox"/> Headaches	Interferes with concentration Increased irritability	Interperse rest breaks Allow for short naps in quiet location (e.g., nurse's office)
<input type="checkbox"/> Light/ noise sensitivity	Symptoms worsen in bright or loud environments	Wear sunglasses, seating away from bright sunlight Limit exposure to SMART board, provide hard copy of class notes Avoid noisy/crowded environments such as lunchroom, assemblies, chorus/music class, and hallways. Leave class early.
<input type="checkbox"/> Dizziness/ balance/ nausea	Unsteadiness when walking Nausea or vomiting	Elevator pass Class transition before bell
<input type="checkbox"/> Sleep disturbance	Decreased arousal, shifted sleep schedule, trouble falling asleep	Later start time Shortened day or rest breaks
<input type="checkbox"/> Fatigue	Lack of energy	Periodic rest breaks Passive participation
<b>Emotional Symptoms</b>		
<input type="checkbox"/> Irritability	Poor tolerance for stress	Reduce stimulation and stressors (e.g., overwhelmed with missing work)
<input type="checkbox"/> Anxiety/ nervousness	Worried about falling behind, pushing through symptoms	Reassurance from teachers and team about accommodations, workload reduction, alternate forms of testing Time built in for socialization
<input type="checkbox"/> Depression/ withdrawal	Withdrawal from school or friends because of stigma or activity restrictions	Allow student to be engaged with peers during selected low stress/ extra curricular activities as tolerated Lunch in a quiet room with friends
<b>Course Specific Recommendations</b>		
<input type="checkbox"/> Course specific difficulties	Writing Mathematics calculation	Provide alternatives to written output (word bank, oral response, etc.) Use of calculator
	Reading comprehension	Shorter reading passages Provide tools to assist with visual tracking or comprehension of information (e.g., use of audio books)
<input type="checkbox"/> Other:		

## ACE POST-CONCUSSION RETURN TO SCHOOL LETTER

Dear School Staff:

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THINKING/COGNITIVE				
<input type="checkbox"/> Feeling mentally foggy	<input type="checkbox"/> Problems remembering	<input type="checkbox"/> Feeling slowed down	<input type="checkbox"/> Problems concentrating	
SOCIAL/EMOTIONAL				
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Do any of the symptoms worsen with: Physical activity ☐Yes ☐No ☐N/A  
Cognitive activity ☐Yes ☐No ☐N/A

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- \* No physical activity during recess
- \* No PE class
- \* No Contact Sports

Other \_\_\_\_\_

# Gradual Return to School

## ACE Post-Concussion Gradual Return to School (RTS) Guide

**Use of the *Gradual Return to School Guide*:** Every student's recovery from concussion is different. The five progressive stages were designed to give the medical provider and school team general guidance to assist the student's gradual return to school. The stages should not be viewed as absolute for every student if their symptoms do not warrant it. What is important is to strike a balance between providing the student with the necessary supports for symptom relief while progressing to their normal school schedule. Students with faster recoveries may skip a stage or two. Use of the ***Symptom Targeted Accommodation & Management Plan*** should accompany this guide.

			day.
2	Full Day, Maximal Supports (required throughout day)	* Able to attend most classes, with 2-3 rest breaks (20-30'), * Expectations for productivity: Minimal – moderate. No tests. Homework < 60'.	To Move To Stage 3: Symptom number & severity improving, needs 1-2 cognitive rest breaks during school day.
3	Return to Full Day, Moderate Supports (provided in response to symptoms during day)	* Attend all classes with 1-2 rest breaks (20-30') * Expectations for productivity: Moderate. Begin quizzes. Moderate homework 60-90' * Design schedule for make-up learning/work	To Move To Stage 4: Continued symptom improvement, needs no more than 1 cognitive rest break per day
4	Return to Full Day, Minimal Supports (Monitor final recovery)	* Attend all classes with 0-1 rest breaks (20-30') * Expectations for productivity: Moderate-maximum. Begin modified tests (breaks, extra time). Homework 90+'	To Move To Stage 5: No active symptoms, no exertional effects across the full school day.
5	Full Return, No Supports Needed	* Full class schedule, no rest breaks. * Expectations for productivity: Maximum * Begin to address make-up learning/ work	N/A

# School Concussion Management Team

## Two Key Roles

### – Medical monitor:

- monitors the symptom status of the student, using standardized symptom scale
- Liaisons with community medical provider
- Reports status to academic monitor

### – Academic monitor:

- oversees & guides academic support process - Day 1 to recovery
- Links student symptom status with accommodations
- Liaisons with, student, teachers and medical monitor





## Symptom Targeted Accommodation & Management Plan (STAMP)

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Symptom (check)	Functional school problem	Accommodation/ management strategy (select)
<b>Cognitive Symptoms</b>		
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<b>Physical Symptoms</b>		
<input type="checkbox"/> Headaches	Interferes with concentration Increased irritability	<input type="checkbox"/> Intersperse rest breaks <input type="checkbox"/> Allow for short naps in quiet location (e.g., nurse's office)
<input type="checkbox"/> Light/ noise	Symptoms worsen in bright or loud	<input type="checkbox"/> Wear sunglasses, seating away from bright sunlight <input type="checkbox"/> Limit exposure to SMART board, provide hard copy of class notes
<b>Emotional Symptoms</b>		
<input type="checkbox"/> Irritability	Poor tolerance for stress	<input type="checkbox"/> Reduce stimulation and stressors (e.g., overwhelmed with missing work)
<input type="checkbox"/> Anxiety/ nervousness	Worried about falling behind, pushing through symptoms	<input type="checkbox"/> Reassurance from teachers and team about accommodations, workload reduction, alternate forms of testing <input type="checkbox"/> Time built in for socialization
<input type="checkbox"/> Depression/ withdrawal	Withdrawal from school or friends because of stigma or activity restrictions	<input type="checkbox"/> Allow student to be engaged with peers during selected low stress/ extra curricular activities as tolerated <input type="checkbox"/> Lunch in a quiet room with friends
<b>Course Specific Recommendations</b>		
<input type="checkbox"/> Course specific difficulties	Writing	<input type="checkbox"/> Provide alternatives to written output (word bank, oral response, etc.)
	Mathematics calculation	<input type="checkbox"/> Use of calculator
	Reading comprehension	<input type="checkbox"/> Shorter reading passages <input type="checkbox"/> Provide tools to assist with visual tracking or comprehension of information (e.g., use of audio books)
<input type="checkbox"/> Other:		

# School Care Pathway

School Notified of Injury



① Med/Symptom Monitor / ② Academic Monitor

HCP Evaluation



Student Returns to School



Periodic Monitoring

Communication  
w HCP

Re-Adjustments



Recovery



# Primary Care Clinical Pathway

	Event	Action	Tools	Communication
4	Office Visit - Follow Up	Monitor symptoms, exertional response to management	<i>Post-Concussion Symptom Inventory-PCSI</i> (Parent, Student)	<b>To Family:</b> ACE Care Plan with updated symptom profile
		Home Management	<i>ACE Care Plan</i>	<b>To Family:</b> activity management; decisions to increase tolerable cognitive/school, social, physical activity
		School progress update	<i>School Symptom Monitor</i>	<b>To School:</b> ACE Care Plan w updated symptom profile, input on accommodations & adjustments
5	Office Visit - Clearance	<b>Assess for full recovery</b> 1. No symptoms at rest/ no medication use to manage symptoms 2. No return of symptoms with typical physical and cognitive activities 3. Cognitive functions at typical baseline 4. Normal balance and coordination 5. No other medical/neuro complaints	* <i>PCSI</i> (Student, Parent) * <i>Medical Clearance for Gradual Return</i> -- Full Return follows completion of grad RTP program * <i>Gradual Return to Sport</i> guide	<b>To Family:</b> counsel on gradual return process <b>To School:</b> clearance to return to PE <b>To Sport:</b> clearance to begin gradual Return to Play protocol; monitor until Final Clearance

# When to Refer: Complex Concussion Case

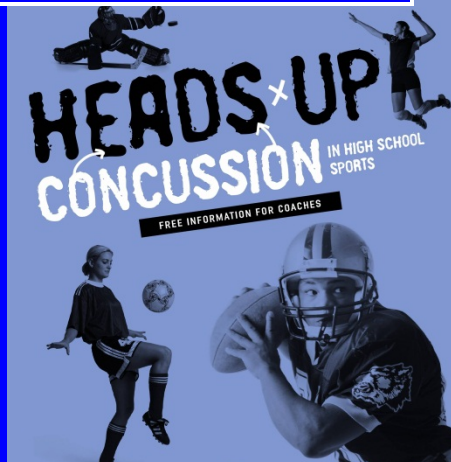
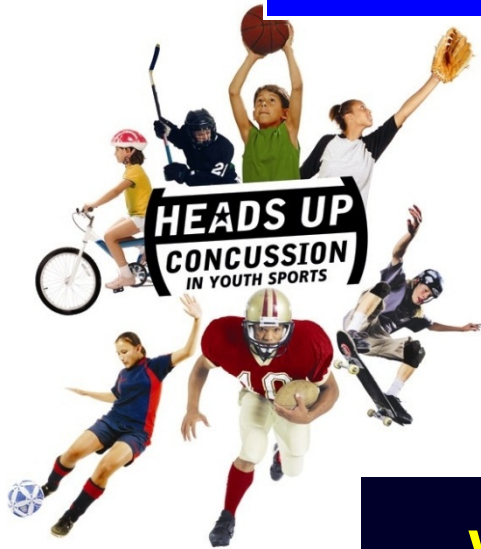
- Complex injury (e.g., multiple blows within a short time period, possible rotational / neck injury, significant injury characteristics including types / severity of signs & symptoms)
- Persistent symptom pattern (greater than 2 weeks) without significant improvement (< 20% symptom improvement)
- No change in cognitive dysfunction/ ongoing school problems and challenges
- Significant emotional factors possibly interfering w recovery
- Presence of risk factors (e.g., medical/ neurological, psychiatric, learning/ attention disorders) possibly related to prolonged recovery
- History of multiple concussions
- Confirm/ clearance for return to risk activities



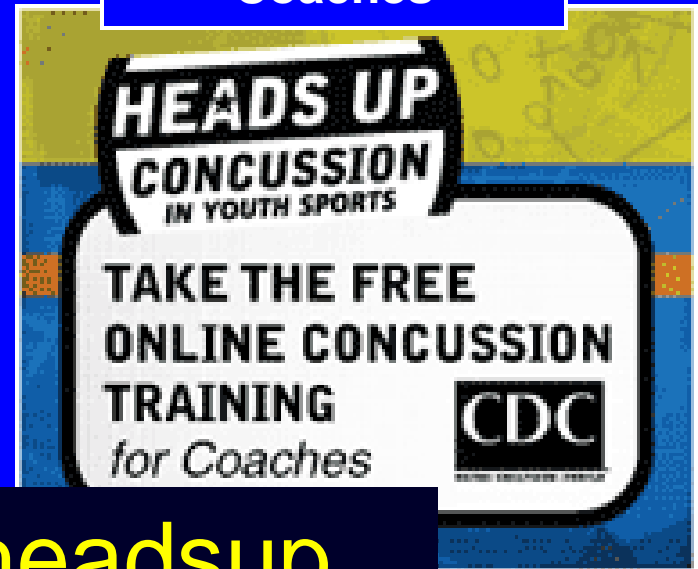
# Concussion Management 2016 and Beyond

- ❑ Primary care takes on management of “typical” cases
  - ❑ Follow Primary Care Clinical Pathway
- ❑ Conduct Activity Management with patient
  - ❑ Activity-rest balance across recovery: use symptoms as guide
  - ❑ School → Home → Recreation/ Athletics
- ❑ Collaborate with schools: Use ACE Return to School Letter, identify symptom targets for CMT programming; co-monitor
- ❑ Recovery: Apply Criteria for Medical Clearance
  - ❑ Allow return to risk only with COMPLETE recovery; gradual RTP
  - ❑ Collaborate with local athletic trainers
- ❑ Refer complex, slow to recover cases to specialist

## Parents & Coaches & Athletes

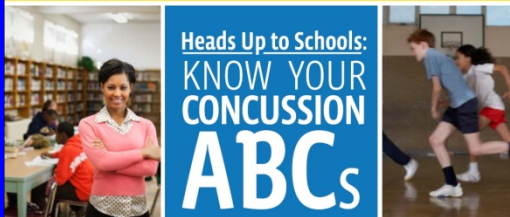


## Coaches



[www.cdc.gov/headsup](http://www.cdc.gov/headsup)

## Schools



EDUCATIONAL MATERIALS FOR SCHOOL PROFESSIONALS IN ELEMENTARY, MIDDLE, AND HIGH SCHOOL

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
CENTERS FOR DISEASE CONTROL AND PREVENTION

## Healthcare Providers



Heads Up  
Brain Injury  
in Your Practice



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
CENTERS FOR DISEASE CONTROL AND PREVENTION

## Healthcare Providers

[ HEADS UP  
TO CLINICIANS ]  
CONCUSSION  
TRAINING



CDC FOUNDATION

Interested in learning more?

Sign up for the

Concussion Academy Skill Training  
(CAST) Program

**[ggioia@childrensnational.org](mailto:ggioia@childrensnational.org)**

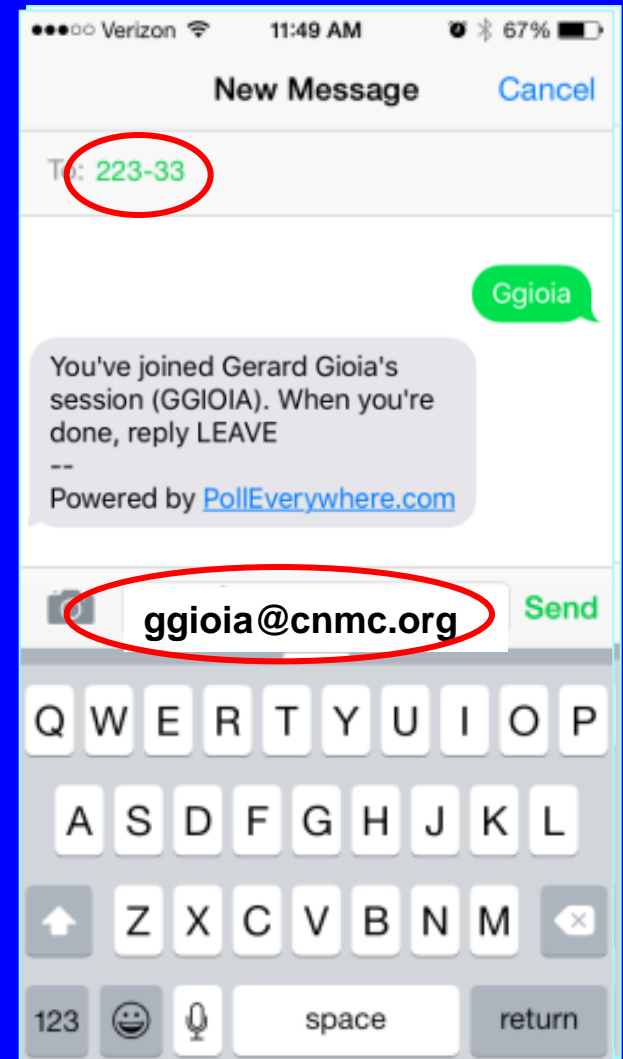
# Want more training?

Step 1 - Text “ggioia” to 22333 to let us know!

Step 2 - Type your email address  
Hit “Send”

Step 3 – Type “Leave”

**We will contact you!**



# SCORE



Safe Concussion Outcome,  
Recovery & Education

**Let's Do It!**

PLAY HARD.  
PLAY SAFE.  
PLAY SMART!

