



# Concussion and Sudden Cardiac Arrest

Presented by  
Lisa Conroy, ATC, LAT



- A concussion is a trauma induced alteration in mental status that may or may not involve loss of consciousness. (NATA)
- A concussion is a type of traumatic brain injury, or TBI, caused by a bump, blow, or jolt to the head that can change the way your brain normally works. Concussions can also occur from a blow to the body that causes the head to move rapidly back and forth. (CDC)
  - Centers for Disease Control and Prevention

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- <https://youtu.be/yKrWOjxsYG0>

- <https://youtu.be/rw-ZhwxyXDc>

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[ZhwxyXDc](https://youtu.be/rw-ZhwxyXDc)" frameborder="0" allow="accelerometer;  
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## Signs of a concussion (will be visible to others)

- trouble resting/getting comfortable
  - appears dazed or stunned
  - slow response/drowsiness
    - lack of concentration
    - balance problems
- acts silly/combative/aggressive/irritable
  - incoherent/slurred speech
- confusion/disorientation/memory problem
  - loss of consciousness

# Symptoms of Concussion

(what athlete reports)

- Headache
- Feeling slowed down
- Difficulty concentrating
  - Dizziness
- Feeling foggy or groggy
  - Ringing in ears
  - Pressure in head
- Blurred or double vision
- Oversensitivity to light/sound/touch
  - Nausea or vomiting
  - Just don't feel right

- The management of a sports-related

•



- Recognition
- Removal
- Referral
- Rest

# Components of concussion treatment include:

- Rest
- Academic Accommodations/Cognitive Rest
  - Physical Therapy - neck injury
  - Vestibular/oculomotor therapy
  - Balanced and nutritious diet

# Active Rest

- Any activity that increases blood flow to the brain will cause symptoms and should be avoided.
  - No computer use
  - No video games
  - No text messaging
    - No driving
  - No spinning carnival rides
    - No sports
    - No P.E.
- No studying, tests, quizzes or class



Patients engaged in higher cognitive loads experienced symptoms that took longer to resolve. (Brown, et al 2014)

# Recovery from Concussion

- All concussions are different.
- Concussion treatment should be individualized.
- Everyone recovers in a different time frame.



# How can you protect yourself from a concussion?



The best way to protect oneself from sustaining a concussion is to wear properly fitted equipment, avoid dangerous playing styles and immediately report signs or symptoms.

# Post-concussion syndrome

- Most concussions resolve within 7-10 days. When symptoms last for weeks or months after a head injury it's referred to as PCS.
- <https://youtu.be/TbQ8cUC7wVs>

- `<iframe width="560" height="315" src="https://www.youtube.com/embed/TbQ8cUC7wVs" frameborder="0" allow="accelerometer; autoplay; encrypted-media; gyroscope; picture-in-picture" allowfullscreen></iframe>`

- Athletes who sustain a concussion and return to play prior to complete healing are at risk for Second Impact Syndrome.
- SIS occurs when the brain swells rapidly, and catastrophically, after a person suffers a second concussion before symptoms from an earlier one have subsided.

- Second Impact Syndrome
- Second Impact Syndrome is often fatal (50%), and almost everyone who is not killed is severely disabled (nearly 100%).
- Most cases of SIS have occurred in young people, who are thought to be particularly vulnerable.

# Max's Story

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- [https://youtu.be/\\_GbGt3Fwl2w](https://youtu.be/_GbGt3Fwl2w)

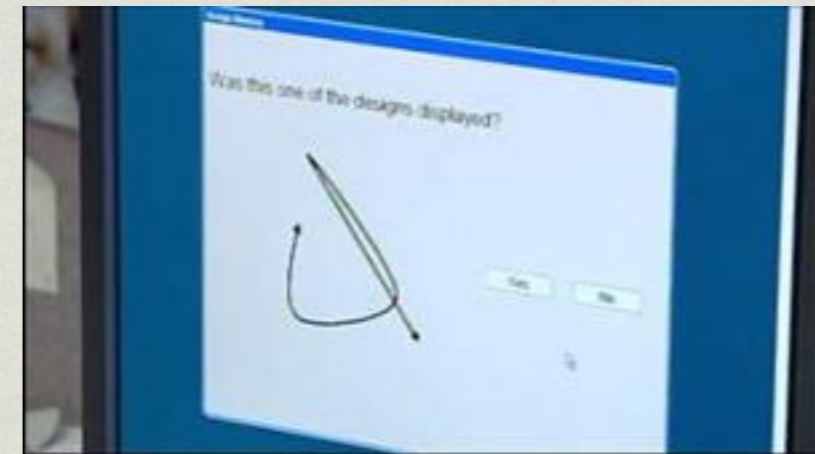
How are we protecting our students?







- ImPACT takes approximately 45 minutes to complete.
- The program measures multiple aspects of cognitive functioning in athletes.



**X's and O's**

In this window, do the following for each shape displayed:

**Q** Press this key on your keyboard as quickly as you can when you see:

**P** Press this key on your keyboard as quickly as you can when you see:

PLEASE RESPOND AS FAST AS YOU CAN!

LEFT **Q**

RIGHT **P**

## Symbol Matching Test: 27 Times

△	○	/		◇	□	+	✧	∞
1	2	3	4	5	6	7	8	9

+

1	2	3	4	5	6	7	8	9

✧

Morton Plant Mease  
DayCare Health System  
SPORTS MEDICINE

## BACKGROUND

Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 Examiner: \_\_\_\_\_  
 Sport/team/school: \_\_\_\_\_ Date/time of injury: \_\_\_\_\_  
 Age: \_\_\_\_\_ Gender: ☐ M ☐ F  
 Years of education completed: \_\_\_\_\_  
 Dominant hand: ☐ right ☐ left ☐ neither  
 How many concussions do you think you have had in the past? \_\_\_\_\_  
 When was the most recent concussion? \_\_\_\_\_  
 How long was your recovery from the most recent concussion? \_\_\_\_\_  
 Have you ever been hospitalized or had medical imaging done for a head injury? ☐ Y ☐ N  
 Have you ever been diagnosed with headaches or migraines? ☐ Y ☐ N  
 Do you have a learning disability, dyslexia, ADD/ADHD? ☐ Y ☐ N  
 Have you ever been diagnosed with depression, anxiety or other psychiatric disorder? ☐ Y ☐ N  
 Has anyone in your family ever been diagnosed with any of these problems? ☐ Y ☐ N  
 Are you on any medications? If yes, please list: ☐ Y ☐ N

SCAT3 to be done in resting state. Best done 10 or more minutes post exercise.

## SYMPTOM EVALUATION

### 3 How do you feel?

*"You should score yourself on the following symptoms, based on how you feel now".*

	none		mild		moderate		severe
Headache	0	1	2	3	4	5	6
"Pressure in head"	0	1	2	3	4	5	6
Neck Pain	0	1	2	3	4	5	6
Nausea or vomiting	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Blurred vision	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling like "in a fog"	0	1	2	3	4	5	6
"Don't feel right"	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Fatigue or low energy	0	1	2	3	4	5	6
Confusion	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
More emotional	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervous or Anxious	0	1	2	3	4	5	6

Total number of symptoms (Maximum possible 22)

Symptom severity score (Maximum possible 132)

Do the symptoms get worse with physical activity? ☐ Y ☐ N

Do the symptoms get worse with mental activity? ☐ Y ☐ N

☐ self rated ☐ self rated and clinician monitored  
☐ clinician interview ☐ self rated with parent input

**Overall rating:** If you know the athlete well prior to the injury, how different is the athlete acting compared to his/her usual self?

Please circle one response

☐ no different ☐ very different ☐ unsure ☐ N/A

**Scoring on the SCAT3 should not be used as a stand-alone method to diagnose concussion, measure recovery or make decisions about an athlete's readiness to return to competition after concussion. Since signs and symptoms may evolve over time, it is important to consider repeat evaluation in the acute assessment of concussion.**

## COGNITIVE & PHYSICAL EVALUATION

### 4 Cognitive assessment

Standardized Assessment of Concussion (SAC)<sup>4</sup>

**Orientation** (1 point for each correct answer)

What month is it?	0	1
What is the date today?	0	1
What is the day of the week?	0	1
What year is it?	0	1
What time is it right now? (within 1 hour)	0	1

Orientation score \_\_\_\_\_ of 5

**Immediate memory**

List	Trial 1		Trial 2		Trial 3		Alternative word list		
elbow	0	1	0	1	0	1	candle	baby	finger
apple	0	1	0	1	0	1	paper	monkey	penny
carpet	0	1	0	1	0	1	sugar	perfume	blanket
saddle	0	1	0	1	0	1	sandwich	sunset	lemon
bubble	0	1	0	1	0	1	wagon	iron	insect
Total									

Total \_\_\_\_\_

Immediate memory score total \_\_\_\_\_ of 15

**Concentration: Digits Backward**

Concentration: Digits backward					
List	Trial 1		Alternative digit list		
4-9-3	0	1	6-2-9	5-2-6	4-1-5
3-8-1-4	0	1	3-2-7-9	1-7-9-5	4-9-6-8
6-2-9-7-1	0	1	1-5-2-8-6	3-8-5-2-7	6-1-8-4-3
7-1-8-4-6-2	0	1	5-3-9-1-4-8	8-3-1-9-6-4	7-2-4-8-5-6

Total of 4 \_\_\_\_\_

**Concentration: Month in Reverse Order** (1 pt. for entire sequence correct)

Dec-Nov-Oct-Sept-Aug-Jul-Jun-May-Apr-Mar-Feb-Jan ☐ 0 ☐ 1

Concentration score \_\_\_\_\_ of 5

### 5 Neck Examination:

Range of motion \_\_\_\_\_ Tenderness \_\_\_\_\_ Upper and lower limb sensation & strength \_\_\_\_\_

Findings: \_\_\_\_\_

### 6 Balance examination

Do one or both of the following tests.

Footwear (shoes, barefoot, braces, tape, etc.) \_\_\_\_\_

**Modified Balance Error Scoring System (BESS) testing<sup>5</sup>**

Which foot was tested (i.e. which is the non-dominant foot) ☐ Left ☐ Right

Testing surface (hard floor, field, etc.) \_\_\_\_\_

**Condition**

Double leg stance: \_\_\_\_\_ Errors

Single leg stance (non-dominant foot): \_\_\_\_\_ Errors

Tandem stance (non-dominant foot at back): \_\_\_\_\_ Errors

**And/Or**

**Tandem gait<sup>6,7</sup>**

Time (best of 4 trials): \_\_\_\_\_ seconds

### 7 Coordination examination

**Upper limb coordination**

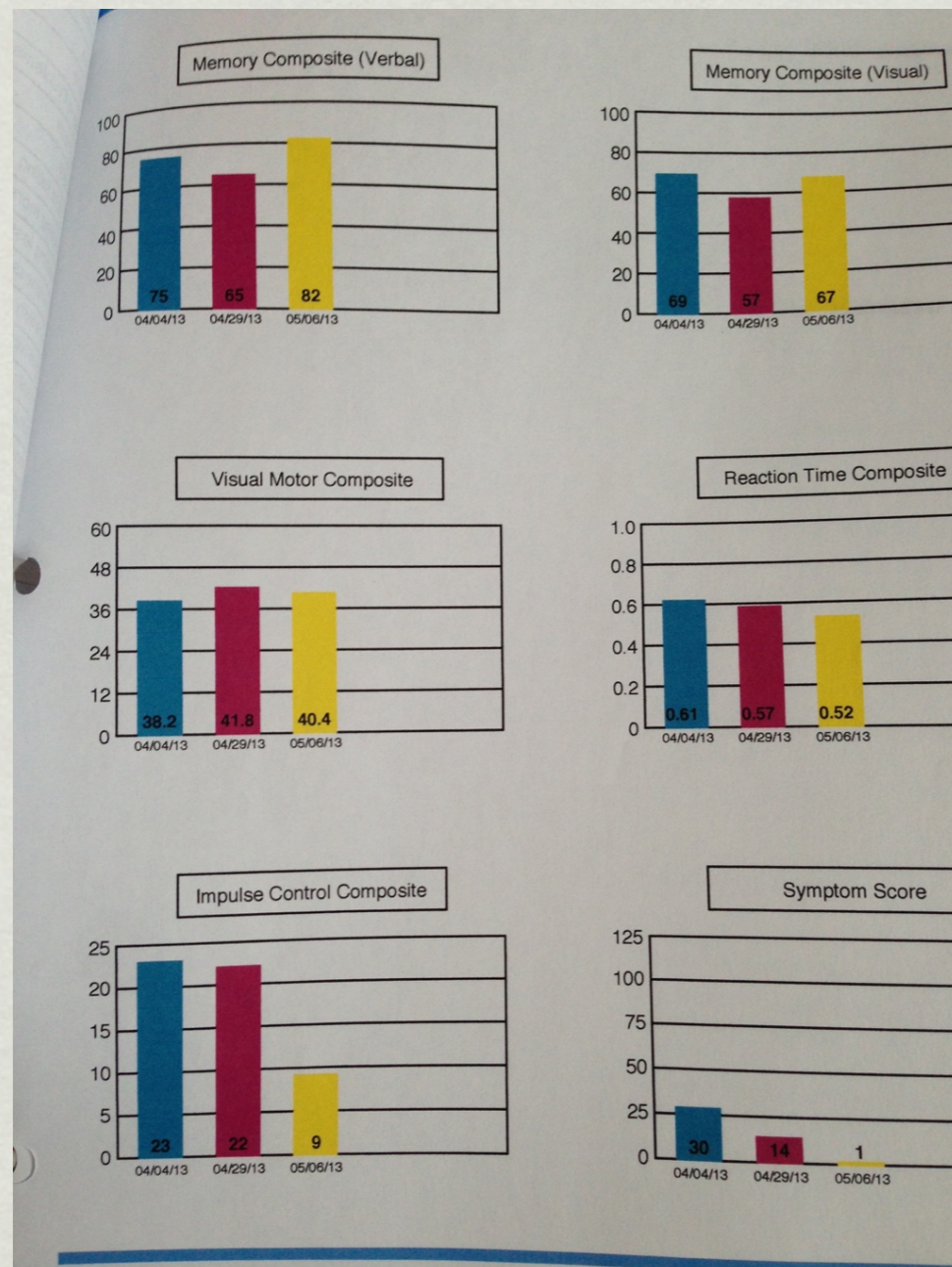
Which arm was tested: ☐ Left ☐ Right

Coordination score \_\_\_\_\_ of 1

### 8 SAC Delayed Recall<sup>4</sup>

Delayed recall score \_\_\_\_\_ of 5

# ImPACT Test Report



Composite Scores		Percentile scores if available are listed in small type.		
Memory composite (verbal)	75	<b>65</b>	82	
Memory composite (visual)	69	57	67	
Visual motor speed composite	38.2	41.8	40.4	
Reaction time composite	0.61	0.57	0.52	
Impulse control composite	23	22	9	
Total Symptom Score	30	14	1	

Cognitive Efficiency Index:		0.41	0.27	0.52
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The Cognitive efficiency Index measures the interaction between accuracy (percentage time) in seconds on the Symbol Match test. This score was not developed to make return helpful in determining the extent to which the athlete tried to work very fast on symbol match or attempted to improve their accuracy by taking a more deliberate and slow approach. A range of scores is from approximately zero to approximately .70 with a mean of .34. A higher score indicates the athlete did well in both the speed and memory domains on the symbol match test. A low score indicates they performed poorly on both the speed and accuracy component. If this score is a new score, it indicates they performed very poorly on the reaction time component.

Scores in **bold RED** type exceed the Reliable Change Index (RCI) when compared to previous scores that do not exceed to RCI index may still be clinically significant. Percentile scores are listed in small type.

Hours slept last night		7	7.5	
Medication				

# Criteria to Begin Return to Play Progression

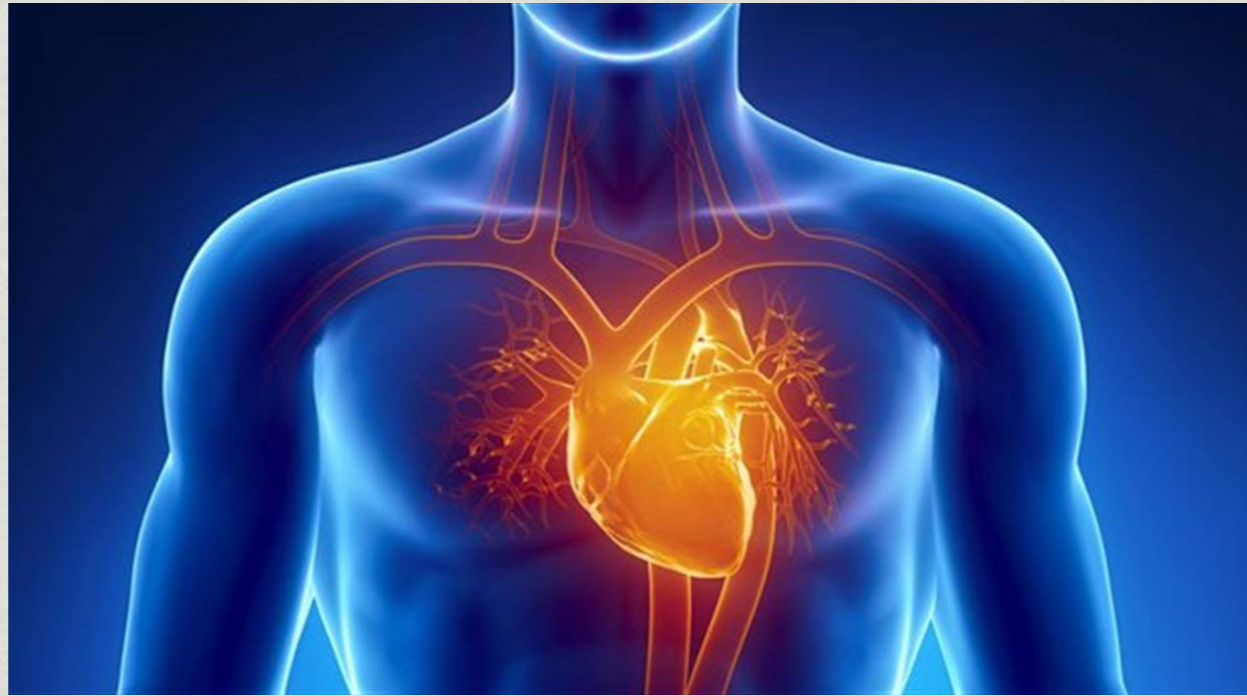
1. Symptom-free
2. ImPACT scores are within a normal range of baseline
3. Normal balance
4. Cleared by doctor

# East Haddam School District

## Return to Play Progression

- Step 1. Light, low-impact activity such as walking or riding an exercise bike. No weight lifting.
- Step 2. Initiate aerobic activity fundamental to the specific sport such as skating or running.
- Step 3. Begin non-contact skill drills specific to sport such as dribbling, fielding, batting, etc. May also begin progressive strength training activities.
  - Step 4. Full contact practice setting.
- Step 5. If athlete remains asymptomatic, he/she may return to game play.

# Sudden Cardiac Arrest



- SCA is the sudden onset of an abnormal and potentially lethal heart rhythm. When this happens, blood stops flowing to the brain and vital organs.

- cardiac 1 (Part1) <https://youtu.be/nyCNj99NCsM> What is sudden cardiac arrest?
- `<iframe width="560" height="315" src="https://www.youtube.com/embed/nyCNj99NCsM" frameborder="0" allow="accelerometer; autoplay; encrypted-media; gyroscope; picture-in-picture" allowfullscreen></iframe>`
- cardiac 2 (part 3) <https://youtu.be/xiatp8bxeyY> Warning symptoms of sudden cardiac arrest
- `<iframe width="560" height="315" src="https://www.youtube.com/embed/xiatp8bxeyY" frameborder="0" allow="accelerometer; autoplay; encrypted-media; gyroscope; picture-in-picture" allowfullscreen></iframe>`

# Warning Signs and Symptoms

- Fainting or seizures during exercise
- Unexplained shortness of breath
  - Dizziness
  - Extreme fatigue
  - Chest pains or racing heart
- The symptoms can happen before, during or after activity.

- Any student-athlete who shows signs or symptoms of SCA must be removed from athletic activity and referred to a licensed health care professional trained specifically in treatment of cardiac care.
- Before returning to play, the athlete must be evaluated. Clearance to return to play must be in writing. The evaluation must be performed and written clearance be provided by a licensed medical provider.

- Sudden Cardiac Arrest can be prevented if the underlying cause can be diagnosed and treated.
- SCA is a medical emergency. If not treated immediately, it can cause sudden cardiac death. With appropriate medical care, survival is possible.

# How are we protecting our students from SCA?



- All coaches are trained in CPR and the use of an AED. AEDs are located near fields and courts for quick and easy access.

The goal of any athlete  
is to be at peak  
performance. Your body  
is the instrument of  
performance, so treat it  
with care.



# Preston Plevretes' Life After Tragedy



# Preston's Story

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## Zachary Lystedt's Story

