Adolescent Sports Concussion

Tips for Management on the Field and in the Classroom

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Disclosures

- I have no disclosures

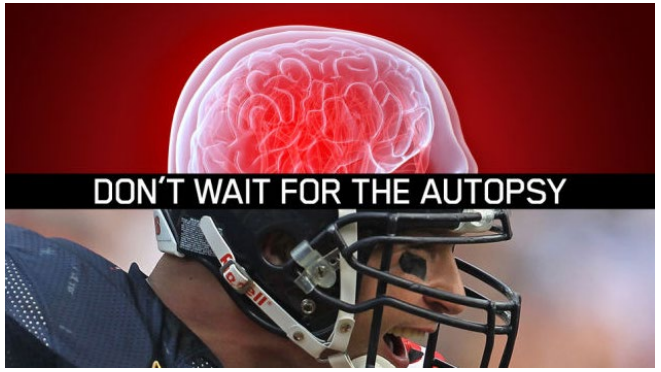
CONCUSSION

HOT TOPIC

- Prevalence in sports
  - Media involvement

- Clinically difficult to diagnose
  - Testing often subjective

- Significant short term/long term complications
  - Physical, emotional, psychological
  - Second impact syndrome, depression, anxiety, suicide, etc…



CONCUSSION

WHAT IS IT?

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CONCUSSION

DEFINITION

Mild TRAUMATIC brain injury

CONCUSSION
DEFINITION

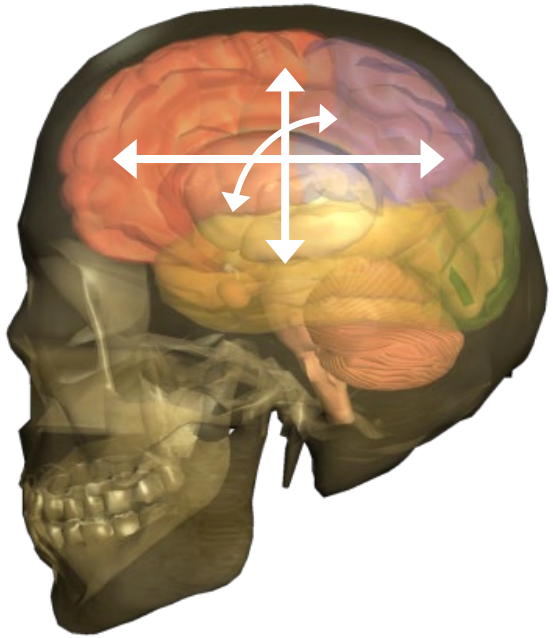
- A complex pathophysiological process affecting the brain, induced by biomechanical forces:
  - Impulsive force transmitted to head
  - Short-lived impairment of neurologic function that resolves spontaneously
  - Neuropathological changes – functional disturbance, not structural problem

https://www.orthoinfo.org/globalassets/figures/a00574_feature.jpg

Consensus Statement on Concussion in Sport;
3rd International Conference on Concussion in Sport
McCrory, P, et al. Clin J Sport Med 2009;19:185–200

CONCUSSION
PATHOPHYSIOLOGY

- Direct impact to head is not required
- Kinetic energy leads to acceleration-deceleration and rotational mechanisms
- Mechanical trauma causes neuronal cell membrane and axon disruptive stretching
- Alterations in cerebral blood flow



Shrey, DW, et al. Phys Med Rehabil Clin N Am. 2011 Nov; 22(4): 577-602.

CONCUSSION
EPIDEMIOLOGY

- 1.6 to 3.8 million mild traumatic brain injuries/year
  - 21% in high school athletes
  - 20-45% in motor vehicle accidents
  - 30-38% in falls
  - 10% in occupational accidents
  - 10% in recreational accidents

- Concussions represent an estimated:
  - 10% of all high school athletic injuries
  - 4-8% of collegiate athletes
  - 7.7% of National Football League (NFL) athletes

- **53% of concussed high school athletes go unreported**

Halsted, M and K Walter. Pediatrics, 2010; 126 (3): 597-615
Broglio, SP, et al. Journal of Athletic Training 2009;44(4):342–349.
Frommer, LJ, et al. JAT 2011; 46 (1): 76-84

CONCUSSION
EPIDEMIOLOGY

- CDC surveillance data on high school athletes suggest highest overall rate in football
  - Followed by girls' soccer, boys' lacrosse, boys' ice hockey, boys' wrestling, and girls' lacrosse
- Boys' sports have majority of concussions
- Recent studies suggest girls may be at higher risk than boys
  - Higher rate of concussion in gender comparable sports
  - Girls report higher number and severity of symptoms

TABLE 1

Concussion Rates in High School Sports

Sport	Concussions per 1000 AEs
Boys' tackle football	0.54–0.94
Girls' soccer	0.30–0.73
Boys' lacrosse	0.30–0.67
Boys' ice hockey	0.54–0.62
Boys' wrestling	0.17–0.58
Girls' lacrosse	0.20–0.55
Girls' field hockey	0.10–0.44
Girls' basketball	0.16–0.44
Boys' soccer	0.17–0.44
Girls' softball	0.10–0.36
Boys' basketball	0.07–0.25
Girls' volleyball	0.05–0.25
Cheerleading	0.06–0.22
Boys' baseball	0.04–0.14

Pediatrics (2018) 142 (6): e20183074.

CONCUSSION

HOW DO I RECOGNIZE IT?

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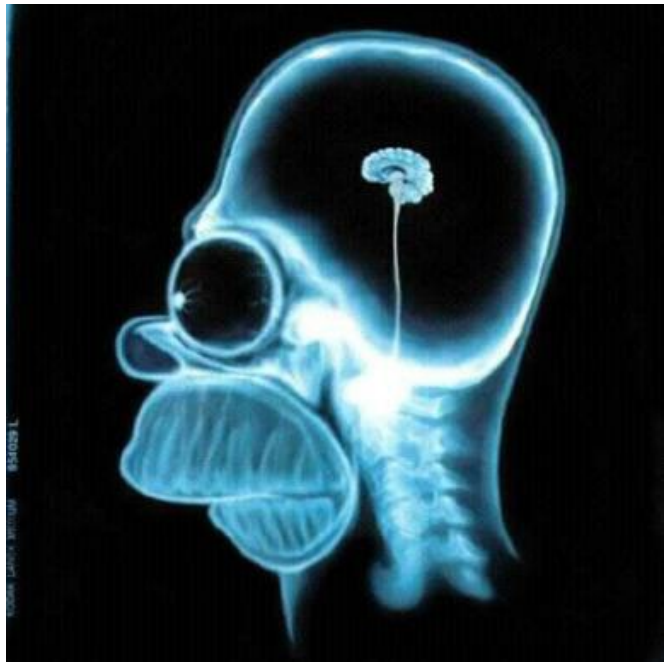
CONCUSSION
DIAGNOSIS

- No definitive test for diagnosing concussion

- Concussion remains a clinical diagnosis
  - Relies on patient reporting
  - Recognition of certain signs and symptoms
  - Requires a high index of suspicion
    - Based on mechanism of injury and exam

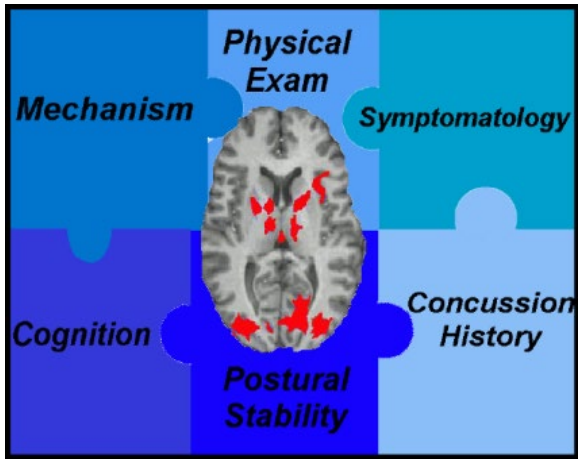
- Neuroimaging is typically normal and therefore not routinely indicated



Kutcher, J.S. and J.T. Eckner. Curr. Sports Med. Rep.,2010; 9(1): 8-15

CONCUSSION
DIAGNOSIS

- Diagnosis is challenging because every concussion is unique
- Symptoms often delayed – evolving injury
- Numerous symptoms grouped into four categories:
  - Somatic (physical)
  - Cognitive
  - Emotional
  - Sleep



Kutcher, J.S. and J.T. Eckner. Curr. Sports Med. Rep.,2010; 9(1): 8-15

CONCUSSION

SYMPTOMS

- Somatic (Physical)
  - HEADACHE
  - Nausea/vomiting
  - Dizziness
  - Visual Disturbances
  - Photophobia
  - Phonophobia
  - Fatigue
  - Numbness/tingling
  - Balance/coordination problems

CONCUSSION

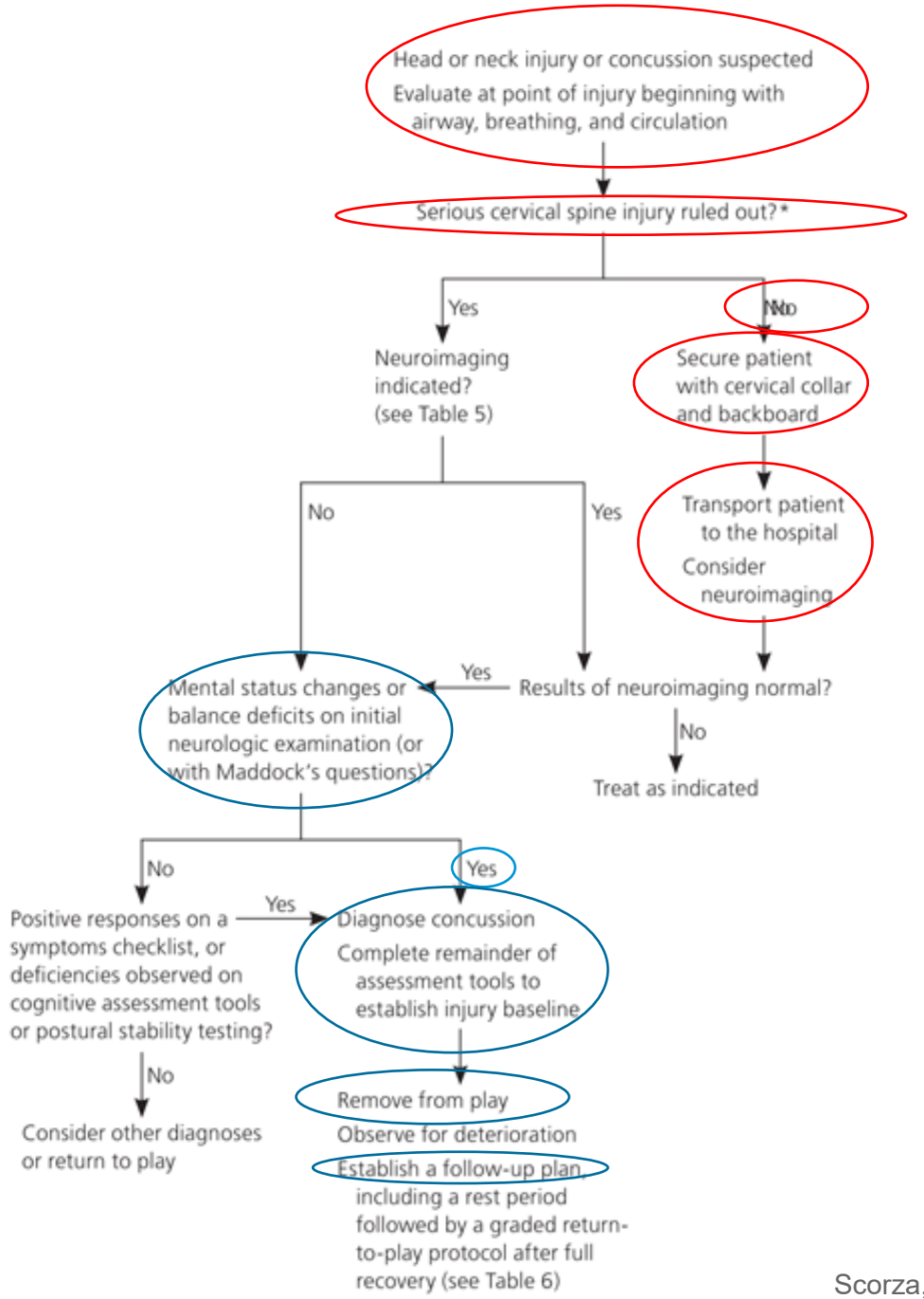
SYMPTOMS

- Cognitive
  - LOC
  - Vacant stare
  - Mental fogginess or feeling slow
  - Disorientation
  - Difficulty concentrating
  - Difficulty remembering
  - Slow or incoherent speech
  - Difficulty finding words
- Emotional
  - Irritability
  - Sadness
  - Emotional lability
  - Nervousness
- Sleep Disturbances
  - Drowsiness
  - Too much/little sleep
  - Difficulty falling asleep

CONCUSSION

Sideline Evaluation

Initial Evaluation of Concussion

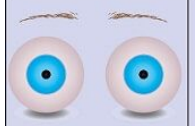


Scorza, KA et al. Am Fam Physician. 2012 Jan 15;85(2):123-132

CONCUSSION

WHEN TO SEND ATHLETE TO HOSPITAL

- GCS score< 13 on initial assessment; <15 two-hours after injury
- Examination findings suspicious for skull fracture
- High Impact or high risk mechanism for intracranial bleed
- Post-traumatic seizure
- Acute worsening of symptoms – may suggest ICH
  - Nausea/vomiting (>1 episode since injury)
  - Focal neurological deficit
  - Deteriorating Neurological Status: somnolence, slurred speech, difficulty walking, worsening mental status
- LOC or amnesia with history of bleeding/clotting disorder, dangerous mechanism of injury OR > 30 minutes of retrograde amnesia of events immediately before injury.

Behaviour	Response
 Eye Opening Response	4. Spontaneously 3. To speech 2. To pain 1. No response
 Verbal Response	5. Oriented to time, person and place 4. Confused 3. Inappropriate words 2. Incomprehensible sounds 1. No response
 Motor Response	6. Obeys command 5. Moves to localised pain 4. Flex to withdraw from pain 3. Abnormal flexion 2. Abnormal extension 1. No response

STEP 1: RED FLAGS

RED FLAGS:

- Neck pain or tenderness
- Double vision
- Weakness or tingling/ burning in arms or legs
- Severe or increasing headache
- Seizure or convulsion
- Loss of consciousness
- Deteriorating conscious state
- Vomiting
- Increasingly restless, agitated or combative

Sharp,DJ and Jenkins, PO. Pract Neurol. 2015 Jun; 15(3): 172–186

CONCUSSION
SIDE-LINE EVALUATION

- Minimize distractions – i.e. evaluate in the locker room
- Thorough history/physical
  - History from coaches/trainers if you didn't observe the impact; mechanism of injury is important
  - Cranial Nerve Exam – symptoms worsen if cognition stressed
  - Strength and sensation exam: UE/LE
  - Vestibular and oculomotor exam
- Sideline assessment tool

CONCUSSION
ASSESSMENT TOOLS

SIDELINE EVALUATION:

- SAC – Standardized Assessment of Concussion
- BESS – Balance Error Scoring System
- SCAT 5 – combines SAC and BESS
  - endorsed by the Olympic Committee
- King-Devick – eye movement screening test endorsed by Mayo
- VOMS – Is a vestibular ocular motor screening test developed by UPMC
  - It looks at the systems in charge of integrating balance, vision, and movement

OFFICE EVALUATION:

- Computerized Neurocognitive Testing (i.e. IMPACT, CogState etc.)
  - Best if athletes complete the test pre-season
  - Compared to post injury

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Patient details

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date of Injury: _____ Time: _____

WHAT IS THE SCAT5?

The SCAT5 is a standardized tool for evaluating concussions designed for use by physicians and licensed healthcare professionals[1]. The SCAT5 cannot be performed correctly in less than 10 minutes.

If you are not a physician or licensed healthcare professional, please use the Concussion Recognition Tool 5 (CRT5). The SCAT5 is to be used for evaluating athletes aged 13 years and older. For children aged 12 years or younger, please use the Child SCAT5.

Preseason SCAT5 baseline testing can be useful for interpreting post-injury test scores, but is not required for that purpose.Detailed instructions for use of the SCAT5 are provided on page 7. Please read through these instructions carefully before testing the athlete. Brief verbal instructions for each test are given in italics. The only equipment required for the tester is a watch or timer.

Recognise and Remove

A head impact by either a direct blow or indirect transmission of force can be associated with a serious and potentially fatal brain injury. If there are significant concerns, including any of the red flags listed in Box 1, then activation of emergency procedures and urgent transport to the nearest hospital should be arranged.

Key points

- Any athlete with suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration. No athlete diagnosed with concussion should be returned to play on the day of injury.
- If an athlete is suspected of having a concussion and medical personnel are not immediately available, the athlete should be referred to a medical facility for urgent assessment.
- Athletes with suspected concussion should not drink alcohol, use recreational drugs and should not drive a motor vehicle until cleared to do so by a medical professional.
- Concussion signs and symptoms evolve over time and it is important to consider repeat evaluation in the assessment of concussion.
- The diagnosis of a concussion is a clinical judgment, made by a medical professional. The SCAT5 should NOT be used by itself to make, or exclude, the diagnosis of concussion. An athlete may have a concussion even if their SCAT5 is "normal".

Remember:

- The basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the athlete (other than that required for airway management) unless trained to do so.
- Assessment for a spinal cord injury is a critical part of the initial on-field assessment.
- Do not remove a helmet or any other equipment unless trained to do so safely.

Davis GA, *et al. Br J Sports Med* 2017;**0**:1–8. doi:10.1136/bjsports-2017-097506SCAT5

1

IMMEDIATE OR ON-FIELD ASSESSMENT

The following elements should be assessed for all athletes who are suspected of having a concussion prior to proceeding to the neurocognitive assessment and ideally should be done on-field after the first first aid / emergency care priorities are completed.

If any of the "Red Flags" or observable signs are noted after a direct or indirect blow to the head, the athlete should be immediately and safely removed from participation and evaluated by a physician or licensed healthcare professional.

Consideration of transportation to a medical facility should be at the discretion of the physician or licensed healthcare professional.

The GCS is important as a standard measure for all patients and can be done serially if necessary in the event of deterioration in conscious state. The Maddocks questions and cervical spine exam are critical steps of the immediate assessment; however, these do not need to be done serially.

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date: _____

STEP 1: RED FLAGS

RED FLAGS:

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- Double vision
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STEP 2: OBSERVABLE SIGNS

Witnessed ☐ Observed on Video ☐

Lying motionless on the playing surface	Y	N
Balance / gait difficulties / motor incoordination: stumbling, slow / laboured movements	Y	N
Disorientation or confusion, or an inability to respond appropriately to questions	Y	N
Blank or vacant look	Y	N
Facial injury after head trauma	Y	N

STEP 3: MEMORY ASSESSMENT MADDOCKS QUESTIONS[2]

"I am going to ask you a few questions, please listen carefully and give your best effort. First, tell me what happened?"

_____

_____

Mark Y for correct answer / N for incorrect

What venue are we at today?	Y	N
Which half is it now?	Y	N
Who scored last in this match?	Y	N
What team did you play last week / game?	Y	N
Did your team win the last game?	Y	N

Note: Appropriate sport-specific questions may be substituted.

STEP 4: EXAMINATION GLASGOW COMA SCALE (GCS)[3]

Time of assessment			
Date of assessment			
Best eye response (E)			
No eye opening	1	1	1
Eye opening in response to pain	2	2	2
Eye opening to speech	3	3	3
Eyes opening spontaneously	4	4	4
Best verbal response (V)			
No verbal response	1	1	1
Incomprehensible sounds	2	2	2
Inappropriate words	3	3	3
Confused	4	4	4
Oriented	5	5	5
Best motor response (M)			
No motor response	1	1	1
Extension to pain	2	2	2
Abnormal flexion to pain	3	3	3
Flexion / Withdrawal to pain	4	4	4
Localizes to pain	5	5	5
Obeys commands	6	6	6
Glasgow Coma score (E + V + M)			

CERVICAL SPINE ASSESSMENT

Does the athlete report that their neck is pain free at rest?	Y	N
If there is NO neck pain at rest, does the athlete have a full range of ACTIVE pain free movement?	Y	N
Is the limb strength and sensation normal?	Y	N

In a patient who is not lucid or fully conscious, a cervical spine injury should be assumed until proven otherwise.

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Patient details

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Examiner: _____

Date of Injury: _____ Time: _____

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OFFICE OR OFF-FIELD ASSESSMENT

Please note that the neurocognitive assessment should be done in a distraction-free environment with the athlete in a resting state.

STEP 1: ATHLETE BACKGROUND

Sport / team / school: _____

Date / time of injury: _____

Years of education completed: _____

Age: _____

Gender: M / F / Other

Dominant hand: left / neither / right

How many diagnosed concussions has the athlete had in the past?: _____

When was the most recent concussion?: _____

How long was the recovery (time to being cleared to play) from the most recent concussion?: _____ (days)

Has the athlete ever been:

Hospitalized for a head injury?	Yes	No
Diagnosed / treated for headache disorder or migraines?	Yes	No
Diagnosed with a learning disability / dyslexia?	Yes	No
Diagnosed with ADD / ADHD?	Yes	No
Diagnosed with depression, anxiety or other psychiatric disorder?	Yes	No

Current medications? If yes, please list:

_____

_____

_____

_____

_____

_____

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date: _____

2

STEP 2: SYMPTOM EVALUATION

The athlete should be given the symptom form and asked to read this instruction paragraph out loud then complete the symptom scale. For the baseline assessment, the athlete should rate his/her symptoms based on how he/she typically feels and for the post injury assessment the athlete should rate their symptoms at this point in time.

Please Check: ☐ **Baseline** ☐ **Post-Injury**

Please hand the form to the athlete

	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
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
Trouble falling asleep (if applicable)	0	1	2	3	4	5	6
Total number of symptoms:							of 22
Symptom severity score:							of 132
Do your symptoms get worse with physical activity?						Y	N
Do your symptoms get worse with mental activity?						Y	N
If 100% is feeling perfectly normal, what percent of normal do you feel?							

If not 100%, why?

_____

_____

_____

Please hand form back to examiner

Davis GA, *et al. Br J Sports Med* 2017;**0**:1–8. doi:10.1136/bjsports-2017-097506SCAT5

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STEP 3: COGNITIVE SCREENING

Standardised Assessment of Concussion (SAC)[4]

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date: _____

ORIENTATION

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

The Immediate Memory component can be completed using the traditional 5-word per trial list or optionally using 10-words per trial to minimise any ceiling effect. All 3 trials must be administered irrespective of the number correct on the first trial. Administer at the rate of one word per second.

Please choose EITHER the 5 or 10 word list groups and circle the specific word list chosen for this test.

I am going to test your memory. I will read you a list of words and when I am done, repeat back as many words as you can remember, in any order. For Trials 2 & 3: I am going to repeat the same list again. Repeat back as many words as you can remember in any order, even if you said the word before.

List	Alternate 5 word lists					Score (of 5) Trial 1	Trial 2	Trial 3
A	Finger	Penny	Blanket	Lemon	Insect			
B	Candle	Paper	Sugar	Sandwich	Wagon			
C	Baby	Monkey	Perfume	Sunset	Iron			
D	Elbow	Apple	Carpet	Saddle	Bubble			
E	Jacket	Arrow	Pepper	Cotton	Movie			
F	Dollar	Honey	Mirror	Saddle	Anchor			
					Immediate Memory Score			of 15
					Time that last trial was completed			

List	Alternate 10 word lists					Score (of 10) Trial 1	Trial 2	Trial 3
G	Finger Candle	Penny Paper	Blanket Sugar	Lemon Sandwich	Insect Wagon			
H	Baby Elbow	Monkey Apple	Perfume Carpet	Sunset Saddle	Iron Bubble			
I	Jacket Dollar	Arrow Honey	Pepper Mirror	Cotton Saddle	Movie Anchor			
					Immediate Memory Score			of 30
					Time that last trial was completed			

CONCENTRATION

DIGITS BACKWARDS

Please circle the Digit list chosen (A, B, C, D, E, F). Administer at the rate of one digit per second reading DOWN the selected column.

I am going to read a string of numbers and when I am done, you repeat them back to me in reverse order of how I read them to you. For example, if I say 7-1-9, you would say 9-1-7.

Concentration Number Lists (circle one)					
List A	List B	List C			
4-9-3	5-2-6	1-4-2	Y	N	0
6-2-9	4-1-5	6-5-8	Y	N	1
3-8-1-4	1-7-9-5	6-8-3-1	Y	N	0
3-2-7-9	4-9-6-8	3-4-8-1	Y	N	1
6-2-9-7-1	4-8-5-2-7	4-9-1-5-3	Y	N	0
1-5-2-8-6	6-1-8-4-3	6-8-2-5-1	Y	N	1
7-1-8-4-6-2	8-3-1-9-6-4	3-7-6-5-1-9	Y	N	0
5-3-9-1-4-8	7-2-4-8-5-6	9-2-6-5-1-4	Y	N	1
List D	List E	List F			
7-8-2	3-8-2	2-7-1	Y	N	0
9-2-6	5-1-8	4-7-9	Y	N	1
4-1-8-3	2-7-9-3	1-6-8-3	Y	N	0
9-7-2-3	2-1-6-9	3-9-2-4	Y	N	1
1-7-9-2-6	4-1-8-6-9	2-4-7-5-8	Y	N	0
4-1-7-5-2	9-4-1-7-5	8-3-9-6-4	Y	N	1
2-6-4-8-1-7	6-9-7-3-8-2	5-8-6-2-4-9	Y	N	0
8-4-1-9-3-5	4-2-7-9-3-8	3-1-7-8-2-6	Y	N	1
		Digits Score:			of 4

MONTHS IN REVERSE ORDER

Now tell me the months of the year in reverse order. Start with the last month and go backward. So you'll say December, November. Go ahead.

Dec - Nov - Oct - Sept - Aug - Jul - Jun - May - Apr - Mar - Feb - Jan	0 1
Months Score	of 1
Concentration Total Score (Digits + Months)	of 5

SCAT5©

SPORT CONCUSSION ASSESSMENT TOOL – 5TH EDITION

DEVELOPED BY THE CONCUSSION IN SPORT GROUP

FOR USE BY MEDICAL PROFESSIONALS ONLY

supported by

Patient details

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date of Injury: _____ Time: _____

WHAT IS THE SCAT5?

The SCAT5 is a standardized tool for evaluating concussions designed for use by physicians and licensed healthcare professionals[1]. The SCAT5 cannot be performed correctly in less than 10 minutes.

If you are not a physician or licensed healthcare professional, please use the Concussion Recognition Tool 5 (CRT5). The SCAT5 is to be used for evaluating athletes aged 13 years and older. For children aged 12 years or younger, please use the Child SCAT5.

Preseason SCAT5 baseline testing can be useful for interpreting post-injury test scores, but is not required for that purpose.Detailed instructions for use of the SCAT5 are provided on page 7. Please read through these instructions carefully before testing the athlete. Brief verbal instructions for each test are given in italics. The only equipment required for the tester is a watch or timer.

Recognise and Remove

A head impact by either a direct blow or indirect transmission of force can be associated with a serious and potentially fatal brain injury. If there are significant concerns, including any of the red flags listed in Box 1, then activation of emergency procedures and urgent transport to the nearest hospital should be arranged.

Key points

- Any athlete with suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration. No athlete diagnosed with concussion should be returned to play on the day of injury.
- If an athlete is suspected of having a concussion and medical personnel are not immediately available, the athlete should be referred to a medical facility for urgent assessment.
- Athletes with suspected concussion should not drink alcohol, use recreational drugs and should not drive a motor vehicle until cleared to do so by a medical professional.
- Concussion signs and symptoms evolve over time and it is important to consider repeat evaluation in the assessment of concussion.
- The diagnosis of a concussion is a clinical judgment, made by a medical professional. The SCAT5 should NOT be used by itself to make, or exclude, the diagnosis of concussion. An athlete may have a concussion even if their SCAT5 is "normal".

Remember:

- The basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the athlete (other than that required for airway management) unless trained to do so.
- Assessment for a spinal cord injury is a critical part of the initial on-field assessment.
- Do not remove a helmet or any other equipment unless trained to do so safely.

Davis GA, *et al. Br J Sports Med* 2017;**0**:1–8. doi:10.1136/bjsports-2017-097506SCAT5

4

STEP 4: NEUROLOGICAL SCREEN

See the instruction sheet (page 7) for details of test administration and scoring of the tests.

Can the patient read aloud (e.g. symptom check-list) and follow instructions without difficulty?	Y	N
Does the patient have a full range of pain-free PASSIVE cervical spine movement?	Y	N
Without moving their head or neck, can the patient look side-to-side and up-and-down without double vision?	Y	N
Can the patient perform the finger nose coordination test normally?	Y	N
Can the patient perform tandem gait normally?	Y	N

BALANCE EXAMINATION

Modified Balance Error Scoring System (mBESS) testing[2]

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

Testing surface (hard floor, field, etc.) _____

Footwear (shoes, barefoot, braces, tape, etc.) _____

Condition	Errors
Double leg stance	of 10
Single leg stance (non-dominant foot)	of 10
Tandem stance (non-dominant foot at the back)	of 10
Total Errors	of 30

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date: _____

5

STEP 5: DELAYED RECALL:

The delayed recall should be performed after 5 minutes have elapsed since the end of the Immediate Recall section. Score 1 pt. for each correct response.

Do you remember that list of words I read a few times earlier? Tell me as many words from the list as you can remember in any order.

Time Started _____

Please record each word correctly recalled. Total score equals number of words recalled.

_____

_____

_____

Total number of words recalled accurately: _____ of 5 or _____ of 10

6

STEP 6: DECISION

Domain	Date & time of assessment:		
Symptom number (of 22)			
Symptom severity score (of 132)			
Orientation (of 5)			
Immediate memory	of 15 of 30	of 15 of 30	of 15 of 30
Concentration (of 5)			
Neuro exam	Normal Abnormal	Normal Abnormal	Normal Abnormal
Balance errors (of 30)			
Delayed Recall	of 5 of 10	of 5 of 10	of 5 of 10

Date and time of injury: _____

If the athlete is known to you prior to their injury, are they different from their usual self?
☐ **Yes** ☐ **No** ☐ **Unsure** ☐ **Not Applicable**
(If different, describe why in the clinical notes section)

Concussion Diagnosed?
☐ **Yes** ☐ **No** ☐ **Unsure** ☐ **Not Applicable**

If re-testing, has the athlete improved?
☐ **Yes** ☐ **No** ☐ **Unsure** ☐ **Not Applicable**

I am a physician or licensed healthcare professional and I have personally administered or supervised the administration of this SCAT5.

Signature: _____

Name: _____

Title: _____

Registration number (if applicable): _____

Date: _____

SCORING ON THE SCAT5 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.

Davis GA, *et al. Br J Sports Med* 2017;**0**:1–8. doi:10.1136/bjsports-2017-097506SCAT5

Identifying Vestibular and Ocular Problems after Concussion: UPMC VOMS

Horizontal & Vertical Pursuits

Horizontal & Vertical Saccades

Near Point Convergence

Horizontal & Vertical VOR

Visual Motion Sensitivity

- A brief 5 minute ***clinical screening*** tool to identify additional vestibular and ocular motor impairment and symptoms following concussion
- Used in conjunction with symptom reporting, neurocognitive assessment, balance testing, cervical and exertion screening in order to provide more complete clinical picture

Mucha et al, 2014

https://www.sportsmedreview.com/wp-content/uploads/2020/03/vestibular-ocular-motor-screening-tool-concussion-1024x576.jpg

Vestibular/Ocular Motor Test:	Not Tested	Headache 0-10	Dizziness 0-10	Nausea 0-10	Fogginess 0-10	Comments
BASELINE SYMPTOMS:	N/A					
Smooth Pursuits						
Saccades – Horizontal						
Saccades – Vertical						
Convergence (Near Point)						(Near Point in cm): Measure 1: _____ Measure 2: _____ Measure 3: _____
VOR – Horizontal						
VOR – Vertical						
Visual Motion Sensitivity Test						

https://www.physio-pedia.com/images/3/34/Vestibular_Ocular-Motor_Screening.JPG

Recheck in 30-60 minutes

REMEMBER: Concussion is a CLINICAL diagnosis…"WHEN IN DOUBT, SIT THEM OUT"

CONCUSSION

HOW TO TREAT IT?

Ochsner Orthopaedics & Sports Medicine Institute | Andrews Institute Orthopaedics & Sports Medicine

CONCUSSION
MANAGEMENT

- Cognitive and physical rest remain "cornerstone" of concussion management
- Limited evidence supporting use of medications
- Resolution of signs and symptoms occurs in <10 days for 80-90% of individuals
- Several risk factors for prolonged recovery…

Risk Factors for Prolonged Recovery

Selected risk factors for prolonged recovery after concussion

- Younger age
- Number, severity, and proximity of concussions
- Increased number of symptoms (≥4)
- Self-reported cognitive/memory issues
- Prolonged headache, fatigue, or fogginess
- Amnesia
- History of prior concussions
- Attention-deficit disorder/attention-deficit hyperactivity disorder
- History of chronic headaches and/or migraine disorder
- History of learning disability
- History of psychiatric illness (such as anxiety or depression)

Kaufman, MS et al. Phys Med Rehabil Clin N Am. 2014, 25: 707-722.

CONCUSSION

Return to Learn?
Return to Play?
Where Do We Start?

Ochsner Orthopaedics & Sports Medicine Institute | Andrews Institute Orthopaedics & Sports Medicine

CONCUSSION
ZACKERY LYSTEDT LAW

- Passed in Washington state in 2009
- "Three main tenets:
  - Education of young athletes and parents
  - Removal of an athlete from sports if they appear to have suffered a concussion
  - Evaluation and written clearance of that athlete by licensed HCP before returning to play or practice
- All remaining states have passed concussion legislation

http://www.seattlemag.com/article/story-behind-zackery-lystedt-law

CONCUSSION

LOUSIANA Youth Concussion Act

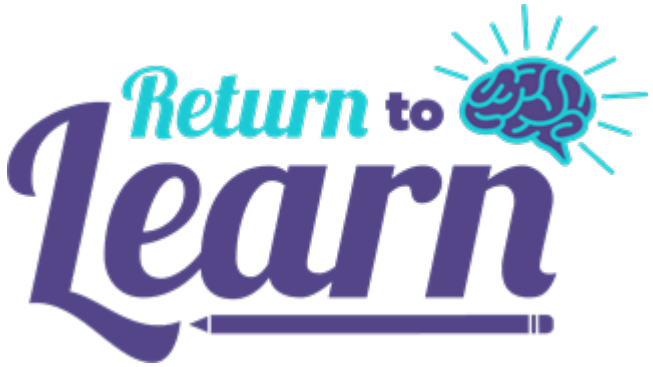
- Developed in 2011, the act is a proactive movement to educate families and institutions on how to better serve and protect Louisiana's youth

- Three Components:
  1. Policies and Procedures
     - Required training for personnel and volunteers
  2. Protocol for Return to Learn
  3. Protocol for Return to Play

Louisiana Youth Concussion Act

RETURN TO LEARN PROTOCOL

- Following a concussion, many athletes will have difficulty in school
- Some students may need total rest with a gradual return to school, while others will be able to continue doing academic work with minimal instructional modifications.
- These problems may last from days to months and often involve difficulties with short- and long-term memory, concentration, and organization.
- In many cases, it is best to lessen the student's class load early on after the injury.

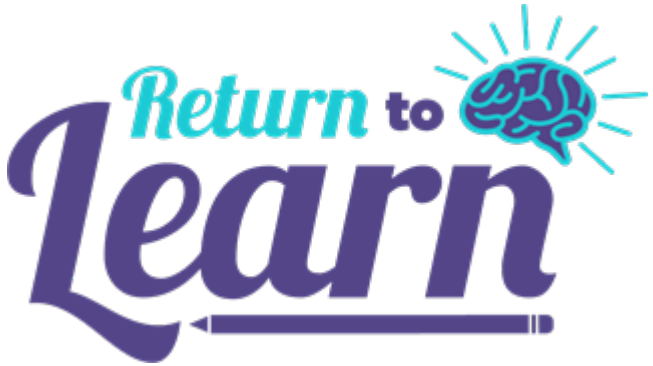


https://www.healthykidslearnmore.com/Healthy-Kids-Learn-More1/Images/background-rtl.png?Medium

Louisiana Youth Concussion Act

RETURN TO LEARN PROTOCOL

- This may include staying home from school for a few days, followed by a lightened schedule for a few days, or longer, if necessary.
- The decision to progress from one phase to another should reflect the absence of any relevant signs or symptoms, and should be based on the recommendation of the student's appropriate licensed health care provider in collaboration with school staff:
  - teachers
  - school counselors
  - school administrators
  - nurses



https://www.healthykidslearnmore.com/Healthy-Kids-Learn-More1/Images/background-rtl.png?Medium

Louisiana Youth Concussion Act

RETURN TO LEARN PROTOCOL

Ochsner™
Sports Medicine Institute

1221 S. Clearview Pkwy, New Orleans, LA 70121

504-736-4800

Return To Learn Protocol

1. Prepare to return to academic activities
    a. Begin ***light mental activity*** for short periods of time (about 15 minutes several times/day)
    b. Limit other mental/cognitive activities, especially those that worsen symptoms
        i. For example, computers, phones, video games
2. Begin light activity academics
    a. Return to class
        i. This may be a single class, or limited number of classes at first
        ii. See if a classmate can take notes while you work on paying attention
        iii. Change seating arrangement to limit distractions/stimulation
    b. Work on short/small assignments
        i. Work for short periods with rest in between
        ii. Avoid computer, if able, due to the risk of eye strain, headache, or neck tension
    c. Continue to limit problematic cognitive activities
        i. Computer, texting, watching TV, etc
3. Increase academic work load
    a. Return to more/all classes
        i. Begin taking notes
        ii. Work on major assignments, tests, and projects
4. Return to normal academic work load
    a. Return to ALL classes
    b. Arrange to take tests and complete missed work, if any

https://image.shutterstock.com/z/stock-photo-adorable-young-boy-rubbing-his-temples-thinking-hard-while-studying-in-the-class-at-elementary-669822871.jpg

Louisiana Youth Concussion Act

RETURN TO PLAY PROTOCOL

- No student-athlete shall participate in any athletic event or practice the same day he/she is injured and exhibits signs, symptoms, or behaviors attributable to a concussion; or has been diagnosed with a concussion.
- No member of a school athletic team shall return to participate in an athletic event or training on the days after he/she experiences a concussion unless **all** of the following conditions have been met:
  - student attends all classes, maintains full academic load/homework, and requires no instructional modifications
  - student no longer exhibits signs, symptoms, or behaviors consistent with a concussion, at rest or with exertion
  - student is asymptomatic during, or following periods of supervised exercise that is gradually intensifying
  - student receives a written medical release from an appropriate licensed health care provider.

Louisiana Youth Concussion Act

RETURN TO PLAY PROTOCOL

- Low levels of physical activity: walking, light jogging, light stationary biking, light weightlifting (lower weight, higher reps, no bench, no squat).
- Moderate levels of physical activity (with body/head movement): moderate jogging, brief running, moderate-intensity stationary biking, moderate-intensity weightlifting (reduced time and/or reduced weight from the typical routine).
- Heavy non-contact physical activity: sprinting/running, high-intensity stationary biking, regular weightlifting routine, non-contact sport-specific drills (in 3 planes of movement).
- Full contact in controlled practice.
- Full contact game play.

Return To Play Protocol

Ochsner™
Sports Medicine Institute

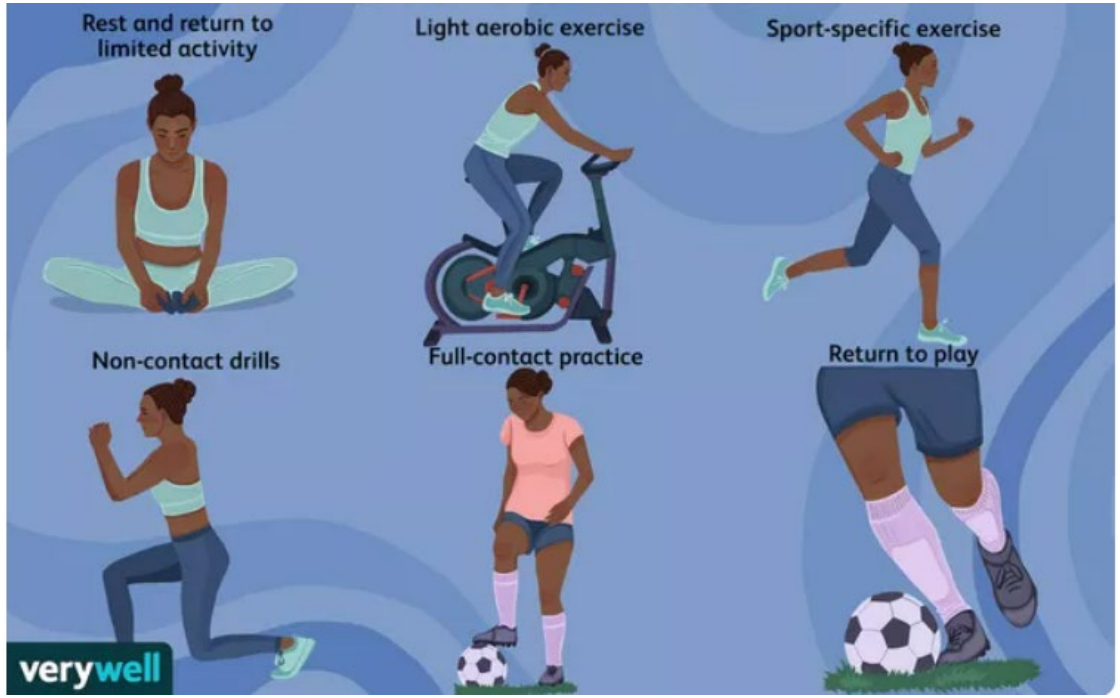
1221 S. Clearview Pkwy, New Orleans, LA 70121

504-736-4800

Return To Play Protocol

Rehabilitation Stage	Functional Exercise at Each Stage of Rehabilitation	Objective of Each Stage
1. No Activity	Symptom limited physical and cognitive rest	Recovery
2. Light aerobic exercise	Walking, swimming, or stationary cycling keeping intensity <70% maximum permitted heart rate	Increase heart rate Perform for 30 minutes
3. Sport-specific exercise	Skating drills in hockey. Running drills in soccer. No head impact activities.	Add movement Perform for 30 minutes
4. Non-contact training drills	Progression to more complex training drills. For example, passing drills in football and soccer	Improve exercise, coordination, and increase cognitive load
5. Full contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play	

If at any point concussion symptoms present or worsen, the player is to stop athletic activity and return to the prior step. Once the prior step is completed without symptoms, the player may progress to the next step to try and complete it again.



https://www.verywellhealth.com/thmb/MXZ_9Ww-vAdn5La5Twf0Ej-Ghxl=/1500x1000/filters:no_upscale():max_bytes(150000):strip_icc()/zhansen_concussion-protocol-5195083_final-bb6b9f202739426893a4d5c18f130f77.jpg

Return to Competition Form

LHSAA Return to Competition Form

LHSAA rules require a written statement from a physician in order for an athlete to return to competition who apparently had a concussion.

"If a competitor is determined to have a concussion, he/she shall not be permitted to continue practice or competition the same day. Written approval of a physician shall be required for the athlete to return to competition. If a physician recommends an athlete not continue, he/she shall not be overruled".

The undersigned attending physician has examined the student athlete identified below and gives permission for the student athlete to return to competition on the date and in the sport identified.

ATHLETE: _____

SCHOOL: _____

SPORT: _____ *DATE of CONCUSSION* _____

ACTIVITY: _____ *DATE to RETURN* _____

Attending Physician Name (print) _____ **LA Medical License** _____

Attending Physician Signature _____ **Date signed** _____

- The LHSAA requires a written statement from a physician in order for an athlete to return to competition after sustaining a concussion
- If a physician recommends an athlete not continue, he shall not be overruled

https://www.childrens.com/wps/wcm/connect/childrenspublic/969c35ad-6592-44f8-9249-a16c2b3f9305/Micah%28J180629113%29_800x480.jpg?MOD=AJPERES&CVID=

Resources

Act 314 - Latainc.org. http://www.latainc.org/Resources/Documents/2014_Concussion_Packet.pdf.

Bloom, MD and Blunt, MD. "Sideline Evaluation of Concussion." Up To Date.

Halstead, Mark E., et al. "Sport-Related Concussion in Children and Adolescents." *Pediatrics*, vol. 142, no. 6, 2018, https://doi.org/10.1542/peds.2018-3074.

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Louisiana Athletic Trainers' Association, Inc. - Home. https://latainc.wildapricot.org/Resources/Documents/2014_Concussion_Packet.pdf.

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Scorza, et al. Current Concepts on Concussions: Evaluation & Management. *Am Fam Physician.* 2012 Jan 15;85(2):123-132

Waryasz GR, Tambone, Kriz PK. Update on Concussion Management for the Rhode Island Clinician. *Rhode Is Med Journ*. Feb 2015: 31-35

Weinberger BC, Briskin SM. Sports-Related Concussion. *Clin Ped Emer Med*. 2013, 14(4): 246-254.

Questions?