

CONCUSSION

A GP perspective...

*SA Academy of Family Physicians
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River Club, Observatory*

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saam vorentoe · masiye phambili · forward together



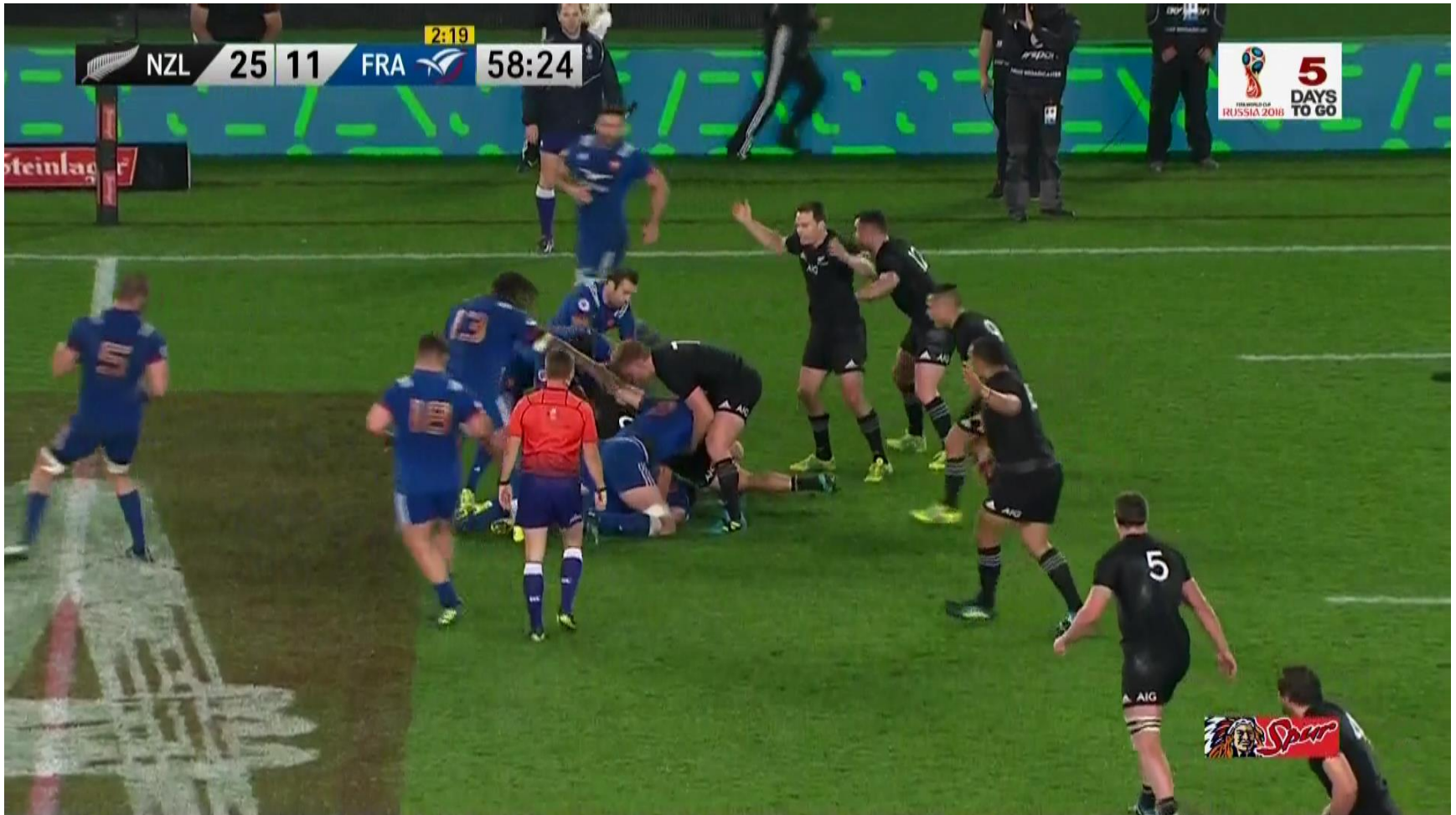
Introduction

- SEM Consultant, ISEM Clinic
Tygerberg Hosp
- Experience – Rugby Medicine:
 - SARU
 - WP Rugby
 - Maties Varsity Cup
- No other disclosures (including financial)



- Definition
- Pathophysiology
- Clinical management – on- and off-field
- Return protocols
- Advanced management
- Conclusive remarks

Reality.....

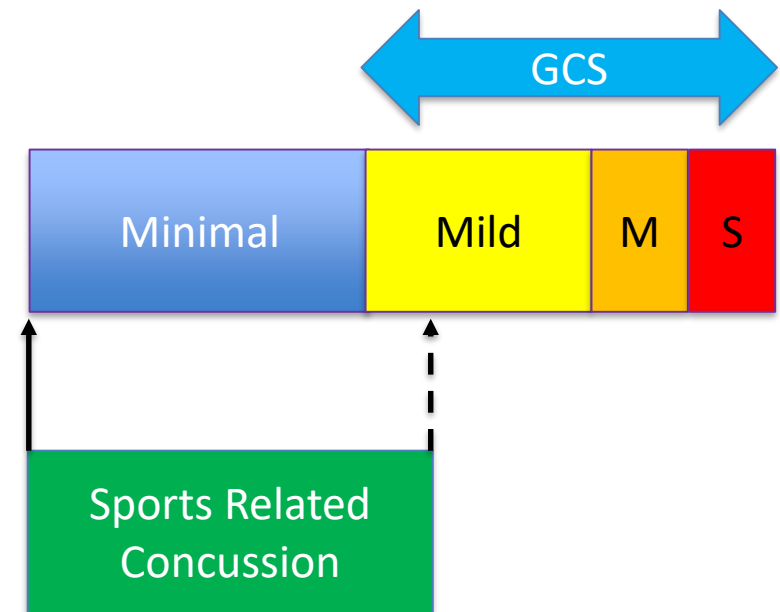




Head Injuries and Sport in Context

- Concussion – most common HI in sport - may contribute to significant morbidity
- Sport is a major cause of traumatic brain injury (TBI) and occur in 1,6-3,8 million athletes
- Head injuries which occur in amateur and professional athletes vary from mild to severe/ fatal
- Gender differences (female > male)
- Young athlete different approach
- Majority of concussions > player-to-player contact
- Subdural hematoma (SDH) is the most common cause of death & severe disability amongst sport related head injuries
- Type of sport (speed & **impact** energies) determines the severity of HI (neural tissue is particularly susceptible to shearing forces)

Teasdale et al Lancet, 1974



Mild: GCS 13-15
Moderate: GCS 9-12
Severe: GCS 1-8

Concussion: Berlin 2016 Consensus Definition



- Concussion is a traumatic brain injury induced by biomechanical forces translated to the brain.
- Concussion results in a rapid onset of temporary impairment of brain function which resolves spontaneously.
- Concussion is a functional disturbance of the brain, therefore no abnormality will be seen on structural neuro-imaging studies
- Resolution of clinical symptoms & cognitive features typically follows a sequential course (it may be prolonged).
- Concussion can have a significant impact on the short and long-term health of players, if not managed correctly.
- Clinical signs & symptoms of concussion cannot be explained by drug or alcohol/ medication use, or other cervical injuries and peripheral vestibular dysfunctions, or psychiatric disorders



McRory, et al. BJSM 2017



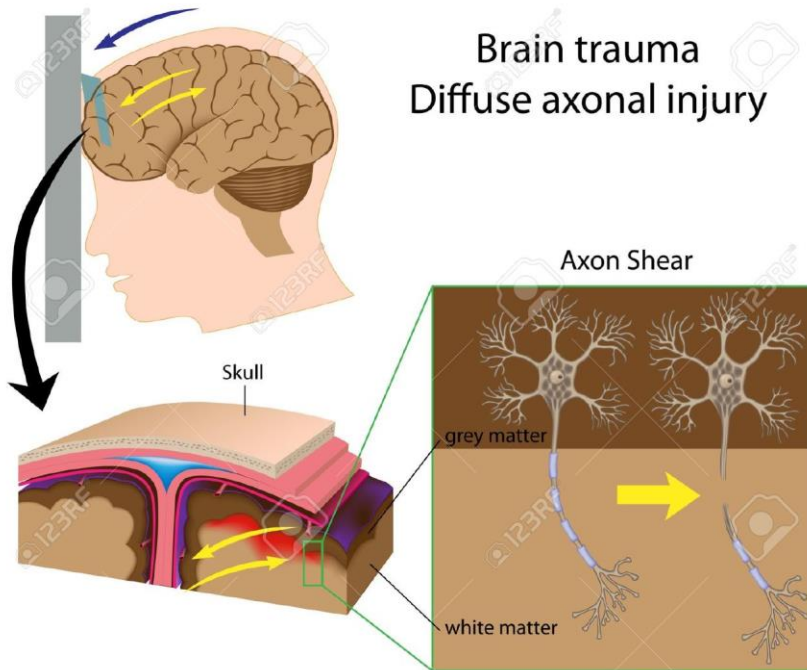
Currie Cup Data: Injury Diagnosis (OSICS)

			%	
2014	HN1 Concussion		7	
	THV Quadriceps haematoma		6	
	KL3 Knee medial collateral ligstr/tear/rupture		6	
	GH1 Haematoma, hip region		5	
	TM1 Hamstring strain/tear		4	
2015	SJ2 Acromioclavicular jt sprain		7	
	KL3 Knee medial collateral ligstr/tear/rupture		7	
	THV Quadriceps haematoma		5	
	HN1 Concussion		5	
	AL1 Sprain lateral collateral ligament, ankle		4	
2016	HN1 Concussion		7	14
	KL3 Knee medial collateral ligstr/tear/rupture		6	23
	TM1 Hamstring strain/tear		6	11
	AL1 Sprain lateral collateral ligament ankle		5	15
	SJ2 Acromioclavicular jt sprain		4	5

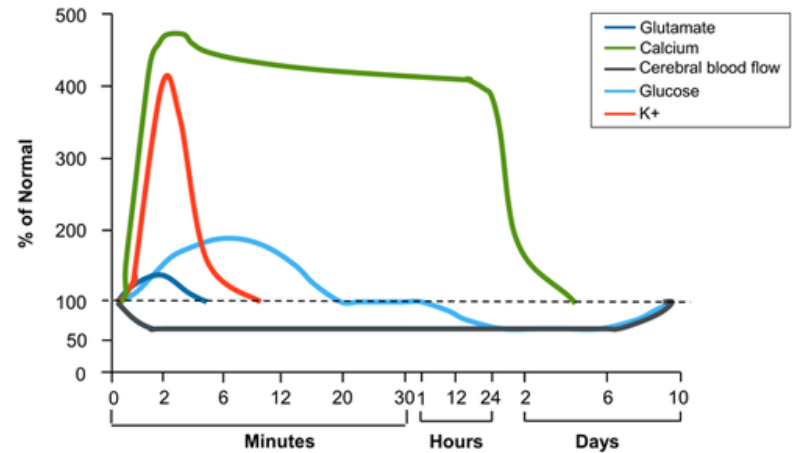
Currie Cup Rugby: The movement of the top 5 most common OSICS classification diagnoses of time-loss injuries from 2014 - 2016. Data expressed as a % of total Time-Loss injuries for 2014 (n=120), 2015 (n=114), 2016 (n=142) and the average severity for 2016 is expressed in days.



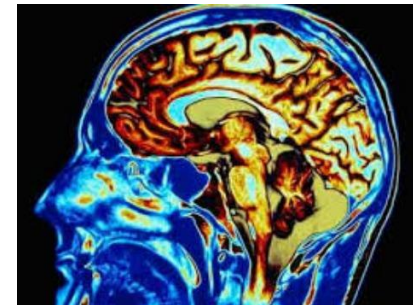
Concussion: Pathophysiology



Neurometabolic Cascade Following Cerebral Concussion/mTBI

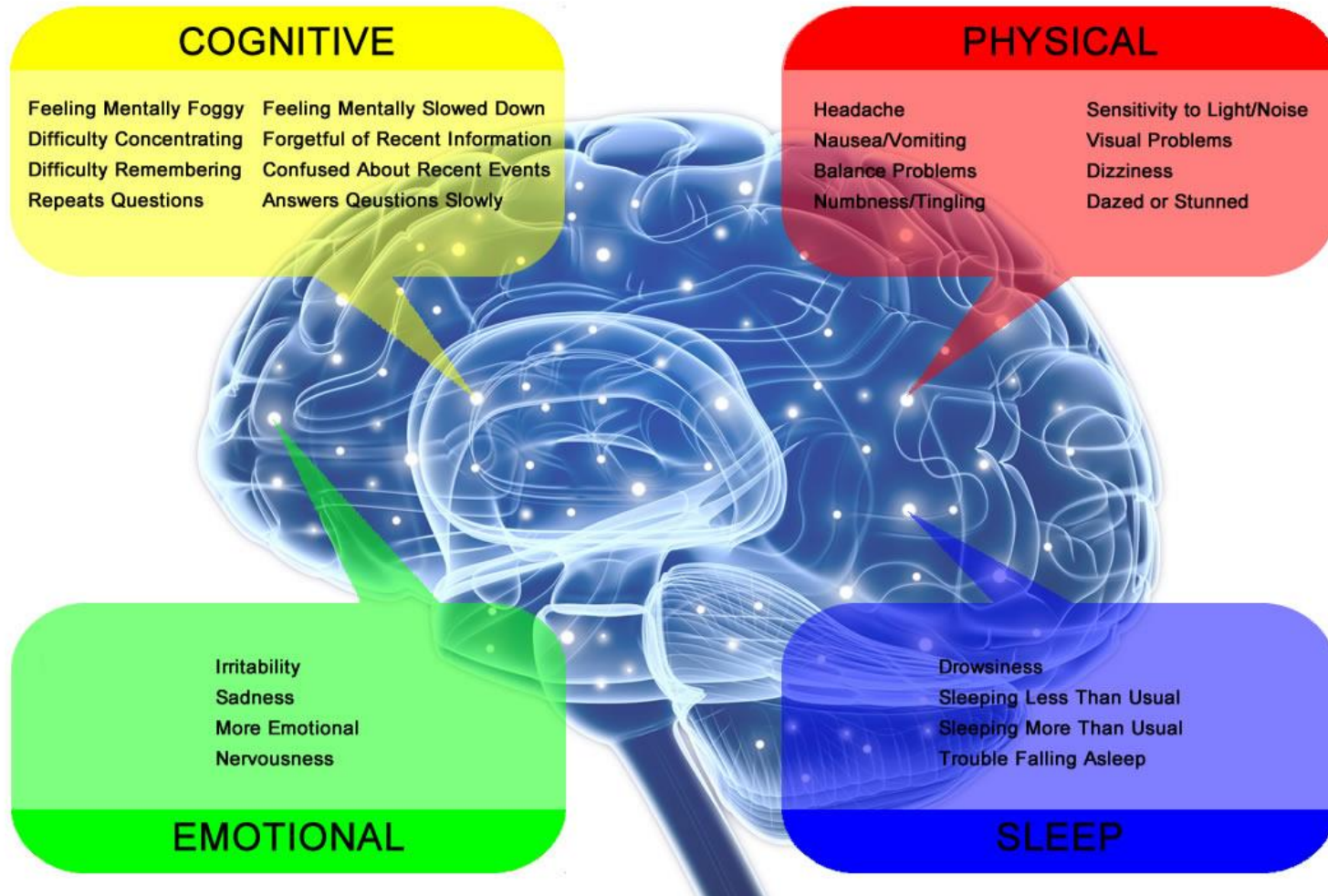


From Giza CC, et al.^[10]



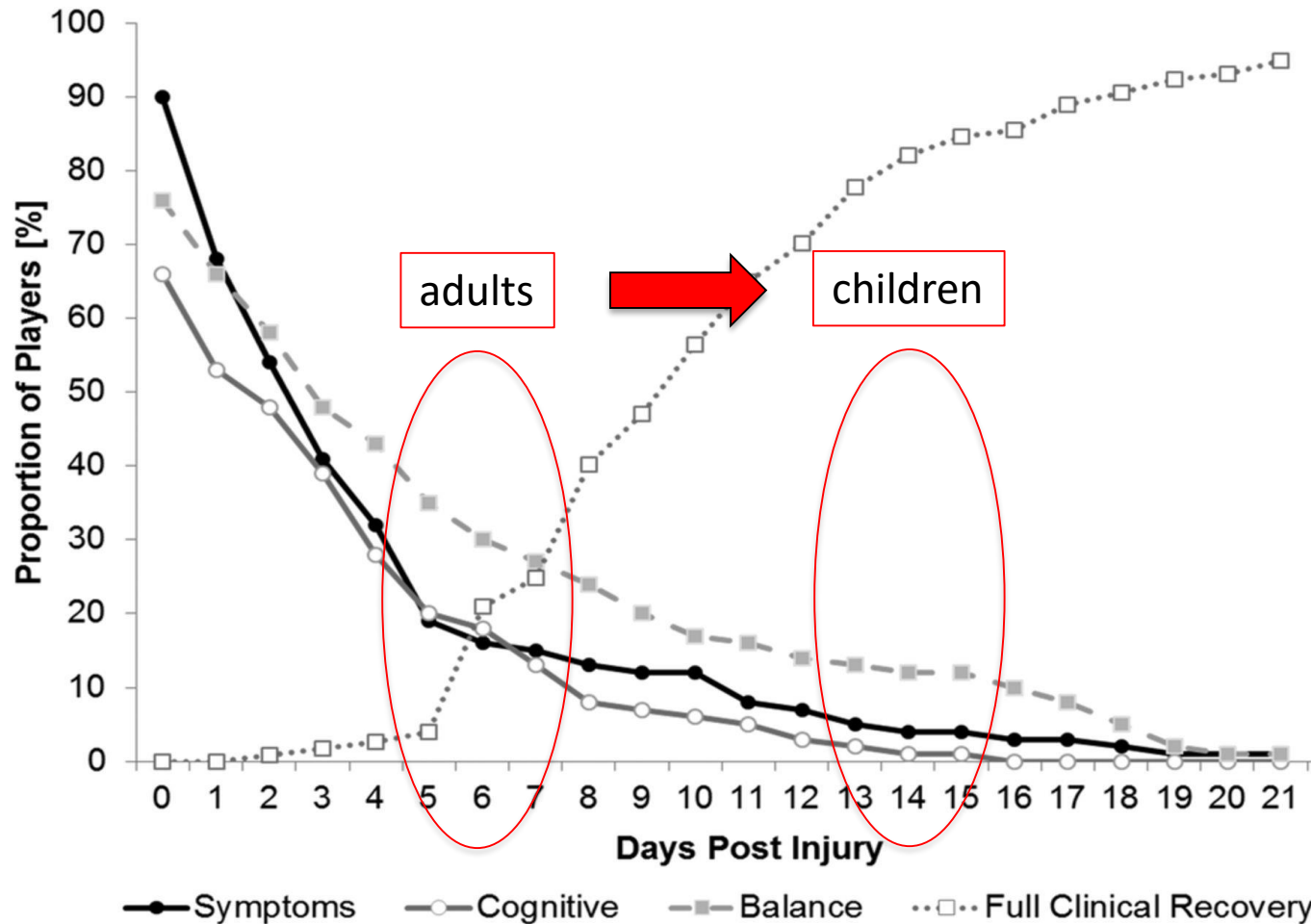


Concussion: Symptoms & Signs





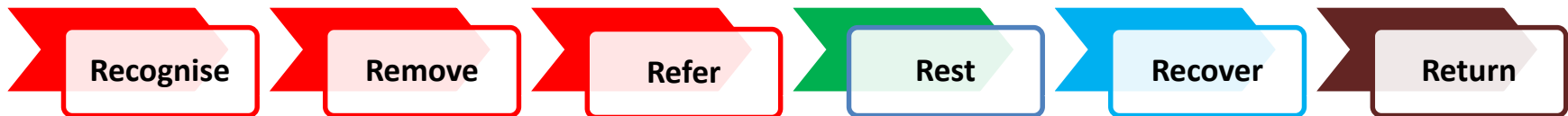
Concussion Progress of Symptoms





Concussion Management Continuum

If a player has any **ONE** of the visible clues, they must be **REMOVED** from activity and must **NOT RETURN** to play, before comprehensively **MEDICALLY ASSESSED**.
Considerations for return to play should include **COMPLETE RESOLUTION** of clinical symptoms, **COMPLETELY NORMAL** neurological examination **AND** a completed graduated return to play protocol (**G RTP**)





Concussion: Berlin 2016 Consensus SCAT 5

SCAT3™
Sport Concussion Assessment Tool – 3rd Edition
For use by medical professionals only

Name: _____ Date / Time of Injury: _____ Examiner: _____
Date of Assessment: _____

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 12 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. Preseason 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 freely copied in its current form for distribution to individuals, teams, groups and organizations. Any revision or any reproduction in a digital form requires approval by the Concussion in Sport Group.

NOTE: The diagnosis of a concussion is a clinical judgment, ideally made by a medical professional. The 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 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 examples listed below) and most often 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).

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
Eyes opening spontaneously	4

Best verbal response (V)

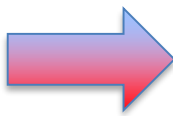
No verbal response	1
Incomprehensible sounds	2
Inappropriate words	3
Confused	4
Oriented	5

Best motor response (M)

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

Glasgow Coma score (E + V + M) _____ of 15

GCS should be recorded for all athletes in case of subsequent deterioration.



2 Maddocks Score¹

¹ "I am going to ask you a few questions, please listen carefully and give your best effort". Modified Maddocks questions (1 point for each correct answer)

What venue are we at today?	0 - 1
Which half is it now?	0 - 1
Who scored last in this match?	0 - 1
What team did you play last week/league?	0 - 1
Did your team win the last game?	0 - 1

Maddocks score _____ of 6

Maddocks score is validated for sideline diagnosis of concussion only and is not used for serial testing.

Notes: Mechanism of Injury ("tell me 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. No athlete diagnosed with concussion should be returned to sports participation on the day of injury.

SCAT3 SPORT CONCUSSION ASSESSMENT TOOL 3 | PAGE 1 © 2013 Concussion in Sport Group 259

BJSM Online First, published on April 28, 2017 as 10.1136/bjsports-2017-097506SCAT5

SCAT5™ SPORT CONCUSSION ASSESSMENT TOOL – 5TH EDITION
DEVELOPED BY THE CONCUSSION IN SPORT GROUP
FOR USE BY MEDICAL PROFESSIONALS ONLY

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 professionals¹. 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.

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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.

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SCAT-5: Immediate/ On-Field Assessment

Step 1

- Red flags



Step 2

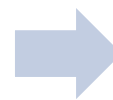
- Observable Signs



Step 3

- Memory Assessment

Step 4



- C-Spine & GCS

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

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.



Visible Clues: **Permanent Removal**

- Seizure
 - Tonic posturing
 - Loss of Consciousness (suspected/confirmed)
 - Unsteady on feet or balance problems, falling over or poor coordination (ataxia)
 - Dazed, blank or vacant look
 - Confused
 - Disorientated – place, person & time (Maddock's questions fieldside)
 - Behavioural changes (more emotional or more irritable)
- (any one or more indicate a concussion)***

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





Suspected: “If in Doubt – Sit them Out”

- Injury event that could possibly cause concussion
- Slow to get up off the ground
- Grabbing or clutching of head
- Lying motionless on the ground, still awake

(any one or more may suggest a concussion)



STEP 3: MEMORY ASSESSMENT MADDOCKS QUESTIONS²

"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

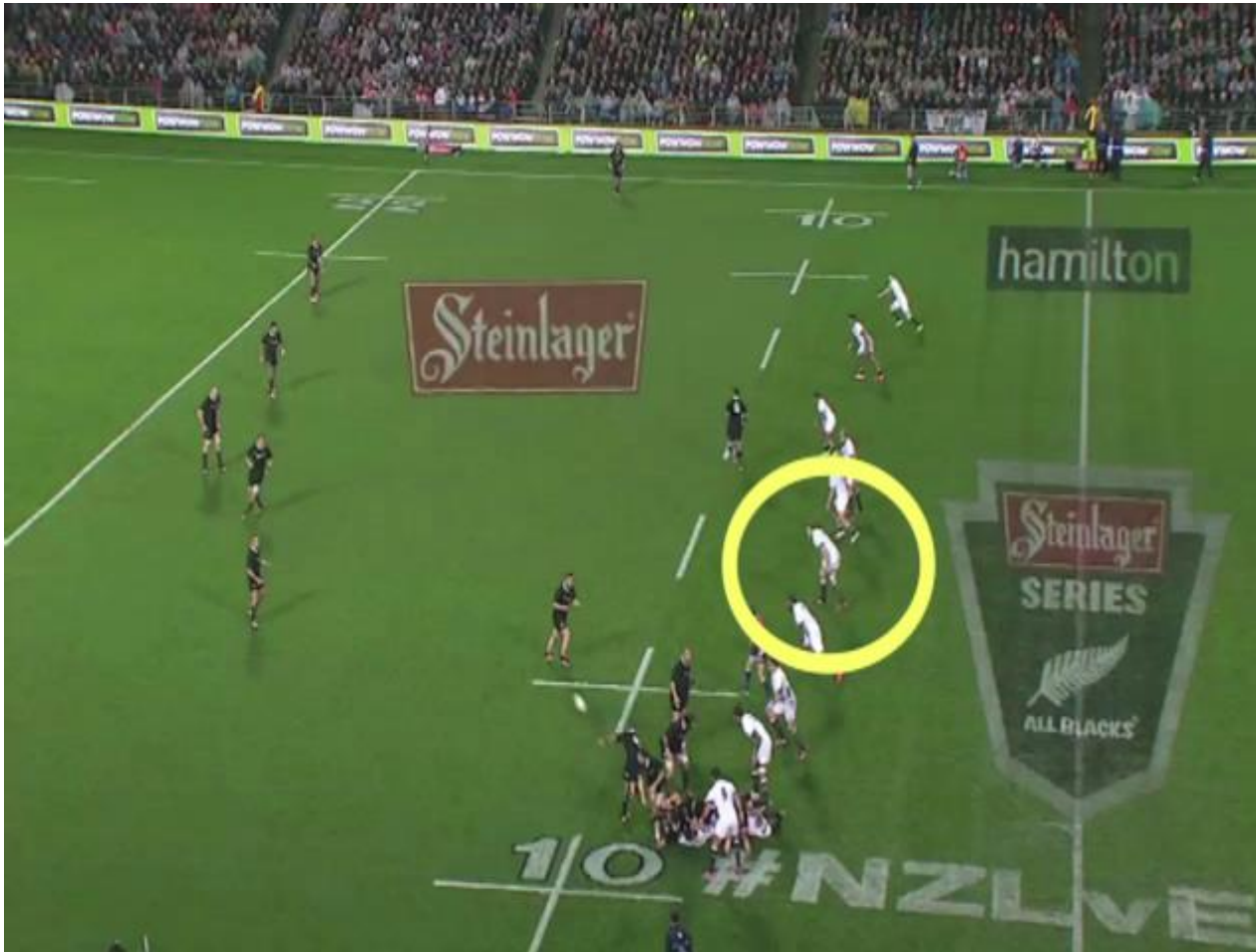
Note: Appropriate sport-specific questions may be substituted.

Tonic posturing



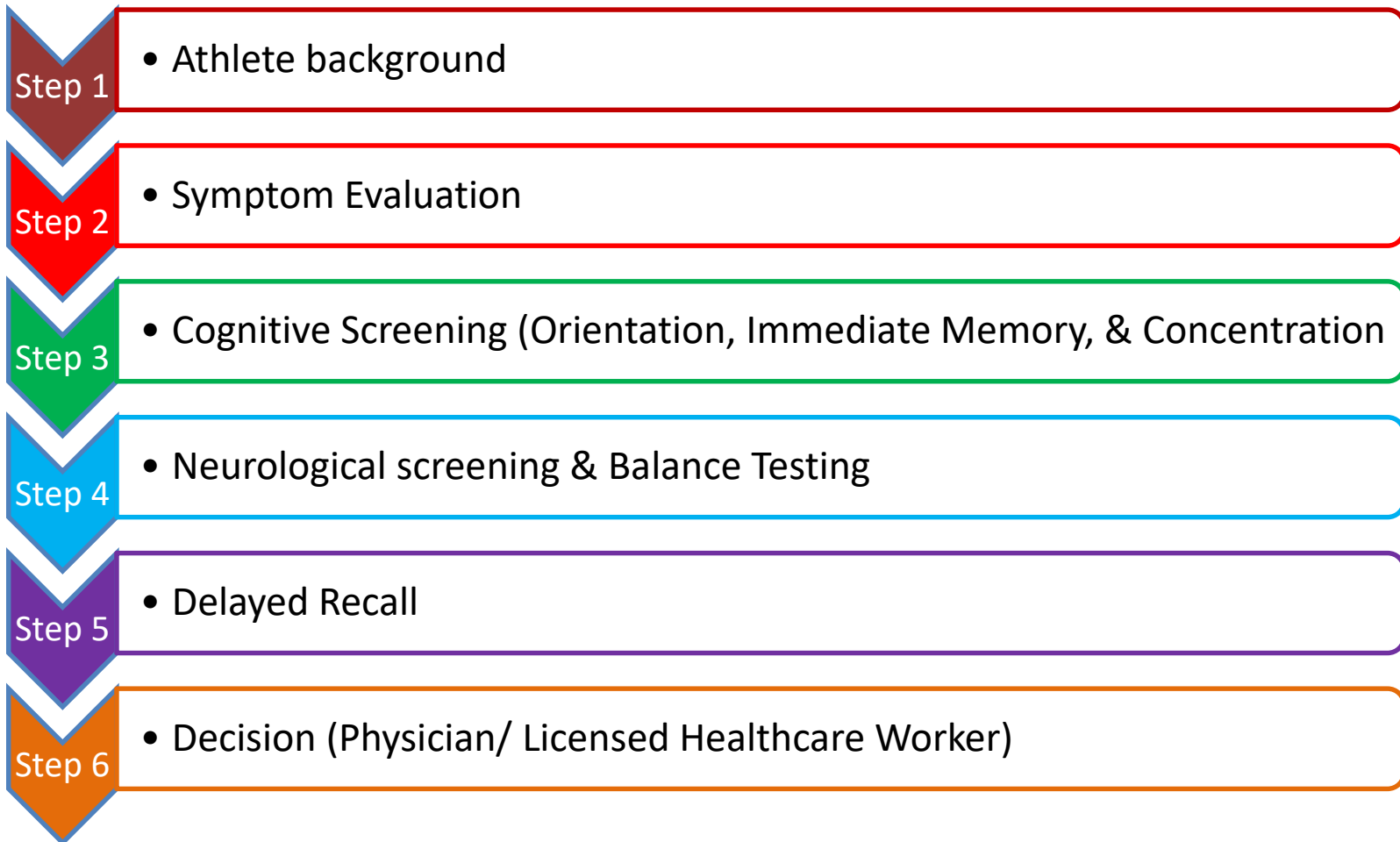


Balance problems (Ataxia)





SCAT-5: Off-Field/ Office Assessment





SCAT-5: Physician confirmation

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.



Return strategies

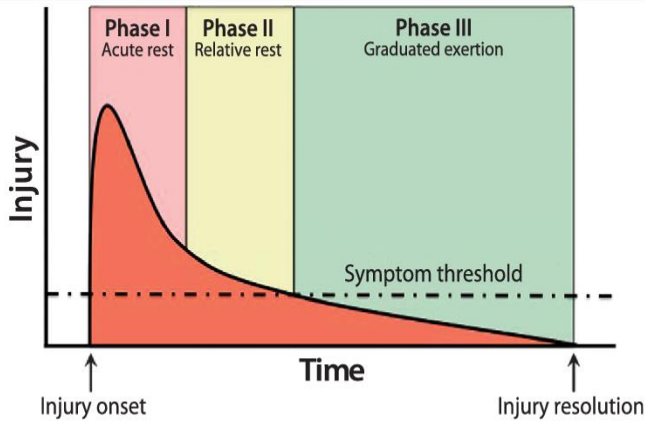
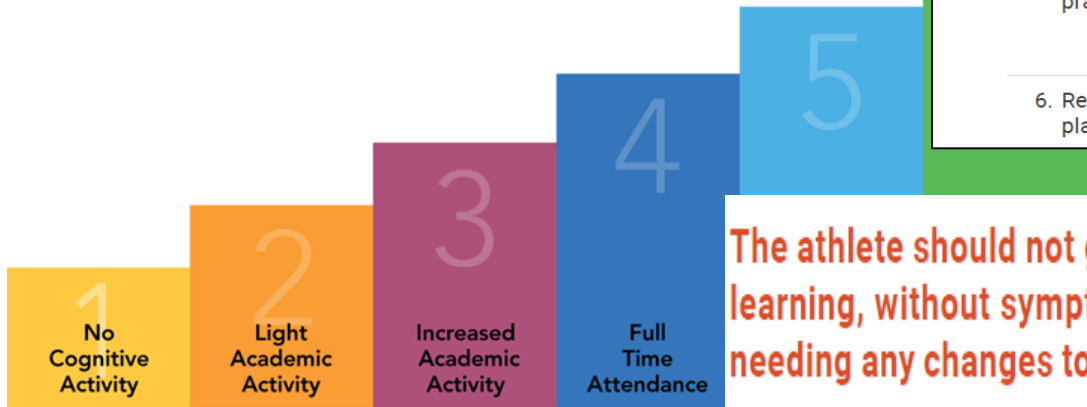


FIGURE 2-2 Three phases of concussion management.

Graduated Return to Sport Strategy

Exercise step	Functional exercise at each step	Goal of each step
1. Symptom-limited activity	Daily activities that do not provoke symptoms.	Gradual reintroduction of work/school activities.
2. Light aerobic exercise	Walking or stationary cycling at slow to medium pace. No resistance training.	Increase heart rate.
3. Sport-specific exercise	Running or skating drills. No head impact activities.	Add movement.
4. Non-contact training drills	Harder training drills, e.g., passing drills. May start progressive resistance training.	Exercise, coordination, and increased thinking.
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/sport	Normal game play.	

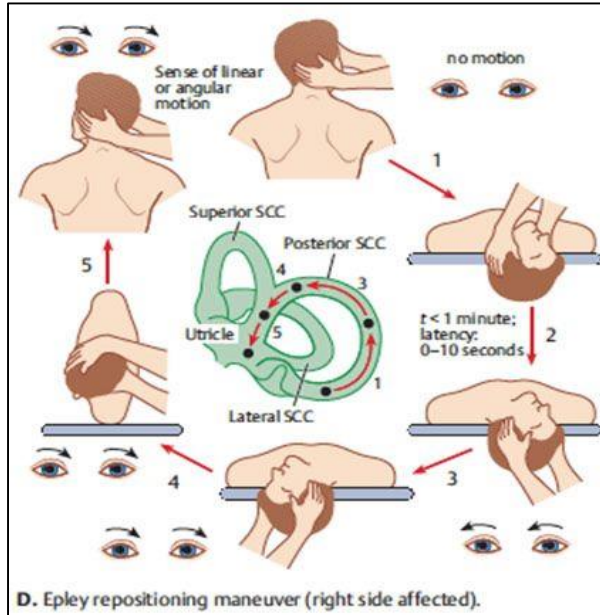


The athlete should not go back to sports until they are back to school/learning, without symptoms getting significantly worse and no longer needing any changes to their schedule.

Stages for Return to Learn



Advanced Concussion Program



Concussion Baseline Testing

ImPACT®

Immediate Post-Concussion Assessment
and Cognitive Testing

PERFORMANCE NEUROPSYCHOLOGY

CLINICAL NEUROPSYCHOLOGY SPORTS PSYCHOLOGY
CONCUSSION MANAGEMENT



Thank you

