ThinkAskLearn
Health Professional Education

Assessing the concussion head injury

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Head Trauma

- Common in multi system trauma
- 50% of trauma deaths related to head injury
- Major drain on health resources
  - Initially, rehab and long term care
- Improving outcomes over the last 20-30 years
- Significant impact on youth of society
- Very little serious head injury comes from contact sport

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Classification of Primary Injury

- Skull fracture
- Concussion
- Contusion
- Intracranial Haematoma
- Diffuse Axonal Injury
- Penetrating Injury

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Base of Skull Fracture

Racoon Eyes

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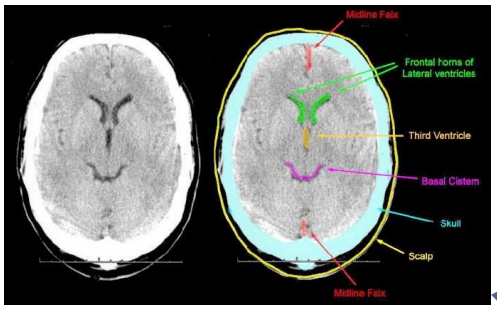
We Love CT – but does it harm?



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Chalice Guidelines for CT in Kids

- Witnessed unconsciousness >5 minutes
- Amnesia >5 minutes
- Abnormal drowsiness
- Three or more discrete episodes of vomiting
- Clinical suspicion of nonaccidental injury
- Post-traumatic seizure in the absence of history of epilepsy
- GCS score <14 in a child, GCS score <15 in infants in the hospital emergency department setting
- Suspicion of open/depressed skull fracture or tense fontanelle
- Clinical evidence of base of skull fracture
- Focal neurological deficit
- Bruise, swelling or laceration >5 cm in infants
- High impact head trauma

Dunning et al 2006

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Concussion

- 3000 hospital admission per year
- Only 20% of concussion are reported
- Even less seek medical care (1 in 4- only if symptoms persist)
- Estimated 10 times number reported
- AFL 7-8 concussions per team per season
- NRL 7% concussion rate
- Increased awareness –esp US Football
  - Australia lot less head impact sports
- Australia leading research and implementation

Rushworth 2012 Brain Injury Australia

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You have just got concussion

- No real medical intervention – Just rest
- Growing awareness of long term damage
- 3 or more concussions result in long term damage
- Kids with concussion more at risk than adults
  - Evidence limited

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You have just got concussion

- Repeated damage with less force
- Increased risk
  - Depression and other mental health illnesses
  - Cognitive impairment/Headache/Memory loss
  - Chronic Traumatic Encephalopathy (CTE)
  - Dementia – controversial evidence

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To Headgear or not to Headgear

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Headgear

- No evidence that reduces rates of concussion***

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How could we forget!!!!

Parachute use to prevent death and major trauma related to gravitational challenge: systematic review of randomised controlled trials

Gordon C S Smith, Jill P Pell

BMJ VOLUME 327 20–27 DECEMBER 2003 bmj.com

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Headgear

- No evidence that reduces rates of concussion***
- Worry that kids change their playing style and therefore have more impacts
  - Evidence is poor and has been challenged
- Can prevent more serious injuries or other minor injuries –lacerations, cauliflower ears
- Pretty rare event serious HI
  - 9 events in 33 years - AFL Finch & McIntosh(2012)
- AFL/NRL has a no head gear policy for concussion

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Rules Rules and More Rules

- AFL clubs can be fined $50K for playing an unfit player
- Needs medical clearance to play - coaches have no role

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Serious Head Injury

- Rare from contact sports
- Airway with C-spine precautions
- Breathing
- Circulation
- Disability
- Limited movement of patient
- Get Help – Call Ambulance

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Concussion Assessment

CRT6™
Concussion Recognition Tool
To Help Identify Concussion in Children, Adolescents and Adults

- Anyone can use

SCAT6™

- Health Professionals Only – Adult assessment

Child SCAT6™
Sport Concussion Assessment Tool
For Children Ages 8 to 12 Years

- Health Professionals Only –Kids 8-12 years assessment

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CRT6™
Concussion Recognition Tool
To Help Identify Concussion in Children, Adolescents and Adults

Pocket CONCUSSION RECOGNITION TOOL
To help identify concussion in children, youth and adults

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Concussion Assessment

- Recognize & Remove
- Be Conservative
- Assess off the field
- Ignore the game, parents, coach
- Advocate for the patient

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Management guidelines for Suspected Concussion

Presence of any concussion symptoms or signs (e.g. stunned, confusion, memory problems, balance problems, headache, dizziness, not feeling right)

YES

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Step 1 - Visible Clues

1. Visible clues of suspected concussion
Any one or more of the following visual clues can indicate a possible concussion:

Loss of consciousness or responsiveness
Lying motionless on ground / Slow to get up
Unsteady on feet / Balance problems or falling over / Incoordination
Grabbing / Clutching of head
Dazed, blank or vacant look
Confused / Not aware of plays or events

Pocket CONCUSSION RECOGNITION TOOL

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Step 2 – Clinical Signs

2. Signs and symptoms of suspected concussion
Presence of any one or more of the following signs & symptoms may suggest a concussion:

- Loss of consciousness
- Dizziness
- Nausea or vomiting
- "Pressure in head"
- Irritability
- Amnesia
- Nervous or anxious
- Sensitivity to noise
- Headache
- Balance problems
- Feeling slowed down
- More emotional
- Sensitivity to light
- Fatigue or low energy
- Neck Pain
- Difficulty remembering
- Seizure or convulsion
- Confusion
- Drowsiness
- Blurred vision
- Sadness
- Feeling like "in a fog"
- "Don't feel right"
- Difficulty concentrating

Pocket CONCUSSION RECOGNITION TOOL

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Step 3 - Memory Function

3. Memory function
Failure to answer any of these questions correctly may suggest a concussion.

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

Pocket CONCUSSION RECOGNITION TOOL

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Remove Player

Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, and should not be returned to activity until they are assessed medically. Athletes with a suspected concussion should not be left alone and should not drive a motor vehicle.

- If continues to play, then more likely to suffer second injury
- More likely to suffer life threatening head injury
- Recommend to see medical professional for assessment and return to play guidance
  - Some centres mandated sign off RTP

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For health professionals only

SCAT6™

Child SCAT6™
Sport Concussion Assessment Tool
For Children Ages 8 to 12 Years

shortcutting

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Potential Signs of Concussion

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?"		
Balance or motor incoordination (stumbles, slow/laboured movements, etc.)?	☐ Y	☐ N
Disorientation or confusion (inability to respond appropriately to questions)?	☐ Y	☐ N
Loss of memory:	☐ Y	☐ N
"If so, how long?"		
"Before or after the injury?"		
Blank or vacant look:	☐ Y	☐ N
Visible facial injury in combination with any of the above:	☐ Y	☐ N

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Glasgow Coma Scale

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.

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Issues with GCS

- Subjective
- Preverbal kids
- Inconsistent
- Difficult to remember
- Done on the run
- Needs to be done in series
- Complicated

Glasgow Coma Scale

	Points
Eye Opening	
Eyes open spontaneously	4
Eyes open to verbal command	3
Eyes open only with painful stimuli	2
No eye opening	1
Verbal Response	
Oriented and converses	5
Disoriented and converses	4
Inappropriate words	3
Incomprehensible sounds	2
No verbal response	1
Motor Response	
Obeys verbal commands	6
Response to painful stimuli (UE)	
Localizes pain	5
Withdraws from pain	4
Flexor posturing	3
Extensor posturing	2
No motor response	1

Total score = eye opening + verbal + motor
GCS<5: 80% die or remain vegitative
GCS>11: 90% complete recovery
From Teasdale G, Jennett B: Acta Neurochirurg 34:45, 1976.

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Maddocks Score

2 **Maddocks Score[3]**

"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)

At 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/game?	0	1
Did your team win the last game?	0	1
Maddocks score		of 5

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"?):

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Collect Pt History

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 excercise.

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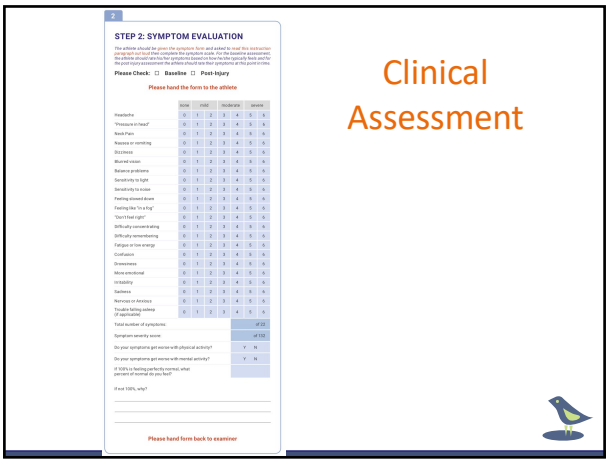

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STEP 2: SYMPTOM EVALUATION

The athlete should be given the symptom form and asked to read the instruction at the top of the form. Alternatively, the examiner can read the form to the athlete. 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

Clinical Assessment

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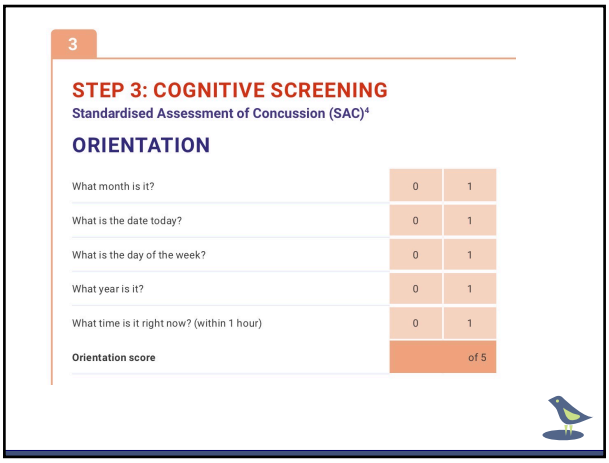

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STEP 3: COGNITIVE SCREENING

Standardised Assessment of Concussion (SAC)[4]

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

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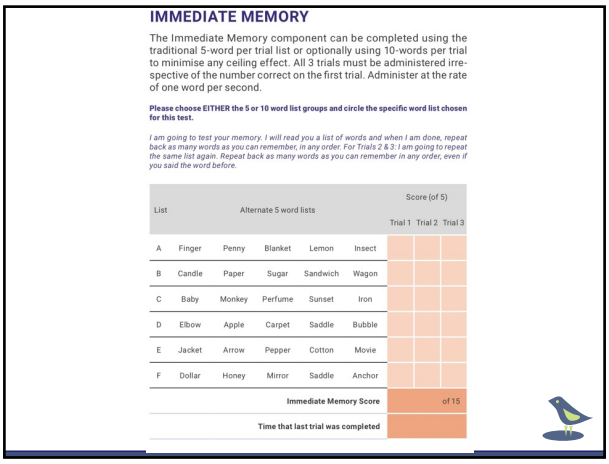

IMMEDIATE MEMORY

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			

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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

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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

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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

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Neck Assessment SCAT3

5 Neck Examination:

Range of motion Tenderness Upper and lower limb sensation & strength

Findings: _____

**** Canadian C-Spine Rule or Nexus Rule

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Balance Examination 20 secs

BALANCE EXAMINATION

Modified Balance Error Scoring System (mBESS) testing[5]

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

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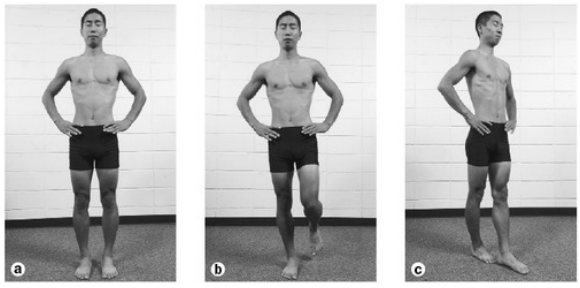

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Balance testing – types of errors

1. Hands lifted off iliac crest
2. Opening eyes
3. Step, stumble, or fall
4. Moving hip into > 30 degrees abduction
5. Lifting forefoot or heel
6. Remaining out of test position > 5 sec

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Balance Examination

BALANCE EXAMINATION

Modified Balance Error Scoring System (mBESS) testing[5]

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

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Can you remember the list of words?

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

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INSTRUCTIONS

Words in *Italics* throughout the SCAT5 are the instructions given to the athlete by the clinician

Symptom Scale

The time frame for symptoms should be based on the type of test being administered. At baseline it is advantageous to assess how an athlete "typically" feels whereas during the acute/post-acute stage it is best to ask how the athlete feels at the time of testing.

The symptom scale should be completed by the athlete, not by the examiner. In situations where the symptom scale is being completed after exercise, it should be done in a resting state, generally by approximating his/her resting heart rate.

For total number of symptoms, maximum possible is 22 except immediately post injury, if sleep item is omitted, which then creates a maximum of 21.

For Symptom severity score, add all scores in table, maximum possible is 22 x 6 = 132, except immediately post injury if sleep item is omitted, which then creates a maximum of 21x6=126.

Immediate Memory

The Immediate Memory component can be completed using the traditional 5-word per trial list or, optionally, using 10-words per trial. The literature suggests that the Immediate Memory has a notable ceiling effect when a 5-word list is used. In settings where this ceiling is prominent, the examiner may wish to make the task more difficult by incorporating two 5–word groups for a total of 10 words per trial. In this case, the maximum score per trial is 10 with a total trial maximum of 30.

Choose one of the word lists (either 5 or 10). Then perform 3 trials of immediate memory using this list.

Complete all 3 trials regardless of score on previous trials.

"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." The words must be read at a rate of one word per second.

Trials 2 & 3 MUST be completed regardless of score on trial 1 & 2.

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."

Score 1 pt. for each correct response. Total score equals sum across all 3 trials. Do NOT inform the athlete that delayed recall will be tested.

Concentration

Digits backward

Choose one column of digits from lists A, B, C, D, E or F and administer those digits as follows:

Say: "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."

Begin with first 3 digit string.

If correct, circle "Y" for correct and go to next string length. If incorrect, circle "N" for the first string length and read trial 2 in the same string length. One point possible for each string length. Stop after incorrect on both trials (2 N's) in a string length. The digits should be read at the rate of one per second.

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"

1 pt. for entire sequence correct

Delayed Recall

The delayed recall should be performed after 5 minutes have elapsed since the end of the Immediate Recall section.

"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."

Score 1 pt. for each correct response

Modified Balance Error Scoring System (mBESS)[5] testing

This balance testing is based on a modified version of the Balance Error Scoring System (BESS)[5]. A timing device is required for this testing.

Each of 20-second trial/stance is scored by counting the number of errors. The examiner will begin counting errors only after the athlete has assumed the proper start position. The modified BESS is calculated by adding one error point for each error during the three 20-second tests. The maximum number of errors for any single condition is 10. If the athlete commits multiple errors simultaneously, only one error is recorded but the athlete should quickly return to the testing position, and counting should resume once the athlete is set. Athletes that are unable to maintain the testing procedure for a minimum of five seconds at the start are assigned the highest possible score, ten, for that testing condition.

OPTION: For further assessment, the same 3 stances can be performed on a surface of medium density foam (e.g., approximately 50cm x 40cm x 6cm).

Balance testing – types of errors

1. Hands lifted off iliac crest
2. Opening eyes
3. Step, stumble, or fall
4. Moving hip into > 30 degrees abduction
5. Lifting forefoot or heel
6. Remaining out of test position > 5 sec

"I am now going to test your balance. Please take your shoes off (if applicable), roll up your pant legs above ankle (if applicable), and remove any ankle taping (if applicable). This test will consist of three twenty second tests with different stances."

(a) Double leg stance:

"The first stance is standing with your feet together with your hands on your hips and with your eyes closed. You should try to maintain stability in that position for 20 seconds. I will be counting the number of times you move out of this position. I will start timing when you are set and have closed your eyes."

(b) Single leg stance:

"If you were to kick a ball, which foot would you use? [This will be the dominant foot] *Now stand on your non-dominant foot. The dominant leg should be held in approximately 30 degrees of hip flexion and 45 degrees of knee flexion. Again, you should try to maintain stability for 20 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes."*

(c) Tandem stance:

"Now stand heel-to-toe with your non-dominant foot in back. Your weight should be evenly distributed across both feet. Again, you should try to maintain stability for 20 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes."

Tandem Gait

Participants are instructed to stand with their feet together behind a starting line (the test is best done with footwear removed). Then, they walk in a forward direction as quickly and as accurately as possible along a 38mm wide (sports tape), 3 metre line with an alternate foot heel-to-toe gait ensuring that they approximate their heel and toe on each step. Once they cross the end of the 3m line, they turn 180 degrees and return to the starting point using the same gait. Athletes fail the test if they step off the line, have a separation between their heel and toe, or if they touch or grab the examiner or an object.

Finger to Nose

"I am going to test your coordination now. Please sit comfortably on the chair with your eyes open and your arm (either right or left) outstretched (shoulder flexed to 90 degrees and elbow and fingers extended), pointing in front of you. When I give a start signal, I would like you to perform five successive finger to nose repetitions using your index finger to touch the tip of the nose, and then return to the starting position, as quickly and as accurately as possible."

References

1. McCrory et al. Consensus Statement On Concussion In Sport – The 5th International Conference On Concussion In Sport Held In Berlin, October 2016. British Journal of Sports Medicine 2017 (available at www.bjsm.bmj.com)
2. Maddocks, DL; Dicker, GD; Saling, MM. The assessment of orientation following concussion in athletes. Clinical Journal of Sport Medicine 1995; 5: 32-33
3. Jennett, B., Bond, M. Assessment of outcome after severe brain damage: a practical scale. Lancet 1975; i: 480-484
4. McCrea M. Standardized mental status testing of acute concussion. Clinical Journal of Sport Medicine. 2001; 11: 176-181
5. Guskiewicz KM. Assessment of postural stability following sport-related concussion. Current Sports Medicine Reports. 2003; 2: 24-30

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Scoring Symptoms

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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: ____________________

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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.

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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.	

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Graduated Return to School Strategy

'may need to miss a few days of school after a concussion'

Mental Activity	Activity at each step	Goal of each step
1. Daily activities that do not give the athlete symptoms	Typical activities that the athlete does during the day as long as they do not increase symptoms (e.g. reading, texting, screen time). Start with 5-15 minutes at a time and gradually build up.	Gradual return to typical activities.
2. School activities	Homework, reading or other cognitive activities outside of the classroom.	Increase tolerance to cognitive work.
3. Return to school part-time	Gradual introduction of school-work. May need to start with a partial school day or with increased breaks during the day.	Increase academic activities.
4. Return to school full-time	Gradually progress school activities until a full day can be tolerated.	Return to full academic activities and catch up on missed work.

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Take Home Messages

- Concussion is a serious long term issue
- Use standardised tools to assess concussion
- Be conservative in your approach
- If in doubt – sit out
- Advocate for your patient

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SCAT 6 documents

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