Sport Concussion Assessment Tool™ – 6 (SCAT6)

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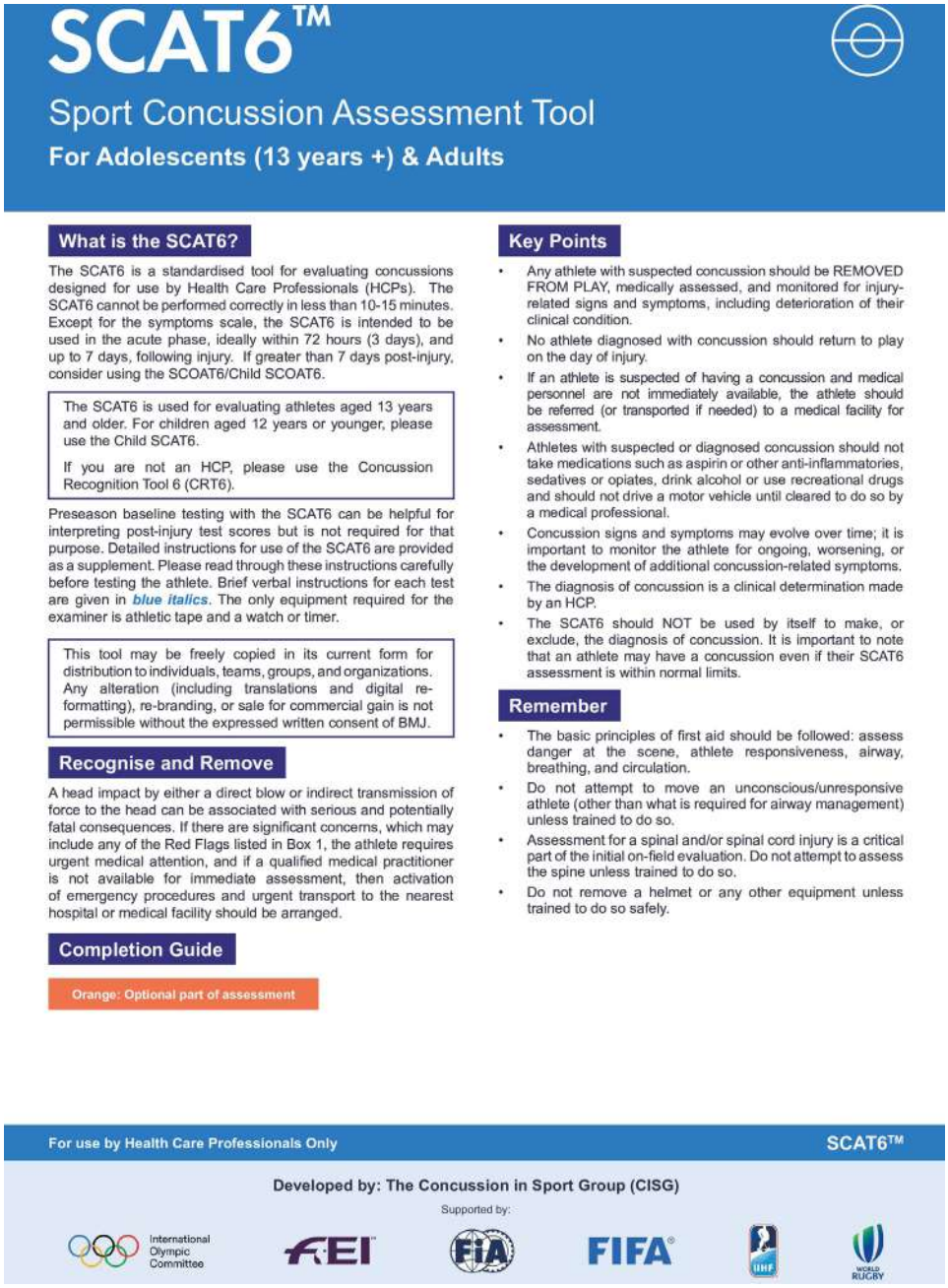

SCAT6™

Sport Concussion Assessment Tool

For Adolescents (13 years +) & Adults

What is the SCAT6?

The SCAT6 is a standardised tool for evaluating concussions designed for use by Health Care Professionals (HCPs). The SCAT6 cannot be performed correctly in less than 10-15 minutes. Except for the symptoms scale, the SCAT6 is intended to be used in the acute phase, ideally within 72 hours (3 days), and up to 7 days, following injury. If greater than 7 days post-injury, consider using the SCOAT6/Child SCOAT6.

The SCAT6 is used for evaluating athletes aged 13 years and older. For children aged 12 years or younger, please use the Child SCAT6.

If you are not an HCP, please use the Concussion Recognition Tool 6 (CRT6).

Preseason baseline testing with the SCAT6 can be helpful for interpreting post-injury test scores but is not required for that purpose. Detailed instructions for use of the SCAT6 are provided as a supplement. Please read through these instructions carefully before testing the athlete. Brief verbal instructions for each test are given in *blue italics*. The only equipment required for the examiner is athletic tape and a watch or timer.

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Recognise and Remove

A head impact by either a direct blow or indirect transmission of force to the head can be associated with serious and potentially fatal consequences. If there are significant concerns, which may include any of the Red Flags listed in Box 1, the athlete requires urgent medical attention, and if a qualified medical practitioner is not available for immediate assessment, then activation of emergency procedures and urgent transport to the nearest hospital or medical facility should be arranged.

Completion Guide

Orange: Optional part of assessment

Key Points

- Any athlete with suspected concussion should be REMOVED FROM PLAY, medically assessed, and monitored for injury-related signs and symptoms, including deterioration of their clinical condition.
- No athlete diagnosed with concussion should return 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 (or transported if needed) to a medical facility for assessment.
- Athletes with suspected or diagnosed concussion should not take medications such as aspirin or other anti-inflammatories, sedatives or opiates, drink alcohol or use recreational drugs and should not drive a motor vehicle until cleared to do so by a medical professional.
- Concussion signs and symptoms may evolve over time; it is important to monitor the athlete for ongoing, worsening, or the development of additional concussion-related symptoms.
- The diagnosis of concussion is a clinical determination made by an HCP.
- The SCAT6 should NOT be used by itself to make, or exclude, the diagnosis of concussion. It is important to note that an athlete may have a concussion even if their SCAT6 assessment is within normal limits.

Remember

- The basic principles of first aid should be followed: assess danger at the scene, athlete responsiveness, airway, breathing, and circulation.
- Do not attempt to move an unconscious/unresponsive athlete (other than what is required for airway management) unless trained to do so.
- Assessment for a spinal and/or spinal cord injury is a critical part of the initial on-field evaluation. Do not attempt to assess the spine unless trained to do so.
- Do not remove a helmet or any other equipment unless trained to do so safely.

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Developed by: The Concussion in Sport Group (CISG)

Supported by:

International Olympic Committee FEI FIA FIFA IIHF World Rugby

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Athlete Name:		**ID Number:**	
Date of Birth:	**Date of Examination:**	**Date of Injury:**	
Time of Injury:	**Sex:** Male ☐ Female ☐ Prefer Not To Say ☐ Other ☐		
Dominant Hand: Left ☐ Right ☐ Ambidextrous ☐		**Sport/Team/School:**	
Current Year in School (if applicable):		**Years of Education Completed (Total):**	
First Language:		**Preferred Language:**	
Examiner:			

Concussion History

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

When was the most recent concussion?:

Primary Symptoms:

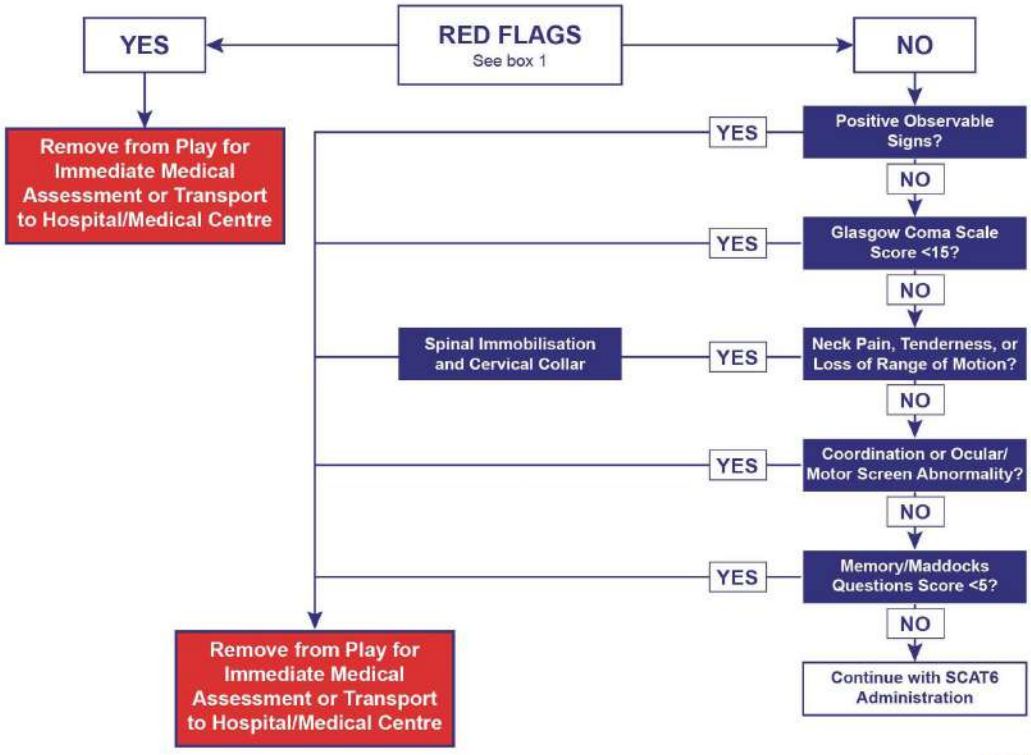
How long was the recovery (time to being cleared to play) from the most recent concussion?: (Days)

Immediate Assessment/Neuro Screen (Not Required at Baseline)

The following elements should be used in the evaluation of all athletes who are suspected of having a concussion prior to proceeding to the cognitive assessment, and ideally should be completed "on-field" after the first aid/emergency care priorities are completed.

If any of the observable signs of concussion are noted after a direct or indirect blow to the head, the athlete should be immediately and safely removed from participation and evaluated by an HCP.

The Glasgow Coma Scale is important as a standard measure for all patients and can be repeated over time to monitor deterioration of consciousness. The Maddocks questions and cervical spine exam are also critical steps of the immediate assessment.



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Step 1: Observable Signs

Witnessed ☐ Observed on Video ☐

Lying motionless on playing surface	Y	N
Falling unprotected to the surface	Y	N
Balance/gait difficulties, motor incoordination, ataxia: stumbling, slow/laboured movements	Y	N
Disorientation or confusion, staring or limited responsiveness, or an inability to respond appropriately to questions	Y	N
Blank or vacant look	Y	N
Facial injury after head trauma	Y	N
Impact seizure	Y	N
High-risk mechanism of injury (sport-dependent)	Y	N

Step 2: Glasgow Coma Scale

Typically, GCS is assessed once. Additional scoring columns are provided for monitoring over time, if needed.

Time of Assessment:

Date of Assessment:

Best Eye Response (E)			
No eye opening	1	1	1
Eye opening 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 (V)			
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
Localized to pain	5	5	5
Obeys commands	6	6	6
Glasgow Coma Score (E + V + M)			

Box 1: Red Flags

- Neck pain or tenderness
- Seizure or convulsion
- Double vision
- Loss of consciousness
- Weakness or tingling/burning in more than 1 arm or in the legs
- Deteriorating conscious state
- Vomiting
- Severe or increasing headache
- Increasingly restless, agitated or combative
- GCS <15
- Visible deformity of the skull

Step 3: Cervical Spine Assessment

In a patient who is not lucid or fully conscious, a cervical spine injury should be assumed and spinal precautions taken.

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

Step 4: Coordination & Ocular/Motor Screen

Coordination: Is finger-to-nose normal for both hands with eyes open and closed?	Y	N
Ocular/Motor: Without moving their head or neck, can the patient look side-to-side and up-and-down without double vision?	Y	N
Are observed extraocular eye movements normal? If not, describe:	Y	N

Step 5: Memory Assessment Maddocks Questions[1]

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

Modified Maddocks questions (Modified appropriately for each sport; 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/game?	0	1
Did your team win the last game?	0	1
Maddocks Score		/5

Note: Appropriate sport-specific questions may be substituted

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Off-Field Assessment

Please note that the cognitive assessment should be done in a distraction-free environment with the athlete in a resting state **after** completion of the Immediate Assessment/Neuro Screen.

Step 1: Athlete Background

Has the athlete ever been:

Hospitalised for head injury? (If yes, describe below)	Y N	Diagnosed with attention deficit hyperactivity disorder (ADHD)?	Y N
Diagnosed/treated for headache disorder or migraine?	Y N	Diagnosed with depression, anxiety, or other psychological disorder?	Y N
Diagnosed with a learning disability/dyslexia?	Y N		

Notes:

Current medications? If yes, please list:

Step 2: Symptom Evaluation

Baseline: ☐ **Suspected/Post-injury:** ☐ **Time elapsed since suspected injury:** _____ mins/hours/days

The athlete will complete the symptom scale (below) after you provide instructions. Please note that the instructions are different for baseline versus suspected/post-injury evaluations.

Baseline: Say ***"Please rate your symptoms below based on how you typically feel with "1" representing a very mild symptom and "6" representing a severe symptom."***

Suspected/Post-injury: Say ***"Please rate your symptoms below based on how you feel now with "1" representing a very mild symptom and "6" representing a severe symptom."***

PLEASE HAND THE FORM TO THE ATHLETE

Symptom	Rating
Headaches	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

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 THE FORM BACK TO THE EXAMINER

Once the athlete has completed answering all symptom items, it may be useful for the clinician to revisit items that were endorsed positively to gather more detail about each symptom.

Total number of symptoms: _____ **of 22** **Symptom severity score:** _____ **of 132**

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Step 3: Cognitive Screening (Based on Standardized Assessment of Concussion; SAC)[2]

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

All 3 trials must be administered irrespective of the number correct on Trial 1. Administer at the rate of one word per second.

Trial 1: Say *"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."*

Trials 2 and 3: Say *"I am going to repeat the same list. Repeat back as many words as you can remember in any order, even if you said the word before in a previous trial."*

Word list used: A ☐ B ☐ C ☐

				Alternate Lists	
List A	Trial 1	Trial 2	Trial 3	List B	List C
Jacket	0 1	0 1	0 1	Finger	Baby
Arrow	0 1	0 1	0 1	Penny	Monkey
Pepper	0 1	0 1	0 1	Blanket	Perfume
Cotton	0 1	0 1	0 1	Lemon	Sunset
Movie	0 1	0 1	0 1	Insect	Iron
Dollar	0 1	0 1	0 1	Candle	Elbow
Honey	0 1	0 1	0 1	Paper	Apple
Mirror	0 1	0 1	0 1	Sugar	Carpet
Saddle	0 1	0 1	0 1	Sandwich	Saddle
Anchor	0 1	0 1	0 1	Wagon	Bubble
Trial Total					

Immediate Memory Score of 30 **Time Last Trial Completed:**

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Step 3: Cognitive Screening (Continued)

Concentration

Digits Backward:

Administer at the rate of one digit per second reading DOWN the selected column. If a string is completed correctly, move on to the string with next higher number of digits; if the string is completed incorrectly, use the alternate string with the same number of digits; if this is failed again, end the test.

Say *"I'm 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. So, if I said 9-6-8 you would say? (8-6-9)"*

Digit list used: A ☐ B ☐ C ☐

List A	List B	List C			
4-9-3	5-2-6	1-4-2	Y	N	0 1
6-2-9	4-1-5	6-5-8	Y	N	
3-8-1-4	1-7-9-5	6-8-3-1	Y	N	0 1
3-2-7-9	4-9-6-8	3-4-8-1	Y	N	
6-2-9-7-1	4-8-5-2-7	4-9-1-5-3	Y	N	0 1
1-5-2-8-6	6-1-8-4-3	6-8-2-5-1	Y	N	
7-1-8-4-6-2	8-3-1-9-6-4	3-7-6-5-1-9	Y	N	0 1
5-3-9-1-4-8	7-2-4-8-5-6	9-2-6-5-1-4	Y	N	
			Digits Score		of 4

Months in Reverse Order:

Say *"Now tell me the months of the year in reverse order as QUICKLY and as accurately as possible. Start with the last month and go backward. So, you'll say December, November… go ahead"*

Start stopwatch and CIRCLE each correct response:

December November October September August July June May April March February January

Time Taken to Complete (secs): **Number of Errors:**

1 point if no errors and completion under 30 seconds

Months Score: of 1

Concentration Score (Digits + Months) of 5

Step 4: Coordination and Balance Examination

Modified Balance Error Scoring System (mBESS)[3] testing

(see detailed administration instructions)

Foot Tested: Left ☐ **Right** ☐ (i.e. test the **non-dominant** foot)

Testing Surface (hard floor, field, etc.):

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

OPTIONAL (depending on clinical presentation and setting resources): 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) with the same instructions and scoring.

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Step 4: Coordination and Balance Examination (Continued)

Modified BESS (20 seconds each)

Double Leg Stance:		of 10
Tandem Stance:		of 10
Single Leg Stance:		of 10
Total Errors:		of 30

On Foam (Optional)

Double Leg Stance:		of 10
Tandem Stance:		of 10
Single Leg Stance:		of 10
Total Errors:		of 30

Note: If the **mBESS** yields normal findings then proceed to the **Tandem Gait/Dual Task Tandem Gait**.

If the **mBESS** reveals abnormal findings or clinically significant difficulties, **Tandem Gait** is not necessary at this time.

Both the **Tandem Gait** and optional **Dual Task** component may be administered later in the office setting as needed (see SCOAT6).

Timed Tandem Gait

Place a 3-metre-long line on the floor/firm surface with athletic tape. The task should be timed. Please complete all 3 trials.

Say ***"Please walk heel-to-toe quickly to the end of the tape, turn around and come back as fast as you can without separating your feet or stepping off the line."***

Single Task:

Time to Complete Tandem Gait Walking (seconds)				
Trial 1	Trial 2	Trial 3	Average 3 Trials	Fastest Trial

Dual Task Gait (Optional. Timed Tandem Gait must be completed first)

Place a 3-metre-long line on the floor/firm surface with athletic tape. The task should be timed.

Say ***"Now, while you are walking heel-to-toe, I will ask you to count backwards out loud by 7s. For example, if we started at 100, you would say 100, 93, 86, 79. Let's practise counting. Starting with 93, count backward by sevens until I say "stop"."*** Note that this practice only involves counting backwards.

Dual Task Practice: Circle correct responses; record number of subtraction counting errors.

Task									Errors	Time
Practice	93	86	72	65	58	51	44	37		

Say ***"Good. Now I will ask you to walk heel-to-toe and count backwards out loud at the same time. Are you ready? The number to start with is 88. Go!"***

Dual Task Cognitive Performance: Circle correct responses; record number of subtraction counting errors.

Task													Errors	Time (circle fastest)
Trial 1	88	81	74	67	60	53	46	39	32	25	18	11	4		
Trial 2	90	83	76	69	62	55	48	41	34	27	20	13	6		
Trial 3	98	91	84	77	70	63	56	49	42	35	28	21	14		

Alternate double number starting integers may be used and recorded below.

Starting Integer: **Errors:** **Time:**

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Step 4: Coordination and Balance Examination (Continued)

Were any single- or dual-task, timed tandem gait trials not completed due to walking errors or other reasons?

Yes ☐ **No** ☐

If yes, please explain why:

Step 5: Delayed Recall

The Delayed Recall should be performed after **at least 5 minutes** have elapsed since the end of the Immediate Memory section: **Score 1 point for each correct response.**

Say ***"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:

Word list used: A ☐ B ☐ C ☐

List A	Score	Alternate Lists: List B	Alternate Lists: List C
Jacket	0 1	Finger	Baby
Arrow	0 1	Penny	Monkey
Pepper	0 1	Blanket	Perfume
Cotton	0 1	Lemon	Sunset
Movie	0 1	Insect	Iron
Dollar	0 1	Candle	Elbow
Honey	0 1	Paper	Apple
Mirror	0 1	Sugar	Carpet
Saddle	0 1	Sandwich	Saddle
Anchor	0 1	Wagon	Bubble
Delayed Recall Score	of 10		

Total Cognitive Score

Orientation:	**of 5**
Immediate Memory:	**of 30**
Concentration:	**of 5**
Delayed Recall:	**of 10**
Total:	**of 50**

If the athlete was known to you prior to their injury, are they different from their usual self?

Yes ☐ **No** ☐ **Not applicable** ☐ (If different, describe why In the clinical notes section)

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Step 6: Decision

Domain	Date:	Date:	Date:
Neurological Exam (Acute Injury evaluation only)	Normal/Abnormal	Normal/Abnormal	Normal/Abnormal
Symptom number (of 22)			
Symptom Severity (of 132)			
Orientation (of 5)			
Immediate Memory (of 30)			
Concentration (of 5)			
Delayed Recall (of 10)			
Cognitive Total Score (of 50)			
mBESS Total Errors (of 30)			
Tandem Gait fastest time			
Dual Task fastest time			

Disposition

Concussion diagnosed?

Yes ☐ No ☐ Deferred ☐

Health Care Professional Attestation

I am an HCP and I have personally administered or supervised the administration of this SCAT6.

Name:

Signature: **Title/Speciality:**

Registration/License number (if applicable): **Date:**

Additional Clinical Notes

Note: Scoring on the SCAT6 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 sport after concussion. Remember: An athlete can score within normal limits on the SCAT6 and still have a concussion.

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Contributors RJE served as the primary author and responsible for all aspects of the project, including initial preparation, coordination, review, editing and final preparation of the manuscript and SCAT6 tool. All co-authors contributed to the development and critical review of the manuscript and SCAT6 tool, and approved the final version of the manuscript and tool.

Competing interests BLB reports grants from the National Institute on Aging and National Institute of Neurological Disorders and Stroke and travel support for professional conferences. SB reports current or past research funding from the National Institutes of Health; Centers for Disease Control and Prevention; Department of Defense - USA Medical Research Acquisition Activity, National Collegiate Athletic Association; National Athletic Trainers' Association Foundation; National Football League/ Under Armour/GE; Simbex; and ElmindA. He has consulted for US Soccer (paid), US Cycling (unpaid), University of Calgary SHRed Concussions external advisory board (unpaid), medico-legal litigation, and received speaker honorarium and travel reimbursements for talks given. He is co-author of "Biomechanics of Injury (3rd edition)" and has a patent on "Brain Metabolism Monitoring Through CCO Measurements Using All-Fiber-Integrated Super-Continuum Source" (U.S. 11,529,091 B2). He is on the and is/was on the editorial boards (all unpaid) for Journal of Athletic Training (2015 to present), Concussion (2014 to present), Athletic Training & Sports Health Care (2008 to present), British Journal of Sports Medicine (2008 to 2019) JMB reports being a part-time employee of the NHL. JMB's institution has received funding from Genzyme, and EyeGuide supporting his work, and he has served as a paid consultant to Med-IQ and Sporting KC. JSB reports receiving methods author funding for this review and Alexander Graham Bell Canada Graduate Scholarships-Doctoral Program. GAD reports grant from Murdoch Children's Research Institute and travel support for professional conferences. He is a member of the Scientific Committee of the 6th International Consensus Conference on Concussion in Sport; an honorary member of the AFL Concussion Scientific Committee, and a board member of CISG. RJE is a paid consultant for the National Hockey League and co-chair of the National Hockey League /National Hockey League Players Association Concussion Subcommittee, Major League Soccer's Concussion Committee and the US Soccer Federation, provides testimony in matters related to mTBI and reports a grant from Boston Children's Hospital (sub-award from the National Football League) and travel support for the CIS conference and other professional conferences, an unpaid board member of CISG and leadership roles (unpaid) in professional organizations. GG Reports grant funding from CDC TEAM and OnTRACK grants, NIMH APNA grant, royalties from PAR, consulting fees from NFL Baltimore Ravens, Zogenix International, and Global Pharma Consultancy, and travel support for professional meetings. He is a member of USA Football Medical Advisory Panel. KMG reports compensation from National Collegiate Athletic Association for other services and grants from Boston Children's Hospital (sub-award from the National Football League). KH reports research grants from AMSSM and Football Research, Inc. She is the Research Development Director of the PAC-12 and a member of the NFL Head, Neck, And Spine committee and PAC-112 Brain Trauma Task Force. SH reports he is Co-founder and senior advisor, The Sports Institute at UW Medicine (unpaid), Centers for Disease Control and Prevention and National Center for Injury Prevention and Control Board Pediatric Mild Traumatic Brain Injury Guideline Workgroup (unpaid), NCAA Concussion Safety Advisory Group (unpaid), Concussion in Sport Group (travel support), Team Physician, Seattle Mariners, Former Team Physician, Seattle Seahawks, Occasional payment for expert testimony, Travel support for professional meetings. DH reports research support from the Eunice Kennedy Shriver National Institute of Child Health & Human Development, the National Institute of Neurological Disorders And Stroke, the National Institute of Arthritis and Musculoskeletal and Skin Diseases, 59th Medical Wing Department of the Air Force, MINDSOURCE Brain Injury Network, the Tai Foundation, and the Colorado Clinical and Translational Sciences Institute (UL1 TR002535-05) and he serves on the Scientific/Medical Advisory Board of Synaptek, LLC. CM reports no financial COI. She holds leadership positions with several organizations American College of Sports Medicine, American Medical Society for Sports Medicine, Pediatric Research in Sports Medicine, Council on Sports Medicine and Fitness, American Academy of Pediatrics, Untold Foundation, Pink Concussions, Headway Foundation, and the editorial boards of Journal of Adolescent Health, Frontiers in Neuroergonomics, Exercise, Sport, and Movement. MM reports grants from NIH, Veterans Affairs, Centers for Disease Control and Prevention (CDC), Abbott Laboratories, Department of Defense (DoD), and NCAA outside the submitted work. DN receives consulting fees from the CFL and travel support for professional conferences. He is a team physician for the NHL and CFL. He is CMO for the CFL and a member of NHL and CFL committees. JP reports travel support for the CIS conference and other professional meetings, consulting fees and grant funding from World Rugby, and an unpaid board member of CISG and EyeGuide. MP reports receiving a travel stipend for attending CIS meeting and other professional conferences, grant funds from NCAA-CARE 2.0, royalties from Netters' Sports Medicine, consulting fees from Major League Soccer as CMO, and occasional expert testimony/serves. She is a member of several professional boards advisory panels. KJS reported receiving an educational grant for assisting with the administrative and operational costs associated with the writing of the reviews and a travel grant from Publi Creations, grant funding from Canadian Institutes of Health Research, Public Health Agency of Canada (through Parachute Canada), National Football League Scientific Advisory Board, International Olympic Committee Medical and Scientific Research Fund, World Rugby, Mitacs Accelerate, University of Calgary; leadership roles in AFL, Federal Provincial Territorial Work Group on Concussion, Canada. JVL reports CIHR Postdoctoral Fellowship Award, UOMBRI Grant, travel stipend from CTRC and Founder of R2P™ Concussion Management. TCVM is a paid member of the NFL Head, Neck, and Spine Committee and an unpaid member of the USA Swimming Concussion Task Force. SRW reports honoraria and travel support for professional meetings and leadership positions in World Federation of Athletic Training and Therapy and Outcomes, International Traumatic Brain Injury Research Initiative.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; internally peer reviewed.

► Additional supplemental material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/bjsports-2023-107036).

To cite Echemendia RJ, Brett BL, Broglio S, *et al*. *Br J Sports Med* 2023;**57**:622–631.

Accepted 5 June 2023

Br J Sports Med 2023;**57**:622–631.
doi:10.1136/bjsports-2023-107036

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