SCOAT6™

Supplement: Guidelines to using the Sport Concussion Office Assessment Tool 6 (SCOAT6)™

Context and Purpose of the Sport Concussion Office Assesment Tool 6 (SCOAT 6)

The Sport Concussion Office Assessment Tool 6 (SCOAT6) is to be used in the sub-acute setting, typically from 72 hours (3 days) after injury; where an athlete presents to a healthcare provider before this time, use of the SCOAT6 may still be appropriate.

The SCOAT6 is designed to be used with the Sport Concussion Assessment Tool, Version 6 (SCAT6) where this has been completed for an athlete on the sideline, or within 72 hours (3 days) of the injury. The systematic review supporting the development of the SCOAT6 specifically evaluated clinical tests used between 72 hours (3 days) and 30 days following sports-related concussion.

The SCOAT6 is for use in athletes ages 13 years and over. Child versions of both the SCAT6 and SCOAT6 are available for athletes ages 8-12 years. Importantly, symptoms associated with concussion may overlap with those associated with other clinical diagnoses; clinical judgement should be used to determine the most appropriate diagnosis.

Who can use the SCOAT6?*

The SCOAT6 is developed for use by qualified medical practitioners days to weeks after the injury, in a quiet, private, clinical consultation room setting, using limited equipment. Some components may be used by other Health Care Practitioners (HCPs) with the appropriate qualifications, training and experience. HCPs should reflect on their personal knowledge and competencies and engage other HCPs in the event that components of the tool fall outside of their knowledge base and scope of practice.

What is the SCOAT6?

The SCOAT6 is a multidimensional clinical screening, evaluation and management tool for use with sports-related concussion (SRC).

Equipment Required

- Quiet room
- 3 Chairs (Examiner, Patient, Parent/Guardian)
- Examination bed
- Sphygmomanometer
- Torch light/flashlight
- Ophthalmoscope
- Stopwatch
- Pins or toothpicks
- 3m line or tape for marking the line on the floor
- Tape measure
- Reflex hammer
- Tongue depressor with 14-point font for VOMS
- Metronome (freely available in App form)

How can it be used?

The SCOAT6 can be used in the following ways:

- Diagnosis – assists in the diagnostic process by helping to distinguish concussion symptoms and signs from other primary and secondary conditions.
- Evaluation – assembles tools for comprehensively assessing critical domains potentially affected by SRC.
- Management – initiating individualised intervention plans to address the affected domains and co-morbidities with the aim of optimising function and returning to school, work, driving, sport, family and social life.
- Referral – to expert clinicians for specialised diagnosis, treatment and rehabilitation.
- Serve as a medical document for recording significant clinical findings, interventions and outcomes to help achieve best possible case management and follow-up.
- Serve as a foundation for modifications based on cultural, linguistic, and other local factors.
- Serve as a potential source of (de-identified) data for sports-related concussion research.
- Understanding that clinical settings, expertise and time pressures vary, the SCOAT6 is meant as a guide and all components may not necessarily be completed in every scenario; those aspects most recommended in all cases as part of an office assessment are coloured in green on the SCOAT6.

Blue: Complete only at first assessment

Green: Recommended part of assessment

Orange: Optional part of assessment

* In reviewing studies informing the SCOAT6 and Child SCOAT6, the period defined for the included papers was 3–30 days. HCPs may choose to use the Child SCOAT6 beyond this timeframe but should be aware of the parameters of the review.

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Developed by: The Concussion in Sport Group (CISG)

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History

The template provided is a guide. Users may make additional historical notes guided by clinical indications.

Symptoms

The table is designed to allow for comparison between the symptoms recorded on the day of consultation with those before injury, at the time of injury and previous consultations related to the same injury.

Concussion-related symptoms may also be associated with other medical conditions and should be interpreted in the context of the injury, the athlete's baseline symptoms (where recorded), and the medical context.

Verbal Cognitive Tests

Document the time at which the Immediate Word Recall Test was completed to ensure that at least 5 minutes has passed before the Delayed Recall Test is performed.

The first 10 words on a list may be used to compare to the SCAT6 10-word recall result.

If no prior test result exists, one of the lists of 10 words should still be used; if the athlete recalls the words without difficulty, 15 words may be used for the 3 successive trials. Use the QR code to obtain the 15-word lists.

The words should be read out clearly, in a monotone voice and at a rate of one word per second.

Digits Backwards

Digits should be read out clearly at a rate of one digit per second.

If a string of numbers is correctly completed on the first attempt, move to the next highest number string.

Athletes who fail a digit string may have another attempt at the same number digit string but using a different set of digits; failure to correctly recall the same number of digits twice ends this test.

Athletes who pass on the first attempt, move immediately to the higher number string.

Months in Reverse Order

"Now tell me the months of the year in reverse order. Start with the last month and go backward. Go ahead."

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

Time taken to complete (secs)_____ (N <30 sec)
Number of errors_____

Vital Signs

An automated sphygmomanometer should be used to measure heart rate and blood pressure; alternatively a manual blood pressure cuff is used with the palpated pulse recorded. The first measurement is taken after the patient lies supine on the examination table for at least 2 minutes. The patient is then asked to stand up without support and with both feet firmly on the ground and a second measurement is taken after standing for 1 minute. The patient is asked if they experience any dizziness or light-headedness upon standing (initial orthostatic intolerance) or by one minute (orthostatic intolerance). The criteria for orthostatic hypotension are the following: systolic blood pressure drop of ≥ 20 mmHg or diastolic blood pressure drop of ≥ 10 mmHg or heart rate increase > 30 bpm or any heart rate decrease. Ask the athlete if s/he develops any symptoms including dizziness, light-headedness, palpitations, tremor, nausea, generalized weakness and visual disturbance, and document the symptoms with the BP and HR measurements.

Cervical Spine Assessment

Palpate the cervical spine itself from the occipital protuberance to the prominence of the T1 spinous process. Tenderness is documented according to the subjective reporting of pain by the patient and spasm according to objective palpation by the examiner.

With the athlete sitting on the edge of the examination bed, observe active range of motion (ROM) into cervical flexion, extension, lateral (side) flexion, and rotation left and right.

Next palpate the paravertebral muscles and spinous processes segmentally and note muscle spasm or tenderness.

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Neurological Examination

Abridged Cranial Nerve Exam

Cranial Nerve 1: Olfactory Nerve

- Subjective- Do you have any issues with smell?
- Objective- have a smell that players can identify (coffee, mint, or vanilla) test sense of smell each nostril with eyes closed.

Cranial Nerve 2: Optic Nerve

Briefly shine a pen/torch light into each pupil.

Pupils Equal And Reactive (PEARL)- pupil equal and reactive to light. Examine – pupillary constriction.

Consensual reflex – look for constriction of a pupil when light is shone into the other eye.

Visual fields – Using red hat pin or finger, assess each visual field quadrant of each eye separately.

Cranial Nerve 3, 4 & 6: Eye Movement

Examine position of the eye lid, and eye tracking with athlete's head still and examiner's finger drawing an "H" and an "X"

Cranial Nerve 5: Sensory

Examine sense of touch in 3 anatomical regions

- Forehead, above both eyes
- On both check bones
- On both sides of the jaw line

Motor - examine opening the mouth and side-to-side movements of the mandible.

Jaw jerk

Cranial Nerve 7: Facial Nerve

Look for symmetry in the following movements:

- Raise eyebrows
- Close eyes tight
- Puff cheeks
- Big smile
- Purse lips
- Tight closed lips

Cranial Nerve 8: Gross hearing test

Whisper a number in each ear while clicking fingers in opposite ear.

Cranial Nerves 9 & 10:

Inspect uvula's symmetrical movement when saying "Ahhhhh".

Cranial Nerve 11: Trapezius and SCM Control

Athlete performs a shoulder shrug against resistance followed by neck rotation against resistance (if no neck pain or tenderness detected).

Cranial Nerve 12: Tongue

Stick tongue out – make sure it protrudes

Instructional Video

Cerebellar Function

Rapid repetitive movement

Place the right hand on top of the dorsum of the left hand, and repeatedly and rapidly supinate and pronate the right forearm so that the right hand repeatedly is palm up followed by palm down, atop the left hand. Repeat using the left hand.

Finger to nose test

Instruct the athlete to place right index finger on his/her nose and then (with your index finger 50-60cm in front of their face) instruct them to touch your finger and then their nose and repeat 5 times. Then repeat with left index finger.

Then repeat the test with the athlete's eyes closed.

Looking for the movement to be performed smoothly.

Heel to shin test

With athlete supine, slide heel up and down shin – test both left and right legs.

Limb Bulk and Tone

Look at muscle tone at rest and look for definition, ensure muscles of upper and lower limb are not flaccid or in spasm.

Limb Strength

Test upper and lower limb strength against resistance in seated position

- Shoulder
- Elbow flexion and extension
- Wrist extension and flexion
- Hands/fingers

- Hip flexion and extension
- Knee extension and flexion
- Foot dorsi and plantar flexion

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Deep Tendon Reflex

Test in seated position and test left and right sides using a tendon hammer

Biceps – limb relaxed, finger over the tendon

Brachioradialis (supination) - 3cm proximal to radial styloid process

Triceps - patient flexes forearm at the elbow; support flexed elbow in your non-dominant hand; tap the triceps tendon just above the elbow with the narrow end of the reflex hammer.

Patellar – in a seated position, legs over end of exam bed, just below inferior pole of patella

Ankle/Achilles – slightly dorsiflex the ankle

Instructional Video

Sensation

Test upper and lower limbs using a soft (gauze, cotton wool) and sharp (pin or toothpick) object.

Balance - Balance Error Scoring System (mBESS)

Double Leg Stance

Instruct athlete to place feet together, hands on their hips and eyes closed and maintain stability in that position for 20 seconds.

Single Leg Stance

Instruct athlete to stand on non-dominant foot, with their hands on their hips and eyes closed and maintain stability in that position for 20 seconds; the dominant leg should be held in approximately 30 degrees of hip flexion and 45 degrees of knee flexion.

Tandem Stance

Instruct athlete to stand heel-to-toe with the non-dominant foot at the back, have their hands on their hips and eyes closed and maintain stability in that position for 20 seconds.

Each of the twenty-second trials is scored by counting the errors, or deviations from the proper stance, accumulated by the subject. The examiner will begin counting errors only after the individual has assumed the proper testing position.

Errors: An error is credited to the subject when any of the following occur:

- Moving the hands off of the iliac crests
- Opening the eyes
- Step stumble or fall
- Abduction or flexion of the hip beyond 30°
- Lifting the forefoot or heel off of the testing surface
- Remaining out of the proper testing position for greater than 5 seconds

If a subject commits multiple errors simultaneously, only one error is recorded. For example, if an individual steps or stumbles, opens their eyes, and removes their hands from their hips simultaneously, then they are credited with only one error.

The maximum total number of errors for any single condition is 10.

Instructional Video

On Foam

Where available, a foam pad may be used to perform the BESS using the same sequence of 3 tests. This increases the sensitivity.

Foam Pad (Power Systems Airex Balance Pad 81000 or similar)

Dimensions: Length: 25cm Width: 25cm Height: 6cm

The purpose of the foam pad is to create an unstable surface and a more challenging balance task.

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Tandem Gait

Test Setup

- Secure a strip of athletic tape (3m in length) on the ground in a straight line.
- Have the athlete remove their shoes ± socks.

Familiarization

- Instruct the athlete they will be asked to walk heel-to-toe in a forward direction, along the line on the floor, with their hands on their hips.
  - **Example:** *"You are going to walk heel-to-toe along this line with your hands on your hips the whole time. When you get to the end, you will do a 180 degree turn and return back to where you started, still walking heel-to-toe."*
- First perform a practice test
  - Explain that they should walk as fast as they can to the end and turnaround, without stepping off the line, touching a table or wall for support, or separating their heel and toe during the test.

Single-Task Trials

- Instruct the patient to perform a single-task trial, where they will be timed
  - **Example:** *"Now let's do the same thing, but this time I will time you. Remember, go as fast as you can without making a mistake"*
- Start the test over if they have a failure (if they step off the line or touch a nearby item for support).
- Record the single task trial 1 time on the tracking sheet.
- Repeat up to three single-task trials.
- Trial time is recorded as the time from when the practitioner says "start" until the patient walks down, back, and their back heel crosses the original start line.

Complex Gait

Instructions

Set-up as for Tandem Gait

The athlete walks forward five steps tandem gait heel-to-toe, with eyes open, then continues forward five steps with eyes closed.

Then have the athlete walk backwards five steps tandem gait heel-to-toe, with eyes open, then continue backwards five steps with eyes closed.

Say: *"Please walk heel-to-toe quickly five steps, then continue forward with eyes closed five steps, then walk backwards with eyes open five steps then continue backwards with eyes closed five steps."*

For eyes closed, say: *"I will tell you when to walk backwards and when to stop".*

For each of the 4 conditions (forward/backward, eyes open/closed) score:

1 point for each step off the line, 1 point for truncal sway

Total score (Forward + Backward) : ≤4 may be normal, ≥5 may be concussed.

- Instruct the patient to perform a trial, where they will be timed
  - **Example:** *"Now do the same thing, but this time walking backwards while I time you. Remember, go as fast as you can without making a mistake"*
- Start the test over if they have a failure (if they step off the line or touch a nearby item for support); allow 3 attempts.
- Record the complex task trial 1 time on the tracking sheet.
- Trial time is recorded as the time from when the practitioner says "start" until the patient walks down, back, and their back heel crosses the original start line.

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Dual Task Trials

- Instruct the athlete they will now perform dual-task trials, where they will be timed while they complete the same test but while also completing a mental test
- For three trials, there are three possible different mental tasks (see attached scoring sheet)
  - 5-letter words backwards
  - Serial 7s backwards
  - Months backwards
- Explain which of the three tests that the patient will be asked to do, and allow them to practise each
- Begin the first trial (e.g., words backwards)
  - **Example:** *"This time I will give you words to spell backwards out loud while you walk. I will continue to give you words until you cross the finish. Do you understand the instructions?"*
- During the test, the test administrator will record the patient's response as either correct or incorrect.
  - For words backwards: if the patient's response is incorrect, provide them with the next word on the list.
  - For serial subtraction: if the patient makes a mistake in their subtraction, record the initial mistake as incorrect on the tracking sheet, but continue assessing the responses that follow as correct or incorrect by using the mistaken number as the new starting point.

    For example, if a patient is asked to do serial 7s from 95, and they say "95, 88, 80, 73": there are three correct responses out of four total responses (88→80 is incorrect, but 80→73 is correct).
- Repeat up to three dual-task trials.
- Trial time is recorded in the same manner as single-task tandem gait.
- The test administrator records the time to completion in seconds for the tandem gait portion of the test, as well as the correct and incorrect responses on the cognitive portion of the test.

Outcomes to Record

- Single-task trials: average time to tandem gait test completion.
- Dual-task trials: average time to tandem gait test completion, correct/total cognitive responses.
- If the patient does step off the line, or touches a nearby item for support, the test would be considered a failure and the test should be restarted.

Record on the testing sheet the number of failures that occur in each condition.

Normative Scores

Single-task tandem gait time with no mistakes:

- Normal range (fastest 75%): <11.7 seconds
- Slower than average (75%-90%ile): 11.8 – 12.5 seconds
- Very slow (>90%ile, or slowest 10%): >12.5 seconds

Dual-task tandem gait time:

- Normal range (fastest 75%): <14.4 seconds
- Slower than average (75%-90%ile): 14.5 – 16.3 seconds
- Very slow (>90%ile, or slowest 10%): >16.3 seconds

Instructional Videos

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Modified Vestibular/Ocular-Motor Screening (mVOMS) for Concussion

Test Description

Modified Vestibular Ocular Motor Screen (mVOMS) – note this is a shortened version of the previously developed VOMS (Mucha et al, 2014)

Test Setup

- Two chairs set up so that there is 90cm (3 feet) between the examiner's finger and the patient's nose.

Visual Guide to VOMS

Equipment Required

- Adjustable Metronome (download phone app) http://eumlab.com/pro-metronome/
- Two tongue depressors with a 14 point font letter attached to each (The test has also been described using just the examiner's fingertip)

Time to complete test: 5 minutes

Instructions and Script for Test Administration

Baseline Symptoms:

"Rate the following on a scale of 0-10, with 0 being no symptoms and 10 being the worst imaginable symptoms: Current Headache | Current Dizziness | Current Nausea | Current Fogginess"

Record baseline symptoms of Headache, Dizziness, Nausea & Fogginess ratings on 0-10 scale prior to beginning screening.

1. **Smooth Pursuits:**

Description:

The patient and the examiner are seated. The examiner holds a fingertip 90 cm from the patient.

- The patient is instructed to maintain focus on the target as the examiner moves the target smoothly in the horizontal direction 45cm to the right and 45cm to the left of midline.
- One repetition is complete when the target moves back and forth to the starting position, and 2 repetitions are performed.
- The target should be moved at a rate requiring approximately 2 seconds to go fully from left to right and 2 seconds to go fully from right to left.
- The test is repeated with the examiner moving the target smoothly and slowly in the vertical direction 45cm above and 45cm below midline for 2 complete repetitions up and down. Again, the target should be moved at a rate requiring approximately 2 seconds to move the eyes fully upward and 2 seconds to move fully downward. You will need to record what symptoms are elicited by the test itself, but also some details about the performance during the test for both vertical and horizontal SP.

"Follow this target with your eyes, without moving your head." After the test is completed, ask: *"Rate the following on a scale of 0-10: Current Headache | Current Dizziness | Current Nausea | Current Fogginess"*

Record symptoms: Headache, Dizziness, Nausea & Fogginess ratings after the test.

2. **Horizontal Saccades:**

Description:

The patient and the examiner are seated.

The examiner holds two single points (ideally tongue depressors with stickers on them) horizontally 90 cm from the athlete, with one at 45cm to the right and one to 45cm to the left of midline so that the athlete must gaze 30 degrees to left and 30 degrees to the right.

Instruct the athlete to move their eyes as quickly as possible from point to point.

One repetition is complete when the eyes move back and forth to the starting position, and 10 repetitions are performed.

Record what symptoms such as headache, dizziness, nausea and fogginess are elicited by the test.

"Look as quickly as you can from target to target, 10 times, without moving your head." After 10 repetitions are completed, ask:

"Rate the following on a scale of 0-10: Current Headache | Current Dizziness | Current Nausea | Current Fogginess"

Record Symptoms: Headache, Dizziness, Nausea & Fogginess ratings after the test.

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Modified Vestibular/Ocular-Motor Screening (mVOMS) for Concussion (Continued)

3. Horizontal Vestibular-Ocular Reflex (VOR) Test:

Description:

The patient and the examiner are seated. The examiner holds a target of approximately 14-point font size in front of the athlete in midline 90 cm. The patient is asked to rotate their head horizontally while maintaining focus on the target. The head is moved at an amplitude of 20 degrees to each side and a metronome is used to ensure the speed of rotation is maintained at 180 beats/minute (one beat in each direction). One repetition is complete when the head moves back and forth to the starting position, and 10 repetitions are performed. You will need to record what symptoms are elicited by the test itself, but also some details about the performance during the test

The patient focuses on the target while moving their head side-to-side, at the speed of this beat. Demonstrate the speed and amount of motion required if needed. After 10 repetitions, wait for 10 seconds, then ask the athlete to rate the following on a scale of 0-10 as they currently feel: headache, dizziness, nausea and fogginess.

"Focus on the target while moving your head side to side, at the speed of this beat." – demonstrate the speed and amount of motion required if needed. After 10 repetitions, wait for 10 seconds, then ask: *"Rate the following on a scale of 0-10 Current Headache | Current Dizziness | Current Nausea | Current Fogginess"*

Record symptoms: Headache, Dizziness, Nausea and Fogginess ratings 10 sec after the test is completed.

4. Visual Motion Sensitivity Test (VOR cancellation)

Description:

Have the patient stand with feet shoulder-width apart.

The examiner stands next to and slightly behind the athlete so that the patient is guarded but the movement can be performed freely.

- The athlete holds an arm outstretched and focuses on their thumb.
- Maintaining focus on their thumb, the athlete rotates, together as a unit, their head, eyes and trunk at an amplitude of 80 degrees to the right and 80 degrees to the left.
- A metronome is preferably to be used to ensure the speed of rotation is maintained at 50 beats/min (one beat in each direction).
- One repetition is complete when the trunk rotates back and forth to the starting position, and 5 repetitions are performed.
- You will need to record what symptoms are elicited by the test itself, but also some details about the performance during the test.

"Stand and hold your arm outstretched with your thumb up. Keep your head and eyes focused on your thumb, as you rotate your entire body side to side." Demonstrate the movement, speed and amplitude if necessary. After stopping, wait for 10 seconds, then ask: *"Rate the following on a scale of 0-10: Current Headache | Current Dizziness | Current Nausea | Current Fogginess"*

Record symptoms: Headache, Dizziness, Nausea & Fogginess ratings 10 sec after the test is completed.

Where a tongue depressor with 14 point font sticker on it is not available, the examiners index finger may be used.

Anxiety Screen - The Generalised Anxiety Disorder Assessment (GAD-7)

Overview - GAD-7 is a free access, seven-item instrument that is used to measure or assess the severity of generalised anxiety disorder (GAD). Each item asks the individual to rate the severity of his or her symptoms over the past two weeks. Response options include "not at all", "several days", "more than half the days" and "nearly every day".

Suitability - The GAD-7 has been validated for primary care patients, general population, and adolescents with GAD (Mossman et al., 2018, found that GAD-7 scores may be used to assess anxiety symptoms and to differentiate between mild and moderate GAD in adolescents).

Administration - The GAD-7 is a self-administered patient questionnaire and it takes about 1-2 minutes to complete.

Scoring - The GAD-7 score is calculated by assigning scores of 0, 1, 2, and 3, to the response categories of "not at all," "several days," "more than half the days," and "nearly every day," respectively, and then adding together the scores for the seven questions.

Interpretation - Scores of 5, 10, and 15 represent cut-points for mild, moderate, and severe anxiety, respectively. When used as a screening tool, further evaluation is recommended when the score is 10 or greater.

Depression Screen – The Patient Health Questionnaire-2 (PHQ-2)

Overview - The PHQ-2 enquires about the frequency of depressed mood and anhedonia over the past two weeks. The PHQ-2 includes the first two items of the PHQ-9. The purpose of the PHQ-2 is to screen for depression in a "first-step" approach.

Interpretation – A PHQ-2 score ranges from 0-6. The authors identified a score of 3 as the optimal cut-point when using the PHQ-2 to screen for depression. If the score is 3 or greater, major depressive disorder is likely. Patients who screen positive should be further evaluated with the PHQ-9, other diagnostic instruments, or direct interview to determine whether they meet criteria for a depressive disorder.

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Sleep Screen - The Abbreviated Athlete Sleep Screening Questionnaire (ASSQ)

Overview - The ASSQ was developed as a quantitative sleep screening tool to detect clinically significant sleep disturbances and daytime dysfunction and to provide interventions based on the type and severity of the problem that is detected in an athlete population. The 5-item version has been used in the Sport Mental Health Assessment Tool (SMHAT).

Scoring - The ASSQ calculates a Sleep Difficulty Score (SDS) for athletes. A higher SDS indicates a greater likelihood of a clinical sleep disorder using the following cut-points 0-4 (Normal), 5-7 (Mild), 8-10 (Moderate), 11-17 (Severe).

When a more extensive athlete mental health screen is needed the SMHAT is indicated.

Delayed Recall

The delayed recall should be performed after a minimum of 5 minutes have elapsed since the end of the Immediate Recall section. Document the time since the immediate recall. Have the athlete recite as many of the words remembered in any order. Score 1 point for every correct response.

Exercise Test Protocols

Graded exercise protocols may be used for both symptom provocation and as a treatment intervention. Before starting, exclude contra-indications including cardiac condition, respiratory disease, significant vestibular symptoms, motor dysfunction, lower limb injuries, and cervical spine injury. For athletes whose symptoms include dizziness and poor balance, a stationary bike test is more appropriate.

Validated protocols include the Buffalo Concussion Treadmill Test (BCTT) and the Buffalo Concussion Bike Test (BCBT)

Record the protocol used, HR, RPE, overall condition (VAS) and symptoms for every stage.

Protocol:		Name/Patient ID:		
Min	**HR (bpm)**	**RPE**	**Overall Condition (0-10)**	**Symptoms/Observations**
Rest				
1 min				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
1 min recov				
2 min recov				

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McCrory P. Retired Players' Assessment Form (Australian Football League)

National Football league (NFL) Concussion Protocol https://www.nfl.com/playerhealthandsafety/health-and-wellness/player-care/concussion-protocol-return-to-participation-protocol

SCAT5 https://bjsm.bmj.com/content/bjsports/early/2017/04/26/bjsports-2017-097506SCAT5.full.pdf

SHRED protocols (University of Calgary) https://www.ucalgary.ca/sport-injury-prevention-research-centre/research/studies/concussion/shred-concussions

Reed, N.*, Zemek, R.*, Dawson, et al. Living Guideline for Diagnosing and Managing Pediatric Concussion. Toronto, ON: Ontario Neurotrauma Foundation 2020. https://doi.org/10.17605/OSF.IO/3VWN9

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