What is the SCAT3?1
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.2 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).

SIDELINE ASSESSMENT
Indications for Emergency Management
NOTE: A hit to the head can sometimes be associated with a more serious brain injury. Any of the following warrants consideration of activating emergency procedures and urgent transportation to the nearest hospital:
- Glasgow Coma score less than 15
- Deteriorating mental status
- Potential spinal injury
- Progressive, worsening symptoms or new neurologic signs

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

Glasgow coma scale (GCS)
Best eye response (E)
- No eye opening
- Eye opening in response to pain
- Eye opening to speech
- Eyes opening spontaneously
Best verbal response (V)
- No verbal response
- Incomprehensible sounds
- Inappropriate words
- Confused
- Oriented
Best motor response (M)
- No motor response
- Extension to pain
- Abnormal flexion to pain
- Flexion/Withdrawal to pain
- Localizes to pain
- Obeys commands

Glasgow Coma score (E + V + M) of 15
GCS should be recorded for all athletes in case of subsequent deterioration.

Maddocks Score3
“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?
- Which half is it now?
- Who scored last in this match?
- What team did you play last week/game?
- Did your team win the last game?

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?”):

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.
BACKGROUND

Name: ____________________ Date: ____________________
Examiner: ____________________
Sport/team/school: ____________________ Date/time of injury: ____________________
Age: ____________________
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 diagnosed with headaches or migraines?
Have you ever been diagnosed with depression, anxiety or other psychiatric disorder?

Are you on any medications? any of these problems?

How do you feel?

“Symptom evaluation”

You should score yourself on the following symptoms, based on how you feel now.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>&quot;Pressure in head&quot;</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Neck Pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nausea or vomiting</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Dizziness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Blurred vision</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Balance problems</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to noise</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling slowed down</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling like “in a fog”</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>“Don’t feel right*”</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fatigue or low energy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Confusion</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trouble falling asleep</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>More emotional</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Irritability</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sadness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nervous or Anxious</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Total number of symptoms (Maximum possible 22)
Symptom severity score (Maximum possible 132)

Do the symptoms get worse with physical activity? □ Y □ N □
Do the symptoms get worse with mental activity? □ Y □ N □

Overall rating: If you know the athlete well prior to the injury, how different is the athlete acting compared to his/her usual self?
Please circle one response:
no different □ very different □ unsure □ N/A □

COGNITIVE & PHYSICAL EVALUATION

Cognitive assessment

Standardized Assessment of Concussion (SAC)*
Orientation (1 point for each correct answer)
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

List | Trial 1 | Trial 2 | Trial 3 | Alternative word list
---|---|---|---|---
elbow | 0 1 0 0 1 | candle | baby | finger |
apple | 0 0 1 0 1 | paper | monkey | penny |
carpet | 0 0 1 0 1 | sugar | perfume | blanket |
saddle | 0 0 1 0 1 | sandwich | sunset | lemon |
bubble | 0 0 1 0 1 | wagon | iron | insect |
Total score of 15

Concentration: Month in Reverse Order (1 pt. for entire sequence correct)
Concentration score of 5

Neck Examination:

Range of motion □ Tenderness □ Upper and lower limb sensation & strength
Findings:

Balance examination

Do one or both of the following tests.
Footwear (shoes, barefoot, braces, tape, etc.)
Modified Balance Error Scoring System (BESS) testing*
Which foot was tested (i.e. which is the non-dominant foot) Left □ Right □
Testing surface (hard floor, field, etc.)
Condition
Double leg stance: Errors □
Single leg stance (non-dominant foot): Errors □
Tandem stance (non-dominant foot at back): Errors □

And/or
Tandem gate**
Time (best of 4 trials): ________ seconds

Coordination examination

Upper limb coordination
Which arm was tested: Left □ Right □
Coordination score of 1

SAC Delayed Recall*

Delayed recall score of 5

Scoring on the SCAT3 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. Since signs and symptoms may evolve over time, it is important to consider repeat evaluation in the acute assessment of concussion.

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INSTRUCTIONS

Words in italics throughout the SCAT3 are the instructions given to the athlete by
the tester.

Symptom Scale

“You should score yourself on the following symptoms, based on how you feel now.”

To be completed by the athlete. In situations where the symptom scale is being
completed after exercise, it should still be done in a resting state, at least 10 minutes
post exercise.

For total number of symptoms, maximum possible is 22.
For Symptom severity score, add all scores in table, maximum possible is 22 x 6 = 132.

SAC4

Immediate Memory

“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 & 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.”

Complete all 3 trials regardless of score on trial 1 & 2. Read the words at a rate of one per second.
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

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

If correct, go to next string length. If incorrect, read trial 2. One point possible for each string
length. Stop after incorrect on both trials. 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 completion of the Balance and Coordi-
nation Examination.

“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

Balance Examination

Modified Balance Error Scoring System (BESS) testing4

This balance testing is based on a modified version of the Balance Error Scoring System (BESS)’. A stopwatch or watch with a second hand is required for this testing.

“I am now going to test your balance. Please take your shoes off, 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. 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.”

(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 de-
grees 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.”

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 forehead or heel
6. Remaining out of test position > 5 sec

Each of the 20-second trials is scored by counting the errors, or deviations from the
proper stance, accumulated by the athlete. The examiner will begin counting
errors only after the individual 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 total number of errors for any single con-
dition is 10. If a 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 subject is set. Subjects 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 50 cm x 40 cm x 6 cm).

Tandem Gait4

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 38cm wide (sports tape), 3 meter 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. A total of 4 trials are done and the best time is retained. Athletes should complete the
test in 14 seconds. 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. In this case, the time is
not recorded and the trial repeated, if appropriate.

Coordination Examination

Upper limb coordination

Finger-to-nose (FTN) task:

“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.”

Scoring: 5 correct repetitions in < 4 seconds = 1
Note for testers: Athletes fail the test if they do not touch their nose, do not fully extend their elbow
or do not perform five repetitions. Failure should be scored as 0.

References & Footnotes

1. This tool has been developed by a group of international experts at the 4th In-
ternational Consensus meeting on Concussion in Sport held in Zurich, Switzerland
in November 2012. The full details of the conference outcomes and the authors of
the tool are published in The BJSIM Injury Prevention and Health Protection, 2013,
Volume 47, Issue 5. The outcome paper will also be simultaneously co-published in
other leading biomedical journals with the copyright held by the Concussion in Sport
Group, to allow unrestricted distribution, providing no alterations are made.
2. McCrory P et al., Consensus Statement on Concussion in Sport – the 3rd Inter-
national Conference on Concussion in Sport held in Zurich, November 2008. British
3. Maddocks, DL, Dicker, GD; Saling, MM. The assessment of orientation following
4. McCrea M. Standardized mental status testing of acute concussion. Clinical Jour-
5. Guskiewicz KM. Assessment of postural stability following sport-related concus-
ative values for 16-37 year old subjects for three clinical measures of motor
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S.W. The effect of footwear and sports-surface on dynamic neurological screen-
ing in sport-related concussion. Journal of Science and Medicine in Sport. 2010;
13(4): 382 – 386.

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ATHLETE INFORMATION

Any athlete suspected of having a concussion should be removed from play, and then seek medical evaluation.

Signs to watch for
Problems could arise over the first 24–48 hours. The athlete should not be left alone and must go to a hospital at once if they:
- Have a headache that gets worse
- Are very drowsy or can’t be awakened
- Can’t recognize people or places
- Have repeated vomiting
- Behave unusually or seem confused; are very irritable
- Have seizures (arms and legs jerk uncontrollably)
- Have weak or numb arms or legs
- Are unsteady on their feet; have slurred speech

Remember, it is better to be safe.
Consult your doctor after a suspected concussion.

Return to play
Athletes should not be returned to play the same day of injury. When returning athletes to play, they should be medically cleared and then follow a stepwise supervised program, with stages of progression.

For example:

<table>
<thead>
<tr>
<th>Rehabilitation stage</th>
<th>Functional exercise at each stage of rehabilitation</th>
<th>Objective of each stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No activity</td>
<td>Physical and cognitive rest</td>
<td>Recovery</td>
</tr>
<tr>
<td>Light aerobic exercise</td>
<td>Walking, swimming or stationary cycling keeping intensity, 70 % maximum predicted heart rate. No resistance training</td>
<td>Increase heart rate</td>
</tr>
<tr>
<td>Sport-specific exercise</td>
<td>Skating drills in ice hockey, running drills in soccer. No head impact activities</td>
<td>Add movement</td>
</tr>
<tr>
<td>Non-contact training drills</td>
<td>Progression to more complex training drills, e.g. passing drills in football and ice hockey. May start progressive resistance training</td>
<td>Exercise, coordination, and cognitive load</td>
</tr>
<tr>
<td>Full contact practice</td>
<td>Following medical clearance participate in normal training activities</td>
<td>Restore confidence and assess functional skills by coaching staff</td>
</tr>
<tr>
<td>Return to play</td>
<td>Normal game play</td>
<td></td>
</tr>
</tbody>
</table>

There should be at least 24 hours (or longer) for each stage and if symptoms recur the athlete should rest until they resolve once again and then resume the program at the previous asymptomatic stage. Resistance training should only be added in the later stages.

If the athlete is symptomatic for more than 10 days, then consultation by a medical practitioner who is expert in the management of concussion, is recommended.

Medical clearance should be given before return to play.

CONCUSSION INJURY ADVICE

(To be given to the person monitoring the concussed athlete)

This patient has received an injury to the head. A careful medical examination has been carried out and no sign of any serious complications has been found. Recovery time is variable across individuals and the patient will need monitoring for a further period by a responsible adult. Your treating physician will provide guidance as to this timeframe.

If you notice any change in behaviour, vomiting, dizziness, worsening headache, double vision or excessive drowsiness, please contact your doctor or the nearest hospital emergency department immediately.

Other important points:
- Rest (physically and mentally), including training or playing sports until symptoms resolve and you are medically cleared
- No alcohol
- No prescription or non-prescription drugs without medical supervision. Specifically:
  - No sleeping tablets
  - Do not use aspirin, anti-inflammatory medication or sedating pain killers
  - Do not drive until medically cleared
  - Do not train or play sport until medically cleared

Clinic phone number