What is childSCAT3?1

The ChildSCAT3 is a standardized tool for evaluating injured children for concussion and can be used in children aged from 5 to 12 years. It supersedes the original SCAT and the SCAT2 published in 2005 and 2009, respectively.1 For older persons, ages 13 years and over, please use the SCAT3. The ChildSCAT3 is designed for use by medical professionals. If you are not qualified, please use the Sport Concussion Recognition Tool. Preseason baseline testing with the ChildSCAT3 can be helpful for interpreting post-injury test scores.

Specific instructions for use of the ChildSCAT3 are provided on page 3. If you are not familiar with the ChildSCAT3, please read these instructions carefully. This tool may be freely copied in its current form for distribution to individuals, teams, groups and organizations. Any revision and any reproduction in a digital form require approval by the Concussion in Sport Group.

NOTE: The diagnosis of concussion is a clinical judgment, ideally made by a medical professional. The ChildSCAT3 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 ChildSCAT3 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 (like those 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 severe brain injury. If the concussed child displays any of the following, then do not proceed with the ChildSCAT3; instead activate 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
- Persistent vomiting
- Evidence of skull fracture
- Post traumatic seizures
- Coagulopathy
- History of Neurosurgery (e.g Shunt)
- Multiple injuries

Potential signs of concussion?

If any of the following signs are observed after a direct or indirect blow to the head, the child 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.)?
- *If so, how long?*
Disorientation or confusion (inability to respond appropriately to questions)?
- *If so, how long?*
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?

Sideline Assessment – child-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)

1. Where are we at now?
2. Is it before or after lunch?
3. What did you have last lesson/class?
4. What is your teacher’s name?
5. child-Maddocks score

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

Any child with a suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration (i.e., should not be left alone). No child diagnosed with concussion should be returned to sports participation on the day of Injury.

BACKGROUND

Name: ____________________________ Date/Time of Injury: ____________________________

Examiner: ____________________________ Date of Assessment: ____________________________

Sport/team/school: ____________________________ Age: ____________________________

Current school year/grade: ____________________________ Gender: M F

Dominant hand: right left neither

Mechanism of Injury ("tell me what happened"): ____________________________

For Parent/carer to complete:

How many concussions has the child had in the past?

When was the most recent concussion?

How long was the recovery from the most recent concussion?

Has the child ever been hospitalized or had medical imaging done (CT or MRI) for a head injury?

Has the child ever been diagnosed with headaches or migraines?

Does the child have a learning disability, dyslexia, ADD/ADHD, seizure disorder?

Has the child ever been diagnosed with depression, anxiety or other psychiatric disorder?

Has anyone in the family ever been diagnosed with any of these problems?

Is the child on any medications? If yes, please list: ____________________________

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
Obey commands 6

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

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

### Child report

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have trouble paying attention</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I get distracted easily</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have a hard time concentrating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have problems remembering what people tell me</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have problems following directions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I daydream too much</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I get confused</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I forget things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have problems finishing things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have trouble figuring things out</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>It’s hard for me to learn new things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have headaches</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I feel dizzy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I feel like the room is spinning</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I feel like I’m going to faint</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Things are blurry when I look at them</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I see double</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I feel sick to my stomach</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I get tired a lot</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I get tired easily</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total number of symptoms** (Maximum possible 20)

<table>
<thead>
<tr>
<th>Symptom severity score (Maximum possible 20 x 3 = 60)</th>
</tr>
</thead>
</table>

### Parent report

**The child**

- Has trouble sustaining attention: 0 1 2 3
- Is easily distracted: 0 1 2 3
- Has difficulty concentrating: 0 1 2 3
- Has problems remembering what he/she is told: 0 1 2 3
- Has difficulty following directions: 0 1 2 3
- Tends to daydream: 0 1 2 3
- Gets confused: 0 1 2 3
- Is forgetful: 0 1 2 3
- Has difficulty completing tasks: 0 1 2 3
- Has poor problem solving skills: 0 1 2 3
- Has problems learning: 0 1 2 3
- Has headaches: 0 1 2 3
- Feels dizzy: 0 1 2 3
- Has a feeling that the room is spinning: 0 1 2 3
- Feels faint: 0 1 2 3
- Has blurred vision: 0 1 2 3
- Has double vision: 0 1 2 3
- Experiences nausea: 0 1 2 3
- Gets tired a lot: 0 1 2 3
- Gets tired easily: 0 1 2 3

**Total number of symptoms** (Maximum possible 20)

**Symptom severity score** (Maximum possible 20 x 3 = 60)

**Cognitive & Physical Evaluation**

### Cognitive assessment

**Standardized Assessment of Concussion – Child Version (SAC-C)**

#### 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

**Orientation score** of 4

### Immediate memory

- **Immediate memory score total** of 15

### Concentration: Digits Backward

<table>
<thead>
<tr>
<th>List</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Alternative digit list</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-2</td>
<td>0 1</td>
<td>5-2</td>
<td>4-1</td>
<td>4-9</td>
</tr>
<tr>
<td>4-9-3</td>
<td>0 1</td>
<td>6-2-9</td>
<td>5-2-6</td>
<td>4-1-5</td>
</tr>
<tr>
<td>3-8-1-4</td>
<td>0 1</td>
<td>3-2-7-9</td>
<td>1-7-9-5</td>
<td>4-9-6-8</td>
</tr>
<tr>
<td>6-2-9-7-1</td>
<td>0 1</td>
<td>1-5-2-8-6</td>
<td>3-8-5-2-7</td>
<td>6-1-8-4-3</td>
</tr>
<tr>
<td>7-1-8-4-6-2</td>
<td>0 1</td>
<td>5-3-9-1-4-8</td>
<td>8-3-1-9-6-4</td>
<td>7-2-4-8-5-6</td>
</tr>
</tbody>
</table>

Total of 5

### Concentration: Days in Reverse Order

- **Concentration score** of 6

### 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.): Standardized Assessment of Concussion – Child

**Condition**

- Double leg stance: Errors
- Tandem stance (non-dominant foot at back): Errors

**Tandem gait**

- Time taken to complete (best of 4 trials): 

### Coordination examination

- **Upper limb coordination**

**Which arm was tested:** Left/Right

**Coordination score** of 1

### SAC Delayed Recall

- **Delayed recall score** of 5

**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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**Scoring on the ChildSCIAT3 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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**CHILD-SCAT3 SPORT CONCUSSION ASSESSMENT TOOL 3 | PAGE 2 © 2013 Concussion in Sport Group**
INSTRUCTIONS

Words in italics throughout the ChildSCAT3 are the instructions given to the child by the tester.

Sideline Assessment – child-Maddocks Score
To be completed on the sideline/in the playground, immediately following concus -
sion. There is no requirement to repeat these questions at follow-up.

Symptom Scale®
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.

On the day of injury
• the child is to complete the Child Report, according to how he/she feels now.

On all subsequent days
• the child is to complete the Child Report, according to how he/she feels today.
   scored
• the parent/carer is to complete the Parent Report according to how the child has
  been over the previous 24 hours.

Standardized Assessment of Concussion – Child Version (SAC-C)®
Orientation
Ask each question on the score sheet. A correct answer for each question scores 1 point. If the
child does not understand the question, gives an incorrect answer, or no answer, then the score for
that question is 0 points.

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 child 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 backwards, in reverse order of how I read them to you. For example, if I say 7-1, you would
say 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.

Days in Reverse Order:
“Now tell me the days of the week in reverse order. Start with Sunday and go backward. So I
will say Sunday, Saturday . . . go ahead.”

1 pt. for entire sequence correct

Delayed recall
The delayed recall should be performed after completion of the Balance and Coor -
dination 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.”

Circle each word correctly recalled. Total score equals number of words recalled.

Balance examination
These instructions are to be read by the person administering the childSCAT3, and each balance task
should be demonstrated to the child. The child should then be asked to copy what the examiner
sampled.

Modified Balance Error Scoring System (BESS)®
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 two
different parts.”

(a) Double leg stance:
The first stance is standing with the feet together with hands on hips and eyes closed. The
child should try to maintain stability in that position for 20 seconds. You should inform the child
that you will be counting the number of times the child moves out of this position. You should
start timing when the child is set and the eyes are closed.

(b) Tandem stance:
Instruct the child to stand heel-to-toe with the non-dominant foot in the back. Weight should
be evenly distributed across both feet. Again, the child should try to maintain stability for 20
seconds with hands on hips and eyes closed. You should inform the child that you will be
counting the number of times the child moves out of this position. If the child stumble out of
this position, instruct him/her to open the eyes and return to the start position and continue
balancing. You should start timing when the child is set and the eyes are closed.

Balance testing – types of errors - Parts (a) and (b)
1. Hands lifted off iliac crest
2. Opening eyes
3. Step, stumble, or fall
4. Moving hip into > 30 degrees abduction
5. Lifting foot/toe 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 child. The examiner will begin counting errors
only after the child has assured the proper start position. The modified BESS is
calculated by adding one error point for each error during the two 20-sec -
ond tests. The maximum total number of errors for any single condition is
10. If a child commits multiple errors simultaneously, only one error is recorded but
the child should quickly return to the testing position, and counting should resume
once subject is set. Children who 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 stances can be performed on a surface
of medium density foam (e.g., approximately 50cmx40cmx6cm).

Tandem Gaity®
Use a clock (with a second hand) or stopwatch to measure the time taken to complete this task.
Instruction for the examiner – Demonstrate the following to the child:

The child is 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 accu -
rate as possible along a 3m line (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
eンド 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. Children 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.

Explain to the child that you will time how long it takes them to walk to the end of the line and back.

Coordination examination
Upper limb coordination
Finger-to-nose (FTN) task:
The tester should demonstrate it to the child.

“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). When I give a start signal, I would like you to perform five successive
fingers to nose repetitions using your index finger to touch the tip of the nose as quickly and
accurately as possible.”

Scoring: 5 correct repetitions in < 4 seconds = 1

Note for testers: Children 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 Brain Injury Prevention and Health Protection, 2013,
Volume 47, Issue 5. The outcome paper will be also 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 -
Normative values for 16-37 year old subjects for three clinical measures of motor
performance used in the assessment of sports concussions. Journal of Science and
7. Schneiders, A.G., Sullivan, S.J., Kvarnstrom. J.K., Yeates, K. The effect of footwear and sports-surface on dynamic neurological screen -
CHILD ATHLETE INFORMATION

Any child suspected of having a concussion should be removed from play, and then seek medical evaluation. The child must NOT return to play or sport on the same day as the suspected concussion.

Signs to watch for

Problems could arise over the first 24–48 hours. The child should not be left alone and must go to a hospital at once if they develop any of the following:
- New Headache, or Headache gets worse
- Persistent or increasing neck pain
- Becomes drowsy or can’t be woken up
- Can not recognise people or places
- Has Nausea or Vomiting
- Behaves unusually, seems confused, or is irritable
- Has any seizures (arms and/or legs jerk uncontrollably)
- Has weakness, numbness or tingling (arms, legs or face)
- Is unsteady walking or standing
- Has slurred speech
- Has difficulty understanding speech or directions

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

Return to school

Concussion may impact on the child’s cognitive ability to learn at school. This must be considered, and medical clearance is required before the child may return to school. It is reasonable for a child to miss a day or two of school after concussion, but extended absence is uncommon. In some children, a graduated return to school program will need to be developed for the child. The child will progress through the return to school program provided that there is no worsening of symptoms. If any particular activity worsens symptoms, the child will abstain from that activity until it no longer causes symptom worsening. Use of computers and internet should follow a similar graduated program, provided that it does not worsen symptoms. This program should include communication between the parents, teachers, and health professionals and will vary from child to child. The return to school program should consider:
- Extra time to complete assignments/tests
- Quiet room to complete assignments/tests
- Avoidance of noisy areas such as cafeterias, assembly halls, sporting events, music class, shop class, etc
- Frequent breaks during class, homework, tests
- No more than one exam/day
- Shorter assignments
- Repetition/memory cues
- Use of peer helper/tutor
- Reassurance from teachers that student will be supported through recovery through accommodations, workload reduction, alternate forms of testing
- Later start times, half days, only certain classes

CONCUSSION INJURY ADVICE FOR THE CHILD AND PARENTS / CARERS

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

This孩子 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. It is expected that recovery will be rapid, but the child will need monitoring for the next 24 hours by a responsible adult.

If you notice any change in behavior, vomiting, dizziness, worsening headache, double vision or excessive drowsiness, please call an ambulance to transport the child to hospital immediately.

Other important points:
- Following concussion, the child should rest for at least 24 hours.
- The child should avoid any computer, internet or electronic gaming activity if these activities make symptoms worse.
- The child should not be given any medications, including painkillers, unless prescribed by a medical practitioner.
- The child must not return to school until medically cleared.
- The child must not return to sport or play until medically cleared.

The child is not to return to play or sport until he/she has successfully returned to school/learning, without worsening of symptoms. Medical clearance should be given before return to play.

If there are any doubts, management should be referred to a qualified health practitioner, expert in the management of concussion in children.

Return to sport

There should be no return to play until the child has successfully returned to school/learning, without worsening of symptoms. Children must not be returned to play the same day of injury. When returning children to play, they should 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 cognitve rest</td>
<td>Recovery</td>
</tr>
<tr>
<td>Light aerobic exercise</td>
<td>Walking, swimming or stationary cycling</td>
<td>Increase heart rate</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 school program should include communication between the parents, teachers, and health professionals and will vary from child to child. The return to school program should consider:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- Following concussion, the child should rest for at least 24 hours.
- The child should avoid any computer, internet or electronic gaming activity if these activities make symptoms worse.
- The child should not be given any medications, including painkillers, unless prescribed by a medical practitioner.
- The child must not return to school until medically cleared.
- The child must not return to sport or play until medically cleared.