What is childSCAT3?¹

The Child-SCAT3 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 SCAT4. The Child-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 Child-SCAT3 can be helpful for interpreting post-injury test scores.

Specific instructions for use of the Child-SCAT3 are provided on page 3. If you are not familiar with the Child-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 and any reproduction in a digital form require approval by the Concussion in Sport Group.

The Child-SCAT3 should not be used solely to make, or exclude, the diagnosis of concussion 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.

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 Child-SCAT3; 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?"¹
- Balance or motor incoordination (stumbles, slow/laboured movements, etc.)?¹
- Disorientation or confusion (inability to respond appropriately to questions)?¹
- Loss of memory:
  - "If so, how long?"¹
  - "Before or after the injury?"¹
- 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)

Where are we at now?

Is it before or after lunch?

What did you have last lesson/class?

What is your teacher’s name?

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: ____________________________ Gender: ______ M ______ F

Current school year/grade: ____________________________

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)

<table>
<thead>
<tr>
<th>Best eye response (E)</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>No eye opening</td>
<td></td>
</tr>
<tr>
<td>Eye opening in response to pain</td>
<td>2</td>
</tr>
<tr>
<td>Eye opening to speech</td>
<td>3</td>
</tr>
<tr>
<td>Eyes opening spontaneously</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Best verbal response (V)</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>No verbal response</td>
<td></td>
</tr>
<tr>
<td>Incomprehensible sounds</td>
<td>2</td>
</tr>
<tr>
<td>Inappropriate words</td>
<td>3</td>
</tr>
<tr>
<td>Confused</td>
<td>4</td>
</tr>
<tr>
<td>Oriented</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Best motor response (M)</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>No motor response</td>
<td></td>
</tr>
<tr>
<td>Extension to pain</td>
<td>2</td>
</tr>
<tr>
<td>Abnormal flexion to pain</td>
<td>3</td>
</tr>
<tr>
<td>Flexion/Withdrawal to pain</td>
<td>4</td>
</tr>
<tr>
<td>Localizes to pain</td>
<td>5</td>
</tr>
<tr>
<td>Obey commands</td>
<td>6</td>
</tr>
</tbody>
</table>

Glasgow Coma score (E + V + M)

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

---

¹ Concussion in Sport Group

³ Child-Maddocks score

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### 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</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)

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

---

#### Parent report

The child

<table>
<thead>
<tr>
<th>Symptom</th>
<th>never</th>
<th>rarely</th>
<th>sometimes</th>
<th>often</th>
</tr>
</thead>
<tbody>
<tr>
<td>has trouble sustaining attention</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>is easily distracted</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>has difficulty concentrating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>has problems remembering what he/she is told</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>has difficulty following directions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>tends to daydream</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>gets confused</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>is forgetful</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>has difficulty completing tasks</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>has poor problem solving skills</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>has problems learning</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>has headaches</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>feels dizzy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>has a feeling that the room is spinning</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>feels faint</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>has blurred vision</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>has double vision</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>experiences nausea</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>gets tired</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>gets 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)

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 (1 point for each correct answer)

Orientation score

---

#### Immediate memory

**Immediate memory score total**

---

#### Concentration: Digits Backward

<table>
<thead>
<tr>
<th>List</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Alternative word 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

#### Immediate memory score total

---

#### Balance examination

**Range of motion**

**Tenderness**

**Upper and lower limb sensation & strength**

**Findings:**

---

#### Coordination examination

**Upper limb coordination**

Which arm was tested: Left Right

Coordinating score

---

#### SAC Delayed Recall

**Delayed recall score**

---

Scoring on the ChildSCAT3 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.
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 concussion. 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.
- 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)4

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, give 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 you’ll 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 Coordination 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 demonstrated.

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 two different parts.”

(a) Double leg stance:
The first stance is standing with the feet together with hands on hips and with 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 stumbles 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 forefoot 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 assumed the proper start position. The modified BESS is calculated by adding one error point for each error during the two 20-second 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 2 stances can be performed on a surface of medium density foam (e.g., approximately 50cmx40cmx6cm).

Tandem Gait5

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:

“I am going to test your balance 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 finger-to-nose repetitions using your index finger to touch the tip of your nose as quickly and as 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.

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 finger-to-nose repetitions using your index finger to touch the tip of your nose as quickly and as accurately as possible.”

References & Footnotes

1. This tool has been developed by a group of international experts at the 4th International 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 BJS 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.
7. Schneider, A.G., Sullivan, S.J., Kvarnstrom. J.K., Yeates, K. et al., Consensus Statement on Concussion in Sport – the 3rd International Conference 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 BJS 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.
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

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 cognitive 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></td>
<td>Keeping intensity, 70% maximum predicted heart rate</td>
<td></td>
</tr>
<tr>
<td>Sport-specific exercise</td>
<td>Skating drills in ice hockey, running drills in soccer</td>
<td>Add movement</td>
</tr>
<tr>
<td></td>
<td>No head impact activities</td>
<td></td>
</tr>
<tr>
<td>Non-contact training drills</td>
<td>Progression to more complex training drills, eg 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 approximately 24 hours (or longer) for each stage and the child should drop back to the previous asymptomatic level if any post-concussive symptoms recur. Resistance training should only be added in the later stages. If the child is symptomatic for more than 10 days, then review by a health practitioner, expert in the management of concussion, is recommended. Medical clearance should be given before return to play.

Notes:

CONCUSION INJURY ADVICE FOR THE CHILD AND PARENTS / CARERS

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

This child 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 pain killers, 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.

Clinic phone number

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