Aims

1/ To acknowledge the significance of concussion, however it occurs.

2/ To encourage an understanding both by the pupil and the school that a return to sport too soon after a concussion injury carries significant risk to immediate and long term health.

3/ To acknowledge that concussion can affect cognitive functioning for weeks after an injury, and to encourage schools to support affected pupils.

4/ To provide a protocol to follow to facilitate a timely medical review if a pupil suffers a suspected concussion within the school environment.

5/ To provide a protocol to follow during the recovery phase to ensure that a pupil is appropriately managed to allow them to make a full and safe recovery.

Concussion management

Definition of concussion

6/ Concussion is a complex process affecting the brain and which is induced by biomechanical force. Concussion typically results in the rapid onset of a short-lived impairment of brain function that resolves spontaneously. It does not require a loss of consciousness to be diagnosed – and, in fact, many people with concussion do not present this way.

7/ Concussion can occur in any situation where there is the potential for a head injury. Particular attention should be paid to high impact sport, those involving the potential for falls from a height or those involving activity on a hard surface e.g. cycling.

8/ It should be noted that the symptoms of concussion can first present at any time after the incident which caused the suspected concussion but typically in the first 24-48 hours.
Table 1: Common early signs and symptoms of concussion

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>Headache, dizziness, &quot;feeling in a fog&quot;</td>
</tr>
<tr>
<td>Physical signs</td>
<td>Loss of consciousness, vacant expression, vomiting, inappropriate playing behaviour, unsteady on legs, slowed reactions</td>
</tr>
<tr>
<td>Behavioural changes</td>
<td>Inappropriate emotions, irritability, feeling nervous or anxious</td>
</tr>
<tr>
<td>Cognitive impairment</td>
<td>Slowed reaction times, confusion / disorientation, poor attention and concentration, loss of memory for events up to and / or after the concussion</td>
</tr>
<tr>
<td>Sleep disturbance</td>
<td>Drowsiness</td>
</tr>
</tbody>
</table>

*(Ref IRB 2013)*

**Why worry about concussion?**

- Second head injury syndrome

9/ If the injured person has had a small intra-cerebral bleed/haematoma which has not been apparent after the first injury, a second blow to the head may trigger significantly greater and more damaging bleeding with potential lifelong consequences.

- Cognitive functioning

10/ There is increasing evidence that concussion affects cognitive functioning for days after the injury. A return to any exercise too soon can prolong that loss of function. There is also the possibility of longer term cognitive damage from repeated injury.

11/ Whilst this guideline applies to all age groups, particular care needs to be taken with children and adolescents due to the potential dangers associated with concussion in the developing brain. The school doctor is often uniquely placed to raise awareness of these dangers within the school environment and to advise the school on an appropriate process to follow for pupils who have sustained a concussion.

**Diagnosis and management of concussion**

**How do I know there is a concussion?**

12/ Visible clues of concussion - what you see

Any one or more of the following visual clues can indicate a concussion: -

- Dazed, blank or vacant look
- Lying motionless on ground / slow to get up
- Unsteady on feet / balance problems or falling over / incoordination
- Loss of consciousness or responsiveness
- Confused / not aware of plays or events
• Grabbing / clutching of head
• Seizure (fits)
• More emotional / irritable than normal for that person

13/ Symptoms of concussion - what you are told

Presence of any one or more of the following symptoms may suggest a concussion:
- Headache
- Dizziness
- Mental clouding, confusion or feeling slowed down
- Visual problems
- Nausea or vomiting
- Fatigue
- Drowsiness / feeling like “in a fog” / difficulty concentrating
- “Pressure” in the head
- Sensitivity to light or noise

14/ Questions to ask to assess further

Failure to answer any of the following questions correctly may suggest a concussion:
- “What venue are we at today?”
- “Which half is it now?”
- “Who scored last in this game?”
- “What team did you play last week / game?”
- “Did your team win the last game?”

15/ For a school doctor involved with pitch side management of concussion, there is a very detailed assessment tool, SCAT3 (see appendices), that helps to standardise the assessment and provides a useful guide to the process. It is intended for use by medical personnel only and can be used as part of a pre-season assessment as well as the acute evaluation of a potentially concussed pupil.

IF IN DOUBT, SIT THEM OUT
Management of a suspected concussion

Immediate management

16/ A pupil falls to the ground after a blow to the head.

• If he / she gets to their feet unaided immediately and appears fully conscious and orientated, then:

   He / she may continue as before the injury

• If he / she is unable to get up for a short period of time - 10 seconds or more - or appears confused or disorientated 2 minutes after the blow, then:

   He / she must stop playing and be checked by an appropriately trained medical professional

• If he / she is unconscious for 60 seconds or more or has retrograde amnesia (cannot remember the blow or the events leading up to it) as assessed by failure to answer all the following questions correctly:

   • “Which venue are we at today?”
   • “Which half is it?”
   • “Who scored last in the game?”
   • “What team did you play last week / game?”
   • “Did your team win the last game?”

and / or vomits on 2 or more occasions

and / or has a GCS (Glasgow Coma Scale) score of less than 15

   He / she must be transferred to hospital. Ring 999 for an ambulance and DO NOT DELAY for example by calling for a doctor or nurse

17/ If he / she is unconscious on the field, the game must stop and he / she should not be moved – except by appropriately trained medical personnel using a spinal stretcher.

18/ The pupil must be removed in a safe manner in accordance with emergency management procedures. If a cervical spine injury is suspected the player should only be removed by emergency healthcare professionals with appropriate spinal care training.

Concussion assessment

19/ A school doctor may be asked to see pupils to determine if they have a concussion several days after they have sustained the head injury. There may be limited time to make the assessment and in that situation carrying out a full SCAT3 is not feasible; also it is not how that assessment is designed to be used.

20/ It is suggested that a careful history is taken in order to establish the mechanism of the injury and that this is followed by an examination that focuses on particular points.

21/ The pupil should be asked to explain what happened in their own words and should move through the incident in a logical order, for example:

   • When did the injury happen?
• Whom were you playing?
• In which team were you playing?
• How far into the match did the injury happen?

22/ It is suggested further that the pupil explains exactly what they remember, for example: -
• Were you tackling or being tackled?
• Did the incident happen off the ball?
• What hit your head?
• Do you remember the impact or hitting the ground?
• How did you feel immediately afterwards?
• Did you have any blurred vision or changes to your colour vision?
• Did you feel nauseous, did you vomit?
• Did you have any problems with your balance or noises in your ears
• Were you confused at any time?
• Did you have a headache or any loss of consciousness?
• Can you remember everything that happened or are there any parts you can’t remember?
• Did you leave the pitch?
• What happened next (was the pocket SCAT3 administered by a doctor)?
• How were you 10, 30 and 60 minutes later? What about later that evening?
• Did you go to a hospital A&E department?
• Did you feel more irritable or emotional than usual?
• How well did you sleep that night and how did you feel the following morning?
• Did you notice any problems with your concentration or mood in the days afterwards?
• When did you feel completely back to normal from your point of view?

23/ In terms of examining the pupil, the key points to consider should be: -
• Fundoscopy, including checking the pupillary reflexes.
• Assessment of the eye movements including observing the presence / absence of nystagmus.
• Performing Romberg’s Test and a finger-to-nose test.

24/ The diagnosis of concussion is a clinical one and there is no one test that can definitively confirm or refute it. It can be difficult to diagnose and can present with an evolving collection of symptoms and signs over a number of days.

25/ Caution is advised therefore and if the school doctor is in any doubt, it is better to err on the side of making the diagnosis.

26/ Obviously a loss of consciousness associated with a head injury should be treated as concussion irrespective of any symptoms the pupil had after the event but these cases will only involve approximately ten per cent of those pupils with concussion.

**Concussion recognition and management within the school**

27/ Whilst the guidelines apply to all age groups, particular care needs to be taken with children and adolescents due to the potential dangers associated with concussion in the developing brain.
28/ The school doctor is often uniquely placed to raise awareness of these dangers within the school environment and to advise the school on an appropriate process to follow for pupils who have sustained a concussion.
29/ **Education of staff and pupils** about the signs and symptoms of concussion is the priority if the aim is to try and ensure that people feel able to report concussion. If everyone is aware of the symptoms, pupils are more likely to feel able to say to their friends that they have concerns about them in this regard.

30/ There are many [online education modules](https://example.com) run by different agencies that are useful for staff training (don’t forget to include the matrons), and the Irish RFU has produced some excellent videos for both junior and senior players, as well as parents, to help educate about concussion (See Further Information below)

31/ Once the diagnosis is made, it is important that there is a robust **chain of communication** for the **information** to be **passed to the school**. A pupil with concussion should **NOT** be relied upon to deliver the right message.

32/ If possible, an **electronic database for sports injuries** that is accessible to all staff should be available and failing that an email from the medical centre to house staff, coaches and rehab team should be used.

33/ It is recommended that there is a **single member of staff** responsible for co-ordinating the **graduated return to play (GRTP) process** and it is helpful to have a form that can be signed off - either electronically or in person - at each stage of the process. This will ensure that when the school doctor sees the pupil when he or she has finished the GRTP, it can be easily checked that the pupil has completed all the requisite stages.

34/ The gold standard management would be for a **doctor-assessment** at the point of **diagnosis**, after two weeks to clear the pupil to start the GRTP and then again to pass them as being fit to **return to contact sport**.

35/ However, this may have a significant impact on resources and may not be feasible. As an alternative it may be possible for **nursing staff** or a **physiotherapist** to pass the pupil as being fit to start the GRTP following an **agreed protocol** but it should always be left to a **doctor** to make the **final decision** about a pupil **being fit to return to contact**.

### Graduated return to play plan

36/ After assessment by the school doctor or GP to ensure that they are **symptom free**, and following a **minimum of a 14 day rest period**, pupils will be allowed to **start exercise** following a “**stepwise process**” adapted from the [Consensus Statement on Concussion in Sport: 4th International Conference on Concussion in Sport (Zurich November 2012)](https://example.com).

37/ If any **post-concussion symptoms** occur during this process, then the pupil should **drop back to the previous step** and try to **progress again after 48 hours**. This process can be shortened if supervised by a doctor with concussion management expertise.
Table 2: Stages in rehabilitation

<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>1 No physical activity or prolonged reading, use of television, computer etc. for minimum 14 days following injury</td>
<td>Complete physical and cognitive rest without symptoms</td>
<td>Recovery</td>
</tr>
<tr>
<td>2 Light aerobic exercise during 48 hr period</td>
<td>Walking, swimming or static bike, keeping intensity &lt;70% max. predicted heart rate. No resistance training. Symptom free for full 48 hour period</td>
<td>Increase heart rate</td>
</tr>
<tr>
<td>3 Sport-specific exercise during 48 hour period</td>
<td>Running drills, NO head impact activity. Symptom free for full 48 hour period</td>
<td>Add movement</td>
</tr>
<tr>
<td>4 Non-contact training drills during 48 hour period</td>
<td>Progression to more complex training drills e.g. passing drills. May start resistance training. Symptom-free for full 48 hour period</td>
<td>Exercise, coordination. And cognitive load</td>
</tr>
<tr>
<td>5 Full contact practice</td>
<td>Following medical clearance by school doctor / GP, can participate in normal training activities</td>
<td>Restore confidence and coaching staff to assess functional skills</td>
</tr>
<tr>
<td>6 After 48 hours return to play</td>
<td>Player rehabilitated</td>
<td>Recovered</td>
</tr>
</tbody>
</table>

Concussion and school studies

38/ Once the initial symptoms from the injury have settled, pupils should undertake a graded return to academic studies. Consideration should be given to a managed return to full school days and a gradual re-introduction of homework if appropriate.

39/ In a small number of cases, symptoms may be prolonged and this may impact on the pupil’s studies. In such cases early referral back to their GP and educational support service is advised. Special consideration may need to be applied for if this period overlaps with exams.

Further information

- Concussion Guidelines for the Education Sector June 2015: Sport + Recreation Alliance.
- World Rugby Concussion Management
  [http://playerwelfare.worldrugby.org/concussion](http://playerwelfare.worldrugby.org/concussion)
• England Rugby Headcase resources
  

• Irish RFU concussion videos for players, parents and coaches
  
  http://www.irishrugby.ie/concussion

• Consensus statement on concussion in sport: the 4th International Conference on
  Concussion in Sport held in Zurich, November 2012.
  
  http://bjsm.bmj.com/content/47/5/250.full

• Online Concussion Assessment Tool (SCAT3)
  
  http://bjsm.bmj.com/content/47/5/259.full.pdf

October 2015
(due revision October 2018)
Appendices

HEAD INJURY ACUTE MANAGEMENT SUPPORTING DOCUMENTS

Pocket CONCUSSION RECOGNITION TOOL

RECOGNIZE & REMOVE
Concussion should be suspected if one or more of the following visual clues, signs, symptoms or amnesia in memory questions are present:

1. Visual clues of suspected concussion
   Any one or more of the following visual clues can indicate a possible concussion:
   - Loss of consciousness or responsiveness
   - Unexplained falls or loss of balance
   - Unexplained or uncontrolled head movement
   - Dizziness
   - Nausea or vomiting
   - Numbness or tingling
   - Fatigue or low energy
   - Irritability
   - Anxiety or panic
   - “Don’t feel right”
   - Difficulty remembering

2. Signs and symptoms of suspected concussion
   Presence of any one or more of the following signs & symptoms may suggest a concussion:
   - Headache
   - Dizziness
   - Confusion
   - Feeling slowed down
   - Trouble with vision
   - Trouble with speech
   - Change in behavior
   - Change in mood or personality
   - sensitivity to noise
   - Difficulty concentrating

3. Memory function
   Failure to answer any of these questions correctly may suggest a concussion.
   - “What time is it today?”
   - “Which day is it today?”
   - “Who scored last in this game?”
   - “What team did you play last week/game?”
   - “Did your team win the last game?”

RED FLAGS
If any of the following are reported then the player should be safely and immediately removed from the field. If no qualified medical professional is available, consider transporting by ambulance for urgent medical assessment:

- Athlete complains of neck pain
- Increasing confusion or irritability
- Repeated vomiting
- Seizure or convulsion
- Weakness or tingling/burning in arms or legs
- Wheezing or choking
- Deteriorating conscious state
- Severe or increasing headache
- Unusual behaviour change
- Double vision

Remember:
- In all cases, the basic principles of first aid (dagger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the player (other than required for airway support) unless trained to do so.
- Do not remove helmet (if present) unless trained to do so.

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. 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. Pre-season 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 (dizziness, slow/shuffled movements, etc.)
- Disorientation or confusion (difficulty 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) | 1 |
| Eye opening in pain | 2 |
| Eye opening to speech | 3 |
| Eyes opening spontaneously | 4 |

| Best verbal response (V) | 1 |
| No verbal response | 1 |
| Incomprehensible sounds | 2 |
| Inappropriate words | 3 |
| Confused | 4 |
| Oriented | 5 |

| Best motor response (M) | 1 |
| No motor response | 1 |
| Extension to pain | 2 |
| Abnormal flexion to pain | 3 |
| Fixation-Withdrawal to pain | 4 |
| Localization to pain | 5 |
| Obey commands | 6 |

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

Maddocks Score1

“Am I 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? | 0 | 1 |
| Which half is it now? | 0 | 1 |
| Who scored last in this match? | 0 | 1 |
| What team did you play last week/game? | 0 | 1 |
| Did your team win the last game? | 0 | 1 |

Maddocks score

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.
For more MOSA guidelines have you considered becoming a MOSA member?

SCAT3 to be done in resting state. Best done 10 or more minutes post exercise.

SYMPTOM EVALUATION

How do you feel?

*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>Pressure in head</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>Address</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

self rated self rated and clinician monitored

Clinician interview self rated with parent input

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

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.

SCAT3 SPORT CONCUSSION ASSESSMENT TOOL 3 (PAGE 2) © 2013 Concussion in Sport Group
INSTRUCTIONS
Words in italics throughout the SCA3 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 be still be done in a resting state, at least 30 minutes post-exercise.
For total number of symptoms, maximum possible is 21.
For Symptom severity score, add all scores together, maximum possible is 21 x 2 = 42.

SAC*
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.”

Triage 2.6.5:
“I am going to repeat the same list again, repeat back as many words as you can remember in any order.”
Complete all 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 scores will be counted.

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 5-1-6, you would say 6-1-5.”
If correct, go to next string if incorrect, read trial 2. One point possible for each string correct. 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 sentence 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 have a few times earlier? Tell me as many words from the list as you can in any order.”
Score 1 pt. for each correct response.

Balance Examination
Modified Balance Error Scoring System (BESS) testing*
This balance testing is based on a modified version of the Balance Error Scoring System (BESS), a stopwatch or second hand timer is required for this testing.
“I am now going to test your balance. Please take your shoe, roll up your pant leg below your knee if possible, and remain as steady as possible while standing on your toes.”

(a) Double leg stance:
“The first stance is standing with your feet together with your hands on your hips and with your knees locked. 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. 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 do the same thing with your other foot. The dominant leg should be held at approximately 30 degrees 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 do not maintain your balance, 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:
“How would you walk if you were to walk along one line? 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 stop timing when you are set and have closed your eyes.”
Balance testing—types of errors
1. Hands/feet off/lose balance
2. Opening eyes
3. Step, stumble, or fall
4. Moving hip in >30 degrees abduction
5. Lifting/floor reaction or heel
6. Remaining out of test position

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 two 20-second tests. The maximum total number of errors for any single condition is 10. If a trial 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 has 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 stance can be performed on a surface of medium density foam (e.g., approximately 500g x 40cm x 60cm)

Tandem Gait
Participants are instructed to stand with their feet together behind a starting line (the test is best done with footwear removed). Then, they walk a forward direction as quickly and as accurately as possible along a 5m wide strip of tape. 1 point given with an alternate first heel-toe gait ensuring that they approximate their heel and toe on each step. Once they cross the end of the 5m line, they turn 180 degrees and return to the starting line using the same gait. A total of 4 trials are done and the best time is recorded. Athletes should complete the test in 14 seconds. Athletes fail the test if they stop 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, approximately.

Coordination Examination
Upper limb coordination
Finger-to-nose test (FTNT)
“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 fixed to 30 degrees elbow and fingers extended, finger in front of you. When I give a start signal, I would like you to perform the successive finger to nose repetitions using your index finger to touch the tip of your nose, then return to the starting position, as quickly and as accurately as possible.”

Solving: 4 correct repetitions in <4 seconds = 1 point
Note for athlete: Although neither hand nor their feet touch their nose, do not fully extend their elbow or do not perform repetitions. Failure should be scored as 0.

References & Footnotes
1. This tool has been developed by a group of international experts at the 4th International Concussion in Sport meeting on Concussion in Sport held in Zurich, Switzerland in November 2013. The full details of the conference outcomes and the authors of the tool are published in The BSS Injury Prevention and Health Protection, 2013, Volume 4, Issue 1. 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.
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 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 jerking 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 supervised program, with stages of progression.

For example:

<table>
<thead>
<tr>
<th>Rehabilitation stage</th>
<th>Functional exercise at each stage of progression</th>
<th>Objective of each stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No activity</td>
<td>Physical activity test</td>
<td>Recovery</td>
</tr>
<tr>
<td>Light exercise</td>
<td>Swimming, stationary cycling, walking, running</td>
<td>Increase heart rate</td>
</tr>
<tr>
<td>Sport-specific</td>
<td>Running, cutting, jumping, soccer</td>
<td>Add movement</td>
</tr>
<tr>
<td>Non-contact training</td>
<td>Progression to more complex training tasks</td>
<td>Return to play</td>
</tr>
<tr>
<td>Contact practice</td>
<td>Return to contact play</td>
<td>Normal game play</td>
</tr>
</tbody>
</table>

There should be at least 24 hours or (longer) for each stage and if symptoms recur the athlete should not 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.

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 behavior, 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