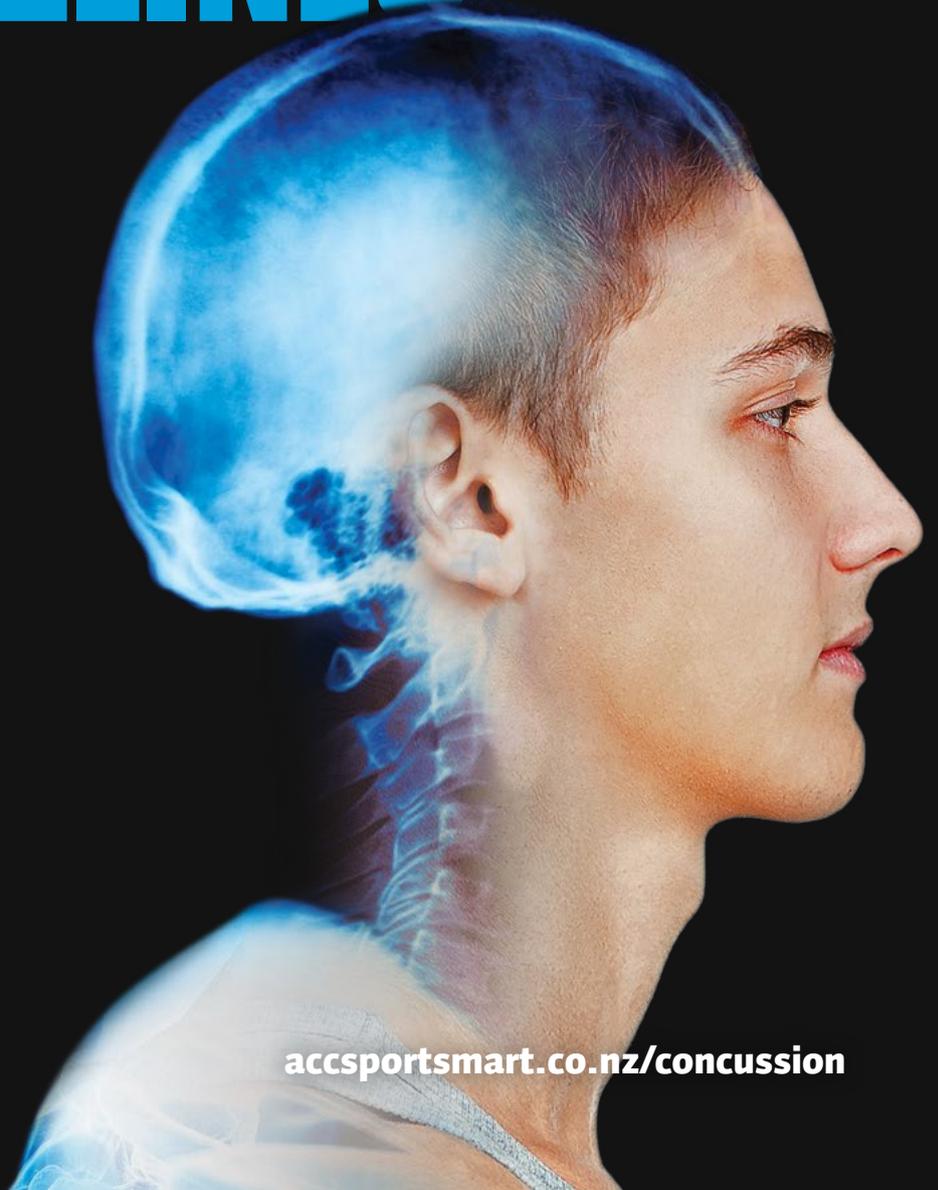


**ACC**  
*SportSmart*

# **SPORT CONCUSSION IN NEW ZEALAND NATIONAL GUIDELINES**



[accsportsmart.co.nz/concussion](https://accsportsmart.co.nz/concussion)

This guideline document has been produced to help National Sports Organisations (NSOs) and recreation, education and health sectors in their development of specific policy for concussion in sport.

These guidelines, produced by ACC in consultation with a panel of medical, sport and research experts, is based on the 2016 Berlin Consensus Statement[1] on Concussion in Sport.

These guidelines are intended to help people such as medical doctors, health providers, first aiders, coaches, trainers, athletes, parents, sports administrators and school teachers to understand the following:

- Why there is a need for concussion guidelines.
- What concussion is.
- How to recognise the signs and symptoms of concussion.
- What action to take when a concussion occurs, and how to get help.
- Who can assess and diagnose concussion (only a medical doctor).
- Why a management protocol for graduated return to school, work or sport is needed.
- How NSOs can develop a concussion policy and implementation plan.

Developed with our partners:



**NETBALL**  
NEW ZEALAND



**NEW ZEALAND**  
**RUGBY LEAGUE**



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## KEY MESSAGES

**National Concussion Guidelines** have been created because concussion is a serious injury to the brain and it occurs frequently in New Zealand. Concussion is a brain injury defined as a complex process affecting the brain, induced by biomechanical forces. Several common features that incorporate clinical, pathologic, and biomechanical injury constructs can be utilized in defining the nature of a concussive head injury.<sup>[1]</sup>

### Recognise and Remove

- If concussion is suspected, remove from play or activity immediately and seek urgent assessment by a medical doctor.
- Concussions often occur without loss of consciousness (only 10-20% lose consciousness).
- Extra caution is required for child and adolescent athletes.
- It may take several hours (or even days) post injury for some or all of the symptoms of concussion to emerge.
- Non-medical people have an important role to play in recognising the signs and symptoms of concussion. Concussion can present in a similar manner to other catastrophic conditions with delayed onset of symptoms.

### Refer

- Diagnosis can be very difficult to make and only a medical doctor can provide assessment and management for concussion.

### Rest, Recover, Return

- It is unanimously agreed that **no return** to sport or activity on the day of concussive injury should occur.<sup>[1]</sup>
- The effects of concussion can interfere with the athlete's ability to learn in the classroom or to function well at work. Return to school or work may need to happen gradually and demands altered as guided by an experienced medical practitioner. Return to school or work and social activities should be achieved before returning to sport or physical activities.
- Aerobic exercise, at a level which does not aggravate the patient's symptoms may have an important role in helping recovery. This should be progressed slowly in consultation with a medical doctor.
- Treatment appears to be most effective when initiated early.

## WHY WE NEED CONCUSSION GUIDELINES

Early recognition and appropriate treatment of concussion may improve outcomes.

### **Concussion is a serious injury that occurs frequently:**

- There are an estimated 36,000 head injuries in New Zealand per year.<sup>[2]</sup>
- 21% (7,350 per year) of all head injuries in New Zealand are sustained through sport related activity.<sup>[3]</sup> ACC only receive claims for 6,250 of those sports related concussion injuries suggesting that 1,100 currently go untreated.
- Between 2009-2013 sports related concussion claims with ACC totalled \$76 million.
- 46% (3,381 per year) of sports head injuries are classified as 'mild with a high risk of complications'. Injuries are most frequently sustained during rugby, cycling and equestrian activities.
- 11% of sports related concussion claimants had multiple concussions within a two-year period (2009-2013).
- Evidence shows that with repeat concussion people may experience a decline in general health and quality of life up to 10 years following injury.<sup>[4]</sup>

## DEFINITION OF CONCUSSION

Concussion is a brain injury defined as a complex process affecting the brain, induced by biomechanical forces. Several common features that incorporate clinical, pathologic, and biomechanical injury constructs can be utilized in defining the nature of a concussive head injury.

- Concussion may be caused either by a direct blow to the head, face, neck or elsewhere on the body with an “impulsive” force transmitted to the head.
- Concussion typically results in the rapid onset of short-lived impairment of neurologic function that resolves spontaneously. However in some cases, symptoms and signs may evolve over a number of minutes to hours.
- Concussion may result in neuropathological changes, but the acute clinical symptoms largely reflect a functional disturbance rather than a structural injury and as such, no abnormality is seen on standard structural neuroimaging studies.
- Concussion results in a graded set of clinical symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course. However, it is important to note that in some cases symptoms may be prolonged.

### **A laymen’s definition of concussion:**

Concussion is a brain injury that can occur in any sport, particularly where there is body contact. Concussion is caused by the impact of force (a blow) to a part of the body not necessarily the head directly.<sup>[1]</sup>

## RECOGNISE THE SIGNS AND SYMPTOMS OF CONCUSSION

Concussion presents with a range of signs and/or symptoms that may or **may not** include loss of consciousness.<sup>[1]</sup> It is important to remember that not every sign and symptom will be present in every case and signs and symptoms may have delayed onset.

### Memory (what they say)

- What venue are we at today?
  - Which half/quarter is it now?
  - Who scored last in this game?
  - What team did you play last week?
  - Did your team win the last game?
- Failure to answer any of these questions correctly could suggest concussion.**

### Physical signs (what you see)

- Loss of consciousness or non-responsive
- Lying on the ground not moving or slow to get up
- Loss of balance or co-ordination
- Dazed or vacant look
- Disorientated or confused
- Visible injury to face or head
- Grabbing or clutching head

### Clinical symptoms (what they feel)

- Blurred vision
- Neck pain
- Nausea
- Dizziness
- Confusion
- Sensitivity to light or noise
- Nervous or anxious
- Tired
- Irritability
- Headache or pressure in the head
- Drowsiness
- More emotional
- Problems with memory
- Reduced ability to think or concentrate
- Difficulty sleeping

### Red Flags (what requires hospitalisation)

- Complaints of neck pain
- Increasing confusion or irritability
- Repeated vomiting
- Seizure or convulsion
- Double vision
- Muscle weakness, tingling or burning in arms or legs
- Deteriorating conscious state
- Severe or increasing headache
- Unusual behaviour change

## REMOVE THE ATHLETE FROM PLAY

**It is important to take action when a concussion or possible concussion occurs. The most important steps in the early identification of concussion are to recognise a possible injury and remove the athlete from the sport/activity.**

**Use the Concussion Recognition Tool (CRT) to recognise concussion and remove the athlete from play.** A printable PDF of the pocket CRT can be downloaded at:

 <http://bjsm.bmj.com/content/51/11/872>

Non-medical personnel have an important role in observing possible concussion and its effects (e.g. behaviour/symptoms), and should take responsibility for removing the injured athlete from the sport or activity.

- In cases of uncertainty always adopt a conservative approach – **If in doubt sit them out.**
- Athletes with a suspected concussion should not be left alone and should not drive a motor vehicle.

### **To help an unconscious athlete:**

- Apply first aid principles – DRSABC (Danger, Response, Send for help, Airway, Breathing, Circulation).
- Treat all unconscious athletes as though they have a neck injury.
- An unconscious athlete must ONLY be moved by a medical professional trained in spinal immobilisation techniques.
- Call 111 if you are concerned about the risk of head or next injury as urgent hospital care is required.

## WHAT YOU SHOULD DO

- Recognise the signs and symptoms of concussion
- Remove the player from play
- Refer them to a medical doctor for assessment

## RECOGNISE THE SIGNS AND SYMPTOMS OF CONCUSSION

Concussion should be suspected if one or more of the following visible clues, signs, symptoms or errors in memory questions are present.

### 01 PHYSICAL SIGNS (WHAT YOU SEE)

- Loss of consciousness or non-responsive
- Disorientation/confusion
- Lying on the ground not moving or slow to get up
- Visible injury to face or head (especially in combination with any other signs)
- Loss of balance/co-ordination
- Grabbing/clutching of head
- Dazed or vacant look

### 02 MEMORY (WHAT THEY SAY)

Failure to answer any of these questions correctly may suggest a concussion.

“What venue are we at today?”

“Which half/quarter is it now?”

“Who scored last in this game?”

“What team did you play last week/game?”

“Did your team win the last game?”

### 03 CLINICAL SYMPTOMS (WHAT THEY FEEL)

If any of the following symptoms appear, concussion may be present.

- Blurred vision
- Irritability
- Neck pain
- Problems with memory
- Nausea
- Reduced ability to think/concentrate
- Dizziness
- Difficulty sleeping
- Confusion
- Sensitivity to light &/ or noise
- Nervous or anxious
- Fatigue
- Headache/pressure in the head
- Drowsiness/trouble sleeping
- More emotional

### 04 RED FLAGS (WHAT REQUIRES HOSPITALISATION)

If no qualified medical professional is available, consider transporting by ambulance for urgent medical assessment.

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

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## CONCUSSION RECOGNISING THE SIGNS.

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## REMOVE THE PLAYER FROM PLAY

Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, and should not be returned to activity until they are assessed medically.

- Apply first aid principles: **DRSABC** (Danger, Response, Send for help, Airway, Breathing, Circulation).
- Treat as though they have a **neck injury**.
- **ONLY be moved by a medical professional** trained in spinal immobilisation techniques.
- **Do not remove helmet** (if present) unless trained to do so.
- **Call 111** if there is concern regarding the risk of structural head or neck injury.

## REFER THEM TO A MEDICAL DOCTOR FOR ASSESSMENT

Anyone with a suspected head injury needs to see and be assessed by a medical doctor.

Only a qualified medical doctor can assess and diagnose a concussion. This is essential to confirm the diagnosis of concussion and to assess the risk for more serious injury.

It is useful to have a list of local medical doctors, concussion clinics and emergency departments close to where the sport/activity is being played.

## WHAT HAPPENS NEXT REST, RECOVER AND RETURN

It is unanimously agreed that no return to sport/activity on the day of concussive injury should occur.

**Rest** until symptom-free.

**Recover** by following your medical doctor's advice and gradually becoming more active.

**Return** to the full demands of your sport when fully recovered & cleared by your medical doctor.

It is important to note that different sports have different rules and return to play guidelines. Before returning it is important to check with your sports code on the rules for your sport.



[accsportsmart.co.nz/concussion](https://accsportsmart.co.nz/concussion)

Based on the Concussion Recognition Tool™ produced by the 2013 Concussion in Sport Group.

ACC7551 July 2017

## CONCUSSION RECOGNITION TOOL 5<sup>©</sup>

To help identify concussion in children, adolescents and adults



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### RECOGNISE & REMOVE

Head impacts can be associated with serious and potentially fatal brain injuries. The Concussion Recognition Tool 5 (CRT5) is to be used for the identification of suspected concussion. It is not designed to diagnose concussion.

#### STEP 1: RED FLAGS – CALL AN AMBULANCE

If there is concern after an injury including whether ANY of the following signs are observed or complaints are reported then the player should be safely and immediately removed from play/game/activity. If no licensed healthcare professional is available, call an ambulance for urgent medical assessment:

- Neck pain or tenderness
- Double vision
- Weakness or tingling/ burning in arms or legs
- Severe or increasing headache
- Seizure or convulsion
- Loss of consciousness
- Deteriorating conscious state
- Vomiting
- Increasingly restless, agitated or combative

#### Remember:

- In all cases, the basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Assessment for a spinal cord injury is critical.
- Do not attempt to move the player (other than required for airway support) unless trained to do so.
- Do not remove a helmet or any other equipment unless trained to do so safely.

If there are no Red Flags, identification of possible concussion should proceed to the following steps:

#### STEP 2: OBSERVABLE SIGNS

Visual clues that suggest possible concussion include:

- Lying motionless on the playing surface
- Slow to get up after a direct or indirect hit to the head
- Disorientation or confusion, or an inability to respond appropriately to questions
- Blank or vacant look
- Balance, gait difficulties, motor incoordination, stumbling, slow laboured movements
- Facial injury after head trauma

### STEP 3: SYMPTOMS

- Headache
- “Pressure in head”
- Balance problems
- Nausea or vomiting
- Drowsiness
- Dizziness
- Blurred vision
- Sensitivity to light
- Sensitivity to noise
- Fatigue or low energy
- “Don’t feel right”
- More emotional
- More Irritable
- Sadness
- Nervous or anxious
- Neck Pain
- Difficulty concentrating
- Difficulty remembering
- Feeling slowed down
- Feeling like “in a fog”

### STEP 4: MEMORY ASSESSMENT

(IN ATHLETES OLDER THAN 12 YEARS)

**Failure to answer any of these questions (modified appropriately for each sport) 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?”

#### **Athletes with suspected concussion should:**

- Not be left alone initially (at least for the first 1-2 hours).
- Not drink alcohol.
- Not use recreational/ prescription drugs.
- Not be sent home by themselves. They need to be with a responsible adult.
- Not drive a motor vehicle until cleared to do so by a healthcare professional.

The CRT5 may be freely copied in its current form for distribution to individuals, teams, groups and organisations. Any revision and any reproduction in a digital form requires approval by the Concussion in Sport Group. It should not be altered in any way, rebranded or sold for commercial gain.

**ANY ATHLETE WITH A SUSPECTED CONCUSSION SHOULD BE IMMEDIATELY REMOVED FROM PRACTICE OR PLAY AND SHOULD NOT RETURN TO ACTIVITY UNTIL ASSESSED MEDICALLY, EVEN IF THE SYMPTOMS RESOLVE**

## REFER THEM TO A MEDICAL DOCTOR FOR ASSESSMENT

### **Only a qualified medical doctor can assess and diagnose a concussion.**

Anyone with a suspected head injury needs to see and be assessed by a medical doctor. This is essential to confirm or exclude the diagnosis of concussion and to assess the risk for more serious injury. Medical doctors are also available at concussion clinics.

An athlete with any of the following should be referred to hospital urgently :

- Loss of consciousness or seizures.
- Persistent confusion.
- Deterioration after being injured – increased drowsiness, headache or vomiting.
- Report of neck pain or spinal cord symptoms – numbness, tingling, muscle weakness.

### **If at any time there is any doubt the athlete should be referred to a hospital.**

It is useful to have a list of local medical doctors, concussion clinics and emergency departments close to where the sport or activity is being played. A checklist of the appropriate services could include:

- Local doctors or medical centre.
- Local hospital emergency department.
- Ambulance services (111).

ACC endorses the Sport Concussion Assessment Tool version5 (SCAT5) and the Child-SCAT5 as a validated means of assessing concussion by a medical doctor. A printable PDF of SCAT5 can be downloaded at:

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

A printable PDF of Child-SCAT5 can be downloaded at:

 <http://bjsm.bmj.com/content/bjsports/early/2017/04/26/bjsports-2017-097492childscat5.full.pdf>

We recommend you become familiar with symptoms evaluated in SCAT5.

**The SCAT5 is NOT to be used for diagnosis of concussion alone. It provides a standardized assessment to aid diagnosis by a medical doctor.**

*NOTE: In some areas of the world, sports physiotherapists and other trained medical personnel can do the assessment (e.g., SCAT5), **but only a doctor can diagnose concussion.***

## How do you feel?

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

	none	mild		moderate		severe	
Headache	0	1	2	3	4	5	6
'Pressure in head'	0	1	2	3	4	5	6
Neck pain	0	1	2	3	4	5	6
Nausea or vomiting	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Blurred vision	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling like 'in a fog'	0	1	2	3	4	5	6
'Don't feel right'	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Fatigue or low energy	0	1	2	3	4	5	6
Confusion	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
More emotional	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervous or anxious	0	1	2	3	4	5	6

**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 their usual self?

Please circle one response:

no different

very different

unsure

N/A

## REST, RECOVER, RETURN.

### Concussion management involves a graduated return to school, work and sport protocol.

It is unanimously agreed that **no return** to sport/activity on the day of concussive injury should occur.<sup>[1]</sup>

Early concussion management involves physical and cognitive **rest** until the acute symptoms clear. When patients have more refractory symptoms (lasting more than 10 days) it is important to consider actively treating these. In some situations physical activity might be used as part of a treatment plan. This should be progressed by a doctor experienced with the management of concussion. Prolonged 'complete rest' should be avoided where possible.

**Recovery** from concussion involves a graduated return to activity protocol guided by a person trained in concussion management (such as a coach, trainer, teacher or parent) and under the supervision of a medical doctor. Athletes should have fully returned to school or work and social activities before returning to physical activity and sport.

Clearance by a medical doctor is required before **returning** to your sport or activity.

There is a lack of research to support the optimal period of time an athlete should be out of training and competition. Following is an example of a **graduated return to sport protocol** based on the best available evidence and expert experience.

Return to activity stage	Functional exercise at each stage of rehabilitation	Objective of each stage
<b>Symptom-limited activity</b>	Daily activities that do not provoke symptoms.	Gradual reintroduction of work/school activities.
<b>Light aerobic exercise</b>	Walking, swimming or stationary bike at a low to medium pace. No resistance training.	Increase heart rate.
<b>Sport specific exercise</b>	Running drills. No head impact activities.	Add movement.
<b>Non-contact training drills</b>	Progression to more complex training drills e.g. passing, drills. May start progressive resistance training.	Exercise, co-ordination and increased thinking.
<b>Full contact practice</b>	Following <b>clearance from medical doctor</b> , participate in normal training activities.	Restore confidence and assess functional skills by coaching staff.
<b>Return to Sport</b>	Normal sport.	Full return to sport.

## Summary

- It is unanimously agreed that no return to sport/activity on the day of concussive injury should occur.<sup>[1]</sup>
- It is important to note that different sports have different rules and return to play guidelines. Each individual international sports federation may have specific rules which must be considered (e.g. International Rugby Board rules for New Zealand Rugby).
- Return to activity should be particularly cautious where children and adolescents are concerned.
- The safety of the athlete is the priority and must NOT be compromised.
- The decision to return to school, work or restricted activity should always be made by a medical doctor.
- The decision of the timing to return to sport or clearance from restricted activity should always be made by a medical doctor.
- In some cases, concussion symptoms may be prolonged or graded activity may not be tolerated. Evaluation by a concussion specialist or clinic may be needed to decide if there are other aspects of the concussion that could respond to rehabilitation.

The following summary shows the roles and responsibilities for concussion management including the stages of identification, assessment and diagnosis, rehabilitation and return to sport.

▼	Responsibility	Tool	Education
<b>Recognise, Remove, Refer</b>	Everybody, especially referees, coaches, parents	ACC SportSmart concussion resources	General public, ambulance staff, first aiders
<b>Assessment &amp; diagnosis</b>	Medical doctors (GP, ED doc's, sports physicians)	SCAT-5 (SCAT-3) guided medical assessment and diagnosis	Medical doctors
<b>Rest</b>	Athlete & family	ACC SportSmart Concussion resources	Patients, parents, caregivers, teachers, coaches
<b>Recover. Rehabilitation &amp; management</b>	Athlete, physios, sports medics, occupational & physical therapists, coaches, parents, teachers, employers	SCAT-5 (SCAT-3) symptom checklist. Return to play graduated protocol	Everybody
<b>Return to work/ school/activity</b>	Medical doctors	SCAT-5 (SCAT-3) guided medical assessment and diagnosis	Medical doctors
<b>Sport training &amp; competition</b>	Athlete & coaches		

## **DEVELOP A POLICY AND IMPLEMENTATION PLAN**

It is suggested that National Sport Organizations (NSOs) and other relevant organisations develop a concussion policy and educate their members and community on how to implement the guidelines specific to their sport.

ACC has an expert panel available that can be consulted to review organisations' concussion policies, implementation plans and education material with the goal of ensuring a consistently high standard of care across New Zealand.

## REFERENCES

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It is intended to formally review this document prior to February 2019.



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