



## The Australian Society for Motorsports Medicine and Rescue

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### Race control

Welcome to 2012. I hope it has started well for you and that you have some entertaining motor sports planned for the coming months. This year I'm making some changes to the newsletter and maybe to the ASMMR in general. To start with, the newsletter will no longer be listing updated results from the major motor sports categories. It takes too long to put together and simply replicates what online sites, including the official ones, already do. Removing it should cut down on the length of the newsletter (sure) and focus attention on the higher yield items.

Secondly, I'm considering changing how the Society operates. Its title was originally developed somewhat tongue-in-cheek, but as a genuine attempt to make a point about how there is enough talent and experience in Australia to justify meaningful contribution to a national and international audience. However, the title "Australian Society for Motorsport Medicine and Rescue", while an accurate aspiration, may sound a little officious and overly academic. The Society should be maintained as an entity, but perhaps its role needs to be redefined. I'd be interested in any opinions regarding this issue and any suggestions on a more inclusive name and agenda.

One of the Society's aims is to encourage the exchange of experience and opinion between practitioners of motor sports rescue, whether they have years of experience or are attending their first event. So it's great to have Luke Bennett write a discussion paper on the tricky topic of return to competitive motor sports following a concussive injury and agree to have it published in the newsletter and on the website. It should generate a bit of useful discussion..

Good luck.

Matthew Mac Partlin

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## **Clinical review**

### **When to stop and when to go – the tricky issue of return to competitive motorsports following a concussive episode.**

**Matthew Mac Partlin**

Luke Bennett is a critical care doctor with extensive experience in motorsport medicine, having been involved in multiple circuit and off-road events, including Formula 1, World Rally Championship and the Australasian Safari Rally. He has put together a discussion paper on the difficulties in determining fitness to return to competition presented by the motorsport competitor who suffers a concussive event.

The management of all motorsport injuries includes both the actual treatment of the injury and the consideration of fitness to return to competition. This latter aspect, return to competition, has the potential for conflicts of interest, particularly for injuries that do not necessarily require transport to hospital yet may have implications that reach beyond the immediate period of contact in the medical centre. Concussion is one of these types of injury, where even though the patient may appear to have recovered completely and thus there may be pressure to return to competition as soon as possible, concern regarding issues such as the “second hit” syndrome and long term neurological sequelae should be forefront in the treating physician's mind.

Luke's review demonstrates that while concussion and post concussive syndromes and risks are well documented in medical literature, assessment and management guidelines largely relate to non-competitive trauma, such as falls, assault and motor vehicle accidents. Where sporting populations have been studied, the data are mostly drawn from contact sports such as American gridiron, hockey, rugby and boxing. These have resulted in sport specific return to play guidelines such as the Cantu<sup>1</sup>, Colorado<sup>2</sup> and Consensus Statement on Concussion in Sport guidelines<sup>3</sup>. Though it is tempting to extrapolate the conclusions and guidelines to the motor sport environment, there are significant differences in circumstance that blur the validity of doing so. Additionally, the aforementioned guidelines are mainly derived from expert opinion rather than evidence base.

Motorsports, almost by definition, involve high speed and dangerous mechanism incidents, which immediately exceed investigative and treatment thresholds used in civilian non-competitive management guidelines, such as the Canadian CT Head Rules. Additionally, the safety equipment used in motorsports, such as rollcages, helmets, HANS devices and trackside barriers, are characteristics not considered by these non-competitive incident guidelines.

Luke's paper mentions ImpACT (Immediate Post-Concussion Assessment and Cognitive Testing<sup>4</sup>), a computer based tool for assessing concussion in athletes<sup>5</sup>. Developed in the 1990s, it can be

applied to individuals and then used to track their cumulative neurocognitive risk and their recovery and fitness to return to competitive sport. Ideally, though not necessarily, a baseline assessment of the individual is made prior to any injury, which may be easier for a coach to do with a team he will be in contact with for a whole season, than for a clinician to do for a field of 30 – 40 competitors in a 3 day event. Testing takes 20 minutes, however its design is better suited to field sports where a player can be removed from play after a concussion related injury and be assessed in a clinic setting and where there is ample time to perform ongoing assessment and graded return to play. The average time to return to play is often 7 to 12 days. So it may be useful between motorsport events to assess a drivers readiness for the next round following a concussion injury, but may be less practical as an assessment during events. For more information, go to <http://impacttest.com/about/background>

The developers of ImPACT claim wide validation, though interestingly all of the papers quoted on the site have at least one of the developers as a main author. Trials conducted by independent investigators tend to be less glowing, pointing to the use of surrogate end-points in assessing the tool, rather than patient outcome<sup>6</sup>. They also question the assessment's ability to go beyond identifying potential neurocognitive deficit and have a meaningful influence on patient management.

While Luke draws attention to the lack of clear motor sport specific guidelines being a particular issue with multi-day endurance events, such as the Australasian Safari Rally in which a competitor injured on day one or two may seek to continue with the event if there are no further concussive features by day 4 or 5, it is still potentially a concerning issue for high pressure 3-day events such as the Formula 1, WRC, MotoGP or V8 Supercars. Though an episode of concussion generally excludes a driver from further competition in that round, drivers are rarely keen to be relegated to watching the race from the edge of the track following an incident that may have occurred during practice or qualifying. Particularly if there is not a perceived ongoing injury. Not only is there the competitive desire to re-engage, but there may also be pressure from the manufacturer team or from sponsors.

So, as Luke points out, finding clear advice on how to manage the potentially concussed motorsports competitor who is keen to rejoin the fray is not easy. At the end of his review, he suggests a set of guidelines that appear reasonable, based on what *is* known, while acknowledging their lack of context-specific evidence base. It is an area that perhaps would benefit from efforts made by agencies such as the Australian Institute for Motor Sport Safety (AIMSS) or the FIA Institute.

## References

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[www.impacttest.com/](http://www.impacttest.com/)

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## **Motorsport Safety and Rescue**

### **Discussion Paper: Return to Competition after Concussion**

Dr Luke Bennett

(November 2011)

#### **Introduction and Context**

Concussion and Mild Traumatic Brain Injury (see definitions below) are common in the motorsport environment, especially during motorcycle competition.

The international medical community is increasingly concerned about premature return to competition for any athlete at risk of repeated head injury. There are no clear guidelines on this matter from Motorcycling Australia or CAMS, although the issue is well managed at higher levels of motorsport such as in Formula One.

These issues are especially pertinent during multi-day endurance events such as the Australasian Safari. A competitor may typically suffer an unwitnessed blow to the head during a fall in a remote location, and be found by a fellow competitor with signs and symptoms meeting the criteria for concussion in the minutes after the incident. The history of any loss of consciousness can be very difficult to reliably ascertain.

This subset of patients often may not meet clinical criteria for a CT Scan of the head and therefore may not be medically evacuated to a secondary or tertiary hospital. Frequently they are observed in a small local hospital for a brief period and/or informally monitored in the service park by the event medical staff.

There may subsequently be significant pressures on event medical staff to sanction early return to competition, especially where a competitor has been rested for 24-48 hours and exhibits no symptoms or signs of neurological impairment.

#### **References and Acknowledgement**

The information presented here is extracted from the UpToDate clinical information database topic “Concussion and Mild Traumatic Brain Injury” – an evidence based summary compiled from comprehensive and current literature review.

Suggested guidelines draw upon multiple sources however largely reflect American Academy of Neurology parameters.

#### **Clinical Outline and Definitions**

*Concussion* is considered here as a subset at the lesser end of the spectrum of *mild traumatic brain*

*injury* (GCS 13-15 at about 30 minutes post injury).

The American Academy of Neurology defines concussion as a trauma-induced alteration in mental status that may or may not involve loss of consciousness. There have been a variety of summary and consensus documents over the past decade describing the functional syndrome of concussion as having features including direct or transmitted traumatic etiology, rapid onset, progressive and spontaneous resolution, and absence of gross structural changes on imaging studies. CNS disruption is considered to occur mostly at the histological and neurophysiological level.

Concussion has traditionally been graded on a three-point scale, although accepted definitions vary. The most important features of each concussion episode are (in increasing order of severity and clinical significance):

- transient signs of confusion and disorientation (see list below)
- presence or absence of amnesia
- presence or absence of loss of consciousness of any duration

Caution regarding return to competition is aimed at reducing the risks of:

- *further episodes of concussion*, to which any athlete in the early post-concussion phase may be more readily prone
- more serious *second impact* episodes, which, although rare and controversial, may have catastrophic neurological outcomes
- *cumulative neurological damage* over multiple episodes of concussion

For the purposes of this discussion regarding early return to motorsport competition, patients are assumed to have been cleared of any subsequent neurological emergencies or focal neurological deficits, and in most cases would not have met the clinical criteria for CT imaging.

### **Clinical Features of Concussion**

Signs and symptoms may evolve over minutes to hours after injury.

Symptoms may include headache, dizziness, nausea, vomiting.

The following clinical signs which may be present in the athlete with a concussion:

- vacant stare and delayed verbal expression
- distractibility and disorientation
- slurred or incoherent speech, gross incoordination
- emotional lability
- short term memory deficits
- loss of consciousness may or may not be present

Post concussion features (such as headache, dizziness and cognitive disturbances) may also evolve over days or weeks post-injury, and are beyond the scope of this discussion.

## **Suggested Clinical Approach to Head Injury for Australasian Safari**

### *1. Initial Neurological Assessment*

Neurological assessment at scene for focal deficits and features of concussion. This should include a mini-mental state examination and assessment for cerebellar signs and any period of amnesia.

Medical teams and/or FIV Controller need to specifically question co-competitors (on scene by radio or as soon as possible afterwards) to determine whether definitive loss of consciousness is/was present. Such bystander assessment may admittedly be problematic but should be actively sought nevertheless.

### *2. Disposition of Patient*

Transfer to secondary or tertiary hospital for CT Imaging and/or observation if any focal deficits or CT criteria exist.

Patients with isolated mild traumatic brain injury (GCS 13-15), including concussion, should be removed from competition immediately and observed as appropriate in local medical facility, service park or under supervision of family/crew with head injury advice.

### *3. Return to Competition*

In a small number of cases, return to competition within the event may be appropriate, see discussion below.

All other competitors (and the relevant sporting authority, usually Motorcycling Australia), should be advised on rest periods from competition as required.

## **Criteria for CT Brain Scan**

The Canadian CT Head Rules apply to the assessment of adults with mild traumatic head injury.

High risk of need for surgical intervention is associated with:

- GCS less than 15 at 2 hours post trauma
- suspicion of open, depressed or base of skull fracture
- two or more episodes of vomiting
- age over 65 years

Medium risk is also associated with:

- amnesia for more than 30 minutes pre-event
- dangerous mechanism

The latter will give the most problematic scope for subjective discussion. Examples given for dangerous mechanism of trauma in adults include fall from more than 1 metre, pedestrian struck by motor vehicle, passenger ejected from MVA. Obviously many (but not necessarily all) motocross competitors will fall into this category. The CHALICE criteria (for CT imaging in children) define dangerous traffic accidents at > 60 km/h.

Any anticoagulation or antiplatelet therapy should also be considered to increase the need for CT imaging, as would any focal neurological deficit or seizures (especially multiple).

Considerations for CT imaging of the brain are separate from any simultaneous concerns about clearance of the cervical spine, which is not considered here.

### **Suggested Approach to Return to Competition for Australasian Safari**

There are a number of published staged protocols, provocation tests and criteria for return to sporting competition, which are un-validated and also largely impractical for motorsport purposes. These protocols tend to be more conservative for adolescent athletes and are mostly based upon experience in contact field sports.

Nevertheless, common criteria include:

- immediate removal from competition upon suspicion or diagnosis of concussion
- no return to competition whilst any signs or symptoms of concussion are present
- loss of consciousness, prolonged amnesia or concussive symptoms, and multiple episodes of concussion mandate rest from competition

Therefore, *return to competition in the Australasian Safari might be considered for the following small subset of competitors* after concussion:

- all signs and symptoms of concussion completely resolved
- no loss of consciousness was recorded at the scene
- concussion symptoms lasted less than 30 minutes
- amnesia was brief or absent
- no other episodes of concussion during current event

Serial examinations should encompass full neurological (including cerebellar) assessment and at least mini-mental state and short term memory testing.

An aid to assessment may be a commercially available cognitive testing regimen (such as the ImPACT Test) which can be administered reliably on-event. It is impractical to collect baseline tests for all competitors at the grassroots level of motorsport, however post-injury tests can be used

against validated population baseline results and may give objective evidence for or against return to competition.

### **Further Considerations**

A break of at least 24-36 hours out of competition will be prudent in most cases even in milder cases of concussion. Extra caution should be applied to younger competitors in the 15-19 year age group in line with suggested guidelines for the developing adolescent brain.

The concept of a provocation test before return to competition is impractical in motorsport, but wherever possible *any returning competitor should be medically reassessed after the first stage of competition* on the day of return before being allowed to continue. For the Australasian Safari, this would typically be undertaken by an MIV crew in the mid-day service area.

Typically the competitor requesting return to competition will appear bright, well and clinically normal 24-48hrs post-concussion, and enthusiastic to resume. Exclusion from the event is NOT a wider safety issue ensuring that the competitor can undertake proper control of their vehicle, but rather a personal health precaution aimed at avoiding second impact concussion and cumulative neurological damage before the original insult has resolved. It will be important to communicate this to excluded competitors.

### **Guidelines on Rest From Competition**

Mild Head Injury or Concussion with high risk features:

- Multiple episodes of low grade concussion – one week
- Prolonged concussive features or amnesia – one week
- Brief loss of consciousness (seconds) – one week
  
- Multiple episodes of higher grade concussion – two weeks
- Prolonged loss of consciousness (minutes) – 2 weeks

In all cases competitors should be advised to defer competition and seek medical evaluation on return home if concussive or post-concussion features recur.

For the Mild, Moderate or Severe Head Injured patient evacuated to secondary or tertiary hospital, seek advice and follow-up from the treating neurosurgical team.



### **Motorsports news**

- Formula 1 kicks off in a few weeks in Melbourne, having finished testing in Jerez. For those who may be interested, the afterparty is planned to be at EVE nightclub in Southbank on

Sunday evening. So, if you happen to just be walking past and had nothing better to do ...

- The FIA was granted International Olympic Committee recognition in December. It is currently provisional and will last for 2 years. The FIA is taking steps to make the recognition permanent and will be advocating all FIA sanctioned events and agencies to adopt IOC sporting principles. Perhaps we'll see a motor sport category in future Olympic events.
- CAMS has restated its stance on race suit embroidery and the attachment of badges, which is all laid out in the FIA regulations. Might be getting out the stitch cutters.  
([http://www.cams.com.au/Publications/Speedread/Past\\_Editions/2011\\_Speedread/December\\_2011/Embroidery\\_of\\_Race\\_Suits\\_and\\_Apparel.aspx](http://www.cams.com.au/Publications/Speedread/Past_Editions/2011_Speedread/December_2011/Embroidery_of_Race_Suits_and_Apparel.aspx))



## Caught by the cameras



A couple of Monegasque spectators get some face time with Mikko Hirvonen during a spin on the Col-de-Turini night stage.

