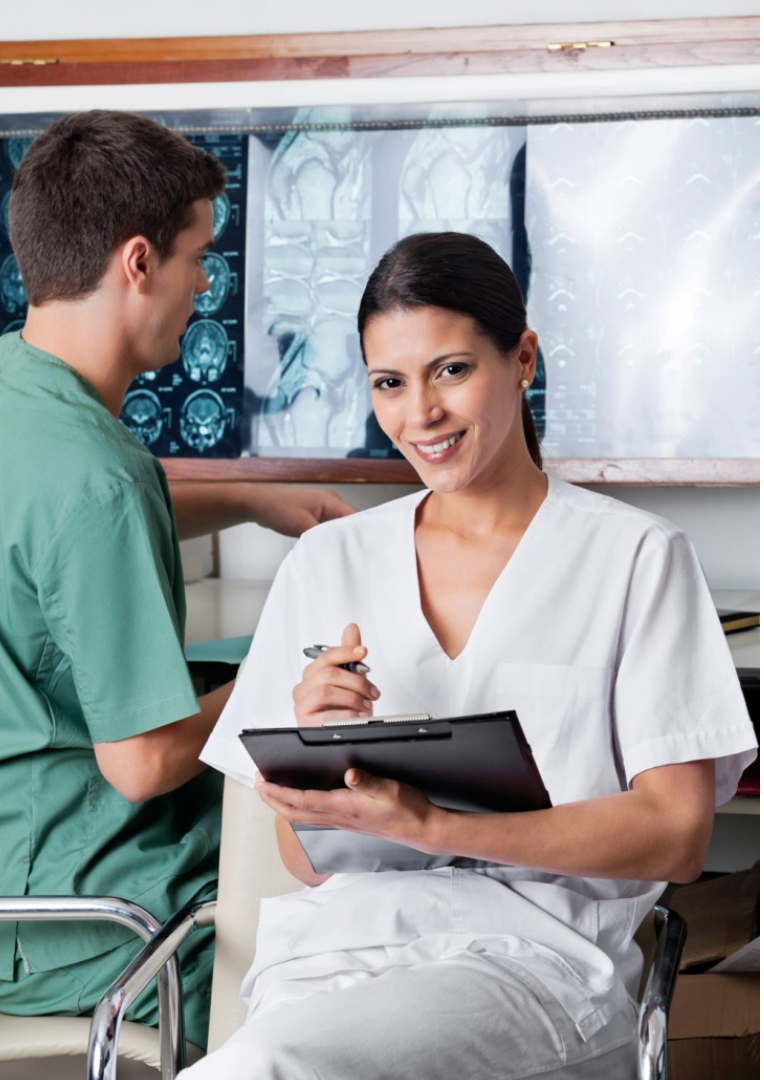


Concussion:
Issues for Rural Practitioners

David Maddocks LL.B. (Hons), Ph.D.

Overview

History / definitions of concussion

Concerns - long term effects - litigation

Assessment tools

Position statements

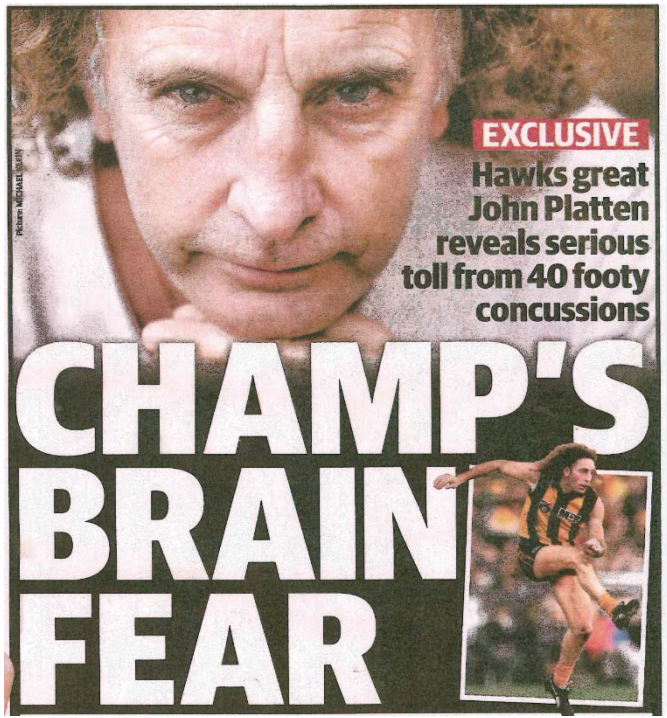
Reducing risk

Issues in rural areas?

Disclaimer

The information and observations conveyed in this presentation are provided in good faith and without warranties of any kind, either express or implied and should not be regarded as legal advice.

If you have specific legal questions, you should seek independent legal advice.


EXCLUSIVE
Hawks great John Platten reveals serious toll from 40 footy concussions
CHAMP'S BRAIN FEAR


erald Sun
"I had to make an important phone call, so I did and got told: 'Mate, we spoke for 20 minutes yesterday'
TIGER STAR RICHO TELLS
MY BRAIN FEARS
GRANT McARTHUR
MATTHEW Richardson has revealed he has suffered memory loss and fears his 282-game AFL career may have left him with brain injuries.
The Richmond Tiger champ has admitted worries about several hard hits to his head and concussions have caused him to question the legacy of his career since he quit in 2009.
CONTINUED PAGE 6

Historical Definitions

"The symptoms of concussion reflect suspension of function with recovery after a brief period"

(Syme 1856)

"The term concussion should only be used to indicate an essentially transient state …"

(Trotter 1924)

"A clinical syndrome characterised by immediate and transient impairment of neural function …"

(Congress of Neurological Surgeons 1966)

Voss v. Richardson

VFL / AFL Research 1980's

acute assessment

film

pre-morbid measures

hallmark features of concussion

tests

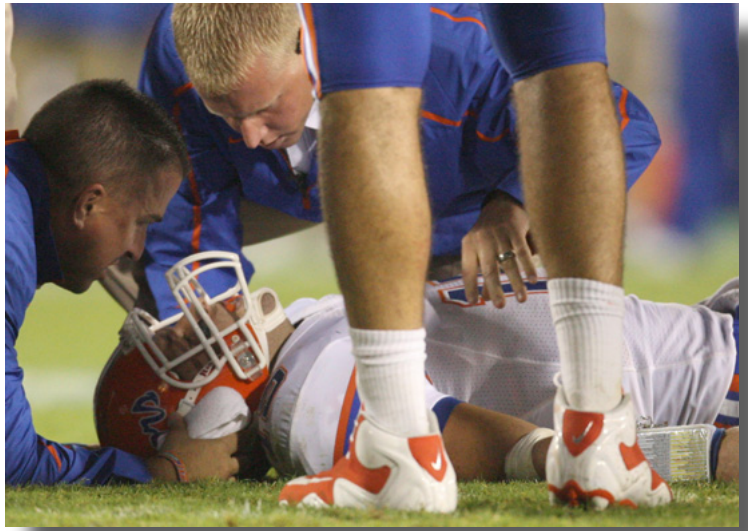
Data

- Age
- Educational History
- Occupational History
- Games played
- Concussive History
- Neuropsychological testing

Summary - results

- While performance on tests of reactions times and information processing were found to be reduced in the first days after injury, performance returned to normal levels in the first weeks after injury.

- There was no concern expressed at that time in the medical literature about possible long-term effects of concussion in the football codes.



September 30th, the *New York Times* reported on a telephone survey of over 1,000 former NFL players conducted by the University of Michigan's Institute for Social Research and commissioned by league which found, alarmingly, that former players were being diagnosed with Alzheimer's or similar memory-related diseases at a rate 19 times higher than the normal rate for men aged 30 through 49.

NFL litigation

- Former players alleged significant long-term medical problems following concussion/s
- On public record:
    - nature of the pleadings
    - claims of depression, psycho-social dysfunction, suicidality, CTE
    - damages

CTE

- Chronic Traumatic Encephalopathy (CTE) is a degenerative brain disease associated with a build-up of tau protein in the brain. It is believed to be associated with repetitive head trauma.
- It is a very rare condition and diagnosis can only be made at autopsy.
- It is a controversial condition that is still not well-understood.

NFL litigation

Allegations:

- failed to warn players of known risks
- concealed research findings
- encouraged to play through injury
- long term problems

Outcome …

NFL settlement

"The settlement does not represent, and cannot be considered, an admission by the NFL of liability, or an admission that plaintiffs' injuries were caused by football …"

Head injuries in sport

- Boxing
- Martial arts
- Football codes
- Motor sports
- Horse riding
- Skiing
- Cricket, Hockey, baseball

Head and brain injuries in sport

Sport	Rate/1000 participation hrs
Horse racing (Amateur)	95.2
Horse racing (Jumps)	25
Horse racing (Flat)	17.1
Boxing (professional)	13.2
Australian football	4.2
Rugby union	3.9
Soccer football (NCAA)	1.7
Ice Hockey (NHL)	1.5
Soccer football (FIFA)	0.4
NFL football (NFL)	0.2

Other litigation

- National Hockey League
- National Collegiate Athletics Association
- World Wrestling Entertainment
- National Rugby League

…

Australia – reported concerns

Greg Williams
John Platten
Daniel Bell
Dean Kemp
Chad Rintoul
Heritier Lumumba
…
Justin Clark, Sean Dempster, Leigh Adams, Sam Blease, Matt Maguire …

Medico-legal issues

Legal concepts that might apply if litigation was issued by a player or former player:

- Causation
- State of knowledge

Causation issues

Medical issues & other possible factors:

- depression, dementia, suicidality, brain pathology …
- generalisation from other sports?
- pre-morbid issues, drugs/alcohol, genetic factors? etc.
- coping with life after professional career

Evidentiary issues

- Doctor's evidence …
- Player's evidence …
- Would have acted differently?
- Voluntary assumption of risk

Diagnosis

Physical signs (e.g. loss of consciousness)

Symptoms

- somatic (e.g. headache, dizziness …)
- cognitive (e.g. disorientation)
- emotional symptoms (e.g. lability)

Behavioural change (e.g. irritability)

Cognitive impairment (e.g. slowed reaction times …)

Loss of consciousness

Only 10 - 30% concussions have LOC

LOC has NO prognostic significance

LOC has no effect on:

- neuropsychological deficit
- return to play
- future injury risk

Concussion Assessment Tools

- Sports Concussion Assessment Tool (SCAT 5)
- Standardized Assessment of Concussion (SAC)
- Acute Concussion Evaluation (ACE)
- ImPACT

…

SCAT5®

SPORT CONCUSSION ASSESSMENT TOOL – 5TH EDITION

DEVELOPED BY THE CONCUSSION IN SPORT GROUP

FOR USE BY MEDICAL PROFESSIONALS ONLY

supported by

FIFA · IOC · FEI

Patient details

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date of Injury: _____ Time: _____

WHAT IS THE SCAT5?

The SCAT5 is a standardized tool for evaluating concussions designed for use by physicians and licensed healthcare professionals[1]. The SCAT5 cannot be performed correctly in less than 10 minutes.

If you are not a physician or licensed healthcare professional, please use the Concussion Recognition Tool 5 (CRT5). The SCAT5 is to be used for evaluating athletes aged 13 years and older. For children aged 12 years or younger, please use the Child SCAT5.

Preseason SCAT5 baseline testing can be useful for interpreting post-injury test scores, but is not required for that purpose.Detailed instructions for use of the SCAT5 are provided on page 7. Please read through these instructions carefully before testing the athlete. Brief verbal instructions for each test are given in italics. The only equipment required for the tester is a watch or timer.

This tool may be freely copied in its current form for distribution to individuals, teams, groups and organizations. It should not be altered in any way, re-branded or sold for commercial gain. Any revision, translation or reproduction in a digital form requires specific approval by the Concussion in Sport Group.

Recognise and Remove

A head impact by either a direct blow or indirect transmission of force can be associated with a serious and potentially fatal brain injury. If there are significant concerns, including any of the red flags listed in Box 1, then activation of emergency procedures and urgent transport to the nearest hospital should be arranged.

Key points

- Any athlete with suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration. No athlete diagnosed with concussion should be returned to play on the day of injury.
- If an athlete is suspected of having a concussion and medical personnel are not immediately available, the athlete should be referred to a medical facility for urgent assessment.
- Athletes with suspected concussion should not drink alcohol, use recreational drugs and should not drive a motor vehicle until cleared to do so by a medical professional.
- Concussion signs and symptoms evolve over time and it is important to consider repeat evaluation in the assessment of concussion.
- The diagnosis of a concussion is a clinical judgment, made by a medical professional. The SCAT5 should NOT be used by itself to make, or exclude, the diagnosis of concussion. An athlete may have a concussion even if their SCAT5 is "normal".

Remember:

- The basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the athlete (other than that required for airway management) unless trained to do so.
- Assessment for a spinal cord injury is a critical part of the initial on-field assessment.
- Do not remove a helmet or any other equipment unless trained to do so safely.

1

IMMEDIATE OR ON-FIELD ASSESSMENT

The following elements should be assessed for all athletes who are suspected of having a concussion prior to proceeding to the neurocognitive assessment and ideally should be done on-field after the first first aid / emergency care priorities are completed.

If any of the "Red Flags" or observable signs are noted after a direct or indirect blow to the head, the athlete should be immediately and safely removed from participation and evaluated by a physician or licensed healthcare professional.

Consideration of transportation to a medical facility should be at the discretion of the physician or licensed healthcare professional.

The GCS is important as a standard measure for all patients and can be done serially if necessary in the event of deterioration in conscious state. The Maddocks questions and cervical spine exam are critical steps of the immediate assessment; however, these do not need to be done serially.

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date: _____

STEP 1: RED FLAGS

RED FLAGS:

- 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

STEP 2: OBSERVABLE SIGNS

Witnessed ☐ Observed on Video ☐

Lying motionless on the playing surface	Y	N
Balance / gait difficulties / motor incoordination: stumbling, slow / laboured movements	Y	N
Disorientation or confusion, or an inability to respond appropriately to questions	Y	N
Blank or vacant look	Y	N
Facial injury after head trauma	Y	N

STEP 3: MEMORY ASSESSMENT MADDOCKS QUESTIONS[2]

"I am going to ask you a few questions, please listen carefully and give your best effort. First, tell me what happened?"

Mark Y for correct answer / N for incorrect

What venue are we at today?	Y	N
Which half is it now?	Y	N
Who scored last in this match?	Y	N
What team did you play last week / game?	Y	N
Did your team win the last game?	Y	N

Note: Appropriate sport-specific questions may be substituted.

STEP 4: EXAMINATION GLASGOW COMA SCALE (GCS)[3]

Time of assessment			
Date of assessment			
Best eye response (E)			
No eye opening	1	1	1
Eye opening in response to pain	2	2	2
Eye opening to speech	3	3	3
Eyes opening spontaneously	4	4	4
Best verbal response (V)			
No verbal response	1	1	1
Incomprehensible sounds	2	2	2
Inappropriate words	3	3	3
Confused	4	4	4
Oriented	5	5	5
Best motor response (M)			
No motor response	1	1	1
Extension to pain	2	2	2
Abnormal flexion to pain	3	3	3
Flexion / Withdrawal to pain	4	4	4
Localizes to pain	5	5	5
Obeys commands	6	6	6
Glasgow Coma score (E + V + M)			

CERVICAL SPINE ASSESSMENT

Does the athlete report that their neck is pain free at rest?	Y	N
If there is NO neck pain at rest, does the athlete have a full range of ACTIVE pain free movement?	Y	N
Is the limb strength and sensation normal?	Y	N

In a patient who is not lucid or fully conscious, a cervical spine injury should be assumed until proven otherwise.

OFFICE OR OFF-FIELD ASSESSMENT

Please note that the neurocognitive assessment should be done in a distraction-free environment with the athlete in a resting state.

STEP 1: ATHLETE BACKGROUND

Sport / team / school: _____

Date / time of injury: _____

Years of education completed: _____

Age: _____

Gender: M / F / Other

Dominant hand: left / neither / right

How many diagnosed concussions has the athlete had in the past?: _____

When was the most recent concussion?: _____

How long was the recovery (time to being cleared to play) from the most recent concussion?: _____ (days)

Has the athlete ever been:

Hospitalized for a head injury?	Yes	No
Diagnosed / treated for headache disorder or migraines?	Yes	No
Diagnosed with a learning disability / dyslexia?	Yes	No
Diagnosed with ADD / ADHD?	Yes	No
Diagnosed with depression, anxiety or other psychiatric disorder?	Yes	No

Current medications? If yes, please list:

_____

_____

_____

_____

_____

_____

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date: _____

2

STEP 2: SYMPTOM EVALUATION

The athlete should be given the symptom form and asked to read this instruction paragraph out loud then complete the symptom scale. For the baseline assessment, the athlete should rate his/her symptoms based on how he/she typically feels and for the post-injury assessment the athlete should rate their symptoms at this point in time.

Please Check: ☐ **Baseline** ☐ **Post-injury**

Please hand the form to the athlete

	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
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
Trouble falling asleep (if applicable)	0	1	2	3	4	5	6
Total number of symptoms:							of 22
Symptom severity score							of 132

Do your symptoms get worse with physical activity?	Y	N
Do your symptoms get worse with mental activity?	Y	N

If '100% is feeling perfectly normal, what percent of normal do you feel?' _____

If not 100%, why? _____

_____

_____

_____

Please hand form back to examiner

3

STEP 3: COGNITIVE SCREENING

Standardised Assessment of Concussion (SAC)*

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
What time is it right now? (within 1 hour)	0	1
Orientation score		of 5

IMMEDIATE MEMORY

The Immediate Memory component can be completed using the traditional 5-word per trial list or optionally using 10-words per trial to minimise any ceiling effect. All 3 trials must be administered irrespective of the number correct on the first trial. Administer at the rate of one word per second.

Please choose EITHER the 5 or 10 word list groups and circle the specific word list chosen for this test.

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. For 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.

List	Alternate 5 word lists					Score (of 5) Trial 1	Trial 2	Trial 3
A	Finger	Penny	Blanket	Lemon	Insect			
B	Candle	Paper	Sugar	Sandwich	Wagon			
C	Baby	Monkey	Perfume	Sunset	Iron			
D	Elbow	Apple	Carpet	Saddle	Bubble			
E	Jacket	Arrow	Pepper	Cotton	Movie			
F	Dollar	Honey	Mirror	Saddle	Anchor			
					Immediate Memory Score			of 15
					Time that last trial was completed			

List	Alternate 10 word lists					Score (of 10) Trial 1	Trial 2	Trial 3
G	Finger	Penny	Blanket	Lemon	Insect			
	Candle	Paper	Sugar	Sandwich	Wagon			
H	Baby	Monkey	Perfume	Sunset	Iron			
	Elbow	Apple	Carpet	Saddle	Bubble			
I	Jacket	Arrow	Pepper	Cotton	Movie			
	Dollar	Honey	Mirror	Saddle	Anchor			
					Immediate Memory Score			of 30
					Time that last trial was completed			

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date: _____

CONCENTRATION

DIGITS BACKWARDS

Please circle the Digit list chosen (A, B, C, D, E, F). Administer at the rate of one digit per second reading DOWN the selected column.

I am going to read a string of numbers and when I am done, you repeat them back to me in reverse order of how I read them to you. For example, if I say 7-1-9, you would say 9-1-7.

Concentration Number Lists (circle one)

List A	List B	List C			
4-9-3	5-2-6	1-4-2	Y	N	0
6-2-9	4-1-5	6-5-8	Y	N	1
3-8-1-4	1-7-5-3	6-8-3-1	Y	N	0
3-2-7-9	4-9-6-8	3-4-8-1	Y	N	1
6-2-9-7-1	4-8-5-2-7	4-9-1-6-3	Y	N	0
1-5-3-8-6	6-1-8-4-3	6-8-2-5-1	Y	N	1
7-1-8-4-9-2	8-2-1-9-6-4	3-7-6-5-1-9	Y	N	0
5-9-1-4-8	7-2-4-8-5-6	9-2-6-5-1-4	Y	N	1
List D	**List E**	**List F**			
7-8-2	3-8-2	2-7-1	Y	N	0
9-2-6	5-1-8	4-7-9	Y	N	1
4-1-8-3	2-7-9-3	1-6-8-3	Y	N	0
9-7-2-3	2-1-4-8	3-9-2-4	Y	N	1
1-7-9-2-5	6-1-8-4-5	2-6-7-5-8	Y	N	0
8-1-7-5-2	9-4-1-7-5	8-3-9-6-4	Y	N	1
2-6-4-8-1-7	6-9-7-3-8-2	5-8-6-2-4-9	Y	N	0
8-4-1-9-3-5	6-2-7-9-3-8	3-1-7-8-2-6	Y	N	1
		Digits Score:			of 6

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.

Dec - Nov - Oct - Sept - Aug - Jul - Jun - May - Apr - Mar - Feb - Jan 0 1

Months Score of 1

Concentration Total Score (Digits + Months) of 5

4

STEP 4: NEUROLOGICAL SCREEN

See the instruction sheet (page 7) for details of test administration and scoring of the tests.

Can the patient read aloud (e.g. symptom check-list) and follow instructions without difficulty?	Y	N
Does the patient have a full range of pain-free PASSIVE cervical spine movement?	Y	N
Without moving their head or neck, can the patient look side-to-side and up-and-down without double vision?	Y	N
Can the patient perform the finger nose coordination test normally?	Y	N
Can the patient perform tandem gait normally?	Y	N

BALANCE EXAMINATION

Modified Balance Error Scoring System (mBESS) testing[2]

Which foot was tested (i.e. which is the non-dominant foot) ☐ Left ☐ Right

Testing surface (hard floor, field, etc.) _____

Footwear (shoes, barefoot, braces, tape, etc.) _____

Condition	Errors
Double leg stance	of 10
Single leg stance (non-dominant foot)	of 10
Tandem stance (non-dominant foot at the back)	of 10
Total Errors	of 30

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date: _____

5

STEP 5: DELAYED RECALL:

The delayed recall should be performed after 5 minutes have elapsed since the end of the Immediate Recall section. Score 1 pt. for each correct response.

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.

Time Started _____

Please record each word correctly recalled. Total score equals number of words recalled.

_____

_____

_____

Total number of words recalled accurately: of 5 or of 10

6

STEP 6: DECISION

Domain	Date & time of assessment:		
Symptom number (of 22)			
Symptom severity score (of 132)			
Orientation (of 5)			
Immediate memory	of 15 of 30	of 15 of 30	of 15 of 30
Concentration (of 5)			
Neuro exam	Normal Abnormal	Normal Abnormal	Normal Abnormal
Balance errors (of 30)			
Delayed Recall	of 5 of 10	of 5 of 10	of 5 of 10

Date and time of injury: _____

If the athlete is known to you prior to their injury, are they different from their usual self?
☐ **Yes** ☐ **No** ☐ **Unsure** ☐ **Not Applicable**
(If different, describe why in the clinical notes section)

Concussion Diagnosed?
☐ **Yes** ☐ **No** ☐ **Unsure** ☐ **Not Applicable**

If re-testing, has the athlete improved?
☐ **Yes** ☐ **No** ☐ **Unsure** ☐ **Not Applicable**

I am a physician or licensed healthcare professional and I have personally administered or supervised the administration of this SCAT5.

Signature: _____

Name: _____

Title: _____

Registration number (if applicable): _____

Date: _____

SCORING ON THE SCAT5 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.

HEADS UP CLINICIANS

Acute Concussion Evaluation (ACE)

Physician/Clinician Office Version

Gerard Gioia, PhD[1] & Micky Collins, PhD[2]
[1]Children's National Medical Center
[2]University of Pittsburgh Medical Center

Patient Name:_____
DOB: _____ Age:_____
Date:_____ ID/MR#_____

A. Injury Characteristics Date/Time of Injury_____ Reporter: __Patient __Parent __Spouse __Other_____

1. **Injury Description** _____

1a. Is there evidence of a forcible blow to the head (direct or indirect)? __Yes __No __Unknown
1b. Is there evidence of intracranial injury or skull fracture? __Yes __No __Unknown
1c. Location of Impact: __Frontal __Lft Temporal __Rt Temporal __Lft Parietal __Rt Parietal __Occipital __Neck __Indirect Force
2. **Cause:** __MVC __Pedestrian-MVC __Fall __Assault __Sports (*specify*)_____ __Other_____
3. **Amnesia Before (Retrograde)** Are there any events just BEFORE the injury that you/ person has no memory of (even brief)? __Yes __No Duration
4. **Amnesia After (Anterograde)** Are there any events just AFTER the injury that you/ person has no memory of (even brief)? __Yes __No Duration
5. **Loss of Consciousness:** Did you/ person lose consciousness? __Yes __No Duration
6. **EARLY SIGNS:** __Appears dazed or stunned __Is confused about events __Answers questions slowly __Repeats Questions __Forgetful (recent info)
7. **Seizures:** Were seizures observed? No__ Yes___ Detail_____

B. Symptom Check List* Since the injury, has the person experienced any of these symptoms any more than usual today or in the past day?
Indicate presence of each symptom (0=No, 1=Yes). **Lovell & Collins, 1998 JHTR*

PHYSICAL (10)		COGNITIVE (4)		SLEEP (4)		
Headache	0 1	Feeling mentally foggy	0 1	Drowsiness	0 1	
Nausea	0 1	Feeling slowed down	0 1	Sleeping less than usual	0 1	N/A
Vomiting	0 1	Difficulty concentrating	0 1	Sleeping more than usual	0 1	N/A
Balance problems	0 1	Difficulty remembering	0 1	Trouble falling asleep	0 1	N/A
Dizziness	0 1	**COGNITIVE Total (0-4)** ____		**SLEEP Total (0-4)** ____		
Visual problems	0 1	**EMOTIONAL (4)**				
Fatigue	0 1	Irritability	0 1			
Sensitivity to light	0 1	Sadness	0 1			
Sensitivity to noise	0 1	More emotional	0 1			
Numbness/Tingling	0 1	Nervousness	0 1			
PHYSICAL Total (0-10) ____		**EMOTIONAL Total (0-4)** ____				
(Add Physical, Cognitive, Emotion, Sleep totals) Total Symptom Score (0-22) ____						

Exertion: Do these symptoms worsen with:
Physical Activity __Yes __No __N/A
Cognitive Activity __Yes __No __N/A

Overall Rating: How different is the person acting compared to his/her usual self? (circle)
Normal 0 1 2 3 4 5 6 Very Different

C. Risk Factors for Protracted Recovery *(check all that apply)*

Concussion History? Y____ N____	√	Headache History? Y____ N____	√	Developmental History	√	Psychiatric History
Previous # 1 2 3 4 5 6+		Prior treatment for headache		Learning disabilities		Anxiety
Longest symptom duration Days__ Weeks__ Months__ Years__		History of migraine headache __ Personal __ Family_____		Attention-Deficit/ Hyperactivity Disorder		Depression
						Sleep disorder
If multiple concussions, less force caused reinjury? Yes__ No__				Other developmental disorder_____		Other psychiatric disorder _____

List other comorbid medical disorders or medication usage (e.g., hypothyroid, seizures)_____

D. RED FLAGS for acute emergency management: Refer to the emergency department with sudden onset of any of the following:

* Headaches that worsen	* Looks very drowsy/ can't be awakened	* Can't recognize people or places	* Neck pain
* Seizures	* Repeated vomiting	* Increasing confusion or irritability	* Unusual behavioral change
* Focal neurologic signs	* Slurred speech	* Weakness or numbness in arms/legs	* Change in state of consciousness

E. Diagnosis (ICD): __Concussion w/o LOC 850.0 __Concussion w/ LOC 850.1 __Concussion (Unspecified) 850.9 __Other (854) _____
__No diagnosis

F. Follow-Up Action Plan **Complete *ACE Care Plan* and provide copy to patient/family.**
___ **No Follow-Up Needed**
___ **Physician/Clinician Office Monitoring**: Date of next follow-up _____
___ **Referral:**
___ Neuropsychological Testing
___ Physician: Neurosurgery____ Neurology____ Sports Medicine____ Physiatrist____ Psychiatrist____ Other_____
___ Emergency Department

ACE Completed by:_____

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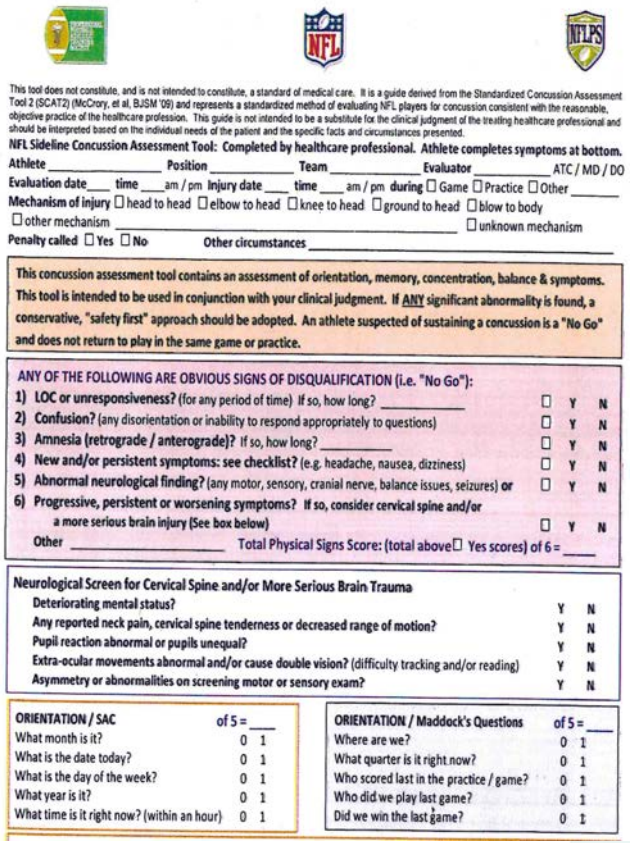
This form is part of the "Heads Up: Brain Injury in Your Practice" tool kit developed by the Centers for Disease Control and Prevention (CDC).

NFL



This tool does not constitute, and is not intended to constitute, a standard of medical care. It is a guide derived from the Standardized Concussion Assessment Tool 2 (SCAT2) (McCrory, et al, BJSM '09) and represents a standardized method of evaluating NFL players for concussion consistent with the reasonable, objective practice of the healthcare profession. This guide is not intended to be a substitute for the clinical judgment of the treating healthcare professional and should be interpreted based on the individual needs of the patient and the specific facts and circumstances presented.

NFL Sideline Concussion Assessment Tool: Completed by healthcare professional. Athlete completes symptoms at bottom.

Athlete _____ **Position** _____ **Team** _____ **Evaluator** _____ ATC / MD / DO

Evaluation date ___ **time** ___ am / pm **Injury date** ___ **time** ___ am / pm **during** ☐ Game ☐ Practice ☐ Other _____

Mechanism of injury ☐ head to head ☐ elbow to head ☐ knee to head ☐ ground to head ☐ blow to body

☐ other mechanism _____ ☐ unknown mechanism

Penalty called ☐ Yes ☐ No **Other circumstances** _____

This concussion assessment tool contains an assessment of orientation, memory, concentration, balance & symptoms. This tool is intended to be used in conjunction with your clinical judgment. If ANY significant abnormality is found, a conservative, "safety first" approach should be adopted. An athlete suspected of sustaining a concussion is a "No Go" and does not return to play in the same game or practice.

ANY OF THE FOLLOWING ARE OBVIOUS SIGNS OF DISQUALIFICATION (i.e. "No Go"):

1)	**LOC or unresponsiveness?** (for any period of time) If so, how long? _____	☐ Y	N
2)	**Confusion?** (any disorientation or inability to respond appropriately to questions)	☐ Y	N
3)	**Amnesia (retrograde / anterograde)?** If so, how long? _____	☐ Y	N
4)	**New and/or persistent symptoms: see checklist?** (e.g. headache, nausea, dizziness)	☐ Y	N
5)	**Abnormal neurological finding?** (any motor, sensory, cranial nerve, balance issues, seizures) **or**	☐ Y	N
6)	**Progressive, persistent or worsening symptoms? If so, consider cervical spine and/or a more serious brain injury (See box below)**	☐ Y	N

Other _____ Total Physical Signs Score: (total above ☐ Yes scores) of 6 = ____

Neurological Screen for Cervical Spine and/or More Serious Brain Trauma

Deteriorating mental status?	Y	N
Any reported neck pain, cervical spine tenderness or decreased range of motion?	Y	N
Pupil reaction abnormal or pupils unequal?	Y	N
Extra-ocular movements abnormal and/or cause double vision? (difficulty tracking and/or reading)	Y	N
Asymmetry or abnormalities on screening motor or sensory exam?	Y	N

ORIENTATION / SAC	of 5 = ___
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
What time is it right now? (within an hour)	0 1

ORIENTATION / Maddock's Questions	of 5 = ___
Where are we?	0 1
What quarter is it right now?	0 1
Who scored last in the practice / game?	0 1
Who did we play last game?	0 1
Did we win the last game?	0 1

25 Year Follow-Up Research

Aims:

1. Determine the long term impact of concussion on cognitive function.

2. Identify any other factors that may contribute to cognitive, emotional and behavioural symptoms reported by retired footballers.

Measures include

- Cognitive tests
- Depression, Anxiety, Stress Scales
- WHO Quality of Life Questionnaires (psychological & social)
- General Health Questionnaire
- Alcohol & Drug Use Scales

Summary - Preliminary Results

No significant relationship between:

- number of concussions and performance on neuropsychological measures
- number of concussions and psychosocial variables (i.e., depression, anxiety, stress, QoL measures, etc.)
- number of concussions and subjective memory complaints

Subjective Memory Problems

Results:

No significant group differences found on:

- neuropsychological measures
- psychosocial variables

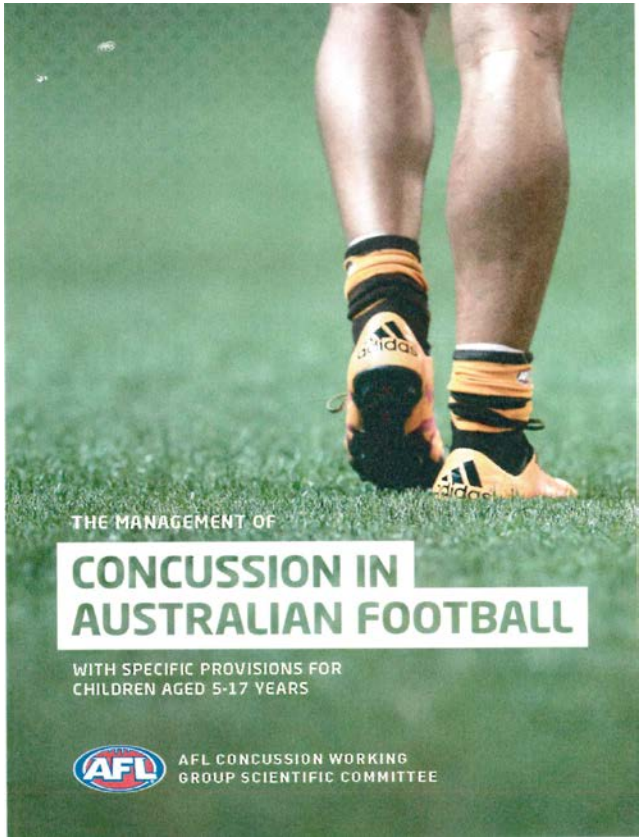
Memory & New Learning:

- All players (including those reporting memory problems) performed within or above the mean for their age

Position Statements / Guidelines

- Concussion in Sport Group
- American Academy of Neurology
- AIS / AMA

- Specific sports – AFL …


THE MANAGEMENT OF
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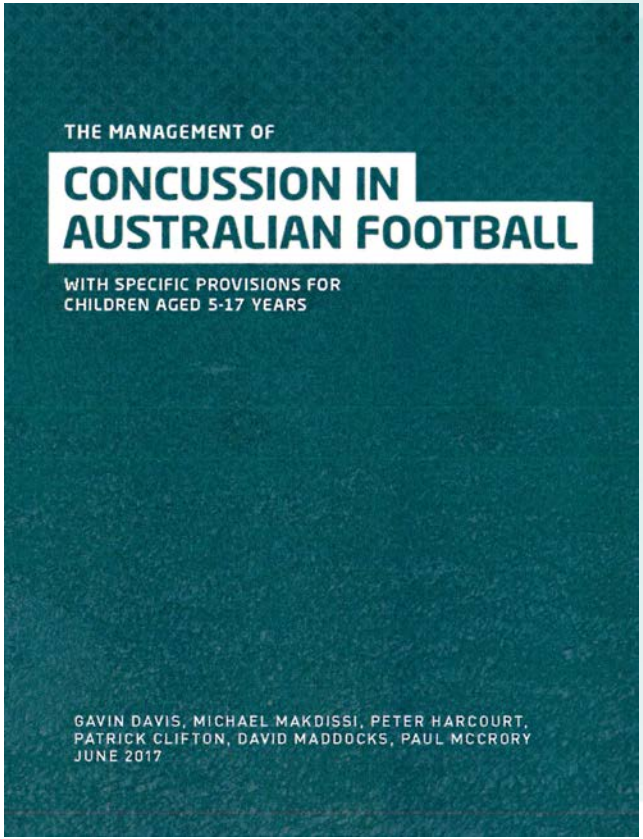
WITH SPECIFIC PROVISIONS FOR CHILDREN AGED 5-17 YEARS
AFL
AFL CONCUSSION WORKING GROUP SCIENTIFIC COMMITTEE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JUNE 2017

Zurich Consensus Statement - 2012

"The majority (80-90%) of concussions resolve in a short (7-10 day) period, although the recovery time frame may be longer in children and adolescents"

Zurich Consensus Statement - 2012

"… the speculation that repeated concussion or sub-concussive impacts causes CTE remains unproven.

The extent to which age-related changes, psychiatric or mental health illness, alcohol/drug use, or co-existing medical or dementing illnesses contribute to this process is largely unaccounted for in the literature."

(British Journal of Sports Medicine, 2013)

AIS & AMA Concussion in Sport Position Statement - 2016

- *"… there is currently no reliable evidence clearly linking sport-related concussion with CTE.*
- *The evidence purporting to show a link between sport-related concussion and CTE consists of case reports, case series and retrospective analyses.*
- *Due to the nature of the studies and the reliance on retired athletes volunteering for autopsy diagnosis, there is significant selection bias in many of the reported cases.*
- *The studies to date have not adequately controlled for the potential contribution of confounding variables such as alcohol abuse, drug abuse, genetic predisposition and psychiatric illness.*"

December 2016

mips

AIS / AMA

- There is no such thing as a ‘good concussion’
- AIS & AMA are *not* saying that there are no long term effects, but the quality of evidence (for a causative link) to date is poor.
- The vast majority of individuals who suffer a sports related concussion go on to live, normal healthy and fulfilling lives
- The best way to care for the (immediate and long term) health of athletes is to take concussion seriously, treat each case carefully and be conservative with RTP

Berlin - 2016

Consensus statement

Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016

Paul McCrory,[1] Willem Meeuwisse,[2] Jiří Dvořák,[3,4] Mark Aubry,[5] Julian Bailes,[6] Steven Broglio,[7] Robert C Cantu,[8] David Cassidy,[9] Ruben J Echemendia,[10,11] Rudy J Castellani,[12] Gavin A Davis,[13,14] Richard Ellenbogen,[15] Carolyn Emery,[16] Lars Engebretsen,[17] Nina Feddermann-Demont,[18,19] Christopher C Giza,[20,21] Kevin M Guskiewicz,[22] Stanley Herring,[23] Grant L Iverson,[24] Karen M Johnston,[25] James Kissick,[26] Jeffrey Kutcher,[27] John J Leddy,[28] David Maddocks,[29] Michael Makdissi,[30,31] Geoff T Manley,[32] Michael McCrea,[33] William P Meehan,[34,35] Shinji Nagahiro,[36] Jon Patricios,[37,38] Margot Putukian,[39] Kathryn J Schneider,[40] Allen Sills,[41,42] Charles H Tator,[43,44] Michael Turner,[45] Pieter E Vos[46]

Berlin - 2016

- 12 questions addressing issues including:

  definition; sideline evaluation; acute symptoms & signs; removal; re-evaluation; rest; rehabilitation; persistent symptoms – referral; recovery; return to activities; residual effects; risk reduction & prevention.

Berlin 2016

- The literature on neurobehavioural sequelae and long-term consequences of exposure to recurrent head trauma is inconsistent.
- Clinicians need to be mindful of the potential for long-term problems such as cognitive impairment, depression etc ...
- However, there is much more to learn about the potential cause-and-effect relationships of repetitive impact exposure and concussions.

Berlin - 2016

- The potential for developing CTE must be a consideration, as this condition appears to represent a distinct tauopathy with an unknown incidence in athletics populations.
- A cause-and-effect relationship has not yet been demonstrated between CTE and sports related concussions or exposure to contact sports.
- The notion that repeated concussion or subconcussive impacts cause CTE remains unknown.

Reducing the risk

Reducing Risk

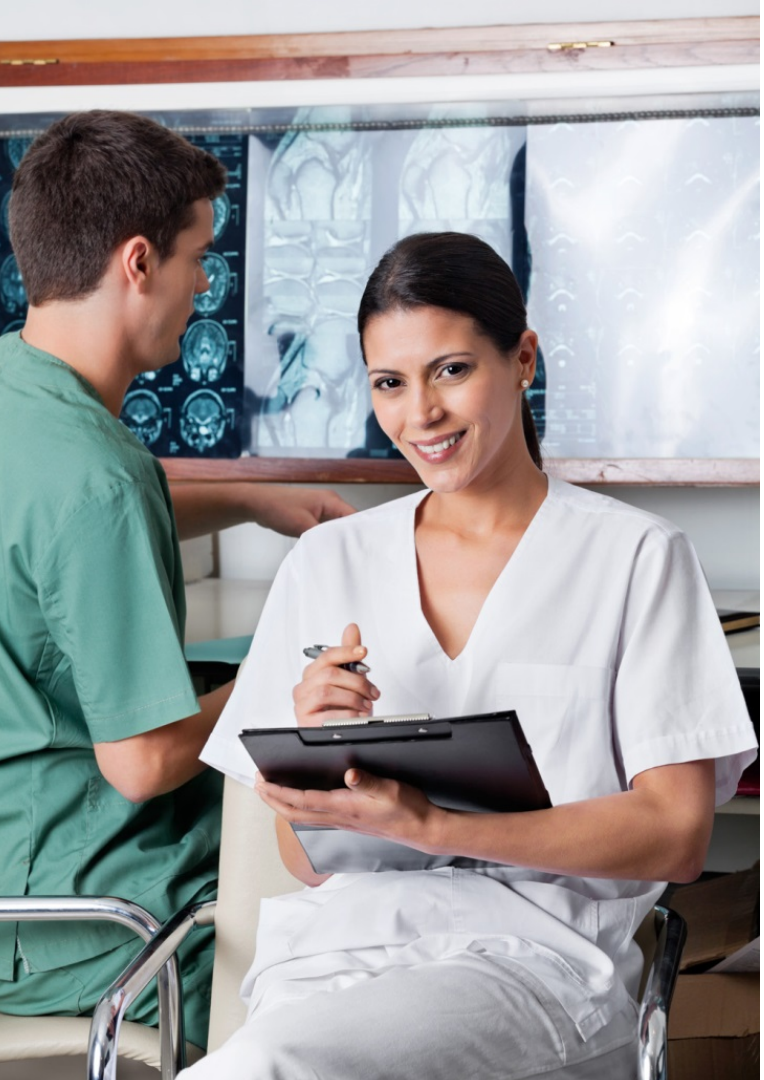
- **Rule changes** - to reduce exposure
- **Education** – particularly players so they appreciate the potential significance and are ‘open’ with doctors
- **Further research** ... if have better understanding of cause/s of reported problems, better able to manage and treat.
- **Adopting concussion protocols for assessment and management** and all reasonable medical management practices – diagnosis, advice, management ...

Issues in rural settings?

- Access to cranial imaging –
  - acute settings - CT to exclude haematoma etc.
  - persistent symptoms - MRI
- Referrals to specialists …
- Knowledge within community?

Best practice messages for management

- If in (any) doubt, sit them out
- 24 – 48 hours of deliberate rest
- Return to moderate activity as long as it doesn't exacerbate concussion symptoms
- Stepwise progression through increasing levels of activity
- Final medical clearance before return to full contact
- More cautious RTP in children and adolescents – 14 days symptom free



Thank you