

CONCUSSION

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KEY LEARNING POINTS

- RECOGNIZE
- REMOVE
- REST

KEY LEARNING POINTS

- **IF IN DOUBT, SIT THEM OUT**



KEY LEARNING POINTS

- **IF YOU SUSPECT CONCUSSION,
IT IS CONCUSSION**

WHAT IS CONCUSSION?

- Concussion is a **brain injury**
- Caused by either a direct blow to head or blow to other parts of the body resulting in impulsive force to the brain (whiplash)
- Affects the brain **function**.
- Standard scans (CT and MRI) are typically normal.
- Loss of consciousness (LOC) is a sign of concussion but is **not essential** for diagnosing concussion – LOC is present in < 10% of concussive cases.

WHO IS AT RISK?

Children and adolescents are at increased risk and;

- are more susceptible to concussion
- take longer to recover
- have more significant memory and mental processing issues
- are more susceptible to rare and dangerous neurological complications, including death caused by a single or second impact

Athletes with a history of **two or more concussions** within the past year are at greater risk of further brain injury and slower recovery – referral to a concussion expert is recommended

HOW DO I IDENTIFY CONCUSSION?

- If any of the following are present following a head injury a player **MUST** be **permanently removed** from the game or training
- Convulsion (fit)
- Tonic posturing (rigid arms ±legs)
- Loss of consciousness
- Unsteady on feet
- Not orientated in time, place or person – confused or disorientated

COMMON SYMPTOMS OF CONCUSSION

- Headaches
- Dizziness
- Confusion
- Blurred vision
- Nausea
- Fatigue
- Feeling like you are in a fog

SIGNS OF CONCUSSION

- What you may see
- Dazed, dinged or blank facial expression
- Unsteady on feet
- Loss of consciousness (knocked out) – occurs in < 10% of diagnosed concussions
- Tonic posturing – identified by rigid fully extended limb or limbs
- Convulsion

TREATMENT OF CONCUSSION

- ALL players who are suspected of having a concussion should be removed from the field of play for further assessment

TREATMENT OF CONCUSSION

Rest the body

and

Rest the brain



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RETURN TO TRAINING

- You must **rest until all symptoms have disappeared** or you are advised by your doctor that you can commence exercise.
- As a **minimum** you **MUST** rest completely for 24 hours.

RETURN TO TRAINING

- When you start training you must follow a **Graduated Return to Play (G RTP) program** – this gradually reintroduces you to exercise
- **Don't start exercise or return to play while symptoms are present. This includes a return of symptoms during or after exercise**

WHAT ARE THE PLAYERS RESPONSIBILITIES?

- Following a head injury players/athletes MUST report all symptoms to medical staff or coaches
- Players must NOT hide or deny symptoms are present.
- Any player, coach or administrator who suspects another player may have been concussed should encourage this player to report their symptoms to medical staff or alternatively report this injury to medical staff

KEY MESSAGES

1. Head injuries can cause death – take them seriously
2. Recognize and remove
3. If in doubt, sit it out.
4. Most concussions recover with resting the body and resting the brain.
5. Report ALL symptoms following a head injury and during your recovery

INVESTIGATIONS

Neuropsychological (NP) assessment:

- Important component in overall assessment and RTP
- Should NOT be sole basis of management decisions, but an aid to clinical decision making

INVESTIGATIONS (CONT.)

Neuropsychological (NP) assessment:

- Included as part of clinical neurological assessment by treating physician often with computerized NP screening tools
- Best done when asymptomatic but may be advantageous at other stages in particular situations
- Baseline testing not mandatory. May be helpful in test interpretation and for education opportunity

DIAGNOSTIC TOOLS

SCAT3™



Sport Concussion Assessment Tool – 3rd Edition

For use by medical professionals only

Child-SCAT3™



Sport Concussion Assessment Tool for children ages 5 to 12 years

For use by medical professionals only

Pocket CONCUSSION RECOGNITION TOOL™

To help identify concussion in children, youth and adults



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SIDELINE ASSESSMENT - 1

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? Y N
"If so, how long?" _____
- Balance or motor incoordination (stumbles, slow/laboured movements, etc.)? Y N
- Disorientation or confusion (inability to respond appropriately to questions)? Y N
- Loss of memory: Y N
"If so, how long?" _____
"Before or after the injury?" _____
- Blank or vacant look: Y N
- Visible facial injury in combination with any of the above: Y N

SIDELINE ASSESSMENT - 2

1

Glasgow coma scale (GCS)

Best eye response (E)

No eye opening	1
Eye opening in response to pain	2
Eye opening to speech	3
Eyes opening spontaneously	4

Best verbal response (V)

No verbal response	1
Incomprehensible sounds	2
Inappropriate words	3
Confused	4
Oriented	5

Best motor response (M)

No motor response	1
Extension to pain	2
Abnormal flexion to pain	3
Flexion/Withdrawal to pain	4
Localizes to pain	5
Obeys commands	6

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

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

SIDELINE ASSESSMENT - 3

2

Maddocks Score³

"I am going to ask you a few questions, please listen carefully and give your best effort."

Modified Maddocks questions (1 point for each correct answer)

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	of 5	

Maddocks score is validated for sideline diagnosis of concussion only and is not used for serial testing.

SCORING - 1

BACKGROUND

Name: _____ Date: _____

Examiner: _____

Sport/team/school: _____ Date/time of injury: _____

Age: _____ Gender: M F

Years of education completed: _____

Dominant hand: right left neither

How many concussions do you think you have had in the past? _____

When was the most recent concussion? _____

How long was your recovery from the most recent concussion? _____

Have you ever been hospitalized or had medical imaging done for a head injury? Y N

Have you ever been diagnosed with headaches or migraines? Y N

Do you have a learning disability, dyslexia, ADD/ADHD? Y N

Have you ever been diagnosed with depression, anxiety or other psychiatric disorder? Y N

Has anyone in your family ever been diagnosed with any of these problems? Y N

Are you on any medications? If yes, please list: Y N



SCORING - 2

3

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)



SCORING - 3

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 - 4

4

Cognitive assessment

Standardized Assessment of Concussion (SAC)⁴

Orientation (1 point for each correct answer)

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

List	Trial 1		Trial 2		Trial 3		Alternative word list		
elbow	0	1	0	1	0	1	candle	baby	finger
apple	0	1	0	1	0	1	paper	monkey	penny
carpet	0	1	0	1	0	1	sugar	perfume	blanket
saddle	0	1	0	1	0	1	sandwich	sunset	lemon
bubble	0	1	0	1	0	1	wagon	iron	insect
Total									

Immediate memory score total **of 15**

Concentration: Digits Backward

List	Trial 1		Alternative digit list		
4-9-3	0	1	6-2-9	5-2-6	4-1-5
3-8-1-4	0	1	3-2-7-9	1-7-9-5	4-9-6-8
6-2-9-7-1	0	1	1-5-2-8-6	3-8-5-2-7	6-1-8-4-3
7-1-8-4-6-2	0	1	5-3-9-1-4-8	8-3-1-9-6-4	7-2-4-8-5-6
Total of 4					

Concentration: Month in Reverse Order (1 pt. for entire sequence correct)

Dec-Nov-Oct-Sept-Aug-Jul-Jun-May-Apr-Mar-Feb-Jan	0	1
Concentration score	of 5	



SCORING - 5

5

Neck Examination:

Range of motion Tenderness Upper and lower limb sensation & strength

Findings: _____

6

Balance examination

Do one or both of the following tests.

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

Modified Balance Error Scoring System (BESS) testing⁵

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

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

Condition

Double leg stance: _____ Errors

Single leg stance (non-dominant foot): _____ Errors

Tandem stance (non-dominant foot at back): _____ Errors

And/Or

Tandem gait^{6,7}

Time (best of 4 trials): _____ seconds

7

Coordination examination

Upper limb coordination

Which arm was tested: Left Right

Coordination score _____ of 1

8

SAC Delayed Recall⁴

Delayed recall score _____ of 5

PATIENT INFORMATION

Scoring Summary:

Test Domain	Score		
	Date: _____	Date: _____	Date: _____
Number of Symptoms of 22			
Symptom Severity Score of 132			
Orientation of 5			
Immediate Memory of 15			
Concentration of 5			
Delayed Recall of 5			
SAC Total			
BESS (total errors)			
Tandem Gait (seconds)			
Coordination of 1			



CHILD SCAT 3

Child Sport Concussion Assessment Tool



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CHILD SCAT 3 -DIFFERENCES

- Child Maddocks questions
- Symptom Scale child-specific - 4 point rating scale
- Parent rating of child's symptoms
- Orientation - no time of day
- Concentration - start with 2 reverse digits
- Reverse days of the week
- Modified BESS - no single leg stance
- Patient advice - return to school

CHILD SCAT 3 - ASSESSMENT - 1

2

Sideline Assessment – child-Maddocks Score³

"I am going to ask you a few questions, please listen carefully and give your best effort."

Modified Maddocks questions (1 point for each correct answer)

Where are we at now?	0	1
Is it before or after lunch?	0	1
What did you have last lesson/class?	0	1
What is your teacher's name?	0	1
child-Maddocks score	of 4	

Child-Maddocks score is for sideline diagnosis of concussion only and is not used for serial testing.

CHILD SCAT 3 – ASSESSMENT - 2

3

Child report

Name: _____	never	rarely	sometimes	often
I have trouble paying attention	0	1	2	3
I get distracted easily	0	1	2	3
I have a hard time concentrating	0	1	2	3
I have problems remembering what people tell me	0	1	2	3
I have problems following directions	0	1	2	3
I daydream too much	0	1	2	3
I get confused	0	1	2	3
I forget things	0	1	2	3
I have problems finishing things	0	1	2	3
I have trouble figuring things out	0	1	2	3
It's hard for me to learn new things	0	1	2	3
I have headaches	0	1	2	3
I feel dizzy	0	1	2	3
I feel like the room is spinning	0	1	2	3
I feel like I'm going to faint	0	1	2	3
Things are blurry when I look at them	0	1	2	3
I see double	0	1	2	3
I feel sick to my stomach	0	1	2	3
I get tired a lot	0	1	2	3
I get tired easily	0	1	2	3

Total number of symptoms (Maximum possible 20)

Symptom severity score (Maximum possible 20x3 = 60)

self rated clinician interview self rated and clinician monitored

CHILD SCAT 3 – SCORING - 1

4

Parent report

The child	never	rarely	sometimes	often
has trouble sustaining attention	0	1	2	3
Is easily distracted	0	1	2	3
has difficulty concentrating	0	1	2	3
has problems remembering what he/she is told	0	1	2	3
has difficulty following directions	0	1	2	3
tends to daydream	0	1	2	3
gets confused	0	1	2	3
is forgetful	0	1	2	3
has difficulty completeing tasks	0	1	2	3
has poor problem solving skills	0	1	2	3
has problems learning	0	1	2	3
has headaches	0	1	2	3
feels dizzy	0	1	2	3
has a feeling that the room is spinning	0	1	2	3
feels faint	0	1	2	3
has blurred vision	0	1	2	3
has double vision	0	1	2	3
experiences nausea	0	1	2	3
gets tired a lot	0	1	2	3
gets tired easily	0	1	2	3

Total number of symptoms (Maximum possible 20)

Symptom severity score (Maximum possible 20x3 = 60)

CHILD SCAT 3 – SCORING - 2

Do the symptoms get worse with physical activity?

Y N

Do the symptoms get worse with mental activity?

Y N

parent self rated

clinician interview

parent self rated and clinician monitored

Overall rating for parent/teacher/coach/carer to answer.

How different is the child acting compared to his/her usual self?

Please circle one response:

no different

very different

unsure

N/A

Name of person completing Parent-report: _____

Relationship to child of person completing Parent-report: _____



CHILD SCAT 3 – SCORING - 3

5

Cognitive assessment

Standardized Assessment of Concussion – Child Version (SAC-C)⁴

Orientation (1 point for each correct answer)

What month is it?	0	1
What is the date today?	0	1
What is the day of the week?	0	1
What year is it?	0	1

Orientation score of 4

Immediate memory

List	Trial 1		Trial 2		Trial 3		Alternative word list		
elbow	0	1	0	1	0	1	candle	baby	finger
apple	0	1	0	1	0	1	paper	monkey	penny
carpet	0	1	0	1	0	1	sugar	perfume	blanket
saddle	0	1	0	1	0	1	sandwich	sunset	lemon
bubble	0	1	0	1	0	1	wagon	iron	insect
Total									

Immediate memory score total of 15

Concentration: Digits Backward

List	Trial 1		Alternative digit list		
6-2	0	1	5-2	4-1	4-9
4-9-3	0	1	6-2-9	5-2-6	4-1-5
3-8-1-4	0	1	3-2-7-9	1-7-9-5	4-9-6-8
6-2-9-7-1	0	1	1-5-2-8-6	3-8-5-2-7	6-1-8-4-3
7-1-8-4-6-2	0	1	5-3-9-1-4-8	8-3-1-9-6-4	7-2-4-8-5-6
Total of 5					

Concentration: Days in Reverse Order (1 pt. for entire sequence correct)

Sunday-Saturday-Friday-Thursday-Wednesday-Tuesday-Monday	0	1
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Concentration score of 6



CHILD SCAT 3 – SCORING - 4

6

Neck Examination:

Range of motion Tenderness Upper and lower limb sensation & strength

Findings: _____

7

Balance examination

Do one or both of the following tests.

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

Modified Balance Error Scoring System (BESS) testing⁵

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

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

Condition

Double leg stance: _____ Errors

Tandem stance (non-dominant foot at back): _____ Errors

Tandem gait^{6,7}

Time taken to complete (best of 4 trials): _____ seconds

If child attempted, but unable to complete tandem gait, mark here

8

Coordination examination

Upper limb coordination

Which arm was tested: Left Right

Coordination score _____ of 1

9

SAC Delayed Recall⁴

Delayed recall score _____ of 5



CHILD SCAT 3 – RETURN TO SCHOOL

Return to school

Concussion may impact on the child's cognitive ability to learn at school. This must be considered, and medical clearance is required before the child may return to school. **It is reasonable for a child to miss a day or two of school after concussion, but extended absence is uncommon.** In some children, a graduated return to school program will need to be developed for the child. The child will progress through the return to school program provided that there is no worsening of symptoms. If any particular activity worsens symptoms, the child will abstain from that activity until it no longer causes symptom worsening. Use of computers and internet should follow a similar graduated program, provided that it does not worsen symptoms. This program should include communication between the parents, teachers, and health professionals and will vary from child to child. The return to school program should consider:

- Extra time to complete assignments/tests
- Quiet room to complete assignments/tests
- Avoidance of noisy areas such as cafeterias, assembly halls, sporting events, music class, shop class, etc
- Frequent breaks during class, homework, tests
- No more than one exam/day
- Shorter assignments
- Repetition/memory cues
- Use of peer helper/tutor
- Reassurance from teachers that student will be supported through recovery through accommodations, workload reduction, alternate forms of testing
- Later start times, half days, only certain classes

POCKET CRT

Pocket CONCUSSION RECOGNITION TOOL™

To help identify concussion in children, youth and adults



RECOGNIZE & REMOVE

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

1. Visible clues of suspected concussion

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

Loss of consciousness or responsiveness
Lying motionless on ground/Slow to get up
Unsteady on feet / Balance problems or falling over/Incoordination
Grabbing/Clutching of head
Dazed, blank or vacant look
Confused/Not aware of plays or events

2. Signs and symptoms of suspected concussion

Presence of any one or more of the following signs & symptoms may suggest a concussion:

- Loss of consciousness
- Seizure or convulsion
- Balance problems
- Nausea or vomiting
- Drowsiness
- More emotional
- Irritability
- Sadness
- Fatigue or low energy
- Nervous or anxious
- "Don't feel right"
- Difficulty remembering
- Headache
- Dizziness
- Confusion
- Feeling slowed down
- "Pressure in head"
- Blurred vision
- Sensitivity to light
- Amnesia
- Feeling like "in a fog"
- Neck Pain
- Sensitivity to noise
- Difficulty concentrating

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3. Memory function

Failure to answer any of these 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?"

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

It is recommended that, in all cases of suspected concussion, the player is referred to a medical professional for diagnosis and guidance as well as return to play decisions, even if the symptoms resolve.

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
- Deteriorating conscious state
- Severe or increasing headache
- Unusual behaviour change
- Double vision

Remember:

- In all cases, the basic principles of first aid (danger, 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.

from McCrory et. al, Consensus Statement on Concussion in Sport. Br J Sports Med 47 (5), 2013

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MANAGEMENT



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MANAGEMENT

- CORNERSTONE = initial period of rest until acute symptoms resolve
 - Physical Rest
 - No training, playing, exercise, weights
 - Beware of exertion with activities of daily living
 - Cognitive Rest
 - No television, extensive reading, video games?
 - Caution re: daytime sleep

MANAGEMENT

- Expect gradual resolution in majority within 7-10 days
- Gradual return to school and social activities that does not result in significant exacerbation of symptoms
- Proceed through step-wise return to sport / play (RTP) strategy
- May take longer in children and adolescents
*important to consider school and learning impact

RECOVERED?

- Everyone “*feels fine*”
- Always ask:
 1. “*On a scale of 0 to 100%, how do you feel?*”
 2. “*What makes you not 100%?*”
 3. Symptom Checklist – SCAT3

GRADUATED RTP PROTOCOL



Rehabilitation stage	Functional exercise at each stage of rehabilitation	Objective of each stage
1. No activity	Symptom limited physical and cognitive rest.	Recovery
2. Light aerobic exercise	Walking, swimming or stationary cycling keeping intensity < 70% MPHR No resistance training.	Increase HR
3. Sport-specific exercise	Skating drills in ice hockey, running drills in soccer. No head impact activities.	Add movement
4. Non-contact training drills	Progression to more complex training drills e.g. passing drills in football and ice hockey. May start progressive resistance training	Exercise, coordination, and cognitive load
5. Full contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play	

CHILDREN AND ADOLESCENTS

The IRB acknowledge the following:

1. A more conservative GRTP approach **MUST** be adopted for children and adolescents
2. It is appropriate to extend the period of asymptomatic rest and the length of time of that an athlete has to be symptom free before progression to the next level

AGE SPECIFIC GRTP PROTOCOLS

AGE GROUP	MINIMUM REST PERIOD POST CONCUSSION		GRTP		MINIMUM NUMBER OF MISSED WEEKENDS
U/6 - U/15	2 weeks	Caution! Return to play protocol should be started only if the player is symptom free off medication that modifies symptoms of concussion	4 Stage GRTP with progression every 48 hours if asymptomatic Total GRTP days = 8 days.	Caution! Contact Sport should be authorized only if the player is symptom free off medication MEDICAL CLEARANCE RECOMMENDED	Earliest Return to play = 2 weeks rest post injury + 8 days GRTP (Play - Day 23 post injury) 3 Weekends missed
U/16 - U/19*	1 week		4 Stage GRTP with progression every 24 hours if asymptomatic Total GRTP days = 4 days.		Earliest Return to play = 7 days rest post injury + 4 day GRTP (Play - Day 12 post injury) 1 Weekend missed
Adults	24 hours		4 Stage GRTP with progression every 24 hours if asymptomatic Total GRTP days = 4 days.		Earliest Return to play = 24 hours rest post injury + 4 day GRTP (Play - Day 6 post injury)
Any player with a second concussion within 12 months, a history of multiple concussions, players with unusual presentations or prolonged recovery should be assessed and managed by health care providers (multidisciplinary) with experience in sports-related concussions. If this expertise is unavailable the player should be managed using the protocol from the lower age group.					

* Note: U/19 players playing adult Rugby should be managed via the U/16 - U/19 protocol.

U6 –U15 AGE GROUPS

AGE GROUP	<u>MINIMUM</u> REST PERIOD POST CONCUSSION	G RTP	<u>MINIMUM</u> NUMBER OF MISSED WEEKENDS
U/6 - U/15	2 weeks	4 Stage GRTP with progression every 48 hours if asymptomatic Total GRTP days = 8 days.	Earliest Return to play = 2 weeks rest post injury + 8 days GRTP (Play - Day 23 post injury) 3 Weekends missed

U16 – U19 AGE GROUPS

AGE GROUP	<u>MINIMUM REST PERIOD POST CONCUSSION</u>	GRTP	<u>MINIMUM NUMBER OF MISSED WEEKENDS</u>
U/16 - U/19*	1 week	4 Stage GRTP with progression every 24 hours if asymptomatic Total GRTP days = 4 days.	Earliest Return to play = 7 days rest post injury + 4 day GRTP (Play - Day 12 post injury) 1 Weekend missed

ADULTS

AGE GROUP	MINIMUM REST PERIOD POST CONCUSSION	GRTP	MINIMUM NUMBER OF MISSED WEEKENDS
Adults	24 hours	4 Stage GRTP with progression every 24 hours if asymptomatic Total GRTP days = 4 days.	Earliest Return to play = 24 hours rest post injury + 4 day GRTP (Play - Day 6 post injury)

* Note: U/19 players playing adult Rugby should be managed via the U/16 - U/19 protocol.

SUMMARY

GRADUAL RETURN TO PLAY PROTOCOL

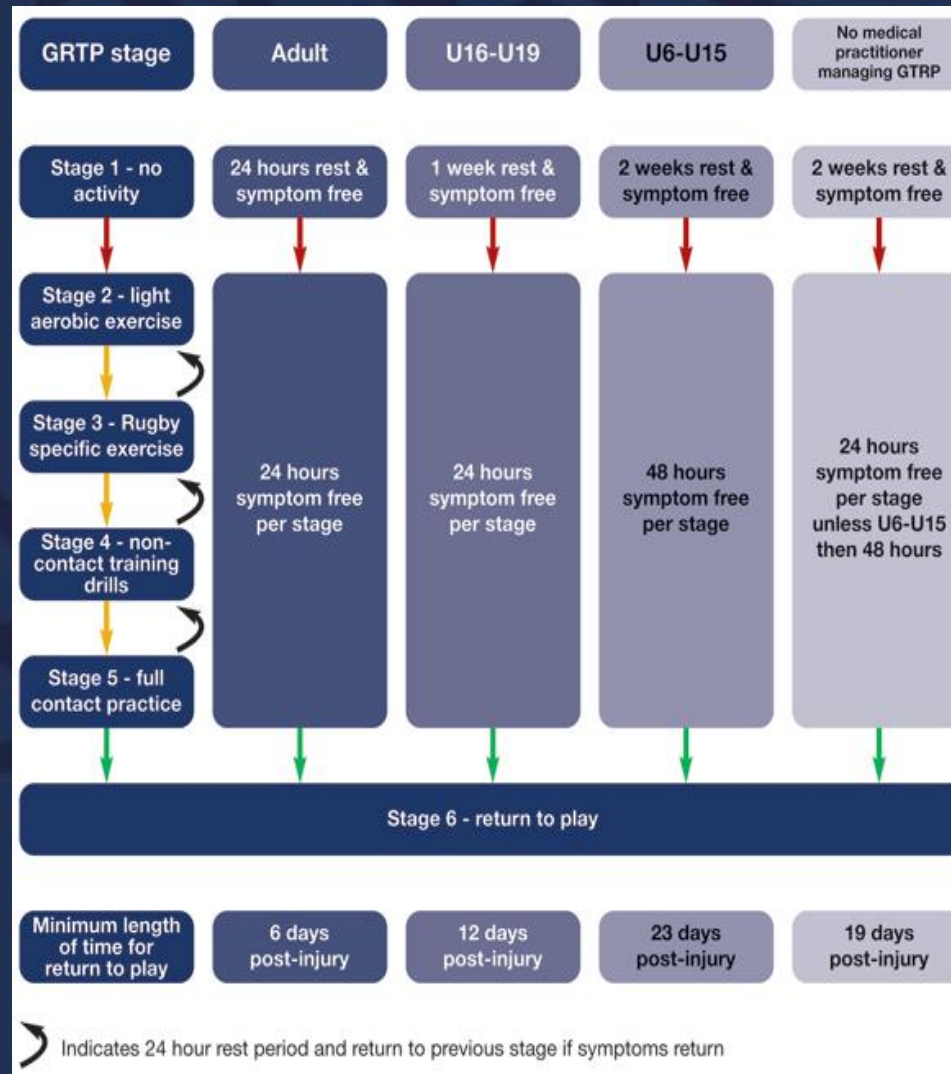
Each step should be separated by 24 hours

- 1 NO ACTIVITY.** Complete physical and cognitive rest.
- 2 Light aerobic exercise**
Walking, swimming, stationary cycling; Keep intensity <70% of maximum heart rate. No resistance training.
- 3 Sport-Specific Exercise**
Running; Sport drills; No head impact activities.
- 4 Non-Contact Training Drills**
Progression to more complex training drills; May start progressive resistance training.
- 5 Full-Contact Practice**
Participate in normal training activity.
- 6 Return to Play**
Normal game play; No restrictions.

Do not advance to the next step if symptoms reappear



IRB GRTP SUMMARY



MULTIPLE CONCUSSIONS AND UNUSUAL PRESENTATIONS

- Any player with a second concussion within 12 months, a history of multiple concussions, players with unusual presentations or prolonged recovery should be assessed and managed by health care providers (multidisciplinary) with experience in sports-related concussions. If this expertise is unavailable the player should be managed using the protocol from the lower age group.

MODIFYING FACTORS



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FACTORS	MODIFIER
Symptoms	Number Duration (>10 days) Severity
Signs	Prolonged LOC (>1min) Amnesia
Sequelae	Concussive convulsions
Temporal	Frequency -repeated concussion over time Timing - injuries close together “Recency” - recent concussion or TBI
Threshold	Repeated concussions occurring with progressively less impact force or slower recovery after each successive concussion
Age	Child and adolescent (< 18 years old)
Co and Pre-morbidities	Migraine, depression or other mental health disorders, attention deficit hyperactivity disorder (ADHD), learning disabilities (LD), sleep disorders
Medication	Psychoactive drugs Anticoagulants
Behaviour	Dangerous style of play
Sport	High risk activity Contact and collision sport High sporting level

MODIFIERS

- May influence investigation and management
- May predict potential for prolonged or persistent symptoms
- Multidisciplinary approach coordinated by a physician with specific expertise in management of concussion.

CONTROVERSY IN CONCUSSION



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QUESTIONS

- Does significant brain injury occur in rugby in children?
- Are children at increased risk of concussion?
- Is the natural history and management of concussion different in children to adults?

Answers: Very rarely, Yes and Yes

CONCUSSION ISSUES

- Does repeated concussion cause dementia?

Answer: We do not have enough evidence to be certain about concussion being the cause but there are some studies which suggest that professional sportsmen in contact sports may have an increased risk in comparison to the background population

CHRONIC TRAUMATIC ENCEPHALOPATHY (CTE)

- Acknowledge potential for long-term problems in all athletes
- CTE unknown incidence in athletic populations, cause/effect not yet demonstrated between CTE and concussions or exposure to contact sport



Chronic traumatic encephalopathy

Clinicians need to be mindful of the potential for long-term problems in the management of all athletes. However, it was agreed that chronic traumatic encephalopathy (CTE) represents a distinct tauopathy with an unknown incidence in athletic populations. It was further agreed that a cause and effect relationship has not as yet been demonstrated between CTE and concussions or exposure to contact sports.^{105–114} At present, the interpretation of causation in the modern CTE case studies should proceed cautiously. It was also recognised that it is important to address the fears of parents/athletes from media pressure related to the possibility of CTE.

Chronic Traumatic Encephalopathy: A view from a dissenting expert

- Concussion is a **traumatic brain injury** with associated damage to the brain:
 - Diffuse axonal injury, neuronal death, blood brain barrier compromise, vascular
 - These changes are detectable weeks after injury
- There is **no question** brain injuries are associated with increased risk of neurodegenerative pathology
- Exposure required, co-existing factors, operational diagnostic and pathology criteria and many more details still to be addressed
- There is **no question** brain injuries are associated with increased risk of neurodegenerative pathology

**National Football League
 Player Care Foundation**

Study of Retired NFL Players

September 10, 2009

Submitted by
 David R. Weir, James S. Jackson and Amanda Sonnega
 Institute for Social Research
 University of Michigan

Table 7.3 Dementia

	All US Men		NFL retirees	
	30-49	50+	30-49	50+
<u>Memory problems</u>				
Dementia, Alzheimer's disease, or other memory-related disease?	0.1%	1.2%	1.9%	6.1%

Published Ahead of Print on September 5, 2012 as 10.1212/WNL.0b013e31826daf50

Neurodegenerative causes of death among
 retired National Football League players

Conclusions: The neurodegenerative mortality of this cohort is 3 times higher than that of the general US population; that for 2 of the major neurodegenerative subcategories, AD and ALS, is 4 times higher. These results are consistent with recent studies that suggest an increased risk of neurodegenerative disease among football players. *Neurology*[®] 2012;79:1-1

KNOWLEDGE TRANSFER

- Education of athletes, parents, coaches
- Awareness of concussion symptoms and signs
- Fair play and respect
- Role for web based resources, social media

KEY LEARNING POINTS

- RECOGNIZE
- REMOVE
- REST

KEY LEARNING POINTS

- **IF IN DOUBT, SIT THEM OUT**



KEY LEARNING POINTS

- **IF YOU SUSPECT CONCUSSION,
IT IS CONCUSSION**



RESOURCES

Referees' /Coaches' On-field

Concussion Guide



www.hkrugby.com



RESOURCES

www.irbplayerwelfare.com



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CONCUSSION

Thank you!



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