WORLD RUGBY *Putting Players First*

Head Injury Assessment (HIA) Protocol

Introduction

The Head Injury Assessment (HIA) protocol is a three-stage process introduced by World Rugby for elite adult teams to assist with the identification, diagnosis and management of head impact events with the potential for a concussion. This HIA Protocol consists of the following three stages:

- Stage 1 – game day assessment using the HIA1 Form.
- Stage 2 – post-game, same day assessment using HIA2 Form.
- Stage 3 – 36-48-hour post-injury assessment using HIA3 Form.

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HIA Protocol Explanation

Temporary substitution for head injury was introduced permanently into Law for elite adult rugby in August 2015. The HIA Protocol has been developed to support Law 3.11 and Regulation 10, both of which are relevant to this temporary replacement for head injury and the management of concussion.

The three-stage HIA Protocol consists of:

Stage 1 – Off-field HIA1 Assessment:

In stage 1, players who sustain head impact events with the potential for a concussion are identified by match officials, team doctors (TD), or independent match-day doctors (MDD). The identification is either by direct observation or on video review.

The off-field HIA1 assessment has four components and they are:

a. 12 immediate and permanent removal criteria (known as Criteria 1 indications) AND
b. an off-field screening tool AND
c. pitch-side video review AND
d. clinical evaluation by the attending doctor

The off-field HIA1 assessment is therefore not limited to the off-field screening tool. Instead, the off-field screening tool is one component of a comprehensive assessment.

Players displaying obvious on-pitch signs of concussion (Criteria 1) are immediately and permanently removed from play, and the completion of the off-field screening tool is not required. Any other cases, where players have the potential for concussion (Criteria 2), but without clear on-pitch symptoms or signs, undergo an off-field assessment consisting of a medical room clinical evaluation by an attending doctor supported by the multi-modal screening tool, and video review.

The off-field screening tool is a re-formatted Sports Concussion Assessment Tool (SCAT 5), the pitch-side assessment tool recommended by experts from the international concussion consensus meeting. This off- field screening tool includes a check of symptoms, memory assessment and balance evaluation. Only used in the professional game, the results of this off-field assessment are compared to a previously conducted 'baseline assessment', or to a normative result. An abnormal screening tool result is indicated if the score is different from that player's baseline assessment or the normative score and confirms a suspected concussion. Any player with an abnormal off-field assessment or if there is a clinical opinion of suspected concussion must be removed from the game.

The team doctor has the primary responsibility for conducting the off-field screen but can delegate this role to the match-day doctor. The off-field screen is conducted in the stadium's medical room or other agreed venue if medical room is too distant from the field. If a temporary substitution for head injury is required a 12-minute temporary replacement is allowed. This is a set 12 minutes and is absolute time not playing time.
A player undergoing an off-field assessment must report to the 4th official within the 12 minutes but will not be allowed to return to play until the 12-minute period has expired.

Video review has three roles in the off-field HIA1 assessment. Firstly, during play, independent match-day doctors can supplement side-line observation with video reviews of incidents to identify any suspicious head impact events requiring either permanent removal from play or removal from play for further side-line assessment. At this point, the decision of the MDD is simply that the player be removed. A second video review is then undertaken with the MDD and Team Doctor present. If HIA1 immediate removal criteria (Criteria 1) are identified, the player is permanently removed from play without further evaluation. If there are no Criteria 1 signs identified and agreed, the player undergoes the off-field assessment supported by the screening tool. The final use of video is a review after the off-field assessment, where video is again reviewed prior to a player being returned to play.

Stage 2 - HIA2 Assessment - identifies an early concussion:

In stage 2, every player entered into the HIA protocol undergoes an early medical evaluation (HIA2 clinical assessment) within three hours of completing the match, to assess clinical progress and identify an **early** diagnosis of concussion. This Stage 2 assessment is performed using the SCAT5 tool supported by player baselines or normative Rugby baseline values.

Stage 3 - HIA3 Assessment - identifies a late concussion:

In stage 3 further medical testing is performed after two night's rest (36-48 hours post-head impact event) to further assess clinical progress and identify a **late** diagnosis of concussion (HIA3 clinical assessment). This HIA3 consists of a clinical assessment supported by the SCAT5 and the computer neuro-cognitive tool of each team's choice e.g. CogSport, Impact.

Players presenting with delayed symptoms or signs suspicious for concussion, but who are not identified with a head impact event during the game, can enter the HIA protocol at a later stage (stage 2 or 3) and undergo HIA2 and/or HIA3 clinical assessments as appropriate.

A definitive diagnosis of concussion is made if a player demonstrates observable signs of concussion requiring immediate and permanent removal from play (Criteria 1 e.g. loss of consciousness) or a clinical diagnosis of concussion is made supported by the HIA2 or HIA3 clinical assessment.

The HIA protocol allows for a diagnosis of concussion to be made immediately (Criteria 1) following a head impact event but a diagnosis cannot be excluded following a head impact event until both a HIA2 and HIA3 assessments are completed and normal.

SUMMARY

The Head Injury Assessment (HIA) is a three-point in time process and includes:

Off-field HIA1 assessment containing

- Criteria 1 - indications for immediate and permanent removal from a match
- An off-field assessment including symptom checklist, medical evaluation, balance assessment and cognitive tests performed by a doctor
- Video review
- Clinical evaluation by the treating doctor

HIA2

- A repeat medical evaluation performed by the doctor within 3 hours of the incident
- Assists in an **early** diagnosis of concussion

HIA3

- A further medical evaluation performed 48-72 hours after the incident
- Assists with the **late** diagnosis of concussion

SUMMARY OF HIA PROTOCOL CHANGES (2017 & 2019)

Following the release of the 2016 Berlin Concussion Consensus Statement and review of the 2015-16 HIA monitoring data, World Rugby's HIA Working Group recommended the following changes that will apply to the HIA Protocol from November 1 2019.

HIA1

- The HIA1 off-field screen will now be a fixed 12 minutes – this means a player cannot return to play before 12 minutes even if the assessment has been completed. If a player fails to present to the 4th official before the 12-minute period is completed that player will be deemed to have been permanently replaced.
- Players must read aloud the symptom check list and confirm their presence.
- The time between the Immediate Memory and Delayed Recall testing must be a minimum of 5 minutes
- The Immediate Memory and Delayed Recall number of words now consist of a 10-word list.
- The single leg stance and tandem stance (mBESS assessment) are the balance tests used by the HIA1 off-field screen.
- The following Criteria 2 indication has been added in 2017 - Possible transient or sub-threshold criteria 1 signs e.g., possible balance disturbance, possible loss of consciousness, possibly dazed etc.'

HIA2 and HIA3

- Both assessments require:
    - Reading aloud of the symptom checklist
    - Use of the 10-word Immediate Memory and Delayed Recall word list
    - Completion of both tandem gait and mBESS balance assessments
    - 5-minute time between Immediate Memory and Delayed Recall testing

<u>Baseline SCAT - Symptom Collection Process</u>

1. The initial baseline SCAT symptoms should be collected in a quiet environment and may be completed as a group that is of a manageable size so that all instructions are given and received as intended.
2. The athlete(s) should be given the symptom form and asked to read the instruction paragraph.
3. An explanation of the difference between 'trait' and 'state' symptoms should be provided and highlighted by the supervisor.
4. The athlete(s) should be told that only 'trait' symptoms (those typically present) should be reported in this initial baseline SCAT symptom checklist.
5. Athletes should also be advised that the report of any symptom(s) will be followed-up by the attending medical or healthcare professional.
6. After completing the baseline SCAT symptom checklist, any athlete reporting any symptom(s) should be identified and a follow-up appointment confirmed. This follow-up should be at least 24 hours after the initial symptom collection and following 24 hours of rest from exercise.
7. This follow-up assessment should be completed in a quiet environment and in a one-on-one situation by the medical or healthcare professional responsible for that athlete's care.

8. Before completing this follow-up symptom checklist, the difference between a 'trait' and 'state' symptom should again be explained, and the player advised that only 'trait' symptoms are to be reported.
9. The athlete should also be advised that it is important that they concentrate and be truthful.
10. At the completion of this follow-up baseline SCAT, the clinician should discuss and confirm with the athlete any identified trait symptoms. If following this discussion 'trait' symptoms are confirmed, they should then be logged as confirmed baseline SCAT symptom(s) for that player.
11. All 'trait' symptoms confirmed by this process require further review and investigation. The clinical guidance outlined below is provided to support this investigation.

BASELINE COGNITIVE AND BALANCE TESTS

Cognitive and balance tests are pivotal to the SCAT, and each is assessed using numerous sub-tests. The verbal cognitive assessment has four sub-tests: Immediate Memory, Orientation, Digits Backwards and Delayed Recall, whilst the mBESS balance assessment consists of a double leg stance, tandem stance and single leg stance.

Our large baseline SCAT dataset has been used to quantify performance during baseline cognitive and balance tests. These data have been used to determine a population-derived approximate 95th percentile "cut-off" level for each sub-test. Our recommendation is that these reference limits be used to identify when a baseline sub-test should be re-assessed (Table 1 and Figure 1). This re-assessment has been introduced in the collection process to address 'player-effort' issues and to improve baseline SCAT validity and reliability.

Baseline SCAT - Cognitive and Balance Test Collection Process

1. The initial baseline SCAT cognitive tests should be collected in a quiet environment and in a one-on-one situation. Baseline balance testing does not require a quiet environment.
2. Prior to performing both cognitive and balance tests, the athlete should be advised that it is important that they maximise concentration and performance. They should be advised that their results will be measured against reference limits and if their performance is outside of these limits the tests will be repeated.
3. Following the initial baseline cognitive and balance testing, any sub-test outside of the reference limits identified in Table 1 must be re-tested by the attending medical or healthcare professional.
4. Re-testing of cognitive and balance sub-tests is only required for that sub-test identified as being outside of reference limits. For example, if Immediate Memory is outside of reference limits, it is not necessary to repeat Delayed Recall.
5. The potential for a learning effect with re-testing is recognised. However, the impact of this learning effect is unknown. As the most likely impact from a learning effect is an improvement in baseline scores which will ultimately produce a more conservative baseline comparison for that player, we recommend that re-testing be undertaken at a time that suits both the player and clinician.
6. Re-testing should not be undertaken if the player is receiving treatment for a concussion or another injury which might affect the test result.
7. Prior to re-testing of the sub-test, the player should be advised that it is important that they concentrate and perform to the best of their ability.

The best result from the original and follow-up assessments for each sub-test should be adopted as the player's baseline performance. A sub-test(s) result that falls outside the 95% "cut-off" reference limits at initial AND follow-up testing requires investigation using the clinical guidance identified below.

BASELINE TESTING 2019 ONWARDS

Annual **full** baseline testing is now not required, as research has confirmed that the baseline SCAT does not change with serial testing. 'Post exertion' testing is also not required as exercise does not significantly impact the overall baseline performance.

Yearly testing of symptom checklists is recommended.

Table 1: Recommended reference limits for SAC and balance sub-modes of SCAT5 and HIA assessments

The following are outside of reference limits for cognitive sub-tests, and require re-testing and if still abnormal, investigation:

- Orientation – 3 or fewer correct answers
- Immediate memory (10-word list) –15 or fewer correct answers
- Concentration score (digits backwards and months in reverse) – 2 or fewer correct answers
- Digits backwards – 1 or fewer correct answer
- Delayed recall score (10-word list) - 3 or fewer correct answers

The following are outside of reference limits for balance sub-tests, and require further investigation:

Tandem gait (3 m line) – a time slower than 13 seconds

Modified BESS errors:

- Double leg stance – 1 or more errors
- Tandem stance – 4 or more errors
- Single leg stance – 6 or more errors

Management of U19 players in elite adult rugby

- Players 18 years and under playing in elite adult Tournaments where the use of the HIA has been approved must be managed with Recognise and Remove.
- Players who fit this category and who have Criteria 2 signs or symptoms cannot be removed for an off-field HIA1 assessment. They must be removed from further participation in that game - Recognise and Remove. Criteria 1 players must be immediately and permanently removed from the game and are considered to have a confirmed concussion.
- Following Recognise and Remove all players should follow the HIA Process as described using the HIA2 and HIA3. Players who are confirmed with a concussion should follow their Unions GRTP protocols.

Management of off-field HIA1 assessment replacements when all replacements have been exhausted

- If all substitutes have been used by a team and a player requires removal following a head impact event, irrespective of the medical room classification, that is immediate & permanent removal or off- field screen, a tactically replaced player can return to play.
- Even if all replacements have been exhausted this temporary replacement will be permitted to stay on the field if the injured player does not return after expiry of the 12 minute off-field period.
- A tactically substituted player can return to play to substitute an immediate and permanently removed player or a player undergoing an off-field HIA1 assessment, even if other replacements have not been used.

RETURN TO PLAY RECOMMENDATIONS FOR THE ELITE ADULT PLAYER

- Each stage of the GRTP is for a minimum of 24 hours starting from the time of the injury.
- Players with symptoms present at 24 hours post injury, progress to Stage 2a. To be clear, if symptoms do not resolve within the Initial Rest (Stage 1) period then progression to symptom limited activities of daily living (Stage 2a) is recommended.
- Players who are symptom free following the Initial Rest (Stage 1) should progress to Stage 2b
- If any concussion-related symptoms occur during the stepwise approach, the athlete should drop back to the previous asymptomatic level and attempt to progress again after being free of concussion-related symptoms for a further 24-hour period at the lower level.

EACH STAGE IS A MINIMUM OF 24 HOURS

Stage	Rehabilitation stage	Exercise allowed	Objective
1	Initial Rest (Physical and Cognitive)	Normal activites of daily living which do not worsen symptoms, vigorous activity should be avoided. Relative cognitive rest, limiting screen time etc- ensure symptoms continue to improve or remain absent. Symptoms must be absent before commencing Stage 2.	Recovery
2a	Symptom-limited activities	This includes activities of daily living that do not provoke symptoms. Consider time off or adaptation of work or study.	Return to normal activities (as symptoms permit)
2b	Light aerobic exercise	Light jogging for 10-15 minutes, swimming or stationary cycling at low to moderate intensity. No resistance training. Symptom free during full 24-hour period.	Increase heart rate
3	Sport-specific exercise	Running drills. No head impact activities.	Add movement
4	Non-contact training drills	Progression to more complex training drills, e.g., passing drills. 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 sport	Normal game play.	

HIA Procedures

1. What are the indications (Criteria 1) for immediate and permanent removal from play following a head injury?

There are 12 Criteria 1 signs and symptoms with six possibly observed on video and the remaining five identified during the on-field assessment.

Typically observed on video:

- Confirmed loss of consciousness
- Suspected loss of consciousness
- Convulsion
- Tonic posturing
- Balance disturbance / ataxia
- Clearly dazed

Identified during on-field assessment:

- Player not orientated in time, place and person
- Definite confusion
- Definite behavioural changes
- Oculomotor signs (e.g. spontaneous nystagmus)
- On-field identification of signs or symptoms of concussion

Identified prior to the game

- Under-19 – Recognise and Remove

2. What are the indications (Criteria 2) for an HIA?

- Head impact event where diagnosis is not immediately apparent
- Possible behaviour change
- Possible confusion
- Injury event witnessed with potential to result in a concussive injury
- Possible transient or sub-threshold criteria 1 signs e.g., possible balance disturbance, possible loss of consciousness, possibly dazed etc.'

3. How is a player diagnosed with concussion?

Under World Rugby's Operational Definition, a player has a confirmed concussion if:

a. There is confirmed Criteria 1 sign or symptom as per the HIA1 form
b. There is an abnormal HIA2 post game, same day assessment (an early concussion)
c. There is an abnormal HIA3, 36-48-hour assessment (a late concussion)
d. The treating doctor has a clinical suspicion that the player has a concussion.

Under this operational definition a concussion can be diagnosed immediately following a head injury but cannot be excluded until completion of both the HIA2 and HIA3, that is 36-48 hours after the injury.

4. Are the immediate and permanent removal signs and symptoms (Criteria 1) confirmed during an on-field assessment?

No. Criteria 1 signs may be identified from the side-line, on video or en-route to attend the injured player. The symptoms and oculomotor signs are identified whilst the team doctor is attending the player.

If identified on video, the player should be removed from play and the video reviewed simultaneously by the Team Doctor and Match Day Doctor (MDD) and agreement reached before enforcing permanent removal from further game participation.

5. What assessment is required to identify an 'oculomotor' sign?

An oculomotor sign is generally, immediately apparent and includes such signs as nystagmus, asymmetrical eye movements, pupil size and reactions. Whilst not a common sign of concussion, if present following a head injury, they are indicators for immediate and permanent removal from further game participation.

6. Who can request an HIA1 off-field screen?

The on-field medical staff (as defined by each Union), the referee or the MDD are allowed to request an off- field screen. A member of the opposition's on-field medical staff is not allowed to request an off-field screen on an opposing player, nor are they allowed to make comments on incidents involving opposition players.

7. Who completes the HIA1 off-field screen?

The Team Doctor will complete an HIA1 off-field screen on a player when indicated unless the Team Doctor assigns this responsibility to the Match Day Doctor (MDD) prior to the commencement of the match. The Team Doctor can, in cases of emergency, assign off-field screen responsibility to the MDD during a match. If the MDD completes the off-field screen the responsibility for the return to play decision rests with the MDD.

In Sevens, the HIA will be completed by the Team Physician, Match Day Doctor or World Rugby Tournament Team Physician.

8. When does a player fail or have a positive off-field HIA1 assessment?

A player has an abnormal off-field HIA1 assessment and must NOT return to play if:

- the player answers "Yes" to one or more symptoms **or**
- the player answers one or more memory questions incorrectly **or**
- the player scores below baseline or below identified Rugby norms for SAC assessment **or**
- the player fails the balance test (Tandem stance – 4 or more errors, Single leg stance – 6 or more errors) **or**
- the player exhibits an abnormal sign as observed by the Team Doctor **or**
- the doctor performing the off-field screen has any clinical suspicion of a concussion.

Any clinical suspicion of concussion by the doctor performing the off-field HIA1 assessment for any reason should see the player removed permanently from the match, even if the off-field HIA1 assessment is normal.

If a player reports a positive answer to any part of the off-field screen test that can be explained by an alternate reason rather than a head injury, the team doctor does retain the ability to over-rule the abnormal off-field HIA1 assessment in consultation with the Match Day Doctor. In this case an explanation must be recorded on the HIA1 form identifying the reason for this over-ruling decision.

9. What is the role of the MDD (independent doctor) and what role does the MDD play in the decision on fitness to return to play? How is independence defined with respect to the MDD?

The MDD will observe the off-field screen with the Team Doctor delivering the off-field screen unless assigned this responsibility by the Team Doctor. If the MDD is assigned the responsibility for undertaking an off-field screen by the Team Doctor, the MDD will complete the off-field screen and be responsible for deciding return to play.

If the MDD completes an off-field screen because there are two players requiring an off-field screen at the same time, then the Team Doctor will retain the decision-making responsibility regarding return to play.

If a player is cleared to return to play or returns to play but the MDD is concerned or notices signs, or the player complains of symptoms suggestive of concussion, a discussion between the Team Doctor and MDD should be undertaken. Every effort should be made to arrive at a consensus around management of individual cases. If a dispute persists, the MDD has the right to request another off-field screen independent of the Team Doctor or to unilaterally remove the player from the field, this should not be done without extensive discussion with Team Doctor.

If the player has any indication for permanent removal from the field of play (as listed above) then there is no dispute, the player must be removed from field of play.

Each nominated competition or tournament is able to determine if 'independence' of the MDD is mandatory and if so, what is the definition of 'independence' for their competition or tournament.

10. Where should the HIA off-field screen be completed?

The off-field screen will be completed in the medical room. If the off-field HIA1 assessment cannot be completed in the medical room because the medical room is too distant from the field of play for an off-field HIA1 assessment to be performed within 12 minutes, the MDD, with the Team Doctors, will identify an agreed and appropriate area prior to the commencement of the match.

11. Can a player undergoing an HIA be replaced or substituted?

A player undergoing an off-field screen will be replaced for 12 minutes. The player will not be allowed to return to play until the 12 minutes has expired and if the player undergoing this off-field HIA1 assessment does NOT present themselves to the 4th official within the 12 minutes, the temporary

replacement becomes a permanent replacement. This 12-minute period refers to actual time not game time.

12. **What happens if a player has a head impact event just prior to half-time and requires an** off-field HIA1 assessment?

The off-field screen still must be completed within 12 minutes of leaving the field. The off-field screen cannot be delayed. The player must present to a match official prior to commencement of the second half or they will be considered a permanent replacement.

13. **What happens if a player will not co-operate with an** off-field HIA1 assessment?

A player failing to co-operate with an off-field screen will be assumed to have concussion and be removed permanently from the match.

14. **If the player has a head injury requiring further off field assessment and a co-existing blood injury how long is available to complete the off-field screen and control the bleeding?**

In this scenario, control of bleeding will be the priority however the off-field screen must be completed as soon as possible. If bleeding can be controlled, suturing should be completed after the off-field screen. The total time available is 17 minutes to complete both the off-field screen and control the bleeding

15. **If a player has a second off-field screen requested during a match, does this mean automatic removal from the match?**

No, a second off-field screen is not an automatic indication for permanent removal from the match. However, if a definitive diagnosis was not identified following the first off-field screen or the second assessment arises due to a low force impact incident then caution should be applied, and that player removed from further match participation.

16. **Are there any restrictions applied to the temporary replacement?**

No. A temporary replacement is not restricted in any game activities and can take a penalty kick for goal and a conversion attempt.

17. **What happens if a player undergoing an** off-field HIA1 assessment **does not return to the match?**

The injured player will be considered to have been replaced for an injury and the temporary replacement will become a permanent replacement.

18. **If a player is simultaneously removed as a tactical replacement and an off-field HIA1 assessment, can the player return to play?**

All players who are removed for an off-field HIA1 assessment MUST return to play at the 12-minute mark if cleared even if they have been tactically replaced. To be clear in this situation if the player does not

return to the field of play, they are considered permanently removed because of a failed off-field screen.

19. If a player is removed from play for an off-field HIA1 assessment and that team have exhausted all of its substitutions, is a temporary replacement allowed?

Yes, if all substitutes have been exhausted a temporary replacement for head injury is allowed.

If a player requires permanent removal following a head impact event, irrespective of the medical room classification, that is immediate & permanent removal or off-field HIA1 assessment, the player who is the temporary replacement will be permitted to remain on the field even if the injured player does not return after expiry of the 12 minute off-field period.

To be clear a tactically substituted player can return to play to replace a head injured player, even if other replacements have not been used.

20. What is the role of the opposition medical team in the off-field HIA1 assessment process?

Medical and non-medical staff from opposing teams cannot request an off-field HIA1 assessment on players that are not within their team. Suggestions or comments regarding an off-field HIA1 assessment for another team's member should not be made.

21. What is the role of non-medical team staff in the off-field HIA1 assessment process?

Non-medical staff can alert their respective team medical staff that they have seen an incident that suggests an off-field HIA1 assessment or permanent removal. Non-medical staff cannot call for an off-field HIA1 assessment, this must be done by medical staff. Non-medical staff cannot overrule or question a call for an off-field HIA1 assessment requested by the on-field medical staff, MDD or referee.

22. What happens if the player has a simultaneous injury?

Apart from a blood injury the assessment of a simultaneous injury and the off-field HIA1 assessment must be completed within the 12-minute period allowed for the off-field HIA1 assessment or the replacement will become permanent.

23. What are the follow up processes for the off-field HIA1 assessment?

All players who have an off-field HIA1 assessment completed during a match irrespective of the outcome must have:

a. A post-match, same-day assessment using the HIA2; and
b. Follow up assessment using the HIA3 which incorporates a computer neuro-cognitive assessment is completed between 36-48 hours following the injury.

24. Can the off-field HIA1 assessment be used to diagnose a concussion?

The presence of a Criteria 1 sign or symptom confirms a diagnosis of a concussion and the player must be immediately and permanently removed from further game participation and complete a GRTP. An

abnormal off-field HIA1 assessment supports a suspected concussion and the player is removed from further game participation. The follow up HIA2 may confirm an early diagnosis of concussion if abnormal and or an HIA3 if abnormal confirms a late diagnosis of concussion.

25. How should I interpret the HIA Form 2 result?

The HIA2 form is the SCAT 5. This tool is used to support the clinical diagnosis of the Team Doctor at that point in time. Any negative deviation from baseline data or normative data should be considered supportive of early diagnosis of concussion.
In the absence of baseline testing any one of the following should be considered strongly in favour of a diagnosis of concussion:

- Immediate Memory – score 15 or fewer correct answers
- Concentration score (digits backwards and months in reverse) – 2 or fewer correct answers
- Delayed recall score - 3 or fewer correct answers
- Balance – Double leg stance – 1 or more errors, Tandem stance – 4 or more errors
- Any athlete with any symptom declared in the symptom list which is not usually experienced by the player following a Rugby match or training is strongly in favour of concussion.

A normal HIA2 and clinical assessment (post-match, same day) does not exclude a concussive episode. It is possible for players to develop delayed symptoms and signs related to concussion, day or days after a head impact incident. The HIA process requires a normal HIA3 and clinical assessment at 36-48 hours to completely exclude a concussion.

26. If an off-field HIA1 assessment is called by a team's on-field staff, can this be cancelled by other on-field staff?

Once the team's on-field medical staff member calls an off-field HIA1 assessment and it is acknowledged by the referee, then it must be completed. To be clear, a requested off-field HIA1 assessment by a team's on-field medical staff cannot be cancelled.

27. Which players are required to undertake a Graduated Return to Play (GRTP) programme?

Players diagnosed with concussion during the match, after the match whilst at the ground or at the 36-48 hour follow up MUST go through a Graduated Return to Play (GRTP) programme that must be started at least 24 hours after the injury.

28. How do I manage a player who presents after the match with concussive symptoms? What off- field screen form should be used?

If a player does not have an off-field assessment during the match but has signs or presents with symptoms suggestive of concussion after the match and at the stadium a HIA2 Form should be completed before leaving the stadium. This should then be followed up at 36-48 hours with the HIA3.

If a player does not have an off-field HIA1 assessment during the match but presents with symptoms suggestive of concussion after leaving the stadium but within 48 hours of the match, this player should be assessed using the HIA3 Form.

29. What happens if a player has a suspected concussion at training?

If a player suffers a suspected concussion during training, 'Recognise and Remove' should be employed, the payer should be removed and not returned to training. Appropriate immediate medical attention should be employed.

After training, the player should be evaluated with a HIA2. The player should undergo a HIA3 36-48 hours post-training. And if at either stage a concussion is diagnosed a GRTP should be completed.

30. What happens if a player presents with a suspected concussion after training?

If a player presents to medical staff after a training session, this is dealt with similarly to a delayed presentation post-game. If the presentation is within 2 hours of the training session, then a HIA2 assessment is performed with subsequent HIA3 at 36-48 hours. If the presentation is outside of 2 hours post-training a HIA3 assessment should be completed.

31. I have a player who sustains a head and neck injury and the player has an emergency evacuation. What HIA Form should be completed on this player in conjunction with a clinical assessment?

In this instance, an off-field HIA1 assessment is not necessary as the player has been permanently removed from play. A HIA2 and or HIA3 Form should be used to support the clinical diagnosis in this instance.

32. When can a player return to play after a diagnosed concussion?

As per World Rugby Regulation 10, any adult player with a diagnosed concussion:

- must be immediately and permanently removed from training or the field of play; and
- should be medically assessed by an appropriately qualified person (as applicable in the relevant jurisdiction); and
- must not return to play in the same match; and
- must rest for at least 24 hours and must not return to play or train until symptom free; and
- must undertake a graduated return to play program, which must be consistent with World Rugby's GRTP Protocol applicable to adults.

33. What is meant by 'rest'?

The definition of rest is dependent on the time following the injury

- Rest after a diagnosed concussion and within 24 hours of the injury means normal activities of daily living which do not worsen symptoms, vigorous activity should be avoided. Relative cognitive rest, limiting screen time etc.- ensure symptoms continue to improve or remain absent.
- Rest after the initial 24 hours should be relative rest which is defined as "activity below the level at which physical activity or cognitive activity provokes symptoms".

34. Is there any evidence from research that the pitch side interventions have had a positive impact?

Prior to the introduction of temporary replacement for head injuries and standardization of pitch side head injury assessment, evidence confirmed that 56% of players with a confirmed concussion were returning to play on the same day following their injury. Research has confirmed that since introducing the HIA Protocol this number has reduced to less than 8%.

Appendix 1 – HIA Definitions

Criteria 1 signs and symptoms

The following signs and symptoms are Criteria 1 and indicate that a player must be immediately and permanently removed from further match participation:

- Confirmed loss of consciousness
- Suspected loss of consciousness
- Convulsion
- Tonic posturing
- Balance disturbance / ataxia
- Clearly dazed
- Player not orientated in time, place and person
- Definite confusion
- Definite behavioural changes
- Oculomotor signs (e.g. spontaneous nystagmus)
- On field identification of signs or symptoms of concussion
- Under-19, recognise and remove

Criteria 2 signs and symptoms

The following signs and symptoms are Criteria 2 and indicate that a player must be removed for an off-field assessment:

- Head impact event where diagnosis is not immediately apparent
- Possible behaviour change
- Possible confusion
- Injury event witnessed with potential to result in a concussive injury
- Possible transient Criteria 1 sign e.g. possible balance disturbance / ataxia
- Other symptoms or signs suggesting a suspected concussion

The time allowed for this off-field assessment as identified in Law 3 is 12 minutes.

Confirmed Loss of Consciousness

A confirmed loss of consciousness is identified by a medical or healthcare professional when a player is not responding to orders and not moving apart from reflex movement such as tonic posturing and convulsions or is not orientated in time, place or person.

Suspected Loss of Consciousness

A loss of consciousness should be suspected if one or more of the following is observed following a witnessed head impact event:

- Cervical hypotonia (loss of head control) immediately post head impact.
- Failure of the player to protect himself/herself during the fall to the ground
- If player is already on the ground the above criteria may be replaced by loss of control of the upper limbs

- Player remains lying on ground without purposeful movement for > 5 seconds

Ataxia / Balance disturbance

Ataxia is the inability to coordinate voluntary muscular movements. Typically, it manifests as unsteadiness when standing unaided, or difficulty walking steadily without support.

Clearly dazed

Stunned, having a blank or vacant stare following a head impact event. Slow responses to questions or directions

Tonic Posturing

A player has tonic posturing if he/she has extension of one or both forearms (typically into the air) for a period lasting up to several seconds after a head impact event

Appendix 2 – Team and Match Day Medical Staff Procedures

UNDERSTANDING THE 3-STAGE HIA PROTOCOL

Figure 1 on the following page summarises the HIA Protocol identifying when each Stage arises and when these Stages are entered by a player displaying suspicious signs or reporting suspicious symptoms.

CRITERIA 1 IDENTIFIED – PROCEDURES

If the independent match-day doctor identifies, from the side-line or on video, a suspicious head impact event resulting in a possible or probable Criteria 1 sign then the decision of the MDD is simply that the player be removed.

A second video review is then undertaken with the MDD and Team Doctor present. If HIA1 immediate removal criteria (Criteria 1) are identified, the player is permanently removed from play without further evaluation. If there are no Criteria 1 signs evident on video, the player undergoes the off-field assessment supported by the screening tool.

If after viewing the video there is a dispute between the Team Doctor and MDD regarding the presence of a Criteria 1 sign the off-field HIA1 assessment is completed. If the off-field screen is abnormal the player is removed. If the off-field screen is normal and the MDD still believes a Criteria 1 sign is evident then the video is reviewed again with both doctors' present. If after this second viewing the dispute continues the MDD has the power to unilaterally and permanently remove the player from the game.

MATCH DAY DOCTOR RESPONSIBILITIES

Each nominated competition or tournament is able to determine if 'independence' of the MDD is mandatory and if so, what is the definition of 'independence' for their competition or tournament.

PRE-MATCH DUTIES

- Confirm location where off-field HIA1 assessment will be performed with the Team Doctors, match officials (referees) and the Match Commissioner
- Confirm with both Team Doctors who will be undertaking the HIA (Team Doctor can assign responsibility and decision making for HIA to the MDD).
- Prepare CSx (side-line) software by entering game details and Maddocks Questions for both teams
- Confirm with Match Officials and Team Doctors the hand signal indicating that a player is leaving the field with a head injury - head touched on three occasions.

DURING MATCH

- Support Team Doctor with identification of suspicious events
- If Criteria 1 sign identified request player be removed from play and review video to confirm or exclude Criteria 1 sign. No unilateral decision by the MDD can be made at this point in time.
- Observe the Team Doctor undertaking an HIA unless assigned responsibility by the Team Doctor to perform the HIA.
- If MDD disagrees with a decision to return a player to play this MUST be raised with the Team Doctor. The MDD does have the power under Regulation 15.2.1 (d) to unilaterally remove an injured player from further participation in a game. It is strongly recommended that this be done only following discussion and consultation with the Team Doctor.

POST-MATCH DUTIES

- Confirm that all players who have undergone an HIA1 off-field screen during a match irrespective of the result have completed a post-match, same-day assessment using the World Rugby HIA Form 2.
- Complete the HIA2 Form if requested by the Team Doctor or observe completion of the HIA2 Form by the Team Doctor. If completed the Team Doctor must sign to confirm the diagnosis.
- If the MDD completes the HIA2 Form, they will not be responsible for undertaking the neurological assessment or determining the clinical diagnosis.

Appendix 2 – Team and Match Day Doctor Flowchart Explanation

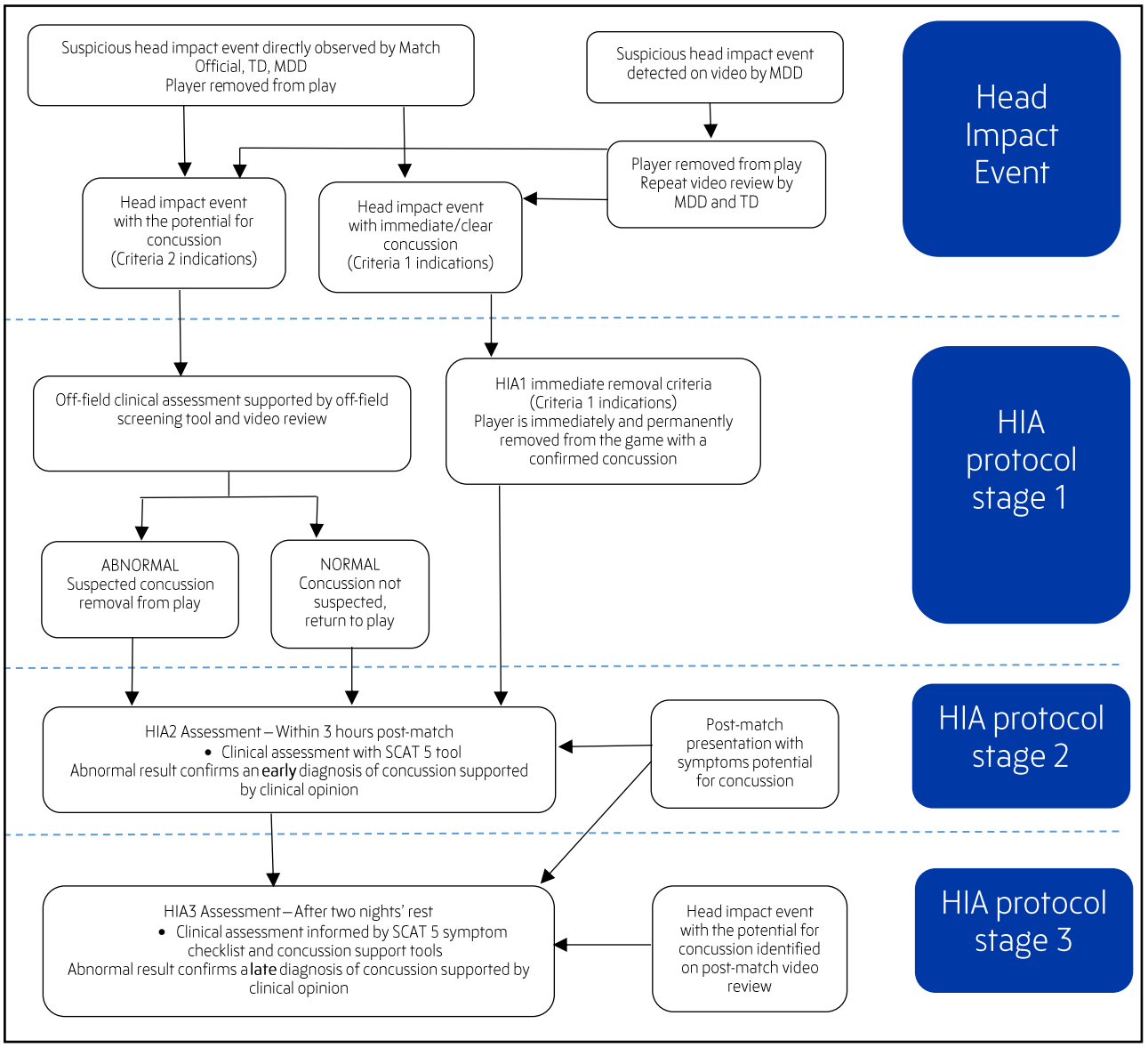


Figure 1. Summary of the HIA protocol for evaluating head impact events with the potential for concussion

Application for use of HIA and use of temporary substitutions/replacements

HIA

Appendix 3 – Application for the use of HIA and use of temporary substitutions/replacements

Temporary replacement for head injury assessment was introduced permanently into Law in August 2015. This application form should be completed after reading: World Rugby Head Injury Assessment (HIA) Protocol; Law 3.26 and Regulation 10.

Tournament / competition	
Name of applicant	
Applicant's role	
Date of application (dd/mm/yyyy)	
Tournament/competition dates	

Please answer sections 1, 2 and 3 by ticking the Yes or No column. Any further information can be provided on Page 3.

1. TOURNAMENT AND MATCH ORGANISERS PLAYER WELFARE STANDARDS

Tournament Organisers or Match Organisers wishing to access temporary replacement for head injury assessment (HIA) must apply to World Rugby for approval.

A Premium level of Mandatory Player Welfare Standards 1 - 5 will apply to the following competitions:

1. Rugby Championship
2. Six Nations
3. Guinness Pro 14
4. European Club Rugby Champions Cup (EPCR)
5. Gallagher Premiership
6. Top 14
7. Super Rugby
8. Top League (Japan)
9. All World Rugby elite adult competitions

	Mandatory Player Welfare Standards for Premium Competitions	YES	NO
1	They will implement mandatory injury surveillance programs compliant with Consensus Statement		
2	There will be mandatory presence of a MDD to access HIA		
3	Has the nominated competition defined 'independence' with respect to their MDD		
4	The following minimum game video standards will be adhered to: • Live and delayed (10 seconds) views • Minimum 4 views (broadcast + 3 others – ideally high wide view) • Ability to mark incident • Ability to stop / rewind / slow down / replay vision • Availability of sound or sports ears		
5	There will be compulsory World Rugby representation on HIA Review Process		

For ALL competitions, Mandatory Player Welfare Standards 6 - 9 must be confirmed as being in place.

	Mandatory Player Welfare Standards for all Competitions	YES	NO
6	The Tournament or Matches in question are elite adult tournament or matches.		
7	The Core (mandatory) Concussion Player Welfare Standards outlined at Section 2 have been included in Terms of Participation or Tours Agreement documents signed by all participating unions or teams.		
8	They have facilitated the establishment of an HIA REVIEW PROCESS (HRP) that is in line with the process recommended and outlined in HIA Protocol document and Appendices		
9	They have facilitated access to video to assist with the management of head impact events occurring during games.		

Application for use of HIA and use of temporary substitutions/replacements

HIA

2. UNION AND TEAM PLAYER WELFARE STANDARDS

Tournament Terms of Participation or Tour Agreements must include the following union and team responsibilities. The Tournament Organiser is responsible for confirming that Union and teams are aware of these responsibilities and have agreed to adhere to these Player Welfare Standards.

	Mandatory Player Welfare Standards - Union and Teams	YES	NO
1	All on-field team medical staff and Tournament match day medical staff have completed the following World Rugby online education modules: • Concussion Management for Elite Level Match Day Medical Staff – need to identify the new MDD education requirements e.g. renewal every 2 years • Medical Protocols for Match Day Medical Staff • Mindset - A Mental Health Resource They must also have completed the following face-to face course: • Level 2 Immediate Care in Rugby or equivalent Confirmation of completion of education modules is available by contacting mark.harrington@world.rugby		
2	All players and team management have completed a concussion education session (delivered by the Union CMO or relevant team doctor) within the year prior to commencement of the Tournament. This education session as a minimum must cover the essential information outlined in the HIA Protocol		
3	Each player has completed a baseline concussion assessment in the year prior to commencement of the tournament and the results of this baseline are available to the team medical staff. As a minimum this baseline should be a SCAT 5 however it is recommended that teams also include a computer neurocognitive assessment as part of a player's annual baseline assessment.		
4	A concussion risk stratification (see HIA Protocol document and Appendices) has been completed on all players, at least annually, to support concussion management on an individual basis.		
5	All team medical staff, coaches and team management will comply with the World Rugby permanent and temporary removal from field of play criteria for head impact events (available in HIA Protocol document and Appendices and in the HIA Form 1).		
6	All team medical staff, coaches and team management will comply with a Graduated Return to Play programme as approved by World Rugby and/or the union in accordance with medical practice in the relevant jurisdiction.		
7	All teams within the respective tournament will participate in World Rugby HIA research and will confirm player consent has been obtained (HIA Protocol document and Appendices)		
8	All team staff acknowledge that an HIA REVIEW PROCESS has been established to support team medical staff to optimize player welfare and safety for game head injuries. Specifically, for incidents where criteria, identified in the HIA, for permanent and temporary removal from play following a head injury are not enforced review and education will be applied. Also, all team staff acknowledge that they will participate if requested in any HIA REVIEW PROCESS or if appropriate any disciplinary proceeding that may arise following this HIA REVIEW PROCESS.		
9	All team staff acknowledge that the Match Day Doctor has the power under Regulation 15.2.1(d) to unilaterally remove an injured player from further game participation.		
10	All teams agree to use or enter HIA (1, 2 and 3) data into the World Rugby App (CSx) unless exemption is provided by World Rugby		

Application for use of HIA and use of temporary substitutions/replacements

HIA

3. RECOMMENDED PLAYER WELFARE STANDARDS

The following union and team responsibilities are recommended and relate to concussion and other general medical issues and should be completed and included or referenced within each union's relevant medical policies, Tournament Terms of Participation or Tours Agreement and if included in these documents signed by participating unions and or teams.

	Recommended standards - concussion	YES	NO
1	Unions should define within their Concussion Policy an "approved healthcare professional" as appropriate to their jurisdiction. This "approved healthcare professional" would be suitable for determining concussion return to play decisions.		
2	Unions should define, 'advanced level of concussion care', within their Concussion Policy. Advanced care allows for a more individualised management of concussion. This level of care is essential for all adult elite players wishing to start a return to play programme without a week of physical rest. A definition guide to this 'advanced level of concussion care' is provided in HIA Protocol document		
	Recommended standards - general medical issues	**YES**	**NO**
3	Unions prior to all tournament or matches should confirm that all players have been assessed by appropriate medical staff as being medically, dentally and physically fit to attend and participate in a tournament or match.		
4	Unions should confirm that each player has completed the World Rugby cardiac screening questionnaire and cardiac examination as described in the World Rugby Cardiac Screening document. Each tournament is responsible for deciding if an ECG should be part of this cardiac screening process.		
5	Confirmation that all team medical staff have completed: **Keep Rugby Clean** or equivalent, anti-doping educational module **Keep Rugby Onside** or equivalent, anti-corruption educational module		

4. ADDITIONAL INFORMATION

If you have answered **NO** to any of the approval criteria or mandatory standards, then please indicate why and any steps you will be taking. Please also note any other issues which World Rugby may need to consider.

Please return to mark.harrington@world.rugby
This application will be reviewed by World Rugby Chief Medical Officer and Head of Technical Services

Appendix 4 – HIA Review Process

The HIA Review Process is an education, training and compliance support process developed to underpin player welfare and safety in elite adult rugby with respect to head injuries. This process will monitor adherence to the latest HIA Protocols.

This HIA Review Process, outlined in the accompanying flow chart, is required to be implemented by all Tournaments and Competitions seeking approval to access temporary substitution for head injury.

The key features of this process that must be implemented by all Unions and their Chief Medical Officers accessing temporary substitution by September 1, 2017 are:

1. Identification and appointment of a Union HIA Reviewer(s) – this appointment is to be made by each Union Chief Medical Officer for Competitions, Tournaments and Test Matches played by teams within their jurisdiction. This HIA Reviewer may be the Union CMO or their appointee and must have experience in head injury video review and concussion recognition and management. As a minimum, this Union HIA Reviewer must have completed World Rugby's on-line 'Video Interpretation' and 'Concussion' education modules. The HIA Reviewer will monitor adherence of practitioners to the current HIA Protocols and be the central contact person for Team Doctors and Match Day Doctors with respect to education and training.

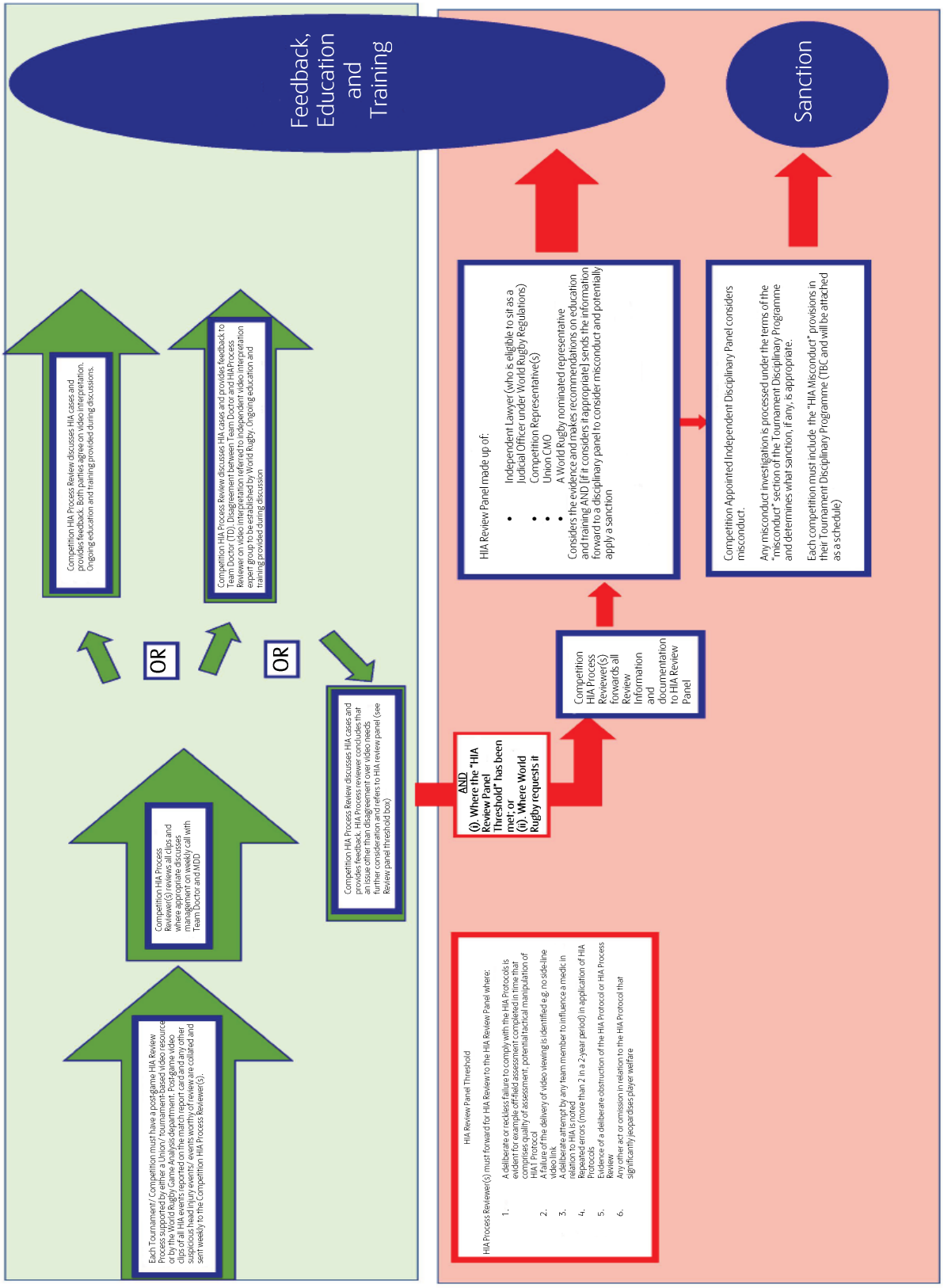
2. Confirmation regarding video-incident support. Each Union CMO must confirm whether all HIA and suspicious video incidents within their jurisdiction will be identified and 'clipped' by the Union's video support technicians or where this service is not available within a Union by World Rugby's Game Analysis department. Unions requiring support from World Rugby MUST contact Marc Douglas (marc.douglas@world.rugby) to coordinate this service.

3. Each Tournament and Competition must appoint an HIA Review Panel as a condition to access temporary substitution for head injury. This HIA Review Panel will become involved if the identified 'thresholds' (see flowchart) are breeched. The membership qualifications of this HIA Review Panel are also identified in the flow chart document. The possible actions arising from this HIA Review Panel for breech, of the Protocols are:
    - recommendation for further education and training for the team doctor
    - recommendation for the World Rugby HIA Working Group to consider an alteration in the process
    - referral to that Tournament or Competition's Disciplinary Committee.

4. This HIA Review Process will be supported by the appointment of a World Rugby independent video interpretation expert group. World Rugby will appoint three video interpretation experts from each hemisphere. A Union requiring the support of an independent video interpretation expert (as per the flow chart) will contact an expert from the opposite hemisphere to provide an opinion where an interpretation dispute exists. Disputes unable to be resolved by the independent video interpretation expert group will be referred to World Rugby's Chief Medical Officer.

The attached flowchart outlines the HIA Review Process.

Appendix 4 – HIA Review Process



Appendix 5 – Minimum education content, risk stratification guide advanced level of concussion care

The following are minimum issues that should be included when developing an annual concussion education program for players, coaches and team management:

- What is concussion?
- What are the common symptoms and signs?
- How is a concussion managed?
- What is a graduated return to play?
- What is a Head Injury Assessment (HIA)?
- How to treat concussion – what is meant by rest?
- Protect yourself, protect your team mate?
- What is new in concussion?
- Video interpretation (coaches only)

World Rugby has developed an education presentation appropriate for players, coaches and team management that is appropriate for Unions to deliver as their pre-tournament education session.

Risk Stratification – Example

When developing a concussion risk stratification system for players the following factors may be considered as part of the concussion risk stratification:

1. Players over the age of 30
2. Players under the age of 18
3. Players with a two or more concussions within the preceding 12 months
4. Players with a history of multiple concussion
5. Players with a history of multiple concussion with each subsequent concussion occurring with less force.
6. Players with unusual presentations or prolonged recovery

When undertaking a concussion risk stratification, medical staff are advised to consider all potential risk factors that may identify a high-risk athlete for both a concussion and a slow recovery.

Advanced Level of Concussion Care

The highest level of concussion care is supplied in an advanced care setting that would include at least each of the following:

- medical doctors with training and experience in recognising and managing concussion and suspected concussion; and
- access to brain imaging facilities and neuroradiologists; and
- access to a multidisciplinary team of specialists including neurologists, neurosurgeons, neuropsychologists, neurocognitive testing, balance and vestibular rehabilitation therapists.

An Advanced Level of Concussion Care are generally available within Professional Rugby teams and allow for a more individualized management of concussion.

Appendix 6 – HIA Review Process

A Graduated Return to Play (GRTP) programme incorporates a progressive exercise program that introduces a player back to contact training and play in a step wise fashion. Following a diagnosed concussion, the player should have physical and cognitive rest for at least 24 hours. Following this initial rest period, the player should be encouraged to become gradually and progressively more active whilst staying below their cognitive and physical symptom exacerbation thresholds.

If a player has symptoms prior to the concussive event, these must have returned to the pre-concussion level prior to commencing a GRTP.

For elite adult rugby players who are being monitored by experienced medical practitioners, each Stage of the GRTP should be for a minimum of 24 hours. The stages of the GRTP are shown in the table below.

World Rugby recommends that a medical practitioner or approved healthcare professional confirm that the player can take part in full contact training before entering Stage 5.

2017 RETURN TO PLAY RECOMMENDATIONS FOR THE ELITE ADULT PLAYER

- Each stage of the GRTP is for a minimum of 24 hours starting from the time of the injury.
- Players with symptoms present at 24 hours post injury, progress to Stage 2a. To be clear, if symptoms do not resolve within the Initial Rest (Stage 1) period then progression to symptom limited activities (Stage 2a) is recommended.
- Players who are symptom free following the Initial Rest (Stage 1) should progress to Stage 2b
- If any concussion-related symptoms occur during the stepwise approach, the athlete should drop back to the previous asymptomatic level and attempt to progress again after being free of concussion-related symptoms for a further 24-hour period at the lower level.

Appendix 6 – Graduated Return to Play (GRTP) Programme

EACH STAGE IS A MINIMUM OF 24 HOURS

Stage	Rehabilitation stage	Exercise allowed	Objective
1	Initial Rest (Physical and Cognitive)	Normal activites of daily living which do not worsen symptoms, vigorous activity should be avoided. Relative cognitive rest, limiting screen time etc- ensure symptoms continue to improve or remain absent. Symptoms must be absent before commencing Stage 2	Recovery
2a	Symptom-limited activities	This includes activities of daily living that do not provoke symptoms. Consider time off or adaptation of work or study.	Return to normal activities (as symptoms permit)
2b	Light aerobic exercise	Light jogging for 10-15 minutes, swimming or stationary cycling at low to moderate intensity. No resistance training. Symptom free during full 24-hour period	Increase heart rate
3	Sport-specific exercise	Running drills. No head impact activities	Add movement
4	Non-contact training drills	Progression to more complex training drills, e.g., passing drills. 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 sport	Normal game play	

Appendix 7 – Player Consent & Explanation

Please initial all boxes

Please initial:

1. I confirm that I have read and understand the information contained in the Head Injury Assessment Study Player Information sheet with regard to the processing of my personal information by World Rugby ☐
2. I give my consent to World Rugby to process my personal information for research purposes in the context of World Rugby's Head Injury Assessment Process. ☐
3. I understand that World Rugby may process information about me which is considered sensitive personal information and I consent to the processing ☐
4. I consent to World Rugby processing my information in order to depersonalize it for further research purposes ☐
5. I acknowledge that my personal information may be transferred to countries outside the European Economic Area (EEA) which may not have equivalent levels of data protection to the levels available within the EEA. I understand that appropriate safeguards are in place with respect to any such transfer of my personal information ☐
6. I understand that my participation in the study is voluntary and that I am free to withdraw my consent to the use of my personal information at any time by contacting World Rugby without giving any reason, without my medical care or legal rights being affected ☐
7. I understand that all the information provided on my injuries and training will be treated in strict confidence. ☐
8. I agree to take part in the above study. ☐

Name of participant [BLOCK CAPTIALS]	Date	Signature
Name of person responsible for obtaining consent [BLOCK CAPITALS]	Date	Signature

Consent form date of issue: [2017] Consent form version number: Version 1.2

Appendix 7 – Player Consent & Explanation

Dear player,

The health and safety of players is a top priority for World Rugby.

Head injuries are an important problem and World Rugby is constantly aiming to improve their management.

We would therefore like to ask if you would allow your information to be used in a research study evaluating World Rugby's Head Injury Assessment Process.

Please could you read this information sheet carefully and then decide if you are happy for us to use your personal information to investigate how well the Head Injury Assessment process is working. We endeavor to ensure that your information is de-personalized before using such information for research purposes.

If so, please complete the attached consent form and return it to the World Rugby Head Injury Assessment Competition Coordinator.

Why are head injuries important?

Head injury is an important problem in elite rugby. Very rarely a serious head injury resulting in structural brain damage will occur that needs immediate emergency treatment. A milder form of head injury, termed concussion, occurs more often. A concussion is a brief disturbance in brain function, without causing any structural brain damage. Symptoms of concussion, which include headaches and loss of concentration, memory and coordination, are usually temporary and typically resolve within 7 days. Concussion can lead to a number of short-term consequences relevant to Rugby:

1. Decrease player performance which can lead to physical and tactical errors,
2. Decreased attention and reduced anticipation may lead to an increased risk of further injuries,
3. Further concussions may increase symptoms and delay recovery
4. Rarely, the occurrence of a second concussion, shortly after an initial concussion, may lead to very serious brain swelling, called 'second impact syndrome'.

To avoid these problems, it is important to identify any players with suspected concussion, stop them playing, and have them leave the field.

How are suspected head injuries managed in elite Rugby?

Any player who suffers a blow (either directly or indirectly) with the potential for causing a head injury will be managed by World Rugby's Head Injury Assessment protocol. The Head Injury Assessment process was introduced as a Global Law Trial in 2012. The process has been designed to improve the management of head injuries, including concussion, during elite Rugby matches and will identify 3 groups of players:

1. **Concussion obviously or clearly suspected:** Players exhibiting clear signs of head injury, such as unconsciousness or seizures, will receive the necessary emergency treatment and will be immediately and permanently removed from play.
2. **Head injury diagnosis not immediately obvious:** Players suffering head trauma where the diagnosis is not immediately obvious, will undergo a short off-field medical assessment. Testing will consist of brief assessments of symptoms, balance, memory and orientation. Assessment will be undertaken in a quiet place and will last up to 12 minutes. During the assessment a temporary player substitution is allowed. Positive findings on any of the tests result in concussion being suspected and the player will be removed from play for the rest of the match. Players may also be removed if the tests show no signs of concussion but the doctor conducting the assessment suspects the player may be concussed. If a doctor decides that the player is definitely not concussed, the player can return to the match.
3. **Development of concussive symptoms after the match:** The signs and symptoms of concussion may appear soon, or even up to 24-48 hours after the match. If this happens, the player will need to take a standard assessment to confirm the diagnosis. The players identified in 1 and 2 above will also undertake the standard follow up assessments given to players who show symptoms soon after the match and 24-48 hours after the match.

There is no change to the usual post-head injury return to play protocols.

What is the Head Injury Assessment Study?

This study will investigate how well the Head Injury Assessment process is working and to identify any areas where management of concussion can be improved.

We would like to use information that is collected by team doctors as part of the Head Injury Assessment process. As well as the assessments usually completed by the team doctors, the World Rugby Game Analysis Department will identify incidents where players may have suffered a head injury during a game. This is conducted by reviewing video footage of games, which in turn may involve the processing of your personal data. These incidents will be brought to the attention of team doctors and they will be asked to give feedback on the incident, which may involve the processing of player personal data. This may result in the player undergoing an assessment for concussion after the game.

This information will be used to determine how good the off-field assessment is at identifying concussion, and whether the Head Injury Assessment Process works as planned.
The Head Injury Assessment study will not change your management following a head injury in any way; and will not result in any extra information being collected.

The study has been independently reviewed by an expert committee to ensure that all research procedures are safe and ethical.

How would my information be used?

Your personal information is used by World Rugby for the purpose of concussion research. Only information collected by your team doctor as part of the Head Injury Assessment process, and video footage reviewed by the World Rugby Game Analysis Department, will be used by World Rugby. This

information may include, for example, de-personalized medical information relating to suspected concussion collected by the team doctor; and physical information observed via video footage. Some of the information collected as part of the Head Injury Assessment process may be considered sensitive personal information about you. We endeavor to ensure that your personal information is de-personalized before using such information for research purposes.

All information collected by team doctors will be submitted to a competition coordinator, who is a person independent from World Rugby who has been assigned to gather the information for individual competitions or areas. The competition coordinator will enter information collected into a database where it will be stored securely. Only competition coordinators will have access to specific player information, Project personnel will not have any access to it.

World Rugby will retain your information for the duration of this research project. If you no longer want World Rugby to use your information which it controls as part of the Head Injury Assessment process, you may contact info@world.rugby

Some of your information may be transferred to a country outside of the European Economic Area. When your information is moved from your home country to another country, the laws and rules that protect your personal information in the country to which your information is transferred may be different from those in the country in which you live and may not provide the same data protection safeguards.

Who is in charge of this study?

The person with overall responsibility for this study is the World Rugby Chief Medical Officer. The research study is being conducted by a team with expertise in Sports medicine, statistics, and concussion.

What do I do now?

If you are happy for your information to be used for the above purposes, please complete the attached consent form. We rely on your consent to carry out this processing and your participation in this research is optional. You have the right to withdraw from the study at any time without consequences. To do this you only have to report your withdrawal to Dr Éanna Falvey by sending an email to eanna.falvey@world.rugby

If you would like to access, limit, or delete your personal information you can do so by contacting World Rugby. Upon request, World Rugby will let you know whether we hold any of your personal information. In certain cases where we process your information, you may also have a right to restrict or limit the ways in which we use your personal information. In certain circumstances, you also have the right to object to the processing of your personal information, to request the deletion of your personal information, and to obtain a copy of your personal information in an easily accessible format.

If you have questions or suggestions about your information and our use of it for this research, you can contact the Head of Technical Services at World Rugby. Without prejudice to any other rights you may have, you may file a complaint with the Irish Data Protection Commissioner, which is World Rugby's supervisory authority

Please complete the study consent form to confirm your agreement to submit data to the Head Injury Assessment Study.