



Introduction

The Head Injury Assessment (HIA) Protocol is a four-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 is made up of the following four stages:

- Stage 1 – in-game assessment which includes use of the HIA1 Form.
- Stage 2 – post-game, same day assessment which includes use of the HIA2 Form.
- Stage 3 – 36-48-hour post-head impact event assessment which includes use of the HIA3 Form.
- Stage 4 – clearance to return to full play following completion of individualised rehabilitation which includes use of the HIA4 Form.

This document contains the following:

1. HIA Protocol Explanation
2. HIA Procedures
3. Appendices
 - Appendix 1 – HIA Procedures, Frequently asked questions
 - Appendix 2 – HIA Definitions
 - Appendix 3 – Procedures for Team and Match Day Medical Staff
 - Appendix 4 – HIA protocol in Sevens Rugby
 - Appendix 5 – **Application for the use of HIA and use of temporary substitutions/replacements**
 - Appendix 6 – HIA Review Process Explanation and Flowchart
 - Appendix 7 – **Minimum education content and advanced level of concussion care**
 - Appendix 8 – **HIA Player consent and Research explanation**

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 HIA Protocol is not just an off-field assessment (HIA1), it is a combination of clinical signs, observable video signs, instrumented mouthguard alerts and clinical assessment which facilitate a comprehensive multi-modal and multi-point in time concussion assessment. The HIA Protocol is electronically supported by the Specialised Concussion Rugby Management (SCRM) application. The SCRM app is used by World Rugby for the HIA process in approved competitions and allows for the effective and standardised logging of HIA assessments (baseline and post-head impact event), individualised rehabilitation stages and assessments, and an independent concussion consultant (ICC) consultation referral if needed. A user guide to the SCRM application may be found [HERE](#) or downloaded [HERE](#).



The ability to access the HIA Protocol is based on World Rugby approval and is only used in competitions or fixtures that meet specific minimum criteria set out by World Rugby. Competition organisers or Unions must apply to use the HIA via the World Rugby HIA application process outlined in appendix 4. Competition organisers or Unions agree to uphold the player welfare standards outlined in the application document. This includes agreeing that all players will comply with the HIA protocol in full. Those players who do not comply fully with the protocol at any stage in the protocol (i.e. the HIA1 off-field assessment) will not be permitted to partake in that assessment.

The four-stage HIA Protocol consists of:

Stage 1 – HIA1 off-field Assessment:

In stage 1, players who sustain head impact events with the potential for a concussion are identified by Match Officials, Team Doctors, pitch side medical practitioners or Independent Match Day Doctor (MDD). The identification is via direct observation, video review or instrumented mouth guard (iMG) data.

The HIA1 off-field assessment has five components:

- a. 12 immediate and permanent removal criteria (known as Criteria 1 indications)
- b. an objective assessment of head accelerations via iMG data
- c. an off-field assessment tool
- d. pitch-side video review
- e. clinical evaluation by the attending doctor

The HIA1 assessment is therefore not solely an off-field assessment tool, but a series of a multi-modal assessments.

Players displaying obvious on-field signs of concussion (Criteria 1) are immediately and permanently removed from play, and the completion of the off-field assessment tool is not required. Players who exhibit Criteria 1 on-field signs are diagnosed as concussed. The player should be evaluated in the medical room by either the Team Doctor or MDD to identify if further investigation or management of their injury is necessary during the game.

Criteria 2 cases are removed for an off-field assessment when players have the potential for concussion (Criteria 2 signs – clinical indicators) or when head accelerations measured by an iMG exceed an identified threshold. A player who has an identified Criteria 1 sign and an iMG alert is managed as a Criteria 1 sign. The use of iMGs in the premium level HIA protocol is necessary to access the HIA1 off-field assessment – the requirements are outlined [HERE](#). In a small number of cases, players may have a medical exemption which precludes the use of an iMG, this must be formally referred to Lindsay Starling lindsay.starling@worldrugby.org at the latest, 48 hours prior to match day.



This World Rugby off-field assessment tool is a re-formatted version of the Sports Concussion Assessment Tool (SCAT) recommended by experts from the international concussion consensus conferences. This off-field assessment tool includes a check of symptoms, memory assessment and balance assessment, as well as an evaluation of video footage of the event. The SCAT tool has been regularly updated following concussion consensus meetings when new evidence is available. This is reviewed by the Independent Concussion Working Group, and combined with World Rugby Research to inform the HIA tool. The SCAT and HIA tools therefore change intermittently, but in this document will be referred to as 'SCAT' and 'HIA' respectively. Results of the HIA are compared to an individual's previously conducted 'baseline assessment', or to a normative result if an individualised baseline is not available. An abnormal off-field assessment 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 who is clinically suspected to have concussion must be removed from the game. To be clear, a clinical opinion supporting a suspected concussion may over-rule a normal assessment.

The Team Doctor has the primary responsibility for conducting the off-field assessment but can delegate this role to the Independent Match Day Doctor and should be determined pre-game. All return to play decisions must be discussed with the Independent Match Day Doctor who has ultimate oversight and decision-making with respect to return to play. The off-field assessment is conducted in the stadium's medical room or another agreed venue if the 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 and the 12-minutes should begin when the player crosses the sideline to leave the field of play.

A player who has undergone an HIA1 off-field assessment and has been cleared to return to play must report to the 4th official within the 12 minute time-period but will not be allowed to return to play until the 12-minute period has expired. If during the evaluation of a head injury there is a blood injury requiring suturing the time allocated for dealing with the blood injury and the off-field assessment is 17 minutes.

Where a team needs to carry out 2 simultaneous HIA off-field assessments, the Team Doctor should perform one assessment whilst the Independent Match Day Doctor undertakes the other assessment. The Team Doctor and Independent Match Day Doctor will discuss both cases at the summary stage before making a final decision.

In the unlikely event of three or more suspected head injury events occurring within the same time-period, if there is an appropriately qualified medical team member available with prior experience of undertaking HIA assessments (Immediate care lead or video match day doctor), and there is an appropriate area to perform the test (medical room) then they may perform the HIA1 off-field assessment but must again discuss the outcome with the Team Doctor and Independent Match Day Doctor at the summary stage prior to making any decision.



If there is not a suitable member of the medical team available, the player must await either the Team Doctor or the Independent Match Day Doctor to be available to undertake the assessment. In this scenario, extra time is made available for this assessment so that the player has a maximum of 17 minutes for the assessment i.e., they may return at 12 minutes if their assessment is finished, but have an additional 5 minutes if required.

Video review has three roles in the HIA1 off-field assessment. Firstly, during play, the Independent Match Day Doctor 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 both the MDD and Team Doctor present. If HIA1 immediate removal criteria (Criteria 1) are identified, the player is permanently removed from play without the need for the HIA1 off-field assessment. If there are no Criteria 1 signs identified and agreed, the player undergoes the off-field assessment supported by the assessment tool. Finally, the video of the incident is reviewed again after the off-field assessment prior to any decision being made regarding return to play.

In 2024 the World Rugby Independent Concussion Working Group developed an updated [Head Impact Monitoring Programme](#). These recommendations include mandatory use of iMG technology to measure head impact exposure (acute and chronic) in elite level rugby. The Executive Board supported these recommendations, including the use of iMG alerts as part of the HIA protocol. Understanding head impact load requires an accurate capture of training load as well match load. Players are required to use their iMG in all training and play where a head impact might occur. Access to the HIA1 off-field assessment will be restricted to those players who are compliant with iMG use. Players are eligible to access HIA1 on match day provided they meet the following three criteria on each match week:

1. Have worn their iMG during the preceding weeks training: Players are to wear their iMG in all training sessions where there is a chance of a head impact event. A means of defining this would be all training sessions where a rugby ball is involved. Usage will be monitored by the Competition Compliance Liaison on a weekly basis.
2. Be wearing their iMG at start of match: The pitch-side official will assess this through the iMG portal using their iPad or tablet. This assessment is carried out digitally through the App, not through a physical examination.
3. Have worn their iMG for at least 50% of their match time preceding the incident: The MDD will be presented with this information on their iPad or tablet when they carry out the HIA1.

Players who are not compliant with iMG use will be managed as ‘Recognise and Remove’, if following a head impact event a concussion is suspected, the player will be removed from play and may not return. An HIA2, HIA3 and following individualised rehabilitation, a HIA4 must be completed for the player.



Management of suspected concussion in 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 HIA1 off-field assessment. They must be removed from further participation in that game i.e. 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 still follow the HIA Process as described using the HIA2 and HIA3. Players who are confirmed to have a concussion should follow their Unions individualised rehabilitation protocols.

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 includes players who are criteria 1 cases and who do not complete the HIA1 off-field assessment tool). Ideally the HIA2 should be completed at the ground and by the person who completed the HIA1 or the Team Doctor. The HIA2 is performed using the SCAT tool supported by player baselines or normative rugby baseline values. The HIA2 assessment also provides an opportunity to discuss the events surrounding the player removal. If there is disagreement about an HIA1 assessment or Criteria 1 event it should be discussed and clarified at this stage.

The HIA2 assessment is also the most appropriate test for a suspected concussion occurring outside of a game, for example, during training for players 19 or over.

Sevens Rugby

In Sevens Rugby matches are played over a weekend (2-3 days). The HIA protocol for Sevens Rugby is therefore slightly different to other versions. A player who suffers a Criteria 1 event, they will not play again in the tournament and will have HIA2 and HIA3 as normal. A player who has a suspected concussion and an off-field assessment has their HIA2 within 3 hours of the game, but also has a second HIA2 the next morning. If both HIA2s are normal and the examining doctor is satisfied there are no clinical signs or symptoms of a concussion, the player may play on day 2 of the event. The player continues and has a HIA3 the next day (36-48 hours after the event). This process is outlined in appendix 4.

Stage 3 - HIA3 Assessment - identifies a late-onset concussion:

In stage 3 further medical testing is performed after two nights' rest (36-48 hours post-head impact event) to further assess clinical progress and identify a **later** diagnosis of concussion (HIA3 clinical assessment). This HIA3 assessment consists of a clinical assessment supported by the SCAT and which maybe supported by an additional computerised neuro-cognitive assessment tool of each team's choice (e.g. CogState Sport or 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.

Confirming a diagnosis of concussion

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 if a clinical diagnosis of concussion is made supported by a HIA2 or HIA3 result which is worse than the player's baseline (or if baseline unavailable normative data) or the treating practitioner has clinical suspicion of a concussion, at any time during this process.

The HIA protocol allows for a diagnosis of concussion to be made immediately (Criteria 1) following a head impact event. However a diagnosis of concussion cannot be excluded following a head impact event until both HIA2 and HIA3 assessments are completed and are assessed as being normal with no clinical suspicion of concussion.

Stage 4 – HIA4 Assessment – confirms completion of individualised rehabilitation and clearance to return to play:

Stage 4 is completed when the player has completed individualised rehabilitation which is outlined in detail below. The player will also have completed neurocognitive testing by this stage. Where indicated, the player will have completed an Independent Concussion Consultant review prior to completing full contact training. Once the player has completed their individualised rehabilitation the Team Doctor must complete the HIA4 to 'close' the case. This has particular importance as the SCRM application will automatically register the length of each individualised rehabilitation and a recovery lasting >21 days indicates a concussion history regardless of the number of concussion events a player has suffered.



SUMMARY

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

HIA1 off-field assessment containing

- Criteria 1- indications for immediate and permanent removal from a match
- An off-field assessment including symptom checklist, memory assessment, balance assessment and cognitive tests performed by a doctor
- An objective assessment by instrumented mouthguards of head accelerations that exceed a clinical threshold
- 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 by a doctor or relevant practitioner 48-72 hours after the incident
- Assists with **later** presentations of concussion

HIA4

- Completion of this form confirms recovery from the concussion event
- This assists in identifying concussion history (duration of recovery)



COMPONENTS OF THE HIA

HIA1

The HIA1 off-field Assessment is a fixed 12 minutes of absolute and not playing time – 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.

- The HIA1 off-field assessment tool is a re-formatted Sports Concussion Assessment Tool (SCAT) and includes the following sections:
- Section 1– 12 indicators for immediate and permanent removal (Criteria 1 signs), 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 not applicable for HIA1 off-field assessment

Indicators for HIA1 off-field assessment (Criteria 2 signs)

- 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
- Subthreshold Criteria 1 sign e.g., possible balance disturbance / ataxia
- Other behaviour or motor response following a head impact event raising suspicion of a concussion
- Instrumented mouthguard alert for head acceleration event (HAE)
- event exceeding the clinical threshold for suspected concussion as defined by the World Rugby Independent Concussion Working Group



Components of the HIA1 off-field assessment .

- Immediate Memory – 6 x 5-word lists are included. In the SCRM application the 10 words are generated randomly from two of these lists. These are delivered by the application with one second between words. The player is asked to repeat the list three times and a score is created out of a possible best of 30. This is compared to baseline or normative data.
- Maddock's questions – five orientation questions.
- Digits backwards – strings of three, then four, then five and six numbers are called out the player at a rate of one per second and the player must repeat them backwards.
- Balance tests – Tandem stance and single leg stance are both performed for 20 seconds with any errors compared to baseline or normative data.
- Symptom checklist – players are asked to read aloud and identify any symptoms present from a list of nine.
- Clinical signs – observation by the doctor informs answering of the three clinical signs questions.
- Delayed Memory – the player is asked to repeat the list of 10 words from immediate recall. This must be performed at least five minutes after the immediate recall questions and is a score out of 10.

HIA2 and HIA3

- Both assessments require:
 - Use of the 10-word Immediate Memory and Delayed Recall word list.
 - Completion of the single leg stance and tandem stance tests from the modified balance error scoring system (mBESS) balance assessments.
 - Minimum 5-minute time between Immediate Memory and Delayed Recall testing.

HIA4

- This assessment is currently a simple confirmation that the player has been cleared to return to full play.
- Failure to complete this assessment will mean the concussion 'case' remains open, prolonging recorded recovery and possibly creating a 'concussion history' in the player's file.
- In the future, guided by research from the recent [Rugby Readiness and Rehabilitation Enhanced and Personalised \(RREP\)](#) study, the HIA4 test may extend to a clinical evaluation of recovery.



BASELINE TESTING

All players participating in the HIA protocol need to have a valid baseline test performed prior to use. The baseline is a composite SCAT assessment which provides comparison data for HIA1, HIA2 and HIA3. It should be entered directly on the SCRM application (World Rugby's HIA protocol software). Where a baseline is not available, a player's HIA will be compared to reference limits which may be more conservative and may increase the risk of a false positive test during or after the game.

Baseline SCAT testing must be completed in line with the World Rugby [baseline SCAT process](#). A complete baseline must be performed on a player entering the system (for example first baseline on SCRM system), however, only an annual symptom baseline check is required and can be completed on the SCRM application. If a player has not completed an annual symptom check the application will indicate that [this is required](#).

Repeat annual **full** baseline testing is now not required, as research has confirmed that the baseline SCAT apart from symptoms does not change with serial testing. 'Post exertion' testing is also not required as our research confirms that exercise does not significantly impact the overall baseline performance.

If a Team Doctor wishes to repeat part or all of the HIA baseline this is possible in the SCRM application.

In addition, Team Doctors will complete an annual concussion history risk stratification. This is outlined in the return to play section.

Baseline SCAT – Mandatory Symptom Collection Process

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. An explanation of the difference between 'trait' and 'state' symptoms should be provided and highlighted by the supervisor.
 - a. For Baseline the player should be asked 'Please rate your symptoms based on how you **typically** feel... (this is a 'trait' symptom – or how you feel day to day, on daily life activities)
 - b. For assessment post-injury the player should be asked 'Please rate your symptoms on how you feel **now**... (this is a 'state' symptom, or how you feel 'right now' during the assessment)
3. The athlete(s) should be told that only 'trait' symptoms (those typically present) should be reported in this **initial baseline** SCAT symptom checklist.
4. Athletes should also be advised that the report of any symptom(s) will be followed-up by the attending medical or healthcare professional.



5. After completing the baseline SCAT symptom checklist, any athlete reporting any symptom(s) should be identified and a follow-up appointment confirmed. The SCRM application will automatically ask the Team Doctor to re-test if a player endorses any symptoms at baseline. This follow-up should be at least 24 hours after the initial symptom collection and following 24 hours of rest from exercise.
6. 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.
7. Again 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.
8. The athlete should also be advised that it is important that they concentrate and be truthful.
9. 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.
10. All 'trait' symptoms confirmed by this process require further review and investigation. The clinical [guidance outlined](#) is provided to support this investigation.
11. Should a player endorse multiple symptoms, and on re-testing confirm that these are in fact trait symptoms Team Doctors should make every effort to evaluate and resolve these issues. When a player endorses a number of symptoms at baseline it may undermine the utility of the symptom scale in the HIA protocol.

Baseline SCAT – Cognitive & 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 components used include the tandem stance and single leg stance.

World Rugby's 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). 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 informed 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.

Table 1: Recommended reference limits for Standardised Assessment of Concussion (SAC) and balance sub-modes of SCAT 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:

Modified BESS errors:

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



VIDEO REVIEW PROCESS

Review of video footage is an important part of the identification of suspected concussion events. As a basic standard a competition using the HIA protocol must facilitate access to video review to assist with the management of head impacts events occurring during the game, and for any HIA review process after the game.

For premium competitions minimum game video standard will be adhered to:

- Live and delayed (10 seconds) views
- Minimum 4 views (broadcast + 3 others – ideally inclusive of a high wide view)
- Ability to mark incident
- Ability to stop / rewind / slow down / replay vision
- Availability of sound or sports ears

When a head impact which requires a HIA1 off-field assessment occurs, the MDD and Team Doctor can discuss this and agree on removal of the player. The video footage of the event should be reviewed before and after the assessment before making a final decision on permanent removal of the player. The World Rugby 5-step video review process outlines the most effective way to review video of a head impact [event and is described here](#).

In the event of a suspected concussion, when a player has an off-field assessment, the player should not return to play until the Team Doctor and MDD have **fully reviewed** the video footage of the event. To be clear, if a MDD undertakes the HIA1 and is cleared to return to play the Team Doctor **MUST** review the video before the player is allowed to return to play.

In the event of a video system review failure immediately prior to, or during a game, the HIA protocol may still be used. The MDD and Team Doctor should work in tandem to identify any visible significant head impact events. It is advised that in the absence of video review they operate a lower threshold for removal of a player for an HIA off-field assessment. If a system failure is identified prior to the game all efforts must be made to repair the system or provide alternative means of sideline video review. If the game is to proceed without video review the MDD should ensure that there is some video footage of the game (Broadcast or performance) being captured for the game, this may be used in the case of untoward incident review.

CLINICAL JUDGEMENT

Research from 2021 shows that thoughtful application of [clinical judgement is best practice in concussion management](#). This means that a doctor who is familiar with a player, or in their experience believe that an abnormal result in a HIA sub-test can be explained by reasons other than concussion (e.g. fatigue), may over-rule that abnormal sub-test. In limited circumstances, this may change the outcome of a HIA1, HIA2 or HIA3 assessment. Research has shown this gives the HIA1 process superior overall diagnostic accuracy versus strict application of player baselines alone. However, because this practice increases the risk that players will be returned to play despite a concussion at the time of the HIA1, or



ruled not to have concussion (both false negative cases), it should not be employed without good reason. In particular, we recommend that doctors exercise significant caution when considering employing clinical judgement to over-rule:

- Any endorsed symptoms
- Any failed Maddocks questions
- More than one cognitive sub-test fail
- Any clinical sign

INDIVIDUALISED REHABILITATION – the return to play process following a concussion

In 2022 the World Rugby Concussion Working Group considered research on risk factors for delayed recovery from concussion and recommended changes to the return-to-play process.

The return to play process will be referred to as Individualised Rehabilitation in place of the ‘GRTP’.

Individualised Rehabilitation, varies for each player, and now includes some further minimum timings based on the following:

1. The player’s previous concussion history
2. Their acute presentation (Criteria 1 or Criteria 2)
3. Their symptom and cognitive burden at concussion diagnosis (HIA3)

This process of risk stratification is a more individualised management of our concussed athletes when compared with return to play processes used for the general public (figure 1). The times set out are minimum return-to-play times, the player may not return prior to these timings.

Doctors managing a player’s individualised rehabilitation should use their experience and clinical judgement. This document sets out the minimum milestones of each possible outcome and also includes an example from the 2022 Concussion in Sport Consensus Conference.



Concussion History

Those players who are defined as having a concussion history (defined below) have a minimum return to play time of 12 days. They must also consult with an Independent Concussion Consultant prior to returning to contact training.

Concussion History Definition:

1. Concussed within last 3 months
2. Three or more concussions in the last 12 months
3. Five or more career concussions
4. Reduced impact threshold noted*
5. Any previous concussion complicated by psychological issues
6. Previous concussion with prolonged recovery (>21 days)

Criteria 1 presentation

Those players diagnosed with a Criteria 1 presentation have a minimum return-to-play time of 12 days. There are 12 Criteria 1 signs and symptoms with six possibly observed on video and the remaining five identified during the on-field assessment.

HIA3 findings worse than baseline level

Those players who are still symptomatic (state symptoms endorsed, or trait symptoms or greater severity than baseline) or have abnormal cognitive or balance testing at the time of HIA3 testing have a minimum return to play time of 12 days.

Players who qualify for accelerated individualised rehabilitation

Those players who do **not** have a concussion history, who have **not** been diagnosed as Criteria 1, and whose HIA3 is equal to or better than their baseline may qualify for accelerated individualised rehabilitation. If the player completes their individualised rehabilitation without issues, they must see an independent concussion consultant (ICC) prior to contact training. If they complete the process with no identifiable concerns, they may qualify for a minimum return to play time of 7 days.

A player's risk stratification is automatically populated by the SCRM application, [LINK](#) but Team Doctors may add unrecorded concussions or prior issues manually when required.

Concussion may only be excluded after HIA3. The HIA3 result is also central to risk stratification. Therefore, a decision on how the player progresses on their individualised rehabilitation is made at that point. The date of injury is 'Day 0' and HIA3 is completed on 'Day 2'.

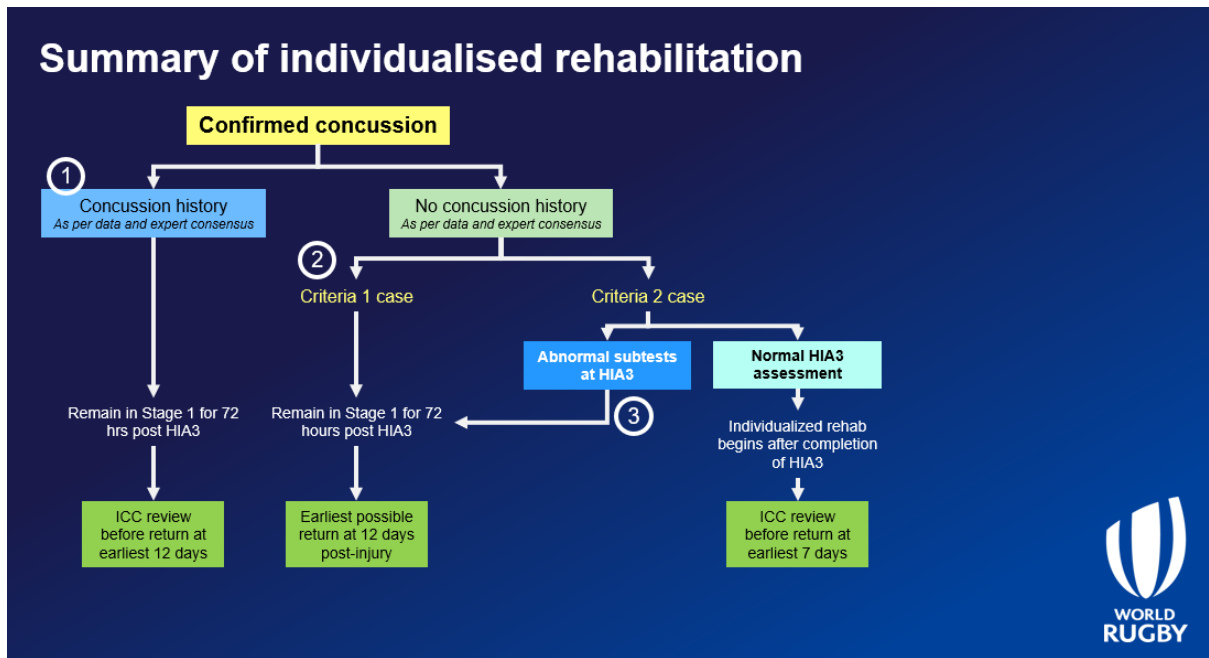


Figure 1: Summary of individualised rehabilitation pathways with minimum return to play time and indication for Independent Concussion Consultant consultations.

Concussion history risk stratification

Each player must have their concussion history noted when they complete their annual HIA baseline test, this process has been updated in the new World Rugby SCRM application [LINK](#).

During the season or competition, a player’s risk status will be automatically tracked and indicated within the SCRM application. Where a player’s status changes eg. after a further concussion, this will be reflected in the application. Likewise, if a Team Doctor or ICC has concerns at a lowering of concussion threshold this may be manually entered on the system.

Return to play following a concussion managed in the HIA protocol

Recovery will vary between players. Most players have a minimum return to play time of 12 days.

Our research data confirm that small group of players (14%) are eligible for accelerated return to play. These are players with no concussion history, who present as Criteria 2 and who have a normal HIA3 when compared to baseline. If these players complete their individualised rehabilitation symptom free they must see an ICC prior to contact training.

Figure 2 is a graphical illustration of minimum return-to-play times based on risk stratification. Those players with a concussion history will require a minimum 12 days individualised rehabilitation and need to see an ICC before returning to contact. A player who has abnormalities in HIA3 compared to their baseline must also complete a minimum of 12 days of individualised rehabilitation.



Figure 2: Illustration of possible return to play times – earliest return times from day of injury

Who will need to see the Independent Concussion Consultant (ICC)?

The ICC supports the Team Doctor in the return to play process. The players who need to see the ICC are in one of the following two categories:

1. Those players who have a concussion history – regardless of how long their individualised rehabilitation takes.
2. Those players who are eligible for accelerated return to play i.e. they,
 - a. do not have a concussion history,
 - b. are not a criteria 1 presentation
 - c. do not have persistent abnormalities beyond their baseline at HIA3.

Return to sport process

The goal of early management of concussion is to settle symptoms and return to normal activities of daily living (which do not provoke symptoms) as soon as possible. Research now shows that prolonged periods of inactivity are not helpful. Rest is now best described as ‘relative rest’.

- Rest after a diagnosed concussion and within 48 hours of the injury means normal activities of daily living which do not significantly worsen symptoms. Vigorous activity should be avoided. Relative cognitive rest, limiting screen time etc.- ensure minimal exacerbation of symptoms.
- After the initial 48 hours the resumption of activity including exercise is encouraged and defined as "activity below the level at which physical activity or cognitive activity significantly provokes symptoms" (symptom exacerbation of more than 2 points on a 10-point scale or lasting for longer than an hour).

The individualised rehabilitation process should aim to move the player through gradually increasing exercise intensity, ensuring it is tolerated. As with all rehabilitation processes there is no one correct way to complete this. Below is an example of a return-to-sport process published following the Amsterdam 2022 International Consensus Statement



on Concussion in Sport. This highlights a staged approach to increasing activity and also advises on managing possible mild symptom exacerbation during exercise phases.

Table 2: An example of a return-to-sport process

Step	Exercise Strategy	Activity at Each Step	Goal
1	Symptom-limited activity.	Daily activities that do not exacerbate symptoms (e.g., walking).	Gradual reintroduction of work/school.
2	Aerobic exercise 2A – Light (up to approx. 55% max HR) then 2B – Moderate (up to approximately 70% max HR)	Stationary cycling or walking at slow to medium pace. May start light resistance training that does not result in more than mild and brief exacerbation* of concussion symptoms.	Increase heart rate.
3	Individual sport-specific exercise NOTE: if sport-specific exercise involves any risk of head impact, medical determination of readiness should occur prior to step 3.	Sport-specific training away from the team environment (e.g., running, change of direction and/or individual training drills away from the team environment). No activities at risk of head impact.	Add movement, change of direction.
Steps 4-6 should begin after resolution of any symptoms, abnormalities in cognitive function, and any other clinical findings related to the current concussion, including with and after physical exertion.			
4	Non-contact training drills.	Exercise to high intensity including more challenging training drills (e.g., passing drills, multiplayer training). Can integrate into team environment.	Resume usual intensity of exercise, coordination, and increased thinking.
5	Full contact practice.	Participate in normal training activities.	Restore confidence and assess functional skills by coaching staff.
6	Return to sport.	Normal game play.	

In this example steps 1-3 are exercise-based treatments which are part of recovery from concussion and during which the player may still have mild symptoms; stages 4-6 are graduated return to rugby-related activities for which the player should have returned to a baseline symptom score.

Players may begin Step 1 (i.e., symptom-limited activity) within the first 24 hours of injury, with progression through each subsequent step typically taking a minimum of 24 hours.

In the suggested example, clinicians may commence light aerobic exercise (up to 55% max heart rate) and if tolerated moderate aerobic exercise (up to 70% max heart rate) at stage 2. This is an evidence-based treatment for concussion symptoms in the acute phase. If tolerated steps 2a and 2b may be completed on the same day.

A mild and brief exacerbation (an increase of no more than 2 points on a 0-10 point scale for less than an hour when compared with the baseline value reported prior to physical activity) resolving within an hour is acceptable after activity. If more than mild exacerbation of symptoms occurs during Steps 1-3, the athlete should stop and attempt to exercise the next day.

In rugby training steps 4-6 run the risk of head impacts so progression to stages 4-6 should happen only when the player has fully returned to baseline for symptoms, cognitive function, clinical findings, and the supervising medical staff are satisfied that the player is normalising.



If a player experiences concussion-related symptoms during Steps 4-6, they should return to Step 3 to establish full resolution of symptoms with exertion before engaging in at-risk activities.

The player's rehabilitation is personalized based on their history, presentation and HIA3 burden via the risk stratification process. In the same manner any domains affected during the HIA process should be included in the individualised rehabilitation process. Examples of this include:

- Vestibulo-ocular rehabilitation for symptoms or balance disturbance, blurred vision or dizziness.
- Cervical spine rehabilitation for neck pain
- Further psychological assessment and intervention where a player endorses ongoing anxiety, irritability or sadness.

Individualised rehabilitation process in the SCRM application

The trajectory of a player's recovery from concussion is a critical factor in their risk stratification, so their concussion recovery must be properly documented. Each stage of the player's recovery should be documented on the SCRM application. [LINK](#). Once the individualised rehabilitation has progressed (and where appropriate, the player has seen an independent concussion consultant, when contact training is complete and the player is cleared to return to play, an HIA4 form should be completed in the SCRM application. This documents the completion of rehabilitation and closes the concussion case. If this is not completed the system will automatically identify the player as still concussed and prevent use on match day for the player.

Independent Concussion Consultant (ICC) Process

The ICC process is part of a safe return to play process and is not intended to oversee or contribute to the injury management process. An ICC review for a player who is stratified as 'high risk' for complicated recovery or recurrence should only enter the ICC process when fully recovered. If the player has a current delayed recovery and therefore current symptoms, then this is a concussion management issue and should not be referred to an ICC until such time as they have been deemed recovered.

To be clear, the ICC process is not intended to confirm or refute a prior diagnosis of concussion made during the ICC process;

- Team Doctors should not use the ICC process as a second opinion on whether a player has suffered a concussion.
- Team Doctors should not attempt to use the ICC process to reverse a concussion decision made in the HIA process.
- Team Doctors should not attempt to use the ICC to reverse the determination of a Criteria 1 event by an MDD.



It may also be appropriate to include players following a prolonged recovery from concussion in the ICC process, especially if they have not had the opportunity to be reviewed by a concussion specialist during their recovery. If the player is seeing a specialist for management of their concussion and this specialist has the required qualifications of an ICC, that specialist can provide an ICC opinion on return to play or appropriate intervention.

If referred to an ICC, that ICC may recommend imaging be undertaken before making a decision on returning to play. The final decision to undertake this imaging will rest with the Team Doctor as part of the injury management process therefore the costs of imaging will be the responsibility of the club and/or national Union.

To be clear, the ICC procedures do not mandate imaging as part of the return-to-play decision-making process as there is no current science to support this approach, particularly in asymptomatic players who are the candidate cases for the ICC process.

Process prior to independent concussion consultant (ICC) consultation

The process to support this ICC intervention is as follows:

- Team Doctor completes HIA2 within 3 hours of the injury and HIA3 at 36-48 hours post injury. This HIA3 is a SCAT with a more detailed symptom checklist. Teams have been encouraged to also utilise a computer neuro-cognitive tool of their choice following the HIA3 assessment.
- Once the process above is completed, if a player has a confirmed concussion, but is asymptomatic and a return to match play for the next match (typically 7 to 10 days from the injury) is expected, the ICC must be consulted.
- If the concussed player is identified as a high risk based on the risk stratification protocol described above, then the ICC must be consulted.

Nominated independent concussion consultant (ICC) consultation

For international tournaments, World Rugby will provide a nominated panel of experts who would act as ICCs. We invite nominations from Unions to include in this list. For national competitions, each Union may avail of the World Rugby List or develop their own list according to minimum standard criteria outlined below. The list of available ICCs is regularly updated on the World Rugby Player welfare website [HERE](#).

Video-consultation has been used successfully in many medical scenarios, including during RWCs 2015, 2019, 2021 & 2023 for ICC consultations. The advantages of using video-consultation with ICCs is not only ease of access from geographically isolated locations, but it also overcomes the issue of language and offers the players the best opinions from leading international experts.



The procedure to obtain an ICC opinion is:

- Team Doctor identifies ICC of their choice from referral list provided by World Rugby for international games, or their competition. This list will contain experts from different nations and with different language capabilities.
- Team Doctor confirms via email an appropriate time for video-consultation with the ICC. If first choice ICC is not available due to other commitments the Team Doctor should select an alternate consultant.
- Team Doctor forwards to the ICC prior to the video-consultation, key information related to the concussive injury that must include:
 - Video clip of incident (if not available within team, contact World Rugby for a copy)
 - Copies of all three HIA forms plus the result of any computer neuro-cognitive assessment result
 - Concussion risk stratification assessment

The process to be used during the consultation with the ICC is:

1. Team Doctor with the player present commences the consultation with the ICC, discussing the results of all HIAs and any cognitive assessment completed.
2. Team Doctor and player answer any and all questions asked by the ICC.
3. The ICC has a private consultation **with only the player present**.
4. Team Doctor returns to the room to complete a balance assessment under the view of the ICC plus any other clinical assessment as requested by ICC.
5. Team Doctor and ICC discuss the case **without the player present**, determining if the player:
 - Requires further investigation or follow-up consultation.
 - Is not fit to return to play or;
 - Is fit to continue their individualised rehabilitation and if successful return to play in the next game.
 - In this process we aim for agreement, however if this is not possible the ICC has the ultimate decision.
6. Player returns to consultation and the Team Doctor outlines the agreed return-to-play opinion(s).
7. If follow-up consultation is required, an appointment date is agreed.



Minimum criteria for independent concussion consultants

1. Medical Doctor (Neurologist, Neurosurgeon, Sports & Exercise Medicine Physician, Emergency Medicine Physician)
2. Recognised expert in concussion management in rugby
3. Experienced in management of rugby players
4. If Union CMOs conform with this ICC Minimum Criteria, they are permitted to be nominated as an ICC.

Delayed recovery and persisting concussion symptoms

Players who have difficulty progressing through individualised rehabilitation, who have signs or symptoms that are not progressively improving, beyond the first 2-4 weeks may benefit from targeted rehabilitation and further specialist consultation. Access to a multidisciplinary environment or team where affected domains (vestibulo-ocular, psychological, cervical) may be assessed and appropriately rehabilitated is recommended.



Appendix 1 - HIA Procedures, Frequently Asked Questions

1. 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 delayed-onset or delayed-presentation 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.

2. 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 or pitch side practitioner 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 MDD and agreement reached before enforcing permanent removal from further game participation.

3. 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.

4. Who can request an HIA1 off-field assessment?

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



5. Who completes the HIA1 off-field assessment?

The Team Doctor will complete an HIA1 off-field assessment on a player when indicated unless the Team Doctor assigns this responsibility to the MDD prior to the commencement of the match. The Team Doctor can, in cases of emergency, assign off-field assessment responsibility to the MDD during a match.

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

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

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

- the player answers “Yes” to one or more symptoms **that exceed their trait 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 assessment has any clinical suspicion of a concussion.

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

If a player reports a positive answer to any part of the off-field assessment 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 HIA1 off-field 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.

7. What is the role of the MDD (Independent Match Day 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 HIA1 off-field assessment with the Team Doctor delivering the off-field assessment unless assigned this responsibility by the Team Doctor. If the MDD is assigned the responsibility for undertaking an off-field assessment by the Team Doctor, the MDD will complete the off-field assessment and be responsible for deciding return to play. The MDD however should discuss their findings with the Team Doctor prior to finalising the result in the SCRM application.



If the MDD completes an off-field assessment because there are two players requiring an off-field assessment at the same time, then the Team Doctor should discuss their findings with the MDD prior to finalising the result in the SCR application.

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 assessment 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.

8. Where should the HIA1 off-field Assessment be completed?

The off-field assessment will be completed in the medical room. If the HIA1 off-field assessment cannot be completed in the medical room because the medical room is too distant from the field of play for an HIA1 off-field 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.

9. Can a player undergoing an HIA1 off-field assessment be replaced or substituted?

A player undergoing an off-field assessment 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 HIA1 off-field 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.

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

The off-field assessment must still be completed within 12 minutes of leaving the field. The off-field assessment 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.



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

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

12. What happens if a Player does not wear an instrumented mouthguard (iMG)

A player who does not wear an iMG will not benefit from the protection of the iMG alert in the event of a significant head impact event. The player will therefore be managed more conservatively and managed under 'Recognise & Remove' process and may therefore not return to play in that game. The player will be eligible for HIA2 and HIA3 to confirm a potential diagnosis of concussion. The player may also be prescribed and avail of the individualised rehabilitation programme to return to play (as normal) if a concussion is diagnosed.

13. 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 Assessment and control the bleeding?

In this scenario, control of bleeding will be the priority however the HIA1 off-field Assessment must be completed as soon as possible. If bleeding can be controlled, suturing should be completed after the off-field Assessment. The total time available is 17 minutes to complete both the off-field Assessment and control the bleeding

14. If a player has a second HIA1 off-field assessment requested during a match, does this mean automatic removal from the match?

No, a second off-field assessment is not an automatic indication for permanent removal from the match. However, if a definitive diagnosis was not identified following the first off-field assessment 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.

15. 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.



16. What happens if a player undergoing an HIA1 off-field 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.

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

All players who are removed for an HIA1 off-field assessment MUST report to match officials to 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 Assessment.

18. If a player is removed from play for an HIA1 off-field assessment and that team has 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 HIA1 off-field 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.

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

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

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

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



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

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

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

All players who have an HIA1 off-field 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.

23. Can the HIA1 off-field 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 individualised rehabilitation. An abnormal HIA1 off-field 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.

24. How should I interpret the HIA2 result?

The HIA2 is a composite SCAT assessment. 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 an 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.



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

26. Which players are required to undertake Individualised Rehabilitation?

Players diagnosed with concussion during the match (Criteria 1, or during off-field assessment), after the match whilst at the ground (HIA2) or at the 36-48 hour follow up (HIA3) MUST complete Individualised Rehabilitation. This is stratified according to personal concussion history and symptom burden at diagnosis that may be started after HIA3.

27. How do I manage a player who presents after the match with concussive symptoms? What off- field assessment 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 an 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 HIA1 off-field 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.

28. 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 player should be removed and not returned to training that day. Appropriate immediate medical attention should be employed.

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

29. 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 an HIA2 assessment is performed with subsequent HIA3 at 36-48 hours. If the presentation is outside of 2 hours post-training an HIA3 assessment should be completed.



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

31. 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 significantly 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".

32. 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 later confirmed as having concussion were returning to play on the same day following their injury. Since introducing the HIA Protocol this number has reduced to less than 8%.



Appendix 2 – HIA Definitions

Criteria 1 signs and symptoms

There are 12 Criteria 1 signs and symptoms that indicate a player must be immediately and permanently removed from further match participation, six may possibly be 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

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
- Subthreshold Criteria 1 sign e.g., possible balance disturbance / ataxia
- Other behaviour or motor response following a head impact event raising suspicion of a concussion
- Instrumented mouthguard alert for HAE event exceeding the clinical threshold for suspected concussion as defined by the World Rugby Independent Concussion Working Group

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 not responding to orders and not moving apart from reflex movement (such as tonic posturing and convulsions) **and keeps their eyes closed.**

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 3 – Procedures for Team and Match Day Medical Staff

UNDERSTANDING THE 4-STAGE HIA PROTOCOL

Figure 3 below 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 MDD 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 **HIA1 off-field assessment**.

If, after viewing the video, there is a dispute between the Team Doctor and MDD regarding the presence of a Criteria 1 sign the HIA1 off-field assessment is completed. If the off-field assessment is abnormal, the player is removed. If the off-field assessment 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. The MDD has specific duties before during and after the game, some of these are listed below – a complete list is available in the [Match Day Doctor](#) section of the 'Concussion Management for Match Day Medical Staff' using the HIA Protocol found on the World Rugby Player Welfare website.

PRE-MATCH DUTIES

- Lead pre-match briefing with Team Doctors Match Officials and the Match Commissioner in the medical room confirming location where the HIA1 off-field assessment will be performed.
- Confirm with both Team Doctors who will be undertaking the HIA (Team Doctor can assign responsibility and decision making for HIA to the MDD).
- Confirm location of sideline video.
- Prepare SCRM (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.
- Confirm relevant instrumented mouthguard communication applications are loaded on their digital device.



DURING THE 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 to remove a player should be made.
- Observe the Team Doctor undertaking an HIA1 unless assigned responsibility by the Team Doctor to perform the HIA1.
- 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 assessment during a match irrespective of the result have completed a post-match, same-day assessment using the HIA2.
- Complete the HIA2 assessment if requested by the Team Doctor or observe completion of the HIA2 assessment by the Team Doctor. Once completed the Team Doctor must agree and confirm the diagnosis.
- If the MDD completes the HIA2 assessment, they should consult with the Team Doctor before agreeing and confirming the diagnosis.

A comprehensive list of MDD roles, responsibilities and duties (including pre-game checklists) are outlined in the [Match Day Doctor](#) section of the 'Concussion Management for Match Day Medical Staff' using the HIA Protocol found on the World Rugby Player Welfare website.

Figure 3: Summary of the HIA protocol for evaluating head impact events with the potential for concussion

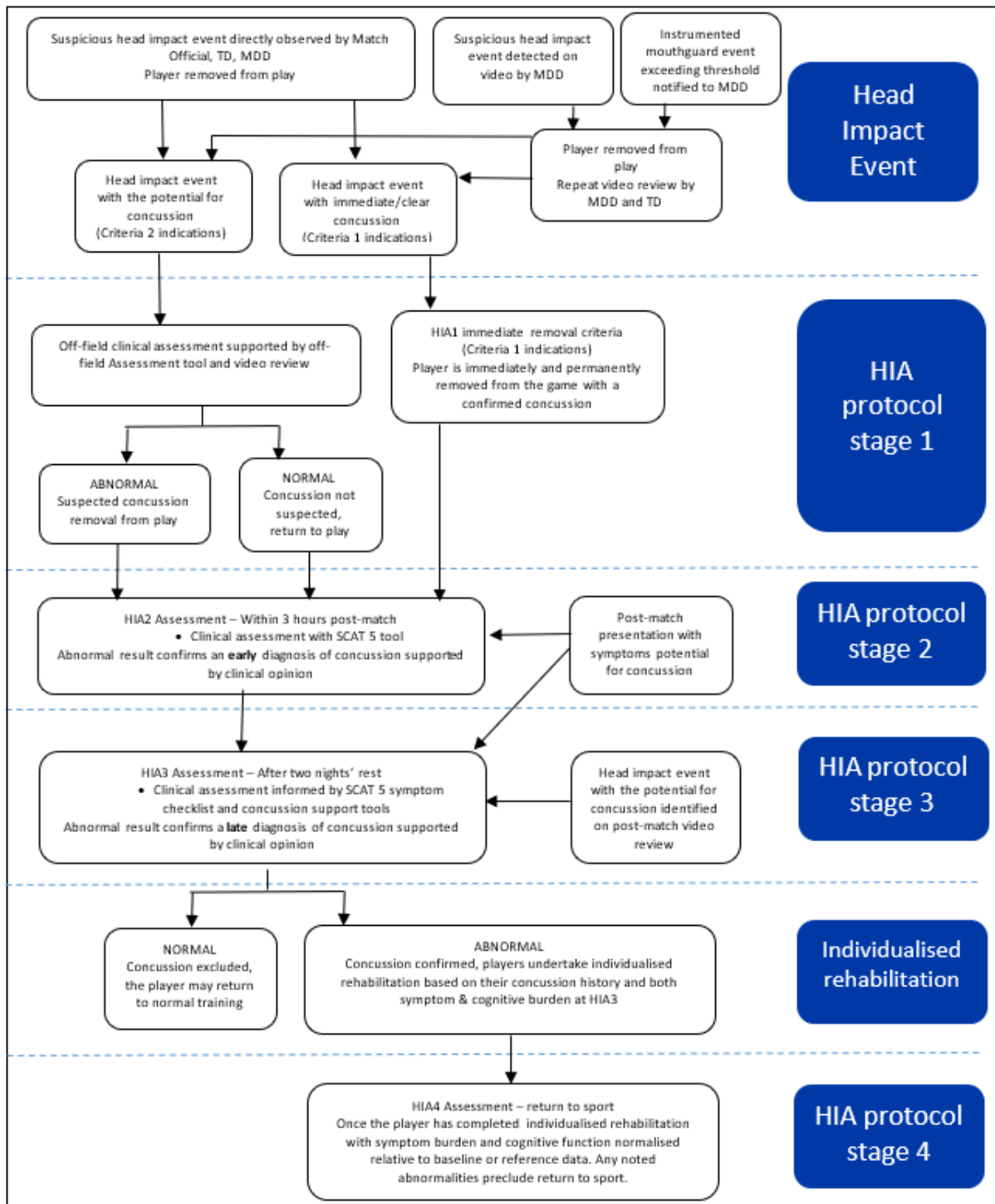
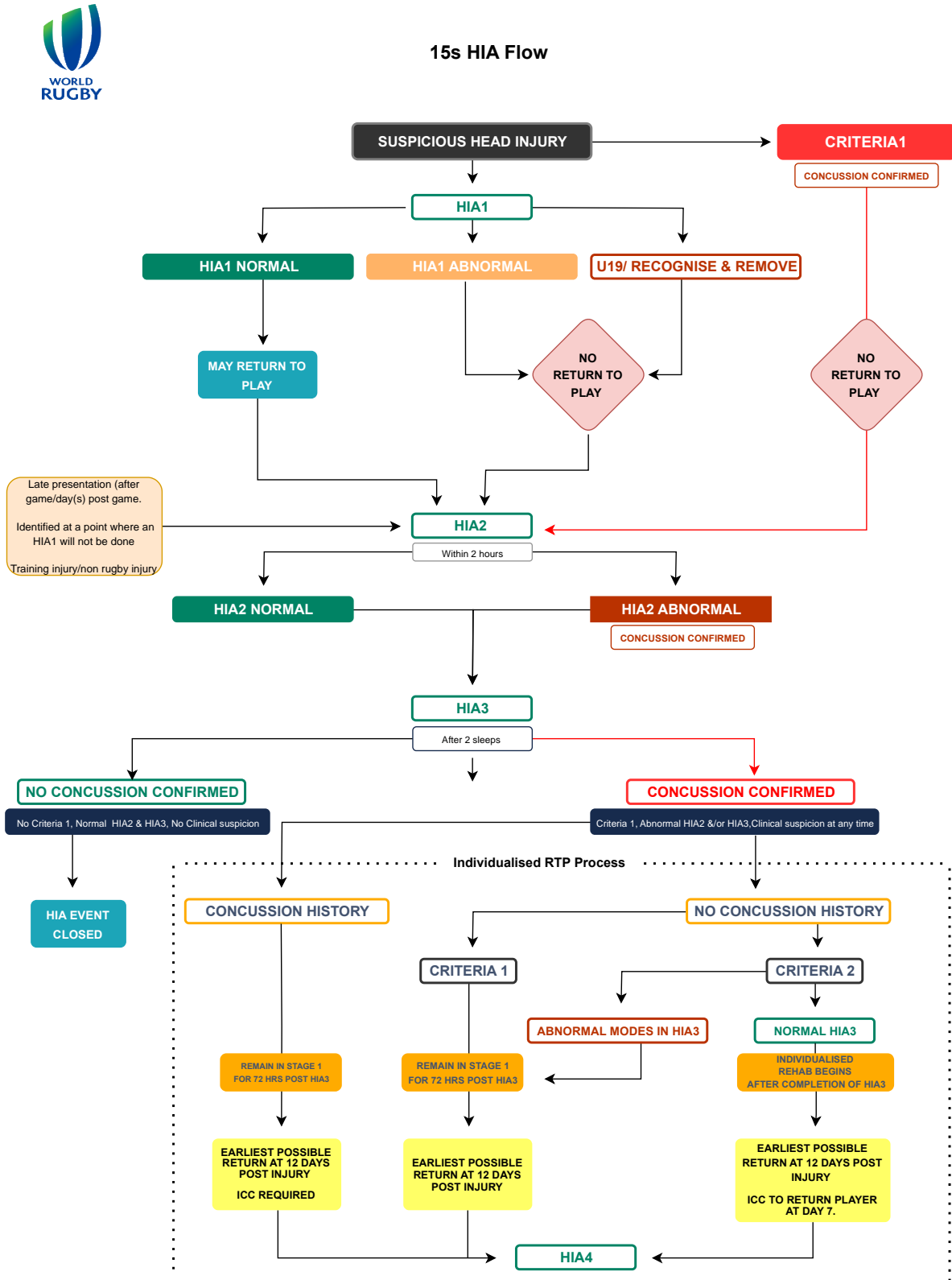


Figure 4: Summary of the HIA protocol for evaluating head impact events with the potential for concussion ([download here](#))



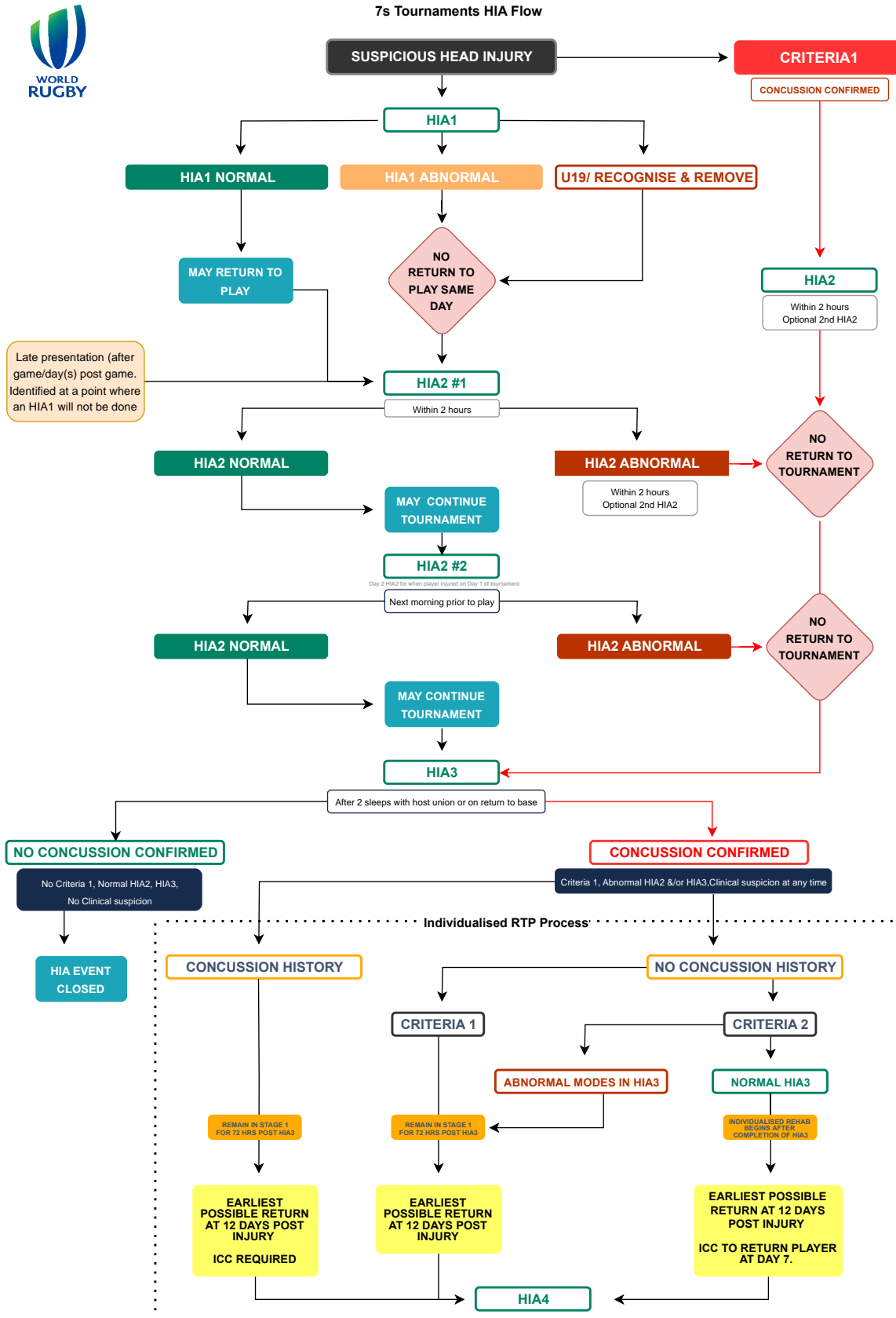


Appendix 4 – HIA PROTOCOL SEVENS RUGBY

In Sevens Rugby a player who has a suspected concussion and a HIA1 off-field assessment has their HIA2 within 3 hours of the game, but also has a second HIA2 the next morning. If both HIA2s are normal and the examining doctor is satisfied there are no clinical signs or symptoms of a concussion, the player may play in day 2 of the event (figure 5). The player continues and has a HIA3 the next day (36-48 hours after the event).

Players aged 18 or under at the time of the tournament do not complete a HIA1, if there is a suspected concussion they are managed under 'Recognise & Remove'.

Figure 5: Summary of the HIA protocol for evaluating head impact events with the potential for concussion ([download here](#))





Appendix 5 – Application for the use of HIA and use of temporary substitutions/replacements

Each competition must apply to use the HIA protocol annually.

An updated version of the World Rugby HIA application form is now available. You can download the new HIA application forms here: [HIA Application Forms 2024](#)

The updates reflect the importance of accurately submitting the pitch-side/field of play and/or tournament medical staff information when making an application. This is to check medical staff are compliant with the face-to-face accreditations and World Rugby online education modules required for the respective tournament and/or match.

The process for submitting the application form to World Rugby has also been updated. This is explained on 'Section 5' of the form and a video guide taking you through the submission process is available to view here: [HIA Application Submission Guide](#)

The changes are outlined below:

- Clarified face-to-face accreditations and online modules required for pitch-side/field of play team medical staff and tournament medical staff
- Section 5 of the form:
 - Confirmed the pitch-side/field of play medical staff and/or tournament medical staff details required. Details for **all pitch-side/field of play members of the medical team** (e.g. doctors, physiotherapists, sports trainers etc.) must be submitted. This also includes **all tournament/competition/match medical personnel** (e.g. MDDs, HIA, ICL etc.)
 - Added downloadable templates to enter pitch-side/field of play and/or tournament medical staff details
 - Application form and completed pitch-side/field of play and/or tournament medical staff templates to be uploaded through application submission portal. Step by step guide available on Section 5 of form.

Should you have any questions, please contact: mark.harrington@worldrugby.org



Appendix 6 – HIA Review Process Explanation and Flowchart

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 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 MDDs 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 Ben Hester (ben.hester@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 breached. 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 breach of the protocols are:
 - recommendation for further education and training for the Team Doctor and pitch side medical staff.
 - Recommendation for the World Rugby HIA Working Group to consider an alteration in the process.
 - referral to that Tournament or Competition’s Disciplinary Committee.

- 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.

Each Tournament/ Competition a Union/tournament-based video resource or by the World Rugby Game Analysis department. Post-game video clips of all HIA events reported must have a post-game HIA Review Process supported by either on the match report card and any other suspicious head injury events/ events worthy of review are collated and sent weekly to the Competition HIA Process Reviewer(s). This process is outlined in the diagram below in a series of steps:

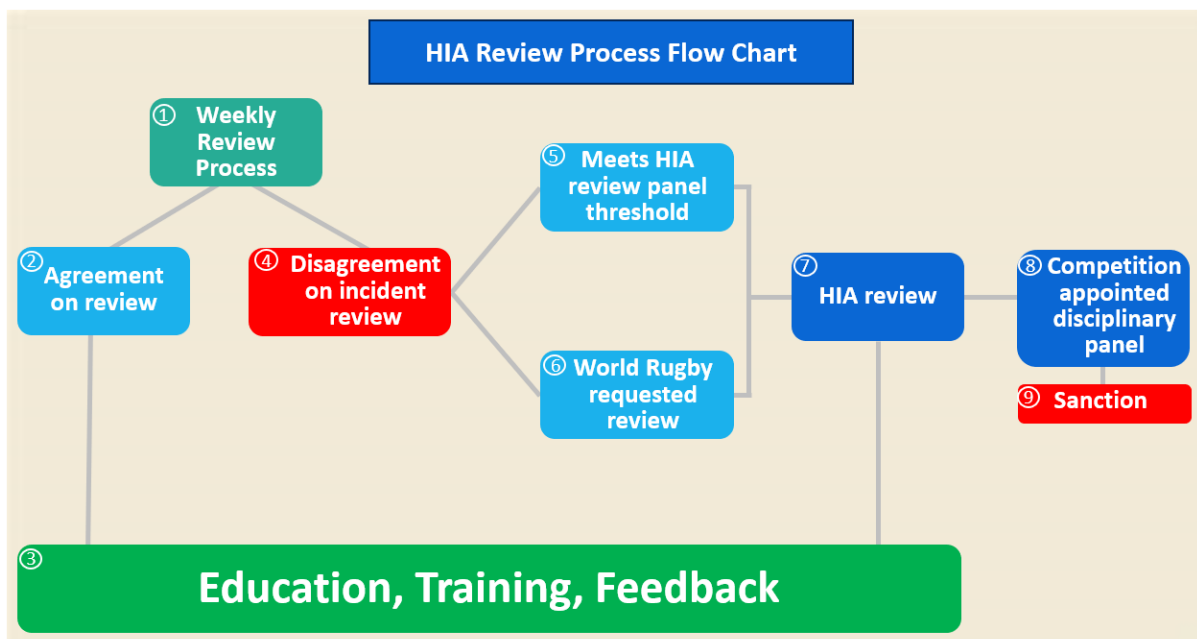


Figure 6: HIA Review Process Flow Chart

Step 1: Competition HIA Process Reviewer(s) reviews all clips and where appropriate discusses management on weekly call with Team Doctor and MDD

Step 2: The Competition HIA Process Review group discusses HIA case with the responsible Team Doctor and provides feedback. Both parties agree on video interpretation, agree on how this outcome could be avoided in the future. This is a learning opportunity and the outcome following these discussions is step 3.



Step 3: Ongoing education and training are provided during discussions, where appropriate this outcome is used to improve training for all competition doctors. This process should be primarily supportive and education-driven rather than punitive and fault-finding. Every review is an opportunity for collaboration and education.

Step 4: The Competition HIA Process Review group discusses HIA case with the responsible Team Doctor and provides feedback. If there is disagreement between the Team Doctor and HIA Process Reviewer on video interpretation, the case is referred to independent video interpretation expert group to be established by World Rugby. Ongoing education and training provided during discussion.

Step 5: The Competition HIA Process Review group concludes that an issue other than disagreement over video needs further consideration and refers to HIA review panel (see Review panel threshold – table 3 below).

Table 3: HIA Review Panel Threshold

HIA Review Panel Threshold
HIA Process Reviewer(s) must forward for HIA Review to the HIA Review Panel where:
<ul style="list-style-type: none">• A deliberate or reckless failure to comply with the HIA Protocols is evident for example off-field assessment completed in time that comprises quality of assessment, potential tactical manipulation of HIA1 Protocol• A failure of the delivery of video viewing is identified e.g. no side-line video link• A deliberate attempt by any team member to influence a medic in relation to HIA is noted• Repeated errors (more than 2 in a 2-year period) in application of HIA Protocols• Evidence of a deliberate obstruction of the HIA Protocol or HIA Process Review• Any other act or omission in relation to the HIA Protocol that significantly jeopardises player welfare

Step 6: World Rugby may request that an issue be reviewed as part of the Competition HIA Review Process.

Step 7: Competition HIA Process Reviewer(s) forwards all review information and documentation to HIA Review Panel. This panel should be nominated prior to the commencement of the competition. The members should include:

- An independent Lawyer (eligible to sit as a Judicial Officer under World Rugby Regulations)
- A competition Representative(s)
- The responsible Union Chief Medical Officer
- A World Rugby nominated representative



The panel considers the evidence and makes recommendations on education (step 3) and training AND [if it considers it appropriate] sends the information forward to a disciplinary panel.

Step 8: Each competition must appoint an independent disciplinary panel to consider any misconduct.

Any misconduct investigation is processed under the terms of the “misconduct” section of the Tournament Disciplinary Programme.

Step 9: The independent disciplinary panel determines what sanction, if any, is appropriate. Each competition must include the “HIA Misconduct” provisions in their Tournament Disciplinary Programme.



Appendix 7 – Minimum education content and advanced level of concussion

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 teammate?
- 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. This video will be updated regularly and should be shown to players as a minimum education standard.

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;
- access to brain imaging facilities and neuroradiologists; and
- access to specialised care programmes with 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 International, Professional teams, and in leagues operating in similar geographical locations to other professional leagues. This process allows for a more individualized management of concussion.



Appendix 8 – HIA Player Consent & Research Explanation – Premium Competitions

Dear player,

Player welfare is our number one priority, despite injury reduction efforts over the last 10 years head injury rates remain high. We work constantly to improve both head injury management and reduction. 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 information to investigate how well the Head Injury Assessment process is working. All data analysis for research purposes will be done on pseudonymized data, with results presented as combined or group average data, meaning there will be no way for you to be identified in any outputs from this study.

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

When you have read and fully understood the information and if you agree to be included in the study, 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 will require immediate emergency treatment. A milder form of head injury, termed concussion, occurs more often. The current understanding of concussion is that it is a brief disturbance in brain function, with symptoms most commonly including headaches and loss of concentration, memory and coordination, and are usually temporary and typically resolve within 7 days. Multiple concussions can lead to a number of possible consequences:

1. Multiple concussions may increase symptoms and delay recovery.
2. Rarely, the occurrence of a second concussion, shortly after an initial concussion, may lead to very serious brain swelling, called 'second impact syndrome'.
3. Repeated concussive, and sub concussive impacts may contribute to cognitive decline in the long term.
4. Decreased attention and reduced anticipation may lead to an increased risk of further injuries.
5. Decrease player performance which can lead to physical and tactical errors.

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. **Clearly suspected concussion:** 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 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 the off-field tests do not indicate the player has a suspected concussion and the doctor has no other reason to suspect that the player has a concussion, the player may return to the match following completion of the off-field assessment.
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?

There are several standard assessments that are performed as a part of World Rugby's Head Injury Assessment protocol. Consenting to this study will not influence this recommended medical care, and will not result in any extra information being collected, but will allow us to analyse the data from these assessments to investigate how well the Head Injury Assessment process is working and to identify any areas where the management of concussion can be improved. Refusing consent to participate in the study will not affect the collection of data by your team, for the purposes of World Rugby's Head Injury Assessment protocol, which is a separate World Rugby requirement. Granting consent under this document will only permit World Rugby to use this data for the additional purpose of the Head Injury Assessment study as set out in this document.



These standard assessments involve team doctors collecting clinical information about you 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 also identify incidents where players may have suffered a head injury during a game by reviewing game video footage. The information collected by your team doctor as a part of the Head Injury Assessment process, and video footage reviewed by the World Rugby Game Analysis Department will be used by the World Rugby research team in this study.

How would my information be used?

In order to optimise the HIA process, we need to continually conduct research on the data that are being collected.

Data collection and preparation: The routinely collected information gathered as a part of the Head Injury Assessment process, and video footage reviewed by the World Rugby Game Analysis Department, will be gathered by World Rugby. Head injury assessment data may be combined with analysed video footage of the injury event to inform future concussion prevention strategies. Whilst the video footage will allow World Rugby to identify your data, it will be promptly pseudonymised once the data sets have been combined and before the data is used in any future research projects.

Once the data are prepared, it will be hashed and stored as deidentified data. What this means is that all personally identifiable fields will be converted to an unidentifiable 32-digit hash and there will be no way of identifying you from the data in the database. Only pseudonymised data will be stored and analysed for research purposes.

The only exception to this pseudonymisation is where World Rugby needs to share identifiable data with a partner research institution (a University) solely as required to complete the Head Injury Assessment Study. If you would like further details of the specific institutions involved, please contact us at eanna.falvey@world.rugby

Data analysis and presentation: Subject to the above, only pseudonymised data will be analysed for research purposes. Aggregated or group average data will be presented and in cases where counts of specific injuries are <5, we won't show the actual number. This means there will be no way of identifying individuals or individual events in the data that are presented. If an image or video clip is used in a presentation or in a published paper, the image will have your face pixelated/obscured.

Head Injury Assessment data is currently stored on GDPR compliant Amazon Web Service (AWS) containers located in the Europe AWS region. World Rugby may change the provider of data storage services but the data will remain securely stored in accordance with legal requirements.



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 and if you do, then we will delete any information relating to you that we held for the purpose of this study, based on you previously having consented to participate in it. To do this you only have to report your withdrawal to the Chief Medical Officer at World Rugby, 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 Dr Éanna Falvey at 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. For further information regarding our privacy practices and your rights, please see world.rugby/privacy-policy.

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

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



Load Safety Tool Information Sheet – Premium Competitions

The contact load guidelines published in 2021 are designed to protect players from excessive contact load, specifically head impact events. The HIA protocol is used in competitions around the world and monitoring how people train and play individually has not been possible to date. In the last three years we have completed extensive work in 5 competitions with instrumented mouthguards (iMGs). We now know we can safely and accurately measure how many, and what size head impact events a player experiences when playing. Because of this, the independent concussion working group have endorsed mandatory use of iMGs in this competition.

What is an Instrumented Mouthguard and how does it work?

An instrumented mouthguard is like other mouthguards, except that sensors have been placed inside it to measure head impacts and accelerations/decelerations. The data from the mouthguard sensors are used to identify both when an acceleration has happened and the size (how fast your head accelerates) of the acceleration. World Rugby currently approves the use of Prevent Instrumented Mouthguards, which are CE certified and compliant with all required safety regulations and minimum performance specifications. World Rugby may approve instrumented mouthguards offered by other suppliers in the future, as they become available and where they are compliant. In order to comply with and benefit from the HIA1 off-field assessment, you will be required to wear a World Rugby approved instrumented mouthguard in matches and all field training sessions. After each session, your instrumented mouthguard will be returned to the charging case to be charged and for the data to be downloaded. In this way, the process will be like how your GPS unit is managed. Over the last 3 years we have worked to improve how we gather data with this technology. We are now able to require instrumented mouthguards to be used as a safety tool to help seek to ensure that players are not exposed to excessive head impact events – either large ones too often, or too many medium size impacts

Do I have to wear an instrumented mouthguard?

Yes, if you want to benefit from the HIA1 off-field assessment. As stated in the competition Player Welfare Standards, you must wear this safety tool in all matches. In order for your team to get a complete and accurate picture of all head acceleration events you sustain when playing rugby, you will also be required to wear your instrumented mouthguard in all contact training sessions. If, for any reason, you are unable to wear the instrumented mouthguard during matches, you can apply for an exemption through your Team Manager or Doctor, directed to Lindsay Starling, the Science and Medical Manager at World Rugby (lindsay.starling@worldrugby.org). This exemption application should be supported by ample evidence, such as a medical justification, to be considered. All medical exemptions must be applied for at least 2 days before the match day(s) to which they relate. No exemptions will be granted following MD – 2.



IF YOU DO NOT WANT TO WEAR AN INSTRUMENTED MOUTHGUARD FOR ANY REASON AND HAVE NOT BEEN GRANTED AN EXEMPTION, YOU MAY OPT-OUT OF WEARING THE INSTRUMENTED MOUTHGUARD BUT YOU WILL NOT BE ABLE TO BENEFIT FROM THE HIA1 OFF-FIELD ASSESSMENT. IF YOU RECEIVE A HEAD INJURY DURING PLAY AND YOU ARE NOT WEARING AN INSTRUMENTED MOUTHGUARD, YOU WILL BE TREATED AS A PERMANENT REMOVAL FOR THE REMAINDER OF THE MATCH. YOU WILL THEN ENTER THE HIA PROCESS AT HIA2 POST-MATCH AND MOVE THROUGH THE REMAINDER OF THE HIA PROCESS (HIA3, GRPT AND ICC WHERE REQUIRED).

What data will be collected?

When worn, the iMG unit measures the number and size of head accelerations you experience during rugby activities. The data will be uploaded from your instrumented mouthguard to a central server after every time you wear it. Video from matches (where available) will be used to identify match activities and events (e.g., tackles, breakdown, etc.) that cause head accelerations, and these will be linked to the head acceleration data from the mouthguards.

How will my data be used?

Your team will use your iMG data in connection with seeking to detect and deal with head accelerations and head injuries that you experience in matches and training sessions while wearing your iMG. If you have any questions about how your team will use your iMG data, you should contact your team.

Separately, if you consent to the use of your iMG data for research purposes by World Rugby, then your iMG data will also be hashed and stored as deidentified data. What this means is that all personally identifiable fields will be converted to an unidentifiable 32-digit hash and there will be no way of identifying you from the data in the database. Only pseudonymised data will be provided to World Rugby and analysed for research and global decision-making purposes.

Your data will be analysed by World Rugby in aggregated form, where it is combined with iMG data from various competitions around the world. No player's iMG data, including team, nationality or identity will ever be made public by World Rugby, and any communication of decisions by World Rugby that are derived from data will be completely de-identified. This means there will be no way of identifying you from the data that are presented by World Rugby. If an image or video clip is used in a presentation or in a published paper, the image will have your face pixelated/obscured.

Pseudonymised integrated mouthguard data may be transferred by World Rugby to a third party for secure storage, to allow further research that can benefit welfare to be carried out.



Player Consent – Premium Competitions

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 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 video footage of me being used by World Rugby in this study
5. I consent to World Rugby processing my information in order to depersonalize it for further research purposes
6. I consent to World Rugby sharing my information with its partner research institutions solely as set out in this document
7. I acknowledge that any data shared by World Rugby with any third party for research purposes will only be pseudonymized information and that appropriate safeguards are in place with respect to any such transfer of this data
8. 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
9. I understand that all the information collected by World Rugby on my injuries and training will be treated in strict confidence and only shared with research institutions where appropriate data sharing agreements are in place .

10. I agree to take part in the above study.

Name of participant

Date

Signature

Name of person responsible for obtaining consent

Date

Signature



HIA Player Consent and Research explanation – Core Competitions

Dear player,

Player welfare is our number one priority, despite injury reduction efforts over the last 10 years head injury rates remain high. We work constantly to improve both head injury management and reduction. 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 information to investigate how well the Head Injury Assessment process is working. All data analysis for research purposes will be done on pseudonymized data, with results presented as combined or group average data, meaning there will be no way for you to be identified in any outputs from this study.

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

When you have read and fully understood the information and if you agree to be included in the study, 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 will require immediate emergency treatment. A milder form of head injury, termed concussion, occurs more often. The current understanding of concussion is that it is a brief disturbance in brain function, with symptoms most commonly including headaches and loss of concentration, memory and coordination, and are usually temporary and typically resolve within 7 days. Multiple concussions can lead to a number of possible consequences:

6. Multiple concussions may increase symptoms and delay recovery.
7. Rarely, the occurrence of a second concussion, shortly after an initial concussion, may lead to very serious brain swelling, called 'second impact syndrome'.
8. Repeated concussive, and sub concussive impacts may contribute to cognitive decline in the long term.
9. Decreased attention and reduced anticipation may lead to an increased risk of further injuries.
10. Decrease player performance which can lead to physical and tactical errors.

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:

4. **Clearly suspected concussion:** 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.
5. **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 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 the off-field tests do not indicate the player has a suspected concussion and the doctor has no other reason to suspect that the player has a concussion, the player may return to the match following completion of the off-field assessment.
6. **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?

There are several standard assessments that are performed as a part of World Rugby's Head Injury Assessment protocol. Consenting to this study will not influence this recommended medical care, and will not result in any extra information being collected, but will allow us to analyse the data from these assessments to investigate how well the Head Injury Assessment process is working and to identify any areas where the management of concussion can be improved. Refusing consent to participate in the study will not affect the collection of data by your team, for the purposes of World Rugby's Head Injury Assessment protocol, which is a separate World Rugby requirement. Granting consent under this document will only permit World Rugby to use this data for the additional purpose of the Head Injury Assessment study as set out in this document.



These standard assessments involve team doctors collecting clinical information about you 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 also identify incidents where players may have suffered a head injury during a game by reviewing game video footage. The information collected by your team doctor as a part of the Head Injury Assessment process, and video footage reviewed by the World Rugby Game Analysis Department will be used by the World Rugby research team in this study.

How would my information be used?

In order to optimise the HIA process, we need to continually conduct research on the data that are being collected.

Data collection and preparation: The routinely collected information gathered as a part of the Head Injury Assessment process, and video footage reviewed by the World Rugby Game Analysis Department, will be gathered by World Rugby. Head injury assessment data may be combined with analysed video footage of the injury event to inform future concussion prevention strategies. Whilst the video footage will allow World Rugby to identify your data, it will be promptly pseudonymised once the data sets have been combined and before the data is used in any future research projects.

Once the data are prepared, it will be hashed and stored as deidentified data. What this means is that all personally identifiable fields will be converted to an unidentifiable 32-digit hash and there will be no way of identifying you from the data in the database. Only pseudonymised data will be stored and analysed for research purposes.

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Data analysis and presentation: Subject to the above, only pseudonymised data will be analysed for research purposes. Aggregated or group average data will be presented and in cases where counts of specific injuries are <5, we won't show the actual number. This means there will be no way of identifying individuals or individual events in the data that are presented. If an image or video clip is used in a presentation or in a published paper, the image will have your face pixelated/obscured.

Head Injury Assessment data is currently stored on GDPR compliant Amazon Web Service (AWS) containers located in the Europe AWS region. World Rugby may change the provider of data storage services but the data will remain securely stored in accordance with legal requirements.



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 and if you do, then we will delete any information relating to you that we held for the purpose of this study, based on you previously having consented to participate in it. To do this you only have to report your withdrawal to the Chief Medical Officer at World Rugby, 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 Dr Éanna Falvey at 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. For further information regarding our privacy practices and your rights, please see world.rugby/privacy-policy.

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

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



Player Consent – Core Competitions

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 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 video footage of me being used by World Rugby in this study
5. I consent to World Rugby processing my information in order to depersonalize it for further research purposes
6. I consent to World Rugby sharing my information with its partner research institutions solely as set out in this document
7. I acknowledge that any data shared by World Rugby with any third party for research purposes will only be pseudonymized information and that appropriate safeguards are in place with respect to any such transfer of this data
8. 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
9. I understand that all the information collected by World Rugby on my injuries and training will be treated in strict confidence and only shared with research institutions where appropriate data sharing agreements are in place.
10. I agree to take part in the above study.

Name of participant

Date

Signature

Name of person responsible for obtaining consent

Date

Signature

