



DIAGNOSTICA PRECOCE DELLA CONCUSSIONE CEREBRALE NEL TRAUMA CRANICO IN PAZIENTI DA SOTTOPORRE A PROCEDURE CHIRURGICHE D'URGENZA

Daniel Di Mattia, Anna Maffioli, Piergiorgio Danelli





I TEST DIAGNOSTICI NELLA CONCUSSIONE CEREBRALE

I Test Diagnostici per la rilevazione della **concuSSIONE cerebrale** nel trauma cranico possono costituire una determinante fondamentale nella gestione e **nell'iter terapeutico dei Pazienti** che giungono presso i nostri Nosocomi con patologie passibili di **trattamento chirurgico d'urgenza**.



I TEST DIAGNOSTICI NELLA CONCUSSIONE CEREBRALE

Un numero superiore ai 70 milioni di soggetti in tutto il mondo subiscono una lesione cerebrale traumatica ogni anno. Frequentemente questi pazienti presentano delle patologie che necessitano di trattamenti chirurgici di emergenza per lesioni vascolari, dell'apparato muscolo scheletrico degli organi cavi e parenchimatosi.



TC E CONCUSSIONE CEREBRALE

Il rilevamento delle lesioni intracraniche si basa sulla TC del cranio, che è abusata e richiede ulteriori risorse e tempo. L'utilizzo di **biomarcatori selezionati** quali **UCH-L1, GFAP, NF-L e TAU** possono predire la lesione intracranica presente alla tomografia computerizzata del cranio in fase acuta consentendo un iter diagnostico ed eventualmente **terapeutico chirurgico** più **veloce, efficace** e con **minor rischio di complicanze** peri procedurali.



I TEST DIAGNOSTICI NELLA CONCUSSIONE CEREBRALE USA E FRANCIA

L'introduzione dei test sui biomarcatori del trauma cranico e conseguente concussione cerebrale è già una **realtà in USA ed in Francia** dove viene utilizzata routinariamente sia nei Pronto Soccorso che nella Traumatologia Sportiva.



I TEST DIAGNOSTICI NELLA CONCUSSIONE CEREBRALE IN CHIRURGIA D'URGENZA

Nell'attività lavorativa e quotidiana, come negli Sport di contatto ed in quelli che utilizzano mezzi meccanici, la probabilità di lesioni agli organi interni nei traumi toracici ed addominali è elevatissima. Si possono verificare lesioni del parenchima polmonare, spleniche, epatiche, renali e, seppur più rare, lesioni da scoppio intestinali e pancreatiche. A queste si possono associare traumi cranici di differente entità che possono ulteriormente complicare le condizioni cliniche.



SPORT E CHIRURGIA D'URGENZA

Durante l'attività sportiva esercitata negli Sport di Contatto (ne sono esempi [Rugby](#), [Pugilato](#), [Football Americano](#), [Calcio](#), [Hockey su Ghiaccio](#)) o negli Sport individuali (come [Sport Motoristici](#), [Ciclismo in tutte le sue discipline](#), [Sci Alpino](#) e [Snowboard](#), [Bob](#), [Skeleton](#)) ove esiste un elevato [rischio di trauma cranico](#) e conseguente [concussione cerebrale](#) allo stato dell'arte attuale in Italia non esiste altra metodica diagnostica sul campo, se non quella induttiva con l'[osservazione diretta](#) dell'evento traumatico [da parte del Medico di Campo](#) ed il successivo esame obbiettivo dell'Atleta.



CONCUSSIONE CEREBRALE E SINDROME DA SECONDO IMPATTO

Nella maggior parte dei casi la commozione cerebrale fatale è successiva ad una precedente non diagnosticata ([sindrome da secondo impatto](#)) che ha effetti neurologici permanenti o letali nel 50% dei casi quale potrebbe divenire lo [stress operatorio chirurgico](#) per il trattamento con [procedure chirurgiche d'urgenza](#) di lesioni di altri distretti.



CHIRURGIA D'URGENZA DICUMAROLICI E NAO

A questi vanno aggiunti i Pazienti che assumono terapia anticoagulante con Dicumarolici ed i NAO ove il rischio emorragico intracranico è più elevato.

TRAUMATIC BRAIN INJURY DIAGNOSTICS

Expert Rev Mol Diagn. **2018** February ; 18(2): 165–180. doi:10.1080/14737159.2018.1428089.

An update on diagnostic and prognostic biomarkers for traumatic brain injury

Kevin K. Wang 1, Zhihui Yang 1, Tian Zhu 1, Yuan Shi 2, Richard Rubenstein 3, J. Adrian Tyndall 4 , and Geoff T. Manley 5,6.

1 Departments of Emergency Medicine, Program for Neurotrauma, Neuroproteomics & Biomarkers Research, Psychiatry, Neuroscience and Chemistry, University of Florida, Gainesville, Florida, USA

2 Department Of Pediatrics, Daping Hospital, Chongqing, Third Military Medical University, No. 10 Changjigang Zhilu, Chongqing 400042, China

3 Departments of Neurology and Physiology/Pharmacology, Laboratory of Neurodegenerative Diseases and CNS Biomarker Discovery, SUNY Downstate Medical Center, Brooklyn, NY, USA

4 Department of Emergency Medicine, University of Florida, Gainesville, Florida, USA

5 Brain and Spinal Injury Center, San Francisco General Hospital, San Francisco, CA, USA

6 Department of Neurological Surgery, University of California, San Francisco, San Francisco, CA, USA



TRAUMATIC BRAIN INJURY DIAGNOSTICS

- **6.1 TBI diagnostics:**
- **6.1.2. Emergency Department:** In the civilian setting the majority of TBI cases are mild-moderate TBI (about 80–85%, GCS 13–15 for mild, GCS 9–12 for moderate). Most of these patients would arrive at Emergency Departments for treatment and care. Currently, the cranial CT is the primary diagnostic tool for assessing injury severity. However, while CT can detect blood hemorrhage, **it is not particularly sensitive in detecting DAI** (Diffuse Axonal Injury) **or other more subtle forms of brain injuries**. In addition, repeated CT scanning can present **high radiation exposure to at risk population** such as children. Thus we envision **a rapid POC device** being developing as a screening **prior to the use of CT**. It is possible that repeated measurement of biomarkers over time could potentially be used to access evolving lesion, worsening of injury or the course of brain recovery.

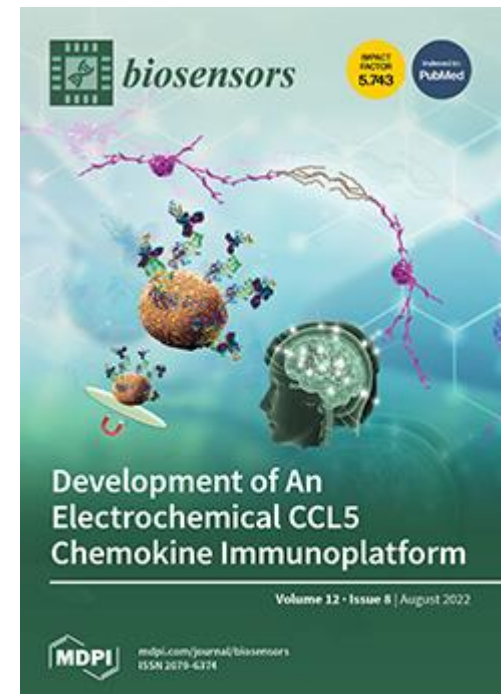
TRAUMATIC BRAIN INJURY DIAGNOSTICS

Biosensors **2022**, *12*, 172. <https://doi.org/10.3390/bios12030172>

Towards a Point-of-Care (POC) Diagnostic Platform for the Multiplex Electrochemiluminescent (ECL) Sensing of Mild Traumatic Brain Injury (mTBI) Biomarkers

Milica Jović , Denis Prim , Edis Saini and Marc Emil Pfeifer

Diagnostic Systems Research Group, Institute of Life Technologies,
School of Engineering, University of Applied Sciences and Arts
Western Switzerland (HES-SO Valais-Wallis), 1950 Sion, Switzerland





Concussion in FIA

Open access
Protocol

BMJ Open Sport & Exercise Medicine

Research Evaluating Sports Concussion Events—Rapid Assessment of Concussion and Evidence for Return (RESCUE-RACER): a two-year longitudinal observational study of concussion in motorsport.

Naomi D Deakin ,¹ John Suckling ,² Peter J Hutchinson ¹

To cite: Deakin ND, Suckling J, Hutchinson PJ. Research Evaluating Sports Concussion Events—Rapid Assessment of Concussion and Evidence for Return (RESCUE-RACER): a two-year longitudinal observational study of concussion in motorsport. *BMJ Open Sport & Exercise Medicine* 2021;7:e000879. doi:10.1136/bmjsem-2020-000879

Accepted 17 December 2020

© Author(s) (or their employer(s)) 2021. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹Clinical Neuroscience, University of Cambridge, Cambridge, UK
²Department of Psychiatry, University of Cambridge, Cambridge, UK

Correspondence to Dr Naomi D Deakin; naomi.deakin@cam.ac.uk

ABSTRACT Concussion is a clinical diagnosis, based on self-reported patient symptoms supported by clinical assessments across many domains including postural control, ocular/visual/ocular dysfunction, and neurocognition. Concussion incidence may be rising in motorsport which, combined with unresolved challenges to accurate diagnosis and lack of guidance on the optimal return-to-race timeframe, creates a difficult environment for healthcare practitioners.

Methods and analysis Research Evaluating Sports Concussion Events—Rapid Assessment of Concussion and Evidence for Return (RESCUE-RACER) evaluates motorsports competitors at baseline (Competitor Assessment at Baseline, Ocular, Neuroscientific (CA/BON) study) and post-injury (Concussion Assessment and Return to motorsport (CARS) study), including longitudinal data. CA/BON collects pre-injury neuroscientific data; CARS repeats the CA/BON battery sequentially during recovery for competitors involved in a potentially concussive event. As its primary outcome, RESCUE-RACER will develop the evidence base for an accurate trackside diagnostic tool. Baseline objective clinical scoring (Sport Concussion Assessment tool—5th edition (SCAT5)) and neurocognitive data (Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT)) will be assessed for specificity to motorsport and relationship to existing examinations. Changes to SCAT5 and ocular, vestibular, and reaction time function (Dx 100) will be estimated by the reliability change index as a practical tool for trackside diagnosis. Neuropsychological (Cambridge Neuropsychological Test Automated Battery (CNTAB)) assessments, brain MRI (7 Tesla) and salivary biomarkers will be compared with the new tool to establish utility in diagnosing and monitoring concussive injuries.

Ethics and dissemination Ethical approval was received from East of England-Cambridge Central Research Ethics Committee (18/EE/0141). Participants will be notified of study outcomes via publications (to administrators) and summary reports (to other communications). Ideally, all publications will be open access.

Trial registration number February 2019 nationally (Central Portfolio Management System 38259) and internationally (ClinicalTrials.gov NCT03844282).

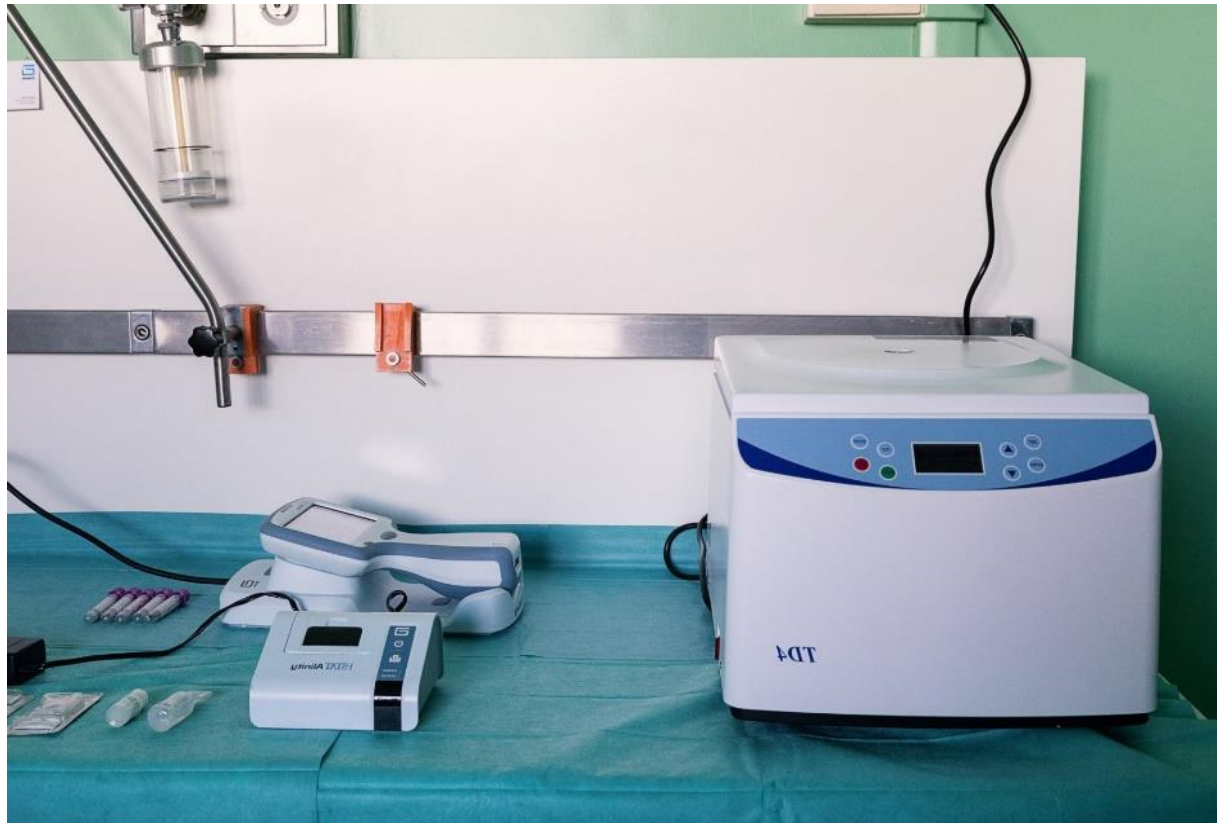
INTRODUCTION Concussion is defined by the Concussion In Sport Group as: ‘a traumatic brain injury induced by biomechanical forces’¹ and is diagnosed clinically according to a constellation of symptoms including alterations of mental state and consciousness.² The natural history is believed to be benign, but there is significant individual heterogeneity in its severity and rate of recovery, with longer recovery periods in certain demographics, such as adolescents.³ Amidst rising concern about concussion in contact sports,^{4,5} there is scarce evidence in the scientific literature on the incidence, severity, and recovery of head injuries specifically in motorsport.⁶ What little there is suggests that even though there has been significant investment in safety, drivers continue to experience a greater risk of concussion compared with other high-risk sports.⁷ Furthermore, a recent survey in the international journal of motorsport medicine, *ACTO-Medical*, found that 70% of competitors ‘did not feel completely normal’ when they attempted to return-to-race following concussion.⁸ This landscape in the motorsport environment specifically—a relatively high concussion incidence combined with competitors returning before they have fully recovered—may leave competitors in control of a high-speed vehicle that poses an ongoing threat to the individual, other participants, and the public. Accurate identification of concussion and a

Deakin ND, et al. *BMJ Open Sp Ex Med* 2021;7:e000879. doi:10.1136/bmjsem-2020-000879

CONCUSSION IN FIA



Kit diagnostici e l'apparecchiatura i-STAT ALINITY Abbott



Kit diagnostici e l'apparecchiatura i-STAT ALINITY Abbott nella Concussione Cerebrale

Durante il Gran Premio d'Italia di Formula Uno, è stato disposto per la prima volta in assoluto un servizio aggiuntivo disponibile durante le giornate della manifestazione.

GFAP e UCH-L1 sono proteine che si trovano nelle cellule gliali e nei neuroni e vengono rilasciate nel sangue dopo che l'encefalo ha subito un trauma od insulto meccanico. I risultati del test sono disponibili in circa 15 minuti.



CONCUSSION PROTOCOLS

Le Federazioni Internazionali hanno ben presente il problema e stanno sviluppando i protocolli e le linee guida per il riconoscimento ed il trattamento del trauma cranico e della concussione cerebrale.

Ne sono esempi:

FIFA, UEFA, FIA, WORLD RUGBY, FIS, NFL, NHL.

Concussion Protocols

Cosgrave C, et al. BMJ Open Sport Exerc Med 2018;4:e000455. doi:10.1136/bmjsem-2018-000455

Concussion in adolescent rugby union players: comprehensive acute assessment protocol and development of the SSC concussion passport to monitor long-term health

**Ciaran Cosgrave,1 Colm Fuller,1 Andy Franklyn-Miller,1,2
Eanna Falvey,1,3 Cliff Beirne,1 John Ryan,4 Paul McCrory5**

Author affiliations

1 Sports Medicine Department, Sports Surgery Clinic, Dublin, Ireland

2 Centre for Health Exercise and Sports Medicine, University of Melbourne, Melbourne, Australia

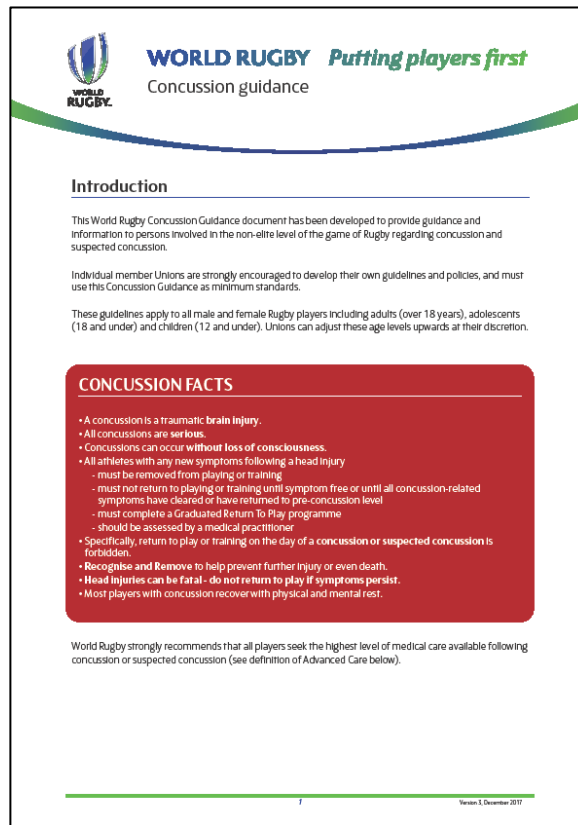
3 Department of Medicine, University College Cork, Cork, Ireland


4 Emergency Department, St. Vincent's University Hospital, Dublin, Ireland

5 The Florey Institute of Neuroscience and Mental Health, Heidelberg, Victoria, Australia



Concussion in Rugby



 **WORLD RUGBY** *Putting players first*
Concussion guidance

Introduction

This World Rugby Concussion Guidance document has been developed to provide guidance and information to persons involved in the non-elite level of the game of Rugby regarding concussion and suspected concussion.

Individual member Unions are strongly encouraged to develop their own guidelines and policies, and must use this Concussion Guidance as minimum standards.

These guidelines apply to all male and female Rugby players including adults (over 18 years), adolescents (18 and under) and children (12 and under). Unions can adjust these age levels upwards at their discretion.

CONCUSSION FACTS

- A concussion is a traumatic brain injury.
- All concussions are serious.
- Concussions can occur without loss of consciousness.
- All athletes with any new symptoms following a head injury
 - must be removed from playing or training
 - must not return to playing or training until symptom free or until all concussion-related symptoms have cleared or have returned to pre-concussion level
 - must complete a Graduated Return To Play programme
 - should be assessed by a medical practitioner
- Specifically, return to play or training on the day of a concussion or suspected concussion is forbidden.
- Recognise and Remove to help prevent further injury or even death.
- Head injuries can be fatal - do not return to play if symptoms persist.
- Most players with concussion recover with physical and mental rest.

World Rugby strongly recommends that all players seek the highest level of medical care available following concussion or suspected concussion (see definition of Advanced Care below).

1 Version 1, December 2017

CONCUSSION IN RUGBY





CONCLUSIONI

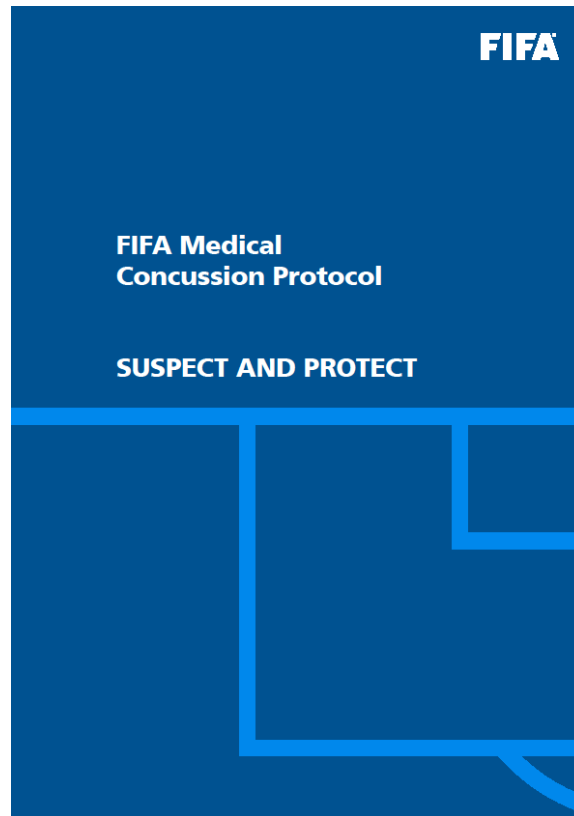
In Italia attualmente non è stata ancora presa in considerazione l'introduzione dei **Test Diagnostici Rapidi** per la **Concussione Cerebrale**. Tali test sono di straordinaria importanza per una rapida diagnosi durante l'ospedalizzazione del Paziente o dell'Atleta infortunato che debba essere sottoposto a procedure chirurgiche d'urgenza, per la **diagnosi precoce di concussione cerebrale** e la prevenzione della **Sindrome da secondo impatto** che, come dimostrato, ha effetti neurologici permanenti o letali nel 50% dei casi.



Concussione Cerebrale Conclusioni

**DIAPOSITIVE ACCESSORIE CHE NON VERRANO
MOSTRATE DURANTE LA PRESENTAZIONE PER I TEMPI
RISTRETTI DELLA STESSA.**

FIFA Medical Concussion Protocol





UEFA concussion awareness campaign

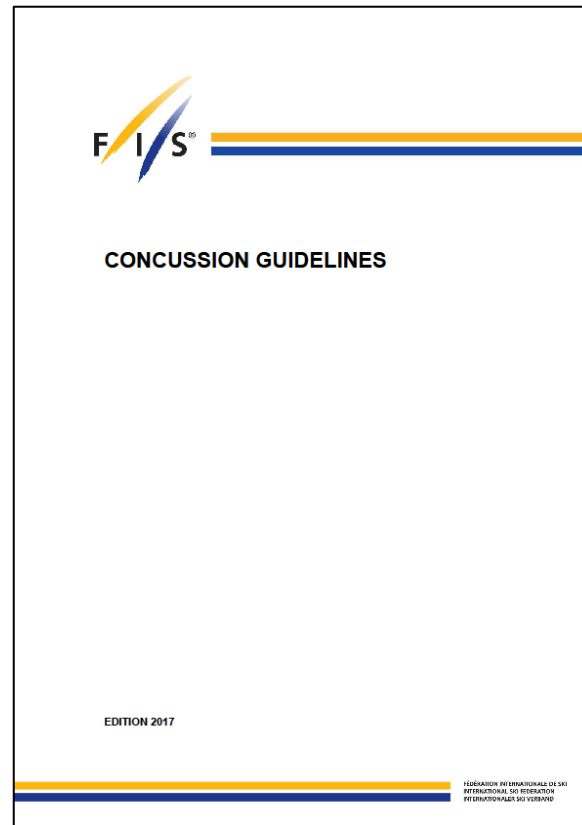
RECOGNISE, REPORT AND REMOVE

- **Players** should **RECOGNISE** a head injury in a case of collision.
- They must then **REPORT** the injury to the **referee** – if he has not seen it – for him to stop the game and call for the Team Doctor. In the meantime, everyone is expected to remain calm and not touch or move the injured player.
- **The Team Doctor** will then make an on-pitch assessment and decide whether the player is fit to play. If the doctor has any doubts about unconsciousness or signs of concussion to the player's head, he should **REMOVE** the player from the field.
- The **Team Doctor is the ONLY Person** who can take the decision for the player to stay on the pitch or be substituted. **The Team Doctor's decision should always be respected, even if the player or the coach believes that the player is fit to continue.**

Concussion in Soccer



Concussion in Winter Sports (FIS) International Ski and Snowboard Federation



Concussion in Winter Sports (FIS) International Ski and Snowboard Federation





Concussion in Hockey (IIHF) International Ice Hockey Federation



INTERNATIONAL
ICE HOCKEY
FEDERATION

2022/23 – 2023/24 Season IIHF MEDICAL REGULATIONS

These Regulations come into effect on 01 June 2022.

Concussion in Hockey



CONCUSSION EVALUATION AND MANAGEMENT PROTOCOL 2022/23 Season

This Concussion Evaluation and Management Protocol ("Protocol") sets forth the procedures that Clubs shall follow regarding concussion education, testing, identification, evaluation, and management. The NHL/NHLPA Concussion Evaluation and Management Protocol is consistent with the Consensus Statement on Concussion in Sport – the 5th International Conference on Concussion in Sport held in Berlin, October 2016 ("Berlin Consensus Statement"). The Protocol utilizes the descriptive definition of "concussion" set out in the Berlin Consensus Statement (Medical Handbook 3.6).

The Protocol that follows applies to NHL Players and Officials, and references to Players shall include Officials, unless otherwise noted below. Consistent with the Berlin Consensus Statement on Concussion in Sport, the evaluation and management of concussion is an individualized process supervised by a Club Physician based on the principles set forth in the Protocol and all information available to him or her. The Club Physician is solely responsible for making the diagnosis of concussion and determining when a Player may return to play.

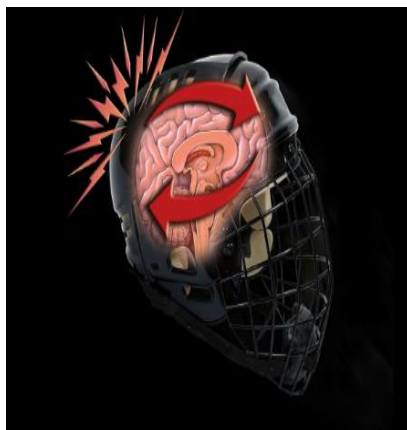
I. EDUCATION

- A. Educational Video:** Clubs shall show the 2022 Concussion Educational Video to all Players, Coaches, Club Medical personnel, the Club General Manager and Assistant General Manager ("attendees") no later than the first day of Training Camp. Club Medical Personnel (Team Physicians, including Team Neuropsychologists, and Athletic Trainers) shall be present during the showing of the video to Players. A Player who joins the Club after the commencement of Training Camp and who has not seen the 2022 Concussion Education Video shall be shown the video. All attendees shall sign the attendance sheet upon watching the video (Medical Handbook 3.3.1), which the Club shall submit to the League by the first Monday after the start of Training Camp 2022, or for a Player joining the Club after Training Camp, as applicable. Below is a link to the Concussion Education video.

Concussion Education
<https://vimeo.com/211706255/a88d0c4b>

- B. Educational Brochure:** Clubs shall provide the NHL Concussion Education Program FAQ Brochure (Medical Handbook 3.4) to all Concussion Educational Video attendees, and shall also provide the Brochure to all Players who are diagnosed with a concussion thereafter, and give copies for distribution by NHL Players to family and close friends. **Non-English language translations are available here:**
<https://nhl.box.com/s/z8em3ktqm19d8uxapw0onk605elt4jfs>

Concussion in Hockey (IIHF)






Concussion Protocols


Altre federazioni e Sport sono nel periodo della discussione come
Boxing, Moto GP.



Concussion in Boxing



BOXING CANADA
CONCUSSION MANAGEMENT PROTOCOL



CONCUSSION MANAGEMENT SUMMARY

If an athlete is suspected to have a concussion, then he/she must go through physical and cognitive rest for 24-48 hours. The athlete is required to see a physician to fill out a **medical assessment letter** for the diagnosis of concussion and to rule out other possible injuries to the brain or spine.

It is advised that a coach, physiotherapist or certified athletic therapist supervise the athlete through each step of the return-to-sport protocol to ensure safety and optimal progression. The general steps include:

1. Symptom-limited activity
2. Light aerobic exercise
3. Sport-specific exercise
4. Non-contact training drills
5. Full-contact practice, and
6. Return to competition.

Once a step is completed, the athlete must not have any new symptoms or worsening of symptoms for least 24h before starting the next step. If symptoms appear, the athlete must stop the activity and rest until symptoms resolve (minimum 24h) and return to the previous step. If symptoms appear during steps 5 or 6 of the Return-to-Sport protocol, the athlete must stop the activity and consult with a health professional before returning to their sport.

Boxing Canada recommends a minimum period of 30 days after a concussion is diagnosed before the athlete returns to sparring (step 5) or any training with the risk of physical contact. Before this step, the athlete must obtain a **medical clearance letter** from a physician and give it to their coach.

Concussion symptoms can include:

<ul style="list-style-type: none"> Headache "Pressure in head" Neck pain Nausea or vomiting Dizziness Blurred vision Balance problems Sensitivity to light Sensitivity to noise Feeling slowed down Feeling like "in a fog" 	<ul style="list-style-type: none"> "Don't feel right" Difficulty concentrating Difficulty remembering Fatigue or low energy Confusion Drowsiness More emotional Irritability Sadness Nervous or anxious Trouble falling asleep
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

September 2020

Concussion in Boxing



Concussion in Moto GP





Kit diagnostici e l'apparecchiatura i-STAT ALINITY Abbott

L'introduzione dei test sui biomarcatori del trauma cranico lieve e conseguente concussione cerebrale è già una realtà Americana per la National Football League (NFL). Le stime di incidenza della **commozione cerebrale** correlata allo sport **negli Stati Uniti** variano da una sottostima di 200.000 casi fino ad un numero ipotizzabile di 3.800.000 **con una media di 1,5 morti all'anno** rilevata dal Centers for Disease Control and Prevention (CDC).

Nella maggior parte dei casi **la commozione cerebrale fatale era successiva ad una precedente non diagnosticata** (Sindrome da secondo impatto).

Kit diagnostici e l'apparecchiatura i-STAT ALINITY Abbott

- **What is the NFL concussion protocol?**
- The NFL concussion protocol is a series of steps players have to take to return to playing after suffering a concussion.
- **How does the NFL concussion protocol work?**
- If a player shows symptoms of a concussion, the protocol will be initiated by the person who spotted them. The player is taken to the sideline and examined for a concussion. They will be evaluated for any so-called "no-go" symptoms — loss of consciousness, gross motor instability, confusion, amnesia, fencing response, impact seizure — history of concussions, any other symptoms or a focused neurological exam. [Following the findings of the investigation into the handling of Tua Tagovailoa's Week 4 injury](#), ataxia, defined as abnormality of balance/stability, motor coordination or dysfunctional speech caused by a neurological issue, was added to the list of no-gos. If a no-go is found, then the player is not allowed to return to the field.
- If there are concerns a player might have a concussion, the player must undergo an exam by a team doctor or an unaffiliated neurotrauma consultant or athletic trainer. The protocol will be initiated if the examiners believe a player has a concussion. The protocol includes a follow-up neurological exam and periodic evaluation by the medical team. Players are not allowed to return to play during that time.



Concussion in NFL

How long does the NFL concussion protocol last?

- Players have to go through several steps before they can be medically cleared to play. Since each phase can take a different amount of time depending on the severity of the concussion, the timeline can differ wildly based on the player.
- Here are the steps players have to take to leave the concussion protocol:
- **Symptom limited activity**
- In this phase, players are asked not to engage in much activity. They are supposed to rest during this period and limit anything that could aggravate their symptoms. Eventually, players will be allowed to do limited stretching and light aerobic exercises, so long as team training staff are supervising.
- **Aerobic exercise**
- Players will start to work on cardio exercises along with stretching and training, with team medical staff supervising. After this phase, players can start working on balance testing.
- **MORE NFL PLAYOFFS: [AFC & NFC bracket](#) | [TV schedule](#) | [Wild-card predictions](#)**
- **Football-specific exercise**
- In the third stage, players can take part in football-specific exercises and start working with the team for up to 30 minutes under supervision. Players are also able to increase their cardio workloads.
- **Club-based non-contact training drills**
- Players reaching the fourth stage are able to start throwing, catching and running and engage in activities more specific to their position. They also can continue to ramp up their exercise and training. By end of this phase, players have to have undergone neurocognitive and balance testing.

Concussion in NFL





Concussione e Sintomatologia

Il sintomo più evidente della commozione cerebrale la perdita di coscienza, ma la maggior parte degli Atleti invece **manifestano altri sintomi** e segni quali **cefalea**, **nausea** e **vomito**, **vertigini**, **disturbi dell'equilibrio**, confusione con **stordimento** o **intontimento**, **amnesia** retrograda o anterograda, **diplopia** e **fotofobia**.



Concussione Cerebrale Conclusioni

In Italia attualmente non è stata ancora presa in considerazione l'introduzione dei **Test Diagnostici Rapidi** per la **Concussione Cerebrale**.

Tali test sono di straordinaria importanza per una rapida diagnosi ed ospedalizzazione dell' Atleta e per la prevenzione della **Sindrome da secondo impatto** che, come dimostrato, ha effetti neurologici permanenti o letali nel 50% dei casi.



Concussione Cerebrale Conclusioni

E' auspicabile che oltre all'introduzione da parte di tutte le Federazioni Nazionali di protocolli per il riconoscimento, la diagnosi ed il trattamento della Concussione Cerebrale, **venga presa in assoluta considerazione la possibilità di effettuare in campo gara la diagnostica precoce di Concussione Cerebrale** tramite i Biomarcatori Cerebrali in conseguenza di un trauma cranico sportivo.



CONCUSSIONE CEREBRALE E SINDROME DA SECONDO IMPATTO

Le stime di incidenza della commozione cerebrale correlata allo sport negli Stati Uniti variano da una sottostima di 200.000 casi fino ad un numero ipotizzabile di 3.800.000 con una media di 1,5 morti all'anno rilevata dal Centers for Disease Control and Prevention (CDC).