FIFA®

FIFA Concussion Protocol for Medical Staff

SUSPECT AND PROTECT

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CONCUSSION SUSPECT AND PROTECT

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FOREWORD

FIFA is committed to raising awareness of and improving education on concussion management among all stakeholders within football.

The FIFA Medical Network is a freely accessible resource with dedicated modules on concussion and head and neck injuries and their management.

The FIFA Emergency Care Manual is also freely available.

This document is intended for use by all doctors working with football teams, and is supported by FIFA's concussion awareness campaign, "Suspect and Protect – No Match Is Worth the Risk".

This document accompanies the FIFA Concussion Protocol for Grassroots Football.

Definition and classification of concussion

A concussion is defined as a traumatic brain injury caused by a direct blow to the head, neck or body resulting in an impulsive force being transmitted to the brain. This initiates a neurotransmitter and metabolic cascade, with possible axonal injury, blood-flow change and inflammation affecting the brain. Symptoms and signs may present immediately or evolve over minutes to days. Symptoms commonly resolve within days, but may be prolonged.

Concussions can result in substantially different outcomes, ranging from no detectable effect to transient functional impairments or life-threatening structural lesions. Team doctors must therefore immediately recognise the possibility of a concussion and proceed to assess the player and determine the severity as swiftly as possible, whether on or off the pitch. FIFA recommends a standardised, evidence-based approach to support team doctors and those dealing with head injuries in football.

If there is even a suspicion of a concussion at any stage, you should remove the player from the match or training session and assess and treat them appropriately, as described in this protocol.

Several common features may be utilised in clinically defining the nature of a concussion. These include the following:

- A concussion can be caused either by a direct blow to the head, face or neck or by a blow to another part of the body with an impulsive force transmitted to the brain. The evaluation after trauma to the brain or neck should always include an examination of associated structures, i.e. the neck (after a head impact) and labyrinth (after a head or neck impact), since symptoms alone cannot distinguish a concussion from a cervical/vestibular injury and both may occur at the same time.
- A concussion may result in neuropathological changes, but the acute clinical signs and symptoms largely reflect a functional disturbance rather than a structural injury and, therefore, no abnormality is seen in standard structural neuroimaging studies.
- A concussion may result in a range of clinical signs and symptoms and does not always involve a loss of consciousness. The resolution of the clinical and cognitive features typically follows a sequential course.

However, despite these common features, there can be considerable variation in the course of a concussion:

- Signs and symptoms sometimes evolve in a matter of minutes, but this can take hours to days in other cases.
- In some cases, persistent symptoms may occur.

Planning for emergencies

FIFA PRE-MATCH EMERGENCY ACTION PLAN

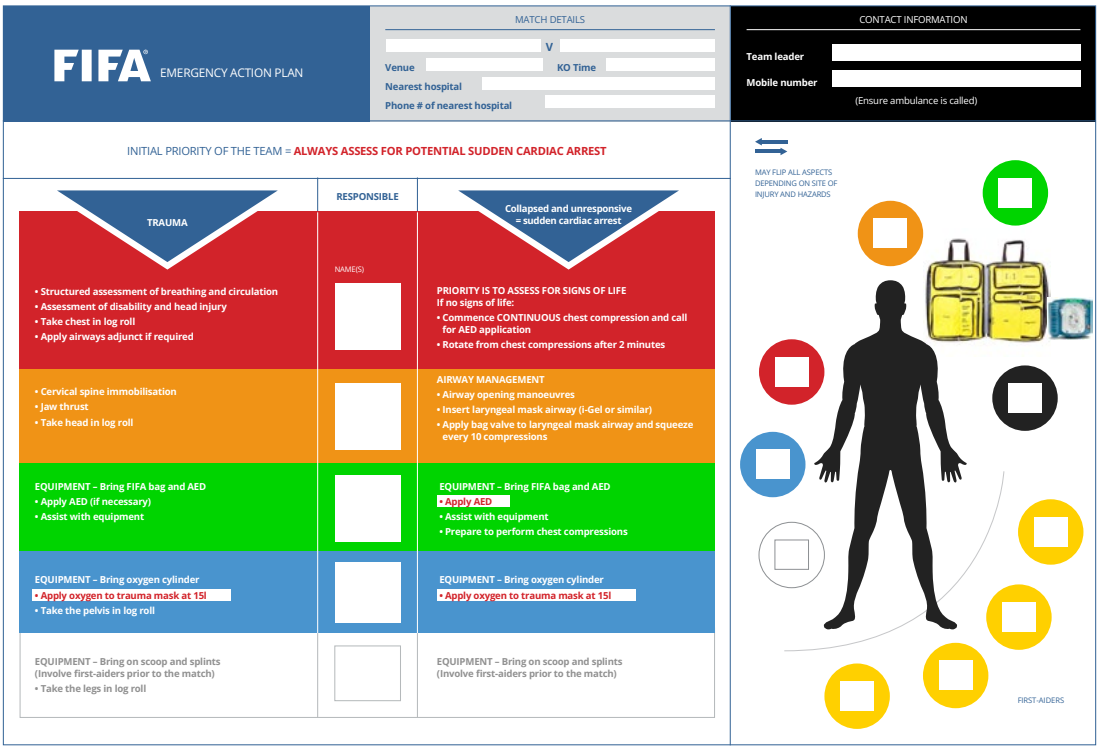
There are several actions that will improve the management of a player in the event of a concussion, such as adequate planning for concussion incidents (including a standardised assessment process), performing baseline examinations and having a structured plan for post-concussion management.

To support and promote a consistent level of emergency medical care on the football pitch and reduce the number of errors, FIFA has proposed a standardised protocol for medical teams managing medical emergencies in football: the FIFA Pre-Match Emergency Action Plan, which includes planning for concussion incidents.

As illustrated in the associated poster (Figure 1), the FIFA Pre-Match Emergency Action Plan comprises a process by which medical teams organise themselves to deliver prioritised care in emergency scenarios and to minimise the intrinsic risks that come with working in the complex and often publicly viewed environment of competitive football. By linking key clinical assessments and interventions with predetermined roles, the FIFA Pre-Match Emergency Action Plan helps teams to manage the challenging human factors inherent in a time-critical emergency on the field of play. Importantly, the FIFA Pre-Match Emergency Action Plan moves away from the more traditional reactive team dynamics to a more proactive team preparation model.

Whilst we cannot predict when emergencies may occur, we can be sure that emergencies will occur, and our job is to be adequately prepared to respond.

Figure 1. Poster for FIFA Pre-Match Emergency Action Plan



BASELINE EXAMINATION

A baseline examination refers to an assessment performed at a time when a player has not recently had a concussion (e.g. pre-season). The baseline examination provides valuable information for both the diagnosis and management of concussions. Results from the baseline examination can be helpful for comparing signs and symptoms following a concussion and assessing the level of impairment in relation to what is normal for the individual player. They can also be instrumental in the decision-making process with respect to the return to football.

FIFA recommends using the latest version of the Sport Concussion Assessment Tool (SCAT, currently version 6) for baseline examinations. The SCAT is the most widely used assessment tool in sport internationally and provides a battery of multimodal tests to assess several aspects of brain function that are typically impaired in concussion. It measures consciousness, orientation, neurocognitive function, self-reported symptoms and postural stability. It further includes a section for acute concussion evaluation, taking note of observable signs of a concussion, including red flags, the Glasgow Coma Scale and cervical spine function, and a neurological screening examination. Clinicians using this tool will vary widely in their education and training, experience in evaluating and managing concussions, experience with cognitive assessment, and understanding of the clinical and physiological manifestations of a concussion. Because of this variability, it is important for clinicians to familiarise themselves with all aspects of the tool, including the strengths and limitations of the SCAT6. To this end, the following considerations should be taken into account:

- The SCAT is most effective in discriminating between concussed and non-concussed athletes up to seven days post-injury, with diminishing clinical utility after 72 hours. For evaluations more than seven days after an injury, use of the Sport Concussion Office Assessment Tool 6 (SCOAT6) should be considered.
- The SCAT6 is for use with adolescents (>12 years) and adults. The Child SCAT6 should be used with children aged 8-12.
- The SCAT6 is designed to be an aid in the standardised evaluation of concussion during the acute phase of injury. It is not intended to be used as a stand-alone diagnostic tool but rather to inform clinical assessment and diagnosis.
- The SCAT6 is not intended to be used in isolation for making return-to-play decisions.
- It is important to underscore that concussed athletes may perform within normal ranges on the SCAT6 (false negatives), just as non-concussed individuals may perform poorly (false positives).
- The interpretation of SCAT6 data is a clinical endeavour that includes examining the player in the context of personal, psychological, social, cultural, athletic, educational and medical factors and the characteristics/mechanism of any relevant injury.
- Performance well below emerging normative standards should trigger repeated and/or additional cognitive evaluations to establish an accurate baseline and/or rule out true cognitive impairment in the player.
- The Modified Balance Error Scoring System (M-BESS) is most accurate if administered by the same person at baseline and post-injury.
- Differences in SCAT6 performance have been related to demographic variables (e.g. age, sex and education), as well as cultural and linguistic factors.

Examination and management

DIAGNOSIS AND MANAGEMENT IN FIRST 72 HOURS AFTER INCIDENT

A systematic approach is recommended in the first 72 hours after a potentially concussive incident in football, starting with the initial examination and continuing with diagnosis and management:

- Observation and recognition
- Initial (on-pitch) inspection and examination
- Off-pitch examination
- Post-incident examinations/observation and follow-up
- Observation and serial re-examination until a concussion can be excluded
- Graduated Return-to-Football Programme

Notably, this procedure is the sole responsibility of the team doctor. They should have a low threshold to remove a player from play and observe them over the following 72 hours to gauge the development of symptoms.

The purpose of the on-pitch assessment is to identify if there are signs or symptoms of a concussion or a concussion is suspected despite the absence of signs or symptoms. Should this be the case, the doctor should remove the player from the pitch for a more detailed examination. Due to the potential severe neurological consequences of a concussion, any suspicion of abnormal findings should result in the initiation of an appropriate examination.

The post-incident examinations serve to establish a diagnosis so as to accurately initiate therapeutic strategies and enable a safe return to football. The doctor should be aware that an emergency can arise at any time in the hours and days immediately after a concussion; therefore, repeated comprehensive examinations are required until a concussion can be excluded. Ideally, the team doctor should know each individual player, including their characteristics, medical history and baseline examination results, and should be able to communicate with all players appropriately.

OBSERVATION AND RECOGNITION

Team doctors should observe the match (or training session) with a focus on possible mechanisms or situations that could cause a concussion. Concussions are particularly prevalent during aerial duels. The injury mechanism and player behaviour are best recognised using direct observation – supported, if possible, by immediate video review. There are specific signs following a head injury that should increase the suspicion of a concussion, as used and validated by FIFA (Table 1).

Table 1. FIFA video signs of a possible concussion (adapted from Serner A, Araújo J, Beasley I, et al. 2023)

Video signs of possible concussion	
Red flags	**Yellow flags**
• **Impact seizure/convulsion** • **Tonic posturing** • **No protective action/floppiness** • **Motor incoordination** • Vomiting • Visible signs following return to play – after a medical assessment	• **Lying motionless** - High suspicion of unconsciousness - Low suspicion of unconsciousness • **Blank/vacant look** • Disorientation • Concerning impact mechanism - High-force impact - Double head impact • Face or scalp bleeding • Visible signs following return to play – without a medical assessment
Recommend substitution	**Recommend video review and clinical assessment**

Video review allows the direct observation of the mechanism of injury and the identification of early/immediate signs (e.g. a player taking no protective action, an impact seizure or tonic posturing), as well as signs that may occur in the period immediately after the injury (e.g. a player lying motionless, displaying motor incoordination or having a dazed or blank and vacant look). Consequently, it is important to review all available video footage focusing on the player in the immediate period following the injury.

Where permitted by competitions, the use of concussion spotters is recommended. As their name suggests, these figures provide valuable information regarding the mechanism of injury and initial signs that may be evident, allowing the team doctor the time to assess and treat any possible life-threatening issues. A concussion spotting programme is now available as standard at all FIFA competitions.

Prior to the initial examination, it is important to consider the differential diagnoses of a deteriorating or collapsed player. Potential emergencies after an acute head injury include signs or symptoms of cardiopulmonary arrest or of severe structural injuries to the brain, skull, face, cervical spine or spinal cord, which have been denoted as “red flags”. The emergency assessment and management after any acute head injury should be performed according to clear principles and standardised practice, as per the FIFA Emergency Care Manual.

Any head injury should be regarded as having a concomitant cervical spine injury until this has been excluded by clinical examination or by imaging if indicated (Table 2). Any suspicion of a cervical fracture or intraspinal lesion (e.g. as prompted by a Glasgow Coma Scale (Annexe 1) score of <15 on initial assessment, neck pain or tenderness, a focal neurological deficit, paraesthesia or weakness in the extremities, or any other clinical suspicion of a cervical spine injury) should result in the immobilisation and stabilisation of the cervical spine, appropriate removal from the pitch and emergency transport to a hospital.

Any suspicion of a skull fracture should result in immediate removal from play. In addition to local ocular tenderness to palpation, other significant signs and symptoms of an orbital floor fracture are a periorbital haematoma, double vision (diplopia) and abnormalities in eye movements. Any deterioration of signs and symptoms can indicate intracranial bleeding and/or swelling, which can only be diagnosed by tomographic imaging (i.e. computerised tomography) of the brain. Therefore, it is important to continuously observe players even if they are initially symptom-free.

Table 2: Emergency management principles (from FIFA Emergency Care Manual)

Domain	Concern, signs on examination	Actions	Consequence
Cardiopulmonary	**Concern:** Cardiopulmonary arrest Signs on examination: Unresponsiveness, not breathing normally	- Start cardiopulmonary resuscitation (CPR) chain: emphasis on chest compression and rapid defibrillation. - Place the automated external defibrillator (AED) but shock the player only if the AED device self-charges and verbally recommends pressing the shock button. - Place the player onto a spinal stabilisation device (e.g. spinal board) and extricate the player appropriately.	Remove the player from the pitch and continue emergency management if indicated. Consider immediate emergency transport to hospital.
Brain	**Concern:** Intracranial lesion Signs on examination: Glasgow Coma Scale score of <13, loss of consciousness, severe headache, repetitive vomiting, seizure/ convulsion, abnormal posturing, new difference in pupil size, nystagmus, fall due to imbalance	- Neutralise and stabilise the cervical spine appropriately. - Maintain and protect the airway as safely as possible. - Ventilate the unconscious patient if necessary. - Place the player onto a spinal stabilisation device (e.g. spinal board) and extricate the player appropriately.	
Skull and face	**Concern:** Fracture Signs on examination: Severe headache, blood or clear fluid exiting from the ear(s) or nose, deformity, periocular or retroauricular haematoma	- Neutralise and stabilise the cervical spine appropriately. - Control any external bleeding. - Place the player onto a spinal stabilisation device (e.g. spinal board) and extricate the player appropriately.	
Cervical spine and neck	**Concern:** Fracture or intraspinal lesion Signs on examination: Deformity, severe pain, swelling over the neck, paresis, impaired sensation	- Neutralise and stabilise the cervical spine appropriately. - Place the player onto a spinal stabilisation device (e.g. spinal board) and extricate the player appropriately.	

INITIAL (ON-PITCH) INSPECTION AND EXAMINATION

The outcome of the initial (on-pitch) inspection and examination is the basis for the decision on emergency management, referral to hospital, removal from play and/or off-pitch assessment in a quiet area.

The recommended elements of the initial inspection and examination are based on the latest version of the SCAT (currently SCAT6) and the UK National Institute of Health and Care Excellence (NICE) guideline (Table 3). During this initial examination, it is essential to focus on the possibility of medical emergencies.

The inspection concentrates on visible signs (e.g. loss of consciousness, vomiting, the mechanism of injury), while the examination assesses core signs and symptoms of neurological impairment of different brain areas (cortical, subcortical, cerebellar, brain stem) and of a cervical spine or intraspinal injury. Any loss of consciousness or a Glasgow Coma Scale score of <15 indicates a brain injury. At any stage during this initial examination, the medical personnel attending to the injured player can be assisted by information from other available resources, such as video replays or eyewitness accounts. The procedures for the use of such resources, as well as the relevant lines of communication, should be agreed pre-match/training and documented in the FIFA Emergency Action Plan.

In either of the following non-emergency scenarios, the injured player should be removed to an off-pitch location for further assessment and/or management:

1. The outcome in one or more aspects of the initial assessment is considered or suspected to be abnormal and additional time for examination is required.
2. All tests yield normal results, but there is a suspicion of concussion.

Table 3: Sample checklist for an initial (on-pitch) inspection and examination of a possible brain injury

Inspection	1	**Acute signs**		
		Short-term loss of consciousness	No	Yes
		Deformity or swelling of the head or neck or holding of the head due to pain/for stabilisation	No	Yes
		Blood or clear fluid exiting from the ear(s) or nose	No	Yes
		Blank look	No	Yes
		Slowness in getting up	No	Yes
		Vomiting	No	Yes
		Uncharacteristic behaviour	No	Yes
Examination	2	**Glasgow Coma Scale: 15 points**		
		Eye opening: spontaneous (4 points)	Yes	No
		Verbal: oriented (correctly gives name, place, date) (5 points)	Yes	No
		Motor: obeys commands (6 points)	Yes	No
	3	**Selected new acute symptoms**		
		Headache or pressure in the head	No	Yes
		Neck pain	No	Yes
		Nausea	No	Yes
		Vertigo, dizziness, drowsiness, unsteadiness	No	Yes
		Blurred or double vision, sensitivity to light	No	Yes
		Tinnitus, hypacusis, hyperacusis	No	Yes
		Impaired sensation in the upper or lower extremities	No	Yes
	4	**Orientation and memory (Maddocks questions)**		
		What venue are we at today?	Correct	Incorrect
		Which half of the match is it now?	Correct	Incorrect
		Which team scored last in this match?	Correct	Incorrect
		Which team did your team play against in their last match?	Correct	Incorrect
		Did your team win their last match?	Correct	Incorrect
	5	**Delayed, slow or inappropriate responses**	No	Yes
	6	**New difference in pupil size, crossed eyes, spontaneous nystagmus**	No	Yes
	7	**Range of motion of the cervical spine, only if no acute neck pain**		
		Active rotation to the left and right from a neutral position	Normal and painless	Impaired or painful
		Active flexion and extension from a neutral position	Normal and painless	Impaired or painful
	8	**Strength of the upper and lower extremities**	Normal	Impaired
	9	**Touch sensation of the upper and lower extremities**	Normal	Impaired
	10	**Balance, control and coordination of posture and the limbs**		
		Stand on both legs with heel and toe together (eyes closed, 10 seconds; if failed, maximum 1 repetition)	Stable/no sway	Failed
		Finger-to-nose task (right and left) (eyes closed, 2 repetitions, both sides)	All trials correct	Failed

If no signs or symptoms and nothing to suggest a concussion injury -> player allowed to return to match play or training; further observation until leaving the sports facilities.

If any emergencies -> emergency management.

OFF-PITCH EXAMINATION

The off-pitch examination should focus on possible emergencies (Table 4). If there is a team doctor available, the testing of ocular motor function should be included. Obvious minor injuries, such as lacerations or bruises, can be treated during the process if this is practical and does not pose any risks or impinge on the examination.

Table 4: Selected signs and symptoms indicating red and yellow flags after a head injury

Domain	Red flags	Yellow flags	
Alertness/ attention	Glasgow Coma Scale score of <13	Signs	Glasgow Coma Scale score of 13 or 14, blank look, confusion, disorientation, delayed, slow or inappropriate response, difficulty concentrating or remembering things
		Symptoms	Feeling slowed down, not feeling "right", drowsiness, fatigue, low energy
Neuromotor	Seizure/convulsion or postictal signs, abnormal posturing	Signs	Impaired control of trunk or limb movements
Headache	Severe headache, repeated vomiting	Signs	Nausea or vomiting (once), holding of the head
		Symptoms	Pressure, headache
Dizziness/ balance	Fall due to imbalance	Signs	Imbalance
		Symptoms	Vertigo, dizziness, fogginess, unsteadiness
Vision/ocular motor function	Crossed eyes, nystagmus, other acute disordered eye movements, new difference in pupil size	Symptoms	Blurred vision, eyes being unable to follow a finger/other moving target, sensitivity to light
Emotions/ behaviour		Signs	Emotional instability, irritability or aggression with little or no provocation
Hearing	Acute hearing loss	Symptoms	Hyperacusis, hypacusis, tinnitus
Cervical spine/ spinal cord	Pain, tenderness, swelling, deformity, paresis, impaired sensation in the upper or lower extremities	Signs	Impaired hearing, tinnitus, sensitivity to noise
		Symptoms	Neck pain
Skull/face	Blood or clear fluid exiting from the ear(s) or nose, deformity, periocular or retroauricular haematoma	Signs	Contusion, laceration
Personal history	Anticoagulation, clotting disorder	Previous brain injury	

Note: Some signs and symptoms can be attributed to different domains. Yellow flags can turn into red flags.

RED FLAGS:	Potential life-threatening problems or hints of intra- or extracerebral lesion -> if any: emergency management and consider immediate transport to hospital.
YELLOW FLAGS:	Neurological or orthopaedical impairment -> if any or the doctor is in doubt: removal from football and further examination, with a specialist to be consulted if required.

If any (suspected) yellow flags are identified during the initial on- or off-pitch examination, the player should be further assessed using a detailed neurological examination.

This detailed neurological assessment should include an examination of the following:

- The cranial nerves
- Vestibular, balance and coordinative functions, including spontaneous nystagmus, head impulse test, vertical eye deviation, dynamic visual acuity, balance (Romberg test) and positioning manoeuvres
- The cervical spine, including range of motion, stability, proprioception, strength and muscle tone
- The motor function of the upper/lower extremities

Standardised neurocognitive tests should also be performed.

Based on the outcome of the neurological examination, the team doctor may decide on further examinations.

Players who are removed from a match or training session and have signs or symptoms of a concussion or of another significant head injury at any time should complete the Graduated Return-to-Football Programme prior to recommencing normal football activities, under the guidance of a doctor.

Observation and serial re-examination until a concussion can be excluded

The team doctor should continue to observe the player. Medications that may mask or worsen symptoms should be avoided unless a more severe head injury has been ruled out. Any worsening or newly developed signs or symptoms should result in emergency management in the event of red flags or further examinations in the event of yellow flags.

Prior to leaving the sports facilities, all injured players should be re-examined for worsening or new signs and symptoms. Before travel without access to emergency care (e.g. flights), any worsening symptoms regarding any form of brain, skull or cervical spine injury should be checked, and any concerns allayed, using appropriate diagnostic imaging.

An initial computerised tomography scan is recommended on the day of the injury if any of the following are present:

- Glasgow Coma Scale score of <13 (or <15 after two hours)
- Suspected skull fracture
- More than one episode of vomiting
- Post-injury seizure
- Loss of consciousness
- Persistent anterograde amnesia
- Focal neurological deficit

It is important to note that concussion will very often be diagnosed without radiological findings. A concussion is a clinical diagnosis.

Current guidelines and position statements agree that a player with a (suspected) concussion should not return to football on the same day, but rather should follow a graduated return to play.

In general, all players who have suffered a (suspected) concussion should be observed for 72 hours by the team doctor.

The time frame of 72 hours has been chosen because symptoms can develop with latency. The team doctor should assess the injured player daily during this period and be particularly attentive to whether the signs and symptoms do not improve or even worsen in intensity or the player develops new signs/symptoms.

In the event of minimal or improving symptoms and a normal outcome in all examinations, the player can be medically cleared to start the Graduated Return-to-Football Programme.

In the event of persistent yellow flags, the player should be referred to a medical specialist for further examination and treatment.

GRADUATED RETURN-TO-FOOTBALL PROGRAMME

The Graduated Return-to-Football Programme (Table 5) is intended to ensure a controlled, stepwise resumption of footballing activities for high-level adult football players after a concussion. For players with structural damage (such as an intracranial haemorrhage or a skull fracture), the return-to-football procedure should be determined on an individual basis by the doctor in charge.

The player should be re-examined by the doctor in charge before starting symptom-limited activity (Stage 1), and again before returning to "routine/contact training" (Stage 6). The medical re-evaluations should focus on the following:

- Abnormal diagnostic findings on the day of the injury
- Persistent or additional signs or symptoms or changes in their character, intensity or frequency
- Symptom development under an increasing physical and cognitive training load

The Graduated Return-to-Football Programme comprises six stages, with a progressive increase in physical demands (from aerobic to anaerobic, from no resistance to the addition of resistance), football-specific exercises (from simple to complex), and the risk of contact (from individualised to team training, from non-contact to full contact) and head impact (from no heading to the inclusion of heading). **Each stage should include at least one training session and last a minimum of 24 hours**. In the event of worsening or recurring symptoms during or after a training session at any stage, the player should rest until these symptoms have resolved (for a minimum of 24 hours) and then continue the programme at the previous symptom-free stage. The player should only be medically cleared to return to match play when each stage has been completed without symptoms. With younger players and players with certain risk factors, such as a history of repetitive concussion injuries, a more conservative approach must be followed.

The time frame for clinical recovery and the return to play has increased over the past two decades, perhaps due to increased injury awareness and policies/legislation regarding the recognition of injury, removal from play and medical oversight of sporting activity.

Medical clearance for a return to football should always be given by the treating doctor, who must be experienced in managing brain injuries. Such clearance must be based on medical considerations only, regardless of a player's desire to play, the concealment of symptoms and/or pressure from others, including the coaching staff, parents or the media.

Table 5: Graduated Return-to-Football Programme

Stage	Focus	Activity
1	Symptom-limited activity	Daily activities without exaggeration of symptom threshold (worsening of pre-activity symptoms or additional symptoms), e.g. 10 minutes of walking
2	Light aerobic exercises (up to approx. 70% HRmax)	a) Cardiovascular exercise on stationary bike: 25-40 minutes including warm-up and cool-down; controlled activities at low to moderate intensity b) Mobility/stretching, stabilisation and balance (double- and single-stance) exercises
3	Football-specific exercises	a) Cardiovascular training on the pitch - Warm-up for 10 minutes at moderate intensity with variable running tasks - Interval runs at higher intensities with sufficient breaks - Cool-down for 5-10 minutes at low intensity b) Technical training with the ball (1:1) - Basics: balance and short/long passing; easy shooting at targets - Body training (no resistance/add elastic resistance) - Mobility and stretching exercises c) Trunk strength/stabilisation exercises (no resistance or explosive movements) - Basic lower-/upper-extremity strength exercises (elastic resistance) - Balance exercises (double- and single-stance) on unstable surfaces No heavy-resistance training or contact activities For goalkeepers: controlled diving movements (not explosive) on a foam surface in the gym (without catching the ball)
4	Non-contact football training drills	a) Cardiovascular training on the pitch - Warm-up for 10 minutes at moderate intensity with straight running, changes of direction, lateral shuffles, forward-backward running and zigzag running - Interval runs at high intensity up to 90% HRmax - Cool-down for 5-10 minutes at low intensity b) Technical training (with a small group of players) - Small-sized game - Short/long passing - Shooting at goal/targets - Plant and cut, dribbling with the ball - Basics: easy heading with only a soft ball (increase in complexity while balancing), controlled setting and limited quantity c) Body training (including elastic resistance) - Mobility and stretching exercises - Trunk strength/stabilisation exercises (including free weights) - Basic lower-/upper-extremity strength exercises (elastic resistance, free weights) - Balance exercises (double- and single-stance) on unstable surfaces d) Strength training - Keep resistance below about 80% 1-RM, no Olympic weightlifting or exercises with the head below the level of the hips - Progressively increase external resistance for multi-joint exercises No contact activities For goalkeepers: diving drills on a foam surface, some without catching the ball and others with catches (shots from short/medium range; 1:1 with the goalkeeping coach)

Stage	Focus	Activity
5	Football training drills with controlled contact	Controlled contact activities: simulate contact situations (e.g. headers, checks, tackles) - Stepwise increase in intensity - From playing with 1 partner (e.g. rehabilitation coach) to training in small groups of players - Increase from a small playing area (a third or quarter of a pitch) to the whole pitch - Heading with a regular ball in controlled settings (e.g. after throwing the ball; heading without opposition); gradual increase in the number of headers For goalkeepers: controlled diving drills on grass, some without catching the ball and others with catches (shots from short/medium/long range; 1:1 with the goalkeeping coach)
6	Full-contact practice (team training)	Following medical clearance, participation in normal team training a) Cardiovascular training: continue to progress b) Body and strength training: resume usual routine (unrestricted) c) Assess and ensure psychological readiness
7	Return to competitive football	Normal match play

Note: A player should move to the next stage only when activities are tolerated without any worsening of pre-activity symptoms or the emergence of additional symptoms.

Abbreviations: HRmax = maximum heart rate; 1-RM = one-repetition maximum.

SUMMARY

Concussions can result in different outcomes, and signs and symptoms can develop or change rapidly within the minutes, hours and days after an impact. Therefore, a systematic procedure for the examination and management of football players after head injuries should be implemented to support team doctors in their decision as to whether a player should be allowed to continue to play or should be removed. Awareness of the potential severity of concussions should be raised across all medical personnel and all other professionals involved in football.

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Annexe

GLASGOW COMA SCALE ASSESSMENT AID

GLASGOW COMA SCALE : Do it this way

GCS EYES VERBAL MOTOR

Institute of Neurological Sciences NHS Greater Glasgow and Clyde

CHECK

For factors Interfering with communication, ability to respond and other injuries

OBSERVE

Eye opening , content of speech and movements of right and left sides

STIMULATE

Sound: spoken or shouted request
Physical: Pressure on finger tip, trapezius or supraorbital notch

RATE

Assign according to highest response observed

Eye opening

Criterion	Observed	Rating	Score
Open before stimulus	✔	Spontaneous	4
After spoken or shouted request	✔	To sound	3
After finger tip stimulus	✔	To pressure	2
No opening at any time, no interfering factor	✔	None	1
Closed by local factor	✔	Non testable	NT

Verbal response

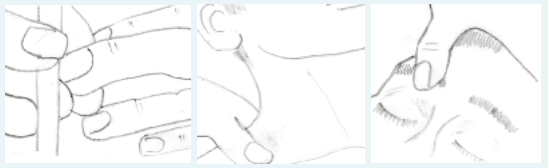
Criterion	Observed	Rating	Score
Correctly gives name, place and date	✔	Orientated	5
Not orientated but communication coherently	✔	Confused	4
Intelligible single words	✔	Words	3
Only moans / groans	✔	Sounds	2
No audible response, no interfering factor	✔	None	1
Factor interferring with communication	✔	Non testable	NT

Best motor response

Criterion	Observed	Rating	Score
Obey 2-part request	✔	Obeys commands	6
Brings hand above clavicle to stimulus on head neck	✔	Localising	5
Bends arm at elbow rapidly but features not predominantly abnormal	✔	Normal flexion	4
Bends arm at elbow, features clearly predominantly abnormal	✔	Abnormal flexion	3
Extends arm at elbow	✔	Extension	2
No movement in arms / legs, no interfering factor	✔	None	1
Paralysed or other limiting factor	✔	Non testable	NT

Sites For Physical Stimulation

Finger tip pressure | Trapezius Pinch | Supraorbital notch



Features of Flexion Responses

Modified with permission from Van Der Naalt 2004
Ned Tijdschr Geneeskd

Abnormal Flexion

Slow Sterotyped
Arm across chest
Forearm rotates
Thumb clenched
Leg extends

Normal flexion

Rapid
Variable
Arm away from body

For further information and video demonstration visit www.glasgowcomascale.org

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