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Soccer first aid basics- review

Abstract

Soccer is one of the most popular sports around the world. The large number of practitioners, associated with technical and tactical characteristics, make it subject to a large number of injuries. Therefore, it is necessary the continuous training of health professionals who act as rescuers in soccer matches. In addition, due to a series of factors, there is currently an increase in the number of potentially more serious injuries, especially concussions. This has caused concern not only for health professionals, but also for the institutions that regulate the practice of sport. In professional soccer, there is a minimum requirement of material and human resources that guarantee greater safety for competitors, something not observed in amateur. The dissemination of basic first aid knowledge is extremely relevant and should cover the entire public involved in the sport.

Keywords: first aid, soccer, sports medicine

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José Martins Juliano Eustaquio,[1] Maria Luiza Renaud de Oliveira,[2] Ana Gabriela Rodrigues Carneiro,[2] Octávio Barbosa Neto[3]

[1]Coordinator of the Orthopedics and Traumatology Residency at Hospital Mário Palmerio, University of Uberaba (UNIUBE), Brazil
[2]Academic of the Medicine Course at the University of Uberaba (UNIUBE), Brazil
[3]Institute of Physical Education and Sports, Federal University of Ceará, Brazil

Correspondence: José Martins Juliano Eustaquio, Mário Palmerio Hospital, University of Uberaba (UNIUBE). Av. Cecília Palmerio, s/n, Uberaba, MG, Brazil,
Email zemartinsjuliano@hotmail.com

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Introduction

Soccer is a sport with great potential for injuries.[1] These injuries can occur either from direct trauma, which involves physical contact between two bodies, or from indirect trauma, which occurs without such contact. In addition to these, there are also less common injuries, unrelated to the traumatic mechanism, caused by musculoskeletal overload ("overuse").[2]

In general, in soccer, the injuries that most commonly require the removal of the athlete from the field are those of indirect trauma, represented mainly by muscle injuries. Contusions, which are direct trauma between two athletes, occur several times during a game and usually do not cause major concerns. In this sense, it is important to highlight two extremes of service in soccer. When an athlete is supposed to have an injury and then performs movements in a flashy way, his goal is likely to be to manipulate the situation. On the other hand, in injuries in which an athlete remains immobile in the sports environment, without showing a reaction of pain and without responding to the calls of his teammates, it is probably a more serious situation that requires greater attention and concern.

For those who act as a rescuer in a soccer event, especially when it is directly to a team, it is necessary to observe some precautions prior to the game and that can help in the prevention of injuries and other more serious complications. First, it is necessary for athletes to remove all adornments, such as earrings, rings, rings and the like, before starting to practice the sport. Injuries related to the presence of these adornments can be more serious and, ultimately, may even compromise the viability of the body segment, such as the fingers. In addition, another very important precaution is the prohibition of the use of candies or chewing gum concomitantly with the practice of sports, due to the risk of compromising the airway.

When approaching the athlete for care within the sports environment, it is always important that the rescuer approaches him in the ideal position, which is with both knees on the ground (preferred) or in a crouched position with one knee on the ground (Figure 1). It is prohibited that this service is performed in the fully crouched position, as it does not provide stability to the rescuer and can compromise the safety of the service.

Figure 1 Ideal position to assist an athlete in the sports environment.

Source: Author's own file.

Knowledge of first aid procedures is extremely important for anyone involved in a soccer match, from members of the coaching staff and judges to the players. The potential for providing adequate care is much greater in professional events, due to the mandatory presence of a medical team, a properly equipped ambulance and an automatic external defibrillator (AED). In amateur games, there is usually no health professional available for medical care. Often, at best, the massage therapist is the only professional with some health knowledge to perform initial care for an athlete.

This chapter was written based on the main injuries and traumas that occur in soccer, through a review of the literature and the senior author's experience, who has approximately thirteen years of direct experience as a soccer doctor. The general objective was to describe, in a summarized way and through easy understanding, the main injuries and the necessary conducts for the performance of health professionals in the acute phase of trauma, within a soccer event.

Development

Basic first aid supplies

As already mentioned, in professional events, it is currently mandatory to have at least one properly equipped ambulance, the AED and two medical professionals (one responsible for the care of the teams and one responsible for the care inside the ambulance).

However, especially in lower division championships, sometimes the inspectors of a match do not strictly check the operation of these mandatory items. The mere presence of the vehicle configured as an ambulance, an AED device and the physical presence of the doctor allow a match to be started. Ideally, it would be necessary for the inspectors of a match to check, before the start, at least the existence of first aid equipment inside the ambulance (through a specific checklist) and the functioning (or maintenance date) of the AED devices.

As basic items for first aid care at the sporting event, in addition to the AED, it is necessary at least to have immobilization materials (rigid board, rigid head support blocks, side straps, cervical collar, flexible splints for limbs, bandages crepe), dressing (0.9% saline solution, sterile gauze and compresses, crepe bandage, adhesive tapes, swimming cap), ventilation aid (Guedel cannula, mask with ambu, barrier devices for ventilation), measurement of signs vital drugs (sphygmomanometer, stethoscope, pulse oximeter) and cryotherapy (in the form of liquid, bars, cubes or spray), as well as general medications both orally and injectable (mainly analgesics, anti-inflammatory drugs, antiemetics, antidiarrheals, topical hemostatic products, moisturizing eye drops, among others) in accordance with the regulations of the championship and complete materials for suturing.

Main reasons for attendance at the sporting event venue

Concussion

Main features

Concussion is a clinical syndrome characterized by changes in brain function that typically affect memory and orientation, with or without involvement of loss of consciousness. It occurs after direct trauma to the skull region, in a typical movement of acceleration and deceleration of the cranial vault, which has repercussions with physiological changes to the central nervous system. The relative incidence is higher in women, for anatomical, endocrinological and physiological reasons.[3]

It should be noted that loss of consciousness occurs in less than 10% of cases and its presence over a longer period represents a more intense traumatic brain injury.[4] However, severe cases can occur even in the absence of loss of consciousness.

The occurrence of a second episode of concussion, sometimes even of lesser intensity, within a short time of the first episode (usually in the first two weeks), can trigger Second Impact Syndrome, which has the potential to cause important brain repercussions and even the death of the athlete.[5] Another pathophysiological condition related to concussion is Post Concussion Syndrome, represented by persistent signs and symptoms for short periods (days or weeks) or even longer (months or years). Of these, the most common are headache, dizziness, amnesia, and difficulty concentrating. In the long term, isolated or repeated (most common) cases of concussion may evolve into a chronic traumatic encephalopathy, characterized by early neuronal degeneration and its consequent clinical repercussions.[5]

Treatment

In the potential presence of a case of concussion, the athlete must be attended immediately, regardless of the referee's authorization for the rescuer to enter. However, due to the growing knowledge on the subject and the protocols adopted by the Fédération Internationale de Football *Association* (FIFA),[6] there is currently ongoing training for referees on the conduct to be adopted in situations of concussion. It is worth mentioning an experimental regulation, recently released by the Federation, which authorizes the performance of extra substitutions in cases of concussion.[6]

Glasgow Coma Scale is an objective parameter that is easy to apply. In an associated way, the degree of mental confusion should be assessed, with questions such as "Where are you? How much is the game? What is your name?" In addition, a search for signs and symptoms such as headache, dizziness, mental confusion, nystagmus and/or other visual alterations should be carried out, in addition to the evaluation of head and face injuries and evaluation of pain in the cervical spine. If the athlete has pain in this segment of the spine, or according to the severity of the trauma, it is important to stabilize this vertebral segment through the cervical colar.[7]

Different International Federations have created practical tools to help diagnose concussion. The Concussion recognition Tool (CRT) provides information for the rescuer, medical or not, to carry out a practical and quick approach in the first care of the concussion victim.[8] Now the Sport Concussion assessment Tool (SCAT) is a more complete tool, used by the physician or qualified health professional in emergency care, commonly used in the locker room and in the evolutionary clinical follow-up of the athlete after the concussion.[8]

In the case of suspected concussion, the athlete must be removed from the game, both due to the damage to his performance and the risk to his health, regardless of the technical or tactical conditions involved in the match. This is an important concept that should be widely disseminated to all those who work in the sport. If the athlete does not accept to be substituted, which is common, the coaching staff must assume responsibility and remove him from the game.

After all the diagnostic workup and therapy, often complemented in the initial phase at the hospital level, the athlete remains away from the sport indefinitely. Serial clinical assessments are extremely important as objective parameters for considering gradual improvement. The return to sport is preceded by activities performed on a progressive basis, initially of low intensity and low volume, which assess the athlete's neurological response to physical exercise. When there are satisfactory clinical and computerized responses in relation to motor and cognitive parameters, the athlete will be able to return to usual training.[7] Due to the increase in the number of cases of concussion, health professionals have performed prophylactic and routine neurocognitive assessments in soccer clubs, even in base athletes, as a way of establishing baseline comparative parameters in case the athlete presents a concussion in the future.[9]

Face wound

Main features

Facial injuries are very common in soccer, especially those involving the brow region, caused by direct trauma. Another common anatomical site of involvement is the nasal region, which evolves with epistaxis of different severity. In these cases, it is essential to exclude associated concussion cases, as in these situations it is mandatory to remove the athlete from the game.[10]

Treatment

Facial injuries usually evolve with active bleeding and, in these cases, it is necessary to stop the external bleeding for the athlete to return to the game. In addition, it is important to palpate the bone surfaces in the search for significant pain or crackles, which suggest the presence of a fracture. More immediately, in the sports

environment, it is recommended to compress the site with gauze and the placement of an external support, such as a swimming cap or crepe bandages for external injuries and a gauze wrapped around its axis in epistaxis (or rhinorrhea). Due to the athlete's degree of sweating, it is difficult to stabilize the wounds with only gauze and adhesive tapes. Stopping external bleeding, regardless of the injury, allows the athlete to return to play.

As soon as there is an opportunity, such as at half-time or at the end of the match, the definitive treatment of the wounds is carried out, after washing the site with 0.9% saline solution. Those larger than 1 cm and/or with active bleeding (without improvement with direct compression with gauze) are treated with suture and dressing with gauze and adhesive tape, and in those smaller than 1 cm, only gauze positioning is performed and duct tape, both followed by daily dressings.

For epistaxis or rhinorrhagia, it is recommended to place a glove finger with several micro- perforations filled internally with a gauze wrapped around its axis. This measure will serve for mechanical tamponade of bleeding. If there are ampoules of adrenaline at the site, its use is recommended, diluted in 0.9% saline, as a chemical measure to reduce bleeding.

Closed musculoskeletal trauma

Main features

These are the most common injuries in soccer.[1]. In this category, they range from simpler and more routine traumas, such as muscle injuries, to more serious traumas, such as dislocations or fractures.

Muscle injuries present clinically with pain located in a body segment, mainly thigh and leg. In soccer, the image of an athlete who, during the eccentric contraction phase of running, palpates the posterior aspect of the thigh, is typical, in reference to a hamstring injury. Currently, consecrated terms representing muscle injury, such as strain and strain, are out of use, and instead of using the term muscle rupture (partial or total)[11] is recommended.

Sprains, characterized by rotational movements, are usually associated with joint injuries, especially ligaments. In addition, this trauma mechanism, when it affects non-articular segments, can trigger fractures with spiral morphology. Fractures assume different clinical conditions, according to the severity of the injury. Incomplete fractures may even go unnoticed by the athlete at the time of the game, unlike complete fractures which, regardless of the anatomical region affected, will cause significant pain, swelling and local deformity. One of the most serious injuries in this group are dislocations, characterized by loss of joint congruence. Clinically, the athlete presents with severe pain, joint deformity and absence of joint range of motion. Dislocations need treatment as early as possible.

Treatment

For the most immediate treatment of these injuries, the concept of the POLICE protocol is used, represented by optimized load and relative rest, cryotherapy, compression and limb elevation.[12] Other protocols were created mainly to guide the initial stages of rehabilitation of athletes, but the POLICE protocol remains the reference of choice for use in the acute phase of sports trauma.

These physical and mechanical measures are performed in order to reduce the inflammatory process and, consequently, the athlete's pain. Thus, in general, for all closed musculoskeletal injuries, relative rest (with temporary immobilization in the most serious traumas), protection of the site (such as avoiding weight in lower limb injuries) and application of cryotherapy early. Cryotherapy is performed in a compressive manner and, ideally, for 20 minutes in a row, at an hourly frequency.

Muscle injuries of the lower limbs demand, preferably, the immediate withdrawal of the athlete from the game because, on the contrary, there will be an increase in the severity of the injury. On the other hand, muscle injuries of the upper limbs, due to the lower demand of these segments, allow athletes to continue in the game, except generally in the case of goalkeepers. However, in extreme situations, according to the need for the athlete's presence in the game and with specific adaptations (such as avoiding running in cases of lower limb muscle injuries, for example), the athlete can be considered to continue in the match. In this type of injury, it is not necessary to perform external immobilization and it is recommended to apply ice packs (preferably through compression) early on, to reduce the acute inflammatory process adjacent to the injury.

In joint injuries, which are usually caused by sprains and associated with ligament injuries, it is important for the rescuer to assess the degrees of instability and joint effusion (or swelling for extracapsular injuries). In general, instability represents the presence of ligament injuries or fractures and joint effusion reflects the presence of one or more intra-articular injuries (bone, cartilaginous, meniscus, capsular, among others). In milder cases, the continuation of the athlete in play, although not ideal, is possible, except in cases of intense joint pain, at least moderate joint effusion and/or functional instability. In cases of clinical signs of fractures, such as localized pain, deformity, swelling and crepitus, the athlete must be replaced. In more serious fractures, in which the injured segment is unstable, it is necessary that the site be immobilized in the game environment, at least with a metal splint for the fingers, a sling for the upper limbs and a flexible splint for the lower limbs.

Dislocations are serious injuries due to the potential for joint degeneration and, therefore, require immediate reduction, performed by a qualified rescuer. After performing the reduction, it is necessary to immobilize the joint. In soccer, dislocations of the finger of the hand in goalkeepers and of the shoulder in athletes from other positions are highlighted. Reduction of finger dislocation can be resolved in the sports environment, usually through support at the proximal point of the hand and traction at the distal position of the finger. The reduction of shoulder dislocation requires, in most cases, a more reserved environment, such as the locker room. In cases where bloodless reduction occurs successfully (by clinical evaluation), the athlete may even return to the field, in extreme situations, as long as there is no stress on the injured segment. However, it is worth noting that this return to play approach is not ideal, since a radiographic examination must always be performed both before and after a dislocation reduction, followed by relative rest of the limb for a few weeks.

In general, for all traumas to the upper limbs and shoulder girdle, a simple sling, with at least one crepe bandage, is sufficient to temporarily stabilize the segment (Figure 2). In less severe lower limb trauma, the athlete is advised to avoid loading the limb. In more severe traumas, lower limb immobilization is required using flexible splints, which are stabilized with a crepe bandage.

Open musculoskeletal trauma

Main features

This type of trauma involves, in the vast majority of cases, superficial injuries to limbs caused by direct trauma to the opponent's body, with the opponent's objects (such as cleats) or even foreign

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objects (such as glass, wires, among others) present in the body sporting environment. However, they may be related to higher energy trauma, characterized by exposure of noble tissues, such as tendons, ligaments, nerves and bones. Due to injuries of this nature, the rescuer , when assisting an athlete on the field, must be wearing a procedure glove, preferably light in color, so that he can palpate the injured segment and check for any type of bleeding. This measure is extremely important for diagnosing wounds in areas of the body where direct visualization is more difficult.

Figure 2 Simple sling for immobilization of upper limb trauma.

Source: Author's own file.

Treatment

In the sports environment, the presence of any injury to a limb requires the need to perform a compressive dressing, with gauze and crepe bandage. Before applying the dressing, it is important to wash the wound with 0.9% saline solution. Injuries that occur in the upper limbs are more satisfactory for the athlete's return to the game. As for lower limb injuries, those present in the leg are easier to stabilize, due to the presence of the garment over the dressing. In any case, if the wound is completely covered, without the presence of external bleeding, the athlete is allowed to return to the game.

At the appropriate time, usually at half-time or at the end of the match, wounds with an approximate size greater than 1 cm are sutured and covered with a sterile dressing (with gauze and adhesive tape or gauze and crepe bandage). In cases of major injuries and in those where there is exposure of noble structures, it is necessary to apply a compressive dressing, as mentioned above, and to replace the athlete. If it is associated with a fracture, the limb must also be immobilized and, as it is an open fracture, the athlete must be immediately taken to a hospital.

Syncope (sudden illness)

Main features

Syncope is the occurrence of loss of consciousness and can represent a series of clinical complications. Faced with this condition, it is necessary to perform the clinical stabilization of the athlete and, in a second moment, to investigate the reason. In soccer, it is worth mentioning the performance of the exercise in unsatisfactory environmental conditions, even in the Brazilian Championship of the first division, in which games are held at 11 am. As a preventive measure, in games played in a hot and dry environment, care must be taken with the potential for dehydration and, in a hot and humid environment, greater care is taken with the risk of hyperthermia. This last situation can trigger the emergence of pathological changes related to increased body temperature, such as muscle fatigue and syncope, and progress to more serious clinical conditions, such as exertional hyperthermia. However, in general, in the presence of syncope, it is always necessary to rule out a more serious situation, which is cardiorespiratory arrest (CPA). For this circumstance, the presence of qualified professionals is required to perform the service.

Treatment

In the event that a player has a sudden fall to the ground, without apparent traumatic reason and without protective reaction in the fall, the rescuer must immediately go to the assistance, regardless of authorization by the refereeing team. In situations in which the characteristics of the event and the sports practice are suggestive of syncope due to hyperthermia, after an initial assessment of vital signs, it is necessary to immediately remove the athlete from the match and position him in a ventilated environment, in addition to proceeding with immediate cooling,[13] through immersion in cold water (around 17°C), preferably under continuous flow, and optimization of hydration, orally or intravenously.[14]

The care protocol is performed based on American 2020 guidelines heart Association for cardiopulmonary resuscitation.[15] Right at the time of care, the rescuer must confirm that the environment in which he is in is safe. After this confirmation, he must position himself next to the athlete, in a kneeling position, and provoke stimulation through tactile and verbal contacts. If the athlete presents any type of response, a CPA situation is excluded, but it is necessary that he be replaced and the reason for the syncope is investigated. If the athlete does not respond or is gasping, it is necessary for the rescuer to direct someone to call the ambulance and ask for the defibrillator (AED).

Once this is done, the rescuer should palpate the athlete's carotid pulse for a maximum period of 10 seconds. If the pulse is palpable, it is necessary to evaluate the patient's airway in the search for a foreign body. In addition, it is necessary to proceed with the stabilization of the airway through the anteriorization of the mandible or elevation of the chin, the protection of the cervical spine and the evaluation of vital signs, such as blood pressure, peripheral oxygen saturation, heart rate, respiratory rate and neurological response (Glasgow Coma Scale).

Resuscitation (CPA) is started, based on performing 30 chest compressions and 02 ventilations, at a frequency of 100 to 120 compressions per minute. As soon as the AED arrives, the device must be positioned on the athlete's chest and only when the pulse is checked should the chest compressions be interrupted. Once the rhythm has been checked and the need for defibrillation has been observed, it is important that everyone around the athlete moves away and, after defibrillation, chest compressions are resumed at the same pace and frequency.

If the security of the place of care and the human and material resources are sufficient, all the initial care must be done in the sports environment or in the ambulance present at the place. For this, in addition to performing CPA, it is necessary for the rescue team to puncture a peripheral venous access and start the administration of the drugs recommended in cases of CPA. The athlete must be sent to the hospital, properly positioned on a rigid board, at the moment in which he presents minimal clinical stabilization for transport. Attending a case of cardiac arrest at a sporting event, in general, involves a series of mistakes and exposes the existing structural and human fragility, even in professional championships. Continuing education programs and the increasing professionalization of Sports Medicine in soccer help to minimize existing errors in the care provided to the athlete. In addition, in professional games, the mandatory presence of a medical team, an ambulance and the AED significantly shortens the time for definitive help.

Systemic trauma/ Polytraumatism

Main features

This class involves cases of trauma to the chest, abdomen, pelvis, spine and skull, represented by higher energy accidents. The association of trauma to two or more organ systems is known as polytrauma. In these cases, the rescuer must be more concerned about the potential for serious injuries. These injuries are caused by direct trauma, commonly in split plays with the opposing athlete.

Treatment

At the time of care, it is necessary to assess the safety of the environment (for the rescuer and for the athlete) and perform the step-by-step care for the multiple trauma patient (ABCDE of trauma), based on sequential techniques for evaluating the opening of the airways with protection of the cervical spine, ventilation, circulation, neurological status and body exposure with temperature control.

The assessment of airway opening is performed through the athlete's responsiveness and, in cases without response, by raising the chin or forwarding the mandibles, always with the need to protect the cervical spine. In cases where the athlete is unconscious, it is necessary to place the Guedel cannula to avoid posteriorization of the tongue. Ventilation, when indicated, is performed through external devices, such as a mouthpiece or mask valve bag (ambu).

Circulation is assessed by the presence of visible or potential bleeding and, in the unconscious athlete, by palpation of a central pulse. To assess the neurological response, the Glasgow Coma Scale is used, based on ocular, verbal and motor responses. In places with low temperatures, it is necessary to protect the athlete with thermal blankets. If any injury of this nature is suspected, due to the potential severity of the injuries, the athlete must be removed from the game on a rigid board, with the positioning of the cervical collar, semi-rigid blocks lateral to the head and stabilizing straps, in addition to immobilization of any eventual associated trauma of limbs.

Assessment of vital signs, such as level of consciousness (Glasgow Coma Scale), heart rate, respiratory rate, peripheral oxygen saturation, blood pressure, in addition to specific assessments of the traumatized site, should be performed initially at the site of the injury sporting event, during the primary assessment, and repeated serially until arrival at the hospital.

Final considerations

Injuries in soccer have an increasing incidence, reflecting the growing competitiveness and the high volume of matches, especially among professionals. In addition, there is an increase in potentially more serious injuries, such as concussions. Therefore, the scientific community has dedicated attention to the study of injury prevention protocols in this population, whose benefits will be expressed both in the health of athletes and in the reduction of financial costs spent in these situations.

As in soccer there is no homogeneity in relation to material and human resources between the amateur and professional classes, the dissemination of basic knowledge about first aid is extremely relevant for the health of athletes. In addition, even in higher division championships, in which these resources are more abundant, common errors are observed during the care of athletes, often due to the lack of adoption of protocols and the unpreparedness of professional rescuers. Attention to the health of athletes, through training professionals and improving the resources available in soccer matches, is a reflection of political changes in the institutions that regulate the sport. This need has been widely discussed today and will certainly generate important benefits for everyone who works in this sport.

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None.

Conflicts of interest

The authors decalre no conflicts of interest.

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