Chapter 8: Handling Emergency Situations and Injury Assessment
Overview

• When injuries occur they require prompt care

• Emergencies are unexpected occurrences that require immediate attention

• Mistakes in initial injury management can prolong the length of time required for rehabilitation or cause life-threatening situations to arise

• All fitness professionals, coaches, and others in related areas should be CPR, AED and First Aid trained
Emergency Action Plan

• Primary concern is maintaining cardiovascular and CNS functioning

• Key to emergency aid is the initial evaluation of the injured athlete

• Emergency Action Plans
• EAP Policy
  – Separate plans should be developed for each facility
    • Outline personnel and role
    • Identify necessary equipment
    • All involved personnel should know the location of the AED
• Venue EAP's

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Emergency Action Plans, cont.

- Establish equipment and helmet removal policies and procedures
- Availability of phones and access to 911
  - Must be aware of wireless phone calling area issues
- All staff should be familiar with community based emergency health care delivery plan
  - Be aware of communication, transportation, treatment policies
Emergency Action Plans, cont.

– Community based care (continued)
  • Individual calling medical personnel must relay the following:
    1. type of emergency
    2. suspected injury
    3. present condition
    4. current assistance (e.g. CPR)
    5. location of phone being used
    6. location of emergency

– Keys to gates/locks must be easily accessible

– Key facility and school administrators must be aware of emergency action plans and be aware of specific roles

– Individual should be assigned to accompany athlete to hospital
Cooperation Between Emergency Care Providers

• Cooperation and professionalism is a must
  – Athletic trainer generally first to arrive on scene
  – When AT or physician unavailable, rescue squad should be called
  • EMT has final say in transportation

• To avoid problems, all individuals involved in plan should practice to familiarize themselves with all procedures
  – Including equipment management
Parent Notification

• When athlete is a minor, AT should try to obtain consent from parent prior to emergency treatment (based on HIPAA)

• Consent indicates that parent is aware of situation, is aware of what the AT wants to do, and parental permission is granted to treat specific condition

• When unobtainable, predetermined wishes of parent (provided at start of school year) are enacted

• With no informed consent, consent implied on part of athlete to save athlete’s life
Principles of Assessment

• Appropriate acute care cannot be provided without a systematic assessment occurring on the playing field first

• On-field assessment
  – Determine nature of injury
  – Provides information regarding direction of treatment
  – Divided into primary and secondary survey
Principles of Assessment, cont.

• **Primary survey**
  – Performed initially to establish presence of life-threatening condition
  – Airway, breathing, circulation, shock and severe bleeding
  – Used to correct life-threatening conditions

• **Secondary survey**
  – Assess vital signs and perform more detailed evaluation of conditions that do not pose life-threatening consequences
  – Used to identify additional problems in other parts of the body not necessarily associated with the injury
FIGURE 8–1 Flowchart showing the appropriate emergency procedures for the injured patient.
Primary Survey

• Life threatening injuries take precedents

• Life threatening injuries include
  – Injuries requiring cardiopulmonary resuscitation
  – Profuse bleeding
  – Shock

• Rescue squad should always be contacted in these situations
The Unconscious Athlete

• Provides great dilemma relative to treatment
  – When acting alone, should contact EMS first

• Must be considered to have life-threatening condition
  – Note body position and level of consciousness
  – Check and establish airway, breathing, circulation
  – Assume neck and spine injury
  – **Appropriate equipment (helmets, face masks, and shoulder pads)** should be removed by at least three rescuers who have training and experience with equipment removal
    • If fewer than three people are present, equipment should be removed as soon as possible once enough trained personnel arrive on the scene
The Unconscious Athlete, cont.

- With athlete supine and not breathing, ABC’s should be established immediately
- If athlete unconscious and breathing, nothing should be done until consciousness resumes
- If prone and not breathing, log roll and begin CPR
- If prone and breathing, nothing should be done until consciousness resumes --then carefully log roll and continue to monitor ABC’s
- Life support should be monitored and maintained until emergency personnel arrive
Emergency Cardiopulmonary Resuscitation

• In 2010, the American Heart Association changed its acronym of ABC to CAB
  – Circulation, Airway, Breathing
    • Change emphasizes the importance of chest compressions in creating circulation.

  – Individuals associated with competitive or recreational sports program should be certified through American Heart Association, American Red Cross or National Safety Council
Emergency Cardiopulmonary Resuscitation, cont.

• Individuals involved in emergent situation should be aware of Good Samaritan Law
  – Provides legal protection to individual voluntarily providing emergency care
  – Nature of job vs. “duty to act”

• Ideally should obtain consent from victim prior to rendering first aid
  – When unconscious, consent is implied
Emergency Cardiopulmonary Resuscitation, cont.

• In 2008, the American Heart Association simplified CPR for those that are not certified
  – Hands-only CPR
  – Following activation of 911, perform uninterrupted CPR (100 compression/min) until EMS arrives or an AED is present
  – Should be used for those adults that unexpectedly collapse, stop breathing or are unresponsive
Equipment Considerations

– Equipment may compromise lifesaving efforts.
– Decisions to remove helmet/shoulder pads must be made based on the potential of injury to the cervical spine before administering CPR.
– Use of pocket mask/barrier mandated by OSHA during CPR to avoid exposure to blood-borne pathogens.
Equipment Considerations

Equipment Removal

– Appropriate equipment (helmets, face masks, and shoulder pads) should be removed by at least three rescuers who have training and experience with equipment removal
  • If fewer than three people are present, equipment should be removed as soon as possible once enough trained personnel arrive on the scene

– Removal of helmet and shoulder pads appropriate when:
  • Prevent airway or chest access
  • Helmet does not prevent independent movement of the head
  • Prevents neutral alignment of cervical spine
  • Trained personnel feel circumstances indicate on-site equipment removal

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Controlling Bleeding

• Abnormal discharge of blood

• Arterial, venous, capillary, internal or external bleeding
  – Venous - dark red with continuous flow
  – Capillary - exudes from tissue and is reddish
  – Arterial - flows in spurts and is bright red

• Universal precautions must be taken to reduce risk of bloodborne pathogens exposure
Managing External Bleeding

• Direct pressure
  – Firm pressure (hand and sterile gauze) placed directly over site of injury against the bone (if not fractured
  – Recommended primary technique

• Elevation
  – Reduces blood pressure and facilitates venous and lymphatic drainage

• Pressure Points
  – Eleven points on either side of body where direct pressure is applied to slow bleeding
Internal Hemorrhage

• Invisible unless manifested through body opening, X-ray or other diagnostic techniques

• Can occur beneath skin (bruise) or contusion, intramuscularly or in joint with little danger

• Bleeding within body cavity could result in life and death situation

• Difficult to detect and must be hospitalized for treatment

• Could lead to shock if not treated accordingly
Managing Shock

• Generally occurs with severe bleeding, fracture, or internal injuries

• Result of decrease in blood available in circulatory system
  – Vascular system loses capacity to maintain fluid portion of blood due to vessel dilation, and disruption of osmotic balance

• Movement of blood cells slows, decreasing oxygen transport to the body
Managing Shock, cont.

• Extreme fatigue, dehydration, exposure to heat or cold and illness could predispose athlete to shock

• Signs and Symptoms
  – Moist, pale, cold, clammy skin
  – Weak rapid pulse, increasing shallow respiration decreased blood pressure
  – Urinary retention and fecal incontinence
  – Irritability or excitement, and potentially thirst
Managing Shock, cont.

• Management
  – Dial 911 to access emergency care
  – Maintain core body temperature
  – Elevate feet and legs 8-12” above heart
  – Positioning may need to be modified due to injury
  – Keep athlete calm as psychological factors could lead to or compound reaction to life threatening condition
  – Limit onlookers and spectators
  – Reassure the athlete
  – Do not give anything by mouth until instructed by physician
Conducting a Secondary Survey

• Begin once athlete is stable

• Vital signs
  – Heart rate (Adults 60-80bpm, Children 80-100bpm) and breathing rate (Adults 12 breaths/minute, Children 20-25)
    • Heart Rate in trained athletes tends to be lower
    • Shallow breathing indicates shock; gasping indicates cardiac issue
  – Blood pressure (120/80 mmHg; females tend to be 8-10mmHg lower than males)
  – Temperature- 98.6 F and 37 C- Most accurately measured from rectum or tympanic membrane
  – Skin color- See chart
  – Pupils- PEARL
  – Movement
  – Presence of pain
  – Level of consciousness
<table>
<thead>
<tr>
<th>Sign</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse</td>
<td>Normal pulse rate per minute for adults ranges between 60 and 80 beats and in children from 80 to 100 beats. Trained athletes usually have slower pulse rates. Pulse rate is measured at the carotid artery in the neck or the radial artery in the wrist (Figure 8–6).</td>
</tr>
<tr>
<td>Respiration</td>
<td>Normal breathing rate per minute is approximately 12 breaths in adults and 20 to 25 breaths in children. Breathing may be shallow (indicating shock), irregular, or gasping (indicating cardiac involvement).</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Normal systolic pressure for 15- to 20-year-old males ranges from 100 to 140 mm Hg. The diastolic pressure, on the other hand, usually ranges from 60 to 90 mm Hg. The normal blood pressure of females is usually 8 to 10 mm Hg lower than in males for both systolic and diastolic pressures. Blood pressure can only be measured using a blood pressure cuff and a stethoscope (Figure 8–7).</td>
</tr>
<tr>
<td>Temperature</td>
<td>Normal body temperature is 98.6°F (37°C). Core temperature is most accurately measured in the rectum or at the tympanic membrane in the ear (Figure 8–8).</td>
</tr>
<tr>
<td>Skin color</td>
<td>Red skin may indicate heatstroke, high blood pressure, or elevated temperature. Pale, ashen, or white skin can mean insufficient circulation, shock, fright, hemorrhage, heat exhaustion, or insulin shock. Blue skin (cyanotic), primarily noted in lips and fingernails, usually means an airway obstruction or respiratory insufficiency.</td>
</tr>
<tr>
<td>Pupils</td>
<td>Pupils should be of equal size. Pupil should respond to light, resulting in constriction or dilation. Response is more critical than pupil size (Figure 8–9).</td>
</tr>
<tr>
<td>State of</td>
<td>Normally the athlete is alert, is aware of the environment, and responds quickly to vocal stimulation.</td>
</tr>
<tr>
<td>consciousness</td>
<td></td>
</tr>
<tr>
<td>Weakness of</td>
<td>Weakness of one side of the body compared to the other is not normal and may indicate nerve damage.</td>
</tr>
<tr>
<td>movement</td>
<td></td>
</tr>
<tr>
<td>Sensory changes</td>
<td>Numbness, tingling, or complete loss of sensation is not normal.</td>
</tr>
</tbody>
</table>
On-Field Injury Inspection

- Initial on-field injury inspection
  - Determine injury severity and transportation from field

- Must use logical process to adequately evaluate extent of trauma

- Knowledge of mechanisms of injury and major signs and symptoms are critical

- Once the mechanism has been determined, specific information can be gathered concerning the affected area
  - Brief history
  - Visual observations

- Gently palpate to aid in determining nature of injury
  - Determine extent of point tenderness, irritation and deformity
On-Field Injury Inspection, cont.

- Decisions can be made with regard to:
  - Seriousness of injury
  - Type of first aid and immobilization
  - Whether condition requires immediate referral to physician for further assessment
  - Manner of transportation from injury site to sidelines, athletic training room or hospital

- Individual performing initial assessments should document findings of exam and actions taken
Off-Field Assessment

- Performed by athletic trainer, physical therapist or physician once athlete has been removed from site of injury
- Divided into 4 segments
  - History
  - Observation
  - Physical examination
  - Special tests
• History
  – Obtain information about injury
  – Listen to athlete and how questions are answered

• Visual Observation
  – Compare injured and non-injured areas
  – Look for gross deformity, swelling, skin discoloration

• Palpation
  – Assess bony and soft tissue structures
  – Systematic evaluation beginning with light pressure and progressing to deeper palpation – begin away from injured area

• Special Test
  – Designed for every body region for detecting specific pathologies
  – Used to substantiate findings from other testing
Immediate Treatment Following Acute Injury

- Primary goal is to limit swelling and extent of hemorrhaging

- If controlled initially, rehabilitation time will be greatly reduced. If mismanaged injury can be made worse or recovery prolonged

- Control via PRICE
  - PROTECTION
  - REST
  - ICE
  - COMPRESSION
  - ELEVATION
Immediate Treatment Following Acute Injury, cont.

– PROTECTION
  • Prevents further injury
  • Immobilization and appropriate forms of transportation will help in protecting an injury from further damage

– REST
  • Stresses and strains must be removed following injury as healing begins immediately
    – Depends on severity. Can they finish the game?
  • Days of rest differ according to extent of injury
    – Goal of ATC is no rest. Keep them playing
  • Book recommends 72 hours…but if they can start rehab why wouldn’t you?
Immediate Treatment Following Acute Injury, cont.

- ICE (Cold Application)
  - Initial treatment of acute injuries
  - Used for strains, sprains, contusions, and inflammatory conditions
  - Used to decrease pain, promote vasoconstriction
  - Lowers metabolism, tissue demand for oxygen and hypoxia
  - Ice should be applied initially for 20 minutes and then repeated every 1 - 1 1/2 hours and should continue for at least the first 72 hours of new injury
  - Treatment must last at least 20 minutes to provide adequate tissue cooling and can be continued for several weeks

- Take this w/a very LARGE grain of salt...times are changing
– Compression
  • Decreases space allowed for swelling to accumulate
  • Important adjunct to elevation and cryotherapy and may be most important component
  • A number of means of compression can be utilized (Ace wraps, foam cut to fit specific areas for focal compression)
  • Compression should be maintained daily and throughout the night for at least 72 hours (may be uncomfortable initially due to pressure build-up)

– Elevation
  • Reduces internal bleeding due to forces of gravity
  • Prevents pooling of blood and aids in drainage
  • Greater elevation = more effective reduction in swelling
New Way of Thinking

• M.E.A.T.
  – Movement- Start movement and ROM immediately as tolerated. Produces muscle pump. Activate lymph system
    • Lymph system is a passive system that only works w/muscle pump.
      – One way valve system to lymph nodes
  – Exercise- Begins strengthening ASAP to prevent degeneration of muscle tissue (Atrophy)
  – Analgesics- Pain management. No NSAIDs. We want inflammation to occur
  – Treatment- Heat, Ultrasound, H-Wave, Marc Pro, Hivamat
    • All lymphatic treatments
Emergency Splinting

• Should always splint a suspected fracture before moving
  – Without proper immobilization increased damage and hemorrhage can occur (potentially death if handled improperly)

• Two rules
  – Splint 1 joint above and below fx
  – Splint injury in position found

• Rapid form immobilizer
  – Styrofoam chips sealed in airtight sleeve
  – Moldable with Velcro straps to secure
  – Air can be removed to make splint rigid
Emergency Splinting, cont.

• Air splint
  – Clear plastic splint inflated with air around affected part
  – Can be used for splinting but requires practice
  – Do not use if it will alter fracture deformity
  – Provides moderate pressure and can be x-rayed through

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Emergency Splinting, cont.

- Splinting of Lower Limb Fractures
  - Fractures of foot and ankle require splinting of foot and knee
  - Fractures involving knee, thigh, or hip require splinting of whole leg and one side of trunk

- Splinting of Upper Limb Fractures
  - Around shoulder, splinting is difficult but doable with sling and swathe with upper limb bound to body
  - Upper arm and elbow should be splinted with arm straight to lessen bone override
Emergency Splinting, cont.

- Splinting of Upper Limb Fractures (cont.)
  - Lower arm and wrist fractures should be splinted in position of forearm flexion and supported by sling
  - Hand and finger fractures/dislocations should be splinted with tongue depressors, roller gauze and/or aluminum splints

- Splinting of the spine and pelvis
  - Best splinted and moved with a spine board
  - Total body rapid form immobilizers have been developed for dealing with spinal injuries
  - Effectiveness has yet to be determined
Moving and Transporting Injured Athletes

- Must be executed with techniques that will not result in additional injury
- No excuse for poor handling
- Planning is necessary and practice is essential
- Additional equipment may be required

FIGURE 8–15  The ambulatory aid method of transporting a mildly injured athlete.
Suspected Spinal Injury

- Access EMS immediately and wait for rescue squad before attempting to move athlete
- Transportation and movement should be left to trained experts

- Maintain head and neck in alignment with long axis of body
Placing Athlete on Spine Board

- EMS should be contacted if this will be required
- Must maintain head and neck in alignment of long axis of the body
- One person must be responsible for head and neck at all times
- Primary emergency care must be provided to maintain breathing, treating for shock and maintaining position of athlete
- Permission should be given to transport by physician
Stretcher Carrying

– Best and safest mode of transport
– With all segments supported/splinted athlete is lifted and placed gently on stretcher
– Minimum eight individuals, one stabilizing the head, one at the feet and three on each side
– Careful examination is required if stretcher is needed
– Various injuries will require different positioning on stretcher
Ambulatory Aid

– Support or assistance provided to injured individual to walk
– Serious injury should be ruled out along with further injury with walking
– Complete and even support should be provided on both sides by individuals
– Arms of athlete are draped over shoulders of assistants, with their arms encircling his/her back
Manual Conveyance

– Used to move mildly injured athlete a greater distance than could be walked with ease
– Carrying the athlete can be used following a complete examination
– Convenient carry is performed by two assistants
Proper Fit and Use of Crutch or Cane

• When lower extremity ambulation is contraindicated a crutch or cane may be required

• Faulty mechanics or improper fitting can result in additional injury or potentially falls
  – Athlete should stand with good posture, in flat soled shoes
  – Crutches should be placed 6” from outer margin of shoe and 2” in front
  – Crutch base should fall 1” below anterior fold of axilla
  – Hand brace should be positioned to place elbow at 30 degrees of flexion
  – Cane measurement should be taken from height of greater trochanter
Walking with Cane or Crutch

- Corresponds to walking
- Tripod method - Most Common
  - Swing through without injured limb making contact with ground
- Four-point crutch gait
  - Foot and crutch on same side move forward simultaneously with weight bearing
- Stair climbing should be introduced when athlete is able to move effectively on level surface (‘up with the good – down with the bad’)