CHAPTER 6
HEAD INJURY AND UNCONSCIOUSNESS

BRAIN INJURY

Injury to the brain is one of the more serious outcomes that occur due to injury or illness. The first aider plays a major role in limiting damage that has already occurred and in preventing damage by identifying the danger of a potential brain injury.

INJURIES TO THE BRAIN

There are three types of injury inflicted upon the brain

Concussion - Concussion occurs where the brain is subjected to violent ‘shaking’ usually as a result of a blow or deceleration. This rapid motion results in the opening up of little gaps between the nerve cells that make up the brain.

Contusion - This is bruising and tearing of the brain and is caused when the brain is bounced around inside the skull or damaged by a foreign body.

Compression - Compression is caused by bleeding inside the skull due to the rupture of a blood vessel due to injury or a physical weakness. The danger with compression is that it may not be noticed until after the casualty begins to suffer permanent brain damage. As a result all casualties who have been knocked out must see a doctor.

PROVISIONAL DIAGNOSIS OF BRAIN INJURY

HISTORY
a. Story of blow to the head or unconsciousness

SIGNS
a. Altered state of consciousness (Glasgow Coma Scale)
b. bleeding and cerebro-spinal fluid from ears and/or nose
c. blood under the sclera (white area) of the eye and bruising around eyes
d. obvious head injury
e. loss of movement on one side of the body (Hemiplegia)
f. loss of power on one side of the body (Hemiparesis)

SYMPTOMS
a. headache
b. nausea
c. confusion
d. speech disturbance
e. loss of balance
f. visual disturbance including a dislike of bright light

Because of the danger of compression it is very important that you are able to accurately identify potential brain injury and monitor changes in a casualty’s level of consciousness. The method of measuring conscious level is the Glasgow Coma Scale.
ASSESSING THE LEVEL OF CONSCIOUSNESS USING THE GLASGOW COMA SCALE

There are three features to the Glasgow Coma Scale; eye opening, verbal response and motor response¹.

<table>
<thead>
<tr>
<th>EYE OPENING</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous</td>
<td>4</td>
</tr>
<tr>
<td>To Speech</td>
<td>3</td>
</tr>
<tr>
<td>To Pain</td>
<td>2</td>
</tr>
<tr>
<td>Nil</td>
<td>1</td>
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<table>
<thead>
<tr>
<th>BEST VERBAL RESPONSE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientated</td>
<td>5</td>
</tr>
<tr>
<td>Confused conversation</td>
<td>4</td>
</tr>
<tr>
<td>Inappropriate words</td>
<td>3</td>
</tr>
<tr>
<td>Incomprehensible sounds</td>
<td>2</td>
</tr>
<tr>
<td>Nil</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BEST MOTOR RESPONSE</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Obeys</td>
<td>6</td>
</tr>
<tr>
<td>Localises</td>
<td>5</td>
</tr>
<tr>
<td>Withdraws</td>
<td>4</td>
</tr>
<tr>
<td>Abnormal Flexion</td>
<td>3</td>
</tr>
<tr>
<td>Extensor Response</td>
<td>2</td>
</tr>
<tr>
<td>Nil</td>
<td>1</td>
</tr>
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Calculation: \((E + M + V) = \) casualty's level of consciousness at a given time. A fully conscious casualty would have a score of 15 and a deeply unconscious a score of 3.

<table>
<thead>
<tr>
<th>APPLYING THE GLASGOW COMA SCALE TO A CHILD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best Verbal Response</td>
</tr>
<tr>
<td>Appropriate words, social smile or fixes</td>
</tr>
<tr>
<td>and follows objects with eyes</td>
</tr>
<tr>
<td>Cries but is consolable</td>
</tr>
<tr>
<td>Persistently Irritable</td>
</tr>
<tr>
<td>Restless and agitated</td>
</tr>
<tr>
<td>Nil</td>
</tr>
</tbody>
</table>

1. Danger, Response, Airway, Breathing, Compressions and defibrillation
2. Treat for Spinal Injury
3. Call ambulance immediately
4. Dress wounds
5. Glasgow Coma Scale and Observations including Circulation

HEAD INJURY INVOLVING SKULL AND SCALP

Head injury describes all injuries inflicted to the head. These injuries may be caused by:

- **direct force** applied to the head by a blow, bullet wound or other penetrating injury; or,
- **indirect force** such as a person who falls from a height and lands upon their feet causing the base of the skull to fracture

There are three types of fractures involving the bones of the head.

1. **Open** - This involves the broken bone and brain being exposed to the air.
2. **Closed** - Closed fractures of the skull and face referring to breaks in the bones.
3. **Complicated** - Complicated fractures involve damage to the brain or its protective coverings and blood vessels.

INJURIES TO THE SPINE

The spine and back may be injured in many ways. The most common injuries are those caused by damage to the muscles and the discs between the vertebrae. These injuries occur as a result of dangerous lifting practices and are extremely painful, costly and, unfortunately, very common. Other injuries include stable and unstable fractures and dislocations of the spine. With stable injuries there is little danger of the bone damaging the spinal cord, but with unstable injuries damage to the spinal cord can be easily caused by movement.

Spinal injuries not only result in paralysis but can cause many problems such as poor perfusion and uncontrolled loss of heat from the body. As well as the spinal injury there may be other injuries, particularly severe head injury. Remember that all unconscious casualties with severe head injury have a spinal injury till proven otherwise in hospital.
PROVISIONAL DIAGNOSIS OF SPINAL INJURY

HISTORY
a. severe head injury
b. patient, if conscious, often reports hearing a snapping noise

SIGNS
a. obvious head injury
b. poor perfusion
c. no movement following the accident
d. inability to differentiate between the sharp and blunt end of a pin

SYMPTOMS
a. pain in the region of the spine
b. loss of sensation/numbness/tingling in body, arms or legs
c. loss of movement
d. loss of power

TREATMENT OF SUSPECTED SPINAL INJURY
1. Approach to the Incident
2. Call ambulance
3. Check A,B,C
4. Keep casualty’s head and neck straight
   - do not move casualty unless necessary
   - keep head, neck and torso aligned
   - never allow flexion or twisting of neck
5. Control bleeding and dress wounds
6. Cover casualty, maintain and constantly monitor body temperature
7. Complete full examination and take observations
INJURIES TO THE FACE, JAW AND SENSORY ORGANS

Injuries to the face are common and dramatic but rarely life threatening. Most facial injuries consist of lacerations which are treated like any other bleeding using direct pressure, elevation and rest. However, severe facial injuries pose a very real threat to the casualty’s life through airway blockage and brain and spinal injury.

Severe facial injuries are usually accompanied by severe head and neck injuries as well. In one US study 55% of severe facial fractures were found to have an associated closed head injury and 10% were found to have associated cervical spinal injuries.

NOSE INJURIES

Fractured Nose -Fractures of the nose are painful and disfiguring but not life threatening unless there is associated uncontrolled bleeding.

Foreign Body in Nose - If it can not be blown out or swallowed send to medical practitioner.

Nose Bleed -Most nose bleeds (epistaxis) are dramatic but not life threatening unless it follows severe facial injury or the casualty is unconscious or elderly.

TREATMENT OF NOSE BLEED

1. Rest casualty and sit them forward
2. Pinch nose below bone for 10 minutes
3. Get casualty to breath through mouth
4. Loosen all tight clothing
5. Have casualty Spit blood from throat into bowl
6. Apply ice packs to throat, neck and forehead
7. If bleeding lasts longer than 20 minutes seek medical aid

TECHNIQUE FOR MAPPING SPINAL INJURY

When a casualty suffers an actual injury to the spinal cord the ability to feel sensations such as pain, pressure or temperature will be lessened or lost. Thus where the casualty is conscious a spinal injury can be identified by testing the casualty’s ability to differentiate between pain and pressure.

The procedure is simple and consists of using an open safety pin to map the level of sensory nerve activity. The procedure begins by establishing the casualty’s ability to differentiate between the sharp and blunt ends of the pin on their forehead (sensation in the skin of the forehead is transmitted via the Ophthalmic Nerve directly to the brain and is not affected by spinal cord injury).

Once the casualty is able to differentiate between the sharp point and blunt end of the pin on their forehead you then ask the casualty to identify which part of the pin is being used to touch along their body. This is continued until the casualty’s body is fully examined or the casualty is unable to differentiate between the sharp and blunt ends of the pin. The area of the body where the change is detected indicates the possible level of the injury.
EYE INJURIES

Foreign Bodies in Eye - The first indication of an eye injury is often the sensation that there is something in the eye.

**TREATMENT OF FOREIGN BODY IN EYE**

1. Sit casualty down and reassure them
2. Wash your hands
3. Open casualty’s eye and lift eye lids out and look under each eye lid
4. Have casualty pull upper eyelid over the lower eyelid and vigorously blow their nose
5. Recheck eye for object
6. If object still on white of eye, carefully remove with cotton bud, cloth or tissue
7. If unsuccessful flush eye with clean water or saline
8. If all fails send casualty to medical practitioner

**TREATMENT OF SEVERE EYE INJURIES**

1. Do not attempt to examine eyes
2. Get ambulance immediately
3. Dressings applied to both eyes
4. Bandage lightly in place
5. Rest and reassure casualty - never leave them alone
6. Prevent casualty vomiting, coughing or sneezing

*Heat, Chemical or Smoke Injuries to Eye* - see burns chapter

EAR INJURY

Bleeding from Ears - Bleeding from ears is usually associated with picking at skin, a ruptured ear drum or fractured skull

**TREATMENT OF BLEEDING FROM EAR**

1. Place pad over affected ear
2. Lie casualty on affected side, if possible
3. If both ears bleeding sit casualty slightly up
4. If serious incident - explosion or accident call ambulance immediately
Foreign Object in Ear - For foreign objects in ear leave them for the medical practitioner. If it is an insect it can be drowned using warm olive or vegetable oil. Insects, such as moths, can be removed from ears at night by holding a light a few feet away from the affected ear. The moth will, hopefully, then fly out from the ear.

**TREATMENT OF FOREIGN OBJECT IN EAR**

1. Sit casualty down with affected ear upward
2. Wash your hands
3. Attempt to remove with fingers or use warm olive or vegetable oil for insect
4. If object or insect stuck send to medical practitioner

FRACTURED JAW

There are two basic types of jaw fracture; stable and unstable. With both types of fracture the major concern is with the casualty’s airway. If the casualty is unconscious, simply place them on their side. If the casualty is conscious then treat as follows:

**TREATMENT OF FRACTURED JAW**

1. Sit casualty down and lean forward
2. Allow saliva and blood to drain from mouth
3. Have casualty support their jaw with their own hand