MODULE

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Important Guidelines for Printing and Photocopying

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UNIT ONE
INTRODUCTION

1. 1. Purposes and uses of the module

Injuries are major health problems that commonly appear on the morbidity and mortality reports of the health institutions in Ethiopia. Despite this prevailing phenomenon, limited attention has been given to injuries as health problems.

It is true that the Ethiopian National

1. 2. Directions for using the module

Attempt all the pre - test questions.

Go through the core module and ensure that you have understood the epidemiology, predisposing factors, causes, preventive and management aspects of injuries.

Each category of students should;

- read their respective satellite modules.
- study and discuss their own specific learning objectives and activities.

Answer all post-test questions

Compare your answers of the pre - test and post – test questions.

UNIT TWO

CORE MODULE

2. 1. Pre-test

c. Circulatory, Excretory, Digestive

d.

b. Females are not as frequently affected as males in homicidal injuries
c. The mechanism by which the injury is produced affects the treatment
d. The role of prevention in some physical causes of injury is minimal
e. None

9. The wrong statement in the general approach of a patient who is severely injured is:

a. Organisation and team approach is necessary
- b. Priority should be given to treatment of shock before anything else.

c. The arrest of bleeding can be done by tourniquet if other simple methods fail
d. The mainstay of treatment of burn is fluid administration if the surface area of burn injury is greater than 10%
- e. None

The annual medical and social costs of injury are estimated to exceed $500 billion world wide (WHO, 1989).

Observation of trends in the epidemiology of injury in developing countries raises the question of the relationship between development and injury. Omran (1971) pointed out that developing countries move through an “epidemiological transition,” from a disease profile dominated by infectious diseases to one characterised by the “post-transition” non-communicable health problems, including injuries. The global health burden of injuries in the year 2020 is projected to be equal to that of communicable diseases, and even greater in some developing countries.

Demographic changes (such as the shift in age structure and urbanisation) have had effects on the epidemiology of injury primarily through an increase in the incidence of injuries, which are more prevalent among the elderly (such as falls) and in urban environments (such as motor vehicle accident).

The incidence of moderate to severe burn injury is probably at least 600 per 100,000 people in developing countries. The occurrence of new injuries from falls in developing countries is probably at least 2,000 per 100,000. The average age of 30 years at the time of injury reflects the higher incidence among the elderly and the occupational nature of many of these injuries.

The incidence of all injuries due to motor vehicle accident in developing countries is likely to be at least 665 per 100,000. The average age of thirty years at the time of injury reflects the fact that persons injured in motor vehicle accident in developing countries are older than their counterparts in the industrial world (PAHO, 1986).

The estimated mortality rate from injury and poisoning in Sub – Saharan Africa is much higher for males than females. For example, the mortality rates for males for the years 1985, 2000 and 2015 were estimated to be 138, 129 and 123 per 100,000 persons respectively. For the years given above, the estimated mortality rates for females were 32, 32 and 31 per 100,000 persons respectively.

Although the impact is less well understood, injury is one of the leading causes of adult mortality and a major contributor to disability in most age groups in many low- income countries such as those in Africa. This is especially true in countries that experienced recent increases in industrialization and motorization. Despite this, limited attention has been paid to injury as a health problem. Comprehensive epidemiological information on injury incidence, severity, risk groups and risk factors is essential for setting intervention priorities and preventive policies. Development of these effective efforts depends on reliable, detailed information on the incidence and outcome of specific mechanisms of injury. However, in developing countri

In a study conducted in the North Gondar administrative zone, Northwest Ethiopia, the leading cause of injuries was assault (48.5%) followed by falls (18.6%) and then road traffic injuries (14.7%).

Therefore, the health center team should have a clear understanding of the epidemiology of injuries in order to design appropriate preventive (control) strategies and manage injured cases. It is also of paramount importance for the health center team to understand the necessity of proper documentation and timely reporting of injuries and the measures taken to tackle such problems.

2. 3. Predisposing Factors

Accidents happen in conditions and on individuals prone to injuries. The Presence of predisposing factors promotes injuries to happen. The health center team thus is expected to know some of these conditions.

a) ***Excessive alcohol intake and addictions of any kind***:- reduces the concentration and motor control of individuals. It is particularly associated with road traffic injuries, homicidal and criminal acts. These predispositions are avoidable.

b) ***Mental illness***:- mentally ill people can have self-inflected injuries or cause injuries to others. For example seizure patients may suffer fits in a site close to fire and sustain fall or burn injuries. Also they may be eating food and choke get.

c) ***Lack of knowledge or information***:- Information regarding safety measures about use of sharp instruments, irritants and electric systems, firearms and explosives are necessary. Failure to have adequate knowledge and information about all these measures predisposes to injuries.

Good knowledge of traffic rules and regulations save lives that could be lost due to road traffic injuries.

d) ***Negligence and Carelessness***: - there are some jobs which demand absolute concentration and attention, otherwise leading to injuries.

For example:

- Grinders and operators of chain saws, hammer and other tools are exposed to segmental vibration, which affect the upper limbs
- Health professionals
  - in advertent infection during working times.

2. 4. Common Causes

The mechanism by which accidents happen is long-listed. However, based on epidemiological data on injury in our country and data from other African countries of similar settings, the following causes are identified:

2. 4. 1. Physical causes

1. *Personal assault/ homicidal injuries*

   These types of injuries are commonly intentional in the event of producing an injury to another person. Many things can be used to cause injury: throwing objects such as sticks or stones; using parts of the body and knives.

2. *Road traffic injuries*: - play a major role as a cause of death in towns and cities. Studies have shown that proper application of driving rules reduces injuries. Mixed traffic systems where by vehicles, animals, and pedestrians share the roads, is one of the major causes of road traffic injuries. Unsafe

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5. *Sexual assaults (Rapes)* :- produces both physical and psychological trauma; the psychological trauma may be more disabling than the physical trauma and may be harder to detect.
6. *Mishandling* of sharp objects, machineries, weapons, explosives etc.
7. *Drowning*: - can occur during flooding, when trying to cross a flooded river, swimming, infants may drown in small tubes of water if left unattended.
8. *Choking/aspirations*: - this may happen to occur while eating food. Children playing with coins may aspirate or swallow the coin, which may result in choking.

2. 4. 2. Burn and electrical injuries

Burns are accidental injuries known to mankind since ancient times. It is caused by exposure to extreme heat from open fire, hot liquids, very hot surfaces or steam. Electrical injuries also produce burns. When a high voltage current passing across the tissue, it encounters resistance and heat will be generated resulting in tissue injury.

2. 4. 3. Chemical injuries: - exposure to harmful chemicals such as strong acids or alkaline damages tissue. Chemicals used by the traditional healers may also cause tissue injury. The magnitude of local industry and agricultural practices determines the prevalence of chemical injuries.

Table 1. Pathological outcomes commonly associated with injury events in the developing world.

Injury event	Type of injury
Fire	Burn & thermal injury
Electric shock	Burn and thermal injury
RTA	Crush and deceleration injury, abrasion and laceration, dislocation and fracture
Fall	Crush and deceleration injury, abrasion and laceration, dislocation and fracture
Drowning	Anoxic injury
Poisoning	Chemical injury

***2.4.4. Radiation exposure*:** - rare cause of injury in developing countries.

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Keep covered hazardous substances.

Use personal protective devices such as safety goggles, face shield, gloves, helmet, dust masks, protective suits and safety shoes.

Control conditions likely to cause fire or promote spread.

Provide adequate emergency facilities for escape in case of fires.

Protect danger of electric shocks in which proper electric wiring is essential, such as proper installation of sockets, insulation of electric wires using conduits

Protect gas poisoning which calls for proper ventilation or venting of

patients or mass casualty can arrive at health institutions any time; therefore, the health centre team needs to have a modest organizational capacity to deal with the primary care of the injured. Organization comprises adequate number of staff, protective devices such as gloves, aprons and lifesaving equipment. Principle of triage (sorting out of patients according to the severity of their injury to prioritise treatment) needs to be employed in cases of mass casualty.

The team, in order to handle injuries, must understand the following general approach (the ABC's of trauma care).

A. *Airway*: It is easily obstructed by the tongue falling in back to the throat in an unconscious patient. It can also be obstructed by foreign bodies in the pharynx or larynx. Putting the patient in semi-prone position and lifting of the chin prevents the tongue from obstructing the airway. This opens the mouth and makes the removal of a foreign body easier.
B. *Breathing difficulty*: - it is usually from rib fractures, (single or multiple) that can be treated by analgesics. Breathing problems can also arise from (hemo-thorax) and tension pneumothorax. Immediate chest tube insertion should be done if there is any doubt about the presence of pleural space collection.
C. *Circulation:* bleeding kind/or a circulatory collapse is a clinical condition, which accompanies trauma. Any external bleeding has to be stopped. Simple pressure application or dressing stops the majority of bleeding. Profuse bleeding from a ruptured major vessel of a limb can be stopped temporarily by a tourniquet

   Following trauma patients may bleed internally. In su

Therefore wide bore IV line should be opened and resuscitation started with normal saline (N/S) or Ringer's lactate (R/L)

2. 6.1.CARDIO-PULMUNORY RESUSCITATION (CPR)

- Is a technique of providing external cardiac massage and artificial ventilation. It is employed for any patient who has just stopped breathing, has a gasping type of breathing or has no cardiac activity.
- It is performed by applying five chest compressions followed by one artificial ventilation (either by ambou bag, mouth – to – mouth or mouth – to – nose) until cardiopulmonary function resumes or death is confirmed.

- Neurological assessment: - A quick assessment of the level of consciousness using Glasgow coma scale (eye opening verbal response and motor function) gives some idea about the conscious level.

Transportation of an injured patient should be done very carefully taking care of the airways fractured limbs and especially if spinal injury is suspected or confirmed. When spinal injury is suspected the patient is transported without moving the spine by at least 8 people 4 on each side. This prevents further injury to spinal cord.

2. 6. 2. WOUNDS

There are two kinds of wounds: Open and closed. Open wounds are treated based on the site, size and degree of contamination and the mechanism by which they are produced.

- Abrasions, bruises and punctures are treated by wound cleaning with antiseptics and dressings.
- Simple lacerations need cleaning, disinfection and primary closure by suturing if less than 72 hrs from time of injury.

- Contaminated and rugged wounds are treated best with wound toileting (washing) with disinfectants and saline. The wound is left unsutured for delayed primary or secondary closure.
- Extensive wounds with necrotic tissue are treated by removing necrotic tissues or any foreign bodies (done best at a hospital setting) and close by secondary closure.
- Do not close primarily animal and human bite wounds; consider antirabies prophylaxis in suspected cases.
- Do not primarily close bullet injuries regardless of wound size.
- Splint and immobilize extensive soft tissue injuries to relieve pain and facilitate wound healing.

Tetanus Prophylaxis: -

Tetanus toxoid is an active prophylaxis, which prevents tetanus; therefore, it should be given following open wounds. Tetanus anti-toxin is an immunoglobulin, which gives passive protection against tetanus. It should be given as soon as possible for all wounds except clean lacerations, which are not contaminated.

2. 6. 3 Poisoning

Is the application of harmful substances to the body whether applied externally or internally.

- Sign and symptoms of poisoning

  Sudden on set of pain or illness

  Burns around the lips or mouth

  Peculiar breath odour

  Vital sign derangement

  Pupillary size changes (meiosis)

- Management of acutely poisoned patient primarily aims at supporting vital functions (air way, breathing, circulation)
- All patients who need hospital care are referred when all preconditions are fulfilled: first aid given, appropriate

A) Explain the evaluation of the

UNIT THREE

SATELLITE MODULES

3.1 Satellite module for health officer students on Injury Prevention and Management

3. 1. 1. Introduction

Management of injuries is an essential part of primary health care and the majority of trauma cases can be handled by midlevel health workers.

The module presents case studies, which are believed to illustrate the learning objectives below. The health officer has already the basic knowledge about the various clinical features of injuries and is the leader in the management of the injured. The team needs to have good coordination among its members. Members should be encouraged to actively play their role in the teams endeavour. The goal of this module is to emphasize the role of the health officer in the health center team.

3. 1. 2. Learning objectives:

At the end of this course the student should be able to: he90 Tc4 0 Td(are b >>0 Tw 12 0oFiC 0 0e ts

subcutaneous emphysema, (hyper-resonance), dullness and asymmetry of air entry to the lungs.

- Chest X-ray (patients with unstable vital signs should not be sent for x-ray).

4. The tenderness on the left upper abdomen may be due to Injuries of:
    a.
    b.

5. Describe the treatment of chest injuries

6. What are the basic principle of diagnosis and treatment of abdominal injuries?

7. Outline the basic laboratory and X-ray investigations relevant to the condition

8. On the 3rd day of trauma, the victim developed abdominal Distension, tachycardia and became febrile
    - What likely complication did this patient develop
    - What can you do in a serious complication like this?
9. Was this injury preventable? Explain

2. Abdominal injuries

Types

1. Blunt abdominal injury
    - may be due to road traffic injuries, fall, or Kicks from people or animals.
    - solid intrabdominal organs like spleen and liver are injured mostly causing intra-abdominal bleeding
2. Penetrating abdominal injury
    -

Patient evaluation

History: - ask about the mechanism of injury, abdominal pain, vomiting, bowel motion and rectal bleeding.

Physical exam: - check for tachycardia, hypotension, pallor, bruises, abdominal distension, tenderness, rigidity and shifting dullness.

Investigation: - Hematocrit, blood grouping and x-match.

-

- Prevention and institution of early treatment of secondary brain injury is the most important point in the management of patients with head injury.

Patient evaluation

History: mechanism of injury, loss of consciousness, seizure, vomiting, bleeding through the nose or ears, symptoms of associated injuries (e.g. chest pain).

Examination:- vital signs (hypotension may indicate concealed bleeding into the chest or abdomen).

- look for tenderness, swelling, bruises and wounds to the head. Bleeding from ears or nose, subconjunctival hematoma.
- Look for associated injuries especially chest and abdominal injuries.
- The neurological examination should:
  - A) Assess the level of consciousness (using the GCS) – see annex.
  - B) Detect any lateralizing signs. (compare the power, tone and reflexes of extremities)

Investigation:- skull x-ray j-a

-Th deficitcri injf e

- Patients with depressed skull fractures

Case study

A 60 year old carpenter fell from a roof which is 10 meters high while repairing an old leaking roof. Following the accident he reportedly lost consciousness immediately. On preliminary examination he opens his eyes to painful stimulation, flexes his extremities utters some incomprehensible words and the right pupil is dilated.

Based on the above information

1. What is the GCS?
2. What is the life threatening condition in this patient?
3. What does pupillary dilatation indicate?
4. How do you prevent brain edema?
5. What precautions do you take before transferring to a hospital?

4. Spinal injury

A polytrauma patient especially after road traffic and fall accidents must be considered a potential suspect for spinal injury until it is ruled out.

Clinical features - Pain and tenderness in the region of the injury

- Weakness or paralysis below the level of the injury
- Loss of bladder and bowel control

Management

- Use rules of ABC for resuscitation
- Transportation of the patient with spinal injury when stable.

Transportation and treatment of spinal injury patient

The method of transportation and treatment of a spinal injury patient differs depending on the anatomic region of injury, neurological status, stability of the injury, and general status of the patient.

Cervical spinal injury

- Keep the head of the patient flat on a stretcher
- Put sandbags or rolled –up cloth on each side of the head to support the head
- Apply cervical collar if available
- Watch for respiratory distress
- Treat other injuries

Thoracic and lumbar spinal injury

♦ If the patient is conscious

- Lift patient flat on back
- Use spinal board if available

♦ If the patient is unconscious

- Take resuscitatory measures (ABC's see core module)
- Elevate the lower limb for a short time
- Keep the patient flat on face
- Treat other injuries

♦ If available do also X-ray examination of the spine in various directions or plains (Atrerio-posterior, Lateral, Oblique, Pillar view, etc)

5. Fractures

The following must be done in-patients suspected of a fracture.

- Inspection for obvious deformity, swelling, visible bone
- Test the active and passive movements of the potentially affected joint(s)
- Localize pain
- Check for instability (abnormal movement), crepitation, circulation problems (colour changes or absence of pulse), motor dys function, sensitivity
- Laboratory investigations like Haemoglobin/Hematocrit, blood grouping and cross match

(half of the calculated amount is given in 1st 8 hours and remaining half in the next 16 hrs).

4. Give activated charcoal

   Adult: 50-60 gm PO or NGT

   Children: 1gm/kg body weight activated charcoal PO or NGT or more ideally 10 gm charcoal/gm ingested toxin.
5. Maintain fluid and electrolyte balance
6. Control of pain, e.g. in corrosive poisoning
7. Broad-spectrum antibiotics to prevent pulmonary and other infections – may not be necessary.
8. Observation of the patient for about 4 -6 hrs - for seizures, unresponsive hypotension.
9. General nursing care including bladder and bowel care in comatose patients
10. Refer the patient to a hospital but avoid supine position during transportation

Pesticides (Organophosphates like malathion) –

Lead to parasympathetic over stimulation by inhibiting cholinesterase.

Clinical features - miosis (pin-pointed pupils)

- Excessive salivation
- Abdominal cramp
- Sweating and lacrimation
- Bronchospasm and excessive bronchial secretion
- Nausea
- Vomiting
- Diarrhea
- Muscle twitching and excessive skeletal muscle weakness (flaccid paralysis)
- Convulsion
- Tachycardia initially (Nicotinic effect)
- Bradycardia later (Muscarinic effect)

Generally organophosphate poisoning must be suspected with-patients that have miosis, sweating and hyperperistalsis.

Treatment

- Complete rest
- Remove contaminated clothing

and the measures to be taken in the prevention of accidents caused by poisonous animals and their methods of management.

Manifestations of poisoning caused by animal bites

Poisonous animal bites usually have local and systemic manifestations.

Local manifestations:

-

8. If symptoms develop fast, apply constricting bands just proximal and distal to the bite, if the accident is within less than 30 minutes. Loosen the bandage intermittently as swelling progresses. They should remain there until definitive therapy is instituted

3.2 Satellite Module for Public Health Nurses Injury Prevention and Management

3. 2. 1. Introduction

The objective of preparing this satellite module is to provide the nurses with the knowledge and skills needed to assess injured persons. The module also incorporates information on causes of injuries and the appropriate nursing measures.

3. 2. 2. Learning objectives

The main purpose of this satellite module is to enable the nurses to:

1. Assess the conditions of the injured persons
2. Identify the patient's problems related to injuries (nursing diagnosis)
3. Establish goals for nursing intervention
4. Put the established goals into action
5. Evaluate the interventions (activities put into action)

3. 2. 3. Learning activity

Case study

Ato Kumma, a 52-year-old man, was brought to the health center after he sustained injury to both upper extremit

3. 2. 4. Nursing assessment

Assessment begins with the nurse's first encounter with the patient. It involves the systematic collection of data about the patient's actual and potential problems and the use of these data to formulate nursing diagnosis.

Take complete nursing history

Carry out physical examination in order to determine the patient's mental status, physical limitations etc.

-

3. 2. 5. Nursing diagnose

Are those actual or potential problems, which could be resolved by means of nursing action

Identify the patient's problem and its particular characteristics

State the nursing diagnosis precisely.

In cases of accidental injuries, there could be:

Inadequate airway clearance

Loss of function in particular strsoO l1.46(imitad bctiovity)

3. 2. 8. Evaluation

Determine the extent to which the goals are achieved

Identify change due to the intervention.

Assist in the referrals to appropriate institution.

3. 2. 9. The role of the nurse in handling accidentally injured persons

Understand and practice working with the health center team

Assess the patient's status (physical and emotional)

Set priorities

Do the necessary nursing care in order to promote, maintain, and restore health.

Check vital signs

Promote comfort and relief of pain.

Arrest bleeding and immobilize the injured part

Monitor respiration, fluid intake, out put, fluid deficit and signs of shock.

Prevent wound infections.

Provide frequent reassurance to patient and family.

Do all measures which help to empty the urinary bladder

Ensure asepsis during dressing changes.

Stay with the patient as needed.

3.3. Satellite Module for Environmental Health Students on Injury Prevention and Management

3. 3. 1. Introduction

Studies show that majority of injuries occur with greater frequency and much greater severity in workplaces and residential environment. This is basically due to unsafe work and home environments, as well as lack of awareness and negligence.

Therefore, this satellite module is designed to equip environmental health students with the appropriate knowledge, attitudes and skills required to prevent injuries together with the other team members. It also consists of some promotive, preventive and rehabilitative services that should be delivered at individual, family and community level.

3. 3. 2. Learning objectives

At the end of this satellite module, environmental health students should be able to:

1. Identify predisposing factors for accidents and injuries
2. Describe the common causes of accidents and injuries
3. Device accident and injury prevention measures

3. 3. 3. Learning activity

Just after the report of the injury, the environmental health students went to the factory for inspection. They found that the factory was very old, some machines with unguarded rotating belt and protruded parts, and overcrowded working conditions. Further, they observed poor lighting, ventilation, excessive heat, and noise in the factory. They also identified that majority of the workers were uneducated and inexperienced with long working hours.

Based on the above case study answer the following questions.

1. If you were in charge of the above health centre what do you do first?
2. What are the possible predisposing factors for the above injuries?
3. What are the possible causes for the above injury?
4. How do you prevent the occurrence of such injuries?

3. 3. 4. Predisposing factors for injuries

See core module

3. 3. 5. Common causes for injuries.

See core module

3. 3. 6. Injury prevention

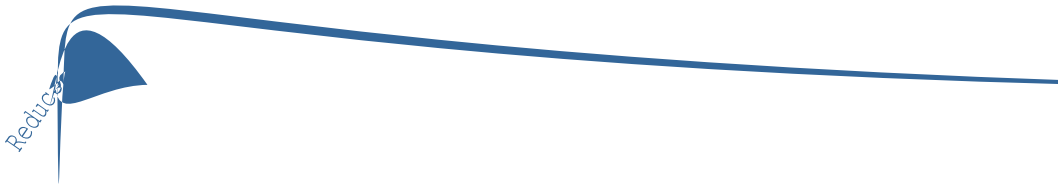
The role of environmental health technician in injury prevention is mostly on awareness creation, improvement on working and home environment and S

3. Establish sound sanitary condition within the rehabilitation centers such as water supply, waste disposal, canteen, cloakroom, shower and hand washing facilities.
4. Involve in the rehabilitation of the injured.
5. Determine whether the work environment and working conditions are harmful to health and prevent such conditions from occurring.
6. Conduct survey for evidence of accidents and injuries in the community.
7. Give professional advice to guard securely moving parts of machinery, keep away combustible material, avoid shock, friction, sparks and heat.
8. Protect fire using stoves and heaters mounted with fireproof materials. Cylinders are better placed outside the kitchen and smoke pipes (chimney) should be placed away from combustible walls.
9. Supervise occupational environment and give training for workers on how to prevent and control accidents in work places and home environment.
10. Educate the public not to practice certain traditional behaviours that may result in injuries.

Chain of injury events and opportunities for injury control (injury triangle)

(**Host)**

Prevention



Injury occurs because of a process involving these 3 factors. Haden deucloped a way to analyze injury prevention/control:

	Host	Agent	Environment
Pre-Event			
Event			
Post-Event			

Using this matrix, we can devise interventions for each of the 9 components.

3.4. Satellite Module for Medical Laboratory Students on Injury Prevention and Management

3. 4. 1. Introduction

This satellite module provides the specific tasks and skills that should be done by a medical laboratory technician in health center in the prevention and management of trauma.

3. 4. 2. Learning objectives

Upon completion of the activities in this module, the students will be able to:

1. Organize the emergency laboratory

3. 4. 4. Laboratory diagnosis

Emergency laboratory diagnostic tests for specific trauma are summarized in table – 1. below

Table –1: - Common trauma and the recommended laboratory tests.

Types of injuries	Recommended laboratory tests
Hemorrhagic shock	Hemoglobin/hematocrit, blood group and cross - match
Wound	Gram's stain and culture
Head injuries	Hemoglobin/hematocrit, blood group and cross-match
Abdominal injuries	Hemoglobin/hematocrit, blood group, cross-match, leukocytes and urinalysis

UNIT FOUR
BIBLIOGRAPHY

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Annex

The Glasgow coma scale

		Scale
Eyes Open:	spontaneously	4
	to speech	3
	to pain	2
	never	1
Best verbal response:	oriented	5
	confused	4
	inappropriate words	3
	incomprehensible sound	2
	none	1
best motor response:	obeys commands	6
	localize pain	5
	flexion to pain:	
	withdrawal	4
	abnormal	3
	extension to pain	2
	none	1
	Total	3-15

This score has been modified to be applicable to children, including those who have not learned to speak.