

“Basic nursing care saves more lives than heroic surgical interventions. . . . A chest drain should be inserted if penetrating chest injuries are suspected. Antibiotic prophylaxis (benzyl penicillin) and tetanus prophylaxis should be administered if available.”

*International Association for the Study of Pain Newsletter*

A Rural Clinic in Africa may or may not have beds. Usually, it will be staffed by a Clinical Officer (or Medical Assistant) and/or a nurse or army medical orderly. Workers with this level of training and expertise need to develop confidence and skill in the initial assessment, resuscitation and stabilisation of a patient injured by an anti-personnel landmine, giving effective preparation for subsequent transfer to a surgical centre.

Staff at a rural clinic should check that they have the knowledge, the equipment, and the supplies to provide a basic standard of care. This will include clean instruments and water, ready at all times. In situations where mine injury is common, it may be possible to prepare basic kits and keep them ready for use. They should contain:

- Sterile gloves to protect the operator from contamination and to prevent infection
- Large bandages and wadding to make pressure bandages
- Plain wooden splints to immobilise a limb
- Strong scissors to cut away clothing
- A bucket to contain clean water for cleansing the wounds
- Toothed forceps and scalpel to remove dead tissue and clean wounds
- Artery forceps for clamping major bleeding vessels
- An oral airway
- Wide-bore needles for crico-thyroid insertion to maintain airway
- A cuffed endo-tracheal tube
- Small scissors and artery forceps for performing cut-down I-V
- I-V giving set
- I-V fluids in sterile packs – normal saline or Ringer's lactate
- Clean plastic sheet to cover sucking chest wound or protruding bowel
- Adhesive strapping
- Analgesic injection – pethidine or morphine

What can be done will depend on the level of training and experience of staff, but the same principles apply to care at the Rural Clinic and at the District Hospital.

## **PRIMARY SURVEY OF THE INJURY AND THE PATIENT**

This is the first examination of the patient by the Nurse or Doctor. It aims to identify the problems which must be faced first and quickly — especially those which might cause further rapid deterioration. Then the examiner should set the findings in an order of priority.

The survey is considered under these headings, and in this order:

- |                                      |  |
|--------------------------------------|--|
| <b>A – Airway</b>                    | Checked first, because without air death occurs in five minutes.                 |
| <b>B – Breathing</b>                 | Whether it is adequate.  |
| <b>C – Circulation</b>               | Not so immediately urgent; a shocked patient often survives for hours untreated. |
| <b>D – Disability</b>                | Assessment of function. How alert, responsive?<br>What neurological deficit?     |
| <b>E – Exposure/<br/>Environment</b> | Is the situation helpful to care – protected from sun, cold?                     |

### **A – Airway (the passage of air into the lungs)**

1. Is the breathing noisy, requiring extra effort? Give special attention to the airway when there has been injury to the neck or face. Tissues here swell very quickly after they are damaged, and may block the flow of air. If the airway seems partly closed, quickly try to improve the passage for air.
2. Place the head tilted back with the neck extended. This is not the time to worry about whether the cervical spine is injured – without air, the patient will die very quickly. If this does not improve the airway, intubation must be considered, or the crico-thyroid membrane needled (see below) if intubation cannot be done.
3. If the breathing is satisfactory but the patient is unconscious, turn him on his side so that if he vomits he will not obstruct the airway and suck vomit into the lungs. Aspiration of vomit causes a high mortality in unconscious injured persons.

### **To establish an effective airway**

1. If a good airway cannot be maintained by positioning the head or by insertion of an oral airway, perform intubation, if it can be done. Is the equipment and skill available?



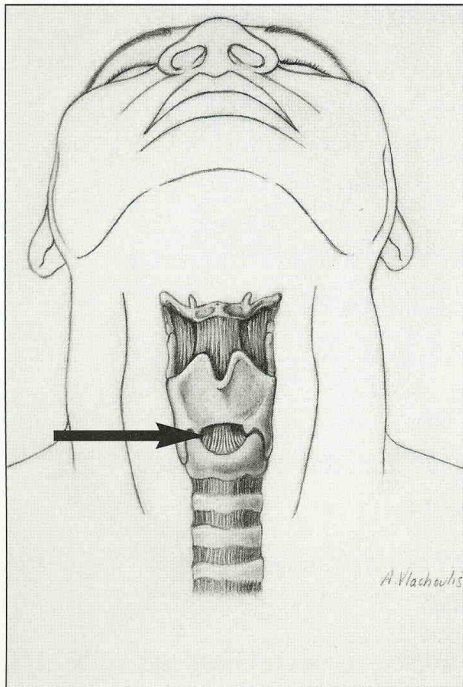


Figure 16. At this point several large bore needles passed through the skin and through the crico-thyroid membrane will establish a temporary airway.

2. If not, as an alternative, insert several (up to ten) 14 G needles through the crico-thyroid membrane to allow air to enter the trachea.

You can locate the crico-thyroid membrane by running your finger down from the pointed knob on the front of the thyroid cartilage to the lower border of the cartilage, where the finger finds a definite depression or groove between the thyroid cartilage and the cricoid cartilage.

Use any wide-bore needles and pass several through the skin and the membranes underneath right into the trachea. This will allow enough flow of air for some time, while other parts of the survey can be done.

## B – Breathing (the ability to move air into the lungs)

If a patient is not breathing on arrival at the Clinic, he is dead.

Breathing may be inadequate because of:

- Oedema of the tissues of the mouth. Rapid swelling of the floor of the mouth will cause closing of the airway.
- Bleeding from the face, with blood running into the pharynx. Place the patient face down to let the blood drip away from the throat.
- Penetrating wound of the neck
- Head injury
- Thoracic injury, for example haemothorax (blood filling the chest cavity), pneumothorax (air in the chest cavity). A tension pneumothorax — where air passing into the chest cavity outside the lung itself that cannot return, so that its pressure increases and it forces the lung to a smaller and smaller volume — needs urgent attention.

If there is an open wound to the thorax making a sucking sound, a simple closure with a valve mechanism (letting air out, but not in) can be obtained by covering the defect with a small sheet of plastic fastened down (with vaseline and adhesive) on three sides. This allows air to pass out from the chest cavity, but prevents air from entering.

## Tension Pneumothorax

The diagnosis of a tension pneumothorax may be difficult. Usually the patient will be seen to have increasing difficulty in breathing, with a rapid anxious respiratory effort, and a rapid pulse. The trachea may be seen to have shifted away from the side of the pneumothorax, and that side (usually the side of the injury) will be very drum-like to percussion.

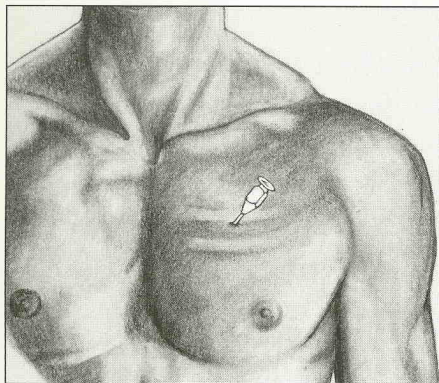


Figure 17. Needle passed into chest through second intercostal space to relieve pneumothorax.

If a tension pneumothorax is recognised:

Pass a 14G needle into the chest in the second intercostal space in the mid-clavicular line on the side of the pneumothorax. This will relieve the pressure, and you will hear the air come out.

If the needle is passed into the chest through the finger section of a soft glove, an effective valve mechanism can be established because the rubber is sucked against the open end of the needle and blocks air from being drawn into the chest.

## Pneumothorax

### C – Circulation

A mine injury patient is very often in shock when first seen; remember that he/she may have had to travel long distances since the time of the injury.

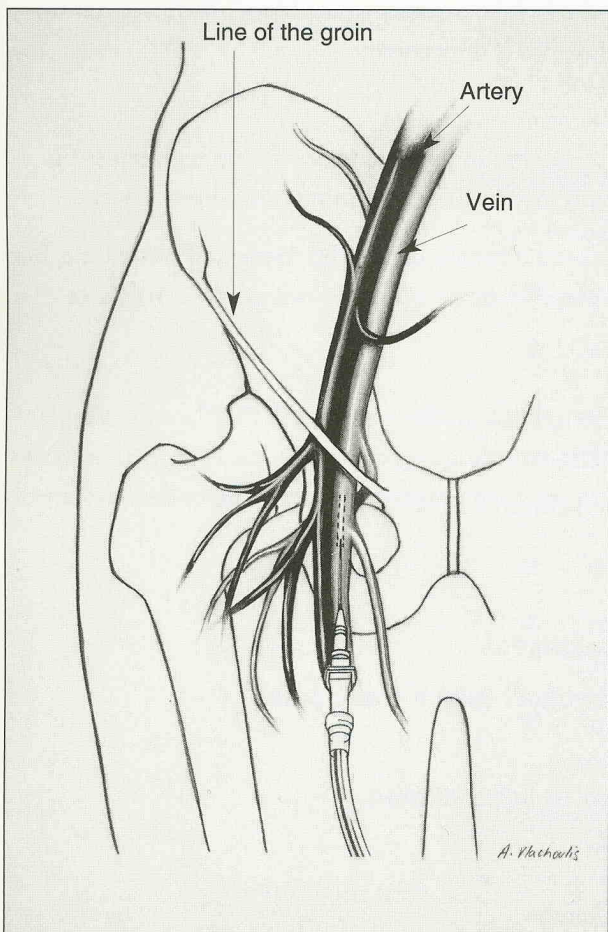


Figure 18. Femoral push showing needle entering femoral vein medial to the femoral artery

#### 1. Stop the bleeding.

An obvious spurting artery that is visible and easily reached should be clipped with artery forceps and tied. Do not clamp blindly in the depth of a wound – only clamp points you can see bleeding.

Other external bleeding can be controlled in the great majority of cases by firm pressure on the damaged vessel or the wound, using a pad bandaged firmly over the wound. (See Care at the Site of Injury, earlier) pressure cannot be applied at certain sites (beside the clavicle, in the popliteal fossa or inguinal area, in the neck). It may be possible to press into the wound with the finger to stop bleeding, or to inflate a Foley catheter in the depth of the wound, and clamp the end.

#### 2. Replace lost plasma volume.

##### Route

If the clinical officer is not skilled in I-V access, transfer as quickly as possible to a more experienced doctor. Insertion of more than one I-V line may be an advantage.

##### Adults

If a peripheral vein cannot be located it may be possible to insert a cannula into the external jugular vein or to push into the femoral vein medial to a palpable femoral pulse. Never insert a drip further down a limb from where it is injured by a mine.



**If circumstances, equipment or experience make I-V access too difficult, DO NOT CAUSE DELAY BY TRYING MANY TIMES — TRANSFER ON QUICKLY.**

## **Children**

In children under 10 years, the intra-osseous route will often be most suitable for transfusion of fluid, if there is a tibia which is not fractured. Insert a 16-gauge needle or a spinal needle into the flat part of the tibia, 2 finger-breadths below the tibial tubercle. Push and twist the needle in a downwards direction at 45° to the surface until the needle “gives”, then stop. If the I-V will not run, push fluid in repeatedly using a syringe.

## **What fluid to run in?**

Normal saline or Ringers/Lactate has been demonstrated to be just as effective as expensive colloid solutions. It should not be cold; bottles or bags can be warmed in an incubator or a warm water bath.

Blood is difficult to obtain and potentially dangerous unless screened. A haemoglobin of 7.5g/L can carry 90% of the oxygen capacity of the blood, therefore transfusion for a haemoglobin above this level is unnecessary.

## **How fast?**

As fast as possible. Observe pulse and blood pressure to see if fluid replacement is proving effective, because the fluid may be merely running into a body cavity.

If starting an I-V infusion has proved difficult, don't keep trying and waste time, but transfer as soon as possible to a place where an I-V cut-down can be carried out.

## **D – Disability**

Observe what the patient is no longer able to do. Use the “AVPUP” — the simple five-point scale for observation and recording (yes or no) the level of function of the patient. This will be important in assessing progress and reporting to the next site of care:

**A – alert?**

**V – responds to verbal stimulus?**

**P – responds to painful stimulus? (pinch the nipple)**

**U – is unresponsive**

**P – pupils are unresponsive to light, dilated.**

Record the AVPUP and the time;

For example: “A V P U **P** 9:30 am, 3/6/99”

## **E –Environment**

Maintain body temperature and comfort. Do not leave an injured person unshaded in the sun; keep warm if the surroundings are cool; and protect from rain and wind. Give thought to the emotional environment of the patient — are family members with him; does he ask for a priest?

## **SECONDARY SURVEY**

This is a second examination carried out once the patient is in a stable condition. It is a head-to-toe examination that aims to pick up evidence of other injuries, to check the full extent of injury, and to prepare a report for transfer of the patient. It should be done at the Rural Clinic before transferring on to a larger hospital, so that no injury is missed which might be helped immediately.

Remove all clothing as soon as practicable, and examine the patient all over, including the back, and in the hairline, under the breasts, in the axilla, between the legs and in the perineum. These are all sites where a penetrating injury may occur following a mine injury, yet be missed on superficial examination.

## **WOUND CARE**

The immediate aim of care is:

- Not to worsen the injury
- To limit the spread of infection
- To make patients ready for transfer to the nearest hospital as soon as possible for definitive wound care.

Common injuries include:

- Traumatic amputation or near-amputation of a limb
- Compound fracture of Tibia and Fibula (often of the opposite limb – the one less severely damaged)
- Shrapnel Injuries, which will often be multiple to several parts of the body, including the opposite limb (fracture), perineum, abdomen, chest, face.

## **LOWER LIMB**

1. Remove any first-aid dressing applied following the injury, and examine the wound.
2. Clamp and ligate obvious bleeders — arterial or venous.

3. Wash the wound with fresh water poured from a can or bucket over the area. (Water alone is sufficient, saline is unnecessary. Do not use antiseptic solutions — iodine and Dettol kill tissues).
4. Remove any obvious foreign material, but do not probe into the wound.
5. Apply a dressing — sterile gauze if available — and a firm bandage (crepe bandage is preferred).

For compound fracture and exposed tibia bone (usually of the opposite leg) wash lavishly with whatever solution is available (water will do), apply wet gauze over it, and then bandage firmly. Apply a splint (from foot to hip) to stabilise the fracture.

Shrapnel injuries, if penetrating, should be washed and a large pad dressing applied. Leave superficial injuries open.

### **CHEST WOUNDS**

These take priority over other wounds, and should be treated first, even when airway and breathing appear to be OK.

If the chest wound is sucking or bubbling, move quickly to apply a pad of gauze or wool, and seal the edge with plaster or vaseline. Apply a bandage just tight enough to hold the pad in position and refer the patient immediately.

(A small plastic sheet may be applied over the defect and if sealed down on three sides will form a valve mechanism).

### **Watch for Pneumothorax!**

Examine the patient quickly: Note the respiratory rate and effort. If the patient is dyspnoeic (high respiratory rate, flaring of the nostril openings, using chest and shoulder muscles) a tension pneumothorax may be present and this may cause death if not relieved quickly. The trachea will usually be pushed away from the pneumothorax, that side will be very resonant to percussion but with no breath sounds

1. Insert a wide bore needle into the second intercostal space on the affected side in the anterior axillary line.
2. If transfer will be delayed and the means are available, institute an under-water seal drain; if oxygen is available give by mask or nasal cannula.
3. If there is a superficial chest wound which may penetrate more deeply and it can be readily sutured, suture it.

### **Injury to the Perineum**

Wash affected area and apply dressing.

**Examine the patient quickly.  
Watch for Pneumothorax!**



## ABDOMINAL WOUNDS

Assume that any shrapnel injury to the abdomen has penetrated the peritoneal cavity. Therefore, refer the patient to hospital because exploration of the abdomen and bowel repair may be necessary.

1. If the bowel can be seen within or poking through the wound, and is open and leaking, tie off the bowel, wash out the area with a flush of water, cover the wound with wet gauze, and above that place a plastic sheet under a binder or large bandage.
2. If bowel is protruding through a very small abdominal wound, it may swell and strangulate (cut off its own blood supply); therefore make the wound opening bigger by cutting through the abdominal wall at one edge of the wound.

### Injury to the Liver

1. If the abdominal wall has been opened as part of the injury and the liver is seen to be bleeding, pack it behind and in front with six large packs.
2. Refer to hospital immediately

## FACIAL WOUNDS

Wash the face lavishly with normal saline or water

## EYE WOUNDS

All landmine blasts have the potential to injure upper body parts including facial structure and eyes. Bounding mines are especially prone to produce ocular injuries.

Eye injuries may be classified into four types:

- Soft tissue external injuries to the eyelids and muscle/skin structures around the eyeballs
- Surface injuries (non-penetrating) to the eyeball and under the eyelids
- Penetrating injuries to the eyeball (intra-ocular injuries)
- Bony fractures of the orbit (bony protection of the eyeball)

Inspect ocular injuries carefully. If there are injuries only to the skin and eyelids, there is no need to attend to those injuries when more serious injuries to limbs, trunk, and other parts of the body are present.

Examine both corneas with a small bright hand light. If the ocular surfaces and corneas appear intact and do not appear penetrated, but the patient complains of foreign body sensation of the eyes:

### CAUTION:

No ointment or drops should be placed on an eye which has been penetrated or lacerated.



1. Irrigate the eyes with sterile solution or clean water to lavage (rinse) small particles from the ocular surfaces.
2. Stain the corneas with fluorescein dye if available.
3. If a cornea stains and no foreign body is present, a corneal abrasion is present. Apply an antibiotic ointment (not an antibiotic-steroid combination) to the cornea and apply a light pressure patch for 24 hours.

If the eye has been penetrated and a foreign body is likely inside the eyeball, the eye should be lightly patched and protected with an eye shield over the patches and referred immediately.

Caution: No ointment or drops should be placed on an eye which has been penetrated or lacerated.

## **HEAD WOUNDS**

1. Shave the affected area, and wash thoroughly.
2. If there is a defect in the skull and brain matter is oozing out, cover with a wet sterile gauze and refer to hospital.
3. It may be possible to bring the torn scalp back over the defect and insert several simple sutures to hold it in place.

## **CONTROL OF INFECTION**

- Avoid delay; encourage early transfer from the site of injury to a clinic, and from a clinic to hospital as necessary.
- All obvious serious injuries should be treated with antibiotics. Give penicillin IV, if possible.
- Give whatever analgesia is available to help the patient remain calm and quiet. If the patient is not fully conscious or is confused, it may be better to avoid giving morphine until a further neurological assessment can be made.
- Inject tetanus toxoid to all patients, if available, unless there is known to have been a reaction in the past.
- Keep reassuring patient while waiting for transfer.

## **URINE FLOW**

Consider insertion of a catheter into the bladder to observe urine output. No urine flow over a long period suggests that shock may have shut down the kidneys, which is a bad sign, or that there may be an injury to the renal system interrupting the flow of urine into the bladder.

## REPORTING PRIMARY CARE

When preparing a person for transfer, it is useful to provide information for the next caregivers. Here is a sample of a suggested form containing the useful information to pass on. A blank copy of this form appears on pages 71-72 for future use.

### LANDMINE INJURY — PATIENT REFERRAL RECORD (Sample)

Names TOKA NIMBABWE Age 30 Sex M

Marital Status: Married ☒ Single ..... Divorced ..... Widowed .....

Address NINDABA SETTLEMENT  
NEAR SOKA VILLAGE

Occupation/Profession FARMER Pregnant ☒ Yes/No

Date of Injury MAY 26, 2000 Time of injury 10:00 AM

Where Injured (Please circle best answer):

Footpath ☒ Farm Field Wild Bush Home

Public Place, e.g., School Yard, etc.

Other (Specify) .....

HEALTH UNIT (Name) TONAMIN RURAL HEALTH CENTRE

Date of arrival 26 MAY Time of arrival 1 PM

Means of transport to health unit: Foot Vehicle Bicycle ☒ Other  
(Specify) CARRIED ON STRETCHER

Admission Findings:

BP 90/50 Pulse 110 Temp 36.2

Mucous Membranes PALE Conscious Level DROWSY Respiratory rate 28  
BUT ALERT

INJURIES — mark your findings on the simple diagram.

Lower Limb Injury (Please circle):

Left: ☒ Below Knee Above Knee

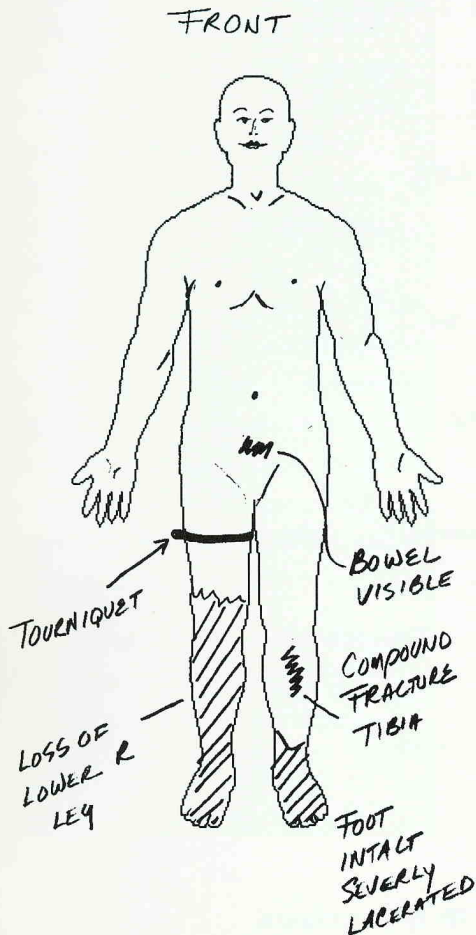
Right: Below Knee ☒ Above Knee

Other Injuries

Other limb ..... Abdomen ☒ Chest ..... Face ☒

Perineum ..... Neck ..... Scalp ..... Skull ..... Back .....

Other (Specify) R. BUTTOCK

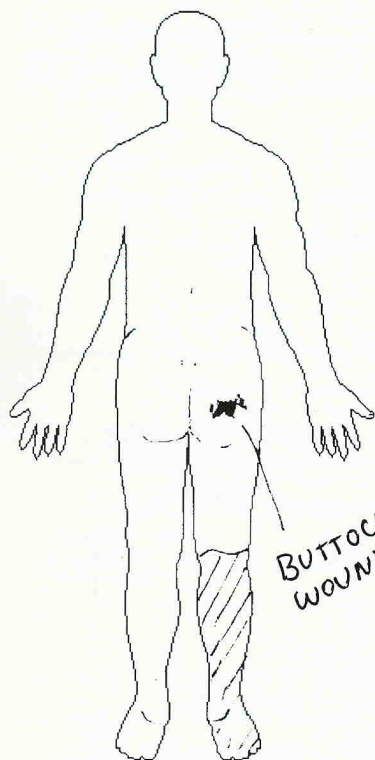




Haemorrhage Control — Pressure Dressing..... Tourniquet.....

Other (Specify).....

BACK



BUTTOCK  
WOUND

RIGHT LEG

If Tourniquet — state level above injury line 2-5cm..... >5cm.....

Time tourniquet applied ..... 1:30 PM

Time tourniquet last loosened ..... 3:30 PM

LEFT LEG

Splint applied Yes..... No.....

Resuscitation with I-V Fluids No..... Yes.....

When started..... 2 PM

No. of litres since..... 3 LITRES SALINE

Medication: Penicillin..... Tetanus toxoid..... Other (specify).....

I-M I-V

Analgesia Drug and dose ..... NIL ..... Time of last dose .....

Condition at referral: Poor..... Fair..... Good.....

A (V) P U P

Drowsy but responds to questions

Referral by: Name (print) ..... P. DIMBALA

Position: ..... CLINICAL OFFICER, SOKA HEALTH CENTRE

Signed: ..... [Signature]

Date: ..... 26-5-2000 ..... Time: ..... 3:40 PM