

# FIRST



# AID

Authorised Manual of The St. John Ambulance Association in Australia

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# FIRST AID

The authorised manual of  
THE ST. JOHN AMBULANCE ASSOCIATION  
OF THE ORDER OF ST. JOHN  
OF THE PRIORY IN AUSTRALIA



FIRST EDITION

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1969

*The authorised manual for First Aid Instruction  
for use by the St. John Ambulance Association Australia,  
and the Australian Red Cross Society*

FIRST EDITION

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## FOREWORD

FIRST AID teaching by the St. John Ambulance Association in Australia has previously been from the United Kingdom manual. The Priory Chapter in Australia, however, decided in 1966 that a First Aid manual should be produced by the Order of St. John in this country, to relate the teaching of First Aid in Australia more closely to our own conditions and environment.

As a result therefore, under the authority given to the Director of The St. John Ambulance Association in Australia, Air Vice Marshal E. A. Daley, C.B.E., K.ST.J., M.B., B.S., F.R.A.C.P., D.T.M., this manual has been produced by the Deputy Director, Mr. A. H. Toyne, S.B.ST.J., M.B., B.S., F.R.C.S., Mr. Toyne's fine, comprehensive and sustained effort in this task has been carried out with the guidance and assistance of a select Editorial Panel of representatives from each St. John Ambulance Centre of the Priory in Australia.

Other available sources of advice and help have also been used.

The existing close relationship between St. John and the Australian Red Cross Society is being maintained by the decision of the latter body to support this Australian publication.

It is considered that this Australian First Aid Manual represents an effective contribution to the better teaching and understanding of First Aid throughout Australia and its usage forthwith is commended to all concerned.



GEORGE STENING, Chancellor,  
Priory of The Order of St. John,  
In Australia.

May, 1969.

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With the co-operation of the Editorial Panel and others he completed this exacting work, a unique and historic achievement for the Order of St. John in this country.

Thanks are due to members of the Editorial Panel:

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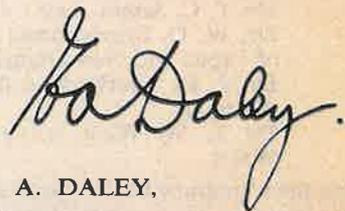
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# SYLLABUS

The contents of all chapters are to be taught and used for examination.

Chapter 21: Transport: This chapter is included to teach the First Aid student the principles of transport. Techniques should be confined to demonstrations by instructors and do not need to be taught in detail. However, the candidate can be examined on theory.

## A SUGGESTED SYLLABUS

The course will be spread over fourteen (14) sessions, and includes seven (7) theoretical and seven (7) practical sessions.

### SESSION 1

#### PRACTICAL:

#### APPLICATION OF THE ROLLER BANDAGE

- Simple spiral
- Reversed spiral
- Figure of eight

### SESSION 2

Chapters 1, 2, 3, 19 and 21

#### THEORETICAL:

#### PRINCIPLES AND PRACTICES OF FIRST AID

- Objects and scope
- Diagnosis
- Management

## FIRST AID

Disposal  
Transport

### STRUCTURE AND FUNCTIONS OF THE BODY

Anatomy  
Physiology

### DRESSINGS AND BANDAGES

Sterile Dressings  
Non-sterile Dressings  
Improvised Dressings  
Bandages—triangular and roller  
Slings

### A TYPICAL INCIDENT TRANSPORT

#### SESSION 3

PRACTICAL:

#### APPLICATION OF ROLLER BANDAGE

Spica  
Application of the triangular bandage to retain dressings

#### SESSION 4

Chapters 4, 6 and 7

THEORETICAL:

#### THE CIRCULATORY SYSTEM

Circulation of the blood  
Cardiac arrest

## FIRST AID

### WOUNDS AND BLEEDING BLEEDING FROM SPECIAL AREAS INFECTION

#### SESSION 5

Chapters 5 and 8

THEORETICAL:

#### THE RESPIRATORY SYSTEM

Asphyxia  
Respiratory failure

#### SHOCK

#### SESSION 6

PRACTICAL:

Circulatory resuscitation  
Respiratory resuscitation  
Coma position

#### SESSION 7

Chapters 9 and 10

THEORETICAL:

#### THE SKELETON

Joints  
Muscles  
Connective tissue

#### INJURIES TO BONES, JOINTS, MUSCLES AND LIGAMENTS

## FIRST AID

### SESSION 8

#### PRACTICAL:

Control of haemorrhage  
External  
From special regions  
Use of slings  
Treatment of fractures (Part I)

### SESSION 9

#### PRACTICAL:

Treatment of fractures (Part II)

### SESSION 10

Chapters 11, 13, 14 and 15

#### THEORETICAL:

#### HEAT AND COLD

Burns  
Corrosive injuries

#### ABDOMINAL CONDITIONS

#### HEART CONDITIONS

#### MISCELLANEOUS CONDITIONS

Eye injuries

### SESSION 11

#### PRACTICAL:

Treatment of fractures (Part III)

## FIRST AID

### SESSION 12

Chapter 12

#### THEORETICAL:

#### UNCONSCIOUSNESS

### SESSION 13

Chapters 16, 17, 18 and 20

#### THEORETICAL:

#### POISONS

#### MARINE STINGS

#### EMERGENCY CHILDBIRTH

#### FIRST AID IN REMOTE AREAS

### SESSION 14

#### DEMONSTRATION:

Taking temperature  
Transport techniques

# FIRST AID

## PRINCIPLES AND PRACTICE

---

---

*First Aid is the emergency care  
of the injured or the sick.*

---

It is based on current medical and surgical principles.

It begins immediately the First Aider arrives on the scene and continues until the casualty is attended by a doctor, removed to a hospital, home, or has fully recovered.

It enables persons trained in first aid to give such assistance as will—

**PRESERVE LIFE**

**PROMOTE RECOVERY**

**PREVENT THE INJURY OR ILLNESS FROM  
BECOMING WORSE.**

## FIRST AID

It is limited to assistance at the time of the emergency and does not include redressing of injuries.

The First Aider must co-operate with other First Aiders, use bystanders and be ready to help with medical aid if required.

Individuals react differently to injury and illness. The First Aider must be prepared to appreciate these variations and adapt his handling to the conditions encountered.

**MEDICAL AID IS TREATMENT BY A DOCTOR ON THE SPOT, IN THE HOME, OR IN HOSPITAL.**

### GOLDEN RULES OF FIRST AID

- Rapidly assess the whole situation.
- Remove the cause if still active or remove the casualty from the source of danger.
- Act with quiet confidence.
- Check for the pulse.
- Check for breathing.
- Control any haemorrhage.
- Assess the state of consciousness.
- Give injuries priority according to severity.
- Reassure the casualty.
- Handle the casualty gently.
- Remove clothing only if necessary.
- Arrange for the disposal of the casualty.

### THE SCOPE OF FIRST AID

- To make a diagnosis.
- To decide the nature and extent of the treatment required.
- To arrange for the disposal of the casualty.

### DIAGNOSIS

The First Aider must consider the HISTORY, SYMPTOMS and SIGNS from which he will diagnose the case.

## FIRST AID

### HISTORY

The history is the story of an accident or an illness that may be obtained from—

The casualty.

Witnesses.

The evidence of the surroundings.

It could indicate that a person is subject to a particular disease, or the surroundings may suggest the cause, e.g. a crash scene.

### SYMPTOMS

Symptoms are the sensations the casualty describes, e.g. pain, faintness, nausea, thirst.

### SIGNS

The signs are differences from normal which can be detected by the First Aider, e.g. pallor, raised temperature, rapid pulse.

### TREATMENT

Remove the cause if still active, or remove the casualty from the source of danger.

Commence treatment necessary to—

Sustain life by restoring circulation, restoring respiration.

Control bleeding.

Lessen shock.

Prevent the conditions from being aggravated by—

Covering wounds.

Immobilising fractures.

Posturing the casualty in the best position.

Promote recovery by—

Reassurance.

Relief of pain.

## FIRST AID

Gentle handling.  
Protection from the weather.

IMPROVISE IF NECESSARY.

### DISPOSAL

The First Aider must arrange the transport of the casualty to medical aid, to hospital or to home.

---

### GLOSSARY

CASUALTY—*Victim of illness or accident.*

PULSE—*The heart beat.*

DIAGNOSIS—*Naming the illness or injury suffered.*

NAUSEA—*Feeling of sickness.*

CIRCULATION—*The movement of blood through the body.*

RESPIRATION—*Breathing.*

# 2

## THE BODY STRUCTURE AND FUNCTION

---

*The human body is made up of millions of cells, each specialised to carry out its own particular function, but also co-ordinated with the functions of other body cells.*

---

To survive, these cells must have oxygen, food and water, and waste products must be removed.

### THE HUMAN BODY

The human body needs—

- A circulatory system to transport oxygen, food, water and waste products.
- A respiratory system to supply oxygen to the blood. It also removes carbon dioxide.
- A digestive system to absorb food and eliminate some waste products.

## FIRST AID

- A urinary system to remove other waste products.
- A skeletal system of bones, muscles and joints to allow locomotion and to support and protect the organs of the body.
- Skin to control temperature, appreciate sensations, and for protection.
- Connective tissue, which holds together the various structures of the body.
- The reproductive system for propagation of the species.
- Sense organs—skin, ears, eyes, nose and tongue—to appreciate touch, pain, temperature, hearing, balance, sight, smell and taste.
- A nervous system to control all these processes.

### THE CIRCULATORY SYSTEM

The circulatory system is made up of the heart (a muscular pump) and a huge number of blood vessels which carry blood to and from the cells of the body.

There is also fluid between the cells (tissue fluid) which is carried back to the circulation by the lymph vessels.

### THE RESPIRATORY SYSTEM

The respiratory system is designed to allow a large volume of blood to make contact with a large volume of air, and thus allow interchange of the gases, oxygen and carbon dioxide. This occurs in the lungs. Replenishment of the air in the lungs is achieved by a bellows mechanism created by movement of the chest wall and diaphragm.

### THE DIGESTIVE SYSTEM

The digestive system is designed to break down a wide variety of foods and fluids, taken through the mouth, into materials sufficiently small to be absorbed into the circulation and simple enough to be utilised by the tissues of the body. It is also a means of expelling certain waste products in the faeces.

## FIRST AID

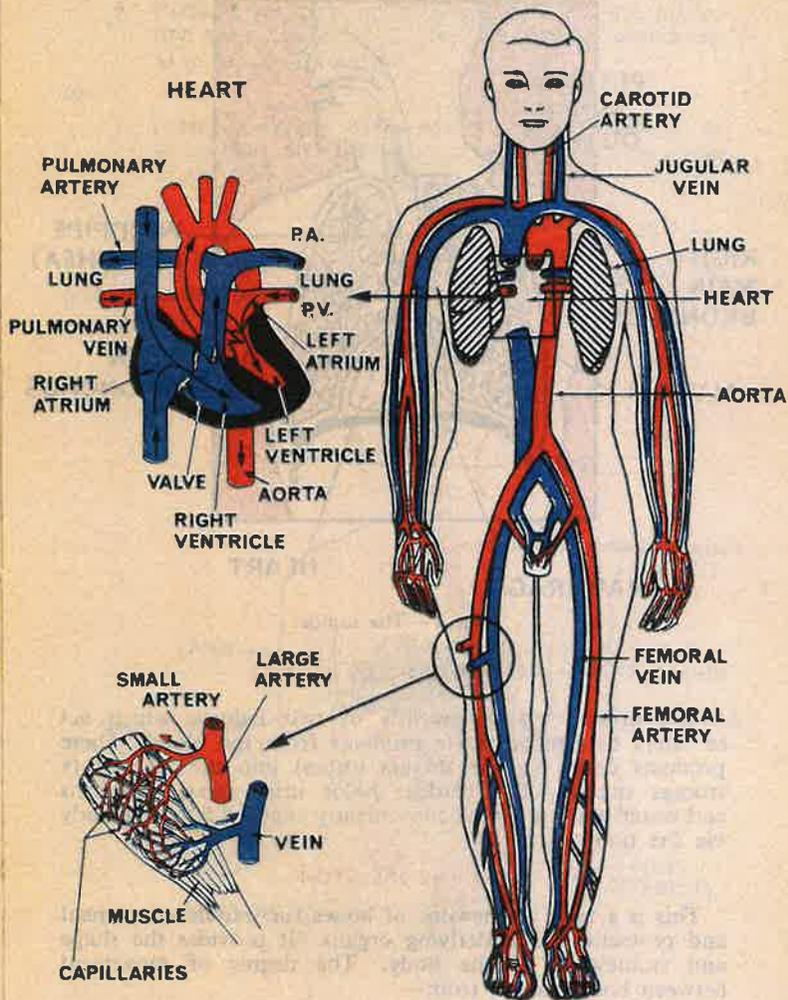


Fig. 1—A sketch showing the main features of the heart and circulation.

## FIRST AID

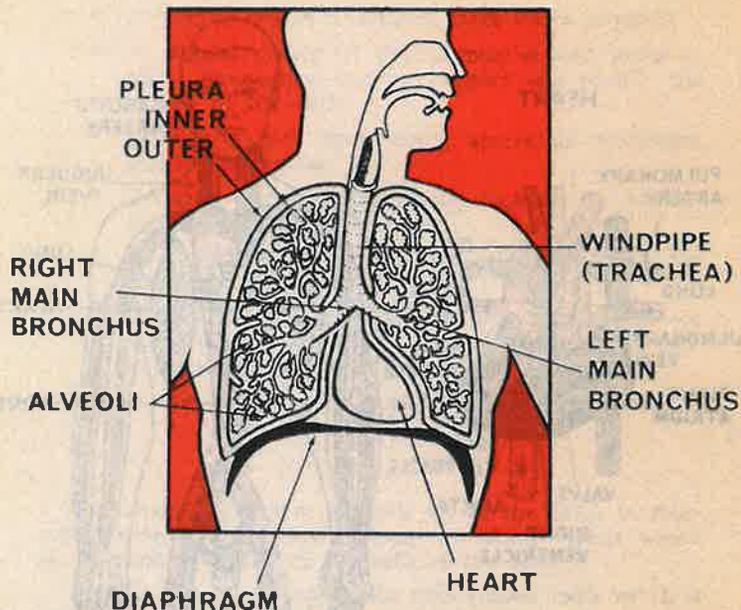


Fig. 2—The Lungs.

### THE URINARY SYSTEM

The urinary system consists of two kidneys which act as filters to remove waste products from the blood. These products drain via the ureters (tubes) into the bladder (a storage organ). The bladder holds urine (waste products and water) until it can be conveniently expelled from the body via the urethra.

### THE SKELETON

This is a rigid framework of bones for muscle attachment and protection of underlying organs. It provides the shape and framework of the body. The degree of movement between bones ranges from—

- Almost none, where bones are primarily needed for protection, as in the bones of the skull.
- through—

## FIRST AID

- Partially movable joints where stability and protection are more important than freedom of movement, as in joints of the spine.
- to—
- Freely movable joints where the emphasis is on locomotion and skilled movement, as in most joints of the limbs.

### THE SKIN

The skin is a waterproof layer designed to protect the cells beneath from damage, drying out, infection, and from

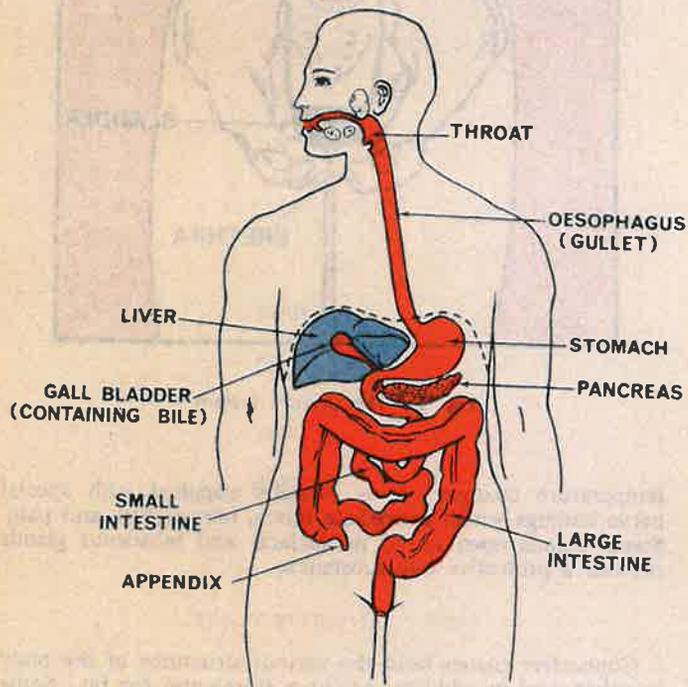


Fig. 3—A sketch of the digestive system.

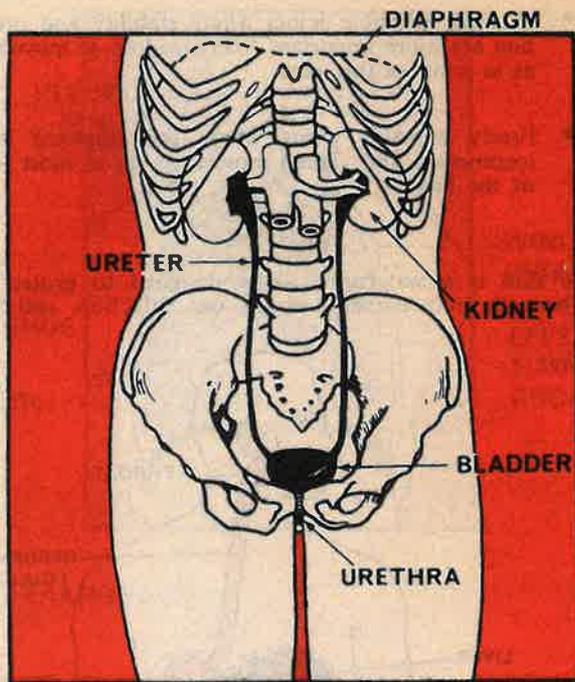


Fig. 4—The urinary system.

temperature changes. It is liberally supplied with special nerve endings which appreciate touch, temperature and pain. Sweat glands open on to its surface, and sebaceous glands provide a protective oily substance.

#### THE CONNECTIVE TISSUE

Connective tissues hold the various structures of the body together, and in addition, act as a storehouse for fat. Some tissues are very fine and delicate, whilst others are very strong and firm (ligaments).

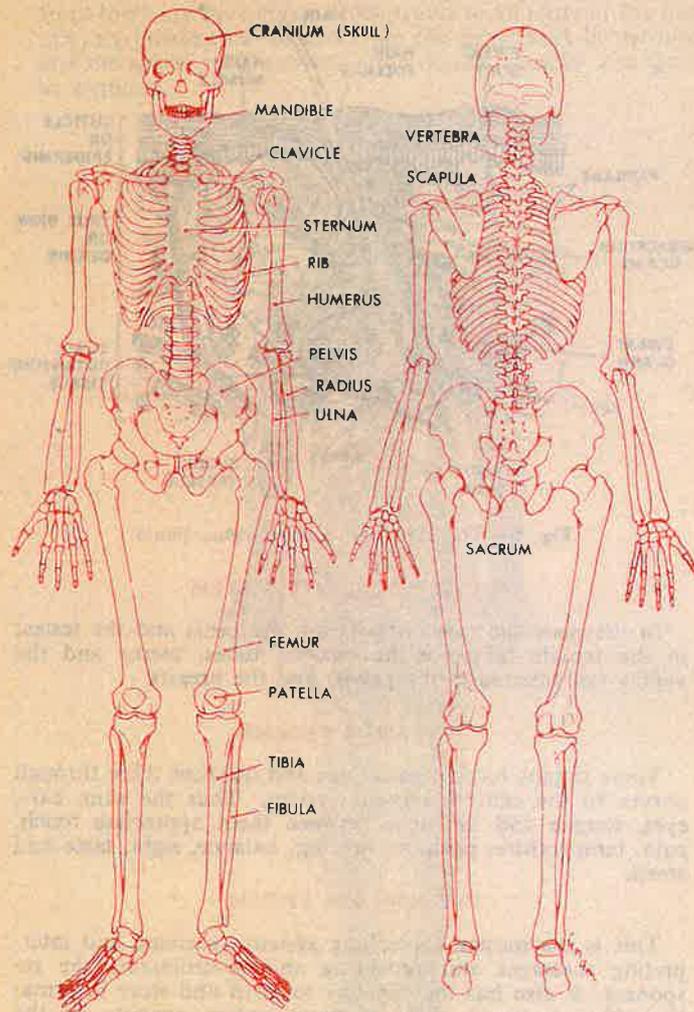


Fig. 5—The skeleton.

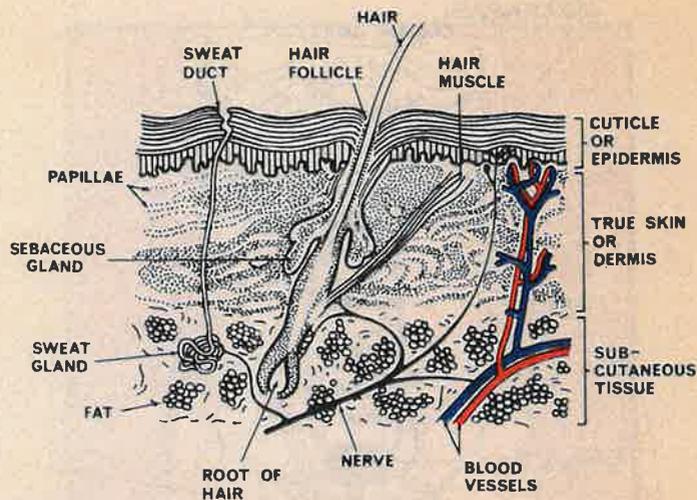


Fig. 6—The skin and subcutaneous tissue.

### THE REPRODUCTIVE SYSTEM

In the male the main organs are the penis and the testes; in the female they are the ovaries, tubes, uterus and the vagina (all situated in the pelvis) and the breasts.

### THE SENSE ORGANS

These organs receive sensations and transmit them through nerves to the central nervous system. Thus the skin, ears, eyes, tongue and the nose between them appreciate touch, pain, temperature, position, hearing, balance, sight, taste and smell.

### THE NERVOUS SYSTEM

This is the master controlling system, receiving and interpreting messages and activating and co-ordinating the responses. It also has the capacity to learn and store information (the memory). The nervous system consists of the brain and spinal cord enclosed in the skull and spinal column and bathed in a fluid called the cerebro-spinal fluid. Radiating

from these are the nerves, which travel to all parts of the body relaying information to and from the nerve cells in the brain and the spinal cord, activating the organs, muscles and glands as required.



Fig. 7—The nervous system.

## FIRST AID

### GLOSSARY

URINE—*Solution of waste products removed from the blood by the kidneys.*

SKELETON—*Bones of the body.*

LYMPH—*Fluid between the cells of the body.*

SEBACEOUS GLANDS—*Produce an oily substance in the skin.*

DIAPHRAGM—*Muscular wall between the thorax and abdomen.*

FAECES—*Waste food products passed by the bowel.*

CEREBRO-SPINAL FLUID—*Fluid bathing the brain and spinal cord.*



## DRESSINGS AND BANDAGES

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*Dressings and bandages are used to cover a wound and support injured parts.*

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### DRESSINGS

A dressing is a covering applied to a wound or an injured part to—

- Assist in controlling bleeding.
- Protect the wound from further injury.
- Prevent or lessen infection.
- Ease pain.
- Minimise swelling.

## FIRST AID

### RULES FOR APPLICATION OF DRESSINGS

Because your hands are never sterile do not touch any wound except for the emergency control of haemorrhage.

Do not touch any part of the dressing which will come into contact with the wound.

Avoid coughing, sneezing or talking over an open wound.

### TYPES OF DRESSINGS

DRY

WET

#### DRY DRESSINGS

#### PREPARED STERILE DRESSINGS

The best dressing for wounds is a sterilised (germ free) piece of gauze. This can be a shell dressing or gauze sealed in a protective covering.

#### APPLICATION

Loosen the protective covering and remove the dressing.

Expose the dressing as little as possible to the air.

The greatest care must be taken to avoid touching any part of the dressing which will be in contact with the wound.

Apply the sterile pad to the wound and bandage, using the attached roller bandage.

#### GAUZE

This is used if a prepared sterile dressing is not available.

#### APPLICATION

Loosen any covering with a clean pair of scissors.

Cut the gauze to the size required to cover the wound adequately.

## FIRST AID



To put on a "shell dressing," loosen the protective covering.



Remove the dressing.



Apply it, being careful not to touch the surface which goes next to the wound.



Use the attached roller bandages to put pressure on the dressing and to hold it firmly in place.

Fig. 8—Application of a prepared sterile dressing.

Take care not to touch the side which is to be applied to the wound.

#### ADHESIVE PREPARED DRESSINGS

These dressings are quite suitable for small wounds.

#### EMERGENCY DRESSINGS

In an emergency use—

The inside fold of a clean handkerchief.

A freshly laundered towel.

## FIRST AID

A clean piece of linen.

A clean paper tissue.

Cover dry dressings with a firm pad of cotton wool which extends beyond the dressing and is retained in place with a bandage. The cotton wool must never be in contact with the wound.

Clean linen or any soft bulky material may be used if cotton wool is not available.

### WET DRESSINGS

#### COLD COMPRESSES

Are used to—

Ease pain.

Minimise swelling.

Control bleeding under the skin (bruising).

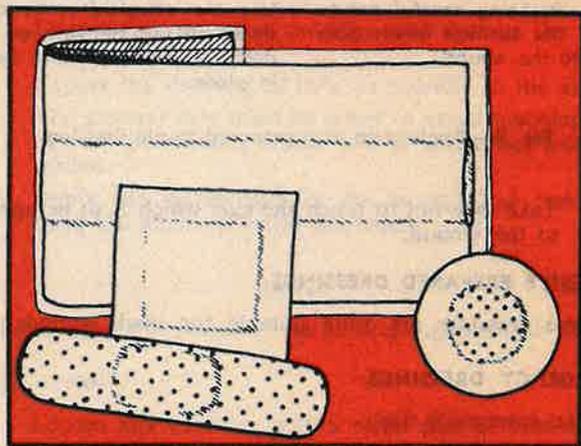


Fig. 9—Adhesive prepared dressings.

## FIRST AID

### TO MAKE A COLD COMPRESS

Take a thin towel, several layers of gauze, or a clean handkerchief. Fill with ice chips or soak in cold water.

Add one part of methylated spirit to three parts of water, to help cooling.

Where cold water is used, keep the compress moist by constantly dripping on more cold water.

Ice packs and cold compresses are best secured by bandaging firmly.

Do not apply ice treatment continuously for longer than 20 minutes.

Do not apply a wet dressing where there is a wound.

Do not use methylated spirit near the eyes.

### BANDAGES

#### ROLLER

#### TRIANGULAR

#### THE ROLLER BANDAGE

The roller bandage is used to—

- Retain dressings in position.
- Control bleeding.
- Afford support.
- Restrict movement.

Roller bandages are made from strips of different materials of varying lengths and widths according to the part of the body to which they are applied.

The recommended materials include muslin, calico, flannel, winceyette or crepe.

The ideal length is 6 yards and the usual widths used are:

Fingers—1 inch.

Head—2 inches.

Arm—2.3 inches.

Leg—3.4 inches.

Trunk—4.6 inches.

Before use bandages should be firmly and evenly rolled by one of the following methods—

## FIRST AID

By hand.

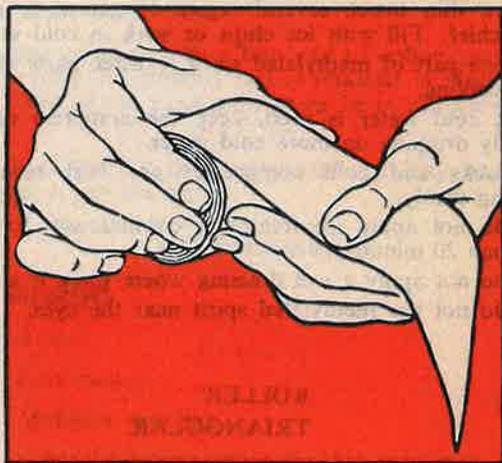


Fig. 10—Rolling a bandage by hand.

By two persons rolling a bandage over the back of a chair.



Fig. 11—Rolling a bandage using a chair.

## FIRST AID

By a roller bandage machine.

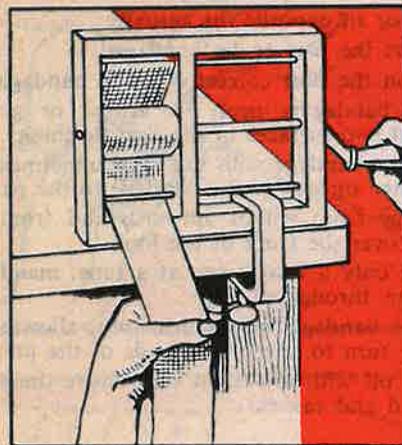


Fig. 12—Rolling a bandage using a machine.

When a bandage is partly unrolled, the roll is called the head and the unrolled part the free end.

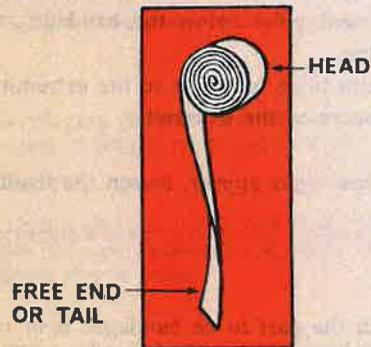


Fig. 13—Parts of a roller bandage.

**RULES OF APPLICATION**

- Use a firmly rolled bandage of the correct width.
- Stand or sit opposite the casualty.
- Support the part to be bandaged.
- Position the part correctly before bandaging.
- When bandaging near the armpit or groin pad to prevent two surfaces of the skin touching.
- Hold the bandage with the head uppermost and apply the outer surface of the bandage to the part.
- Bandage from within outwards and from below upwards over the front of the limb.
- Unroll only a few inches at a time, maintaining even pressure throughout.
- Fix the bandage with a firm turn, allowing each successive turn to cover two-thirds of the previous turn.
- Finish off with a straight turn above the part, fold in the end and fasten.

**POINTS TO BE OBSERVED**

The comfort of the casualty is the first consideration except when controlling bleeding.

The bandage must completely cover the dressing.

Watch for signs of interference with the circulation—

- An absent pulse below the bandage.
- Swelling.
- A bluish tinge or pallor to the extremity.
- Numbness of the extremity.
- Pain.

If any of these signs appear, loosen the bandage.

**URNS USED IN ROLLER BANDAGING****Simple Spiral**

Is used when the part to be bandaged is of uniform thickness. The bandage is carried obliquely around in a spiral fashion; each turn covering two-thirds of the preceding one, and the edges being kept parallel.

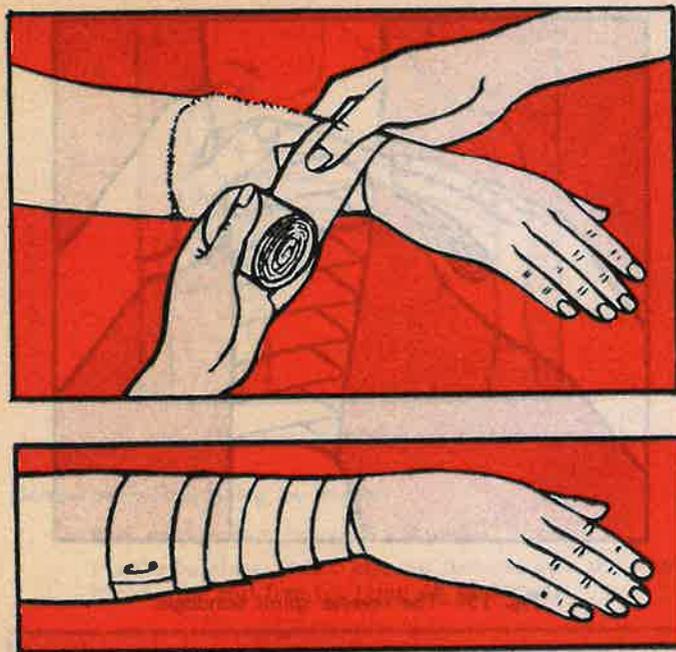


Fig. 14—The simple spiral bandage.

**Reverse Spiral**

Is used in bandaging parts of the limbs where, owing to varying thicknesses, a simple spiral will not lie evenly.

**The Figure of Eight**

Is used for bandaging at or in the neighbourhood of a joint such as the knee or elbow. It may also be used instead of a reverse spiral for a limb.

**The Spica**

The spica is a modified figure of eight in which one turn is much larger than the other and is used for bandaging the shoulder, groin or thumb.



Fig. 15—The reverse spiral bandage.

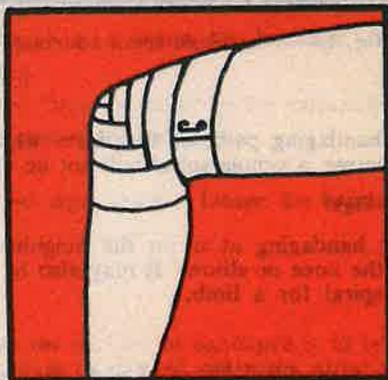


Fig. 16—Figure of eight bandage to the knee.



Fig. 17—Spica bandage for shoulder.

**Simple spiral bandaging to fingers**

Pronate the forearm (palm down).

Fix the bandage by two circular turns around the wrist, leaving the end free for tying off afterwards.

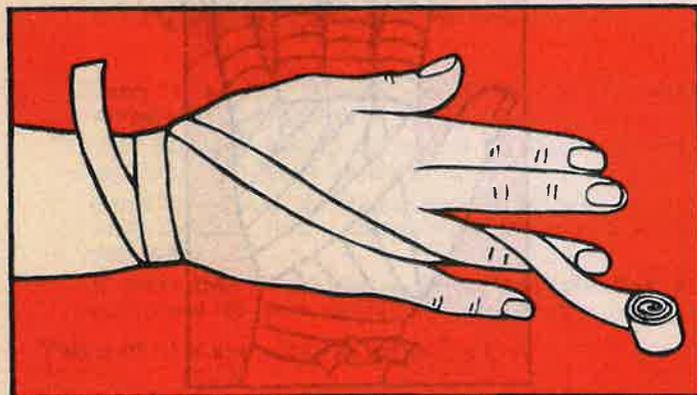


Fig. 18—Commencement of the finger bandage.



Fig. 19—Bandage carried to the second finger.



Fig. 20—Completion of finger bandage.

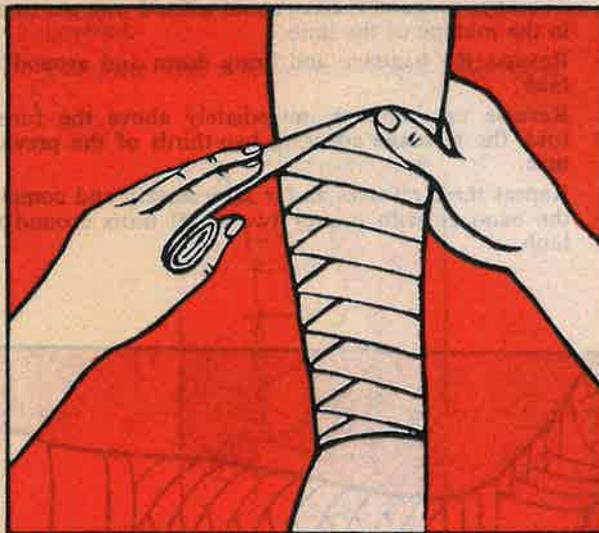


Fig. 21—Reverse spiral of the forearm.

Carry the bandage obliquely over the back of the hand to the base of the finger to be bandaged.

Take one spiral turn to the base of the finger nail and then cover the finger by simple spiral turns.

Carry the bandage across the back of the hand to the wrist, complete with a straight turn around the wrist and secure.

If more than one finger is to be bandaged take a turn round the wrist between each two fingers.

This method is also used for bandaging a leg.

#### Reverse Spiral of the Forearm

Apply one or two simple spiral turns around the wrist.

## FIRST AID

The upper edge of the last spiral is fixed with the thumb in the midline of the limb.

Reverse the bandage and bring down and around the limb.

Reverse the bandage immediately above the former fold, the bandage covering two-thirds of the previous turn.

Repeat these reverses as far as necessary and complete the bandage with one or two spiral turns around the limb.

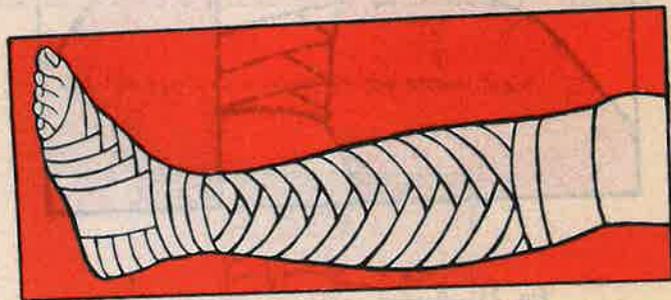


Fig. 22—Reverse spiral bandage of the leg.

### Figure of eight bandage to the hand

Pronate the forearm.

Fix the bandage by a turn around the wrist.

Carry the roll obliquely over the back of the hand to the side of the little finger.

Carry the bandage around the palm and encircle the fingers with a horizontal turn at the level of the base of the little finger-nail.

Carry the bandage around the palm and then return obliquely to the wrist.

## FIRST AID

Repeat the figure of eight turns until the hand is covered.

Complete with a spiral turn around the wrist.



Fig. 23—The figure of eight bandage of the hand.

### Figure of eight bandage to the elbow.

Bend the elbow at right angles.

Lay the outer side of the bandage on the inner side of the joint and take one straight turn.

Carry the bandage over the elbow tip and around the limb at the elbow level.

The second turn encircles the forearm, the third the arm.

Continue the turns alternately below and above the first turn.

Finish above the elbow.



Fig. 24—Commencement of the elbow bandage.

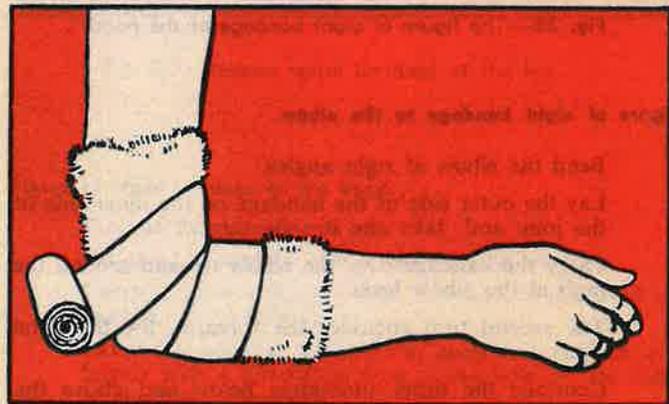


Fig. 25—Early turns of the elbow bandage.

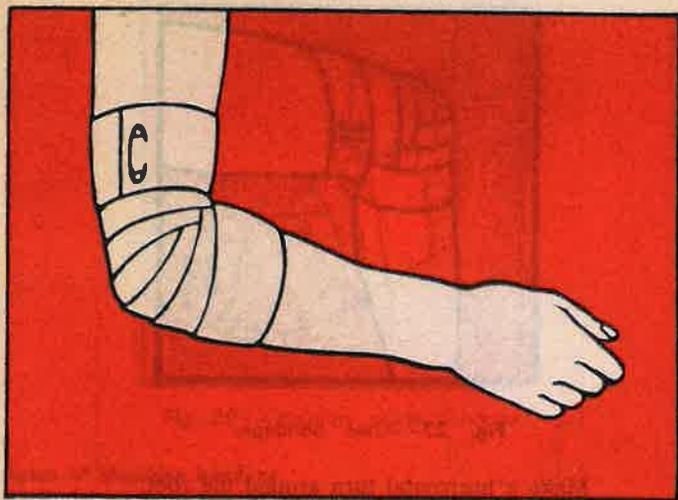


Fig. 26—The completed elbow bandage.

Similar techniques can be used for bandaging—

#### The knee

Flex the knee.

Lay the outer side of the bandage against the inner side of the knee.

Take one turn above the knee cap.

Bring the bandage around the knee just below and then just above so that the margins of the bandage covering the knee-cap are covered.

Repeat until the whole knee is covered.

Complete with one straight turn around the thigh.

#### Foot and ankle bandage

Take one or two turns around the ankle.

Then take the bandage obliquely across the foot to the root of the little toe.

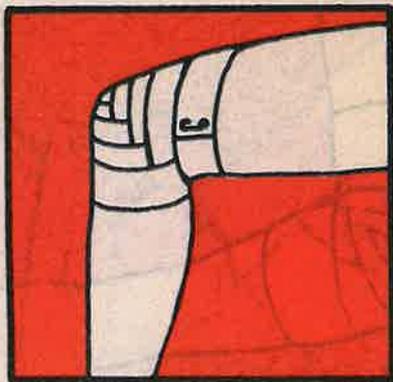


Fig. 27—Knee bandage.

Make a horizontal turn around the foot.

Carry the bandage back over the foot and take a turn around the ankle just above the heel.

Repeat figure of eight turns overlapping the preceding turns until the foot is covered.



Fig. 28—Early turns of the ankle bandage.



Fig. 29—Complete ankle bandage.

#### Spica of shoulder bandage

Place a small pad of cotton wool in each axilla.

Using a 3-4 inch bandage fix it with two spiral turns around the upper arm.

Make two reverse spiral turns around the upper arm to reach the point of the shoulder.

Carry the bandage over the shoulder, across the back and under the opposite armpit.

Cross the chest and arm and bring it around under the armpit on the affected side and over the shoulder.

Repeat the figure of eight until the whole shoulder is covered.

#### Spica of hip bandage

If the casualty is lying down, place suitable support under pelvis.

Place the outside of the bandage on the inner side of the thigh 3 in. to 6 in. below the groin.

Carry the bandage horizontally around the limb and make three or four ascending reverse spiral turns around the thigh.

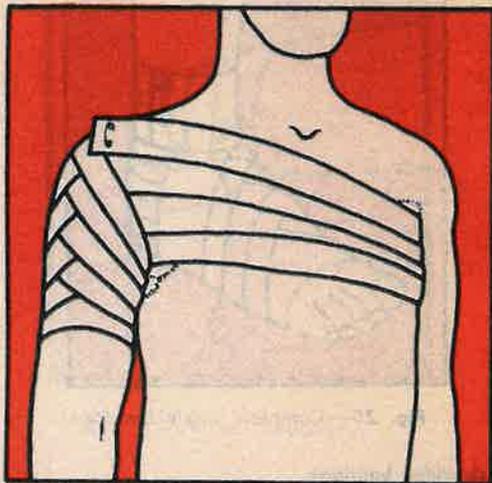


Fig. 30—Shoulder Spica.

Carry the bandage from within outwards over the front of the groin and up around the hips and the back. Pass it over the prominence of the hip bone on the opposite side. Bring the bandage down over the abdomen to the outer side of the thigh. Repeat the figure of eight turns as required.

#### Spica of thumb bandage

Pronate the forearm.

Take two turns around the wrist and carry the bandage over the back of the thumb.

Encircle the thumb with one or two straight turns with the lower border level with the root of the thumb-nail.

Carry the bandage back over the back of the hand and around the wrist.

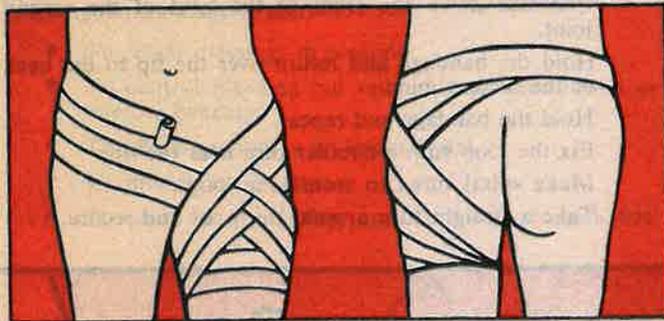


Fig. 31—Hip spica bandage (front and back view)

Repeat figure of eight until the ball of the thumb is covered.

Finish with one straight turn around the wrist.



Fig. 32—Spica of thumb bandage.

#### To cover the finger-tip

Commence as for a simple spiral bandage of the finger but take the bandage up the back of the finger and over the middle of the tip.

Continue down the front to the level of the second joint.

Hold the bandage and return over the tip to the back of the second joint.

Hold the bandage and repeat.

Fix the loop with a circular turn near the tip.

Make spiral turns to secure the loops.

Take a straight turn around the wrist and secure.

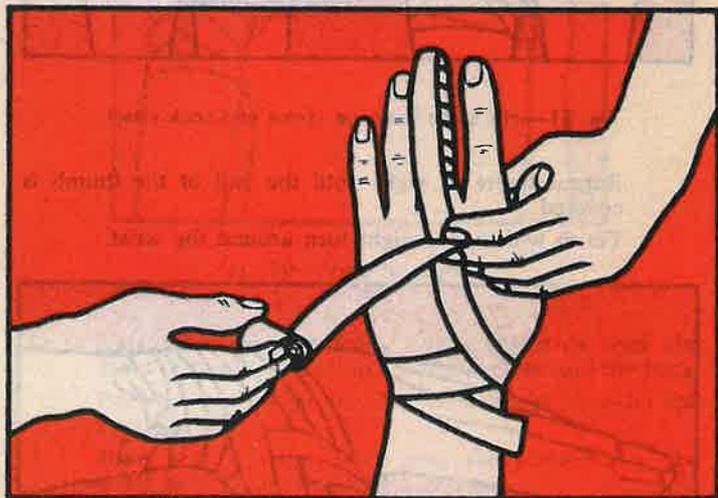


Fig. 33—Bandage to cover tip of finger.

### TRIANGULAR BANDAGES

Triangular bandages are made by cutting a piece of linen or calico, not less than forty inches square, diagonally into two pieces.

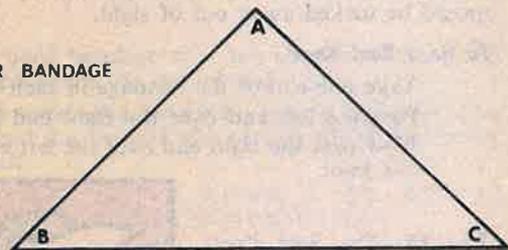
A triangular bandage has three borders. The longest of these is called the "base" and the other two the "sides".

There are three corners; the upper one (opposite the base) is called the "point" and the others the "ends".

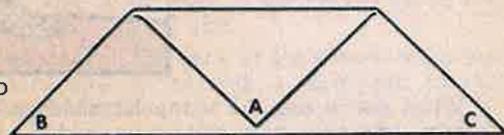
A triangular bandage is used—

- To retain dressings in position.
- To control bleeding but only if used as a broad or narrow bandage.
- To afford support to an injured part.
- To immobilise fractures.
- To assist in the lifting and carrying of casualties.

### TRIANGULAR BANDAGE



### FIRST FOLD



### BROAD BANDAGE



### NARROW BANDAGE

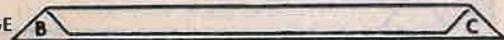


Fig. 34—The triangular bandage.

The bandage may be applied—

As a whole cloth spread out to its full extent.

As a broad bandage made by bringing the point down to the centre of the base and then folding the bandage again in the same direction.

## FIRST AID

As a narrow bandage made by folding the broad bandage once again in the same direction.

To secure the ends of a bandage a reef knot must be used.

The knot must be placed where it does not cause discomfort or chafe the skin. It must not be placed directly over the wound.

If the bandage or knot is likely to be uncomfortable, a pad must be placed between the bandage or knot and the body.

After the reef knot is completed, the ends of the bandage should be tucked away out of sight.

### To tie a Reef Knot

Take one end of the bandage in each hand.

Pass the left end over the right end and tie.

Now pass the right end over the left end and complete the knot.



Fig. 35—The Reef Knot.

When not in use, the triangular bandage should be folded narrow, the two ends should be folded to the centre, the bandage folded to the centre again and then the end folded in two, reducing it to a packet 7 ins by  $3\frac{1}{2}$  ins.

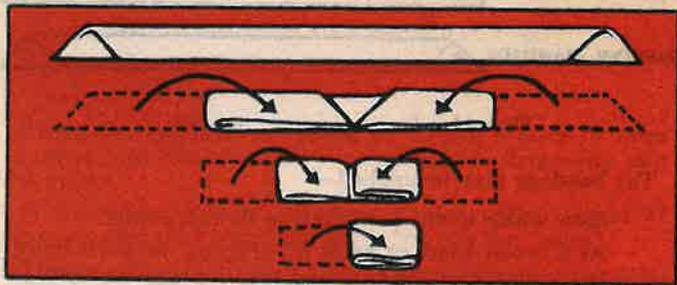


Fig. 36—Folding a triangular bandage.

## FIRST AID

### SLINGS

Slings are used—

To afford support and rest to an upper limb.

To prevent the weight of an upper limb pulling on or moving the chest, shoulder or neck.

### Arm Sling

This supports the forearm and hand.

### METHOD

Place an open bandage over the chest with the point towards the elbow on the injured side.

Carry the upper end over the shoulder on the sound side, around the back of the neck to the front of the injured side.

Flex the elbow, with the forearm at right angles to the arm, palm of the hand towards the chest.

Carry the lower end of the bandage up over the hand and forearm and tie the ends in the hollow above the collarbone on the injured side.

Tuck the bandage in the back of the elbow, bring the point forward and secure with a safety-pin to the front of the bandage.

When the bandage has been applied, the base should reach the root of the little fingernail so that all the fingernails are exposed.

Check the circulation.

Interference to the circulation is shown by—

- The pulse being absent.
- Swelling.
- A bluish tinge or pallor of the fingers.
- Numbness of the fingers.
- Pain.

If any of these are present loosen the sling.

The bandage should be kept as low as possible at the back of the neck and below the collar of a coat if worn. If there

## FIRST AID

is no coat worn, a pad must be placed under the loop to prevent chafing.

The sling should be adjusted so that the wrist is in line with or even slightly higher than the elbow.

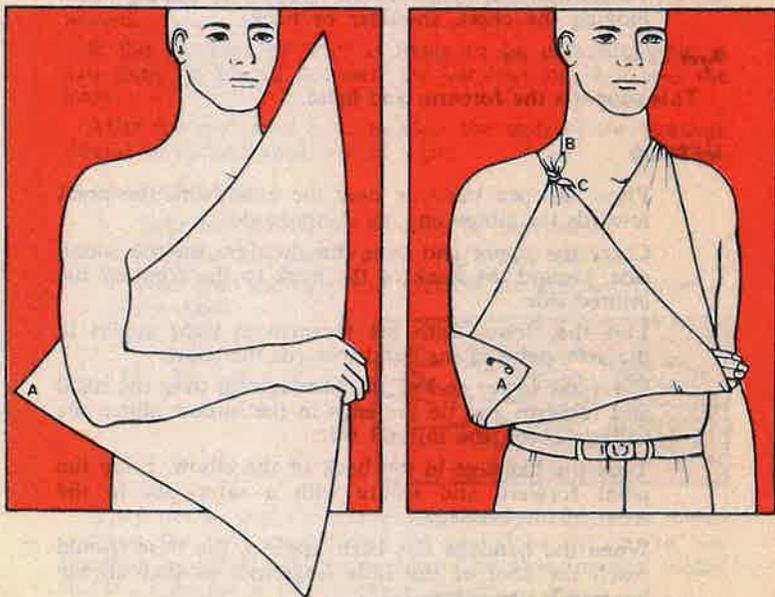


Fig. 37—The application of the arm sling.

### Collar and cuff sling

This supports the wrist.

### METHOD

Flex the casualty's elbow and place the forearm across the chest with the fingers pointing towards the opposite shoulder.

Pass a clove hitch over the hand and round the wrist, the knot of the clove hitch on the thumb side of the

## FIRST AID

wrist, and a fold of the cuff on either side of the wrist.

Tie the ends of the bandage in the hollow just above the collarbone on either side.

Check the circulation.



Fig. 38—The application of the collar and cuff sling.



Fig. 39—The clove hitch.

## FIRST AID

To make a clove hitch take a narrow bandage and make a loop. Make a second loop and place it on top of the first. Then put the top loop behind the first without turning.

### St. John Sling

This supports the hand in a well raised position.

#### METHOD

Place the casualty's arm naturally by the side, with the elbow flexed and the forearm across the chest, fingers pointing towards the opposite shoulder.

Place an open bandage over the forearm and hand, its point towards the elbow with its upper end over the sound shoulder.

Whilst supporting the limb, tuck the base of the bandage under the fingers, hand, wrist and forearm, thus forming a trough.

Carry the lower end around the back to the front of the sound shoulder.

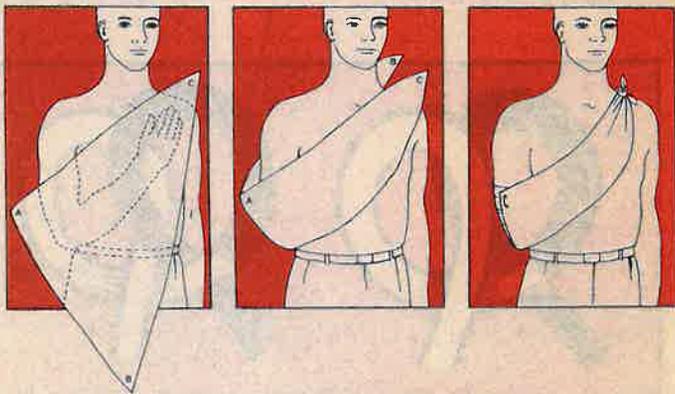


Fig. 40—The application of the St. John Sling.

## FIRST AID

Gently adjust the height of the sling and tie the ends in the hollow above the collarbone on the sound side. Tuck the point firmly in between the forearm and the bandage.

The fold so formed is turned backward over the lower part of the upper arm and secured with a safety-pin.

### Improvised slings

May be made by—

Pinning the sleeve to the clothing.

Turning up and pinning the lower edge of the coat.

Passing the hand inside the buttoned coat or waist-coat.

The use of scarves, ties, belts, stockings.



Fig. 41—Improvised slings.

### APPLICATION OF TRIANGULAR BANDAGES

#### Used to retain dressings in position

These methods are alternatives to roller bandaging, but an open triangular bandage will not control haemorrhage.

A triangular bandage may be folded as a broad or narrow bandage.

The First Aider will adjust the width to adequately—  
Cover the part.

Cover the wound.

Cover fractured bone ends.

Folded it can be used to control haemorrhage.

In practising bandaging, the First Aid student is advised to simulate a dressing by placing a pad on the part to be bandaged.

#### For the scalp

Fold a hem inwards along the base of an open bandage.

Stand behind the casualty and place the open bandage so that the hem lies on the forehead close to the eyebrows.

The point hangs down at the back of the head.

Carry the ends round the head above the ears and cross them near the nape of the neck.

Bring them forward again and tie a knot in the centre of the forehead.

Steady the casualty's head with one hand and with the other draw the point of the bandage downwards. Turn it up and pin it to the bandage on the top of the head.

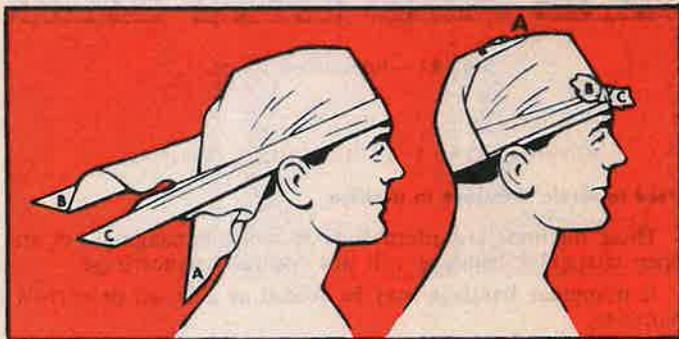


Fig. 42—Triangular bandage holding a dressing on the scalp.

#### Bandage for the elbow

Flex the elbow to a right angle.

Lay the point on the back of the arm and the middle of the base on the back of the forearm.

Fold a hem along the base.

Cross the ends in front of the elbow, then around the arm and tie above and at the back of the elbow.

Bring the point down over the knot and fix in place.



Fig. 43—Bandage for the elbow.

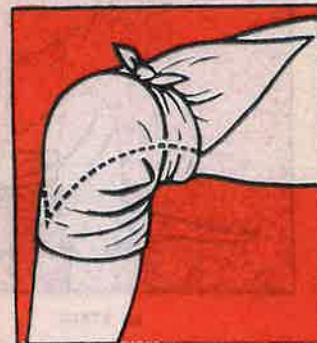


Fig. 44—Bandage for the knee.

#### Bandage for the knee

Flex the knee to a right angle and proceed as for an elbow.

#### Bandage for the hand

Fold a hem along the base of an open bandage.

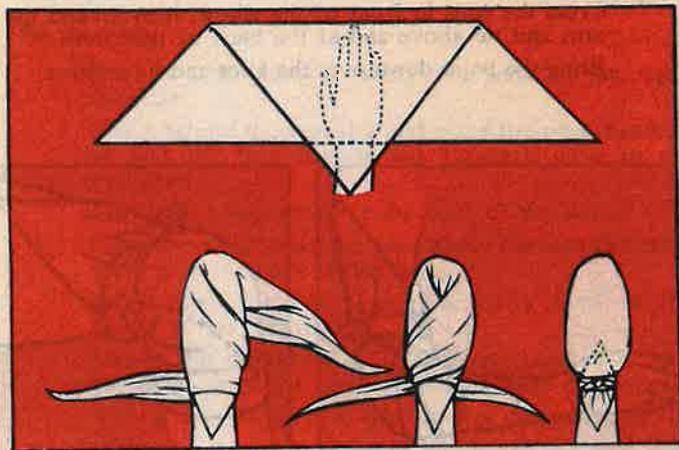
Place the bandage with the point away from the casualty under the hand with the fingers extended and the thumb alongside the forefinger.

Place the injured surface uppermost.

Carry the point of the bandage back over the hand.

## FIRST AID

Pass the ends around the wrist and cross them and tie.  
Bring the point over the knot and fix to the bandage over the hand.



1st STAGE                      2nd STAGE                      FINAL STAGE

Fig. 45—Bandage for the hand.

### Bandage for the foot

Place the centre of an open bandage under the foot with the point beyond the toes and the base at shoe top level at the back of the ankle.

Draw up the point over the instep.

Fold the bandage over the foot.

Pass the ends around the ankle and tie in front.

Draw the point forward and fix to the bandage over the foot.

## FIRST AID



Fig. 46—Bandage for the foot.

### Bandage for a stump

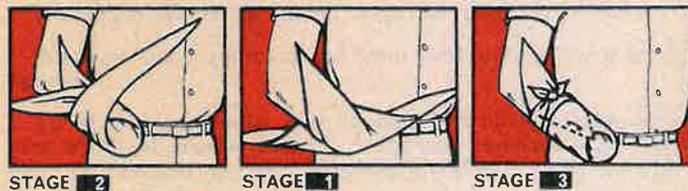
Fold a narrow hem inwards along the base of an open bandage.

Place the base of the bandage high up on the under side of the stump with the point hanging down.

Draw the point up over the stump and cross the ends in front over the point.

Carry the ends behind the stump, cross them again, bring them forward and tie in front.

Bring the point down over the knot and pin it.



STAGE 2

STAGE 1

STAGE 3

Fig. 47—Bandage for a stump.

## FIRST AID

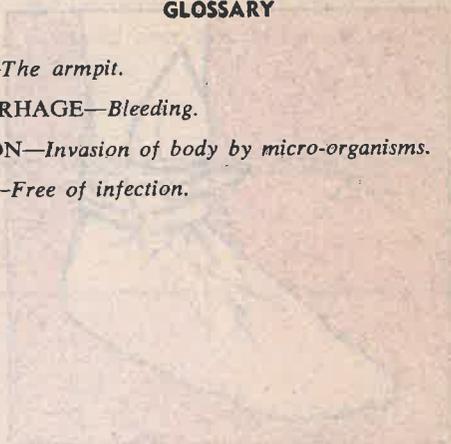
### GLOSSARY

AXILLA—*The armpit.*

HAEMORRHAGE—*Bleeding.*

INFECTION—*Invasion of body by micro-organisms.*

STERILE—*Free of infection.*



# 4

## CIRCULATORY SYSTEM

---

*The circulation provides individual cells with oxygen and nutriment and removes carbon dioxide and waste products.*

---

Oxygen enters and carbon dioxide leaves the blood through the lungs.

Nutriment enters the blood from the digestive system.

Waste products are extracted from the blood by the urinary system.

To fulfil this purpose, it is necessary to have a large complex of blood vessels (arteries, veins and capillaries) and the heart (a muscular pump) to keep the blood circulating through the blood vessels.

## THE HEART

The heart is a pump. Its walls are composed of muscle up to one inch thick in parts, and when this muscle contracts the blood in the heart is forced into the circulation.

The pressure necessary to achieve this is called the **blood pressure**.

The heart contracts constantly and rhythmically at a rate which responds to demand. This rate is called the **pulse rate**.

## THE CIRCULATION

The heart is divided into four chambers, the **left atrium**, the **left ventricle**, the **right atrium**, and the **right ventricle**.

The **atria** are the collecting chambers.

The **ventricles** are the thick walled muscular pumping chambers.

The blood in the left side of the heart is completely separated from the blood in the right side of the heart.

The left side of the heart contains pure blood, i.e., blood freshly charged with oxygen, and when the left ventricle contracts, this blood is pumped into the **systemic circulation**.

The right side of the heart contains impure blood, i.e., blood which has given up its oxygen and has taken up carbon dioxide. When the right ventricle contracts, this blood is pumped to the lungs into the **pulmonary circulation**.

## THE SYSTEMIC CIRCULATION

Oxygen-rich blood enters the left atrium from the lungs. From the left atrium it passes to the left ventricle, return being prevented by a valve.

The left ventricle contracts and forces the blood into the main arteries of the body, and thence through the arterioles to capillaries.

In the capillaries it discharges its oxygen and nutriment to the cells of the body and receives carbon dioxide and waste products from the cells.

Food is absorbed into the blood in the capillaries of the digestive system.

Waste products are filtered out in the kidneys.

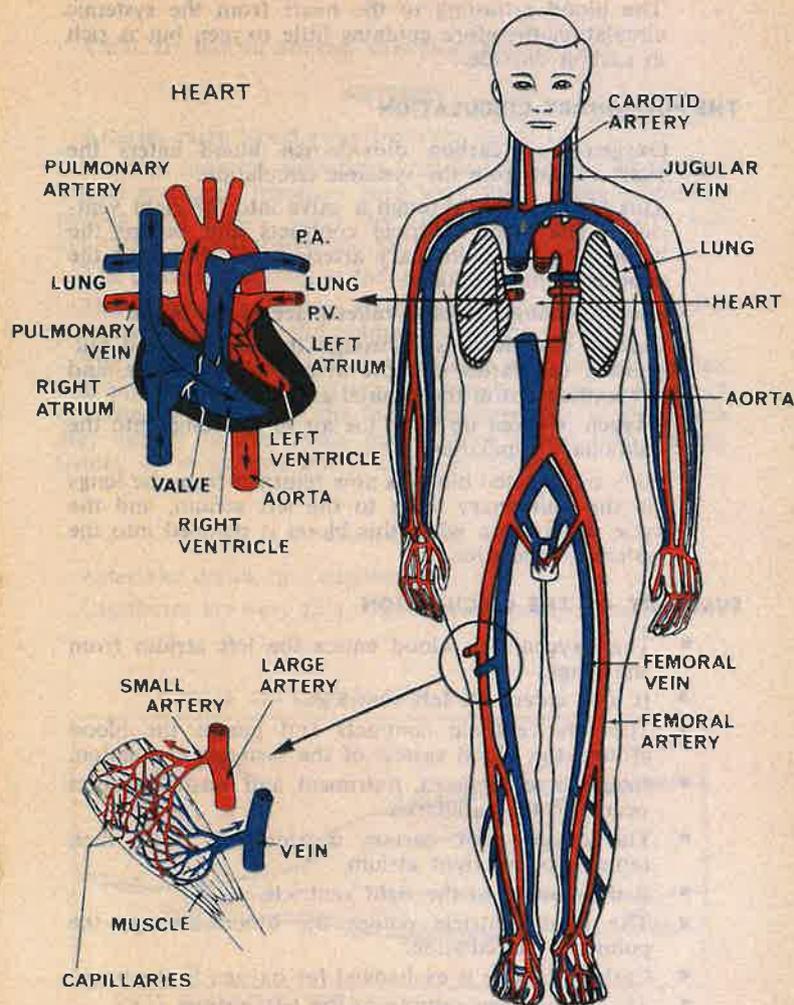


Fig. 48—The heart and circulation

## FIRST AID

The blood returning to the heart from the systemic circulation therefore contains little oxygen but is rich in carbon dioxide.

### THE PULMONARY CIRCULATION

Oxygen-poor, carbon dioxide-rich blood enters the right atrium from the systemic circulation.

This blood passes through a valve into the right ventricle. The right ventricle contracts and pumps the blood into the pulmonary arteries, and thence to the capillaries of the lungs.

An interchange of gases takes place in the lungs.

Carbon dioxide passes through the walls of the pulmonary capillaries into the alveoli of the lungs, and is breathed out in the expired air.

Oxygen is taken up from the air in the lungs into the pulmonary capillaries.

Fully oxygenated blood is now returned from the lungs via the pulmonary veins to the left atrium, and the cycle starts again when this blood is pumped into the systemic circulation.

### SUMMARY OF THE CIRCULATION

- The oxygen rich blood enters the left atrium from the lungs.
- It then enters the left ventricle.
- The left ventricle contracts and pumps the blood around the blood vessels of the systemic circulation.
- Interchange of gases, nutriment and waste products occurs in the capillaries.
- The oxygen-poor carbon dioxide-rich blood then returns to the right atrium.
- It then passes to the right ventricle.
- The right ventricle pumps the blood through the pulmonary circulation.
- Carbon dioxide is exchanged for oxygen in the lungs.
- This blood then returns to the left atrium.

This completes the circulation cycle, which is repeated about 72 times a minute.

## FIRST AID

### THE BLOOD VESSELS

These are named arteries, capillaries and veins.

#### ARTERIES

Arteries carry blood away from the heart.

Arteries have to withstand the force of the heart beat (blood pressure), therefore they have thick walls containing muscle and elastic tissue to allow them to stretch and contract. They transmit the pulse.

The pulse is felt only in the arteries.

The main artery on the systemic side is the aorta; on the pulmonary side it is the pulmonary artery.

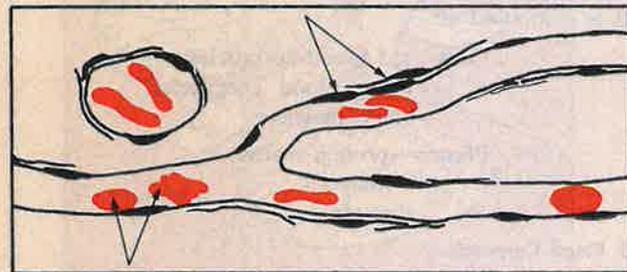
The main arteries divide into smaller and smaller arteries, then into arterioles, which are tiny vessels that can be opened or closed according to the blood requirements of the tissue they supply (active tissue needs more blood than resting tissue), or in an emergency to conserve blood.

#### CAPILLARIES

Arterioles divide into capillaries.

Capillaries are very thin-walled vessels whose total surface

#### CELLS OF CAPILLARY WALL



RED BLOOD CORPUSCLES

Fig. 49—A blood capillary.

area is very much greater than the arteries which supply them or the veins which drain them.

The nervous system controls arterioles, which determine how many capillaries are filled with blood at any time.

The blood flow through the capillaries is so slow that there is adequate time for the cells to gain oxygen and food from the blood and lose carbon dioxide and waste products back into the blood.

Not all the capillaries are open at once. If it were so, the arteries could not supply enough blood to keep the heart beating (see Fainting p. 192).

The capillaries which are open are determined by the needs of the body and are controlled by the arterioles and nervous system.

### THE VEINS

Veins collect blood from the capillaries and carry it back to the heart under the squeezing action of limb muscles and the negative pressure of respiration.

Valves in the veins allow the blood to flow only towards the heart. In these vessels there is very little pressure of blood flow; therefore the veins are much thinner. They have no pulse.

### THE BLOOD

The blood is contained within the blood vessels.

It is composed of—

- Cells—red blood corpuscles.
- white blood corpuscles.
- blood platelets.
- Plasma—protein matter.
- minerals.
- water.

#### Red Blood Corpuscles

Red blood corpuscles carry oxygen.

They contain a pigment called haemoglobin which has the capacity to take up and release large quantities of oxygen.

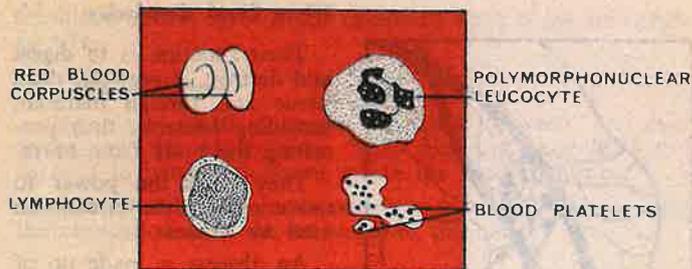


Fig. 50—Cells found in the blood.

Haemoglobin in blood charged with oxygen is red and the healthy colour of the skin is pink for this reason.

Blood in the veins which is low in oxygen is bluish red. Therefore a casualty with insufficient oxygen in the blood goes blue. This is called **cyanosis**.

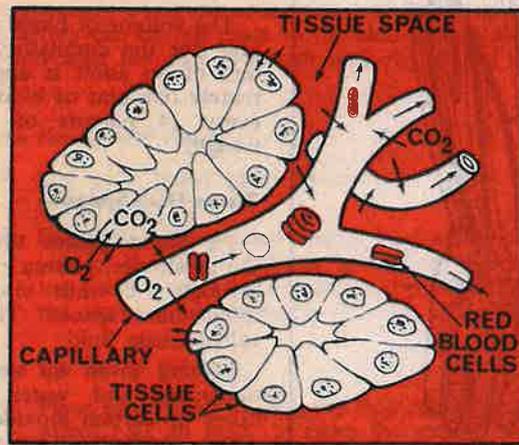


Fig. 51—Showing the exchange between capillaries, tissue fluid and cells

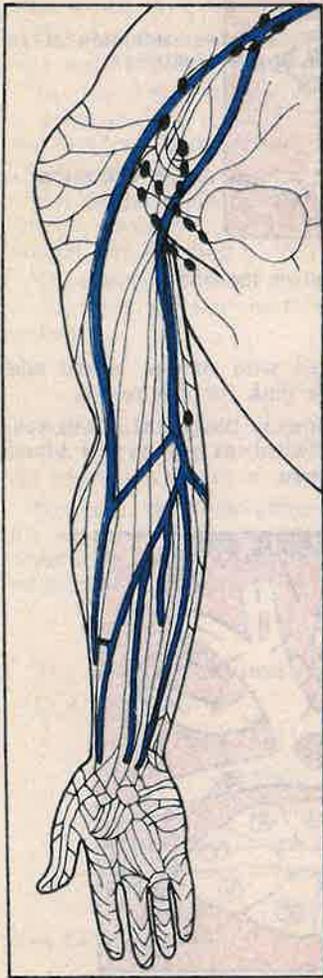


Fig. 52—Lymphatics of the arm.

### White Blood Corpuscles

Their function is to digest and destroy, if possible, dead tissue and foreign material, including bacteria, thus protecting the body from harm.

They have the power to move out of the circulation into the tissues.

An abscess is made up of white blood cells, bacteria live and dead, and dead tissue killed by the infection.

### Blood Platelets

These are very small bodies whose function is to assist in blood clotting.

### The Volume of the Blood

The volume of blood available for the circulatory system of an adult is approximately one pint of blood for every 14 pounds of body weight.

### Tissue Fluid System

As blood passes through the capillaries, plasma exudes through the walls into the intercellular spaces. This is called tissue fluid.

Having given up oxygen, nutriment and water, and taken up carbon dioxide and waste products, it re-enters

the blood stream through the capillary walls or by the lymph vessels.

### The Lymph Vessels

These are small channels scattered between the cells throughout the whole body. They pick up tissue fluid and carry it to lymphatic glands where the fluid is filtered.

Finally the larger lymph vessels carry the lymph to enter the circulation again in the veins of the neck.

## THE PULSE

The average rate in healthy adults at rest is 72 beats to each minute but much slower rates are found in athletes—as low as 38.

In infants and young children the natural rate is faster (up to 100 beats per minute).

The pulse rate is increased by exercise, excitement and fever.

The pulse is taken in the neck (carotid pulse) in emergency, but is generally observed at the front of the wrist where the radial artery can be felt close to the skin (radial pulse). The pulse indicates the rate, strength and rhythm of the heart beat.

### To take the Carotid Pulse

- Lay your hand, palm downwards, across the front of the neck.
- Draw the outstretched fingers backwards across the side of the neck until the tips of the fingers rest in the groove behind the Adam's apple and in front of the sterno-mastoid muscle (see fig. 53).

### To take the Radial Pulse

- Place three fingers along the line of the radial artery about half an inch in from the thumb side of the lower end of the forearm.
- Roll the artery under the fingers until the maximum beat is felt.



Fig. 53

Feeling the carotid pulse.



Fig. 54

Feeling the radial pulse.

### ESTIMATION OF THE PULSE

Determine—

- The rate—whether normal, fast or slow.
- The strength—whether normal, strong or feeble.
- The rhythm—whether regular, or irregular.

### CLOTTING OF BLOOD

When a blood-vessel is damaged or torn, haemorrhage (bleeding) takes place. This is controlled by—

Contraction of the muscular wall of the torn blood vessel.

Clotting—

The deposit of fibrin (precipitated from the blood plasma) into the damaged area.

Trapping of platelets and other blood cells in the mesh.

### THROMBOSIS

This is the clotting of blood in a blood-vessel, at the site of an injury or disease.

The commonest sites are in the veins of the legs, the coronary arteries (coronary occlusion—see p. 200), the vessels of the brain (stroke—see p. 191) and the arteries of the limbs.

### CARDIAC ARREST

Cardiac arrest is cessation of the heart's action. Therefore the pulse will be absent.

This means that death will occur unless the heart can be restarted.

External cardiac compression can restart the heart and so proficiency in this method is essential.

### COMMON CAUSES OF CARDIAC ARREST

- Coronary occlusion.
- Electric shock.
- Drowning.
- Asphyxia.

### DIAGNOSIS

There is—

- Unconsciousness.
- Increasing cyanosis or pallor.
- Absent pulse.
- Wide dilation of the pupils.
- Rapidly failing respiration.

### THE AIMS OF TREATMENT

To produce an effective circulation in order to prevent damage (from lack of oxygen) to the brain and other vital organs.

Without oxygen the brain suffers irreparable damage within three minutes.

### STEPS OF TREATMENT

Stage 1.—Remove the cause and/or remove the casualty from the cause.

## FIRST AID

Stage 2.—Ensure a clear airway.

Stage 3.—Restore the circulation.

Stage 4.—Restore respiration.

### TREATMENT

**Stage 1.**—According to the cause, isolate the casualty from danger.

**Stage 2.**—Ensure a clear airway—

With the casualty on the back, press the top of the head downwards with a backward tilt of the head.

Pull the jaw forwards from behind the angle. This clears the tongue from the airway.

Give 3 or 4 strong quick breaths as in mouth to mouth artificial respiration (see p. 72).

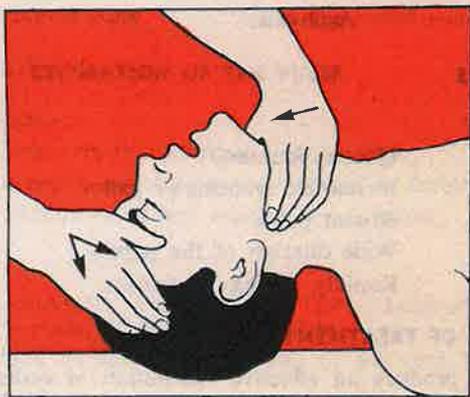


Fig. 55—Positioning the head to clear the airway.

**Stage 3.**—Restore the circulation by external cardiac compression.

This is carried out by the intermittent manual pressure on the lower chest, thus compressing the heart between

## FIRST AID



Fig. 56

Showing the positioning of the hands for cardiac compression.

the lower part of the sternum (breastbone) and the vertebral column.

It simulates the normal function of the heart, which is to contract regularly.

### METHOD

With the casualty on the back on a firm surface, kneel at the side of the casualty's chest.

Feel the chest and locate the lower half of the sternum.

Place the heel of one hand on this part of the bone, keeping the palm and fingers raised from the chest.

Cover this hand with the heel of the other hand.

With the arms straight, rock forward over the casualty until the shoulders are vertically above the hands and press briskly down on the sternum.

Rock backwards, releasing the pressure but maintaining constant contact on the sternum.

Constantly check head tilt.

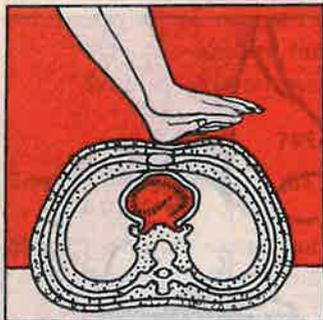


Fig. 57

Before  
pressure

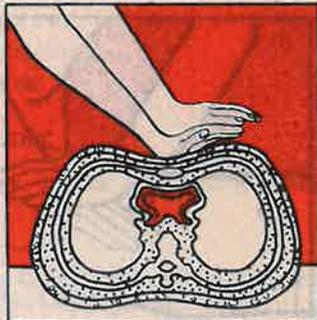


Fig. 58

With  
pressure

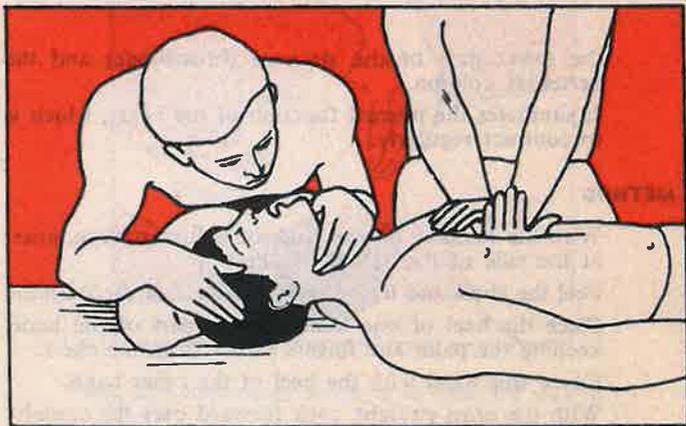


Fig. 59

Combined external cardiac compression and  
mouth to mouth respiration.

### Simultaneous ventilation of the lungs will be necessary.

Start external cardiac compression and combine this with mouth to mouth artificial respiration in the ratio of one inflation of the lungs to 6 to 8 compressions of the sternum.

### RATE OF APPLICATION

AN ADULT. Repeat the routine once a second.

AN INFANT OR CHILD. Repeat the routine 90 times per minute.

The pressure of two fingers for an infant or one hand for a child is sufficient. In all cases the first 3 or 4 compressions should be made cautiously to gauge the reaction of the chest and to avoid damage by excess pressure.

### RISKS OF CARDIAC COMPRESSION

Pressure ill-applied or excessive can cause damage to the rib cage, the heart or liver.

However, when cardiac compression is well carried out, the risk is much less.

In any event, the most important objective is to save life; the little risk involved must not interfere with this principle.

**Check** the effectiveness of the compression of the heart by—

Watching for improvement in the colour (blue to pink).

Checking the presence of the carotid pulse.

Noting the size of the pupils (large to smaller).

When the pulse returns cease cardiac compression but frequently confirm that the pulse is still present.

If help is available continuously record the pulse.

If alone, check at half minute intervals.

If the pulse does not return, continue treatment until medical aid arrives.

### Stage 4. Restore respiration.

The treatment of choice is the Expired Air Method of artificial respiration (mouth to mouth or mouth to nose).

## FIRST AID

This method is designed to force air into the lungs of the casualty who has ceased breathing or in whom it is failing.

Expired air still contains sufficient oxygen to revive the casualty. (For method, see Chapter 5, p. 72).

---

## GLOSSARY

**ATRIUM**—*holding chamber of the heart.*

**VENTRICLE**—*pumping chamber of the heart.*

**SYSTEMIC CIRCULATION**—*blood flow to the body excluding the lungs.*

**PULMONARY CIRCULATION**—*blood flow to the lungs.*

**ARTERIOLES**—*small arteries.*

**ALVEOLI**—*air spaces in the lungs.*

**PULMONARY ARTERY**—*main artery to the lungs.*

**AORTA**—*largest artery of the body.*

**PLASMA**—*fluid part of the blood.*

**HAEMOGLOBIN**—*oxygen carrying pigment of the blood.*

**CYANOSIS**—*blue colour of the blood and skin, due to lack of oxygen.*

**BACTERIA**—*micro-organisms which cause infection.*

**ABSCESS**—*a local reaction to infection, producing pus.*

**PULMONARY VEIN**—*main vein leading from the lungs.*

**RADIAL ARTERY**—*artery in the wrist.*

**CAROTID ARTERY**—*artery in the neck.*

**FIBRIN**—*protein in the plasma.*

**CORONARY ARTERY**—*artery of the heart.*

**CARDIAC**—*pertaining to the heart.*

**ASPHYXIA**—*lack of oxygen*

**STERNUM**—*breastbone.*

**PUPIL**—*Shutter of the eye.*

**CORNEA**—*Window of the eye.*



# THE RESPIRATORY SYSTEM

---

*Respiration is the process by which oxygen is supplied to the body cells, and carbon dioxide is removed from them.*

---

**EACH CELL REQUIRES A CONSTANT SUPPLY OF OXYGEN.**

This is carried to them by the blood which also removes the carbon dioxide formed in the cells.

**THE OXYGEN MUST BE REPLENISHED AND THE CARBON DIOXIDE REMOVED FROM THE BLOOD.**

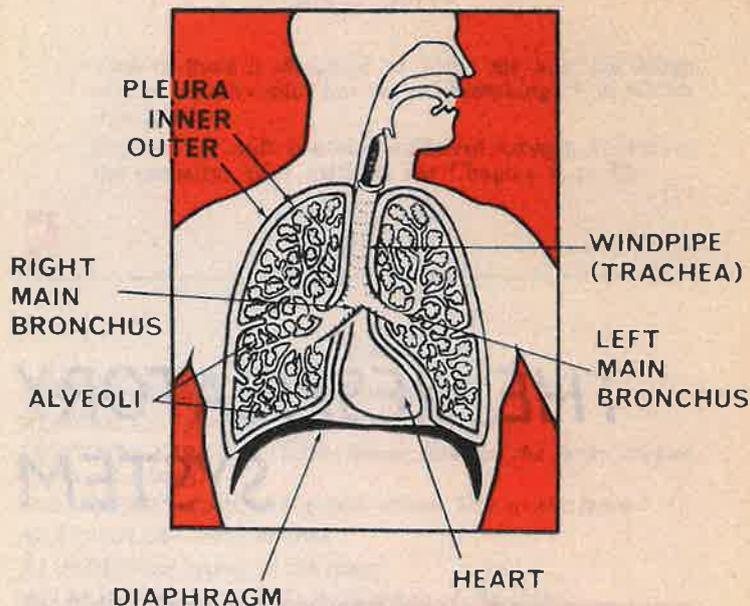


Fig. 60---The Respiratory System.

This means that a constant supply of oxygen-carrying fresh air must come in close contact with the blood.

This takes place in the lungs.

The lungs consist of very thin-walled air sacs, the alveoli, between which is a large network of capillaries.

A large volume of blood is thus separated by the thickness of only one or two cells from the air in the lungs, and this allows oxygen to enter the blood-stream and carbon dioxide to leave it.

#### THE AIR IN THE LUNGS MUST BE REPLENISHED.

The lungs are situated in the chest.

The chest is a semi-rigid cage formed by—

Twelve thoracic vertebrae behind.

Twelve pairs of ribs at the sides with intercostal muscles between them.

The sternum (breastbone) in front connected to the ribs by costal cartilages.

The diaphragm (a muscular dome) which makes the base.

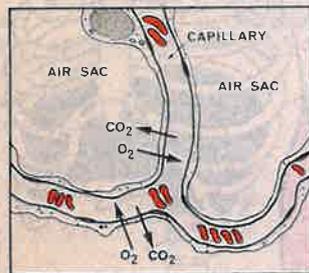


Fig. 61—Interchange of gases in an air sac.

Entry of air to the lungs is—

through the mouth, nose and pharynx,

then through the larynx (voice box),

the trachea (wind pipe),

the bronchi,

into the alveoli of the lungs.

When a breath is taken in (inspiration) the diaphragm moves downward and the ribs upwards and outwards.

This increases the volume of the chest, a partial vacuum is created in the chest cavity, the lungs are stretched and air is sucked in through the mouth and nose into the lungs.

Normal breathing out (expiration) is produced by a relaxation of the chest wall and intercostal muscles and a moving up of the diaphragm. This forces air out of the lungs.

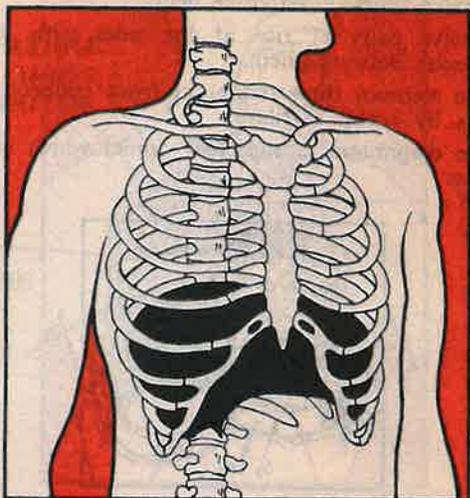


Fig. 62—Skeleton of the chest.

The chest wall must be rigid, otherwise in inspiration it would collapse.

The outer surfaces of the lungs are covered by a membrane (the pleura). This also lines the inner surfaces of the chest walls.

Thus, the lungs are separated from the chest wall by a potential space, the pleural cavity.

Normally the opposing layers of the pleura are in close contact, but if the pleura, chest wall or lungs are injured, air or blood can enter and expand the pleural cavity and the lung will collapse.

**THERE MUST BE A CONTROL OF THE AMOUNT OF AIR SUPPLIED TO THE BLOOD.**

Situated in the brain at the base of the skull and in the upper part of the spinal cord is the respiratory centre.

This centre controls respiration by analysing the carbon dioxide content of the blood it receives.

Too much carbon dioxide causes the centre to respond by increasing the depth and rate of the breathing and vice-versa.

### ASPHYXIA

If a breakdown in the supply of oxygen to the body cells occurs, a condition called asphyxia results.

Vital organs and the important nerve centres in the brain which regulate their activity cease to function normally and life is endangered.

Unless the cause is speedily removed and the supply of oxygen restored to the cells, there is—

Cessation of breathing.

Loss of consciousness.

Failure of circulation.

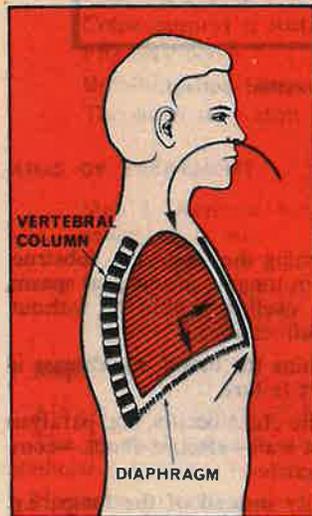


Fig. 63—Inspiration.

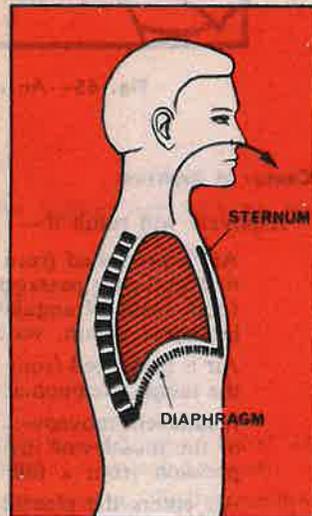


Fig. 64—Expiration.



Fig. 65—An asphyxiated patient.

#### Causes of Asphyxia

Asphyxia will result if—

Air is prevented from reaching the lungs, e.g. (obstruction to the air passages from tongue, pharyngeal spasm, food, teeth, strangulation, swelling within or without, laryngeal spasm, water, suffocation).

Air is prevented from reaching the blood, e.g. disease in the lungs, pneumonia, heart failure.

Insufficient movement of the chest occurs, e.g. paralysis of the muscles of the chest wall—electric shock—compression from a fall of earth.

Air enters the pleural cavity instead of the lungs, e.g. collapse of lungs—sucking wound.

Rigidity of the chest wall is lost, e.g. flail chest.

Insufficient oxygen is present in the blood, e.g. carbon monoxide poisoning, lack of oxygen in the air (fires, altitude).

The respiratory centre does not function normally, e.g. electric shock, some poisons, shock, poliomyelitis, cerebral compression.

The cells cannot use oxygen, e.g. cyanide poisoning.

#### SYMPTOMS

Shortness of breath.

#### SIGNS

Increase in rate and depth of breathing.

Cyanosis of the face, lips, ears and nail beds of the fingers and toes.

The veins of the head and neck are swollen.

The blood-vessels of the eyes are swollen and red.

Gasping respiration.

Noisy breathing with frothing may develop.

Consciousness is lost.

Fits may occur.

Breathing may stop.

The heart may stop.

#### AIMS OF TREATMENT

Step I—Remove the cause and/or remove from the cause (see p. 60).

Step II—Ensure a clear airway (see p. 60).

Step III—Restore the circulation (see p. 60).

Step IV—Restore respiration.

#### Step IV

Always check the circulation.

The method of choice is the expired air method of artificial respiration (mouth to mouth or mouth to nose).

However, in certain circumstances (see p. 77) this method is impracticable. The method then recommended is the Silvester Method (see p. 77).

## FIRST AID

### EXPIRED AIR METHOD OF ARTIFICIAL RESPIRATION

This method is designed to force air into the lungs of a person in whom breathing has ceased or is failing.

#### MOUTH TO MOUTH METHOD

- With the casualty on the back, kneel beside the head.
- Hold the head in both hands, one pressing the head downwards and backwards and the other pushing the lower jaw upwards and forwards.

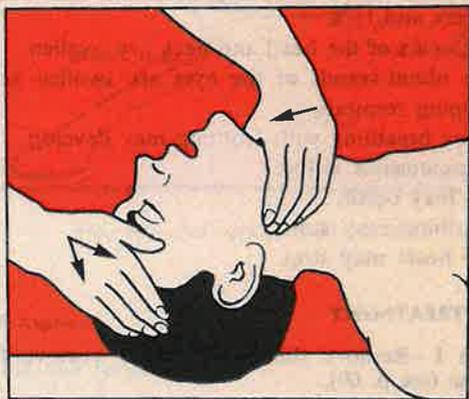


Fig. 66—Positioning the head.

- Open your mouth wide and take a deep breath.
- Seal your lips around the casualty's mouth.
- Pinch the nostrils between your thumb and forefinger.
- Breathe out firmly into the casualty's mouth and watch the chest rise.

## FIRST AID

- The rise of the chest should be similar to that in normal inspiration.
- Then remove your mouth.
- Allow the chest to collapse.

Time is vital, therefore, the first 3 or 4 inflations should be given as quickly as possible.

For continued artificial respiration, inflations should be at the rate of ten per minute.

If the chest does not fill with air, check the airway and check the air seal of your mouth over that of the casualty.



Fig 67—Position for the mouth to mouth method.

#### APPLICATION TO AN INFANT OR CHILD

- Seal your lips around the mouth and nose.
- Breathe out gently until you see the chest rise.
- Stop and remove your mouth, allowing the chest to collapse.
- Repeat this procedure at the rate of 20 times per minute.



Fig. 68—Obstructing the nostrils.

#### MOUTH TO NOSE METHOD

Where due to obstruction or damage to the mouth, the mouth to mouth method cannot be applied, inflation of the lungs can be achieved by the mouth to nose method. This method is often used in drowning cases.



Fig. 69—Mouth to nose method.

#### TECHNIQUE

- With the casualty on the back, kneel beside the head.
- Position the head as for mouth to mouth method (see p. 72).
- Take a deep breath in and seal your lips widely on the casualty's face around the nose.
- Make sure your lips do not obstruct the nostrils.
- Close the casualty's mouth by placing your thumb on the lower lip.
- Breathe out and watch the chest rise.
- Remove your thumb, part the casualty's lips and allow the chest to collapse.

The rate of inflations per minute is the same as in the mouth to mouth method.

#### POINTS TO BE OBSERVED

Air must pass into and out of the casualty's lungs. The chest must be seen to rise and fall, or the expiration be heard.

The head must be positioned correctly throughout. An airtight seal should be maintained during the operator's exhalation into the casualty's mouth or nose. The operator must turn his face away from the casualty's face to watch the chest and to take in fresh air for the next application.

#### ASSISTED BREATHING

When the casualty commences to breathe again, the operator should continue assisting the breathing.

By closely watching the rise and fall of the casualty's chest, he should try to keep in time with the attempts of the casualty to breathe.

When the casualty starts to breathe again, recovery is often accompanied by vomiting.

Therefore put the casualty in the coma position to assist breathing and the discharge of vomitus if this commences.

Maintain a clear airway.

## FIRST AID

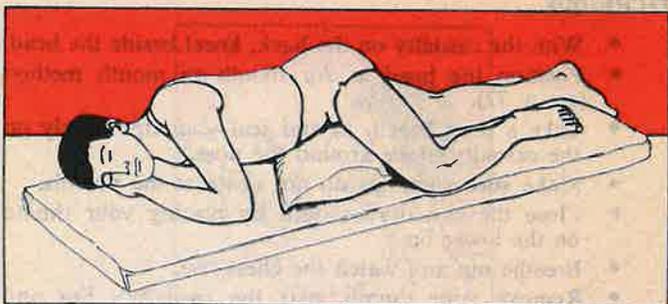


Fig. 70—Coma position—front view.

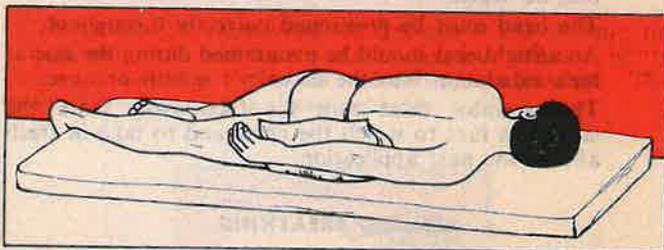


Fig. 71—Coma position—back view.

### CHANGEOVER OF OPERATORS

This action can be carried out quickly and efficiently with no ill effects to the casualty. During the changeover the correct position of the head must be maintained.

## FIRST AID

### CASES UNSUITABLE FOR MOUTH TO MOUTH OR MOUTH TO NOSE ARTIFICIAL RESPIRATION

- Injuries around mouth and nose.
- Local infections of mouth and nose.
- Contagious conditions in the casualty.
- Inhalation of poisonous gases.

In these circumstances the recommended method of artificial respiration is the—

### SILVESTER (MANUAL) METHOD

#### METHOD

- Place the casualty on the back on a firm surface.
- Place a folded coat, small pillow or something similar under the shoulder blades. The back of the head must be supported.
- This allows the head to extend and clears the airway.
- This position must be maintained.
- Kneel at the casualty's head, facing the feet.
- Grasp the wrists and cross the forearms over the lower part of the chest.
- Straighten your arms and move forward or backward on the knees until you are comfortably relaxed with buttocks resting on heels.

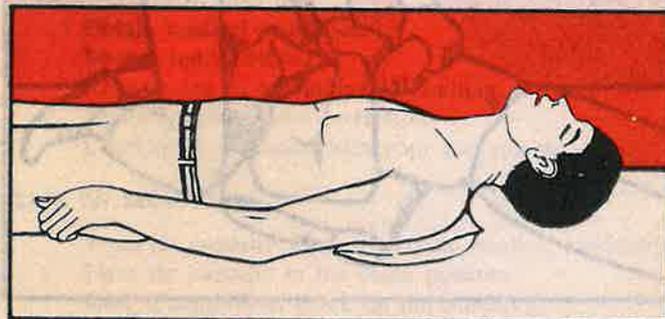


Fig. 72—Position for the Silvester Method.

## FIRST AID

- Rock forward with the arms fully extended and press firmly on the lower part of the casualty's chest.
- This movement occupies two (2) seconds.
- Release this pressure and pull the arms towards you and above the casualty's head, then backwards and outwards as far as they will go.
- This movement occupies three (3) seconds.

Repeat the routine rhythmically at the rate of twelve (12) times per minute.

When natural breathing begins, time your movements to correspond with it.



Fig. 73—Commencing the Silvester Method.

## FIRST AID

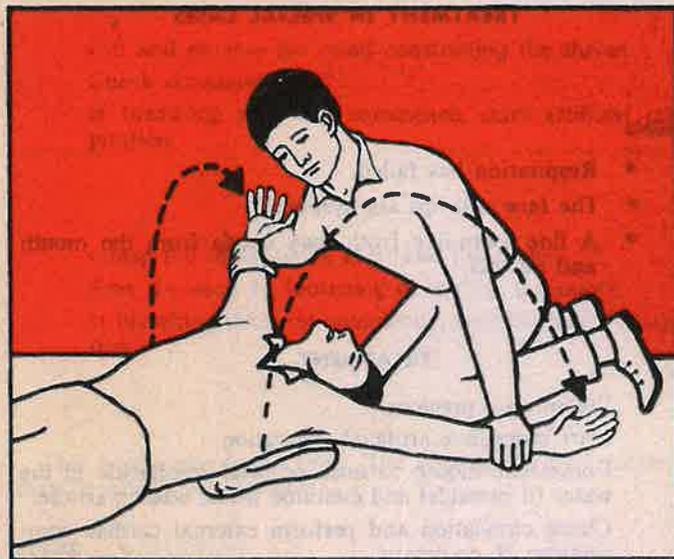


Fig. 74—Conclusion of the Silvester Method.

### USE OF AVAILABLE HELP

Utilise available help to—

- Obtain medical assistance.
- Loosen tight clothing.
- Remove wet or contaminated clothing.
- Provide warmth and protection.
- Combine or alternate with your movements.

### CARE ON RECOVERY

- Wrap the casualty according to the weather conditions.
- Place the casualty in the coma position.
- Keep a continuous check on the breathing.
- Prevent inhalation of saliva, mucus or vomitus.
- Arrange for transport to hospital.

## FIRST AID

### TREATMENT IN SPECIAL CASES

#### DROWNING

##### SIGNS

- Respiration has failed.
- The face and lips are cyanosed.
- A fine foam-like froth may exude from the mouth and nostrils.

##### TREATMENT

Seconds are precious.

Start immediate artificial respiration.

Commence mouth to nose artificial respiration in the water (if possible) and continue whilst wading ashore.

Check circulation and perform external cardiac compression if necessary.

Continue until breathing starts spontaneously or medical aid is obtained.

Help to prevent complications (pneumonia) by keeping the casualty warm.

#### SPASM OF THE LARYNX

Spasm of the larynx is the contraction of the muscles of the larynx resulting in its closure.

This prevents air entering the lungs.

Suffocation due to spasm of the larynx occurs in 10-20 per cent of cases of drowning.

In these cases water is prevented from entering the lungs.

Water is swallowed instead of breathed. Thus the casualty simply suffers from lack of oxygen.

These cases respond well to immediate artificial respiration.

## FIRST AID

#### STRANGULATION

Cut and remove the band constricting the throat.

Check circulation.

If breathing does not commence, start artificial respiration.

#### HANGING

Grasp the lower limbs and raise the body.

Free the neck by loosening or cutting the noose.

If breathing does not commence, start artificial respiration.

#### CHOKING

This is common at all ages. The obstruction to breathing may be largely due to spasm.

##### SIGNS

- The casualty has a fit of coughing.
- Violent and alarming attempts at inspiration are made.
- Increasing cyanosis of the face, neck, fingers and toes may develop.
- Consciousness may be lost.
- Breathing may fail.

##### AIMS OF FIRST AID

To remove any foreign body.

To relieve the spasm.

To get air to the lungs if necessary.

##### METHOD

Remove any obvious obstruction.

If the obstruction is thought to be in the trachea—

## FIRST AID

In the case of—AN INFANT

Hold the infant up by the legs.

Smack the infant three or four times between the shoulders.

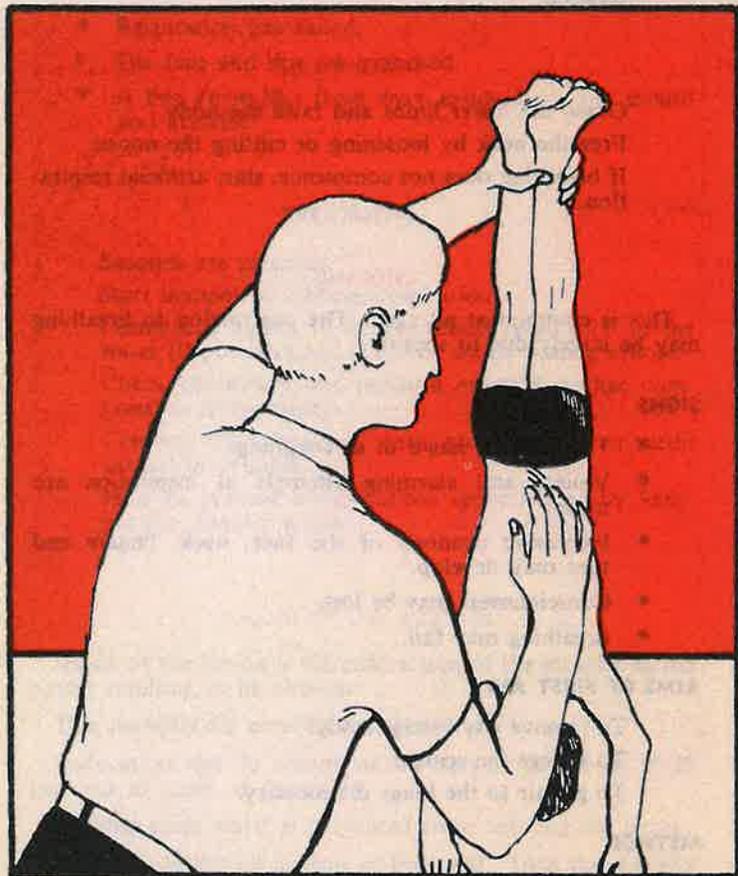


Fig. 75—Treatment for choking in an infant.

## FIRST AID

In the case of—A CHILD

Lay the child with the head downwards over the knee.

Give three or four sharp smacks between the shoulders.



Fig. 76—Treatment for choking in a child.

## FIRST AID

### AN ADULT

Strike the casualty three or four sharp blows between the shoulder blades.

### SWELLING OF THE TISSUES WITHIN OR AROUND THE THROAT

This may occur in injury, allergy, infection, stings, bites or scalds.

#### AIMS OF TREATMENT

To lessen the congestion by reducing the blood flow.  
To ensure sufficient oxygen supply.

#### TREATMENT

Sit the casualty up.  
Loosen constrictive clothing.  
Ensure adequate fresh air.  
Apply ice packs to the throat.

### DISEASES OR CONGESTION OF THE LUNGS

These conditions limit the air-containing capacity of the lungs and thus the intake of oxygen is reduced.

#### TREATMENT

Prop the casualty up (to make breathing easier).  
Ensure adequate fresh air.  
If shivering starts, treat by warming the casualty.

### PARALYSIS OF THE CHEST

This may be caused by poliomyelitis and some poisons.  
If breathing is failing, support by artificial respiration.  
If swallowing is difficult, place in the coma position, never on the back or sitting.

Do not give anything by mouth.

## FIRST AID

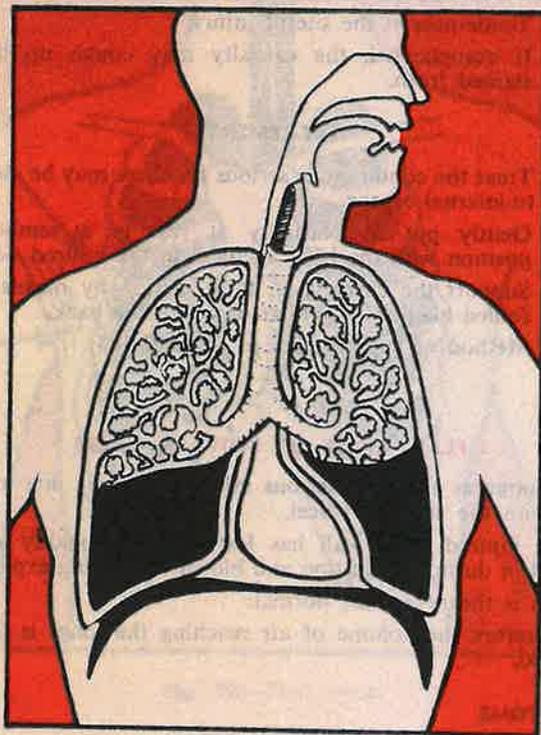


Fig. 77—Congestion in the lungs.

### CHEST INJURIES

#### SYMPTOMS

Pain at the site of injury, made worse by breathing or coughing.

#### SIGNS

Shallow rapid breathing.

## FIRST AID

Tenderness at the site of injury.

If complicated, the casualty may cough up blood-stained froth.

### TREATMENT

Treat the condition as serious for there may be damage to internal organs.

Gently put the casualty at rest in a semi-sitting position with the body inclined to the injured side.

Support the casualty in this position by means of a folded blanket or similar object to the back.

Method of support (see p. 141 and 144).

### FLAIL CHEST OR STOVE-IN CHEST

A common and very serious injury to drivers due to contact with the steering wheel.

The injured chest wall has lost its bony rigidity and is sucked in during inspiration and blown out during expiration.

This is the reverse of normal.

Therefore the volume of air reaching the lungs is greatly reduced.

### SYMPTOMS

Severe difficulty in breathing.

Gaspings air hunger.

### SIGNS

Cyanosis.

Failing respiration.

Consciousness may be lost.

### AIMS OF TREATMENT

To stabilise the chest to quickly restore normal respiratory movements.

## FIRST AID

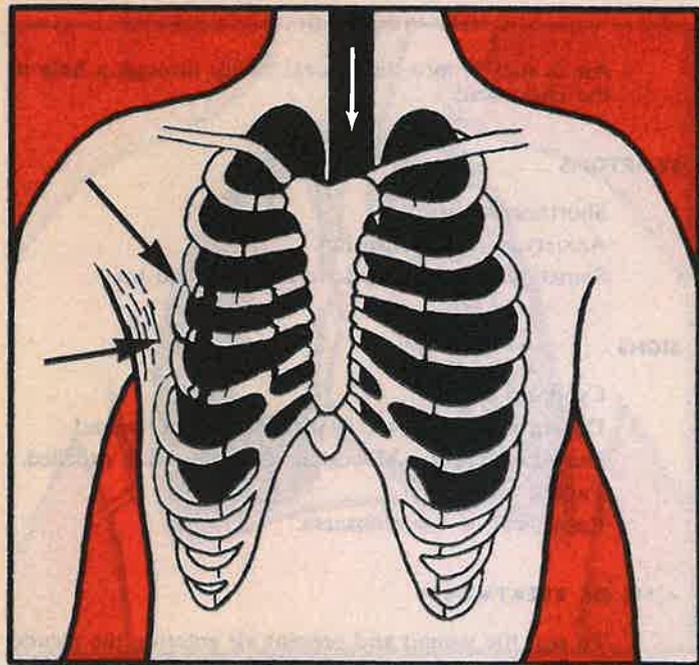


Fig. 78—Flail chest.

### TREATMENT

Loosen clothing.

Immobilise the flail part of the chest wall by—

Placing a large dressing over the mobile part of the chest and retaining it by bandaging.

Splinting the chest with the arm with the elbow bent, fingers pointing to the opposite shoulder. Secure by bandaging to the chest.

If respiration fails start mouth to mouth or mouth to nose artificial respiration.

Transport the casualty with the injured side down.

**SUCKING WOUND OF THE CHEST**

Air is sucked into the pleural cavity through a hole in the chest wall.

**SYMPTOMS**

Shortness of breath.  
Anxiety and apprehension.  
Sometimes bloodstained froth is coughed up.

**SIGNS**

Cyanosis.  
During inspiration air is sucked into the wound.  
During expiration bloodstained bubbles are expelled.  
Failing respiration.  
Rapid loss of consciousness.

**AIMS OF TREATMENT**

To seal the wound and prevent air entering the pleural cavity.

**TREATMENT**

Squeeze the edges of the wound together

OR

Place your hand over the wound until a dressing can be applied.

An airtight seal is essential.

Cover the wound with a large bulky dressing and bandage firmly.

Sustain respiration.

Transport the casualty with the injured side down.

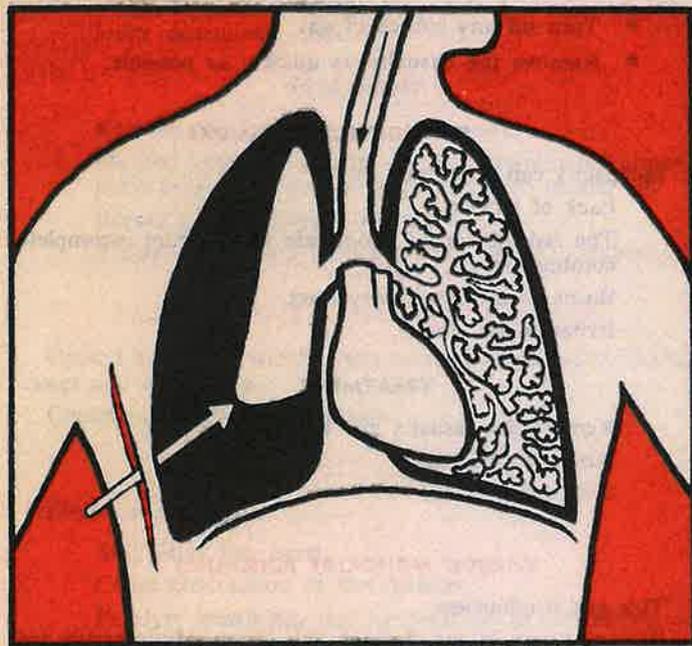


Fig. 79—Sucking wound of the chest.

**POISONING BY GASES ADVERSELY AFFECTING RESPIRATION****GENERAL RULES**

- Make sure you are not the next casualty.
- Before entering any space suspected to contain poisonous gas, take a big breath and hold it.
- Ensure a free circulation of air in the space by opening or breaking doors and windows.

## FIRST AID

- Turn off any source of gas.
- Remove the casualty as quickly as possible.

### SUFFOCATION BY SMOKE

Incapacity can be caused by—

Lack of oxygen.

The risk of carbon monoxide fumes from incomplete combustion.

Burns to the respiratory tract.

Irritation by smoke.

#### TREATMENT

Remove the casualty into fresh air.

Sustain respiration.

Seek medical aid.

### CARBON MONOXIDE POISONING

This gas is odourless.

Poisoning can occur through inhalation of domestic gas and exhaust gases from engines.

A small amount of gas in the atmosphere is dangerous.

The gas combines with the haemoglobin in the blood and prevents the haemoglobin carrying oxygen. Asphyxia thus results.

#### SYMPTOMS

Headaches.

Dizziness.

Drowsiness.

#### SIGNS

Confusion, stupor.

Coma.

## FIRST AID

Pink colouration of the lips and skin—the casualty looks deceptively well.

#### TREATMENT

Remove the casualty from the cause.

Do not leave the casualty in the contaminated atmosphere even if the source of gas has been turned off.

Ensure a liberal supply of fresh air.

Sustain respiration until breathing is well established.

### PARALYSIS OF THE RESPIRATORY CENTRE

Caused by electric shock, some poisons, some pain-relieving drugs and snake bite.

Commence artificial respiration.

### ELECTRICAL INJURIES

Electrical currents—

May stop the heart.

Cause contraction of the muscles.

Paralyse breathing, due to paralysis of the centre of respiration in the brain.

Cause burns.

The casualty may not be able to free himself from the current.

The casualty may not be able to breathe due to fixation of the chest.

#### TREATMENT

Shout for help.

Disconnect the current or remove the casualty from the current.

Feel for the pulse. If no pulse and no breathing are present—

Start external cardiac compression.

Start mouth to mouth/nose artificial respiration.

## FIRST AID

If the pulse is present but breathing has stopped—

Start mouth to mouth/nose artificial respiration.

When breathing and the pulse have been restored, apply a simple dressing to the burns.

Remove the casualty to medical aid.

Do not leave the casualty until medical aid is obtained.

### Removal from the current—domestic voltage

Switch off the current, or if a flexible cable, jerk free from the plug.

**DO NOT CUT.**

If it is not possible to switch off or break the current—

Remove the casualty from contact with the current.

Using insulated materials.

Using only dry materials.

Remember moisture is a powerful conductor of electricity and will facilitate the passage of the current.

If the skin at the point of contact or the earth is wet, the danger is greater.

**Do not use water** on an electrical fire until the current has been disconnected.

Smother electrical fires with dry material.

In **higher voltage** cases, **do not** attempt to rescue the casualty until the current has been disconnected by the authorities.

### Suitable Insulating Materials

Thick rubber gloves.

A coat.

A piece of dry wood.

A folded newspaper.

If possible, stand on a dry piece of wood or piles of papers.

It is sometimes feasible to kick the victim free from the current.

## FIRST AID

### GLOSSARY

**CAPILLARIES**—*Tiny blood vessels.*

**THORACIC**—*Pertaining to the chest (thorax).*

**PHARYNX**—*Air space behind the mouth and nose.*

**LARYNX**—*Voice box.*

**TRACHEA**—*Wind pipe.*

**BRONCHI**—*Large air passages.*

**INSPIRATION**—*Breathing in.*

**EXPIRATION**—*Breathing out.*

**PLEURA**—*Outer lining of the lungs and inner lining of the chest.*

**VOMITUS**—*Stomach contents vomited up.*

**SALIVA**—*Secretions of the mouth.*

**MUCUS**—*Secretions from the glands in the body.*

## FIRST AID

### NOTES

# 6

## HAEMORRHAGE

---

*Haemorrhage (bleeding) is the loss of blood from the circulation.*

---

The blood may escape through a wound or may remain in the tissues.

Severe haemorrhage leads to shock (see chapter 8).

### TYPES OF HAEMORRHAGE

#### Arterial

Bleeding from an artery. The bleeding is in spurts associated with the heart beats and the blood is red (oxygen rich).

#### Capillary

Bleeding from the capillaries. It is small in amount and flows as a gentle ooze.

## FIRST AID

### Venous

Bleeding from the veins. There is a continuous flow and the blood is dark in colour (oxygen poor).

### External

Haemorrhage which is visible to the First Aider, e.g. bleeding from a wound. The effect of treatment is readily determined.

### Internal

Haemorrhage which occurs—

Into the tissues.

Into the internal organs.

Into the cavities of the body.

The site of the haemorrhage and the amount of blood lost are hard to assess. Furthermore, control of haemorrhage is difficult and it is only by careful observation of the colour, pulse and respiration that the First Aider can determine whether haemorrhage is continuing.

### THE RESPONSE OF THE BODY TO HAEMORRHAGE

The body responds by—

- Taking steps to try to stop the haemorrhage (blood clotting, fall of blood pressure).
- Maintaining the blood supply to vital structures, particularly the brain, at the expense of other structures.

Continuing haemorrhage results in—

- The pulse becoming weak and rapid.
- The skin becoming pale, cold and clammy.
- The respiration becoming rapid, increased in depth with yawning and sighing. These are the signs of air hunger.
- Restlessness and apprehension.
- Extreme thirst.

## FIRST AID

- Consciousness becoming affected by dizziness, faintness and collapse.
- The pulse becoming rapid and weak because the heart is not receiving sufficient blood.

### EXPLANATION OF RESPONSE

The heart accelerates to attempt to maintain an adequate circulation but, because very little blood is returning to the heart, the beat is weak. It may be so weak that the pulse cannot be detected at the wrist.

The skin is pale, cold and clammy because all blood not being used for vital tissues is shunted into the circulation. Thus the nervous system controlling the blood vessels of the skin empties these vessels of blood.

The skin is now pale and cold because there is very little blood.

The nervous system also causes the sweat glands to empty, resulting in a pale, cold clammy skin.

The respiration is affected because the brain is not getting sufficient oxygen and blood.

Respiration increases in rate and depth with sighing, yawning and in extreme situations, air hunger in an attempt to increase the supply of oxygen to the blood and brain.

If the circulation fails further, irregular gasping respirations occur due to upset of the function of the respiratory centre. This is an extremely dangerous state.

Restlessness occurs because of an upset in the brain function due to oxygen lack.

Thirst occurs because of the amount of fluid lost from the circulation.

The consciousness is disturbed through lack of blood and therefore of oxygen in the brain. This is manifest firstly as giddiness, made worse by standing or moving. It might lead to fainting. This is caused by insufficient blood reaching the brain.

If haemorrhage is still more severe, unconsciousness will occur with progressive failure of the brain, heart and respiration, until death finally occurs.

## FIRST AID

### NATURAL CONTROL OF HAEMORRHAGE

Bleeding will tend to stop spontaneously by

- Contraction of the walls of the torn blood-vessels.
- The deposit of fibrin.
- The trapping of corpuscles.
- The fall of blood pressure.

### FIRST AID CONTROL OF HAEMORRHAGE

- Act quickly—every drop of blood is important.
- Apply direct pressure to the wound.
- Rest the casualty.
- Elevate the part.
- Rest the part.

### APPLY DIRECT PRESSURE

The application of firm pressure directly to the wound controls haemorrhage by—

Compressing the blood vessels leading into the wound and by retaining blood in the wound long enough for it to clot.

Pressure is applied by placing a large dressing over the wound.

This extends well beyond the edges of the wound and a firm bandage holds it in position.

### REST THE CASUALTY

This lowers the blood pressure, decreases the demand for blood and so slows the pulse. In severe cases the casualty must be lying down.

### ELEVATE THE PART

This drains the veins of the injured part and decreases the blood flow to the limb by making it flow uphill.

## FIRST AID



Fig. 80—Elevate the part.

### REST THE PART

This lessens the blood demand of the tissues and also preserves intact the delicate blood clot that is forming. This clot must not be disturbed.

If bleeding is not quickly controlled by a properly applied dressing, put on more pressure or press down firmly on the dressing with the palm of the hand, until the bleeding has ceased. Do not remove the first dressing.

### IN AN EMERGENCY

- If bleeding is very profuse or a dressing is not readily available, grasp the sides of the wound and firmly squeeze them together.
- Apply firm digital pressure directly to the bleeding point.

These methods will tend to introduce infection into the wound but this is justified where haemorrhage is severe.

Never remove dressings once applied. This will, by dislodging the blood clot, only lead to further haemorrhage.

## FIRST AID

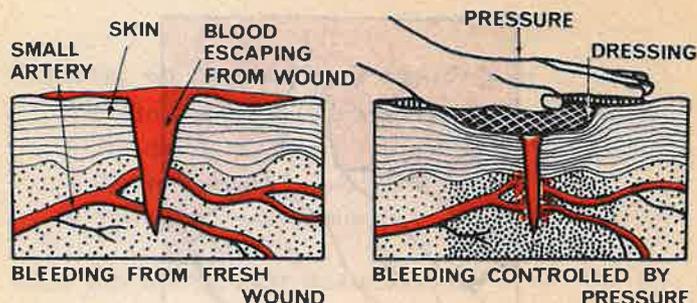


Fig. 81

Control of haemorrhage by pressure.

If sufficient pressure is applied to the wound, bleeding will almost always be controlled.

Very occasionally, when a large artery is involved, bleeding is so rapid and forceful that it can only be controlled by constant pressure with the hand over the cut vessel.

This pressure must not be released until the casualty reaches medical care.

The tourniquet is **NOT RECOMMENDED** as a first aid measure for haemorrhage. It is often ineffective and frequently harmful.

### HAEMORRHAGE FROM SPECIAL REGIONS

#### HAEMORRHAGING FROM THE EAR CANAL

This can mean the casualty is suffering from a fracture of the base of the skull.

Do not plug the ear canal. Let it drain freely.

Place the casualty in the coma position with the affected ear downwards.

## FIRST AID

Assess the level of unconsciousness (see p. 183).

Arrange for the urgent removal of the casualty to hospital.

#### HAEMORRHAGING FROM THE NOSE

Bleeding usually occurs from just inside the nose on the septum (central partition).

#### TREATMENT

Sit the casualty up with the head slightly forwards.

Loosen all tight clothing around the neck, chest and waist.

Keep the casualty cool with a free supply of fresh air.

Instruct the casualty not to blow the nose.

Instruct the casualty to breathe through the mouth.

Place cold wet towels on the neck and forehead, replacing frequently.

Apply pressure on the flap of the nostril for at least 10 minutes.

#### HAEMORRHAGING FROM THE GUMS AFTER TEETH EXTRACTIONS

Do not attempt to remove the clot in the socket by rinsing.

Instruct the casualty to keep the tongue clear of the socket.

Place a pad of gauze over the socket and instruct the casualty to bite firmly onto it.

#### HAEMORRHAGING FROM THE PALM OF THE HAND

This can often be very severe because the blood vessels are numerous, deep and poorly supported.

Place a 2 inch or 3 inch rolled bandage in the palm.

## FIRST AID

Have the casualty close the fingers firmly onto the bandage.

Apply a triangular bandage to the hand (see p. 46).

### HAEMORRHAGING FROM VARICOSE VEINS

Varicose veins occur when valves in the veins fail. Back pressure fills the veins and they become enlarged and tortuous. The most common site is in the legs.

If such a vein ruptures, severe haemorrhage will occur unless:

The casualty is placed flat and the legs raised. This empties the veins of blood.

A clean pad is firmly bandaged to the site.

Any constricting bands are removed from the limb and around the waist.

### INTERNAL HAEMORRHAGE

This is the situation existing when bleeding occurs and is not easily seen on the exterior of the body. It may result from injury or may be due to disease.

It may be—

Visible.

Concealed.

#### VISIBLE

Internal haemorrhage is visible in simple **bruising** where injury to capillaries allows blood to escape into the tissues.

#### SYMPTOMS

Pain at the site.

Swelling.

Discolouration—firstly red then later changing to black and blue.

## FIRST AID

### SIGNS

Local tenderness.

Thickening of the tissues.

### TREATMENT

Ice packs or cold compresses will diminish the amount of bleeding. Firm bandaging and elevation of the part may be necessary if the bruise is large.

### VISIBLE HAEMORRHAGE CAN ALSO OCCUR FROM—

**The lungs**—blood is coughed up and it is bright red and frothy, because it is mixed with air.

**The stomach**—the blood is vomited. It is often the colour of coffee grounds, due to the action of the acid of the stomach on it. It can be bright red in colour if the haemorrhage is severe. It may be mixed with food.

**The upper bowel**—the blood is mixed with the motions and due to the action of the strong digestive juices in this part of the bowel, they have a black tarry appearance.

**The lower bowel**—the blood in the motions is a normal colour.

**The kidneys or bladder**—the blood escapes with the urine which is red or smoky in colour.

### CONCEALED

This group includes—

Haemorrhage into the muscles after injury or surrounding fractures.

Haemorrhage into the abdominal cavity from the liver, spleen or pancreas.

Haemorrhage into the abdominal cavity from the uterus and tubes in the female.

These haemorrhages can be very extensive and can lead to severe shock.

## FIRST AID

### SYMPTOMS AND SIGNS

These are the same as for external haemorrhage, except that pain at the site of the haemorrhage is usually very much more pronounced.

To repeat, the symptoms and signs are—

A rapid and weak pulse.

A pale, cold and clammy skin.

Rapid respiration increasing in depth, and with sighing and yawning. In severe cases air hunger occurs.

Restlessness.

Extreme thirst.

Consciousness affected causing dizziness, fainting and collapse.

### GLOSSARY

CORPUSCLES—*cells in blood.*

WOUND—*break in tissues.*

FRACTURE—*broken bone.*

# 7 WOUNDS AND INFECTION

---

*A wound is a break in the continuity of the tissues of the body.*

---

### AIMS OF TREATMENT

- To stop the haemorrhage.
- To prevent or minimise infection.
- To reassure the casualty.

### TREATMENT

Put the casualty and the injured part at rest.

Elevate the injured part unless the limb is fractured.

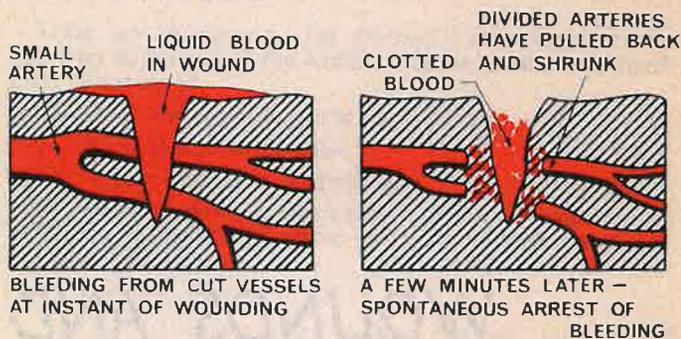


Fig. 82—A wound.

This can be done once the fracture is adequately immobilised.

Cleanse and dress the wound, using maximum care to prevent infection.

Handle all wounds gently.

Reassure the casualty and watch for and treat any signs of fainting.

### INFECTION

Infection is the invasion and growth of harmful organisms in the tissues of the body.

Organisms can enter wounds—

- At the time of the injury—being in the dirt on the wound or on the objects causing the injury.
- After the injury.

From careless handling of the wound.

From the noses and throats of persons breathing, sneezing or coughing into the wound (droplet infection).

Once introduced into a wound, the organisms under favourable conditions multiply and invade healthy tissue.

The body reacts by increasing the blood supply to the area. This blood contains white blood cells and antibodies to kill organisms.

This is inflammation. The inflamed tissue is hot, red, swollen and painful. The tension in the tissues causes throbbing.

Pus may be formed in this process. It is composed of organisms, white blood cells and dead tissue cells.

Some germs may spread in the tissue spaces. These are taken up into the lymphatic system and go to the lymphatic glands where they are attacked by one of the types of white blood cell and killed.

Thus we often see red streaks leading away from infected areas. These are inflamed lymph channels.

### PREVENTION OF INFECTION

The only sure method is to keep organisms out, or if the wound is contaminated, clean the tissues thoroughly.

**Infection** cannot be prevented at the time of the injury, but correct handling can prevent implanting organisms into the wound.

### AIMS OF TREATMENT

To cover the wound as quickly as possible using a sterile or clean dressing, and keep it covered.

Remember organisms are invisible to the naked eye.

Even if your hands look clean, they will have many organisms on them. Therefore only handle the wound with your bare hands if it is necessary for emergency control of haemorrhage.

Do not touch the surface of the dressing which will be placed next to the wound.

Do not breathe, cough, sneeze or talk directly towards the wound.

## FIRST AID

The removal of organisms introduced at the time of injury can only be effected by thorough cleansing in a doctor's surgery or a hospital. The earlier this is done, the greater the chance of completely removing the organisms.

Therefore, have the casualty seek medical attention as soon as possible.

Preliminary cleansing with water is permissible (cooled boiled water is preferable, but tap water can be used).

### FOREIGN BODIES IN WOUNDS

Large foreign bodies, if projecting from the wound, may be gently removed.

Avoid putting your fingers into the wound.

Otherwise pack dressings around the foreign body and bandage the dressing around it.

### ANTISEPTICS

These are chemical preparations which have the power of restraining the growth of organisms. They are commonly used as antiseptic creams or in antiseptic lotions.

Their use in first aid is limited and should be confined to cleaning the skin around a wound when medical aid is not readily available, or to very minor wounds.

### GLOSSARY

FAINTING—*A form of loss of consciousness.*

ORGANISMS—*Germ.*

ANTIBODIES—*Protective substances in the tissues.*

ANTISEPTIC—*A substance capable of killing organisms.*

# 8

## SHOCK

---

*Shock is a state of collapse.  
If not controlled, death may result.*

---

Shock is caused by a loss of effective circulating blood volume due to loss of—

WHOLE BLOOD

SERUM

FLUIDS

And is aggravated by—

- Pain.
- Nervous reaction.
- Infection.
- The toxic effect of substances taken into the body or the breakdown of tissues in the body producing toxic substances.
- An inadequate oxygen supply to the brain.

## FIRST AID

Conditions causing shock are—

- Haemorrhage—loss of whole blood.
- Burns, due to loss of serum from the blood.
- Diarrhoea and vomiting—the loss of a large volume of fluid from the body.
- Painful injuries, especially multiple injuries associated with blood loss.
- Disease and infection, especially associated with blood loss.
- Nervous reaction—after injury or after a severe fright—fainting.
- Infections, particularly of the abdominal cavity—peritonitis.
- Damaged tissue in crush injuries.
- Poisons, which when absorbed lead to profound depression of the nervous system, excessive vomiting and diarrhoea, or lower the capacity of the blood to carry oxygen.

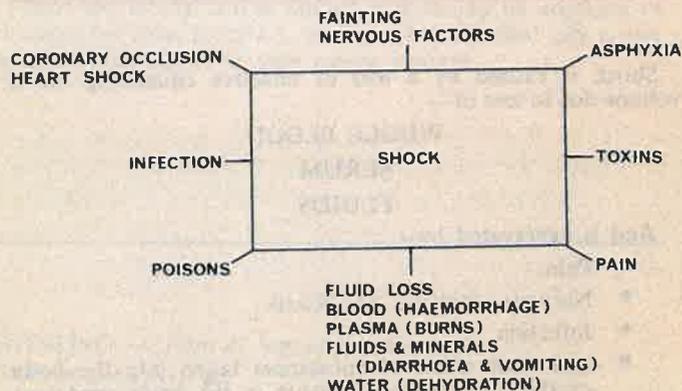


Fig. 83—Schema showing factors in shock.

## FIRST AID

- Heart attacks, due to failure of the heart's ability to continue circulating enough blood.
- Heat exhaustion.

### DEVELOPMENT OF SHOCK

The heart beats faster in an attempt to maintain a normal blood pressure. The pulse therefore becomes rapid and feeble.

The brain receives less oxygen due to lowered blood volume and the low blood pressure. Dizziness, fainting and unconsciousness occur.

The nerves supplying the blood vessels act to shunt blood into the vital structures (see p. 97, Haemorrhage). The skin is pale and cold and sweat pours out.

Nervous reaction affects the stomach and intestines. Nausea and vomiting result.

### SYMPTOMS

Giddiness and faintness.

Thirst.

Nausea and vomiting.

### SIGNS

A cold clammy pale skin.

A slow pulse at first, becoming rapid and feeble.

Rapid shallow respiration.

Mental dulling, then unconsciousness.

### AIMS OF TREATMENT

To control the blood volume loss.

To sustain the circulation.

To sustain the respiration.

To ease pain.

To reassure the casualty.

## FIRST AID

### TREATMENT

First aid must be started immediately.

Ensure an adequate airway and supply of fresh air.

If the casualty is unconscious, place in the coma position.

Control any haemorrhage.

Ensure the maximum supply of available blood to the brain by placing the casualty flat and elevating the legs.

Do not heat the casualty unnecessarily and divert vital blood to the skin; but prevent shivering.

Prevent fluid loss through sweating by protection from evaporation.

Relieve pain by—

Covering wounds.

Splinting fractures.

Elevating the injured part.

Resting the injured part.

Gentle handling.

Reassure the casualty.

Arrange quick and gentle transport to medical aid.

Fluids can be given in small quantities frequently if medical aid is not immediately available.

Do not give fluids if

The casualty is unconscious or unable to swallow.

There is an abdominal injury.

There is a possibility of immediate operation.

The casualty feels sick.

Do not give alcohol.

## FIRST AID

### GLOSSARY

**SHOCK**—*State of collapse.*

**TOXIN**—*Substance which causes collapse.*

**DIARRHOEA**—*Loose bowel actions.*

**PERITONEUM**—*Covering of the internal organs of the abdomen.*

**PERITONITIS**—*Inflammation of the peritoneum.*

## THE SKELETON

NOTES

9

# THE SKELETON

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*The Skeleton  
is the supporting framework  
of the body.*

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The skeleton consists of a large number of separate bones, joined to each other either loosely or firmly by means of ligaments and muscles.

The junctions between bones are called joints.

The chief bony structures are

- The skull.
- The vertebral column (backbone or spine).
- The ribs and sternum (breastbone).
- The bones of the upper and lower limbs.

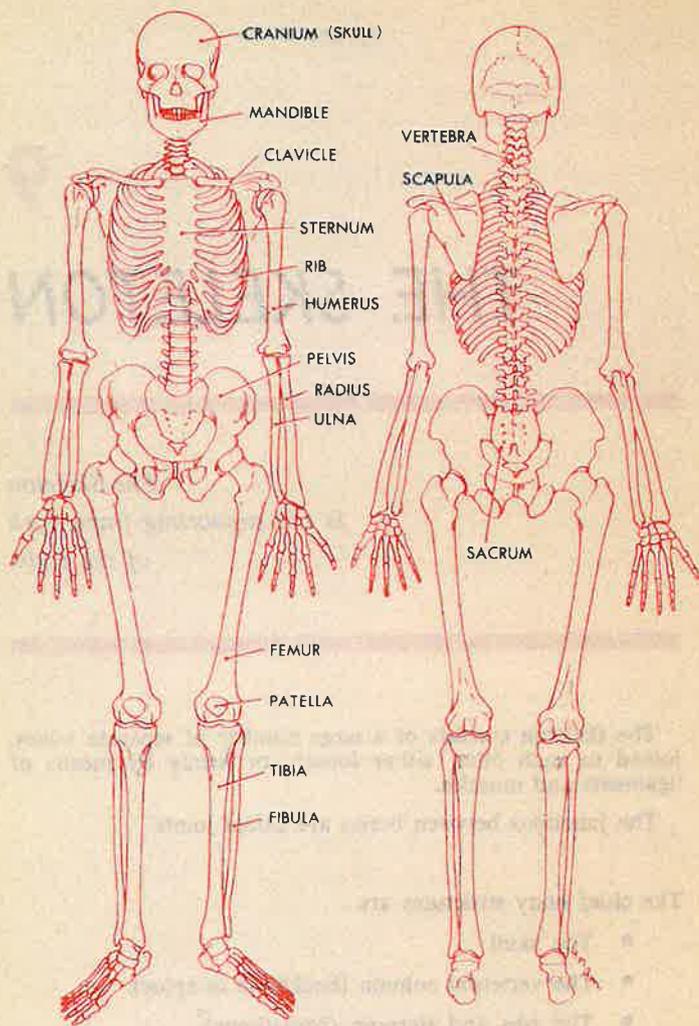


Fig. 84—The skeleton.

**THE SKULL**

Divided into

The face and jaws.

The cranium.

The bones of the face and jaws form the framework of the features below the eyes and support the structure of the nose and mouth.

The cranium provides rigid protection for the enclosed fragile brain. It is made up of a large number of individual bones firmly united together.

**THE VERTEBRAL COLUMN**

The vertebral column is made up of thirty-three (33) separate bones called vertebrae—

Seven (7) situated in the neck (cervical vertebrae).

Twelve (12) in the thorax (thoracic vertebrae).

Five (5) in the loins (lumbar vertebrae).

Five (5) in the pelvis (sacral vertebrae) fused together to form a broad mass of bone called the sacrum.

Four (4) very little bones at the base of the spine fused together to form the coccyx.

Between the separate vertebrae there are discs of elastic tissue called intervertebral discs. These allow some movements between the vertebrae and act also as shock absorbers.

Extending within the full length of the vertebral column is the extension of the brain called the spinal cord. As the cranium protects the brain, so the vertebral column protects the spinal cord.

**THE RIBS AND STERNUM**

Extending around the chest from the thoracic vertebrae, one pair at each vertebra, are twelve (12) pairs of ribs which

Protect the sides of the chest and its contents.

Give rigidity to the chest walls.

The upper ten (10) pairs of ribs join the sternum in front.



Fig. 85—Sketch of a vertebra.

### THE BONES OF THE UPPER AND LOWER LIMBS

The upper limb is suspended by muscles and ligaments from the trunk. It is supported by two bones, the scapula (shoulder blade) and the clavicle (collar bone).

The attachment allows a greater range of movement and a lesser degree of stability of the upper limb.

The lower limb by contrast is firmly attached to the trunk through a deep socket on the outer side of each pelvic bone into which the rounded upper end of the femur (thigh bone) fits to form the hip joint. The pelvis (hip bones) is anchored to the sacrum.

This firm attachment is essential to support the body in standing and walking, and gives stability at the expense of some mobility.

The pelvis forms a bony protection for the contents of the pelvic cavity.

Fig 84 shows that the bones of the upper and lower limbs are similarly arranged, the humerus, radius and ulna, and the small bones of the hands of the upper limbs being equivalent to the femur, tibia, fibula and small bones of the feet of the lower limbs.

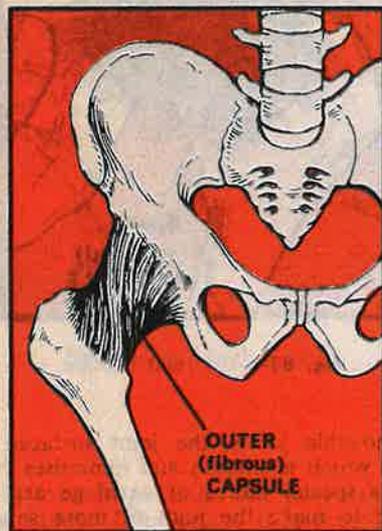


Fig 86—The ligaments of a joint.

### THE JOINTS

As previously mentioned, between bones are joints which allow movements. These movements can vary from almost none, as in the skull, to the most freely movable joints, the shoulder joints.



Fig. 87—The joint capsule.

In freely movable joints, the joint surfaces are covered with cartilage, which is smooth and minimises friction. Also in some joints special pieces of cartilage are found, their function being to make the joint fit more snugly, e.g., the cartilages of the knee.

Each freely movable joint is surrounded by a double layered capsule, which is attached to the margins of the joint surfaces. The inner (synovial) layer produces a lubricating fluid which keeps the joint surfaces moist. The outer layer is made up of strong fibrous tissues, thickened in certain areas to form ligaments.

The ligaments are placed in such a way as to bind the bones firmly together, without restricting the normal range of movement of the particular joint.

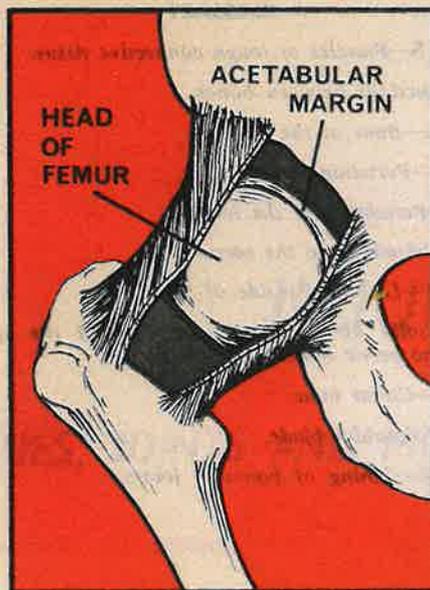


Fig. 88—Inside the joint.

### THE MUSCLES

The muscles are responsible for producing movements of the various joints. Their ability to move is controlled by the motor nerves from the brain and spinal cord. Damage to a nerve will result in paralysis of the muscles it supplies.

These muscles can be moved at will and are called voluntary muscles.

Other muscles control the movements, rate of action and size of the various organs and structures of the body, regulated by the sympathetic nervous system but are not under the control of the will. These are involuntary muscles. They are found in the bowels, arteries and bronchi. The heart is made up of a special type of involuntary muscle.

## FIRST AID

### GLOSSARY

- LIGAMENTS**—Bundles of tough connective tissue.
- JOINTS**—Junctions between bones.
- VERTEBRA**—Bone of the spine.
- CERVICAL**—Pertaining to the neck.
- LUMBAR**—Pertaining to the loin.
- SACRAL**—Pertaining to the sacrum.
- SYNOVIUM**—Lining of inside of joints.
- SACRUM**—Solid bony mass at the base of the spine which supports the pelvic bones.
- CLAVICLE**—Collar bone.
- SCAPULA**—Shoulder blade.
- CARTILAGE**—Lining of bones in joints.

# 10

## INJURIES

### BONES, JOINTS AND MUSCLES

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*A Fracture is a Broken Bone*

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#### FRACTURES

The break is usually complete but in the young the bone can be bent without completely breaking.

#### TYPES OF FRACTURES

CLOSED

OPEN

COMPLICATED

## FIRST AID

### CLOSED

The skin around the fracture is unbroken.



Fig. 89—A closed fracture.

### OPEN

There is a wound leading to the fracture, or the bone may protrude through the skin.

Hence organisms may enter and cause infection.

Infection in a fracture is a serious complication which may greatly delay healing.

## FIRST AID



Fig. 90—An open fracture.

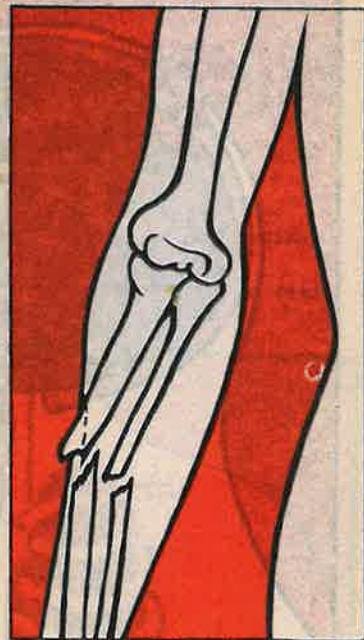


Fig. 91—An open fracture.

### COMPLICATED

In addition to the fracture other vital structures have been damaged—

Brain damage may occur from a fractured skull.

Damage may occur to internal structures such as—

spinal cord, lung, liver, spleen, kidney, major blood-vessels or nerves.

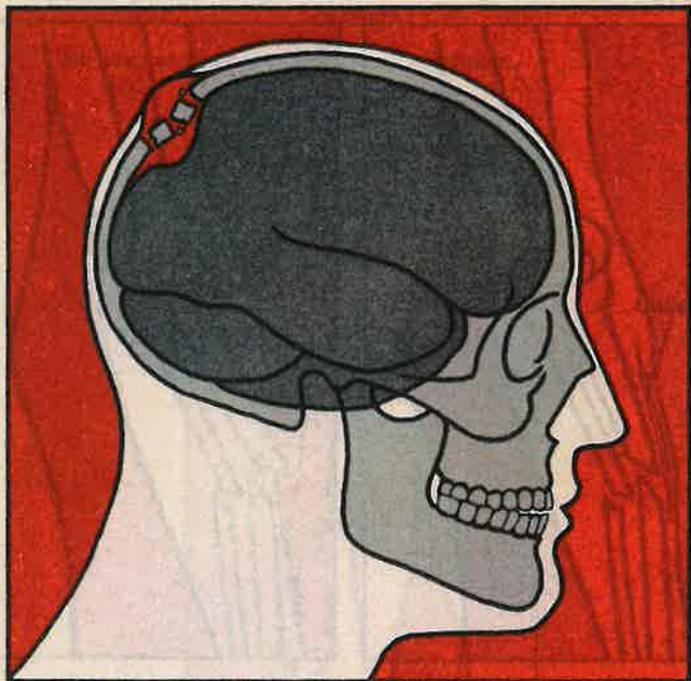


Fig. 92—A complicated fracture.

**CAUSES OF FRACTURES**

- Direct force.
- Indirect force.
- Abnormal muscle action.

**DIRECT FORCE**

The bone is fractured at the site of impact.

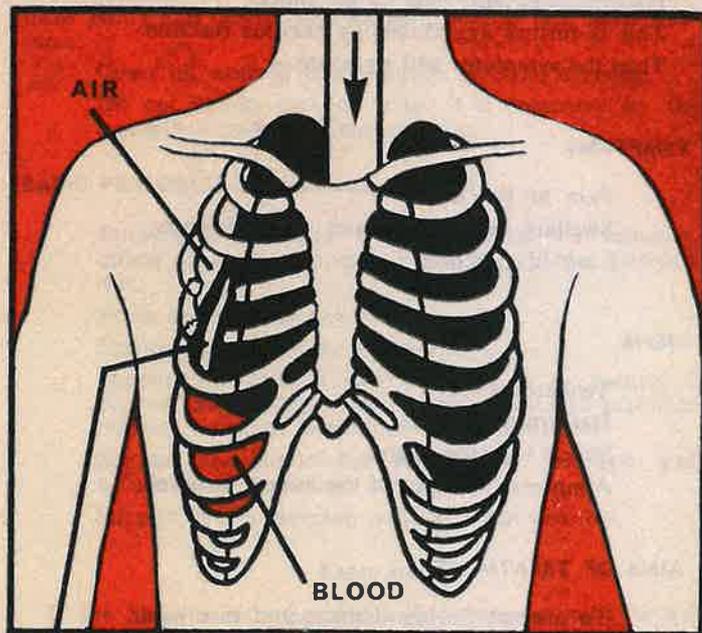
**INDIRECT FORCE**

The bone is fractured at some distance from the point where the force is applied. A fall on the outstretched hands can result in a fracture at the wrist, elbow, shoulder or clavicle.

**ABNORMAL MUSCULAR ACTION**

The kneecap can be fractured by a sudden contraction of the muscles attached to it.

This can occur when a person trips and tries to regain balance.



**LACERATION IN LUNG**

Fig. 93—Fractured ribs with lung damage.

## FIRST AID

### EFFECTS OF A FRACTURE

Bones, particularly in the young, have a liberal blood supply.

When a bone is broken, haemorrhage occurs.

This is further aggravated by the damage to surrounding tissues.

In fractures of large bones, a considerable loss of blood can take place, e.g., a fractured femur commonly loses two to three pints of blood into the tissues.

Pain is present, particularly if movement at the fracture occurs.

Haemorrhage and pain cause shock.

This is further aggravated by nervous reaction.

Thus the symptoms and signs are—

### SYMPTOMS

Pain at the site.

Swelling at the site, later giving bruising.

Loss of function.

### SIGNS

Tenderness.

Deformity.

Shock to some degree.

Abnormal mobility of the bones sometimes.

### AIMS OF TREATMENT

To prevent further damage and ease pain.

To treat the shock present and prevent its further development.

To minimise the risk of infection.

## FIRST AID

### TREATMENT

To prevent further damage and ease pain—  
Immobilise the fracture.

To treat the shock present and prevent further development—

Control any haemorrhage.

Immobilise the fracture.

Elevate the injured part where possible.

Reassure the casualty.

Handle gently to lessen the nervous reaction and pain.

To minimise the risk of infection, handle all closed fractures gently and do not turn closed fractures into open fractures.

Cover all wounds with a sterile or clean dressing.

Do not handle wounds unless it is necessary for the emergency control of haemorrhage.

### BASIC PRINCIPLES OF IMMOBILISATION

Immobilise fractures before moving the casualty, unless danger to the casualty or First Aider prevents this.

Warn the casualty not to move.

Control haemorrhage, if present.

Support the injured part or limb in as natural a position as possible without using force and maintain this support until immobilisation is completed.

Support and immobilise with slings, bandages and splints when necessary.

Support in the elevated position when possible.

### BANDAGES

If the area to be supported will accommodate a broad bandage, use a broad bandage.

If the area to be supported will not permit a broad bandage, use a narrow bandage.

## FIRST AID.

When applying a bandage around the body or limbs of a casualty in the lying position, double the bandage over the end of a splint and pass it gently under the nearest natural hollow of the body (the neck, loins, knees and ankles).

Avoid jerking or jarring movements whilst moving the bandages into their correct position.

### PRECAUTIONS

During handling, loading or transport frequently check—

- For impairment of the circulation in the limb.
- That splints and bandages have not become loose.

### SPLINTS

Splints are any suitable material that is long, wide and firm enough to immobilise the joints above and below the fracture.

Splints in all cases must be well padded.

### PADDING

#### USE

- To protect skin surfaces and bony points.
- To accommodate natural hollows and deformity.
- To allow splints to fit snugly to the body or limbs.

Padding in an emergency may be improvised from newspapers, rugs, scarves and blankets.

## SPECIAL FRACTURES

### FRACTURES OF THE SKULL (see p. 187)

### FRACTURES OF THE FACE AND JAWS

These fractures, because of—

- Bleeding
- Damage to soft tissues

## FIRST AID

Loose teeth

The tongue falling back

Reactive swelling

Excessive saliva

tend to lead to respiratory obstruction and asphyxia.

They are commonly associated with injuries to the brain.

### SYMPTOMS

Pain, especially on movement of the jaws.

Difficulty in closing the mouth.

Difficulty in speaking and swallowing.

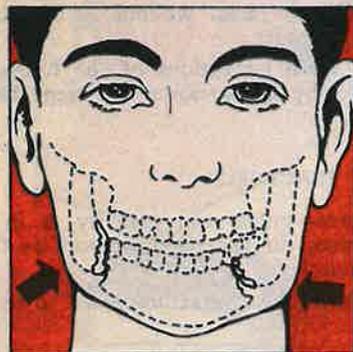


Fig. 94—Fracture of the lower jaw.

### SIGNS

Bloodstained saliva.

Irregularity of the teeth.

Swelling and deformity in the area.

### AIMS OF FIRST AID

To maintain an airway and respiration.

## FIRST AID

To control bleeding.

To immobilise fractures.

### MAINTAIN AN AIRWAY AND RESPIRATION

By removing from the mouth and throat loose blood-clots, loose teeth and saliva.

By positioning the unconscious or severely injured casualty in the coma position.

The conscious casualty not severely injured can sit up with the head well forward so that any secretions can drain freely.

### TO CONTROL HAEMORRHAGE

Haemorrhage from facial wounds is controlled by firm pressure over a dressing.

Haemorrhage from lacerations of the tongue, cheek and lips is controlled by compression between the thumb and index finger.

### TO IMMOBILISE FRACTURES

Closed fractures—unless the casualty is in considerable pain such fractures do not need support as they are supported by the muscles.

Open and painful closed fractures need to be supported.

### SUPPORT

Unless contra-indicated—

Sit the casualty down and instruct the casualty to lean forward.

Support the lower jaw with the palm of the hand.

Gently move the lower jaw up to the upper jaw.

Pass the centre of a narrow bandage beneath the chin and carry both ends upwards on either side of the face.

Continue the vertical run of the bandage on the injured side, over the head and behind the vertical run on the uninjured side.

## FIRST AID

Cross the ends immediately above and in front of this ear, carry the short end around the forehead—clear of the eyes and the long end around the back of the head. Tie off the bandage on the injured side.

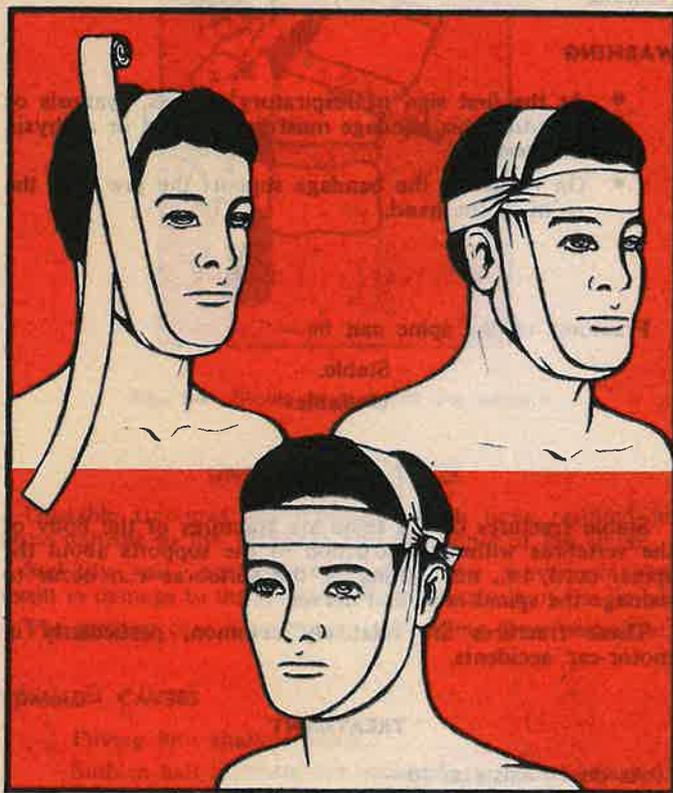


Fig. 95—Bandaging the jaws.

**TRANSPORT**

If the casualty is able to travel in a sitting position, instruct the casualty to sit with the head held forwards and downwards.

If the casualty is suffering from severe shock and haemorrhage, or is unconscious, nurse and transport in the coma position.

**WARNING**

- At the first sign of respiratory distress, cyanosis or vomiting this bandage must be removed or asphyxia will result.
- On removing the bandage support the jaw with the palm of the hand.

**FRACTURES OF THE SPINE**

Fractures of the spine can be—

Stable.

Unstable.

**STABLE**

Stable fractures of the spine are fractures of the body of the vertebrae without destruction of the supports about the spinal cord, i.e., no shifting of the vertebrae can occur to damage the spinal cord and nerves.

These fractures are relatively common, particularly in motor-car accidents.

**TREATMENT**

As doubt exists as to—

The diagnosis.

The degree of stability.

Treat as shown for unstable fractures.



Fig. 96—Stable fracture of the spine.

**UNSTABLE FRACTURES**

Unstable fractures are fractures which have resulted in gross damage to the vertebrae and the joints of the spine.

Stability has been destroyed and any movement can result in damage to the spinal cord and paralysis of the limbs.

The greatest care is necessary in handling these casualties.

**COMMON CAUSES**

Diving into shallow water.

Sudden halt in motor-car accidents (whiplash injuries).

Ejection from motor-cars.

Falls of rock onto the bent back.

Heavy falls on the buttocks.

## FIRST AID



Fig. 97—Unstable fracture of the spine.

### DIAGNOSIS

### HISTORY

This type of injury will often help the First Aider to suspect a spinal injury.

### SYMPTOMS

Pain at the site of the injury.

Loss of power below the site of injury. (Can the casualty move the limbs?)

Loss of feeling below the site of the injury. (Can the casualty feel touch on the limbs?)

### SIGNS

Deformity of the spine. **N.B.** This should only be

## FIRST AID

felt for if the spine can be examined without shifting the casualty.

Signs of shock are present.

### NOTE

If there is any doubt, treat as if the casualty has a fractured spine.

Certainly if the casualty complains of—

Pain in the back.

Numbness of the limbs.

Loss of power in the limbs.

The First Aider must treat the casualty as a fractured spine.

### WARNING

- Instruct the casualty not to attempt to move.

### AIMS OF TREATMENT

To lift the casualty without any movement taking place at the fracture site.

Always to support the natural curves of the spine.

In fractures of the cervical spine to prevent lateral (sideways) movement of the spine.

To protect all numb areas of skin.

To watch for any respiratory failure, particularly when paralysis involves the chest muscles.

### ERRATUM—PAGE 137

#### TREATMENT

If the casualty is—

Conscious or

Unconscious, the diagnosis certain, and a clear airway can be maintained, **transport the casualty on the back.**

However, if the airway is obstructing **move the patient promptly but gently into the coma position.**

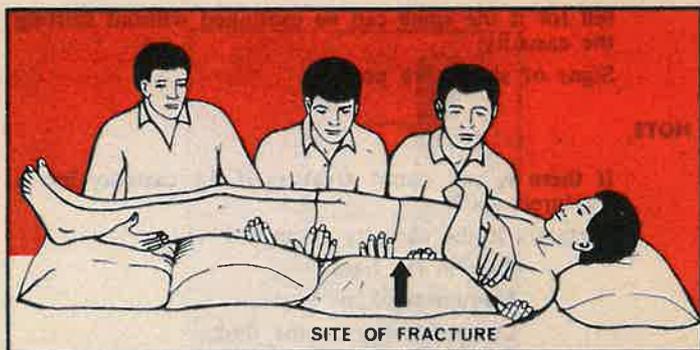


Fig. 98—Placing arms in position for lift.



Fig. 99—The casualty lifted.

Support the curves of the neck and the loin with a suitable support.

Cervical spine fractures require an additional support on either side of the neck.

When lifting the casualty the First Aider must support the spine closely on either side of the fracture.

Obtain as much help as possible.

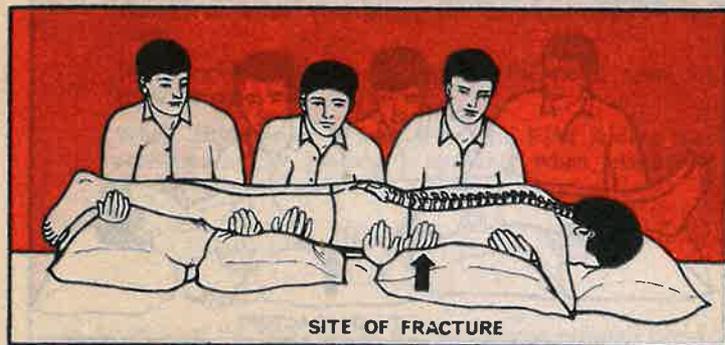


Fig. 100—Preparing to roll casualty on to back.



Fig. 101—Supporting the spine during roll.

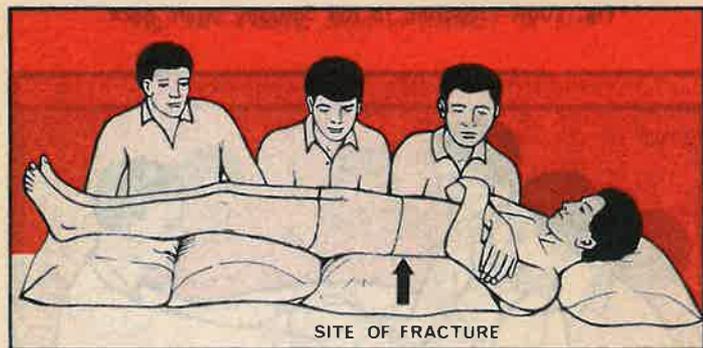
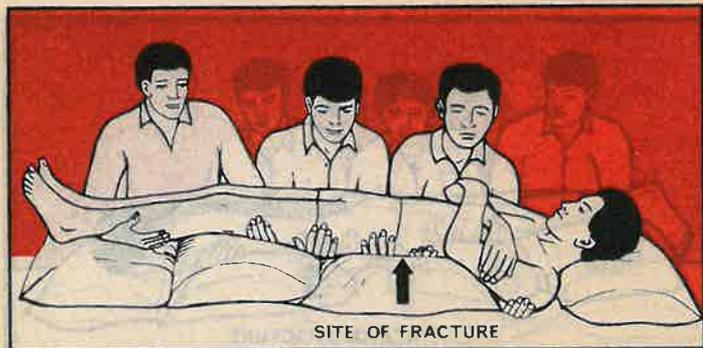


Fig. 102—Completing roll.

### TECHNIQUE

Carefully study figs. 98 to 104.

Note that the First Aider's hands always closely support the fractured area.

Counter pressure from the opposite side is needed to allow the First Aiders gently to push their hands under the casualty.

The First Aider controlling the fracture controls the team.

In cervical fractures traction on the head must be maintained.

When lifting from ground level, the First Aiders take positions as for loading a stretcher when blanket is available (see p. 290).

### FRACTURES OF THE RIBS

A fracture of the ribs may be a closed uncomplicated break.

On the other hand, multiple fractures may result in loss of rigidity in the chest wall and flail chest (see p. 86).

OR

Ribs may be forced into and damage the lung, leading to blood or air collecting in the pleural cavity.

### SYMPTOMS

Pain at the site of the fracture, worse on breathing, coughing or sneezing.

The casualty has difficulty in breathing and supports the injured side of the chest with the arm.

### SIGNS

Tenderness to touch at the site.

The casualty breathes in short gasps.

If severe enough, some degree of asphyxia is present.

### AIMS OF TREATMENT

To support the fracture with the arm bandaged to the side.

Treat any asphyxia due to obstruction or lung damage.

Transport the casualty half sitting with the injured side down.

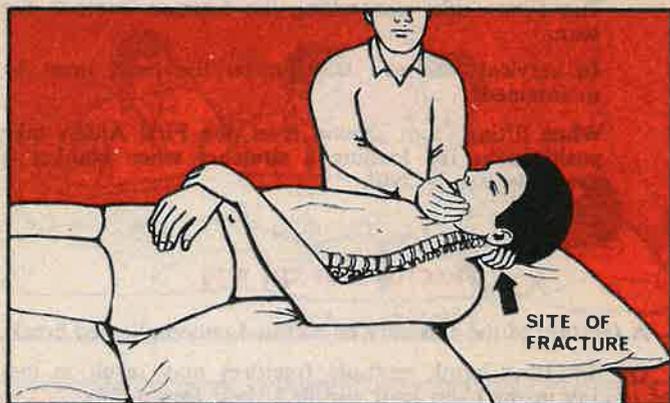


Fig. 103—Position for support of the head in a cervical fracture.



Fig. 104—Ready to lift.

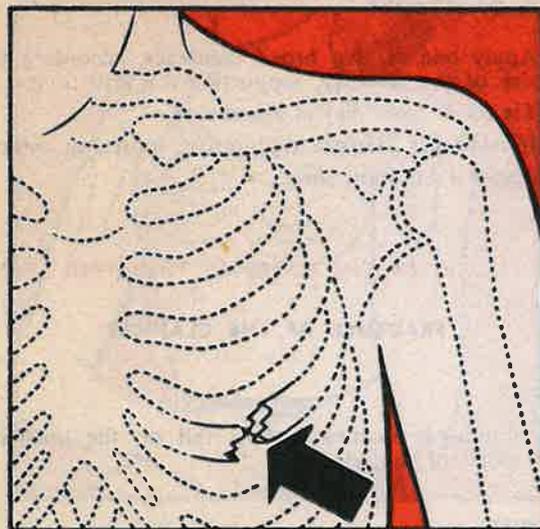


Fig. 105—Fractured ribs.



Fig. 106—Supporting the fractured ribs.

## FIRST AID

### METHOD OF SUPPORT

Apply one or two broad bandages, according to the size of the casualty, supporting the arm to the chest. Tie off in front on the sound side. If bandages increase discomfort, loosen or remove. Apply a St. John sling.

### FRACTURES OF THE BONES OF THE UPPER LIMB

#### FRACTURE OF THE CLAVICLE

##### HISTORY

This commonly occurs from a fall on the outstretched hand or point of shoulder.

##### SYMPTOMS

Often the casualty hears a snap and feels pain in the region of the clavicle.

Loss of power is present in the arm on the affected side.

##### SIGNS

The casualty supports the elbow and forearm to relieve the pain.

The head is inclined to the injured side.

The arm sags on the affected side.

Tenderness, swelling and deformity over the clavicle exists.

### METHOD OF SUPPORT

Remove or loosen any straps on the injured side. Place padding between the arm and the chest wall.

## FIRST AID

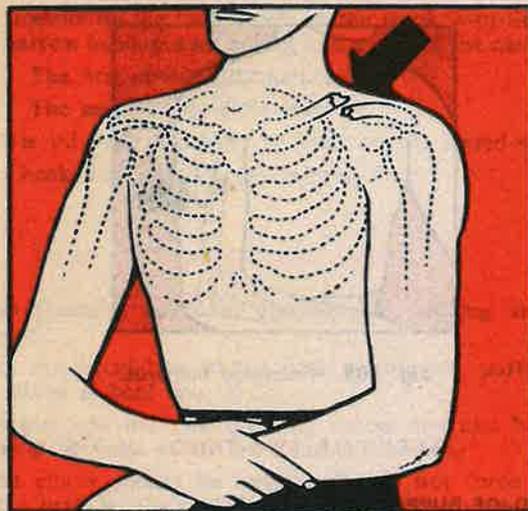


Fig. 107—Fractured clavicle.

Support the upper limb with a broad bandage over the arm and around the chest.

Tie off in front on the sound side.

Apply a St. John sling.

Check the condition of the pulse.

#### FRACTURE OF THE SCAPULA

Because of the large muscle bulk attached to this bone, little displacement occurs.

### METHOD OF SUPPORT

As for fractured clavicle.

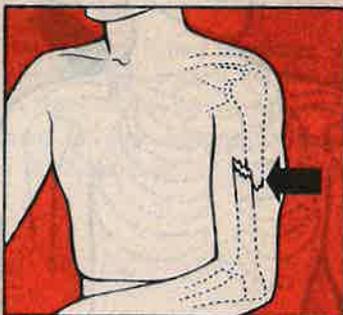


Fig. 108—Fractured humerus.

**FRACTURE OF THE UPPER TWO-THIRDS OF THE HUMERUS****METHOD OF SUPPORT**

Apply a collar and cuff sling.

Place soft padding between the lower arm and the chest wall.

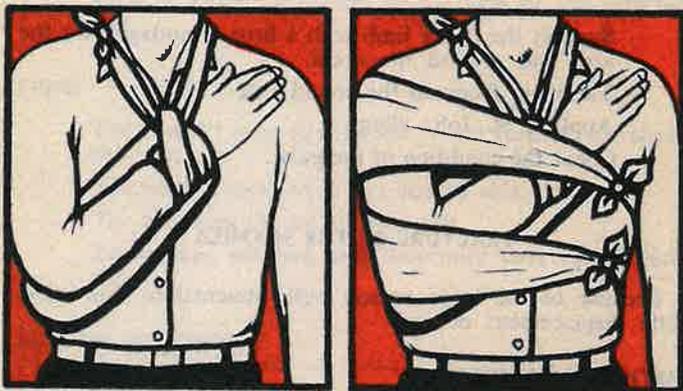


Fig. 109—Supporting a fractured humerus.

Immobilise the limb firmly to the trunk with broad or narrow bandages according to the size of the casualty—

The first above the fracture.

The second below the fracture.

Tie off both bandages in front on the sound side.

Check the pulse of the injured limb.

**FRACTURES ABOUT THE ELBOW JOINT**

These fractures result in considerable swelling and displacement.

Often the circulation to the hand is affected, particularly if the elbow is bent too far.

Therefore, do not flex the arm unless this can be done easily and the pulse at the wrist can still be felt.

If the elbow cannot be bent easily, do not force it, but place the limb by the casualty's side, palm to the thigh, and protect with adequate padding.

Check the pulse.

**METHOD OF SUPPORT**

If the elbow can be bent—

Apply a collar and cuff sling.

Place soft padding between the elbow area and the chest.

Immobilise the arm with a broad bandage over the arm and forearm.

Tie off in front on the sound side.

Carefully check the pulse.

If the elbow cannot be bent—

Place the casualty on the back.

Place the injured limb by the side of the body, in the most comfortable position possible.

Place soft padding between the arm and the body.

## FIRST AID

Immobilise the limb firmly to the body with broad or narrow bandages—

Around the arm and body.

Around the forearm and body.

Tie off the bandages in front on the sound side.

Check the condition of the pulse.



Fig. 110—Fracture of the forearm.

## FIRST AID

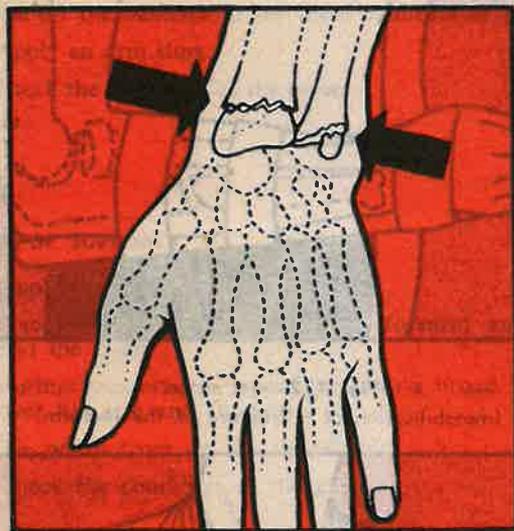


Fig. 111

Fracture of the wrist.

## FRACTURES OF THE FOREARM AND WRIST

### METHOD OF SUPPORT

Apply a padded splint on the front or back of the forearm.

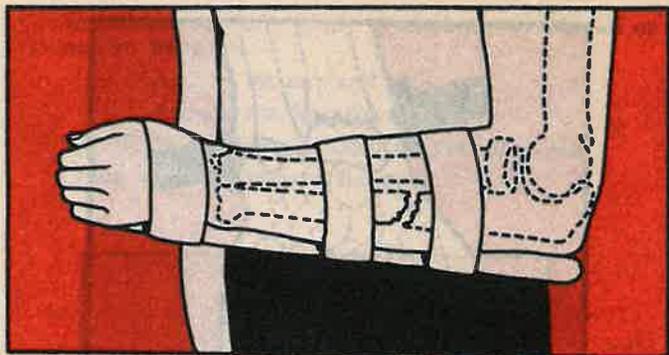
The splint must extend from the elbow to the finger tips.

Immobilise the limb firmly to the splint with broad or narrow bandages—

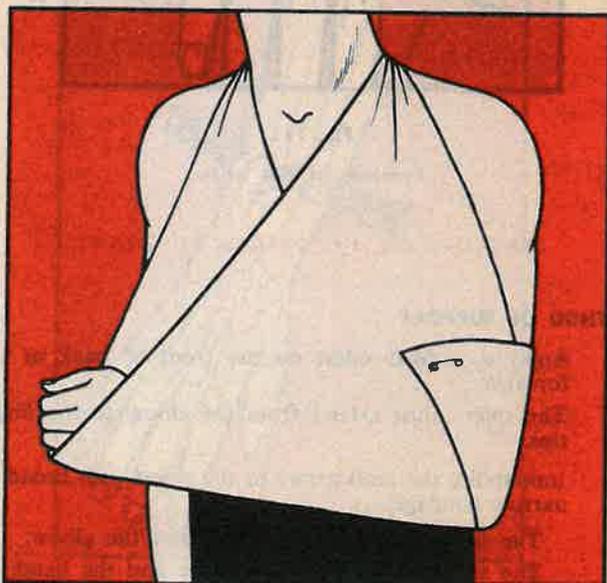
The first between the fracture and the elbow.

The second between the fracture and the hand.

The third supporting the hand to the splint.



**Fig. 112**—1st stage.  
Immobilisation of a fracture of the forearm.



**Fig. 113** Completed Immobilisation of the forearm.

Tie off the bandage in the most comfortable position.  
Apply an arm sling.  
Check the condition of the pulse.

### FRACTURE OF THE HAND AND FINGERS

#### METHOD OF SUPPORT

Apply a St. John sling.  
Place soft padding between the forearm and hand and the chest.  
Further support the upper limb with a broad bandage over the arm and forearm.  
Tie off in front on the sound side.  
Check the condition of the pulse.

### FRACTURE OF THE PELVIS

Not only are the bones of the pelvis fractured, but the organs in the pelvic cavity; especially the bladder and urinary passages, can be injured.

#### SYMPTOMS

Pain in the region of the hips and groin made worse on moving the legs.  
If the bladder is injured there is often a desire to pass urine.  
If passed, the urine may be bloodstained.

#### SIGNS

Tenderness on pressure on the pelvic bones.  
Signs of internal haemorrhage.

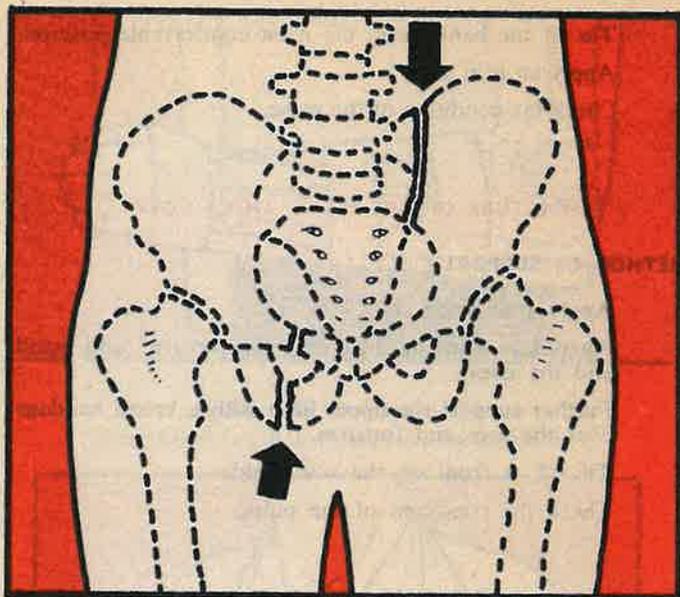


Fig. 114—A fractured pelvis.

#### METHOD OF SUPPORT

Place the casualty flat on the back with the knees slightly bent and supported by a folded blanket.

Remove the contents of nearby pockets.

Instruct the casualty to avoid trying to pass urine.

Apply two broad bandages firmly round the pelvis, with the first immediately above and the second immediately below the seat of the pain.

The lower bandage should overlap the upper to half its extent.

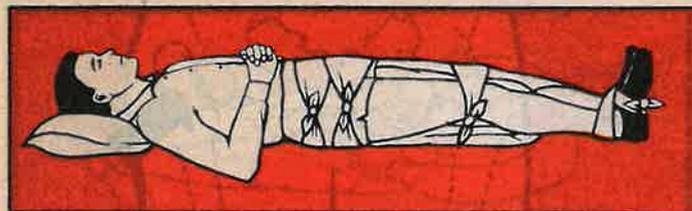


Fig. 115—Immobilisation of a fractured pelvis.

Place soft padding between the knees and the ankles.

Apply a narrow bandage as a figure of eight around the ankles and feet.

Apply a broad bandage around the knees.

Tie off the bandages on the sound side.

Support the pelvis on either side with rolled up blankets.

#### FRACTURES OF THE BONES OF THE LOWER LIMBS

##### FRACTURES OF THE FEMUR

Commonly occur in—

The neck.

The shaft.

##### FRACTURED NECK OF FEMUR

These fractures usually occur in elderly persons who trip and fall.



Fig. 116—A fractured neck of femur.

### SYMPTOMS

Loss of power in the limb.  
Pain over the hip.

### SIGNS

Tenderness over the hip.  
Pain on moving the limb.  
The foot on the affected side is commonly rolled outwards compared with the sound side.  
The limb is often shortened.  
Bruising around the hip.

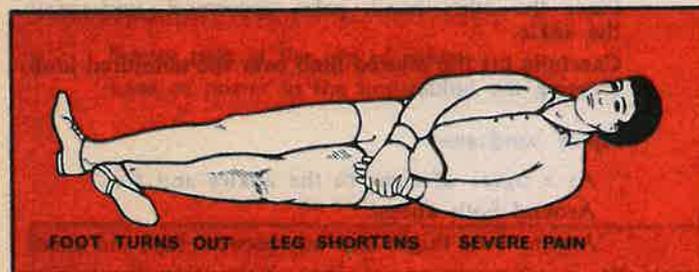


Fig. 117—Showing shortening and deformity.

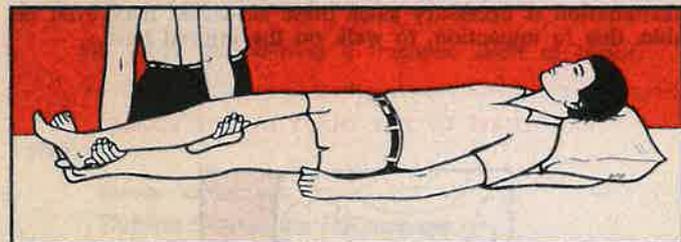


Fig. 118—Immobilising a fractured neck of femur.

### METHOD OF SUPPORT

With the casualty on the back support with the head and shoulders slightly raised.  
Extend the uninjured lower limb and draw the foot into the middle line of the body.  
Place padding over the knee and instep.  
Kneeling on the injured side place one hand, palm uppermost, underneath the thigh on the injured side close to the knee.

## FIRST AID

Place the other hand, palm uppermost, underneath the ankle.

Carefully lift the injured limb over the uninjured limb, crossing the ankles.

Apply bandages—

As a figure of eight to the ankles and feet.

Around both knees.

Around both thighs mid-way between hips and knees.

Place padding to the outside of both calves and feet.

### NOTE

An elderly person who, after a fall, complains of pain in the region of the hip joint should be considered as having a fractured neck of femur until proven otherwise. Careful examination is necessary since these casualties may even be able, due to impaction, to walk on the injured limb.

### FRACTURES OF THE SHAFT OF THE FEMUR



Fig. 119—A fractured shaft of femur.

## FIRST AID

### SYMPTOMS

Severe pain at the site of injury.

Loss of power in the limb.

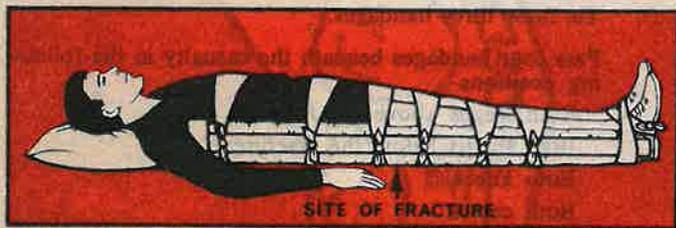


Fig. 120—Immobilising a fractured shaft of femur.

### SIGNS

Gross tenderness.

Deformity over the fracture site.

Swelling due to the large amount of internal haemorrhage that takes place; this is always marked.

Shortening is commonly present.

Signs of severe shock are present.

### METHOD OF SUPPORT

Apply steady traction to the foot, drawing the limb alongside the uninjured limb.

Place a well padded splint between the limbs extending from the ankle to the groin.

Apply a narrow bandage as a figure of eight round the ankles and feet.

## FIRST AID

Pass three bandages under the casualty in the following order—

- The chest, just below the armpits.
- The pelvis, in line with the hip joints.
- The ankles and feet.

Place a long splint along the outside of the leg extending from the armpit to the feet.

Tie these three bandages.

Pass four bandages beneath the casualty in the following positions—

- Both thighs above the fracture.
- Both thighs below the fracture.
- Both knees.
- Both calves.

All are now tied off in turn over the centre of the outside splint.

### FRACTURE OF THE PATELLA (KNEE CAP)

#### SYMPTOMS

- Pain over the patella.
- Loss of power at the knee.

#### SIGNS

- Tenderness over the knee cap.
- Swelling about the front of the knee.
- Sometimes a gap can be felt on the front of the knee.

#### METHOD OF SUPPORT

- Place the casualty in a semi-recumbent position.
- Gently place a splint—long enough to reach from the buttocks to just beyond the foot under the limb.
- Raise and support the splint well off the ground.

## FIRST AID

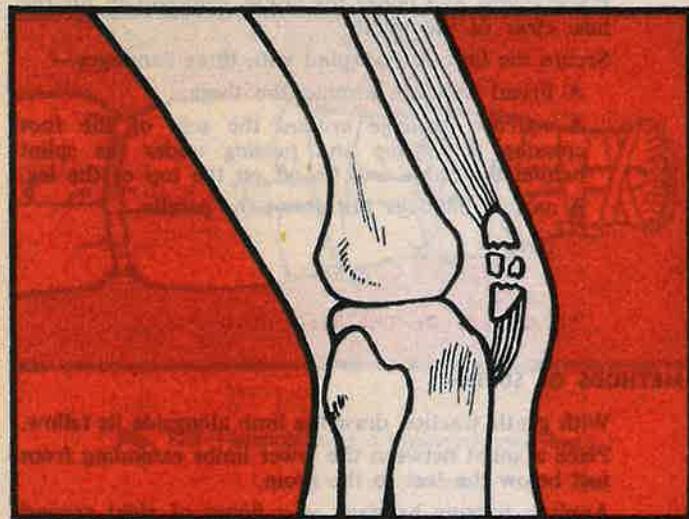


Fig. 121—Fracture of the patella.



Fig. 122—Immobilising a fractured patella.

## FIRST AID

Place a firm pad under the ankle, sufficient to lift the heel clear of the splint.

Secure the limb to the splint with three bandages—

A broad bandage around the thigh.

A narrow bandage around the sole of the foot crossing the instep and passing under the splint behind the ankle and tie off on the top of the leg.

A narrow bandage just above the patella.

### FRACTURES OF THE TIBIA AND FIBULA

#### METHODS OF SUPPORT

With gentle traction draw the limb alongside its fellow. Place a splint between the lower limbs extending from just below the feet to the groin.

Apply a narrow bandage as a figure of eight around the ankles and feet.

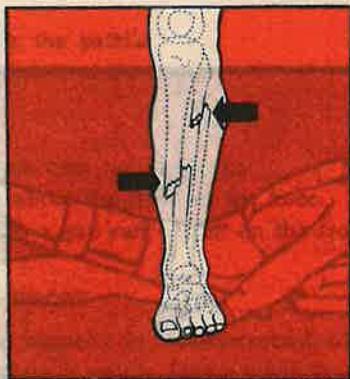


Fig. 123—Fracture of the tibia and fibula.

## FIRST AID

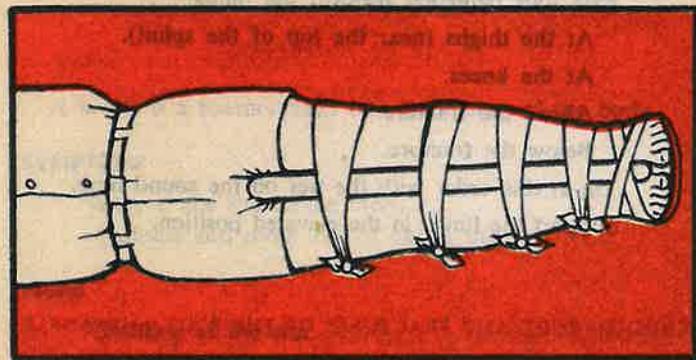


Fig. 124—Immobilising a fractured lower leg.



Fig. 125—Fracture about the ankle.

## FIRST AID

Pass four bandages beneath the limbs—

At the thighs (near the top of the splint).

At the knees.

Above the fracture.

Below the fracture.

Tie in this order with the ties on the sound limb.

Support the limbs in the elevated position.

### CRUSHED FOOT AND FRACTURES OF THE FOOT AND ANKLE

When a wound is present or suspected—

Gently remove the shoe and sock.

Treat the wound.

Apply a splint to the sole of the foot, reaching from the heel to the toes.

Secure the splint to the foot with a double figure of eight.

Using a broad bandage commence with the top border of the bandage on the splint level with the ball of the big toe.

Cross the ends over the instep and then back around the lower leg.

Cross again and bring over the instep once more.

Once more cross and tie over the sole of the foot on the splint.

Raise the foot and support.

If no wound is present or suspected, do not remove the shoe or boot.

Secure with a double figure of eight.

Raise and support the foot.

## FIRST AID

### INJURIES TO MUSCLES, LIGAMENTS AND JOINTS

#### CONTUSION OR BRUISE

A bruise is a haemorrhage into the tissues of the body.

#### SYMPTOMS

Pain at the site of the blow.

Stiffness and some loss of use at the site.

#### SIGNS

Swelling at the site.

Tenderness at the site.

Discolouration—red at first, later becoming black and blue.

#### TREATMENT

Rest and elevate the part.

Apply ice packs or cold compresses.

Apply firm pressure to the part.

#### STRAIN

A strain is the result of overstretching of a muscle or tendon.

#### SYMPTOMS

Pain in the region—usually of sudden onset and sharp in nature.

Loss of power.

Pain on movement.

#### SIGNS

Tenderness over the muscle.

Pain if the muscle is stretched.

## FIRST AID

Support the lower jaw as for a fracture without trying to close the mouth.

### DISPLACED CARTILAGE OF THE KNEE

If the knee is suddenly subjected to violent twisting strain, a cartilage may be displaced or torn.

#### SYMPTOMS

Severe pain over the joint line.  
Inability to straighten the knee—any attempt causes severe pain.

#### SIGNS

Tenderness over the joint line.  
Swelling of the joint.

#### TREATMENT

Apply ice packs or cold compresses.  
Apply a firm bandage in the most comfortable position.  
Seek medical aid as quickly as possible.

## FIRST AID

### GLOSSARY

SPLEEN—Organ in abdomen.  
FEMUR—Thigh bone.  
TIBIA—Main long bone below knee.  
FIBULA—Smaller long bone below knee.  
SECRETION—Fluid from glands in body.  
HUMERUS—Long bone of upper arm.  
RADIUS—Long bone of lower arm.  
ULNA—Long bone of lower arm.  
PATELLA—Knee cap.  
DISLOCATION—Displacement of joint.

## FIRST AID

### TREATMENT

Prevent further damage and treat by—

- Controlling haemorrhage and reducing the swelling.
- Preventing further overstretching and damage.
- Supporting the injured muscle with pressure.
- Encouraging gentle exercise to reduce painful spasm and shortening.
- Avoiding all massage.

### SPRAINS AND DISLOCATIONS

These are injuries caused when the ligaments which bind the opposing bony surfaces together are forced beyond their normal range, leading to stretching or tearing and the displacement of joint surfaces.

If the force applied is sufficiently violent, the ligaments may be completely disrupted and the bones pushed out of their normal contact with each other.

This is a dislocation.

Whether sprained or dislocated, an injured joint is very painful and cannot be moved without increasing the discomfort.

Swelling is usually marked and discolouration, due to haemorrhage beneath the skin, develops quickly.

Prompt application of ice packs or cold compresses to the injured area, together with firm bandaging and elevation, control the swelling.

Remember that sprains and dislocations are often associated with fractures of adjacent bones.

Medical aid must be sought.

Do not attempt to reduce a suspected dislocation.

### TREATMENT OF SPRAINS

- Rest the joint in the most comfortable position.
- Elevate the limb.

## FIRST AID

- Expose the joint and apply a firm bandage.
- Apply ice packs or cold compresses over the joint.
- In all doubtful cases treat as for a fracture.

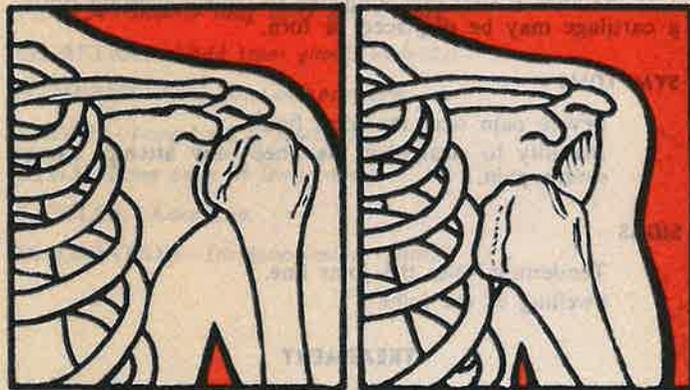


Fig. 126—A dislocated shoulder.

### TREATMENT OF DISLOCATIONS

- Do not attempt to reduce the dislocation.
- Obtain medical aid at once.

In the case of a limb—

- Rest the joint in the most comfortable position.
- Elevate if possible.
- Expose the joint and apply ice packs or a cold compress.
- Use soft padding to eliminate any jolting during transport.

In the case of the lower jaw—

- The casualty is unable to close the mouth.
- Remove any dentures.

## FIRST AID

### NOTES

## FIRST AID



# HEAT AND COLD ABNORMALITIES

---

*Extreme heat and cold cause injuries  
and abnormal states in tissues.*

---

### BURNS

Burns are the damage to body tissues caused by exposure to excess heat.

They occur from—

#### DRY HEAT

from—

A fire.

A flame.

Contact with hot objects.

## FIRST AID

An electric current.  
Exposure to sun rays.  
Excess friction.

### MOIST HEAT

from—

Hot water or steam. These burns are called scalds.

### EXCESS HEAT CAUSES

Death of the superficial layers of the skin or in severe cases the whole skin and deeper tissues.

Damage to the superficial capillaries with out-pouring of serum from the blood.

A raw area ideal for the invasion of organisms and infection.

Severe pain from exposure to the air of bare nerve endings.

The injured area rapidly to become red, swollen, blistered and painful.

Shock occurs in burns because of—

Loss of fluid (serum) from the blood.

The extreme nervous reaction to burning.

Pain.

Toxins from the dead cells.

Infection if this is allowed to occur.

### THE CLASSIFICATION OF BURNS

Burns are classified according to—

Their depth.

The area of the body surface burnt.

### SUPERFICIAL BURNS

Here only the outer layers of the skin are damaged.

The area is red and painful.

Blisters may form.

## FIRST AID

### DEEP BURNS

In these burns the full thickness of the skin is destroyed and underlying fat and muscle are burned.

The area has a yellowish white appearance and is less painful because the nerve endings in the skin have been destroyed.

### THE AREA OF THE BODY SURFACE INVOLVED

The larger the area burned, the greater the shock and the more seriously ill the casualty.

The area burned is assessed as a percentage of the body surface.

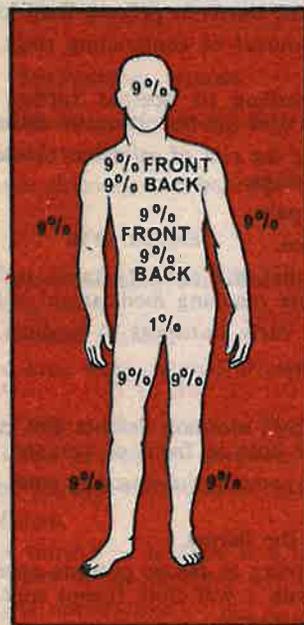


Fig. 127—Estimating the area of burns.

## FIRST AID

This can be calculated by the Rule of Nines (see fig. 127).  
All burns are serious.

Burns exceeding 10% of body surface are dangerous and if exceeding 33% are often fatal.

### AIMS OF TREATMENT

Remove the casualty from danger.

Prevent further burning by—

Putting out burning clothes.

Washing away corrosives.

Holding the burned area under cold water tap.

Prevent further development of shock by—

Covering the burns to prevent fluid loss and pain.

Prompt removal of constricting rings, bracelets, belts, etc.

Gentle handling to prevent further pain, death of tissue cells and the liberation of toxins.

Minimising the risk of infection by clean handling and clean dressings.

Relief of pain.

Reassurance.

Ensuring that the casualty takes sufficient fluid if a delay before reaching medical aid is likely.

Arranging early transport to medical aid.

### NOTES ON RESCUE OF BURN CASUALTIES

When a casualty's clothing catches fire, approach holding a rug, blanket or coat in front of yourself.

- Wrap it around the casualty and lay the casualty flat.
- Smother the flames.
- In attempting to rescue persons cover your nose and mouth with a wet cloth (keeps superheated air from the air passages).
- Move keeping as low as possible (the coolest and purest air is near the ground).

## FIRST AID

- Open doors cautiously (avoid a blast of flame and hot air).
- Remove any electrical contact before quenching flames with water.
- Tear off smouldering clothes.

### TREATMENT OF BURNS

Cold compresses after irrigating the burns with cold running water greatly reduce the swelling and pain in burns. This treatment should be used in all burns.

Because serum pours out of burnt tissues, and as serum and the raw area encourage the growth of micro-organisms and lead to infection, clean handling and covering with clean (preferably sterile) dressings will help to control this complication.

### SUPERFICIAL BURNS

Where there is reddening and minor blister formation—

Wash with cold water.

Apply a sterile dressing and bandage firmly.

### DEEP BURNS

Remove or cut away clothing over the burned area but leave clothing that is stuck.

Wash liberally with cold water.

Cover the burned area with a sterile or clean dressing and bandage securely.

Cover large burns with a clean sheet or towel.

In burns of the face, provide an adequate airway.

Do not apply any lotions, ointments or oily dressings.

Do not prick blisters.

If the casualty is thirsty, or if there is a long delay, give small amounts of water or tea, **unless—**

The casualty is unconscious.

Medical aid is readily available.

Transport the casualty to medical aid without delay.

## FIRST AID

### SUNBURN

Prolonged exposure to the sun may lead to extensive superficial burns with blister formation.

The distress of sunburn without blister formation can be alleviated by—

Applying cool moist compresses.

Resting the casualty in a cool place.

Giving copious fluids.

Serious sunburn with severe blistering needs medical attention after this treatment.

### CHEMICAL AND CORROSIVE BURNS

Wash off immediately with a large volume of water.

Remove contaminated clothing but avoid contaminating yourself.

Apply a neutralising agent if available.

For acids—a solution of baking soda.

For alkalis—dilute vinegar.

Apply a dressing.

### ELECTRICAL BURNS

(See page 91).

### ADDITIONAL HAZARDS OF BURNS

Asphyxia due to lack of oxygen (the fire has used up oxygen.)

Carbon monoxide poisoning due to incomplete combustion.

Chemical fumes have a very irritating effect on the respiratory tract.

In all these cases treat the asphyxia.

### EFFECTS OF HEAT

#### Regulation of the body temperature

Body cooling is effected by—

Evaporation of sweat from the surface of the body.

Evaporation of moisture from the alveoli of the lungs.

## FIRST AID

The total area of the lining of the alveoli is many times the surface of the skin, and so this is the more important of the two mechanisms.

When air passes over a moist surface, the surface cools. In hot weather or in places where the temperature is high, the first reaction of the body, therefore, is to sweat freely, and the evaporation of sweat helps to lower the body temperature. There is also an increase in the rate of respiration to accelerate evaporation of fluid inside the lungs.

The mechanism controlling body heat is governed by the heat regulating centre in the base of the brain, and if this centre fails, the body temperature rises.

In general, the body can withstand outside temperatures up to 140°F (Fahrenheit) if the air is dry, but in moist air evaporation from body surfaces is reduced and consequently the cooling process is seriously affected. Humid weather is much more distressing than a hot, dry day, and if the air contains a large amount of water vapour, the body will not withstand temperatures of higher than 120°F for very long.

**Heat exhaustion** is the first stage.

It is caused by—

Exposure to excessive heat, especially if the humidity is high.

This causes—

Excessive fluid loss by sweating and evaporation from the surface of the body and from the alveoli of the lungs and

Loss of salt in the sweat.

### SYMPTOMS

The casualty feels hot and stifled for air.

Headaches occur.

Giddiness and a tendency to feel faint follow.

Cramps are frequent.

## FIRST AID

### SIGNS

The casualty is pale and exhausted and sweats freely. The pulse and breathing are rapid. Fainting is common.

### TREATMENT

Place the casualty at rest in a cool place. Sponge the casualty with cold water. Give plenty of water (containing a teaspoonful of salt to the pint) to drink.

### HEAT STROKE

**Heat stroke** is a much more serious condition, caused by— Failure to treat heat exhaustion early, so that the heat regulating centre in the brain begins to fail, and there is a breakdown in the heat regulating mechanism of the body. The body temperature begins to rise.

### SYMPTOMS

Headache.  
Irritability.  
Nausea and vomiting.  
Faintness.

### SIGNS

Sweating ceases.  
The skin becomes hot and dry.  
Body temperature rises rapidly to very high levels.  
Mental disturbance and unconsciousness occur.

### TREATMENT

Remove to a cool place. Cool the casualty down by removing clothing; sprinkling with water; wrapping in a wet, cold sheet; rubbing down with ice.

## FIRST AID

Fan by hand or by electric fan, ensuring that the sheet is kept damp.

If conscious give frequent drinks of salt and water, one teaspoonful of salt to a pint of water.

Arrange for medical aid as a matter of urgency.

### SURVIVAL IN THE DESERT

Sun, heat and lack of water are the problems.

### SHELTER

Utilise whatever shade is available.

During the daytime cover the body, including the head, to protect against—

Sunburn.

Heat.

Sand.

Insects.

Clothing should be worn loose and flapping.

### WATER

Requirement is a gallon a day in hot weather.

Conserve by—

Controlling perspiration.

Keeping in shade.

Keeping clothed.

Resting during daytime.

Water may sometimes be found by digging in dried lakes or creek beds but must be sterilised.

### TRAVEL

Travel only at night—

If direction of travel and destination are known.

If direction of travel is marked.

## FIRST AID

### SIGNALS

Adequate signals should be laid out and casualty should remain near the signals.

### EXPOSURE TO COLD

The effect of cold is insidious and may pass unnoticed.

### SYMPTOMS

Increasing slowness of physical and mental effort.  
Cramps and shivers.

### SIGNS

Unreasonable behaviour and irritability.  
Difficulty in speech.  
Difficulty in vision.  
Stumbling.

### TREATMENT

Take shelter.  
Keep warm.  
Use all clothing available.  
Use newspapers as insulation.  
Protect from the wind.  
Give warm sweet drinks if available.  
Send for help or get the casualty to medical aid, insulated from the cold during transport.  
If available, rapidly warm the casualty in a hot bath (water as hot as the elbow can stand).

### FROSTBITE

During very cold weather, especially if there is also a strong wind, frostbite is liable to occur on the nose, chin, ears, fingers, toes.

## FIRST AID

After being painfully cold the affected parts become waxy white in appearance and feel quite numb.

Whiteness and numbness are danger signals which must not be overlooked—prolonged freezing will do irreparable damage.

Persons exposed to severe cold must learn to watch each other's faces for the tell-tale changes of colour—a white patch on a red face.

At the same time, the development of numbness in hands or feet must be recognised as an emergency requiring urgent treatment.

### TREATMENT OF FROSTBITE

Gradual warming by body heat is the safest way to relieve minor frostbite.

If the face or ear is affected, cover the frozen patch with a gloved hand until normal colour and sensation return.

In the case of frozen fingers or toes, remove tight gloves or boots.

The hand may be placed under the clothing in the armpits.

The feet may be wrapped in a warm blanket or snuggled under a companion's jacket.

In treating minor frostbite—

Do NOT rub.

Do NOT rub with snow.

Do NOT apply direct heat in any form.

All cases of severe frostbite resulting from prolonged exposure to extreme cold and involving large parts of the body such as feet or hands must be recognised as "serious" injuries needing urgent medical care, preferably in hospital.

In such cases the tissues are frozen deeply below the skin surface—the involved area is white, cold, insensitive, hard and solid like wood.

No attempt must be made to thaw severe frostbite as a first aid measure.

These cases must be hurried to medical care without rewarming the injured parts of the body.

## FIRST AID

Whenever possible they should be transported by stretcher and be protected against further cold injury by adequate clothing, food and hot drinks.

They should not, however, be allowed to smoke or drink alcoholic beverages.

If transportation cannot immediately be arranged, these casualties should be made to walk even if they have frozen feet.

The over-riding considerations are—

To get them to hospital quickly.

To avoid thawing the frozen part before admission to hospital.

## GLOSSARY

**CORROSIVE**—*Substance that eats in.*

# 12

## THE NERVOUS SYSTEM

*Controls all the functions  
of the body.*

It consists of the brain and the spinal cord and all the nerves which pass to and from these structures to all parts of the body.

The nervous system controls and co-ordinates all functions of the body.

It is responsible for the control of movements of voluntary muscles.

Motor nerves control movement and pass directly from the brain, or by way of the spinal cord, to the muscles.

The nervous system also receives and interprets information coming to it from the sense organs of sight, hearing, balance,

## FIRST AID

touch, pain, temperature, taste and smell, situated in the eye, ear, skin, joints, tongue and nose.

Sensory nerves lead from these sense organs to the spinal cord and brain.

From the information received from these sense organs, the brain can learn and store knowledge (the memory) and it can use this knowledge to decide upon a course of action.

Autonomic or sympathetic nerves control the involuntary muscles in—

The heart and blood vessels.

The bowel.

The glands.

The bronchi.

And other organs.

Cutting a sensory nerve leads to loss of function of the sense organ, e.g. cut the optic nerve from the eye, and the eye is blind.

Cutting a motor nerve leads to paralysis of the muscle supplied.

Damage from injury, loss of blood supply, toxins or abnormal stimulation can lead to loss of normal function in the brain and spinal cord, giving rise to various degrees of malfunction, unconsciousness and paralysis.

### UNCONSCIOUSNESS

Unconsciousness manifests itself as a clouding of mental activity on the one hand or a deeply comatose state on the other hand.

It can be progressive and this will only become apparent on re-examination of the casualty at intervals.

The casualty may be in danger because of—

Inability to appreciate and react to danger.

Inability to maintain a clear airway.

An inadequate circulation to the brain and other vital organs.

Inadequate respiration.

## FIRST AID

### THE AIMS OF FIRST AID

To remove the casualty from the cause, or the cause from the casualty.

To maintain a clear airway.

To maintain a satisfactory oxygen supply to the brain by—

Sustaining the circulation.

Sustaining the respiration.

Controlling shock.

To assess and treat other injuries.

To obtain medical aid as soon as possible.

### TREATMENT

Having removed the casualty from the cause or the cause from the casualty—

Clear any obstruction to the airway.

Check the pulse. If the pulse is absent, commence external cardiac compression.

Check the breathing. If breathing has stopped or is failing commence artificial respiration.

Control haemorrhage.

Quickly check for any other injuries, particularly injuries to the spine.

Place the casualty in the coma position. This will permit secretions, blood, vomit, food to drain from the mouth and not obstruct the air passages.

Assess the level of unconsciousness by—

The response to touch, command, pain.

Whether the breathing is quiet, rapid, stertorous (noisy), bubbly.

Whether the casualty lies quietly or is restless.

The size, equality and reaction of the pupils—normal pupils are equal in size and react to light by getting smaller.

Loosen clothing about the neck, chest and waist.

Maintain a careful watch on the colour of the casualty.

## FIRST AID

The casualty will become cyanotic or pallid in colour if oxygen is not in adequate supply. If the casualty is a pink colour, the circulation is adequate. Aim at this.

Do not give anything by mouth.

Never leave the casualty unless in the care of a responsible person.

Look in the pocket or handbag of casualty for a medical treatment card.

### TO PLACE THE CASUALTY IN THE COMA POSITION

If the casualty is lying on the back—

Cross the casualty's right leg over the casualty's left leg.

Kneel on your right knee at the casualty's side.

Place the casualty's right arm across the casualty's chest.

Extend the casualty's left arm, palm uppermost, out at an angle of 45 degrees from the body.

Roll the casualty on to the left side.

Bend the casualty's right leg up to a right angle.

Place the casualty's right hand under the left cheek.

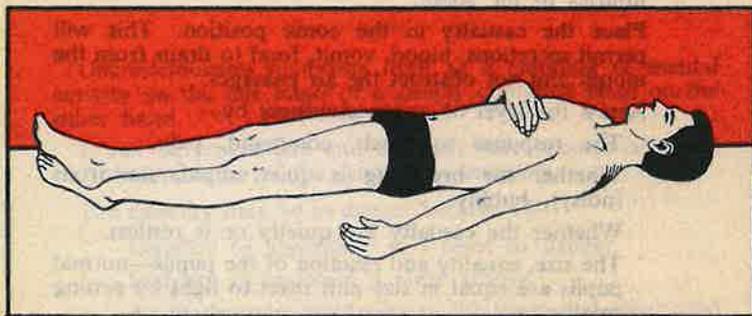


Fig. 128—First stage.

## FIRST AID



Fig. 129—Second stage.

Placing the casualty in a coma position.

Turn the head to one side in the backward tilt position.

Gently pull the casualty's left arm through to the back. This maintains the casualty's position.

If the right leg cannot be flexed, then support in this position with pillows, folded up blanket or rug, in front of the legs.

When the casualty is lying on the side or face downwards, this position is much easier to adopt.

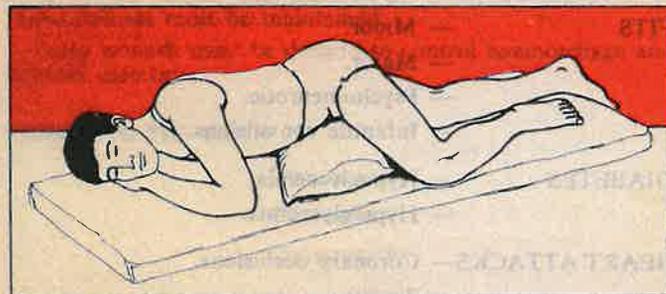


Fig. 130—Coma position—front view.

## FIRST AID



Fig. 131—Coma position—back view.

### CAUSES OF UNCONSCIOUSNESS

- HEAD INJURIES — Concussion of brain.  
— Contusion of brain.  
— Compression of brain.

### STROKE

### FAINING

### DRUNKENNESS

### FITS

- Minor.
- Major.
- Psycho-neurotic.
- Infantile convulsions.

### DIABETES

- Hypoglycaemia.
- Hyperglycaemia.

### HEART ATTACKS—

- Coronary occlusions.
- Angina.
- Cardiac congestion.

## FIRST AID

ASPHYXIA (see Chapter 5).

POISONS (see Chapter 16).

SHOCK (see Chapter 8).

### HEAD INJURIES

Trauma to the head may cause—

- Injury to the soft tissues.
- Fracture of the skull.
- Injury to the brain.

### INJURY TO THE SOFT TISSUES

Lacerations of the scalp bleed freely but are easily controlled by firm pressure.

If the blow has caused any disturbance of consciousness, no matter how brief, medical aid must be sought.

### FRACTURE OF THE SKULL

These injuries are significant largely because of the damage to the underlying brain and scalp wounds.

The fracture itself rarely requires treatment.

However, careful and continuous watch on the state of consciousness must be maintained.

Scalp wounds must be dressed to control haemorrhage and prevent infection.

### INJURY TO THE BRAIN

Concussion.

Contusion.

Compression.

Three major upsets may occur in the brain from injury. The brain may be concussed, i.e. temporarily thrown out of

## FIRST AID

action, usually associated with brief loss of consciousness. The after effects, however, may last for days.

The brain may be bruised or torn (contusion).

The brain may be compressed within the skull due to blood or fluid accumulating inside the skull.

Remember combinations of these conditions occur.

Fractures of the neck are found associated with head injuries and must be carefully looked for.

### CONCUSSION

Concussion is a disturbance of the function of the brain, not necessarily associated with any change in the brain substance.

Brain shaking is a good description.

#### SYMPTOMS

Headaches after a head injury.

A loss of memory for events before and after the injury is frequent.

Nausea and often vomiting.

Blurring of vision.

#### SIGNS

A loss or clouding of consciousness.

#### TREATMENT

If unconscious place in the coma position.

Check the airway.

Check the pulse.

Check the breathing.

Control haemorrhage.

Check for associated injuries.

Record the level of consciousness at half hourly intervals for several hours.

## FIRST AID

### WARNING

- No head injury should be regarded or treated lightly.
- Every casualty who has had even a mild injury to the head is to be observed thoroughly to detect the onset of complications.
- Advise the casualty who has been unconscious, even for a moment, to seek medical aid.
- A return of unconsciousness is a sign of serious danger.

### CONTUSION OF THE BRAIN

When the surface or the deeper parts of the brain receive damage contusion is said to have occurred.

This is a more serious matter.

#### SIGNS

A state of altered consciousness exists from the time of the accident.

The contusion may be slight or severe in degree—in the latter case the casualty is deeply unconscious.

Weakness of one side of the body may occur.

Breathing may be stertorous (snoring).

#### TREATMENT

As for concussion.

### COMPRESSION OF THE BRAIN

Compression is caused by a collection of blood or fluid within the skull pressing on the brain.

The commonest causes are fractures of the skull and stroke.

## FIRST AID

### SIGNS

In its early stages irritation of the brain may occur, causing, for example, twitching of the limbs, convulsions or epileptiform fits.

Congestion of the face.

Vomiting if conscious.

The breathing becomes stertorous.

The pulse becomes slow and full.

The pupils of the eyes may become unequal or they may both dilate.

The body temperature may rise.

Weakness or paralysis may appear on one side of the face or body.

As compression develops, the casualty's conscious level falls.

### TREATMENT

As for concussion.

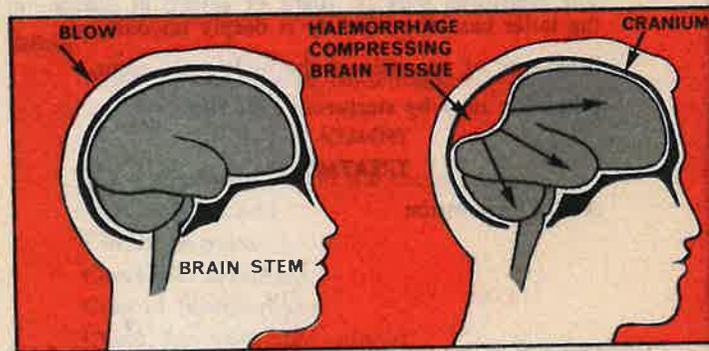


Fig. 132—Compression of the brain.

## FIRST AID

### STROKE

This occurs most commonly in elderly people suffering from high blood pressure.

It is caused by a haemorrhage or blood clot in the brain.

It can, however, occur in the young.

The part of the brain affected is cut off from its blood supply or compressed and damaged by haemorrhage.

The casualty—

Might give a history of high blood pressure.

Frequently complains of very severe headache.

May lose the ability to move one or more limbs (commonly on one side of the body).

May have paralysis of one side of the face and complain of difficulty in swallowing and speaking.

### SIGNS

The casualty might suddenly or gradually lose consciousness.

The face is often flushed and congested.

Limp paralysis of one side of the body may be present.

Breathing may be stertorous.

The head and eyes are often turned to the side of the brain damage.

The pupils may be unequal.

The pulse may be full and bounding.

### TREATMENT

If the casualty is conscious, support the head and shoulders on pillows.

Loosen clothing about the neck, chest and waist.

Reassure and keep the casualty cool.

Wipe away collections of saliva and mucus from the mouth.

If unconscious, place in the coma position.

Assess the level of consciousness. (see p. 183).

## FIRST AID

### FAINING (SYNCOPE)

Fainting is due to a temporary disturbance of the nervous control of the blood vessels, allowing the arterioles to dilate so that blood is pooled in the tissues.

Not enough blood returns to the heart and an inadequate supply of blood to the brain results.

Usually it is in response to—

A nervous shock.

Some injury.

Standing still for a long time.

Sudden postural change.

Remember internal haemorrhage can also lead to fainting

Always exclude this.

### SYMPTOMS

Giddiness, unsteadiness and blurred vision.

The casualty becomes cold and clammy.

Yawning occurs.

Weakness and loss of consciousness.

### SIGNS

Unconsciousness.

Pale, cold and clammy skin.

Shallow breathing.

The pulse is weak and slow.

### TREATMENT

Lie the casualty down with legs raised and head lowered.

Encourage deep breathing if conscious.

Loosen clothing around neck, chest and waist.

Ensure a liberal supply of fresh air.

If the casualty is in the sitting position and cannot lie flat, press the head between the knees.

Reassure the casualty.

## FIRST AID

### DRUNKENNESS

The cause of unconsciousness is usually apparent from the smell of the breath.

However, remember that a casualty whose breath smells of alcohol may not be drunk, but may have fallen and suffered head injuries.

All unconscious drunk persons should be transported to medical aid in the coma position.

### FITS

Fits are caused by a disturbance of the brain function.

They may be—

Minor fits.

Major epileptic fits.

Psycho-neurotic.

Infantile convulsions.

### MINOR FITS

### SIGNS

The casualty suddenly pales.

The eyes become fixed and staring.

For one or two moments the casualty may appear to be inattentive or day-dreaming.

The casualty may drop any object held.

On recovery there is no recollection of the event.

No first aid treatment is required, but the casualty must be kept under observation for some hours because of post-epileptic automatism.

## FIRST AID

### MAJOR EPILEPTIC FITS

#### SIGNS

Attention may be drawn to the fit by the "cry of the epileptic" (expiration of air through the vocal cords in spasm).

The casualty falls to the ground unconscious and lies rigid for some seconds.

The face and neck become congested and cyanosed because the breath is held.

This stage is followed by convulsions (jerking spasmodic movements due to alternatively contracting and relaxing groups of muscles), and the colour improves.

Froth comes from the mouth and may be bloodstained.

There may be incontinence (loss of control of the bladder or bowels).

The casualty then becomes limp.

On regaining consciousness the casualty remains confused and dazed for some minutes and feels exhausted and may fall into a deep sleep.

#### AIMS OF FIRST AID

To prevent the casualty, who has no control, from coming to harm.

Arrange transport to medical aid.

#### TREATMENT

Remove the casualty from danger.

Protect the casualty from injury but do not restrict movements.

Do not try to prise the mouth open.

If opportunity arises, remove any false teeth and place a knotted handkerchief or similar soft object between the jaws to prevent the tongue being bitten: avoid hard objects.

## FIRST AID

Because of the risk of post-epileptic automatism arrange supervision for some hours after the fit.

If the casualty falls asleep, do not disturb.

### PSYCHO-NEUROTIC FITS (HYSTERIA)

These fits occur in some individuals as a reaction to an emotional upset or mental stress.

The attack may closely simulate an epileptic fit, but is more dramatic and is staged to appeal to a sympathetic audience.

The fits vary from a temporary loss of control, during which time the individual may shout and scream, to a more dramatic effort in which the arms are thrown about or clothes or hair are torn with the object of gaining sympathy and support from onlookers.

On the other hand, the casualty may give a plausible demonstration of an epileptic fit.

In falling the casualty rarely is injured and is never incontinent.

#### TREATMENT

Isolate the casualty.

Reassure the casualty gently but firmly.

Encourage the casualty to seek medical aid.

### CONVULSION IN INFANTS AND YOUNG CHILDREN

Commonly associated with—

A raised temperature.

A digestive upset.

Constipation.

#### SIGNS

Twitching of the limbs.

## FIRST AID

Congestion of the face and neck.  
Cyanosis may occur.  
Stiffness or rigidity.  
The head and spine may be arched back.  
Rolling of the eyes.

### TREATMENT

Loosen tight clothing about the neck, chest and waist.  
Ensure a clear airway—prevent inhalation of vomitus or mucus.  
If the casualty has a high temperature, reduce it by tepid sponging or blowing a fan onto wet towels on the casualty.  
Seek medical aid.

### EMERGENCIES IN DIABETES

Diabetes is a condition caused by failure of the pancreas to manufacture enough insulin to digest sugar and fat.

It is usually treated by a special diet and by regular injections of insulin. Sometimes tablets with an action like insulin may be taken by mouth.

#### INSULIN LACK, RESULTS IN **HYPERGLYCAEMIA**

(Too much sugar in the blood)

Drowsiness developing into coma may result.

This can happen if too little or no insulin is taken or if a regular insulin injection is forgotten or delayed.

The presence of infection aggravates the lack of insulin.

#### SYMPTOMS

Excessive thirst.  
Drowsiness.

## FIRST AID

### SIGNS

The breath smells strongly of acetone (musty apples or nail varnish remover).  
Disturbance of consciousness.  
Persistent deep breathing.  
A hot dry skin.

### TREATMENT

Get medical advice immediately.  
Look in pockets or handbag for a medical treatment card.  
If you are uncertain whether the symptoms are due to lack of insulin or excess insulin, give a teaspoonful of sugar to the conscious casualty.  
If due to insulin excess, improvement will result.  
No harm will be done in insulin lack.  
If unconscious, place in the coma position.

#### INSULIN EXCESS, PRODUCES **HYPOGLYCAEMIA**

(Too little sugar in the blood)

This will occur in a diabetic taking insulin—

In excess amount.

Who has forgotten to eat a normal meal.

Who has over-exercised.

Who has become over-excited.

### SYMPTOMS

Giddiness.  
Weakness.  
Hunger.

### SIGNS

Profuse sweating.  
Pallor.

## FIRST AID

Rapid pulse.  
Mental confusion and often aggressive behaviour.  
Breathing is quiet.  
Coma may result.

### TREATMENT

If conscious give two teaspoonsful of sugar, either dry or in a drink.

Repeat at 15 minute intervals for one hour or until full recovery occurs.

If unconscious—

Place in the coma position.

Remove to medical aid immediately.

---

### GLOSSARY

**MOTOR NERVES**—Control movement.

**SENSORY NERVES**—Appreciate sensation.

**AUTONOMIC NERVES (SYMPATHETIC)**—Control involuntary movements.

**PALLID**—Pale colour.

**COMA**—State of unconsciousness.

**EPILEPSY**—Condition of the brain leading to fits.

**DIABETES**—Disease of the pancreas.

**SYNCOPE**—Fainting.

**PSYCHO-NEUROSIS**—Hysterical state.

**INSULIN**—Chemical manufactured in the pancreas.

## HEART CONDITIONS

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*Heart attacks may occur due to—  
failure of the heart's blood supply,  
failure of the heart's muscle,  
cardiac arrest.*

---

The heart, like other tissues, requires an adequate blood supply.

Impairment of the heart's blood supply occurs in—

Angina.

Coronary occlusion.

### ANGINA

Chest pain originating in the heart.

The bore of the arteries supplying blood to the heart has been narrowed by disease or spasm.

## FIRST AID

Pain is often induced by over-excitement or over-exertion. The pain radiates from the chest up to the left arm and often into the neck.

It is made worse by exertion.

### SYMPTOMS

Pain in the chest progressing until the casualty is forced to rest.

Shortness of breath.

### SIGNS

The casualty may collapse.

The pulse is sometimes rapid.

### TREATMENT

Place the casualty at rest in the most comfortable position (usually half sitting).

Reassure the casualty.

Loosen clothing about the neck, chest and waist.

If the casualty has tablets for the condition, give one.

### CORONARY OCCLUSION

Blocking of a coronary artery by a blood clot. This will cause—

Death to the part of the heart muscle supplied by the artery.

In serious cases—

Disturbance in the muscular action may lead to ventricular fibrillation (twitching of heart muscle).

Cardiac arrest due either to shock or massive muscular damage.

These call for emergency treatment.

## FIRST AID

If the area is small, recovery can take place with only a little scarring in the muscle.

### SYMPTOMS

The casualty complains of severe vice-like pain behind the breastbone.

It may radiate to the left arm or neck or can resemble acute indigestion.

### SIGNS

The casualty is apprehensive and in great distress.

Pallor and clamminess are prominent.

The pulse may be rapid and feeble or may not be changed in rhythm.

The casualty may become unconscious.

The pulse may be absent because of either cardiac arrest or ventricular fibrillation.

Shock is often prominent in severe cases but may be absent in mild ones.

Pupils may be dilated.

### TREATMENT

Feel for the pulse. If absent, start external cardiac compression and mouth to mouth artificial respiration. If in shock (rapid weak pulse), treat in the coma position.

Loosen clothing about the neck, chest and waist.

If conscious, place in the position which the casualty finds most comfortable.

Do not allow the casualty to move.

Reassure the casualty.

### CONGESTIVE HEART DISEASE

This is a condition caused by the heart muscle being unable to pump blood around the circulation properly.

## FIRST AID

This causes congestion of the lungs and legs.  
The blood is inadequately saturated with oxygen.

### SYMPTOMS

Shortness of breath, especially on effort.  
Irritating cough.  
Giddiness.

### SIGNS

The casualty is pale or cyanosed.  
The pulse is rapid and weak, and often irregular.  
Bloodstained sputum is often coughed up.  
Sudden collapse occurs.  
The ankles may be swollen.

### TREATMENT

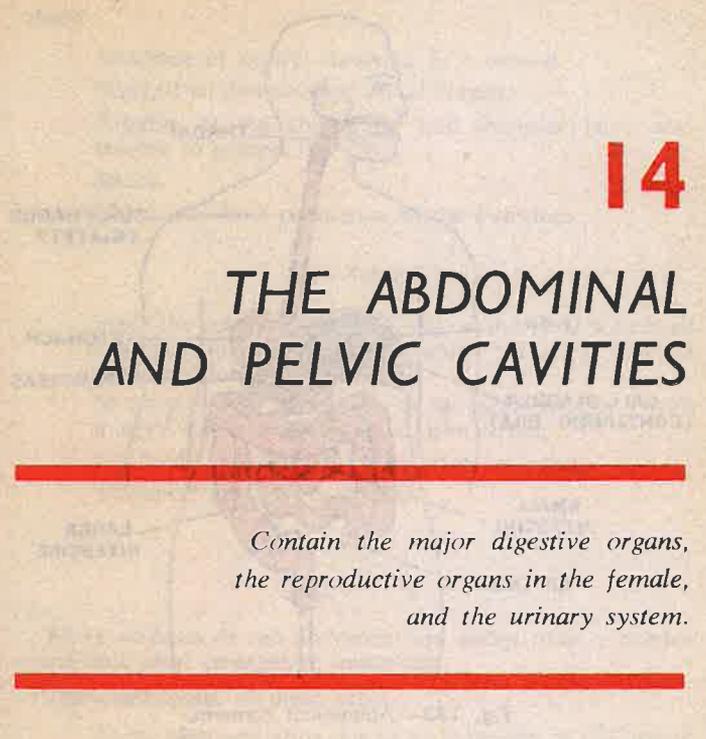
Sit the casualty up, if laid flat breathing is difficult.  
Loosen clothing about the neck, chest and waist.  
Wipe secretions from the mouth and throat.  
Seek urgent medical aid.

### GLOSSARY

ANGINA—*Disease of heart muscle causing chest pain.*  
CORONARY OCCLUSION—*Blocked coronary artery.*  
FIBRILLATION—*Irregular twitching of muscles.*

# 14

## THE ABDOMINAL AND PELVIC CAVITIES



---

*Contain the major digestive organs,  
the reproductive organs in the female,  
and the urinary system.*

---

These cavities are enclosed by the lumbar vertebrae and the sacrum behind, the diaphragm above, the abdominal muscles and pelvis on the sides and front.

### DIGESTION

This is a process by which food eaten is chemically converted into substances which can be absorbed and utilised by the body.

Injury and disease of the digestive organs can lead to the sudden onset of symptoms requiring first aid attention.

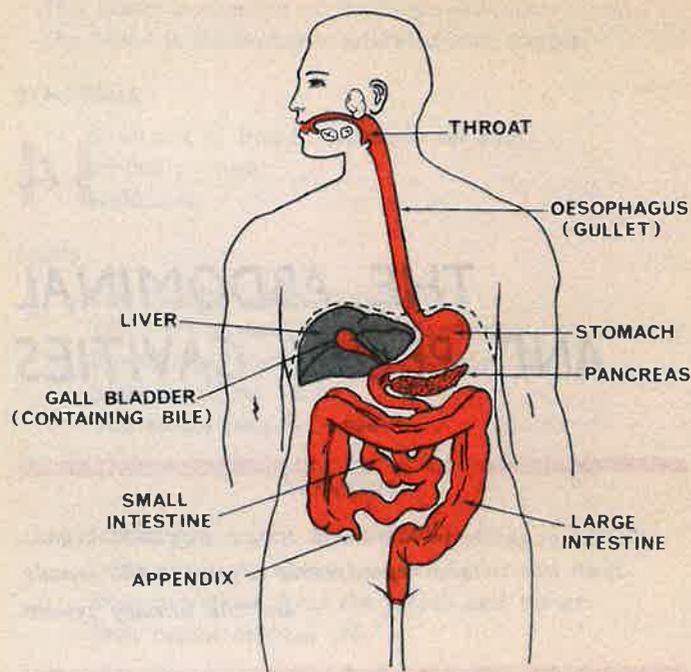


Fig. 133—Abdominal contents.

### WOUNDS OF THE ABDOMEN

Wounds of the abdomen are dangerous because of the risk of damage to the internal organs.

- Treat with caution.
- Suspect internal damage from minor trauma.

### SYMPTOMS

Pain over the site of injury.  
The casualty often vomits.

### SIGNS

Evidence of injury—bruising or a wound.  
Marked tenderness over the abdomen.  
Rigidity of the abdominal wall (muscles have contracted to protect the area).  
Shock.  
There may be a protrusion of the intestines.

### TREATMENT

Place the casualty at rest—lying on the back with head slightly raised and a blanket under the knees to relax the abdominal muscles.

In wounds with protrusion of the intestines cover with a large sterile dressing or a clean towel.

No fluids or foods are to be given by mouth.

Transport gently to hospital.

### ABDOMINAL CONDITIONS

Many diseases of the abdomen and pelvis have a sudden onset and need emergency treatment.

The commonest of these are—

- Acute gastro-enteritis due to an infection of the bowel.
- Acute inflammation of the appendix.
- Acute crises in gastric ulcers and gall bladder disease.
- Acute blockage of the bowel.

A correct diagnosis in these cases can be very difficult.

Treatment often requires emergency surgery.

Early assessment by a doctor is vital.

### SYMPTOMS

Pain, either as a constant ache, or colicky in nature.  
Vomiting.

## FIRST AID

### SIGNS

- Tenderness in the abdomen.
- The pulse and respiration tend to become rapid.
- Rigidity of the abdominal muscles.
- Fever.
- Onset of shock.
- Distension of the abdomen.

### MANAGEMENT

- Put the casualty at rest lying down with the head raised and a blanket beneath the knees.
- No fluids or food to be given by mouth.
- Arrange gentle and rapid transport to medical aid.

### ABDOMINAL HERNIA (RUPTURE)

Abdominal hernia or "rupture" is a protrusion of part of the bowel through the muscular wall but under the skin of the abdomen.

A swelling is present at the site. This occurs most commonly in either groin or at the umbilicus (navel).

There is often an impulse on coughing.

The condition can sometimes come on suddenly, with much pain followed by vomiting.

If strangulation of the bowel occurs, severe pain and tenderness will be present.

### TREATMENT

If pain is present treat as for an acute abdominal emergency.

### A SWALLOWED FOREIGN BODY

Pins and other small objects such as coins or buttons can be accidentally swallowed.

## FIRST AID

- Small objects need not cause alarm.
- Do not give fluids or food by mouth.
- Arrange for medical aid without delay.

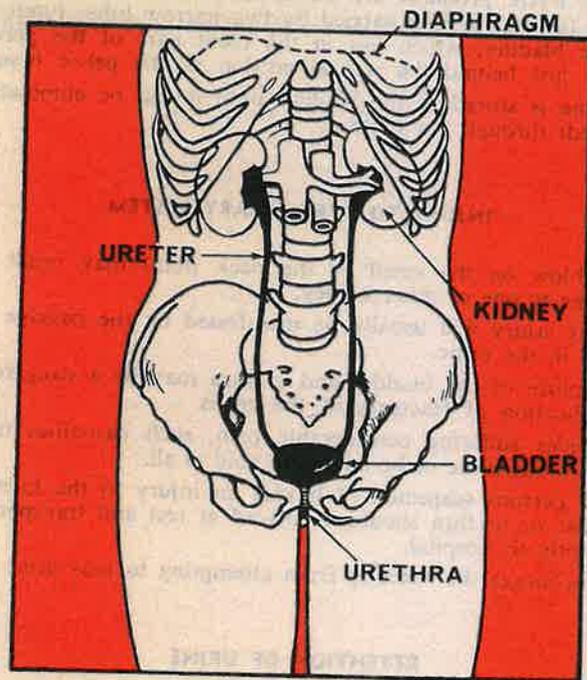


Fig. 134—The Urinary system.

### THE URINARY SYSTEM

#### EXCRETION

The removal from the blood and subsequent discharge from the body of waste products, is accomplished by the kidneys.

## FIRST AID

The kidneys, right and left, lie against the upper part of the back wall of the abdominal cavity, one on each side of the vertebral column just below the diaphragm.

The waste products are extracted from the blood as a liquid (urine). This is carried by two narrow tubes (ureters) to the bladder, which lies in the front part of the pelvic cavity just behind the central portion of the pelvic bones.

Urine is stored in the bladder until it can be eliminated (voided) through the urethra.

### INJURY TO THE URINARY SYSTEM

A blow on the small of the back (loin) may result in damage to one or other kidney.

This injury will usually be manifested by the passage of blood in the urine.

Rupture of the bladder and urethra may be a dangerous complication of fractures of the pelvis.

Besides suffering considerable pain, such casualties may pass bloody urine or be unable to void at all.

All persons suspected of having an injury to the kidney, bladder or urethra should be placed at rest and transported promptly to hospital.

Discourage the casualty from attempting to pass urine.

### RETENTION OF URINE

The casualty cannot pass urine.

This is a painful and frightening condition requiring urgent treatment.

### TREATMENT

Apply heat to region.

Place in a warm bath.

Reassure to allay fear.

Send the casualty to hospital.

## FIRST AID

### GLOSSARY

**HERNIA**—*Rupture in the abdominal wall.*

**URETER**—*Tube leading from the kidney to the bladder.*

**URETHRA**—*Tube leading from the bladder to the exterior.*

MISCELLANEOUS  
CONDITIONS

NOTES

15

MISCELLANEOUS  
CONDITIONS

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*A collection of common  
first-aid problems.*

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**HICCOUGH**

This is commonly the result of a digestive or kidney upset, but may be caused by nervousness.

Relief can frequently be obtained by—

Sips of water.

Holding the breath.

Rebreathing into a paper bag.

## FIRST AID

### WINDING

Is the result of a blow in the upper part of the abdomen affecting the solar plexus (a group of autonomic nerve centres in the upper abdomen).

#### TREATMENT

Place the casualty on the back—raise the head and put a blanket under the knees.

Loosen all tight clothing and gently massage the upper abdomen.

Check for more serious injury (internal haemorrhage).

### CRAMPS

An involuntary shortening of a muscle caused by—

Over-exercise.

Poor co-ordination.

Chilling.

Occasionally from salt depletion in hot weather.

#### TREATMENT

Stretch the shortened muscle.

Give salt (a teaspoonful to a pint of water) if the weather is very hot.

### CRAMP IN THE CALF

Straighten the knee and with your hand draw the foot up towards the shin, or straighten the toes and have the casualty stand on the ball of the foot.

### CRAMP IN THE THIGH

Straighten the knee and raise the whole leg.

## FIRST AID

### HEADACHES

Often they are due to worry and stress and are usually relieved by reassurance and giving a mild sedative.

If severe, persistent, or accompanied by other symptoms, the casualty needs medical attention.

### PSYCHIATRIC EMERGENCIES

The First Aider may be confronted with mentally distraught casualties.

These can generally be divided into two groups—

Neurotic.

Psychotic.

#### NEUROTIC GROUP

Are suffering from a nervous or emotional disorder, but remain mentally in contact with reality.

#### SYMPTOMS

The following are commonly present—

Headaches.

Indigestion.

Shakiness.

Impairment of memory.

Hysterical turns.

#### SIGNS

Often it is difficult to find any real signs, but the casualty is frequently—

Tense.

Agitated.

Depressed.

Introspective.

## FIRST AID

### TREATMENT

Positive reassurance with firm but gentle handling.  
Be a sympathetic listener.

### PSYCHOTIC GROUP

These casualties have a more severe disorder of the mind, often associated with a loss of contact with reality. They can be violent.

### SIGNS

They may suffer from—

Extreme excitement.

Deep depression.

Hallucinations (the casualty sees or hears things not there).

Delusions (the casualty has false beliefs despite all evidence to the contrary).

### TREATMENT

Obtain medical aid as quickly as possible.

Tactful gentle handling and persuasion until medical aid arrives.

Remove all objects which could be used for attack or suicide.

Do not leave the casualty until medical aid is obtained.

Physical restraint may sometimes be needed, but should be restricted to casualties who—

Become actively suicidal.

Are dangerous to others.

Application of force should never be excessive.

## FIRST AID

### THE EYE

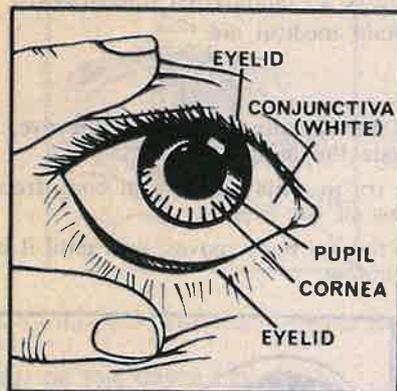


Fig. 135

Structures of the Eye.

### FOREIGN BODIES IN THE EYE

Commonly from—

Loose lashes.

Insects.

Particles of grit.

Metal.

Glass.

### SYMPTOMS

Pain, particularly on looking at the light.

Profuse tear formation.

### SIGNS

Spasm of the eyelids.

Redness of the eye.

## FIRST AID

### AIMS OF FIRST AID

- To remove an unimpacted foreign body.
- To obtain medical aid.

### WARNING

- Warn the casualty not to rub the eye, as this may aggravate the injury.
- Never try to remove a foreign body from the cornea (window of the eye).
- If the foreign body moves, wait until it is away from the window.

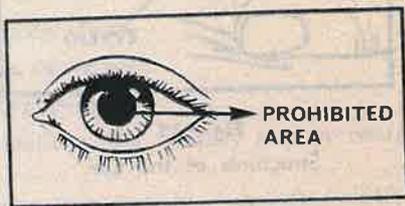


Fig. 136—The Cornea (window) of the Eye.

### TREATMENT

Small loose foreign bodies often are washed out by tears.  
If not—

- Get a wisp of cotton wool, or the corner of a clean handkerchief moistened with cold water.
- If possible place the casualty in a good light.

### EXAMINATION OF THE LOWER LID

Instruct the casualty to look up.

Gently draw the lower lid downwards and away from the eyeball—this may expose the foreign body, which can be removed with the wisp of wool or the handkerchief.

## FIRST AID

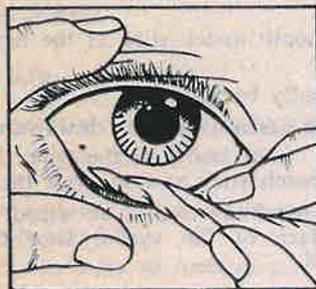


Fig. 137—Everting the Lower Lid to remove foreign body.

### EXAMINATION OF THE UPPER LID

Instruct the casualty to look down, then gently grasp the eye-lashes of the upper lid.

Pull the upper lid downwards and forwards over the lower lid—this may dislodge the foreign body.

If not, sometimes an eye bath is useful.



Fig. 138—Everting the Upper Lid.

## FIRST AID

### EVERTING THE UPPER LID

Place a smooth match stick at the base of the upper lid.

Press it gently backwards.

Instruct the casualty to look downwards.

Take hold of the lashes of the upper lid, pull up and over the match stick and so evert the eyelid.

If the foreign body cannot be wiped away from the under surface of the eyelid, send the casualty to medical aid.

### BURNS TO THE EYE

These may be due to:—

Chemicals.

Heat.

Flash.

### CHEMICAL BURNS

Often from caustic chemicals—

Acids.

Alkali.

Lime.

Lime particularly causes serious burns.

### SYMPTOMS

Pain, especially on looking at the light.

Commonly profuse watering of the eyes.

### SIGNS

Spasm of eyelids.

Reddening of the eyeball.

## FIRST AID

Burns on eyelids which result in marked swelling are often present.

### AIMS OF FIRST AID

IMMEDIATE ACTION IS NECESSARY TO PREVENT SEVERE DAMAGE.

To dilute and wash out the cause by free irrigation with running water.

To get the casualty to medical aid.

### TREATMENT

Open the eyelids with your fingers.

Flush the eye freely with cold water.

Evert the lids to make sure there is no solid matter adhering.

Flush under the lids.

Place an eye pad over the eye.

Transport the casualty to medical aid.

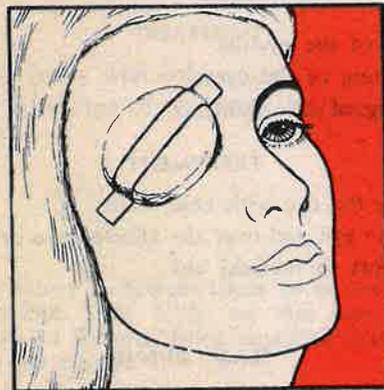


Fig. 139—Covering the Eye with an Eye Pad.

## FIRST AID

### TO IRRIGATE THE EYE

Instruct the casualty to incline the head to the affected side with the neck extended.

Hold eyelids apart with thumb and index finger of one hand.

This is assisted by asking the casualty to try to open the other eye.

Using tap water, gently pour a stream of water into the inner corner of the eye.

Irrigation should be continued until complete relief is obtained, or, if this is not possible, for 15-20 minutes, or until medical aid arrives.

### HEAT BURNS

Common in bushfires and petrol explosions.

#### SYMPTOMS

Pain, especially on exposure to light.  
Profuse watering.

#### SIGNS

Spasm of the eyelids.  
Reddening of the eyes.  
Swelling of the eyelids.

#### TREATMENT

Irrigate the eye with cold water.  
Place an eye pad over the affected eye or eyes.  
Transport to medical aid.

### FLASH BURNS

The eye is burned by being exposed unprotected to the light from arc welding.

## FIRST AID

### SYMPTOMS

Severe sensitivity to light.

Often a feeling of grit in the eyes (the onset can be delayed for several hours).

Severe pain.

#### TREATMENT

Cover the affected eye with an eye pad.

Seek medical aid.

### SMOKE IN THE EYES

#### SYMPTOMS

Pain.  
Profuse watering.

#### SIGNS

Reddening.  
Spasm of the eyelids.

#### TREATMENT

Irrigate freely with cold water.

If casualty is relieved of symptoms duty may be resumed.

### WOUND OR CRUSH INJURY

#### WARNING

- If the injury is thought likely to be severe **DO NOT EXAMINE THE EYE**, as this may lead to the contents of the eye being squeezed out through any cut in the eyeball.
- Put the casualty at absolute rest in a recumbent position.

## FIRST AID

- Place a dressing over the eye and secure it with strapping.
- Ensure that there is no pressure on the eye.
- Arrange urgent transport to medical aid as quietly and gently as possible.

### THE EAR

Bleeding from the ear sometimes follows a blow on the head.

It may often indicate—

A fracture through the base of the skull.

A serious injury requiring prompt medical attention.

Do NOT attempt to plug the ear canal and do NOT put in drops of any kind.

Turn the injured side of the head down to allow blood to escape easily and, if unconscious, place in the coma position.

### SUSPECTED RUPTURE OF THE EAR DRUM

May be caused by the blast of a powerful explosion, scuba diving, flying.

The casualty will have pain and deafness in the ear.

Bleeding may be present.

Medical attention should be obtained.

### FOREIGN BODIES IN THE EAR

On no account should the First Aider attempt to remove anything from the ear canal by use of a pin, wire or match stick.

There is grave danger of damage to the ear drum.

The casualty should seek medical aid.

The buzzing of an insect which has crawled into the ear can be relieved by dropping in a little warm water or oil.

## FIRST AID

Removal of the insect should be done by a doctor if it does not float out.

### THE NOSE

#### FOREIGN BODIES IN THE NOSE

This occurs mainly in children, who may insert peas, beans, marbles, etc.

Removal may be difficult and should be left to the doctor.

---

### GLOSSARY

INTROSPECTIVE—*withdrawn and self-centred.*

CORNEA—*window of the eye.*

CONJUNCTIVA—*Delicate lining covering the eye and inner side of the eyelids.*

## FIRST AID

### NOTES

#### POISONOUS WORDS IN THE MOST

# 16 POISONS

---

*Poisons are substances which, when introduced into the body, tend to destroy life or impair health.*

---

They may be—

Solid.

Liquid.

Gas.

Introduced—

By the mouth, i.e. swallowed.

Through the lungs, by breathing poisonous gases or fumes.

Through the skin, by absorption or injection.

Taken—

Accidentally.

Deliberately.

## FIRST AID

### TREATMENT

Protect yourself from being overcome by the poison.  
Remove the casualty from the source of danger.

Wash off any poison on the skin.

Arrange to obtain immediate medical aid.

Dilute, eliminate or neutralise the poison.

Dilute the poison if swallowed by giving the casualty several glasses of water or milk.

Induce vomiting, except when—

Unconscious.

A corrosive, caustic substance, kerosene or other petroleum product has been taken.

By—

Putting your fingers down the casualty's throat.

Giving an emetic (a glass of warm water containing one teaspoonful of mustard or two tablespoonsful of salt). Repeat until effective.

Many poisons can be neutralised by giving an antidote.

If the casualty is unconscious DO NOT—

- Give fluids.
- Induce vomiting.
- Give any antidote.

Place the casualty in the coma position.

Assist respiration and the circulation if these have failed or are failing.

Send to hospital with the casualty—

The remaining portion of the substance thought to have caused poisoning.

Any container.

Any sample of vomitus.

If a corrosive poison has been taken, dilute the poison by giving copious fluids or soothing drinks, e.g., milk.

## FIRST AID

### SPECIFIC CAUSES OF POISONING

#### SLEEPING PILLS AND TRANQUILLISERS

Their function is to depress the vital centres of the brain, including the centres which govern consciousness, respiration and heart action.

The heart is rarely completely stopped and, provided oxygen is given to the casualty, life can be sustained for several days, after which the casualty usually recovers.

#### TREATMENT

Guard against asphyxia due to inhalation of vomit or throat secretions.

Sustain respiration if failing.

#### ALCOHOL

#### SYMPTOMS

Mental confusion and inco-ordination of muscular activity.

The casualty smells of alcohol.

The pupils are dilated and coma may result.

Vomiting is often a prominent feature and can lead to asphyxia.

#### TREATMENT

If conscious induce vomiting.

Give black coffee.

If unconscious sustain respiration.

#### ASPIRIN POISONING

#### SYMPTOMS

Abdominal pain, nausea and vomiting (often blood-stained).

Giddiness and drowsiness.

## FIRST AID

### SIGNS

Profuse sweating.  
Rapid pulse and laboured breathing.

### TREATMENT

Induce vomiting.  
Give fluid and glucose or sugar.

## CORROSIVE DISINFECTANTS

### SYMPTOMS

Burning pains from the mouth to the stomach.

### SIGNS

Cold, clammy skin and collapse.  
Burns about the mouth and lips.

### TREATMENT

If conscious, dilute the poison.  
Support respiration.  
Do not induce vomiting.

## POISONING BY INDUSTRIAL GASES

### CARBON MONOXIDE GAS

(See p. 90)

### CARBON TETRACHLORIDE

Is a treacherous poison in a closed space.  
Used in dry cleaning as a solvent.  
Some old-fashioned fire extinguishers also contain it.

## FIRST AID

Smoking enhances the toxic effect of the drug.

### SIGNS

Drowsiness.  
Asphyxia.  
Unconsciousness.  
Liver damage (aggravated by alcohol) can occur.

## TRICHLORETHYLENE

A solvent used in degreasing, and dry cleaning.  
As an anaesthetic.  
Cleaning out tanks which have contained the solvent can be dangerous.

It produces—

Drowsiness.  
Unconsciousness.

## HYDROGEN SULPHIDE

This gas smells of rotten eggs.  
Paralysis of the sense of smell occurs and the gas becomes undetectable.  
Loss of consciousness may occur in a matter of seconds.  
Hydrogen sulphide acts on the respiratory and other centres in the brain and causes paralysis.

## CYANOGEN GAS OR CYANIDE FUMES

Hydrocyanic acid and the heated fumes of cyanides are very powerful and insidious poisons which are rapidly fatal, even in small concentrations.

Cyanides prevent oxygen being taken up by the tissue cells.

The casualty rapidly becomes accustomed to, or loses the sense of smell for, the particular gas.

## FIRST AID

### SYMPTOMS

The casualty becomes light-headed and dizzy.  
Difficulty in breathing may occur.

### SIGNS

The casualty collapses and becomes flushed due to venous congestion.  
Lack of oxygen causes cyanosis of the ears, nose, conjunctivae, lips, fingers and toes.  
Convulsions, which are due to irritation of the brain, follow.

## POISONING BY INDUSTRIAL GASES

### TREATMENT

Make sure the rescuer does not become the next casualty.

Rescue, if possible by experts, must be carried out with extreme care, using a suitable respirator and life-line.

Get the casualty into fresh air.

If breathing is failing or has stopped start artificial respiration by the **Silvester** method.

Remove any contaminated clothing.

Wash contaminated skin thoroughly.

### PESTICIDES

The skin is the most important route of absorption of pesticides.

Avoid inhaling the vapour from liquid sprays.

### TREATMENT

Send for medical aid.

Try to identify the poison and advise medical aid.

## FIRST AID

Remove contaminated clothing and wash contaminated skin, including face, lips and scalp, thoroughly with soap and water.

Get the casualty to drink as much as possible.

Induce vomiting if a chemical has been swallowed.

If breathing weakens, ensure an open airway.

If breathing stops, start artificial respiration immediately and continue, if necessary, on the way to medical aid.

If the casualty is unconscious or stuporose—

Place in the coma position.

Keep a careful check on the breathing.

The casualty must not be left alone.

The chemical's label or container should be sent with the casualty.

### SPECIAL POISONS

#### ORGANO-PHOSPHORUS (O-P) (e.g., **PARATHION**, **MALATHION**)

While many (O-P) compounds are comparatively safe to use if instructions are followed carefully they are dangerous if swallowed.

Parathion is outstanding as a cause of poisoning the world over.

Not all preparations include the name Parathion on the label.

The early symptoms are—

Headache.

Giddiness.

Weakness.

Nausea.

Cramp.

Chest discomfort.

## FIRST AID

### TREATMENT

- Do not leave the casualty unattended.
- Watch the breathing carefully as—
  - Breathing may stop suddenly.
- At the first sign of failure—
  - Start artificial respiration.
  - Seek medical aid immediately.

### ORGANO-CHLORINE, DIELDRIN, BHC (LINDANE) AND DDT

- If swallowed will cause acute convulsions.
- Treat as for a major fit.
- Absolute quiet and rest.

### INSECTICIDES

Many of these, especially those used for commercial spraying, are extremely dangerous.

### SYMPTOMS

- Blurred vision.
- Sweating.
- Vomiting.
- Tightness in the chest.
- Cramps.

### TREATMENT

- Vomiting should be induced if the substance has been swallowed.
- Adequate washing is necessary for skin contact.
- If the casualty stops breathing, mouth to mouth artificial respiration should be avoided and the Silvester method used.

## FIRST AID

### KEROSENE AND PETROLS

- If inhaled even small amounts of kerosene will damage a very large part of the lungs, with subsequent pneumonia.
- Do not induce vomiting as vapour is easily inhaled.
- Give milk.
- Medical aid is urgently required.

### MUSHROOMS AND FUNGI

- Some fungi are dangerous.
- Determination of an edible species is very difficult.
- Poisoning may be—

- Rapid.
- Delayed.

### RAPID

### SYMPTOMS AND SIGNS

In a few minutes occur—

- Excitement.
- Hallucinations.
- Intoxication.
- Sweating.
- Nausea.
- Giddiness.
- Collapse.

### TREATMENT

- Obtain medical aid.
- Induce vomiting.
- Treat the collapse.

## FIRST AID

### DELAYED

Symptoms appear 6-15 hours after intake—

- Nausea.
- Vomiting.
- Diarrhoea.
- Thirst.

### TREATMENT

- Obtain medical aid.
- Induce vomiting.
- Treat the collapse.

### FOOD POISONING

May be due to—

- Ingesting food infected with bacteria or a virus.
- Ingesting toxic substances in food.

### SYMPTOMS

- Nausea.
- Vomiting.
- Diarrhoea.

### SIGNS

- Dehydration.
- Rapid weak pulse.
- Often a high temperature.
- Shock.

### TREATMENT

- Obtain medical aid.
- Treat the collapse.
- Give frequent sips of water to combat dehydration.

## FIRST AID

### GLOSSARY

**EMETIC**—*A substance used to induce vomiting.*

## BITES AND STINGS

Animals—Insects—Plants

NOTES

Faint, illegible text from the reverse side of the page, including words like "TREATMENT" and "NOTES".

17

# BITES AND STINGS

Reptile—Marine—Insects—Plants

---

*Serious and often fatal effects  
can result. Quick effective treatment  
is urgently required.*

---

## SNAKE BITE

### IDENTIFICATION

Venomous snakes are common in Australia.

Treatment is more effective if the species is known, because the correct antivenene can be given.

The First Aider should try to identify the snake if this is possible.

- Nearly all bites are by venomous species.
- Rarely by non-venomous species.
- Therefore assume every bite is by a dangerous snake.

## FIRST AID

### APPEARANCE OF THE BITE

Usually two puncture marks about half an inch apart are present.

There may be scratching from other fangs.

Locally there is often little reaction but occasionally there is—

Swelling.

Reddening.

Bruising.

Immediately after a bite, puncture marks may be difficult to discern.

### SYMPTOMS

First symptoms appear fifteen (15) minutes to two (2) hours after the bite.

Double vision.

Drowsiness.

Nausea and vomiting.

Sweating.

Faintness.

Diarrhoea.

Headache.

Pain in the chest or abdomen.

### SIGNS

Shock may develop.

Signs of asphyxia due to—

Paralysis of the muscles of respiration.

Respiratory obstruction from the tongue.

Note—early symptoms may not be pronounced therefore carefully observe the casualty.

### AIMS OF TREATMENT

- To prevent absorption of the venom into the general circulation.

## FIRST AID

- To reduce the blood flow through—

The part.

The body as a whole.

- To obtain an injection of antivenene at the earliest possible moment.
- To sustain the circulation and respiration.

### TREATMENT

If on a limb apply a constrictive bandage.

Seek medical aid immediately.

Place the casualty at rest lying down.

Reassure and ALLAY FEAR.

Immobilise the injured part.

Wipe or wash the skin clean of venom splashes.

Assist respiration if it is failing or has stopped.

Assist the circulation if it fails.

Transport the casualty lying down.

### IF THE BITE IS ON A LIMB

Immediately grasp the limb—

Above the bite.

Above the elbow or knee.

Use a full grip with fingers and thumb sufficient to obstruct blood returning to the heart.

Maintain until a constrictive bandage is applied above your grip.

### IF THE BITE IS ELSEWHERE THAN ON A LIMB

Wash the skin in the region of the bite and give general treatment as above.

## FIRST AID

### THE CONSTRICTIVE BANDAGE

The ideal constrictive bandage is flat rubber 2 inches wide, but suitable materials are—

Belt.  
Strip of cloth.  
Necktie.  
Handkerchief.  
Broad rubber tubing.

Unsuitable materials are—

Shoelaces.  
Cord.  
Rope.  
Electric light flex.

These are unsuitable because they cut into the flesh and may damage major blood vessels.

### APPLICATION

Apply the bandage between the bite and the heart.

Apply above the elbow or knee.

Apply sufficient pressure to obstruct the main artery to the limb.

Complete stoppage is judged by obliteration of the pulse below the bandage.

The limb may swell, become red, blue or pale in colour.

The bandage **MUST** be released after 1½ hours.

The time of application should be prominently marked on the casualty's forehead.

If practicable keep constricted limb cold and moist.

### LIZARD BITES

Lizards may bite if molested.  
The bite is non-venomous.

## FIRST AID

To detach the lizard apply a lighted match or cigarette to its mouth.

Treat the wound as for any other wound.

Medical aid should be sought as anti-tetanus treatment is necessary.

### SPIDER BITES

Only two species of Australian spider cause fatalities.

These are—

Red back spider.  
Funnel web spider.

### RED BACK SPIDER

Found throughout Australia.

Bites are common.

Only the female bites—her body is the size of a pea, dark brown to black in colour with a red or orange stripe running down the back.

It is found in dark and protected areas.

### SYMPTOMS

The bite, felt as a sharp transient sting.

Localised pain which becomes general.

Nausea and vomiting.

Dizziness.

Faintness and muscular weakness.

### SIGNS

Profuse sweating.

Swelling around the bite.

Muscular spasm.

## FIRST AID

### FUNNEL WEB SPIDER

Found mainly in Sydney and the eastern coast of N.S.W.  
Large black or reddish brown spider, one to one and a half inches long.

Inhabits—

Rock crevices.  
Burrows.  
Post holes, etc.

### SYMPTOMS

The bite is painful initially.  
There is little local reaction.  
Difficulty in breathing.  
Numbness.  
Muscular weakness.

### SIGNS

Shock.  
Profuse sweating.  
Copious salivary and bronchial secretions.  
Spasms of the larynx.

### TREATMENT OF BOTH TYPES

If the bite is on a limb, apply a constrictive bandage.  
Wash the bitten area.  
Apply a cold compress.  
Immobilise the limb and keep the casualty at rest.  
Reassure the casualty.  
Do not delay in obtaining medical aid.

As antivenene, which is very effective, is available for red back spiders—

Bring the spider for identification if possible.

The bites of other spiders are not known to be dangerous although pain and local swelling may result.

## FIRST AID

### SCORPION STINGS

These are rare.

Australian species are small and the sting causes only local pain and swelling.

Treatment apart from local application of spirit is seldom necessary.

### TICKS

Ticks occur from Queensland to eastern Victoria and in Western Australia.

The unengorged tick is bluish-black in colour, oval and flat.

Engorged it is globular and a quarter of an inch in diameter.

It tends to secrete itself in body crevices.

### SYMPTOMS

The venom may cause paralysis, especially in small children.

The paralysis affects first—

The lower limbs.

The upper limbs.

The muscles of respiration.

The facial muscles.

### TREATMENT

Do not attempt to remove the tick.

This forces more venom into the tissues.

Apply kerosene or turpentine liberally over the tick to kill it.

If in the ear apply oil.

Seek medical aid for—

Removal.

An injection of specific tick antiserum.

## FIRST AID

### MOSQUITO AND SANDFLY BITES

Alkalis such as—

Ammonia.

Bicarbonate of soda.

in weak solution give relief.

Hot water should be avoided.

Calamine lotion or zinc cream is recommended.

### BEE STINGS, HORNETS, WASPS

Remove the sting—pull sideways with fingernail, as the sting has a barb. If pulled straight out more venom is injected.

Wipe the area clean.

Apply cold compresses.

### SHARK ATTACK INJURIES

Sharks are prevalent in Australian waters, but shark attacks on humans are relatively uncommon.

Sharks are cold-blooded and are excited by warmth and quietened by cold.

Sharks rarely attack until the temperature of the surrounding water reaches a minimum of 70°F.

Along the southern Australian coast attacks appear to be limited to the December-March period.

Further north the period is extended.

Other factors which predispose to shark attacks are—

Muddy or discoloured water.

Struggling fish hooked by a fisherman.

**Injuries may be inflicted by sharks—**

By biting.

By impact.

## FIRST AID

By cutting with the fins.

By the powerful kick of the tail.

The jaws are extremely powerful and can bite through human bones, even thigh bones, with ease.

Large masses of flesh (with profuse haemorrhage), may be torn away.

### TREATMENT

Immediate and effective control of haemorrhage.

Attempt this in the water by—

Pressing hard right into or just above the spurting point with the fingers.

As soon as the casualty is ashore—

Lay the casualty down, with head down.

Pack the wound with any available clothing.

Towels.

Shirt.

Frock.

Pack until the wound is overlapped.

Maintain pressure until a firm bandage is applied.

Elevate the part if possible.

If haemorrhage is not controlled by packing, apply further pressure by hand or use a constrictive bandage.

Summon immediate medical aid.

Do not move the casualty without medical advice.

Transport and handling must be gentle to avoid aggravating shock.

### STINGS CAUSED BY MARINE AND FRESH-WATER CREATURES MARINE STINGS

Marine creatures may inflict their stings by—

Injection of venom through puncture wounds.

Contact with tentacles bearing stinging cells.

The effects range from acute discomfort to rapid collapse and death.

## FIRST AID

### MARINE CREATURES CAUSING OBVIOUS PUNCTURE WOUNDS

Puncture wounds are usually on the legs, feet or hands.  
Venom remains active after death of the fish.  
Handling or stepping on a dead fish will cause symptoms.

#### SYMPTOMS

Severe burning or throbbing at the site of the puncture.  
Pain along the lymphatics in the region.

#### SIGNS

The stinging spine may be seen in the wound.  
The skin changes colour—  
    Pale.  
    Then blue.  
    Then red.  
The limb becomes swollen.  
Profuse bleeding may occur.  
Sweating followed by shock is common.  
Failure of respiration and paralysis of muscles are caused by—  
    Stone fish.  
    Cone shell.  
    Blue-ringed octopus.

#### TREATMENT

Clean the wound with water.  
Remove any foreign bodies.  
Immerse the part in hot water.  
Do not burn the casualty—test with an uninjured limb.  
Treat for shock.  
**Stone fish**—apply a constrictive bandage.  
Sustain respiration.

## FIRST AID

Stone fish antivenene is available.  
Seek medical aid immediately.

### STINGING BY TENTACLES

Many species of jellyfish have stinging tentacles.

#### STING CHARACTERISTICS

Occur on any part of the body and pieces of tentacles may be seen adhering to the skin.

The area of stinging may resemble—

Whip marks.

A localised area of goose pimples.

A single line of weals.

Pain varies in severity from—

Mild burning.

Intense pain.

Extensive stings may result in—

Respiratory and cardiac arrest within a few minutes.

Minor stings may result in—

Backache.

Pain in the chest and abdomen.

Vomiting.

Limb pains and inco-ordination.

Difficulty in breathing, coming on 10-40 minutes after stinging.

These symptoms do not threaten life.

#### TREATMENT

Pour methylated spirit or other alcoholic spirit over the area of the sting. This destroys undischarged sting cells.

If no alcohol is available—spread dry sand over the sting.

## FIRST AID

Scrape off the remaining tentacles.

Do not rub the area—this causes more venom to be absorbed.

Severe stings—

Keep the casualty at rest.

Treat for shock.

Sustain respiration.

Sustain the circulation.

Send for medical aid.

### PLANTS

Many plants produce poisons which have a serious effect on humans if—

Ingested.

Skin contact is made.

Pollens are inhaled.

### INGESTED POISONS

Symptoms are mostly related to the digestive system with—

Vomiting.

Colic.

Diarrhoea.

Or the nervous system with—

Respiratory distress.

### SKIN CONTACT

Leads to—

A rash.

Itch.

Lumps.

## FIRST AID

### POLLENS INHALED

Lead to—

Sneezing.

Blocked nose.

Asthma.

### TREATMENT

Remove the irritant by giving—

An emetic.

Washing away.

Treat skin conditions with—

Cold compresses.

By applying methylated spirit.

Inhaled pollens need medical aid.

## FIRST AID

### NOTES

# 18

## EMERGENCY CHILDBIRTH

---

*Childbirth occurring where medical  
aid is not available.*

---

First Aiders may be required to act as midwives in an emergency.

They must remember childbirth is a natural occurrence that will be seriously complicated by—

### INJUDICIOUS HANDLING

#### INFECTION

Confronted with an emergency childbirth the First Aider must—

## FIRST AID

Send for a doctor.

DO NOT INTERFERE at all unless it is likely that the baby will be born before medical aid is available.

Adopt a calm attitude which leads to a carefully considered plan of action.

Reassure the mother (an anxious mother more frequently has complications than a calm one).

Take every precaution to ensure that infection is not introduced to the mother's birth canal or baby's umbilical cord.

### PREPARATION

With the onset of labour get ready—

A cot or a suitable makeshift, which should be placed in a warm protected spot.

A blanket, shawl or towel to keep the baby warm.

Sterile ties for tying the cord (three pieces of tape or thick string nine inches long) which have been boiled for 10 minutes.

A suitable clean surface for the mother to lie on. (Protect the surface with a plastic sheet or newspaper and cover with a clean towel or sheet.)

A blanket folded into three (top to bottom) and wrapped in a clean sheet (used to cover the top half of the mother's body).

Jugs of hot water.

### PREVENTION OF INFECTION

Infection or dirt is a grave danger to mother and baby.

No person who has a cold, sore throat or septic hands should help unless it is unavoidable.

- You and any assistants should wear masks. Improvise with a clean handkerchief.
- Scrub your nails and wash your hands thoroughly with soap and water.

## FIRST AID

- Allow to dry in the air.
- If they get soiled, wash again.

### OUTLINE OF TREATMENT

#### THE ONSET OF LABOUR

##### SYMPTOMS

Low backache.

Regular painful contractions occurring in the lower abdomen.

##### SIGNS

A "show" of blood-stained mucus.

The "breaking of the waters" (occasionally).

##### TREATMENT

Do not panic, there is usually plenty of time.

Ring the doctor.

Reassure the prospective mother.

Continue preparations.

#### THE FIRST STAGE

The uterus contracts every 10 to 20 minutes. Normally the stage may last for several hours.

The contractions are dilating the neck of the uterus and the birth canal.

##### SYMPTOMS

The cramp-like pains increase and last up to a minute.

##### SIGNS

The show of blood-stained mucus increases.

As the birth progresses the pains become more frequent.

## FIRST AID

### THE SECOND STAGE

This may start with the "breaking of the waters" surrounding the baby.

A pint or more of water gushes out, or may leak out slowly. This means that the baby is on its way.

"Bearing down" pains begin.

- During the early part of this stage the mother may be kept on her back.
- During the contractions she should draw her knees up, holding them with her hands, bend her head forward and hold her breath. She should rest as much as possible between contractions.

### TREATMENT

When a bulge appears in the perineum.

Turn the mother on to her side.

Instruct her to draw her knees up with her buttocks near to the edge of the bed.

Keep her body warm.

Support her head with a pillow.

Should a bowel movement occur beware of soiling the birth canal.

Wipe clean from in front backwards.

### THE BIRTH

- The mother should not bear down during the contractions, nor hold her breath.
- She should keep her mouth open and pant, i.e., take short breaths, so that the baby may emerge slowly.

The head commonly emerges first, with the face looking backwards.

The buttocks, foot or arm may appear first.

## FIRST AID

DO NOT interfere unless—

A membrane is over the face—it must be torn.

The cord is around the baby's neck—try to ease it over the head or loop it over the shoulder.

DO NOT pull the baby or the cord—

If the cord is pulled and the placenta is torn the baby may bleed to death.

Support the baby's head in the palms of your hands and wait—the next contraction delivers the baby's shoulders.

Get hold of its body under the armpits and lift the baby towards its mother's abdomen.

Lay the baby by the mother's legs with the head lower than the body.

Ensure that the cord is not stretched.

### IMMEDIATE CARE OF THE BABY

Remember the baby is wet and very slippery.

Wrap a cloth around the ankles.

Take a good grip with one finger between the ankles.

Hold the baby up head downwards.

Allow any fluid to drain from the mouth and nose by holding the head slightly back and opening the mouth.

With a clean piece of cloth or gauze gently wipe away any blood or mucus from the baby's mouth and throat.

When the baby cries lay it on its side close to the mother, not face downwards.

Should the baby not cry nor show signs of breathing in two minutes, start resuscitation, by ventilating the lungs, blowing very gently.

On no account should the baby be handled roughly or smacked.

## FIRST AID

### BREECH DELIVERY

Should the baby appear buttocks first (breech delivery), no interference is the rule.

### THE THIRD STAGE

The afterbirth will be expelled by uterine contractions and the mother's voluntary efforts.

Turn the mother on her back and separate her legs.

Place the baby between her legs.

Ten or more minutes may elapse before the afterbirth appears.

If there is much bleeding gently massage the top of the uterus which is found just below the navel—it will stimulate it to contract.

### DEALING WITH THE CORD

Wait until the afterbirth has been delivered and the cord has stopped pulsating, or ten minutes have elapsed since the birth of the baby.

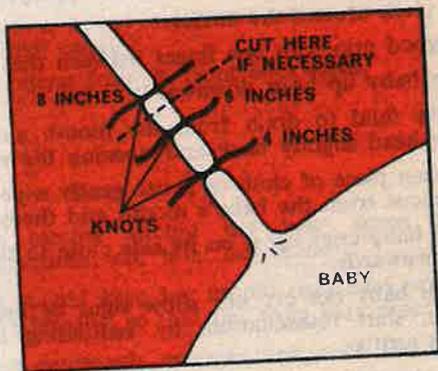


Fig. 140—Tying the umbilical cord—position of knots.

## FIRST AID

Tie the cord very firmly in three places—one four (4) inches, one six (6) inches and one eight (8) inches from the baby's navel.

Unless the cord is securely tied the baby may bleed to death.

The cord need not be cut. This will lessen—

The risk of the baby bleeding from the cord.

The risk of infection.

If the casualty is isolated from medical aid the cord may be cut.

If the cord is cut, leave two ties on the baby's side.

A sterile dressing should be placed over the stump of the cord.

The afterbirth or placenta **MUST** always be retained for inspection.

### CARE OF THE MOTHER

Wash the mother and fix a sanitary towel in position.

Give her hot drinks.

Encourage her to sleep.

Regularly check her pulse and respiration rates.

## FIRST AID

### GLOSSARY

**MIDWIFE**—A person assisting at a birth.

**UMBILICAL CORD**—Cord attaching the baby to the mother through the placenta.

**PLACENTA**—Special tissue attached to the mother's uterus which supplies nourishment to the developing baby.

**AFTERBIRTH**—Placenta.

**UTERUS**—Womb.

**PERINEUM**—Crutch area.

# 19

## INCIDENT

### Rules for handling

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*An incident is a happening requiring first aid action.*

---

First Aiders may be called upon to deal with a range of happenings, minor or major, involving one casualty or many casualties.

They must be prepared to take responsibility and show leadership and control.

Confusion and panic must be eliminated by prompt action and efficient handling.

The First Aider must decide on the order of priority of treatment.

### **DANGER TO THE CASUALTY**

The First Aider must ensure that there is no risk of danger to the casualty or to himself. If this exists remove the casualty from danger or the source of the danger from the casualty.

## FIRST AID

### THE URGENT NEED OF THE CASUALTY

#### Airway

Check that the airway is open.

#### Circulation

If the pulse is absent, commence external cardiac compression.

#### Breathing

Check that breathing is present.  
If not, start artificial respiration.

#### Haemorrhage

Check for serious haemorrhage and control it.

#### Fractures

Immobilise all serious fractures and large wounds before moving your casualty.

#### Treat other injuries

### TREATMENT

Reassurance of the casualty is most important.

Calmness and efficiency on your part will inspire greater confidence than mere words.

Pay attention to any requests and remarks that may be made.

Remember that the casualty may overhear remarks not intended for the casualty's ears.

Give any further treatment required.

Immediately it is decided that medical aid or an ambulance is needed—

## FIRST AID

Send for them.

State the exact place with directions how to get there.

The number of casualties.

Some indication of the type and seriousness of the accident.

### DIAGNOSIS

After attending to needs which have priority, find out what happened. This information may in itself enable you to make a diagnosis. It may greatly assist the doctor who has to deal with the casualty.

If the casualty is conscious—

Ask the site of any pain.

Try to pinpoint the place. This will often identify the site of a fracture.

You can then examine such parts with especial care.

When the casualty has told you of all the places where pain is felt, make sure no other injuries are present.

Ask if the casualty feels anything else wrong.

Examine the casualty carefully—

Start at the head and neck, then check the spine and trunk, and finally the upper and lower limbs.

Should you find something which appears abnormal, compare with the other side of the body.

Look at the colour of the skin, the nail beds, lips and ears.

Listen to the nature of the breathing.

Smell the breath.

Count the pulse, noting its strength and rhythm.

### THE UNCONSCIOUS CASE

When the casualty is unconscious your task is much more difficult.

Check the pulse and if absent start external cardiac compression.

## FIRST AID

Note if breathing is present, and if not, immediately commence artificial respiration.

Note if haemorrhage is present. Examine the whole body including under the casualty for dampness indicating blood.

Stop any haemorrhage before proceeding further with your examination.

Bear in mind the possibility of internal haemorrhage.

Place in the coma position when it has been decided it is safe to turn the casualty.

Establish the level of unconsciousness by observing—

The casualty's reaction to speech and other stimuli.

The character of the breathing and the smell of the breath.

The character of the pulse.

The colour of the face.

The head for injury, and ears, eyes, nose and mouth for blood or other signs.

The pupils of the eyes for any change from normal.

### REMOVAL OF CLOTHING

It is not necessary to strip the casualty for diagnosis or treatment. It is sometimes necessary to expose injuries to diagnose and treat them properly.

This should be done with the minimum disturbance to the casualty's clothing.

Weather conditions (heat or cold) may have to be considered.

Do not destroy clothing. Where it has to be cut, do this very carefully through the seams if possible.

### METHOD

#### COAT

Raise the casualty and slip the coat over the shoulders. Then remove from the sound limb first and, if

## FIRST AID

necessary, slit up the seam of the sleeve on the injured side.

### SHIRT AND VEST

Remove as for the coat.

If necessary slit the shirt down the front.

### TROUSERS

Pull down or up as required; or, if necessary, slit the seam.

### BOOT OR SHOE

Steady the ankle, undo or cut loose the laces and remove carefully.

### SOCKS

If difficult to remove, insert two fingers between the sock and leg.

Raise the edge of the sock and cut it between your fingers.

### DISPOSAL

After the First Aider has done what is necessary, the casualty may be—

Sent to hospital by ambulance.

Handed over to the care of a doctor, a nurse, or other responsible persons.

Allowed to go home and, if necessary, told to seek medical advice.

### LABEL

Use a label or other written message to inform the hospital, doctor or other medical authority the circumstances of the accident or illness and treatment given.

## FIRST AID

Be brief.

Use the smallest number of words which will convey your meaning clearly.

Take the name and address of the casualty and of the nearest relative or friend.

Having treated and disposed of the casualty, check that the relative or friend is being notified by the police or ambulance men as part of the accident service. If not, arrange to do this.

Take care of any personal property of the casualty and do anything you can to help in a general way, e.g. by sending a message to the police road patrol in car accidents, or notifying an employer.

In sending messages by telephone, ask the person receiving the message to repeat it to make sure that it has been understood.

# 20

## FIRST AID IN REMOTE AREAS

---

*This is the practice of First Aid  
under conditions where medical aid  
is unavailable for some hours.*

---

**HAVING CORRECTLY DIAGNOSED AND TREATED THE CASUALTY** the First Aider must have sufficient knowledge to be able carefully to observe and sustain the casualty until medical aid arrives.

Observe and record in writing at half hourly intervals—

The state of consciousness.

The colour of the casualty.

The pulse rate (see p. 57).

The rate and depth of respiration.

## FIRST AID

At four hourly intervals—

The temperature of the casualty (if a thermometer is available).

Any vomiting—

Nature.

Volume.

The volume of urine passed.

Any bowel action—

Nature.

Amount.

The First Aider must—

Maintain the casualty in the correct nursing position.

Give fluids by mouth unless contra-indicated (see p. 112.)

Frequently check the circulation of any injured limb.

Frequently check all bandages, splints or constrictive bandages for tightness and comfort.

### RECORDING THE DEPTH AND RATE OF RESPIRATION

Normal breathing is quiet and rhythmic—inspiration—expiration—pause.

#### DEPTH

Normally breathing is fairly deep as both the upper and lower lobes of the lungs are used.

#### RATE

Varies with age.

The average is—

Infants 32-40 per minute.

Children 24-28 per minute.

Adults 16-20 per minute.

## FIRST AID

The rate is increased in—

Shock.

Emotion.

Fever.

The rate is decreased if the respiration centre is depressed by—

Asphxia.

Head injuries.

Poisons.

Stertorous respirations are slow, deep and noisy breathing (head injuries).

Dyspnoea is rapid, difficult breathing often associated with pain (chest conditions).

Sighing respirations are respirations with a slow deep inspiration and a rapid expiration (common in shock).

Air hunger is where the casualty has gasping, big inspirations.

### METHOD OF COUNTING THE RATE

The casualty should be at rest.

Count the respirations after the pulse while still holding the casualty's wrist.

With infants it is best to lay a hand on the chest.

Count inspirations only, for a full minute.

### TEMPERATURE

The First Aider should make himself familiar with the method of recording temperatures.

The average normal body temperature taken by mouth is 36.9°C.

If taken in the axilla or groin, the reading is slightly lower.

### METHOD OF TAKING THE TEMPERATURE

Rinse the thermometer in cold water. Shake it to make certain that the mercury is below 35°C.

## FIRST AID

Place the bulb of the thermometer under the casualty's tongue.

Instruct the casualty to close the lips and breathe through the nose and not speak or bite the thermometer.

Leave it in position for not less than two minutes.

Remove the thermometer, wipe it, read it and make a note of the temperature.

Shake down the mercury, clean and disinfect the thermometer and replace it in its container.

Ranges of temperature are—

Hypothermia (below  $36^{\circ}\text{C}$ ).

Normal ( $36^{\circ}$ - $37^{\circ}\text{C}$ ).

Pyrexia (above  $37^{\circ}\text{C}$ ).

Hyperpyrexia ( $40.5^{\circ}\text{C}$ ).

In the unconscious casualty or children it should be taken in the axilla.

If the temperature is below  $36^{\circ}\text{C}$  warm the casualty to prevent shivering.

If the temperature is above  $38^{\circ}\text{C}$  keep the casualty cool.

### ADMINISTRATION OF FLUIDS

When fluids can be given by mouth, they should be given in small quantities at frequent intervals. This avoids the danger of overloading the stomach and inducing vomiting.

### RELIEF OF PAIN

When the casualty is in pain and can swallow, it is permissible to give aspirin to relieve pain.

Dosage—

Adults 2 tablets every four hours.

Children 1 tablet every four hours.

## FIRST AID

### GLOSSARY

**HYPOTHERMIA**—*Low body temperature.*

**PYREXIA**—*High body temperature.*

**HYPERPYREXIA**—*Very high body temperature.*

**AXILLA**—*Armpit.*

DISPOSAL

NOTES

21

DISPOSAL

---

*The assistance  
of the casualty to shelter,  
home or medical aid.*

---

The First Aider may be called upon to initiate or assist in the disposal of the casualty to shelter, home or medical aid.

Skill in the use of simple techniques of transport must be practised.

To avoid the casualty's condition being worsened, careful selection and use of the correct method of transport is necessary.

Selection will depend upon—

- The nature and severity of the injury.
- The physical capabilities of the first aider.
- The number of personnel available.
- The type of equipment available.

## FIRST AID

The nature of the evacuation route.

The distance to be covered.

**The basic principles of transport must be observed**

These are—

The airway is open.

Haemorrhage controlled.

The casualty is maintained in the correct position.

The casualty is safely secured to the stretcher.

Regular check of the casualty's condition is made.

The supporting bandages and dressings remain effectively applied.

The method of transport is safe, comfortable and as speedy as circumstances permit.

### METHODS OF TRANSPORT

By—

Support by one or more helpers.

Hand carriage.

Stretcher.

### SUPPORT BY ONE HELPER

By—

Cradle.

Human crutch.

Pick-a-back.

Fireman's lift.

Lift and drag.

### CRADLE

Used for casualties—

Of light weight.

Children.

## FIRST AID

Kneeling on one knee beside the casualty, pass one of your arms under the knees and the other arm round the back.

Lift the casualty, and hold snugly to your body.

Rise and proceed.



Fig. 141—The cradle carry

## FIRST AID

### THE HUMAN CRUTCH

Used for adult casualties where the casualty can walk with assistance.



Fig. 142—The human crutch.

## FIRST AID

Assist the casualty to the standing position.

Standing at the injured side put your nearest arm behind the casualty and grasp the clothing at the opposite hip.

Place the casualty's nearest arm around your neck and hold that hand with your own free hand.

If the casualty's other hand is free, gain additional help from a walking aid.

Step off with the casualty and helper's inside feet and continue to walk out of step.

### PICK-A-BACK

Used for the conscious casualty who can hold on.

Assist the casualty to the standing position.

Stoop in front of the casualty.

The casualty places the arms over your shoulders and clasps them firmly on your chest.

Carry your arms under the casualty's knees.

If possible clasp your hands in front.

Rise and proceed.

### FIREMAN'S LIFT AND CARRY

Used for adult casualties who cannot help themselves, provided the helper has sufficient strength.

Assist the casualty to the standing position by—

Positioning the casualty face downwards.

Kneeling on one knee at the head of the casualty.

Passing both arms beneath the shoulders.

Drawing the casualty towards you and clasping your hands behind the casualty's back.

Assuming the upright position.



Fig. 143—Pick-a-back.

**To carry the casualty on your right shoulder**

Grasp the right wrist with your left hand.

Bend down with your head under the extended right arm so that your right shoulder is level with the lower part of the abdomen and place your right arm between or around the thighs.

Taking the casualty's weight on your right shoulder rise to the erect position.

Pull the casualty across both shoulders and transfer the casualty's right wrist to your right hand.

**To carry the casualty on your left shoulder**

Change right for left and vice-versa.



Fig. 144—1st movement.



Fig. 145—2nd movement.

The Fireman's lift and carry.



Fig. 146—The Fireman's lift and carry completed.

### LIFT AND DRAG

Used to drag a heavy helpless casualty from danger.

Turn the casualty onto the back.

Tie the wrists together.

Face and kneel astride the casualty.

Bend forward, place the wrists round the back of your neck.

Lifting head and shoulders clear of the ground, crawl on your hands and knees from the danger area.

### HAND CARRIAGE

4 handed.

3 handed.

2 handed.

Fore and aft chair.

Fore and aft.

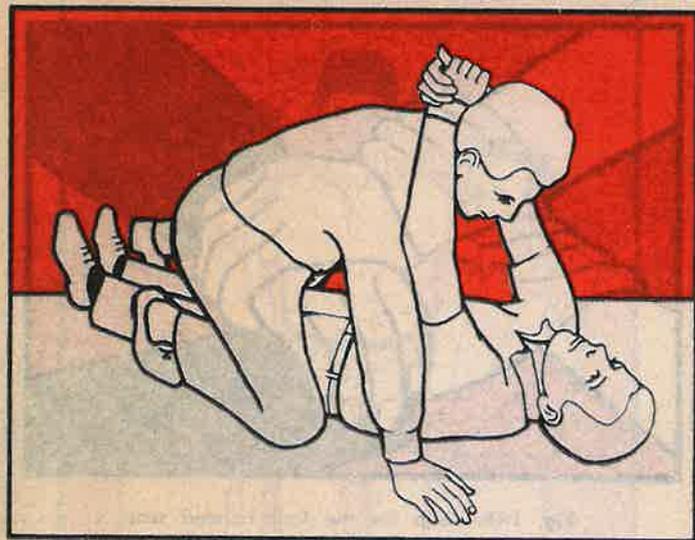


Fig. 147—Lift and drag.

### HAND SEATS

Used if two or more helpers are available.

### THE FOUR HANDED SEAT

Used when the casualty can assist with one or both arms.

Two helpers face each other behind the casualty and grasp their left wrists with their right hands and each other's right wrists with their left hands.

Stoop down.

The casualty is instructed to place one arm around the neck of each helper and to sit on their hands.

The helpers rise together and step off with outside feet.



Fig. 148—Grip for the four handed seat.

### THE THREE HANDED SEAT

Used for supporting either leg when the casualty is able to help with one or both arms.

#### For supporting the left leg

Two helpers face each other behind the casualty.

The helper on the casualty's right grasps his own left wrist with his right hand and the other helper's right wrist with his left hand.

The helper on the left grasps the first helper's right wrist with his right hand.

This leaves his left hand free to support the casualty's left leg.

The helpers stoop down.

The casualty is instructed to place one arm around the neck of each helper and to sit on their hands.

The bearer on the left supports the casualty's leg.

The helpers rise together and step off with outside feet.

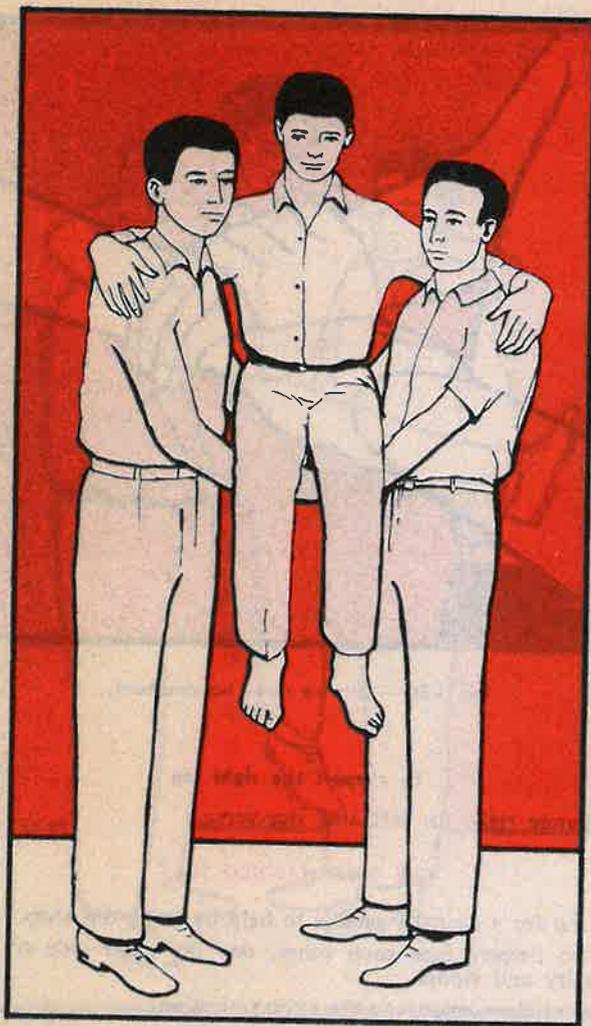


Fig. 149—The four handed seat.

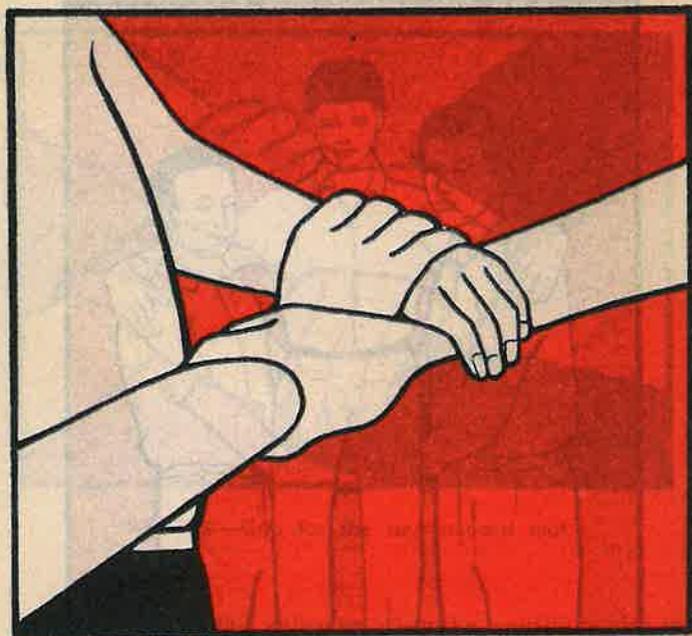


Fig. 150—Grip for three handed seat.

**To support the right leg**

Change right for left and vice-versa.

**THE TWO HANDED SEAT**

Used for a casualty unable to help by using the arms.

Two helpers face each other, one on either side of the casualty and stoop.

Assist the casualty to the sitting position.

Each passes his arm nearest to the casualty's head behind the casualty and grasps the clothing at the opposite hip.



Fig. 151—The three handed seat.



Fig. 152—The two handed seat (front view).

They place their other hands under the thighs, just above the knees and clasp the hands together using the "hook grip".

**NOTE**—a folded handkerchief held in the hands will ensure a comfortable and secure grip.

The helpers rise together stepping off using outside feet.

In all cases of transport by hand seats, the helpers walk with the cross-over step.



Fig. 153—The two handed seat (rear view).

#### FORE AND AFT CHAIR LIFT

Used for a conscious casualty without serious injury.

Seat the casualty in a strong chair.

One helper grasps the back of the chair and tilts the chair to the point of balance.

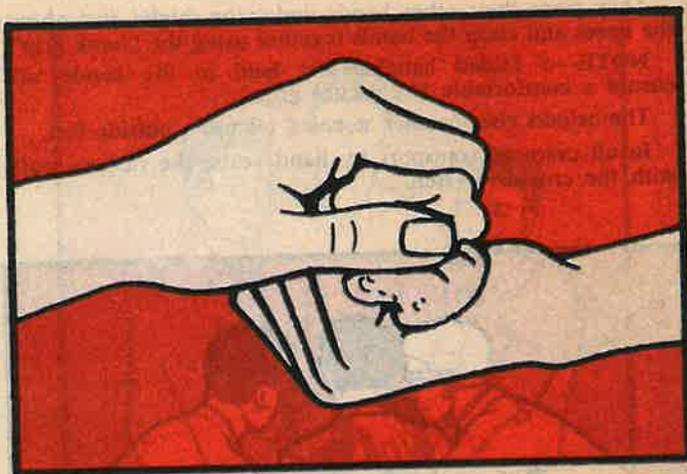


Fig. 154—The hook grip.

The second helper with his back to the casualty kneels on one knee and grasps the front legs of the chair.  
The helpers rise and proceed in step.

#### FORE AND AFT METHOD OF TRANSPORT

Used for a casualty when space does not permit using a hand seat.

One helper stands between the casualty's legs, facing the feet.

Bending down, the helper grasps the casualty under the knees.

The other helper stoops behind the casualty and after raising the head and shoulders, passes the arms under the casualty's armpits and clasps the hands together in front.

The helpers rise together and step off walking in step.



Fig. 155—The fore and aft chair lift.



Fig. 156—Fore and aft lift.

### STRETCHERS

#### Rules for carrying casualties on stretchers

The stretcher must be tested for strength and security before placing the casualty on it.

The casualty must be placed and carried on the stretcher in the correct nursing position according to the disabilities present.

The casualty must be securely fastened on the stretcher, but the restraint used must not aggravate the disabilities present.

The stretcher must be carried as near to a level plane as possible without—

- Sudden changes of direction.
- Acceleration or deceleration.
- Elevation or depression.

#### Securing a casualty to a stretcher

Using two broad bandages tied together secure the casualty at—

- Shoulder level.
- Hips.
- Mid-thigh.
- Calves.

Bandages must be applied sufficiently firmly to prevent the casualty moving.

Bandages must not embarrass the casualty's disabilities.

#### Blanketing a stretcher

When using one blanket proceed as in fig. 157.

When using two blankets proceed as in fig. 158.

Loading a stretcher when no blanket is available—study figs. 159, and 160, 161 and 162.

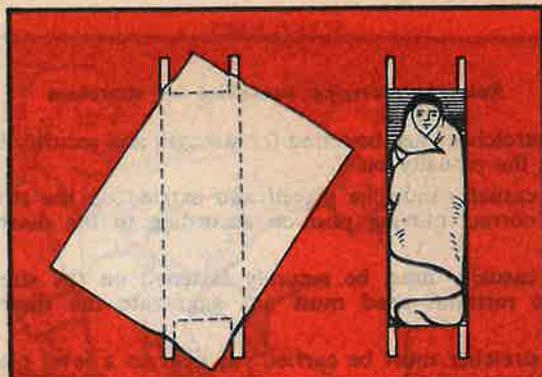


Fig. 157—Blanketing a stretcher with one blanket.

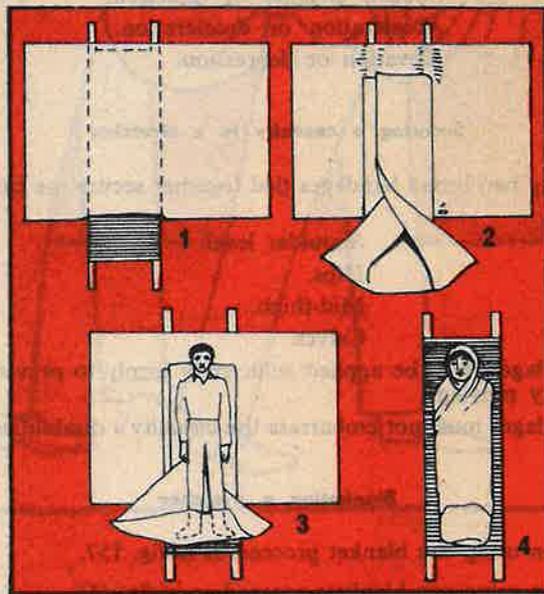


Fig. 158—Blanketing a stretcher with two blankets.



Fig. 160

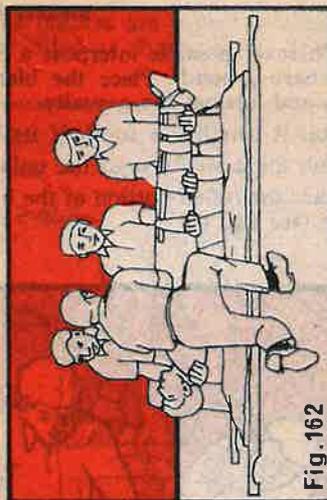


Fig. 162

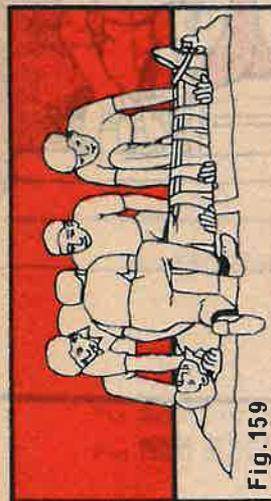


Fig. 159

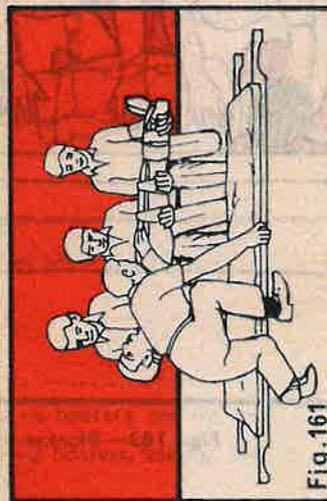


Fig. 161

Loading a stretcher without blanket.

## FIRST AID

### Blanket lift

Wherever possible interpose a blanket between the casualty and bare ground. Place the blanket on the ground in line with and against the casualty.

Roll it lengthwise for half its length.

Roll the casualty onto the uninjured side.

Place the rolled portion of the blanket close to the casualty's back (see fig. 163).

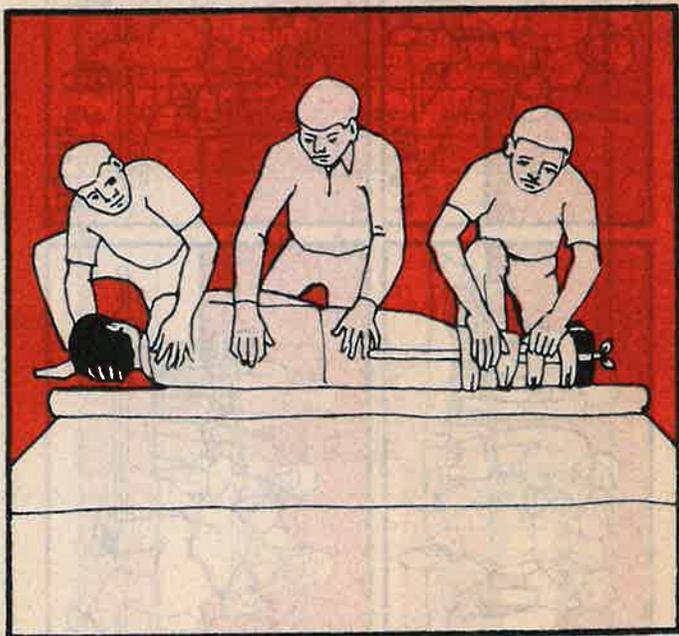


Fig. 163—Blanket lift—1st stage.

Roll the casualty over the rolled edge onto the back.  
Unroll the blanket.

## FIRST AID

For lifting, the edges of the blanket are rolled up close to the casualty and the casualty lifted as shown in fig. 164.



Fig. 164—Blanket lift—2nd stage.

For hand carriage—4 bearers, see fig. 165.

For hand carriage—2 bearers, see fig. 166.

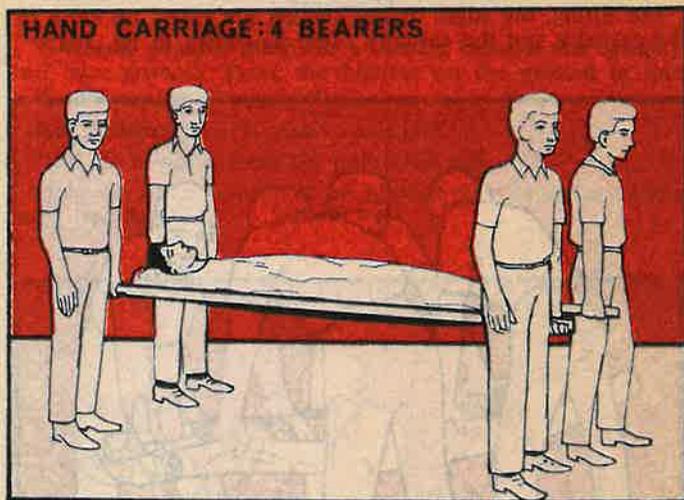
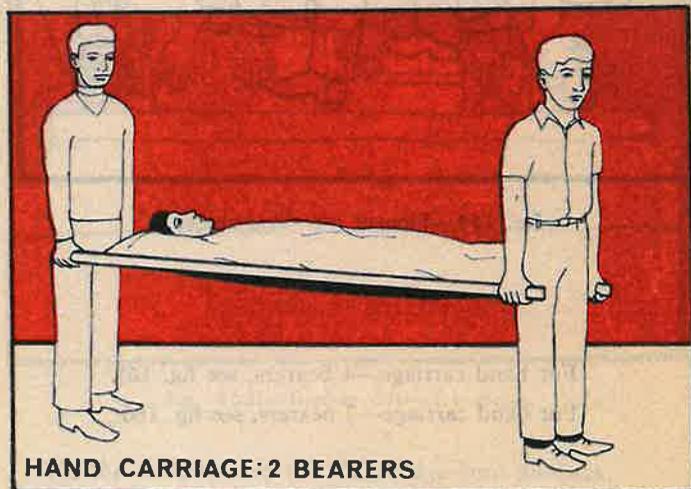


Fig. 165—Hand carriage—four bearers.



HAND CARRIAGE: 2 BEARERS

Fig. 166—Hand carriage—two bearers.

## GLOSSARY

## A

- ABCESS**—The reaction to infection producing pus.  
**AFTER-BIRTH**—Placenta.  
**ALVEOLI**—Air spaces in the lungs.  
**ANGINA**—Disease of the heart muscle causing chest pain.  
**ANTIBODIES**—Protective substances in the tissues.  
**ANTISEPTIC**—A substance capable of killing organisms.  
**AORTA**—Largest artery of the body.  
**ARTERIOLES**—Small arteries.  
**ASPHYXIA**—Lack of oxygen.  
**ATRIUM**—Holding chamber of the heart.  
**AUTONOMIC NERVES**—Control involuntary movements.  
**AXILLA**—The armpit.

## B

- BACTERIA**—Micro-organisms which cause infection.  
**BRONCHI**—Large air passages.

## C

- CARDIAC**—Pertaining to the heart.  
**CAPILLARIES**—Tiny blood vessels.  
**CAROTID**—Name of an artery in the neck.  
**CARTILAGE**—Lining of bones in joints.  
**CASUALTY**—Victim of illness or accident.  
**CEREBRO-SPINAL FLUID**—Fluid bathing the brain and spinal cord.  
**CERVICAL**—Pertaining to the neck.  
**CIRCULATION**—The movement of blood through the body.  
**CLAVICLE**—Collar bone.  
**COMA**—State of unconsciousness.  
**CONJUNCTIVA**—Delicate outside cover of the eye.  
**CORONARY**—Artery of the heart.  
**CORONARY OCCLUSION**—Blocked coronary artery.  
**CORNEA**—Window of the eye.  
**CORPUSCLES**—Cells in the blood.  
**CORROSIVE**—A substance that eats in.  
**CYANOSIS**—Blue colour of blood due to lack of oxygen.

## FIRST AID

### D

DIABETES—*Disease of the pancreas.*  
DIAGNOSIS—*Naming the illness or injury suffered.*  
DIAPHRAGM—*Muscular partition between the chest and the abdomen.*  
DIARRHOEA—*Loose bowel actions.*  
DISLOCATION—*Displacement of a joint.*

### E

EMETIC—*A substance used to induce vomiting.*  
EPILEPSY—*Condition of the brain, leading to fits.*  
EXPIRATION—*Breathing out.*

### F

FAECES—*Waste food products passed by the bowel.*  
FAINTING—*A form of loss of consciousness.*  
FEMUR—*Thigh bone.*  
FIBRILLATION—*Irregular twitching of muscles.*  
FIBRIN—*Protein in the plasma.*  
FIBULA—*Smaller long bone below the knee.*  
FRACTURE—*Broken bone.*

### H

HAEMOGLOBIN—*Oxygen carrying pigment of the blood.*  
HAEMORRHAGE—*Bleeding.*  
HERNIA—*Rupture in the abdominal wall.*  
HUMERUS—*Bone of the upper arm.*  
HYPERPYREXIA—*Very high body temperature.*  
HYPOTHERMIA—*Low body temperature.*

### I

INFECTION—*Invasion of the body by micro-organisms.*  
INTROSPECTIVE—*Withdrawn and self-centred.*  
INSPIRATION—*Breathing in.*  
INSULIN—*Chemical manufactured in the pancreas.*

## FIRST AID

### J

JOINTS—*Junctions between bones.*

### L

LARYNX—*Voice box.*  
LIGAMENTS—*Bundles of connective tissue.*  
LUMBAR—*Pertaining to the loin.*  
LYMPH—*Fluid between the cells of the body.*

### M

MIDWIFE—*A person assisting at a birth.*  
MOTOR NERVES—*Control movements.*  
MUCUS—*Secretions from the glands of the body*

### N

NAUSEA—*Feeling of sickness.*

### O

ORGANISMS—*Germs.*

### P

PALLID—*Pale colour.*  
PATELLA—*Kneecap.*  
PERINEUM—*Crutch area.*  
PERITONEUM—*Covering of the internal organs of the abdomen.*  
PERITONITIS—*Inflammation of the peritoneum.*  
PHARYNX—*Air space behind the mouth and nose.*  
PLACENTA—*Special tissue attached to the mother's uterus which supplies nourishment to the developing baby.*  
PLASMA—*Fluid part of the blood.*  
PLEURA—*Outer lining of the lungs and the inner lining of the chest.*  
PSYCHONEUROSIS—*Hysterical state.*

## FIRST AID

PULMONARY ARTERY—*Main artery to the lungs.*  
PULMONARY CIRCULATION—*Blood flow to the lungs.*  
PULSE—*The heart beat.*  
PUPIL—*Window of the eye.*  
PYREXIA—*High body temperature.*

### R

RADIAL ARTERY—*Artery in the wrist.*  
RADIUS—*Long bone of the forearm.*  
RESPIRATION—*Breathing.*

### S

SALIVA—*Secretions in the mouth.*  
SACRAL—*Pertaining to the sacrum.*  
SACRUM—*Solid bony mass at the base of the spine which supports the pelvis.*  
SCAPULA—*Shoulder blade.*  
SEBACEOUS GLANDS—*Produce an oily substance in the skin.*  
SECRETION—*Fluid from glands in the body.*  
SENSORY NERVES—*Appreciate sensation.*  
SHOCK—*State of collapse.*  
SKELETON—*Bones of the body.*  
SPLEEN—*Organ in the abdomen.*  
STERILE—*Free of infection.*  
STERNUM—*Breastbone.*  
SYMPATHETIC NERVES—*Control involuntary movements.*  
SYNCOPE—*Fainting.*  
SYNOVIUM—*Lining of the inside of joints.*  
SYSTEMIC CIRCULATION—*Blood flow to the body excluding the lungs.*

### T

THORACIC—*Pertaining to the chest (thorax).*  
TIBIA—*Main long bone below the knee.*  
TOXIN—*Substances which cause collapse.*  
TRACHEA—*Wind pipe.*

## FIRST AID

### U

ULNA—*Long bone of the forearm.*  
UMBILICAL CORD—*A cord attaching the baby to the mother through the placenta.*  
URETER—*Tube leading from the kidney to the bladder.*  
URETHRA—*Tube leading from the bladder to the exterior.*  
URINE—*Solution of waste products removed from the blood by the kidneys.*  
UTERUS—*Womb.*

### V

VENTRICLE—*Pumping chamber of the heart.*  
VERTEBRA—*Bone of the spine.*  
VOMITUS—*Stomach contents vomited up.*

### W

WOUND—*Break in the tissues.*

## THE MORE COMMON POISONS

NAME	TREATMENT
<b>ACIDS— CORROSIVE</b>	Do not induce vomiting. Give milk or water. Beaten egg white.
<b>ALCOHOLS</b>	Induce vomiting. Give strong coffee if conscious.
<b>ALKALIS— CORROSIVE</b>	Do not induce vomiting. Give milk or water and lemon juice. Beaten egg white.
<b>AMMONIA</b>	See alkalis.
<b>ARSENIC</b>	Induce vomiting. Give water and milk.
<b>ASPIRIN</b>	Induce vomiting. Give water and milk.
<b>BARBITURATES</b>	Induce vomiting if conscious. Give strong coffee or tea. If unconscious sustain respiration.
<b>BLEACH— CORROSIVE</b>	Do not induce vomiting. Give milk. Beaten egg white.
<b>CARBON MONOXIDE</b>	Remove to fresh air— sustain respiration.
<b>CARBON TETRACHLORIDE</b>	Remove from contaminated area. If conscious, induce vomiting.
<b>CYANIDE (Prussic Acid) CYANOGEN</b>	Sustain respiration by Silvester method.
<b>DETERGENTS</b>	Do not induce vomiting Give milk or water.

## FIRST AID

<b>DIELDRIIN</b>	Induce vomiting. Wash skin.
<b>DISINFECTANTS— CONTAINING EUCALYPTUS PINE LAVENDER</b>	Do not induce vomiting. Give milk and water.
<b>DISINFECTANTS— OTHER</b>	Induce vomiting. Give milk. Beaten egg white.
<b>D.D.T.</b>	Induce vomiting. Clean skin.
<b>FOOD POISONING</b>	Induce vomiting. Give fluids.
<b>HYDROGEN SULPHIDE</b>	Sustain respiration.
<b>INSECTICIDES— CONTAINING KEROSENE OR PETROL</b>	Do not induce vomiting. Give water or fruit juice.
<b>INSECTICIDES— OTHER</b>	Induce vomiting. Give water or fruit juice.
<b>INSULIN</b>	If conscious— Give oral glucose or sugar.
<b>IRON SALTS</b>	Induce vomiting. Give water and milk.
<b>KEROSENE</b>	Do not induce vomiting. Give milk.
<b>LINDANE (BBC)</b>	Induce vomiting. Wash skin.
<b>MATCH HEADS AND BOXES</b>	Induce vomiting.
<b>METAL CLEANERS</b>	Do not induce vomiting. Give water or milk. Beaten egg whites.

## FIRST AID

<b>METHYLATED SPIRIT</b>	Induce vomiting. Give strong coffee.
<b>MUSHROOMS— POISONOUS</b>	Induce vomiting.
<b>ORGANO-CHLORINE</b>	Induce vomiting. Wash skin.
<b>PETROL PRODUCTS</b>	Do not induce vomiting. Give milk.
<b>PHENOLS— CORROSIVE</b>	Do not induce vomiting Give water and milk. Beaten egg whites.
<b>PHOSPHORUS</b>	Induce vomiting.
<b>RAT POISONS</b>	Induce vomiting. Give milk or water.
<b>STRYCHNINE TABLETS</b>	Induce vomiting if conscious. Induce vomiting. Give milk and water.
<b>TOADSTOOLS</b>	Induce vomiting.
<b>TRICHLORETHYLENE</b>	Sustain respiration.
<b>TURPENTINE</b>	Do not induce vomiting. Give milk.

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**IN ALL CASES SEEK MEDICAL AID.**

**IF RESPIRATION IS FAILING, SUPPORT WITH  
ARTIFICIAL RESPIRATION.**

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## MARINE STINGERS FOUND IN AUSTRALIA

NAME	HABITAT
CAT FISH	Widely distributed; active swimmers.
FORTESCUE	Weedy areas, camouflaged, sluggish.
BUTTERFLY COD	coral reefs, rocky reefs, conspicuous.
STING RAY	Sandy area; often lying on the sand.
BUTTER FISH	Widely distributed; active swimmers.
STONE FISH	Rubble associated with sand or mud, camouflaged; sluggish.
CONE SHELL	Coral reef.
SMALL BLUE-RINGED OCTOPUS	Rubble areas.
LARGE STARFISH	Coral reef.
SEA URCHIN	Reef areas or sandy areas containing rocks.
SEA WASP— CHIRONEX	Tropical waters.
IRUPANDI	Tropical waters.
BULL ROUT	In weed—sunken logs, brambles well camouflaged, sluggish, fresh water.
CAT FISH THE COBBLER	Fresh water — widely distributed; active swimmers.

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