FIRST AID

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

SECOND EDITION
1980

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

SECOND EDITION

1982 (Revised)

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THE ORDER OF ST. JOHN IN AUSTRALIA

The Priory in Australia, with headquarters in Canberra, is part of the Order of St. John in the British Realm and is responsible to the Grand Priory in England. The Queen is the Sovereign Head of the Order.

The Order began many centuries ago as a body of monks dedicated to the care of sick and injured pilgrims to the Holy Land. Their patron saint was St. John the Baptist and their emblem was an eight pointed white cross. When Jerusalem was occupied by the Crusaders,the monks built a hospital and took up arms to defend it, thus becoming the Knights Hospitallers. The Order spread throughout Christendom and Grand Priories were established in all the great nations of Europe. In the 16th Century the Knights settled in Malta, so that their emblem henceforth came to be known as the Maltese Cross.

The Grand Priory of England was dissolved by King Henry VIII at the time of the Reformation. It was revived in the 19th Century and granted a Royal Charter by Queen Victoria in 1888. From this derive the organisation and functions of the Order in Australia today.

It consists of three Foundations namely:

i. The St. John Ambulance Association.
ii. The St. John Ambulance Brigade.
iii. The Ophthalmic Hospital in Jerusalem.

The motto of the Order is *Pro Utilitate Hominum* (for the service of mankind), and this forms the basis of the whole work done by the Order.

THE ST. JOHN AMBULANCE ASSOCIATION

This is concerned with the laying down of standards for the teaching of First Aid and Home Nursing, the publication of text books and manuals for this purpose, the running of classes in these subjects and examinations for certificates of proficiency in same. There is an Association Centre in each State capital.

Teachers carrying out the work consist of doctors, nurses and trained lay instructors who give their services voluntarily. There are some paid executive staff. The Association is administered in Australia by its Director.

THE ST. JOHN AMBULANCE BRIGADE

This again consists of voluntary members who wear the St. John uniform and give first aid to the general public as a service to the community. They are to be seen at football matches, parades and national disasters, etc. It consists of officers and other ranks, adults and cadets, male and female. Cadets graduate through the Brigade obtaining by examination certificates in the subjects of First Aid or Home Nursing.

Brigade organisation is on a corps basis in the various States and districts throughout Australia with H.Q. in each capital city. The Chief Commissioner controls the Brigade in Australia.

THE OPHTHALMIC HOSPITAL IN JERUSALEM

This third Foundation situated in Jerusalem gives very comprehensive patient care and nursing treatment to eye disease sufferers in these regions. The hospital and its paid staff are supported by subscriptions from the Order of St. John throughout the world.

The above Foundations constitute the active working teams of St. John and all endeavour to assist mankind in accordance with the motto of the Order.

FOREWORD

Since the publication of the first edition of this Manual during 1969, major changes in treatment have taken place.

These have been met by amendments during subsequent impressions.

The St. John Ambulance Association in Australia is conscious of its public responsibility as the acknowledged authority for teaching first aid.

This revised manual is the result of much research and expert advice received from all branches of the medical profession, both from within and outside the Order of St. John.

The Director of St. John Ambulance in Australia, Mr. A. H. Toyne C.B.E., K.St.J., MB.BS, F.R.C.S., F.R.A.C.S., who produced our first manual has again been responsible for the sustained effort necessary to provide this up-to-date Australian Text Book.

GEORGE STENING G.C.St.J. E.D.,
Chancellor,
Priory of the Order
of St. John in Australia.

ACKNOWLEDGEMENTS

The development of the Second Edition of the authorised manual of the St. John Ambulance Association Priory of the Order of St. John in Australia was deemed necessary for two major reasons. Firstly, the first edition was outdated because there have been considerable changes in the methods of resuscitation and the treatment of snake bites, and secondly, it was felt that the introduction in teaching of prevention of injury and new material in the field of sports medicine, motor car accidents and drug overdosage, were not only desirable but essential for the First Aider to study.

A further major decision was made, namely, to try and cut down the length of First Aid courses to a minimum of eight sessions of two hours. To do this, and introduce new material, it was necessary to classify the new text into material essential to all First Aid courses, and material that was optional, to fit into the eight module course and still be eligible for a St. John Ambulance certificate.

This means that students can elect subject material suitable to their requirements and when subsequent courses are undertaken, new material can be introduced. A further advantage is that where non-certificated Emergency Courses are being conducted, there is a suitable module available in the manual.

To achieve a manual to fulfil these criteria has meant a tremendous amount of co-operation from many people. Whilst I cannot adequately thank all those people, I must make special mention of some of the individuals and organisations who have contributed so much.

The Deputy Director of the St. John Ambulance Association, Mr. A. M. Beech, C.St. J., Q.H.S., F.R.C.S., F.R.A.C.S., who not only organised the photography for the manual but also helped edit the material for both St. John and the Red Cross.

Dr. A. W. Burton, K.St. J., M.B., B.S., LL.B., F.A.C.M.A., gave invaluable guidance, and I thank him.

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Finally, but by no means least, I wish to mention my administration help, led by Mr. N. Billing, K.St.J., M.P., J.P., Miss J. Biddle, Miss L. Tassicker, and the staff of Ruskin Press, particularly Mr. S. Hedley and Mr. A. Jenkins, Chairmen and members of St. John Ambulance Association, State Centres in Australia, Commissioners and members of St. John Ambulance Brigade in Australia, Mr. R.J. Dymond, K.St.J., and members of Casualty Simulation.

A. H. TOYNE,
Director,
St. John Ambulance Association
Priory in Australia.

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SYLLABUS

The contents have been divided into areas of obligatory material, (red) which must be included in any course which entitles the student to receive a certificate, and optional material, some of which will be used to make up the full course of a **minimum** of 16 hours' instruction, usually made up of eight two-hour sessions. The optional material will be selected to meet the requirements of the students, at the discretion of the lecturer.

A SUGGESTED SYLLABUS

SESSION 1 — **OBLIGATORY**

THEORETICAL
Principles and Practices and Rules of Handling
(Principles of transport to be taught)
Structure and Function of the body
CIRCULATION AND RESPIRATION IN DETAIL

PRACTICAL
Taking the pulse
Clearing the airway
Opening the airway
Coma position

SESSION 2 — **OBLIGATORY**

THEORETICAL
Unconsciousness — causes
Asphyxia — causes
Respiratory arrest — causes
Cardiac arrest — causes

PRACTICAL
Expired Air Resuscitation
Cardio Pulmonary Resuscitation

SESSION 3 **OBLIGATORY**

THEORETICAL
Wounds — haemorrhage and infection
Control of haemorrhage
Principles of dressing and bandaging wounds
Haemorrhage from special regions

PRACTICAL
Expired Air Resuscitation
Cardio Pulmonary Resuscitation Session 2

SESSION 4 **OBLIGATORY**

THEORETICAL
Injuries to Bones, Joints and Muscles
Fractures
Dislocation
Sprains
Strains

PRACTICAL
Dressings
Bandages — simple spiral, reversed spiral
— the figure of eight
Slings
Splints
Controlling haemorrhage
Dressing wounds
Fractures Session 1

SESSION 5 **OBLIGATORY**

THEORETICAL
Abdominal and Pelvic conditions
Hiccough
The eye
The ear
Poisons — principles of treatment

PRACTICAL
Fractures Session 2

SESSIONS 6, 7 AND 8 **OPTIONAL**

THEORETICAL
To include material from remaining chapters.

PRACTICAL
Fractures Session 3

Demonstration — taking temperature
— transport techniques
Air splints

Jordon Frame

Thomas Splint

Revision

Chapter 1

FIRST AID

Principles and practice and rules of handling

First Aid is the emergency care of the injured or sick

FIRST AID commences *immediately* the injury or sickness occurs, and continues until medical aid arrives or the casualty recovers.

FIRST AID can

- *PRESERVE* LIFE
- *PROTECT* THE UNCONSCIOUS
- *PREVENT* THE INJURY OR ILLNESS FROM BECOMING WORSE
- *PROMOTE* RECOVERY

The First Aider must be able to

- MAKE a DIAGNOSIS
- DECIDE on the TREATMENT required and commence treatment promptly
- ARRANGE further care of the casualty

Fig. 1 — Taking the carotid pulse.

MAKING A DIAGNOSIS

This is obtained from the

- history
- symptoms and signs

HISTORY

The history is the story of accident or the illness obtained from

- The casualty
- Witnesses
- The evidence of the surroundings

SYMPTOMS AND SIGNS

Are the sensations the casualty describes and the differences from normal detected by the First Aider, e.g. pain, nausea, headache, tenderness, deformity, pallor.

The First Aider must get this information from looking, asking, feeling and smelling.

DIAGNOSING THE CONSCIOUS PATIENT

- Ask the site of any pain. Try to pinpoint the place. This will often identify the cause.
- Compare both sides of the body where possible.
- *Examine* the *painful* area gently and with special care.
- *Examine* the colour of the skin, the nail beds, lips and ears.
- *Examine* the skin and note its temperature and whether it is moist or dry.
- Listen to the nature and rate of the breathing.
- Count the pulse, noting its strength and rhythm.
- Smell the breath.

Fig. 2 — Taking the radial pulse.

DIAGNOSING THE UNCONSCIOUS PATIENT

The unconscious patient is much more difficult to diagnose.

CHECK

- that the airway is clear
- that breathing is present
- that the pulse is present
- that any haemorrhage is controlled

Establish the level of consciousness by observing whether the casualty

- responds to speech
- reacts to painful stimuli

Observe whether breathing is noisy or stertorous (snoring).
Examine the whole body systematically.

Check the

- head and neck
- spine and trunk
- upper and lower limbs

Compare both sides of the body if possible.
Examine the casualty for dampness from blood or urine.
Examine the head for injury, and ears, eyes, nose and mouth for blood or other signs.

Fig. 3 — Clearing the airway.

TREATMENT

- Rapidly assess the whole situation.
- Remove any risk of danger to the casualty or yourself or remove the casualty to safety.

Fig. 4 — Commencing expired air resuscitation.

Attend to urgent needs first.

If

- AIRWAY is blocked — clear it (Fig. 3).
- BREATHING is absent — start expired air resuscitation (E.A.R.) (Fig. 4).

Fig. 5 — Commencing combined external cardiac compression and expired air resuscitation.

- PULSE is absent — start cardiopulmonary resuscitation (C.P.R.) (combined external cardiac compression and expired air resuscitation) (Fig. 5).
- Casualty is UNCONSCIOUS — place in the coma position (Figs. 6 and 7).
- Serious haemorrhage is present — control the haemorrhage.

Immobilise all serious fractures and dress large wounds before moving the casualty.

Treat other injuries if time permits before medical aid arrives.

REMEMBER, First Aiders must be prepared to take responsibility and show leadership and control.

Many accidents involve more than one casualty and the First Aider must decide the order of priority of treatment.

Fig. 6 — Coma position (front view).

Fig. 7 — Coma position (rear view).

HANDLING THE CASUALTY

Remove only sufficient clothing to expose the injuries and treat them.

Minimise movement of the casualty.

Maintain privacy as much as possible.

Do not damage clothing unnecessarily.

The First Aider must inspire confidence and handle the casualty with reassurance, but gently.

Remember, FIRST AID ceases when MEDICAL AID arrives.

MEDICAL AID IS TREATMENT BY A DOCTOR, REGISTERED NURSE OR AMBULANCE OFFICER

- on the spot
- in the home
- in the hospital

SEEKING MEDICAL AID

Immediately it is decided that medical aid or an ambulance is needed

- send for it
- state the EXACT PLACE WITH DIRECTIONS HOW TO GET THERE
- state the NUMBER OF CASUALTIES with some INDICATION OF THEIR SERIOUSNESS.

Messages should be brief and should be repeated back by the person receiving them.

First Aiders should make use of bystanders to

- Telephone for ambulance / police
- Keep back crowds
- Assist in controlling traffic
- Assist in treatment

FUTURE CARE OF CASUALTY INCLUDING TRANSPORT

The First Aider may need to initiate transfer 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 becoming worse, careful selection and use of the correct method of transport is necessary.

Selection will depend upon the

- nature and severity of the injury
- physical capabilities of the FIRST-AIDER
- number of personnel available
- type of equipment available
- nature of the evacuation route
- distance to be covered

The basic principles of transport must be observed. These are —

- The airway is open
- Haemorrhage is controlled
- The casualty is safely maintained in the correct position
- The casualty is safely secured to the stretcher
- Regular checks of the casualty's condition are made
- Supporting bandages and dressings remain effectively applied
- The method of transport is safe, comfortable and as speedy as circumstances permit

MOST ACCIDENTS ARE PREVENTABLE!

The First Aider should know the safety rules —

- At home
- At work
- At play
- On the roads

EMERGENCY RESCUE

Emergency rescue is a procedure for moving a victim from a dangerous location to a place of safety.

Rescue of the casualty by First Aiders may be necessary in an emergency but First Aiders should leave rescue to trained personnel if available.

INSTANCES

- Serious traffic hazards
- Fire, danger of fire or explosion
- Danger of asphyxia due to lack of oxygen or due to toxic gases.
- Risk of drowning
- Exposure to cold or intense heat
- Possibility of injury from collapsing walls
- Electrical hazards

RESCUE INVOLVING FIRES

If entering a burning building

- Feel the temperature of the door before opening. If very hot, do not enter. If cold or slightly warm, crouch low and open slowly
- When entering, crouch low

RESCUE FROM TOXIC OR OXYGEN DEFICIENT AREAS

- Attempt rescue only when ventilation is adequate or when wearing proper equipment.
- Shut off all gases at mains. Open windows and doors unless there is a fire.

RESCUE FROM WATER

Even a non-swimmer, or a person unfamiliar with the standard life-saving techniques, can effect a rescue.

If the casualty is near the edge, extend a hand, foot or pole to the casualty.

If out of reach, push a plank or throw a line to the casualty.

RESCUE FROM ELECTRICAL HAZARDS

Domestic voltage

Switch off the current or jerk cable free — DO NOT CUT. If this is not possible, remove the casualty from the current. Use non-conducting, dry materials.

Higher voltage

Wait until the current is disconnected.

METHODS OF REMOVAL OF CLOTHING

Coat

Raise the casualty and slip the coat over the shoulders. Then remove the sound limb first and, if necessary, slit up the seam of the sleeve on the injured side.

Shirt and vest

Remove as for 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.

METHODS OF TRANSPORT

Using

- Support by one or more helpers
- Hand carriages
- Stretchers

METHODS OF SUPPORT BY ONE HELPER

The

- Cradle
- Human crutch
- Pick-a-back
- Fireman's lift
- Lift and drag

Figs. 8 & 9 — The cradle carry.

THE CRADLE

Used for

- Casualties of light weight
- Children

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. Straighten and proceed.

THE HUMAN CRUTCH

Used for adult casualties where the casualty can walk with assistance.

Assist the casualty to the standing position.

Standing at the injured side, put your nearest arm behind the casualty and grasp the clothing near the opposite hip.

Figs. 10 — The human crutch.

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.

Fig. 11 — The Pick-a-Back

THE 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.

Straighten and proceed.

Fig. 12 — First movement.

Fig. 13 — Second movement.

The Fireman's Lift and Carry.

THE 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
Standing upright

To carry the casualty on your right shoulder

Grasp the casualty's 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, straighten up.

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. 14 — The Fireman's Lift and Carry completed.

THE 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.

Fig. 15 — The Lift and Drag.

HAND CARRIAGES

4 handed
3 handed
2 handed
Fore and aft chair
Fore and aft

HAND SEATS

Used if two or more helpers are available.

Fig. 16 — Grip for the four handed seat.

Fig. 17 — The four handed seat.

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.

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. This leaves the other helper's 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. 18 — Grip for three handed seat.

Fig. 19 — The three handed seat.

For supporting 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. 20 — The hook grip.

They place their other hands under the thighs, just above the knees and clasp the hands together using the "hook grip".

Fig. 21 — The two handed seat (front view).

Fig. 22 — The two handed seat (rear view) sitting.

Fig. 23 — The two handed seat (rear view) standing.

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.

THE 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. 24 — The fore and aft chair lift.

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.

Fig. 25 — The fore and aft method

THE 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.

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

Figs. 26 & 27 — Blanketing a stretcher with one blanket.

Figs. 28, 29, 30, 31 — Blanketing a stretcher with two blankets.

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 aggravate the casualty's disabilities.

Blanketing a stretcher

When using one blanket, proceed as in Figs. 26 & 27.

When using two blankets, proceed as in Figs. 28, 29, 30, 31.

Loading a stretcher when no blanket is available — study Figs. 32, 33, 34, 35, 36.

32

33

34

35

36

Figs. 32, 33, 34, 35 & 36 — Loading a stretcher when no blanket is available.

Blanket lift

Place the blanket on the ground in line with and against the casualty.

Roll it lengthwise for half its width.

Roll the casualty onto the uninjured side.

Place the rolled portion of the blanket close to the casualty's back (see Fig. 37).

Fig. 37 — Blanket lift — first stage.

Roll the casualty over the rolled edge onto the back.

Unroll the blanket.

For lifting, the edges of the blanket are rolled up close to the casualty and the casualty lifted as shown in Fig. 38.

Fig. 38 — Blanket lift — second stage.

Fig. 39 — Blanket lift completed.

For hand carriage — 4 bearers, see Fig. 40.
For hand carriage — 2 bearers, see Fig. 41.

Fig. 40 — Hand carriage — four bearers.

Fig. 41 — Hand carriage — two bearers.

Jordon lifting frame

The Jordon lifting frame is made of tubular steel constructed in two sections which fit together to form a rectangular frame around the inert patient.

Fig. 42 — Patient with Jordon lifting frame around.

Fig. 43 — Putting gliders under patient.

Flexible strips of plastic, called gliders, are then slid under the patient.

When the gliders are attached to the frame the patient can be lifted without movement or discomfort.

Fig. 44 — Frame completed.

IMPROVISED STRETCHERS

A stretcher may be improvised by

- turning the sleeves of two or more coats inside out, passing poles through them and buttoning up the coats
- making holes in sacks and passing poles through them
- tying broad bandages between poles
- using a door or wire mattress

Always test improvised stretchers before use

GLOSSARY

ASPHYXIA — *Lack of oxygen.*
CASUALTY — *Victim of illness or accident.*
COMA — *State of unconsciousness.*
DIAGNOSIS — *Naming the illness or injury suffered.*
FRACTURE — *Broken bone.*
HAEMORRHAGE — *Bleeding.*
NAUSEA — *Feeling of sickness.*
PALLOR — *Paleness of the skin.*
PULSE — *The heart beat felt in an artery.*
RESPIRATION — *Breathing.*
WOUND — *Break in the tissues.*

Chapter 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 co-ordinated with all other body cells.

All cells require OXYGEN, FOOD and WATER and the removal of WASTE PRODUCTS. Thus the human body requires:

- A Nervous System to co-ordinate
- A Respiratory System to supply oxygen and to remove carbon dioxide from the blood
- A Circulatory System to transport oxygen, food and water, and remove waste products
- A Digestive System to absorb food and eliminate some waste products.
- A Urinary System to remove waste products

The body must also move, expend energy, maintain a constant temperature and react to external and internal stimuli. Thus it has:

- A skeletal system of bones and muscles, connective tissue and joints to allow locomotion and to support and protect organs
- Skin to control temperature and appreciate sensation
- Sense organs, skin, ears, eyes, nose and tongue to appreciate touch, pain and temperature, hearing, balance, sight, smell and taste
- A reproductive system to propagate the species

TO EXPLAIN

Oxygen is obtained from air which is breathed into the lungs. From here oxygen enters the bloodstream and reaches each cell of the body. Carbon dioxide is formed within the cell and is carried by the blood to the lungs to be expelled to the air.

Food is absorbed from the bowel into the blood. It is utilised by the cells, and waste products formed enter the blood and

- go to the kidneys to be eliminated in the urine
- are passed into the lower bowel to be removed in the faeces
- are converted to carbon dioxide and lost from the lungs

THE CELL

The cell is the basic unit of the human body.

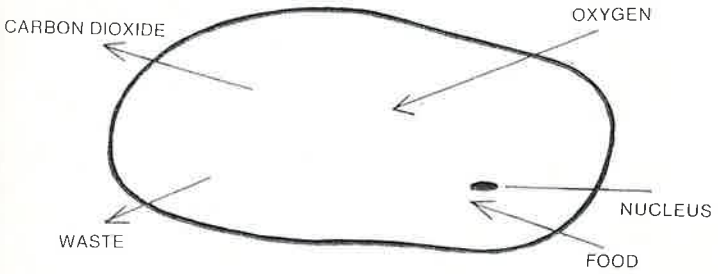


Fig. 45 The basic cell unit.

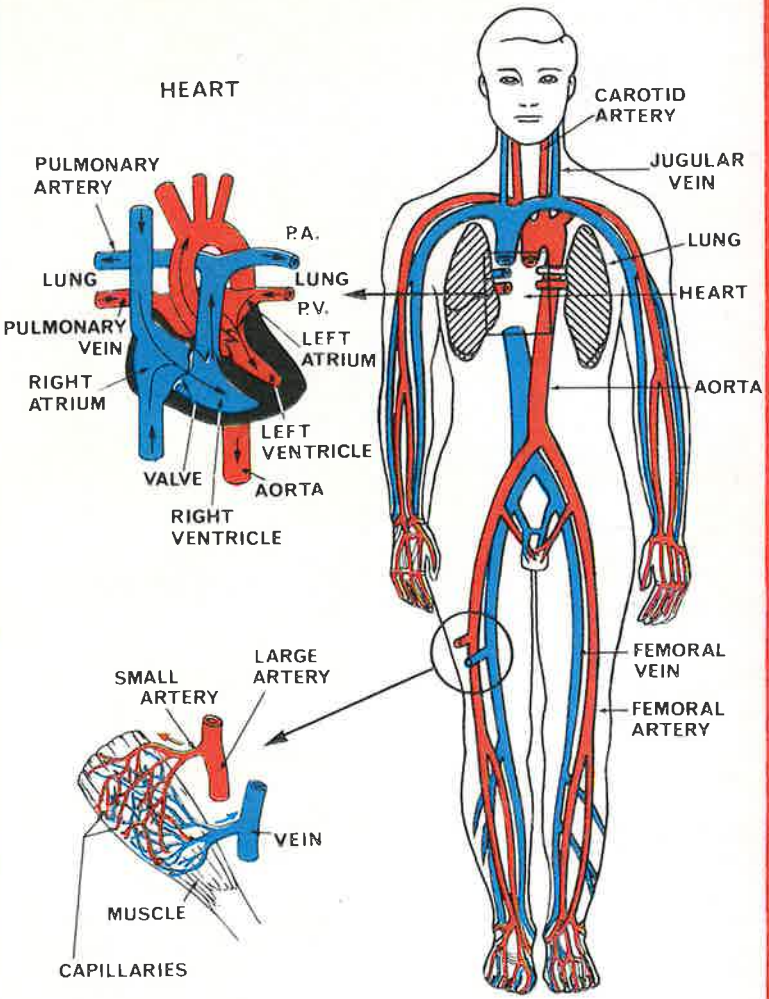


Fig. 46 The circulatory system.

THE NERVOUS SYSTEM

Controlling all activities of the body is the nervous system.

- It consists of the brain and spinal cord, with nerves distributed to all the organs and tissues of the body. The brain receives, co-ordinates and reacts to messages received from internal and external sources but also stores information so that it can react from memory.
- It is responsible for the control of movements of voluntary muscles.

MOTOR NERVES

Motor nerves pass from the brain to the muscles of the body to control movements.

Cutting a motor nerve causes paralysis of the muscle supplied.

SENSORY NERVES

Sense organs are situated in the eye, ear, skin, joints, tongue and nose. Sensory nerves receive information from sense organs of:

Sight
Hearing
Balance
Touch
Pain
Temperature
Taste
Smell

Sensory nerves lead from these organs to the brain.

Cutting a sensory nerve leads to loss of function of the sense organ.

THE CIRCULATORY SYSTEM

The circulatory system provides individual cells with oxygen and nutriment and removes carbon dioxide and waste products. It consists of the heart (a muscular pump) and an enormous number of arteries, capillaries and veins, which carry blood to and from the cells of the body. The heart is a muscular organ which acts as a pump. It lies in the chest behind the breastbone and rib cartilages, in front of the spinal column, between the lungs and immediately above the diaphragm. It is

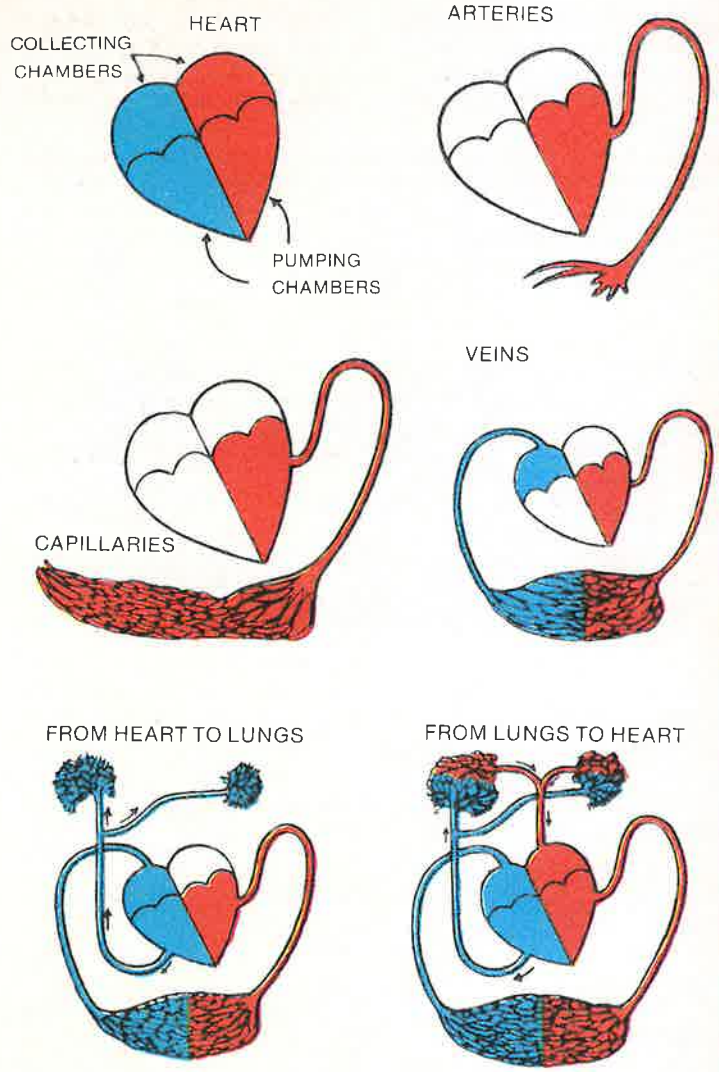


Fig. 47 — Schemata of Circulation

divided into the right side and the left side. Each side is further divided into an upper collecting chamber (atrium) and a lower thicker muscular pumping chamber (ventricle). Between each atrium and ventricle is a valve which allows the blood to flow in one direction only.

When the heart contracts it forces blood to circulate through the lungs and the body. The blood brings oxygen from the lungs and nutrients from the digestive system, to the cells of the body. It also carries the waste products away from the cells to be expelled through the lungs as carbon dioxide, through the kidneys as urine and through the sweat glands and bowel.

CIRCULATION OF THE BLOOD

The complete circulatory system is made up of two separate systems:

- The right side of the heart pumps blood through the lungs, the pulmonary system.
- The left side of the heart pumps blood throughout the body, the systemic circulation.

With each contraction of the heart blood is forced from the ventricles through both of the systems and with each relaxation of the heart blood pours into each atrium which then contracts to fill the ventricles.

In the pulmonary system blood, rich in carbon dioxide and poor in oxygen, collected from the body by the veins, drains into the right atrium and from this chamber it passes through a valve into the right ventricle which contracts and forces it through the pulmonary arteries to the lungs. During its passage through the pulmonary circulation the blood gives off carbon dioxide and water vapour to be expired from the lungs and receives oxygen from the inspired air.

The blood, now rich in oxygen and poor in carbon dioxide, returns in the pulmonary veins to the left atrium of the heart. From this chamber it passes into the left ventricle.

In the systemic circulatory system the left ventricle contracts and forces blood through the arteries.

The systemic circulation supplies oxygen, nutrients and fluids throughout the body and returns waste products to the organs of excretion. The blood returns, in the veins, to the right atrium. The cycle is continuously repeated.

The arteries are the strongest of the blood vessels, their walls being strengthened by elastic and muscular tissue. They carry blood away from the heart and expand with the volume of blood forced along them by the pumping action of the heart. Arteries continue to divide, becoming smaller and smaller until they become arterioles and then capillaries. The arterioles are controlled by the nervous system which controls the volume of blood flowing to any tissue at any one time.

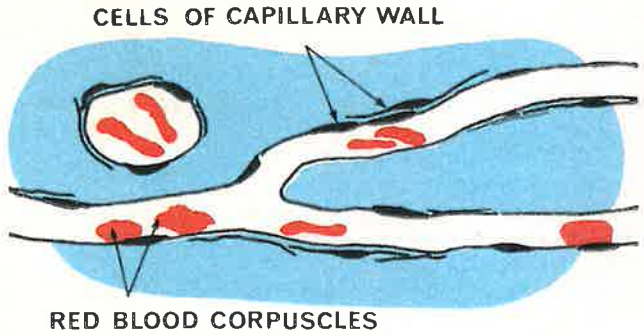


Fig. 48 — A Capillary

The capillaries are very small blood vessels, consisting only of a thin layer of cells which allows the exchange of fluids and gases to and from the tissue cells.

The veins are formed by the joining up of the capillaries and take blood back to the heart. The smaller veins unite to form larger veins. The walls of the veins are thinner than arteries and they have cup-like valves which allow the blood to flow only towards the heart.

The number of capillaries open at one time is determined by the needs of the body. The total capillary bed is so great that if all capillaries were full of blood at one time there would not be sufficient blood to circulate.

THE VOLUME OF BLOOD

The volume of blood available for the circulation in an adult is approximately 5-6 litres.

THE BLOOD PRESSURE

The blood pressure is the pressure exerted by the heart to force blood through the circulatory system. It is highest in the large arteries and progressively falls to the capillaries. The pressure in the veins is much less than the arterial pressure.

THE PULSE

The pulse is the expansion of the arteries caused by the heart contraction. The average pulse rate in healthy adults at rest is 60-72 beats/minute but very fit people can have a pulse rate as low as 38.

In infants and young children the natural rate is faster (in infants up to 140 and children up to 100 beats per minute).

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

The pulse is taken over an artery close to the skin (radial artery of the wrist) but in an emergency it is felt in the carotid artery in the neck. The pulse should be observed for its —

RATE — whether normal, fast or slow
STRENGTH — whether normal, strong or feeble
RHYTHM — whether regular or irregular.

TO TAKE THE CAROTID PULSE (See Fig. 1)

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 strap muscle of the neck.

TO TAKE THE RADIAL PULSE (See Fig. 2)

Place three fingers along the inner border of the radius about one centimetre in from the thumb side of the lower end of the forearm.

Gently roll the artery under the fingers until the maximum beat is felt.

THE BLOOD

The blood 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.

WHITE BLOOD CORPUSCLES

White blood corpuscles digest and destroy, if possible, dead tissue and foreign material including bacteria. They can move out of the circulation into the tissues.

An abscess is made up of white blood cells, bacteria live and dead, and dead tissue (pus).

BLOOD PLATELETS

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

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 supply of oxygen. This is carried to the cells by the blood. Oxygen comes from the air we breathe. It contains 20% of oxygen. Oxygen enters the blood in the lungs. The lungs consist of very thin-walled air sacs (the alveoli) between which is a large network of capillaries. Here oxygen can enter the bloodstream and carbon dioxide can leave it.

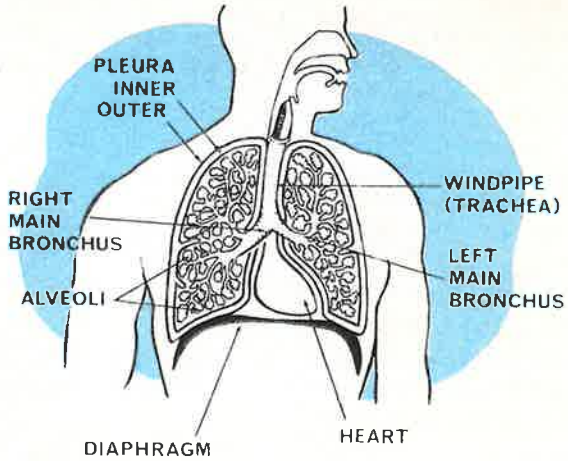


Fig. 49 — The Respiratory System

The air in the lungs must be replenished. The chest functions like a bellows which allows air to move in and out.

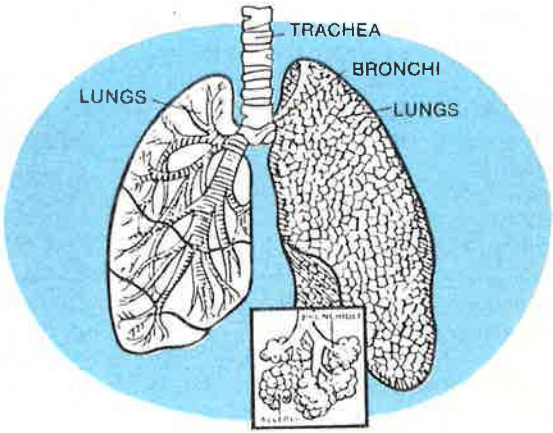


Fig. 50 — The Lungs and Bronchioles

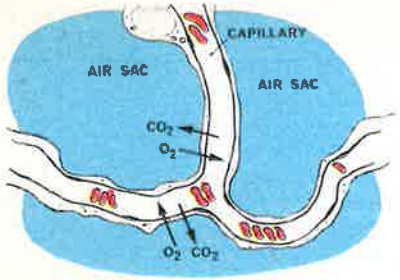


Fig. 51 — Interchange of gases in an air sac

ANATOMY OF THE LUNGS

The lungs are situated in the chest. The chest is a semi rigid cage formed by:

- the 12 vertebrae behind
- 12 pairs of ribs at the sides with intercostal muscles (those of the chest wall) between them.

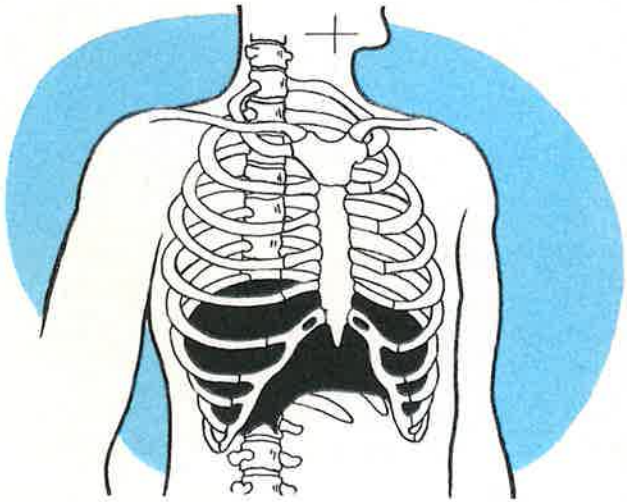


Fig. 52 — The skeleton of the chest

- the sternum (breastbone) in front connected to the ribs by costal cartilages
- the diaphragm (a muscular dome) which makes the base.

Entry of air to the lungs is through:

- the mouth, nose and throat
- the larynx (voice box)
- the trachea (wind pipe)
- the bronchi

and into the alveoli of the lungs.

This forms the airway.

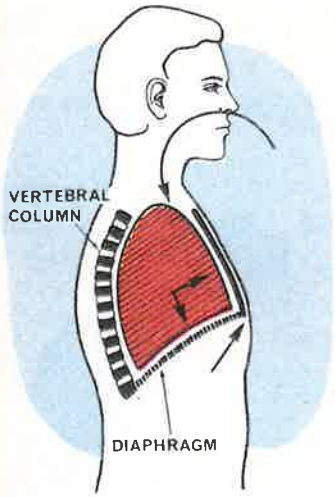


Fig. 53 — Inspiration

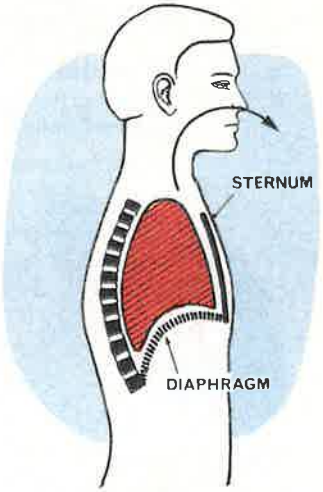


Fig. 54 — Expiration

When we breathe, air is taken in, (inspiration) the diaphragm, moves downwards and the ribs upwards and outwards. This increases the volume of the chest. A partial vacuum is created in the chest cavity, the lungs expand 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.

The amount of air supplied to the blood is controlled by a centre in the brain at the base of the skull and in the upper part of the spinal cord (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.

RATE OF BREATHING

The rate of breathing may vary considerably. The average adult rate AT REST is 16-20 times/minute. In children, the rate is 20-26 times/minute, and in infants 30-40 times/minute. The breathing rate increases if more oxygen is required as in exercise, fever or in conditions which restrict the normal function of the lungs, such as pneumonia.

THE PELVIC AND ABDOMINAL CAVITIES

These contain the major digestive organs, the reproductive organs in the female, and the urinary system. The cavities are enclosed by the lumbar vertebrae and the sacrum behind, the diaphragm above, the abdominal muscles and the pelvis on the sides and front.

The organs are:

- the liver in the upper part of the abdomen covered mostly by the right lower ribs
- the spleen covered by the ribs on the upper part of the left side
- the stomach just below the diaphragm on the left side
- the pancreas behind the stomach
- the intestines which occupy the greater part of the cavity
- the kidneys at the back in the region of the loins
- the bladder which lies in the front of the pelvis
- the female reproductive organs which lie behind the bladder

THE DIGESTIVE SYSTEM

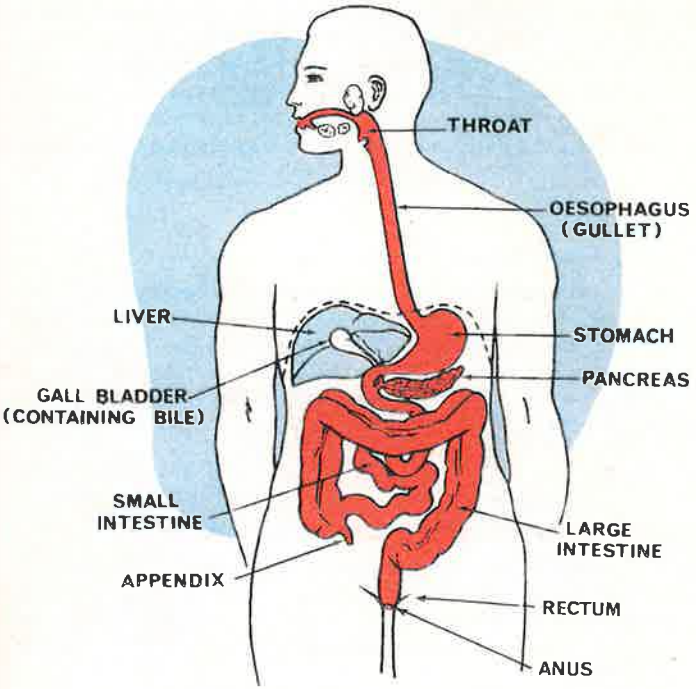


Fig. 55 — The Digestive System

This system breaks down a wide variety of food 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 waste products in the faeces.

THE URINARY SYSTEM

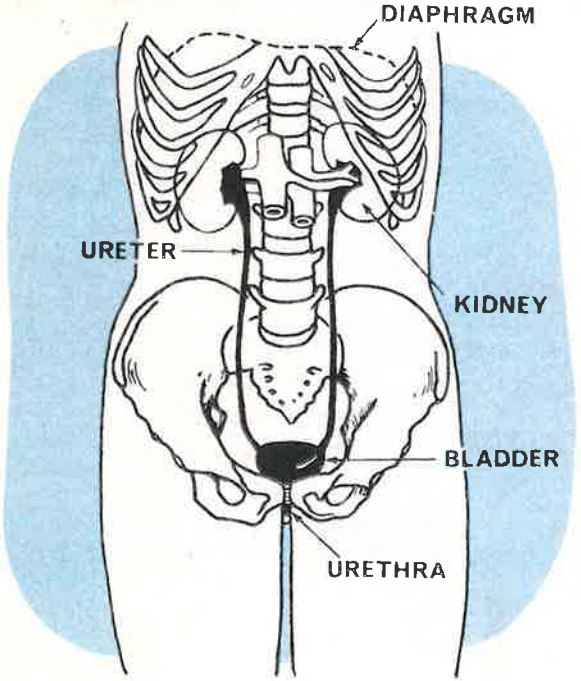


Fig. 56 — The Urinary System

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 REPRODUCTIVE SYSTEMS

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

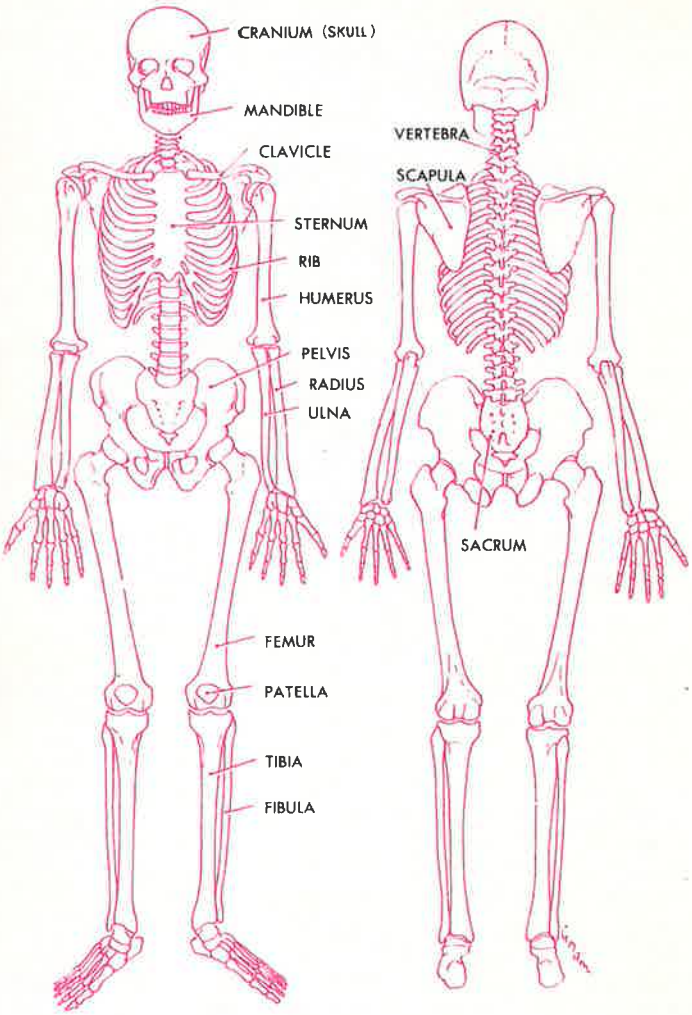


Fig. 57 — The Skeleton

THE SKELETON

The skeleton is the supporting framework of the body. It consists of a large number of 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 pelvis
- The ribs and sternum (breastbone)
- The bones of the upper and lower limbs

THE SKULL

The skull is 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 chest (thoracic vertebrae)
Five (5) in the loins (lumbar vertebrae)
Five (5) in the pelvis (sacral vertebrae) fused together to form the sacrum
Four (4) fused together to form the coccyx (the tail bone) at the base of the spine.

Between the separate vertebrae there are discs of elastic tissue called intervertebral discs. These allow some movement between the vertebrae and act also as shock absorbers. Enclosed within the vertebral column is the spinal cord. As the cranium protects the brain, so the vertebral column protects the spinal cord.

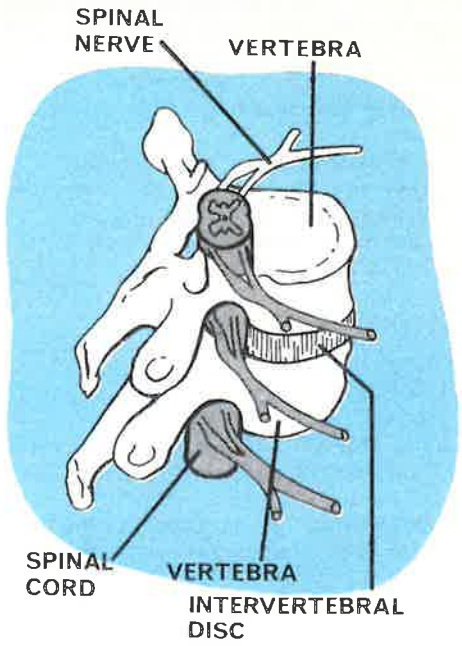


Fig. 58 — Two vertebrae and associated structures

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.

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 bone of the upper arm is the humerus; the bones of the forearm, the radius and ulna, and then come the small bones of the wrist, hand and fingers.

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

The lower leg has the tibia and fibula and then the small bones of the foot and toes.

In the knee joint is the knee cap (patella) which protects the front of the knee.

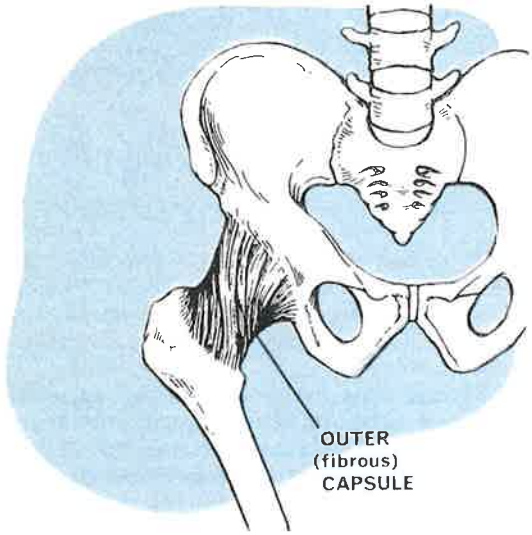


Fig. 59 — The Ligaments of a joint

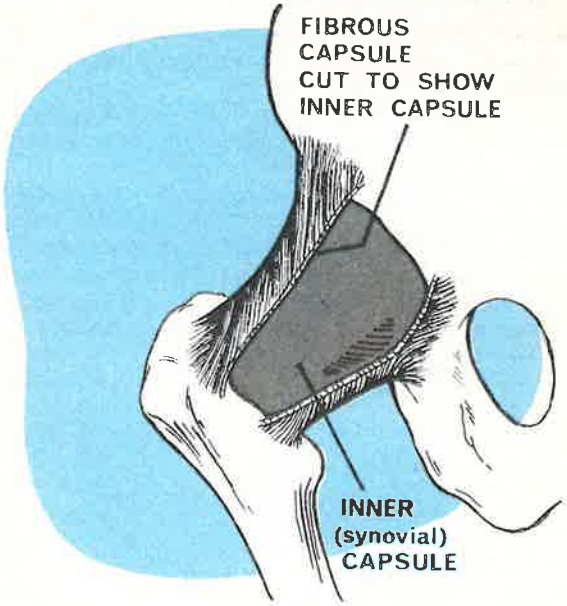


Fig. 60 — The Joint Capsule

THE JOINTS

Between bones are joints where bones come together but at which movement can occur. These movements can vary from almost none, as in the skull, to the most freely movable joints, the shoulder joints.

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 of the capsule produces a lubricating fluid which keeps the joint surfaces moist. The outer layer is made

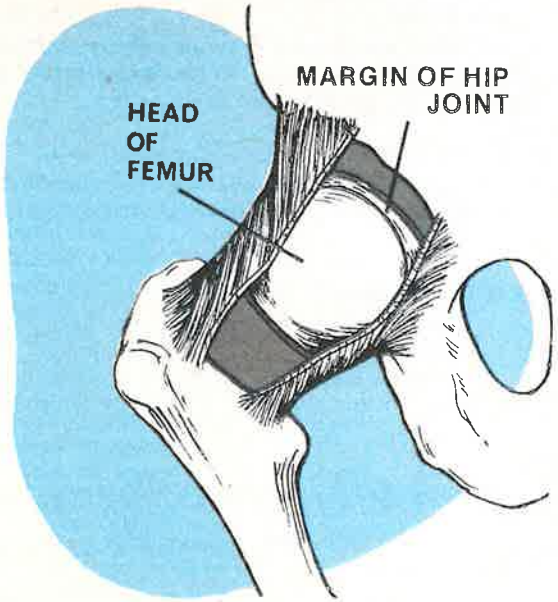


Fig. 61 — Inside the Joint

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.

THE MUSCLES

The muscles acting through their tendons which are attached to the bone 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.

Two types of muscle exist in the body —

- Voluntary
- Involuntary

VOLUNTARY MUSCLES

Act through their tendons attached to bones to move joints. They are supplied by motor nerves from the brain and spinal cord. Damage to the nerve will paralyse the muscle.

INVOLUNTARY MUSCLES

Are found in various organs of the body, e.g. bowel, arteries and bronchi. Through the autonomic nervous system, they control the function of the organs.

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 SKIN

The skin is a waterproof layer designed to protect the cells beneath from damage, drying out, infection, and from 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 connective tissue is very fine and delicate, whilst some is very strong and firm (ligaments).

GLOSSARY

ABSCESS — *A local reaction to infection — producing pus*
ALVEOLI — *Air spaces in the lungs*
AORTA — *Largest artery in the body*
ARTERIOLES — *Small arteries*
ATRIUM — *Collecting chamber in the heart*
AUTONOMIC NERVES — *Control involuntary movements*
BACTERIA — *Microorganisms which cause infection*
BRONCHI — *Large air passage*
CAROTID ARTERY — *Artery in the neck*
CARTILAGE — *Covering of bones in joints*
CERVICAL — *Pertaining to the neck*
CLAVICLE — *Collar bone*
DIAPHRAGM — *Muscular wall between the thorax and abdomen*
EXPIRATION — *Breathing out*
FAECES — *Waste food products passed by the bowel*
FEMUR — *Thigh bone*
FIBULA — *Smaller bone of the lower leg*
HAEMOGLOBIN — *Oxygen carrying pigment of the blood*
HUMERUS — *Long bone of the upper arm*
INSPIRATION — *Breathing in*
JOINTS — *Junctions between bones*
LARYNX — *Voice box*
LIGAMENTS — *Bundles of tough connective tissue*
LUMBAR — *Pertaining to the loin*
MOTOR NERVES — *Control voluntary movements*
PATELLA — *Knee cap*
PLASMA — *Fluid part of the blood*
PULMONARY ARTERY — *Main artery to the lungs*
PULMONARY CIRCULATION — *Blood flow to the lungs*
PULMONARY VEIN — *Main vein leading from the lungs*
RADIAL ARTERY — *Artery in the wrist*
RADIUS — *Long bone of lower arm on the thumb side*
SACRAL — *Pertaining to the sacrum*
SACRUM — *Solid bony mass at the base of the spine and which supports the pelvic bones*
SCAPULA — *Shoulder blade*
SEBACEOUS GLANDS — *Produce an oily substance in the skin*
SENSORY NERVES — *Appreciate sensation*
SKELETON — *Bones of the body*
SPLEEN — *Organ in abdomen*

STERNUM — *Breastbone*
SYNOVIUM — *Lining of inside of joints*
SYSTEMIC CIRCULATION — *Blood flow to the body excluding the lungs*
THORACIC — *Pertaining to the chest (thorax)*
TIBIA — *Main long bone of the lower leg*
TRACHEA — *Wind pipe*
ULNA — *Long bone of lower arm on the little finger side*
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*
VENTRICLE — *Pumping chamber of the heart*
VERTEBRA — *A bone of the spine*

Chapter 3

THE NERVOUS SYSTEM

Controls all the functions of the body

The NERVOUS SYSTEM is made up of the brain, spinal cord and all the nerves which pass to and from these structures to all parts of the body.

Motor nerves control movement, and pass directly from the brain or by way of the spinal cord to the muscles.

The Autonomic system controls all functions of the body through the involuntary muscles of:

- The heart and blood vessels
- The bowel
- The glands
- The bronchi
- Other organs

Sensory nerves transmit information from the sense organs to the Central Nervous System —

- sight
- hearing
- balance
- taste
- smell

or the Peripheral system

- touch
- pain
- temperature

These are situated in the eye, ear, skin, joints, tongue and nose. Sensory nerves convey messages to the spinal cord and brain. The brain can then react or learn and store knowledge (memory).

Cutting motor nerves will lead to paralysis of the muscles supplied.

Cutting or disease of the autonomic nerves may cause serious loss of control of the functions of the body.

Cutting sensory nerves will lead to loss of sensation in the affected area, or loss of function of the sense organ supplied, e.g. blindness if the nerve to the eye is cut.

Damage may be caused to the nervous system by —

- injury
- loss of blood supply
- toxins

Abnormal function of the brain or spinal cord leads to —

- unconsciousness
- paralysis
- malfunction

UNCONSCIOUSNESS

Unconsciousness affects the brain in varying degrees, from a clouding of mental activity up to a deeply comatose state.

It can be progressive.

DIAGNOSIS

HISTORY

- CHECK with witnesses or patient if semi-conscious.
- Look for any obvious causes — injury, empty tablet bottles, etc.

SYMPTOMS AND SIGNS

The patient may be

- drowsy — easily roused but lapses into unconsciousness again.
- in a stupor — can be roused but only with difficulty.
- in a coma — cannot be roused.

Assess the level of consciousness by assessing whether the casualty

- responds to speech.
- reacts to painful stimuli.
- is cougning or swallowing.
- is moving or lying still.

Assess whether the casualty is cyanotic (blue) or pallid in color due to lack of oxygen.

Assess whether breathing is quiet, rapid, stertorous (noisy), bubbly or absent.

Assess the size, equality and reaction of the pupils (normal pupils are equal in size and react to light by getting smaller).

Record these symptoms and signs and re-assess at regular intervals.

TREATMENT

If possible

- determine the cause of the unconsciousness
- remove the casualty from the cause, or the cause from the casualty
- maintain a clear and open airway
- check breathing, if absent, start E.A.R.
- check pulse, if absent C.P.R.
- control any haemorrhage
- loosen clothing about the neck, chest and waist
- place the casualty in the coma position if breathing and the pulse are present
- quickly check for any other injuries and treat accordingly
- maintain a careful watch on the colour of the casualty
- give nothing by mouth
- do not leave the casualty until medical care arrives

If doubt exists as to the cause, check the casualty's pockets or handbag for medical treatment cards. Cards are issued to casualties suffering from conditions such as —

- diabetes
- epilepsy
- angina

all of which may cause unconsciousness.

CLEARING THE AIRWAY

Fig. 62 — Clearing the airway

Quickly turn the head to one side and clear away any blood, water, mucus or foreign matter.

If necessary, use two hooked fingers to scoop away any debris, being careful not to push anything back into the throat.

OPEN THE AIRWAY

Three methods to open the airway are used.

- Full head tilt -- neck lift method.
- Full head tilt — chin lift method.
- Full head tilt — jaw thrust method.

These methods are placed in order of efficiency and should all be learned and practised.

FULL HEAD TILT — NECK LIFT METHOD

- With the casualty on the back, kneel beside the head.
- Place one hand on the forehead and press the head into a backward tilt.
- Place the other hand under the neck and lift upwards.
- Check to see that breathing commences.
- If breathing commences, turn the casualty into the coma position.
- If the airway is obstructed, change immediately to full head tilt — chin lift method.

Fig. 63 — Head extension/neck lift

FULL HEAD TILT — CHIN LIFT METHOD

- With the casualty on the back, kneel beside the head.
- Place one hand on the forehead and press the head into a backward tilt.
- Place the other hand on the casualty's chin, thumb along the front of the lower jaw on the lower lip and the index finger along the jaw. The other three fingers are curled into the palm and press up on the bony part of the lower jaw.
- Check to see that breathing commences.
- If breathing commences, turn the casualty into the coma position.
- If the airway is still obstructed, change quickly to full head tilt — jaw thrust method.

Fig. 64 — Head extension / Chin lift

FULL HEAD TILT — JAW THRUST METHOD

- With the casualty on the back, kneel beside the head.
- Place one hand on the forehead and press the head into a backward tilt.
- Place the other hand under the angle of the lower jaw and lift the jaw upwards and forwards, or if the airway is still obstructed use both hands, one behind each angle of the jaw.

If breathing is now *present*, turn the casualty into the coma position, making sure the airway is still unobstructed.

Fig. 65 — Head extension / Jaw thrust one hand

Caution should be used in suspected neck injuries and in children not to overextend the head.

Fig. 66 — Head extension / Jaw thrust two hands

If breathing is absent, commence E.A.R.

COMA POSITION

The coma position is the position the unconscious casualty is best placed in to ensure that the airway is clear and any likely obstruction flows out from the mouth.

TO PLACE THE CASUALTY IN THE RIGHT COMA POSITION

If the casualty is lying on the back —

Cross the casualty's left leg over his right leg
Kneel on the right side of the casualty with your knee close to the casualty's head
Place the casualty's left arm across his chest
Extend the casualty's right arm, palm uppermost, along the body
Roll the casualty on to the right side
Pull the casualty's right arm down behind his back
Bend the casualty's left leg up to a right angle
Place the casualty's left hand under the casualty's chin to elevate the chin but keep hand clear of the mouth
Extend the neck to clear and open the airway

If the left leg cannot be flexed, then support in this position with pillows, folded blanket or rug in front of the legs, or choose the left coma position.

Fig. 67, Fig. 68 and Fig. 69 — Placing in the coma position

CAUSES OF UNCONSCIOUSNESS

- Head injuries
- Drunkenness
- Fainting
- Asphyxia (see Chapter 5)
- Heart attacks (see Chapter 5)
- Poisons (see Chapter 15)
- Haemorrhage (see Chapter 6)
- Extreme heat and cold (see Chapter 10)
- Illnesses affecting the brain
- Fits
- Stroke
- Diabetes
- Convulsions

HEAD INJURIES

These may result in damage to —

- the scalp
- the skull
- the brain

Scalp wounds without brain injury bleed freely and require control of haemorrhage.

Skull injuries are treated according to the damage to the brain.

Brain injuries can result in conditions varying from

- a mild clouding of consciousness

to

- severe deep unconsciousness;

from

- an injury from which the brain fully recovers

to

- permanent brain damage

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 any complications.

The casualty who has been unconscious even for a moment should always be advised to seek medical aid.

A return of unconsciousness is a sign of serious danger.

TREATMENT

INJURIES TO THE SOFT TISSUES

Apply pressure to the area and sit the casualty up, with clothing about the neck loosened, unless consciousness has been lost. If this has occurred, treat as for unconsciousness.

FRACTURE OF THE SKULL

There may be some brain damage associated with a fracture of the skull. The treatment is the treatment of the effects of this damage.

SYMPTOMS AND SIGNS

Apart from those of brain damage, a fracture of the skull may show bleeding from the nose, ear or into the white of the eyes.

BRAIN INJURY

SYMPTOMS AND SIGNS

Mild —

- a momentary loss or clouding of consciousness
- headaches
- a loss of memory for events
- nausea and often vomiting
- excitability can occur
- blurring of vision

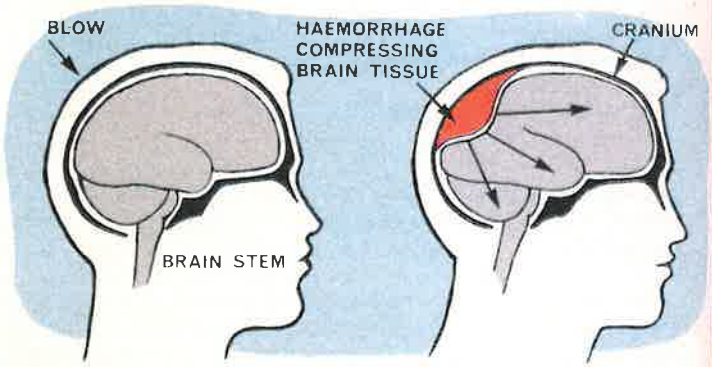


Fig. 70 — Compression of the brain caused by a blow

Severe --

- a state of altered consciousness exists from the time of the accident
- weakness of one side of the body may occur
- breathing may be stertorous (snoring)
- twitching of the limbs or convulsions may occur
- congestion of the face may be present
- vomiting may occur
- the pulse becomes slow and full
- the pupils may become unequal or may dilate
- the body temperature may rise
- the level of unconsciousness can deepen
- breathing may fail

TREATMENT

- maintain a clear airway
- check the breathing
- check the pulse.
- place in the coma position (if bleeding from the ear, place that side down)
- control haemorrhage
- treat the associated injuries
- record the level of consciousness at half hourly intervals

DRUNKENNESS

Alcohol is a depressant of —

- judgment
- motor skills and activities
- co-ordination
- control of respiration
- consciousness

SYMPTOMS AND SIGNS

The casualty may simulate all stages of unconsciousness and may exhibit —

- excitability
- incoherence
- yawning
- unco-ordinated movements
- blurred vision

- vomiting
- collapse
- stertorous respirations

TREATMENT

If unconscious, assess the level; record and treat accordingly.

Remember that a casualty whose breath smells of alcohol may not be drunk, but may have fallen and suffered head injuries, or be in a coma because of illness.

FAINTING

Fainting is due to a temporary disturbance of the nervous control of the blood vessels.

The arterioles dilate and blood pools in the tissues.

Insufficient blood reaches the brain and consciousness is lost.

It often results from —

- a nervous shock
- some injury, often minor
- standing still for a long time, particularly in a hot, stuffy room
- sudden postural change

SYMPTOMS AND SIGNS

- yawning
- pale, cold and clammy skin
- giddiness and blurred vision
- weakness and loss of consciousness
- shallow breathing
- slow weak pulse

TREATMENT

- Loosen clothing around the neck, chest and waist.
- Lie the casualty down with the legs raised and head lowered.
- If the casualty is in the sitting position and cannot lie flat, push the head between the knees.
- Ensure a liberal supply of fresh air and encourage deep breathing if conscious.
- Check for any other injury or illness.

If the casualty is unconscious, and vomits, place him in the coma position and clear the airway. The casualty must remain in the correct position until fully recovered.

ILLNESSES AFFECTING THE BRAIN

FITS

Fits are caused by a disturbance of the brain function.

Types —

- Epileptic fits
- Infantile convulsions
- Psycho-neurotic (not true fits)

MAJOR EPILEPTIC FITS

- The fit often starts with a "cry" (expiration of air through the vocal cords in spasm).
- The casualty falls to the ground unconscious (often receiving injury) and lies rigid for some seconds.
- The face and neck become congested and cyanosed because the breath is held.
- Convulsions (jerking spasmodic movements of the muscles) start and the colour improves.
- Froth (often bloodstained) comes from the mouth.
- The tongue may be bitten.
- Incontinence (loss of control of the bowels or bladder) may occur.
- The casualty becomes limp.
- Consciousness is regained but confusion for some minutes is usual.
- The casualty feels exhausted and may fall into a deep sleep.
- Post epileptic automatism often follows, i.e. the casualty is unaware of what he is doing.

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 the opportunity arises, remove any false teeth and place a knotted handkerchief or similar soft object between the jaws to prevent tongue being bitten — avoid hard objects.
- If the casualty falls asleep, do not disturb.
- Arrange transport to medical aid.
- Place casualty in the coma position as soon as possible.

CONVULSIONS IN INFANTS AND YOUNG CHILDREN

These may be associated with —

- a raised temperature
- a digestive upset
- teething
- constipation

SYMPTOMS AND SIGNS

- twitching of the limbs
- congestion of the face and neck
- cyanosis
- 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 by sponging or blowing a fan over a wet towel.
- Reassure the parents.
- Seek medical aid.

PSYCHO-NEUROTIC FITS (HYSTERIA)

These fits occur in some people as a reaction to an emotional upset or mental stress.

The attack may simulate an epileptic fit but is more dramatic and staged to attract sympathy.

The fits vary from temporary loss of control with crying, shouting and screaming, to where the arms are thrown about and hair or clothing torn.

If the casualty falls he is very rarely injured and never incontinent.

TREATMENT

- Isolate the casualty.
- Reassure gently but firmly.
- Encourage the casualty to seek medical aid.

STROKE (CEREBRO VASCULAR ACCIDENT)

Stroke is caused by haemorrhage or clot in the brain.

The part of the brain affected is cut off from its blood supply or compressed and damaged by haemorrhage.

It commonly occurs in elderly people suffering from high blood pressure, but can occur in the young.

SYMPTOMS AND SIGNS

The casualty —

- Frequently complains of a severe headache
- May have paralysis of one side of the face and difficulty in swallowing and speaking
- May lose ability to move one or more limbs (commonly on one side of the body)
- May suddenly or gradually lose consciousness

The face may be flushed.
The breathing may be stertorous.
Limb-paralysis on one side may be present.
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.
- Keep the casualty cool.
- Wipe away collections of saliva and mucus from the mouth.
- If unconscious, place the casualty in the coma position and assess the level of consciousness.

DIABETES

Diabetes is the result of a disturbance of the normal use of sugar in the body because *insulin,* used to digest sugar and fat, is not being manufactured by the body in sufficient quantities.

Insulin or insulin-like drugs are prescribed for a diabetic to keep the blood sugar at normal levels.

If a diabetic is having too much insulin due to —

- excessive exercise using up too much sugar
- insufficient food being taken
- too much insulin taken

a low blood sugar occurs. This leads to INSULIN coma.

SYMPTOMS AND SIGNS

Are —

- pallor
- profuse sweating
- rapid pulse
- shallow breathing
- limbs trembling
- confusion
- fainting or unconsciousness

If a diabetic is not having insulin or insufficient insulin, too much sugar is in the blood. This leads to DIABETIC coma.

SYMPTOMS AND SIGNS

Are —

- excessive thirst
- drowsiness
- breathing is deep and sighing and the breath smells strongly of acetone (like musty apples or nail varnish remover)
- a hot dry skin
- disturbance of consciousness

TREATMENT

If conscious —

- Do not hesitate to give drinks sweetened with two full tablespoons of sugar or lumps of sugar or glucose.

If dramatic recovery occurs, the problem is excess of insulin — give more sugar every 15 minutes for one hour.

Diabetic coma patients given sugar will come to no harm.

Seek urgent medical attention.

If unconscious —

- place in the coma position.

Diabetics often carry medical treatment cards or sugar in their pockets or handbag.

GLOSSARY

DIABETES — *Disease of the pancreas*
EPILEPSY — *Condition of the brain — leading to fits*
FAINTING — *A form of loss of consciousness*
PALLID — *Pale colour*
PUPIL — *The aperture (the black spot) of the eye*
TOXINS — *Substances which upset the body and can cause collapse*

Chapter 4

CIRCULATION AND RESPIRATION

Action of the heart and lungs

The heart and lungs supply oxygen to the cells of the body and remove carbon dioxide. In addition, the circulation supplies food and removes waste products

The HEART acts as a pump to circulate blood through the CIRCULATORY SYSTEM (see page 35).

The LUNGS are part of the PULMONARY SYSTEM which supplies oxygen to the blood and removes carbon dioxide (see page 42).

Failure of the circulatory and pulmonary systems leads to ASPHYXIA.

Any interruption to respiration or to blood circulation results in the loss of oxygen supply to the cells of the body.

Cells cannot live without oxygen.

Brain cells —

- need more oxygen than other cells
- die quickly in its absence — three minutes for some to be irreparably damaged, five minutes to imminent death

Thus unless asphyxia is treated promptly and effectively —

- breathing ceases
- the heart stops beating
- death results

When this occurs, CLINICAL DEATH is present.

Within minutes IRREVERSIBLE brain damage occurs and BIOLOGICAL DEATH follows.

CLINICAL DEATH CAN BE SURVIVED. No-one survives biological death.

TIME IS CRITICAL. REMEMBER — THREE MINUTES SOME BRAIN DAMAGE, FIVE MINUTES DEATH.

CARDIO PULMONARY RESUSCITATION can prevent clinical death from becoming biological death.

DIAGNOSIS

RESPIRATORY ARREST

The essential signs are —

- UNCONSCIOUSNESS
- ABSENT RESPIRATION

Look to see if the chest is moving.
Listen for breathing.
Feel for air being exhaled.

CARDIAC ARREST

The essential signs are —

- UNCONSCIOUSNESS
- ABSENT PULSE
- ABSENT RESPIRATION

These are the essential signs of respiratory and cardiac arrest.

Other signs such as changes in the skin colour and in the pupils are not as important. (See Asphyxia.)

Do not waste time looking for them.

Feel for the pulse.

Fig. 71 — Feeling the carotid pulse

Place the pads of your finger tips lightly over the neck below the angle of the jaw and behind the Adam's apple.

In infants it is easier to feel for the heart beat by placing the fingertip over the left nipple.

TREATMENT

Step 1 — Remove the cause and/or the casualty from the cause.

Step 2 — *CHECK THE AIRWAY — if it is obstructed, clear and open it.*

Step 3 — CHECK FOR BREATHING — if absent, start Expired Air Resuscitation (E.A.R.).

Step 4 — CHECK FOR THE PRESENCE OF THE PULSE — if absent start Expired Air Resuscitation (E.A.R.) plus External Cardiac Compression (E.C.C.) — that is Cardio Pulmonary Resuscitation (C.P.R.).

STEP 2 (see page 60)

STEP 3

If breathing is absent, commence E.A.R.

Fig. 72 — Commencing E.A.R.

Technique

With the airway open —

- Pinch the casualty's nostrils between finger and thumb of the hand, extending the head.
- Open your mouth wide and take a deep breath.
- Place your mouth firmly over the casualty's mouth, making an air-tight seal.
- Breathe firmly into the casualty's mouth, watching to see that the chest rises.
- Remove your mouth; watch to see the chest fall and listen for the breath exhaling.

If the chest does not rise, CHECK THE AIRWAY and then recommence.

Give five inflations as rapidly as possible (time is vital at this stage).

NOW CHECK THAT THE PULSE IS PRESENT.

Fig. 73 — Pinching the nostrils

If the pulse is present:

- Continue E.A.R. at the rate of 12 (twelve) inflations per minute.
- Check the pulse every two minutes because the heart may stop beating.

If the casualty starts breathing:

- Place quickly into the coma position.
- Vomiting often occurs at this stage.
- Maintain a clear airway.
- Continue to observe whether the casualty's breathing is satisfactory.

If spontaneous breathing does not recommence, continue until help arrives.

E.A.R. must be continued until medical aid is obtained.

CHANGE-OVER OF OPERATORS

This can be carried out quickly without any ill effects. During the change-over, maintain the correct position of the head.

MOUTH TO NOSE METHOD

Fig. 74 — Mouth to nose method

Where mouth to mouth E.A.R. cannot be applied because of —

- obstruction to the mouth,
- damage to the mouth,

inflation of the lungs can be achieved by the mouth to nose method.

This method is often used in cases of drowning.

Technique

- Position the head as for the mouth to mouth method.
- Close the casualty's mouth by placing your thumb on the lower lip.
- Take a deep breath and seal your lips widely around the casualty's nose.
- Breathe firmly into the casualty's nose, watching to see that his chest rises.
- Remove your thumb and mouth and allow the chest to collapse.

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

STEP 4

If the pulse is absent:

Commence C.P.R. (E.A.R. and E.C.C.).

Intermittent manual compression on the lower chest compresses the heart between —

- the lower part of the sternum (breastbone), and
- the vertebral column

Fig. 75 — Showing point of compression.

Fig. 76 — Positioning the hands

Fig. 77 — Commencing E.C.C.

Technique

- Place the casualty on his back on a firm surface.
- Kneel beside the casualty's chest at right angles to the line of his body.
- Locate the lower half of the sternum.
- Place the heel of one hand here, keeping the palm and fingers raised from the chest.
- Cover this hand with the heel of the other hand.

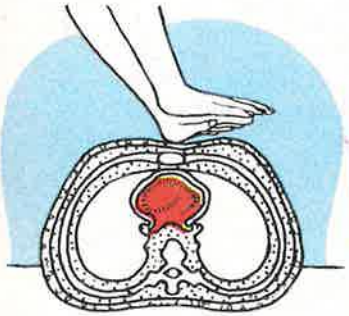


Fig. 78 — Before pressure

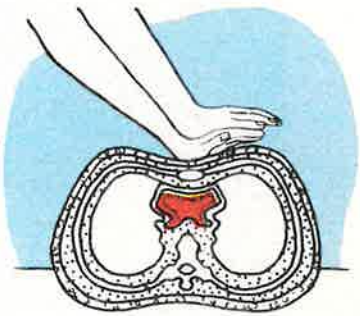


Fig. 79 — After pressure

- Keeping your arms straight, rock forwards over the casualty until your shoulders are vertically above your hands.
- Press briskly down to depress the sternum about 5 centimetres.
- Rock backwards releasing the pressure.
- Continue rhythmically at a rate of about 80 (eighty) per minute.

Simultaneous ventilation of the lungs will be necessary —
If on your own —

- After 15 (fifteen) chest compressions inflate the lungs twice
- Continue at this rate
- Two inflations should not take longer than 5 (five) seconds

Fig. 80 — Combined E.A.R. and E.C.C.

If help is available:

- Divide the task

The operators should kneel on opposite sides of the casualty's body. One operator performs E.C.C. at the rate of 1 (one) per second for five seconds.

The other operator then makes one inflation of the chest.

C.P.R. is continued at this rate, 5 compressions, 1 (one) inflation.

The operator performing E.A.R. times his movements to inflate between the fifth compression of one cycle and the first compression of the next.

The operator performing E.C.C. should count out loud "one thousand, two thousand, three thousand" etc., to get correct timing.

Check the carotid pulse after one minute and thereafter every two minutes.

If the heart does not start beating (and usually it does not) continue C.P.R. until medical aid is obtained.

If the heart recommences but breathing does not, continue E.A.R. Continue to monitor the pulse.

If the heart and respiration recommence, turn the casualty into the coma position. Monitor both the pulse and respiration.

Remember:

Be sure the hands are correctly positioned.

If too low, damage may be caused to —

- the liver
- the stomach
- the diaphragm

If too high —

- compression is ineffective.

If to either side of the sternum —

- ribs may be broken

or

- lungs damaged

The actual pressure required to depress the sternum will depend on the age, size and build of the casualty.

C.P.R. cannot be learned from a text book. Demonstrations and actual practice on a manikin are essential.

INFANTS AND SMALL CHILDREN

Many casualties requiring C.P.R. occur in children under 5 (five) years old.

Important differences are needed in the technique of C.P.R. for small children (under five years) and infants.

THESE MUST BE LEARNED.

- Children have a proportionally larger abdomen and smaller chest.
- The heart lies higher in the chest and is smaller.
- The airway is easily obstructed due to a relatively large tongue and short neck.
- The lungs are much smaller and more easily damaged.

Technique:

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

Step 2 — CHECK THE AIRWAY. If it is obstructed:

- Tip a baby or small child upside down (infants often vomit just before death)
- Then clear the airway as for adults
- Open the airway by lying the child on its back, and then proceeding as for adults
- However, do *not* extend the head
- Keep the head horizontal, and lift the jaw forwards with two fingers under the angle of the jaw
- The tongue must not be pressed upwards as it will then move backwards and obstruct the pharynx

Step 3 — CHECK FOR BREATHING.

- If breathing is now present, turn the casualty into the coma position
- If breathing is absent, commence E.A.R.

In the case of a child:

- Cover both mouth and nose with your mouth, and breath with only enough force to inflate the child's chest
- Give five inflations as rapidly as possible.

In the case of an infant:

- Cover both mouth and nose with your mouth, and puff into the baby only the air contained in your cheeks
- Give five quick inflations.

Fig. 81 — E.C.C. for infant

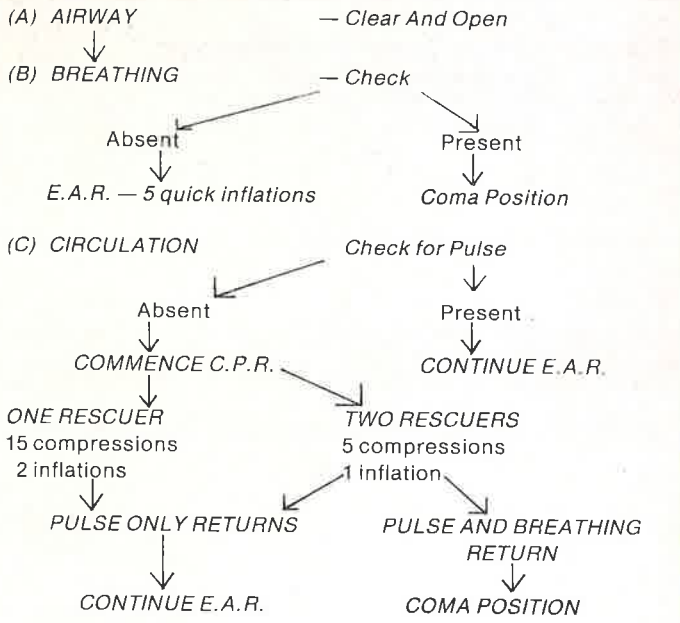
Step 4 — CHECK FOR CIRCULATION.

- Feel for the carotid pulse in the child, as for adults.
- Feel for the heart beat in an infant by placing the fingertips over the left nipple.
- If the pulse is present, continue E.A.R. at the rate of 20 (twenty) inflations per minute.
- If the pulse is absent, commence C.P.R. with the casualty lying on his back on a firm surface.
- For a child, compression is applied with the heel of one hand depressing the sternum two or three centimetres at the rate of one hundred per minute.
- For an infant, compression is applied with the tips of the index and middle fingers over the *centre* of the sternum at the rate of one hundred per minute.

In both cases, E.C.C. is combined with E.A.R. at the following rates:

- One operator — 15 compressions at 100 per minute, followed by two inflations.
- Two operators — five compressions at 100 per minute, followed by one inflation.
- Continue this cycle until help arrives. Further management is the same as for adults.

SUMMARY C.P.R. (E.A.R. and E.C.C.)



COMPRESSION RATES	*1 RESCUER*	*2 RESCUERS*
ADULT	80/minute	60/minute
CHILDREN/INFANTS	100/minute	100/minute

E.A.R. CHECK FOR PULSE for 5 seconds every 2 minutes.

C.P.R. CHECK FOR PULSE for 5 seconds every 2 minutes.

GLOSSARY

MUCUS — *Sticky secretions from some glands in the body, e.g. nose, bronchi*
PHARYNX — *Air space behind the mouth and nose*
SALIVA — *Secretions of the mouth*
VOMITUS — *Stomach contents vomited up*

Chapter 5

CAUSES OF ASPHYXIA

Asphyxia may be caused by
CARDIAC • RESPIRATORY • CENTRAL NERVOUS CONDITIONS

CARDIAC CONDITIONS

- Cardiac Arrest
- Ventricular Fibrillation
- Coronary Occlusion
- Congestive Cardiac Failure

RESPIRATORY CONDITIONS

- Drowning
- Spasm of the larynx
- Strangulation
- Hanging
- Choking
- Swelling of the tissues within or around the throat
- Asthma
- Chest injuries — flail chest
  — sucking wound
- Paralysis of the chest muscles
- Suffocation by smoke
- Suffocating by toxic fumes or gases including carbon monoxide

CENTRAL NERVOUS CONDITIONS

- Paralysis of the respiratory centre by poisons or disease

OTHER CAUSES —

- Poisons affecting the oxygen carrying capacity of the blood
- Electric shock

Asphyxia may lead to —

- Unconsciousness
- Absent respiration
- Absent pulse beat

ALL CASES OF ASPHYXIA IF NEGLECTED WILL CAUSE DEATH.

The First Aider can detect early cases of asphyxia and by removing the cause or starting adequate resuscitation will save life.

SYMPTOMS AND SIGNS OF ASPHYXIA

- Shortness of breath with
  — Increased rate
  — Increased depth
- Blueness of the face, lips ears and nail beds
- Gasping speech
- Swollen veins of the head and neck
- Reddening of the whites of the eyes
- Noisy breathing and frothing at the mouth
- Loss of consciousness and then the breathing stops and the pulse is lost

CARDIAC CONDITIONS

CARDIAC ARREST

It is caused by:

- A failure of the heart muscles
- A failure of the heart's blood supply

It is the cessation of the heart's action. No pulse is present, breathing ceases and death is imminent.

SYMPTOMS AND SIGNS

- Unconsciousness
- Absent respiration
- Absent pulse

TREATMENT

- Commence combined cardiopulmonary resuscitation

VENTRICULAR FIBRILLATION

The ventricular muscles, instead of contracting synchronously, contract by unco-ordinated twitches — blood is not pumped from the heart.

SYMPTOMS AND SIGNS

As for cardiac arrest. An electrical tracing of the heart is necessary to differentiate.

TREATMENT

- As for cardiac arrest

CONGESTIVE CARDIAC FAILURE

The heart muscle fails and is unable to pump the blood around the circulation adequately. This causes congestion of the tissues of the body, especially the lungs and legs.

The blood becomes insufficiently saturated with oxygen and asphyxia results.

SYMPTOMS AND SIGNS

There is:

- Shortness of breath, especially on effort
- An irritating cough, and blood stained sputum is often coughed up
- A rapid, weak and often irregular pulse
- Swelling of the ankles
- Giddiness
- Cyanosis
- Sometimes sudden collapse
- Swelling of the veins in the neck

TREATMENT

- Sit the casualty up, to assist breathing
- Loosen clothing about the neck, chest and waist
- Wipe secretions from the mouth and throat
- Seek urgent medical aid

CORONARY OCCLUSION

The heart is supplied with oxygen through the coronary arteries. Coronary occlusion occurs when these arteries are blocked by a clot. No blood can therefore reach the heart muscles beyond the clot and this muscle will die.

Coronary occlusion affects arteries narrowed by disease and spasm.

These conditions occur very commonly in —

Smokers
The obese
The inactive

In very serious cases, ventricular fibrillation or cardiac arrest occurs.

If the area affected is small, recovery can take place with only a little scarring in the muscle.

SYMPTOMS AND SIGNS

Treat all cases as serious.

- The casualty complains of severe vice-like pain behind the breastbone; the pain may radiate to the left arm or neck or can resemble acute indigestion.
- The casualty is apprehensive.
- Pallor and clamminess are prominent.
- The pulse may be rapid or feeble or may be changed in rhythm.
- The pulse may be absent.
- Respiration may cease.

TREATMENT

- Feel for the pulse. If absent, start cardiopulmonary resuscitation.
- If there is a weak rapid 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.
- Observe continuously until medical aid is available.

ANGINA

This is chest pain originating in the heart.

The blood supply to the heart is sufficient at rest but is inadequate during periods of over-excitement or over-exertion.

SYMPTOMS AND SIGNS

- Pain in the chest made worse by continued effort.
- Shortness of breath.
- Collapse may occur.
- The pulse may be 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.
- If the pain is not relieved, treat as for coronary occlusion.

ELECTRICAL INJURIES

Electrical currents may —

- Stop the heart
- Cause the ventricles to fibrillate
- Cause contraction of the muscles of the body
- Paralyse breathing due to paralysis of the centre of respiration in the brain
- Cause burns

The casualty often cannot free himself from the current and 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.
- Check respiration.
- Feel for the pulse.
- If there are no pulse and no breathing — start cardiopulmonary resuscitation.
- If the pulse is present but breathing has stopped, start expired air resuscitation.
- When the pulse starts and the breathing starts, treat the burns.
- Continue treatment until medical aid is obtained.

REMOVAL FROM THE CURRENT

DOMESTIC VOLTAGE

- Switch off the current.
- If a flexible cable is present, jerk it free from the socket.
- 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
- Wearing rubber soles

Remember moisture is a powerful conductor of electricity and facilitates 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 a dry material.

Suitable insulating materials for Domestic Voltage are:

- 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.

HIGHER VOLTAGE CASES

Do not attempt to rescue the casualty until the current has been disconnected by the authorities.

LIGHTNING STRIKE

Lightning may produce injuries similar to high voltage electricity.

Often instantaneous death occurs, but the casualty may be stunned and fall unconscious.

Patches of burning (scorching) may be seen on the skin.

Clothing may catch fire.

TREATMENT

- Treat according to symptoms.

RESPIRATORY CAUSES OF ASPHYXIA

DROWNING

Drowning is preventable.

PEOPLE SHOULD *LEARN* TO SWIM

KNOW:

- Safety rules for boating (see page 227).
- Safety rules for swimming pools (see page 225).
- Basic rescue techniques (see page 1).

SYMPTOMS AND SIGNS

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

TREATMENT

Seconds are precious.

- Start E.A.R. immediately.
- Commence mouth to nose resuscitation in the water (if possible) and continue whilst wading ashore.
- Clear the airway.
- Check the pulse — if absent start combined cardio-pulmonary resuscitation.
- Continue until breathing starts spontaneously or medical aid is obtained.
- Keep the casualty warm.

SPASM OF THE LARYNX

Suffocation due to spasm of the larynx occurs in 10-15% of drowning cases. Water in contact with the larynx sometimes causes violent spasm of the larynx which prevents air or water entering the lungs. Any further water in the mouth will then be swallowed.

SYMPTOMS AND SIGNS

- As for asphyxia.

TREATMENT

- E.A.R. or if the pulse is absent C.P.R.

STRANGULATION

TREATMENT

- Cut and remove the band constricting the throat.
- If breathing does not commence, start E.A.R. or if the pulse is absent C.P.R.

HANGING

TREATMENT

- Grasp the lower limbs and raise the body.
- Free the neck by loosening or cutting the noose.
- If breathing does not commence, start E.A.R. or if the pulse is absent C.P.R.

CHOKING

This is common in all ages. The obstruction may be largely due to laryngeal spasm.

Choking is preventable.

The most common causes are:

- Children suddenly laughing or crying with objects in their mouths
- Children running and stumbling with objects in their mouths
- Inadequate chewing of food
- Swallowing splinters of bone

SYMPTOMS AND SIGNS

The casualty may have:

- A fit of coughing
- Violent and alarming attempts at inspiration
- Increasing cyanosis of the face, neck, fingers and toes
- Loss of consciousness
- Failing breathing

Fig. 82 — Choking in Children

Fig. 83 — Choking in Infants

TREATMENT

- Remove any obvious obstruction.
- If the obstruction is thought to be in the throat, attempt to remove with the finger.
- If no obstruction found in the mouth —

  In the case of an infant —

  Hold the infant down by the legs. Smack the infant three or four times between the shoulders.

  In the case of a child —

  Lay the child with the head downwards across the knee. Give three or four sharp smacks between the shoulders.

  In the case of an adult —

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

  If this does not dislodge the obstruction, seek urgent medical aid.
- If the obstruction has been inhaled and only wheezing occurs, do not attempt to dislodge it as this may cause complete obstruction. Seek urgent medical aid.

SWELLING OF THE TISSUES WITHIN OR AROUND THE THROAT

This may be caused by injury, allergy, infection, stings, bites, burns or inhaling hot gases.

Rapid swelling in the neck may compress the trachea or obstruct the larynx.

Asphyxia quickly results.

TREATMENT

- Sit the casualty up.
- Loosen constrictive clothing.
- Ensure adequate fresh air.
- Apply ice packs to the throat.
- Urgently obtain medical aid.

ASTHMA

This is a respiratory condition where the casualty has great difficulty breathing out. It is caused by spasm of the bronchioles. The casualty is distressed and has gasping wheezing respirations.

TREATMENT

- Place the casualty either sitting up or leaning over a table or pillow.
- Provide adequate fresh air and arrange for medical aid.

CHEST INJURIES CAUSING ASPHYXIA

PENETRATING WOUND OF THE CHEST

The wound allows air to be sucked into the chest cavity instead of entering the lung, causing collapse of the lung on that side.

SYMPTOMS AND SIGNS

- During inspiration air is sucked into the wound.
- During expiration bloodstained bubbles are expelled.

There is:

- Shortness of breath
- Anxiety and apprehension
- Cyanosis
- Failing respiration
- Rapid loss of consciousness

TREATMENT

The objective is to make an air-tight seal.

- Squeeze the edges of the wound together, or
- Place your hand over the wound until a large dressing can be applied.
- Plastic applied to the wound under the dressing seals well.
- Bandage firmly.
- Sustain respiration.
- Transport the casualty with the injured side down.

Fig. 84 — Asphyxia

FLAIL CHEST OR STOVE-IN CHEST

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

Safety belts prevent most of these injuries.

There are multiple fractures of the ribs so that the chest wall rigidity is lost. The chest wall is sucked in during inspiration and blown out during expiration (the reverse of normal). Thus the volume of air reaching the lungs is seriously reduced.

SYMPTOMS AND SIGNS

- Severe difficulty in breathing.
- Gasping air hunger.
- Pain in the chest.
- Tenderness over the fractured ribs.
- Cyanosis.
- Sucking in of the chest wall on inspiration and blowing out on expiration (paradoxical breathing).
- Failing respiration.
- Unconsciousness.

TREATMENT

- Maintain a clear airway.
- Loosen clothing.
- Immobilise the flail part of the chest by —
  Placing a large dressing over the injured part of the chest and retaining it by bandaging.
  Splinting the chest with the arm on the same side with the elbow bent, fingers pointing to the opposite shoulder, and securely bandaging it to the chest.
- If respiration fails, start E.A.R.
- Transport the casualty with the injured side down.

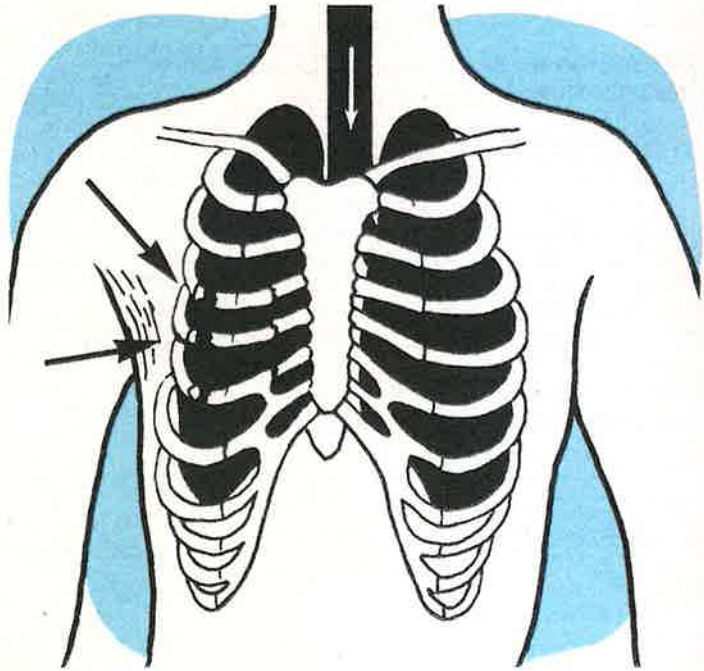


Fig. 85 — Flail Chest

CENTRAL NERVOUS CONDITIONS

PARALYSIS OF THE CHEST AND RESPIRATORY CENTRE

This may be caused by poliomyelitis or some poisons.

SYMPTOMS AND SIGNS

- Breathing is absent or little movement of the chest takes place.
- Cyanosis and asphyxia quickly follow.

TREATMENT

- If breathing is failing, start E.A.R., if pulse is absent, start C.P.R.
- If swallowing is difficult, place in the coma position.
- Give nothing by mouth.

POISONING BY GASES ADVERSELY AFFECTING RESPIRATION

GENERAL RULES

- Make sure you are not the next casualty.
- Turn off any source of gas.
- Before entering any space suspected of containing 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.
- Remove the casualty as quickly as possible.

SUFFOCATION BY SMOKE

Medical problems associated with this can be:

- 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 in the atmosphere (not natural gas), or the exhaust fumes of motors.

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

Asphyxia thus results.

SYMPTOMS AND SIGNS

- Headaches.
- Dizziness.
- Drowsiness.
- Confusion, stupor.
- Coma.
- Pink colouration of the lips and skin — the casualty's colour looks deceptively healthy.

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.
- Use E.A.R. if breathing is absent or inadequate.
- Seek medical aid.

GLOSSARY

CYANOSIS — *Blue colour of the blood due to lack of oxygen*

Chapter 6

WOUNDS, HAEMORRHAGE AND INFECTION

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

Wounds lead to —

- *Haemorrhage*
- *The risk of infection*

TYPES OF WOUNDS

- Abrasions
- Incised
- Lacerated
- Contused
- Penetrating or stab
- Bites

ABRASIONS

The outer protective layers of the skin are damaged, usually over bony prominences as a result of skidding falls onto hard surfaces.

Some bleeding occurs but the raw area oozes mainly serum.

Dirt is often embedded in the wound.

Infection often follows.

TREATMENT

- Cleanse the wound thoroughly with sterile gauze or cotton swabs soaked in sterile water or mild antiseptic and apply a sterile gauze dressing.
- If no aids available, wash under running tap water.

INCISED WOUNDS

These wounds are caused by cuts with sharp objects.

They often bleed profusely.

Deep structures such as blood vessels and tendons and nerves can be cut.

Infection can be caused by organisms on the object which makes the wound.

TREATMENT

- Control the haemorrhage.
- Cleanse thoroughly around the wound.
- Apply a sterile dressing.
- Arrange for medical aid.

Fig. 86 — A lacerated wound

LACERATED WOUNDS

These wounds are caused by blunt or jagged instruments.

The wounds are torn and irregular and often contaminated by dirt.

There is often bruising and damage to tissues around the edges.

Bleeding is normally not as profuse as in incised wounds but infection is more likely.

TREATMENT

- Control haemorrhage.
- Cleanse the wound thoroughly.
- Apply a sterile dressing.
- Arrange for medical aid.

CONTUSED WOUNDS

These are caused by falls or blows against hard objects or by crushing.

Haemorrhage occurs into the deep tissues, causing bruising.

There is —

- Pain at the site
- Swelling
- Discolouration — firstly red then later changing to black and blue
- Local tenderness
- Thickening of the tissues

TREATMENT

Prevent further haemorrhage by:

- Applying ice packs
- Bandaging firmly
- Elevating the part

Treat the casualty according to the degree of haemorrhage.

PENETRATING OR STAB WOUNDS

These wounds can be dangerous because they have a small entrance wound, but may penetrate deeply and cause serious damage.

Infection may be carried deep into the wound.

TREATMENT

- Carefully assess for damage to deep structures and internal haemorrhage and treat accordingly.
- Arrange medical aid.

BITES

Animal bites are jagged, penetrating and get infected.

TREATMENT

- Cleanse thoroughly.
- Apply a sterile dressing.
- Seek medical advice.

Fig. 87 — Foreign body in wound

Fig. 88 — Packing around a foreign body in a wound

FOREIGN BODIES IN WOUNDS

Foreign bodies which are loose and can easily be removed should be removed.

If it is not possible to remove the foreign body EASILY —

- Pack pads of gauze around the wound and bandage down on the dressings, avoiding pressure on the foreign body.

REMOVAL OF FISH HOOK

If the barb is embedded —

- If medical aid is not readily available, push the barb through the skin.
- Cut off the shank of the hook and pull the hook out by the barb,

or

- Cut off the barb and pull the hook out by the shank.

HAEMORRHAGE

Haemorrhage is loss of blood from the circulation.

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

Severe haemorrhage leads to grave circulatory collapse.

TYPES OF HAEMORRHAGE

ARTERIAL

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

CAPILLARY

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

VENOUS

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

EXTERNAL

Haemorrhage which is visible, e.g. bleeding from a wound.

INTERNAL

Haemorrhage which occurs —

into the tissue
into the internal organs
into the cavities of the body.

The site of the haemorrhage is hard to assess. Control of internal haemorrhage is difficult and it is only by careful observation of the colour, pulse and respiration that the First-Aider can determine whether the haemorrhage is continuing.

SYMPTOMS AND SIGNS

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
- Consciousness becoming affected by dizziness, faintness and collapse

REACTION TO HAEMORRHAGE

The body reacts to haemorrhage by —

- Reducing the blood flow from the part (blood clotting, fall of blood pressure)
- Maintaining the blood supply to vital structures, particularly the brain, at the expense of the other structures

The heart accelerates to maintain circulation; therefore —

- The pulse is fast. There is less blood returning to the heart.
- The pulse is weak. The nervous system shunts blood to the vital tissues.
- The skin is pale and cold and clammy — (the skin is emptied of blood and the sweat glands empty).
- The brain is not receiving sufficient oxygen.
- Respiration increases in rate and depth to increase oxygen absorption. Yawning and sighing (air hunger) occur.

Finally —

Unconsciousness occurs
Respiration fails
Circulation fails

NATURAL CONTROL OF HAEMORRHAGE

Bleeding will tend to stop spontaneously by —

- Contraction of the walls of the torn blood vessels
- Clotting — with the deposit of fibrin
  — the trapping of corpuscles
- The fall of blood pressure

FIRST AID CONTROL OF HAEMORRHAGE

Help nature by —

- Direct pressure
- Resting the part
- Elevating the part
- Resting the casualty

N.B. Blood is precious. Do not waste it. Act quickly.

Fig. 89 — Control of haemorrhage by use of pad

Fig. 90 — Control of haemorrhage by pressure

APPLY DIRECT PRESSURE

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

- Compressing the blood vessels leading into the wound
- 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.

RESTING THE CASUALTY

- Lowers the blood pressure
- Decreases the demand for blood and so slows the pulse

In severe cases the casualty must be lying down

ELEVATING THE PART

- Drains the veins of the injured part.
- Decreases the blood flow to the limb by making it flow uphill.

RESTING THE PART

Lessens the blood demand of the tissues.

- Preserves intact the delicate blood clot that is forming. This clot must not be disturbed.

FURTHER ACTION

If bleeding is not quickly controlled by a properly applied dressing —

- Put on more dressing OVER the first dressing.
- Press down firmly on the dressing with the palm of the hand, until the bleeding has ceased.

IN AN EMERGENCY

- If bleeding is profuse or a dressing is not readily available, grasp the sides of the wound and firmly squeeze them together.
- Apply firm finger 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 only lead to further haemorrhage by dislodging the blood clot.

Sufficient pressure applied to the wound will almost always control bleeding. Occasionally when a large artery is involved, bleeding can only be controlled by constant pressure with the hand over the cut vessel.

This pressure must not be released until the casualty receives medical aid.

Constrictive BANDAGES are NOT RECOMMENDED for haemorrhage.

HAEMORRHAGE FROM SPECIAL REGIONS

HAEMORRHAGING FROM THE EAR

The casualty may be suffering from a fracture of the base of the skull. Therefore —

- DO NOT PLUG THE EAR CANAL.
- Let it drain freely.
- Place the casualty in the coma position with the affected ear downwards.
- Assess the level of unconsciousness.
- Medical aid is URGENTLY required.

HAEMORRHAGING FROM THE NOSE

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

TREATMENT

- Instruct the casualty NOT to blow the nose.
- Instruct the casualty to BREATHE through the mouth.
- Apply pressure on the FLAP of the nostril for at least TEN minutes.
- 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.
- Place cold wet towels on the neck and forehead.

HAEMORRHAGING FROM THE GUMS AFTER TEETH EXTRACTIONS

- Instruct the casualty to keep the tongue clear of the socket.
- Do not attempt to remove the clot in the socket by rinsing.
- Place a firm pad of gauze over the socket and instruct the casualty to bite firmly onto it.

HAEMORRHAGING FROM THE PALM OF THE HAND

Can often be severe as several blood vessels can be involved. To control:

- Place a dressing and a rolled bandage in the palm.
- Have the casualty close the fingers on the dressing and bandage firmly.
- Elevate in a St. John sling.

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.

- Place the casualty flat with the *leg well raised* (this empties the veins).
- Remove any constricting bands from the limb.
- Apply a clean pad and firmly bandage the site.

INTERNAL HAEMORRHAGE

Bleeding occurs but 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 or concealed.

VISIBLE

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

- 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 severe and can lead to circulatory collapse.

SYMPTOMS AND SIGNS

These are the same as for external haemorrhage.

- A rapid and weak pulse.
- A pale, cold and clammy skin.
- Rapid respiration increasing in depth and with sighing and yawning. (Air hunger.)
- Restlessness.
- Thirst.
- Consciousness affected causing dizziness, fainting and collapse — leading to unconsciousness.

PAIN AND TENDERNESS ARE OFTEN PRONOUNCED.

TREATMENT

- Absolute rest.
- Seek urgent medical aid.

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 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).

PREVENTION OF FURTHER INFECTION

Infection cannot be prevented at the time of injury but correct handling can prevent further infection.

Once wounds are infected, the body can:

- destroy the organisms,
- localise the infection,

or
- be overcome by the infection.

The blood combats infection by means of white blood cells and antibodies.

The body reacts to increase the blood supply to the area. Some white blood cells, organisms and tissue cells are destroyed, forming pus.

Local areas of infection are *hot*, *swollen*, *red* and *painful* because of increased blood supply and tension.

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 the wound when medical aid is not readily available, or to very minor wounds.

Wash the wound itself in running or sterile (boiled) water only.

TREATMENT

Remember —

- Organisms are invisible.
- Skin, hands, nose and throat have them.
- Avoid coughing, sneezing or talking (unless necessary) when handling a wound.

Therefore:

- Cover the wound with a sterile dressing quickly.
- Avoid handling the wound unless to control haemorrhage.
- Avoid touching the surface close to the wound.

REMEMBER —

Organisms can only be destroyed by nature or thorough cleansing by medical aid. The earlier this is done the better.

GLOSSARY

ANTIBODIES — *Protective substances in the tissues*
ANTISEPTIC — *A Substance capable of killing organisms*
FAINTING — *A form of loss of consciousness*
INFECTION — *Invasion of body by micro-organisms*
ORGANISMS — *Germs*
STERILE — *Free of micro-organisms*

Chapter 7

BURNS AND SCALDS

Extreme heat damages and destroys tissue.

PREVENTION OF BURNS

Burns are most commonly caused by:

- Carelessness with matches and cigarettes
- Scalds from hot liquids
- Defective heating, cooking and electrical equipment
- Using flammable liquids to start fires or for cleaning
- Using unguarded open fires, especially when flammable clothing is worn
- Immersion in overheated bath water
- Careless use of chemicals such as some lyes, strong acids and detergents
- Indiscreet exposure to the sun

CAUSES OF BURNS

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

They occur from:

Dry heat from —

- Fire
- Flame
- Contact with hot objects
- An electrical 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 infections
- Severe pain from exposure to the air of bare nerve endings
- The injured area to rapidly become red, swollen, blistered and painful

In addition where there is fire, asphyxia can result from lack of oxygen. Carbon monoxide poisoning may occur due to incomplete combustion.

The respiratory tract and eyes may be irritated by smoke and chemical fumes.

RESCUING BURNS CASUALTIES

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

Smother the flames by wrapping the article around the casualty.

Lay the casualty flat.

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.)

Remove any electrical contact before quenching flames with water.

Douse smouldering clothes with water.

THE CLASSIFICATION OF BURNS

Burns are classified according to:

- Depth
- The area of the body surface burnt

SUPERFICIAL BURNS

- Only the outer layers of the skin are damaged.
- The area is red and painful.
- Blisters may form.

DEEP BURNS

- The full thickness of the skin is destroyed and underlying fat and muscles are burned.
- The area has a yellowish-white appearance and is less painful because the nerve endings in the skin have been destroyed.

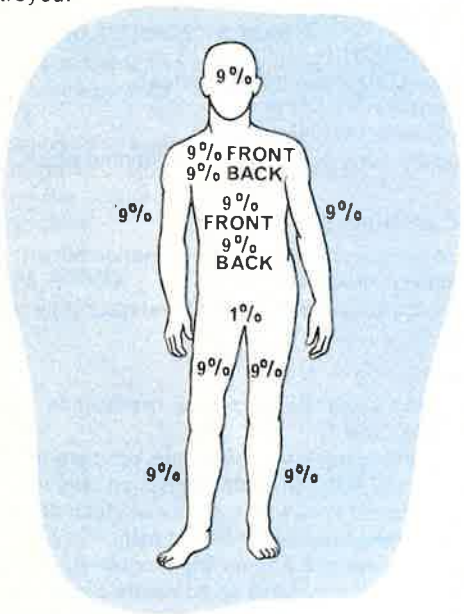


Fig. 91 — The rule of nines

THE AREA OF THE BODY SURFACE INVOLVED

The larger the area burned the greater the effect on the circulation and the more seriously ill the casualty.

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

This can be calculated by the rule of nines (see Fig. 91).

All burns are serious.

Burns exceeding 10% of the body surface are dangerous and if exceeding 50% are often fatal.

Circulatory collapse occurs in burns because of:

- Loss of fluid (serum) from the blood
- The severe nervous reaction to burning
- Pain
- Toxins from the dead cells

TREATMENT OF BURNS

IMMEDIATE ACTION —

- Remove the casualty from danger.
- Put out burning clothes.
- Wash away corrosives.
- Hold the burnt area under cold running water.

SUPERFICIAL BURNS

Where reddening and minor blister formation occur:

- Wash with cold water
- Apply a sterile dressing and bandage lightly

DEEP BURNS

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

Remove constricting rings, bracelets, etc., promptly.

Irrigate liberally with cold water to reduce swelling and pain.

Cover the burned area with a sterile or clean dressing and bandage lightly to minimise fluid loss and pain.

Cover large burns with a clean sheet or towel.

In burns to 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.

SUNBURN

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

The distress of sunburn can be alleviated by:

- Cold showers
- Applying cool moist compresses
- Resting the casualty in a cool place
- Giving fluids

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

CHEMICALS 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 93

GLOSSARY

CORROSIVE — *Substance that eats in.*

Chapter 8

DRESSINGS, BANDAGES, SLINGS, SPLINTS

Dressings, bandages, slings and splints are used to cover and protect a wound and support injured parts

DRESSINGS

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

- Assist in controlling bleeding
- Absorb blood and wound secretions
- Prevent additional infection
- Ease pain
- Minimise swelling
- Protect the wound from further injury

BANDAGES

A bandage is used to:

- Control bleeding
- Give support
- Retain dressings in position
- Restrict movement
- Immobilise fractures, usually with the aid of splints

SLINGS

Slings are used to:

- Give support, elevation and rest to an upper limb
- Prevent the weight of an upper limb pulling on or moving the chest, shoulder or neck

SPLINTS

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

Splints in all cases MUST be well padded.

PADDING

Padding is used to:

- Protect skin surfaces and bony points
- Accommodate natural hollows and deformity
- Allow splints to fit snugly to the body or limbs

In an emergency newspapers, rugs, scarves or blankets may be used.

RULES FOR APPLICATION OF DRESSINGS, BANDAGES, SLINGS, SPLINTS

DRESSINGS

When applying a dressing do not touch the wound (except for the emergency control of haemorrhage) or any part of the dressing which will come in contact with the wound. Infection in wounds results from contamination by the hands, coughing, sneezing or talking over the open wound or dressing.

Expose the dressing as little as possible to the air.

BANDAGES

Use a firmly rolled bandage of the correct width.

Stand or sit opposite the casualty and support the part to be bandaged.

Position the part correctly before bandaging.

When bandaging near the arm pit or the groin, pad to prevent the surfaces of the skin touching.

Hold the head of the bandage 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 pad, fold in the end and fasten.

If using a triangular bandage, secure the ends of the bandage with a reef knot.

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 the 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.

Fig 92 — The Reef knot

TO TIE A REEF KNOT

Take the right hand end of the bandage over the left hand end to tie the first half of the knot, and then, coming back, take the left hand end over the right hand end (or vice versa) to complete the knot.

Remember! "Right over left, left over right" or vice versa.

CHECKING THE BANDAGE

Watch for signs of interference with the circulation —

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

If ANY of these signs appear, loosen the bandage.

Check at intervals to see that the bandage has not loosened or tightened.

SLINGS

The sling should be kept as low as possible at the back of the neck and below the collar of a coat, if worn. If there is no coat worn, a pad must be placed under the loop to prevent chafing.

The reef knot used to tie the bandage should be tied in the hollow just above the collar bone on either side.

The circulation of the arm must not be impaired.

SPLINTS

The splint should be long enough to extend past the joints on either side of the fracture.

The splint must be well-padded, especially over bony points.

Bandages must not be placed over the fracture site, except to cover the wound.

Bandages must be placed above and below the fracture site and at each end of the splints so that the joints above and below the fracture are immobilised.

Knots should be tied over the splint or on the uninjured side.

Bandages must be *firm* enough to prevent movement, but not so *tight* as to interfere with the *circulation* of the blood or *cause pain*.

Bandages should be checked every *15 minutes*, for looseness or tightness.

COMMON TYPES OF DRESSINGS, BANDAGES, SLINGS AND SPLINTS

TYPES OF DRESSINGS

- DRY
- WET

DRY DRESSINGS

- GAUZE
- ADHESIVE PREPARED DRESSINGS
- PREPARED STERILE DRESSINGS
- EMERGENCY DRESSINGS

GAUZE

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

APPLICATION

Loosen the covering with a clean pair of scissors.

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

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.

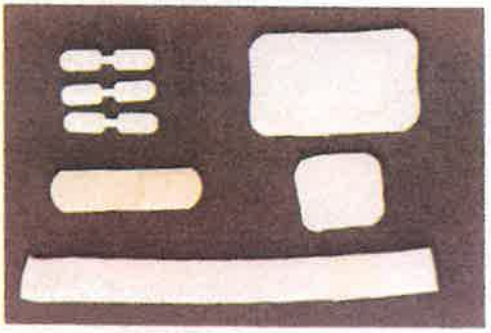


Fig 93 — Adhesive dressings

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.

Figs 94, 95, 96, 97, 98— Prepared sterile dressings and their application

EMERGENCY DRESSINGS

In an emergency use —

The inside fold of a clean handkerchief
A freshly laundered towel
A clean piece of linen
or 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 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)

TO MAKE A COLD COMPRESS

Take a thin towel, several layers of gauze, or clean handkerchief.

Fill with ice chips or soak in cold water. 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.

Avoid applying:

- Ice treatment continuously for longer than 20 minutes
- A wet dressing where there is a wound

BANDAGES

- ROLLER
- TRIANGULAR

THE ROLLER BANDAGE

The roller bandage is used to —

- Retain dressing in position
- Control bleeding
- Give 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 six metres and the usual widths used are:

Fingers	— 2.5 cms
Head	— 5 cms
Arm	— 5-7.5 cms
Leg	— 7.5-10 cms
Trunk	— 10-15 cms

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

- Hand

or • A roller bandage machine.

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

Fig 99 — Showing head and free end of the roller bandage

TURNS USED IN ROLLER BANDAGING

SIMPLE SPIRAL

Is used when the part to be bandaged is of relatively 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.

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.

EXAMPLES OF ROLLER BANDAGING

Figs 100 and 101 — Simple spiral bandage of the forearm

SIMPLE SPIRAL OF THE FOREARM

Fix the bandage by two circular turns around the wrist. Carry the bandage up the forearm with the parallel overlaps of two thirds of the width of the bandage. Fix with a safety pin.

Fig 102 — Reverse spiral of the forearm

REVERSE SPIRAL OF THE FOREARM

Apply one or two simple spiral turns around the wrist. 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.

Figs 103, 104 and 105— Figure of eight bandage to the elbow

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.

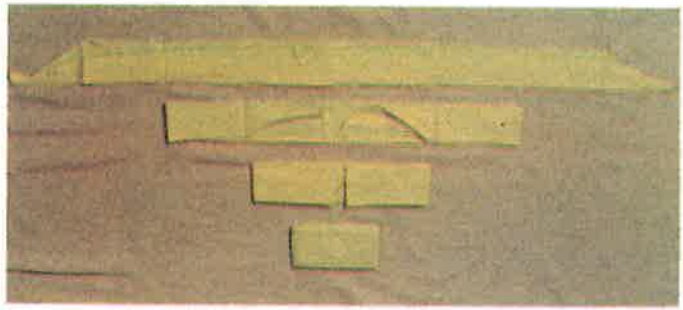


Fig 106 — Folding the triangular bandage

TRIANGULAR BANDAGES

Triangular bandages are made by cutting a piece of linen or calico, not less than 100 centimetres 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".

The bandage may be applied as —

- A whole cloth spread out to its fullest extent.
- 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.
- A narrow bandage made by folding the broad bandage once again in the same direction.

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 18 centimetres by 8 centimetres.

SLINGS

- Arm sling.
- Collar and cuff sling.
- St. John sling.

ARM SLING

This supports the forearm and hand.

METHOD OF APPLICATION

- 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.

Fig 107— The arm sling

- 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 behind 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.

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

Fig. 108 — The arm sling

COLLAR AND CUFF SLING

This supports the wrist.

METHOD OF APPLICATION

- 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 around the wrist, with the knot of the clove hitch on the thumb side of the wrist.
- Tie the ends of the bandage in the hollow just above the collarbone on either side.
- Check the circulation.

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.

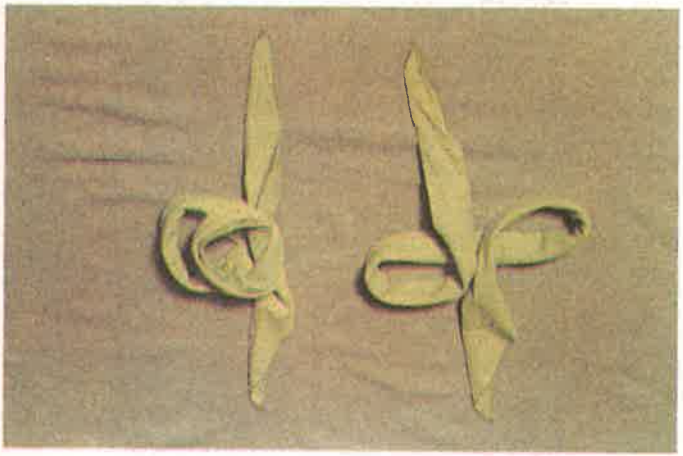


Fig 109-– The collar and cuff sling

Fig. 110 — The collar and cuff sling

ST. JOHN SLING

This supports the hand in a well raised position.

METHOD OF APPLICATION

- 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.
- While 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.
- 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.

Figs 111, 112, 113, 114

— The St John sling

Figs 115, 116, 117, 118 — Improvised slings

IMPROVISED SLINGS

These may be made by —

- Turning up and pinning the lower edge of the coat
- Pinning the sleeve to the clothing
- Passing the hand inside the buttoned coat or waistcoat
- The use of scarves, ties, belts or stockings

IMPROVISED SPLINTS

These may be made of —

- Magazines
- Straight strips of wood or plastic

OTHER TYPES OF BANDAGES AND SPLINTS

FIGURE OF EIGHT OF THE KNEE

METHOD OF APPLICATION

- Flex the knee.
- Lay the outer side of the bandage against the inner side of the knee.
- Take one turn above the kneecap.
- Bring the bandage around the knee just below and then just above so that the margins of the bandage covering the kneecap are covered.
- Repeat until the whole of the knee is covered.
- Complete with one turn around the thigh.

Fig 119 — Figure of eight to knee

Figs 120 and 121 — Foot and ankle bandage

FOOT AND ANKLE BANDAGE

METHOD OF APPLICATION

- Take one or two turns around the ankle.
- Then take the bandage obliquely across the foot to the root of the little toe.
- 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.

Figs 122 and 123 — Figure of eight bandage of the hand

FIGURE OF EIGHT BANDAGE OF 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.
- Repeat the figure of eight turns until the hand is covered.
- Complete with a spiral turn around the wrist.

Fig 124 — Spica of shoulder bandage

SPICA OF SHOULDER BANDAGE

- Place a small pad of cotton wool in each armpit.
- Using a 10 cm 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 of the 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 7 to 15 centimetres below the groin.
- Carry the bandage horizontally around the limb and make three or four ascending reverse spiral turns around the thigh.

Fig 125 — Spica of hip bandage (Front)

- 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.

Fig 126 — Spica of hip bandage (Rear)

SPICA OF THUMB BANDAGE

- 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.
- Repeat figure of eight until the ball of the thumb is covered.
- Finish with one straight turn around the wrist.

Fig. 127 — Spica of the thumb

APPLICATION OF TUBULAR GAUZE BANDAGE TO FINGER OR THUMB

Fig 128 — Tubular gauze dressing to fingers

APPLICATION OF TRIANGULAR BANDAGES USED TO RETAIN DRESSINGS IN POSITION

These methods are an alternative 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 the 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.

Figs 129 and 130 — Triangular bandage to the scalp

Fig 131 — Triangular bandage to the elbow

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.

BANDAGE FOR THE KNEE

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

Fig 132 — Triangular bandage to the knee

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.

Figs 133, 134, 135, 136

- Carry the points of the bandage back over the hand.
- 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.

— Triangular bandage to 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.

Fig 137 — Triangular bandage to 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.

SPECIAL SPLINTS

Apart from the common wooden splints, other forms of splint are commonly in use, and the First Aider may be called on to use them.

Fig 138 — The inflatable splint

INFLATABLE SPLINTS

The air splint provides a very effective means of immobilizing the lower leg or forearm. It is of little value in above elbow or above knee fractures because it does not immobilize the joint above.

Its advantages are:

- It is easy to apply.
- It controls swelling.
- The Fracture area and the limb are easily observed.
- X-rays can be taken through it without removal.

However, if inflated too tightly the blood supply to the limb can be impaired. Therefore the splint must be inflated only to the point where it can be indented by pressure of the thumb. If too tightly inflated the casualty who is conscious will complain of tingling and numbness of the limb.

Also, as gas expands when heated, or with rising altitude, the pressure must be adjusted with change in temperature or altitude.

Air splints consist of a double walled plastic tube with a valve in the outer wall for inflation. The splint is usually fitted with a zipper-like slide fastener.

To apply it is necessary for one person to steady the limb and the other to apply and inflate the splint.

THOMAS RING SPLINT WITH TRACTION

This is used for fractures of the legs or hip.

Fig 139 — The Thomas splint

PREPARING THE SPLINT

Fasten a folded triangular bandage by means of a loop placed over the end of the splint. The ends of the bandage should be of equal length.

THE ANKLE BANDAGE

Is used with the lock-hitch to apply traction. If a shoe is worn, leave it on. Place the middle of a folded triangular bandage under the shoe and in front of the heel.

Carry the ends up and back, crossing them at the back of the heel. Continue around the ankle, crossing the ends over the instep, then downwards towards the arch forming a stirrup in front of the heel. Pull the ends in opposite directions for the desired tension and tie off over the instep.

SUPPORTING BANDAGES

Are used to control the limb in the splint — usually four are used, one about mid-thigh, one at the knee and two below the knee.

With the injured limb lying in the splint, pass the bandage over the splint but under the limb. Now pass the bandage under the limb and splint and over the limb, tying with a reef knot over the outside bar of the splint after traction has been applied. Now apply traction to the limb whilst the ends of the lock-hitch are passed through the stirrup of the ankle bandage and tied. Additional traction may be applied by a Spanish windlass.

Chapter 9

INJURIES BONES, JOINTS AND MUSCLES

Fractures. *Crush injuries to the foot.*
Dislocations. *Sprains.* *Strains.*

FRACTURES AND DISLOCATIONS

The skeleton is the supporting framework of the body. It is made up of a large number of separate bones joined to each other at joints loosely or firmly attached by means of ligaments. Moving these joints are muscles attached to bones at each end by tendons. Lining the joints is cartilage. (For greater detail, see chapter 2.)

FRACTURES

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

TYPES OF FRACTURES

- CLOSED.
- OPEN.
- COMPLICATED.

CLOSED

- The skin around the fracture is unbroken.

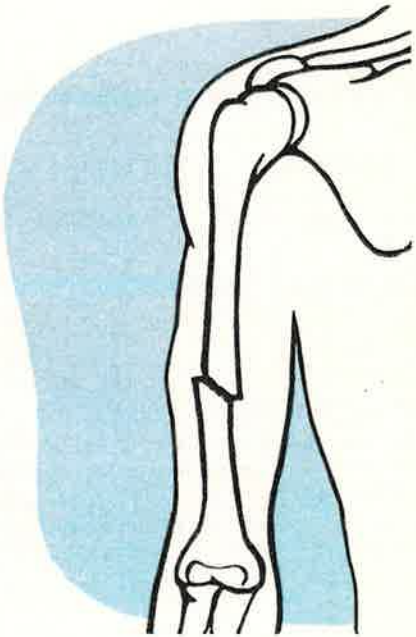


Fig 140 — A closed fracture

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.

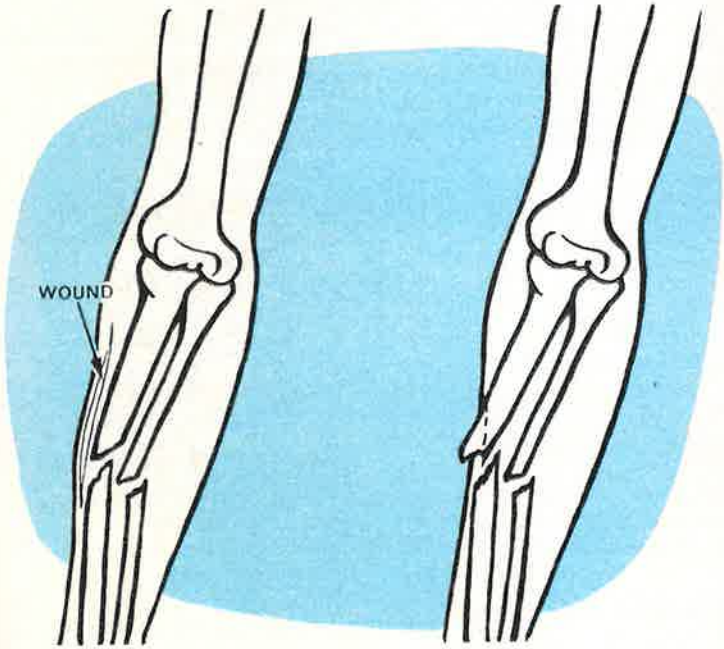


Fig 141 — An open fracture

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.

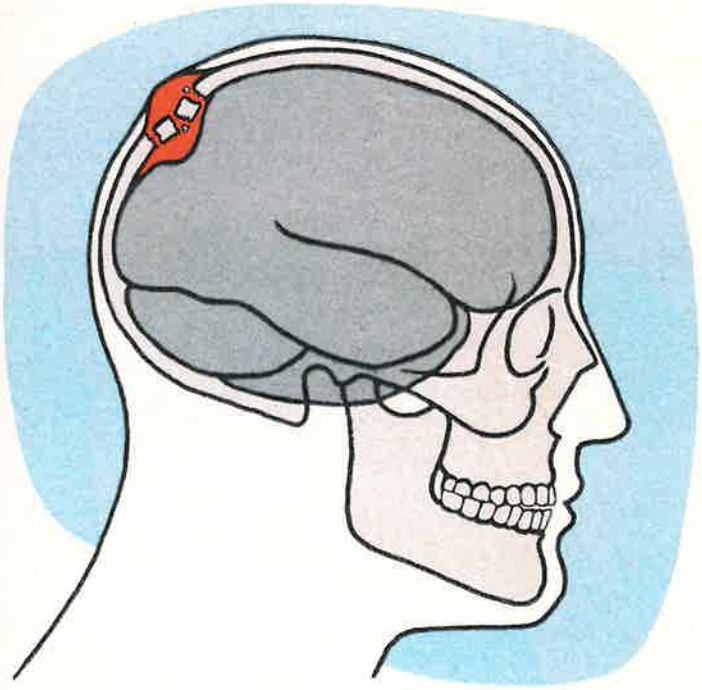


Fig 142 — A complicated fracture

CAUSES OF FRACTURES

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

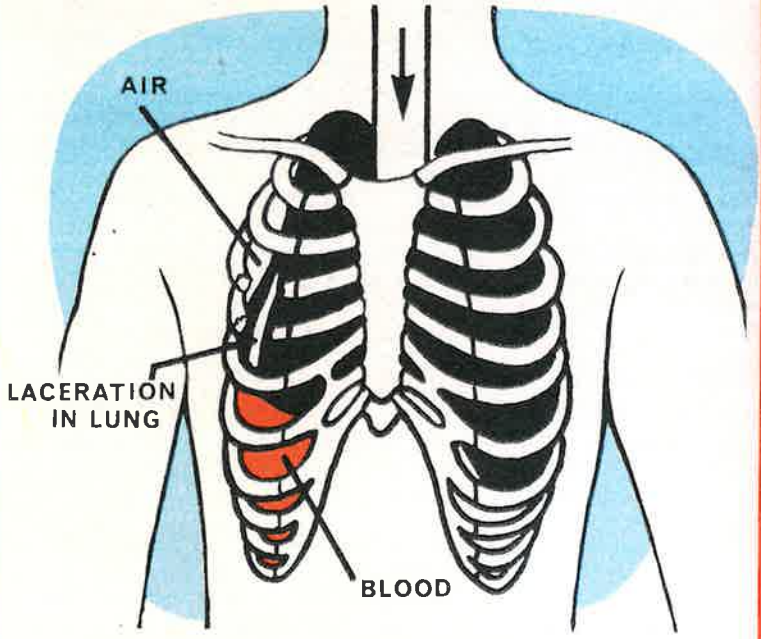


Fig 143 — Fractured ribs with lung damage

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 an outstretched hand 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.

EFFECTS OF A FRACTURE

Bones, particularly in the young, have a liberal blood supply. When a bone is broken haemorrhage occurs. This haemorrhage is increased by damage to surrounding tissues.

In fractures of large bones *considerable loss of blood can take place*, e.g. a fractured femur commonly causes loss of one or two litres of blood into the tissues.

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

Haemorrhage and pain lead to circulatory collapse. This is further aggravated by nervous reaction.

SYMPTOMS AND SIGNS

- Pain at the site.
- Swelling at the site, later giving bruises.
- Loss of function.
- Tenderness.
- Deformity.
- Circulatory collapse to some degree.
- Abnormal mobility of the bones sometimes.
- Crepitus (a coarse grating, felt when one fractured end of a bone moves against the other) sometimes.

PRINCIPLES OF TREATMENT FOR FRACTURES

- Immobilise fracture before moving the casualty, unless danger to the casualty or First Aider prevents this.
- Warn the casualty not to move.
- Control haemorrhage if present.
- Do not handle wounds unless necessary for the emergency control of haemorrhage.
- Cover all wounds with a sterile or clean dressing.
- Support the injured part or limb in as natural a position as possible and maintain this support until immobilisation is completed.
- Handle all fractures gently.
- Support and immobilise with slings, bandages and splints when necessary.
- Support in the elevated position when possible.

BANDAGES

- Use a broad bandage if possible.
- Use a narrow bandage if the area to be supported is too small for a broad bandage.
- When applying a bandage around the body or limbs, double the bandage over the end of a splint and pass it gently under the nearest natural hollow of the body.
- Avoid jerking or jarring movements whilst moving the bandages into their correct positions.

SPLINTS

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

Splints in all cases must be padded.

PADDING

- Protects skin surfaces and bony points.
- Accommodates natural hollows and deformity.
- Allows splints to fit snugly.

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

PRECAUTIONS

During handling, loading or transport frequently check:

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

SPECIAL FRACTURES

FRACTURES OF THE SKULL (see page 164)

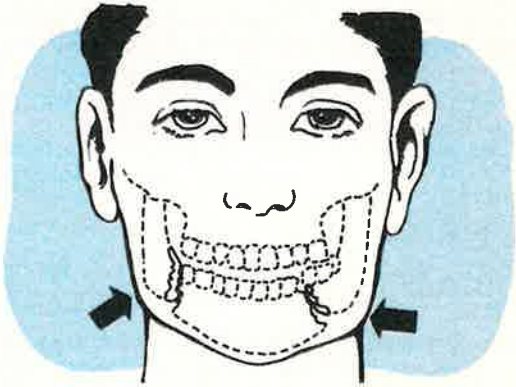


Fig 144 — A Fracture of the lower jaw

FRACTURES OF THE FACE AND JAWS

These fractures, because of:

- Bleeding
- Damage to the soft tissues
- Loose teeth
- The tongue falling back
- Reactive swelling
- Excessive saliva

tend to lead to respiratory obstruction and asphyxia.

These fractures are commonly associated with injuries to the brain.

SYMPTOMS AND SIGNS

- Pain, especially on movement of the jaws.
- Difficulty in closing the mouth.
- Difficulty in speaking and swallowing.
- Blood stained saliva.
- Irregularity of the bite of the teeth.
- Swelling and deformity in the area.

TREATMENT

- Remove from the mouth and throat loose bloodclots, loose teeth and excess saliva.
- If unconscious place in the coma position.
- If conscious and not severely injured, sit the casualty up with the head well forward to allow secretions to drain freely.
- Control haemorrhage from facial wounds.
- Control haemorrhage from lacerations of the tongue, cheek and lips by compression between the thumb and index finger.
- Closed fractures, unless the casualty is in considerable pain, need no support.
- Open and painful fractures need to be supported.

Fig 145 — Supporting a fractured jaw

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.
- 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.

Figs 146, 147 — Supporting a fractured jaw

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 circulatory collapse or is unconscious, nurse and transport in the coma position.

WARNING

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

FRACTURES OF THE SPINE

Fractures of the spine can be:

- Stable
- Unstable

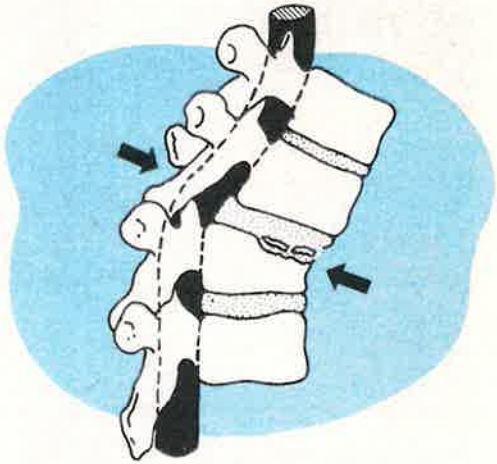


Fig 148 — A stable fracture of the spine

STABLE FRACTURES

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

UNSTABLE FRACTURES

Unstable fractures are fractures which have resulted in gross damage to the vertebrae and the joints of the spine, so that any movement can result in damage to the spinal cord and paralysis of the limbs.

The greatest care is necessary in handling these casualties.

Unstable fractures are relatively common, particularly in motor car accidents. ALL SUSPECTED FRACTURES OF THE SPINE SHOULD BE TREATED AS UNSTABLE UNTIL PROVEN OTHERWISE.

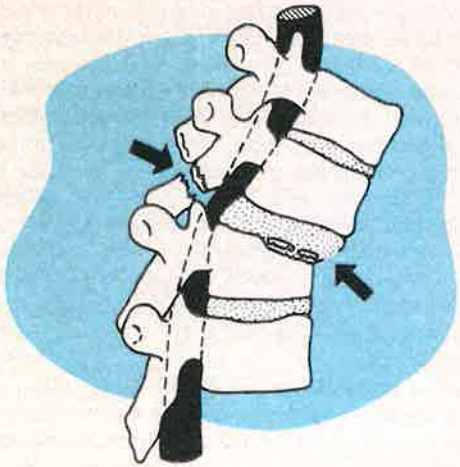


Fig 149 — An unstable fracture of the spine

COMMON CAUSES

- Diving into shallow water.
- Sudden halt in motor car accidents (whiplash injuries).
- Ejection from motor cars.
- Falls of rocks on to the bent back.
- Heavy falls on the buttocks.

DIAGNOSIS

HISTORY

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

SYMPTOMS AND SIGNS

- Pain at the site of the injury.
- Loss of power below the site of the injury (can the casualty move the limbs?).
- Loss of feeling below the site of the injury (can the casualty feel touch on the limbs or is there altered sensation, e.g. tingling, pain?).
- Deformity of the spine
  N.B. *This should only be felt for if the spine can be examined without shifting the casualty.*
- Signs of circulatory collapse.
  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

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

WARNING: *Instruct the casualty not to attempt to move.*

TREATMENT

The object is to prevent any movement taking place at the fracture site.

- Support the natural curves of the spine.
- In fractures of the cervical spine, prevent lateral (sideways) movement of the spine.
- Protect all numb areas of skin.
- Watch for any respiratory failure, particularly when paralysis involves the chest muscles. If the airway is obstructing, move the casualty promptly, but gently, into the coma position.
- If the casualty is conscious or unconscious, the diagnosis certain, and a clear airway can be maintained, transport the casualty on the back.
- Support the curves of the neck and the loins with a suitable support.
- Cervical spine fractures require a splint and an additional support on either side of the neck.
- Obtain as much help as possible, and synchronise all movements.

LIFTING TECHNIQUE

The casualty must be lifted without any movement taking place at the fracture site.

- Study the diagrams.
- Note that the First Aiders' hands always closely support the injured 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 without a blanket (Figs. 32 to 36).
- If a Jordon frame is available, use this.
- All injuries to the cervical vertebrae should be supported in a Jordon splint or cervical collar if available.

Figs 150, 151, — Lifting techniques for fractured spine

Figs 152, 153, 154 — Rolling the patient onto back

Fig. 155 — Controlling the head in cervical injury

CERVICAL COLLARS

Figs. 156 to 159 show some cervical collars in use for splinting in neck injuries. These should be used if available. If not available, a collar can be improvised using —

- a rolled up towel
- padded cardboard.

When transporting the casualty, the neck should also be supported on either side, by sandbags, padded bricks or the hands.

Fig 156 — Lifting a cervical injury

Fig 157 — An improvised cervical collar

Fig 158
Disposable cervical collar

Fig 159 — Jordon cervical collar

Fig 160 — Positioning on a stretcher

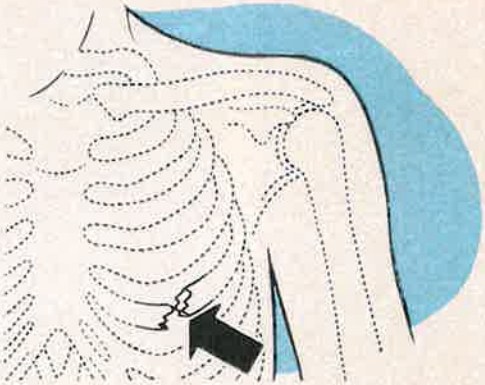


Fig 161 — A fractured rib

FRACTURES OF THE RIBS

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

OR

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

SYMPTOMS AND SIGNS

- 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.
- Tenderness to touch at the site.
- The casualty breathes in short gasps.
- Some degree of asphyxia is present.
- Bloodstained sputum may be coughed up.

TREATMENT

- Treat any asphyxia due to obstruction or lung damage.
- Support the fracture with the arm bandaged to the side.
- Transport the casualty, half sitting, with the injured side down.

METHOD OF SUPPORT

- Apply one or two broad bandages according to the size of the casualty, securing 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.

Fig 162 — Supporting the ribs Stage 1

Fig 163 — Supporting the ribs Stage 2

FRACTURES OF THE BONES OF THE UPPER LIMBS

FRACTURE OF THE CLAVICLE

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

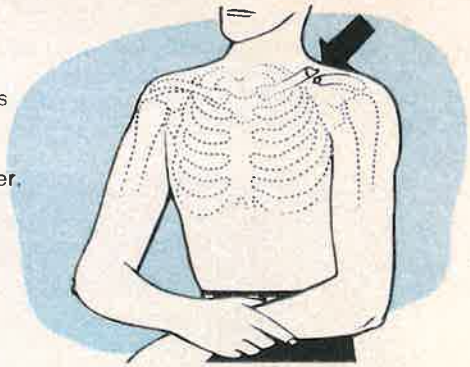


Fig 164 — A fractured clavicle

SYMPTOMS AND SIGNS

- 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.
- 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 exist.

METHOD OF SUPPORT

- Remove or loosen any straps on both sides.
- Place padding between the chest and arms and encircling the shoulder girdle on both sides.
- Using a 15 cm bandage, start at the back over the opposite shoulder blade.
- Carry the bandage over the shoulder on the affected side and then under the armpit.
- Complete the figure of eight by carrying the bandage across the shoulder on the good side and under the armpit.
- Continue to loop and pin away from the armpit or fracture.
- Apply sufficient pressure to brace the shoulders backwards.
- Check the condition of the pulse in both arms.

Fig 165 — Supporting a fractured clavicle using Figure of 8

Fig 166 — Supporting a fractured clavicle using broad bandages

OR

ALTERNATIVELY

- Remove or loosen any straps on the injured side.
- Place padding between the arm and the chest wall on both sides.
- Using a broad bandage, pass one end under the armpit, and tie at the back. Repeat on opposite side. A third broad bandage is then used to lash these loops together tightly between the shoulder blades.
- Check the condition of the pulse in both arms.

FRACTURE OF THE UPPER TWO-THIRDS OF THE HUMERUS

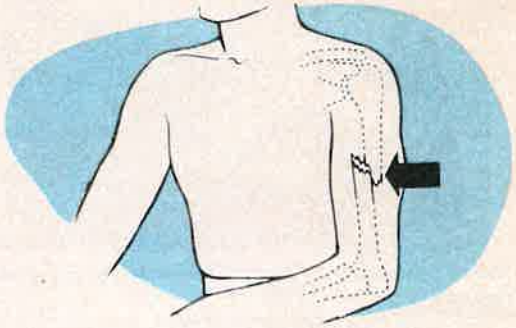


Fig 167 — A fractured humerus

METHOD OF SUPPORT

- Apply a collar and cuff sling.
- Place soft padding between the lower arm and the chest wall.
- 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 thigh, and protect with adequate padding.

Check the pulse.

METHOD OF SUPPORT

- Apply an air splint if available.

If not available and 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.
- 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.

Figs 168 and 169 — Supporting a fractured humerus

FRACTURES OF THE FOREARM AND WRIST

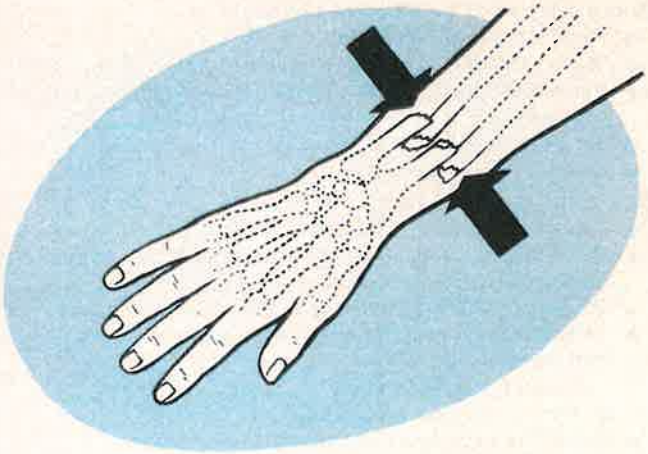


Fig 170 — A fracture of the forearm

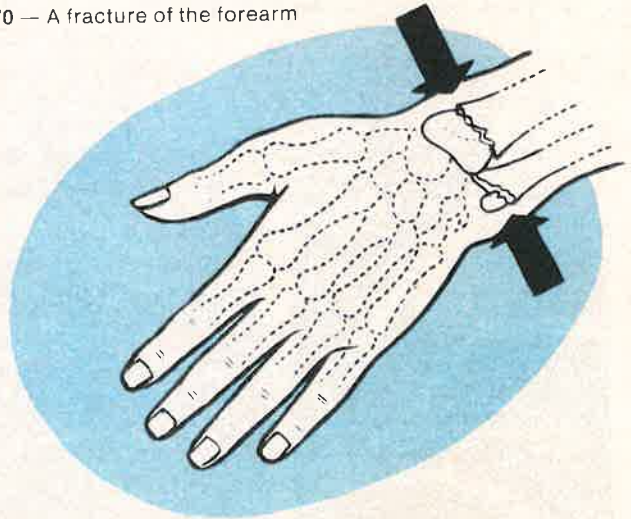


Fig 171 — A fracture of the wrist

METHOD OF SUPPORT

- Apply an air splint if available.

If not available:

- 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 securing the hand to the splint.
- Tie off the bandage in the most comfortable position.
- Apply an arm sling.
- Check the condition of the pulse.

FRACTURES OF THE HAND

METHOD OF SUPPORT

- Apply an air splint if available.

If not available:

- 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.

Fig 172 — Immobilising fracture of forearm Stage 1

Fig 173 — Immobilising fracture of the forearm final stage

FRACTURES OF THE FINGERS

METHOD OF SUPPORT

- Gently strap the fractured finger to the next healthy finger.
- Apply the strapping on either side of the fracture.
- If more than one finger is involved, treat as for fractures of the hand.

Fig 174 — A fracture of the fingers immobilised

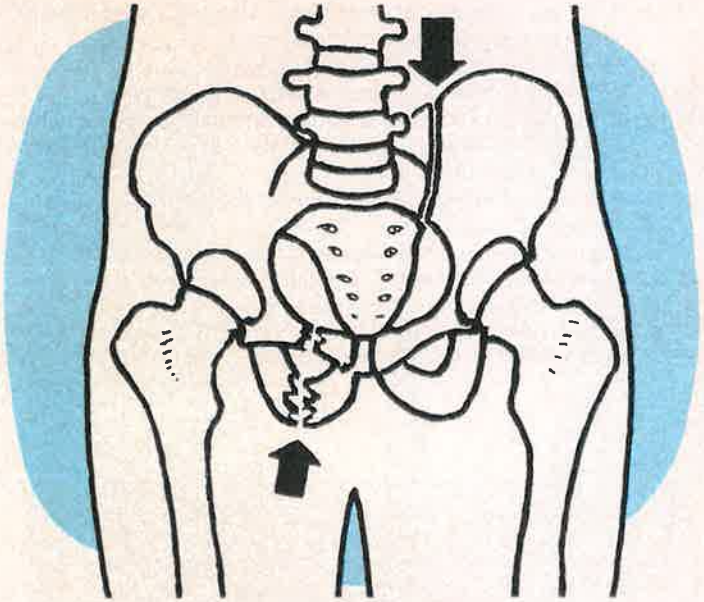


Fig 175 — A fracture of the pelvis

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. Severe haemorrhage is common.

SYMPTOMS AND SIGNS

- Pain in the region of the hips and groin made worse by moving the legs.
- If the bladder is injured there is often a desire to pass urine.
- If passed, the urine may be bloodstained.
- Tenderness on pressure on the pelvic bones.
- Signs of circulatory collapse.

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 around 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.
- Place soft padding between the knees, legs and ankles.
- Apply a broad bandage around the knees.
- Tie off the bandages on the sound side.
- Apply a narrow bandage figure of 8 around feet and ankles.
- Support the pelvis on either side with rolled up blankets.

Fig 176 — Immobilisation of fracture of pelvis

FRACTURES OF THE BONES OF THE LOWER LIMBS

Fig 177 — A fracture of the neck of femur

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.

SYMPTOMS AND SIGNS

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

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 to walk on the injured limb due to impaction, i.e. bone ends are wedged into one another.

METHOD OF SUPPORT

- Support the casualty on the back with the head and shoulders slightly raised.
- Extend the uninjured lower limb and draw the foot into the middle line of the body.
- Place the padding where legs cross.
- Kneeling on the injured side, place one hand, palm uppermost, underneath the thigh on the injured side close to the knee.
- 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 on the outside of both calves and feet.

Fig 178 — Showing shortening and deformity in fractured neck of the left femur

Fig 179 — Supporting a fracture of the neck of the left femur

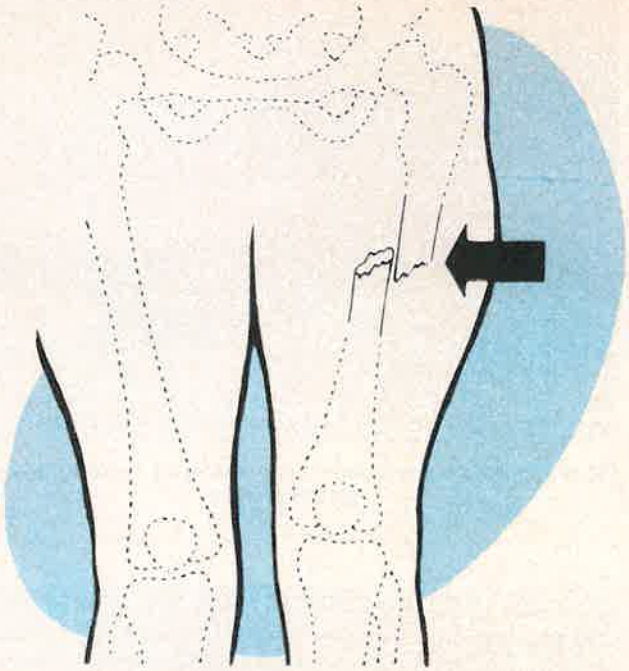


Fig 180 — A fracture of the shaft of the femur

FRACTURES OF THE SHAFT OF THE FEMUR

SYMPTOMS AND SIGNS

- Severe pain at the site of the injury.
- Loss of power in the limb.
- 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 circulatory collapse may be present.

METHOD OF SUPPORT

- If available, apply a Thomas splint.

If not available:

- Apply a steady traction to the foot, drawing the limb alongside the uninjured limb.
- Place a splint between the legs.
- Place padding between the knees and ankles.
- Apply a narrow bandage as a figure of eight round the ankles and the feet.
- Pass three bandages under the casualty in the following order —
  — The thighs above the fracture
  — The thighs just below the fracture
  — Both knees.
- Tie these bandages.
- Check the circulation of both limbs.

Fig 181 — Supporting a fractured femur

Fig 182 — A fracture of the patella

FRACTURE OF THE PATELLA (KNEE CAP)

SYMPTOMS AND SIGNS

- Pain over the patella.
- Loss of power at the knee.
- 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.
- Apply an air splint if available.

If not available:

- Apply a firm pressure bandage to surround the knee joint (figure of eight roller bandage).
- Now place the good leg beside the injured leg, and pad between the knees and ankle.
- Secure the limbs with two broad bandages —
  — One around the thigh
  — One below the knees
  And a narrow bandage as a figure of eight around the ankles and feet.

Fig 183 — Supporting a fracture of the patella

FRACTURES OF THE TIBIA AND FIBULA

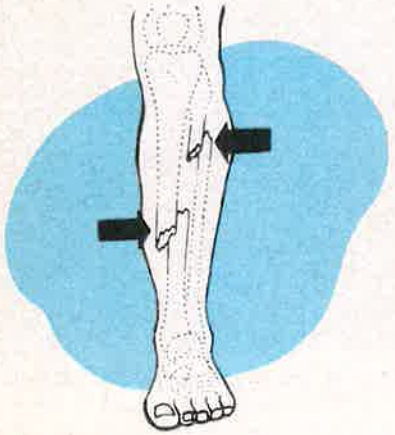


Fig 184 — A fracture of the tibia and fibula

METHOD OF SUPPORT

- Use an air splint if available.

If not available:

- 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.
- 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.

Fig 185 — Supporting a fracture of the tibia and fibula

Fig 186 — A fracture about the ankle

CRUSHED FOOT AND FRACTURES OF THE FOOT

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 or the splint.
- Raise the foot and support.

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

- Secure with a double figure of eight.
- Raise and support the foot.

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.
- The bones are pushed out of their normal contact with each other — this is a dislocation.

Fig 187 — A normal shoulder

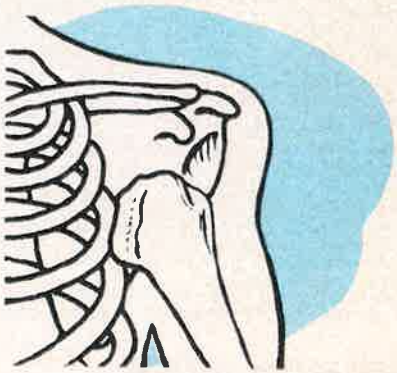


Fig 188 — A dislocated shoulder

SYMPTOMS AND SIGNS

- 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.

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

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 cold compresses.
- Use soft padding to eliminate any jolting during transportation.

In the case of the lower jaw:

- The casualty is unable to close the mouth.
- Remove any dentures.
- Support the lower jaw as for a fracture without trying to close the mouth.

TREATMENT OF SPRAINS

- Apply ice packs.
- Apply pressure bandage.
- Elevate the part.
- *In all doubtful cases treat as for fracture.*

CONTUSION OR BRUISE

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

SYMPTOMS AND SIGNS

- Pain at the site of the injury.
- Stiffness and some loss of use at the site.
- 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 AND SIGNS

- Pain in the region, usually of sudden onset and sharp in nature.
- Loss of power.
- Pain on movement.
- Tenderness over the muscle.
- Pain if the muscle is stretched.

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

GLOSSARY

DISLOCATION — *Displacement of the joint*
SECRETIONS — *Fluid from the glands in the body*

Chapter 10

EXPOSURE TO TEMPERATURE CHANGES

Extremes of hot or cold temperature are very dangerous

HEAT EXPOSURE

The body normally regulates temperature by —

- Evaporation of sweat from the skin.
- Evaporation of moisture from the lungs.
- Increasing the rate and depth of respiration to increase evaporation.

This is controlled by the heat regulating centre in the base of the brain.

STAGES OF EXCESS HEAT EXPOSURE

- Heat cramps.
- Heat exhaustion.
- Heat stroke.

HEAT CRAMPS

Excessive sweating and loss of salt from the skin can lead to cramps.

SYMPTOMS AND SIGNS

The casualty —

- Suffers painful muscle spasm of the arms, legs and abdomen.
- Often complains of
  — weakness
  — dizziness
  — fatigue.

TREATMENT

- Apply ice packs to the cramped muscles.
- Gently stretch the muscles.
- Replace salt lost by giving drinks containing a mixture of salt and water (half teaspoonful of salt to half litre of water).

HEAT EXHAUSTION

SYMPTOMS AND SIGNS

The casualty —

- Feels hot and stifled for air
- Suffers headache
- Suffers giddiness and feels faint
- Suffers from cramps
- Is pale and exhausted and sweats freely

The pulse and breathing are rapid.

TREATMENT

- Place the casualty in a cool place.
- Sponge the casualty with cold water.
- Give plenty of water (with salt) to drink.
- Apply ice packs to cramped muscles and stretch.

HEAT STROKE

Is a much more serious condition as the heat regulatory mechanisms of the brain start to fail. The body temperature then rises. This can happen very quickly to infants left in closed cars, due to the rapid build up of heat within the car during hot weather.

SYMPTOMS AND SIGNS

The casualty —

- suffers headaches
- is irritable
- is nauseated and vomiting
- may faint
- ceases to sweat

The skin becomes hot and dry.
The body temperature rises rapidly.
Mental disturbance and unconsciousness occur.

TREATMENT

Remove the casualty to a cool place.
Cool by —

- removing clothing
- sprinkling with water
- wrapping in wet cold sheets
- rubbing with ice

Fan the casualty, keeping the sheet wet.
If conscious, give frequent drinks of salt and water (half teaspoon of salt to half litre of water).
If unconscious and still breathing, place casualty in coma position.
Arrange for medical aid as a matter of urgency.

SURVIVAL IN THE DESERT

Protect from the sun.
Maintain cooling of the body.
Replace water and salt loss.

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

The requirement is 4 litres 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 and creek beds.

TRAVEL

Travel only at night — *if direction of travel and destination are known.*

SIGNALS

Adequate signals should be laid out and casualty should be kept nearby.

EXPOSURE TO COLD

The degree of injury depends on —

- The temperature
- The wind velocity
- The period of exposure

The casualty if dry, and if there is no wind, can tolerate very low temperature.

The combination of cold rain and wind is much more dangerous.

COLD EXHAUSTION

Severity varies with —

- The casualty's age
- The casualty's physical condition

It is aggravated by —

- Over fatigue
- Anxiety

SYMPTOMS AND SIGNS

The following may be present:

- Increasing slowness of physical and mental responses.
- Stumbling, cramps and shivering.
- Slurring speech.
- Impaired vision.
- Unreasonable behaviour and irritability.

There is an increased rate of pulse and respiration.

TREATMENT

- Protect the casualty from wind, rain and sleet and from the cold wet ground.
- If possible, wrap the casualty in warm, dry clothing and put in a warmed sleeping bag.
- If in a warm place and conscious, give
  — hot fluids
  — a warm bath.

Smoking should be avoided.

If in the open, use campfires and body heat from others to help warm.

Treat all cases of prolonged exposure as serious and seek medical aid. Severely affected cases should be transported in the coma position.

SEVERE ACCIDENTAL COOLING OF THE BODY (HYPOTHERMIA)

Hypothermia is a dangerous lowering of the body core temperature.

There is a loss of surface heat followed by cooling of the deep tissues and organs of the body. Infants and the elderly are particularly susceptible.

Alcohol, drugs and medical conditions lower resistance.

SYMPTOMS AND SIGNS

The casualty —

- Is cold to touch.
- Has a slow pulse and breathing is slow and shallow.

Infants are quiet and refuse food. A pink face, hands and feet may be deceptive.

Elderly and infirm often may be unconscious.

TREATMENT

- Place the casualty between blankets so that the temperature can rise gradually.
- If conscious, give warm sweet drinks. (Body supplies of sugar are reduced with prolonged exposure to cold.)
- *Do not* use hot water bottles or electric blankets as these will open up skin vessels and take blood from deeper tissues causing collapse.

FROSTBITE AND FREEZING

May be —

- superficial
- deep.

SUPERFICIAL FROSTBITE

Usually affects —

- Ears
- Nose
- Cheeks
- Chin
- Fingers
- Toes

SYMPTOMS AND SIGNS

There is —

- A sudden whiteness of the skin
- A waxy appearance and firmness to touch.

The patch does not become red when pressure is applied.

The area is painless.

Blistering may occur.

TREATMENT

- Take care of the casualty's general condition by providing shelter, warmth and hot drinks.
- Remove anything constricting the limbs.
- Thaw the area by covering or by body heat.
- *Do not rub or chafe* the affected parts.
- *Do not apply* snow, cold water or direct heat.
- Cover any blisters with a dry dressing.
- Seek medical aid.

DEEP FROSTBITE

This is a serious injury.

Medical aid is urgently needed.

SYMPTOMS AND SIGNS

The area is white and feels hard to touch. It is painless.

TREATMENT

Keep the casualty dry and warm.

Protect the damaged area from further trauma.

Do not attempt to thaw the part out unless under medical supervision.

OTHER COLD INJURIES

Damage will occur if a wet or damp part of the body comes in contact with very cold metal.

Prevent by protecting with suitable clothing.

The skin adheres and will tear if pulled away.

If stuck, warm the metal.

PREVENTION OF COLD EXPOSURE

- Wear clothing which protects from the wind and the rain (wool undergarments and waterproof overclothing), adequate sleeping bags and covers.
- Have a minimum of four in the party.
- Have experienced members.
- Plan the trip for the weakest member.
- Members should be physically fit to cope with the workload.
- Listen to weather forecasts.
- If caught in bad weather, take shelter early and watch for early signs of trouble.

IMMERSION INTO COLD WATER

Immersion into cold water results in a very rapid loss of body temperature.

TREATMENT

The best treatment by far is to put the casualty into a *warm* bath (42°C maximum).

Recovery is rapid and complete.

Alternatively, the casualty can be allowed to warm slowly in a sleeping bag, preferably with a warm companion.

Chapter 11

INJURIES IN SPORT

With the great increase in leisure time and increasing sports participation, sports injuries are becoming more frequent

Adequate First Aid, diagnosis and treatment are fundamental to quick recovery.

Many sports injuries are common to other accidents. The treatment is the same.

PREVENTION

Fewer injuries will occur if the athlete —

- Is fit to perform the sport
- Is playing up to his own standard
- Wears and uses correct equipment
- After injury is fully recovered and fit again to resume sport.

SPECIFIC INJURIES

HEAD INJURIES

All casualties suffering from head injuries should be rested immediately. Treat as on page 66. At least one week's rest is essential before resuming sporting activities.

FACIAL INJURIES

Cleanse and control haemorrhage. Lacerations of the eyebrows usually require stitching. Seek medical aid.

FRACTURED NOSE

Emergency expert medical attention is essential if a clear nasal airway is to be regained. Refer for immediate medical aid.

EYE INJURIES

- Seek medical aid urgently.
- First Aid treatment as on page 233

TEETH . . . KNOCKED OUT

- Save knocked-out permanent teeth; they may be replaced.
- Cleanse the tooth by preferably having casualty suck it in his own mouth, otherwise wash it under tap.
- Replace the tooth in the mouth in its original position.
- Hold in place for 2 minutes then mould a piece of aluminium foil or milk bottle cap over it and a couple of neighbouring teeth on each side. This acts as a temporary splint and is especially necessary if tooth will not remain in its proper place unaided.
- When moulded with the fingers have casualty bite firmly onto this splint for added stability.
- Advise to see dentist as soon as possible, ideally not more than 24 hours later.

If not replaced —

- Place the tooth in the casualty's mouth to keep moist, or keep moist in wet handkerchief or tissue.
- Seek dental aid immediately; this is more urgent than if tooth is replaced.

Remember — quick action increases the chance of successful replacement. If replaced within minutes there is a 90% chance. Even if replaced some hours after, the tooth will probably last for several years.
Baby (first) teeth should not be replaced.

. . . LOOSENED

- This same aluminium foil splint is also the best immediate help for loosened or partly displaced teeth — once realigned.
- Again advise casualty to see dentist as soon as possible for more effective splinting and examination for other damage.

PREVENTION

Loss of teeth and damage to them can be prevented by the use of a well fitting mouthguard.
Temporary splint: an inexpensive and non-space consuming splint can be made in the following manner:
A 5 cm strip of aluminium foil (44 cm width) is folded lengthways on itself, five times so as to form 16 layers. This gives an ideal degree of rigidity similar to a milk bottle cap.

SPINAL INJURIES

See page 172.

Remove from the playing field with the greatest care (see page 174).

NECK CONTUSIONS

Swelling can result in obstruction of the airway leading to asphyxia.
Treat by —

- Sitting casualty up
- Loosen clothing about neck
- Applying ice packs to neck
- Seek medical aid if swelling persists

SHOULDER INJURIES

Treat all as fractures or dislocations.

- Support.
- Apply ice packs.
- Arrange for X-ray check and medical aid.

ELBOW INJURIES

Apart from fractures and dislocations, typical sports injuries occur at the elbow.

TENNIS ELBOW

Strain of either the outer or inner origin at the elbow.
These occur in many sports.

SYMPTOMS AND SIGNS

- Pain over the bony points on one or other side on stretching the muscles.
- Tenderness over the bony point.

TREATMENT

- Apply ice packs.
- Have the casualty stretch the muscles.

FINGER INJURIES

DISLOCATION OF JOINTS

Treat by gentle steady traction.
Support by strapping to next finger.
Advise casualty to have X-ray check.

MALLET FINGER

Fig. 189 — A mallet finger

Rupture of insertion of tendon or chip fracture of the base of the end joint of the fingers.

TREATMENT

Support on splint.
Seek medical aid quickly.

CONTUSION OF FINGER NAIL

Blood collects beneath nail, following a blow or crushing injury.

SYMPTOMS AND SIGNS

The finger —

- Is hot
- Throbs
- Is very tender.

TREATMENT

- Apply ice to finger.
- With paperclip or needle, heated to red heat, burn hole through nail to release blood — this is painless.
- Soak in warm water to encourage bleeding.

CHEST INJURIES

See page 99.

WINDING

Spasm of diaphragm from blow to the solar plexus.

SYMPTOMS AND SIGNS

- Inability to take a breath.
- Gasping attempts to breathe.

TREATMENT

- Lay the patient flat, breathing will start spontaneously. DO NOT PUMP THE LEGS.

CAUTION — A blow of this kind can also cause damage to the liver or spleen causing haemorrhage. Therefore, observe for signs of internal haemorrhage.

STITCH

A cramp of the muscles of the rib cage.

TREATMENT

Deep breathing and stretching by arching back.

INJURIES TO GROIN AND TESTICLES

Apply ice packs to the area.

GROIN STRAINS

Apply ice packs and gently stretch the muscle.
Have casualty checked by doctor to exclude a hernia.

CORKED THIGH

Haemorrhage into thigh muscles.

TREATMENT

- Apply ice packs.
- Bandage firmly.
- Elevate the limb.
- Stretch the muscle.

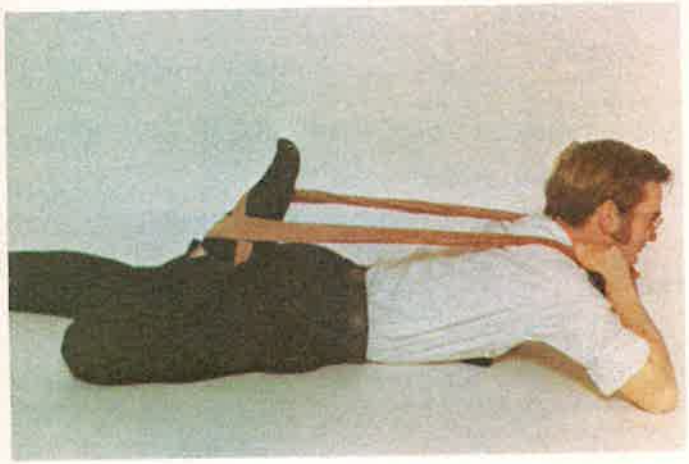


Fig. 190 — Stretching a corked thigh

MUSCLE INJURIES

STRAINS

PRINCIPLES OF TREATMENT

PREVENT SWELLING BY —

- Elevating the injured part
- Supporting the injured part
- Applying ice packs to the injured part
- Applying pressure to the injured part

PROMOTE RECOVERY BY —

- Encouraging early muscle exercises
- Gentle stretching of the muscles

The muscles and joints to regain full recovery must —

- Regain full strength
- Regain full movement
- Be re-educated to the task

KNEE INJURIES

Most knee injuries —

- Develop fluid.
- Result in wasting of the muscles on the front of the thigh (quadriceps).
- Result in spasm of the muscles at back of the thigh (hamstrings).

TREATMENT

- Ice packs.
- Pressure bandage.
- Stretch hamstrings.
- Elevate the limb.

QUADRICEPS EXERCISES

With the casualty reclining —

- Have the casualty lock the knee straight
- In locked position lift the leg from the couch
- Lower and relax the leg
- Repeat

This manoeuvre stretches the hamstrings as well.

ALL knee injuries should be checked by a doctor as soon as possible after injury and after first aid treatment.

TENDO-ACHILLES INJURIES

The tendon may —

- Rupture
- Partially tear
- Be irritated by overuse.

TREATMENT

Early treatment with —

- Ice packs
- Rest
- Elevation of limb
- Raising the heel
- Strapping the muscle with the toe pointed downwards

Seek medical aid.

ANKLE SPRAINS

Result in rupture of the fibres of the ligaments on either side of the joint.

SYMPTOMS AND SIGNS

- Pain over the ligaments.
- Tenderness over the ligaments.
- Swelling over the ligaments.

TREATMENT

- Apply ice packs.
- Apply pressure bandage.
- Elevate the part.
- *In all doubtful cases treat as for fracture.*

STRESS FRACTURES

Overuse of the bones from repetitive use can lead to collapse of the bones — stress fractures. The most common occur in the feet and lower leg. In children the growing plate of the bone (epiphysis) can also be injured.

An X-ray is necessary to confirm the diagnosis.

CRAMPS

Cramps are spasm of the muscles caused by —

- Overuse.
- Excessive jarring.
- A little tear.
- Occasionally from loss of salt from the body.

SYMPTOMS AND SIGNS

- The muscle knots and shortens.
- There is great pain.
- There is inability to continue using the muscle.

TREATMENT

- Ice packs.
- Gently stretch the affected muscle.

SPORTS CAUSING SPECIAL INJURIES

Whilst nearly every sport has special injuries, many of these injuries are included above. Certain sports have injuries peculiar to the sport.

SPORTS WHERE AIR PRESSURE CHANGES OCCUR

SCUBA DIVING, SKY DIVING.

Air pressure changes can cause —

- Rupture of the eardrum.
- Rupture of the air sacs of the lungs.
- Sinusitis.
- Bends — air bubbles being released into the blood.

ALL these complications can be prevented by adequate preparation.

First Aid is to seek medical aid urgently.

For further information, refer to:
Australian Fisheries insert No. 5 1975.
Published for the Fisheries Division, Australian Department of Agriculture, Canberra, A.C.T.

GLOSSARY

HAMSTRINGS — *Muscles on back of thigh*
MALLET FINGER — *Injury to terminal joint*
QUADRICEPS — *Muscles on front of thigh*
SINUSITIS — *Inflammation of the air spaces in the bones of the face.*
TENDO-ACHILLES (ACHILLES TENDON) — *Tendon of calf muscles at the back of the ankle.*

Chapter 12

ROAD ACCIDENTS

Quick effective treatment is essential

PROTECTION AT THE SCENE OF THE ACCIDENT

- Turn off ignition of crashed cars. Apply the handbrake or chock the wheels.
- Ensure all cigarettes are extinguished.
- Station people to warn other cars of the accident.
- At night, light up the area with flashing indicators and headlights.
- Park cars a distance away to protect accident area.
- Do not touch occupants or vehicles if live wires are in contact with the car.
- Send for assistance.
- Contact Ambulance, Police, Fire Brigade. Use passing motorists in each direction.
- Give precise instructions of site of accident — and casualties and if trapped.
- Describe location:
  - — Name of district, suburb, etc.
  - — Name of street, road, highway, etc.
  - — Nearest cross street (suburban).
  - — Distance from town or major landmark (country) kilometres North ☐ South ☐ East ☐ West ☐ of (describe town or landmark).
- Give accident details:
  - — Number of people hurt.
  - — Time of accident (if known).
  - — Time this message written.

PRIORITIES OF TREATMENT

- Quickly check those involved in the accident.
- Has more than one person been hurt and require treatment?
- Look after the unconscious casualty first.
- Do not move casualty unless essential for:
  - — life-saving treatment
  - — safety
- If unconscious
  - — check airway and if necessary, clear
  - — position head so that airway remains open.
- If not breathing, apply E.A.R.
- If no pulse, apply C.P.R.
- Treat haemorrhage.
- If practicable, treat fractures and wounds before movement and transport.

WHEN VICTIM IS TRAPPED

- Maintain a clear airway.
- Control haemorrhage as much as possible.
- Splint any fractures.
- Obtain expert help to remove the casualty.
- Support cervical spine if there is any doubt re cervical injury, e.g. cervical collar.

PREVENTION

See Chapter 13, page 226.

Chapter 13

INJURY PREVENTION

Almost all injuries are preventable!

Although the First Aider's role is to treat the emergency, he should be thoroughly conversant with accident prevention.

Accidents occur —

At home
At play or on holiday
At work

Safety rules and laws help to prevent them.
Know them.

SAFETY RULES AT HOME

A great number of accidents occur in the home. In any home many potentially dangerous objects are in constant use.

Prevention of accidents can only succeed if constant care is exercised to use and store these home devices safely.

The following actions will help:

- Use sharp objects only for their intended purpose. Keep them sharp, handle them with care and store safely.
- Follow the manufacturer's instructions carefully when using equipment.
- Regularly check your home for objects which may cause lacerations.
- Promptly sweep up broken glass.
- Remove nails from boards.
- Safely store and remove dangerous rubbish.
- Mark clearly large transparent walk-through doors.
- Unplug electric cords when not in use and check them regularly for damage.
- Regularly supervise children's area of play to ensure no danger exists or their play is not dangerous.
- Watch to see children cannot reach hot objects.
- Supervise the old and the young in the bathroom.

Take particular care of firearms to see that they are unloaded and stored safely.

Prevent children playing with fireworks.

Keep medicines and chemicals safe —

- Out of reach of children.
- Locked in cupboard.
- Clearly labelled.
- Well corked.
- Away from food.
- Keep to prescribed dose.
- Throw leftovers away safely.

Buy non-flammable clothing.

Do not use portable radiators unless well guarded.

Do not smoke in bed.

FIRE DRILL

If fire occurs —

- Shut all doors and windows
- Call the FIRE BRIGADE
- Turn off all electric power
- Extinguish fire if possible
- Have emergency telephone numbers handy

POOL SAFETY

- The pool must be easily visible from the living area.
- Cover the pool when not in use.
- Teach all users to swim.
- Supervise children swimming at all times.
- Have a non-slip surface in the pool.
- Never swim alone.
- No inflatable toys are allowed.
- Surround the pool with a child-proof fence.
- Store pool chemicals safely.
- Have available a long pole or ring buoy with a rope which can be used for rescue.
- Regularly study methods of rescue and resuscitation.

SAFETY AT PLAY AND ON HOLIDAYS

ROAD SAFETY

- Check your car, caravan and trailer for road worthiness.
- Give full attention to your driving.
- Observe the traffic laws.
- Drive at a safe speed.
- Do not drink and drive.
- Do not take sedatives and drive.
- Always ensure all passengers wear safety belts.
- If a pedestrian, wear clothing that is easily seen.
- Cross the road where well lit and easily seen from all directions.
- Do not drive too far without frequent breaks and rest.

CAMPING

- Label all dangerous items clearly.
- Make sure stoves and lanterns are safe.
- Ensure hot fluids cannot be tipped over.
- Ensure collapsible tables are stable.
- Prevent insect bites.
- Mark tent guys clearly.
- Make sure your camp fire is out before leaving.

HIKING

- Wear suitable clothing.
- Watch against sunburn.
- Keep together.
- Never take long walks without expert advice.
- Wait for help if lost.
- Take water, matches, compass and map of the area on a hike.
- Inform authorities of your plans.

BOAT SAFETY

- Know your boat.
- Know your water.
- Know the weather forecast.
- Wear life jackets at all times.
- Do not overcrowd the boat.
- Do not stand up unless stable.
- Check for oars and rowlocks.
- Take a thick pullover, drinking water and extra petrol.
- Tell somebody on shore of your plans.
- If the boat has an engine, carry a fire extinguisher.
- Carry a signal device.

BEACH SWIMMING

When surfing on an open beach, always choose a beach that is patrolled by surf life savers.

- Bathe between the flags.
- Observe directions of life savers on patrol.
- Swim or surf with the crowd.
- Do not take inflatable rubber floats into surf if a non-swimmer.
- If caught in an undertow or rip, do not try to swim against it, raise right hand and await assistance.
- Do not panic.
- When assistance arrives, do not struggle with rescuer.
- Do not throw sand on beach as it can cause serious eye injuries.
- Do not surf alone.

FRESH WATER SWIMMING

Avoid swimming in lonely rivers or dams unless accompanied by a party.

- Make inquiries concerning swimming area.
- Thoroughly investigate swimming area before entering.
- Watch for currents, which usually flow near steep river banks.
- Check for underwater hazards such as snags (fallen tree limbs).
- Do not enter dark water.
- Do not dive into unknown streams or dams until the depth and absence of underwater obstacles are ascertained.
- Make sure before entering the water you can easily get out again.
- Do not dispose of litter in the water.

Chapter 14

FIRST AID FOR ABDOMINAL AND PELVIC CONDITIONS, EYE, EAR and NOSE

Early First Aid recognition of problems in these structures can prevent serious consequences.

ABDOMINAL AND PELVIC CONDITIONS

The abdomen and pelvis 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 the 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.

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 AND SIGNS

- Pain over the site of injury.
- The casualty often vomits.
- Evidence of injury — bruising or a wound.
- Marked tenderness over the abdomen.
- Rigidity of the abdominal wall (muscles have contracted to protect the area).
- Onset of circulatory collapse.
- 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 AND SIGNS

- Pain, either as a constant ache, or colicky in nature.
- Vomiting.
- Tenderness in the abdomen.
- The pulse and respiration tend to become rapid.
- Rigidity of the abdominal muscles.
- Fever.
- Onset of cirulatory collapse.
- Distension of the abdomen.

TREATMENT

- 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 either in the 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.

Small objects need not cause alarm unless there is respiratory distress. Do not give fluids or food by mouth.

Arrange for medical aid without delay.

THE URINARY SYSTEM

EXCRETION

The removal from the blood and subsequent discharge from the body of waste products is accomplished by the kidneys.

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 passed (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 or 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 and encourage casualty to try to pass urine into the bath water.
- Reassure to allay fear.
- Send the casualty to hospital.

HICCOUGH

This may be the result of a digestive or kidney upset, but is often caused by nervousness.

Relief can frequently be obtained by —

- Sips of water
- Holding the breath
- Rebreathing into a paper bag

THE EYE

FOREIGN BODIES IN THE EYE

Commonly from —

Loose lashes.
Insects.
Particles of grit.
Metal.
Glass.

SYMPTOMS AND SIGNS

- Pain, particularly on looking at the light.
- Profuse tear formation.
- Spasm of the eyelids.
- Redness of the eye.

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.

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.

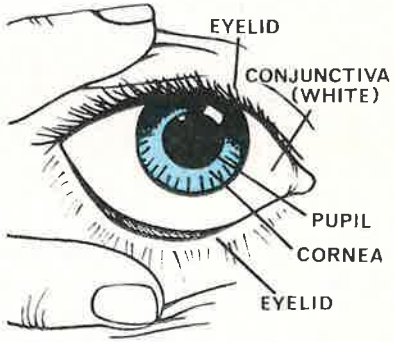


Fig. 191 — Structures of the eye

EXAMINATION OF THE UPPER LID

Instruct the casualty to look down, then gently grasp the eyelashes 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.

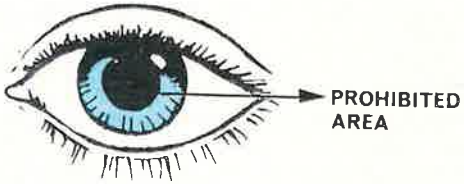


Fig. 192 — The cornea (window) of the eye

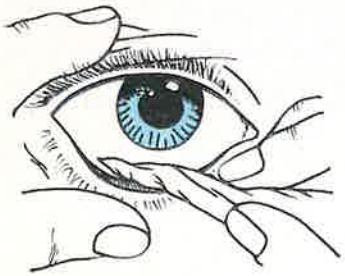


Fig. 193 — Everting the lower lid to remove foreign body

Fig. 194 — Everting the upper lid

EVERTING THE UPPER LID

Place a smooth matchstick 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 matchstick 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, an alkali, is often the cause of serious burns.

SYMPTOMS AND SIGNS

- Pain, especially on looking at the light.
- Commonly profuse watering of the eyes.
- Spasm of the eyelids.
- Reddening of the eyeball.
- Burns on eyelids which result in marked swelling.

IMMEDIATE ACTION IS NECESSARY TO PREVENT SEVERE DAMAGE.

Fig. 195 — Covering the eye with an eye pad

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.

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 AND SIGNS

- Pain, especially on exposure to light.
- Profuse watering.
- 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

Usually both eyes are burned by being exposed unprotected to the light from arc welding.

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 AND SIGNS

- Pain.
- Profuse watering.
- Reddening.
- Spasm of the eyelids.

TREATMENT

- Irrigate freely with cold water.

If casualty is relieved of symptoms, duty may be resumed.

WOUNDS 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.
- 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, pressure changes in flying or a blow to the ear.

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 matchstick. 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. 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.

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.

GLOSSARY

CONJUNCTIVA — *Delicate lining covering the eye and the inner side of the eyelids*

CORNEA — *Window of the eye*

Chapter 15

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

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 milk or water.
- Induce vomiting, except when
  — unconscious
  — a corrosive, caustic substance, kerosene or other petroleum product has been taken
  by —
  — putting your fingers down casualty's throat
  — giving syrup of ipecacuanha (dosage, see page 265)
  — many poisons can be neutralised by giving an antidote.
- If 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.

SEDATIVES

See Chapter 16, page 252.

ASPIRIN POISONING

SYMPTOMS AND SIGNS

- Abdominal pain, nausea and vomiting (often blood-stained).
- Giddiness and drowsiness.
- Profuse sweating.
- Rapid pulse and laboured breathing.

TREATMENT

- Induce vomiting.
- Give fluid and glucose or sugar.

CORROSIVE DISINFECTANTS AND CLEANING AGENTS

SYMPTOMS AND SIGNS

- Burning pains from the mouth to the stomach.
- Cold clammy skin and collapse.
- Burns about the mouth and lips.

TREATMENT

- If conscious, dilute the poison with copious amounts of water or milk.
- Support respiration.
- Do not induce vomiting.

POISONING BY INDUSTRIAL GASES

CARBON MONOXIDE GAS

See Chapter 5, page 103.

CARBON TETRACHLORIDE

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.

Smoking enhances the toxic effect of the drug.

SYMPTOMS AND 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.

SYMPTOMS AND SIGNS

- The casualty becomes light-headed and dizzy.
- Difficulty in breathing may occur.
- 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.

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.
- If breathing is failing or has stopped, place in the coma position.
- 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.
- 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 a common 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

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 AND SIGNS

- 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. Place in the coma position.

KEROSENE AND PETROLS

If inhaled, even small amounts of these liquids 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.

POISON CENTRES IN THE STATES AND TERRITORIES PROVIDE PROMPT ADVICE AT ALL HOURS

POISON INFORMATION CENTRES
(principal centres in each State and Territory)

	STD code	*Telephone*
Australian Capital Territory		
Canberra Hospital	062	43 2111
New South Wales		
Royal Alexandra Hospital for Children, Bridge Road, Camperdown	02	51 0466
Northern Territory		
Darwin Hospital	089	89 2211
Queensland		
Brisbane Royal Children's Hospital, Herston Road, Herston	07	51 0111
South Australia		
Adelaide Children's Hospital, King William Road, North Adelaide	08	267 4999
Tasmania		
Royal Hobart Hospital, Liverpool Street, Hobart	002	38 8485
Victoria		
Royal Children's Hospital, Flemington Road, Parkville	03	347 5522
Western Australia		
Princess Margaret Hospital for Children, Thomas Street, Subiaco	09	381 0222

GLOSSARY

IPECACUANHA — *Drug used to induce vomiting*

Chapter 16

PSYCHIATRIC CONDITIONS, DRUG MISUSE

Drug misuse is common.
Early recognition and help is needed.

PSYCHIATRIC EMERGENCIES

The First Aider may be confronted with mentally distraught casualties.

These can generally be divided into two groups —

Neurotic.

Psychotic.

NEUROTIC GROUP

Neurotic casualties are suffering from a nervous or emotional disorder, but remain mentally in contact with reality.

SYMPTOMS AND SIGNS

The following are commonly present —

- Headaches
- Indigestion
- Shakiness
- Impairment of memory

Often it is difficult to find any real signs, but the casualty is frequently —

Tense
Agitated
Depressed
Introspective

TREATMENT

- Positive reassurance with firm but gentle handling.
- Be a sympathetic listener.
- Advise medical consultation.

PSYCHOTIC GROUP

Psychotic 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.

DRUG OVERDOSAGE

A drug is a substance which may be used commercially or medically, which, if taken in excessive quantities, can affect the human system causing adverse reactions to the brain and nervous system.

DRUG MISUSE AND ABUSE

Many drugs have medicinal use and are prescribed (in controlled dosage) by medical authorities. However, casualties either through ignorance (overdosage by not following instructions), accident (wrong bottle, inebriated), or deliberate (suicidal or hysterical or for stimulus) can and do take an overdosage.

Dependance on a drug develops in certain conditions where —

- The drug is addictive.
- The psychological makeup of the individual demands help.
- The habit develops of taking the drug.

This is addiction.

IDENTIFICATION OF DRUG ABUSE

This is difficult. The casualty rarely admits to it. The First Aider must be on the alert to try to detect possible casualties.

Today many drugs are available for human consumption.

The worst offenders are —

- Alcohol
- Tobacco
- Sedatives
- Stimulants
- Hallucinogens
- Opiates
- Cannabis

ALCOHOL

SYMPTOMS

- Mental confusion and inco-ordination of muscular activity.
- The casualty smells of alcohol.
- The pupils are dilated and coma may result.
- Vomiting can lead to asphyxia.

TREATMENT

- If conscious, induce vomiting.
- Give black coffee.
- If unconscious, sustain respiration.

TOBACCO

Smoking can cause or aggravate many serious conditions —

- Coronary heart disease.
- Thickening of the arteries.
- Ulcers of the stomach.
- Cancer of the lung.
- Sinusitis and bronchitis.

A First Aider who smokes over a patient is setting a very bad example.

SEDATIVES

Their function is to depress the higher 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 vomitus or throat secretions.
- Sustain respiration if failing.

STIMULANTS

Stimulants include caffeine, but the most powerful are the amphetamines.

Stimulants are used to try to maintain efficiency beyond normal human tolerance (truck drivers, sportsmen, etc., tend to use these drugs to increase their endurance).

In fact, the drugs do not help performance, but endanger the casualty's life as well as being a risk to others.

HALLUCINOGENS

This group of drugs includes LSD, mescaline, Mexican mushrooms, DMT.

These drugs send the user on a "trip" which may or may not be pleasant. Many cases of suicide have been traced back to the use of these drugs.

TREATMENT

- Supervise the casualty until medical aid is available.

OPIATES

These are the hard drugs of addiction: morphia, heroin, opium poppy and methadone. These drugs are pain controllers extensively used in medicine.

Unfortunately all these drugs are addictive.

Opiates cause:

- Mental clouding
- Drowsiness
- Inability to concentrate
- Lethargy
- Nausea and vomiting.

In some people these produce a very pleasant euphoria. An opiate user becomes physically dependent on the drug.

Withdrawal leads to:

- Restlessness and drug craving
- Yawning
- Watery eyes, running nose
- Perspiration, fever
- Vomiting
- Insomnia.

The First Aider should encourage the casualty to obtain expert advice.

CANNABIS

Marijuana is made from cannabis plants. Smoking these leaves leads to a state of intoxication. Five to ten reefers a day gives constant intoxication.

Whilst it would appear that cannabis itself is not addictive, often the smoker is promoted to more dangerous drugs inadvertently by unscrupulous pushers.

GLOSSARY

BRONCHITIIS — *Infection in Bronchus*
EUPHORIA — *An abnormal sensation of well-being*
INTROSPECTIVE — *Withdrawn and self-centred*
SEDATIVES — *Drug to calm the nerves*

Chapter 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.

REMEMBER —

- Nearly all bites are by venomous species.
- Therefore, assume every bite is by a dangerous snake.

APPEARANCE OF THE BITE

Usually two puncture marks about a centimetre 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 AND SIGNS

First symptoms appear 15 minutes to two hours after the bite.

- Double vision.
- Drowsiness.
- Nausea and vomiting.
- Sweating.
- Faintness.
- Diarrhoea.
- Headache.
- Pain in the chest or abdomen.

Enlargement of regional lymph glands may occur.

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.

NOTE. — Snake venom enters the general circulation through the lymph vessels.

TREATMENT

- Keep the casualty at rest and allay any fear.
- Apply a broad, firm bandage around the limb, beginning at the bitten area. (As much of the limb should be bandaged as is possible).
- Keep the limb as still as possible. Splint the limb using timber, or a spade, or any rigid material.
- Bring transport to the casualty whenever possible.
- Leave the bandages and splint on until medical care is reached.
- Don't cut or excise the bitten area.

- DON'T APPLY AN ARTERIAL TOURNIQUET.
- Don't wash the bitten area. The snake involved may be identified by the detection of venom on the skin.
- If the snake can be killed safely bring it to the hospital with the casualty.
- If possible alert the doctor or hospital of the impending arrival of the casualty.
- Watch for, and treat, signs of respiratory arrest or circulatory collapse.

LIZARD BITE

Lizards may bite if molested. The bite is non-venomous.

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 and the bite is often slow to heal.

SPIDER BITE

Only two species of Australian spiders cause fatalities.

These are —

Red back spider
Funnel web spider.

RED BACK SPIDER

Found throughout Australia, usually under rubbish.

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 AND SIGNS

- The bite, felt as a sharp transient sting.
- Localised pain which becomes general.
- Nausea and vomiting.
- Dizziness.
- Faintness and muscular weakness.
- Profuse sweating.
- Swelling around the bite.
- Muscular spasm.

FUNNEL WEB SPIDER

Found mainly in Sydney and the eastern coast of New South Wales.

Large and black or reddish brown spider, two to three centimetres long.

Inhabits —

rock crevices
burrows
post holes, etc.

SYMPTOMS AND SIGNS

- The bite is painful initially.
- There is little local reaction.
- Difficulty in breathing.
- Rapid pulse.
- Numbness.
- Muscular weakness and writhing.
- Profuse sweating.
- Copious salivary and bronchial secretions.
- Spasm of the larynx.

TREATMENT OF BOTH TYPES

- If the bite by a funnel web spider is on a limb, the treatment as outlined for snake bite (page 256) should be followed.
- If the bite is from a red back spider, a cold compress should be applied, and medical assistance sought immediately.

As antivenene, which is very effective, is available for red back spiders, bring the spider for identification if possible.

SCORPION STINGS

These are rare.

Australian species are small and the sting causes only local pain and swelling.

If these are troublesome, treat by immersing the part in fairly hot water to which ammonia has been added.

COMMON BUSH 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 about half a centimetre in diameter.

It tends to secrete itself in body crevices.

SYMPTOMS AND SIGNS

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

- Apply turpentine or kerosene over the tick to kill it.
- If in the ear, apply oil.
- Seek medical aid for
  - — removal
  - — an injection of specific tick antiserum.

If medical aid is not readily available, remove the tick by sliding the open blades of a pair of sharp pointed scissors, one on each side of the tick, and lever the tick outwards.

Do not squeeze the tick. This forces more venom into the tissues.

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 numerous 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 21°C.

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
Trailing limbs over sides of boats

Injuries may be inflicted by sharks —

By biting
By impact
By cutting with the fins
By the powerful kick of the tail

The jaw is extremely powerful and can bite through human bones, even thigh bones, with ease.

Large masses of flesh may be torn away, leading to profuse haemorrhage.

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 circulatory collapse.

STINGS CAUSED BY MARINE AND FRESH-WATER CREATURES

MARINE STINGS

Marine creatures may inflict their stings by —

Injection or absorption of venom through the skin.
Contact with tentacles bearing stinging cells.

The effects range from acute discomfort to rapid collapse and death.

MARINE CREATURES — VENOM THROUGH THE SKIN

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 AND SIGNS

- Severe burning or throbbing at the site of the puncture.
- Pain along the lymphatics in the region.
- 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 circulatory collapse is common.
- Failure of respiration and paralysis of muscles are caused by —
  Stone fish
  Cone shell
  Blue-ringed octopus.
- The blue-ringed octopus sting may be painless. Symptoms of intoxication appear within a few minutes.

TREATMENT

- Sustain respiration.
- Treat for circulatory collapse.
- Seek medical aid immediately.

In addition —

Cone shell and stone fish —

- Clean the wound with water.
- Immerse the part in hot water — do not burn the casualty, test temperature with an uninjured limb.
- Stone fish antivenene is available.
- Remove any foreign bodies.

Blue-ringed octopus sting —

- Apply a constrictive bandage where possible.

STINGING BY TENTACLES

Many species of jellyfish have stinging tentacles.

STING CHARACTERISTICS

- Occur on any part of the body and pieces of tentacle 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
  to
  Intense pain.
- Extensive stingings 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

- Lay the casualty on dry sand, avoiding contact by sand to the area stung.
- Encourage the casualty to lie still.
- Pour vinegar over the area stung and repeat frequently.
- *DO NOT USE —*
  Water
  Beer
  Kerosene
  Petrol.
- DO NOT RUB THE AREA.
- DO NOT REMOVE TENTACLES.
- If the sting is on a limb, apply a constrictive bandage.
- Seek urgent medical aid.
- Sustain the respiration and circulation.

THE CONSTRICTIVE BANDAGE

The ideal constrictive bandage is flat rubber, 5 centimetres 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 on the limb 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 and not re-applied.
- The time of application should be prominently marked on the casualty's forehead.
- If practicable, keep constricted limb cold and moist.

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.

POLLENS INHALED

Lead to —

Sneezing
Blocked nose
Asthma.

TREATMENT

- Remove the irritant by giving
  — an emetic (Syrup of Ipecacuanha is best)
  or by
  — washing away.

- Treat skin conditions with
  — cold compresses
  or by
  — applying methylated spirit.

Inhaled pollens need medical aid.

DOSAGE — IPECACUANHA SYRUP (A.P.F.)

Age	
1 year	15 ml.
2 years	20 ml.
3 years	25 ml.
4-14 years	30 ml.
Adults	50 ml.

The shelf life is at least two years.

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.

DELAYED

SYMPTOMS

Appear 6 to 15 hours after intake —

- Nausea.
- Vomiting.
- Diarrhoea.
- Thirst.
- Collapse.

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 AND SIGNS

- Nausea.
- Vomiting.
- Diarrhoea.
- Dehydration.
- Rapid weak pulse.
- Often high temperature.
- Collapse.

TREATMENT

- Obtain medical aid.
- Treat the collapse.
- Give sips of fluid.

GLOSSARY

EMETIC — *A substance used to induce vomiting.*

Chapter 18

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
The rate and depth of respiration

At hourly intervals —

The temperature of the casualty (if a thermometer is available).
Any vomiting —
Nature
Volume.
The volume of the 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
Frequently check the circulation of any injured limb
Frequently check all bandages, splints or constrictive bandages for comfort and tightness

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	30-40 per minute
	Children	20-26 per minute
	Adults	16-20 per minute

The rate is increased in —

Circulatory collapse
Emotion
Fever
Exercise

The rate is decreased if the respiration centre is depressed by — Asphyxia.
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 has been taken while still holding the casualty's wrist, so that no change is induced
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.
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°C
Normal	36°-37°C
Pyrexia	above 37°C
Hyperpyrexia	above 40°C

In the unconscious casualty or children it should be taken in the axilla.

If the temperature is below 36°C, warm the casualty to prevent shivering.

If the temperature is above 38°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 Paracetamol to relieve pain.

Dosage —

Adults	2 tablets every four hours
Children	1 tablet every four hours
Infants up to 4 years	½ tablet 8 hourly

GLOSSARY

AXILLA — *Armpit*
HYPERPYREXIA — *Very high body temperature*
HYPOTHERMIA — *Low body temperature*
PYREXIA — *High body temperature*

Chapter 19

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 —

Send for a doctor.

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.
- 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.

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 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.

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 or 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.

When the baby is breathing place in a suitable wrapping such as a clean towel.

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.

Tie the cord very firmly in three places — one 10 cm, one 15 cm and one 20 cm from the baby's navel.

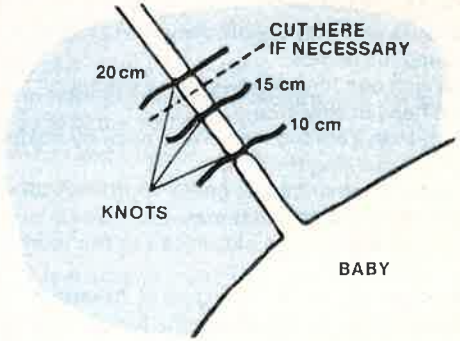


Fig. 196 — Tying the cord

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.

GLOSSARY

AFTERBIRTH — *Placenta.*
MIDWIFE — *A person assisting at a birth.*
PERINEUM — *Crutch area.*
PLACENTA — *Special tissue attached to the mother's uterus which supplies nourishment to the developing baby.*
UMBILICAL CORD — *Cord attaching the baby to the mother through the placenta.*
UTERUS — Womb.

GLOSSARY

A

ABSCESS— *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.*
BRONCHITIS— *Infection in the bronchi.*

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 lining covering the eye and the inner side of the eyelids.*
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.*

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 given to induce vomiting.*
EPILEPSY—*Condition of the brain, leading to fits.*
EUPHORIA—*An abnormal sensation of well-being.*
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.*
HAMSTRINGS—*Muscles on the back of the thigh.*
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.*
IPECACUANHA—*Drug used to induce vomiting.*

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

MALLET FINGER—*Injury to the terminal joint.*
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.*
PALLOR—*Looking pallid.*
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.*
PULMONARY ARTERY—*Main artery to the lungs.*
PULMONARY CIRCULATION—*Blood flow to the lungs.*
PULMONARY VEIN—*Main vein from the lung.*
PULSE—*The heart beat.*
PUPIL—*Window of the eye.*
PYREXIA—*High body temperature.*

Q

QUADRICEPS—*Muscles on front of the thigh.*

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.*
SEDATIVES—*Drugs to calm the nerves.*
SENSORY NERVES—*Appreciate sensation.*
SINUSITIS—*Inflammation of the air spaces in the bones of the face.*
SKELETON—*Bones of the body.*
SPLEEN—*Organ in the abdomen.*
STERILE—*Free of micro-organisms.*
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

TENDOACHILLES—*Tendon of the calf muscles at the back of the ankle.*
THORACIC—*Pertaining to the chest (thorax).*
TIBIA—*Main long bone below the knee.*
TOXIN—*Substances which cause collapse.*
TRACHEA—*Wind pipe.*

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.*

APPENDIX I

THE MORE COMMON POISONS

NAME	TREATMENT
ACIDS—CORROSIVE	Do not induce vomiting. Give milk or water. Beaten egg white.
ALCOHOLS	Induce vomiting. Give strong coffee if conscious.
ALKALIS—CORROSIVE	Do not induce vomiting. Give milk or water and lemon juice. Beaten egg white.
AMMONIA	See alkalis.
ARSENIC	Induce vomiting. Give water and milk.
ASPIRIN	Induce vomiting. Give water and milk.
BARBITURATES	Induce vomiting if conscious. Give strong coffee or tea. If unconscious sustain respiration.
BLEACH—CORROSIVE	Do not induce vomiting. Give milk. Beaten egg white.
CARBON MONOXIDE	Remove to fresh air—sustain respiration.
CARBON TETRACHLORIDE	Remove from contaminated area. If conscious, induce vomiting.

CYANIDE (Prussic Acid) CYANOGEN	Place in the coma position.
DETERGENTS	Do not induce vomiting. Give milk or water.
DIELDRIN	Induce vomiting. Wash skin.
DISINFECTANTS— CONTAINING EUCALYPTUS PINE LAVENDER	Do not induce vomiting. Give milk and water.
DISINFECTANTS— OTHER	Induce vomiting. Give milk. Beaten egg white.
D.D.T.	Induce vomiting. Clean skin.
FOOD POISONING	Induce vomiting. Give fluids.
HYDROGEN SULPHIDE	Sustain respiration.
INSECTICIDES— CONTAINING KEROSENE OR PETROL	Do not induce vomiting. Give water or fruit juice.
INSECTICIDES— OTHER	Induce vomiting. Give water or fruit juice.
INSULIN	If conscious— Give oral glucose or sugar.
IRON SALTS	Induce vomiting. Give water and milk.
KEROSENE	Do not induce vomiting. Give milk.
LINDANE (BBC)	Induce vomiting. Wash skin.

MATCH HEADS AND BOXES	Induce vomiting.
METAL CLEANERS	Do not induce vomiting. Give water or milk. Beaten egg whites.
METHYLATED SPIRIT	Induce vomiting. Give strong coffee.
MUSHROOMS— POISONOUS	Induce vomiting.
ORGANO-CHLORINE	Induce vomiting. Wash skin.
PETROL PRODUCTS	Do not induce vomiting. Give milk.
PHENOLS— CORROSIVE	Do not induce vomiting. Give water and milk. Beaten egg whites.
PHOSPHORUS	Induce vomiting.
RAT POISONS	Induce vomiting. Give milk or water.
STRYCHNINE	Induce vomiting if conscious.
TABLETS	Induce vomiting. Give milk and water.
TOADSTOOLS	Induce vomiting.
TRICHLORETHYLENE	Sustain respiration.
TURPENTINE	Do not induce vomiting. Give milk.

IN ALL CASES SEEK MEDICAL AID.

IF RESPIRATION IS FAILING, SUPPORT WITH ARTIFICIAL RESPIRATION EXCEPT IN CYANIDE POISONING.

APPENDIX II

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.

INDEX

SYLLABUS OF INSTRUCTION — PRELIMINARY FIRST AID CERTIFICATE

	THEORY		PRACTICAL	
	Material to be Covered	Suggested Time	Material to be Covered	Suggested Time
Session 1	Principles and Practice of First Aid Circulation and respiration	1 hour	Taking the pulse Clearing the airway Opening the airway Coma position	1 hour
Session 2	Unconsciousness	1 hour	Expired Air Resuscitation Cardio Pulmonary Resuscitation	1 hour
Session 3	Asphyxia Cardiac arrest	1 hour	Expired Air Resuscitation Cardio Pulmonary Resuscitation	1 hour

	THEORY		PRACTICAL	
	Material to be Covered	Suggested Time	Material to be Covered	Suggested Time
Session 4	Haemorrhage Wounds and infection Burns and scalds	1 hour	Control of haemorrhage Dressings Bandages Slings Splints	1 hour
Session 5	Fractures	1 hour	Treatment of fractures Jaw Collarbone Ribs Upper limb Lower limb	2 hours
Session 6	Poisons	1 hour		
Session 7	Optional subject from rest of material	1 hour	Revision	1 hour