MANUAL

OF

AMBULANCE TRANSPORT NURSING

S.A. DISTRICT

MANUAL
OF
AMBULANCE TRANSPORT NURSING

FIRST EDITION: September, 1963

Compiled by

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with the assistance of

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THE St. JOHN AMBULANCE BRIGADE INC.

SOUTH AUSTRALIA DISTRICT

21 AUSTIN STREET
ADELAIDE, S.A.

P R E F A C E

In 1952, the South Australian Government entrusted the St. John Council for South Australia Inc., and the St. John Ambulance Brigade Inc., South Australia District, with the task of taking over the existing Ambulance Services in the Metropolitan Area of the City of Adelaide and re-organising, re-equipping and running them as a single Service.

As a result of the extra training required to equip a sufficient number of Members of the Transport Divisions of the Brigade with first-aid and mechanical knowledge to act as both full-time and voluntary part-time drivers and nursing attendants, a very large scale increase in training and the introduction of new training methods became necessary.

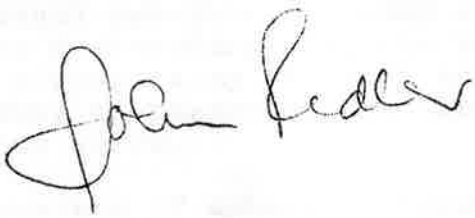
This programme was initiated by Mr. P.L. Ferrier as the first District Officer in Charge, Transport Corps of the Brigade. Mr. Ferrier was then appointed General Secretary and in that position has continued to contribute much to the development of the Brigade Transport Divisions.

Mr. H.G. Berry, who followed as District Officer in Charge of Transport and Training in the Brigade has been in charge of the training programme, both in the Metropolitan and Country Areas of South Australia. It is as a result of his knowledge and experience that this Manual has come to be written.

Mr. Berry some years ago interested a few medical students in their clinical years, in the transport work of the Brigade and these students became Probationary Surgeons attached to Transport Divisions. This scheme has continued over the years and as these medical students graduate in medicine, they are appointed as Divisional Surgeons in the Brigade. They are encouraged to seek practical experience in all facets of Brigade work and they act as drivers of ambulances and nursing attendants, as well as instructors.

The Authors of this Manual include beside Mr. H.G. Berry, many of these medical student instructors. Their knowledge and practical experience which went firstly into their lectures now forms the basis of this Manual.

As Commissioner of the St. John Ambulance Brigade, South ustralia District, I congratulate all these contributors upon heir enthusiasm and the great amount of time they have spent n the Brigade's behalf, in carrying out the training required nd in contributing Chapters to this Manual of Ambulance Transport ursing.



John Pedler, C.St.J., M.B., B.S.
COMMISSIONER,
THE ST. JOHN AMBULANCE BRIGADE INC.
South Australia District.

DELAIDE.
eptember, 1963.

I N T R O D U C T I O N

During the past few years there has been a growing recognition f the need for training Ambulance Crews beyond the confines of the anual "FIRST AID". In fact, that manual itself suggests that irst aid is rendered until the patient is loaded into an ambulance. t is to cover this gap - the actual ambulance journey - that this anual has been written, with, as a secondary aim, the hope hat those engaged regularly in transporting the sick and injured ight be interested in some further knowledge of the conditions uffered by the patients whom they serve.

Partly because of the wide variety of ambulance types in use t the time of writing and partly because much more work is yet o be done in the field, little has been said about the strictly ractical side of ambulance nursing - how to give support to a omiting patient or how to give a bed pan and the like. evertheless, this side of the training of an ambulance crew is aramount and the contents of this manual can be regarded only as supplement to a sound programme of carefully directed practical raining.

Care has been taken to align, where possible, the teaching in his manual with the teaching in "FIRST AID". Where minor epartures from that manual have been made, as in insisting that nconscious patients be nursed in the three-quarter prone position t all times, this has been done after careful consideration and uch practical experience of the altered conditions in a moving ehicle. In the case of the unconscious patient the hiding of any udible respiratory signs by the level of noise in an ambulance - ven without a siren - warrants this change. Similar reasons exist n the few other places where changes have been made.

The method of writing this manual has been to invite ontributions from certain doctors, clinical year medical students nd ambulance officers, all of whom have had considerable xperience both as ambulance crews themselves and in teaching other rews. These contributions have then been discussed in detail by he other contributors and three representative medical ractitioners who have had many years experience both in country nd metropolitan practise and in teaching first aid and kindred ubjects. The material is, therefore, a composite of many views. hat there are errors and omissions the authors have no doubt. hey would appreciate greatly, therefore, any criticisms of the ontent or the lay-out of this manual.

It is suggested that such criticisms be directed to -

"The Commissioner,
The St. John Ambulance Brigade Inc.,
South Australia District,
21 Austin Street,
ADELAIDE S.A.",

who will be pleased to have them directed to the Editorial Committee.

While welcoming criticism and hoping that this will not stem its flow, the Authors feel the need to remind readers that the manual has no pretence to scientific exposition nor to completely covering the very wide field of knowledge required by an ambulance crew. Its aim is to provide a person who has a sound knowledge of first aid to the St. John Ambulance Association Certificate standard with additional information which will be of value in the transport of the sick and injured.

September, 1963. H.G. BERRY.

C O N T E N T S

CHAPTER 1.

THE MANAGEMENT OF HEART CASES

You will recall that the heart is a hollow muscular organ, he size of a clenched fist, situated in the middle of the chest etween the lungs. It functions as a double pump; the right side umps dark venous blood, received from the big veins, to the lungs, hile simultaneously the left side pumps bright oxygenated blood eceived from the lungs, into the aorta. Each side of the heart s divided into an upper collecting chamber (auricle or atrium) rom which blood flows through a one way valve to a lower pumping hamber (ventricle). In order to function like any other organ he heart has its own blood supply, through the Coronary Arteries hich curve over the surface of the heart. Further details of the irculation of the blood are adequately covered by the Authorised anual "First Aid", in which there is a good diagram of the circ- lation which should be before you while reading this.

EART CASES:

There are two basic types.

1. Those due to interference with the supply of blood to the heart muscle itself, with consequent severe pain.

   These are commonly referred to as "Heart Attacks" by the layman and Coronary Occlusion, meaning blocking of the coronary artery, or an important branch of it, or Myocardial Infarction, meaning death of heart muscle, by medical people.

   (a) The coronary arteries may become gradually narrowed by disease. Here the patient is likely to suffer recurrent chest pain, especially on exertion or excitement. This pain is relieved by rest, re- assurance, or by "trinitrin" tablets placed under the tongue. For your interest only this pain is referred to as Angina.

   (b) The coronary arteries may become suddenly and complete- ly obstructed, due for example, to the clotting of blood in them. Usually this occurs in patients whose arteries are diseased, as in 1.(a), but such patients do not necessarily have a history of recurrent chest pain.

These attacks occur in all degrees of severity, ranging from the relatively short-lasting pain in 1.(a), to the full blown "coronary", where the pain is very great indeed - is unrelieved by trinitrin and may last for hours. Alternatively a heart attack may be severe enough to kill within seconds.

Unfortunately, the severity of the pain is not always an accurate guide to the severity of the damage to the heart muscle. Thus, from the First Aid point of view, one should regard all cases with a sudden onset of acute chest pains as being a true "coronary". If it can be determined that the patient has tablets to put under his tongue, and if he is sufficiently conscious, he should be encouraged to use them.

The signs and symptoms of the acute attack are:-

(a) Signs of shock without blood loss - due to failure of the pump. When the blood supply to the heart is blocked, some heart muscle dies, and so the pump becomes less efficient. The patient may be profoundly shocked to the point of being stuporous, but is very rarely unconscious, and hence rarely needs to be in the three-quarter prone position.

(b) A feeling of impending death.

(c) The pain is often "crushing" in type, and may be felt anywhere from the pit of the stomach to the jaw, and down the left arm.

(d) There may be moderate shortness of breath, as in any case of shock, but this is rarely severe enough to prevent the patient from lying flat.

(e) The pulse tends to be rapid and sometimes irregular.

2. <u>Those due to long standing heart disease. (Congestive Cardiac Failure, or C.C.F.). Here the main symptom is shortness of breath</u>.

Either the pumping muscle loses its efficiency or the valves are diseased. A diseased valve may obstruct the flow of blood or may fail to function properly, allowing a portion of the blood flowing through to pass back again.

The key symptom here is breathlessness, which is often so severe that the patient feels that he cannot lie down, and if lain down, he may asphyxiate. A healthy person can lie down quite comfortably, and is then only using about one third of his lung capacity. Only in the upright position is a patient able to make his lungs fully expand with each breath. Note that the patient should be arranged to maintain the sitting position with the minimum of effort on his part - every little exertion will increase his breathlessness.

Other signs and symptoms are often present. He may be coughing up copious sputum, which may be blood stained.

When the left ventricle cannot cope with all the blood returning from the lungs, this banks up in the lungs' blood vessels and the fluid component is forced out through the capillary walls into the alveoli (pulmonary oedema). Aveoli full of fluid obviously do not allow efficient exchange of gases - hence the respiratory rate will rise, eventually leading to the respiratory distress described above.

The onset may be gradual or sudden - in the latter case, often during the night. The patient is likely to be pale, cyanosed and sweating. The colour is often described as "ashen grey".

RANSPORTATION OF HEART CASES:

1. Make a note of whether the doctor has given an injection or not (Morphia is commonly used to relieve the pain of a heart attack, but it is also used with success to relieve pulmonary oedema).

2. "Coronary" patients, where shock and pain predominate should always be carried to the ambulance, lain flat and persuaded to completely relax. C.C.F. patients, where breathlessness is the main factor should be propped in a sitting position and once again should not have to do anything for themselves.

3. Oxygen should be administered through the face mask if tolerated (see Chapter X). Alternatively, oxygen may be given via intranasal catheter (two litres per minute, unless the doctor orders otherwise). Note that it is worth giving oxygen to a heart case even though cyanosis is not present, as this ensures full oxygen saturation of the blood. Remember that pallor may obscure cyanosis.

4. Quiet reassurance. This is not the time for being jovial or cracking jokes.

5. Suck out secretions in the mouth if the patient is too exhausted to cough them up.

ER TYPES OF "HEART" CASES:

Occasionally a coronary occlusion may be the cause of den congestive heart failure or of pulmonary oedema, in which e the symptoms of both will be present. The management e must be based on commonsense - treat according to the worst ptoms, but if in doubt, prop up in a sitting position.

There are many other less common conditions of the heart, these tend to be of a less dramatic nature. In contrast, the above conditions the life hangs in the balance and correct st-aid management is of the utmost importance to avoid ecessary death.

The driver should adjust his speed according to the traffic ditions. There is no need for a hasty ride and the siren t not be used. In all cases, a rough ride will worsen the ient's condition. This should be explained to the relatives, will often be anxious for the patient to be carried at high eds. This is a chance to educate the public that "ambulance le" and "mercy dash" are not synonymous.

CHAPTER 11.

FRACTURES

A fracture is an injury to bone and as such may occur in many different ways, and may have many different forms.

The job of the ambulance crew member is to help the patient get to medical attention with the minimum of further damage. This requires but a little knowledge and much commonsense. There are five questions which we need to be able to answer in treating any fracture. They are:-

1. What is bone?
2. What is a fracture?
3. What is the cause of the fracture (history)?
4. What are the types of fracture?
5. How do we manage this particular fracture?

The answer to the first two questions can be dealt with very simply, i.e., bone is the hard rigid substance which forms the supports for the rest of our body. It has a protective function, as well as a supportive one - e.g., the skull protects the brain, while the femur supports the pelvis. A fracture is simply damage - usually by a "break" - to this bone.

CAUSE:

There are two main types of cause, i.e.

(a) Abnormal forces on normal bone:-

(1) Direct force.
(2) Indirect force.
(3) Force due to muscular action.

All the above types are well known to all of you.

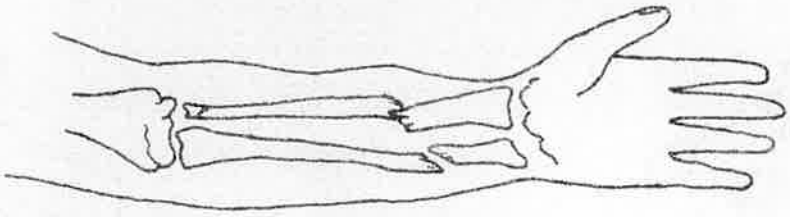
(b) Normal forces on abnormal bone:-

This type of fracture may be found in diseased bone, such as bone with cancer growing in it and is caused by forces which would not normally cause a fracture.

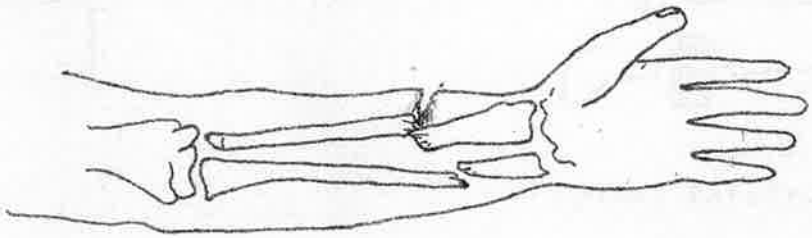
TYPES:

Simple, or Closed.

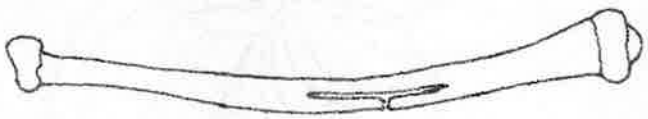
Compound, or Open - here the bone ends may be protruding through the skin.



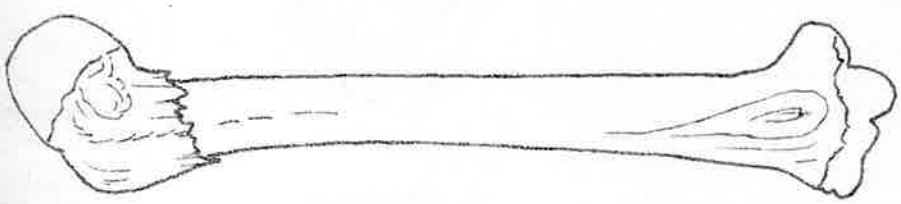
Simple



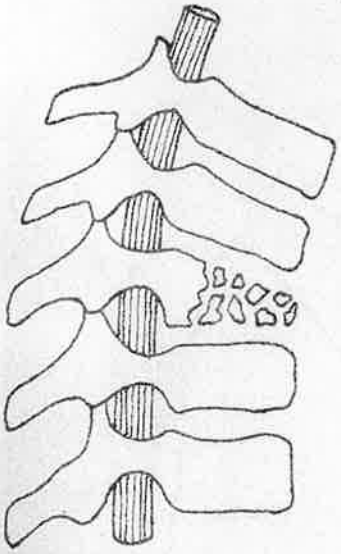
Compound



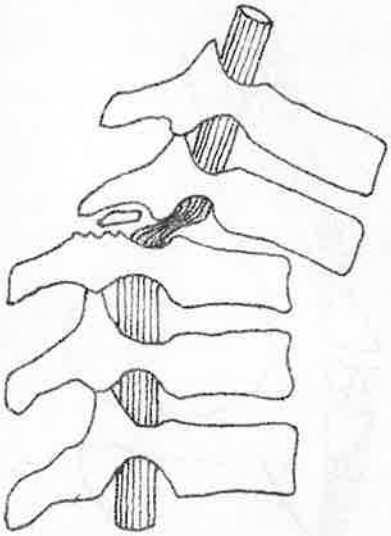
Greenstick



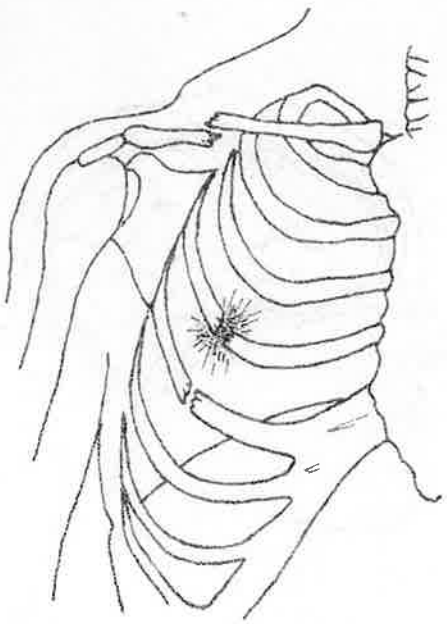
Impacted



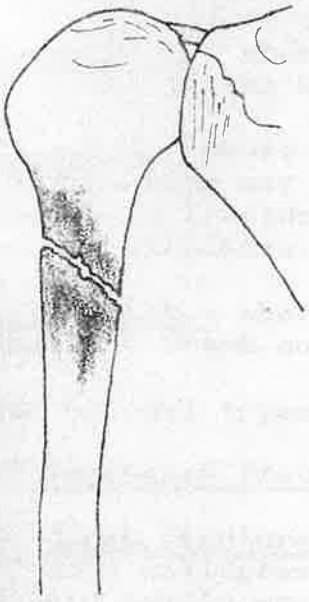
Crush



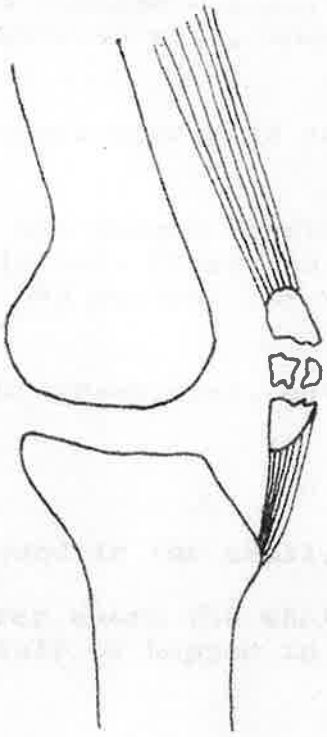
Spinal Paralysis



Complicated



Abnormal
(Diseased Bone)



Comminuted

Depressed

Complicated - where other structures are damaged - e.g., muscles, arteries, nerves, or, as in fractured ribs, where the lung is punctured.

Comminuted - where the bone is in many small pieces as in a fracture of the knee cap.

Impacted - where the two fractured ends are pushed together and the bone may still function - this is very likely to happen in fractured neck of femur where the patient may walk to the ambulance.

Greenstick - where the bone is split like green wood, but does not break completely through.

Two special types of fracture are:-

Depressed fracture - of flat bones found in the skull.

Crush fracture - found in the vertebrae where the whole bone collapses - it is especially likely to happen in old people who lift heavy weights.

NAGEMENT:

In the first aid management of fractures there are several important aspects.

First is the diagnosis which can be made from the following.

MPTOMS:

The factors of which the patient will complain.

(a) History of injury.
(b) Pain - probably over the site of the fracture.
(c) Loss of function.

GNS:

Which are the factors which you, as the first aider discover. Some or all of the following will be present:-

1. Tenderness over the site.
2. Signs of local injury, e.g., bruising, and in the case of compound fracture - the bone ends may be seen.
3. Deformity - e.g., Foot dropped outwards in fractured neck of femur.

4. Loss of function - e.g., loss of use of hand in fractured wrist.

5. Abnormal mobility - e.g., the foot in fracture of tibia and fibula.

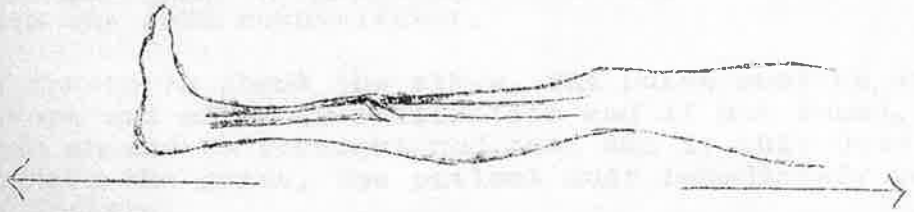
6. Crepitus which should not be sought for but may be felt - it is very easily found in a broken collar bone.

REATMENT:

The aim here is to prevent further damage to the bone or other structures around the fracture - e.g., to nerves, arteries, etc.

(a) The first job is to cover any compound fracture with a sterile pad.

(b) If possible, bring the limb into its normal position. This must be done by gently pulling the broken ends apart to prevent crepitus, and the line of pull must be in such a way that the two ends cannot compound, i.e., in foot, arm, or spine, the pull is along the line of the normal bone.



In the diagram of the leg, the arrows show where force should be applied.

(c) Immobilize the fracture by the methods taught in the first aid book.

(d) Lift the patient onto a stretcher with extreme care as this is the most painful part of the proceedings - pain killers may be used, but remember pain is a sympton and if this sympton is removed, then further damage may occur without anyone knowing until too late.

(e) Transportation in the case of the mechanised first aider is easy, but remember that if a stretcher and ambulance are not available improvisation will be necessary.

At the Hospital the patient will be examined, x-rayed if necessary and the limb put into position under some kind of anaesthetic. The job is easier, and convalescence is greatly shortened if no compound fractures are present, allowing serious infection to the bone.

PECIAL FRACTURES:

(a) Spine - if the spine is fractured, the spinal cord may be cut, but not necessarily so - this will cause complete permanent paralysis below this level - extreme care is needed in handling all cases even suspected of having spinal injuries.

(b) Fractures of the Skull - must be treated as compound fractures and care must be used with Trilene, as the patient may become unconscious.

(c) If the patient has a crushed chest, then a piece of the chest may become "flail" and the patient's respiration will fail despite severe muscular effort. Therefore, the first thing to do is to try to fix the mobile piece of rib cage with your hands. Failing this, oxygen may have to be given with the Ambu resuscitator.

(d) In fractures about the elbow, the pulse must be sought before and after immobilization and if not found, then the limb should be straightened out, and if this does not restore the pulse, the patient must immediately be taken to hospital.

(e) In the case of a fractured pelvis, concealed bleeding may be considerable, with consequent severe shock. This should be anticipated.

CHAPTER 111.

HIDDEN INJURIES

Although this subject is not really an entity in itself, it ars close consideration for a number of reasons:-

(a) Any person may have a more serious injury than meets the eye.

(b) The diagnosis of a hidden injury may be very difficult and a knowledge of the possibilities by the ambulance crew members may be of considerable help to further medical management.

(c) It raises the necessity for the crew members to do a thorough, systematic examination of any victim, rather than to treat only the obvious injury, serious though it may be.

ASSIFICATION:

We can consider these injuries in roughly three categories:-

(1) Internal haemorrhage.

(2) Damage to vital organs.

(3) Rupture of hollow organs inside body cavities with spillage of their harmful contents.

PES OF HIDDEN INJURIES:

We can now consider a list of these injuries in some sort of der. This will not be a complete list but will, perhaps, indicate me of the more common injuries.

1. Internal Haemorrhage.

is may be (a) Visible:-

(1) Lung - bright red, frothy blood coughed up.

(2) Kidney - cloudy, dark or even red urine.

(3) Bladder or Urethra - red urine or frank blood - accompanied by considerable pain if conscious and even inability to pass urine.

N.B. Though it may be wise to avoid urinating if the urethra is ruptured, this is a less common injury than a ruptured bladder. In the case of bladder rupture, urine will leak out anyway, and it is not necessary to restrain the patient from urinating. Hence, restricting urination in such an injury will usually be unnecessary unless an obvious urethral rupture can be diagnosed.

(4) Stomach and Upper Bowel - either vomiting red, brown or black blood ("coffee grounds" is rare) or passing loose black motions, accompanied by diarrhoea (melaena stool).

(5) Lower Bowel - brighter blood mixed to a greater or lesser extent with the motions.

(b) Concealed.

The picture here is one of shock. Blood may be lost from many internal organs, but the most common concealed types are:-

(1) Ruptured Spleen.

(2) Ruptured Liver - this injury is more dangerous, since this organ cannot be removed.

(3) Rupture of Large Blood Vessels - e.g., the aorta or the pulmonary artery.

These are uncommon accidents, but more common is the "internal" emorrhage associated with fractures. Thus, two pints or more blood may be lost in a fractured femur. If there are multiple actures this may be very dangerous indeed.

2. Damage to Vital Organs.

While some injuries to organs which are not vital to life may cause severe illness by spillage of their contents, injuries to organs vital to life may not necessarily be fatal.

Under this catergory we may consider three systems:-

(a) Cardiovascular System:-

(1) Heart - this may be severely damaged; ruptured, crushed etc., or it may be restricted by accumulation of fluid or blood in the sac surrounding it. This may accompany severe chest injuries - e.g., where the driver has been crushed by the steering wheel.

(2) Vessels - see above.

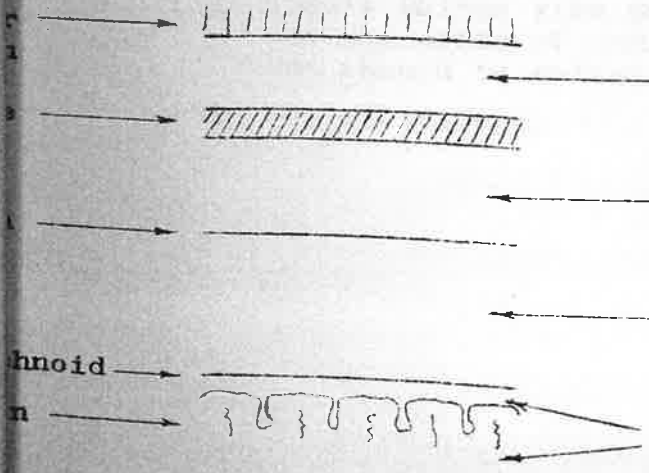
(b) Respiratory System:-

(1) Nose
(2) Larynx
(3) Trachea
All may receive damage - usually obvious.
(4) The Bronchi
(5) Lungs - may be damaged by severe chest injuries. For example, the lung may be pierced by a rib, allowing air in the chest cavity and thus causing respiratory embarrassment.

(c) The Nervous System:-

(1) Spinal Cord - you should assume that any patient with a back injury may have spinal cord damage. Similarly, any patient with a head injury may have a broken neck or spine and if the victim is unconscious, he must be treated as such.

(2) Brain, (Head Injuries) - any patient who has lost consciousness as a result of a head injury and regained it again should be encouraged to go a hospital.
Apart from concussion, contusion and laceration of the brain, another condition is "compression". This, if due to head injury will be caused by bleeding inside the skull. There are several layers in the skull and bleeding can occur in any of these spaces. The diagram below shows the more common types, with some complicated names. Do not try to remember them. Simply understand what may happen - their diagnosis and treatment is a specialist's work, but the crew member can assist by observing the patient, especially if he can describe any deterioration in the state of consciousness, or changes of eye signs.



The important type to remember is the "epidural" haematoma. patient suffering from this recovers consciousness, but lapses ain after a period - called a "lucid interval". Transport to spital is essential for further observation and surgical treatment necessary.

3. Rupture of Hollow Organs.

Any organ may be ruptured:-

e.g. Oesophagus or Gullet.
Stomach.
Bowel.
Gall Bladder.
Bladder.

Spillage of urine, blood, pus etc. or intestinal contents which are all extremely irritant to the body cavities may produce pain and shock. Later on inflammation occurs but the earlier symptoms are worthwhile noting.

RANSPORT OF PATIENTS:

If serious hidden damage is suspected, an immediate but not angerous trip to hospital is wise - but only after a systematic camination of the patient and accumulation of such information is available from spectators, helpers etc.

N.B. (1) Head injuries may have spine injuries.

(2) Transport patient on the side of the lung lesion.

(3) Remember your equipment - sucker, oxygen, mask, and use it.

(4) Use your eyes and ears at the scene. The doctor in Casualty will not know the patient's condition at the scene unless you can tell him.

(5) Simple things like pupils - size and reaction, and the state of consciousness are very important and should be estimated at frequent intervals.

(6) Use of Trilene.

E OF TRILENE:

This is for the relief of pain. It will not help you agnose hidden injuries; its use must be restricted to conscious -operative patients, preferably diagnosed (see Chapter IV).

MISSION AND HOSPITAL TREATMENT:

This starts when you get the patient to hospital. If you spect that time saved in starting the hospital treatment of your tient will contribute to the success of the treatment, use ur radio-telephone to have the hospital alerted, but do not nic - this helps no-one.

Remember your duty towards handing over the patient to the ctor. If you have information, pass it on; it may be eful, even lifesaving. If time permits, the making of notes ll be helpful - see Chapter XII.

Finally ask - either at the time or later - whether

(a) Your diagnosis

and

(b) Your treatment were correct.

CHAPTER IV.

THE USE OF TRILENE IN FIRST AID

GENERAL:

The Hayward-Butt Trilene inhaler may be used by any member of the St. John Ambulance Brigade who has officially attended a course in its use, to relieve the distress of any conscious patient in severe pain, provided the patient is more than two years old and is not suffering long standing pain.

The cases ideally suited for its use are:-

Fractures.
Dislocations.
Burns.
Acute abdominal pain.
Women in severe labour pains.

The only pain for which it must not be used is pain which will persist for long periods. Usually these patients have been given the maximum amount of pain relieving drugs that is compatible with their condition, and to give them further relief for a short period - beyond which it cannot be sustained - will make their state even less tolerable.

NEVER ADMINISTER TRILENE TO AN UNCONSCIOUS PATIENT

In general it should not be given if it is expected that the patient will reach hospital within five minutes, unless, for example, it is required to relieve pain while loading from an awkward situation.

Note that Trilene is not inflammable but is poisonous if inhaled through a lighted cigarette.

PREPARATION OF THE INHALER:

On starting a duty, check that the inhaler is sealed in the appropriate rack in the car. (Station stock should be checked by the senior man on duty). If the inhaler seal is unbroken, you may assume it is loaded with an intact 6 c.c. ampoule of Trilene and ready for immediate use, in which state it may be kept indefinitely without deterioration.

3. PROCEDURE AT SCENE:

It is important that in your enthusiasm to relieve the patient's pain, you do not delay departure to hospital, nor do you relieve pain before you have assessed the patient's injuries - remember always the importance of pain as a symptom. You should, however, if the patient is in severe pain, administer the Trilene after satisfying yourself that a limb is fractured, and before you start splinting. You still must immobilize fractures before extricating patients from cars and before loading.

3.1. Explain to the patient that the instrument will relieve his pain. It is important to sound enthusiastic about it, as getting the patient's confidence in the treatment is of first importance.

3.2. Obtain his consent in the hearing of a third party before you allow him to use the instrument. In general, it is most convenient that the other member of your crew be the third party. If the patient is under 21, parent's consent should be obtained where possible.

3.3. Remove the instrument from rack, unscrew the rounded cap and drive the nozzle downwards towards the other end until the ampoule is felt to break.

3.4. Hold the instrument nozzle down for ten seconds so that all the liquid Trilene is absorbed in the pad. Shake the instrument and listen carefully to be sure there is no fluid Trilene splashing around inside. If there is, the instrument should be held upside down until it runs out - then check again for splashing.

3.5. Give the patient the instrument, show him how to hold it near his face for a few small breaths to get used to the smell.

3.6. Then tell him to insert the nozzle gradually into one nostril, and to close the other nostril with the index finger of the hand holding the instrument. (Alternatively, the face mask attachment may be preferred, particularly in the case of injuries to the face).

SELF-ADMINISTRATION OF TRILENE WITH THE HAYWARD-BUTT INHALER.

The mouth should be closed.

Note that the instrument can be held in one hand, the index finger of which can be comfortably positioned to close one nostril, so that all the breathing takes place through the other nostril containing the inhaler.

3.7. The patient should then be asked to close his mouth and breathe slowly and gradually more deeply as he gets used to the smell. Note that if the instrument is thrust upon the patient too suddenly, or if his first breath is too deep - he may gag (cough). Should this happen, (a) learn to be less hasty next time and (b) REASSURE the patient that if he tries again gradually and persists, he will overcome his tendency to gag. Be sure that there is a good seal between the instrument and his nostril (and that the other nostril if firmly closed), or between his face and the rubber mask.

3.8. As soon as he tolerates the smell, have him take slow, deep breaths.

3.9. Tell him that when the pain is gone he need take only one breath in five from the instrument. Big people may need more Trilene, e.g., one breath in four. Pain usually is relieved in twenty breaths or so, but the maximum relief is not obtained for about three minutes.

3.10. AT NO TIME SHOULD THE PATIENT BE ALLOWED TO BECOME UNCONSCIOUS.

A very close watch should be kept on the patient to avoid this. Failure to respond to the command, "open your eyes" or "close your eyes", is a sign that the patient has had too much Trilene; take the instrument away from him until he regains the ability to respond to your commands.

4. PROCEDURE EN ROUTE:

4.1. Watch the patient closely and continue to reassure him. Note especially that the severely shocked patient may be less co-operative and need special encouragement to continue with the Trilene.

4.2. Fill out the field label and attach it firmly to the patient's clothing in a place where it is clearly visible (usually near his collar-bone).

4.3. Fill out the butt and tear it off. Sign your own name on it, because the butt has legal significance, as Trilene is a dangerous drug. Similarly, the witness must sign his name.

5. PROCEDURE AT HOSPITAL:

5.1. The attendant must stay with the patient until a doctor takes over the responsibility.

5.2. Take the instrument from the patient immediately he is handed over to the doctor.

5.3. Check your diagnosis with the Casualty Doctor and fill this out on the butt as correctly as you are able. Make sure he knows that the patient has been given Trilene. (The patient should lose entirely any effect of the Trilene within 2 minutes of discontinuing the treatment, thus making it easier for the Casualty Doctor to make a correct diagnosis).

6. PROCEDURE ON RETURN:

6.1. Should you be called to another case requiring Trilene during your return journey to the depot (the probability of this is very low), there will be sufficient Trilene in your inhaler to treat this second patient under normal circumstances. Ensure that the knob for the nostrils is clean and proceed as before.

6.2. On return to the depot, remove the outer casing from the instrument in order to dry out the pad. If this is not done, when the next ampoule is broken the pad will not absorb all the Trilene and the excess liquid will run out and burn the patient or yourself.

6.3. When the pad is dry, replace it in the inhaler with a new ampoule from the station store, leaving the butt from the field label which you have just used.

6.4. Check that the ampoule is not too long for the space available in the instrument, i.e., before fitting the base, hold the instrument at eye level, upside down, to see that the tip of the ampoule does not project beyond the end of the casing.

6.5. It is the duty of the day staff Station Officer to arrange for the field label butts to be exchanged for replacement ampoules of Trilene at Transport Headquarters, where he will be required to sign a Master Register of Trilene used.

7. PROCEDURE IN EVENT OF ACCIDENTAL BREAKAGE OF AN AMPOULE:

7.1. Tear off the butt from the field label - destroy the latter and write the date and "ACCIDENTAL BREAKAGE" on the butt.

7.2. Hand in the butt to obtain a replacement.

7.3. Hand in a written report through normal channels to the Officer in Charge, Transport, stating the date, time and how the breakage occurred. This report should bear the names of both members of the crew concerned.

8. NOTE:

8.1. Several cases have been reported in which, although the Trilene administration was carried out correctly, the patient gave all the signs of continuing to suffer severe pain. However, when questioned the following day, the patient had no recollection of the pain suffered and thus had benefitted considerably from the treatment. Thus, even if the patient does not appear to be benefitting from the Trilene, persist with the treatment - you are probably doing better than you think.

8.2. There is enough Trilene in one ampoule to keep a patient pain-free for at least one hour. But, do not be tempted to change to another ampoule without first checking that the absorbing pad is completely dry.

CHAPTER V.

THE HUMID CRIB

The humid crib is simply an incubator with a controlled supply of heat, air (or oxygen) and humidity. It is used for premature or sick, newborn babies, in whom the ability to regulate the body temperature has not yet been acquired.

All crews should be familiar with the method of using this equipment and practise setting it up. There is a crib at Hindmarsh, Elizabeth and certain country centres, and many hospitals have their own - some of these are of a slightly different type.

1. HEAT CONTROL:

Temperature should be maintained at 90°F, or, preferably, according to the doctor's instructions. When taking a St. John humid crib, make sure you take both the 240 volt extension cord and the 6-12 volt leads. In the car the 6-12 volt leads connect to the spotlight plugholes (be sure that you select correct voltage for the vehicle you are using), and elements in the bottom of the crib maintain the temperature. With this you have no control over the heating - it is either "on" or "off". Remember that heat is lost rapidly if the lid of the crib is lifted, or in the trip from car to house on a cold night. When 240 volt supply is available, e.g., in the admission room of the hospital while awaiting a doctor, connection is by the three-pin plug with the extension lead as needed. Heating here is by light globes situated under the crib. The heat given out by these globes can be adjusted by a dial on the front of the machine. In adjusting the temperature, aim to supply too much heat (under close supervision), rather than too little, as rising crib temperatures can be quickly rectified by lifting the lid, whereas should the crib get too cold, it will take some time to heat up again.

2. AIR SUPPLY:

This is adequate in most cases. Oxygen should only be administered under doctor's orders and then at the rate he suggests. In the absence of a doctor only give oxygen if the baby is blue and after ensuring a clear airway; elevate the foot of the crib three or four inches. In the absence of doctor's orders, the flow rate should be 2 litres per minute. Too much oxygen may be harmful to the newborn baby's eyes. Signs of oxygen excess are a bright red complexion and continuous yawning by the baby.

3. HUMIDITY:

The water pads should be kept damp at all times. Wet the sponges under the tap and tip off excess water. The trays slide in or out; the farther in the trays are the higher the crib humidity will be. The humidity should be kept at about 80% (or according to doctor's orders).

Some cribs have "wet and dry bulb" thermometers. In these, the trays should be adjusted so that the "wet" thermometer reads 10^{o} less than the "dry", i.e., usually 90^{o}F and 80^{o}F respectively.

4. GENERAL:

There are sealed ports through which your hands, with an aspirating tube etc. may be passed and sealed in place to treat the baby. Always rotate the ports to the fully closed position when they are not required open.

CAUTION: Do not take an oxygen filled crib near a naked light and do not smoke near it.

Do not give too much heat - the baby will become excessively sweaty and restless.

Do not give too much oxygen - the baby will become bright red and yawn continuously. Both of these potentially dangerous complications should be quickly rectified by opening the lid.

Finally, sit near the crib and hold it firm to the stretcher. If a nurse accompanies the baby and the doctor's instructions are for her to sit with the crib, make sure she knows what suction is available - have it connected up, ready for use and ensure, tactfully, that she is using it efficiently, as our type of sucker differs from most hospital ones.

CHAPTER VI.

UNCONSCIOUSNESS

CAUSES:

Various classifications of the causes of unconsciousness exist. However, many of these do not meet the need of ambulance transport work. For this, the causes can usefully be subdivided into those cases due to HEAD INJURY and those due to OTHER CAUSES.

HEAD INJURY:

1. Concussion.
2. Cerebral contusion (bruising of the brain as in many more severe brain injuries). This is often associated with a fracture of the base of the skull, which may cause bleeding from the ears, nose, mouth or into the whites of the eyes.
3. Cerebral laceration (as in compound fracture of the skull).

OTHER CAUSES:

1. Stroke.
2. Poisoning - especially common in an overdose of sleeping tablets.
3. Insulin overdose, or diabetic coma.
4. Asphyxia.
5. Epilepsy - here the patient often regains consciousness before the ambulance arrives, but should be taken to hospital if:-
   (a) it is his first fit.
   (b) he wishes to be taken.
   (c) he has not regained full consciousness.
6. Infantile convulsions.
7. Heat stroke and heat exhaustion.
8. Fainting.

9. Hysteria.
10. Alcohol (with or without concussion from a fall).

There are other less common causes of unconsciousness.

Note that shock rarely produces unconsciousness, unless there is an associated head injury or other cause. Even with very severe blood loss it is more a state of stupor that is produced. That is, there is usually a response (if only a nod) to simple commands given loudly. This applies also to Heart Attacks. Hysteria is not a common cause of true unconsciousness, even though the patient may refuse to respond to commands, touch or even to pain.

HOW IS UNCONSCIOUSNESS PRODUCED?

To function properly, the brain requires an adequate supply of blood which carries oxygen and sugar to it. It is from the chemical combination of these two substances that the energy necessary for brain function is derived.

In stroke, heat stroke and fainting, the blood flow to the brain is reduced.

In asphyxia, the supply of oxygen via the lungs to the blood stream and hence to the brain, is reduced.

In cyanide and carbon monoxide poisoning, these substances combine more readily with red cells than oxygen does, and so prevent these cells from carrying oxygen to the brain and other vital parts of the body.

In insulin overdose, the blood sugar, and hence the supply of sugar to the brain is reduced to a critical level and thus there is insufficient energy for brain function and unconsciousness supervenes.

Alcohol)
Diabetic Coma) exert a direct poisoning effect on the
Many Poisons) vital centres of the brain.

In epilepsy, infantile convulsions and head injury, unconsciousness is produced by damage to brain cells.

DIAGNOSIS:

When faced with an apparently unconscious patient, first decide - "is he really unconscious?" The subdivision of unconsciousness into confusion, stupor or coma is not as useful as to make an immediate note of the following:-

Response to (a) Spoken command, e.g., "open your eyes"! (Light)
(b) Touch, e.g., eyelashes. (|)
(c) Pain, e.g., squeezing hollow at back of ankle. (Deep ↓)

This information, together with a report of any change in the state of consciousness en route to hospital should be given to the Casualty Doctor.

If there is more than one patient, you should call for one crew for each unconscious patient where possible. One unconscious patient requires the full-time attention of one attendant.

Next, make a note of any likely cause of unconsciousness. Some cases, e.g., heat stroke, epilepsy, head injury may be obvious from the circumstances. Always be on the lookout for nearby tablet bottles, drugs or poison and ask the relatives if the patient has been taking any drugs. If so, take these to the hospital.

Ask - "Did anyone see what happened"?

"Was the onset slow or sudden"?

"Did the patient have a fit, or complain of headache"? (This often precedes a stroke).

These observations and enquiries should be made <u>while treating the patient</u> as set out below.....and they should not be the cause of long delays before leaving for hospital. Obviously, the above observations and enquiries are far more important if no friend or relative is accompanying the patient to hospital.

If the cause is still unknown, en route to hospital it is worth looking for an "epileptic" or "diabetic" card, or examining the patient's thighs, midriff and upper arms for needle marks - this will suggest that the patient is a diabetic. Move the patient's limbs through a range of normal movements. If one side is stiffer than the other, it suggests the patient has had a stroke. This should be even more likely if the pupils are unequal in size.

MANAGEMENT:

The management of the unconscious patient is based on the A.B.C. of unconsciousness:-

Airway
Breathing
Circulation (colour)

This A.B.C. and its significance must be memorised.

ALL UNCONSCIOUS PATIENTS MUST BE CARRIED IN THE THREE-QUARTER PRONE POSITION.

i.e., Lying on the side with no head pillow, with lower arm and leg extended, and upper arm and leg flexed. The position of the limbs may have to be modified to suit the circumstances, - e.g., if the upper arm is fractured it should be tied to the side of the body with broad bandages and a pillow placed longways under the chest to prevent the patient from rolling forward.

ACCIDENT VICTIMS:

If the cause of the unconsciousness is HEAD INJURY - it is impossible to exclude a fractured spine. Therefore the patient should be blanket-lifted as if he had a fractured spine.

Many unconscious patients are lying on their backs when found. If not, modify the following rules accordingly:-

1. Make a rapid check to see if he has ANY OTHER INJURIES. Stop any arterial bleeding and check for injuries to:-

   (a) Head
   (b) Chest
   (c) Clavicles
   (d) Pelvis
   (e) Upper, and
   (f) lower limbs.

   Do this in the same order with each patient, thus developing a system which will minimise omissions. Do not treat them yet, but be aware of them while lifting the patient onto the stretcher. Make the patient SAFE in the three-quarter prone position before anything but the most urgent injuries are treated.

2. Place an opened-out blanket alongside the patient. In the ambulance you will want the patient facing the attendant. Work out which way the patient should finally face. In the majority of ambulances, the patient's left side should be uppermost.

3. Roll the patient into the three-quarter prone position on the blanket - taking care to move him as a whole, with traction on the head and feet, so that the spine is not bent or twisted.

(See following page for illustration of the three-quarter prone position).

4. Put at least two fracture pads or a pillow across the stretcher in a position where the hollow of the patient's loin will be. This will prevent sideways bending of the spine.

5. Blanket-lift the patient onto the stretcher, keeping his spine rigid by traction on head and feet and tension on the blanket.

6. Load the stretcher into the ambulance.

7. If the patient is restless from "cerebral irritation", he may need to be restrained, to avoid further injury.

AIRWAY:

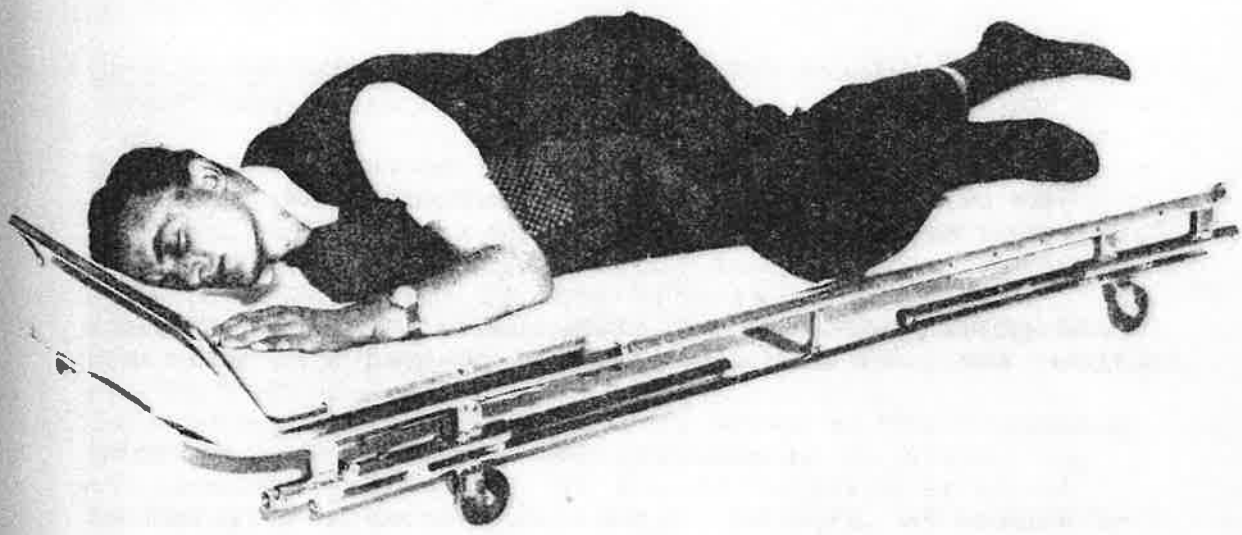
1. Remove false teeth, food, seaweed etc. from his mouth.

2. Check that his neck is extended and chin up, thus keeping his tongue forward.

3. Suck out his airway as far down as the catheter will reach. If this makes the patient cough do not worry, as coughing helps to clear the airway and is also a sign that the patient is not deeply unconscious. If the patient vomits, withdraw the catheter about 2" but continue sucking. The sucker should be cleared every 10 seconds by dipping in a bowl of water. Get to know the sound of:-

   (a) A working sucker, and

   (b) a blocked sucker.



THREE-QUARTER PRONE POSITION.

Note - Head flexed backwards without a pillow and top arm and leg flexed for balance, with a pillow or a rolled blanket supporting the chest.

Bottom arm (not seen) should be behind body.
Note also that secretions have drained readily from the airway, out of the mouth and onto the sheet.

4. Whatever other treatment is required, remember that natural secretions continue to collect in the airway and suction must be repeated every few minutes while the patient is unconscious.

5. Be prepared for vomiting - it occurs suddenly and often silently - and immediate suction is essential to clear the airway.

BREATHING:

1. Is the patient breathing? If not, proceed to give artificial respiration. In general, it is better to use the "Ambu" and oxygen in preference to mouth-to-mouth, although the latter will be used in the event of having two or more unconscious patients while awaiting the arrival of another ambulance. Interrupt the artificial respiration frequently to clear the airway. Failure to do this will result in your efforts at artificial respiration being unsuccessful. (Practise using the Ambu bag on a patient in the three-quarter prone position).

2. In most cases, oxygen should be given to the breathing patient. If he is at all cyanosed or is having any respiratory difficulty, it should be given by nasal catheter or plastic face-tent. It will, of course be connected to the Ambu bag if breathing has stopped.

3. Proceed with external cardiac resuscitation if no pulse can be felt.

CIRCULATION (COLOUR):

1. Cyanosis (blueness) - this means that there is inadequate oxygenation of the blood. This demands that we look for a cause; check airway, check breathing and then give oxygen. Cyanosis may also develop if the flow of blood is reduced as in severe heart attacks. it is also a feature of Cyanide poisoning (see above).

2. Pallor (paleness) - suggests shock and this may mask the cyanosis of oxygen lack, as there may be insufficient blood circulating in the skin to produce the blue colour.

OTHER INJURIES:

Other injuries that may be present may now be treated. If a "third man" is present he can do this treatment under supervision, if necessary.

Now decide, "HOW URGENT IS THIS CASE"? Is it a condition for which a hospital has some life-saving treatment which is not available in your ambulance? If you are honestly in doubt after consultation with your attendant (or doctor if present), then you should make as rapid a trip to hospital as is compatible with:-

(a) Traffic conditions, and

(b) whatever treatment the attendant is attempting, (see Chapter X111).

ON RETURN OF CONSCIOUSNESS:

The patient should be reassured. Train yourself to develop the ability to maintain a reassuring conversation with the patient and so keep his mind off his problems without annoying him. Try to answer his questions as willingly, honestly and tactfully as possible. However, if he asks about the condition of a relative or friend whom you know is seriously injured or dead, say that you do not know. It is the hospital doctor's job to decide when to tell the patient bad news.

IF UNCONSCIOUSNESS PERSISTS:

Arrange to have the hospital notified of your estimated time of arrival and the cause, if known of the unconsciousness. Avoid the use of "pretty bad", "serious" and similar loose terms, which are often misleading. On arrival at hospital, the attendant should remain with the patient until the doctor arrives. Tactfully request that porters, nurses etc. do not put the patient on his back unless the doctor requests it. If, in spite of your request and in the absence of a doctor's order, a nurse or porter puts the patient on his back, you must make a report of the circumstances through the usual channels to the Officer in Charge, Transport. Note however, that a doctor will often turn these patients on their backs to examine their airway with a special torch called a laryngoscope and to make a thorough examination of the patient. Do not be mislead by this into thinking your First-Aid use of the three-quarter prone position was incorrect.

CHAPTER V11.

SHOCK

DEFINITION:

Shock is a condition characterised by a collection of symptoms and signs which are caused by a shortage of blood to the small blood vessels (arterioles or capillaries) of the tissues.

That is, it is an absolute or relative drop in circulating blood volume.

NORMAL COURSE:

Since shock is caused by a loss of fluid, e.g., bleeding, or a decrease in the circulation rate, e.g., coronary occlusion, there is not sufficient blood flow to supply all tissues of the body, so the body tends to compensate by reducing the flow to the skin in order to maintain the supply to the brain, heart and kidneys.

If the loss of effective blood volume increases (untreated shock), this blood lack results in the cells of the capillaries not receiving sufficient oxygen. As a consequence, these capillary cells are damaged. Damaged capillaries then allow more fluid to escape from the blood stream and the shock increases. Thus, a vicious circle is established, with inadequate blood volume causing further fluid loss and resulting in even smaller blood volume.

This is the stage of irreversible shock and must be prevented if at all possible, as it is fatal.

TYPES:

(A) Nervous.
(B) Established.
(C) Irreversible.

(A) Nervous Shock:-

Nervous Shock is caused by fright, fear, pain etc., and an example of this is "fainting". This type of shock is always present with other forms of shock and adds to their effect. It results from nervous impulses received by the brain and relayed by certain nerves to the autonomic nervous system, causing the vessels of the gut to enlarge. Thus, a considerable quantity of blood is pooled in the abdomen. Much can be done to reduce its extent and your treatment must be directed towards this end.

(B) Established Shock:-

This can result from two causes -

(a) External Fluid Loss -

(1) Blood Loss - it is obvious that if blood is lost, the circulating blood volume will be reduced.

(2) Other forms of External Fluid Loss - the most important of which results from burns, where there are few blood cells lost, but plasma is lost in very large quantities through the burnt areas. In severe vomiting and diarrhoea, as in gastro enteritis, considerable quantities of fluid are lost also.

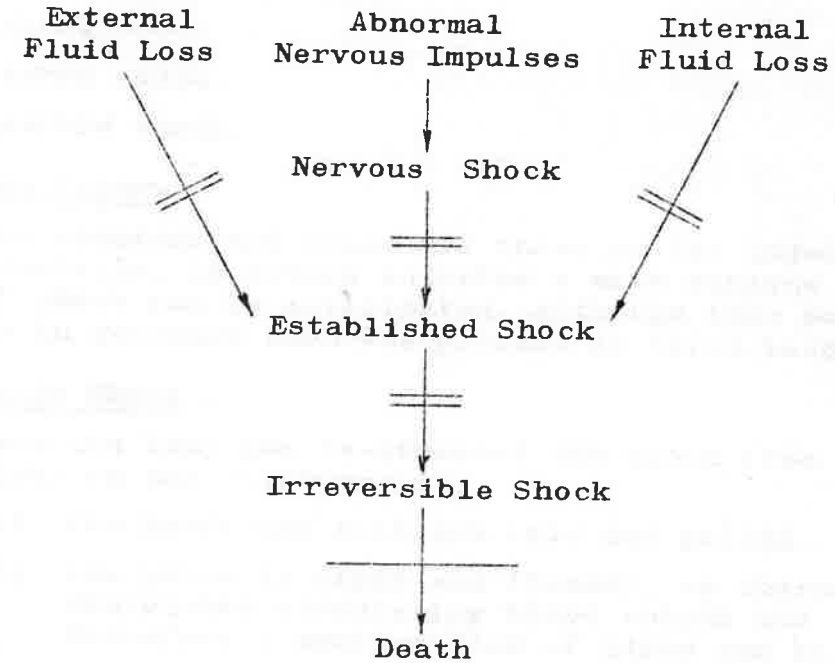
(b) Internal Fluid Loss -

(1) Blood Loss - concealed internal haemorrhage is an important cause of internal fluid loss. Remember that fractures of the pelvis can cause bleeding into the abdomen, as can ruptured organs, (see Chapter 111). A fractured femur can result in two or three pints of blood being lost into the thigh.

(2) Other forms of Internal Fluid Loss - in this type, the most difficult to understand, there is no obvious blood loss as in external bleeding or loss of fluid, as in burns, but the loss is of effective blood volume.

The most common example of this is in the coronary occlusion, where in consequence, a part of the heart muscle dies. The heart is then less efficient and cannot pump blood around as forcibly as it did. Also, there is a strong nervous shock associated with this condition. Thus, the heart is pumping less blood, less efficiently, with the result that irreversible shock may well set in.

Crush injuries and spinal injuries are other cases in which there is internal fluid loss. In spinal injuries blood tends to be pooled in dilated vessels, below the level of the injury.



═══ Points of Treatment.

——— Past This Point is Too Late.

Other common causes of established shock are:-

(a) Intestinal obstruction.

(b) Spinal injury.

(c) Crush injury (of chest etc.).

(C) Irreversible Shock - is described above, and is the end result of untreated or unsuccessfully treated "established shock".

SYMPTOMS AND SIGNS:

The symptoms can be divided into several stages:-

(a) Of the injury itself.

(b) Early shock.

(c) Established shock.

(d) Irreversible shock.

(a) The Injury -

The symptoms and signs are those of the injury. Generally, in severe injuries a more serious type of shock can be anticipated, although this may not be in evidence when the patient is first seen.

(b) Early Shock -

Here the body has re-directed the blood from the limbs to the vital organs.

(1) The hands and feet are cold and pallid.

(2) The pulse is rapid and thready, as there is a diminished circulating blood volume and therefore a smaller flow of blood can be felt.

(3) There is a cold clammy sweat, frequently most noticeable on the forehead.

(4) The patient may feel "weak at the knees", giddy, or about to faint.

(5) The patient may complain of "butterflies in the stomach", nausea, or may vomit.

(c) Established Shock -

Since the circulating blood volume is less and although the heart is doing its best to compensate for this, the brain tends to be short of blood. Thus, the symptoms and signs will be the same as the above, but more pronounced.

(1) The pulse is thinner and more rapid and the patient's colour may be ashen-grey.

(2) As the brain is affected, the patient is a little more disturbed mentally, is not always rational, and is excessively anxious, or may be stuporous.

(3) The patient's mouth may be dry, showing a drier tongue than normal and probably complaining either of this or of thirst.

(4) Air hunger may be apparent as a result of the reduction in the supply of oxygen to the brain.

(5) The blood pressure is lower.

(d) Irreversible Shock -

This is the terminal stage of the condition. The patient may be stuporous or even unconscious, with practically no pulse felt and heart racing. However, the diagnosis of irreversible shock is usually beyond the scope of an ambulance crew.

TREATMENT:

The aim of the crew member in treating shock is two-fold:-

(a) To treat the cause and thus prevent the progress to irreversible shock.

(b) To reduce the factor of nervous shock, which would otherwise add to established shock.

METHOD:

(1) Treat the injury which is causing the shock as quickly and as completely as possible.

(2) Loosen any tight clothing which would otherwise restrict respiration and may impede the return of venous blood to the heart.

(3) Raise the legs high. About a quarter of the body's blood volume is in the legs, and by raising them high much of this blood is allowed to run back into the trunk and thus the blood flow to the vital organs is increased.

(4) Reassure your patient, but do not overdo it. Fear adds to shock.

(5) Cover your patient with something, even if it is only a sheet; this has a reassuring effect. BUT do not overheat your patient, as this may dilate skin vessels and direct blood from vital organs. A good rule is to cover the patient with the number of blankets you would need for sleeping under in the existing weather conditions.

(See illustration for elevation of foot of stretcher for shocked patients, on following page).

(6) TRILENE to relieve pain helps reduce shock.

(7) Administer oxygen via the plastic face-tent in cases of severe shock.

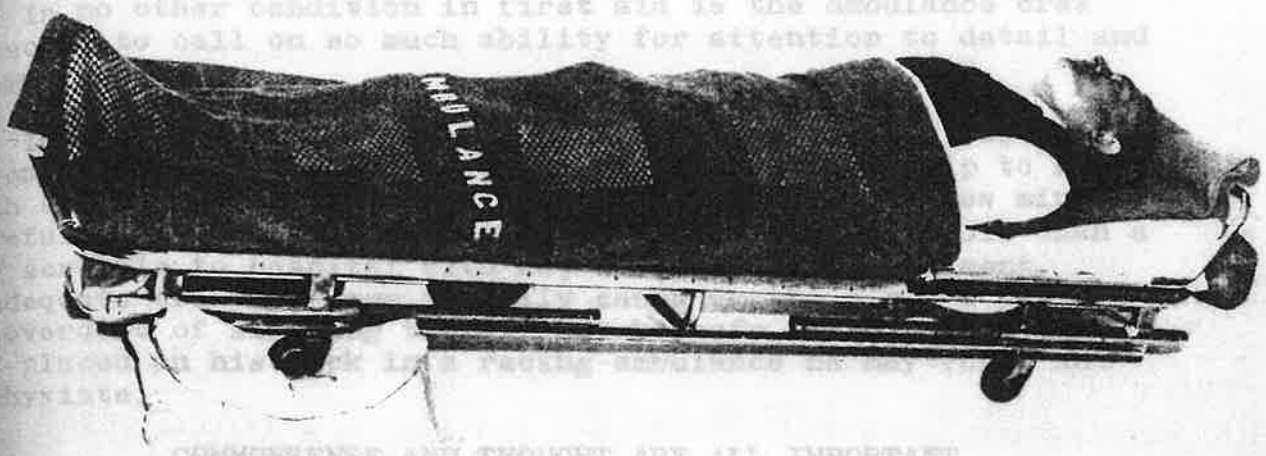
(8) Take the patient to medical aid as quickly and as smoothly as possible, but do not give him a fast, noisy, or rough ride, as this will increase nervous shock greatly and more than cancel out the advantage of the minutes saved.

AT HOSPITAL, the patient, if in established shock will be given fluid by intravenous drip to raise the blood volume. The type of fluid will depend on the cause of the shock and the severity of it.

Drugs will be given to relieve the pain and the patient will be nursed head down.

If you see this type of treatment, observe how collapsed the veins in the skin are - this makes the insertion of the drip by the doctor very difficult, but it will stress to you how the skin can easily give up its blood supply to the more vital areas.

Try to understand shock and by understanding it, how you can prevent its progress.



ELEVATION OF FOOT OF STRETCHER FOR SHOCKED PATIENTS.

This gives elevation to the legs without bending the body.

Each stretcher wheel is placed on a pillow bent double. In the ambulance the stretcher is quite stable, as the pillows grip onto the stretcher wheels and floor sockets.

Note - No pillow is under the head but a blanket protects it from the crossbar.

CHAPTER V111.

POISONING

INTRODUCTION:

In no other condition in first aid is the ambulance crew expected to call on so much ability for attention to detail and common sense.

In poisoning, minutes may count in saving a life, but it is only the occasional case which requires a fast trip to hospital with siren and flashing red light. In general, a few minutes careful treatment at the scene will be far more valuable than a mad scramble to hospital with no, or inadequate treatment. Inadequate treatment may actually cause death, e.g., a patient with an overdose of sleeping tablets may be safe in bed, head down, but placed on his back in a racing ambulance he may vomit and asphyxiate.

COMMONSENSE AND THOUGHT ARE ALL IMPORTANT

In general, there are three causes of poisoning:-

(a) Accident,

(b) Suicide, - or in a few cases

(c) murder.

Accident needs no explanation, as all crew members are familiar with the problem. However, suicide is often misunderstood.

Suicide, or more fortunately, attempted suicide must be regarded as an illness - a mental illness and must be treated as such. Very often the disease is of very rapid onset and may not have been suspected. Moral issues must not cloud the mind of the crew member whose job it is to treat an attempted suicide victim as he would any other serious illness.

TYPES OF POISONING:

These, (in order of their frequency) are the most commonly seen by the crew member:-

(a) Sleeping pills.

(b) Alcohol. ADULTS

(c) Carbon Monoxide.

(d) Kerosene.

(e) Aspirin.

(f) Caustic soda or other corrosives. CHILDREN

Sleeping Pills -

Their function is to depress the vital centres of the brain, including consciousness, respiration and heart action. However, the heart is rarely completely stopped and provided oxygen is given to such a patient, life can be sustained for several days, after which the patient usually recovers. The main thing which must be guarded against is the possibility of asphyxia, due to inhalation of vomit or throat secretions.

Alcohol -

The effects of this drug in slight excess are known to all. However, alcohol in large doses can also depress the brain function in the same way as sleeping pills. Here however, the risk of vomiting is greatly increased and an even stricter watch must be kept.

Carbon Monoxide -

This gas effects the blood to make the red cells useless for carrying oxygen. Thus, the patient will asphyxiate quickly. The best and only form of treatment is to give oxygen as soon as possible. Once this has been done, there is very little else to do beyond routine management of an unconscious patient, even in hospital but prompt action at the scene may save a life.

Kerosene -

If inhaled, small amounts of kerosene will damage a very large part of the lungs, with subsequent pneumonia. Because it evaporates so easily and may be inhaled while in the pharynx or mouth, it is most important that vomiting is not induced. The patient should be taken as soon as practicable to hospital.

Aspirin -

Aspirin in a substantial overdose poisons the blood and brain directly. The lethal dose varies greatly and the best treatment is prevention. At the scene, induction of vomiting may be tried, provided the patient is conscious. Even if successful, the patient must be taken to hospital without delay.

Caustic Soda -

Caustic soda will corrode the stomach or oesaphagus very readily, to give a fatal perforation. Therefore, the caustic soda must be diluted or neutralised as quickly as possible. Initially, give water, or better, milk to the patient to drink, in large doses. From thirty minutes after swallowing, the danger of perforation is high and only sips of fluid should be given.

Others -

There are so many other poisions it is impractical to list them all. When in doubt, try to induce vomiting or delay absorption, except where the casualty is unconscious or his lips and mouth are burned.

MANAGEMENT:

In the case of sleeping pills or other drugs which have caused unconsciousness and may cause asphyxia, the treatment is as for the unconscious patient, i.e., three-quarter prone position, particularly if artificial respiration is required.

In Carbon Monoxide poisoning (from car exhausts, gas stoves, engines etc.) the maximum possible oxygen concentration must be used, either with a respirator or plastic face-tent, depending on whether or not the patient is breathing.

Where vomiting is desirable, the following may be used:-

Salt in water (two tablespoons to a tumbler).

Allow the patient to drink this, then irritate the back of the throat.

Where delay in absorption is required as in kerosene, aspirin and other drugs, give:-

(1) Milk.

(2) Flour in water - at least a pint to an adult.

TRANSPORT:

Rapid transport is unnecessary and undesirable, except in the case of poisoning by:-

(1) Arsenic.

(2) Cyanide.

(3) Other drugs - specified by a doctor.

Use your oxygen and sucker freely when transporting a case of poisoning to hospital.

CHAPTER 1X.

INTRA-VENOUS THERAPY (DRIPS)

THE AIM:

The aim of this type of treatment is to put various fluids directly into the blood stream to replace fluids lost from the body.

The most common example known to ambulance crews is the replacing of lost blood, either by giving whole blood or by giving plasma or a like solution.

THE PRINCIPLE:

The principle of the treatment is to put the fluid into the veins (which contain blood under low pressure), rather than into the arteries (which contain blood under high pressure) where the blood would tend to run into the bottle, rather than the bottle's contents into the blood stream.

A bottle of fluid is held two or more feet above the level of the patient's heart with a tube from this bottle to a needle in his vein.

Fluid is then allowed to run into the vein at a variable controlled rate determined by a doctor. Since the blood circulates through the body every thirty seconds, it does not take long for any fluid added to be uniformly blended.

FLUIDS USED:

These can be divided into two types:-

(1) Fluid to replace lost blood.

(2) Fluid to replace chemicals, e.g., salts lost as in vomiting.

The first group (1) are called "plasma expanders" and consist of blood itself or extracts from it, e.g., serum, albumin etc. Usually these are run in very fast to replace actual blood lost, as in severe bleeding.

Fluids to replace lost salt and water (2) are used in many disorders, some of which are:-

(1) Burns.

(2) Dehydration.

(3) Severe vomiting.

(4) States in which the patient is unable to take fluids by mouth.

There are many other less common conditions in which "drips" may be used.

Drips may be used also to keep a vein open when severe shock is expected but not yet present, e.g., in a crushed chest injury.

The fluids used in this group are:-

(a) Salt in water ("Saline").

(b) Sugar in water("Dextrose").

(c) A mixture of these or other chemicals.

For illustration of Transfusion Set see following page.

AMBULANCE MANAGEMENT:

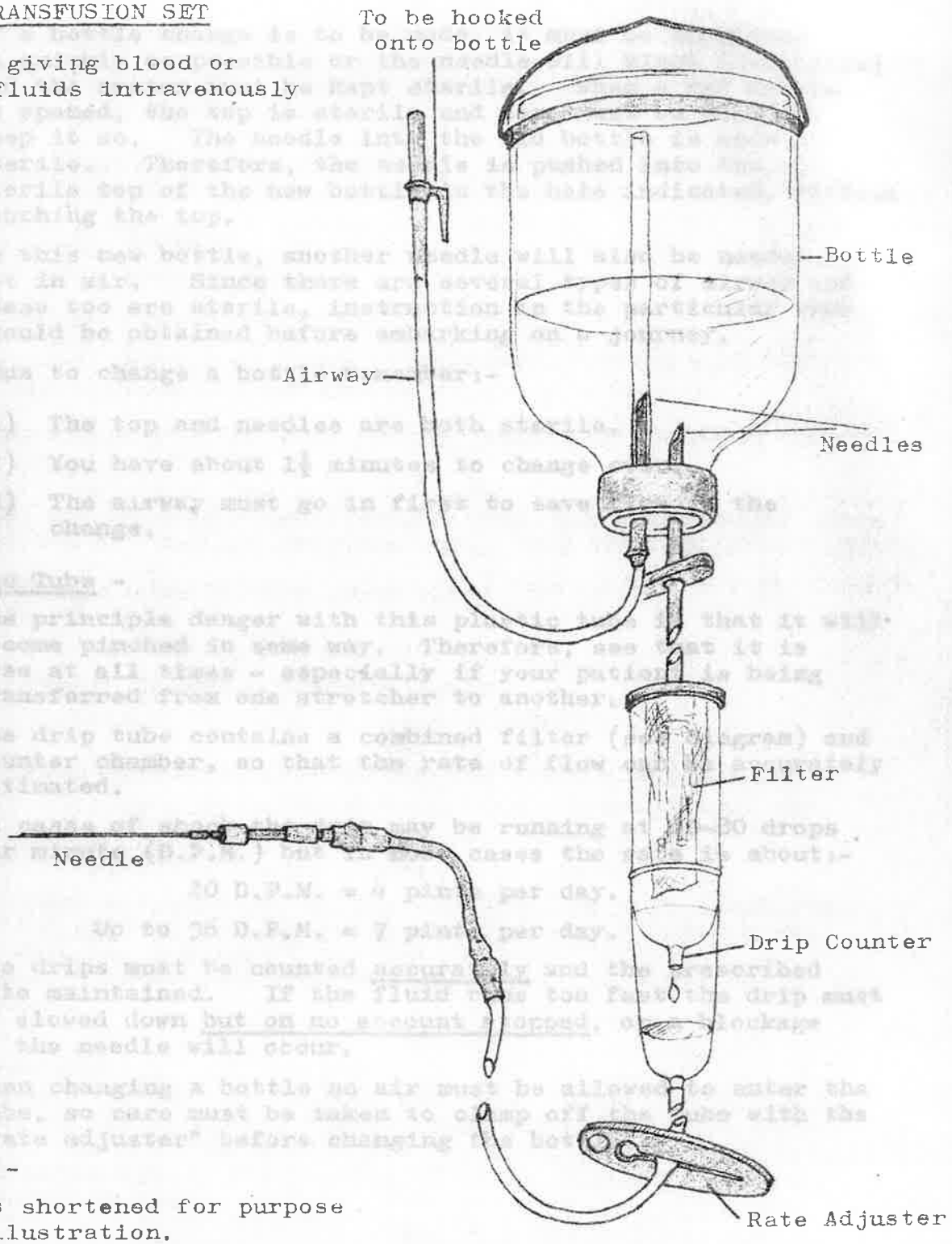
The ambulance crew has no part in deciding what should be given to a patient, or in setting up the drips, but may be called upon to transport a patient with the equipment in operation. Under such circumstances, the following should be observed:-

The Bottle -

This must be kept as high as possible inside the ambulance. Hooks on the roof or a "Drip Stand" attached to the stretchers are in all ambulances and give the maximum available height if used correctly. The bottles of fluid should be securely attached to them.

TRANSFUSION SET

for giving blood or other fluids intravenously



Note:-

Tubes shortened for purpose of illustration.

If a bottle change is to be made, it must be completed as quickly as possible or the needle will block (see below) and the system must be kept sterile. When a new bottle is opened, the top is sterile and care must be taken to keep it so. The needle into the old bottle is also sterile. Therefore, the needle is pushed into the sterile top of the new bottle in the hole indicated, without touching the top.

In this new bottle, another needle will also be needed to let in air. Since there are several types of airway and these too are sterile, instruction in the particular type should be obtained before embarking on a journey.

Thus to change a bottle remember:-

(1) The top and needles are both sterile.

(2) You have about $1\frac{1}{2}$ minutes to change over.

(3) The airway must go in first to save time in the change.

The Tube -

The principle danger with this plastic tube is that it will become pinched in some way. Therefore, see that it is free at all times - especially if your patient is being transferred from one stretcher to another.

The drip tube contains a combined filter (see diagram) and counter chamber, so that the rate of flow can be accurately estimated.

In cases of shock the drip may be running at 60-80 drops per minute (D.P.M.) but in most cases the rate is about:-

20 D.P.M. = 4 pints per day.

Up to 36 D.P.M. = 7 pints per day.

The drips must be counted accurately and the prescribed rate maintained. If the fluid runs too fast the drip must be slowed down but on no account stopped, or a blockage of the needle will occur.

When changing a bottle no air must be allowed to enter the tube, so care must be taken to clamp off the tube with the "rate adjuster" before changing the bottle.

The Needle -

The needle, as explained above, is in a vein usually in the forearm or hand. Care in handling the limb is most important lest the needle come out of the vein, when the fluid will run into the fat or muscle of the limb. This can be recognised by the fact that the drip slows down and cannot be re-adjusted to the prescribed rate and the skin around the needle point swells and becomes painful. If this happens the drip must be turned off and the matter reported to the nearest doctor as soon as practicable.

If the flow of fluid through the needle stops for any reason for more than a minute or so, the needle will block and the drip will not start again. Therefore, if the needle begins to block there are two things that can be done:-

Either (1) Increase the drip to maximum rate and flush the needle out.

(2) Turn the drip off tightly, then squeeze the rubber between your clamp and the needle several times and start the drip again.

In short, there are two causes for your needle not allowing fluid through:-

(a) The needle is not in the vein.

(b) It is in the vein but blocked.

The crew member's job when looking after a drip is:-

(a) To keep a given quantity of fluid running into the patient's veins.

(b) To keep the fluid, needles etc. sterile.

(c) Not to allow the needle to block; but if it does and cannot be cleared, stop the drip until medical aid can be obtained.

CHAPTER X.

ADMINISTRATION OF OXYGEN

The need for a continuous, adequate supply of oxygen to the tissues has been discussed elsewhere in this manual (see Chapters 1, 111 and V1.). Because of its importance in maintaining life, oxygen is stored in metal cylinders in ambulances and is available for any patient suffering from a shortage of it in his tissues.

This shortage may arise -

(1) Because the patient is not breathing, i.e., bringing atmospheric oxygen to the absorbing tissues of his lungs, or

(2) because the lungs are unable to absorb the oxygen, or

(3) because, as a result of difficulty with his circulation, the oxygen is not being transferred in his circulating blood from his lungs to his tissues generally and in particular, those of his vital organs, or

(4) because his circulation has ceased.

In the first case where breathing has failed, it is necessary to introduce the oxygen by artificial respiration, the cycle being maintained at about the rate of normal resting breathing.

This can be done -

(a) By mouth-to-mouth resuscitation - which supplies about 16% oxygen.

(b) By suitable resuscitation equipment (e.g., the Ambu bag) introducing atmospheric air into his lungs - which supplies 21% oxygen.

(c) By using such equipment to introduce a mixture of oxygen and air, which can supply up to 60% oxygen.

In general, the higher the percentage of oxygen the better, but time is of vital importance. Thus, it may be best for one crew member to give mouth-to-mouth resuscitation while the other prepares the equipment, or to give atmospheric oxygen while the other member connects the oxygen from the cylinder.

When using oxygen this way, the flow should start at the maximum rate - 14 litres per minute. When the patient's colour improves, the rate of flow can be reduced to ensure that the supply will last for the time required. As a rough guide, a small cylinder (41 cubic feet) will last for about an hour at 10 litres per minute.

Ensure that the patient's airway is clear. Pause to check this frequently, and use the sucker if necessary. As in any unconscious state, the neck must be extended fully, whatever the position of the patient. Practise fitting an Ambu mask to a three-quarter prone patient's face. With practice, this can be done efficiently in any position. Remember that the movement of the patient's chest must look normal, especially with children, whom it is possible to harm through over-inflation. The appearance of the chest movement is a reliable guide and must be watched closely.

In the case of a patient who is breathing, but because of inefficient absorption of oxygen in his lungs or inefficient circulation (a heart condition and drop in effective circulating volume etc.) is not transferring sufficient oxygen from his lungs to the tissues of his vital organs, increasing the oxygen concentration near the outer ends of his air passages may assist him. Of course, his primary need is the correct treatment for his circulatory difficulty, but if the proper first-aid treatment for this has been given, he may benefit further from having a higher percentage of oxygen in his lungs, thus ensuring that the blood that is circulating is carrying the maximum amount of oxygen.

This may be done:-

1. By fitting a polythene face-tent over his nose and mouth and then feeding oxygen into this, so that he breathes an oxygen enriched atmosphere.

   Note that it is essential that there is sufficient oxygen flow to prevent the tent from emptying completely and collapsing on inspiration, as this gives the patient a feeling of suffocation. 8-10 litres per minute is usually adequate.

(2) By inserting a nasal catheter (should the plastic face-tent be unacceptable to the patient), using the distance from the point of the lower jaw to the lobe of the ear as an indication of the correct length of the catheter and supplying oxygen through it at not more than 2 litres per minute. Care must be taken to insert the catheter gently in a backward and not upward direction, after wetting with the patient's saliva.

(3) By supplying oxygen to a rubber face-mask held a few inches in front of the patient's face. This is an effective improvisation, particularly for infants or children where the face-tent may be impractical. Maximum flow is required for this.

(4) Should the proper equipment not be available, a tube from the oxygen cylinder can be held between the second and third finger of a cupped hand near the patient's face.
Again, maximum flow rate is required.

Remember that cyanosis is a clear sign of oxygen need and that it may be masked by pallor, resulting from inadequate circulation to the skin - the so called ashen-grey colour.

CHAPTER X1.

MAJOR DISASTERS

Experience, both with actual large scale disasters and with realistically set-up mock disasters has shown that better treatment of casualties at the scene and during transport will result from the adherence by all crews to a pre-arranged plan, rather than by each crew treating a segment of the large disaster as they would a smaller accident. Consequently, the following plan has been drawn up with which all crews must be familiar and to which crews must adhere strictly, unless there is strong reason for departure from it.

This plan will be put into operation whenever three or more ambulances are required at the scene of an accident. While it is primarily intended to cope with from five to say fifty patients, it can be broadened readily to cope with even greater numbers of casualties.

ACTION BY RADIO CONTROLLER:

1. Despatch ambulances with two-man crews to the scene on a scale of one per two anticipated patients.

2. Notify the Officer in Charge, Transport (or his nominated deputy if he is out of contact) who will decide whether outside resources+ will be called upon.

3. If he has not sufficient ambulances available to remove all casualties in one lift - i.e., a number of ambulances available equalling half the number of patients - he will despatch cars 17 and 23 (the Mobile First-Aid Vans) complete with emergency first-aid boxes from the wall under the radio control room stairs. If more than thirty patients are involved, car 23 will proceed via Queen Elizabeth Hospital Casualty to pick up additional first-aid stores and any M.O.'s available.

+ (Instructions exist for calling out extra first-aiders and using auxilliary vehicles (e.g., M.T.T. buses) as ambulances (through General Manager and General Secretary), but the decision in the first place rests with the Officer in Charge, Transport, not the radio controller. Other radio controlled ambulances (Stirling, Mallala, Mt. Barker, Pt. Noarlunga etc. may be used also if the Officer in Charge, Transport so decides).

4. Check that Police and relevant hospitals have been informed.

5. Withhold all information from press or radio.

6. Remember that he must hold a small reserve of effort to deal with any other emergency which may occur elsewhere.

7. Take such further steps as directed by the Officer In Charge, Transport.

ACTION BY FIRST CREW AT SCENE:

So that the treatment, collection and disposal of patients at the scene of such an accident proceed in the most efficient manner, special duties fall to the first crew to arrive. It is their responsibility to initiate immediate life-saving treatment and to ensure that the scene is set for the orderly handling of other vehicles which will be arriving in a short time.

Thus, the attendant will, on arrival, assume the duties of the Casualty Collecting Officer, i.e. -

(a) Make a quick assessment of all casualties and, by brief instructions to selected bystanders, start immediate life-saving treatment, e.g., get a suitable bystander to apply direct digital pressure to a severely bleeding wound and another suitable bystander to observe the breathing of an unconscious victim, with instructions to report any development of noisy breathing etc.

(b) Select a suitable site (the Casualty Clearing Post - C.C.P.) for collecting walking patients and have bystanders (or police) gather all ambulance patients at this point. Note - it is important that these casualties are not sent off to Casualty Departments in large groups by private cars in the early stages, as they will tend to block the Casualty Departments - both the unloading areas and the treatment cubicles - and so deny prompt treatment to the more serious cases.

(c) Tag the most urgent cases for removal first by pinning a red tag from his C.C.P. identification kit on a clearly visible part of the casualty's clothing - preferably near his shoulder.

(d) Direct further crews, doctors and hospital staff to the most urgent cases. At the stage where these people are arriving one upon the other, the first attendant may find all his time is taken up with this directing. It is most important that he realise that the greatest good will come from doing this clearly and well, even if he must leave a partly treated patient to do it. If he fails to indicate correctly where the most serious casualties are, there will be a considerable waste of effort re-examining the less seriously injured by each crew, doctor or member of hospital staff to arrive. He should not confuse himself by trying to classify all casualties in a strict order of priority, but rather classify into two groups only:-

(1) Remove immediately.

(2) Remove when casualties under (1) have been dealt with.

(e) Obtain the assistance of a leader from among the bystanders to organise stretcher-carrying parties - skilled first-aiders' energies should be saved for actual patient treatment where possible.

(f) Encourage suitable bystanders (especially females) to give comfort and reassurance to children, hysterical patients etc.

(g) Where practicable, have patients on stretchers (improvised or non-transport types) gathered at the C.C.P. with the best available medical or nursing supervision.

The driver will, on arrival, assume the duties of the Transport Control Officer, i.e. -

(1) Select a suitable place near the C.C.P. for loading ambulances (Ambulance Loading Point - A.L.P.)

(2) Select suitable routes to and from the A.L.P. and if needs be, an ambulance holding point - from which ambulances are fed to the A.L.P. as room permits. Bear in mind that cars 17 and 23 may be coming to the C.C.P.

(3) Obtain the help of police or bystanders to keep these routes clear and to assist with the orderly manoevring of ambulances in the area.

(4) Ensure that each ambulance is carrying the maximum number of casualties (both stretcher patients and sitters) on departure and that all doors are properly closed etc. Remember that some of the stretcher parties will be inexperienced and will not load properly and unless checked, there will be a tendency to load one patient per ambulance, thus delaying the departure of all.

(5) Obtain the help of a suitable person to keep the best possible records of which patients (by name or brief description) are sent to which hospital.

(6) Ensure that ambulances are despatched to the most suitable hospital for the treatment of the casualties' injuries. Bear in mind:-

(a) That there is a maximum admission rate to any hospital.

(b) That the surgical facilities of smaller hospitals are adequate for lacerations, fractures etc., but head injuries, chest surgery and neuro-surgical work generally must have priority at the hospital with surgeons who specialise in the treatment of injuries of this nature.

(7) Ensure that the latest information, particularly about the number of casualties still awaiting transport and the number of patients despatched to each hospital is relayed continuously to the radio base or other control centre.

DOCTOR(S) AT THE SCENE:

The presence of a doctor or other medically trained person at the scene is quite probable, but must be regarded as a bonus nevertheless. Planning and training should be for the circumstances under which it is necessary to deal with the situation without medical direction or when the doctor's entire effort is centred around one patient whose life he can save by continued undivided effort.

Do not hesitate to indicate to the doctor(s) which you think to be the more serious cases, but having done this, leave it entirely to him to deal with whichever patient he elects.

If the doctor gives instructions about individual patients, these instructions must be carried out to the best of your ability, but be prepared to explain quietly and clearly the overall position so that he can modify the instructions slightly to fit in with the plan. Many doctors have not had your experience at multiple accidents and may not see immediately what the general plan is.

SENIOR OFFICERS AT THE SCENE:

Every attempt has been made to ensure that senior officers (both within the St. John Ambulance Brigade and in other public positions) are aware of this plan. Should the magnitude of the disaster require that a senior officer take overall control, it is to be hoped that he will work within the framework of the plan without bringing about changes part of the way through, e.g., although a better site for, say the C.C.P. and A.L.P. may become obvious, he should weigh carefully the advantages of this against the confusion of a change.

Thus, although a senior officer may arrive to take charge, the Casualty Collecting Officer and the Transport Control Officer will remain responsible for the functions outlined above until they are each specifically relieved of their responsibility.

CHAPTER X11.

WHAT AN AMBULANCE CREW SHOULD REPORT TO THE DOCTOR

Just as the hospital nurse must be the doctor's eyes and ears and report accurately and clearly the variations in the patient's condition, so should the ambulance nurse or crew member report any changes in the patient's condition during the journey.

In this Chapter, mention is made of most of the variable factors about a patient's condition, whether this condition results from injury or illness. The nature of the injury or illness will emphasise the need for observation of some factors more than others. While all should be watched, the report should concentrate on those which have shown change during the time that the patient is in the crew's care.

Any change in the following MUST be reported:-

1. State of Consciousness - response to command, touch or pain, and eye signs.
2. Pulse - rate, rhythm, strength.
3. Respiration - rate, rhythm, depth and character.
4. Colour - pallor, flushing or cyanosis.
5. Pain - attitude of patient, e.g., writhing, grasping a part etc, whether intermittent or continuous and what, if anything brings relief.
6. Shock - time of onset and a brief description of the symptoms and signs as far as they indicate severity.
7. Blood Loss - nature and site of loss and estimate of quantity.

The doctor may ask for a report on:-

Temperature - whether feverish or not and the occurrence and time of a rigor.

Food and Fluids - type, amount and time given.

Drugs - the drug, the amount and the time given, whether retained, vomited or refused.

Urine, Faeces and Vomitus - estimate of quantity and if possible a specimen should be saved.

While a hospital nurse provides this information continuously on charts prepared for the purpose, this is somewhat elaborate for ambulance crews and it should be sufficient to note on a piece of paper any changes that you have observed.

Ensure however, that these notes are left in responsible medical or nursing hands.

CHAPTER X111.

DRIVING IN AN EMERGENCY

WHEN

The decision to switch on flashing lights and siren and to proceed more quickly than the other traffic is a most serious one. In taking it, an ambulance driver must realise that he is exercising a right granted him in the Road Traffic Act if he is driving "any motor ambulance which is being driven in answer to an urgent call, or is conveying an injured or sick person to any place for treatment urgently required". (Section 40 of the Road Traffic Act, 1961).

This introduces the need for a definition of urgent. While this has not been done by the Courst of Law in this State relating to ambulances, the following conditions have been considered by medical practitioners to warrant the label "URGENT".

1. Uncontrollable External Bleeding - it should be extremely seldom that your attempts to control this bleeding will fail if properly made. Before you decide to drive quickly with such a case, you must be absolutely sure that you have made proper attempts to control the bleeding.

2. Severe Established Shock - e.g.,

   Internal Bleeding.

   Multiple Fractures.

   Severe Burns.

3. Asphyxia - certain cases only - where you cannot inflate the chest - most cases of asphyxia respond to treatment by inflating the chest. In these cases, the most important point in transport is to limit speed to that at which the attendant can continue to inflate the chest efficiently. However, the following may be exceptions:-

   Irremovable Inhaled Foreign Body.

   Crushed Chest.

4. Certain Poisons - see Chapter V111.

5. Proceeding to a scene where any of the above may reasonably be expected.

WHEN NOT:

For some time the threat of death has been believed to justify fast travel to hospital. Not only has this no logical justification, but it has no legal justification either. An ambulance driver travelling in emergency fashion merely because his patient is "liable to die at any minute" is breaking the law quite flagrantly, as well as risking other lives unnecessarily.

The following conditions are not in themselves indications of need for urgency:-

1. Heart Attacks - speed can only aggravate these.

2. Head Injuries - while time can be important here, a few minutes saved do not make up for the ground lost in the rough ride.

3. Obviously Dead - while the ambulance man cannot presume death, there are many states in which it is obviously so probable that the driver could expect little support from our doctors were he to plead that he thought the condition an urgent one, in a defence plea on a charge of having used emergency procedures unnecessarily.

4. Women in Labour - if this is normal labour, the siren and general excitement of speed may even accelerate the process. If it is an abnormal delivery, it is delayed over some hours and a few minutes saved is of little advantage.

WHAT IS PERMITTED:

In any decision to adopt emergency driving procedures two things must never be overlooked:-

1. You are still required to "take due care". In deciding what is "due care", you must realise clearly that the amount of care needed increases greatly if you are doing something which the normal road-user is not permitted to do - in fact, as far as Brigade investigations are

concerned, if you are involved in an accident when exercising the privileges of Section 40, you have failed to take due care.

2. There is an absolute speed limit in the metropolitan area of 50 m.p.h. This figure has been arrived at after a long and serious consideration of the time that can be saved by exceeding this figure, (in a suburban journey this amounts to only a few seconds) and the greatly increased probability and severity of an accident at higher speeds.

Section 40, paragraph (2) of the Road Traffic Act states that an ambulance driven in an emergency is exempt from the parts of the Act relating to -

"(a) Speed limits.
(b) Stopping at stop signs or traffic lights.
(c) Giving right of way.
(d) Driving or standing on any side or part of a road.
(e) Passing other vehicles on any specified side thereof.
(f) The mode of making right turns.
(g) Stopping in case of accident.
(h) Boarding or leaving a vehicle in motion.
(i) Carrying persons on the bonnet or roof".

However, never forget -

1. Do not, under any circumstance exceed 50 m.p.h.

2. If you exercise the privileges of the exemption, your need to take due care is very much greater.

3. Your first job is to get there safely. Better had you not started at all than to have created a need for another ambulance.

CHAPTER X1V.

A NORMAL DELIVERY

Ambulance Crew Members must expect in the course of their work to be confronted with a woman in labour, or with a woman who has just given birth to a child, or a woman who has recently delivered a child and placenta (or after-birth).

It is with these possibilities in mind that the crew member must know the process and management of a normal delivery.

DEFINITION:

Labour is a process by which a baby is born.

A normal labour is a labour in which the baby's head is delivered first and where the result is a living, mature baby with no complications - the length of labour ranging from four to twenty-four hours.

NORMAL LABOUR:

The defining factors:-

(1) The Powers - by which expulsion is accomplished.
(2) The Passages - through which the baby passes.
(3) The Passengers - the baby and the placenta.

RECOGNITION OF THE ONSET OF LABOUR:

(1) Painful, regular uterine contractions.
(2) The show - a mixture of blood and mucus material.
(3) Rupture of membranes - loss of a few pints of clear fluid.

THERE ARE THREE STAGES IN LABOUR:

Stage 1.

The stage of the opening up of the neck of the uterus. Towards the end of the first stage, contractions may come every three minutes and the pain may be very intense.

Management -

(1) General positioning and comfort of the patient - smooth ride.

(2) Observation - of the severity and frequency of the pains.

(3) Reassurance.

Stage 2.

The stage of expulsion of the baby. The neck of the uterus is now fully opened and the membranes have ruptured, leaving a birth canal which offers no bar to the passage of the child. The character of the pains changes at the onset of this stage. The woman now feels an intense desire to bear down and expel the baby.

Management -

(1) General
(2) Observation
(3) Reassurance

See below.

(4) Trilene if administered must be given continuously.

Stage 3.

The stage of separation and expulsion of the placenta.

Management -

Patience is needed and the spontaneous expulsion awaited.

DELIVERY OF THE BABY - GENERAL MANAGEMENT:

(a) Before Delivery - position the patient on her back with the attendant sitting next to her.

(b) After each contraction, encourage the patient to relax.

(c) Turn on the sucker, ensuring that you have a small catheter fixed ready.

(d) When the baby's head is being delivered, stop the ambulance, but leave the engine running so that your sucker will work.

Note - Ambulance Stationary -

(e) The driver, having moved to the rear of the vehicle, separates and supports the mother's legs by grasping them just above the ankles. The attendant delivers the baby by -

(1) Placing his hand between the patient's legs with his thumb lightly against the child's head and his fingers supporting a pad over the woman's anus.

(2) Supporting the child's head as it appears.

(3) If there is any delay in the expulsion, using the sucker to clean out the child's mouth and upper airway before the whole trunk is born.

(4) Making sure that the cord is not looped around the head or neck - if so, and it can be slid off easily, this must be done. If it is wound tightly around the neck it must be tied twice and cut between the ties.

As soon as the baby is delivered, the cord is tied twice and cut between (as above) and the expulsion of the placenta is awaited. No attempt is made to push the placenta from the uterus. Fiddling with the uterus usually results in partial separation of the placenta and bleeding - sometimes severe. Therefore - hands off!

In many instances, with the next contraction after the baby is born, the placenta is shed. This and the baby are both taken into the hospital.

MANAGEMENT OF THE BABY:

After delivery, the baby is lifted up by its feet and placed, head down, between the mother's legs. The small sucker is inserted into its mouth to remove secretions and, subsequently into each nostril. The baby should by then be breathing normally. If it is not breathing normally and the colour is blue, further suction is necessary. Should marked blueness persist, oxygen may be given - at no time should the baby's head be higher than its feet.

No attempt should be made by ambulance crews to clean the baby's skin. The baby must be wrapped lightly in clean linen and the journey to hospital continued. Gentle handling is necessary at all times.

GENERAL CONSIDERATIONS:

1. Childbirth should be a natural event. Let us keep it that way.

2. Mothers expect us to know what to do. Don't let them down.

3. A calm, reassuring manner is all that is necessary to result in a natural delivery.

4. If complications develop, the doctor, not the crew member is trained to deal with them. These complications however, invariably slow down the birth process and allow time to arrive at hospital.

5. It is never necessary to speed women in labour to hospital. Hurrying will only result in more babies being born in ambulances.

6. Sirens will frighten the mother and baby too.

7. Kindness, courtesy and care should be extended to all those in labour.

CHAPTER XV.

BURNS

The Authorised Manual FIRST AID contains a good description of the causes of burns and this should be read before proceeding with this Chapter.

A burn, however caused results in death of tissues.

The emergency treatment of burns is determined by three special characteristics of the burnt area -

(1) Adherent dead tissue (the cells, which are burned and which die, are contained in this tissue).

(2) A zone of leaking capillaries. This is largely responsible for the loss of circulating fluid, with resulting shock.

(3) A wound, which although initially clean, is likely to be contaminated by germs.

FIRST AID TREATMENT:

A recent burn should be covered with a dry, sterile or freshly laundered cloth immediately, to prevent contamination by germs through contact with hands and clothes, and by germs from the air. Germs can come also from the respiratory tract of anyone talking or coughing near the wound.

For a serious burn, the patient should be removed quickly to hospital and, where possible, the hospital be forewarned, with an estimate of the extent and nature of the burn.

It is important therefore, for crew members to know what percentage of the body area is considered to be a serious burn, and how to assess this.

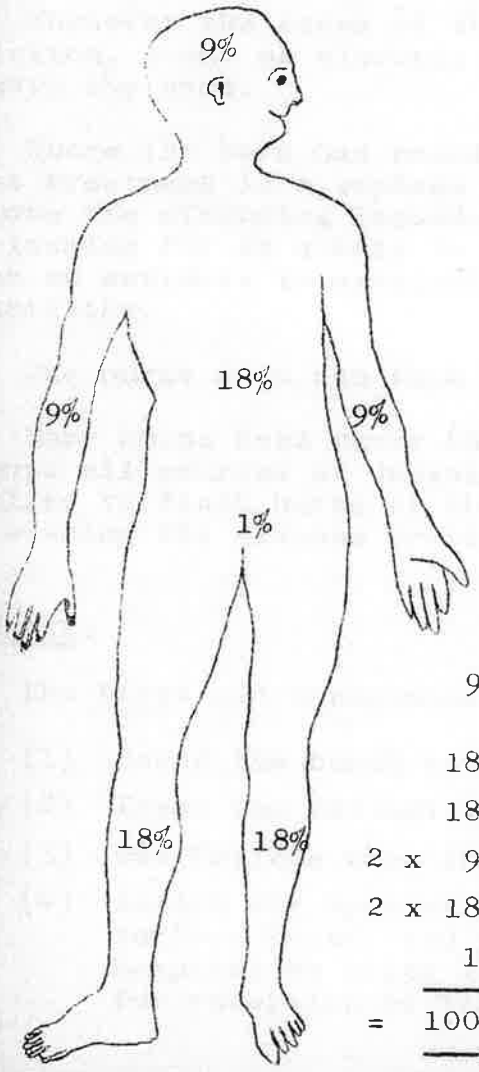
Two factors need to be understood -

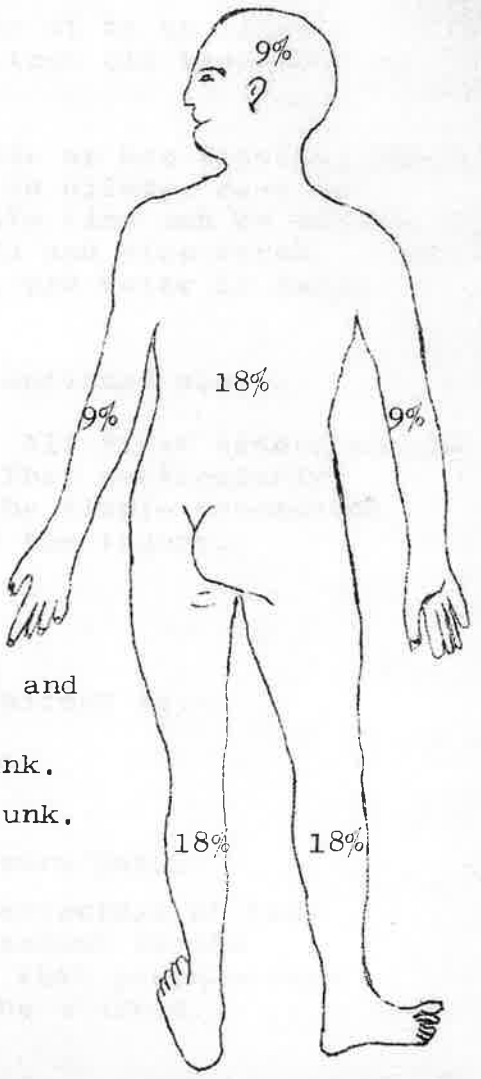
(a) The difference between superficial and deep burns. All burns are either superficial or deep and the older classification of burns by degrees need not be considered by crew members.

(b) How to calculate the percentage of body surface burnt.

There is no clear method by inspecting it of distinguishing between a superficial and a deep burn. However, any burn involving bone, muscle or fat must be deep.

The rule of nine is a very convenient method of assessing the percentage area of the body burnt.





	9%	head, front and back.
	18%	back of trunk.
	18%	front of trunk.
2 x	9%	each arm.
2 x	18%	each leg.
	1%	genitalia.
=	100%	

Any burn involving more than 10% of surface area must be considered a serious burn, particularly in the aged or young patient.

Any obviously deep burn must be considered a serious one.

Most burns when they reach hospital are germ free. This has resulted from good FIRST AID care - let us keep it that way.

It is necessary to combat the shock associated with severe burns by the usual methods. No attempt should be made to apply tight bandages in an attempt to suppress the fluid loss, as this will go on anyway.

A useful aid in correct management is TRILENE, which may be used to relieve the patient's pain.

Whatever the cause of the burn, whether it be by flame, friction, steam or electric current, the first aid treatment is always the same.

Where the burn has resulted from caustic or hot liquids, the best treatment is a copious flow of water to dilute, cool or remove the offending liquid. Much valuable time can be wasted in looking for an alkali to neutralise acid and vice versa. Unless such an antidote is available immediately, use water in large quantities.

The burnt area can then be managed as outlined above.

Many burns need never have occurred. All first aiders should remove all sources of danger when seen. This particularly applies to flash burns of the eye, where the simple precaution of wearing the glasses provided will avoid the injury.

SUMMARY:

The first aid management of a burned patient is:-

(1) Cover the burnt area.

(2) Treat the patient for shock.

(3) Use Trilene when indicated for severe pain.

(4) Assess the type of burn and the percentage of body surface burnt, and pass this assessment to the hospital as early as possible, so that preparations for reception of the patient can be started.

CHAPTER XVI.

WOUNDS AND HAEMORRHAGE

WOUNDS:

A wound is an injury where there has been a breach of the skin by some object, either sharp or blunt which causes damage to the skin and tissues beneath it.

TYPES:

The four types of wounds are described adequately in the Manual of FIRST AID, but some further comment may be of interest to the ambulance crew member -

A clean incision is much easier to treat than a lacerated or contused wound and will usually heal up with less scar than the other types. Generally, a clean wound will heal better than a dirty one, because infection and foreign bodies greatly retard healing and cause ugly scarring.

COMPLICATIONS:

There are many possible complications but among the more important are:-

(1) Damage to blood vessels (haemorrhage).
(2) Damage to nerves.
(3) Damage to muscles and tendons.
(4) Damage to bones.
(5) Deep abdominal wounds.
(6) Chest injuries.
(7) Contamination and infection.

1. Damage to Blood Vessels - is dealt with in the section on haemorrhage.

2. Damage to Nerves - can be diagnosed by the lack of feeling and muscle movement in the affected limb. There is nothing the ambulance crew member can do about this - it is a case for medical help.

3. Damage to Muscles and Tendons - can be diagnosed, firstly by observing the cut muscle or tendon in the wound or secondly, by the fact that the limb below the cut is limited in function, despite the fact that muscular contraction can be felt. This is most common in the fingers, where tendons may be cut. The muscle (which is in the forearm) can be felt to contract, but the finger does not move.

   The only treatment here is to determine whether any foreign body is present. If it is, and is not removable, make sure that it is suitably protected so that it will not be forced in more deeply and so do further damage.

4. Damage to Bones - is discussed in Chapter 11. (Fractures).

5. Deeply Penetrating Abdominal Wounds - this type of wound is more common than wounds with protruding abdominal viscera. They may be caused either by a weapon or a sharply projecting object in an accident.

   Such wounds should be treated in the same way as those with damage to muscles and tendons.

   The dangers of such injuries are two-fold -

   (a) Peritonitis (inflammation of the lining of the abdomen, caused by germs).

   (b) Organs within the abdomen may be damaged. Hollow organs will spill their contents, also causing peritonitis.

   Therefore, it is imperative that such a patient be taken to hospital without delay.

6. Chest Injuries - are discussed elsewhere, but it should be emphasised that when the chest is penetrated, the lung underneath will usually collapse, so that an asphyxia may occur.

   Therefore, the hole should be closed firmly, thus preventing air from entering through the wound and causing further collapse.

There are two types of chest injury -

(a) Open — Here, the air is sucked in and out of the chest cavity with each respiration.

(b) Closed — Here, air or blood escapes into the chest cavity from the damaged tissue, causing collapse of the lung. Blood may be coughed up.

7. Contamination and Infection.

Contamination of a wound will lead to infection unless it is cleaned surgically. Infection causes a reaction in the body called inflammation, which is characterised by redness, heat, swelling and pain, and may lead to the formation of pus. Pus is simply a mixture of dead tissue, dead germs and dead white blood cells.

AIMS OF TREATMENT:

(1) To stop bleeding - see below.

(2) To prevent further damage - by taking care either to remove foreign bodies, or to pad them well if they are not removable.

(3) Prevention of infection - is effected as described in the FIRST AID Manual, by -

(a) Not handling the wound.

(b) Covering it as soon as practicable with a sterile pad.

(c) In the case of minor wounds not requiring hospital treatment, by treating with a suitable antiseptic.

For the ambulance crew member, covering the wound early with a sterile dressing and pad will prevent any further contamination. However, if the pad moves, then germs from around the wound will be forced into it. Thus, it is necessary to place the pad firmly in position and bandage it so that it will not move.

(4) To make the wound more comfortable - immobilisation and the use of TRILENE will be of great help in the relief of pain.

It must not be forgotten that pain may be a symptom of further damage and if pain is suppressed by the use of Trilene, extreme care must be taken that no further damage occurs through careless treatment.

Remember, that often the result of careless treatment is not seen by the crew member, e.g., infection may take several days to develop in the wound.

CIRCULATION:

In normal circulation, the blood leaves the left ventricle via the aorta and the large arteries and passes through the small arteries or arterioles to the capillaries, where oxygen,, food and carbon dioxide are exchanged with the tissues. From the capillaries the blood passes to the small veins (venules), then to the larger veins (vena cava) and eventually to the right auricle. The blood is then pumped by the right ventricle to the lungs (where re-oxygenation occurs) and is then returned to the left auricle.

Haemorrhage may occur from -

(1) Large arteries.

(2) Large veins.

(3) Small arteries.

(4) Small veins and capillaries.

Resistance to the flow of blood is at its greatest in the arterioles (small arteries) and the capillaries. The force needed to pump the blood through these vessels is called the "blood pressure". It rises and falls with the heart's contraction, hence we can feel a pulse. In the veins it is low, thus, when these are injured, the dark blood flows steadily out. Bleeding from the capillaries is a slower ooze.

The blood in the arteries is red because it contains oxygen and in the veins it is blue or black because it does not contain oxygen - which has been used by the tissues.

TYPES OF BLEEDING:

(1) Internal Bleeding - See Chapter 111.

(2) External Bleeding - can occur from anywhere on the outside of the body and can be of three types -

(a) Arterial.

(b) Venous.

(c) Small Vessel.

Arterial Bleeding - is the least common but is the most dramatic and needs urgent attention. The main feature of this type of bleeding is that blood spurts out in a stream at high pressure. It will also be red in colour but usually the crew member does not have time to worry about this!

Venous Bleeding - is more common and is seen regularly on ambulance duty. The blood tends to well up in the wound - and it may be noted that the blood is also darker in colour.

Small Vessel Bleeding - is the slow ooze which can be found after any minor injury.

COMPLICATIONS:

The first and most obvious complication of severe bleeding is shock (see Chapter V11). This shock may be severe and the patient may die if the haemorrhage is not controlled before too much blood is lost.

Secondly, there may be a prolonged weakness from the loss (anaemia). The patient will need either a blood transfusion or a long period of convalescence, during which the lost blood cells are replaced by the body.

TREATMENT:

First decide, what type of bleeding it is, as explained above.

(a) Venous Bleeding -

This type of bleeding can be controlled usually by direct pressure over the wound. However, the pressure will have to be firm. If this does not control the bleeding, lie the patient down, raise the limb as high as possible, maintaining the pressure. A firm pad and a bandage is applied and left alone. If the bleeding persists, reinforce the pad with another one. The principles of anti-sepsis must not be forgotten.

(b) Arterial Bleeding -

Arterial Bleeding can usually be stopped by indirect pressure followed by direct pressure over the wound in the normal way. If this does not stop the bleeding, direct pressure with the hand is recommended, through a sterile pad.

Failing this, an attempt to stop the bleeding with the crew member's fingers directly over the artery with no pad, or by pinching the artery between two fingers should be tried.

In very rare cases, the bleeding can only be controlled by a constrictor bandage. This must be applied just tight enough to stop the bleeding - if the bleeding does not stop, then the bandage should be re-applied. Note however, the use of this bandage is a last resort and the other methods mentioned should be tried first, as the constrictor bandage has several dangers associated with its use -

(a) The limb will die if it is left on too long - therefore it should be released every fifteen minutes as described in the First Aid Manual and the time of application and release noted.

(b) If applied too tightly, it will damage nerves and other tissues.

When using a constrictor bandage the minimum width is 1-1½ inches and the bandage should be made of an elasticised material, e.g., rubber. A width less than this may cause permanent damage to the nerves of the limb.

(c) Small Vessel Bleeding -

Small vessel bleeding can be controlled by direct pressure with a sterile dressing and pad and should be left undisturbed. Pressure must be firm and constant.

Once the bleeding is controlled, the pressure must be maintained, as it takes some time for the blood to clot sufficiently to seal the bleeding vessels.

SPECIAL TYPES OF HAEMORRHAGE:

(a) Lacerated Scalp -

Bleeding from a large laceration of the scalp is a combination of bleeding from middle-sized arteries and veins and the only way of stopping it is to apply direct pressure around the wound site. A ring pad should be tried first, but this may not be successful, and in such a case the finger-tips may be used to compress the wound edges against the underlying skull. The danger of infection in the scalp is low.

Leave the pressure on until the patient reaches hospital if possible, or if the fingers are being used directly then leave them on for five minutes by the clock. Should the bleeding re-occur, then someone must stay with the patient until he reaches hospital.

(b) Bleeding Varicose Veins -

This is an uncommon injury, but can be rapidly fatal, as blood will be lost at a considerable rate unless correct treatment is given.

Lie the patient down and raise his leg as high as possible. Any dangerous bleeding will then cease. The limb must stay elevated in this position until medical aid is reached. Direct pressure by the usual sterile dressing and pad over the wound will control what little bleeding remains.

(c) Miscarriage -

Shock must be anticipated in all cases of miscarriage and treatment should be instituted promptly.

Hospital treatment should be sought immediately, but it is by no means an emergency, i.e., a careful, steady ride to hospital is the requirement.

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