

الجامعة التقنية الشمالية  
المعهد التقني الموصل  
القسم تقنيات صحة المجتمع

أسس التمريض  
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### **Historical view of nursing:**

1. During primitive times , women in the home carried out nursing.
2. Florence Nightingale (1853-1856), studied nursing .
3. During the Crimean war(1853- 1856),Florence Nightingale Worked to provide proper Sanitation, fresh air and clean linen for the sick and wounded soldiers.
4. In 1860 , Florence Nightingale established a training school in England.
5. Before 1930, most registered nurses became engaged in private duty nursing .

### **Nursing in Iraq:**

In 1933 , the first nursing school was opened in Iraq . Nowadays there are many nursing school in our country . The first nursing college was opened in 1962 , in which the study lasts four years to get the first degree in nursing .

## **FUNDAMENTAL OF THE NURSING**

**Hospital:** The place where people are treated.

**Nurse:** A person who has completed a program of basic nursing

**Nursing:** The unique function of the nurse is to assist the individual, sick or well, in the performance of those activities contributing to health or its recovery that he would perform unaided if he had the necessary strength, will or knowledge.

**Patient:** An individual who require assistance to achieve health and independence or peaceful death.

**Health:** A state of complete physical, mental, and social wellbeing and not merely the absence of disease and infirmity.

## **QUALIFICATIONS OF THE NURSE**

The recruit for nursing must have :

1. Mental and physical health.
2. Good education .
3. Good personality.
4. Good power of observation.
5. Good memory for details .
6. Manual dexterity .
7. A calm, clear , pleasant voice.
8. Normal hearing , with willingness to listen .



## NURSING PROCESS

### 1. Assessment.

History taking, Physical exam, Nursing diagnosis.

### 2. Planning:

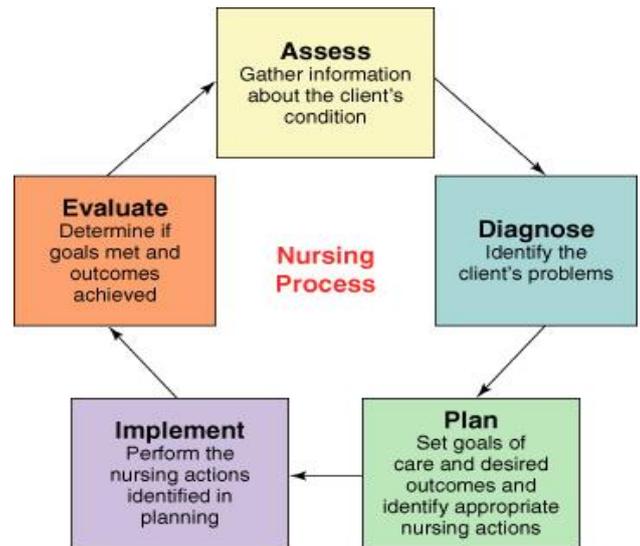
Setting priorities.  
Establishing goals for nursing action.  
Establishing expected outcomes.  
Team planning.  
Formulating the nursing care plan

### 3. Implementation:

This includes monitoring, teaching, further assessing, incorporating physicians orders and monitoring cost effectiveness of interventions.  
Nursing assurance.  
.Outcome criteria

### 4. Evaluation:

Quality assurance, Continue plan of care- ongoing.  
Outcome criteria ,Problem resolved.  
A comparison of patient behavior and/or response to the established outcome criteria  
Continuous review of the nursing care plan  
Examines if nursing interventions are working  
Determines changes needed to help patient reach stated goals.



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## PATIENT'S CHART

**Chart:** A record of the patient condition used by all staff members responsible for his care.  
The patient's chart includes:

1. Full information about the patient's name , adrees ,age, sex , martial status and etc.
2. A graphic form for recording vital signs, fluid intake and output , height and weight.
3. A form of medication.
4. A form for recording past medical history , physical examination and diagnosis.
5. A form of laboratory findingsand x-ray sheet.
6. Sheet of (Operative permit,Anesthesia, Operative , Discharge).

## MEASURING AND REGISTERING HEIGHT AND WEIGHT:

On admitting any patient , the nurse must measure and record his height and weight. The height must be measured while the patient is wearing the internal clothes only.  
Standards tables for height and weight must be the determinant of whether the measurements of the patient are normal or abnormal.

## GANERAL NURSING CARE

- 1.Provision of the physiological needs ( respiration , nutrition , temperature and excretion (Safety needs , cosmetic needs , understanding needs and emotional needs .
- 2.Care of the mouth.
- 3.Provision of good environment for the patient.
- 4.Explanations to the patient about the hospital routine to decrease his fear and anxiety.
- 5.Position the patient in the proper position.

6. Checking the vital signs and fluid intake and output.

7. information about the patient's health status, which includes body temperature, pulse, respiration and blood pressure.

## **BODY MECHANICS**

**BODY MECHANICS:** The coordination of body movements of the nurse by using the movement organs of the body , which include bones , joints , nerve and brain. The aims are :

1. Keeping the vital organs in their correct anatomical and physiological position  
2. Facilitating the control on muscle and their movements.

3. Doing work with little muscular effort.

4. Giving good impression for others and creating self- confidence.

### **ESSENTIAL RULES FOR THE NURSE TO MOVER BODY:**

1. Stand and work near the thing or the body to be lifted.

2. Your direction must be in the same direction of your movement.

3. Keep your back straight.

4. When you stand keep one of your feet in front of the other to make the stability of your body.

5. When you stand keep one of your feet in front of the other to make the stability of your body better.

6. Use your body weight to bush or pull the thing .

7. try to keep your elbow close to your body when you lift anything.

8. Try to be as close to the thing as possible.

9. Ask other for help if the weight to be lifted is too heavy.

## **METHODS OF PHYSICAL EXAMINATION**

**1. INSPECTION :** By using the sense of vision to observe the general status of the patient and the skin, respiration , behavior and body movement (By the eye).

**2. PALPATION :** By using your hands to examine blood vessels , lymph nodes and Organs of the abdomen and pelvis.



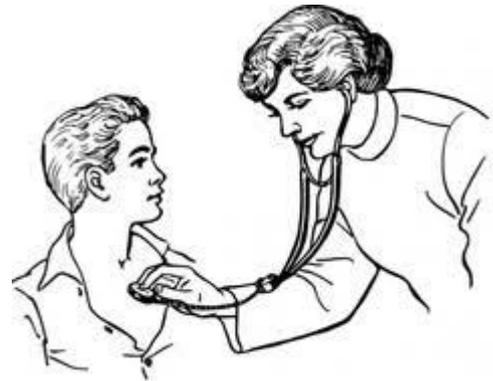
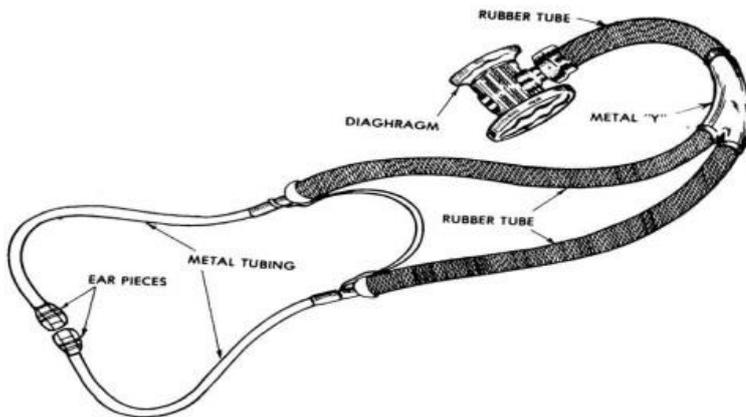
**3. PERCUSSION:** It is used to assess the chest and abdomen, to determine the presence of any gas or fluid (by hands and fingers).



**4.AUSCULTATION :** It is used to assess the heart sounds and breathing sounds, by using the stethoscope.

**Stethoscope consists of:** ear pieces, tubing, two heads such as the bell and the diaphragm.

- **The bell** has cup-shaped and is used to correct low-frequency sounds, such as abnormal heart sounds.
- **The diaphragm** is flat side of the head and is used to test high-frequency sounds: breath, normal breath, and bowel sounds.



### **Vital signs**

Vital signs : are important criteria to show the change in the patient's condition . which give actual picture of the work of different body system . the vital include :

- 1.Body temperature
- 2.Pulse rate.
- 3.Respiratory rate.
- 4.Blood pressure.

### **Body Temperature**

Body temperature :Is the balance between the heat production due to chemical interactions in the body and the heat loss from the body .The normal reading of body temperature is about 37° centigrade or 98° Fahrenheit. The normal range is 36.6° - 37.2°.

## CONVERSION FROM FAHRENHEIT TO CENTIGRADE AND VICE VERSA:

$$^{\circ}\text{C} = 1.8^{\circ}\text{F}$$

$$^{\circ}\text{F} = 0.54^{\circ}\text{C}$$

$$(\text{X}^{\circ}\text{F} - 32) \times 5/9 = \text{Y}^{\circ}\text{C}$$

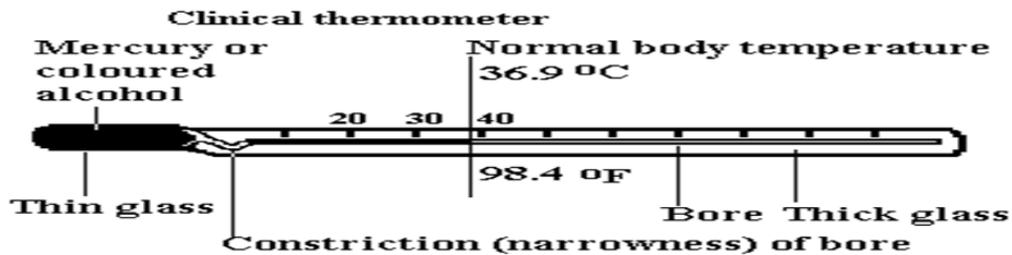
$$(\text{X}^{\circ}\text{C} \times 9/5) + 32 = \text{Y}^{\circ}\text{F}$$

$$\text{Or: } 5 \times (\text{F} + 40) = 9 \times (\text{C} + 40)$$

The temperature is measured by using the clinical thermometer, which consist of parts :

a-The bulb : Which contains the mercury.

b-The shaft : Which is usually graduated from 34° C To 42.2°C.



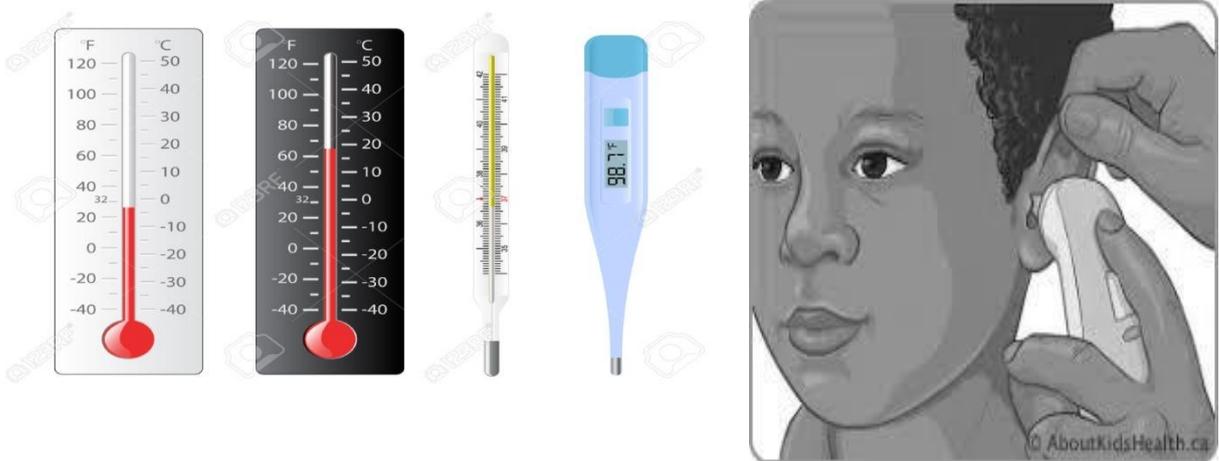
There are three methods of measuring body temperature ( by using thermometer) :

1. ORAL
2. RECTAL
3. Axillary

Body temperature = oral reading

Body temperature = Axillary reading +0.5° C

Body temperature = Rectal reading \_ 0.5° C



Pyrexia (fever): an elevation in normal body temp. is the result of a direct action on temp. regulating center in the hypothalamus.

## **METHODS OF MEASURING BODY TEMPERTURE:**

**1.ORAL METHOD:** By putting the clinical thermometer under the tongue for 3-5 minutes.

This method is contraindication in the following cases:

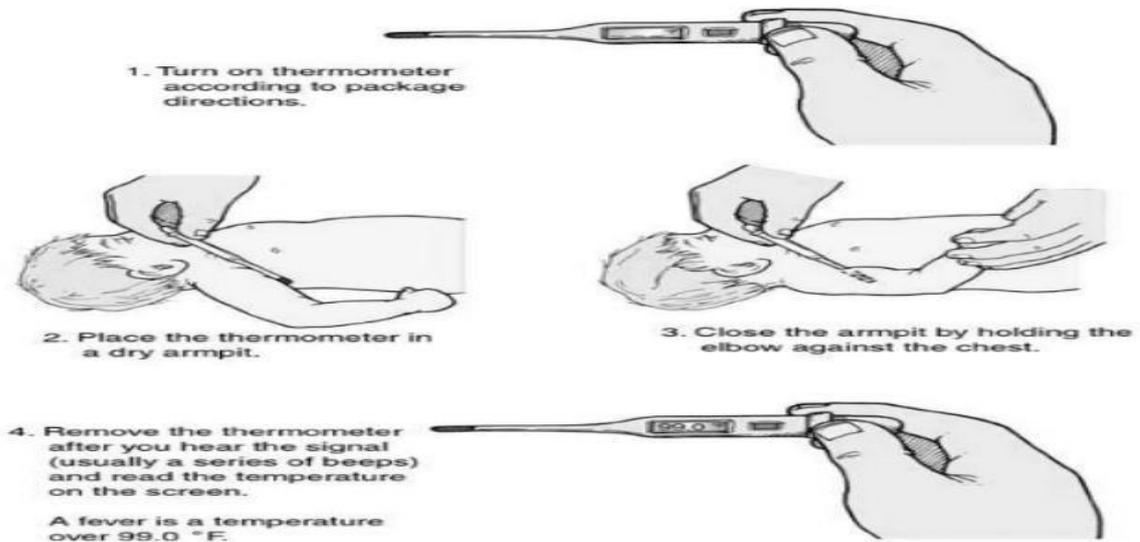
a-Unconscious patients.

- b- Infants and children under six years of age.
- c- A patient who breathes through his mouth.
- d- A patient with oral or dental surgery.
- e- A psychiatric patient.
- f- Patients with continuous coughing.



**2.AXILLARY METHOD:** By putting the temperature in the axilla for 9-11 minute. It is Used only when both oral and rectal methods are contraindicated. in this method we must add 0.5°C to the reading of the thermometer.

### How to Measure Body Temperature: Axillary



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**3.RECTAL METHOD:** By putting the thermometer in the rectum for 1-2 minutes. It is considered the most accurate among the three methods.



### CONTRAINDICATIONS:

a-A child suffering from diarrhea.

b- Patients with rectal surgery as haemorrhoidectomy.

In this method we must subtract  $0.5^{\circ}$  from the reading of the thermometer.

### NURSING CARE FOR THE PATIENT WITH FEVER:

1. Measure body temperature each 2-4 hours.

2. Give good nutrition for the patient increasing the carbohydrates and proteins to prevent loss of weight due to increased burning of food in the body.

3. Increase liquids given to the patient.

4. Frequently change the clothes and bed linen of the patient, because the fever causes increased sweating.

5. Give drugs to decrease body temperature, as aspirin or paracetol according to the doctor's advice.

6. Give cold sponges for the patient. And if the temperature is more than  $40^{\circ}\text{C}$ , then give alcohol bath (water + 50% alcohol), then give him cold rectal enema.

### PULSE

**PULSE:** Is the expansion of the arterial wall as a result to increased blood volume in the arteries when the left ventricle of the heart contracts. The normal pulse for a healthy adult is approximately 50 – 100 beats/ minute.

### FACTORS WHICH AFFECT THE PULSE:

1. Psychological factors.

2. Physical exercise.

3. Decrease blood pressure.

4. Fever: For each  $1^{\circ}$  Fahrenheit increase in body temperature, there is an increase of 7-10 beats / minute.

### NOTES IN TAKING THE PULSE:

1. **PULSE RATE :** The number of heart beats per minute. The normal for adults is 60 -100 beats / minute. It varies according to:

a- Age : 120 -130 beats / minute in infants.

60-80beats / minute in adults.

b- Sex: faster in females by about 7-8 beats / minute.

c- Body size : slower in tall and slim than in short and fat.

### 2. RHYTHM OF THE PULSE:

a- Regular pulse : The beats are regular with the same interval between them.

b- Irregular pulse : The beats are irregular with different intervals between them.

### 3. VOLUME OF THE PULSE:

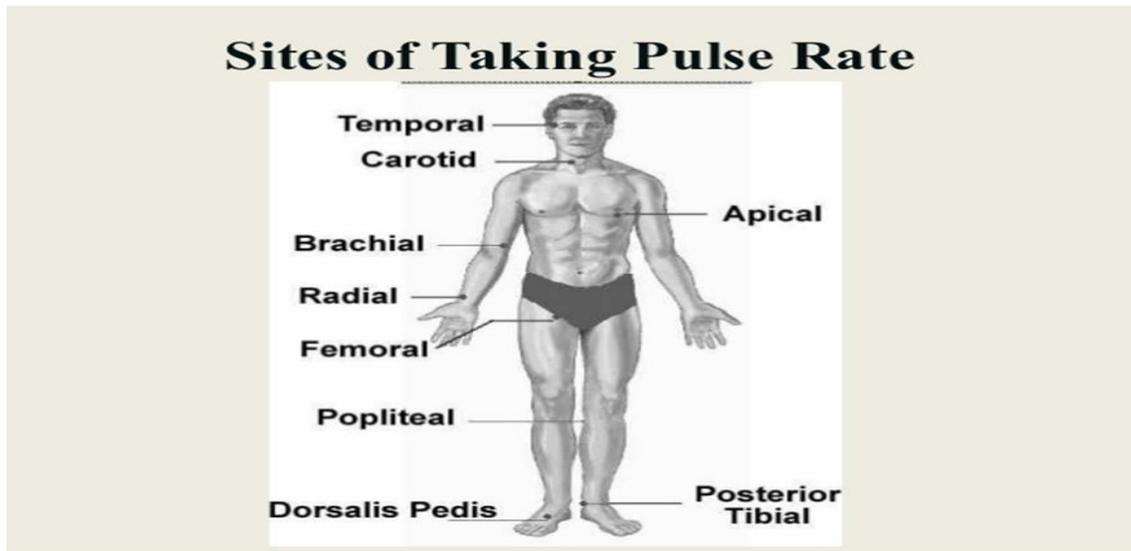
a- full pulse : when the volume is large.

b- Thready or weak pulse: When the volume is weak.

4. **CONDITION OF THE ARTERIAL WALL :** when can be felt by palpation with the fingers. In old age, the arterial walls become less elastic.

## SITES OF TAKING THE PULSE :

- a-Radial artery
- b-Brachial artery.
- c-Carotid artery.
- d-Femoral artery.
- e-Posterior popliteal artery.
- f-Temporal artery.
- g-Facial artery.



The pulse is taken while the patient is lying. The nurse puts her three fingers ( the ring finger the middle finger and the index finger ) over the radial artery of the patient pressing it to feel the pulse, and counts the rate for one minute.



Sometimes the nurse counts the heartbeats by putting the stethoscope on the chest of the patient between the fifth and sixth ribs. At a distance of three inches to the left of the midline of the chest.

Sometimes two nurses act together. so that one of them listens by the stethoscope to the patient's heartbeats, while the other feels and counts the radial pulse of the patient.

**TACHYCARDIA** : Rapid pulse. When the pulse rate is more than 120 beats per minute.

**BRADYCARDIA** : Slow pulse. When the pulse rate is less than 60 beats per minute.

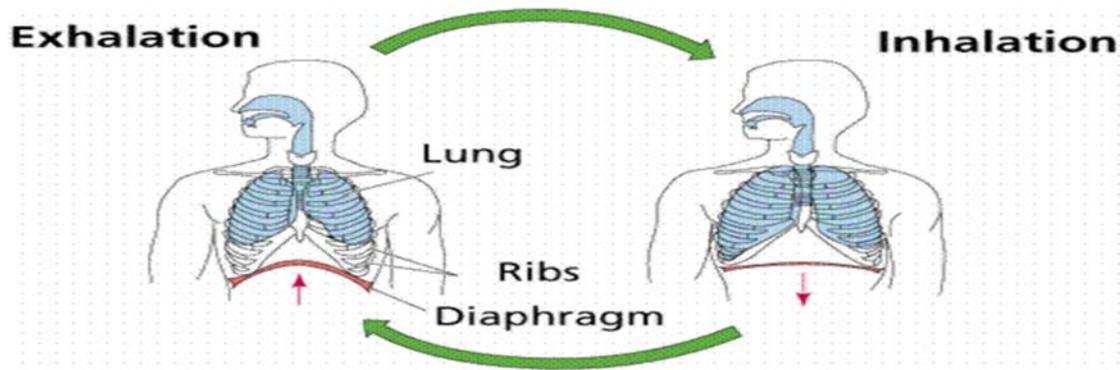
**ARRHYTHMIA** : Irregular pulse rhythm.

## RESPIRATION

RESPIRATION: Is the process by which oxygen and carbon dioxide are exchanged. The normal rate of respiration for normal persons is 14-24 cycle/minute .

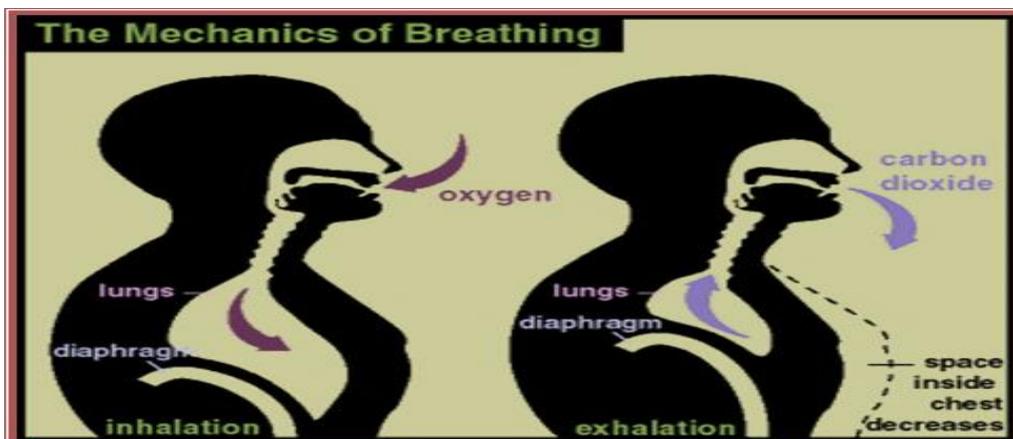
There are two types of respiration :

1. INTERNAL RESPIRATION: The process by which oxygen goes from the blood to the cells. And carbon dioxide from the cells to the blood . It occurs in the cells of the body.
2. EXTERNAL RESPIRATION : The delivery of oxygen to the blood, and the removal of carbon dioxide from the blood. It occurs in the lungs.



### NOTES IN OBSERVING THE RESPIRATION :

1. RESPIRATORY RATE : Is the number of respirations per minute.
2. RESPIRATORY DEPTH : Is the air volume taken in each respiration . This volume normally is 500 cubic centimeters (500cc). Respiration can be:
  - a- deep: when large volume of air is taken in.
  - b- Shallow : when small volume of air is taken in.
3. NATURE OR CHARACTERISTICS OF RESPIRATION:
  - a- Stertorous breathing : When it is accompanied by snoring sound.
  - b- Wheezing breathing When it is accompanied by wheezes.
4. An increased rate of respiration ( more than 24 cycle/minute).
5. HYPERPNOEA : An increased depth of respiration.
6. DYSPNOEA : When breathing is difficult for the patient.
7. POLYPNOEA EUPNOEA : When breathing is done easily without effort or noise .



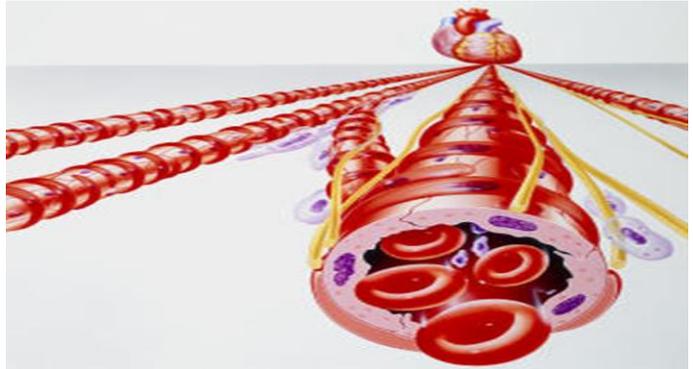
## BLOOD PRESSURE

**BLOOD PRESSURE** : Is the pressure on the arterial walls when the left ventricle of the heart pushes blood into the aorta . The maximum pressure is called systolic pressure . while the minimum pressure is called diastolic pressure . Normal blood pressure is 120/80 mm.Hg . the range for pressure systole is 60-90 mm Hg. And for pressure diastole is 100-140 mm Hg.

**PULSE PRESSURE** : The difference between systolic and diastolic pressures.

### FACTORS WHICH MAINTAIN NORMAL BLOOD PRESSURE :

- 1.Cardiac output.
- 2.Peripheral resistance.
- 3.Elasticity of blood vessels.
- 4.Viscosity of blood.



### FACTORS WHICH AFFECT NORMAL BLOOD PRESSURE :

- 1.Age
- 2.Sex
- 3.Body build
- 4.Exercise
- 5.Psychological condition

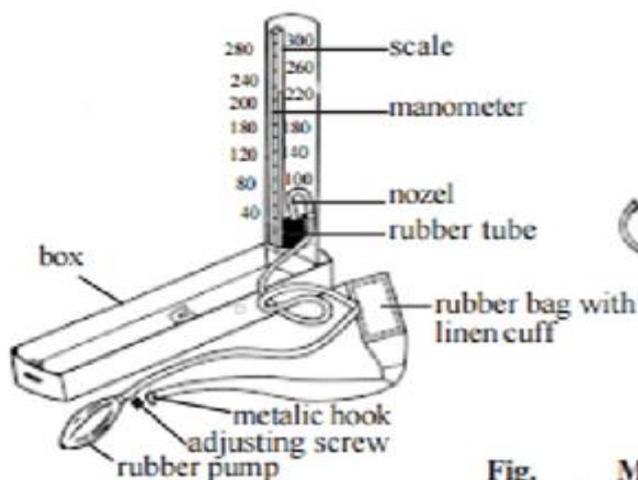


Fig. Sphygmomanometer

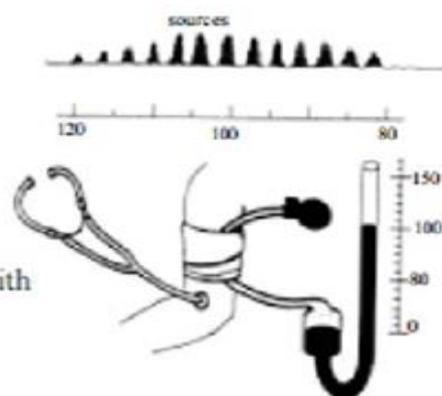
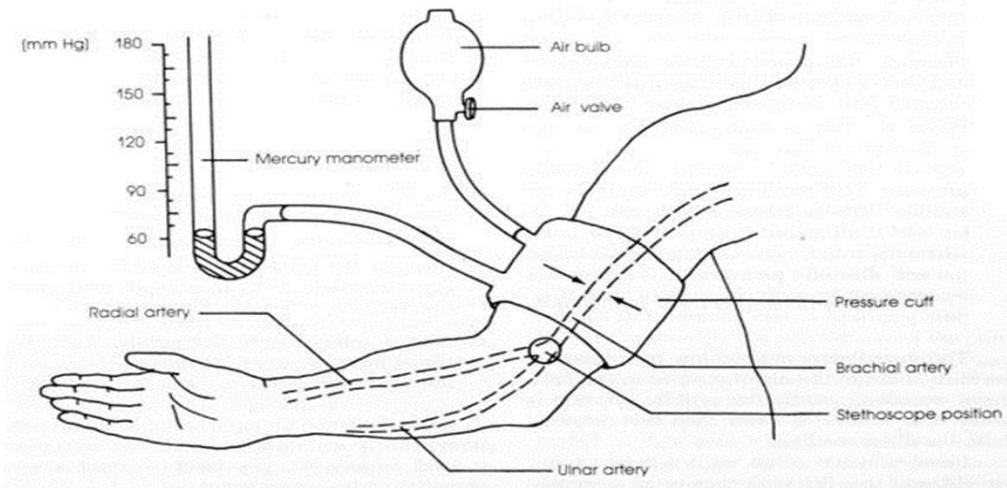


Fig. Method of measuring blood pressure

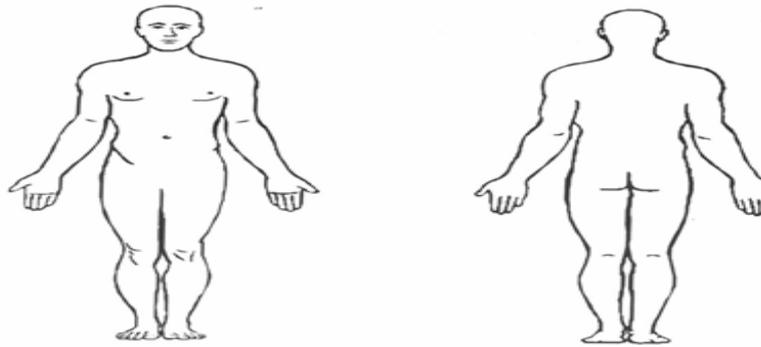


**HYPERTENSION:** Increased blood pressure more than 120/80 mm Hg.  
**HYPOTENSION:** Decreased blood pressure less than 120/80 mm Hg.



### **POSITIONING THE PATIENT**

1. **ERECT ( ANATOMICAL POSITION ):** This is the normal position to inspect the body posture , muscle and extremities.

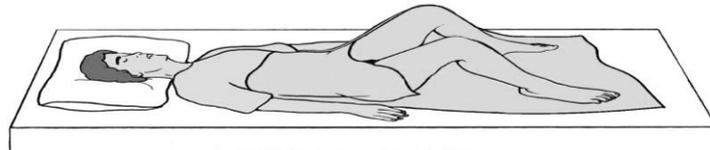


2.DORSAL POSITION ( HORIZONTAL POSITION , RECUMBENT POSITION ): the patient lies on his back with his legs together . His legs may be supported with pillows . it is used for examining the abdomen, chest head , neck , eyes, ears and nose.



3.DORSAL RECUMBENT POSITION : The patient lies on his back with the legs separated and knees flexed. It used in examination of the rectum and vagina .

**Figure 18-6: Dorsal Recumbent Position**

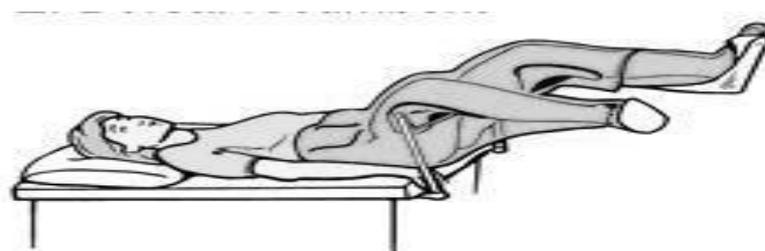


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4.LITHOTOMY POSITION :The same as dorsal recumbent position except that the patient is usually on table equipped with foot stirrups. The patient's buttocks are brought to the edge of the table . It is used for rectal examination and in delivery for pregnant women.



**F. Lithotomy**

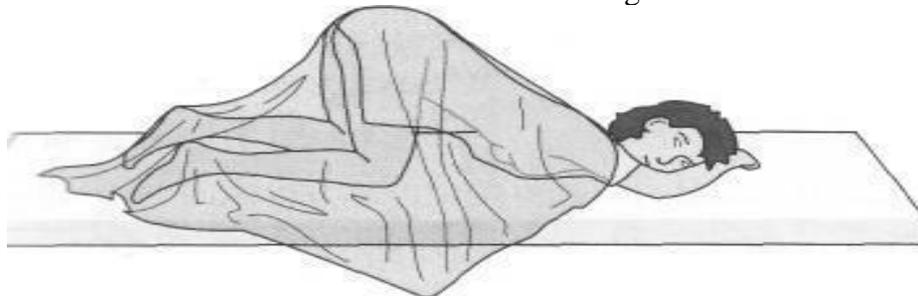
5. PRONE POSITION :The patient lies with his abdomen down , the head to one side and his arms on his head. It is used for examination of the back and for rest.



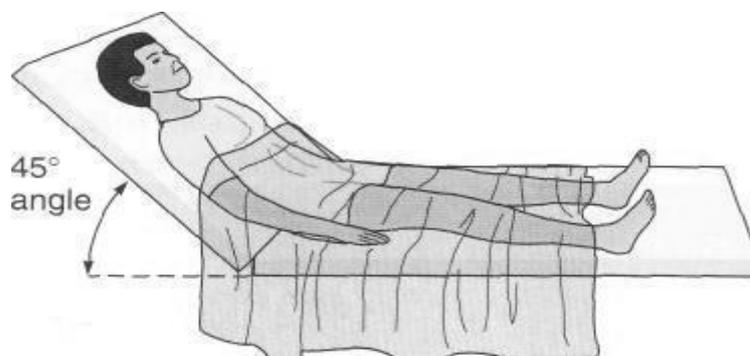
6. LATERAL POSITION :The patient lies on either side , the knee are flexed .it is used for vaginal and rectal examination.



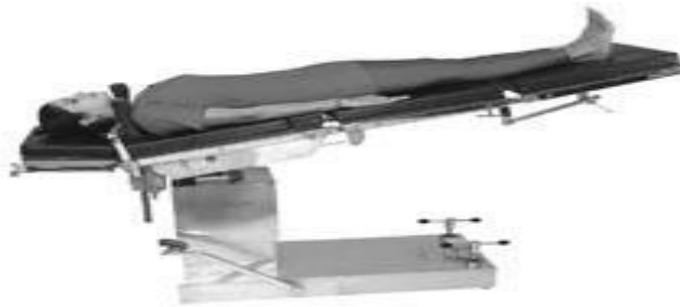
7. KNEE- CHEST POSITION :The patient rests on his knee and chest while the head is turned to one side . It is used for examination of the rectum and vagina and for some treatments.



8. FOWLER POSITION: It is done by raising the head side of the bed to an angle of about 45°. It is used for patient with difficult breathing and patients with thyroectomy.

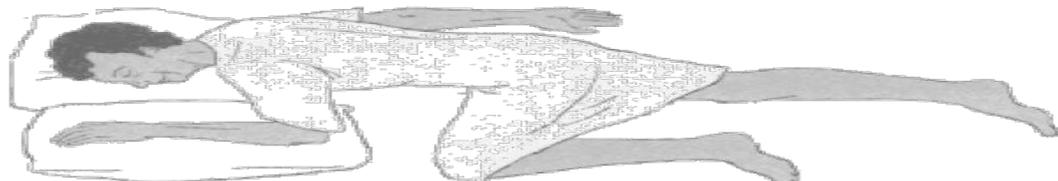


9.TRENDLEBURG'S POSITION : It is done by lowering the head – side of the bed and elevating the foot –side of the bed . It is used for patient going into shock.

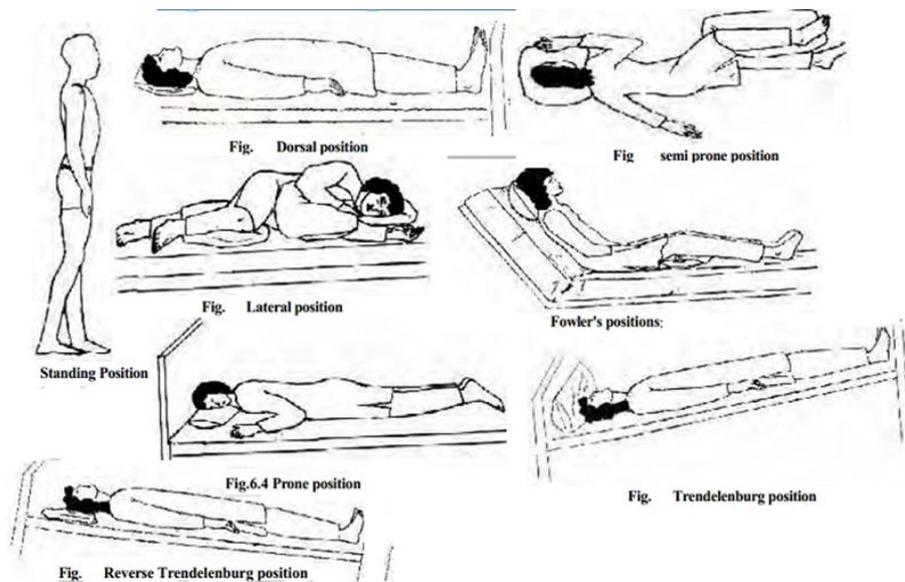


10.SIMS`S POSITION : The patient on the left side , with the chest , the right knee, and thigh drawn up the left arm along the bag, for vaginal examination .called also semiprone position.

### Lateral Decubitus (Sims) Position



Stanford Medicine 25



### FLUID INTAKE AND OUTPUT MEASUREMENT

It is an accurate recording and measurement of fluids introduced into the human body

Orally , intravenously or rectally , and fluid which are excreted from the body (urine,vomits , aspirations, diarrhea , bleeding and eye).

The purpose is to enable the doctor to maintain the patient's salt and water balance in man

Medical and surgical conditions.

## MEASURING AND RECORDING FLUID INTAKE AND OUTPUT:

Normally the body keeps the balance between fluids taken as water and fluids excreted as Sweat , urine , bleeding , vomiting and diarrhea.

In pathological condition when this balance is distributed , it is necessary to compensate these fluids .Normally water intake is three liters daily , and the lost fluid must be the same.

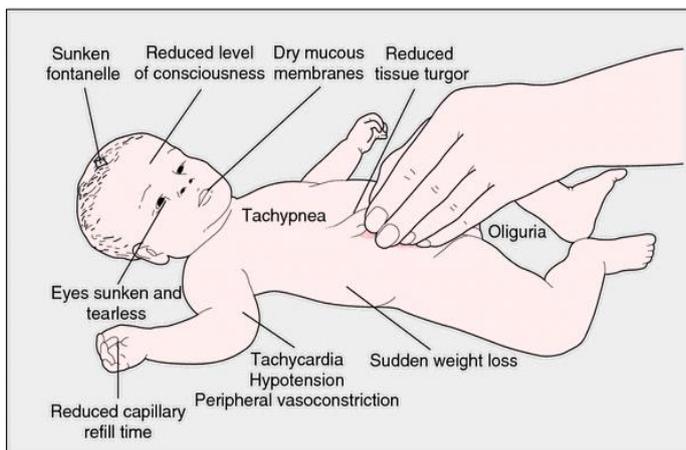
## REASON FOR FLUID IMBALANCE:

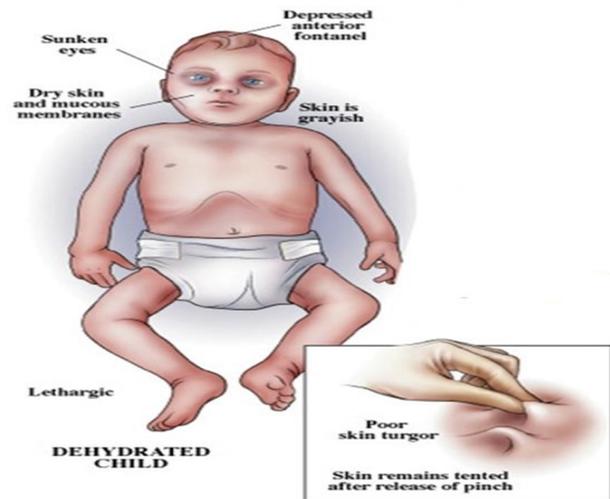
- 1.Insufficient intake.
- 2.Disturbances of the gastrointestinal tract.
- 3.Disturbances of the kidney function.
- 4.Excessive sweating.
- 5.Haemorrhage and burns.

## SIGNS AND SYMPTOMS OF DEHYDRATION:

Thirst , hypotension , loss of weight , general weakness , decrease in amount of urine , dark color of urine, which is highly concentrated and skin dryness.

If dehydration increases , then the pulse rate decrease , the body temperature rises and there may be shock .





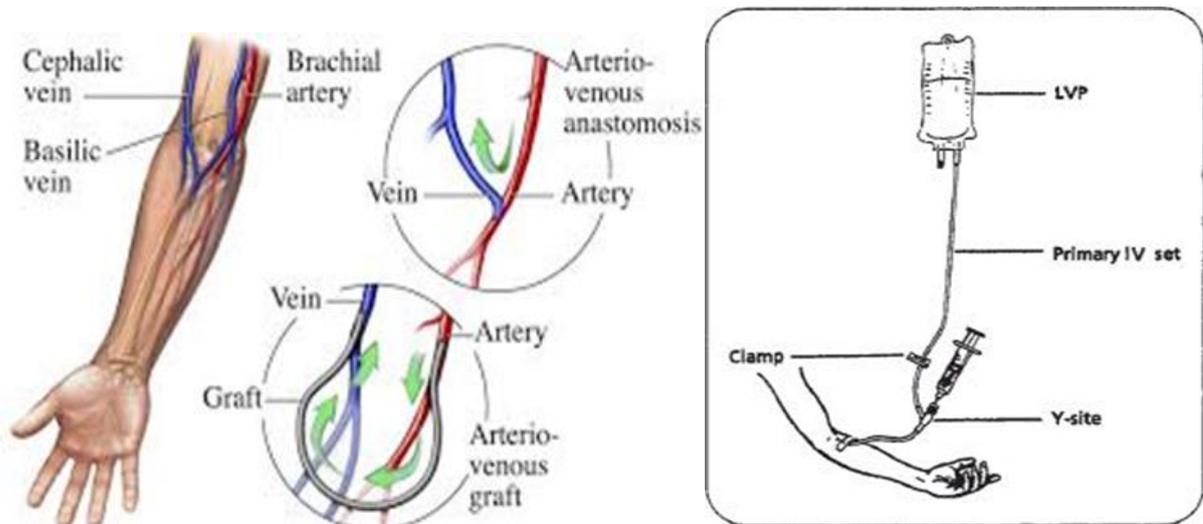
## INTRAVENOUS ADMINISTRATION

INTRAVENOUS ADMINISTRATION : Is the introduction of a solution or a drug directly into a vein.

INFUSION : Give a large quantity of solution by intravenous ( I.V ) rout.

### VEINS USE FOR I.V INJECTION:

1. Basilic vein.
2. Median cephalic vein.
3. Saphenous vein.
4. Venous network on back of the hand.



FLOW RATE : Is usually 40 -60 drops / minute.

## **SOLUTION GIVING INTRAVENOUSLY:**

### **1.FLUID AND ELECTROLYTES :**

a-ISOTONIC : The same concentration as that of the body:

-Normal saline 0.9%.

-Dextrose 5% in water.

The above mentioned two solutions meet all requirements in 95 per cent of cases.

b-HYPERTONIC : A solution which has higher osmotic pressure than that of blood serum as.

### **2. MEDICATION.**

### **3.BLOOD.**

## **OBJECTIVES OF GIVING INTRAVENOUS THERAPY:**

1.To replace water and electrolytes for patient who cannot maintain an adequate intake by mouth.

2.To replace acid – base balance.

## **NURSING RESPONSIBILITIES FOR PATIENT CARE DURING I.V INFUSION:**

1.Check that the patient's arm is in the proper position.

2.Calculate the rate of flow , Blood transfusion is usually given as ten drops per minute.

3.Observe for signs of reaction.

4.Change position of the patient frequently.

5.Record any information about I.V infusion.

## **CONTRAINDICATIONS FOR INTRAVENOUS FLUID THERAPY:**

1.Heart failure.

2.Pulmonary congestion.

3.Hypotension.

4.Poor renal function .

## BLOOD TRANSFUSION

BLOOD TRANSFUSION : Is the administration of whole blood or a component such as plasma , packed RBCS, or platelets.

### INDICATIONS FOR BLOOD TRANSFUSION:

- 1.Cases of severe bleeding due to wounds or diseases as in bleeding peptic ulcer.
- 2.Before surgical operations when the patient has sever anemia.
- 3.In extensive burns and in major surgical operations which may cause loss of a huge amount of blood.
- 4.In cases of septicaemia.
- 5.In some blood disease\ s which cause bleeding as haemophilia

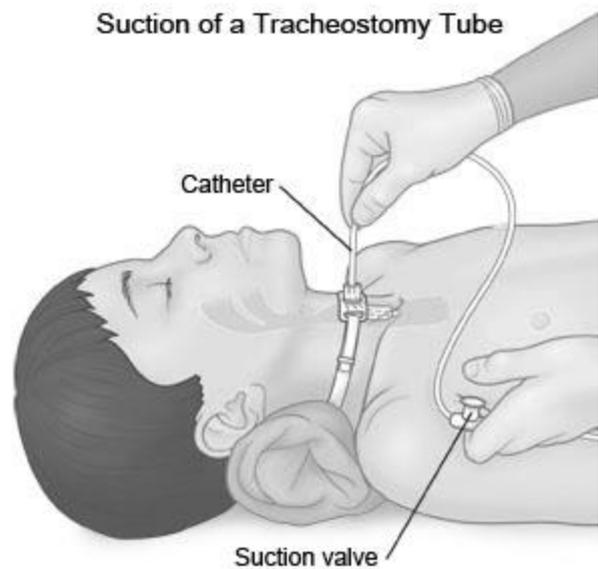
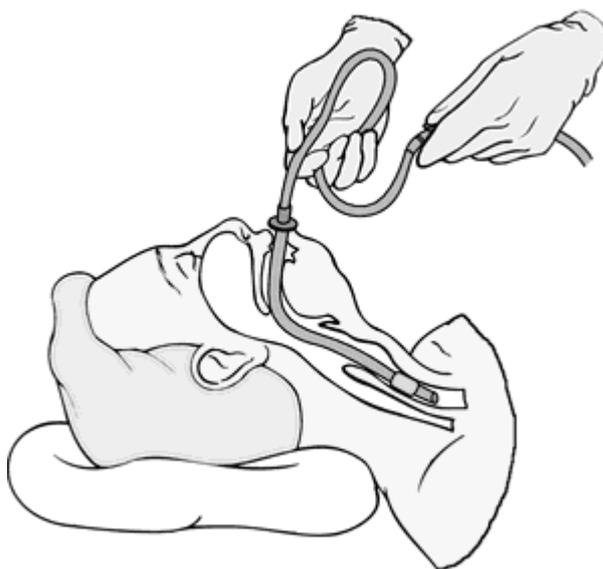
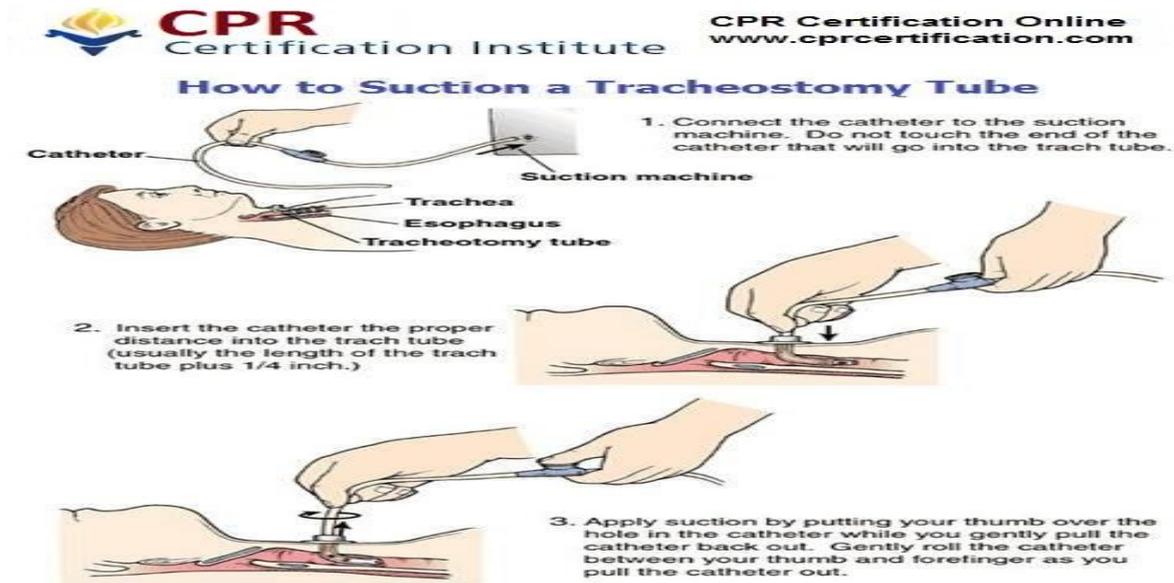


### MANAGEMENT:

- 1.Check blood for its group and Rh.
- 2.Check the vein puncture site for signs of infection.
- 3.Check the vital signs and Hb.
- 4.Assess any side effects as fever, rash , itching and etc.
- 5.Psychological support to the patient and his family.
- 6.If reaction occur the nurse should.
  - a-Stop the transfusion immediately.
  - b-Notify the physician.
  - c-Remain with the patient , observe signs and symptoms and monitor vital signs every five minutes.

## SUCTIONING

SUCTIONING: A process to remove secretions, which may cause dyspnoea, from the mouth and larynx.

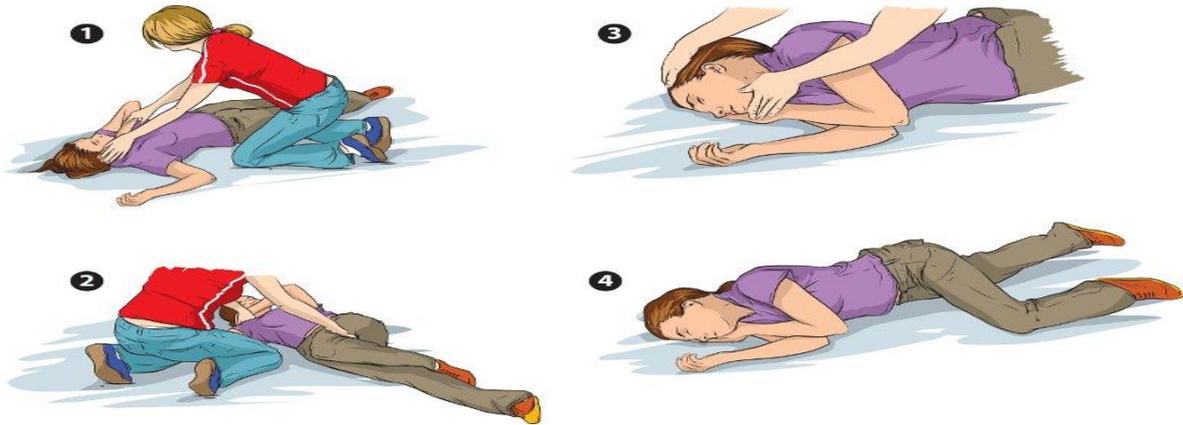


### INDICATION FOR SUCTIONING:

1. Unconscious patient.
2. During surgical intervention or operations.
3. For babies after delivery.

## UNCONSCIOUSNESS

UNCONSCIOUSNESS : Is a condition in which there is depression of cerebral function.



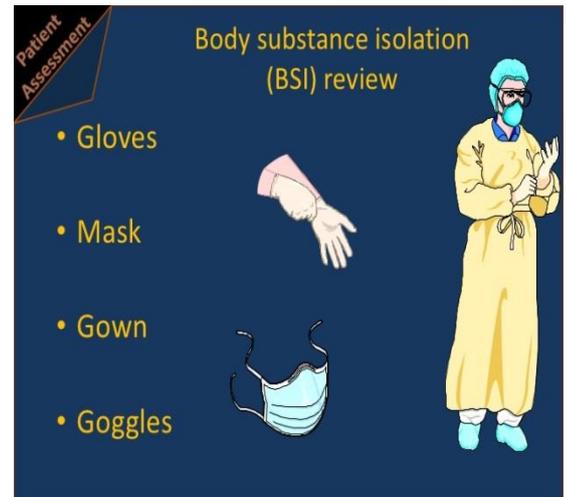
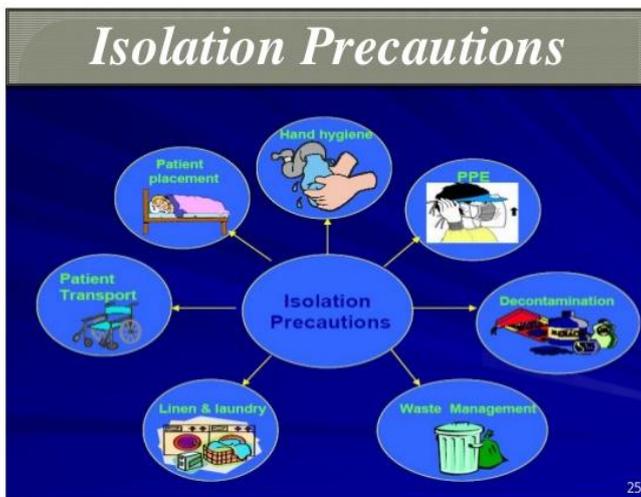
### MANAGEMENT:

- 1.Put the patient in lateral or semiprone position to prevent the airway obstruction.
- 2.If respiration is accompanied with snoring , then lay the patient on his back , keeping his head and shoulders slightly elevated , and turn his face to one side.
- 3.If you observe bubbles in his secretions , then lay him with his face down.
- 4.Loosen all tight clothes.
- 5.Keep the airway free of secretion by efficient suctioning.
- 6.If respiration stops , then do artificial respiration.
- 7.If there is bleeding , then stop it.
- 8.Check vital signs , especially pulse and blood pressure.
- 9.Search for the cause of unconscious.
- 10.Never give him anything by mouth.
- 11.Don't heat him.
- 12.Ask the doctor to come immediately.
- 13.Prepare for tracheostomy if coma is deepening.
- 14.Record the patient's exact reactions as pupil's opening , verbal response , movements  
And quality of speech.
- 15.Examination the pupils of the eyes for size , shape and reaction to light.
- 16.Maintain fluid and electrolyte balance as intravenous fluids and gastric gavage ( nasogastric feeding).

17. Checking position frequently to prevent skin break down ( decubitus ulcer.)
18. Protect the patient from injury , especially during seizures or convulsion.
19. Maintain bladder and bowel elimination to prevent infection.
20. Keep patient 's privacy.

## ISOLATION

ISOLATION : The patient with a communicable disease is isolated to prevent any complication . which may occur to him and to prevent spread of his disease to others.



### NURSING MANAGEMENT:

1. Keep the patient segregated from the others , with all the equipment needed for his care kept in his unit.
2. Keep all linen used by the patient separate.
3. Wash hands before entering the patient's unit and on leaving.
4. Use aseptic technique when working with the patient , as facemask , special shoes , disposable gloves and etc.
5. Educate the patient's family about the process of contamination and how to avoid it.
6. Dispose of all waste matter and excretion as directed by hospital policy.

## MAINTAINING NUTRITION

FOOD: Substance essential to health , which are carbohydrates , proteins , fats , vitamins

And minerals . water is essential to maintain fluid balance in the body.

The person needs foods for the following:

1. Growth and tissue repair.
2. Activity.
3. Production heat.
4. Emotional status.
5. More food is needed in pregnancy and lactation.
6. To overcome disease.

### THE IMPORTANCE OF NUTRION :

Correct feeding is very important for the patient . Some patient need certain foods to ensure cure such as iodine for patients with goiter . Others need to avoid certain foods

To ensure cure as avoiding sugars for diabetic patients.

All patients need a balance diet containing the recommended daily allowance for all constituents of food such as proteins , carbohydrates , fats , vitamins , minerals , fibers , and water .

### MANAGEMENT TO IMPROVE THE PATIENT'S APPETITE:

1. See that the patient is in a comfortable position.
2. Be sure that the patient is clean and is not damp or soiled.
3. Alleviate pain or discomfort.
4. Avoid treatments such as enema , dressing and injection immediately before or after meal time.
5. Check for what the patient likes or dislikes.
6. Keep out of sight objects that would be unpleasant to look at while eating.
7. Make the meal pleasant by arranging dishes nicely.
8. Some patients need assistance while eating or drinking.

ANOREXIA : Is the lack of appetite for food.

DYSPHAGIA: Is difficulty in swallowing.

POLYPHAGIA : Is excessive eating.

## ADMINISTRATION OF OXYGEN

ADMINISTRATION OF OXYGEN : Is the most common form of therapy for patient with respiratory dysfunction.

PURPOSE OF OXYGEN THERAPY:

1. To maintain health and life.
2. To relieve hypoxia.
3. During cyanosis and dyspnea.

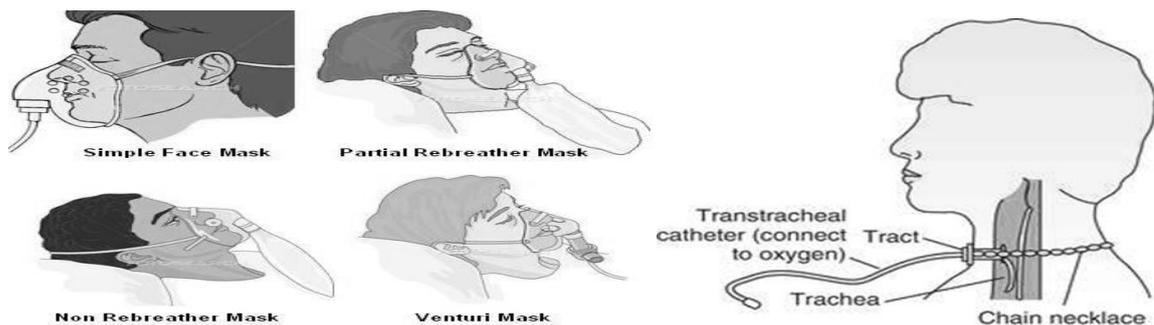
Normal range of oxygen pressure in blood is 80-100 mmHg.

CAUTIONS IN OXYGEN ADMINISTRATION:

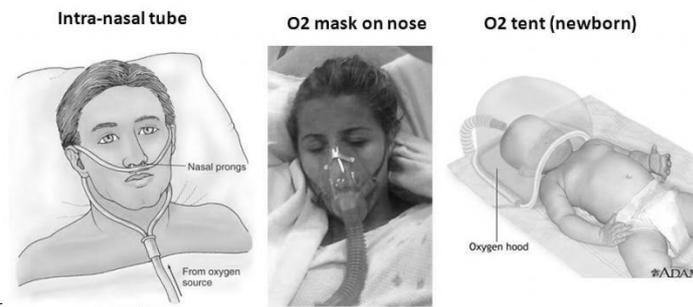
1. Open flames should be avoided.
2. No smoking should be allowed in the unit.
3. All electric devices should be removed from the unit.
4. Clothes made of wool, silk and nylon should be eliminated.

METHODS OF OXYGEN ADMINISTRATION:

1. Nasal cannula.
2. Nasal catheter : Inserting the catheter from the nose to the nasopharynx.
3. Transtracheal oxygen : inserting a small catheter directly into the trachea through a surgical opening in the neck.
4. Oxygen mask



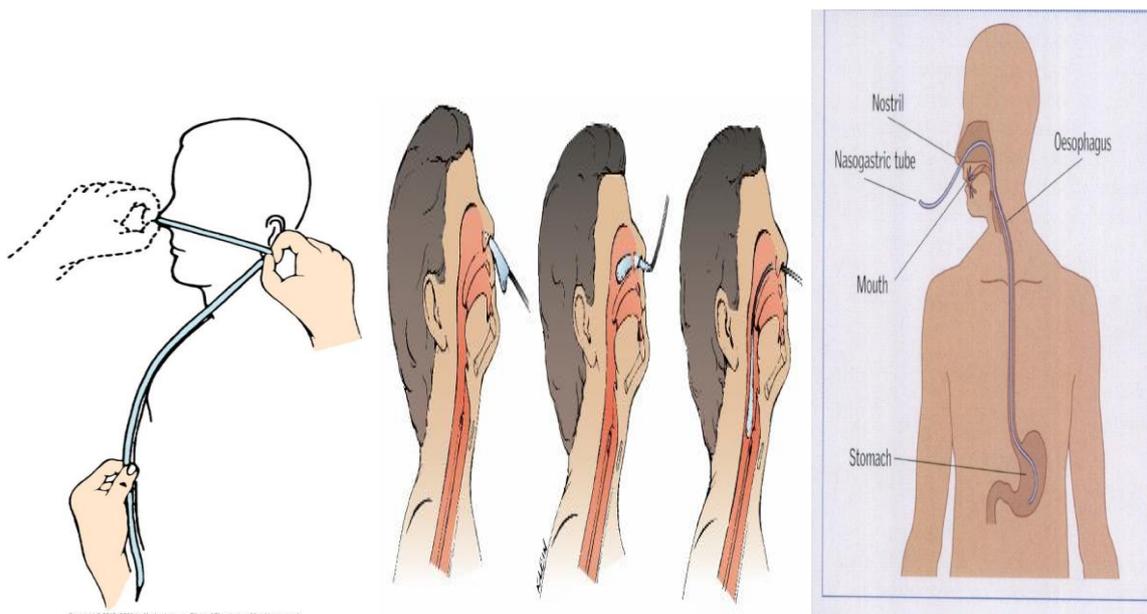
## O<sub>2</sub> THERAPY: (3 ways)



5. Oxygen tent

## Nasogastric feeding

Nasogastric feeding: Is the delivery of nutrients from the nasal route into the stomach via a feeding tube.



Purpose:

1. To feed patient with fluids when oral intake is not possible such as
  - a- surgery in the mouth .
  - b- mental diseases.
  - c- fracture of the jaw.
  - d- unconsciousness .
2. To prevent stress on operated site by decompressing stomach of secretions and gas
3. To relieve nausea, vomiting and distention following surgery.

## **Gastric Lavage**

Gastric Lavage : Is the process of cleaning out the contents of the stomach.

Goals:

1. Treatment of poisoning cases winning by mouth, such as alcohol, food corrupt .
2. Sever vomiting cases such as intestinal obstruction and ventricular opening.
3. Cases of chronic gastritis are used as diluted oxygen and concentration 2%.
4. Before surgical operation of stomach.
5. To remove the stomach contents for the diagnosis .
6. To remove gastric contents when emesis induction is unproductive or contraindicated .

## **NURSING CARE FOR OPERATIONS**

### **PREOPERATIVE CARE:**

1. Admit the patient , prepare his case sheet , fill it completely and add the consent of patient or his family if he is less than eighteen years old.
2. Examine for the vital signs , weight and program a general physical examination.
3. Perform the necessary laboratory tests , as blood group , haemoglobin level and etc.
4. personal hygiene : The patient is advised to take a bath the night before the operation.

### **DIRECT CARE BEFORE OPERATION:**

- 1.Skin preoperation : cut the hair , clean the skin using soap and water , rub the area by an antisept , then cover by dressing to prevent its contamination and decrease the number of skin microorganisms in order to prevent them from entering the body during operation.
- 2.Elimination : Emptying the bladder from urine and the rectum from faeces , so give the patient an enema the night before operation.
- 3.Food and fluid : Observe the patient for a week before operation , and give him sufficient food and if he is unable to take it by mouth , then feed him intravenously.
- 4.Care of valuable belongings of the patient.
- 5.personal hygiene :bathing the patient , care of nail and hair . Cut the nails to prevent scratches after operation while the patient is unconscious . Remove nail painting because the anesthesiologist needs to see the nails to know the condition of blood oxygenation and

circulation . Take care of teeth by telling the patient to brush his teeth three times daily  
remove dentures from the mouth of the patient.

6. Instruct the patient to follow the rules , which help him to recover rapidly and decrease  
complications after operation . these instruction include:

a-Deep breathing and cough : To prevent pneumonia.

b-Changing position every two hours for 24 hours to prevent blood clotting in the lower  
limbs.

d-Early ambulation.

c-Moving the lower limbs.

e-Drinking a large amount of liquids.

7. Prepare the patient immediately before operation by

a-Wearing the special gowns.

b-Assuring and calming him.

c-Pre medication by giving him pethidine to calm him , and atropine to decrease secretions  
to the respiratory passages.

d-Assuring the members of the family about the patient's condition.

e-Transferring the patient to the operation room on the wheeled chair . He should be covered  
by a clean cloth . Send with him his case sheet in addition to the laboratory tests and x- ray  
films, with a record of his vital signs .

### **CARE OF THE PATIENT INSIDE THE OPERATING ROOM:**

1. A member of the surgical team should receive the patient.

The surgical team consist of:

a-The surgeon : Who is the doctor specialized in surgery , and who will perform the  
Operation.

b-The anaesthesiologist : Who is the doctor specialized in anaesthesia , and who will give the  
anaesthetic drugs.

c-The anaesthetist: Who is a nurse or a person trained in giving anaesthesia.

d-The instrument nurse : A nurse who gives the surgical tools to the surgeon.

e-The circulation nurse: A nurse who prepares every thing needed for the operation.

The instrument nurse and the circulating nurse are both responsible for counting the sponges used in the operation , and for being sure that all the sponges were taken outside the patient's body before suturing the wound.

f-The nursing team leader : a nurse responsible for planning , coordination and giving the nursing care to the patient during operation.

2.Assure the patient psychologically and introduce him to the members of the surgical team.

3.Lay the patient

4.Monitor the pulse, temperature , respiration and blood pressure before giving anaesthesia.

5.Give anaesthesia which can be:

a-General anaesthesia : Which causes loss of sensation of all the body.

b-Local anaesthesia : Which causes loss of sensation only in the area to be operated on.

c-Spinal anaesthesia : Which causes loss of sensation only in the lower part of the body.

## **POST – OPERATIVE NURSING CARE:**

AIMS :

1.Rapid return of the patient to normal condition.

2.Faster recovery from anaesthesia.

3.Prevention of the postoperative complications.

4.Shortening of convalescence.

5.Helping the patient to depend on himself.



CARE:

1.Transfer the patient to recovery room , taking care to avoid bleeding, which leads to shock.

2.Care in recovery room : which includes:

- a- Observe the patient and don't leave him alone.
- b- Keep the respiratory passages open by keeping the patient lying on his back and elevating his lower jaw upwards.
- c- When the patient is in deep anaesthesia , put an airway in his mouth until he becomes conscious.
- d- Take pulse , respiratory rate and blood pressure every five minutes.
- e- Watch the suction devices.
- f- Record liquids in and out.
- g- Watch the wound area to discover any bleeding.
- h- Tell the doctor when any abnormal signs appear.

In order to achieve the above mentioned duties , you need:

A-Qualified nurses.

B-A surgeon and an anaesthesiologist for emergencies.

C-Devices , such as:

- 1.Oxygen giving device and a bronchoscope.
2. Tracheostomy set.
3. Suction machine with a rubber tube.
- 4.Sphygmomanometer with intravenous set.
- 5.Venesection set.
- 6.Cardiac defibrillator.
- 7.Pace marker.
- 8.Dressing tray.
- 9.Drugs for emergencies , as for bleeding and hypotension.

#### **NURSAING CARE IN THE WARED:**

- 1.Change the patient's position every two hours.
- 2.Encourage early ambulation.
- 3.Encourage deep breathing and coughing.
- 4.Take care of the wound.
- 5.Remove urine by catheterization and faeces by enema.

6. Give good nutrition.

7. Ensure good fluid balance in order to avoid dryness and dehydration, which has the following signs : Thirst , tongue dryness , sunken eyes and loss of tissue elasticity.

8. Ensure electrolyte balance.

9. Record the following notes:

a- Vital signs.

b- Treatment and drugs.

c- Time of every elimination for a day or two.

d- Liquids taken by mouth or given intravenously and liquids lost by vomiting and urination.

#### **EARLY AMBULATION:**

Encourage the patient to walk on his feet alone or with the help of another person . This aims to decrease complications .

The process is as follows:

1. Move the patient to sit in bed.

2. Move the patient aside and let his legs dangle from bed.

3. Help the patient to stand beside his bed.

4. Let him return to bed when he feels tired.

5. If the patient cannot leave bed during the 24 hours which follow the operation . then encourage him to do the following exercises:

a- Deep breathing.

b- Exercises for the arms.

c- Exercises for the hand and fingers.

d- Exercises for the feet to prevent foot drop and prevent deformities of the toes.

#### **POSTOPERATIVE COMPLICATIONS:**

1. Haemorrhage.

2. Shock.

3. Pain.

4. Hypoxia.

5. Hiccup.

6. Thrombophlebitis.
7. Wound infection.
8. Intestinal gases.
9. Respiratory system complication . which are:
  - a- Bronchitis.
  - b- Pneumonia.
  - c- Thoracic cavity infection.
  - d- Pulmonary collapse.

#### **NURSING CARE FOR RESPIRATORY SYSTEM COMPLICATION:**

1. Supplying complete rest.
2. Watching the vital signs.
3. Encourage the patient to breathe deeply and to cough in order to get rid of secretions. which hinder respiration.
4. Changing the position of the patient in bed.
5. Encouraging the patient to move and leave bed early.
6. Giving him warm fluid.
7. Giving him nutrition rich in proteins and vitamins.
8. When complications occur, give the patient antibiotics after doing sputum culture and sensitivity testing.

#### **ISOLATION AND CARING FOR THE PATIENT WITH A COMMUNICABLE DISEASE:**

The patient is isolated to prevent spread of his disease to others. The period of isolation depends on the incubation period of his disease.

Quarantine is limitation of the patient's activities or the people who are in contact with him.

A communicable disease is that which is transmitted either directly or indirectly from one person to another, as common cold, measles, mumps, malaria, poliomyelitis, influenza, tuberculosis, trachoma, syphilis, meningitis, pneumonia, diphtheria, typhoid fever and cholera.

The patient is isolated in a separate room, which must have good ventilation and lighting and contain only the necessary things, which can be easily cleaned and sterilized.

The nurse and the doctor must wear special gowns. And after the touch the patient or his bed or belongings, They must wash their hands well by water and soap using a brush for three minutes. The secretion of the patient must be treated by a sterilizing solution . The patient's clothes must be boiled or immersed in a sterilizing solution before washing.

After discharging the patient from hospital , the bed and furniture must be cleaned well, and the room must be sterilized by fumigation formaldehyde.

**SURGICAL ASEPSIS:** Activities to keep an area without germs to prevent microorganisms from entering the body through the surgical wound.

**DISINFECTION :** Killing or removal of microorganisms or prevention of their growth.

Disinfection affects the vegetative forms only and doesn't affect spores . For example : using phenol, chlorine, iodine or mercury.

**STERILIZATION :** To get rid of all forms of microorganism as bacteria, spores , fungi and viruses.

#### METHODS OF STERILIZATION AND DISINFECTION:

##### 1. Physical methods (Thermal):

a-Dry heat : As oven , ironing , burning , ultraviolet rays and direct flame.

b-Moist heat:

-Boiling.

-Pasteurization.

-Steam under pressure (Autoclave).

##### 2. Chemical methods:

a-Gases : As Ethylene oxide.

b-Solution as:

-Halogens (Chlorine)

-Phenol.

-Soap.

-Gentian violet.

-Alcohol.

-Acids and bases.

-Mercurochrome.

## **FIRST AID**

**FIRST AID:** Is the branch of medical science in which treatment is given to people suffering from accident or from sudden illnesses.

**PRINCIPLE OF EMERGENCY MANAGEMENT:**

- OBJECTIVES:**
1. To preserve life.
  2. To restore the patient to useful living.
  3. TO prevent deterioration of health.

**PRIORITIES OF EMERGENCY MANAGEMENT:**

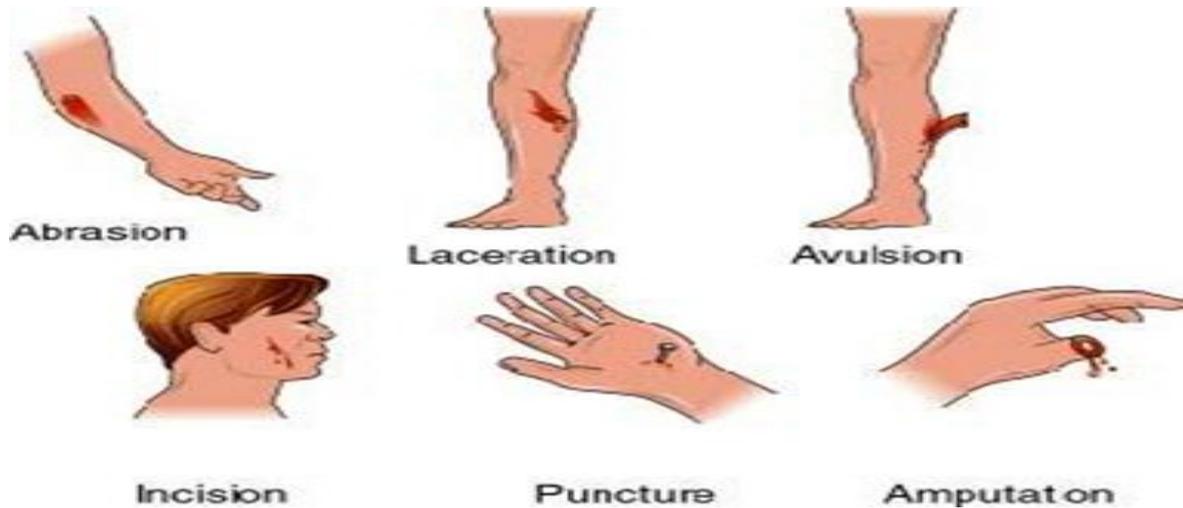
1. Maintain the air way open.
2. Stop bleeding.
3. Prevent and treat shock.
4. Assess for chest injuries and airway obstruction.
5. Protect wounds with sterile dressings.
6. Assess any fracture and fix it if present.
7. Keep the patient as comfortable as possible.

## **WOUNDS**

**WOUNDS :** Openings which occur because of broken skin or mucous membrane which are the first line of defence against harmful agents.

**TYPES OF WOUNDS:**

1. Simple wound ( الجرح البسيط ) .
2. Incised wound ( الجرح القطعي ) .
3. penetrating wound ( الجرح النافذ ) .
4. lacerated wound ( الجرح المتهتك ) .
5. Gunshot wound ( الجرح الناري ) .
6. Puncture wound ( الجرح الوخزي ) .



#### GENERAL PRINCIPLES IN THE TREATMENT OF WOUNDS:

1. Put the patient in a comfortable position.
2. Stop bleeding by direct or indirect pressure.
3. Use a sterile dressing or bandage.

#### CLASSIFICATION OF WOUNDS ACCORDING TO THE DEGREE OF CONTAMINATION

1. Clean wound.
2. Contamination wound.
3. Septic wound.

### BLEEDING

**BLEEDING** :Is a copious escape of blood from a blood vessel.

#### CLASSIFICATION OF BLEEDING:

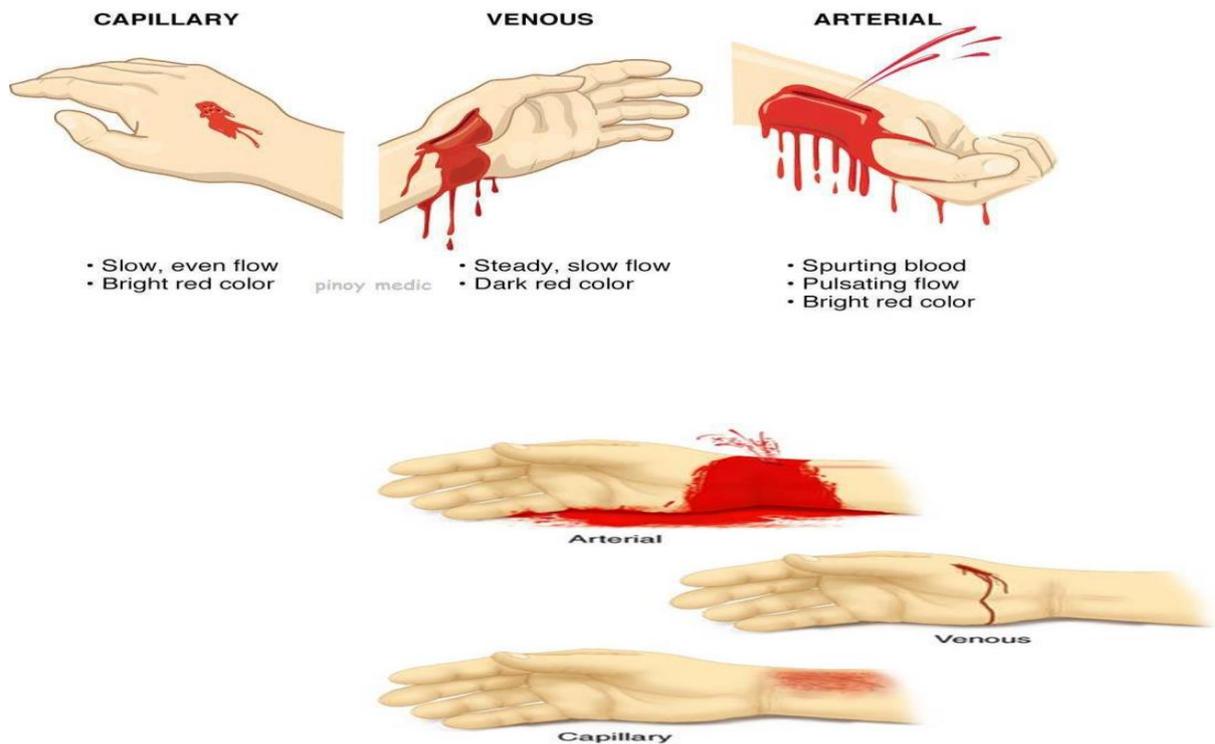
A- According to time:

1. Primary bleeding : when it occurs at the time of operation.
2. Intermediate bleeding : When it occurs within the first few hours after operation.
3. Secondary bleeding : When it occurs at a later time.

B- According to the kind of vessel affected:

1. Venous bleeding : Is dark in colour and bubbles out quickly.
2. Arterial bleeding : Is bright red in colour.
3. Capillary bleeding : Is slow because it comes from capillaries.

## Types of Bleeding



C- According to location:

1. Internal bleeding : It is bleeding which cannot be seen.
2. External bleeding : Visible bleeding on the surface of the body.
3. Special bleeding : As from the ear , nose ( epistaxis ), eye , chest and etc.

SIGNS AND SYMPTOS:

1. pale and moist skin.
2. Elevated pulse rate.
3. Decreased body temperature.
4. Rapid and deep respiration.

EMERGANCE MANAGEMENT:

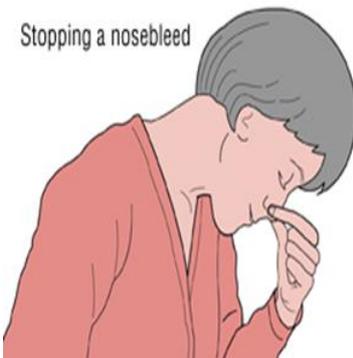
1. Apply firm manual pressure.
2. Immobilize any injured extremity to control the blood loss.
3. Apply a tourniquet when bleeding is server.
4. Elevate the injured part.
5. Provide psychological support to the patient .

## Epistaxis

**Epistaxis** : Bleeding from nostril, nasal cavity or nasopharynx.

### Causes of Epistaxis

1. Excessive nose blowing or picking
2. Injury to the nose or face
3. Dry, warm air, commonly found indoors during the winter
4. Inserting foreign objects into the nose
5. High blood pressure



6. Facial or nasal surgery
7. Tumors
8. Bleeding disorders
9. Use of certain medications or drugs

### TREATMENT:

1. Make patient sit up and relax.
2. Pinch the nose gently for 5-10 minutes.
3. Head lean slightly forward it will reduce the amount of blood that makes it to your throat..
4. Open mouth and breathe .
5. Ice packs

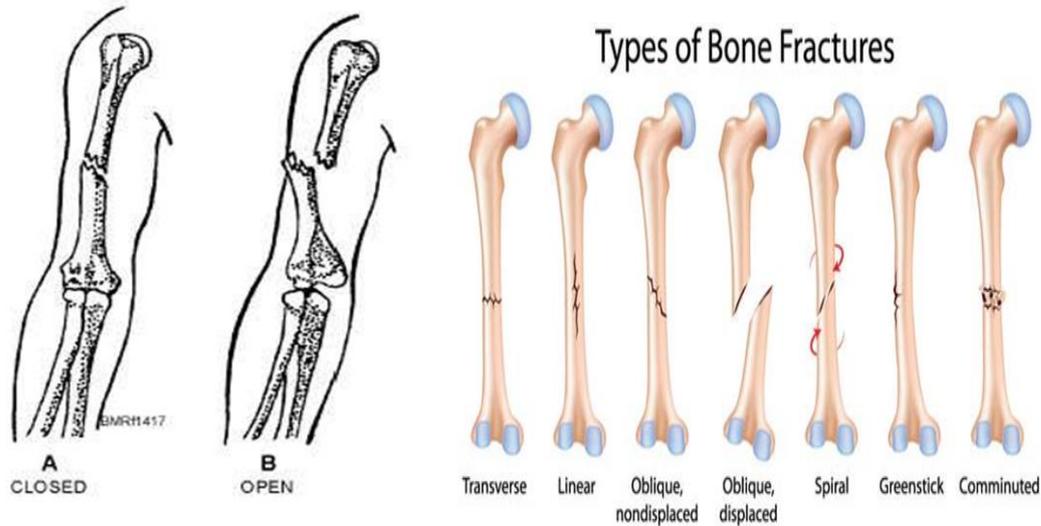
Although some of us may have been taught to tilt our heads back when we have a nosebleed

## FRACTURES

A Fracture is a break in the continuity of a bone.

CLASSIFICATION OF FRACTURES :

- 1.Simple fracture.
- 2.Compound fracture.
- 3.Complex fracture.



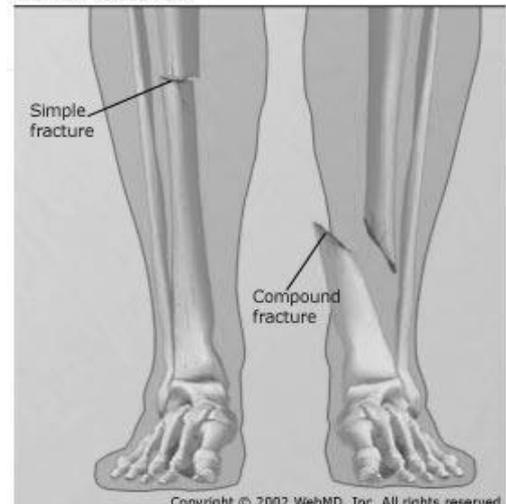
SIGNS AND SYMPTOMS:

- 1.Pain and tenderness.
- 2.Unusual shape and swelling ( deformity).
- 3.Inability to move the site of fracture.
- 4.Spasm of muscle.
- 5.Shock with its signs and symptoms.

EMERGENCY MANAGEMENT:

- 1.Put the patient in a comfortable position.
- 2.Don't try to move the fracture site for any reason.
- 3.Fix the fracture in a proper way.
- 4.Transfer the patient to the nearest health center.

Bone Fractures



## BURNS AND SCALDS

### CAUSES OF BURNS:

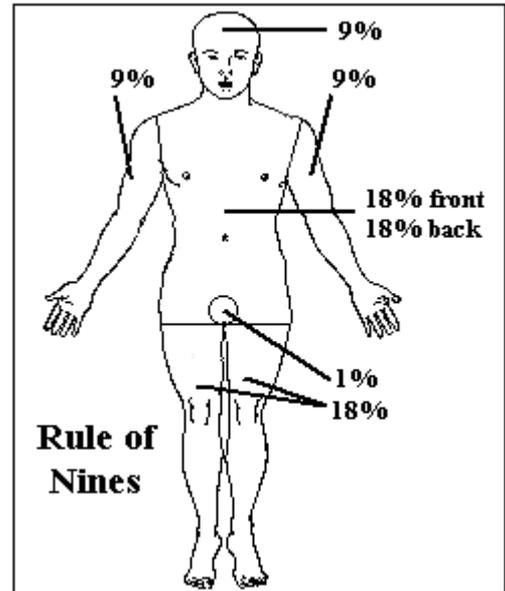
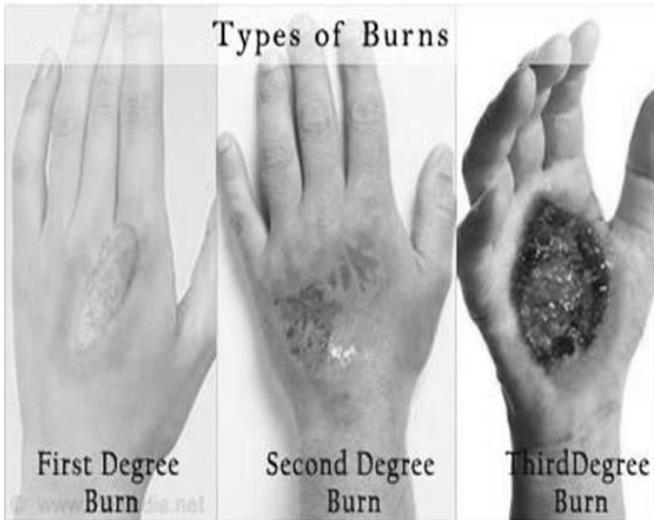
- 1.By flame from a fire.
- 2.By chemicals ( strong acids or alkalis).
- 3.By electricity or lighting.
- 4.By radiation.
- 5.By friction.
- 6.By boiling water.

SCALDS : Caused by moist heat or boiling water.



### CLASSIFICATION OF BURNS:

- 1.First degree burns : Which are of partial thickness.
- 2.Second degree burns : Which are of partial thickness.
- 3.Third degree burns : Which are of full thickness .



## METHODS OF TREATMENT:

Methods depend on:

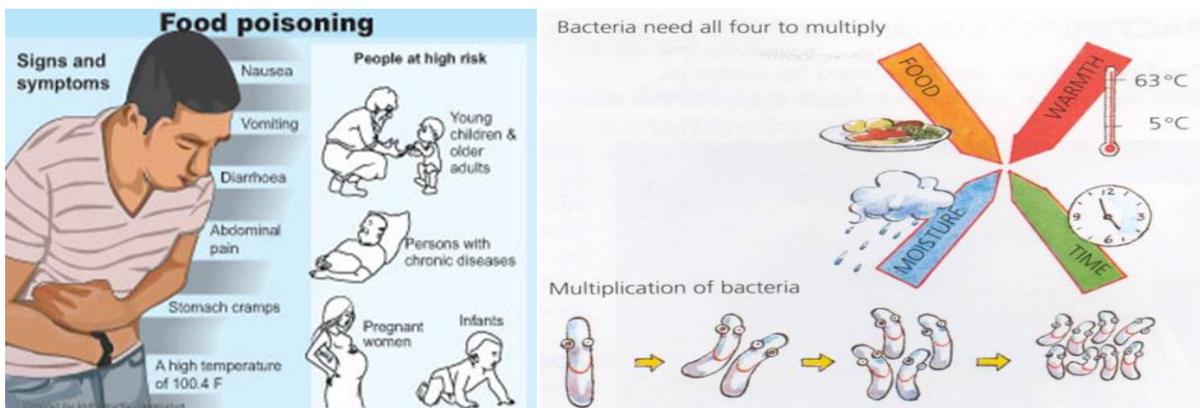
1. Location of the burn.
2. Size and depth ( The area can be determined by the Rule of Nines).
3. Facilities available to therapy.

There are two methods for treating burns:

1. Open method : The burn area is cleaned and exposed to air.
2. Closed method : The burn area is washed and dressed . The dressing should be changed at least once or twice each day.

## FOOD POISONING

**FOOD POISONING** : Is a sudden explosive illness that may occur after ingestion of contamination food or drink.



Type of poisoning :

- 1.Acute poisoning.
- 2.Chronic poisoning.

Signs and symptoms of poisoning:

- 1.vomiting ,nausea and Diarrhea.
- 2.tummy ache and sharp colic.
- 3.Difficulty breathing, cyanosis and sleepiness.
- 5.Low blood pressure.

EMERGENCE MANAGEMENT:

- 1.Determine the source and type of food poisoning.
- 2.Collection food , gastric contents and vomitus for examination.
- 3.Monitor vital signs.
- 4.Support the respiratory system.
- 5.Maintain fluid and electrolyte balance.
- 6.Provide psychological support to the patient and his family

### **Asphyxia**

Asphyxia : is a lack of oxygen arrival to the lungs and excess of Carbon dioxide in the blood.

Causes:

- 1.Drowning.
- 2.Choking.
- 3.Electric shock.
- 4.Hanging.
- 5.Foreign body in the air passages.
- 6.Inhalation of smoke and poisonous gases.

Signs and Symptoms :

- 1.Cyanosis of the face ,lip and fingers.
- 2.Irregular and disturbed respirations, or a complete absence of breathing

3.Cough

3.Slowly losing consciousness.

Emergency Asphyxia :

1.First aid to remove foreign body

2.Emergency resuscitation

3.Expired Air Resuscitation (artificial respiration).

### **Cardiac Arrest And respiration Failure**

Cardiac Arrest: is a sudden stop in effective blood circulation due to failure of heart to contract.

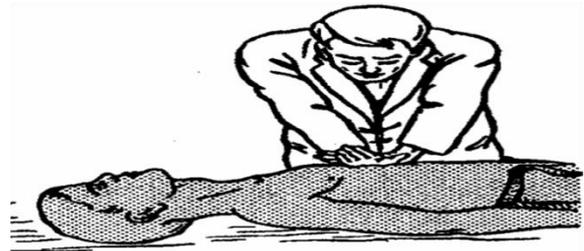
**SIGNS AND SYMPTOMS:**

1.Loss of consciousness

2.Absence of pulse on carotid arteries

3.Respiration arrest – may be in 30 seconds after cardiac arrest

Some people may have chest pain, shortness of breath, or nausea before this occurs.



**Chest Compressions**

After giving 2 breaths immediately begin chest compressions.

**Causes:**

1.Coronary artery disease.

2.Major blood loss.

3.Lack of oxygen.

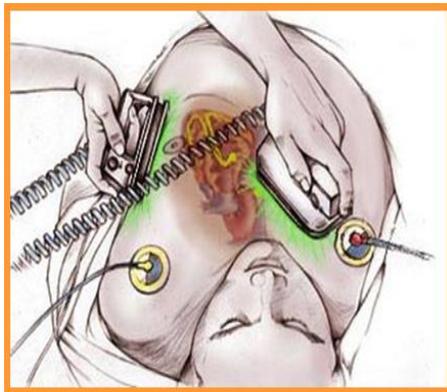
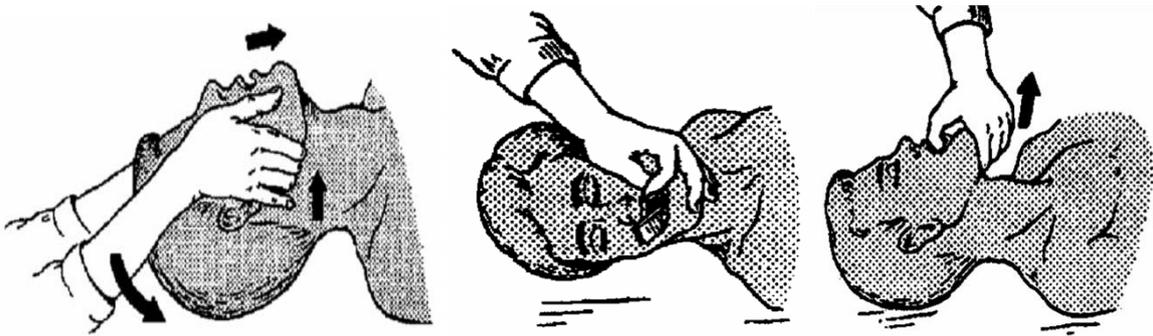
4.Very low potassium.

5.Heart failure.

6.Ventricular fibrillation.

Management :

1. Mouth to mouth ventilation Remove any obvious obstruction.
2. Open airway.



3. Pinch victims nose
4. Give mouth to mouth ventilation ( kiss of life).
5. Repeat breaths.
6. Defibrillation.
7. IV medication.

**RESPIRATION FAILURE:** Is defined as the absence of breathing.

**Artificial Air Way:** Devices inserted to maintain a patient air passage for patient whose airway have become or may become obstructed.

### ADMINSTRARTION OF MEDICATIONS

**DRUG :** Is a chemical substance , which is used to prevent , treat or cure any disease.

**PUPOSES OF MDICATIONS ( DRUGS):**

- 1.For prevention , like vaccines.
- 2.For diagnosis , like tuberculin test.

3.For treatment , like vitamins , insulin and etc.

4.For cure , like antibiotics.

#### **STORGE OF MEDICATIONS:**

1.Drugs and lotions for external use should be kept in distinctive bottles and should be marked (( For external use only)).

2.Drugs for internal use should also be kept in distinctive bottles.

3.Dangerous drugs should be kept in a special cupboard , which should be locked , and the nurse should carry the key.

#### **GENERAL PRINCIPLES OF DRUGS ADMINISTRATION:**

1.When you give any drug , you should check the following six right things.

a- Right patient.

b- Right drug.

c- Right dose.

d- Right time.

e- Right rout.

f- Right frequency.

2.Don't give any drug not written in the patient's case sheet.

3.Wash hands well before preparation of any drug.

4.Be sure of cleanliness of all equipment.

5.Don't touch the tablets or capsules by hand.

6.Don't return any drug to the bottle from which it was taken.

7.Don't give any drug if it colour or smell is changed or if its expiry date is passed.

8.Don't mix drugs together except on doctor's orders.

9.When mistakes are done , inform the doctor immediately.

10.Measure the amount of the drug accurately.

11.Never give a drug if unlabelled or if its label cannot be read clearly.

12.When you pour the drug from a bottle , the label must be on the side away from the direction of pouring to avoid obscuring the name of the drug by the spilt drug.

13.If the drug has two names , then both of them should be written on the label.

14.If you give the drug after delaying one dose , then you must give the next dose according to the delayed one.

16.After giving the drug , you must record the time , day , date , name of the drug , dose , route and signature of the nurse.

#### **METHODS OF ADMINISTRATION:**

1.Oral method : This is most common method because it is simple , economic and safe , for example : tablets , capsules , syrups and suspension.

Disadvantages :

a-The drug may be destroyed by gastric juices.

b-Slow absorption of the drug.

c-The exact amount , which will be absorbed , cannot be measured.

d-Nausea and vomiting may occur.

1. Parenteral method ( injections ) : Which is to insert the drug directly to the tissues or blood Vessels.

#### **Purposes:**

a- We can use this method for the patient who, for any reason cannot take the drug orally.

b- To obtain a fast effect of the drug.

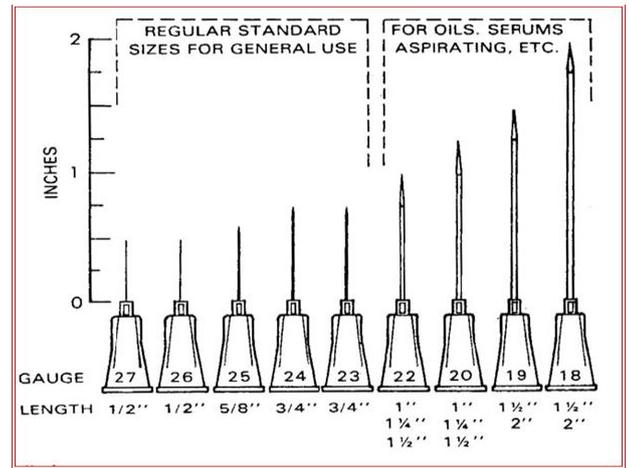
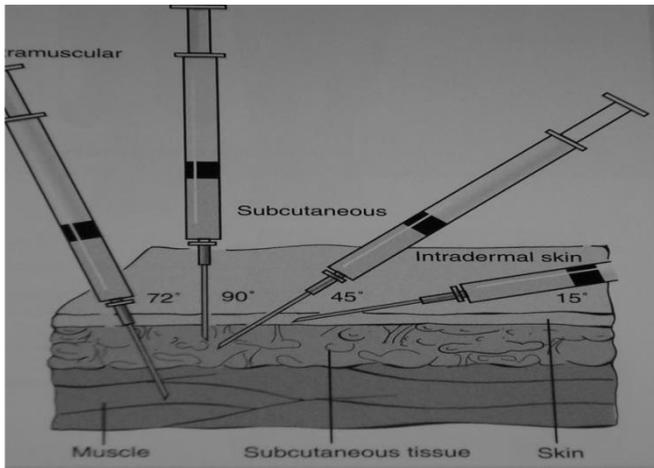
c- To prevent drug destruction by gastric juices.

#### **TYPES OF INJECTIONS:**

A- SUBCUTANEOUS INJECTION ( S.C. ) : Here the drug is inserted into subcutaneous tissue , The nurse should inject the drug quickly , and the needle should be at an angle of  $30^{\circ}$  -  $60^{\circ}$  depending on the depth of the subcutaneous tissue.

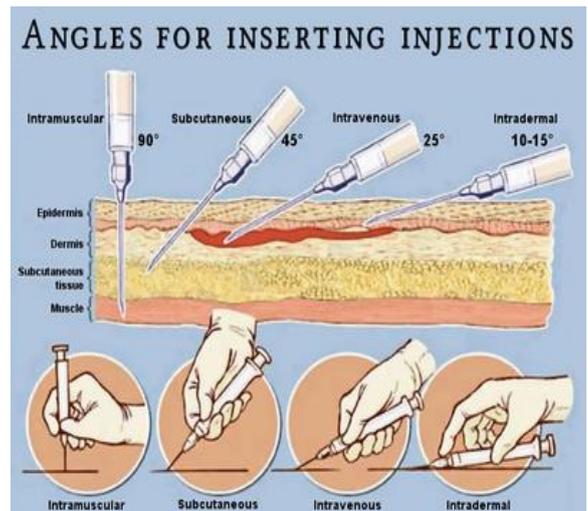
B- INTRADERMAL INJECTION ( I. D. ) : Inject a small amount of the drug , This method is used for diagnosis ( Tuberculin test or allergy test ). The nurse should put the needle between skin layers an angle of  $15^{\circ}$ .

C- INTRAMUSCULAR INJECTION ( I. M. ) : Inject the drug into the gluteus maximums muscle at an angle of  $90^{\circ}$ .



**SITES OF INTRAMUSCULAR INJECTION :**

- I- Deltoid muscle .
- II- Vastuslateralis muscle.



D- INTRAVENOUS INJECTION ( I.V ) :Inject the drug in veins at an angle of 45°.

**COMPLICATIONS OF I .V. INJECTION:**

- 1. Air embolism , which can cause death.
- 2. Vein puncture.

**E- OTHER METHODS OF DRUG ADMINISTRATION:**

- 1. Sublingual method : Under the tongue.
- 2. Intraspinal method.

3. Inhalation method.

4. Rectal method : By giving a suppository.

5. Vaginal method .

6. Intraperitoneal method .

7. Instillation method : By giving drops .

#### F- LOCAL ADMINISTRATION OF DRUGS:

1. Drops:

a- Eye drops.

b- Ear drops.

2. Gargle.

3. Suppository:

a- Rectal.

b- Vaginal.

4. Compresses : Which are used in:

a- Treatment of some disease conditions.

b- Comforting the patient and warming him.



c- Activating circulation

d- Aiding the collection of pus.

e- Reducing pain and muscular cramps.

5. Pastes.

6. Ointments .

7. Creams.

## COMMON ABBREVIATIONS:

Prn حسب الحاجة	*	bid	مرتان في اليوم
q.h. كل ساعة	*	tid	ثلاث مرات في اليوم
q.3h كل ثلاث ساعات	*	qid	أربع مرات في اليوم
stat حال	*	N.P.O	لأشئ عن طريق الفم
QAM كل صباح مع	*	QPM	كل مساء
	*	s	بدون

## LABORATORY INVESTIGATIONS

Laboratory investigations necessary to reach a diagnosis , and they form a part of physical examination.

In order to collect the specimen , you need:

- 1.Test tubes.
- 2.Slides.
- 3.Cotton application.

The investigations include:

1.Urine test : In which you examination.

a- Physical test : Amount , colour , appearance ( clear or turbid ) and specific gravity.

b- Chemical test : Albumin , sugar and ketone bodies.

c- Other tests : R. B.C.s , pus cells , epithelial cells , casts , ova , spermatozoa and etc.

2.Stool test.

3.Sputum examination.

4.Blood examination:

a- Routine test:

- i. R.B.C . : ( Normal value for adult males is 6.1 million /  $\mu$ l , and5.4 million /  $\mu$ l for adult females).
- ii. W.B.C. : ( Normal value is 4000- 11000/  $\mu$ l)
- iii. Platelets : ( Normal value is 150000- 400000/ $\mu$ l).

- iv. Haemoglobin level : ( Normal value is 13.5 – 18 g/100ml for males and 11.5- 16.5 g/100ml for females).
- v. E.S.R . : ( Normal value in westergren method for males is 3-5 mm in 1 hour, and 4-7 mm in 1hour for females).

b- Non – routine test:

- i. Blood group and Rh factor.
- ii. Widal test.
- iii. Blood culture.
- iv. Blood sugar : ( normal value is 65-110mg /100ml).
- v. Blood urea : ( normal value is 20-40 mg / 100ml).
- vi. Cholesterol : ( normal value is 140- 300mg/100ml).

c-Blood electrolytes :

- i.  $\text{Na}^+$  ( sodium ) : ( Normal value is 133 – 144 mmol/ litter).
- ii.  $\text{K}^+$  (Potassium) : ( Normal value is 3.5–4.8 mmol/litre).

**THE ROLE OF THE NURSE IN SPECIMEN COLLECTION:**

- 1.The nurse must know the time of collection of the sample and the amount.
- 2.She must inform the laboratory before sending the specimen.
- 3.She must inform the patient what she is going to do.
- 4.She must prepare all equipment needed for collection of the sample.
- 5.She must label the test tube as follows:
  - a- Patient name.
  - b- Date.
  - c- Type of sample.
  - d- Room number and bed number.
  - e- Name of the wanted test.
- 6.She must record in the patient's chart that she had sent the sample to the laboratory .

## SPECIAL EXAMINATIONS :

1.X- ray.

a- Diagnosis x-ray.

b- Therapeutic x- ray ( Superficial and deep).

2.Paracentesis :

a- Abdominal paracentesis.

b- Thoracentesis.

3.Endoscopy.

4.Biopsy.

5.Electrocardiography ( E. C . G).

6.Angiography.