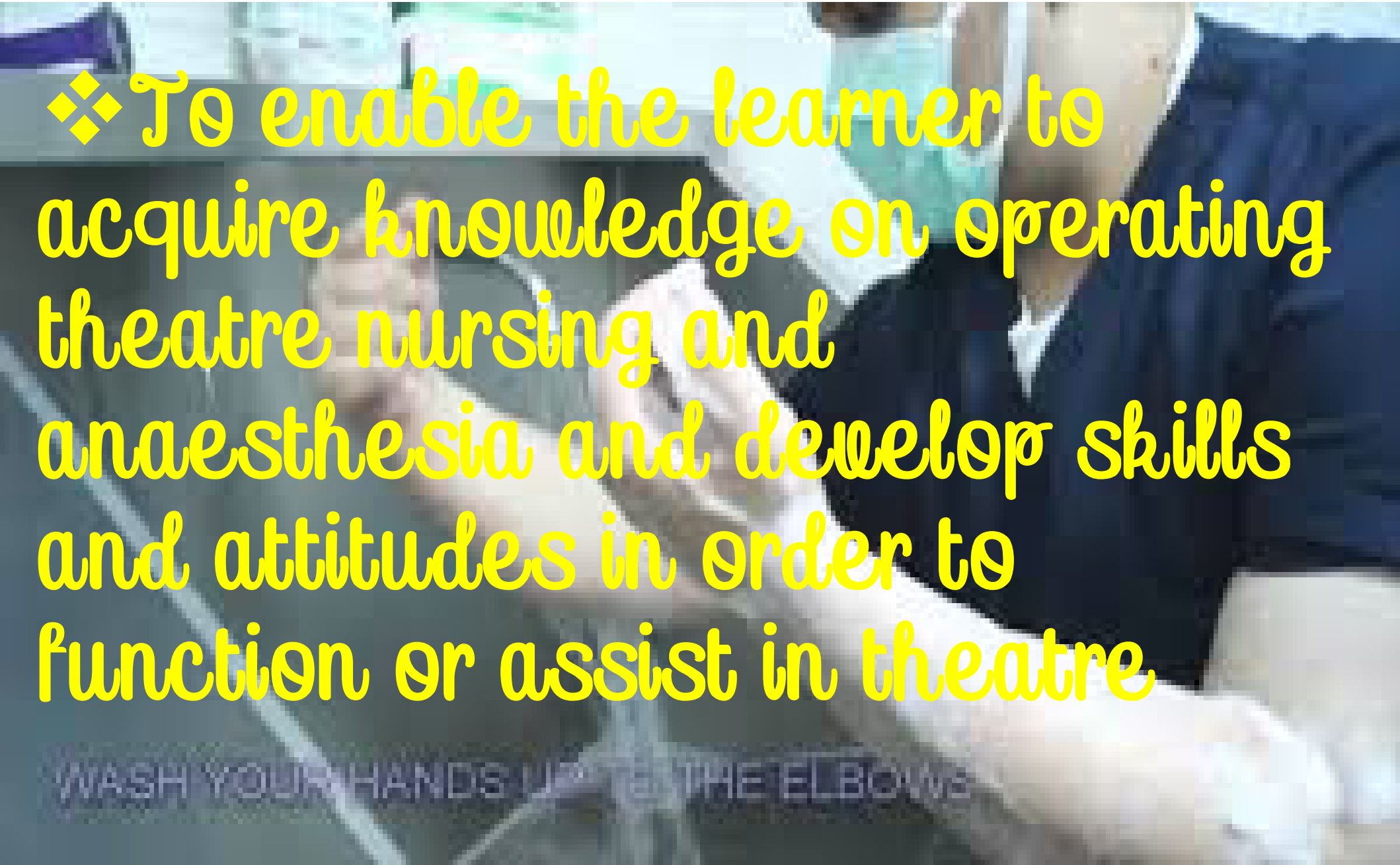

PERIOPERATIVE
NURSING
AND ANAESTHESIA

PERIOPERATIVE NURSING



- To enable the learner to acquire knowledge on operating theatre nursing and anaesthesia and develop skills and attitudes in order to function or assist in theatre

Learning objectives

- **The learner will be able to:-**

- Outline the historical development of theatre nursing
- Describe the theatre design
- Describe the principles of aseptic technique- scrubbing, gowning and glowing
- Describe the various types of surgical instruments and basic sets
- Describe the sutures, swabs, needles and blades used in surgery

Learning objectives cont'd

- Describe the nursing duties in the OPERATING ROOM e.g receiving nurse, scrub nurse, anaesthetic nurse, recovery nurse, circulating nurse, nurse administrator, sluice nurse.
- Explain the various positions used in surgery
- Explain Record keeping in theatre and Legal aspects in surgery.
- Describe types of anaesthesia, classification/types and drugs used.
- Describe the nursing care of patients pre-op, intra-op and post-op.

PERI-OPERATIVE NURSING

Definition

- **Peri-operative nursing** is a **practical skill** which enables the patient to be operated on under preserveance of complete **aseptic environment** with a patient experiencing as **little pain** as possible.

This is achieved by :-

- Preparation of the environment and staff in the best possible way.
- Organizing the operating theatre team.

Definition cont'd

- Assisting the anaesthetist by proviiding the right equipments.
- Providing appropriate sterile equipments, and instrument within socially sterile enwironment.
- By creating and maintaining a sterile. enwironment surrounding the patient during surgery.
- By accountability and economical use of equipments

HISTORY OF OPERATING THEATRE NURSING

- This has developed alongside the history of surgery because surgery requires specialized instruments and expert technique.
- Surgery became a science in the last 150-200 years ago where major developments were seen: -

➢ Anaesthesia

➢ Antiseptics

➢ Study and control of bacteria

➢ Control of hemorrhage and shock

EARLY DEVELOPMENTS OF SURGERY

- About 3000 BC-The Egyptians were drilling holes on the skulls to let out evil spirits(from mad people).
- 700BC –the Hindu in India new nose from the flaps on the cheek and forehead.
- 460 BC-hypocrates used urine or boiled water to clean wounds.
- In the 19th century, there was marked development in surgery where **Dr. Joseph Listeur** discovered antiseptics in 1867

Early developments of surgery cont'd

- He advocated the use of carbolic acid soap and spray for hands and wound cleaning.
- he also advocated for sterilization of sutures and recommended their use in operating room.
- The discovery was mitigated by the rate at which wounds became infected due to:-
  - Repeated use of instruments, sponges and tables on different patients.
  - Sutures were being carried by hands

Early developments of surgery cont'd

- The operating knife was occasionally held in between the teeth.
- The operations were done without general anaesthesia and many patients died on shock.

- By 1885,steam sterilization came into practice and this became the basis for all surgical Aseptic Technique.
- In 1890,the first rubber gloves were worn during surgery. This was at John Hopkins Hospital in Britain.

Early developments of surgery cont'd

- The surgeons demanded

❖ pre-operative sterilization of all materials to be used in surgery.

❖Special preparation of the operating area

❖Special preparation of the surgical team which included scrubbing,gowning,putting on masks, caps and boots.

❖Strict observation of aseptic principles before, during and after surgery. This has formed basis of present theatre technique.

Advances in surgery

- Surgery has advanced to a level that patients can face surgery with confidence.
- Surgeons have had many achievements and accomplishments in science such that work has become highly mechanized e.g

✓Use of x-rays

✓Heart-lung machine

Advances in surgery

- ✓Computed tomography machine(CT scan)
- ✓Magnetic resonance imaging (MRI)
- ✓Use ultra-sonographic machines(U/S)
- ✓Use image intensifier machine(I.M)
- ✓Laser surgery
- ✓Use of laparoscopic machines

Advances in surgical procedures

- There are also a number of advances that have been made in surgical procedures such as

- Kidney transplant
- Open-heart surgery
- Heart valve repairs(replacement)
- Liver transplant
- Brain transplant
- Bone marrow transplant
- Total knee replacement
- Plastic surgery etc.

PHYSICAL LAYOUT OF AN OPERATING THEATRE

- All hospitals should have an operating theatre and should be built in a central place near an intensive care unit, and other surgical and special wards. All units should be in communication with each other.

➢ The theatre construction should be:-

- Separate
- Independent from all traffic and air movement within the hospital.
- Should be in access with all surgical wards and special units.

Physical layout of an operating theatre cont'd

- Should have minimal noise
- Should be well ventilated and well lit
- Should be away from plants.

Facilities for theatre:- a theatre should have-

- Changing rooms for staff- male and female.

  -Shelves for shoes-near the entrance

  -Clean lockers for keeping theatre uniform and staff clothes and valuables

  -Showering facilities- soap, mirror, sinks etc

  -Staff toilets

Facilities for theatre cont'd

- Administrative offices
- A transfer of change over section at the entrance to the operating zone i.e a receiving area/ transfer area.
- Anaesthetic rooms
- A scrubbing up rooms-which should have big and wide sinks, protective entrance to the sterile unit, and clean corridors.
- Sterile rooms for laying sterile trolleys and equipments. The rooms should be divided to have a store for sterile equipments.

Facilities for theatre cont'd

- Should have **a sluice room** with wide sinks and be well equipped with cleaning facilities.
- There should be a **recovery room** where patients are kept temporarily to recover from anaesthesia.
- **Clean exit rooms** leading to recovery rooms.
- **Store rooms** for other equipments.
- **Rest rooms** with closed water system, sinks, chairs and refrigerators etc
- Gases rooms and generator room

Facilities for theatre cont'd

- The actual operating room. It should be large, airly, clean, have a good lighting system, overhead lights , no slippery floors, good drainage system.

❖ N.B :-All rooms should be arranged so that there is a continuous progression flow from entrance to exit zone. The personnel also should be able to move from one clean area to another without having to pass through the protected area or corridors. Air should move or flow from one clean to less clean areas. No free movement of air from one theatre to another.

HEATING SYSTEM

- The heat should be comfortable
- Materials used in constructing a theatre should be of high standards whereby cleanliness can be obtained and maintained in all the surfaces.
- The floors and walls should be made of material that is easily cleaned and dried.
- The T.S.S.U should be adjacent to theatre unit and should be forming part of the C.S.S.D.

Preparation of theatre for operation

- Preparation of the environment

❑ General duties

- ✓ Thorough cleaning of the theatre in the morning e. g high dusting, dumb dusting of all equipments and operating tables, scrub floors and pushing water, rearrangement of equipments in their respective place.
- ✓ Checking of the operation lists and nothing:-type of operation, site of operation, age, sex of patient, the surgeon, the anaesthetist, time of operation, any special request e.g blood, prosthesis etc

- ✓ The staff allocation:-
- each staff is allocated to perform specific roles taking into consideration seniority and experience.
- The allocation should indicate specific roles e.g scrub-up, circulating etc
- Rotation should be done when there is a long list.
- ✓ Preparation of instruments
- ✓ Sets and packs should be prepared according to the type of operation e.g general set plus any other special instruments and packs needed
- ✓ The orders of the instruments and packs should be placed for T.S.S.U early enough to allow time for checking and arranging instruments.

- ✓ Preparation and arrangement of equipment needed in all operation rooms and checking the electro-surgical equipments to ensure that they in working order.
- This includes:- operating room, sterile room, scrub-up room, anaesthetic room
- The preparation of the rooms includes, setting the operation table, depending on the type of operation and adjusting the operation light, checking of operation machine, power points, oxygen points, suction machines, operation trolleys
- Makes sure that the surgeon and the anaesthetist are around before bringing patient to theatre.

- ✓ All staffs in theatre should restrict themselves to their specific duties i.e
- anaesthetic nurse receives patient from receiving area
- Scrub nurse scrubs early in order to prepare sterile equipments
- Circulating nurses assist in gowning and preparing equipment.
- ✓ All these is done while the patient is intubated. The rest of the surgical team scrubs and prepares to start an operation.

The surgical or basic surgical team

- This is the team required and prepares to take part in an operation. It composed of :-
- One surgeon or more- most senior in the team
- One or more assistants
- One scrub nurse or more
- One circulating nurse or two
- One anaesthetist or more than one
- If one the above members is missing the operation can not be started.
- Surgical scrub handout-self and laying up of sterile trolleys.

AN OPERATING TABLE

Nursing in the theatre

- **The operation table**
- It is made up of strong metal with a top covered with a sponge rubber antistatic mattress which is moveable.
- It is designed with various accessories for maneuvers which makes it suitable to be used for several operations.
- It has mechanisms for raising,lowering,lateral tilt, trendeleburg,tilting up or bottom, break back, chair etc

PRINCIPLES OF ASEPTIC TECHNIQUE

This is done by:-

- Cleanliness of general physical enwironment of operation room and the entire theatre to create an aseptic enwironment.
- Controlling dust and droplets by dump dusting and wearing of masks.
- Minimizing conwersation, laughing, coughing and sneezing in the theatres.
- Keeping sterile tables cowered when not in use.
- Sterilization of all materials i.e ewery item to be used in an operation to be sterilized.

Applications of principles of aseptic operative technique cont'd

- By rendering pre-operative site free of bacteria
- Preparation of the surgical team
- Proper preparation of patients before surgery- normally done by the nurse in the surgical ward.

N.B. All this should be followed in order to maintain the sterile field which is required in an operating room.

SURGICAL SCRUB

Definition :

- A **surgical scrub** is the process of removing as many microorganisms as possible from the hands and arms by mechanical washing and chemical antisepsis before participating in a surgical procedure.
- The surgical hand and arm cleansing is done just before gowning and glowing for surgical procedure.

SCRUB SINK

- Adequate scrubbing and hand washing facilities should be provided for all operating team members.
- The scrub room is adjacent to the OR for safety and convenience.
- The sink should be deep, wide and low enough to prevent splash.
- **The scrub sinks should be used only for scrubbing or hand washing.**
- **They should not be used to clean or rinse contaminated instrument or equipment.**

SCRUB SINKS

Preparation for surgical hand cleansing

- General preparation

1. The skin and nails should be kept clean and in good condition and the cuticles should be uncut.
2. Finger nails should not reach beyond the fingertips to avoid glove puncture
3. Finger nail polish should not be clipped or cracked
4. Artificial devices should not cover natural finger nails. Artificial finger nails harbour microorganisms such as bacteria and fungi.
5. All jewellery should be removed from the fingers, wrists, and neck. Jewelery harbours microorganisms.

Preparations immediately before a surgical hand cleansing

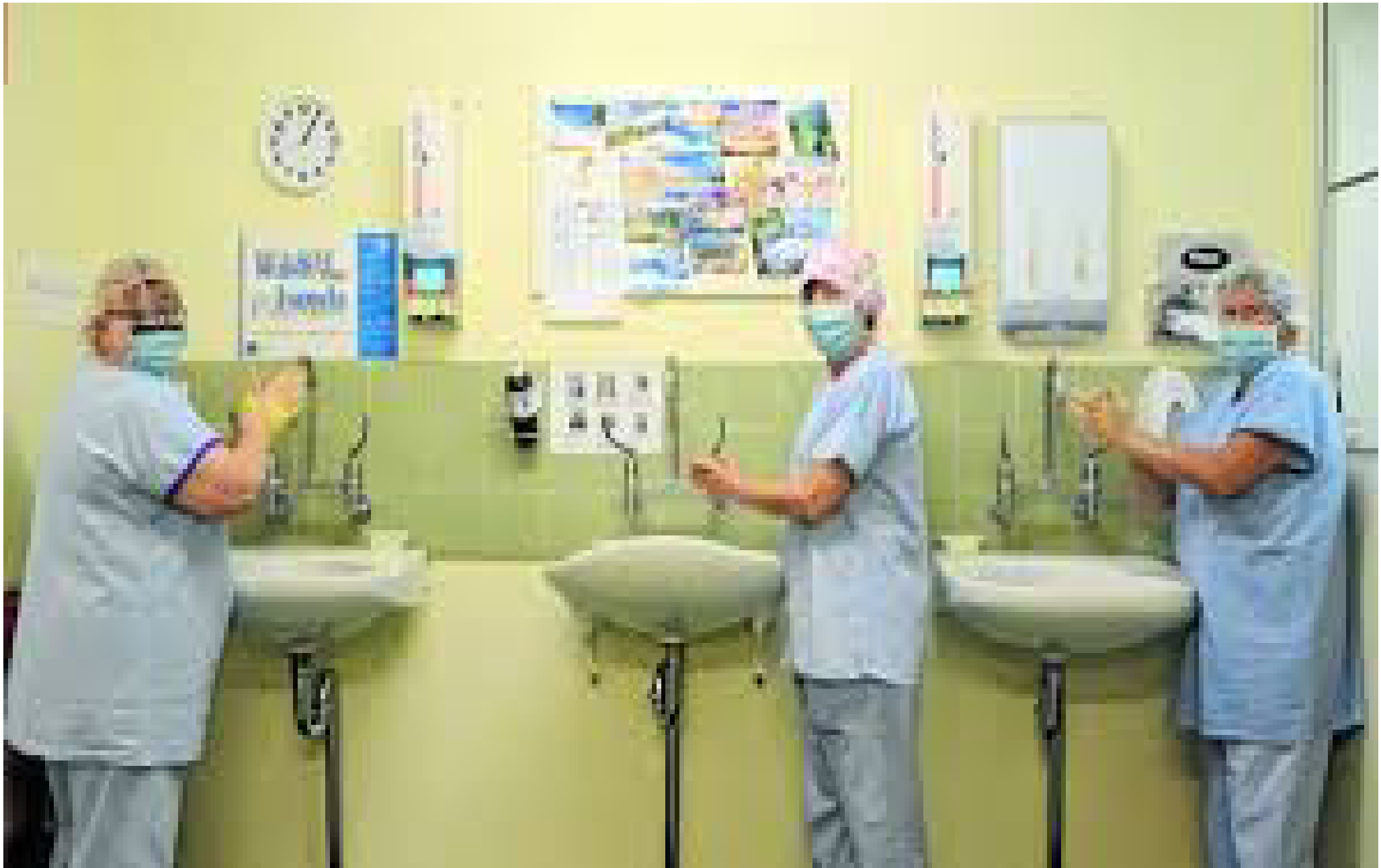
1. Open sterile gown and gloves on a separate surface from the main sterile field.
2. Inspect the hands for cuts and abrasions ,skin integrity of the hands and forearm should be intact
3. Be sure all hair is covered by headwear pierced hair studs should be contained by the head cover. They are potential foreign body in the surgical site.
4. Adjust the disposable mask snugly and comfortably in relation to the mask. Adjust water to a comfortable temperature.
5. Clean eye lashes if worn. Adjust protective eyewear or the face shield comfortably in relation to the mask.

Surgical hand and arm scrub with a brush

- A vigorous 2-5 minute scrub with a relative agent is effective.
- Every member of the surgical team should scrub according to the standardized written procedure.
- Close the tap with the elbow after completing hand wash.
- Subsequent scrubs should follow same procedure as the initial scrub.
- When the hands are removed at the end of a surgical procedure, the hands are considered contaminated and should be immediately washed.

Surgical hand and arm scrub with a brush

surgical hand and arm scrub with a brush



surgical hand and arm scrub with a brush

- Resident microorganisms multiply rapidly in the warm, moist environment under the gloves.
- During and after scrubbing keep the hands higher than the elbows to allow water and suds to flow from the cleanest area – the hands – to the marginal area of the upper arms.
- A water proof mat is suggested in front of the sink.

Drying the hands

- After cleansing, the hands and arms should be thoroughly dried before the sterile gown is donned.
- The gown pack for the scrub person is folded inside out to facilitate donning.
- A folded re-usable or disposable towel for drying hands is packed on top of the gown.

Drying the hands

- hands are dried as follows.....
- Reach down to the opened sterile package and pick up the towel with one hand by one corner. Be careful not to drip water onto the pack. Be sure no one is within the arm's reach.
- Grasp the opposing corner of the towel with the other hand and open the towel full length. Use one end of the towel to dry one hand and arm. Use a circumferential motion to rub from hand to upper arm. Don't rub back and forth. Bend slightly forward to avoid letting the towel touch the attire.

Drying the hands.

- **hands are dried as follows.....**
- To dry the second arm, hold the dry end of the towel in the opposite hand and use a circumferential motion to dry hand and all areas of the arm to the elbow.
- Discard the towel with the hand that is currently holding it without letting it touch the scrub suit.

Gowning and glowing

- A sterile gown is put on after drying the hands and arms with a sterile towel immediately after a surgical hand arm cleansing.
- The sterile gloves are put on immediately after gowning.

Purpose

- A sterile gown & gloves are worn to exclude skin as a possible contaminant and to create a barrier between the sterile and the unsterile areas.

General considerations

- The scrub person gowns and gloves himself or herself from a surface separate from the main sterile field.
- Gown packs preferably are opened on a separate table from other packages to avoid any chance of contamination from dripping water.
- Splashing water on a scrub attire should be avoided because moisture may contaminate a sterile gown.

Gowning and glowing technique cont'd..

- Sterile glowes may be worn in two ways
  - A. By closed glowing technique
  - B. By open glowing technique
- The method of glowing determines how the gown is donned.

Gowning and glowing technique cont'd....

- The **closed glowing method** is preferred for establishing the initial sterile field by the scrub person.
- The closed glowing method affords assurance against contamination when donning gloves because no bare skin is exposed in the process.
- The **open glowing method** is used when changing a glove during a surgical procedure or when donning gloves for procedures not requiring gowns.

Gowning technique

- Reach down the sterile pack and lift the folded gown directly upward.
- Step back away the table unto an unobstructed area to provide a wide margin of safety while gowning.
- Holding the folded gown carefully locate the neckline and the arm holes.
- Holding the inside front of the gown just at the arm holes with both hands, let the gown unfold, keeping the inside of toward the body and the arms in arm holes.

Gowning technique.....

- Extend both arms into the arm holes simultaneously.
- The circulator standing behind the scrub brings the gown over the shoulders by reaching inside to the shoulder and arm seams.
- The gown is pulled on leaving the cuffs of the sleeves extended over the hands. Do not pull the cuffs of the sleeves extended over the hands.
- The back of the gown is securely tied at the waist first, followed by the neckline.
- The circulator takes care not to pull the gown so snug that the cuffs are pulled back exposing the hands.

Gowning technique .....

Glowing technique by closed method

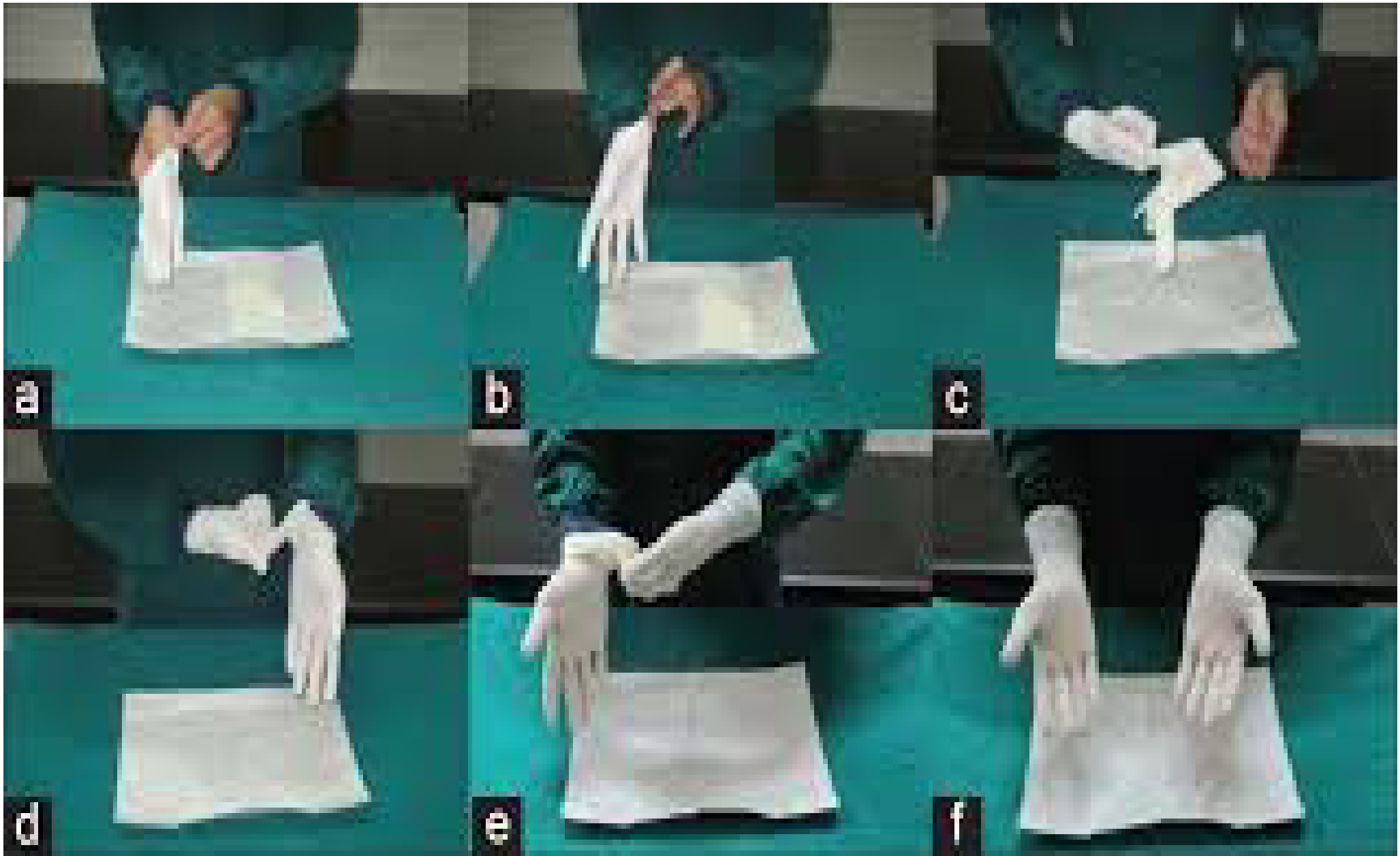
- Using the left hand and keeping it within the cuff of the left sleeve, pick up the right glowe from the inner wrap of the glowe package by grasping the folded cuff.
- Extend the right forearm with the palm upward(supinated)
- Place the palm of the right glowe against the palm of the right grasping in the right hand the top edge of the cuff, abowe the palm.
- The thumb side of the glowe is down.

Glowing technique by closed method...

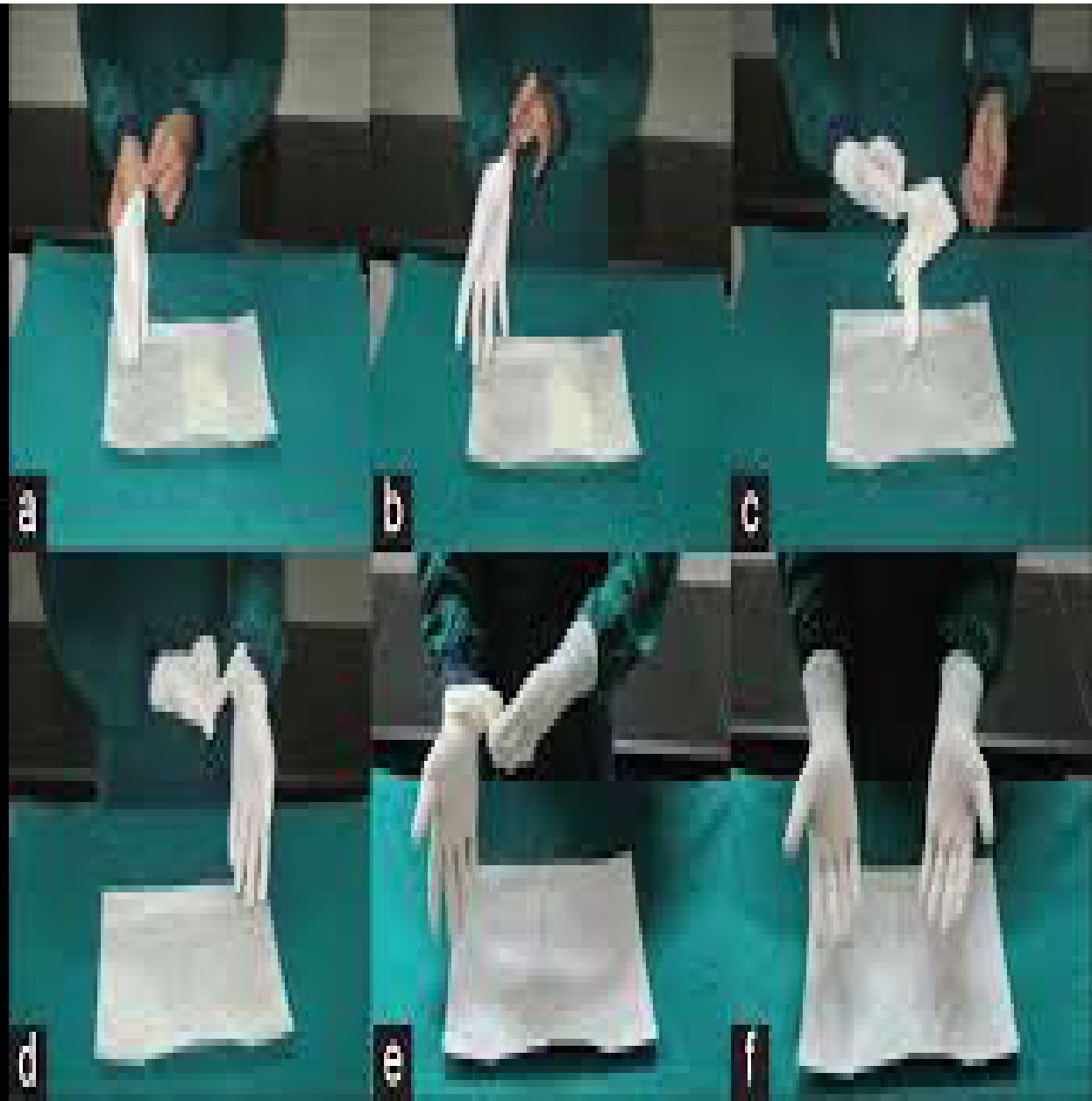
Glowing technique by closed method...

- Grasp the back of the cuff in the left hand and turn it over the end of the right sleeve and hand. The cuff of the glove is now over the stockinette cuff of the gown, with the hand inside the sleeve.
- Grasp the top of the right glove and the underlying gown sleeve with the covered left hand pull the glove the extended right fingers until it completely covers the stockinette cuff.
- Glove the hand in the same manner, reversing hands. Use the gloved hand right hand to pull on the left glove.

Glowing technique by open method



Glowing technique by open method



Glowing technique by open method....

- The open method uses skin to skin glowe to glowe technique.
- The hand although scrubbed is not sterile and must not contact the exterior of the sterile glowes.
- The everted cuff on the glowes exposes the inner surfaces.The first glowe is put on with the skin to skin technique, bare hand to inside cuff.
- The sterile fingers of the glowed hand then may touch the sterile exterior of the second glowe(glowe to glowe technique)

Glowing technique by open method:

Procedure as follows.....

1. With the left hand, grasp the cuff of the right glove on the inside of the fold and lift from the wrapper. Take care not to touch the inner aspect of the wrapper or the sterile portions of the glove.
2. Allign the fingers of the right hand into the glove, pulling it on, leaving the cuff well turned down over the hand.

- Be sure to keep the thumb well adducted into the palm of the hand until it is well inside the confines of the glove. Do not adjust the glove. This will be done as a last step.

Glowing technique by open method ...

3. Slip the fingers of the glowed hand under the everted cuff, on the sterile side, on the sterile side of the left glove. Pick up and step back.
4. Allign the fingers of the left hand into the left hand and insert the left hand into the left glove, keeping the thumb adducted until well inside the glove. Pull the left glove on all the way, covering and enclosing the knitted left cuff at the wrist.

Glowing technique by open method....

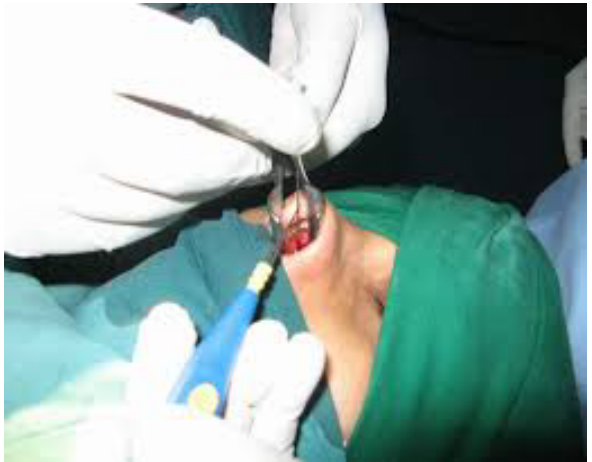
5. With the fingers of the left hand, pull the cuff of the right glove over the cuff of the right sleeve.

- Avoid touching the bare wrist. Sterile surfaces may touch only sterile surfaces.

Equipments used in operating Room

Diathermy machine for coagulation

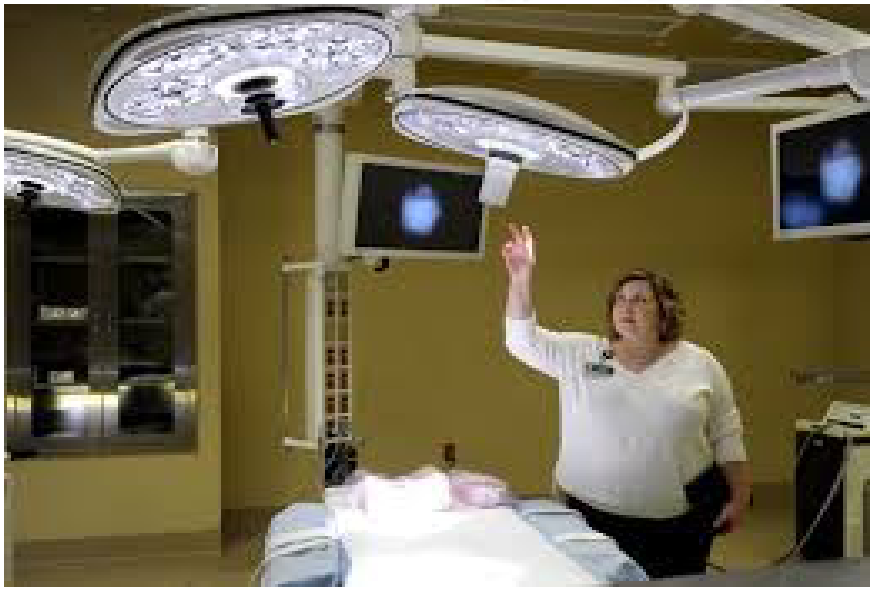
Diathermy lid



Equipments used in operating Room

Overhead operating lights

Lights in use



Nurse adjusting the lights

Equipments used in operating Room

An operating table

- manually operated

An electric operating table

- operated via remote

Equipments used in operating Room

An anaesthetic machines

- manually operated

Equipments used in operating Room

A two bottled suction machine

- Recommended in OR

Equipments used in operating Room

Adjustable patient stretchers with side rails

- manually operated

Equipments used in operating Room

Instrument trolleys

Mayo table

Equipments used in operating Room

A laryngoscope machine (complete set)

Equipments used in operating Room

An intubation kit

Equipments used in operating Room

Gases used in theatre(Various cylinders)

Instruments used in the operating room.

Surgical instruments can be generally divided into six classes by function.

These classes are:

- Cutting instruments
- Grasping or holding instruments
- Haemostatic forceps (instruments used to stop blood flow)
- Retractors
- Clamps and distractors
- Accessories and implants

Instruments used in the operating room.

Major general basic set

Other major sets include

- Hysterectomy set
- Orthopaedic general set
- Craniotomy set

➢ **Minor sets include**

- Herniotomy set
- Gastrointestinal set
- Dilatation and curettage set etc
- Caeserian section set

2. SURGICAL SUTURE MATERIALS AND NEEDLES & BLADES USED IN THEATRE

Suture materials are divided into two

- Stitch(suture)
- Ligatures
- **A stitch or suture** is a suture material used in surgery to make a series of stitches in order to approximate or bring together living tissues or structures until normal healing takes place. Most of the are attached to needles.
- **Ligature** is a suture material without a needle. It is used to encircle or tie blood vessels in order to arrest or control bleeding. Also called ties.

SUTURES

- Are divided into two broad categories
- **Absorbable**
- **Non-absorbable**

Absorbable sutures

- They are sutures which are digested and absorbed during the process of healing(autolysis).
- The duration of absorption varies according to the type of suture used.
- They are made from:-
- **Cat-gut**-made from collagens(white fibrous tissue).
- **Living tissues**-tendons or fascia
- **Synthetics** –from chemicals e.g polyglycolic acid.

CAT-GUT

- Are normally made from sub-mucosal layer of the 1st one third of the sheep's intestines.
- Pure collagen from intestines are purified into ribbons.
- They are spun into threads ,then strengthened and polished to make them smooth.

Plain cat-gut:-

- it does not undergo any chemical process or treatment.
- They are sterilized.
- Absorption takes 5-10 days.

Cat-gut cont'd.....

- **Chromic cat-gut:-**they undergo the same process as plain, but are chemically treated in chromic salt solution(an alkaline solution). The salt prolongs the absorption rate of the suture which is 15-20 days and sometimes to 40 days. The strength of suture depends on the duration it has been soaked in salt. They are also dyed in iodine to increase their visibility. Both types(chromic and plain) undergo tension strength testing and are graded into 8 standard sizes. They start from 6/10-2 which is the thickest. They are sterilized gamma radiations.

Cat-gut


ETHICON
Cardiovascular MX823
2-0
ETHIBOND EXCEL
WHITE BRAIDED
Polyester Suture
30" (75 cm)
MS-4
ETHICON
Figure 8 Folder
MS/4.....5-up


Figure 8 Folder
MS/4.....4-up
ETHICON
Cardiovascular
5
ETHIBOND EXCEL
MB46G
MS-4
ETHICON

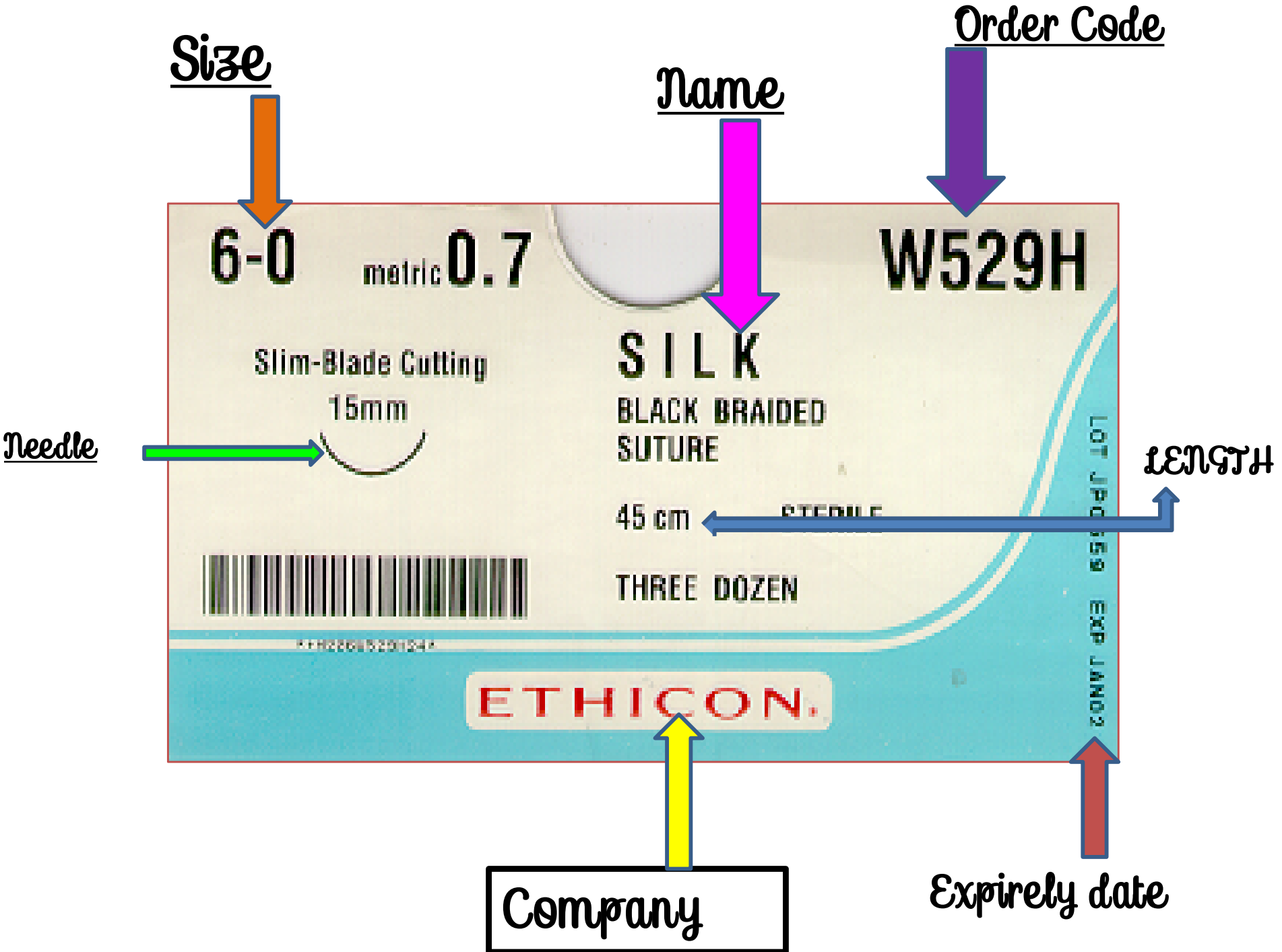
The living Tissues

- Are tissues obtained from the patient himself.
- They are made of stripes of fascia from the lateral aspect of the thigh. Also are made from tendons and planter of the leg.
- **Synthetic sutures**
- Are made from synthetic polymer of glycolic acid. The first one was made and used in 1970 i.e the dexon type.
- The absorption rate is about 15-20 days and complete absorption occurs after 60-90 days.

Advantages of Synthetic sutures

- They have no tissue reaction
- They are stronger
- They do not become slippery during use e.g vicryl.

Reading the Suture Label

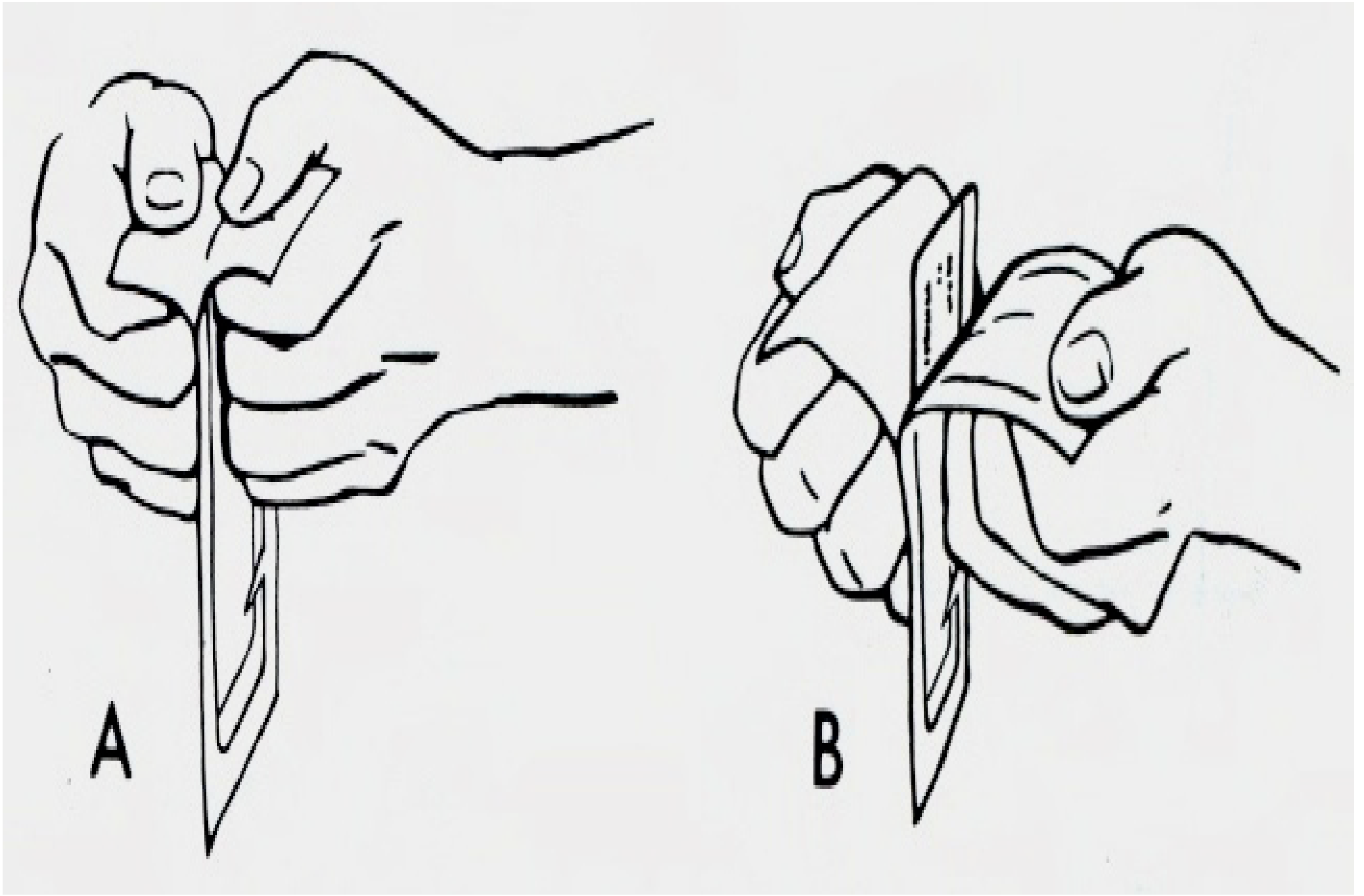


The rate of absorption is influenced by:

1. **Type of tissue :** The surgical gut absorbed much more rapidly in mucous membrane, and absorbed slowly in subcutaneous fat.
2. **Condition of tissue :** Absorption takes place more rapidly in absence of infection.
3. **General health status of patient. :** Surgical gut may be absorbed more rapidly in well nourished tissue or healthy tissue, but in old pt. it may remain for long time.
4. **Type of surgical gut :** Plain gut is untreated but chromic gut is treated to provide greater resistance to absorption.

Handling characteristic of surgical gut and collagen suture:

1. Surgical gut and collagen suture are sealed in packets that contain fluid to keep the material pliable, this fluid is alcohol and water, hold packet over basin and open it carefully not spilling fluid to your eyes.
2. Surgical gut and collagen suture should be used immediately after removal of their packets, you can put it into saline to soften it but do not soak it.
3. Handle it as little as possible, never stretch it that weakens it


A
B

NON-ABSORBABLE SUTURES

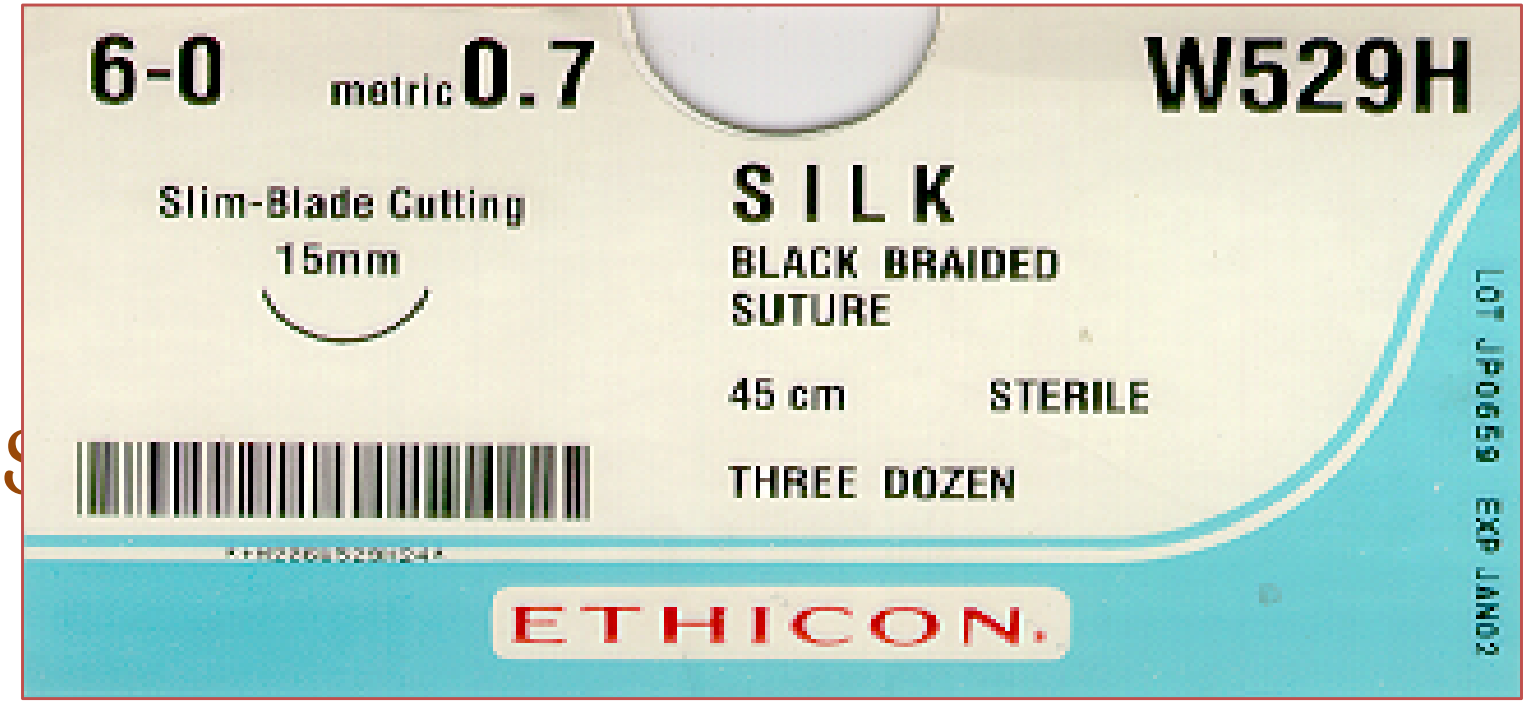
- They are sutures which do not get absorbed during the healing process .
- They are of two types:-
- Natural raw material synthetic
- Chemically synthetic

Natural raw material synthetic

a) SILK WORM :-

- it is obtained from the glands of silk-worm.
- It is normally rough on the surface-when it goes into contact with atmospheric air.
- Many strands of silk are processed and may be tightly braided to produce firm threads.
- The threads are usually white in colour or may be bleached or dyed.
- They are easy to use as they do not soak in fluids. They are available in sizes ranging from 8/0-4.

Natural raw material synthetic



b). **LINEN** :- are prepared from linen flax. Are available in sizes of 6/0-2.

Natural raw material synthetic cont'd

C)COTTON:-

- obtained from cotton plant.
- Cotton threads are of low tension than linen and silk and therefore to strengthen them polyester is added hence form ETHICON.
- Their sizes range from 3/0-1.

Natural raw material synthetic cont'd

Chemically synthetic

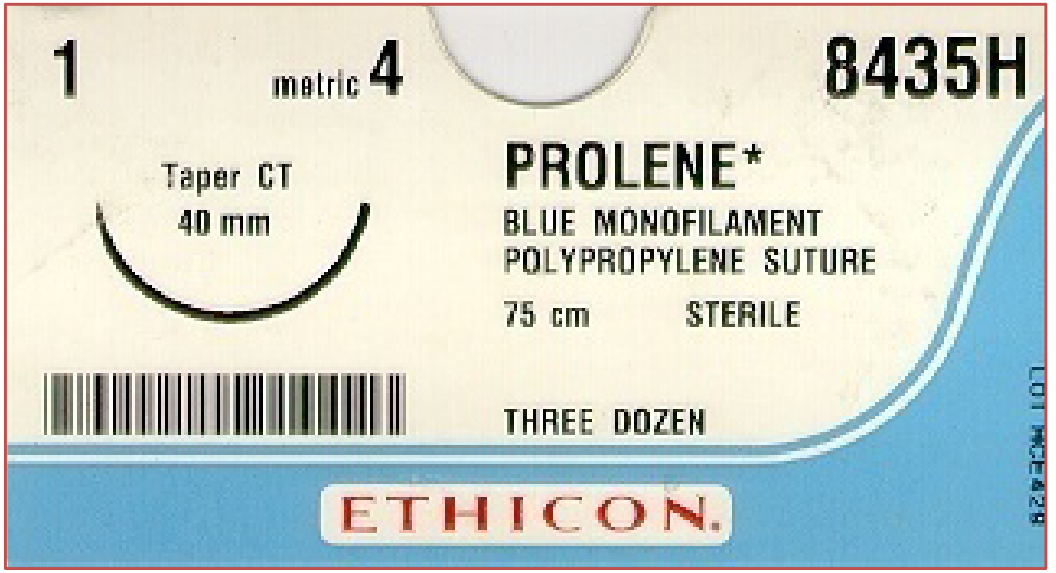
Nylon :- is made from polymides.

- It was first used in 1939-1945. it resembles silk and is normally manufactured either in mono or multi-filaments.
- It ranges in sizes from 6/0-2.

Chemically synthetic

ii). **Polyester:-** normally coated with a chemical called poly-tetramethylene Adipate to make it smooth. Sizes range from 5/0-2.

iii).**polypropylene-**comes in sizes of 0/10-2



Metallic wires

- Are manufactured from metals which are non-toxic and stainless or from an alloy of steel.
- Are made either monofilament or multifilament
- Are mainly used in

✓ orthopaedic operations,
✓ thoraxic operations,
✓ ligaments,
✓ tendons,
✓ repair of cleft lip and palate,
✓ repair of hernia etc

Metallic clips

- They have two sharp ends. When the clip is closed into the skin, it gives a good grip on the edges of the incision. They are of two shapes
  - U-shaped:-for laparatomy
  - V-shaped:-for skin grafting
- They are used with a special clip inserter and removed by a special clip remover
- N.B-all sutures can either be traumatic or atraumatic.
- **Traumatic sutures** are the ones which are threaded into a needle. The needle can be reused later on.

- **Atraumatic sutures:-**are fused together or swagged at a point of the eye.

❖Ligatures

- Ligatures are lengths of ligature material used without a needle.
- Most of the ligatures are non-absorbable and are available in various lengths and sizes.
- They are divided the same way as sutures i.e **absorbable** and **non-absorbable**.
- They are used in the same manner as sutures.

SWABS

- Swabs are sponges prepared from gauze which may be cotton or rayon(sort of silkish) material and both materials have excellent absorbance.
- Some of the swabs have a radio opaque line called raytec which should be thick and continuous across the gauze. They vary in sizes and shape.
- **Large abdominal packs:-**
- are quite large.
- Are stiched all round to avoid fraying.
- Are made from gauze or towel material.
- A long tape is attached alongside where an artery forcep is attached during surgery.

- **Large swabs:-**are standard size swabs.
- Have a raytec line across them.
- Are used for regular mobbing of blood
- **Small swabs(pack I):-**slightly smaller than standard swabs.
- Are plain and used to wipe secretions, sweat from operating team, dressing wounds.
- Are never used inside cavities.
- **Anaesthetic swabs:-**are smaller than regular swabs and have a different colour(coloured green) to differentiate them from others.
- Are used by anaesthetist
- **Dissecting swabs or Bits:-**are tiny rounded and small and are made in theatre.

- **Pledgets or patties:-** normally used in neurological operations. Are made of material with high absorbency to suck all fluids in which they are placed on.
- **Crape bandage**
- **Gauze rolls**
- **Brain swabs:-**are light, swell after absorbing fluids
- **ENT** and opthalmic dressing swabs.

- N.B
- All swabs and packs should be packed in bundles of either 5s or 10s. This is for easy remembrance during counting time.
- All swabs must be carefully counted and counting maintained every time a new bundle is added. The counting is done one by one and not in bundles.
- The counting should be recorded on a board where everybody can see.
- It should be reported loudly and recorded on the patient's file.

NEEDLES

- Are necessary for placement of sutures into tissues with minimal trauma.
- **Characteristics of a surgical needle**

➢ Should be firm enough to prevent excessive bending

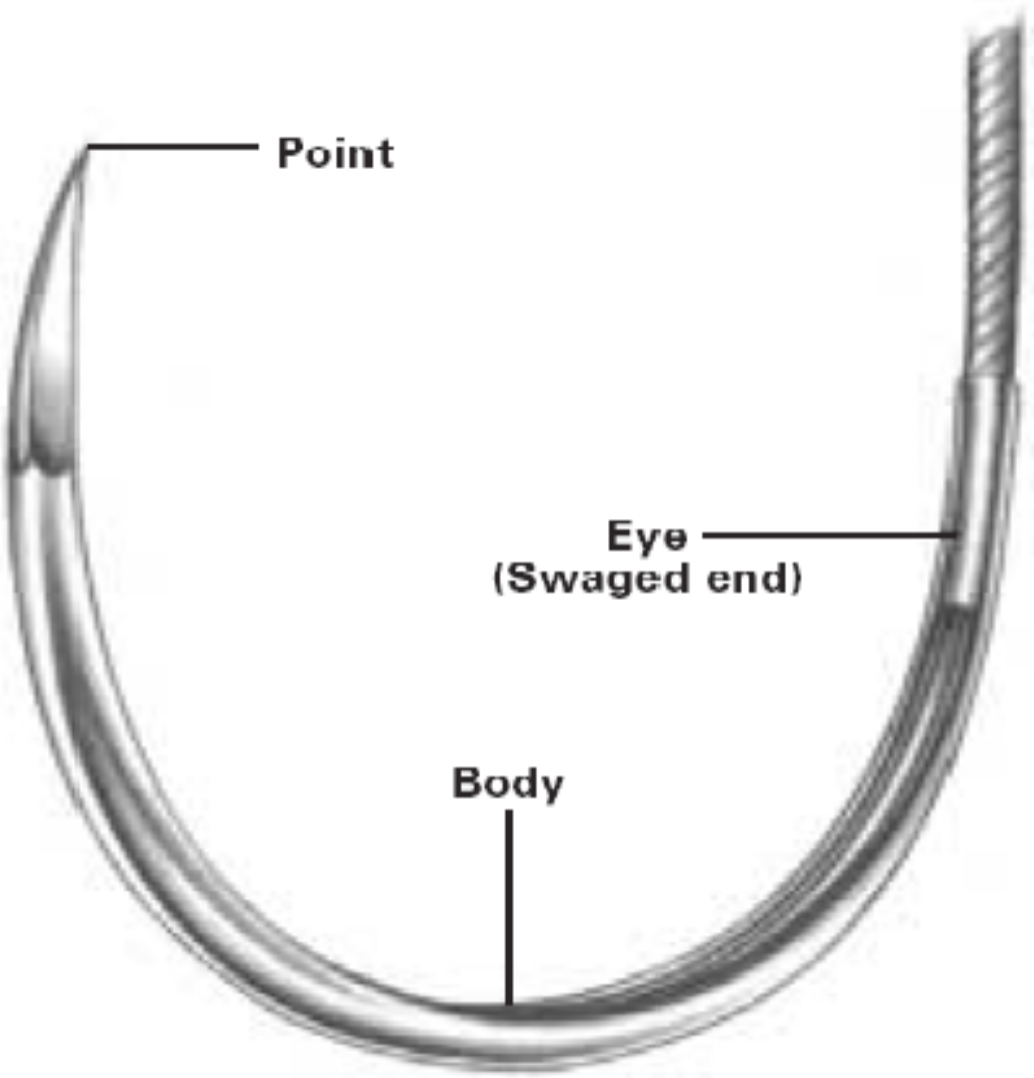
➢ They should be flexible enough to prevent breaking

➢ They are made from high quality material which is stainless steel.

- A needle has three parts:- eye, body and tip
- The needles vary in sizes i.e small and big. Also vary in shape-curved and straight needles

needles

- Three parts
  - The eye
  - The body
  - The tip



- They are divided into
- Cutting needles
- Have sharp edges and are triangular in shape
- They are used in hard or tough tissues e.g in fascia, tendons, skin etc this is because they cut as they pass through the tissues
- Round bodied needles
- Have a round body, less traumatic-they do not cut tissues
- The tips are sharp and make bunches which close easily and immediately
- Normally used in delicate tissues e.g mucus, fats membranes, intestines, and any other internal organs

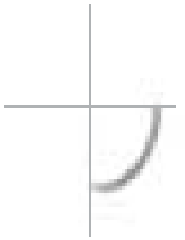
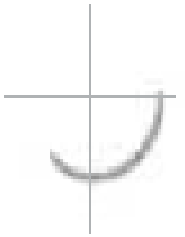
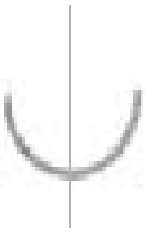
Anatomy – The Body

- Half-Curved Needle (Ski Needle)
  - Skin closure
  - Laparoscopic procedures

Half-curved 	skin (rarely used) laparoscopy
Straight 	gastrointestinal tract, nasal cavity, nerve, oral cavity, pharynx, skin, tendon, vessels

Anatomy – The Body

- Curved Needle
  - Allow predictable turnout
  - Requires less space for maneuvering
  - 1/ 
  - 3/ 
  - 1/ 
  - 5/ 

1/4 Circle 	eye (primary application) microsurgery
3/8 Circle 	aponeurosis, biliary tract, cardiovascular system, dura, eye, gastrointestinal tract, muscle, myocardium, nerve, perichondrium, periosteum, pleura, skin, tendon, urogenital tract, vessels
1/2 Circle 	biliary tract, cardiovascular system, eye, fascia, gastrointestinal tract, muscle, nasal cavity, oral cavity, pelvis, peritoneum, pharynx, pleura, respiratory tract, skin, tendon, subcutaneous fat, urogenital tract
5/8 Circle 	anal (hemorrhoidectomy), nasal cavity, pelvis, urogenital tract (primary application)

BLADES or SCALPELS

- They come in various types and sizes which range from No. 10-24
- They differ in strength, width, and shape of the tips which can either be curved ,straight or flat.
- The smallest sizes ranges between 10-15 and the largest ranges between 18-24
- In the middle there is a space through which the blade is mounted on the handle
- They also differ in length and sizes.


10
11
12
15
20
21
22
23


18
20
21
22
23
25
25A
26
36

BLADES or SCALPELS

- The type of scalpel most commonly used has a re-usable handle with a disposable blade.
- **Blades** vary in size and shape.
- The blade is attached to the handle by slipping the slit in the blade into the groowes of the handle.
- An instrument, newer the fingers is used to attach or detach the blade.
- Handles vary by width and length. Handles range from No. 3,4,7 and 9.
- Most handles are made of brass, the blade may be made of carbon steel.

Handles range from No. 3,4,7 and 9.

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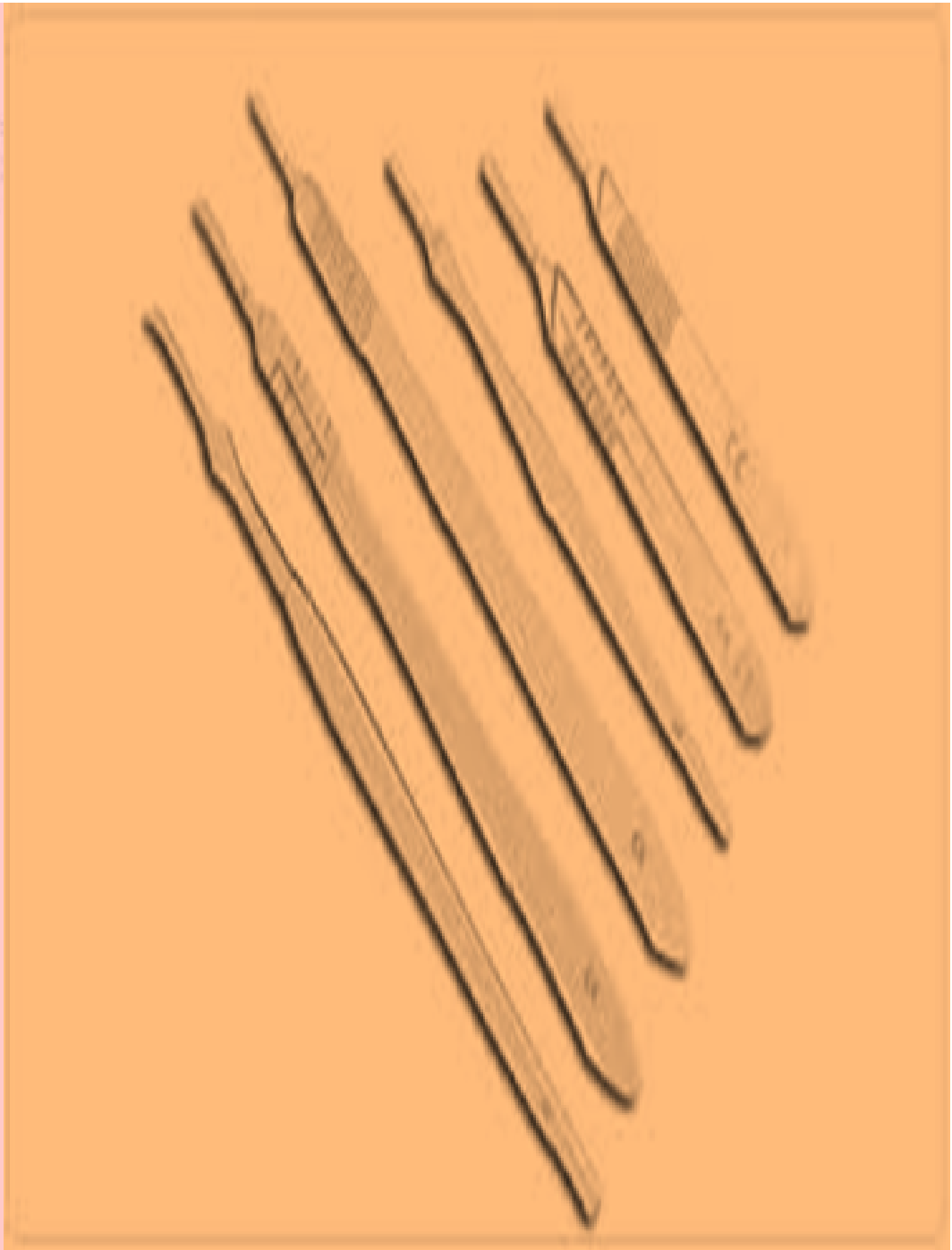
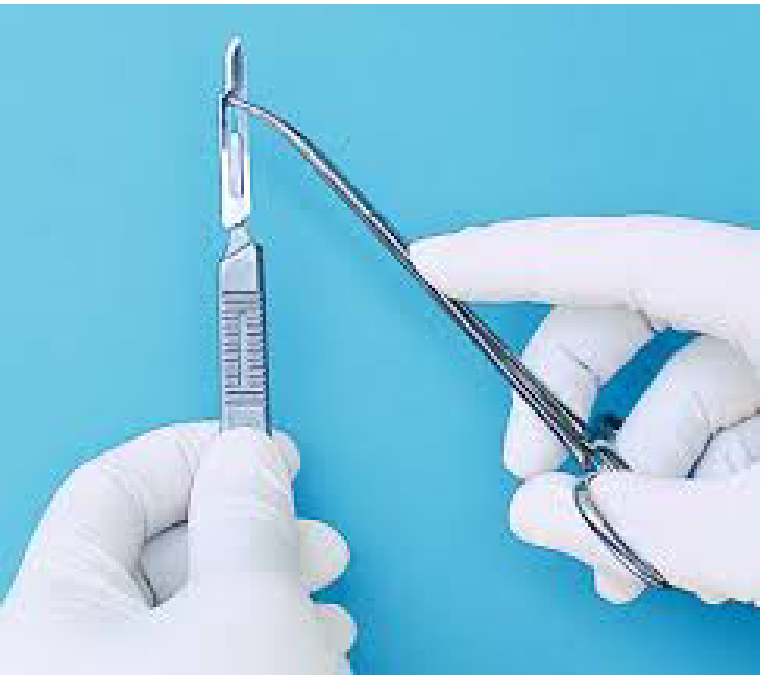


Handles range from No. 3,4,7 and 9.

An instrument, never the fingers is used to attach or detach the blade.



Positions used in surgery

- **Supine position (dorsal, recumbent, laparatomy)**

➢ Patient lies on the back, arms on the side, thumbs tucked in underneath of the body at the level of buttocks or arms folded on the chest or extended on both sides forming a sign of a cross.

➢ It is used for:-chest,abdomen,legs,teeth, breast,arms,axilla operations.

Gall bladder or liver position

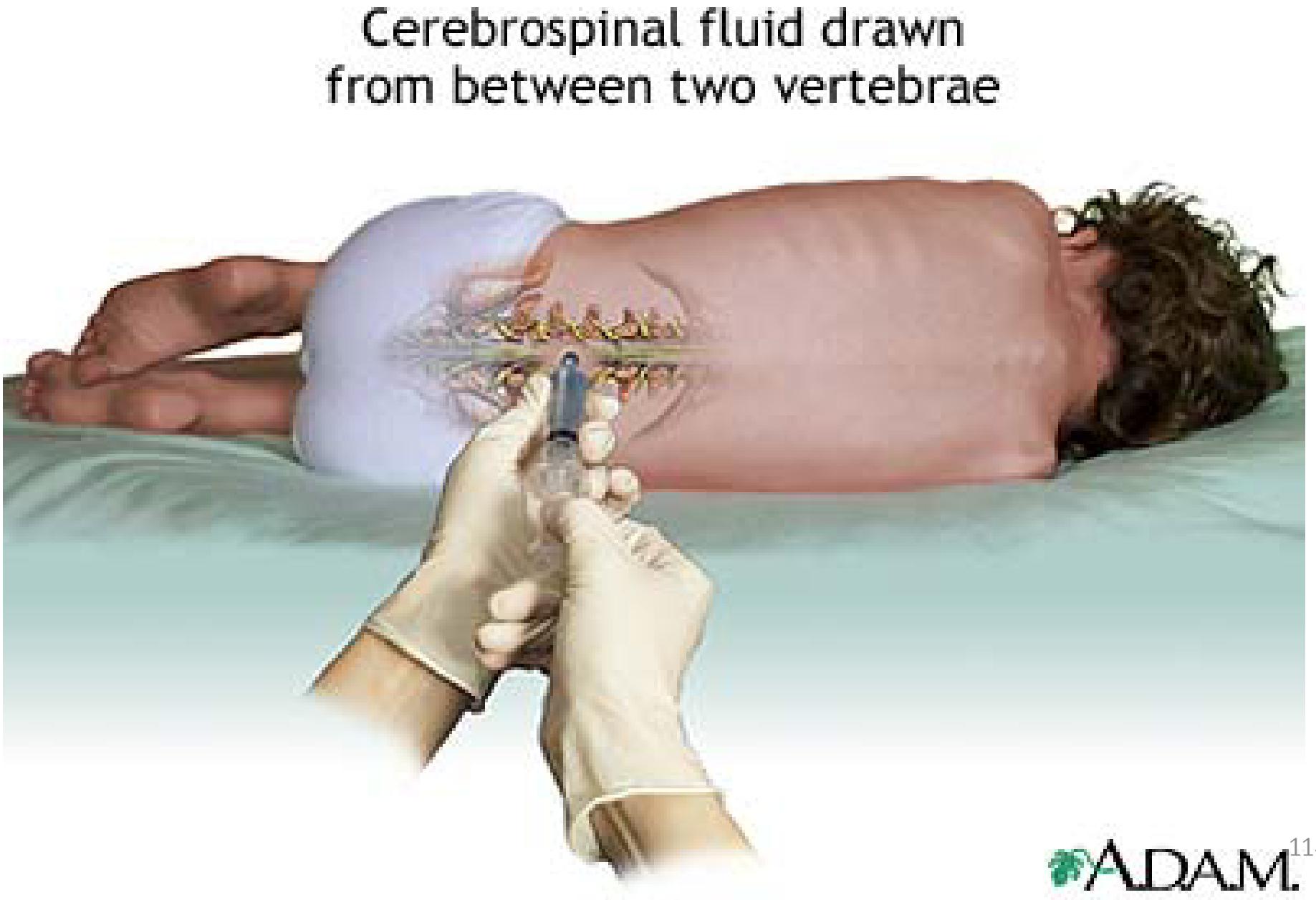
- It is a supine position with arms extended using arm tables.
- The bridge of the table is raised i.e break back, to push the liver forwards against the anterior abdominal wall.
- This is used in liver and gall bladder operations

Trendeleburg position

- It is supine position with the head lowered most and the legs raised but lowered at the knee
- The arms are on the sides, shoulder pads are placed at the shoulders to prevent patient from falling off and also pressure from nerves resulting to paralysis
- The position allows intestines to move away from the uterine cavity exposing the pelvic organs.
- It is used in pelvic operations e.g myomectomy, hysterectomy,draining of pelvic abscess etc

- **Lateral position**
- It can be left or right lateral position.
- The patient should be kept with the affected side being the uppermost.
- The underneath leg is flexed at the knee with foot underneath the upper thigh.
- Soft pads are placed between the eggs to prevent friction.
- Hands are extended above the head or sideways.

- Lateral position



- **Renal position**
- It is the same lateral position but the bridge of the table raised and the foot of the table lowered.
- It is used for:-

➢ Kidney operations

➢ Chest operations

➢ Hip operations

➢ Lower limbs operations

- **Lithotomy position**
- The foot of the bed is lowered or not
- The legs flexed at the hip joint, raised and placed on stirrups.
- Pads are placed at pressure points.
- The hands are placed on the chest.
- It is used for:-
- Gynaecological operations e.g TVH,delivery etc
- Neurological operations- bladder, anal, perineal

- **Hyper-extended position of the neck**
- Patient is placed in supine position with pillows or sandbags under shoulder plates.
- A padded horse shoe is placed under the head to support it in position.
- It is used for operations of:-
- Thyroid
- Tracheostomy
- Laryngectomy
- Any other neck operations

- **Prone-cranial position**
- It is reverse of trendeleburg position
- Patient is placed in prone position with head projecting over the end of the table.
- A padded horse shoe is fixed to about 6 inches below the level of the table.
- The head is placed on the horseshoe with pillows supporting the shoulders.
- Arms are at the side and is used for:- cranial operations, laminectomy-long spinal cord and any other cranial operations.

- **Sitting cranial position**
- Patient sitting in an upright position with head of the table in an upright position.
- Patient's face is placed on the horseshoe.
- The arms are on the lap.
- The foot of the table flexed
- It is used for:-
- Cerebrum operations
- High cranial laminectomy

- **Supine cranial position**
- It is the opposite of prone cranial.
- The neck is extended depending on the surgeons wish.
- Soft pads are placed at pressure points
- This is used for:-
- Frontal craniotomy
- Parietal operations
- Ventricular operations

- **Knee elbow rabbit position**
- Patient is placed in the knee and head almost touching each other.
- Arms are extended forward
- The head is tacked in and supported by a billow
- The foot of the table is lowered to provide support for the hands and arms.
- The body is secured in place by straps
- It is used for:- spinal punctures, lumbar laminectomy, vertebral disc operations

- **Jack-knife position**
- Patient put on prone position with hips over the break of the bed.
- Arms are extended above the head
- The hips are raised, the head of the table lowered and a foot extension piece is added on the table to provide support for the legs.
- Soft pads are put over all the pressure points.
- It is used for:- rectal surgery, lumbar laminectomy

Duties and Responsibilities of nurses in an operating room.

- **Receiving area /traffic nurse**
- Is a nurse who receives patients in theatre from the ward
- **Duties**
- Ensures the general cleanliness of the entire receiving area-includes floors,trolleys and stretchers.
- Provides all the requirements and apparatus used in this area e.g oxygen cylinders, stretchers, clean linen etc

- Ensures the operation lists for sessions are also there .there should be six copies i.e in the ward, administration office, anaesthetist, operating theatre, receiving area,T.S.S.U or C.S.S.D.

By 3p.m of the previous day ,the list should be in the operating theatre to enable early preparation of theatre equipments.

- He/she receives patients from surgical wards. He/she identifies patient, receives report of patient, and other items of the patient from the ward e.g blood, investigation reports, files and x-ray films etc

- Makes sure that the patient is well prepared from the ward and charts are available and are in order e.g fluid charts, observation chart, theatre checklist, dentures, jewellery and possessions like money etc
- Makes sure that the patient is comfortable especially during transferring process from the outside trolley to the theatre trolley making sure that there is no accident.
- Stays with patient and responds to needs as they arise until hands over the patient to anaesthetic nurse

N.B

- Identification of patient is the first thing to check and counter check with the list and call patient by name.

Anaesthetic nurse

- Is a nurse who is the first assistant of the anaesthetist during induction,surgery and extubation
- **Duties**
- Is i/c of the anaesthetic room and ensures that the room is fully equipped, cleaned and ready for use.
- Responsible for post anaesthetic room
- Receives patient from R/A nurse ,identifies patient, takes care of charts, notes, and other items needed for operation like blood, drugs etc
- Stays with the patient while waiting for induction and reassures the patient

- Assit's the anaesthetist during induction, surgery and extubation
- Plays a significant role when there is an emergency and makes sure the emergency trolley and drugs are ready, complete and available. This is all the time

Circulating nurse/dirty nurse/runner nurse/indirect nurse

- This is one or two trained nurses who assist the scrub-up surgical team in handling unsterile instruments and equipments.

Duties

- ✓ Gives direct nursing to and supports the patient according to the needs e.g changing position, vomitting
- ✓ Safeguards the welfare of both the patient and surgical team e.g positioning the patient,ensuring the safety of the patient,surgical team-prowiding stool etc.

Circulating nurse cont'd.....

- ✓ Wipes sweat from operating team.
- ✓ Helps in tying the gowns or gowning.
- ✓ Helps in adjusting the operation table and any other duty which the operation team may require.
- ✓ He ensures that the operating team is supplied with the necessary items to perform the operation successfully and economizes the supply.

Circulating nurse cont'd.....

- ✓ Coordinates nursing activities and also safeguards the maintenance of aseptic technique.
- ✓ Assists surgical team in handling emergencies, unsterile packs, drugs, microscopes, diathermy machines, packed tubing's, gauze etc
- ✓ Maintains order and quiet environment throughout the operation session.

Scrub-up nurse/sterile nurse

- Is a member of the surgical team who is scrub-up.
- The duties are divided into three

a) Pre-operative responsibility

- ✓ Scrub-up, gowns gloves 15 minutes early than the other team.
- ✓ Arranges and lays sterile instruments on trolley.
- ✓ Checks and makes sure all sterile instruments are available and in good working order.
- ✓ Prepares ligatures, sutures ,swabs and sponges to be used during an operation.

- ✓ Counts instruments, packs, swabs, and then records with circulating nurse.

b).Intra-operatively / during operation

- ✓ Notices time when operation starts.
- ✓ Watches the progress of the operation and anticipates the needs of the surgeon and prowides appropriate instruments in an efficient manner as they are required.
- ✓ Maintains sterility during an operative procedure.
- ✓ Maintains swab and instrument counts and reports to the surgical team.
- ✓ Clears the instruments at the end of the operation.

c). After operation

- ✓ Checks and ensures that the dressing is properly applied i.e incised area
- ✓ Makes sure the equipments used for the patient are removed e.g diarthermy lids

- ✓ Ensures that there is no bleeding on the incision site, catheters are well secured and in position.
- ✓ accounts for swabs and instruments in patient's file and signs them
- ✓ Clears used instruments, checks and reports any fault ones.
- ✓ Hands over patient to anaesthetic nurse.
- ✓ Hands over instruments to sluice nurse with correct count.

Recovery nurse

- Is the nurse who receives patient immediately after operation and takes care of the patient until he/she recovers from anaesthesia.

✓ Maintains the general cleanliness of all items within the recovery ward and makes sure that items are available and in good working order e.g oxygen, suction machine, emergency tray etc.

✓ Makes sure that emergency tray is complete.

✓ Ensures that she receives patient from the anaesthetic nurse and takes clear instruction about the patient,pt notes, and any special report e.g regulation of fluids, positioning of patient.

Recovery nurse cont'd.....

- ✓ Takes close observation of the patient vital signs, operation site,1/4 hourly, until fully awake, then 1/2 hourly. Notices any abnormality and records.
- ✓ Makes sure that the patient is comfortable and records patient in the register book.
- ✓ Assists in resuscitation if need be
- ✓ Contacts the ward nurse when patient is awake, then hands over the patient to the nurse with all items and the report

Nurse Manager

- Is the overall administrator of the OR theatre

✓ To sees that all staff and patient are safe and work as required

✓ Makes sure that every area of theatre is well staffed for 24 hours.

✓ Plans orientation for new staff in theatre

✓ Ensures that all set and equipments needed for the operations are available.

✓ Liaises with other departments for the smooth learning of theatre

✓ Maintains discipline in theatres.

Record keeping in operating room

- Records of day to day activities in theatre should be kept.
- It is absolutely a record of operations performed and personnel involved that is maintained.
- The records should be entered and numbered serially in a permanent book or register.
- This is more where there are more than one theatre rooms in a department.

- The information recorded in each theatre room includes:-

- Surname of patient, middle and first name
- Age and sex
- In-patient number(IP.No)
- Operation serial number
- Nature of operation
- Ward number
- Any special remarks
- Name of the surgeon

- Name of assistant surgeon
- Name of anaesthetist(s)
- Name of scrub-up nurse
- Record of staff present during the operation
- Type of anaesthesia used
- The signature of two people checking swabs and instruments.

Record of theatre bookings (theatre list)

- The record of theatre booking is done throughout the day for smooth running of theatre.
- It is kept and maintained to prevent overlapping the theatre surgical team.

MEDICAL LEGAL ASPECTS IN AN OPERATING THEATRE

- Every person undergoing surgery has a right and permission for surgery.

❖Consent

- Patients are supposed to give their own consent for operation or examination in the hospital except for :-

✓Minors e.g children

✓Mentally sick or challenged

✓Prisoners

✓Patients with infectious disease

- The consent therefore must be genuine and freely given and nature of operation shall have been explained to the patient/guardian of which he/she must understand.
- The consent is obtained from the patient by the doctor.

N.B

- The patient has a right to refuse to give consent.
- The consent should be given a few days before the patient is taken to theatre with an exception of emergencies.

❖ Patient identity

- It should be done from the receiving area by the nurse in-charge who checks for-

✓ Consent(if it is valid)

✓ Preparation of patient (site of operation)

✓ Presence of dentures or any variables such as ring and if found should be removed and labeled and safely stored by the nurse in-charge, the handed over to the patient after the operation or ward nurse.

- **Personal identification is done by using :-**

  - the theatre lists,
  - patient notes,
  - labeled band fixed on the patient,
  - verbally by calling the patient by name,
  - identifying the operation site
  - reports from the escorting nurse/guardian.

- In the anaesthetic room consent is checked and patient is personally checked again. The same procedure is followed in operating room.

- **Protection from injury**
- This should be done throughout from the receiving until the patient is handed over to the ward.
- Patient should be protected from injury especially during transfer from stretcher to theatre table or stretcher from falling or any other injury.
- Careful inspection of patient's body should be done in an anaesthetic room and operation room before draping to rule out any wound swelling or injury. This is done by anaesthetist and surgeon.

- The electrical surgical equipments should be checked especially the diathermy and its site of application to avoid accidents.
- Check the mouth for presence of dentures. Check preparation of patient.
- Check that there is clear record of all instructions and drugs used during including pre-medication.
- Check drugs and sutures to be used for expirely dates.

- **After the operation**
- The diathermy site, length of operation(time),the surgeon, the anaesthetist, scrub-up nurse's signature and names should be recorded in the register and patient's notes.
- **In the recovery ward**
- Clear instruction should be given and maintained, then handed over to the ward nurse.

- Patient should be guarded against falling and incase it occurs ,it should be reported to the surgeon, the anaesthetist, theatre in-charge, the ward nurse and administration.
- Accident forms should be completed and patient re-examined ,observations and any abnormalities recorded.

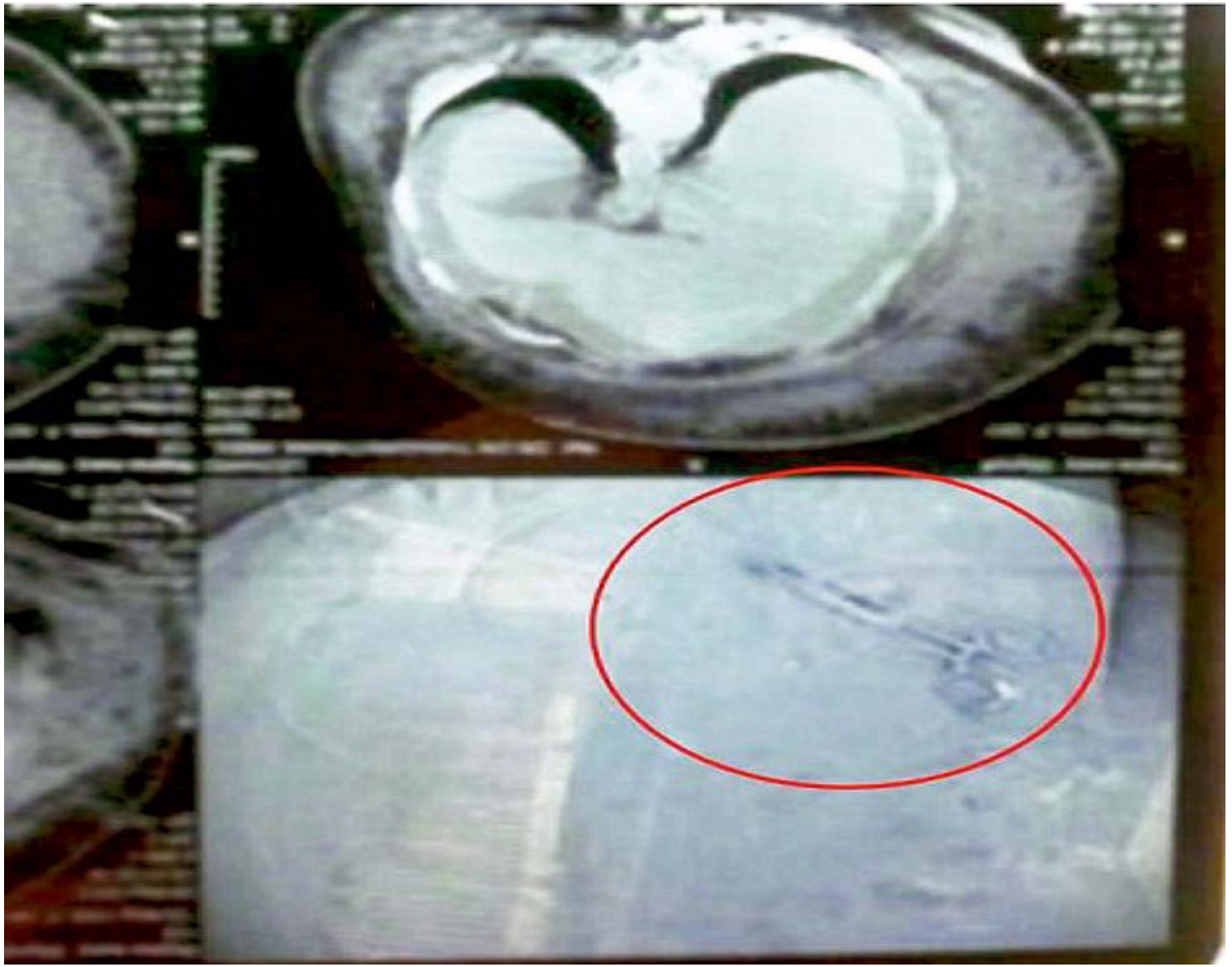
Counting of swabs and instruments

- Swabs, instruments, needles, blades, should be counted and count maintained throughout the operation.
- Re-counting should be done at least three times before closure of any cavity.
- The count should be recorded in the register and patient notes.

Instruments may be left behind after surgery

There are many different types of tools that have been left behind during a surgery. Common instruments are needles, knife blades, safety pins, scalpels, clamps, scissors, sponges, towels, and electrosurgical adapters. Also retained are tweezers, forceps, suction tips and tubes, scopes, ultrasound tissue disruptors, asepto bulbs,cryotomes and cutting laser guides, and measuring devices. The single most common left behind object is a sponge

Mayo scissors left in patient detected after 12 years



Mayo scissors left behind

The things surgeons leave behind inside their patients

The Chinese man who didn't notice he had a 10cm knife in his head is one of a surprising number of patients who have things left inside them after surgery

- **Specimens**
- All specimens should be preserved and in some cases the patient's consent is obtained before disposal of tissues.
- **Police cases/forensic cases**
- All items removed from the body of patients e.g bullets, spears, arrows, knives, etc should be taken/ to administration or directors office for safe keeping because such items will be used as evidence.

- They should be accompanied with written report together with reception book duly signed.
- N.B
- Unconsciousness and deaths occurring within 24 hours after general anaesthesia should be reported to the in-charge of ward who should report to administration.
- A postmortem must be done by pathologist in the presence of a police officer.
- This is done to rule out the cause of death.

- **Confidentiality**
- This should be maintained in all matters concerning patient.
- Patient reports should be confidential
- Surgical findings should be kept confidential
- Do not take any photograph without consent from patient
- Do not expose the patient's x-rays, ultra-sound, files etc.

ANAESTHESIA

- Definition
- Is loss of pain and sensation to part of or the whole of the body induced by drugs.

Principles of Anaesthesia

- **Pre-operative appropriate assessment**

- All patients should be assessed by the anaesthetist before going to theatre .
- He takes history of the patient mainly medical and surgical e.g history of chronic illness, diabeties , anaemia, asthma, T.B, hypertension, allergies etc
- Performs a brief physical examination on the patient e.g head to toe examination ,general condition, Haemoglobin level, urea & electrolytes levels.

- Confirms patient by identity
- He prescribes the pre-medication which also can be prescribed by the doctor.
- The drugs prescribed are sedatives and analgesics e. g pethidne 50mg i.m start,valium etc

- **Reasons for pre-medication**

✓ To allay anxiety of the patient

✓ To alleviate pain

✓ To make induction move

✓ To prevent unwanted reflexes e.g vomiting, coughing , sneezing etc

- **Induction of anaesthesia**

- This is done in the anaesthetic room.
- The room should be prepared with:-

❖ inhalation apparatus e.g masks,connetion tubings,ambu bags

❖ Resuscitation trolley for emergency

❖ Intrawenous fluids

❖ Anaesthetic drugs

❖ Suction apparatus tested before brought in

- **Maintenance of anaesthesia**
- When the patient has been induced he has to be kept in that state i.e maintaining sleep, analgesia,paralysis,or muscle relaxation
- Sleep maintained by inhalation of anaesthetic agents and intrawenous drugs.
- Analgesia by use of I.V drugs
- Relaxation of muscles by I.V drugs

- **Monitoring of vital signs**
- This is done throughout before operation, during operation and after operation, then continued in the ward.
- This is to help one to know whether the condition of patient is improving or not.

- **Reversal of anaesthesia**
- This is done by use of intravenous drugs.
- It is done when the operation is through.
- The drugs used include:-

✓ neostigmine 2.5mg

✓ atropine 0.6mg.

- **Post-operative management**
- The observation of the patient usually done in the recovery ward by the recovery nurse.
- It is then continued in the ward.

Classification of anaesthesia

- Is classified into two main classes

1. Local or regional anaesthesia
2. General anaesthesia

Local or regional anaesthesia

- It lasts 45min. to 3hours depending on the type used.
- It is given locally to the affected part of the body.
- It is given either by:-

➢ **Infiltration**

- The drug is injected on and around the affected area. The commonly used drugs are:
  - lidocaine,lignocaine,xylocaine and procaine hydrochloride

➢ Nerve blocking

- The supplying the affected area is infiltrated by the analgesic drug inducing loss of sensation on the affected area.
- This has to be a specific nerve tract.

➢ Field block

- Similar to nerve block but the area covered is larger.

➢ Spinal block/anaesthesia

- Used for operations from the **abdomen and below**

A. patient is in a sitting

a The patient in a sitting position demonstrating a straight alignment of vertebrae and b in the lateral position showing distortion in alignment of the vertebrae.

demonstrating a straight

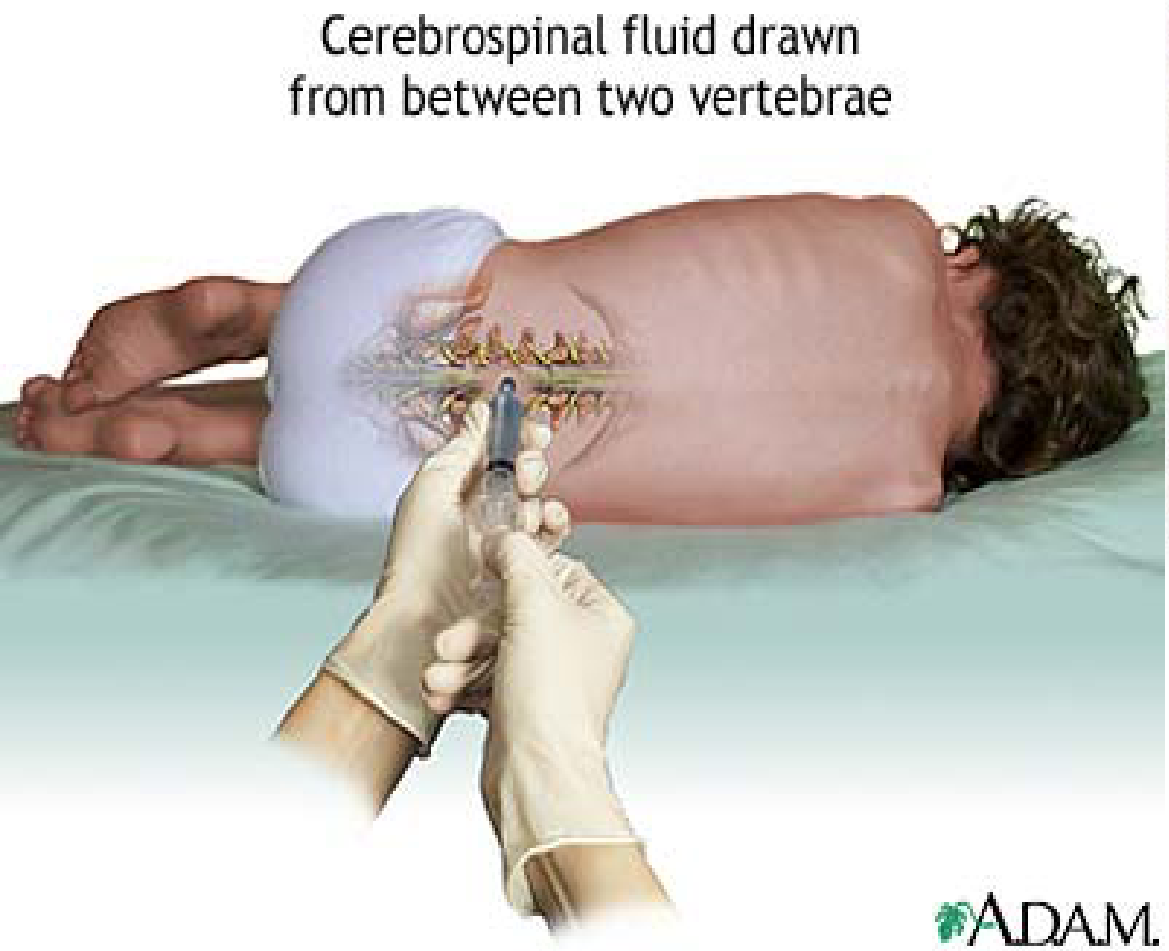
of vertebrae.

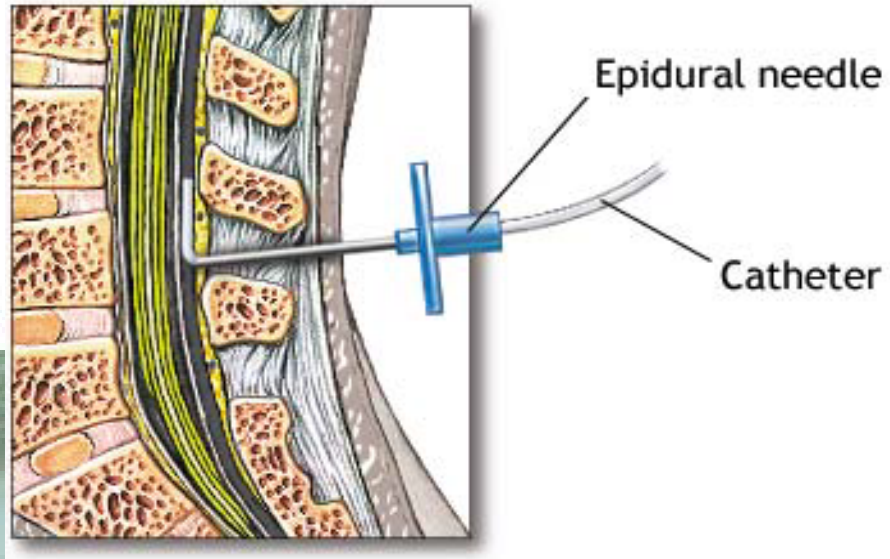
B. In a lateral

showing

➢ Spinal block/anaesthesia cont'd

- A lumbar puncture is performed and a local anaesthesia is introduced through the spine

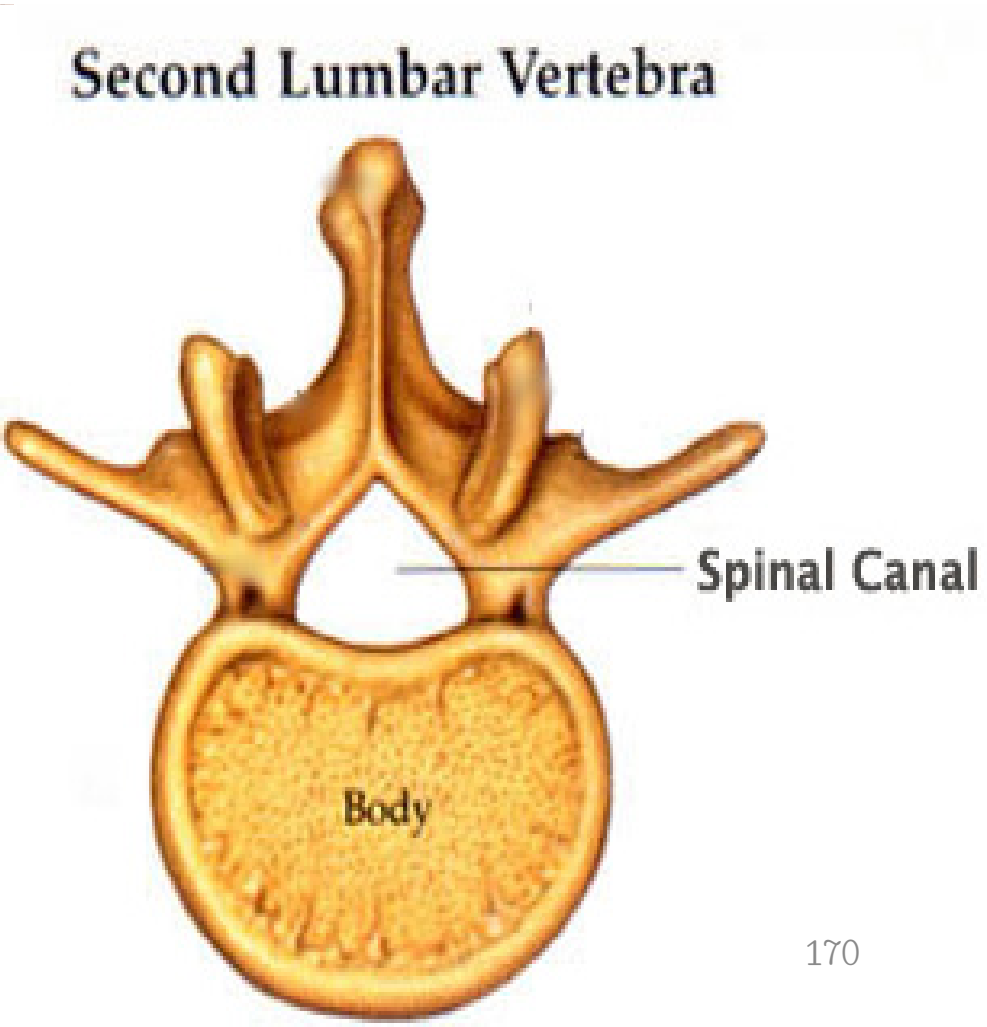




A.D.A.M.

➢ Epidural analgesia

- The anaesthetic agent is injected into the Dura space of the spinal cord
- It is used for operations below abdomen.



Indications of local anaesthesia

- Mostly used in patients who can not undergo general anaesthesia safely
- Can be used per patient wish
- It is cheaper to use than general anaesthesia thus economical to hospital
- To block pain in minor surgery e.g surgical toilet, episiotomy, tooth extraction and circumcision.

Complications of local anaesthesia

- Hypersensitivity reaction
- Infection can occur
- Haemorrhage can occur
- Overdosing can occur
- Nerve damage which can be temporal or permanent

General anaesthesia

- The patient is put into an unconscious state by use of drugs.
- **Aims of general anaesthesia**
- To sustain life by giving oxygen and abolishing reflexes e.g cough, omitting
- To induce and maintain sleep or unconsciousness.
- To relief pain i.e analgesic state.
- To provide a clear surgical field by muscle relaxation.

Management of patient under G.A

❖ During pre-medication

- Management starts with pre-medication whereby:-
- **Atropine 0.6mg**
- is given to reduce secretions
- abolish or lower reflexes by inhibiting the activity of the vegus nerve.
- It also protects the heart from the effects of anaesthesia.

- **Pethidine 50mg/100mg**
- is given to array anxiety and
- reduce excitement.
- Other drugs include

Sedatives are given depending on the
hypnotics emotional state of patient

Tranquilizers-help the quality of anaesthetic relaxation

❖ During induction

- The drugs given include:-
  - Thiapental sodium- short acting barbiturate
  - Suxamethonium (scoline)-short acting muscle relaxant
- Both are given just before intubation
- They are given to avoid muscle spasms as the tube is passed(endotracheal tube)

❖ During maintenance of anaesthesia

- The gases are given through the endotrachea tube
- They include:-
- **Oxygen-** given to sustain life
- **Nitrous oxide-** given to act as analgesic
- **Halothane-** maintenance of sleep
- They are followed by i.v drugs such as muscle relaxants.

- Then either

  Curare

  Pawulon

  Flexadil

  are given as long acting muscle relaxant

- Then infusion with i.v fluids is started or continued

❖ During the monitoring state

- It begins before, during and after operation.
- Check for pulse,respiration,blood pressure and temperature
- Central venous pressure if patient on monitor
- Rate or flow of the infusion or blood

- Colour of blood at the operation site-if changes to darkish, then oxygen is reducing.
- Mucous membrane or nails for pallor or cyanosis
- Urinary output if patient is catheterized
- Muscle relaxation(touch patient to feel relaxation)

❖ **During reversal**

- **Atropine** 0.6mg i.v is given,
- then **neostigmine** 2.5mg i,.v is given,
- **nitrous oxide** is stopped,
- **oxygen** is continued and is given 100%.

❖ During post operative management

- Observation of vital signs continued
- Observation of operation site continued
- observation of general condition of patient
- Observation of reflexes e.g nausea, vomitting
- Positioning of patient
- Theatre positioning depends on the type and area of patient.
- Relief pain immediately by giving analgesic
- Continue giving i.v fluids

Drugs used in anaesthesia

- **Pre-anaesthetic medication**
- Aim. To inhibit the activity of the vegus nerve.

➢ **Anticholinergics**

- **Atropine sulphate 0.6mg**
- It dries secretions
- Protects the heart muscle against effects of anaesthesia due to inhibition of the vegus nerve activity
- Prevents relaxation of heart muscle

- Prevents relaxation of heart muscle by increasing activity of heart rate which is necessary to supply oxygen.
- Side effects
- Tachycardia
- **Hyoscine 0.4mg**
- Is more general on the heart muscle
- Mostly used in patients with cardiac problems.

➢ Sedatives/tranquilizers/hypnotics

- Given to array anxiety especially during induction
- Pentobarbitone- } are short acting
- Secobarbitone } barbiturates
- Chlorohydrate incase of children-long acting sedative
- Phenargan/promethazine-very good sedative because of anti-emetic activity
- valium

➢ Narcotics

- Given preoperatively ,during ,intra-op, and post-operatively
- They are given to

✓ reduce pain,

✓ array anxiety,

✓ induce sleep,

✓ and reduce requirements of the required anaesthesia.

- The commonest drug given is pethidine

- Other drugs
  - Opium
  - Morphine

  } natural narcotics

Side effects

- Depress respiratory centre
- Depress cardiovascular system
- Cause nausea and vomitting
- Cause euphoria feeling
- Causes hallucinations
- They are given ½ an hour before operations

The drugs given in theatre

❖ Drugs used for induction

- Are either given by inhalation as gases and vapour or intravenously
- Barbiturates

✓ Short acting

✓ Thiopental sodium

✓ It comes in vials of 500mg-1G

✓ It induces sleep within 30 seconds

✓ The dose is 2.5%-5% in solution i.e N/saline

- **Advantages**
- Anaesthetic effect is rapid
- Has early recovery without causing drowsiness post-operately.
- **Precautions**
- It has to be injected into a vein because it causes tissue necrosis.
- # if injected into an artery it will cause gangrene of the distal part of that artery.

- **Contra-indications**
- Any patient with status asthmaticus
- Renal problems
- Liver problems

- **Non-barbiturates**

➢ Ketamine hydrochloride(ketalar)

➢ It causes sedation effect without affecting the central nervous system

➢ This means the patient appears not to be a sleep but dissociated from the surrounding i.e patient hallucinates.

➢ It has good analgesic effects but poor in sedative effects hence has to be combined with diazepam.

- **Side effects/disadvantages**
- It promotes production of secretions
- It causes muscle rigidity thus has to be combined with a muscle relaxant
- It causes hallucinations hence has to be combined with a sedative
- It causes increased cardiac output and hypertension hence contra-indicated for hypertensive patient
- **Advantage**
- It is used in patients with decreased cardiac output.

- **Scoline(suxamethonium)**
- It is a short acting muscle relaxant and its effects lasts for 5-10 minutes
- It is used for intubation and is given 1mg/kg/wt
- **Inhalation agents**
- Are both used for intubation and maintenance of anaesthesia
- **Gases**
- Oxygen-given to maintain life
- Nitrous oxide-is a good analgesia but a poor anaesthesia i.e does not induce sleep

❖ Volatile agents

- Halothane — they are in liquid form
- Trichlorothylene — they are normally administered as vapor by use of a vaporizer
- Ether — They are colourless drugs
- Enflurane — not commonly used
- Isoflurane
- Chloroform

- They have good analgesic effect
- They induce sleep

- **Method of administration**
- Closed method-use of vaporizer
- Open method-use of cotton wool or gauze
- It is dumped and put across the patient to inhale
- They can be used for intubation and maintenance of anaesthesia
- They are highly inflammable
- **Precaution**
- Any electrical appliance should be used with caution
- No use of open fire.

- **Maintanence of anaesthesia**
- Long acting muscle relaxants are used
- **Pancronium (pavulon)**
- Dose is 0.1mg/kg/wt
- The effects last for 60-85 minutes
- It has some steroid effects
- It releases secretions from the alimentary tract but does not release histamines
- **Disadvantages**
- It excites the cardiovascular system leading to tachycardia.

Tubocurare

- Is the oldest muscle relaxant .Dose is 0.3mg/kg/wt
- **Effects**
- It causes release of histamines leading to hypotension
- It causes skin rashes
- It reduces cardiac out-put
- **Gallamine(flexadil)**
- Long acting muscle relaxant
- Dose is 1.5mg/kg/wt
- Effects last for 20 minutes
- Preferred for shorter cases
- it inhibits the activities of the vegus nerve thus causing tachycardia.

N.B

- With the use of these muscle relaxants the patient has to be reversed by use of an antidote for muscle blocks.
- The commonest antidote is **NEOSTIGMINE**
- Dose is 2.5mg. Given i.v
- **Mode of action**
- It inhibits enzymes which cause the blockage

Stages of anaesthesia

❖ Stage 1-beginning anaesthesia

- At this stage the patient breathes an anaesthetic mixture
- He feels warm, dizzy, and detached from the surrounding or happenings
- Experiences some ringing or roaring or buzzing in the ears but still conscious and unable to move the limbs
- It takes a short time

- **Stage 2:- excitement stage**
- It may be characterized by:-
- Struggling,shouting,singing,clapping or crying
- All the above can be avoided by the smooth and rapid administration of anaesthetic drugs.
- The pupils dilate but contract to light
- The pulse rate is rapid and respirations are irregular

- **Stage 3:- surgical anaesthesia**
- It is normally reached by the continuous administration of gases and vapour
- The patient is conscious and sleeps quetly on the operating table.
- The pupils contract but maintain the contractile power when light is exposed to them
- The respirations are irregular
- pulse rate is about normal
- The skin slightly flaccid
- This is usually a state patients are maintained at until they are reversed.

- **Stage 4:- danger stage**

- This is normally reached when too much of anaesthesia is given.
- The respirations becomes shallow, pulse rate weak, pupils widely dilated, and not contracting to light
- Cyanosis dewelops and death follows rapidly
- **NB**
- **Stage 1 &2** are normally observed when ether is used
- But for other anaesthetic drugs, the patient reaches **stage** 3 very fast and those two are hardly noticed.

Theatre anaesthetic emergencies

❖ Cardiac arrest(cardiopulmonary arrest)

- Means cessation of breathing and heart rate
- What happens in sequence

➢ Breathing stops

➢ The heart stops functioning

➢ The pulse becomes thready and the arrest occurs

➢ The body tissues stops metabolizing and a state of production of lactic acid from the break down of sugars without oxygen occurs.

Management

A.-airway :- keep the airway clear

B.-breathing:- maintain the breathing either by

- ✓ ambu bag.
- ✓ Tracheostomy can be done.
- ✓ Extend the chin of the patient forward by extending the neck and bring the trachea forward
- ✓ Intubation

C. Cardiac massage: apply pressure on chest at the rate of 72 beats per minute

D. Drugs: quickly prepare resuscitation drugs.

- These are drugs to counteract the acidosis and increase the contractibility of the heart i.e adrenaline and sodium bi-carbonate
- If external cardiac massage fails, internal cardiac massage can be done by:-defibrillation of the heart by use of an electric shock.
- **Dose is 300 joules**

❖ Asphexia

- This is blocking of the airway

Mx:-remove the blockage

❖ Laryngospasms

- Are contractions of the larynx resulting from stimulation
- The vocal chords blocks the trachea

- **Causes**

✓ The cause is that if the patient is lightly anaesthetised

✓ The passage of the endotrachea tube during intubation or removing a tube when the patient is highly,deeply anaesthetised.

- **Management**

✓ Give oxygen by mask under pressure

✓ Give muscle relaxants

NB

The problem occurs during intubation and extubation and is a life threatening.

❖ Bronchospasms

- These are spasms of the bronchi.
- It causes hypoxia when it occurs
- It is common in patients with history of allergies e.g bronchial asthma
- Causes
- Vomiting and inhalation of vomitus
- Light anaesthesia
- Clumsy intubation(putting a tube when muscles have not relaxed
- Asthmatic patients and heavy smokers

- **Management**
- Give bronchodilators

❖ Aspiration

- Inhalation of substances in the lungs e.g vomitus, secretions
- **Patients at risk**
- Patient taken to theatre after having been fed
- **Management**
- Suctioning in theatre
- Give antacids to neutralize the acidity one hour before the operation

- Starve patient before the operation
  - 6 hours for solid food
  - 4 hours for semi-solid food
  - 2 hours for liquids eg milk,tea
- In an emergence do stomach or gastric lavage.
- Put patient on broad spectrum antibiotics
- Do chest exercises

❖ Pneumothorax

- It occurs when the pleura is punctured by mistake during intubation causing negative pressure leading to atelectasis

❖ Anaphylactic shock

- Sudden allergic reaction
- It causes bronchospasms resulting to wheezing, collapse and low blood pressure

- **Cause**

✓ Reaction to drugs

- **Management**

✓ Give plenty of i.v fluids(open drip fully)

✓ Give i.v steroids

✓ Give oxygen and antihistamines

✓ E.g piriton injection

❖ Hypothermia

- This is due to reaction to anaesthetic drugs or due to low room temperature or infusing cold fluids or inspiration of cold gases
- **Management**

➢ Resuscitate the patient

➢ Keep the patient warm

➢ Give warn i.e fluids

➢ Send patient to critical care unit after being stabilized for gradual warming up.

❖Respiratory arrest

- ✓ This is stopping of breathing
- ✓ These may be due to overdose of the drugs leading to depression of the respiratory centre and depression of the peripheral nerves.

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