SUNDARAM MEDICAL FOUNDATION

# Manual of common office procedures

FORUM 2002


Chennai: 600 040
2002

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# Table of Contents

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# Introduction

*"Clinical competence exists when a practitioner has sufficient knowledge and manual skill, such that a procedure can be performed to obtain intended outcomes and without harm to the patient" (Primary care, Vol. 24. no: 2; June 1997)*

Technique of clinical procedures constitute an important part of daily work of any practicing clinician. All of us have learnt these during our training period. Most often than not these procedures are self-learnt without supervision. Are the knowledge and skills we currently possess adequate? Are we using the right technique? Are there newer and simpler ways of doing these procedures?

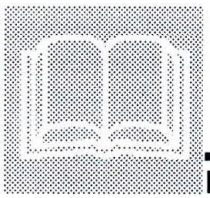
Adequate knowledge of and skills for performing these procedures is the means to quality assurance. In this era of Consumer Protection Act, it is important to have the knowledge and skills that would enable us to perform these procedures safely and without undue harm to patients.
To perform common bedside procedures, preliminary knowledge of the clinical situation, relevant anatomy and equipment is necessary before acquiring the skills to a particular procedure. These elements of knowledge can be summarized into three areas or domains:
**Clinical knowledge and judgment** – this will provide answers to :- Who will need the procedure? On whom should I not do it? When can I perform the procedure? How do I interpret the results? How do I manage my patient after the procedure is done?
**Knowledge of equipment, instrument and supplies** - this will provide answers to:– What are the instruments needed ? How do I put it all together ? Where do I buy ithem ? How do I maintain them ?
**Knowledge of the procedure-** this will provide answers to :- How do I prepare my patient ? How do I actually do it and master the procedure ? Are there any special techniques that I should learn?

| ICON KEY | |
|---|---|
|  | Clinical background |
|  | Relevant anatomy |
|  | Equipment needed |
|  | Steps of the procedure |

This manual has been designed to help you find answers to the above questions. Each chapter has been divided into five sections as shown on the left. The clinical background will deal with a small introduction and the indications and contraindications for the procedure. The relevant anatomy will consist of pictures to reorient us to the details of the anatomy that are relevant in performing the procedure. A list of the equipment needed will be enumerated next. Finally the steps of the procedure will be presented with a small note on practical tips and tricks. At the end of each chapter the link icon (in the CD) will take to you to the relevant video or PowerPoint presentation

Chapter 1

# Nasogastric Tube Insertion



Adynamic ileus or intestinal obstruction can lead to accumulation of gases and liquid in the GI tract. Unless they are removed significant risk of aspiration is present. Nasogastric tubes are placed in the stomach either to remove luminal contents or for purposes of enteral nutrition.

## INDICATIONS/CONTRAINDICATIONS

**For Gastrointestinal decompression**

- Adynamic ileus
- Gastric outlet obstruction
- Intestinal obstruction

**To provide enteral nutrition**

- In severe burns and polytrauma

**To remove toxic substances**

- Gastrointestinal bleeding
- Corrosive / poison ingestion

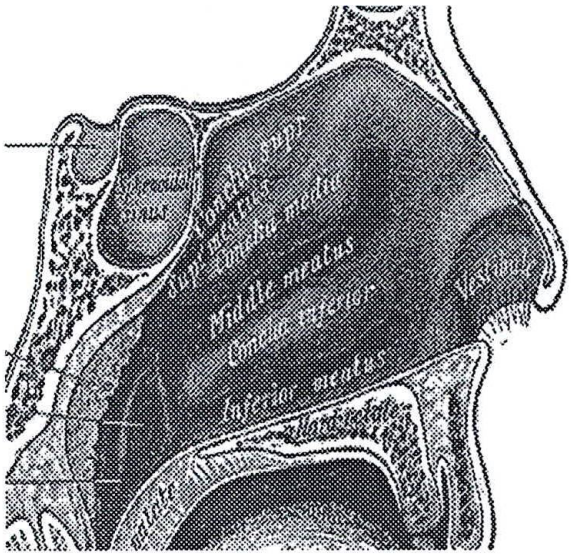
**There are no absolute contraindications for the placement of nasogastric tubes.**

**The relative contraindications are:**

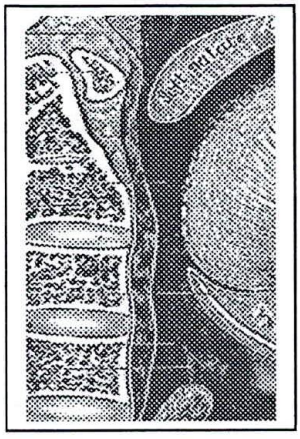
- Severe maxillofacial trauma
- Base of skull fractures
- Corrosive ingestion

Placement of nasogastric tubes in patients with severe maxillofacial trauma is fraught with the the danger of the tube inadvertently entering the cranial fossa. Nasogastric tubes in patients who have consumed corrosives can cause visceral perforation. However in both these instances, nasogastric tubes can be places with due caution by expert personnel.

## RELEVANT ANATOMY



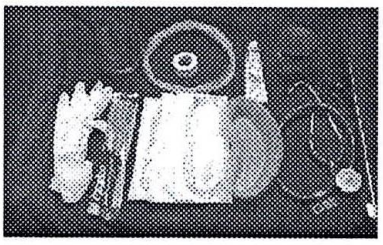
The nasogastric tube passes through the nose. It It is important to remember that the openings of the nasal sisnuses and the Eustachian tube can become infected. Passage of the tube can be difficult in cases of severe deflected nasal septum



The pharynx is an area of complex anatomy. It is worth noting the intimate relationship of the laryngeal inlet and the cricopharyngeal sphincter.

## EQUIPMENT

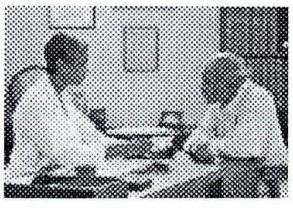
1. 14 -18Fr NG tube
2. Lubricant jelly
3. K-Y jelly is sufficient, but lidocaine jelly may be used
4. Topical nasal vasoconstrictors such as phenylephrine or cocaine (optional)
5. Topical anesthetic such as 10% lignocaine spray (optional)
6. Emesis basin
7. Catheter tip syringe
8. Suction apparatus (i.e., wall suction or portable apparatus)
9. Tip suction tube
10. Gloves and eye protection
11. A small cup with water, with a straw for the patient to sip through
12. Tincture benzoin and tape to secure the tube after placement



## STEPS OF THE PROCEDURE

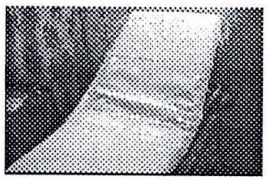
### 1. PREPARE THE PATIENT.

- Explain the procedure
- Explain the risks and the alternatives
- Answer any questions



## 2. PATIENT POSITION

- The bed should ibe inclined
- Position the patient upright or decubitus, with the neck flexed.

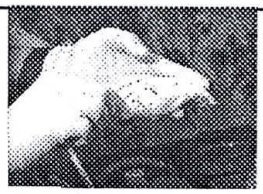


## 3. ESTIMATE THE TUBE LENGTH.

Measure the distance from the patient's ear to the umbilicus. This is a good estimate of the needed length.

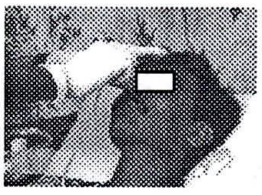
## BEND AND LUBRICATE THE TUBE

The tip of the nasogastric tube should be bent to conform to the direction of passage and lubricated liberally with K-Y or lignocaine jelly



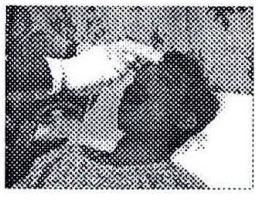
## 4. CHOOSE A NOSTRIL, SELECT THE MOST PATENT ONE.

- Spray topical anesthetic to the back of the throat.
- Apply lubrication jelly liberally to the tip of the tube and along the length of the tube.
- Have the suction apparatus turned on.



## 5. INSERT THE TUBE.

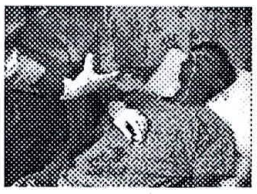
- With the patient's neck flexed (Make sure there is no cervical spine injury), insert the tube into the nostril
- Aim straight back toward the occiput.
- Apply firm constant pressure to the tube.
- Have the patient hold the cup of water; have the patient take small sips and swallow as you apply pressure.



- Continue to advance the tube to the desired length.
- Anticipate some gagging during placement. Spraying additional topical anesthetic to the back of the throat may decrease this.

## 6. CHECK POSITION OF TUBE

- Hold it firmly in place, close to the nostril, which often requires steadying your hand against the patient's nose.



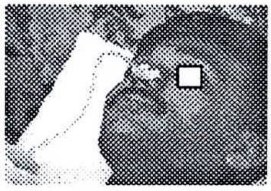
- Attach the catheter tip syringe to the tube and inject 30 to 60 ml of air into the tube. Listen over the epigastrium with a stethoscope for the rumbling of air in the stomach.
- Aspirate back on the syringe to confirm the efflux of gastric fluid; pH should be <5.

**Confirmation of tube position**

Radiographic confirmation of the placement is often necessary. NG tubes have radio-opaque marker tape incorporated into their design so that they are visible on routine kidneys, ureter and bladder (KUB) x-ray.

## 7. SECURE TUBE

- Secure the tube to the nose with benzoin and tape. Avoid taping the tube in such a way that pressure is applied to the nostril. This is a common cause of necrosis of the nares.



- Be sure to tape the tube down to a second site, such as the patient's forehead or shoulder, so that inadvertent traction on the tube does not dislodge it.

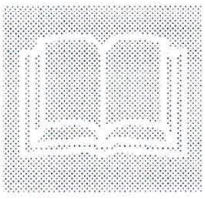
## TIPS & TRICKS

If the tube does not pass easily, do the following:

- If the tube coils in the mouth or esophagus, chill the tube in some ice to stiffen it.
- If the tube does not pass at all, try the other nostril.
- If, during advancement, the patient begins to cough, withdraw immediately. This indicates misplacement into the trachea.

Chapter 2

# Peripheral Venous Cannulation



## CLINICAL BACKGROUND

Venous access is a simple bedside process that is carried out on a daily basis. Proper selection of the vein, using the right sized cannula, proper fixation and cannula care are important.

### SELECTION CRITERIA

- Use the upper arm preferably, dorsum of the hand
- Use as distal a location as possible
- Select a straight vein; tortuos or bent veins are prone to counter puncture
- Use the largest vein available
- Use a soft and resilient vein
- Always use the non-dominant limb as it frees his dominant hand
- Resuscitation

## INDICATIONS/CONTRAINDICATIONS

- Volume replacement
- Fluid replacement
- Blood transfusion - acute and chronic blood loss
- Intravenous administration of drugs

There are no absolute contraindications fro the placement of IV cannulation.

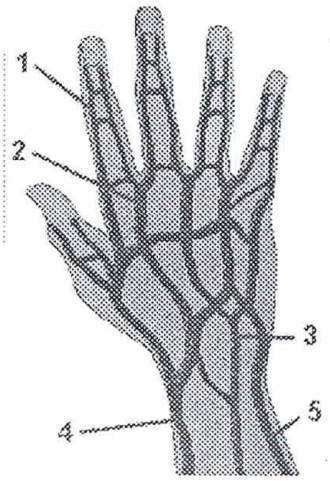
# RELEVANT ANATOMY

## Sites for Cannulation

There are several different potential sites for peripheral venous cannulation. The diagrams below give an outline of the venous anatomy that must be considered.

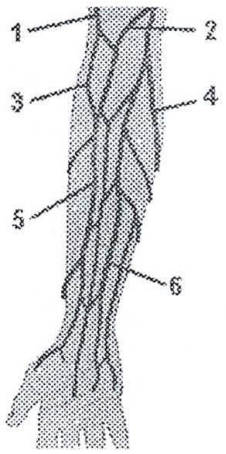
**Veins of the Hand**

1. Digital Dorsal veins
2. Dorsal Metacarpal veins
3. Dorsal venous network
4. Cephalic vein
5. Basilic vein

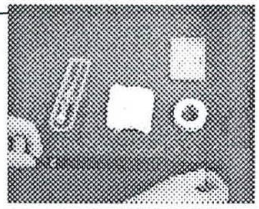



**Veins of the Forearm**

1. Cephalic vein
2. Median Cubital vein
3. Accessory Cephalic vein
4. Basilic vein
5. Cephalic vein
6. Median antebrachial vein




# EQUIPMENT



## Instrument tray

| | |
|---|---|
| **Cannula** | It might sound obvious! Choose the right sized one |
| **Tourniquet** | A quick release one is best. Ensure that it is big enough to go round the limb |
| **Alcohol swab and Gauze** | Extra gauze needed to prevent blood leaking on the patient /trolley/floor |
| **Gloves** | Make sure that the gloves fit you well, especially at the fingertips |

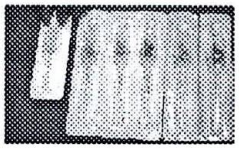
**Blood Bottles, Sharps Bin, Tape and Saline Flush**

**Cannula Size**

The size of the cannula you are intending to use is an important factor in the usefulness of the cannula. Generally speaking, the smallest possible cannula is inserted into the largest possible vein. However, in an emergency situation, the following rule should be followed. - **'Short and Thick does the Trick'**

The primary aims of cannulation in an emergency, depending on the patient's condition, is to provide venous access for drug and fluid administration, and for taking blood for laboratory analysis. Venous cannulae are gauged according to their size, and color-coded accordingly. A green cannula (size 18) is the absolute minimum size of cannula that should be used in an emergency situation. Anything smaller, and you are compromising the amount of fluid that can be pushed through in a given time, and increasing the risk of any withdrawn blood haemolysing.

If a bigger cannula can be used, it should be considered. The fluid flow difference between a green (18G) and gray (16G) cannula is about 100 mls/min. Care should be taken however not to use too large a cannula - if there is no collateral blood flow around the cannula the drugs or fluids will not be distributed through the bloodstream properly.



**Information on cannula sizes colors and maximum flow rates.**

| Color | Size | Int. Diameter/Length | Max Flow |
|---|---|---|---|
| Grey | 16G | 1.4mm/45mm | 180mls/min |
| Green | 18G | 1.0mm/45mm | 80mls/min |
| Pink | 20G | 0.8mm/32mm | 54mls/min |
| Blue | 22G | 0.6mm/25mm | 31mls/min |

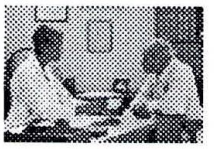
**Which Cannula?**

Most cannulae are now similar - such as the *Angiocath*® and *Intracath*®. Choice of size depends on need and age of patient.

- **Adults**
  - 12-14G - Volume resuscitation and replacement of acute blood loss
  - 16-18G - Fluid replacement
  - 18-20G - Elective blood transfusion, IV drug administration.
- **Infants and Children**
  - 20-22G - serve most purposes depending on size of child
- **Newborns and neonates**
  - 24G - for blood, fluids and IV drugs

# STEPS OF THE PROCEDURE

## 1. PREPARE PATIENT

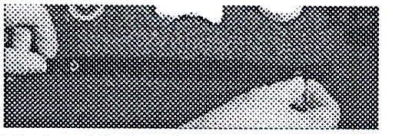


Explain the procedure in detail and the reason for doing it. Inform the patient that it will be painful.

## 2. ASSEMBLE EQUIPMENT

Make sure that you have a tray of all the equipment needed. It is very embarrassing to be running for things in the middle of the procedure

## 3. APPLY THE TOURNIQUET

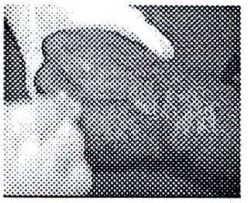


Apply the tourniquet approximately 20 cms above your intended cannulation point. The torniquet should be tight enough to impede venous return but not restrict arterial flow. Advise your patient to lower their arm and clench/release their fist (to maximise venous distension). Flicking or slapping veins does not affect how distended they will become, and can cause pain and haematoma formation particularly in the elderly with fragile veins or thrombocytopenia.

## 4. CHOOSE THE VEIN

Palpate the vein with your fingertips. You should be assessing its rigidity, turgidity, mobility and likelihood of success. If you are not confident, look at the other arm as well - there may well be a king size vein waiting for you!

## 5. SWAB THE SKIN



Swab the skin surrounding the intended cannulation point with an alcohol based swab, for example chlorhexidine 70% in alcohol, and allow it to dry (to ensure maximum effectiveness of the antimicrobial properties of the swab).

**Do we need to anesthetize before venupunture?**

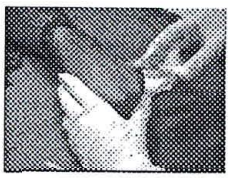
- Except in an emergency, always apply topical EMLA (Eutectic Mixture of Local Anaesthetic) cream in infants and children. EMLA is not approved for infants < 3 months of age).

- Apply an EMLA patch or some EMLA cream (cover with Opsite film) over the selected vein or veins about 1 hr before placement of an IV.. EMLA may make veins less visible if left too long. EMLA analgesia lasts up to 90 minutes.

- Adult patients will appreciate consideration of analgesia when IV cannulas are placed electively.

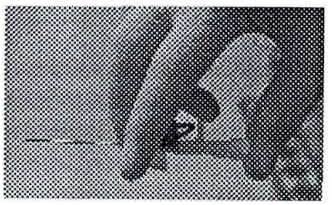
## 6. APPLYING SKIN TRACTION

Apply a small amount of traction to the skin below the cannulation point (not above - you will risk a needlestick injury). This helps to stabilise the vein, and decrease its lateral movement



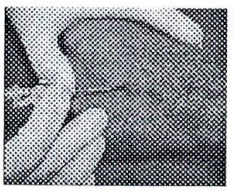
## 7. HOLDING CANNULA

Hold the cannula in your dominant hand, with your index and middle fingers on the flanges either side of the cannula, and your thumb on the cap at the end. This is the steadiest position to hold a cannula, and gives you the greatest control over its movement.



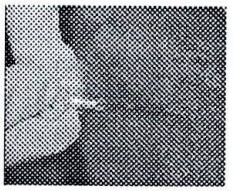
## 8. ENTERING THE VEIN

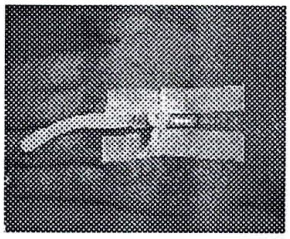
With a short, confident motion, push the point of the cannula through the skin at a 30 to 40 degree angle. Advance the cannula slowly towards the vein, until you see a flashback in the cannula chamber. NOW - STOP! Do not advance the cannula too much further or you may go straight out of the other side of the vein. Maybe another millimetre to clear the plastic tube from the entry point is all that is needed

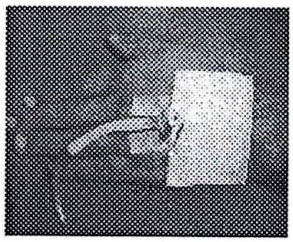


## 9. ADVANCING CANNULA

Holding the needle exactly where it is, advance the cannula itself over the needle. It should advance reasonably smoothly - a lot of resistance may indicate a failed cannulation. The cannula should be advanced as far as it will go. Apply some pressure proximally to the cannula to (try to) occlude the vein, and withdraw the needle disposing of it appropriately (remember to retain the white stopper on the end of the needle!)







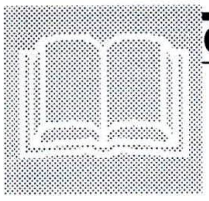
## 10. FIXING THE CANNULA TO SKIN

Use your empty syringe to draw as much blood as you need. Cap the cannula with the white stopper, and secure it to the skin. Document your actions in the nursing or medical notes. Documentation should include site, size, bloods drawn and time. Flush the cannula, noting any signs of extravasation (pain, local swelling, difficulty in flushing).

Chapter 3

# Pap Smear

The PAP test is the cytological evaluation of cells from cervix and vagina for detecting pre-cancerous lesions of the cervix. In 1940 Papanicolaou Traut proposed this method of detecting cervical cancer in its pre-cancerous stage. Hence this screening procedure is known as Papanicolau Smear or Pap test. It is the most cost effective and simple screening test with the least discomfort to the patient and with good sensitivity and specificity.



## CLINICAL BACKGROUND

Cancer cervix is the commonest cancer in women in developing countries. According to the International Agency for Research of Cancer (IARC) Scientific Publication1997, World wide 450, 000 women die from cancer cervix per year. WHO has declared invasive cancer of uterine cervix as a preventable cancer as it can be diagnosed in the asymptomatic pre-cancerous stage and can be controlled.

**Does the incidence of cervical cancer justify screening?**
World wide estimated new cases of cancer cervix is 500,000 per year of which one fifth of cases occur in India. In India, the commonest cancer among women is cancer cervix and Chennai is the most affected among the cities.

**Does the screening of cervical cancer decrease the morbidity or mortality?**
A single negative Pap test decreases the risk by 45%. Look at the table below:

| Screening frequency | Reduction in cancer cervix |
|---|---|
| Once in 10 yrs | 64% |
| Once in 5 yrs | 84% |
| Once in 3 yrs | 91% |

## INDICATIONS

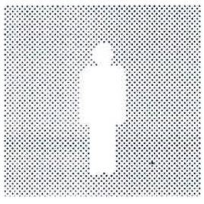
- According to ACOG recommendation, all women who have been sexually active should be screened.
- Screening begins with the onset of sexual activity or at 18 years of age.
- In developing countries like India, IARC working group recommends three yearly screening in the 25 – 64 yrs age group and this gives a 91% reduction in invasive cancer.

### Optimal screening interval

- After three consecutive annual normal pap smear test, it is repeated
    - Once in 3 years in low risk women and
    - Once a year in high risk women

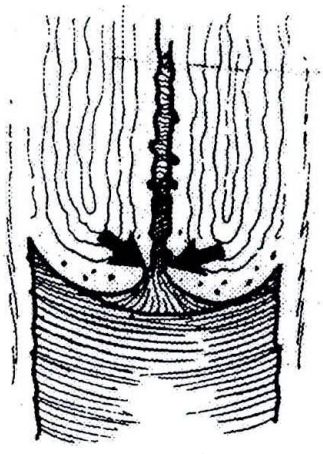
## CONTRAINDICATIONS

- Presence of bleeding PV
- Presence of active infection

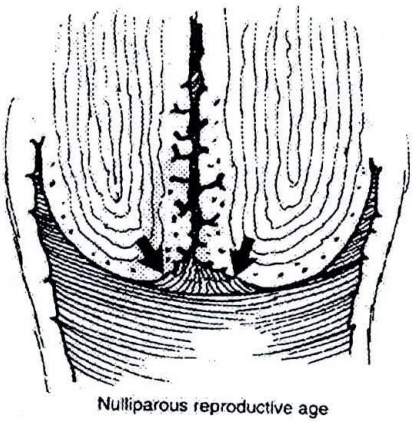


## RELEVANT ANATOMY

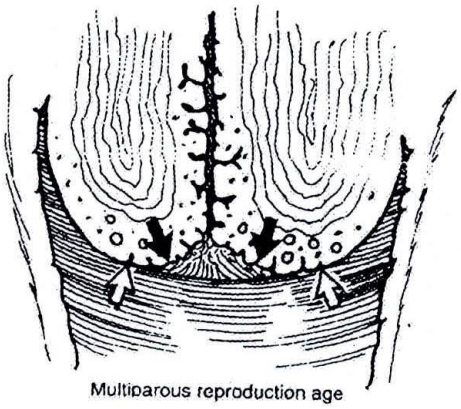
The arrow points to the position of the junction between ectocervix and endocervix . It gradually migrates inwards as the age progresses.



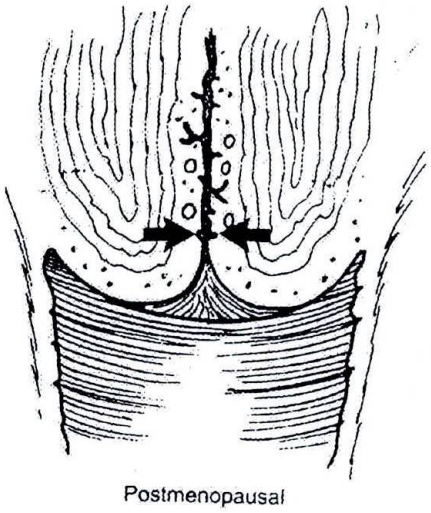
Neonatal



Nulliparous reproductive age



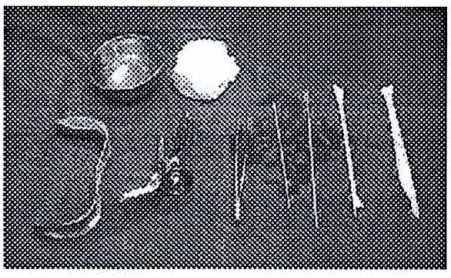
Multiparous reproduction age



Postmenopausal

# EQUIPMENT

- Ayre's spatula / Cervical cytobrush or cotton swab ona stick
- Cusco speculum
- Water to lubricate - no other lubricants
- Two glass slides-clean and dried
- A bottle of liquid fixative or cytofixative
- A focus light or torch light



- Completed cytopathology form with the following details are required:
    - Patient and physician details
    - Age
    - Symptoms – Post Coital Bleeding
    - Clinical diagnosis / Routine screening
    - Prior treatment – hormone / infection
    - Previous Pap / Biopsy date and
    - Report
    - Obstetric history – present pregnancy
    - Contraception
    - LMP
    - Site of collection
    - Method of collection

# STEPS OF THE PROCEDURE

## 1.PREPARE THE PATIENT.

Explain the whole procedure and its importance. Inform the patient that the procedure is inconvenient but painless

## 2. ASSEMBLE EQUIPMENT

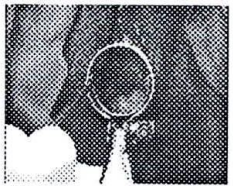
Arrange the tray so that everything is at hand's reach. The lighting should be adequate. Have a person to hold the patients legs and to help you in preparing and fixing the slides

## 3. PATIENT POSITION

The Pap test is done as an outpatient procedure in the dorsal position under natural light or focus light. There is no need for any sedation.

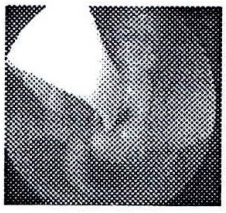
## 4. VISUALISING THE CERVIX.

- First, inspect the vulva. After separation of the labia minora, the Cusco speculum is moistened with water and gently inserted and the blades opened .
- The cervix is visualized fully all and the squamo-columnar junction is seen all around.This may be indrawn in postmenopausal women



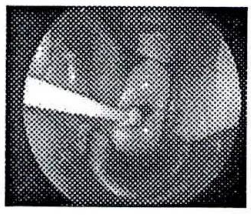
## 5. COLLECTING THE PAP SMEAR - SPATULA

- Choose the contoured end of the spatula which best conforms to the cervix and the transformation zone.
- Rotate the spatula 360 degrees about the circumference of the cervix while maintaining firm contact with the epithelial surface.
- Spread the material collected on the spatula evenly over the slide with a single smooth stroke motion.



## 6. COLLECTING THE PAP SMEAR - CERVIX BRUSH

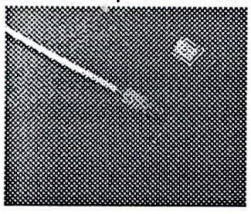
- Introduce the brush into the endocervix
- Rotate the brush several times
- Spread the material collected on the spatula evenly over the slide with a single smooth stroke motion
- Cytobrush is specially suited to obtain adequate endocervical smear, in postmenopausal women where the squamo-columnar junction recedes into the canal
- Not currently recommended for pregnancy.



Except in pregnancy, the use of a cotton tip applicator is not recommended.
It usually provides less cellular samples, possibly because of the trapping of material in the cotton fibers.

## PREPARING THE SLIDE

The spatula or brush is quickly swabbed on the slide to evenly spread the cellular material in a single layer on the slide. Thin out large clumps of material as much as possible, while avoiding excessive manipulation that can damage cells.



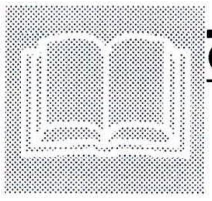
- Transfer material from both sampling instruments to the slide within a few seconds and fix immediately in order to avoid air - drying artifact.
- Immediately fix the specimen by either immersing the slide in 95% ethanol or coating the slide with a surface fixative.
- The slides have to be placed in back to back position so that the smears on the surface of the slides will not stick together.

Chapter 4

# Peritoneal Tap

Synonyms Abdominal Paracentesis; Ascitic Fluid Tap

Paracentesis is a safe procedure when ascites is easily demonstrable on physical examination. When small amounts of ascites are present, a fluid wave may be difficult to demonstrate even when ≤1.5 L ascites is present. CT scan or abdominal ultrasound guided needle aspiration is particularly useful in these cases.



## CLINICAL BACKGROUND

Ascitic fluid is routinely analyzed for cell count, chemistries including LDH, albumin and protein, Gram's stain, bacterial culture, and cytology. Additional tests include special cultures for tuberculosis or fungi, ascitic fluid pH, amylase, lipase, glucose, triglycerides, lactate, CEA, and hyaluronic acid.

### NORMAL FINDINGS

Ascitic fluid is traditionally categorized as either "exudative" or "transudative" based on laboratory analysis. Transudative ascites is caused by either increased portal venous pressure or decreased portal venous colloid osmotic pressure. Examples of transudates include hepatic cirrhosis, congestive heart failure, constrictive pericarditis, Budd-Chiari syndrome, inferior vena caval obstruction, and nephrotic syndrome. Exudative ascites is generally non-cirrhotic in its pathophysiology and may be due to peritoneal membrane permeability defects. Examples of exudates include malignancy, spontaneous bacterial peritonitis (SBP), or other infections (such as tuberculosis), vasculitis, pancreatitis, and myxedema.

## INDICATIONS/CONTRAINDICATIONS

**Diagnostic indications include:**

- Patients with of ascites of recent onset
- Ascites of unknown etiology
- Patients with clinically suspected ascitic fluid infections

**Therapeutic paracentesis is indicated in:**

- Ascitic fluid causing respiratory compromise, abdominal pain, or worsening of existing inguinal or umbilical hernias.

*Paracentesis should not be performed to diagnose the presence of ascitic fluid. This should be known prior to the procedure (by physical examination or radiological imaging).*

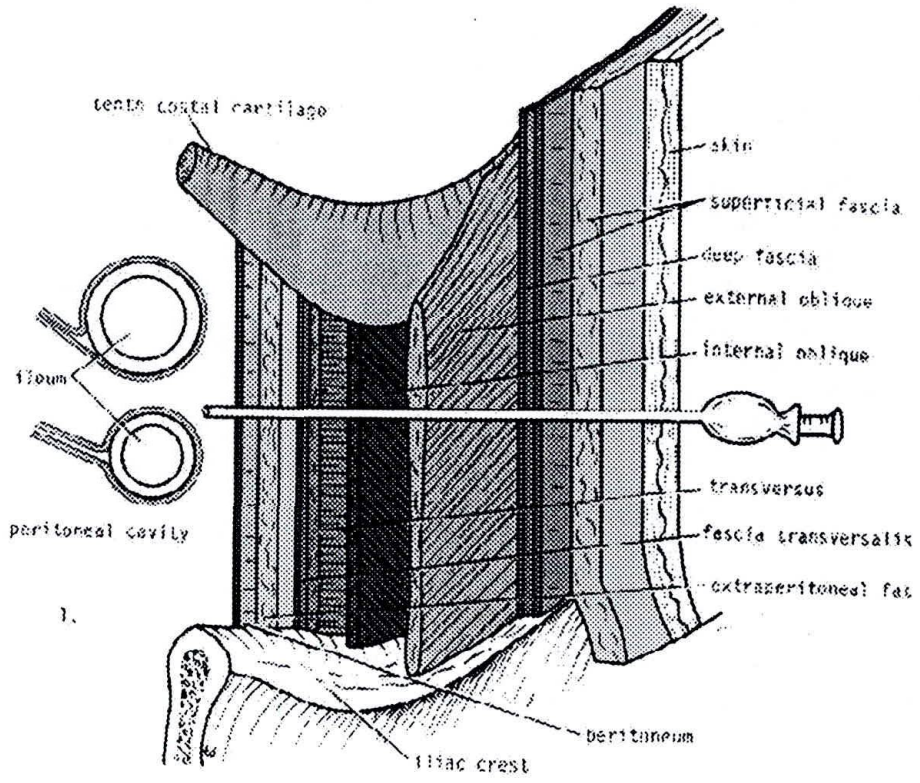
**Contraindications**

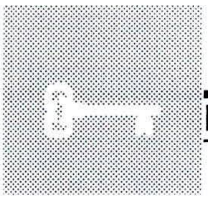
- Inability of the physician to demonstrate ascitic fluid on physical examination.
- Lack of patient cooperation.

The following factors are **NOT** contraindications for paracentesis:

Morbid obesity, low-grade coagulopathy, multiple abdominal surgical scars and bacteremia

## RELEVANT ANATOMY

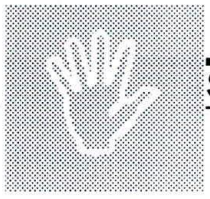




## EQUIPMENT

1. Sterile gloves
2. Drapes (optional)
3. Local anesthesia ( 26-gauge subcutaneous needle, 5 ml syringe and 2% lignocaine)
4. Sterile 50 mL or 60 ml syringe and
5. Sterile 1 litre vacuum bottle with connecting tubing

In clinical practice, various needles and angiocatheters are used. A 22-gauge, 1.5" metal needle with a plastic catheter is recommended. If a thick panniculus is encountered, a 3" to 5" 22-gauge needle may be substituted.



## STEPS OF THE PROCEDURE

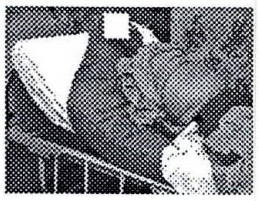
### 1. PREPARE THE PATIENT.

- Technique and risks of the procedure are explained

### 2. ASSEMBLE EQUIPMENT

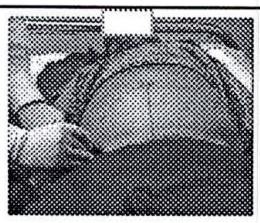
- Paracentesis is at times performed on patients with significant hepatic encephalopathy.
- Additional personnel may be required for conferring with family members and for proper patient positioning during the procedure.
- Premedications (eg, sedatives or narcotics) are not routinely required.
- Laboratory requisitions are completed in advance to avoid delay in fluid processing later.
- Prothrombin and partial thromboplastin times prior to paracentesis are ordered at physician's discretion.

## 3. PATIENT POSITION



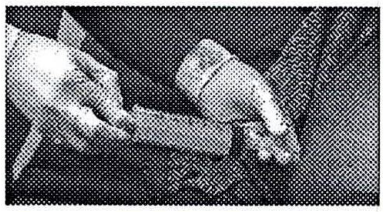
- Patient is placed in a semirecumbent position. Patient should be made to empty his /her bladder prior to procedure.
- Physician confirms presence of ascites by physical examination or by ultrasound examination

## 4. PREFERRED SITE



- Preferred site of entry is inferior & lateral to the umbilicus.
- If a midline scar is present from prior surgery or if percussion is not reliable, an area near the flank is selected.

## 5. ASPIRATE FLUID

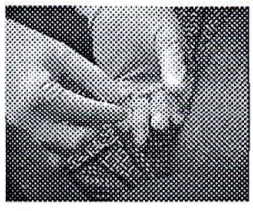


- The site is prepared with iodine solution
- Skin and deeper tissues are infiltrated with xylocaine
- The skin is retracted caudally ( in order to form "z" track)and the 22-gauge needle (attached to syringe) is inserted into the anesthetized area and advanced while aspirating.

## 6. COLLECT SPECIMEN

- When ascitic fluid returns freely, the needle is held in position and not advanced further (avoiding bowel trauma).
- Multiple aliquots (50 mL) may be obtained in this manner.
- Send the specimen for the required tests
-

## 7. CONNECT TO DRAIN TUBE



- For larger volumes, the syringe is removed and connecting tubing is directly attached to the 22-gauge needle to allow drainage into drainage bottles.
- A blood collection bag is an useful alternative as it maintains a closed sterile environment and provides weak suction effect

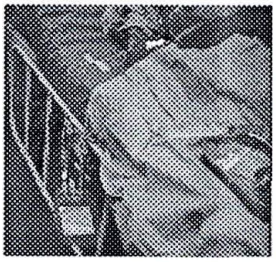
## 8. REMOVE NEEDLE AND SEAL SITE

- Once the desired amount is collected, the needle is withdrawn quickly and the caudal skin retraction is released, allowing the skin to return to its normal position.
- This causes the entrance and exit needle sites to form a "Z-tract" which minimizes ascitic fluid leakage

- Use a sterile gauze dressing; this can be removed after 24 hours

## AFTERCARE

- No special limitations exist for the patient postprocedure.



- If large amounts of ascites are removed (several liters), frequent blood pressure measurements are needed to monitor possible hypotension.
- Patients may ambulate postprocedure if vital signs remain stable.
- Occasionally, ascites fluid may leak persistently from the puncture site; in this instance, the patient should remain supine with the site angled directly upwards, until the leak stops

## COMPLICATIONS

Paracentesis is a safe procedure, carrying <1% risk of major complications and <1% risk of minor complications.
The most feared complication is needle perforation of an abdominal viscus or solid organ such as liver or spleen. Others include: intraperitoneal hemorrhage abdominal wall hematoma, contamination of ascites by nonsterile technique. Hypotension can be seen when large amounts of ascites (more than 1500 mL) are removed

Chapter 5

# Thoracocentesis

Synonyms Pleural fluid aspiration; Pleural tap

**INDICATIONS**

## INDICATIONS/ CONTRAINDICATIONS

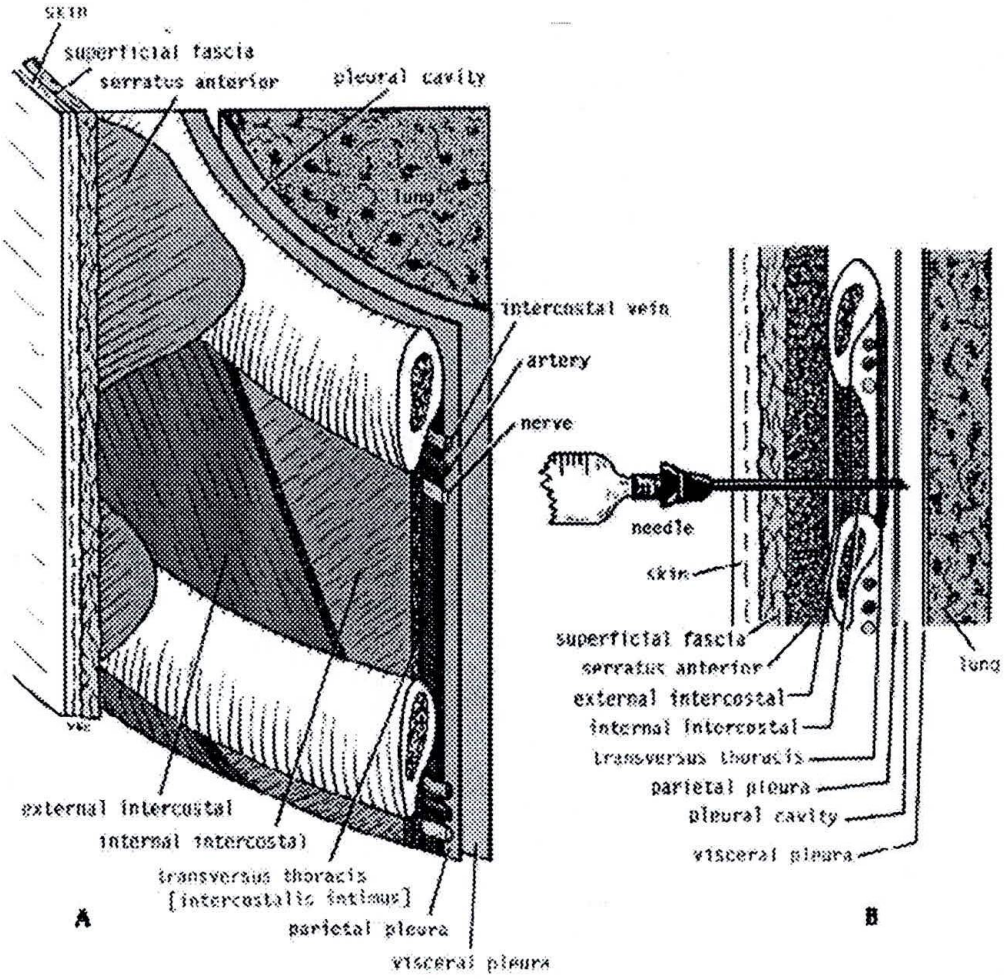
Diagnostic
Determine the etiology of a pleural effusion
Diagnosis and staging of a suspected or known malignancy
Therapeutic
To relieve respiratory insufficiency
To introduce sclerosing or antineoplastic agents

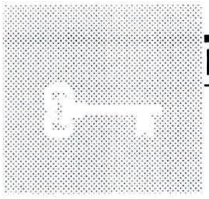
**CONTRAINDICATIONS**

**Absolute contraindications**
Lack of patient cooperation
Respiratory insufficieny or instability
Cardiac instability including unstable angina

**Relative contraindications**
Mechanical Ventilation
Bullous Lung Disease
Local Chest Wall infection

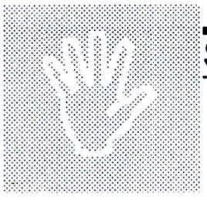
# RELEVANT ANATOMY





## EQUIPMENT

1. Betadine solution
2. Dressing tray with drapes
3. Sterile gloves
4. 2% Xylocaine with 26g needle
5. Three-way stopcock
6. Venous cannula 20G (Pliable catheters generally are preferable to the traditional simple thoracocentesis needle because they decrease the risk of pneumothorax)
7. 60 cc syringe
8. IV set
9. Collecting bottle



## STEPS OF THE PROCEDURE

### 1.PREPARE THE PATIENT.

The procedure and risks are explained to the patient.

Thoracocentesis may be performed safely without premedication and a narcotic or sedative is undesirable.

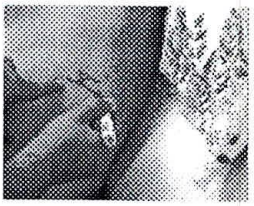
### 2. ASSEMBLE EQUIPMENT

Initially, the physician must verify the presence and location of the pleural fluid, often by physical examination.
However, a lateral decubitus chest x-ray, ultrasonography, and/or CT may be required if the disease is loculated

### 3. PATIENT POSITION

Thoracocentesis is best performed with the patient sitting comfortably, leaning slightly forward, and resting the arms on a support.
Performing it with the patient lying down is possible but more difficult, usually requiring ultrasound or CT guidance.
Only high-risk or unstable patients require monitoring (eg, pulse oximeter, ECG).

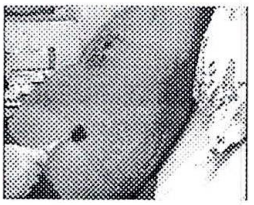
## 4. PREFERRED SITE



The needle must be inserted in an intercostal space overlying the fluid. (above the rib below to avoid injury to intercostal vessels and nerves)

For non-loculated effusions, the space is usually one interspace below the fluid level, in the mid-axillary line

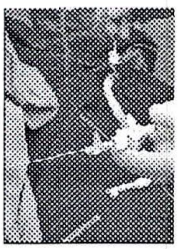
## 5. PREPARE SKIN & INFILTRATE LOCAL ANESTHETIC



After cleansing the skin with iodine and applying sterile draping, the gloved physician uses 1% or 2% lignocaine local to make a skin wheal, then infiltrates the subcutaneous tissue, and advances the needle gradually just above the upper border of the rib

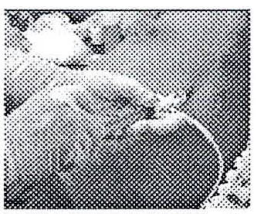
When the anesthetizing needle enters the parietal pleura and pleural fluid is aspirated, the depth of the needle should be noted.

## 6. MAKE CONNECTIONS TO AVOID AIR LEAK



A large-bore (16- to 19-gauge) catheter device (VENFLON) is attached to a three-way stopcock, which is then connected to a 50-ml leur-lock type syringe
The 3-way tap is crucial to prevent pneumothorax and you should make yourself familiar with its action and turn the tap off whenever the syringe is withdrawn.

## 7. ASPIRATE FLUID



- Advance the venous cannula 0.5 cm beyond the noted depth of the anesthetizing needle perpendicular to the chest wall through the skin and subcutaneous tissue, along the upper border of the lower rib into the effusion.

- The syringe and three-way stopcock must be manipulated with care: Air should not be allowed to enter the pleural space. Fluid should never be forcibly aspirated from the pleural space, so as to avoid damaging the lung with the needle or catheter

- Multiple small (15- to 30-mL) samples are obtained in tubes containing 0.1 mL of aqueous heparin; the tubes are processed for appropriate tests.

- For patients with large effusions, generally no more than 1500 mL should be removed at one sitting to avoid precipitating hemodynamic instability or pulmonary edema associated

with lung reexpansion.

- As the lung expands against the chest wall, the patient may feel some pleuritic pain. The procedure must be stopped if severe pain, breathlessness, bradycardia, faintness, or other significant symptoms occur, even if a substantial amount of fluid remains in the chest.

## 8. COLLECTION OF PLEURAL FLUID

**COLLECTION FOR ROUTINE LABS**

- Routine appropriate lab bottles for cell count and differential counts;chemistries including total proteins, albumin, sugar, LDH; aerobic and anaerobic culture media bottles for bacteriology.

- For cytology, send sterile vacuum bottles with 5000 units of heparin added.

**COLLECTION FOR MICROBIOLOGY**

- Samples should be sent for appropriate bacterial stains and cultures in appropriate transport media. Special stains may be required to demonstrate certain specific organisms as the case maybe.

## AFTERCARE

- Pressure is applied to the puncture site to prevent bleeding

- Chest x-rays (erect posterior-anterior and lateral at inspiration and expiration) should be obtained after thoracocentesis to document fluid removal, to view the lung parenchyma previously obscured by the fluid, and to look for possible complications from the procedure

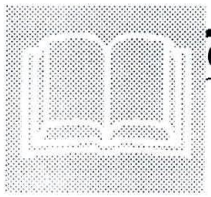
## COMPLICATIONS

1. Pneumothorax
2. Hemorrhage into the pleural space or chest wall
3. Vasovagal or simple syncope
4. Air embolism (rare but catastrophic)
5. Infection
6. Puncture of the spleen or liver due to low or unusually deep needle insertion
7. Reexpansion pulmonary edema, associated with rapid removal of > 1 L of pleural fluid.

Chapter 6

# Rectal examination and Proctoscopy

These are office procedures done as part of the evaluation of acute and chronic lower gastrointestinal symptoms in patients



## CLINICAL BACKGROUND

Digital Rectal Examination (DRE) and proctoscopy are two simple bedside tests that are paramount importance in the evaluation of lower abdominal pain and in a patient who presents with symptoms of lower gastrointestinal symptoms. It is mandatory in a patient who complains of bleeding per rectum.

- DRE forms an integral part of pelvic examination in women.
- It is worth noting that nearly 2/3rds of carcinoma rectum can be felt with a gloved finger and DRE is a cheap and effective screening test for this carcinoma.

The following conditions can be diagnosed on inspection alone:

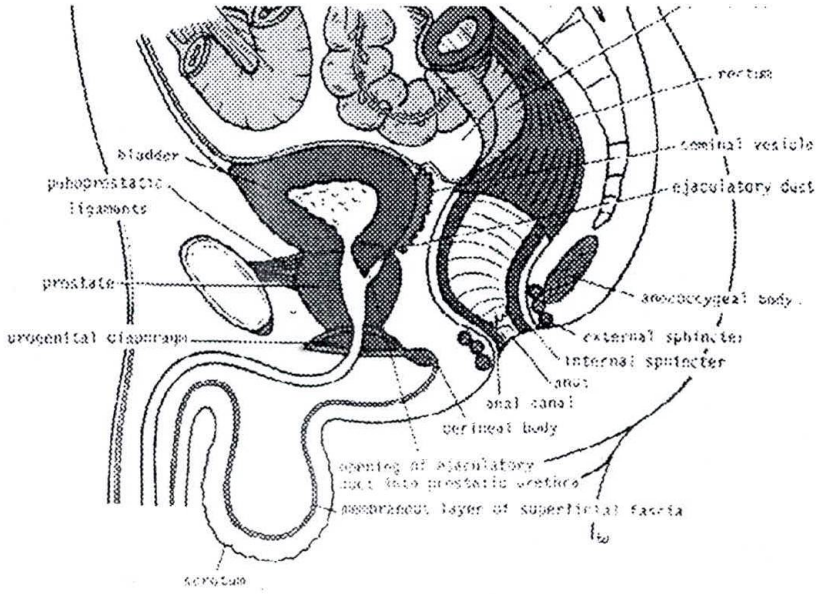
- Anal fissure, anal hematoma and warts, hemorrhoids, pilonidal sinus, skin tags, lower edge of a carcinoma, external opening of an anal fistula, perianal and pilonidal abscesses.

Palpation and proctoscopy provide clues to the following conditions:

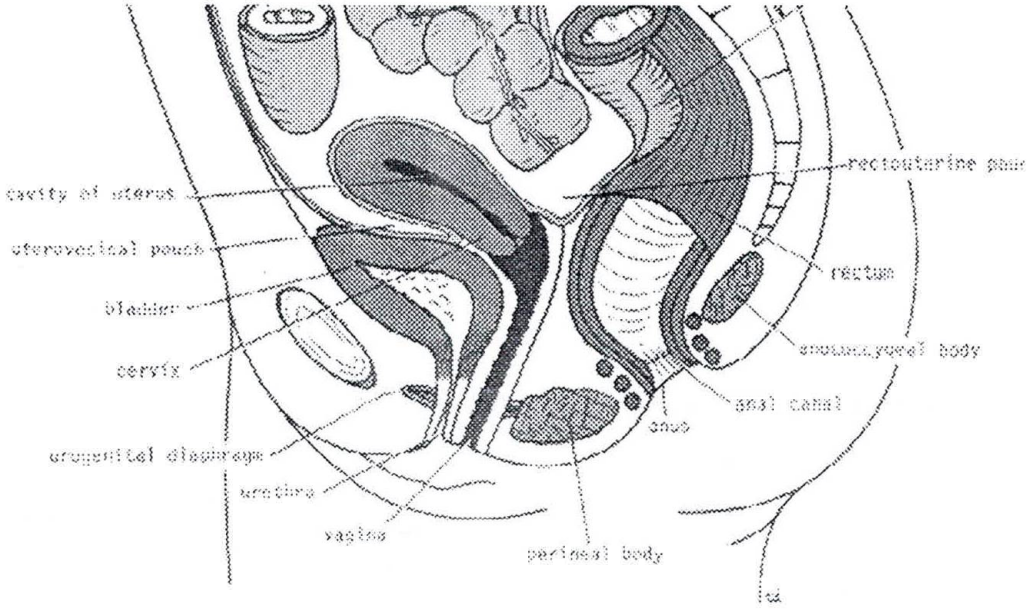
- Abscesses [ ischiorectal type or perianal variety]
- Internal hemorrhoids
- Ulcerative colitis, sessile & pedunculated adenoma, villous papillomas, raised indurated edge of carcinoma
- Secondary deposit of growth in the pelvic peritoneum - Blumer's shelf
- Deformities of the coccyx, presacral tumors, lipomas or teratomas

# RELEVANT ANATOMY

## Cross-section of male pelvic anatomy

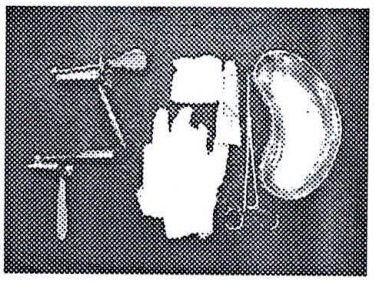



## Cross-section of female pelvic anatomy



## EQUIPMENT

- Gloves
- Proctoscope
- Proper lighting
- Examination table
- Jelly for lubrication
- Gauze packs



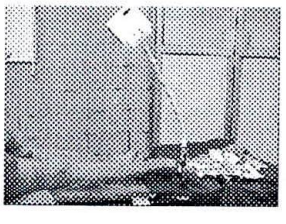
## STEPS OF THE PROCEDURE

### 1. PREPARE THE PATIENT.

- Allay any anxiety, and make the patient to relax his musculature
- The examiner should be sympathetic yet confident with utmost gentleness
- Avoid instruments that are badly designed
- Warn in advance - patient often feels that his bowels are going to act

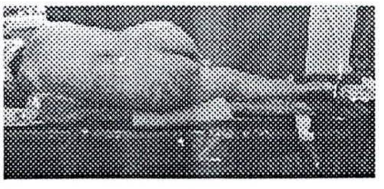
### 2. ASSEMBLE EQUIPMENT

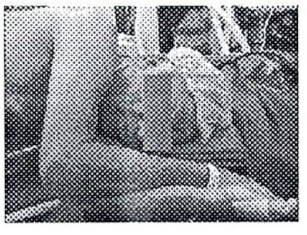
- Light source at the foot end in the midline
- Instrument trolley behind the light
- Arm of the lamp sufficiently long
- Left hand to retract the right buttock upwards
- Right hand within reach of the trolley



## 3. PATIENT POSITION

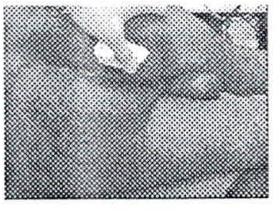
- The left lateral or Sim's position
- Hips are flexed to an angle slightly greater than 90°.
- Patient's left hip rests on a small firm sandbag
- Trunk should lie obliquely across the couch
- Knees and ankles parallel and close to the couch
- Right shoulder and buttock - slightly prone inclination
- Face directed partly into the pillow
- Inclination of the body to be maintained throughout the examination

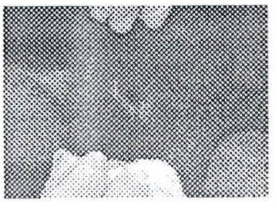




## 4. INSPECTION.

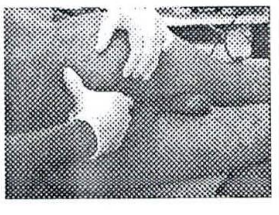
- Most neglected part of the rectal examination
- Light source should be fairly close to the anus
- Left hand gently lifts uppermost buttock
- Fingertips of the two hands placed on the skin over gauze swabs close to the anal verge either side & gently but firmly separated
- Look for sphincter spasm
- In post anal region and perineum, look for other lesions





## 5. PALPATION

- Lubricated right index finger is next stroked across the anus once or twice. It is then gently inserted into the anal canal, intersphincteric groove and anorectal ring.
- The following information should be carefully looked for during palpation:
- The tone of the sphincter and presence of foreign bodies if any are noted
- Cervix uteri or prostate in relation to the anorectal ring
- Palpation of extra rectal structures in anterior, lateral and posterior rectal wall, rectovesical or rectouterine pouch

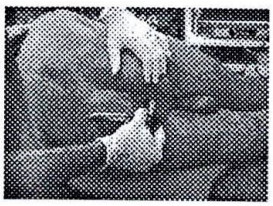


- Examination of examining finger on withdrawal
- Vaginal examination should precede rectal examination

## 6. PROCTOSCOPY

- The proctoscope, after lubrication, is held in the right hand with the obturator and gently pushed into the anal canal exerting gentle pressure in the direction of the umbilicus. Once it enters the anal canal, it is eased into the hollow of the sacrum and the obturator is removed. The following are noted as the proctoscope is gradually withdrawn.

- Mucous membrane is normally pale pink with submucous vessels
- Ask the patient to bear down
- Examine state of the anal valves
- Reinsert & examine for more information

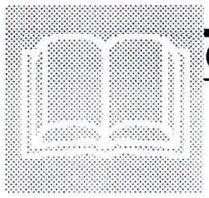


- *Don't replace the obturator with the tube still in the lower part of the anal canal*

Chapter 7

# Blood Pressure measurement

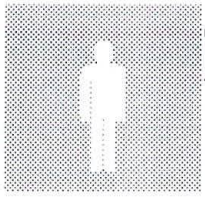
Blood pressure measurement forms an integral part of the physical examination of a patient. If appropriately carried out, this provides vital information concerning the health of the individual.



## CLINICAL BACKGROUND

Blood pressure (BP) is characterized by large spontaneous variations, therefore the diagnosis of hypertension should be based on multiple BP measurements taken on several separate occasions.

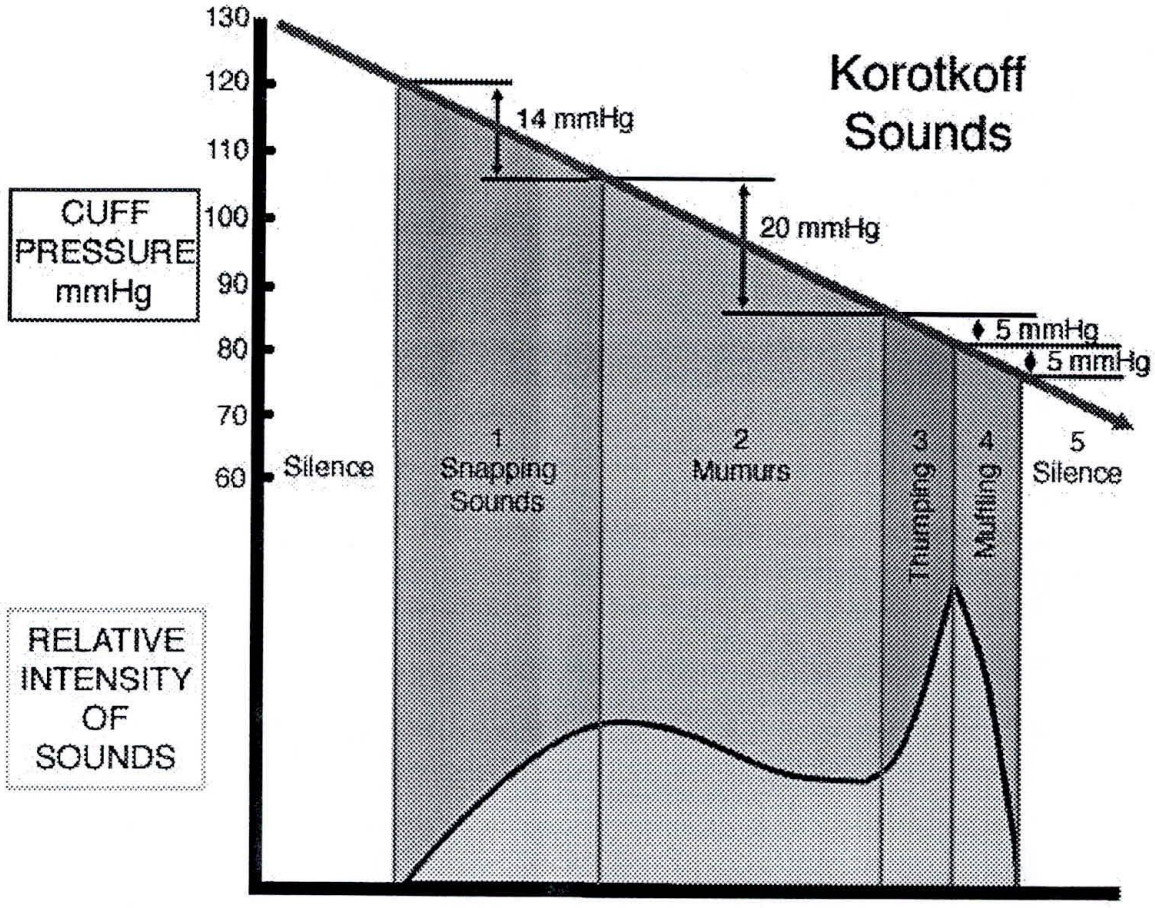
- At the initial visit, an average of three readings, taken at intervals of 2-3 minutes should be recorded.
- For confirmation of diagnosis of hypertension, record at least 3 sets of readings on 3 different occasions, one to three weeks apart.
- If atrial fibrillation is present, additional readings may be required to estimate the average SBP and DBP.
- Occasionally, thigh BP (popliteal) has to be measured with appropriately large cuff, especially in younger persons with hypertension. Normally thigh SBP is higher and DBP a little lower than the arm BP because of the reflected pulse wave. This is important for suspected coarctation and non-specific aortoarteritis.



## RELEVANT ANATOMY

It is believed that Korotkoff sounds are produced within an artery when the internal pressure of the blood flow overcomes the pressure of an outside occluding force for a part of the arterial pressure cycle. This jetting force overcomes the occluding force and causes intermittent turbulent

blood flow within the vessel, which creates vibrations heard by the stethoscope. When the cuff pressure is higher than systolic pressure, the artery remains collapsed so that blood is unable to flow and no sounds are heard. In contrast, when cuff pressure decreases below diastolic pressure, the artery no longer closes, laminar (non-turbulent) flow is restored, and no sounds are heard.




## EQUIPMENT

1. Properly calibrated sphygmomanometer
2. Stethoscope
3. Examination couch with chair
4. Appropriate lighting

# STEPS OF THE PROCEDURE

## 1. PREPARE THE PATIENT.

- Patients should be asked to refrain from smoking or drinking tea/coffee for at least 30 minutes before measuring the BP.
- Allow the patient to sit for at least five minutes in a quiet room before beginning blood pressure measurement.

## 2. ASSEMBLE EQUIPMENT

Check the sphygmomanometer for leaks. Make sure the glass tubing is clean and the vent patent
Choose the right cuff for the patient

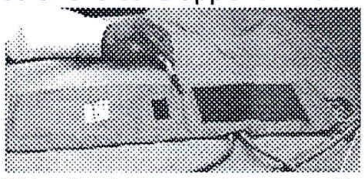
## 3. PATIENT POSITION

- .Seat the subject in a quiet, calm environment with his or her bared arm resting on a standard table or other support so the midpoint of the upper arm is at the level of the heart

Measure the blood pressure in both arms at the first visit and use the higher of the two readings. In older persons aged 60 years and above, in diabetic subjects and patients on antihypertensive therapy, the BP should be measured in both supine / sitting and in standing positions to detect postural hypotension.

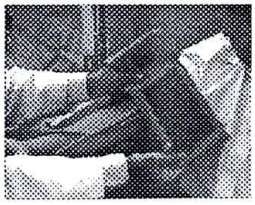
## 4. CHOOSE THE RIGHT CUFF.

- Estimate by inspection or measure with a tape the circumference of the bare upper arm at the midpoint between the acromion and olecranon process (between the shoulder and elbow) and select an appropriately sized cuff.



- The bladder inside the cuff should encircle 80% of the arm in adults and 100% of the arm in children less than 13 years old. If in doubt, use a larger cuff. If the available cuff is too small, this should be noted

## 5. APPLY THE CUFF



- Palpate the brachial artery and place the cuff so that the midline of the bladder is over the arterial pulsation
- Wrap and secure the cuff snugly around the subject's bare upper

arm. Avoid rolling up the sleeve in such a manner that it forms a tight tourniquet around the upper arm.

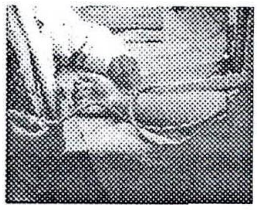
- Loose application of the cuff results in overestimation of the pressure.
- The lower edge of the cuff should be 1 inch (2 cm) above the antecubital fossa (bend of the elbow), where the head of the stethoscope is to be placed.

## 6. AVOID PARALLAX ERRORS

Place the manometer so the center of the mercury column or aneroid dial is at eye level and easily visible to the observer and the tubing from the cuff is unobstructed.

## 7. ESTIMATE SYSTOLIC PRESSURE BY PALPATORY METHOD

Inflate the cuff rapidly to 70 mm Hg, and increase by increments of 10 mm Hg while palpating the radial pulse.



Note the level of pressure at which the pulse disappears and subsequently reappears during deflation.

This procedure, the palpatory method, provides a necessary preliminary approximation of the systolic blood pressure to ensure an adequate level of inflation when the actual, auscultatory measurement is made. The palpatory method is particularly useful to avoid underinflation of the cuff in patients with an auscultatory gap and overinflation in those with very low blood pressure.

## PLACE THE STETHESCOPE

Place the earpieces of the stethoscope into the ear canals, angled forward to fit snugly. Switch the stethoscope head to the low-frequency position (bell). The setting can be confirmed by listening as the stethoscope head is tapped gently.

Place the head of the stethoscope over the brachial artery pulsation just above and medial to the antecubital fossa but below the lower edge of the cuff, and hold it firmly in place, making sure that the head makes contact with the skin around its entire circumference.

Wedging the head of the stethoscope under the edge of the cuff may free up one hand but results in considerable extraneous noise

## RECORD SYSTOLIC PRESSURE

Inflate the bladder rapidly and steadily to a pressure 20 to 30 mm Hg above the level previously determined by palpation, then partially unscrew (open) the valve and deflate the bladder at 2 mm/s while listening for the appearance of the Korotkoff sounds

## LISTEN TO KOROTKOFF'S SOUNDS

As the pressure in the bladder falls, note the level of the pressure on the manometer at the first appearance of repetitive sounds (Phase I) and at the muffling of these sounds (Phase IV) and when they disappear (Phase V).

During the period the Korotkoff sounds are audible, the rate of deflation should be no more than 2 mm per pulse beat, thereby compensating for both rapid and slow heart rates.

After the last Korotkoff sound is heard, the cuff should be deflated slowly for at least another 10 mm Hg, to ensure that no further sounds are audible. The point of disappearance of Korotkoff's sounds is the diastolic pressure.

The cuff is rapidly and completely deflated, and the subject should be allowed to rest for at least 30 seconds.

## RECORD SYSTOLIC AND DIASTOLIC PRESSURES

The systolic (Phase I) and diastolic (Phase V) pressures should be immediately recorded, rounded off (upwards) to the nearest 2 mm Hg.

In children, and when sounds are heard nearly to a level of 0 mm Hg, the Phase IV pressure should also be recorded.

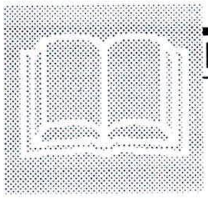
All values should be recorded together with the name of the subject, and the date and time of the measurement, the arm on which the measurement was made, the subject's position, and the cuff size (when a nonstandard size is used).

## REPEAT MEASUREMENT

Record the BP again after 30 to 60 seconds

Chapter 8

# Bladder Catheterization



## INTRODUCTION

Bladder catheterization is one among several bedside skills a doctor is supposed to possess at the end of medical school, however it appears that not many are formally trained in this apparently simple procedure. Insertion of a hollow tube into the bladder using aseptic technique is termed bladder catheterization.

## INDICATIONS/ CONTRAINDICATIONS

INDICATIONS

- Therapeutic- relieve retention, incontinence
- Diagnostic-to obtain a urine sample for analysis and estimation of residual urine
- Monitoring-urine output in post-operative patients or terminally ill / sick patients.

It is important to be sure that the patient deserves a catheter; one should not insert catheters as a solution for dysuria.

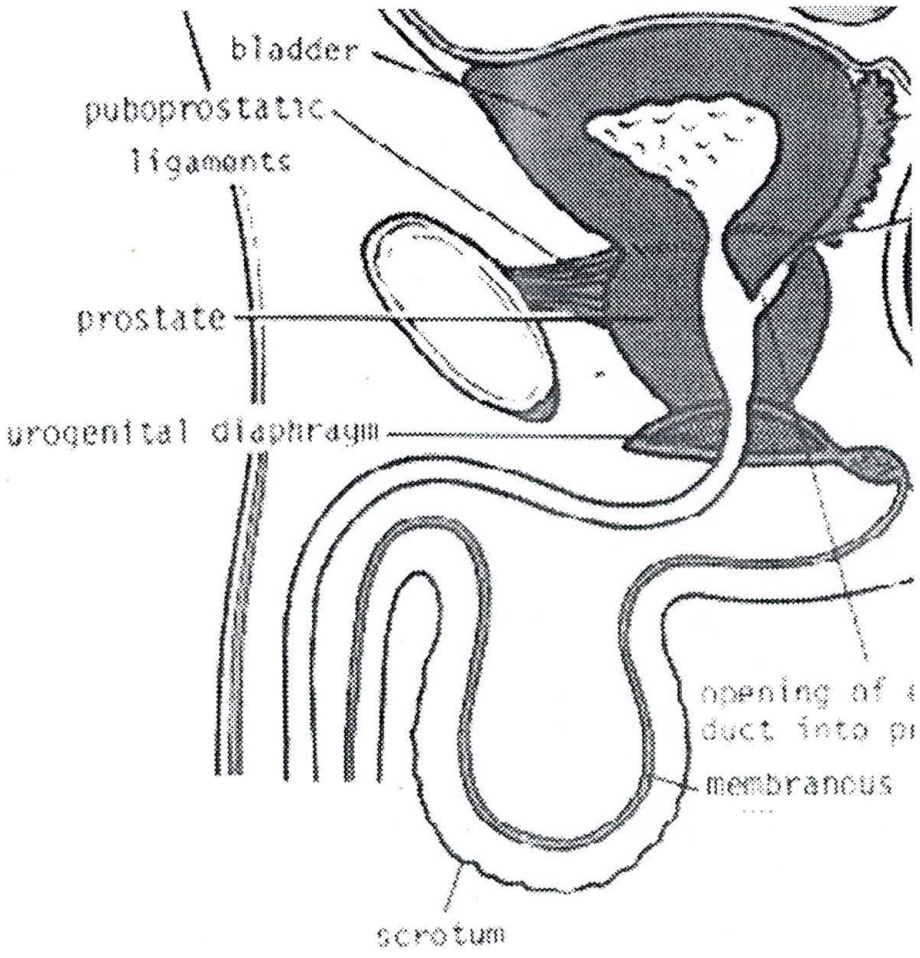
CONTRAINDICATIONS

There are truly no contra-indications to inserting a catheter, however as a principle it is prudent to avoid inserting a catheter in a patient presenting with suspected injury to the urethra with blood at the meatus. This is advised to prevent conversion of a partial injury into a complete one by injudicious and aggressive use of the catheter in pelvic trauma.

# RELEVANT ANATOMY

In the male urethra there are three specific points where one may encounter resistance :

- External urethral meatus
- Membranous or sphincter zone
- Bladder neck.
- Contrary to popular belief prostates, however large,rarely obstruct the passage of a catheter



## EQUIPMENT

- Catheterization tray (autoclaved) consisting of a central hole towel, kidney tray and swab sticks
- Foley catheter of the appropriate size
- 2% Xylocaine jelly in a sterile pack
- Sterile gloves
- Urobag
- 10ml. syringe filled sterile water. Urinary catheter
- Povidone-iodine solution

### The Catheter:

It is vital to understand this piece of equipment in order to select the right tool for the given situation. In the following passage the different parts and types of catheters in common use will be discussed.

### Morphology of the catheter

**Tip:** The tip of the catheter needs to be rounded and reinforced for ease of insertion. The different types of tips are straight, whistle and coude (bent). The coude tip is useful in negotiating high bladder necks.

**Eyes:** The drainage hole located at the tip. This should be sub-terminal in location, smooth, elliptical and beveled for good drainage and easy insertion.

**Self-retaining mechanism**: Catheters intended to be placed as indwelling require a self-retaining mechanism. This can be a mushroom (Depezzer), flower wings (Malecot) and the balloon (Foley). The commonest and most reliable is the Foley balloon. The ideal balloon should have a capacity of 5-30ml., be symmetrical and flush with the shaft.

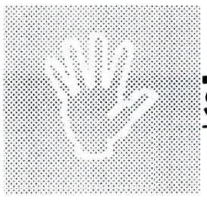
**Shaft (Body):** This part of the catheter extends from the tip to the drainage connector port, it should be flexible, strong and smooth. The drainage and inflation channels run through the shaft, hence thicker the shaft smaller is the size of the drainage channel.

**Drainage port:** This portion of the catheter connects to the collecting device usually the urobag and should be wide, to accommodate a variety of urobag tips. Some catheters are 3-way with an additional port for instilling medications or irrigating the bladder.

**Inflation port:** These are plastic or rubber valves to inflate the balloon, ideally designed for single-handed use with luer lock.

**Material:** Catheters are made of red rubber, polyurethane, latex with silicon coating and pure 100% silicone. Red rubber catheters are rarely used today. Polyurethane catheters are inexpensive and rigid, are ideal for one time in-out catheterization use only. Silicone coated latex are the commonest in use for most situations and can be kept indwelling for up to 2 weeks. When longer indwelling time (up to 3 months) is required the ideal catheter is the 100% silicone one. These are least irritating, do not encourage encrustations but are expensive.

**The Urobag:** It is vital to maintain a closed system drainage for any indwelling catheter. The collecting bag should be transparent, have a minimum capacity of 2 - 3 liters, and possess a no return valve and easy emptying port. The connecting tubing should also be transparent and rigid. This tube should be comfortably long (2-3 feet) to allow the patient mobility in bed.



## STEPS OF THE PROCEDURE

### 1. PREPARE THE PATIENT.

Inform the patient about the procedure and make him understand the need to relax. This can be easily achieved by asking the patient to breathe easy with the mouth open. This allays anxiety and also relaxes the external sphincter

### 2. ASSEMBLE EQUIPMENT

The first step in any procedure is to ensure that all the necessary items are ready - assemble the instrument tray on a trolley and make sure everything is within your hand's reach.

### 3. PATIENT POSITION

Male patients are catheterized in the supine position.
In female patients knees and hips are flexed and supported by an assistant.

### 4. IDENTIFY EXTERNAL MEATUS

Inspect the external meatus after retracting the prepuce in the male or by retracting the labia majora and minora in the female

### 5. PREPARE SKIN & INSTILL LOCAL ANESTHETIC

Prepare the area with povidone iodine and drape with the central hole towel.

Instill local anesthetic jelly through the nozzle fixed to the jelly tube and held flush with the external meatus. You may instill 10 ml. of the jelly into the meatus after gripping the penis behind the corona and keeping it stretched throughout the procedure.
It is necessary to allow 3-4 mins and to milk the jelly down the urethra for proper anesthesia.

## 6. INSERT CATHETER

Insert the catheter housed in its sterile inner pack, do not touch the catheter directly with the hands.

It is important to maintain the penis in the left hand perpendicular to the body and advance the catheter slowly till the drainage and inflation port junction lies at the external meatus of the penis.

## 7. ENSURE URINE DRAINAGE

Allow a minute or two for the urine to exit, sometimes suprapubic pressure may help or it may require flushing with 5-10ml. of saline to dislodge jelly blocking the eye.

## 8. INFLATE BALLOON

Only after ensuring urine drains from the bladder should the balloon be inflated and then connected to the drainage bag.

## 9. REPOSITION RETRACTED PREPUCE

Always ensure that the prepuce is replaced at the end of the procedure to avoid a paraphimosis

## 10. CONNECT UROBAG

The tubing is secured to the front of the thigh with adhesive plaster. The urobag is suspended at a level below the bladder.

## TROUBLE SHOOTING

### 1. Insertion problems

a) Meatus - In some bedridden patients it may not be possible to locate the meatus because of gross oedema. In such situations hold the shaft of the penis vertical and maintain circumferential pressure to reduce the swelling. If this fails, instill some jelly through the preputial opening and direct the catheter tip towards the 6'o'clock position into the meatus. The final solution if all else fails would be to do a dorsal slit or a circumcision.

b) Urethra - In the absence of a stricture one is unlikely to encounter any problems till the area of the external sphincter is reached. At this point one needs to instruct the patient to breathe relaxed with the mouth open and maintain steady but gentle pressure till the sphincter relaxes.

c) Bladder neck - In patients with high bladder necks one may have to use the catheter with the bent or coude tip

## 2. Bleeding

During insertion some blood staining of the urine or at the side of the catheter may be ignored. However bright red steady bleeding from the urethra indicates some degree of urethral trauma, in such cases it may be prudent to abandon the insertion and give pressure over the shaft or the bulb of the urethra for 10 - 15 mins. Do not attempt re-insertion immediately, one may insert a suprapubic cystostomy or if there is no urgent need to decompress wait for a couple of hours before attempting urethral insertion.

Bloody urine draining from the bladder usually indicates a source of bleeding from the bladder or the upper tracts and is unlikely to be related to the procedure. One should obtain a sample of urine for culture or cytology and give appropriate treatment.

## 3. Non- drainage of urine

Never inflate the balloon till one is sure the catheter is in the bladder. Sometimes no urine may drain after reaching the bladder, on many a occasion the jelly will obstruct the eye and flushing the catheter with 5-10ml. of saline or simple suprapubic pressure for a couple of minutes may help. It is safer to strap the catheter to the penis without inflating the balloon and obtain confirmation with an ultrasound.

### DO'S AND DON'TS

**DO:**

1. Insert a catheter only when it is absolutely necessary.
2. Always use aseptic technique.
3. Use the smallest size possible. In an adult without hematuria 14 to 16F is ideal.
4. Maintain a closed system of drainage always, never disconnect collecting device for sampling or to facilitate patient ambulation/convenience. Sampling of urine should be done through the drainage port with a sterile needle and syringe using aseptic precautions.
5. Keep the drainage bag always below the bladder level.

6. Encourage liberal fluid intake in catheterised patients.

7. Remember to replace the prepuce after inserting the catheter.

8. Use a 100% silicone catheter if indwelling time is expected to be longer than 2 weeks.

**Don't:**

1. Force catheters during the process of insertion.

2. Select catheters because they are cheap. Patient will end up paying more for the complications.

3. Apply clamps on catheters, these will destroy the inflation channel and prevent removal.

4. Reuse catheters either by autoclaving or any other method.

5. Use more than 10 ml. to inflate the balloon; a large balloon will irritate the bladder causing painful spasms.

6. Keep catheters in for longer than required.

7. Use antibiotics .

## PROBLEM IN AFTERCARE

### 1. Changing of catheters

Problems may be encountered when the balloon refuses to get deflated.

Solutions:

- Try injecting a few ml. of water to clear the inflation channel, or
- Cut the inflation port because the valve may be faulty.
- If this does not help insert a ureteric catheter stillette into the inflation channel and burst the balloon from within.
- Finally if everything fails it may require rupture with trans-abdominal ultrasound guidance.

### 2. Leakage of urine

Pericatheter leaks usually occur because of urinary infection and secondary bladder spasms.

Solutions:

- culture the urine, change the catheter
- use appropriate antibiotics and anti-cholinergics.
- In females it may help to change to a larger sized catheter especially if the catheter keeps slipping out.

## 3. Blocking

Catheters can get blocked because of encrustations when maintained for longer than 2 weeks

Solutions:

Change the catheter to a silicone if one is expecting a long indwelling time.

Urine may also suddenly stop flowing because of asymmetric balloon inflation or too large a balloon pressing the eye of the catheter, in such cases partial deflation will help.

## 4. Recurrent urinary infections

Urinary infections in catheterized patients can be a challenging clinical problem. The safest course would be to obtain an aspirated sample from the drainage port, change the catheter and use antibiotics appropriately. If the infection recurs send the patient to the specialist or switchover to clean intermittent catheterization.

## 5. Pain

Pain referred to the urethra or bladder area can be due to too large a catheter, too large a balloon, urinary infection or bladder spasms. These causes can be sequentially eliminated and treated. Oxybutynin and liberal fluid intake will offer supportive relief in these situations.

Chapter 9

# Diabetic foot exam

## INTRODUCTION

Diabetes affects each and every organ of the body. Early evaluation and continuous monitoring is necessary in the care of the kidney, heart, eye and the foot.

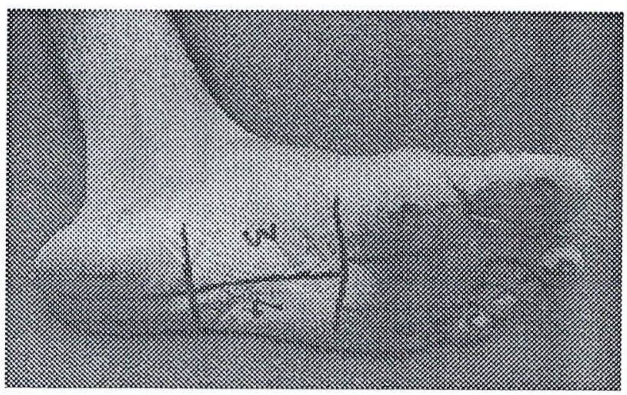
Unlike the other organs foot examination is not given importance. The feet get commonly affected in diabetes and more that 50 % amputations of the leg are due to diabetes mellitus rendering people wheelchair-bound or immobile, an event every diabetic patient dreads. Diabetic foot is a spectrum of diseases that starts with the development of neuropathy and vasculopathy. With the onset of either or both (vasculopathy , neuropathy) the foot becomes extremely vulnerable to ulceration which is the forerunner of infection which may culminate in minor or major amputation or even death in severe cases.

. As a general practitioner it is important to spend just **2 minutes** of our time to evaluate and educate the diabetic patient on the care of the foot

## RELEVANT ANATOMY

### AREAS OF THE FOOT

The foot is divided into well-recognized areas as shown in the figure. Each area of the foot should be screened for the presence or absence of sensation. This will record the sensory status of the foot

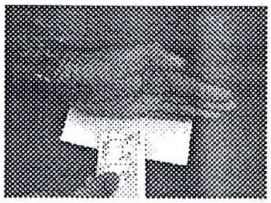


## EQUIPMENT

Semmes-Weinstein Filaments

- Nylon, graduated monofilaments
- 10 gms of pressure is exerted when it deforms
- 10 gms, when perceived represents protective sensation

Deformation of the filament as shown here Sensation is tested using this monofilament. (Various drug companies freely distribute Monofilaments)

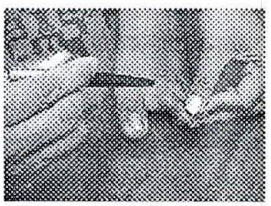


## STEPS OF THE PROCEDURE

### 1.PREPARE THE PATIENT.

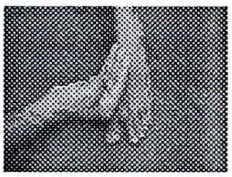
Inform the patient about the procedure and its importance in preventing future complications

### 2. INSPECTION



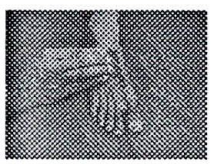
Both the feet are examined together. One foot acts as a comparison to the other.
A preferred sequence is devised and always followed. This could begin with the heel and then proceed to the tips of the toes.
Look for cracks, swelling, dryness, callosities and ulcers in the feet.

### 3.PALPATION

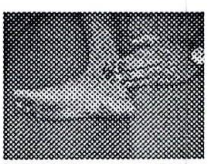


Palpate with the back of the hand to detect any localized increase in temperature. Compare it with the other areas of the foot and also the other foot

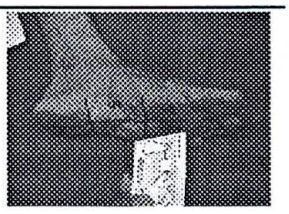
### 4. FEEL THE PERIPHERAL PULSES



Palpate both the dorsalis pedis and the posterior tibial artery pulsations in both feet



## 5.TEST SENSATION WITH NYLON MONOFILAMENTS

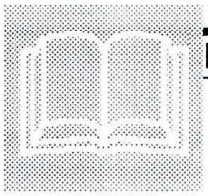


Explain to the patient how the monofilaments will be used to detect the sensation in different areas of the foot.
Demonstrate it with the help of his hand to show how it would feel.
Ask patient to close his eyes and use the monofilament to test sensation in all the areas of the foot and record the findings
**RECORD FINDINGS**

Enter your findings in the chart with the date of examination

Chapter 10

# Local anesthesia



## INTRODUCTION

Many minor procedures like excision of small lesions and suturing simple wounds can be safely and effectively accomplished with local anaesthesia. This section will deal with the use of local anaesthesia for digital blocks and subcutaneous infiltration.

## INDICATIONS/ CONTRAINDICATIONS

INDICATIONS

- Suturing minor lacerations
- Excision of small lesions
- Biopsies of lesions
- Drainage of paronychia, pulp abscess etc.

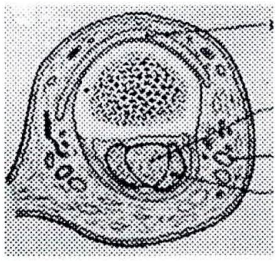
CONTRAINDICATIONS

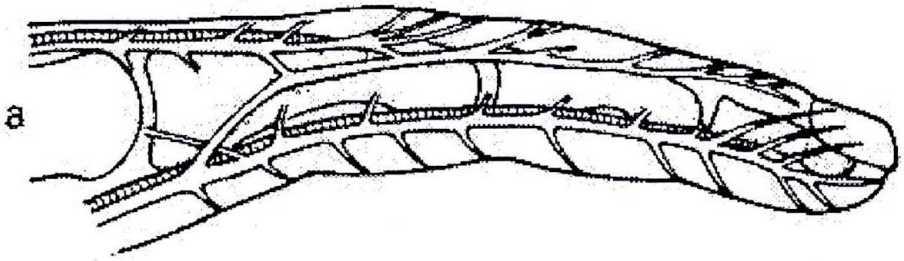
Absolute Contraindication
Hypersensitivity to local anaesthetic agents

Relative Contraindications
Very young patients
Uncooperative patients
Cellulitis around the operative site

## RELEVANT ANATOMY

The figure below shows the cross-section of a digit. Note the palmar digital nerves lying palmar to the digital arteryand the dorsal digital nerves laterally on the dorsum.






The distribution in the ulnar and median innervated digits slightly varies.

## EQUIPMENT

a. Cleansing solution [povidone iodine or chlorhexidine ]
b. Sterile gauze
c. 5 cc syringe with 18G or 21G needle [for withdrawing solution]
d. 24 gauge 1.5 " needle
e. Local anaesthetic
f. Resuscitation tray

**Local anaesthetic agents used commonly**

i. Lignocaine 1 % and 2 % [plain]
ii. Lignocaine 2 % with 1 in 200,000 adrenaline
iii. Bupivacaine 0.25 % and 0.5 % [plain

# STEPS OF THE PROCEDURE

## 1.PREPARE THE PATIENT.

Inform the patient about the procedure and make him understand that the procedure is meant to numb the area to be operated. Warn him that the process of anesthetizing can cause pain.

## 2. ASSEMBLE EQUIPMENT

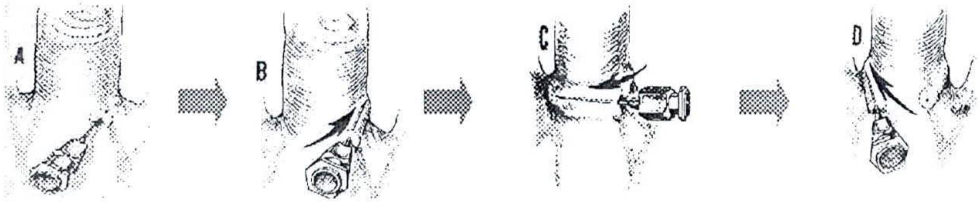
The first step in any procedure is to ensure all the necessary items are ready - assemble the instrument tray on a trolley and make sure everything is within your hand's reach.

## 3. INFILTRATION

- Raise a small skin wheal. Advance the needle towards one side in the subdermal plane, injecting as you do so [there is no need to aspirate].
- Withdraw to starting point and repeat on the other side of the lesion [or wound].
- Inject through the anaesthetised areas to complete the circle

## 5. DIGITAL BLOCK (DORSAL APPROACH)

There are several techniques of giving a digital block; this one is a relatively less painful method.
Use only **plain** lignocaine or bupivacaine.




- Insert the needle to the side of the extensor tendon just proximal to the web. Raise a skin wheal and inject 1 ml of solution superficial to the extensor hood to block the dorsal nerve.

- Advance the needle towards the palm until the tip is palpable beneath the palmar skin at the base of the finger, just distal to the web.
  Inject 1 ml. here to block the palmar digital nerve.

- Before removing the needle, redirect it to the opposite side of the finger across the extensor tendon and raise a small wheal here.

- Withdraw the needle and now repeat the same procedure on the opposite side.
- Do not try to inject circumferentially

## 6. TIPS AND TRICKS

- Use the smallest gauge needle possible
- When suturing wounds infiltrate through the edges of the wound and prior to washing the wound.
- In digital blocks, test sensation prior to giving the block.
- Wait for at least 5 minutes after the block before operating

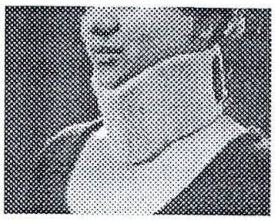
# Workshop handouts

## FORUM 2002


Chennai: 600 040
2002

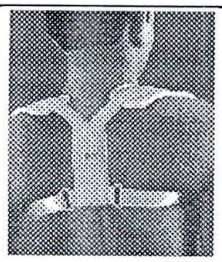
# Common Splints used in Orthopaedics

## 1. CERVICAL COLLAR



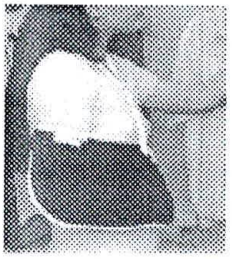
Soft and Hard: External Splintage to neck. Made by plastic sheet and felt, readymade sizes are available. Used to relieve pressure upon cervical spine vertebra, disc and joints.
Uses:
Soft Collar – neck spasm, muscular strain, ligamentous injuries
Hard Collar- Temporarily to immobilize cervical spine trauma and in some as definitive treatment

## 2. CLAVICLE BRACE:



External splintage to splint clavicle fracture. Different types are available. But the commonest is figure of '8' type.
Used to treat clavicle fractures, applied for 3-4 weeks, can be adjusted any time

## 3. ARM SLING:

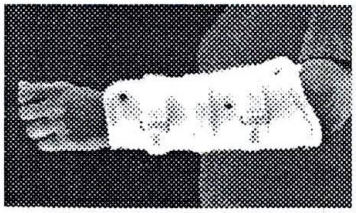


Simplest splintage for upper limb, shaped like a triangle, made out of cotton cloth.

Used to immobilize shoulder injuries

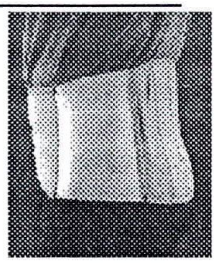
To rest/immobilize in arm & forearm injuries after splinting with pop slab/cast

## 4. FOREARM SPLINT:



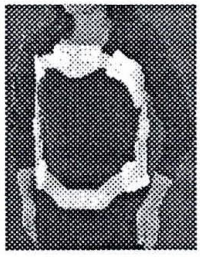
It is a molded, malleable splint made up of plastic & metal strip, which can be applied around forearm & wrist.
Used to splint injuries of wrist & fore-arm, initially as a temporary measure and after plaster cast removal (after 3 weeks) as functional brace.

## LUMBOSACRAL BELT:



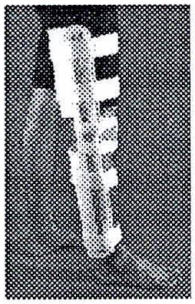
It is a supportive spinal orthosis for L.S spine made of cotton with straps reinforced with metal strips. Posteriorly covers pelvis up to Dorsolumbar junction thus giving stable support to back.
They are used to relieve pain, to support weakened muscles & unstable joints in functional position & to prevent deformity of L.S spine

## 6. ANTERIOR HYPER EXTENSION BRACE (TLSO)



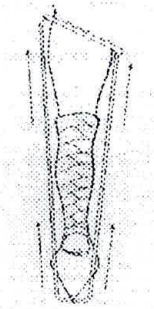
It works on a principle of 3-point fixation to provide mechanical support of spinal column between the middle of lumbar & middle of thoracic region.
Consists of rectangular metal/plastic frame with sides which will fit in front of the thorax & abdomen & plastic strops passes posteriorly which are tied to keep/maintain the brace in position
Used to support / immobilize D.L injuries / fractures D.L spine, Osteoporosis & in T.B spine - D.L region.

## LONG KNEE BRACE:



it is splint used to immobilize knee by covering thigh & leg in extension made by cotton & metal bars with straps to fix in front of thigh & leg.
Used mainly to treat ligament injuries of knee joint
Used temporarily to immobilize bony injuries of knee & post. Op knee surgery

## THOMAS SPLINT:



Consists of a padded oval metal ring to which inner (short) & outer (long) side bars are attached at the end of distal bars are joined in the form 'w'. It comes in various ring sizes & bar lengths
Olden days, it was mainly used to treat femoral fractures by fixed traction in a Thomas splint. It can 'maintain' but not 'obtain' the reduction in femoral fractureNow, it is only used to temporarily immobilize lower limb fractures

# Use of POP Casts / slabs in Orthopaedics:

## PRINCIPLE:

The plaster material (pop roll) is wrapped around the patient's limb and held there while it hardens. The Cast/ slab which results accurately follows all the contour of the encased part of the body, and will support that part firmly and evenly if left in place.

## USES

- To support fractured bones and to rest the damaged soft tissues.
- To stabilize and rest joints where there is ligamentous injury
- Post operatively to immobilize joints and limbs until hailing (e.g. repair of nerves/tendons)
- To correct the deformity (by wedging)
- To make negative mould, as a first step in Orthotics/ prosthetics

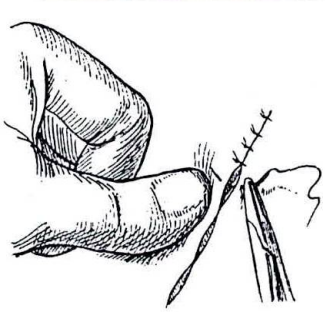
# Suturing Techniques

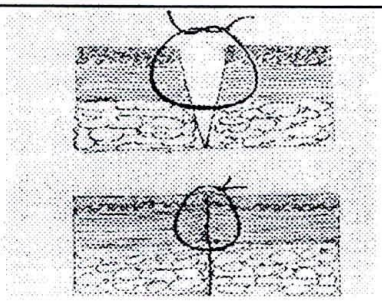
## INSTRUMENTS NEEDED

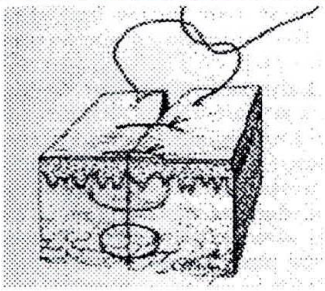
- ✓ 2 skin hooks
- ✓ Fine non-toothed forceps
- ✓ Needle holder
- ✓ Suture cutting scissors

Select appropriate suture material [the finest suture compatible with holding the skin edges together]

## 1) SIMPLE INTERRUPTED







Insert needle through skin at right angles including enough subcutaneous tissue to aid in everting the skin edges.
Exit through skin of the opposite edge at the same angle including a comparable volume of subcutaneous tissue.

## 2) SIMPLE CONTINUOUS

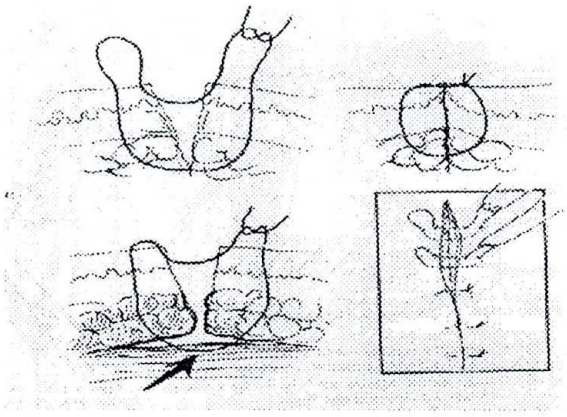
Insert needle as in [1].

Continue suturing without tying, over and over at fixed intervals and tie at the end.

## 3) VERTICAL MATTRESS

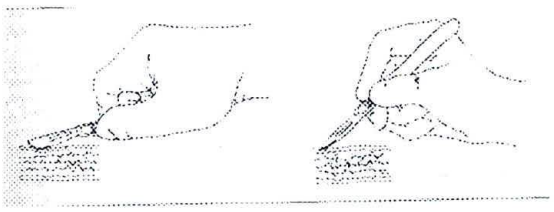
Used mainly to aid in everting skin edges in areas with a tendency to invert.

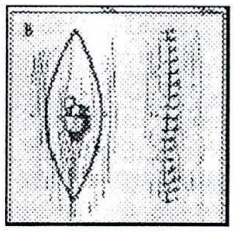
Insert needle as in [1], at least 1cm away from the edge and exit thro' the opposite edge at the same width and depth.
Using a backhand grip reinsert needle through the skin close to the edges in the reverse fashion.



## Excision of a Lesion

### Simple Excision





| Instruments |
| --- |
| Marking ink |
| No. 15 blade scalpel |
| 2 skin hooks |
| Fine non-toothed forceps |
| Needle holder |
| Suture cutting scissors |

- Prepare area.
- Outline ellipse with suitable marking material.
- Place slight tension on the surrounding skin.
- Cut thro' skin at right angles to the surface with a No.15 blade knife.
- Complete skin incision, use skin hooks to hold skin edges and excise lesion.
- Undermine [if necessary] the skin edges with a single sweep of the blade, while holding it with skin hooks.
- Suture wound.

## Debridement

This is the most essential step in the management of the contaminated or dirty wound.

Thoroughly wash the wound with copious amounts of normal saline under pressure using either a large syringe , rubber bulb or a pulsatile lavage system.
Remove large particles of dirt with a toothed forceps.
Sharply excise [using a No. 10 blade or sharp scissors] all slough, devitalised tissues and grossly contaminated tissues.
Wash again.

# Wound Care

Wound care is an important aspect of wound healing and it is important to know the scientific basis in the use of various products available, which are used in wound care. This is commonly referred to as wound dressings. Dressings are required to protect the delicate epithelial cells from drying and to provide a healthy moist environment to promote its migration and hence healing, (Fig 1 shows the anatomy of a typical ulcer with the delicate epithelial layer).

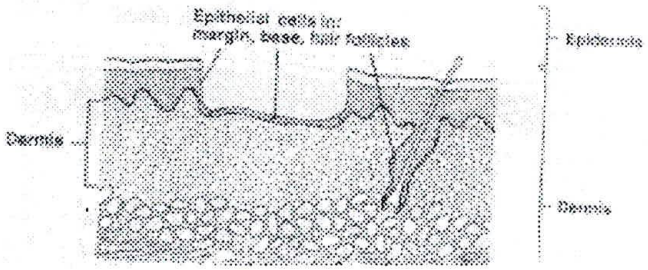


Fig1.

Wound care essentially aims to provide the following -

i. **Antisepsis**

ii. **Wound Debridement**

iii. **Agents to promote healing**

Dressings involve a three-layered approach. It is a clever selection of appropriate materials depending on the needs of each wound e.g. a clean wound, which has minimal exudation will require a non-adhesive layer like paraffin gauze, a sterile gauze and adhesive plaster to retain the dressings.

**Antisepsis:**

(Use of skin disinfectants). All traumatic wounds are contaminated and the normal bacterial flora in the surface of the skin and its appendages are potential pathogens. Various preparations of skin disinfectants are available. Alcohol, various preparations of Iodine and cetrimide are available and can be used to disinfect the skin. Pain is present if there is injury to the delicate epithelial cells. Avoid use of these preparations on the wound.

**Wound debridement agents:**

The purpose of debridement is to reduce the bacterial load in the wound. As mentioned earlier skin disinfectants should not be used on the wound. Surgical debridement and irrigation of the wound remain the mainstay in the debridement of the wounds. However certain chemical substances are used to debride contaminated wounds.

***Chemical*** - Hydrogen Peroxide, Eusol, Tr. Benzoin, and 1 and 2% Acetic Acid

***Enzymes*** - Collagenase, Streptokinase. These are excellent in removing debris but expensive and not generally used in our country.
***Hydrocollids*** - Carboxy methylcellulose.(refer below)

**Agents promoting wound healing:**
Hydrocolloid available as *Inderm* and *Duoderm* and Calcium alginate available as *Kaltostat* also have the properties of keeping the wound moist and the absorptive capacities help maintain a moist and warm environment thus promoting healing. Use of these agents also avoids frequent change of dressings, thus avoiding unnecessary injury to the delicate epithelial layer. Care has to be exercised not to cover heavily infected wounds with these agents as it can sometimes worsen the wound. Used in correct conditions it is cost effective, promotes healing, decreases pain and cuts the time taken for each dressing.

**Care of the Exudation:**
Acute and infected wounds will produce large amounts of exudate. Wound care involves use of adequate absorptive layers to absorb the exudate and thus prevent abnormal soakage of the wound. If this layer becomes soaked it should be changed to prevent abnormal proliferation of bacteria. Change of dressings is dependent on how long the dressings remain dry. Thus sometimes it may be necessary to change the dressings twice or sometimes three times a day. Sterile cotton wool is an excellent absorptive layer. This is the commonly used gamgee pad. Hydrocolloids and calcium alginate have absorptive properties and can absorb 10 to 20 times their weight.

**Devices to retain the dressings:**
Once the wound is debrided and the absorptive layer applied, it is necessary to retain them. Various devices are available- these are referred to as adjuncts to dressings. They can broadly be classified into the following groups-

***Retainers*** Tapes, Bandages, Crepe
***Splints*** POP, Metal, Prefabricated garments.
***Stocking*** Elastic, Pressure garments

**Anatomy of a typical dressing**