

Manual of **Anesthesia** *for* Operation Theater Technicians



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2nd
Edition



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Chapter

2

Role of Anesthesia Technician in Assisting the Anesthesiologist

Chapter Outline

- ❑ Importance of Anesthesia Technician
- ❑ Getting Things Ready in Anesthetic Machine
- ❑ Technique of Setting Up an IV Line
- ❑ Venepuncture (IV Cannulation)
- ❑ Taking Blood Sample
- ❑ Suction Apparatus
- ❑ Suction Tubes
- ❑ Suction Catheters
- ❑ Care during Endotracheal Suctioning
- ❑ Anesthetic Records (Charts)
- ❑ Loading Drugs in Syringes
- ❑ Care of Endotracheal Tubes
- ❑ Intubation of Trachea
- ❑ Care of Unconscious Patient
- ❑ Airway Obstruction
- ❑ Respiratory Arrest
- ❑ Other Assistance
- ❑ Care of Diathermy
- ❑ Adjusting the Lights
- ❑ During Surgery and Recovery
- ❑ Five Clinical Criteria for Recovery
- ❑ Full Stomach
- ❑ Starvation before Anesthesia
- ❑ The Danger of Full Stomach and its Management
- ❑ Transport of Patient to Recovery Area
- ❑ How to Take Care of You?
- ❑ Some Important Points to Remember: Dos and Don'ts

■ IMPORTANCE OF ANESTHESIA TECHNICIAN

A good Anesthesia Technician (Theater Technician) learns his duties by practically working in the operating theater under the guidance of the anesthesiologist. This chapter provides an outline of those duties and serves as an introduction to the subsequent chapters so that he will know what is expected of him before he faces the task.

- ❖ The first essential criterion for the safe administration of anesthesia is *preparedness*, knowing the procedure that is planned and being ready to facing the common problems and some possible rare setbacks that may be encountered.
- ❖ Thus, the first job of operating theater technician is to prepare the anesthetic machine and keep the other equipment ready and wait for the arrival of the patient.
- ❖ The patient is usually frightened and his fear may be easily aggravated if he watches the preparations going on.
- ❖ This preparation may take at least 30 minutes and the technician must be thinking one case ahead, throughout the list.
- ❖ The patient is the most important person in the operating theater and should be treated with due respect in both thought and action.

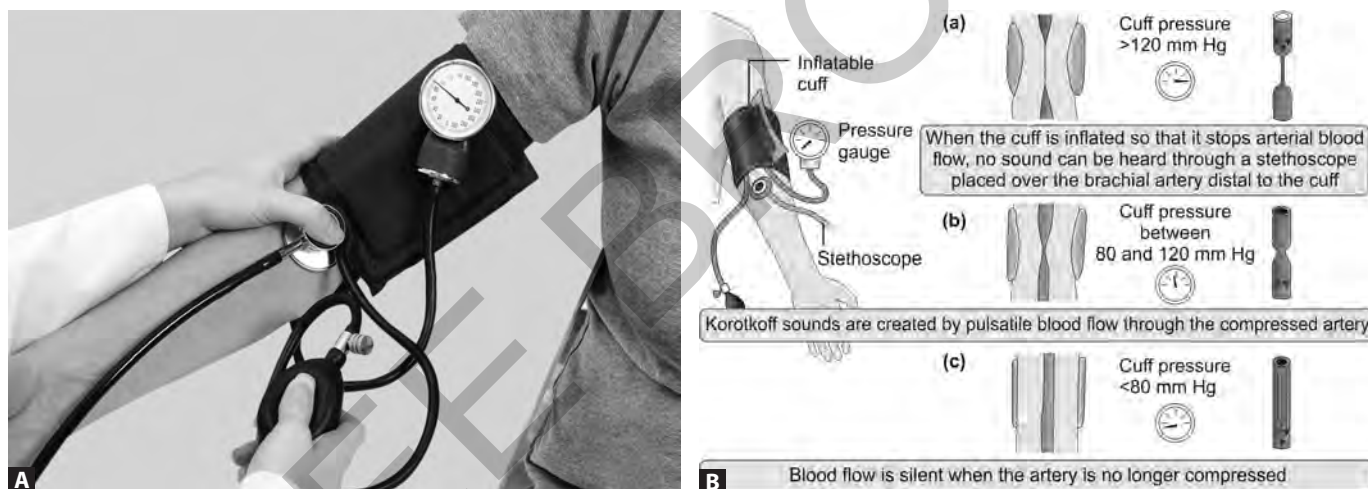
- ❖ The technician must always bear in mind that the unconscious patient is at the mercy of everyone in the theater and cannot protest.
- ❖ The operation theater is the technician's area of work and he must know where every piece of equipment can be found.
- ❖ The anesthetic machine must be checked in a systematic manner so that no point is overlooked. (The systematic check of an anesthetic machine is described in Chapter 5-Anesthetic Machine.)
- ❖ The gas cylinders must be opened and checked whether they are full. The machine is plugged into the pipeline gas outlets (central pipeline) so that the gases are controlled by the needle valves in the flowmeters.
- ❖ The correct volatile anesthetic agent must be filled in the vaporizer, if the anesthesiologist's choice is known.
- ❖ The breathing system that is likely to be used must be made ready with the facemask.

Getting Things Ready in Anesthetic Machine

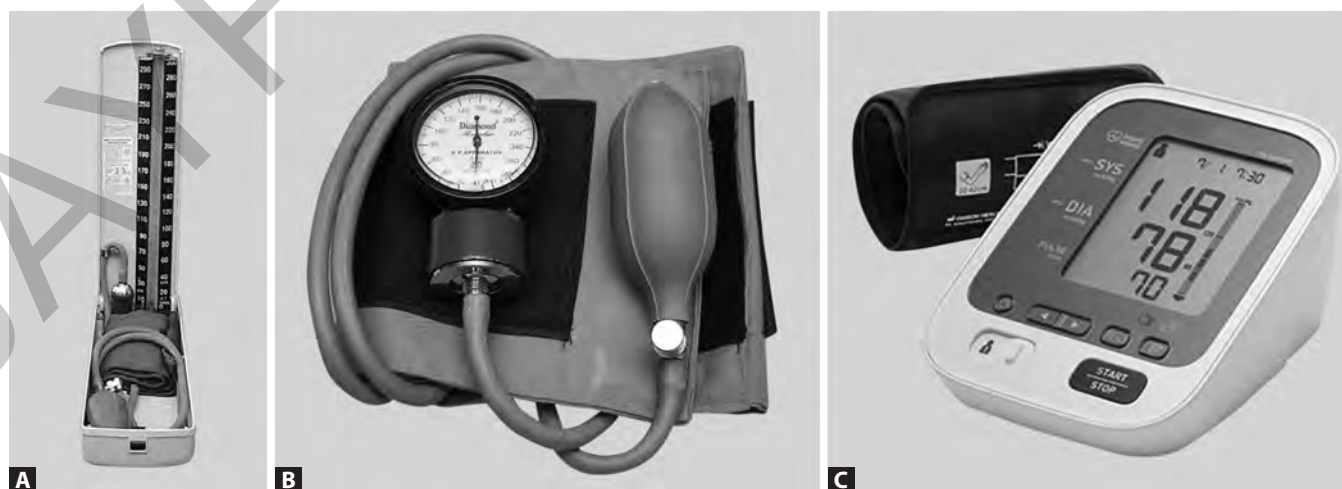
All the following are kept ready always.

- ❖ Gauze swabs

- ❖ Antiseptic solution (Spirit or 0.5% Chlorhexidine with spirit) for skin preparation before venepuncture
- ❖ A laryngoscope in working condition
- ❖ A spare laryngoscope (checked for functioning) should be available handy in the operating room. In case the first one fails and does not work at the crucial moment, there may not be time to search for another.
- ❖ Endotracheal tube of appropriate size (ideally a set of tubes of all sizes) and a plastic syringe for inflating the cuff of an endotracheal tube.
- ❖ Laryngeal spray containing local anesthetic, Magill's intubating forceps and suitable sizes of Oropharyngeal Airways.
- ❖ Sticking plaster for securing the endotracheal tube and a pair of scissors for cutting it to required size and length.
- ❖ A sphygmomanometer (BP apparatus). Usually, it is available as a permanent fixture on the anesthetic machine.
- ❖ The proper method of applying the BP cuff and checking the BP and the principle are shown in **Figures 2.1A and B**.
- ❖ The cuff must be applied in the middle one-third of the arm, not encroaching on to the elbow.
- ❖ The rubber bladder in the cuff must be placed on the inner side of the arm. (This can be identified by feeling it through the cloth cover of the cuff.)
- ❖ The rubber tubes must come at the outer side of the arm.
- ❖ The BP apparatus must be kept at a convenient height to watch the level of mercury column.
- ❖ The elbow is stretched and the diaphragm of stethoscope is kept flat on the inner side of cubital fossa (front of elbow).
- ❖ That is the right place where the brachial artery passes and sound is well heard in the stethoscope.
- ❖ BP apparatus may be available in three forms: Sphygmomanometer (mercury), Aneroid type with dial, or modern Electronic BP apparatus with automatic digital display (**Figs. 2.2A to C**). Mercury BP apparatus is now going out of use as mercury is toxic if it gets spilled.



Figs. 2.1A and B: (A) The method of checking the BP; (B) The principle.



Figs. 2.2A to C: (A) Mercury sphygmomanometer; (B) Aneroid type with dial; (C) Electronic BP apparatus with digital display.

SETTING UP AN INTRAVENOUS LINE (IV LINE)

- ❖ All IV infusions necessary for a particular patient must be prepared using a “no touch technique.”
- ❖ It is vital to keep all the items in sterile packs without causing contamination.
- ❖ This means—leave them in the sterile pack without opening until the last minute and open the pack with a pair of scissors just before using it.
- ❖ At the time of using the item, remove it from the pack carefully without touching any part which actually enters the patient or the inside of any tube which carries fluid.
- ❖ This is known as “No touch technique.”
- ❖ In very simple language, never touch the sterile spike of the infusion set which is to be inserted into the infusion bottle. Similarly, never touch the sterile needle or the adapter which is to be fixed to the IV cannula.
- ❖ If these are contaminated by touching with fingers, *pyrogens* may enter the circulation and cause *shivering* (*rigor*) to the patient.
- ❖ Even if one washes his hands well, they are never bacteriologically sterile and even if sterile rubber gloves are worn, it is wise to stick on to a “No touch technique.”
- ❖ The IV cannula must be handled in the same way. No part of it which enters into the patient must come in contact with fingers or anything unsterile.
- ❖ IV line is lifeline because all the drugs needed in a crisis are given only through intravenous route. Moreover, the blood volume management is done through intravenous infusion line.
- ❖ Depending upon the situation, the blood volume can be replenished either with crystalloid solutions like 0.9% sodium chloride (normal saline), sodium chloride with dextrose (0.9% sodium chloride with 5% dextrose), 5% dextrose solution, Ringer lactate solution, etc., or blood and blood products like plasma. (This has been described elaborately in Chapter 11.)
- ❖ Anesthesia is induced commonly through intravenous route using intravenous agents such as thiopentone sodium, propofol, midazolam, and ketamine.

Venepuncture (Intravenous Cannulation)

- ❖ It is the procedure of puncturing a suitable vein through the skin, usually in the upper limb, and keeping a needle or a cannula in it and fixing it securely.
- ❖ Intravenous puncture (venepuncture) is a basic necessary step to start anesthesia.
- ❖ Skilled assistance at this time often makes all the difference between success and failure of venepuncture.
- ❖ The assistance needed is to make the vein as large as possible by distension and to steady the limb.
- ❖ The typical intravenous cannula with injection port is shown in **Figure 2.3**.
- ❖ Generally, the cannula is made of “Teflon” (polytetrafluoroethylene) as it will be less irritant to the vein. All the sizes are available with color coding.
- ❖ Routinely either 20 gauge (Pink) or 18 gauge (Green) is used depending on the situation.

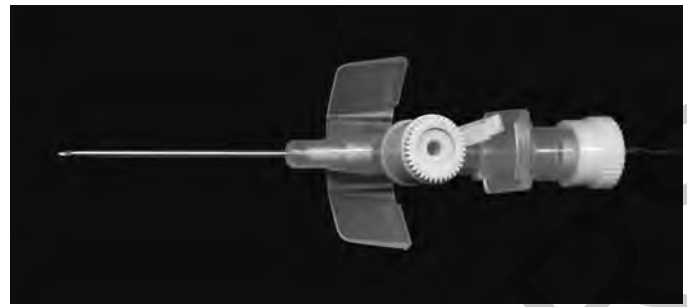


Fig. 2.3: Typical intravenous cannula with injection port.

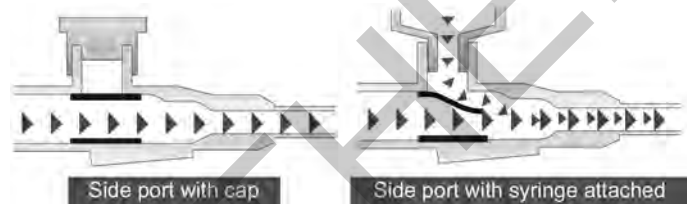


Fig. 2.4: Unidirectional valve in the injection port of the cannula.

- ❖ For pediatric patients, 22 gauge (Blue) is used.
- ❖ Mostly, the intravenous cannula comes with a side injection port for giving additional drugs through the infusion.
- ❖ The injection port has a unidirectional valve to prevent leak (**Fig. 2.4**).
- ❖ The usual site chosen for venepuncture is on the forearm anywhere *between the elbow and the wrist*. Any movement of the hand and forearm does not usually disturb the venepuncture site.
- ❖ Sites like elbow or the wrist are avoided as the movements of the joint may disturb the cannula and cause leak of fluid out into the tissues.
- ❖ Next common site is on the dorsum of hand (**Fig. 2.5**).
- ❖ Ideally a vein **on the middle of dorsum of hand** is suitable, because fixing the cannula with plaster will be easier and secure in that place. Note the points marked in **Figure 2.5**.
- ❖ As a routine, whenever possible, the intravenous line is started on the left hand of the patient.
- ❖ A right-handed individual will have reflex movement of the right hand more frequently causing disturbance to the infusion line.
- ❖ The technician should stand on the appropriate side to assist and not lean across the patient.
- ❖ The limb is held firmly, but not gripped too tightly as to prevent arterial flow. Less pressure is required if the patient's blood pressure is low.
- ❖ Constriction of limb is applied by the assistant with hand above the chosen site of venepuncture.
- ❖ The correct pressure is that at which the veins begin to enlarge but the arterial pulse can still be felt distal to the constriction.
- ❖ Some use sphygmomanometer cuff for this purpose, inflated to diastolic pressure.
- ❖ The correct technique of venepuncture with a cannula and fixing it correctly are shown in sequence in **Figures 2.6A to J**.

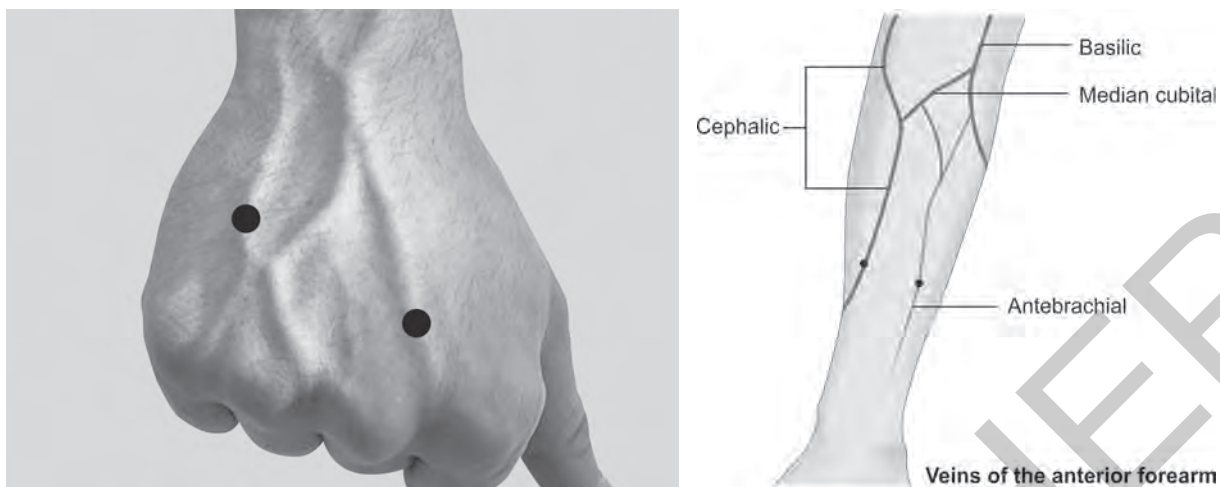


Fig. 2.5: Ideal sites for venepuncture.

□ Note: The ideal points of venepuncture are marked as dots on the course of the veins.

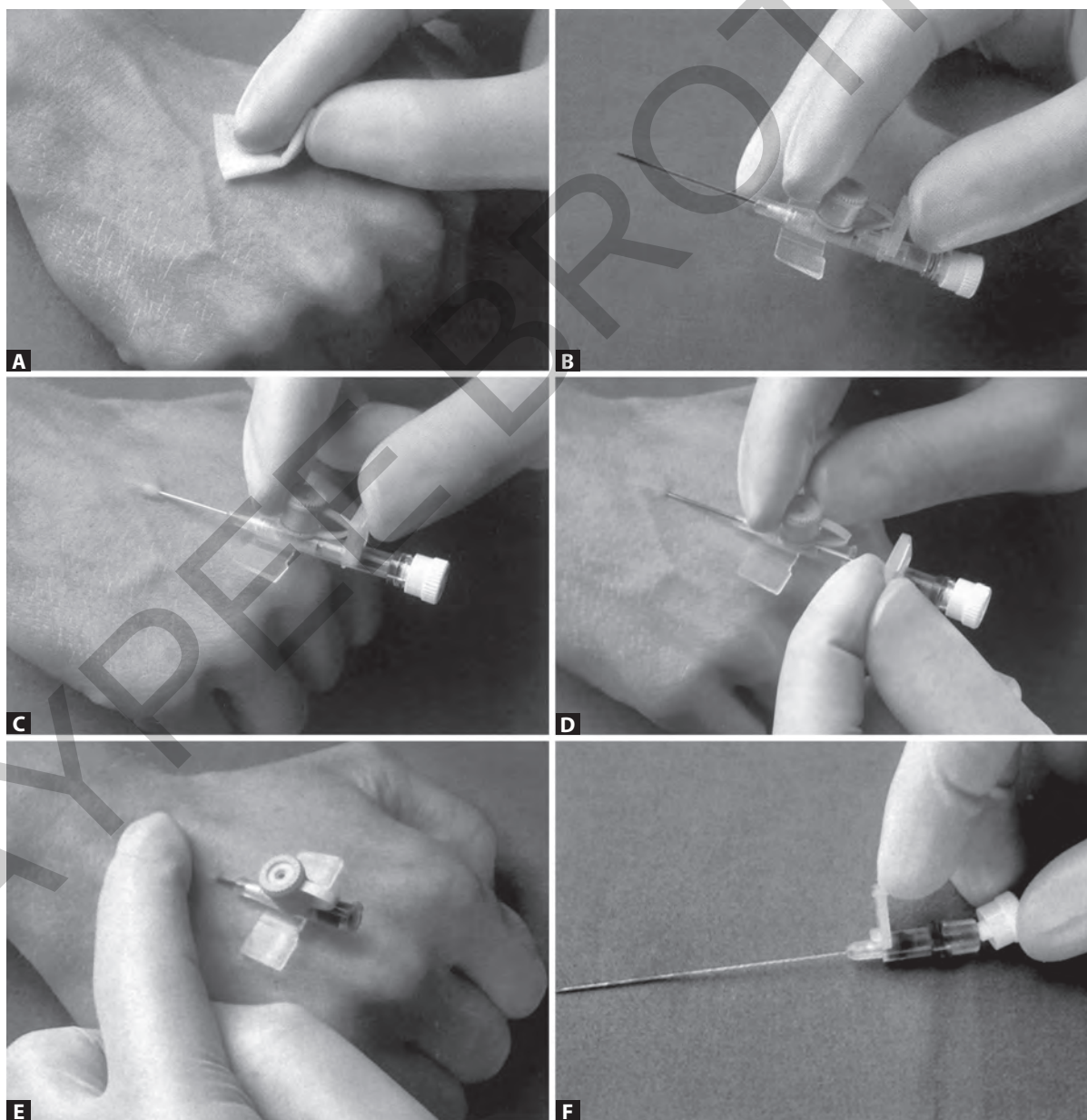


Fig. 2.6A to F:

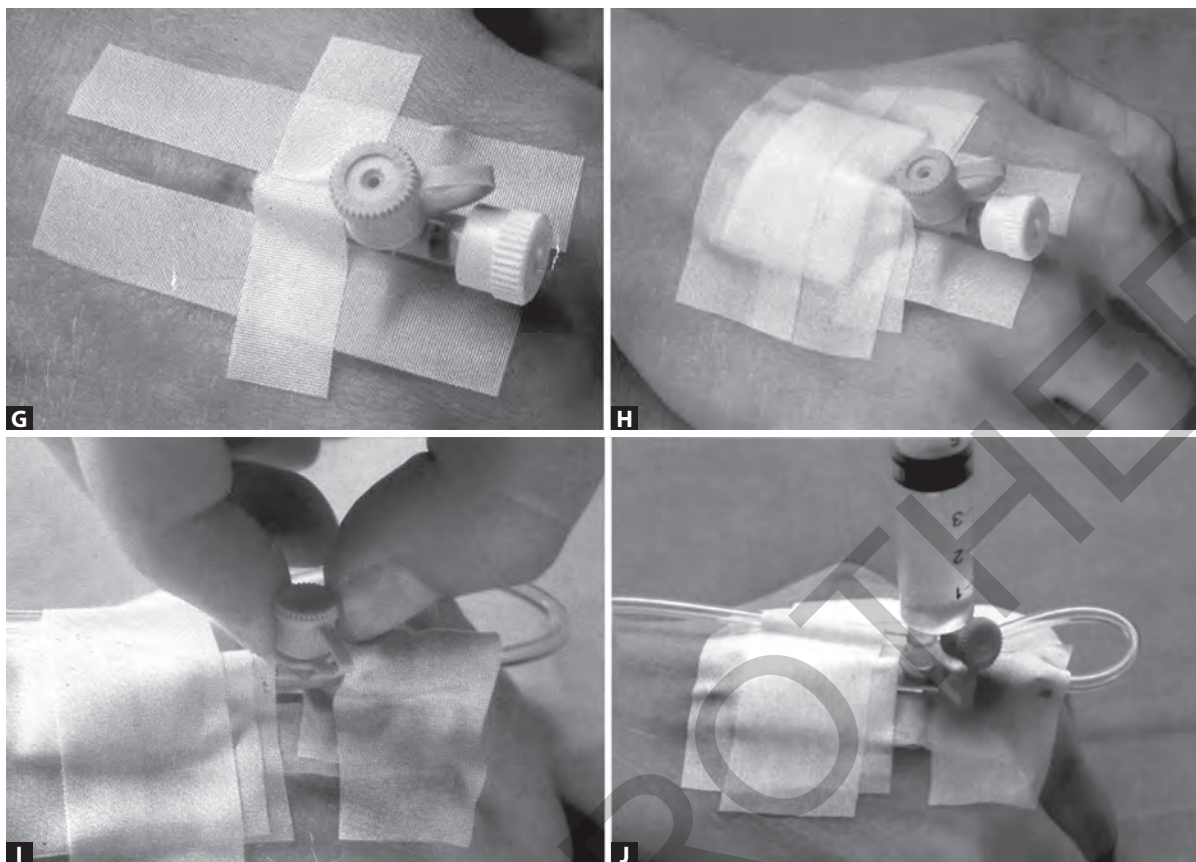


Fig. 2.6G to J:

Figs. 2.6A to J: Steps of venepuncture on the dorsum of hand, fixing the cannula and IV line.

- ❑ Note that after securing the cannula properly, the IV line is connected to the cannula.
- ❑ Through the side port of cannula, the drugs can be injected along with IV fluids.

Taking Blood Sample

- ❖ A sample of blood for investigations is always collected using a sterile syringe and needle carefully from the appropriate vein, properly held by the assistant.
- ❖ Then, the sample is carefully transferred to the specific container, either a vial with chemicals or a tube with cover meant for that.
- ❖ After proper labeling, the sample is sent with a properly filled request form to the laboratory.
- ❖ The anesthetic technician helps the anesthesiologist and shares his responsibilities.
- ❖ The habit of collecting any blood that trickles from a needle hub should be condemned, as it is a manifestation of total disrespect for the human being. *It has to be remembered that blood is collected in this way only in slaughterhouse.*

Suction Apparatus

- ❖ Anesthesia Technician must check the effective functioning of the suction every morning.
- ❖ At all times, efficient suction must be available, either from a mobile electric machine or from a central pipeline installation (**Fig. 2.7A**).
- ❖ Generally, this unit is fitted with two glass suction containers with 2000 mL capacity.

- ❖ Electrically operated suction apparatus is ideal for any small, single operation theater setup.
- ❖ The apparatus must be plugged in the electrical socket and operated; it should be tested for leaks before starting the work, so that it is ready for instant use.
- ❖ Availability of uninterrupted power supply is essential and now, usually generator backup is commonly available even in small hospitals.
- ❖ Central pipeline suction unit is available in bigger hospitals and is relatively trouble-free. It reduces noise pollution in the operation theater (**Fig. 2.7D**).
- ❖ Wall mounting suction units that can be plugged to the wall outlet are also available (**Fig. 2.7E**).
- ❖ Ideally, a foot-operated suction, tested and checked for leaks, must also be available for emergency use if other sources fail (**Figs. 2.7B and C**).
- ❖ Checking and keeping suction units with appropriate-sized suction catheters are important duties of Anesthesia Technician.
- ❖ Different suction units are shown in **Figures 2.7A to E**.

Check

- ❖ Whether the motor is working.
- ❖ Whether it sucks the water in full volume with full power.



Figs. 2.7A to E: Various types of suction devices; (A)Electrically operated suction; (B and C) Foot-operated suction; (D) Central pipeline suction trolley; (E) Wall-mounting units of central suction.

- ❑ Note the two types of foot-operated suction units; both perform efficiently.
- ❑ The one with single bottle and black bellows is light weight and portable.

- ❖ Now, after occluding the suction tube, check the pressure gauge to see whether the negative pressure increases smoothly (the gauge is 0–760 mm Hg).
- ❖ If inadequate power of suction is noticed, it has to be corrected by checking the washers of the suction bottles, connections, and other attachments for any leak and the defects rectified.
- ❖ If the defect in the suction apparatus could not be rectified, inform the anesthesiologist and send it for servicing.
- ❖ In the meanwhile, bring another standby suction unit for use till the repaired suction apparatus is received.

Suction Tubes

- ❖ Commonly, the suction apparatus is provided with a 5-m long suction tube, with 7 mm internal diameter.
- ❖ *This tube is not sterile.* But for oropharyngeal suction and endotracheal suction, the *sterile catheter is fixed* to the suction tube.
- ❖ Usually, the anesthetic technician will be holding the suction tube which is *unsterile*.
- ❖ The anesthesiologist will fix the sterile catheter with gloved hand without touching the unsterile tube.

- ❖ He will apply suction by holding the sterile catheter. Separate catheters are used for oropharyngeal and endotracheal suction.
- ❖ When the suction is needed for the surgical procedure, a sterile suction tube is available in ethylene oxide sterilized pack (**Fig. 2.8**).
- ❖ This tube is supplied with Yankauer suction handle and is used by the assisting nurse.
- ❖ The other end is connected to the suction tube of the suction apparatus.

Suction Catheters

- ❖ Suction catheters are long, flexible tubes that are used to remove (secretions) fluids from the mouth and airways.
- ❖ Removal of these fluids (secretions) is important to ensure that it does not block the airway and the patient is able to breathe properly.
- ❖ The secretions may be aspirated into the lungs and result in lungs complications.
- ❖ Disposable suction catheters are available in all sizes with color coding for different sizes (**Fig. 2.8**).



Fig. 2.8: Sterile suction tube with Yankauer handle.

- ❑ This sterile tube and suction handle come in EO sterilized pack.
- ❑ This pack can be used for suction in the surgical field.

- ❖ Most of them will have a *whistle tip* for efficient suctioning of thick viscid secretions.
- ❖ Some types may be provided with a *thumb control port* at the proximal end (**Fig. 2.9A**).
- ❖ The port may be occluded with thumb partly or completely to adjust the force of suction for precise and accurate suctioning.
- ❖ Plain catheters without thumb control port are also available (**Fig. 2.9B**).

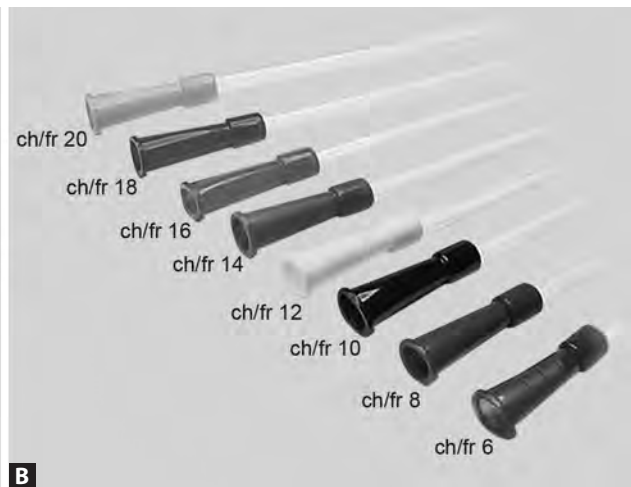
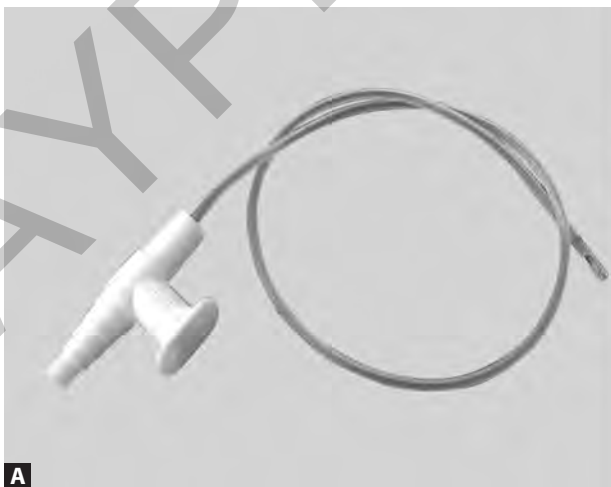
Care during Endotracheal Suctioning

- ❖ Anesthesia technician is responsible for providing the necessary help while the anesthesiologist is applying suction.
- ❖ During anesthesia, while reversing the patient from anesthesia or in the recovery room, there may be need for suctioning.
- ❖ Perfect asepsis is necessary as infection could be easily introduced into the lungs by contaminated catheters.

- ❖ Two different suction catheters are kept ready—one for applying suction in the oral cavity and the other for tracheal suction if needed.
- ❖ Catheter used for suctioning oral cavity should never be used for endotracheal suctioning.
- ❖ During endotracheal suctioning, the following steps are taken:
 - Oxygenate the patient with 100% oxygen before suctioning.
 - Perfect aseptic precaution is followed.
 - The diameter of the catheter should never be larger than one-third of the diameter of the endotracheal tube.
 - If larger catheters are used, then alveolar air may be sucked and it will cause alveolar collapse and hypoxia.
 - The catheter is passed through the endotracheal tube carefully and gently to reach the secretions and sucked out.
 - Every time, the suction catheter must be flushed with sterile water.
 - At any one time, suction is applied for less than 10 seconds.
 - Longer duration of suction will suck out alveolar air and cause collapse of lung.

Anesthetic Records (Charts)

- ❖ It is absolutely essential that a proper record is kept of all administrations of anesthesia.
- ❖ It is a telltale evidence for the type and quality of care given to the patient intraoperatively and to identify whether there were any problems or complications during the course.
- ❖ Anesthetic charts should contain:
 - All the details of the patient with a brief medical history and medications the patient is taking.
 - Investigations done and the report. Grading of Anesthetic Risk.
 - All the anesthetic medications, the doses, and the time of administration are recorded.



Figs. 2.9A and B: Suction catheters: (A) Catheter with thumb control port; (B) Plain catheters with color-coded hubs (For color version, see Plate 1).

- ❑ All catheters have whistle tip to facilitate effective suction.

- All vital parameters are recorded in a specific time interval.
- The monitors used during anesthesia.
- Record of any specific event, either anesthetic or surgical, if encountered is also recorded with the time of occurrence.
- There are various types of charts available, designed and supplied by various companies, which are suitable for general use in any operating room.
- Each institution will have its own type of chart suited for them.
- Usually, the anesthetic charts are in the form of two pages.
- The first page has space for providing comprehensive details of the preoperative status of the patient, investigations done with their reports, ASA Grading of Risk, premedication, anesthetic technique contemplated and employed, etc.
- The second page has space for entering the drugs, dose, and the time of administration during anesthesia,

IV fluids administered with the time and duration, BP, pulse rate and respiration recorded on the graph (Figs. 2.10 and 2.11).

- The anesthetic technician may be required to fill the details in the first page of the chart as the information is available in the first page of the case sheet of the patient.

Loading Drugs in Syringes

- ❖ In many hospitals, the Anesthesia Technician is expected to fill syringes with drugs to be used under the instructions of the anesthesiologist.
- ❖ In the considerations of safety, the handling of drugs by the technician depends partly on his training and partly on the trust the anesthesiologist keeps on him.
- ❖ The label on the drug container must be carefully read, not only to see that it is the *correct drug*, but also to see that it is in the *right concentration* and *dose*.

The first page of anesthetic record has provision for recording the details of patient, identity, preoperative investigations, anesthetic technique, etc. The present form is for recording the vital parameters

Name of institution		H. No. : I.P. No. :	
		Pt. Name :	
ANESTHETIC RECORD		Date of Birth :	Age : Sex :
		☐ OP	☐ Others _____
		☐ IP	Ward : Bed :
Anesthetist :	Surgeon :	Operation/Procedure	Date :
Pastmedical, Surgical and Anesthetic History :			
Present Medications :		Allergies	
		ASA 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐	
Preanesthetic Assessment		Anticipated Anesthetic Problems	
		Premedication	
		Route : Time given : Effect :	
Regional Anesthetic (RLA)		General Anesthesia	
Spinal ☐ Epidural ☐ Caudal ☐		Airway : Laryngeal mask	
Others		ET Tube Size Length	
Drugs		Type Cuffed/Uncuffed	
Comments		Throat Pack Yes/No	
		Spontaneous Breathing/IPPV	
		Manula/Ventilator (Details)	
		Breathing System :	
		Maintenance :	
		O ₂ L/min N ₂ O L/min	
		Volatile Agent : %	
Monitoring :		IV Site Cannula Size	
☐ ECG			
☐ CVP → Site			
☐ Temp → Site			
☐ Arterial Line → Site			
☐ BP			
☐ Pulse Oximeter			
☐ End Tidal CO ₂ Analyzer			
☐ Peripheral Nerve Stimulator			
☐ Other (Specify)			
		Fluids and Blood Given :	
		Total estimated Blood/Fluid Loss : Total amount of Blood/Fluid Given :	

Fig. 2.10: The first page of anesthetic chart.

The second page of anesthetic record has space for recording medications and their doses. The graph is for recording the vital parameters.

D R U G S									

220
200
180
160
140
120
100
80
60
40
20

CVP	INDUCTION	End of GA
VSYS	ADIA	
Pulse	TEMP	

TIME								
------	--	--	--	--	--	--	--	--

Condition of Patient Leaving Theater :
 Postoperative Instructions :
 Monitor BP/Pulse/Color/Resp. Rate
 Level of consciousness every..... Minutes

☐ IV Fluids as per Chart
☐ Oxygen % hrs

☐ Analgesia as per chart
☐ Other (specify)

Comments :

Anesthetist Signature

Fig. 2.11: The second page of anesthetic chart.

- ❖ The drug label must be checked at least two times—once before taking from the rack and keeping it on the machine and again when loading in the syringe.
- ❖ Always have caution that similar looking bottles and color of label can cause wrong drug being loaded.
- ❖ The containers of drugs (whether vials or ampoules) must be retained in a tray, not thrown into the bin. It is meant for checking at the end.
- ❖ After conclusion of the anesthesia, the drugs and the doses used are checked and verified to make sure that the right drug has been given.
- ❖ Later, after noting down in the anesthetic chart, it is disposed off.
- ❖ Proper precautions should be taken to ensure that the syringes and needles are always kept sterile without touching them with hands and keeping them carefully without touching anything unsterile.
- ❖ This is very important as the same syringe will be used many times for injecting multiple incremental doses of the same drug throughout the anesthesia.
- ❖ If unsterile injections are made carelessly, it is sure to induce rigor as soon as the patient recovers.
- ❖ The syringes must be labeled as to the content and the concentration.
- ❖ However, the anesthesiologist is responsible for what he administers and he should, therefore, be able to check the anesthetic drugs that he is about to give.
- ❖ Special care must be taken when doing this part of the preparation; never put down a syringe loaded with a drug until it has been labeled, for it is very easy to make mistakes when there is pressure of work.
- ❖ Adequate checks should be repeatedly made to avoid accidents, which are very common in anesthetic practice that end up in catastrophe.

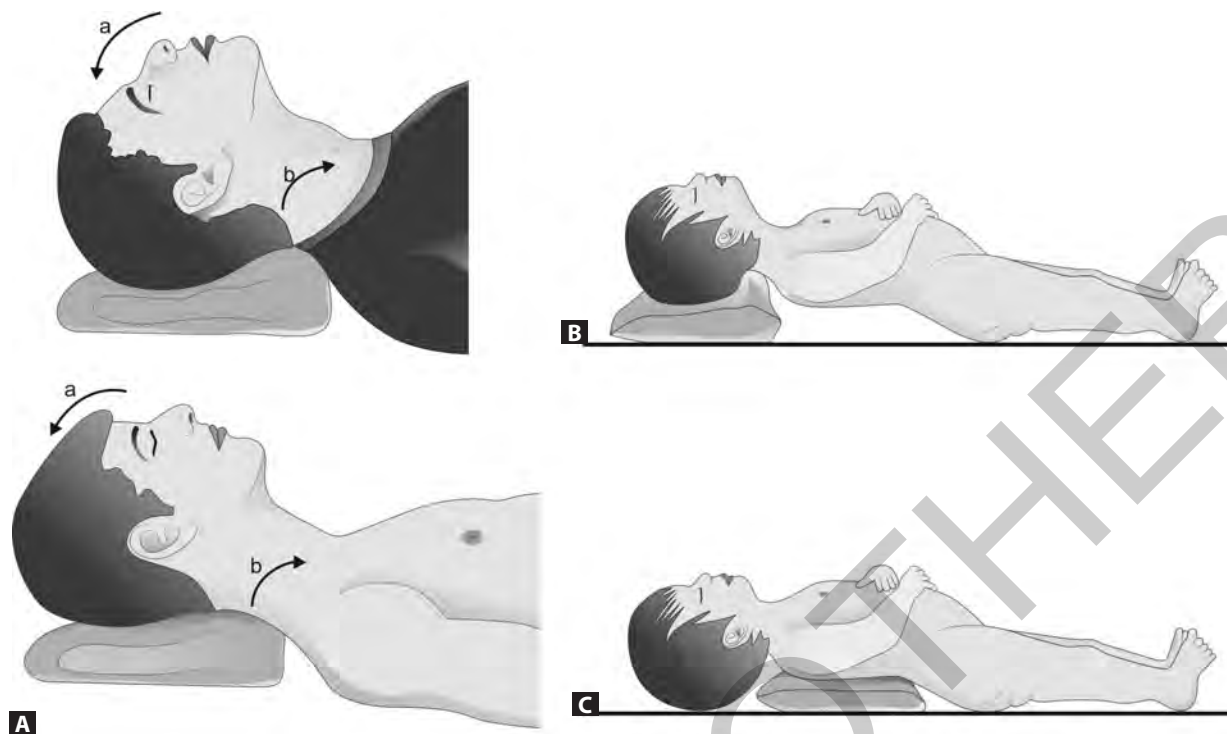
- ❖ Checks by the anesthesiologist are prudent and do not reflect badly on the capability of the technician.
- ❖ Complete honesty and integrity are very important aspects of a technician's work.
- ❖ If a mistake is made, say that regardless of the consequences to yourself.
- ❖ Think only of patient's safety.
- ❖ When the patient arrives into the theater asleep, he need not be awakened. When he is on the table, unnecessary conversations are stopped.
- ❖ If possible, the lights should be dimmed.
- ❖ The shadowless lamp above the operating table must be switched off until the time of induction of anesthesia.
- ❖ It is disturbing to lie on one's back looking at a bright light.
- ❖ Indeed, the world looks very different if one sees it from the horizontal position.

Care of Endotracheal Tubes

- ❖ The details and types of endotracheal tubes are described in Chapter 6 (Anesthetic Breathing Systems and Accessories)
- ❖ However, the care of endotracheal tubes is worth discussing here.
- ❖ All the reusable red rubber tubes (very rarely used nowadays), if at all available, must be stored in a clean dry tray in the order of sizes.
- ❖ During storage, the stopper of the cuff must be kept open.
- ❖ No powder must be used on the tubes or cuffs.
- ❖ After every use, immediately after extubation, the stopper of the cuff inflation tube is closed to prevent water entering the cuff.
- ❖ The tube is then kept immersed in a basin of water to soften the secretions that would be seen adhered to the inner surface of the tube near the tip.
- ❖ The tube must be cleaned with soft soap and water on the outer surface to remove slippery secretions on it.
- ❖ By holding the tube at the connector end in flowing water from a tap, the inner surface of the tube is thoroughly rinsed.
- ❖ This may not clean the secretions adherent to the inner wall near the tip, which requires a tube cleaning brush soaked in soap solution to thoroughly scrub and clean it.
- ❖ Ideally the tube is held at eye level and after straightening it with two hands, the lumen is inspected for any dirt inside.
- ❖ When the cleaning (decontamination—removing the debris) is completed, the tube is again washed both outside and inside in running water to remove any trace of soap.
- ❖ In a washed reusable endotracheal tube even if a trace of soap is present, it may irritate the laryngeal mucosa of the patient where it is next used. It may cause laryngeal edema. This is a life-threatening condition. Disposable tubes eliminate this problem.
- ❖ When satisfactory washing is over, the tube is allowed to drip dry by hanging it using X-ray film clip.
- ❖ When it is completely dry on both outside and inside, it is stored in the suitable tray meant for it.
- ❖ For disposable tubes, no special care is needed except that it is kept in the pack till the time of intubation.
- ❖ Once it is removed from the pack, the cuff is checked for any leak by inflating the cuff with a few mL of air and the air is completely removed before intubation.

Intubation of Trachea

- ❖ Intubation is the procedure where a specially designed tube (endotracheal tube) is introduced into the trachea.
- ❖ During this preparation, the technician after consulting the anesthesiologist should select the *correct-sized endotracheal tube*, which is anticipated for the patient, and keep *one size bigger and one size smaller* and keep them ready on the worktop.
- ❖ The *catheter mount* and the *appropriate connectors* needed for the endotracheal tube are selected and checked for correct fit and kept ready.
- ❖ Usually, intubation is done under direct vision by using an equipment called *Laryngoscope*.
- ❖ If intubation of trachea is required, the conditions needed for this are usually obtained by deep anesthesia or by the use of muscle relaxants.
- ❖ To assist the anesthesiologist in intubation, the technician must stand opposite to the patient's chest, facing toward the head and on the same side of the anesthetic machine. He can easily reach the machine, the patient, and the anesthesiologist.
- ❖ If a muscle relaxant is used (Suxamethonium is the common relaxant used for this purpose), it is injected after injecting thiopentone or propofol; oxygen is administered until the relaxant produces its effect.
- ❖ A pillow of 2-inches height is placed under the head and pushed up to the shoulder but not under the shoulder.
- ❖ Then, the head is placed in the best position for intubation, i.e., the neck is flexed and the head is extended on the flexed neck (**Fig. 2.12A**).
- ❖ For children, the best position is achieved by placing a small pillow under the head and shoulder (**Fig. 2.12B**).
- ❖ In neonates and infants, as the head is larger, keep a pillow under the shoulder to allow the head rest comfortably (**Fig. 2.12C**). The head may be held by an assistant during laryngoscopy to stabilize it.
- ❖ The mouth now falls open and the laryngoscope is now inserted.
- ❖ The laryngoscope commonly used is the "*Macintosh laryngoscope*" with curved blade (**Figs. 2.13A and B**).
- ❖ There are four sizes of blades available—normal adult size, extra-long size, child size, and infant size (**Fig. 2.14**).
- ❖ A better view of larynx is often obtained if the lips are pulled aside by the technician and on occasions, if the larynx is pushed backward. This is called *Sellick's maneuver* (**Fig. 2.15**).
- ❖ The larynx is visualized well and the larynx and trachea are often sprayed with 4% lignocaine.
- ❖ The tube, well lubricated with a water-soluble local anesthetic jelly (2% lignocaine), is passed through the larynx into the trachea. This is "**Orotracheal intubation.**"



Figs. 2.12A to C: Positions of head and neck for intubation of trachea: (A) Best position for intubation of trachea in an adult: a. extension of the head; b. on the flexed neck; (B) In children, keep a small pillow under the head and shoulder; (C) In neonates and infants, keep a pillow under the shoulder.



Figs. 2.13A and B: (A) Macintosh laryngoscope; (B) Adult-sized blade.



Fig. 2.14: Laryngoscope with five blades.

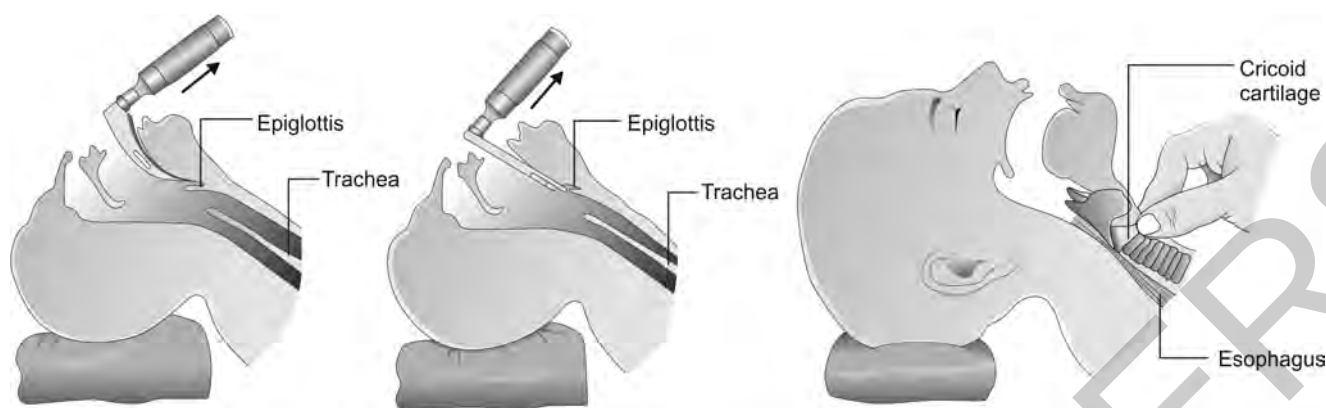


Fig. 2.15: During laryngoscopy, Sellick's maneuver makes the larynx well visualized.

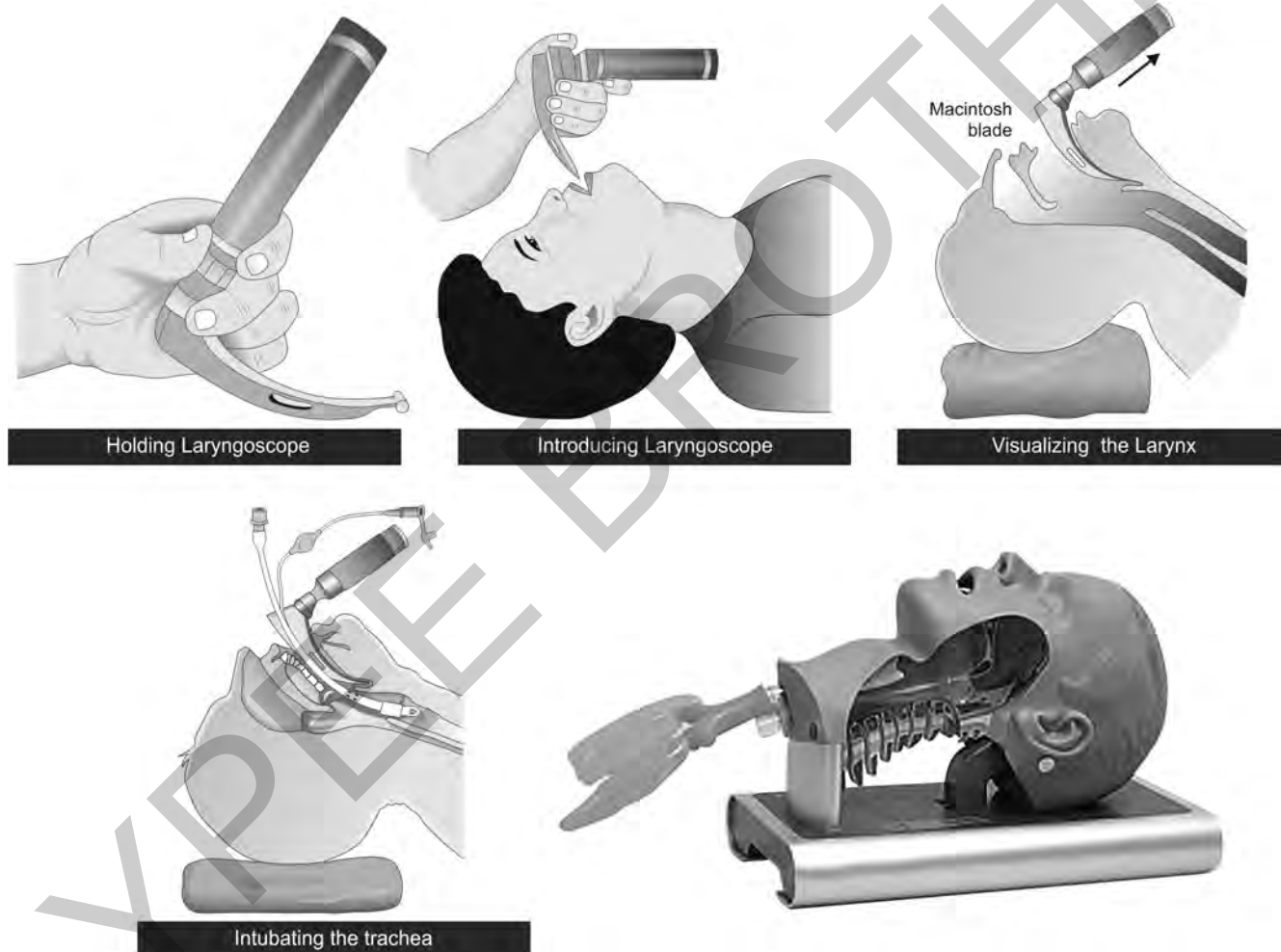


Fig. 2.16: Steps of laryngoscopy, intubation, and intubation trainer.

❑ *Note: The beginners can use the intubation trainer to become well versed with the technique without fear.*

- ❖ The steps of intubation are shown along with an intubation trainer in **Figure 2.16**.
- ❖ This trainer is a boost for beginners to practice the art of intubation without fear.
- ❖ The teacher can train them in the technique perfectly and correct the possible mistakes they may do in real work till they reach perfection.
- ❖ The laryngoscope is then placed on a tray at the bottom of the trolley or elsewhere, not on the worktop of the

machine, as it is badly contaminated with the secretions of oral cavity.

- ❖ Oral cavity, even in the best conditions, is loaded with bacteria as it is open to atmosphere and there is material for bacterial growth.
- ❖ Anything which is dirty must never be placed on the worktop of the anesthetic machine, where it can cause serious bacterial contamination. When a laryngoscope is used in a patient, it is badly contaminated with the



Figs. 2.17A and B: (A) Method of fixing the endotracheal tube with adhesive tape; (B) Method of fixing the nasogastric tube on the nose.

multiple organisms from the patient's mouth. So, should never be placed on the work top of machine unless decontaminated.

- ❖ The tube is secured to the patient by adhesive plaster. One plaster fixes the tube on the maxilla just on the upper lip (fixed structure) and another is fixed on the mandible (moving structure) below the lower lip. *Fixing the tube on the mandible alone is dangerous as it may allow the tube to slip and come out (Fig. 2.17A).*
- ❖ The cuff of the tube is now inflated with an adequate amount of air with a syringe until there is no leak of gases around the tube, when the lung is inflated by squeezing the reservoir bag.
- ❖ When the operation is in and around the mouth, a *softer smaller endotracheal tube (nasal tube)* is passed through the nose into the pharynx and then inserted into the trachea. This is "*Nasotracheal intubation.*"
- ❖ A nasotracheal tube is well lubricated with 2% lignocaine jelly passed through the wider and patent nasal passage. The patent and wider nostril can be assessed by asking the patient to breathe through each nostril when the other is blocked by pressing with a finger on the side. The patent and wider nostril will blow more air when felt by the dorsum of hand.
- ❖ When the tip of the tube has entered into the pharynx, a laryngoscope is passed through the mouth, to view the larynx. The tip of the tube is now directed under vision toward the larynx and passed into the trachea.
- ❖ A "*Magill's intubating forceps*" may be used for holding and directing the tip of the tube into the larynx (**Fig. 2.18**).
- ❖ A suction ready at hand may be used to suck out a little bleeding that may collect in the pharynx during this process.
- ❖ At this point we must remember that many patients may have Ryle's tube in one of the nostrils. Adequate care is taken to fix it securely (**Fig. 2.17B**).

Care of Unconscious Patient

- ❖ An unconscious patient, from whatever cause, cannot look after himself. Therefore, those around him must take over the care of his vital functions.

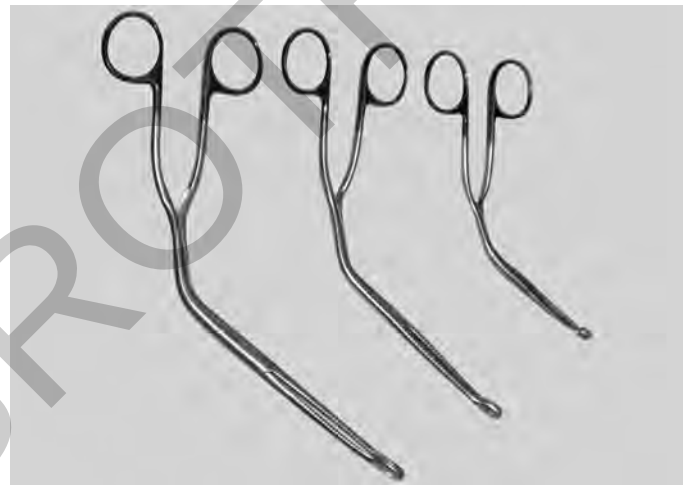


Fig. 2.18: Magill's intubating forceps—adult and child sizes.

- ❖ The first and immediate need is to maintain a clear airway so as to ensure that there is a free passage of air or gases to enter the trachea and bronchi and to reach the alveoli of lungs.
- ❖ Without a clear airway and an adequate amount of oxygen or gas mixture, death may ensue rapidly.
- ❖ If the patient becomes unconscious when he is on his back, the muscles of his jaw and tongue relax and tongue falls against the posterior pharyngeal wall blocking the airway (**Fig. 2.19**).
- ❖ Lift the jaw (mandible) forward (jaw thrust) and extend the head (tilting the head backward) in such a way that the tip of the chin points upward which will move the tongue away from the posterior pharyngeal wall and relieve the airway obstruction (**Figs. 2.19 and 2.20**).
- ❖ Inserting an artificial airway, such as Guedel's airway, will maintain the airway by keeping the base of the tongue anteriorly in the right position (**Fig. 2.21A**).
- ❖ Sometimes, the patient may be unconscious with airway obstruction due to falling back of tongue. But he may not tolerate an oral airway.
- ❖ In such conditions, a nasopharyngeal airway may be passed through the floor of the nasal cavity to reach near the larynx (**Fig. 2.21B**).

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for Operation Theater Technicians

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