

2

The surgical domain: Creating the environment

Key Points



2.1 INFECTION CONTROL AND ASEPSIS

Infection Prevention and Universal Precautions

- **Treat all body substances of all people as potentially infectious**
- **Asepsis depends on standard procedures, staff training, personal discipline and careful attention to detail.**
- **Hand washing, use of barrier protection such as gloves and aprons, the safe handling and disposal of "sharps" and medical waste and proper cleaning, disinfection and sterilization are all part of creating a safe hospital.**



2.1 INFECTION CONTROL AND ASEPSIS

Hand washing

- Hand washing is the single most important measure for the prevention of infection
- Plain soap and water is effective for removal of visible contaminants.
- Wash your hands with a vigorous mechanical action on all surfaces of the hands. Continue for at least 15 seconds. Wash above the wrists and remove jewellery, if possible. Nails are the areas of greatest contamination.
- Rinse under poured or running water.



2.1 INFECTION CONTROL AND ASEPSIS

Prevention of transmission of HIV

- A safe injection does not harm the recipient, does not expose the provider to any avoidable risk and does not result in any waste that is dangerous for other people
- Use a sterile syringe and needle for each injection and to reconstitute each unit of medication
- Ideally, use new, quality controlled disposable syringes and needles
- If single-use syringes and needles are unavailable, use equipment designed for steam sterilization



2.1

INFECTION CONTROL AND ASEPSIS

Prevention of transmission of HIV

- Prepare each injection in a clean, designated area where blood or body fluid contamination is unlikely
- Use single-dose vials rather than multi-dose vials
- If multi-dose vials must be used, always pierce the septum with a sterile needle; avoid leaving a needle in place in the stopper of the vial
- Once opened, store multi-dose vials in refrigerator.



2.1 INFECTION CONTROL AND ASEPSIS

Aseptic technique

- **Anyone entering the operating room, for whatever reason, should first put on:**
 - **Clean clothes**
 - **An impermeable mask to cover the mouth and nose**
 - **A cap to cover all the hair on the head and face**
 - **A clean pair of shoes or clean shoe-covers.**
- **Caps, gowns and masks are worn to decrease the risk of patient exposure to contamination or infection from the surgical team.**
- **Sterile instruments, gloves and drapes are also key elements in the fight against contamination.**



2.2 EQUIPMENT

- **Equipment and instruments should be strictly for use in the**
 - **operating room,**
 - **treatment room or**
 - **emergency department**
- in order to ensure that it will be available, in good repair and sterilized or cleaned ready for use.**



2.2 EQUIPMENT

Care and repair

- It is essential that all personnel check the medications and equipment they will be using prior to beginning a case or procedure.
- Have a regular plan of maintenance for equipment and plan in advance for the repair and replacement of equipment.
- Create a list (inventory) of the equipment.



2.2 EQUIPMENT

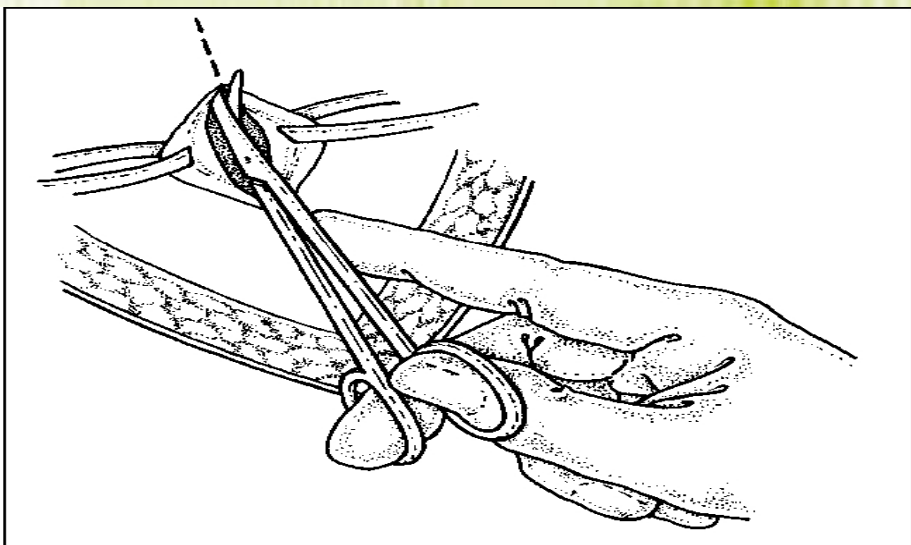


Figure 2.1

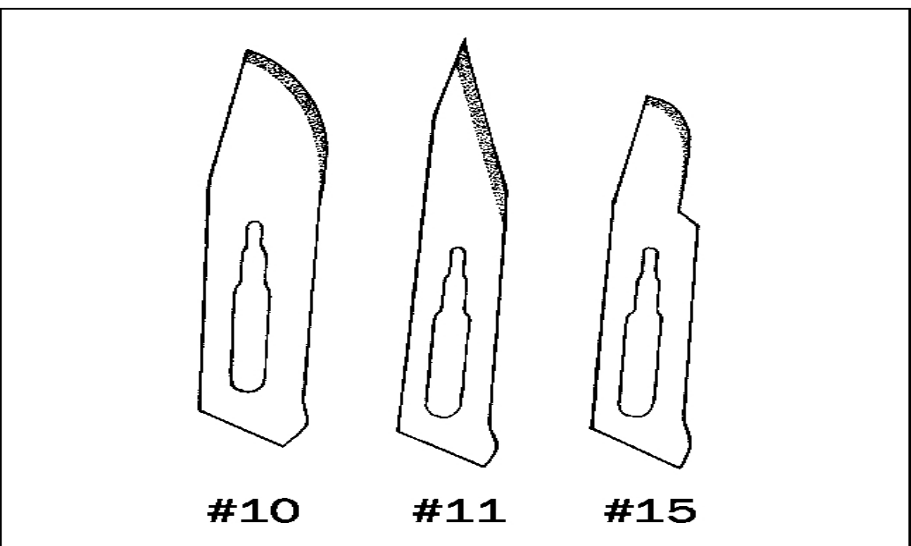


Figure 2.2

Use three-point control

Most procedures are performed with a #3 handle. Use a:
#10 blade for large incisions,
#11 for stab incision
#15 for fine precision work



2.2 EQUIPMENT

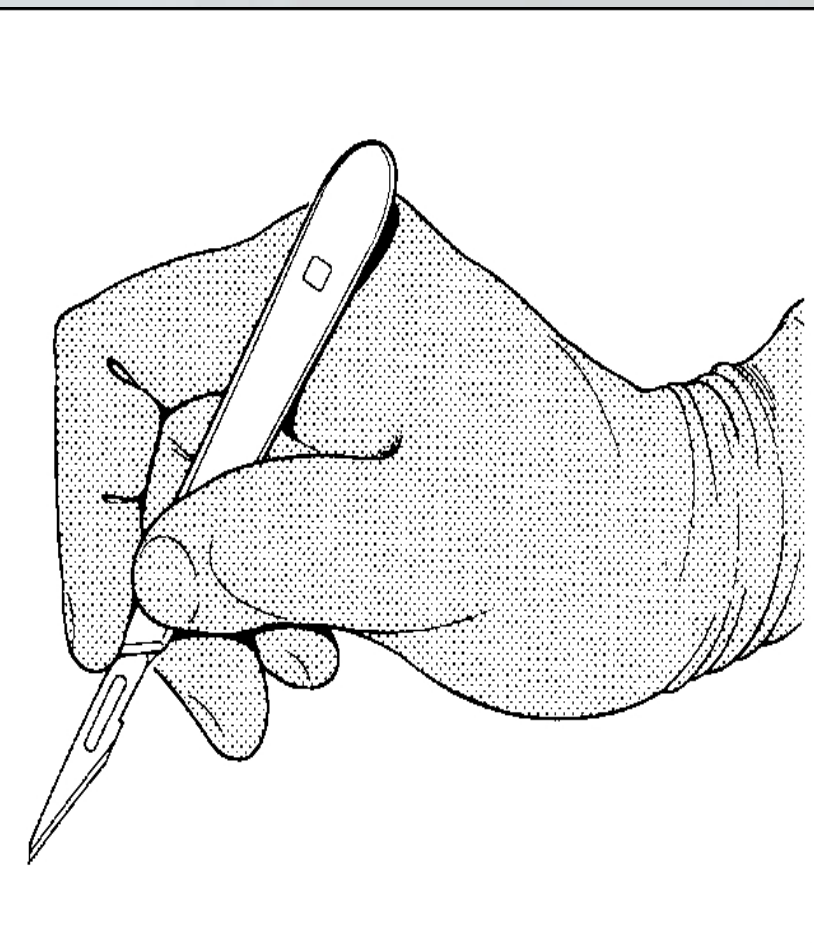


Figure 2.3

When using the scalpel for dissection, use a smaller knife and hold the instrument like a pen with your thumb, third finger and index finger holding the knife and your index finger controlling the dissection



2.3 OPERATING ROOM

- **Keep all the doors to the operating room closed except as needed for the passage of equipment, personnel and the patient.**
- **Store some sutures and extra instruments.**
- **Keep to a minimum the number of people allowed to enter.**
- **Keep the room uncluttered and easy to clean.**
- **Between cases, clean and disinfect the table and instrument surfaces.**



2.3 OPERATING ROOM

- **At the end of each day**
 1. **Clean the operating room**
 2. **Sterilize all surgical instruments and supplies after use**
 3. **Store them protected and ready for the next use**
 4. **Leave the room ready for use in case of an emergency**



2.3 OPERATING ROOM

Sponge and instrument counts

- **Count supplies (instruments, needles and sponges)**
 - before beginning a case
 - before final closure
 - on completing the procedure
- **Aim is to ensure that materials are not left behind or lost.**
- **Pay special attention to small items and sponges**
- **Create standard list of equipment for use as a checklist.**
- **Also make a check list of the instruments for a specific case.**



2.3 OPERATING ROOM

Scrubbing and gowning

- Before each operation all members of the surgical team will scrub.
- When scrubbing-
 - Remove all jewellery and trim the nails
 - Use soap, a brush (on the nails and finger tips) and running water to clean thoroughly around and underneath the nails.
 - Scrub your hands and arms up to the elbows.
 - After scrubbing hold up your arms to allow water to drip off your elbows
 - Turn off the tap with your elbow.



2.3 OPERATING ROOM

Scrubbing

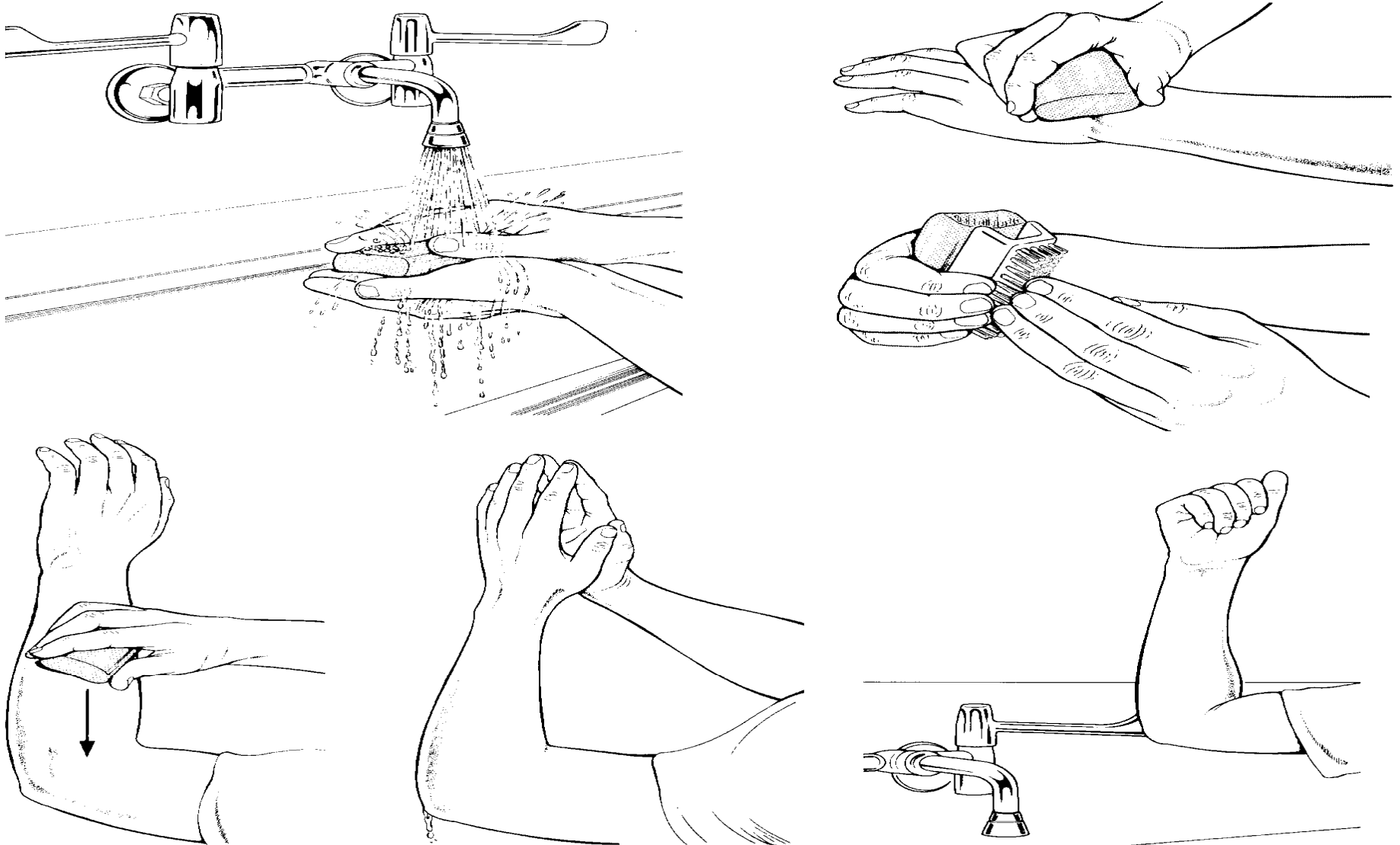


Figure 2.4

2.3 OPERATING ROOM

Scrubbing and gowning

- **After scrubbing your hands**
 - Dry them with a sterile towel and make sure that towel does not become contaminated.
 - Hold your hands and forearms away from your body and higher than your elbows until you put on a sterile gown and gloves.



2.3 OPERATING ROOM

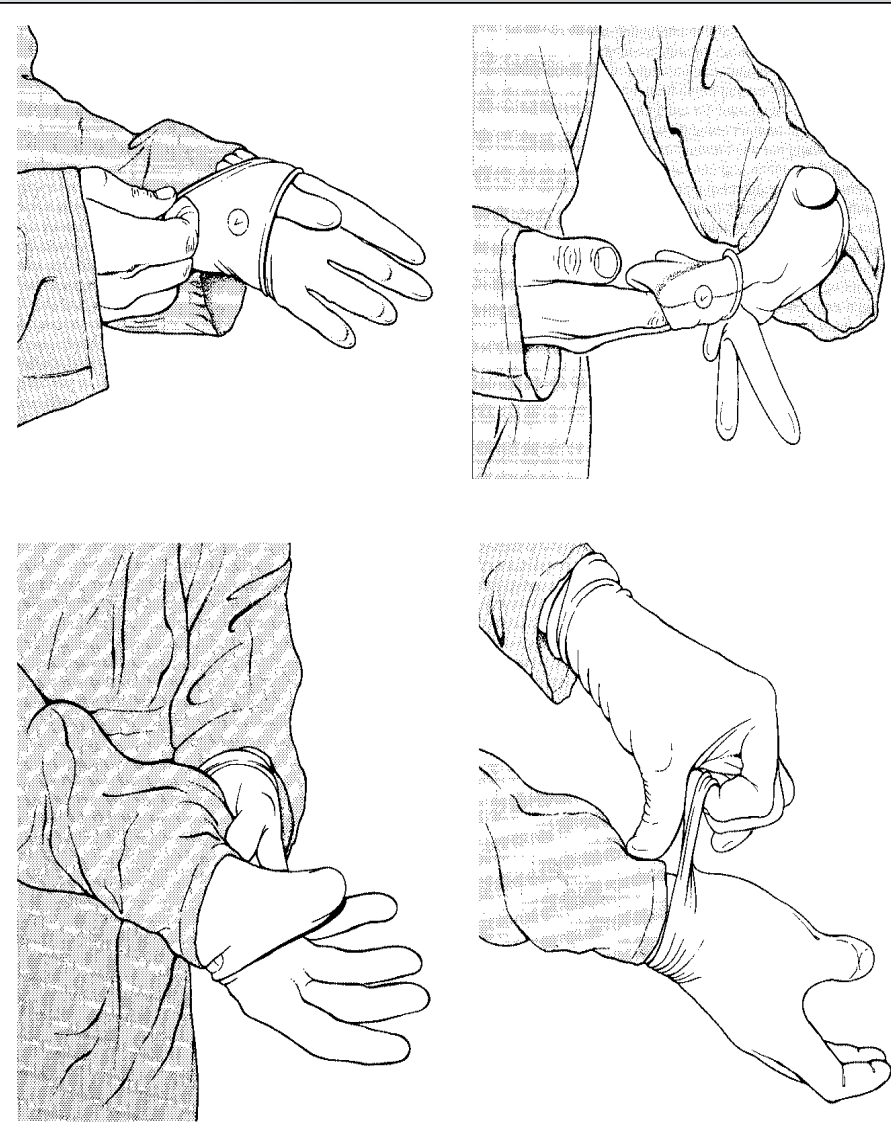


Figure 2.5

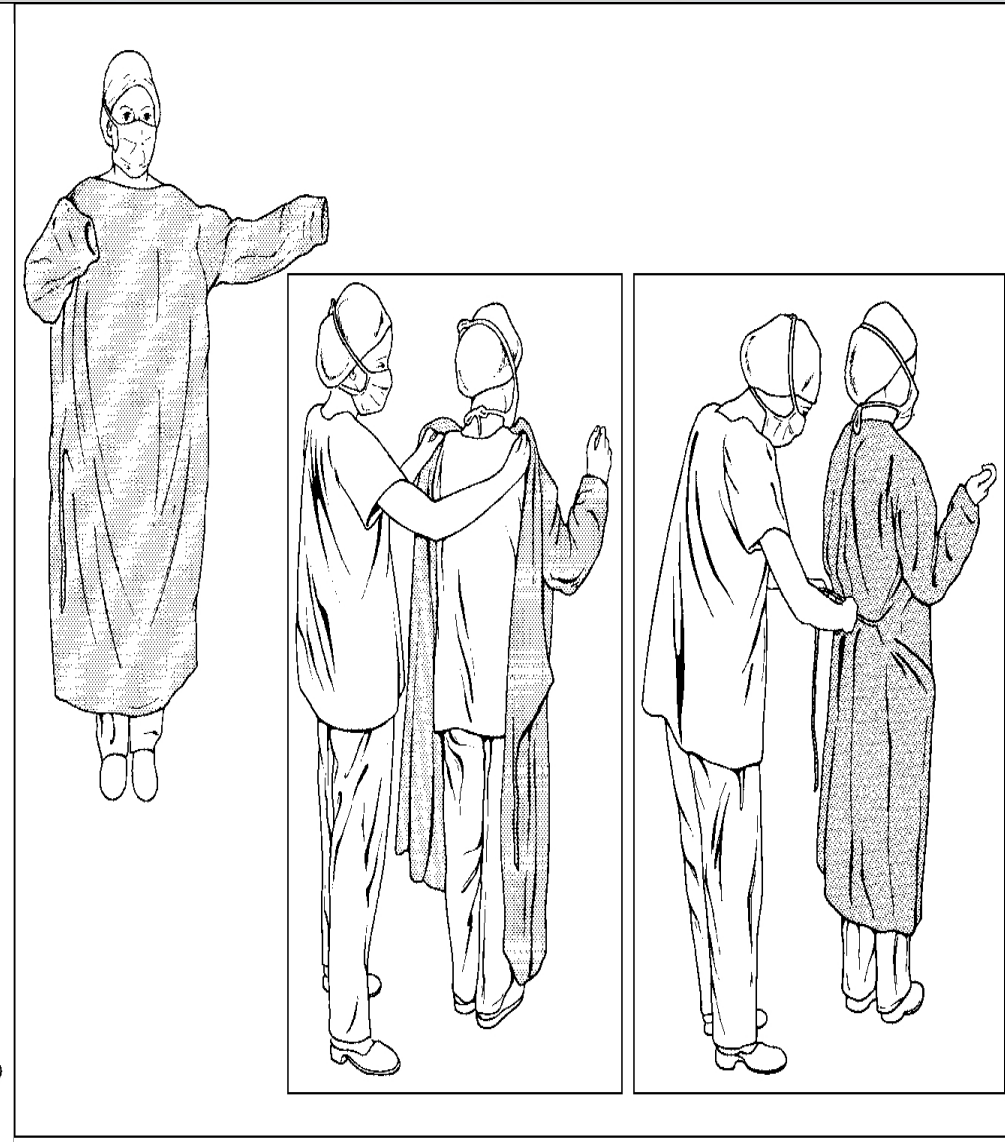


Figure 2.6

2.3 OPERATING ROOM

Skin preparation

- Patient should bathe the night before an elective operation.
- Just before the operation, wash the operation site and area surrounding it with soap and water.
- Prepare the skin with antiseptic solution, starting in the centre and moving out to the periphery.
- Chlorhexidine gluconate and iodine are preferable to alcohol and are less irritating to skin.
- The solution should remain wet on the skin for at least two minutes.



2.3 OPERATING ROOM

Skin Preparation

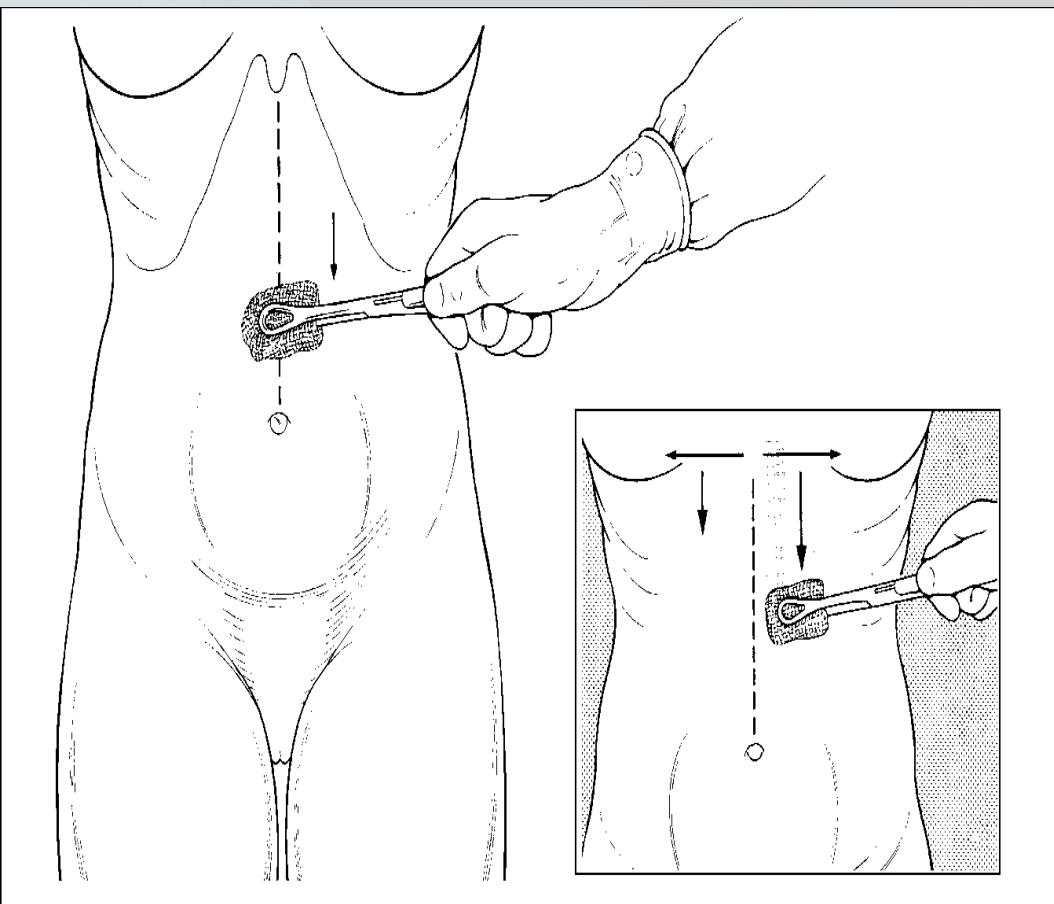


Figure 2.7

Prepare the skin with antiseptic solution, starting in the centre and moving out to the periphery



2.3 OPERATING ROOM

Draping

- Do not place drapes on the patient until you are scrubbed, gowned and gloved
- Leave uncovered only the operative field and those areas necessary for the maintenance of anaesthesia.
- Secure the drapes with towel clips at each corner.



2.3 OPERATING ROOM

Draping

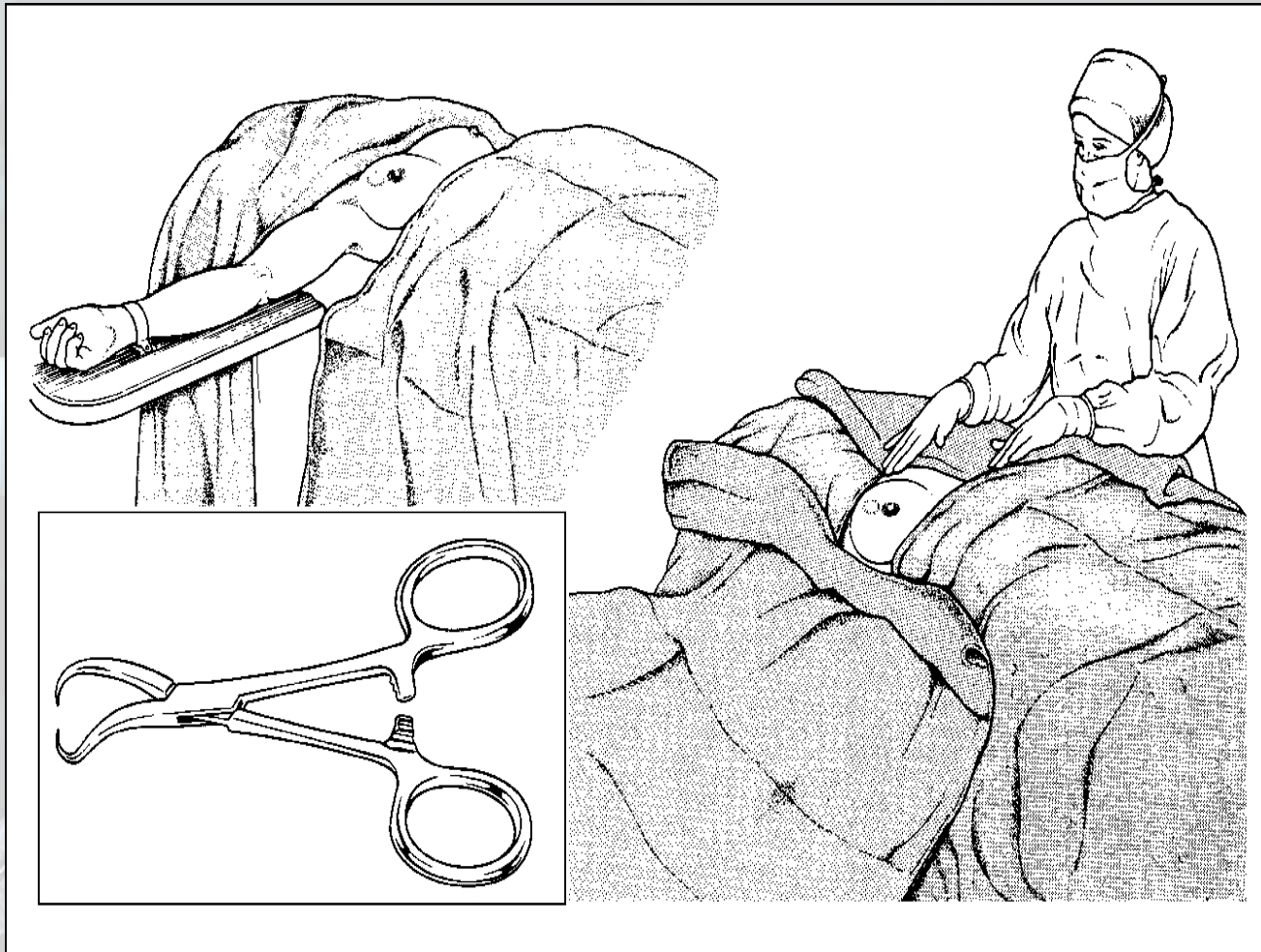


Figure 2.8



2.4 DISINFECTION, CLEANING, AND STERILIZATION

- Disinfection decreases the viral and bacterial burden of an instrument, but does not clean debris or confer sterility.
- Cleaning removes debris.
- Sterilization kills microbes.



DISINFECTION, CLEANING AND STERILIZATION

- It is important to use all disinfectant solutions within their expiry date as some solutions like hypochlorite lose their activity very quickly.
- They must always be available for cleaning working surfaces, equipment that cannot be autoclaved and non disposable items and for dealing with any spillage involving pathological specimens.
- All disinfectants have "Contact Time", which means they must be left in contact with an infectious agent for a certain period of time.



2.4 DISINFECTION, CLEANING AND STERILIZATION

- After disinfection, clean with normal detergent and water to remove the inactivated material and the used disinfectant.
- Before sterilization all equipment must be disinfected and then cleaned to remove debris.
- Sterilization is intended to kill living organisms, but is not a method of cleaning



2.4 DISINFECTION, CLEANING AND STERILIZATION

- The methods of sterilization in common use are:
 - Autoclaving or steam sterilization
 - Exposure to dry heat
 - Treatment with chemical antiseptics
- Autoclaving should be the main form of sterilization at the district hospital.



2.4 DISINFECTION, CLEANING AND STERILIZATION

Autoclaving

- All viruses including HIV, are inactivated by autoclaving for 20 minutes at 121-131 C for 30 minutes if the instruments are in wrapped packs.
- It is often more practical to use a small autoclave several times a day than to use a large machine once.
- At the end of the procedure, the outside of the packs of instruments should not have wet spots, which may indicate that sterilization has not occurred.



2.4

DISINFECTION, CLEANING AND STERILIZATION

Dry Heat

- It is suitable only for metal instruments and a few natural suture material.
- They can be sterilized by dry heat for 1-2 hours at 170 C.
- Boiling instruments is now regarded as an unreliable means of sterilization and is not recommended as a routine in hospital practice.



DISINFECTION, CLEANING AND STERILIZATION

Antiseptics

- Instruments are no longer stored in liquid antiseptic.
- Sharp instruments, other delicate equipment and certain catheters and tubes can be sterilised by exposure to formaldehyde, glutaral, or chlorohexidine.



2.4 DISINFECTION, CLEANING AND STERILIZATION

Antiseptics contd.

- When using formaldehyde, carefully clean the equipment and then expose it to vapour from paraformaldehyde tablets in a closed container for 48 hours.
- Glutaral is extremely effective against bacteria, fungi and a wide range of viruses.



2.4 DISINFECTION, CLEANING AND STERILIZATION

Failure of normal methods of sterilization

- Failure of an autoclave or power supply may suddenly interrupt normal sterilization procedures.
- If an extra set of sterile equipment and drapes are not available, the "antiseptic technique" will allow some surgery to continue.



2.4 DISINFECTION, CLEANING AND STERILIZATION

Antiseptic technique

1. Immerse towels and drapes for 1 hour in a reliable antiseptic such as aqueous chlorhexidine, wring them out and lay them moist on the skin of the patient.
2. Treat gauze packs and swabs similarly but rinse in diluted (1:1000) chlorhexidine for using them in wounds.
3. Immerse instruments, needles and natural suture materials in strong antiseptic for 1 hour and rinse them in weak antiseptic just before use.



2.5 WASTE DISPOSAL

- **Separate non contaminated material such as waste paper, packaging and non sterile but not biologically contaminated materials.**
- **Make separate disposal containers available where waste is created. so that staff can sort the waste as it is being discarded.**
- **All infected waste should be disposed of by incineration.**
- **Do not mix waste chemicals unless you are certain that a chemical reaction will not take place.**



2.5 WASTE DISPOSAL

- Burying waste is the only option in some areas.
- Small amounts of infected waste should be soaked in a hypochlorite solution for at least 12 hours, put into a pit and then covered.
- Large quantities should be put into a pit with a final concentration of 10% sodium hypochlorite solution, before covering immediately.



2.5 WASTE DISPOSAL

- **A container for the safe disposal of sharp objects should be:**
 - Well labelled, puncture proof, watertight and break resistant
 - Opening large enough to pass needles and scalpel blades, but never large enough for someone to reach into.
 - Secured to a surface such as wall or counter to ensure stability during use.
 - Removable for disposal.

