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General Surgery - Topic 14 - Basic Surgical Skills

Asepsis, Sterilisation and Disinfection

Definitions and Required Processing Level

- Asepsis means preventing contamination of a clean or sterile site.
- Antisepsis reduces microorganisms on living tissue, while disinfection is used on objects and surfaces.
- Sterilization destroys viable microorganisms, including bacterial spores, when the validated process is completed correctly.
- Cleaning removes organic material and must come before effective disinfection or sterilization of reusable instruments.

Choosing the Required Level

Item category	Minimum processing principle
Critical items enter sterile tissue or the vascular system.	They require sterilization or an appropriate sterile single-use device.
Semicritical items contact mucosa or non-intact skin.	They require at least high-level disinfection; compatible reusable items may be sterilized.
Noncritical items contact intact skin.	They require appropriate cleaning and low-level disinfection.

Instrument Reprocessing Sequence



Sterilization Methods

1. **Steam Sterilisation**

   - Steam sterilization is preferred for suitable instruments that tolerate heat and moisture.

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- The correct cycle depends on the sterilizer, packaging, load and manufacturer's instructions.
- For wrapped instruments, representative minimum exposure periods are 30 minutes at 121°C in a gravity-displacement steriliser or four minutes at 132°C in a pre-vacuum steriliser.
- These are exposure periods, not the total cycle length; air removal, heating and drying also take time, and the validated equipment instructions remain essential.
- A temperature alone does not prove sterility because exposure time, steam contact and air removal also matter.

2. Low-Temperature Sterilisation

- Heat-sensitive equipment may require a validated low-temperature method such as hydrogen peroxide or ethylene oxide processing.
- Ethylene oxide requires appropriate aeration because residual gas is toxic.

3. Dry-Heat Sterilisation

- Dry heat is suitable for selected heat-resistant materials that moist heat cannot process appropriately, such as certain oils and powders.
- The device instructions and a validated cycle determine suitability; dry heat is not a substitute for steam processing of every surgical instrument.

Disinfection and Reprocessing Limits

Limits of Boiling

- Boiling is not a reliable substitute for sterilization of surgical instruments.

Chemical Disinfection and Device Reprocessing

- Chemical disinfectants must be used at the prescribed concentration and contact time, with safe handling and appropriate rinsing.
- Glutaraldehyde and ortho-phthalaldehyde are examples of high-level disinfectants for compatible heat-sensitive semicritical equipment.
- Appropriate alcohol or chlorine-based preparations can disinfect selected surfaces, while chlorhexidine and povidone-iodine are commonly used for skin antisepsis.
- The product and its intended use determine the required concentration and contact time; a skin antiseptic must not be assumed to sterilise an instrument.
- A reusable endoscope needs careful channel cleaning and the required validated reprocessing after every patient.

Quality Assurance and Storage

- Check physical cycle records, chemical indicators and the required biological monitoring programme.

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- A changed external indicator shows exposure to a process and does not, by itself, prove that every item is sterile.
- Wet, torn or opened packaging compromises the sterile barrier and requires reprocessing according to policy.
- Store sterile packs in a clean, dry area and check integrity before use.
- Instrument tracking should allow a defective sterilization load to be identified and recalled.

Maintaining a Sterile Field

Preparing the Team and Patient

Verification and Surgical Hand Preparation

- Confirm the procedure, consent, patient identity, side and allergies before starting.
- Remove hand jewellery and perform the approved surgical hand preparation.
- Clean visibly dirty hands before applying an alcohol-based surgical hand preparation where that method is used.
- Allow hands to dry, then put on the sterile gown and gloves without touching their sterile outer surfaces.
- Gloves supplement hand hygiene and do not replace it.

Patient Skin Preparation

- Prepare the skin using an appropriate antiseptic while protecting the eyes, ears, mucosa and other vulnerable structures.
- Alcohol-containing solutions must dry fully and must not pool beneath the patient before electrosurgery is used.
- If hair removal is necessary, use clipping rather than routine razor shaving.

Protecting Key Parts

- Keep sterile instrument tips, needles, wound-contact surfaces and other key parts from touching non-sterile objects.
- Place drapes to expose the operative site while maintaining an adequate sterile field.
- Keep hands and instruments within the visible field and avoid unnecessary movement over it.
- If contamination is suspected, state it immediately and replace the affected glove, instrument or drape as appropriate.
- Do not conceal a break in asepsis to avoid interrupting the procedure.

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Surgical Approaches and Incisions

Planning an Incision

- An incision must give adequate access to the target organ and allow safe extension if needed.
- Consider skin lines, previous scars, blood supply, nerves, muscle function and the risk of wound failure.
- A small incision is not beneficial if it causes excessive traction or prevents safe exposure.
- Mark the intended site before preparation when appropriate and confirm the plan with the supervising surgeon.

Common Abdominal Approaches

Approach	Typical use or consideration
Midline laparotomy	It gives rapid, extensible abdominal access through the linea alba.
Subcostal incision	It can expose upper abdominal structures, including the biliary region on the right.
Gridiron or Lanz incision	It can provide localized access for selected open appendicectomy.
Pfannenstiel incision	It gives a low transverse approach for selected pelvic operations.
Groin incision	It provides access for selected inguinal hernia operations.
Laparoscopic ports	Their positions depend on target anatomy, working angles and safe access.

- The chosen incision depends on the operation and the patient's anatomy rather than the name of the disease alone.
- Scar tissue and previous surgery can alter normal tissue planes and increase the risk of visceral injury.

Safe Tissue Handling

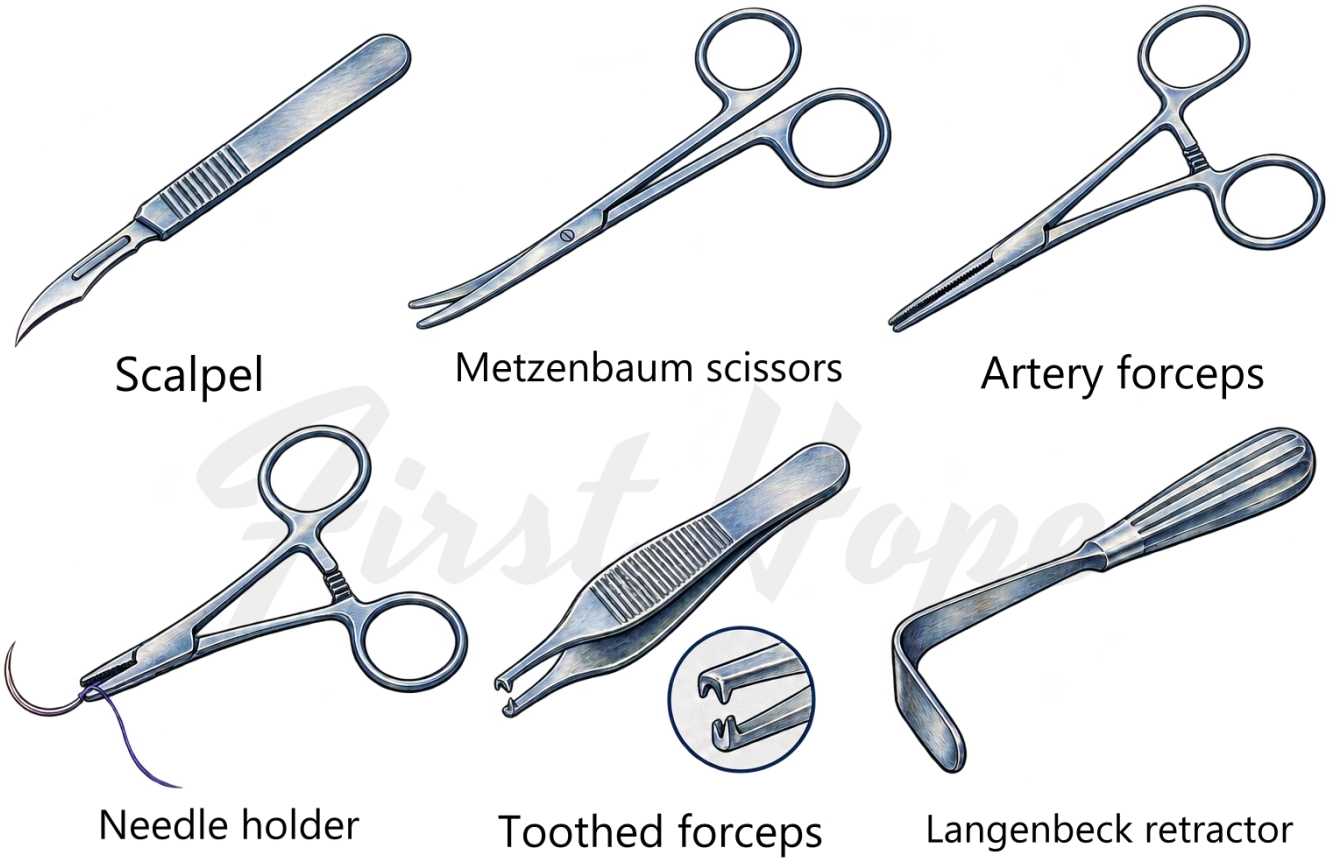
- Handle tissue gently, maintain its blood supply and use sharp dissection when it offers better control.
- Apply traction and countertraction to expose a plane without tearing structures.
- Secure haemostasis and keep the field visible before proceeding into a deeper layer.

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- Use a retractor to improve exposure without excessive pressure on nerves or vulnerable organs.
- Electrosurgery can produce thermal injury beyond the visible contact point and needs appropriate settings and precautions.
- A surgical count and a deliberate check of the field reduce the risk of retained items.

Common Instruments

Identification and Safe Handling



Common surgical instruments have different tip designs for cutting, holding, clamping and retracting tissue

Instrument	Usual purpose
Scalpel	It makes a controlled incision.
Metzenbaum scissors	They cut and dissect relatively delicate soft tissue.
Artery forceps	They temporarily clamp suitable bleeding vessels or tissue.
Needle holder	It controls a curved needle during suturing.
Toothed forceps	They hold suitable firm tissue such as skin with controlled pressure.

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