

MODULE 2

Basic surgical skills



OBJECTIVES OF MODULE 2

To learn basic surgical techniques

- Surgical scrubbing
- Gowning and gloving for surgery
- Basic suturing techniques
- Treatment of various wounds
- Appropriate antibiotic use
- Treatment of burns

ROUTES OF HIV TRANSMISSION

- Injury with **needles** or sharp instruments **contaminated** with blood, body fluids
- Contact between **open wounds**, broken skin (for example, dermatitis), mucous membranes, and contaminated blood, body fluids
- **Transfusion of infected blood or blood products**

PREVENTING TRANSMISSION OF INFECTION

Take care of your patients, your co-workers and yourself:

- Do not recap needles
- Set up sharps containers where sharps are used
- Do not use same injection set on more than one patient
- Dispose of your own sharps
- Pass needles, scalpels, scissors with care and consideration

Every hospital should have clear guidelines for management of injury or exposure to infectious materials

INFECTION PREVENTION AND UNIVERSAL PRECAUTIONS

- Protect areas of broken skin, open wounds with watertight dressings
- Treat all body substances of all people as potentially infectious
- Clean blood spills immediately and safely
- Asepsis depends on standard procedures, staff training, personal discipline, attention to detail
- Trauma situations are chaotic, defenses are down, injuries happen quickly. Precautions are often missed, forgotten, ignored

INFECTION PREVENTION AND UNIVERSAL PRECAUTIONS

- Wear gloves during exposure to blood or body fluids, wash hands afterwards
- Wash immediately with soap and water in case of skin exposure, whether from a splash, glove puncture or non-gloved contact
- Wear protective glasses where blood splashes may occur; wash out eyes with water as soon as possible if splashed
- Wear protective gown or apron if splash potential exists

INFECTION PREVENTION AND UNIVERSAL PRECAUTIONS

- **Infection** is the most important and preventable cause of impaired wound healing
- **Microorganisms** can reach tissues during surgery or manipulation of surgical wound carried and transmitted by:
 - People, including patients
 - Inanimate objects, including instruments, sutures, linen, swabs, solutions, mattresses, blankets
 - Air around wounds, which can be contaminated by dust and droplets of moisture from anyone assisting at surgery or caring for wound
- **Aseptic treatment of a wound:** an attempt to **prevent bacterial contamination** from these sources, during surgery, initial phase of healing

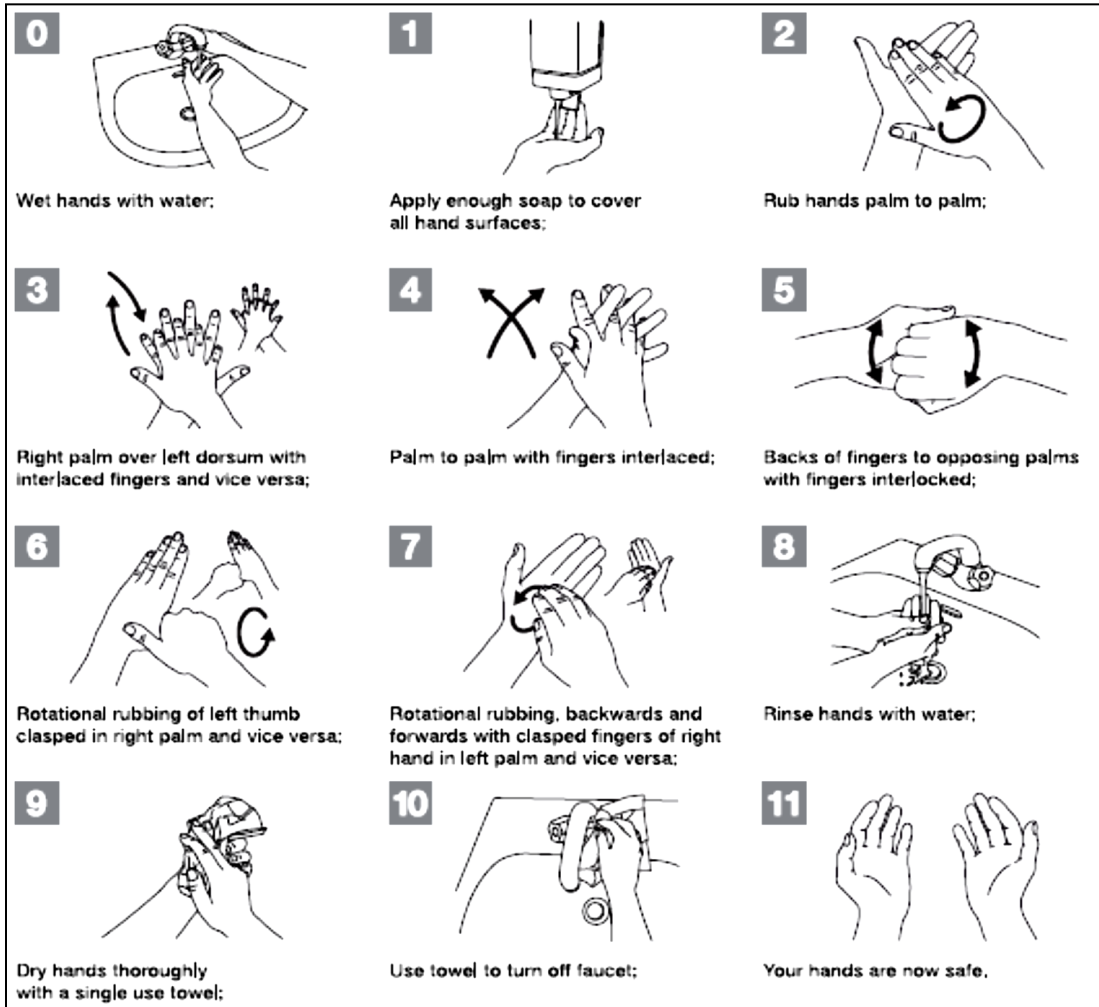
OPERATING THEATRE

- Keep all doors to operating theatre closed except as needed for passage of equipment, personnel, patients
- Store some sutures, extra instruments
- Minimize number of people allowed to enter
- Keep room uncluttered, easy to clean
- Between cases, clean and disinfect table, instruments, surfaces

HAND WASHING

- Hand washing: the single most important measure for prevention of infection
- Plain soap and water is effective for removal of visible contaminants
- Wash with vigorous mechanical action on all hand surfaces for at least 40 seconds; washing above wrists, removing jewellery
- Nails are areas of greatest contamination
- Rinse under poured or running water

HOW TO HAND WASH



To effectively reduce the growth of germs on hands, **hand washing must last 40–60 s** and should be performed by following all of the illustrated steps.

For further reference on clean care <http://www.who.int/gpsc/en/>

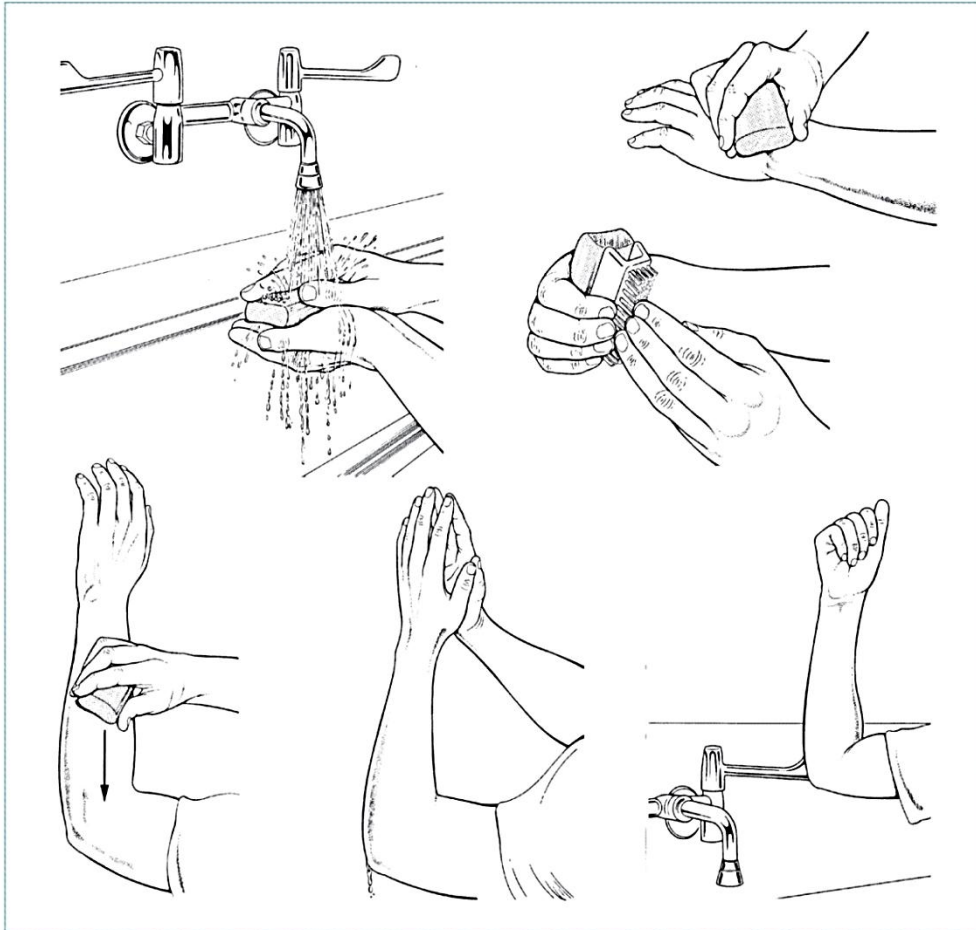
HOW TO HAND RUB



To effectively reduce the growth of germs on hands, **hand rubbing** must be performed by following all of the illustrated steps. **This takes only 20–30 seconds!**

For further reference on clean care
<http://www.who.int/gpsc/en/>

SCRUBBING



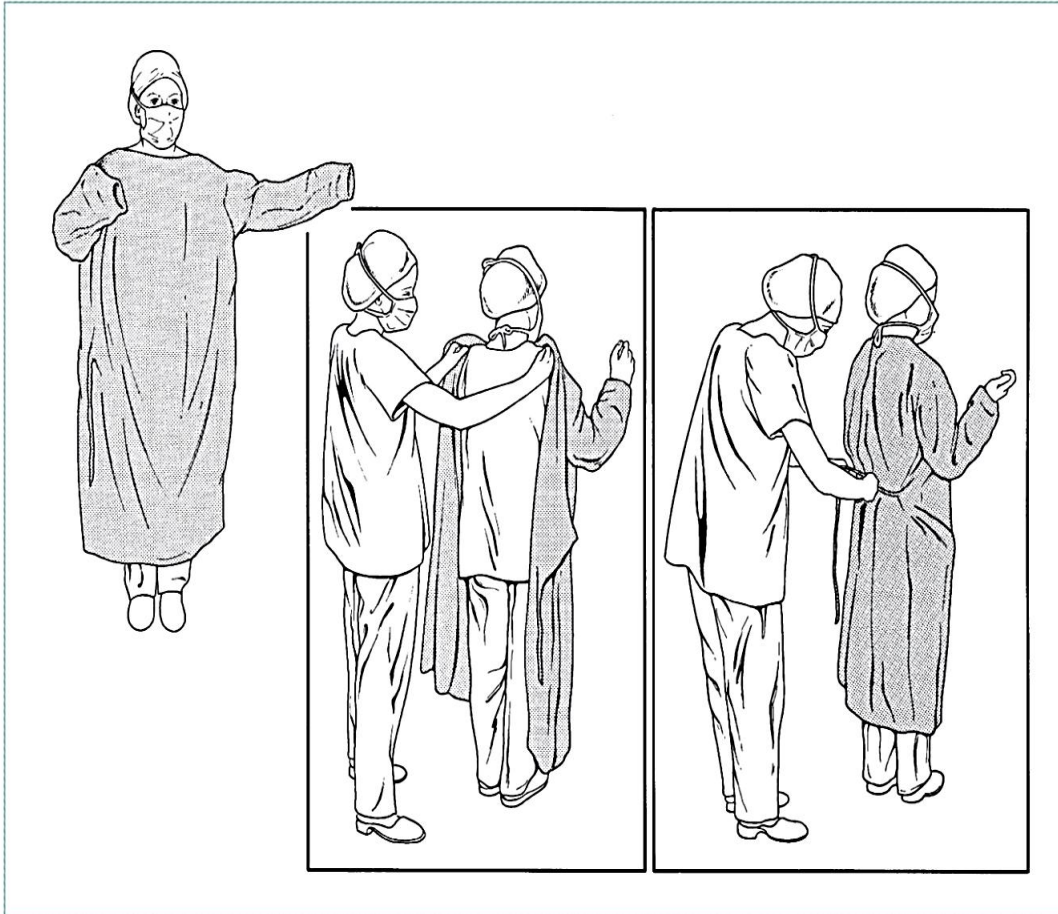
- Remove jewellery
- Use soap, brush, running water to clean thoroughly around nails
- Scrub hands, arms up to elbows
- After scrubbing, hold up arms to allow water to drip off elbows
- Turn off tap with elbow

SCRUBBING

After scrubbing hands:

- Dry with sterile towel, make sure towel does not become contaminated
- Hold hands, forearms away from body and higher than elbows until putting on sterile gown and gloves

GOWNING

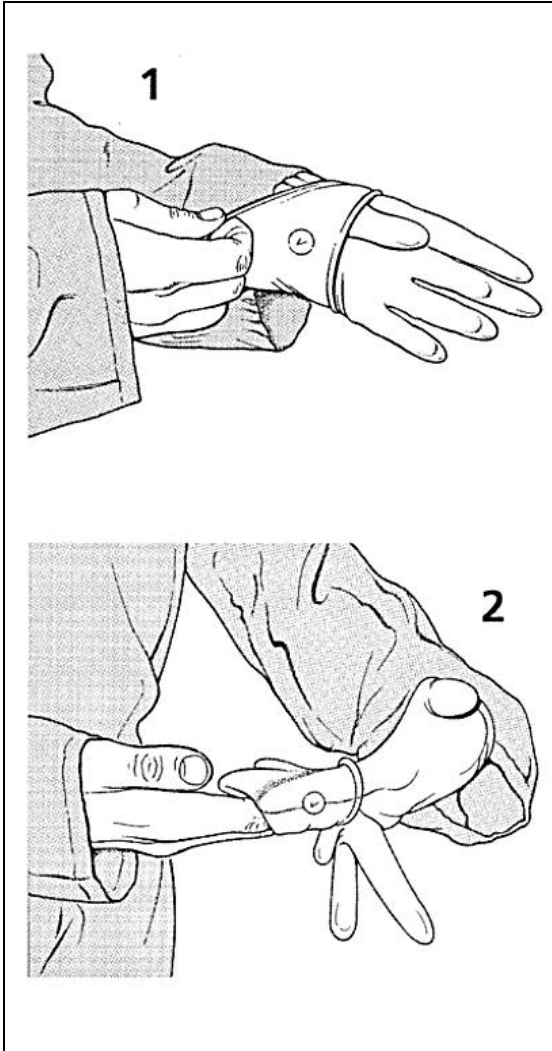


- Place arms through sleeves
- Have a non-scrubbed assistant pull gown over shoulders so hands go through sleeves
- Assistant will tie back of gown

GLOVING

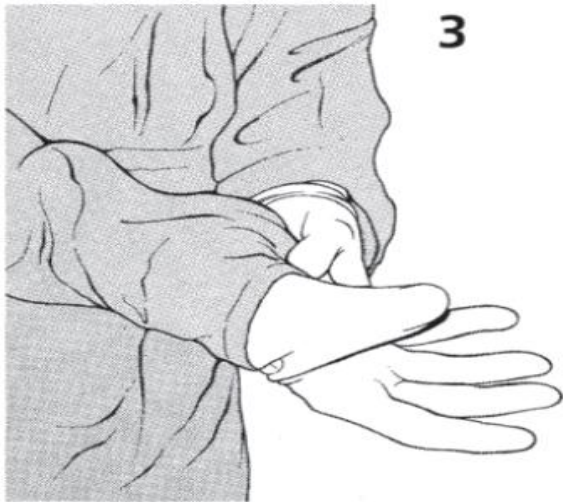
- Surgical gloves prevent transmission of HIV and other infections through contact with blood, other body fluids
- Easiest to have someone who is already gowned and gloved to assist
- Promptly change a glove punctured during surgery, rinse hand with antiseptic or rescrub

GLOVING without assistance

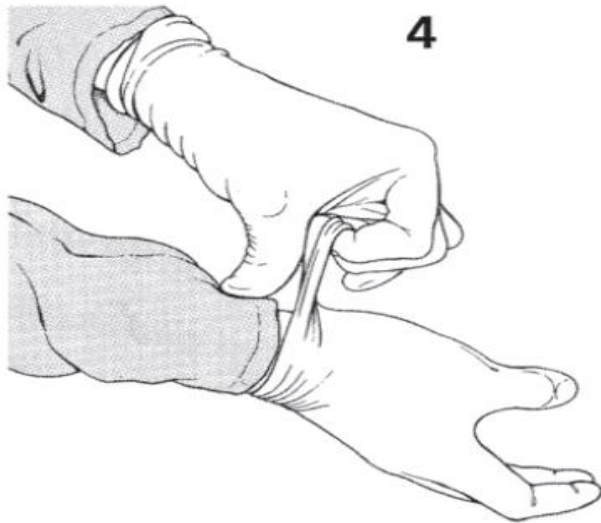


- Open sealed package of sterile gloves before scrubbing, gowning; place inner package on sterile surface
- Once gowned, take cuff of left glove with right hand (1); make sure thumb in correct position
- Slide glove onto left hand, wriggle fingers slightly to help
- Only touch inside of glove, cuff with bare hands
- Slide fingers of gloved left hand into cuff of right glove (2)

GLOVING



- Pull glove onto right hand in similar fashion to placing left glove (3)



- Ensure that cuffs cover ends of both gown sleeves (4)

INSTRUMENTS

Many types of instruments

- Forceps, instruments for holding tissue
- Needle holders
- Scissors
- Retractors

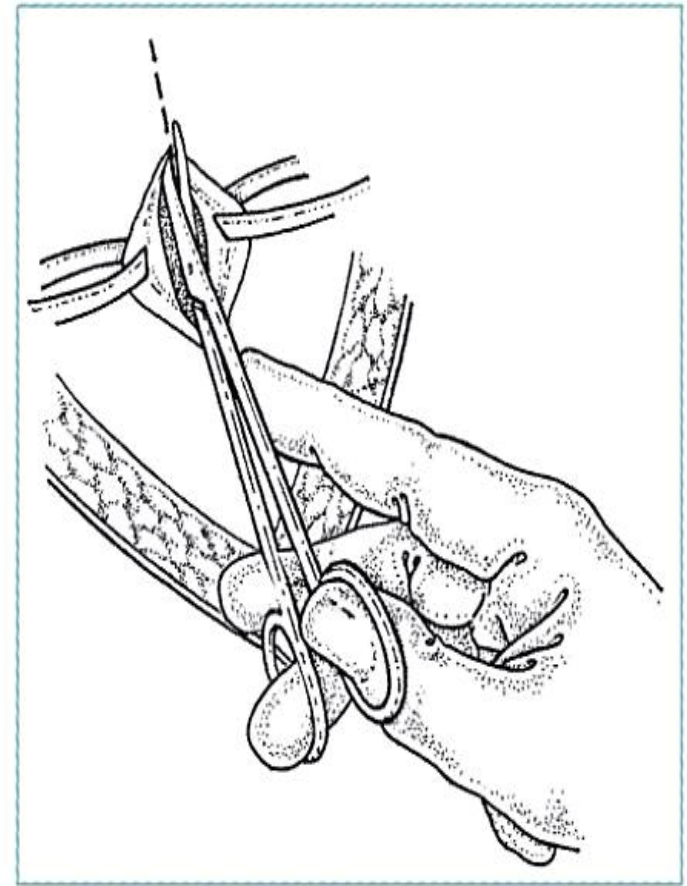
Which instrument to use?

- Choose shortest instrument that will comfortably reach operative site
- If cutting suture or non-tissue material, avoid using fine scissors
- If possible, choose instruments in good repair

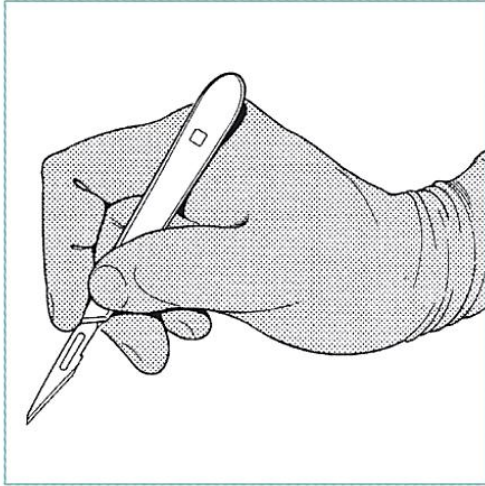
INSTRUMENTS

When holding instruments:

- Use three point control: have 3 points of contact between hand, instrument to increase precision
- Extend index finger along instrument to provide extra control, stability
- Place only fingertips through handle loops,
 - rotation comes from wrist
 - greater control
 - quicker to pick up, put down

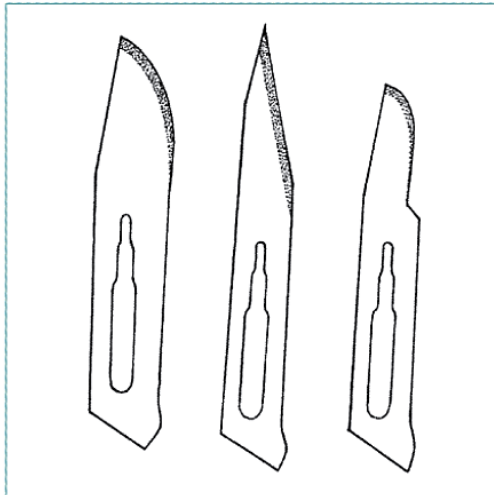


INSTRUMENTS



When using scalpel for dissection,

- use smaller knife
- hold instrument like a pen: thumb and third finger holding knife, with index finger controlling dissection



#10 #11 #15

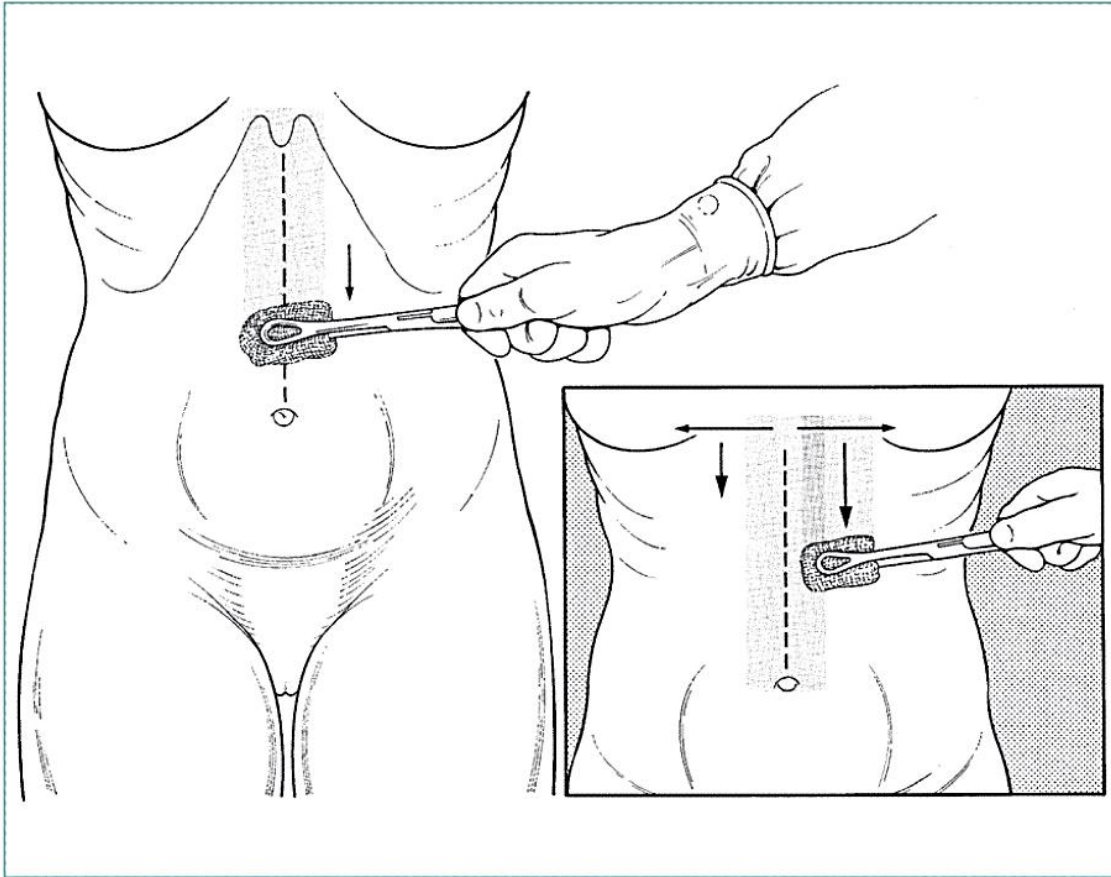
Most procedures are performed with a #3 handle and

- #10 blade for large incisions
- #11 for stab incision
- #15 for fine precision work

SKIN PREPARATION

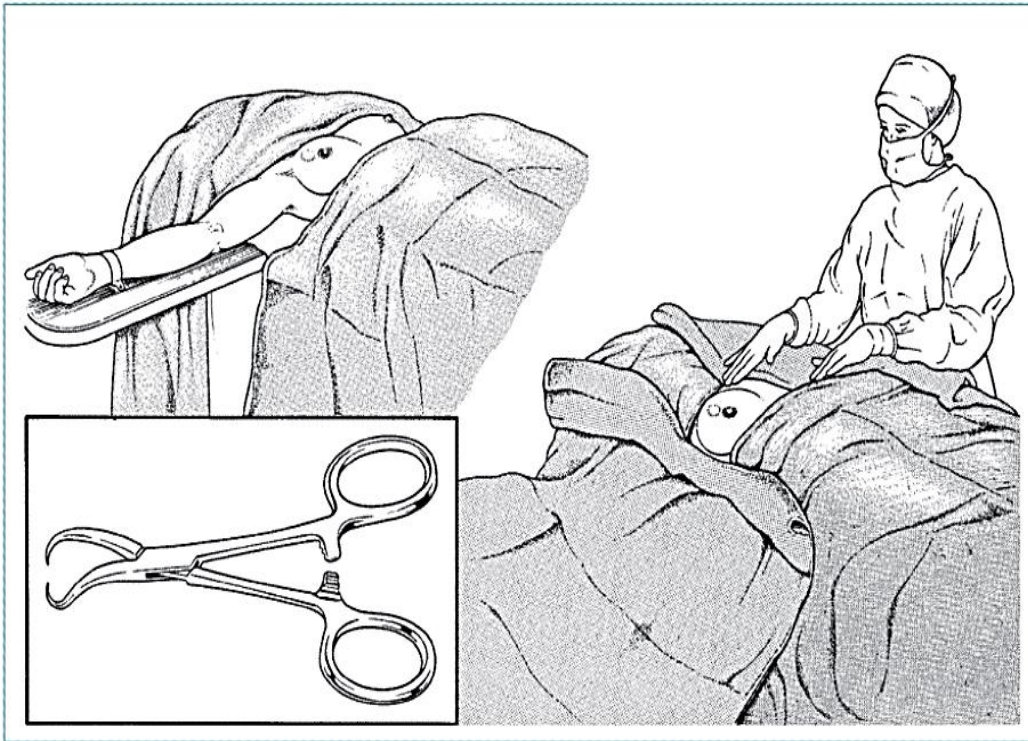
- Before operation, wash surgical site, surrounding area with soap, water; particularly wash debris from injuries
- Prepare skin with antiseptic solution; start in centre, move to periphery
- Chlorhexidine gluconate and iodine preferable to alcohol as less irritating to skin
- Solution should remain wet on skin for at least two minutes

SKIN PREPARATION



- Prepare skin with antiseptic solution, start in center, move to periphery
- This area should be large enough to include entire incision, adjacent working area

DRAPING



- Do not place drapes on patient until scrubbed, gowned, gloved
- Leave uncovered only operative field (areas that have been prepped) and areas necessary for anaesthesia
- Secure drapes with towel clips at each corner

WOUND MANAGEMENT

Surgical wound classification:

- Clean
- Clean Contaminated: normal but colonized tissue
- Contaminated: contains foreign or infected material
- Infected: obvious pus present

WOUND MANAGEMENT

- Clean wounds: close immediately to allow healing by primary intention
- Contaminated or infected wounds: never close, leave open to heal by secondary intention
- Clean Contaminated: surgical toilet, leave open, then close 48 hours later - *delayed primary closure*
- Careless closure of a contaminated wound will promote infection and delay healing

WOUND MANAGEMENT

Primary repair:

- Primary closure requires clean tissue to be approximated without tension
- Leave skin sutures in place for an average 7 days; longer if healing expected to be slow due to blood supply of particular location (back or legs) or patient's condition
- Close deep wounds in layers; absorbable sutures for deep layers

WOUND MANAGEMENT

Delayed Primary Closure:

- Irrigate clean contaminated wounds, then pack open with damp saline gauze
- Close wounds with sutures at 2 days

Secondary healing:

- Perform wound toilet, surgical debridement without closure; may need skin graft

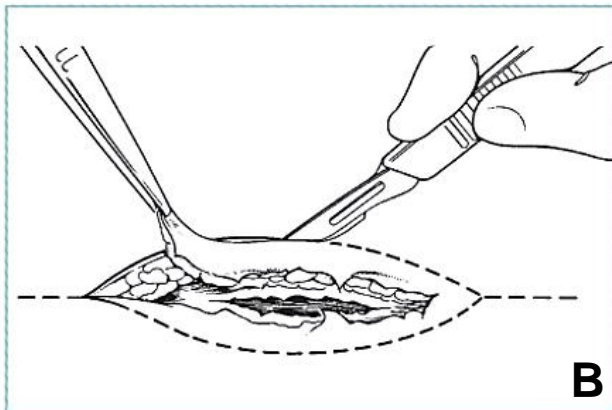
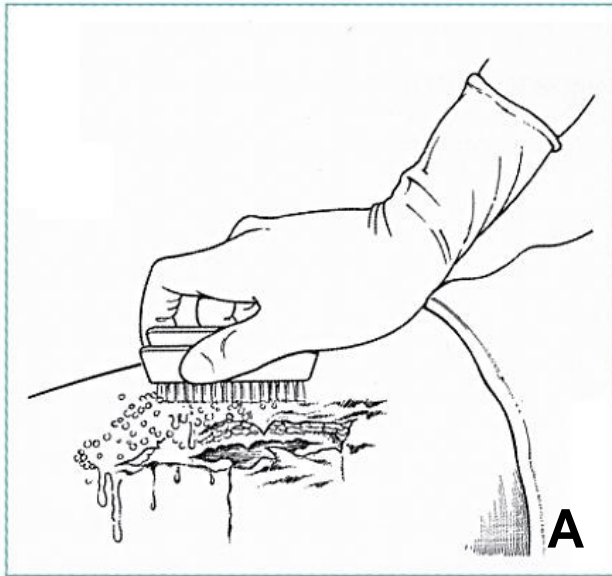
WOUND TOILET AND SURGICAL DEBRIDEMENT

- Thoroughly clean the wound with normal saline or sterile water.
- It is important to use a large volume of fluid and pressure to remove all visible dirt and debris from a wound
- Use a large syringe for irrigation. Attach a 16 or 19 gauge needle or soft IV catheter to generate pressure.

WOUND TOILET AND SURGICAL DEBRIDEMENT

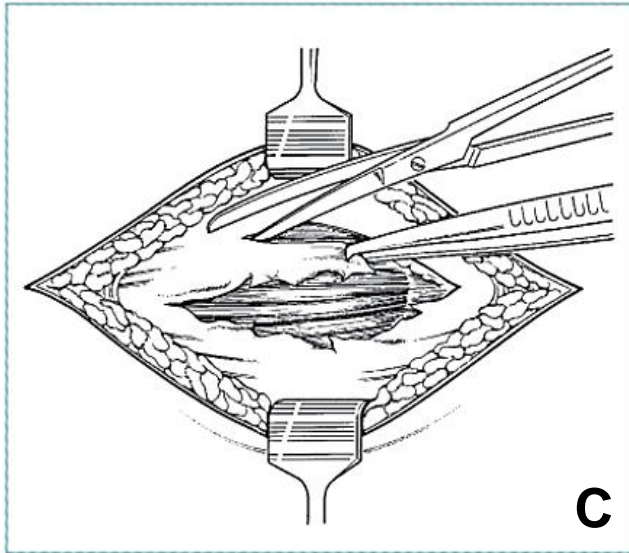
- Gentle handling of tissues to minimize bleeding, additional trauma
- Control residual bleeding with compression, ligation, cautery
- Dead or devitalized muscle is dark in color, soft, easily damaged; does not contract when pinched
- Dead tissue does not bleed when cut

WOUND TOILET AND SURGICAL DEBRIDEMENT

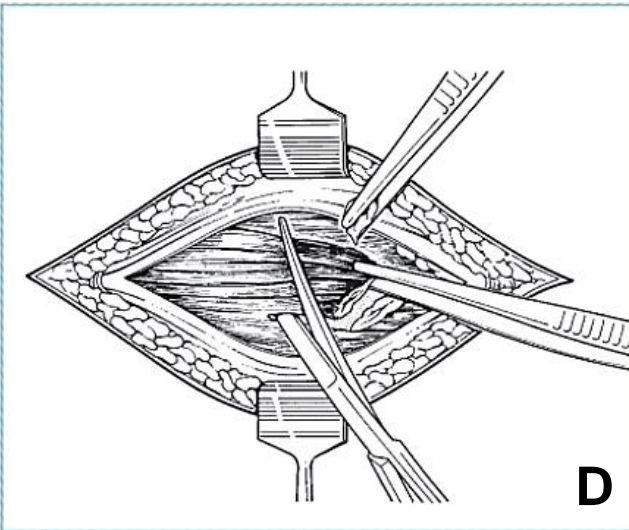


- Wash wound with large quantities of soap and boiled water for 10 minutes, then irrigate with saline; prep skin with antiseptic (A)
- Debride wound meticulously to remove loose foreign material, use surgical techniques to cut away damaged, dead tissue
- Excise only very thin margin of skin from wound edge (B)

DEBRIDEMENT



C



D

- Systematically perform wound toilet, surgical debridement; initially to superficial tissue layers, subsequently deeper layers (C and D)
- With scalpel or dissecting scissors, remove all adherent foreign material along with a thin margin of underlying tissue, irrigate
- Continue cycle of surgical debridement, saline irrigation until wound is completely clean

WOUND TOILET AND SURGICAL DEBRIDEMENT

- Leave wound open after debridement to allow for healing by secondary intention
- Pack lightly with damp saline gauze, cover packed wound with dry dressing
- Change packing, dressing daily - more often if outer dressing becomes damp with blood, other body fluids
- Large defects will require closure with flaps or skin grafts but may be initially be managed with saline packing

PREVENTION OF WOUND INFECTIONS

- Restore breathing, blood circulation as soon as possible after injury
- Warm victim; at earliest opportunity provide high-energy nutrition, pain relief
- Perform wound toilet, debridement as soon as possible (within 8 hours if possible)
- Respect universal precautions
- Antibiotic prophylaxis for deep or penetrating wounds (dirty stick, knife) and wounds older than 12 hours

PREVENTION OF WOUND INFECTIONS

Factors that affect wound healing and infection potential

Patient

- Age
- Underlying illnesses or disease: anemia, diabetes, immune deficient

Wound

- Organ or tissue injured
- Extent of injury
- Nature of injury (laceration less complicated than crush injury)
- Contamination or infection
- Time between injury and treatment (sooner is better)

WOUND INFECTIONS IN CHILDREN

Immuno-suppression from chronic parasitic infections or underlying malnutrition greatly affect wound healing and risk of infection

Preventing infection

- Cleaning wound: most important factor
- Antibiotics usually not necessary unless:
 - Wound older than 12 hours
 - Deep penetrating wounds (dirty stick, knife)

WOUND INFECTIONS IN CHILDREN

Wound closure

- Less than 24 hours from injury, cleaned properly: primary closure
- Greater than 24 hours, contaminated or animal bite: do not close
- Wounds not closed primarily should be packed lightly with damp gauze
- If clean after 48 hours, delayed primary closure
- If wound infected, pack lightly, heal by secondary intention

WOUND INFECTIONS IN CHILDREN

- Clinical signs:
 - Pain, swelling, redness, warmth, pus drainage
- Treatment
 - Open wound if pus present or suspected
 - Clean with disinfectant
 - Pack lightly with damp gauze, change daily
 - Antibiotics until cellulitis resolved
 - Staphylococcus: Cloxacillin (25-50mg/kg po qid)
 - Suspected bowel flora : Ampicillin (25-50mg/kg po qid), Gentamycin (7.5 mg/kg IM or IV once a day) and Metronidazole (7.5 mg/kg tid)

TETANUS PROPHYLAXIS

Patient vaccinated: give booster if needed

Patient not vaccinated: give antitetanus serum and start dose of tetanus toxoid vaccine (separate syringes, separate sites)

Antitetanus serum for adults and children

Tetanus immunoglobulin (human) 250 units IM, increased to 500 units if any of the following conditions apply:

- wound older than 12 hours
- presence or risk of heavy contamination
- patient weight more than 90 kg

TETANUS IMMUNIZATION

ADULTS and CHILDREN over 7 years:

- tetanus toxoid (TT) or tetanus and diphtheria vaccine (Td)

CHILDREN under 7 years:

- *Diphtheria and tetanus vaccine* (DT). Higher diphtheria toxoid content

Dose of TT or Td	When to give	Expected duration of protection
1	As early as possible	None
2	At least 4 weeks after TT 1	1-3 years
3	At least 6 months after TT 2	At least 5 years
4	At least 1 year after TT 3	At least 10 years
5	At least 1 year after TT 4	Booster every 10 years

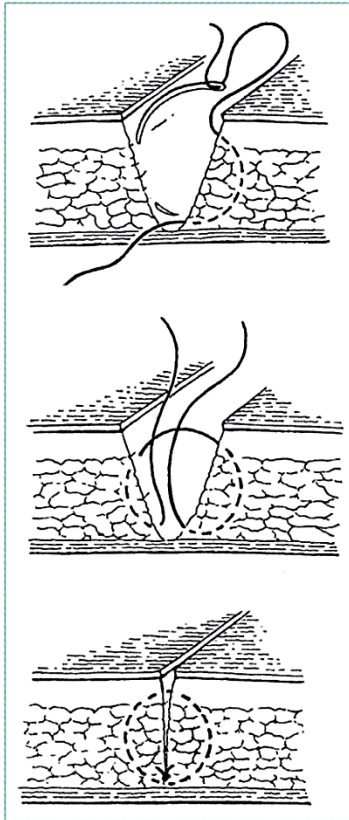
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ANTIBIOTIC PROPHYLAXIS

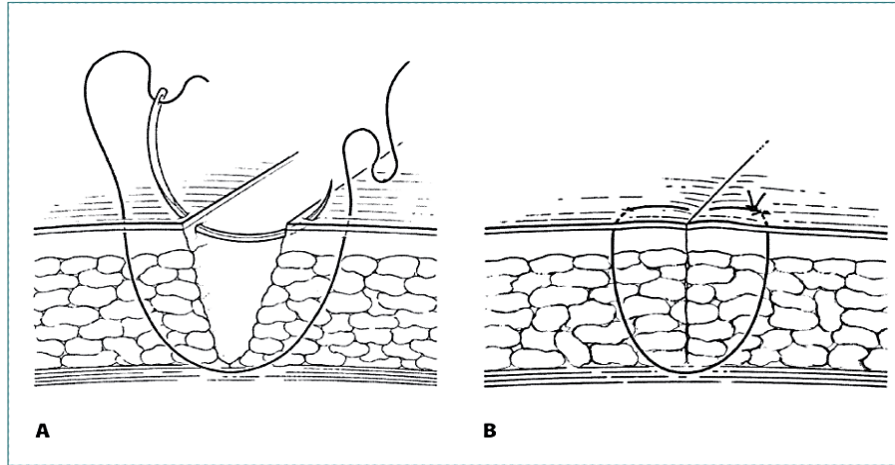
Indicated for wounds at high risk for infection:

- Contaminated wounds
- Penetrating wounds
- Abdominal trauma
- Compound fractures
- Lacerations greater than 5 cm
- Wounds with devitalized tissue
- High risk anatomical sites—hand, foot

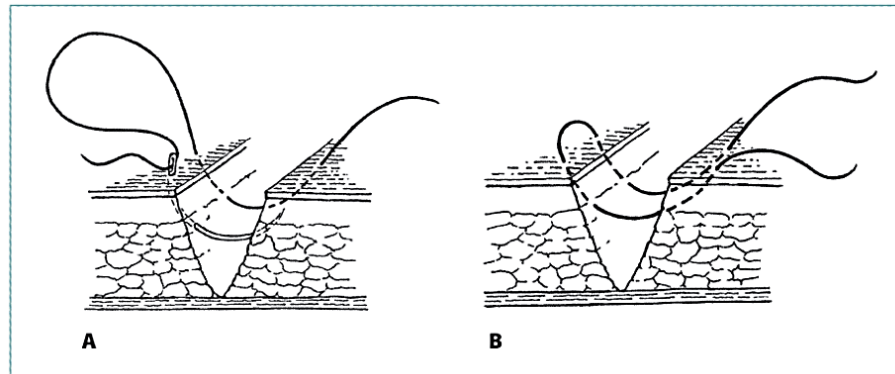
PRACTICAL SUTURE TECHNIQUES



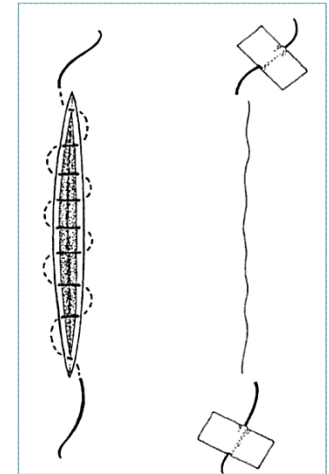
Inverted suture



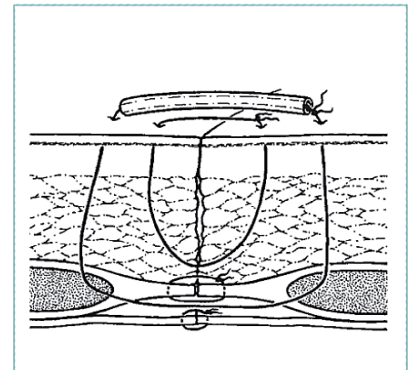
Vertical mattress suture



Horizontal mattress suture



Subcuticular suture



Retention suture

SUTURE TECHNIQUES

- Aim of all suturing techniques: approximate wound edges without gaps or tension
- Size of suture “bite” and interval between bites should be equal in length, proportional to thickness of tissue being approximated
- Suture is foreign body: use minimal size, amount of suture necessary to close wound

SUTURE MATERIALS

Sutures are made of variety of materials with variety of properties

- **Non-absorbable**

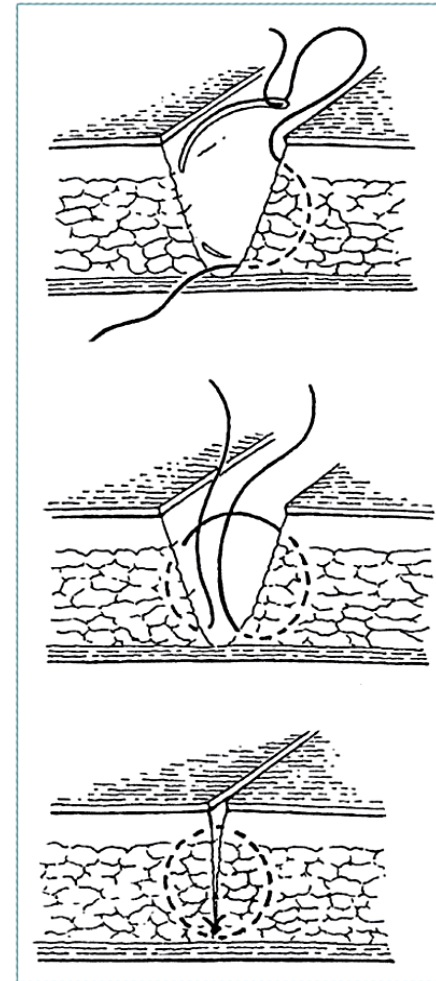
- Use when possible
- Braided suture not ideal for contaminated wounds
- May sterilize polyester thread or nylon line when commercial suture unavailable

- **Absorbable**

- Degrades, loses tensile strength within 60 days
- Option when not possible for patient to return or for children for whom suture removal may be difficult

SUTURE TECHNIQUES

- Use tip of needle driver to hold needle between half - two thirds way along needle
- Hold needle driver so that fingers are just within rings so possible to rotate wrist
- Pass needle tip through skin at 90°
- Use curve of needle by turning needle through tissue
- Close deep wounds in layers with either absorbable or monofilament non-absorbable sutures

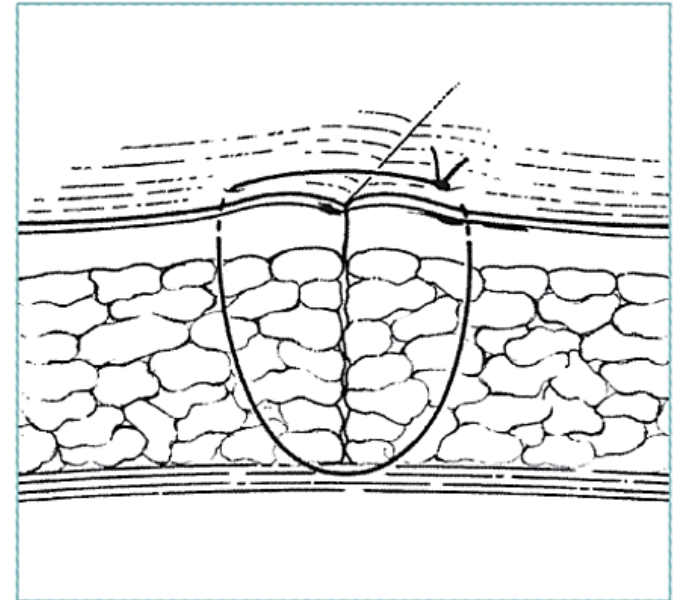


Inverted suture

SUTURE TECHNIQUES

Interrupted sutures

- Most commonly used to repair lacerations
- Permits good eversion of wound edges
- Use only when minimal skin tension
- Ensure bites are equal volume
- If wound edge is unequal, bring thicker side to meet thinner side to avoid putting extra tension on thinner side
- Use non-absorbable suture, if possible



SUTURE TECHNIQUES

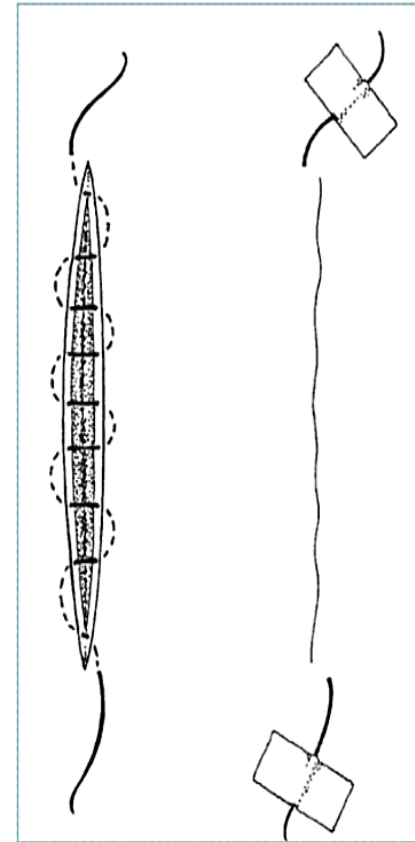
Continuous/running sutures

- Less time-consuming than interrupted sutures;
- Fewer knots tied
- Less suture material used
- Less precise in approximating wound edges
- Poorer cosmetic result than other options
- Epidermal skin cells growing into wound (inclusion cyst) or along suture track are potential complications

SUTURE TECHNIQUES

Continuous subcuticular sutures

- Excellent cosmetic result
- Use fine, absorbable braided or monofilament suture
- Does not require removal if absorbable sutures used
- Useful in wounds with strong skin tension, especially patients prone to keloid formation
- Anchor suture in wound; from apex, take bites below dermal-epidermal border
- Start next stitch directly opposite preceding one

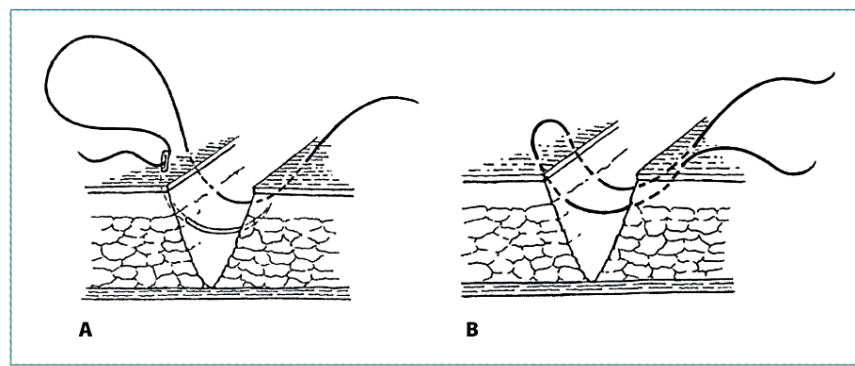


Subcuticular suture

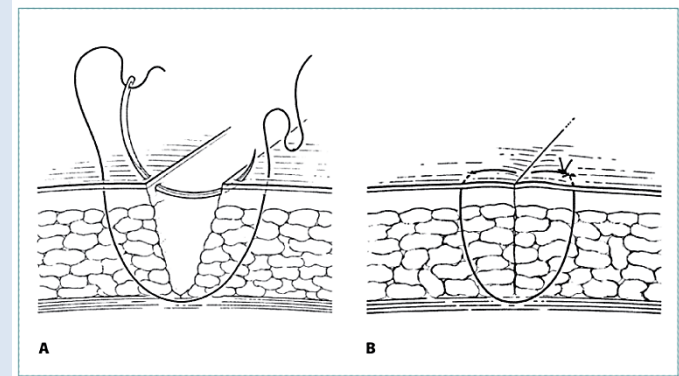
SUTURE TECHNIQUES

Mattress sutures

- Provides relief of wound tension
- Provides precise wound edge apposition
- More complex, therefore more time-consuming
- Vertical and horizontal types



Horizontal mattress suture

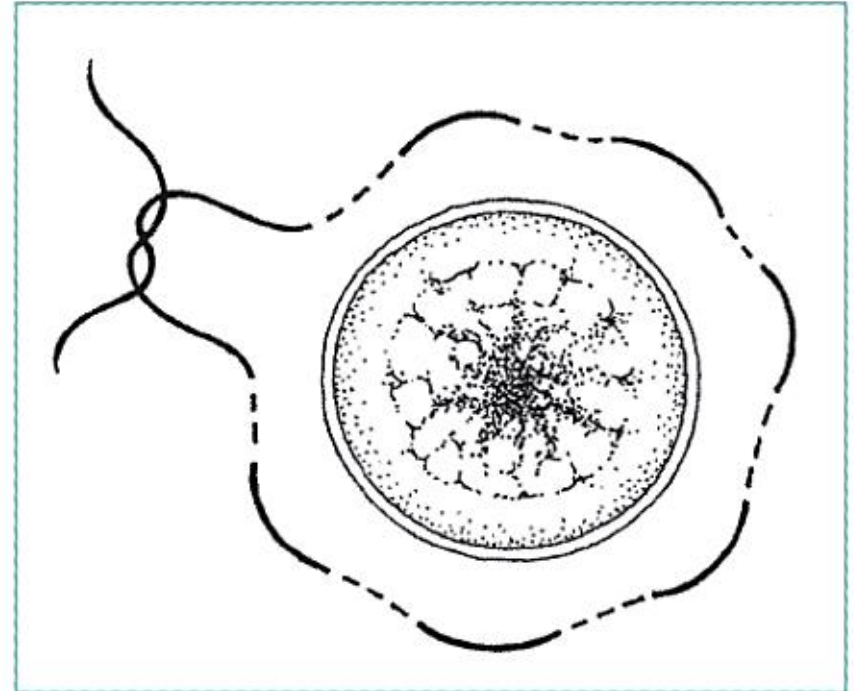


Vertical mattress suture

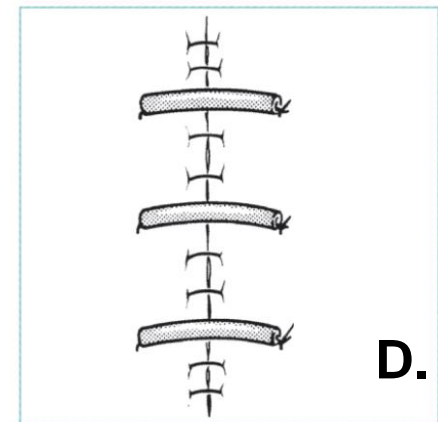
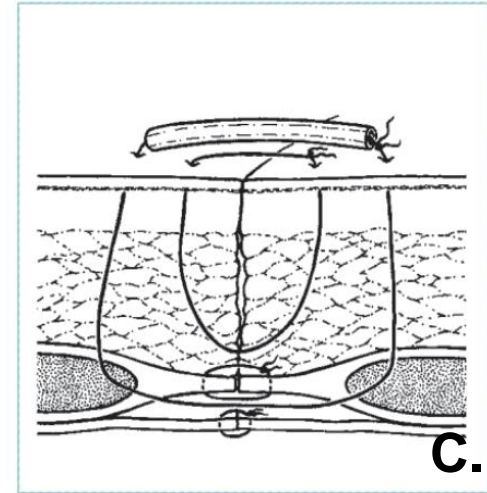
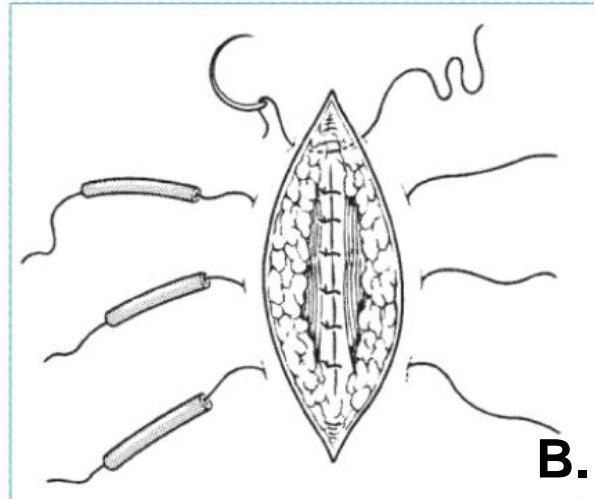
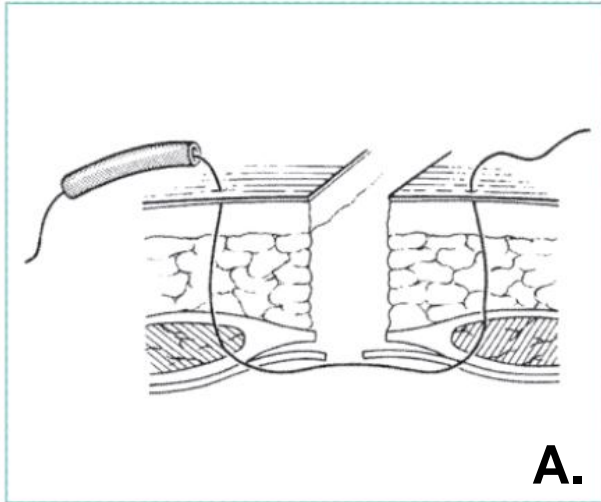
SUTURE TECHNIQUES

Purse string suture

- Circular pattern that draws together tissue in path of suture
- Used particularly around drain sites
- Generally non-absorbable suture



RETENTION SUTURE TECHNIQUES



Insert retention sutures through entire thickness of abdominal wall leaving them untied (A)

Simple or mattress sutures

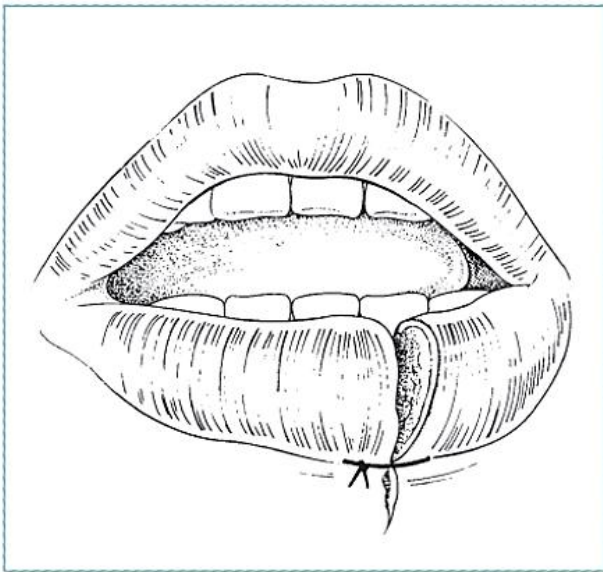
Close wound in layers (B)

When skin closure completed, tie each retention suture after threading through short length plastic or rubber tubing (C, D)

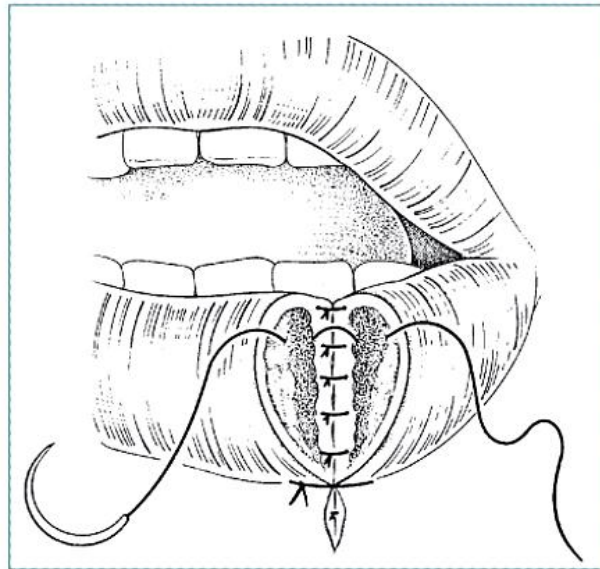
Do not tie retention sutures under tension

Leave sutures in minimum 14 days; may be left for weeks

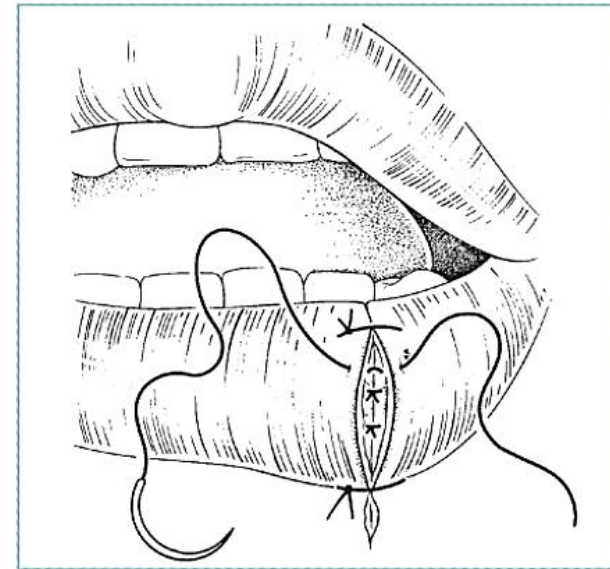
SPECIFIC LACERATIONS: Lip



Initial stitch at border

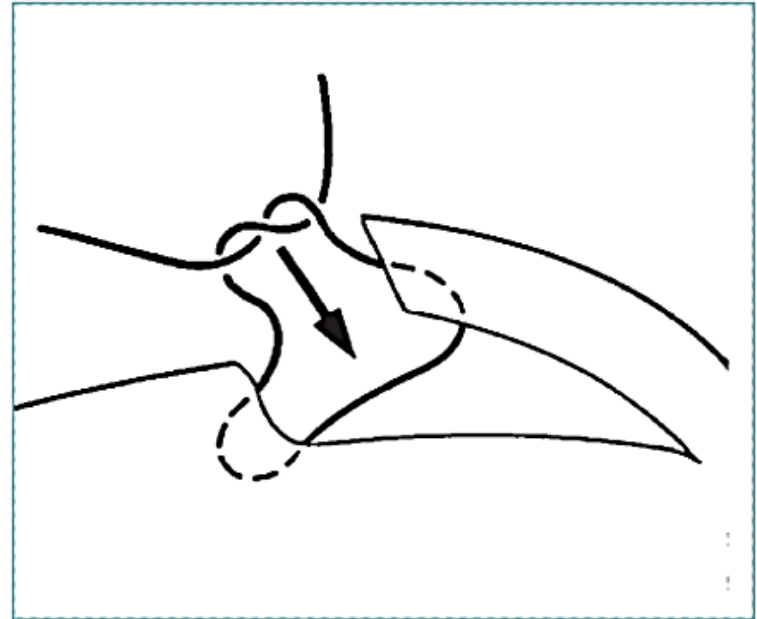
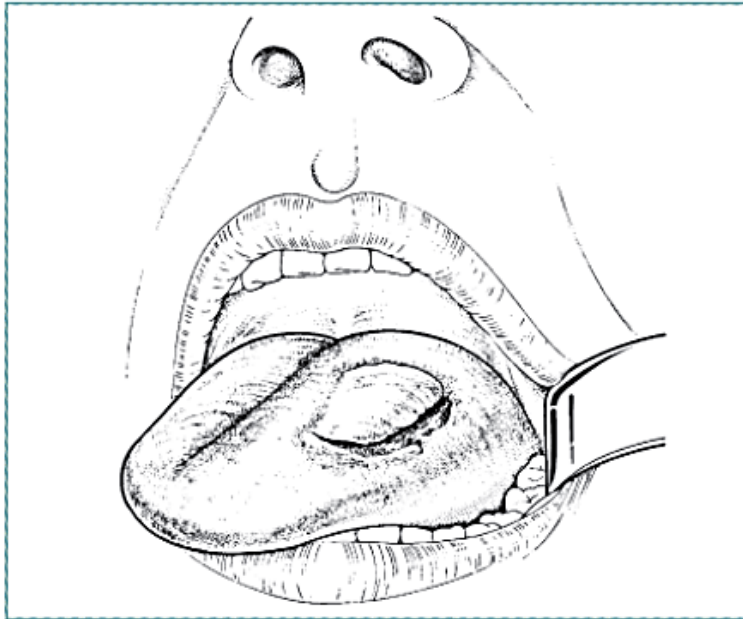


Repair in layers:
mucosa, muscle



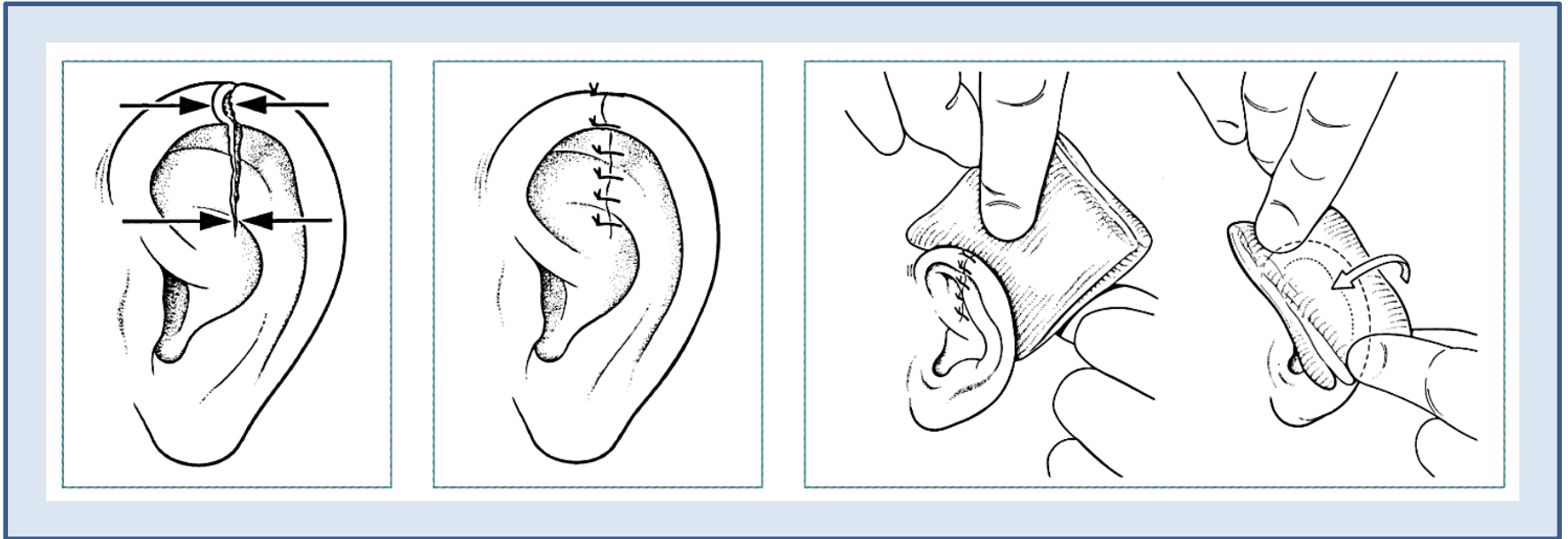
Suture skin last

SPECIFIC LACERATION: Tongue



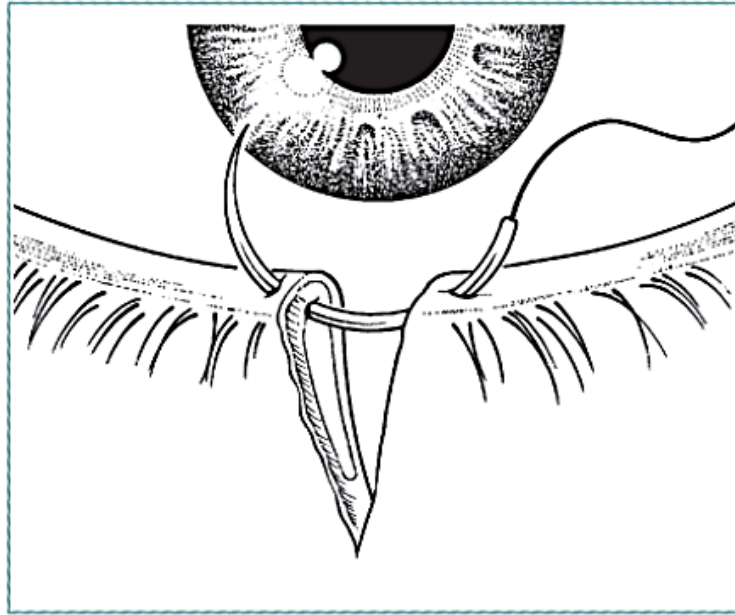
Suture flap-type wounds with absorbable suture

SPECIFIC LACERATIONS: Ear

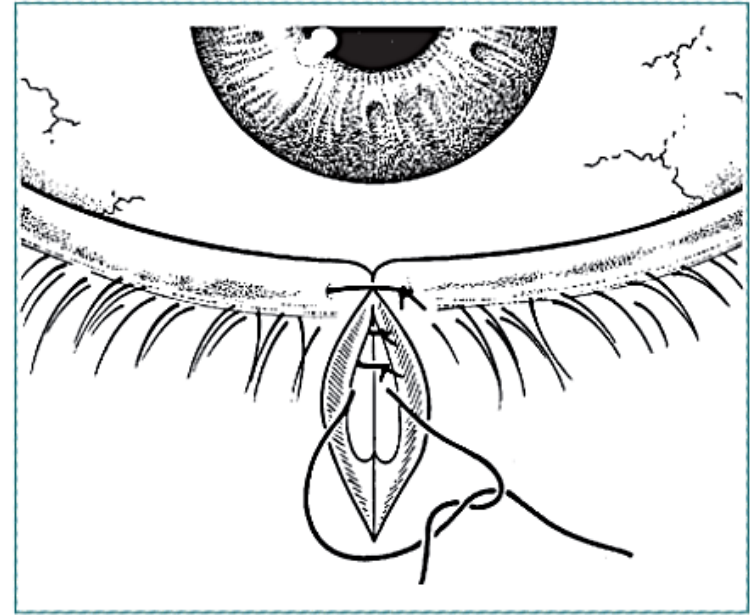


- Use folds of ear as landmarks
- Use absorbable suture for cartilage
- Support pinna on both sides with gauze

SPECIFIC LACERATIONS: Eyelid



Initial suture for precise alignment



Closure in layers: absorbable suture

HAND: Treatment of Lacerations

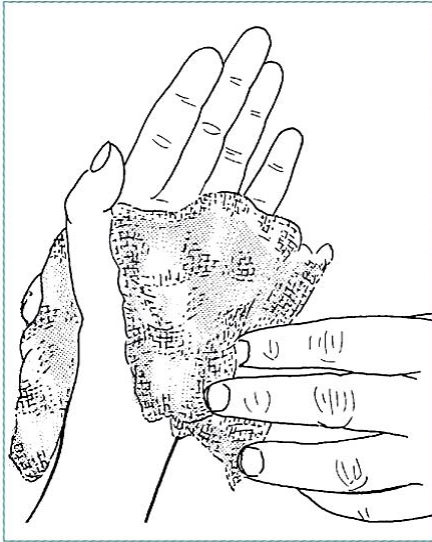
- Check circulation, sensation, motor function
- Gently examine wound using aseptic technique to determine if clean or contaminated: contaminated wound contains foreign material, crushed or dead tissue
- Debride, lavage all wounds in operating theatre or emergency area
- Administer tetanus toxoid, antibiotics if indicated

HAND: Treatment of Lacerations

- Stop bleeding by compression with sterile gauze; if necessary, extend wound, being careful not to cross skin creases in palm, digits
- *Do not excise any skin unless it is dead*
- Close wounds only when clean, using suture, spontaneous healing or skin grafts
- If contaminated, delay closure until after second debridement
- Wounds <1 cm will granulate spontaneously

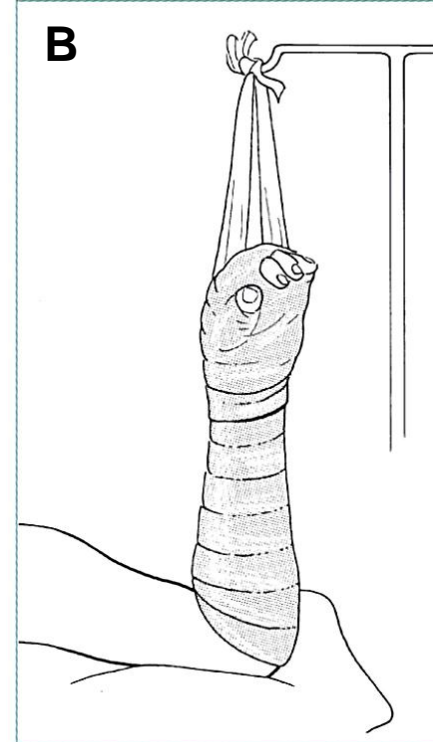
HAND: Lacerations

A

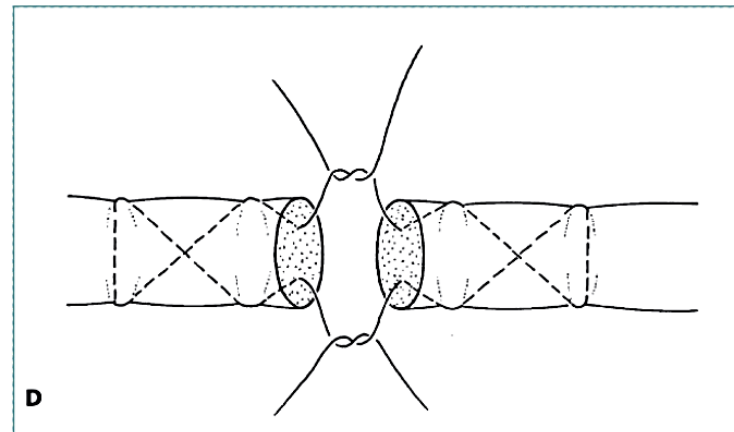
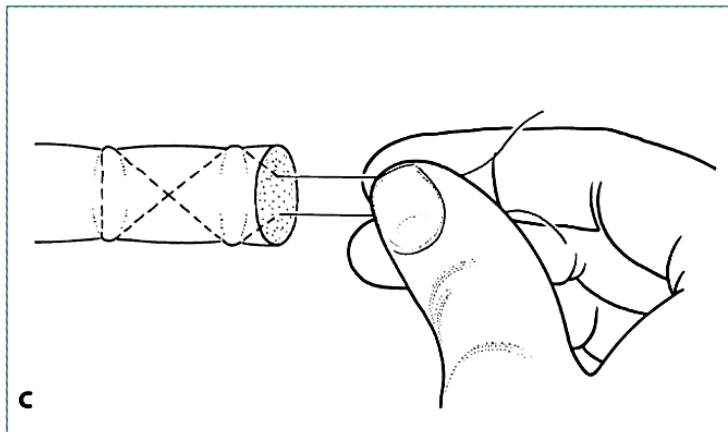
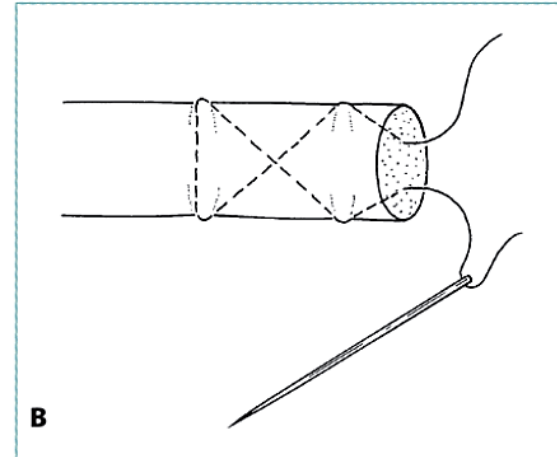
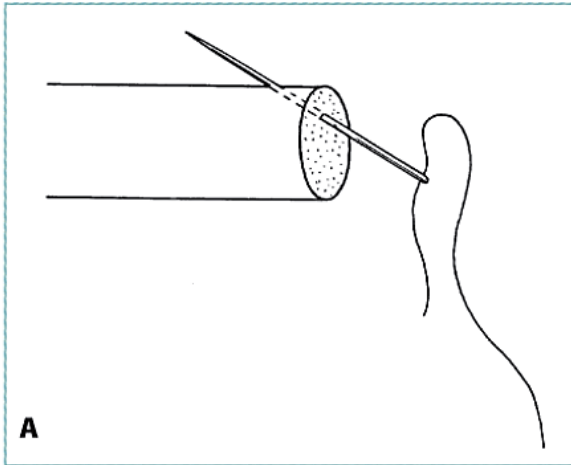


- Cover with sterile gauze (A)
- Apply plaster splint to hold wrist in 20° extension, fingertips exposed
- Elevate limb for first week to reduce oedema (B)
- Begin active exercises as soon as possible
- Inspect wound in 2-3 days to remove drains

B



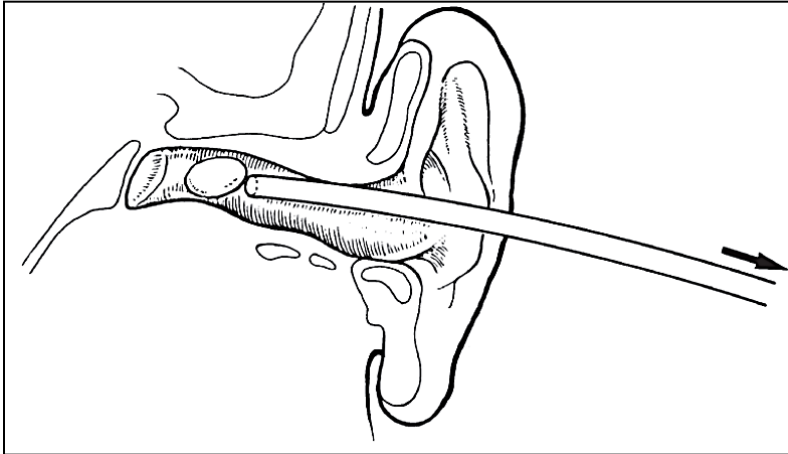
SPECIFIC LACERATIONS: Tendons



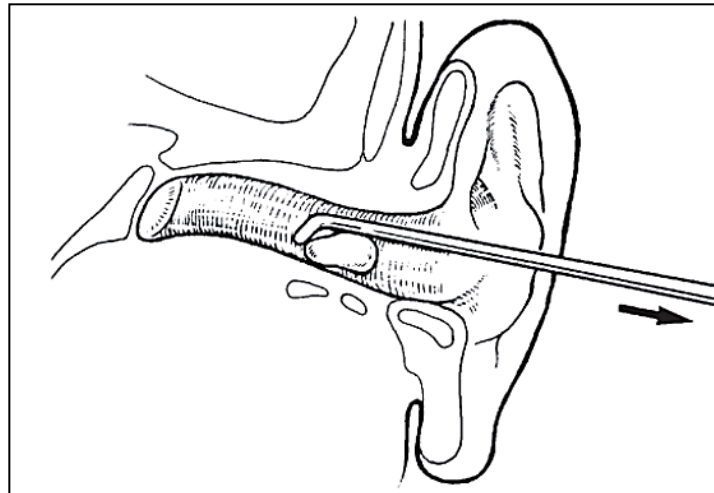
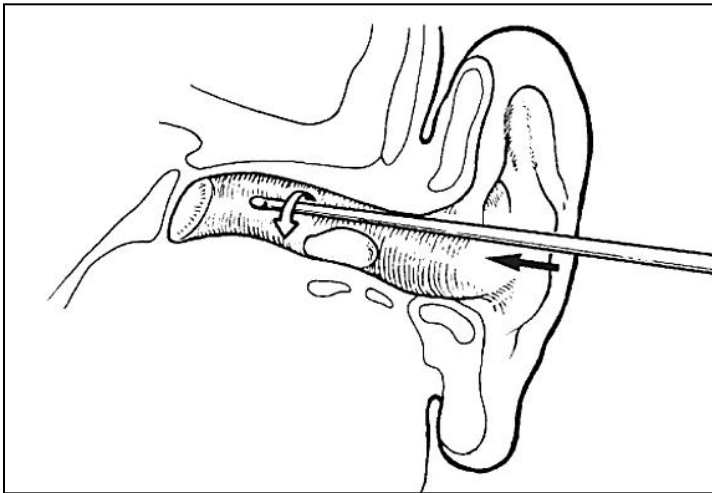
FOREIGN BODY REMOVAL

- Timing
 - Urgent: airway compromise
 - Unnecessary: some deep metal fragments
- May be difficult or time-consuming; patient should be anaesthetized
- X-ray or fluoroscopy is recommended for removal of radiopaque objects: pins, needles, glass
- Foreign bodies in cranium, chest, abdomen, close proximity to vital structures must be removed in operating theatre with team prepared to manage possible complications

FOREIGN BODIES: EAR



Try irrigation unless
contraindicated
Gentle suction
Gentle hook extraction



FOREIGN BODIES

Eye

- Sterile saline wash
- Refer if imbedded in eye

Nose

- Similar to ear

Airway

- Heimlich maneuver
- Bronchoscopy

GI tract

- Most pass if smooth
- Refer if sharp or obstruction

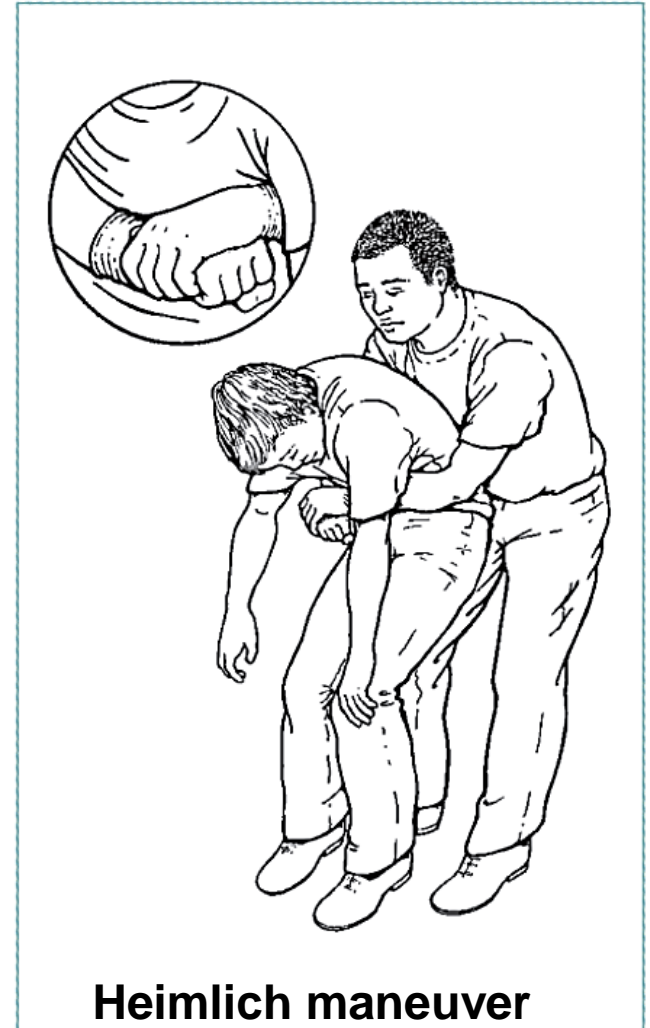


CHART 3. How to manage the choking infant



Back slaps



Chest thrusts

- Lay the infant on your arm or thigh in a head down position
- Give 5 blows to the infant's back with heel of hand
- If obstruction persists, turn infant over and give 5 chest thrusts with 2 fingers, one finger breadth below nipple level in midline (see diagram)
- If obstruction persists, check infant's mouth for any obstruction which can be removed
- If necessary, repeat sequence with back slaps again



Slapping the back to clear airway obstruction in a choking child

- Give 5 blows to the child's back with heel of hand with child sitting, kneeling or lying
- If the obstruction persists, go behind the child and pass your arms around the child's body; form a fist with one hand immediately below the child's sternum; place the other hand over the fist and pull upwards into the abdomen (see diagram); repeat this Heimlich manoeuvre 5 times
- If the obstruction persists, check the child's mouth for any obstruction which can be removed
- If necessary, repeat this sequence with back slaps again



Heimlich manoeuvre in a choking older child

BURN FIRST AID

- Stop burning process by removing clothing, irrigating burns
- Use cool running water to reduce temperature of burn
- Extinguish flames by allowing patient to roll on ground, by applying a blanket, by using water or other fire-extinguishing liquids
- In chemical burns, remove or dilute chemical agent by irrigating with large volumes of water
- Wrap patient in clean cloth or sheet, transport to nearest appropriate medical facility

BURN FIRST AID

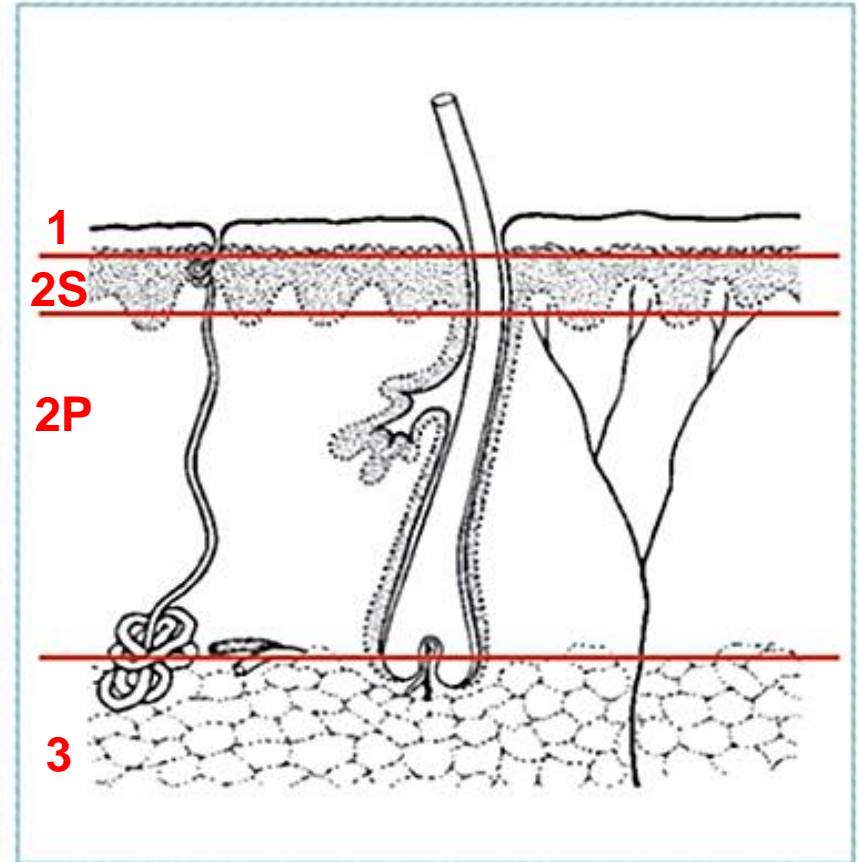
- Do not start first aid before ensuring your own safety (switch off electricity, wear gloves for chemicals, etc.)
- Do not apply paste, oil, turmeric or raw cotton to burn
- Do not apply ice, may deepen injury
- Avoid prolonged cooling with water, will lead to hypothermia
- Do not open blisters until topical antimicrobials can be applied at health care facility
- Avoid application of topical medication until patient has been placed under appropriate medical care

ACUTE BURN MANAGEMENT

- Stop the burning
- ABCDE's
- Determine percentage area of burn
- Good IV access, early fluid replacement
- Adequate pain control essential
- Severity of burn determined by:
 - Burned surface area
 - Depth of burn
 - Other considerations

ACUTE BURNS

- 1st degree: superficial
 - epidermis and upper dermis
- 2nd degree: partial thickness
 - Superficial partial thickness (S)
 - Deep partial thickness (P)
 - Penetrates deep in dermis
 - Skin grafting recommended
- 3rd degree: full-thickness
 - Destroy all epidermal and dermal elements
 - Always use skin grafts
- Most are mixed depth



ACUTE BURN MANAGEMENT

Airway: beware of inhalation, rapid airway compromise

Breathing

Circulation: fluid replacement

Disability: compartment syndrome

Exposure: percentage area of burn

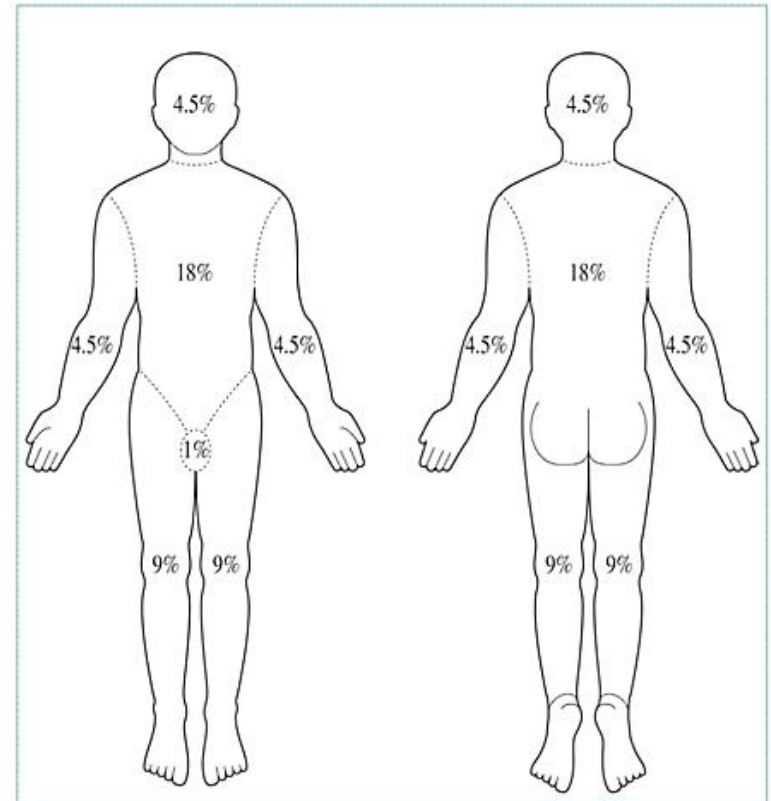
Morbidity and mortality rises with increased burn surface area or with increased age; even small burns may be fatal in elderly

ACUTE BURNS

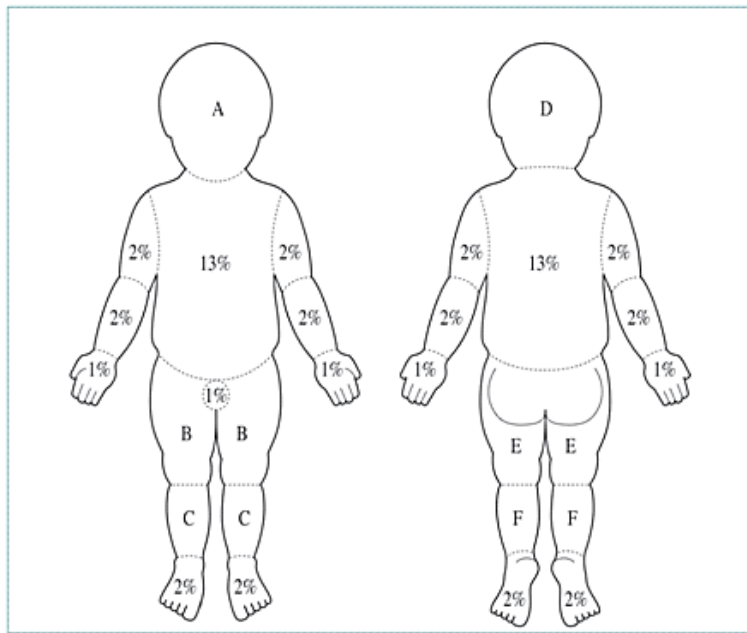
Depth of Burn	Characteristics	Cause
First degree	<ul style="list-style-type: none"> • Erythema • Pain • Absence of blisters 	<ul style="list-style-type: none"> • Sunburn
Second degree - superficial partial thickness	<ul style="list-style-type: none"> • Red or mottled • Flash burns • Blisters • painful 	<ul style="list-style-type: none"> • Contact with hot liquids
Second degree - deep partial thickness	<ul style="list-style-type: none"> • Pale • Reduced sensation • With or without blisters 	
Third degree – full thickness	<ul style="list-style-type: none"> • Dark and leathery • Dry 	<ul style="list-style-type: none"> • Fire • Electricity or lightning • Prolonged exposure to hot liquids/objects

ESTIMATION OF BURN AREA: Rule of 9's

- Count non-superficial burns (2nd degree and 3rd degree)
- The patient's hand is approximately 1% of body surface area.



ESTIMATION OF BURN AREA: CHILDREN



Area	By Age in Years			
	0	1	5	10
Head (A/D)	10%	9%	7%	6%
Thigh (B/E)	3%	3%	4%	5%
Leg (C/F)	2%	3%	3%	3%

FLUID RESUSCITATION

Necessary for burns

- >15% of total body surface area (TBSA) in adults
- >10% of total body surface in children
- Use Ringer's lactate or normal saline

The fluid requirement for the first 24h can be calculated
 $2 - 4 \text{ ml} \times \text{body weight in kg} \times \% \text{TBSA}$

- Give half in the first 8h and remainder in the next 16h
- Children also need maintenance fluids with glucose
- Monitor urine output and adjust iv fluids

ACUTE BURN MANAGEMENT

- Focus care on rapid healing, infection prevention
 - If small area: immerse in cold water 30 minutes to reduce oedema, tissue damage
- Tetanus toxoid
- Remove broken, tense or infected blisters
- Excise adherent necrotic tissue
- Gently cleanse burn with 0.25% (2.5 g/l) chlorhexidine solution, 0.1% (1 g/l) cetrimide solution, or another mild water-based antiseptic
- Maintain good nutrition: very high metabolic demands due to burns

ACUTE BURN MANAGEMENT

- Change burn dressing daily or as often as necessary to prevent seepage through dressing
- On each dressing change, remove any loose tissue
- Inspect wounds: discoloration, hemorrhage may indicate developing infection.
- Cellulitis in surrounding tissue is an indicator of infection
- Fever is not a useful sign; may persist until burn healed

ACUTE BURN MANAGEMENT

- Administer topical antibiotic chemotherapy daily: Silver nitrate (0.5% aqueous) cheapest, apply with occlusive dressings, does not penetrate eschar
- Use silver sulfadiazine (1% miscible ointment) with single layer dressing; has limited eschar penetration, may cause neutropenia
- Mafenide acetate (11% miscible ointment) used without dressings; penetrates eschar but causes acidosis
- Alternating these agents is an appropriate strategy

ACUTE BURN MANAGEMENT

Serious burn requiring hospitalization:

- Greater than 15% burns in adult
- Greater than 10% burns in child
- Any burn in very young, elderly, infirm
- Full thickness burns
- Burns of special regions: face, hands, feet, perineum
- Circumferential burns
- Inhalation injury
- Associated trauma or significant pre-burn illness: e.g. diabetes

ACUTE BURN MANAGEMENT

- Treat burned hands with special care to preserve function
- Cover hands with silver sulfadiazine, place in loose polythene gloves or bags secured at wrist
- Elevate hands first 48 hours, then start hand exercises
- At least once a day, remove gloves, bathe hands, inspect burn, reapply silver sulfadiazine, gloves
- If skin grafting necessary, consider treatment by specialist after healthy granulation tissue appears

ACUTE BURN MANAGEMENT: Healing phase

- Burn depth and surface involved influence duration of healing phase
- Without infection, superficial burns heal rapidly
- Apply split thickness skin grafts to full-thickness burns after wound excision or appearance of healthy granulation tissue
- Plan to provide long term care to patient
- Burn scars undergo maturation
 - First red, raised, uncomfortable
 - Frequently become hypertrophic, form keloids,
 - Although soften, fade with time; can take up to two years

ACUTE BURN MANAGEMENT: Nutrition

- Energy, protein requirements extremely high due to the catabolism of trauma, heat loss, infection, demands of tissue regeneration
- If necessary, feed patient through nasogastric tube to ensure adequate energy intake
- Anemia and malnutrition prevent burn wound healing, result in failure of skin grafts
- Eggs, peanut oil are good, locally available supplements

ACUTE BURN MANAGEMENT IN CHILDREN

- ABCDE – consider respiratory injury
- Use ringer's lactate or normal saline for resuscitation
- Add maintenance fluids, glucose to avoid hypoglycemia
- Admit all children
 - with burns >10% of body and
 - those involving face, hands, feet, perineum
 - circumferential
- Prevent infections with topical antibiotics.
- Prevent contractures by passive mobilization and splinting

ACUTE BURN MANAGEMENT IN CHILDREN

- Scars cannot expand to keep pace with growth, may lead to contractures
- Arrange for early surgical release of contractures before interfere with growth
- Burn scars on face lead to cosmetic deformity, ectropion, contractures about lips
- Ectropion can lead to exposure keratitis, blindness; lip deformity restricts eating, mouth care
- Consider specialized care (referral) as skin grafting insufficient to correct facial deformity

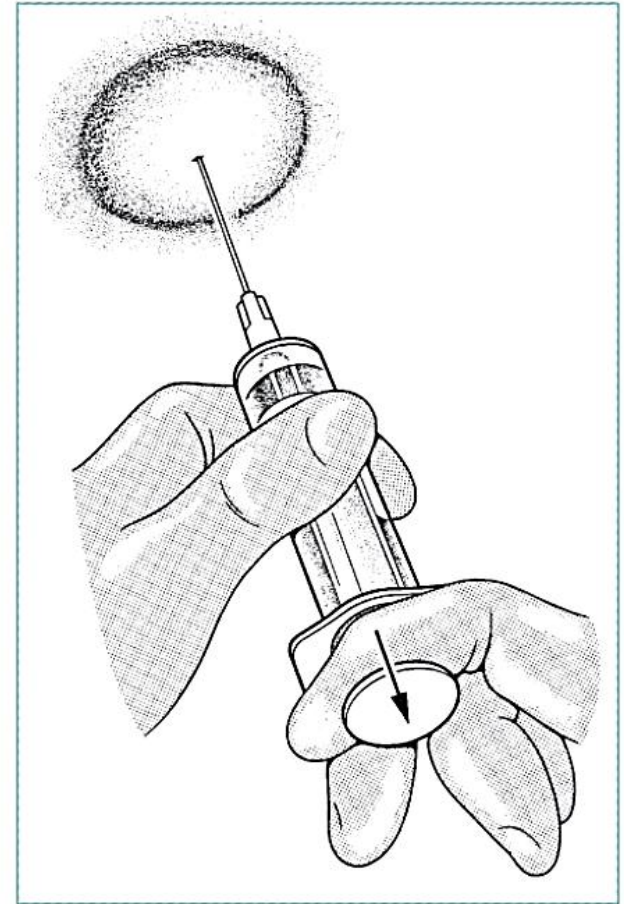
ACUTE BURN MANAGEMENT IN CHILDREN

- Pain control, especially during procedures
- Tetanus vaccination
- Nutrition
 - Begin feeding as soon as practical
 - Need high caloric diet
- Burn contractures
 - Prevent by splinting flexor surfaces, passive mobilization of involved areas
- Physiotherapy and rehabilitation
 - Begin early, continue throughout burn care

CELLULITIS AND ABSCESS: Technique

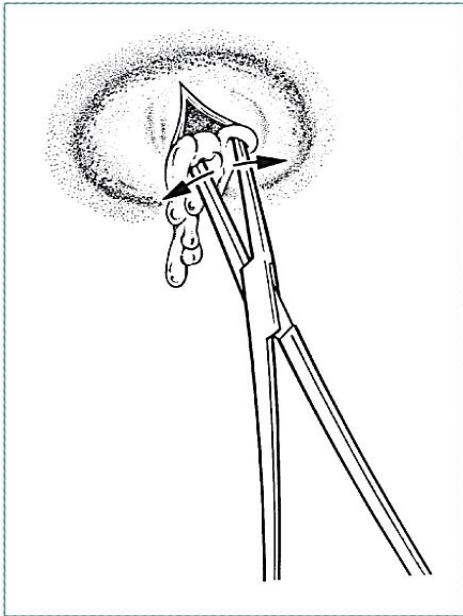
Infiltrate uninfected tissue surrounding the abscess with a local anesthetic

- If in doubt about diagnosis, perform preliminary aspiration using 18 gauge or larger needle
- Make an incision over the most prominent part of the abscess or guided by findings on needle aspiration

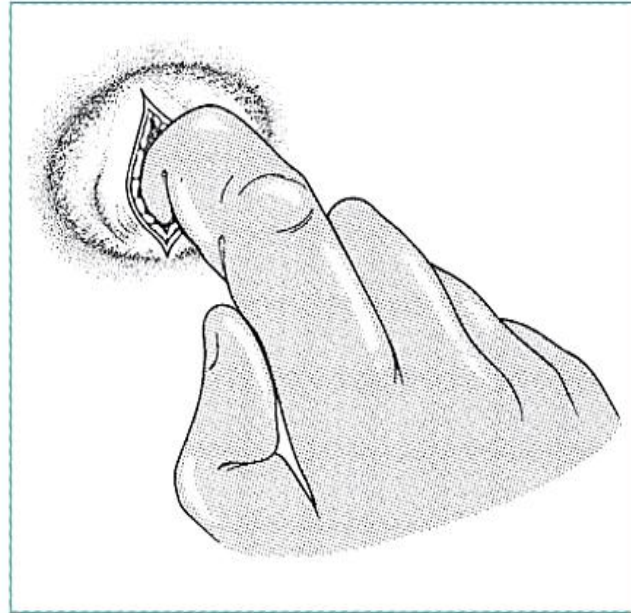


Aspiration of abscess

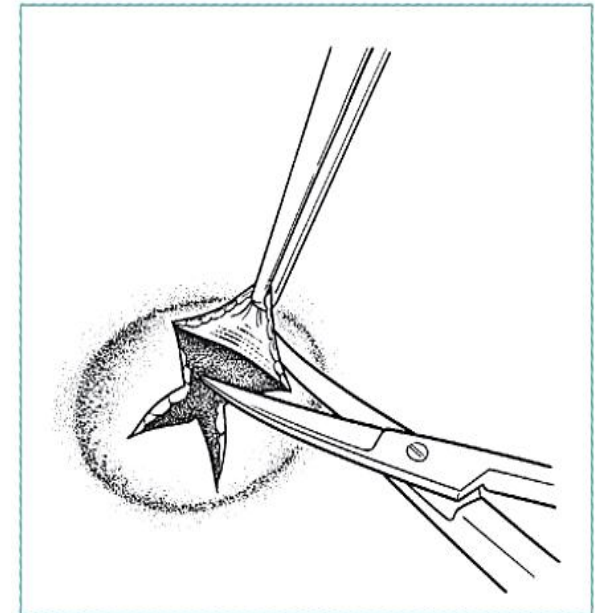
ABSCESS DRAINAGE



Introduce tip of artery forceps into cavity, open jaws

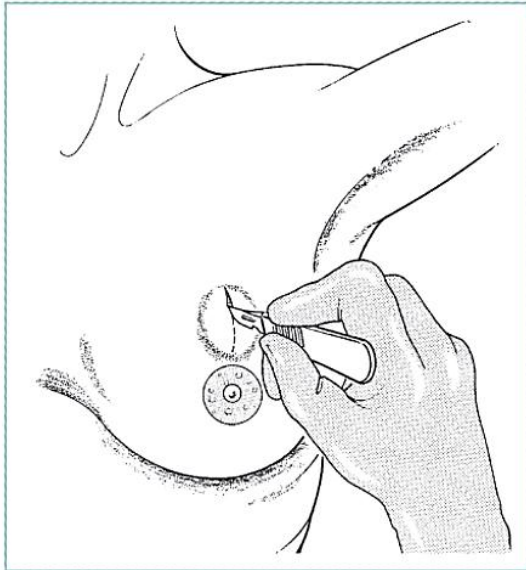


Explore cavity with finger to break down all septae

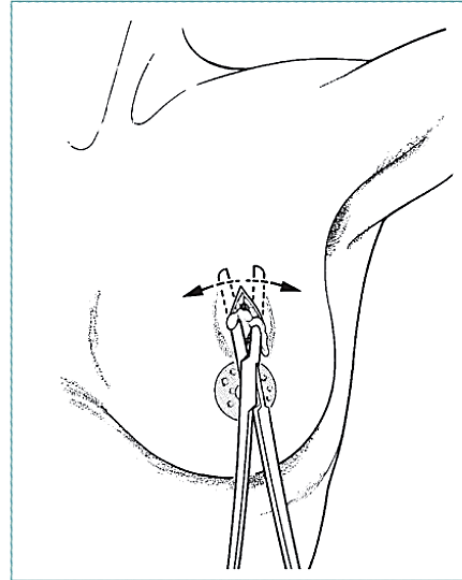


Extend incision, if necessary, for complete drainage

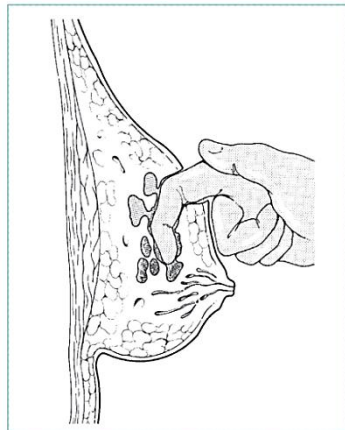
CELLULITIS AND ABSCESS: Breast



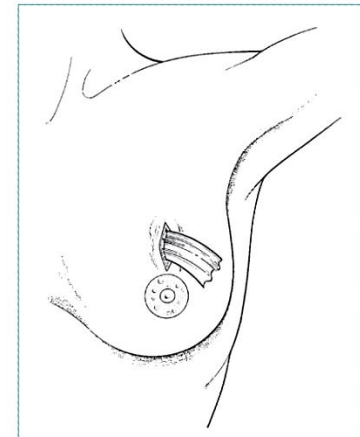
Incise



Spread



**Break down
loculations**

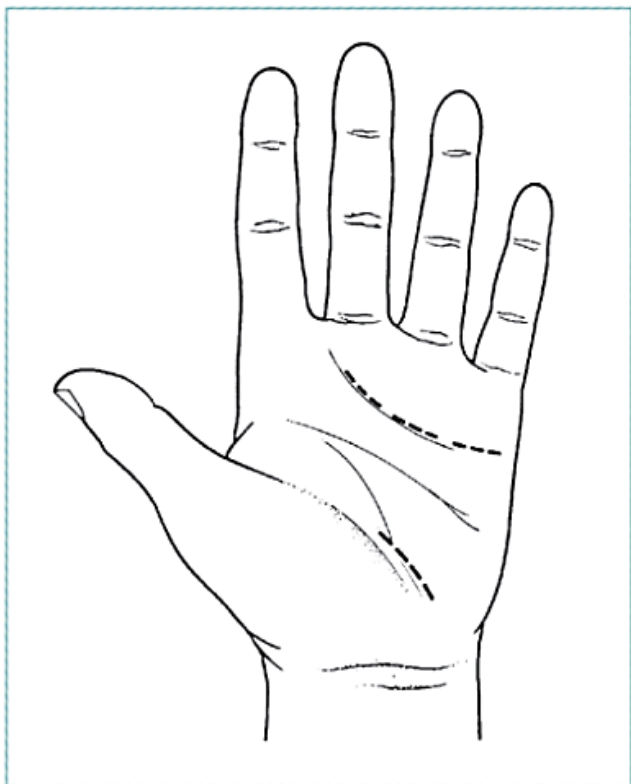


Drain

CELLULITIS AND ABSCESS: Hand

- Staphylococci most common organism
- Patients present with throbbing pain, warm, tender swelling, pain on movement
- May attempt antibiotics alone.
- Confirm the abscess with needle aspiration, send pus for Gram stain
- Swelling on the dorsum of the hand often caused by lymphedema, does not require drainage

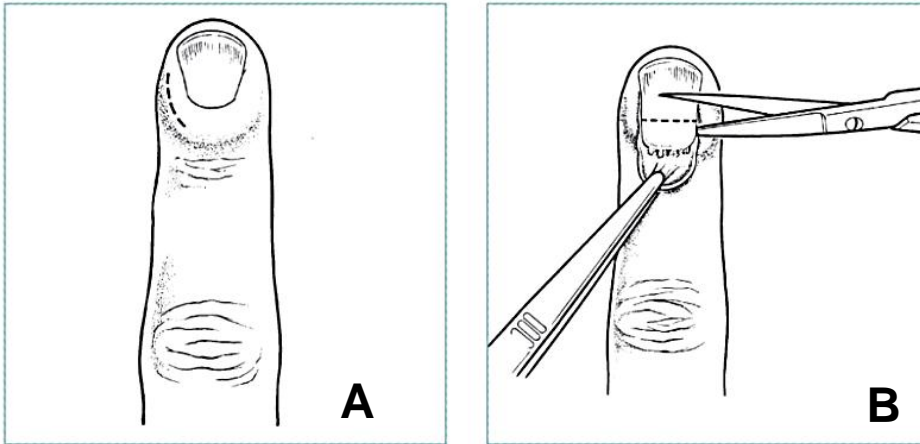
CELLULITIS AND ABSCESS: Hand



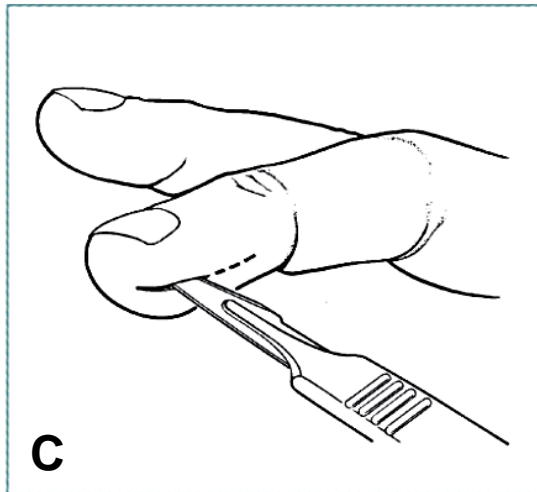
Typical hand incisions

- Make adequate, but not extensive incision along skin crease at site of maximum swelling (figure)
- Aspirate, irrigate all pus
- Open up deeper loculi with artery forceps
- Insert drain
- Dress wound loosely with dry gauze
- Administer antibiotics
- Keep hand elevated

CELLULITIS AND ABSCESS: Hand

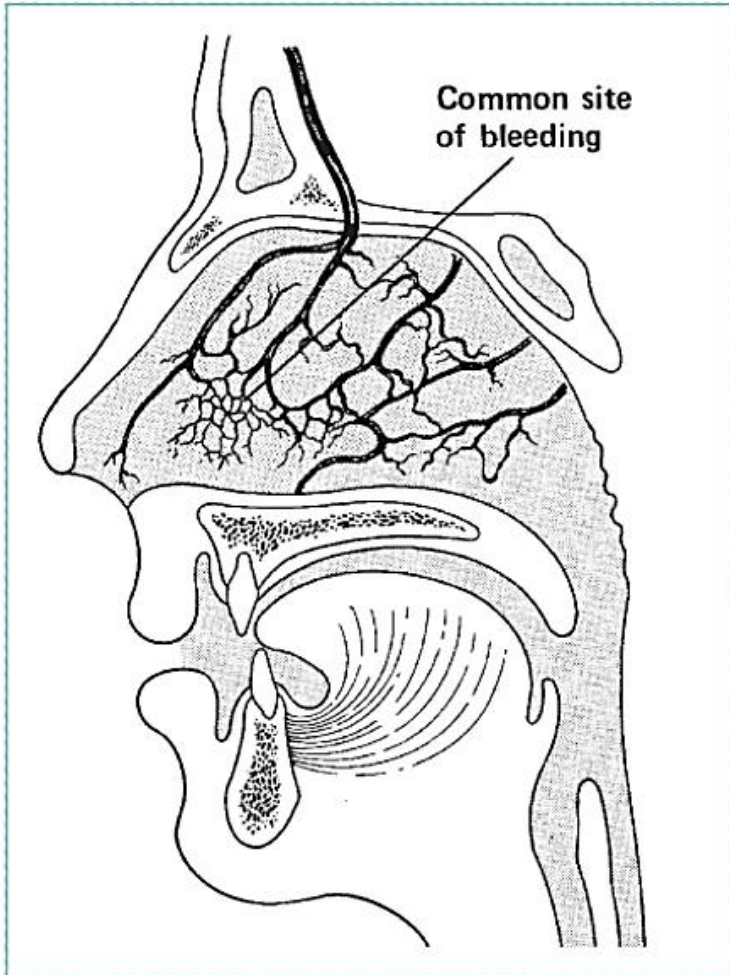


- Treat paronychia with incision over involved area (A), or incise a portion of the nail for effective pus drainage (B)

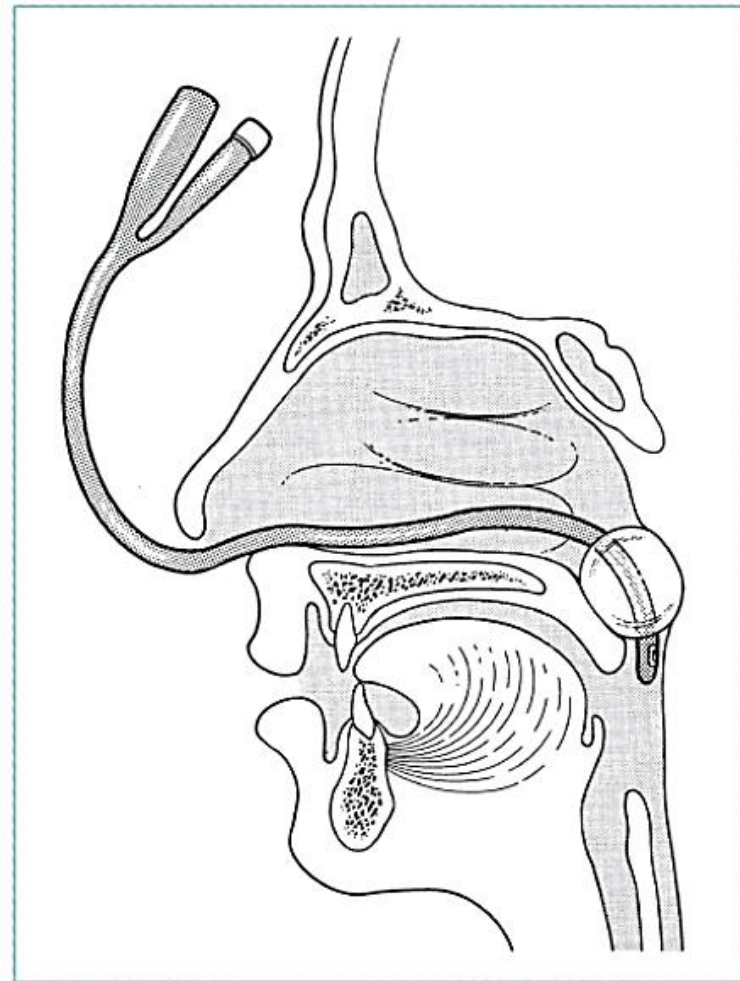


- Treat fingertip abscesses with a "hockey stick" incision (C)

EPISTAXIS



Anterior nares: pinch and apply pressure



Posterior: balloon catheter

Review of Core Learning Objectives

- Infection control and prevention
- Gowning, gloving
- Suturing techniques
- Wound management
- Antibiotic use
- Lacerations
- Foreign bodies
- Acute burns
- Abscesses
- Epistaxis