

Nursing care in surgery: surgical asepsis, medical aseptic practices to break the chain of infection

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The scheme of lecture

- concepts: contamination, decontamination, nosocomial / cross infections (HAI), asepsis (aseptic technique), antisepsis (antiseptic technique), disinfection, sterilization
- medical aseptic practices to break the chain of infection
- principles and practices of surgical asepsis
- hand hygiene - handwashing procedure (hygienic disinfection / surgical disinfection)
- dressing trolley
- surgical instruments
- small surgical procedures
- operation tract

asepsis vs. antiseptis

- asepsis vs. antiseptis
- asepsis and the principles of aseptic technique – to minimize the onset and spread of infection
- aseptic environment – no pathogenic (disease-producing) microorganisms / minimum amount of non-pathogenic microorganisms in the air
- fundamental methods of asepsis - methods of disinfection and sterilization (physical and chemical methods /combination)
- medical asepsis (*clean technique*)
- surgical asepsis (*sterile technique*)

Medical aseptic practices to break the chain of infection

Element of infection chain



Medical aseptic practices

infectious agent or pathogen (disease-producing)

- cleanse contaminated objects
- perform cleaning
- disinfection and sterilization

reservoir or source of pathogen growth

- control sources of body fluids and drainage
- perform hand hygiene
- bathe patients with soap and water
- change soiled dressings, dispose of soiled tissues, dressings, linen in moisture-resistant bags
- place used syringes and needles in puncture-proof containers
- keep table surfaces clean and dry, bottled solutions tightly capped (not opened for prolonged periods)
- keep surgical wound drainage tubes and collection bags/bottles patent, empty and dispose of them according to institutional policy



portal of exit from reservoir

- if respiratory – avoid talking, coughing, sneezing directly over wound or sterile dressing field, cover nose and mouth, wear masks if suffering respiratory tract infections
- if urine, faeces, emesis, blood – wear disposable gloves when handling body fluids and substances
- wear gown and eyewear if there is a risk of splashing fluids
- handle all specimens as infectious

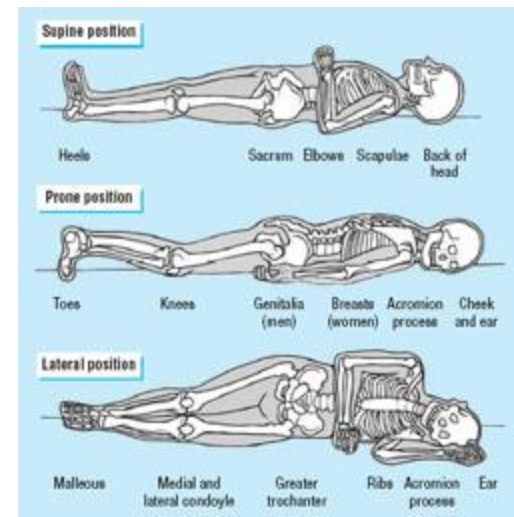
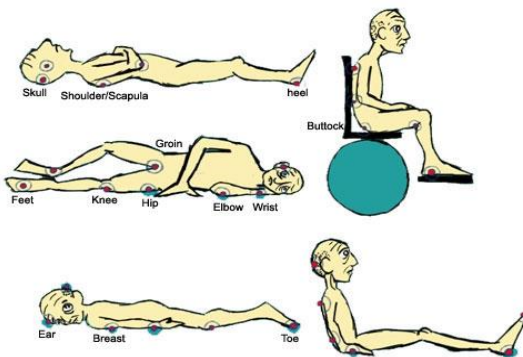


mode of transmission / spread

- perform hand hygiene (hands of personnel as the main risk factor to spread contact cross infections – the highest prevalence in the group of HAI)
- use personal set of care items for each patient
- avoid shaking bed linen / clothes
- avoid contact of soiled item with the uniform
- discard any item that has touched the floor

portal of entry to the host

- if skin and mucosa – keep intact, lubricate skin, offer frequent hygiene, turn position
- cover wounds as needed, clean wound sites thoroughly
- dispose of used needles as needed
- if urinary – keep all drainage systems closed and intact, maintain downward flow



host (e.g. susceptible patient)

- reduce susceptibility to infection:
 - provide adequate nutrition
 - ensure adequate rest
 - promote body defences against infection
 - provide immunization



Principles and practices of surgical asepsis

Principles



Practices

All the objects used in sterile field must be sterile

- appropriate sterilization process
- storage for only a prescribed time – after that unsterile (storage areas clean, dry, off the floor, away from sinks)
- check the packages of sterile materials (intactness, dryness, expiration date, chemical indicators) – if open, torn, punctured or wet – consider it unsterile



Sterile objects become unsterile when touched by unsterile objects

- use sterile forceps / sterile gloved hands



- if contact with unsterile objects – discard or re-sterilize the objects
- if questionable sterility – assume it unsterile



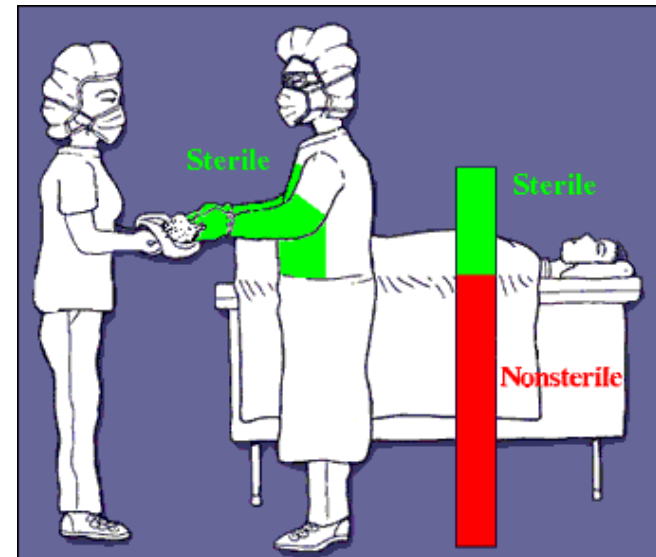


- handling forceps
- plain dissecting forceps / pinsette (plain or surgical with teeth)
- sinus forceps / autofix / haemostat / pean



Sterile items out of vision or below the waist level are considered unsterile

- keep in view:
 - never leave the sterile field out of control
 - never turn your back on sterile field
 - keep sterile gloved hands in view, above the waist and below neckline
- consider sterile draped tables to be sterile only at surface level



Sterile objects can become unsterile by prolonged exposure to airborne microorganisms

- keep the doors closed, traffic to a minimum
- frequent damp cleaning of the area with detergent germicides
- hairs clean, short or enclosed to the net / surgical cap
- refrain from coughing / sneezing over a sterile field, keep talking to minimum and wear masks covering the mouth and nose
- if mild upper respiratory tract infections – wear masks or refrain from carrying out the procedure
- refrain from reaching over a sterile field unless sterile gloved hands
- refrain from moving unsterile objects over sterile field

Fluids flow in the direction of gravity

- always hold wet forceps with the tips below the handles
- hold the hands higher than elbows during a surgical hand wash



Moisture passing through sterile object draws microorganisms from unsterile surfaces by capillary action

- use sterile moisture-proof barriers (special barrier drapes) beneath sterile objects
- avoid dampening sterile field and sterile clothes
- replace sterile drapes if moist



The edges of sterile field are considered unsterile

- 2,5 cm margin at each edge of an opened drape is considered unsterile
- place all objects inside the edges of sterile field



The skin cannot be sterilized and is considered unsterile

- wash the hands prior to procedure
- wear sterile gloves / use sterile forceps to handle sterile objects

Hand hygiene

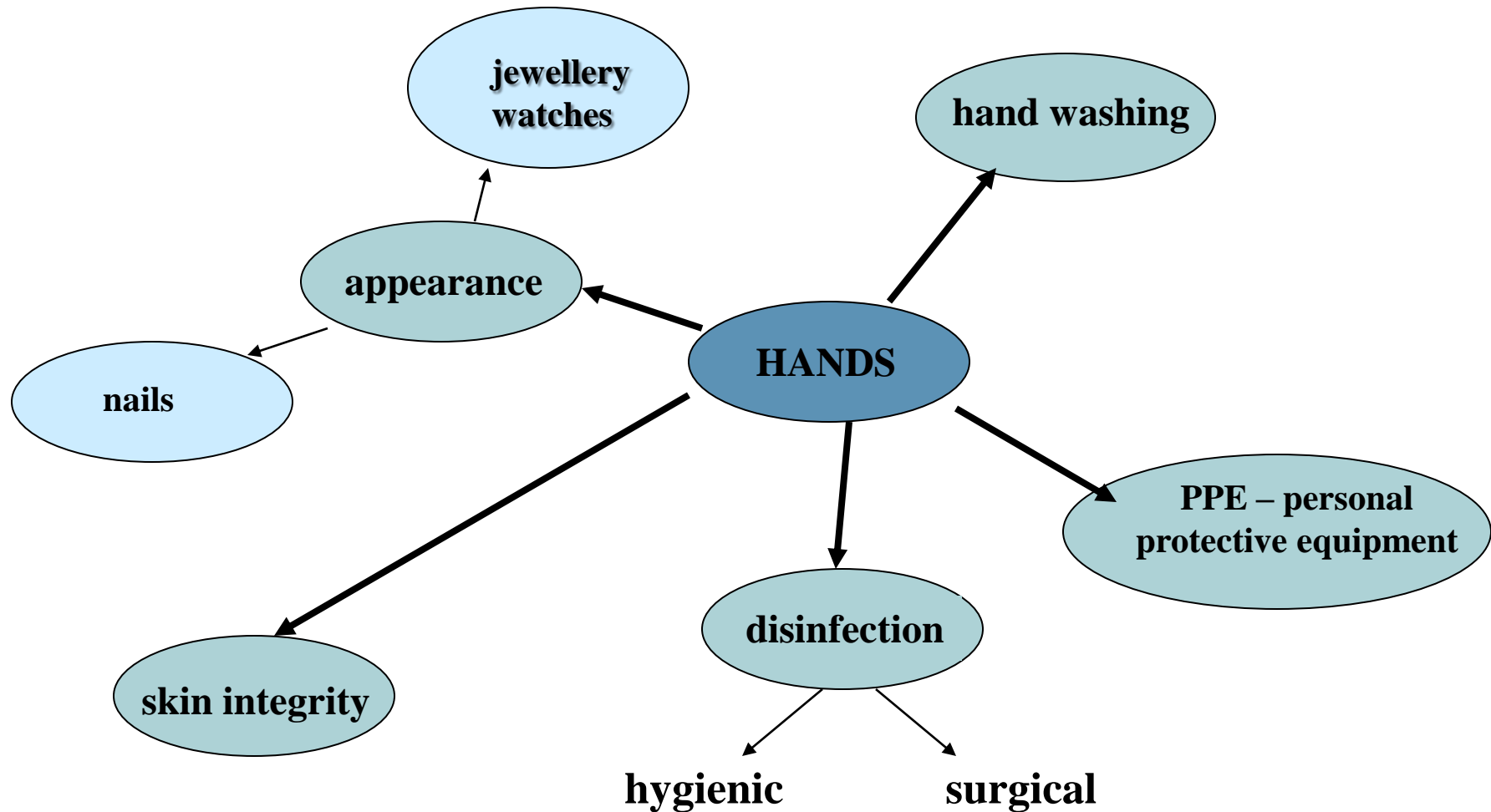
Hand hygiene

- Hand washing
- Hand care

Hands

- main risk factor of the transfer and spread of hospital acquired infections (contact ones)
- hand hygiene – crucial procedure / prophylactic measure in the clinical practice (simple, cheap, effective)
- cannot be optional for all health care professionals including the students
- microorganisms on the skin of hands:
 - resident microorganisms (normal hand flora, deep seated)
 - transient microorganisms (recent contamination)

Hand hygiene = hand washing + hand care



Hand washing

1. routine hand washing (hand wash / antiseptic hand wash)
2. antiseptic hand disinfection (hygienic hand disinfection / alcohol hand rub / antiseptic hand rub)
3. surgical hand hygiene (surgical disinfection, surgical hand antisepsis, surgical scrub)



MISSED SPOTS WHEN HAND-WASHING



■ MOST FREQUENTLY MISSED
■ LESS FREQUENTLY MISSED
■ NOT MISSED



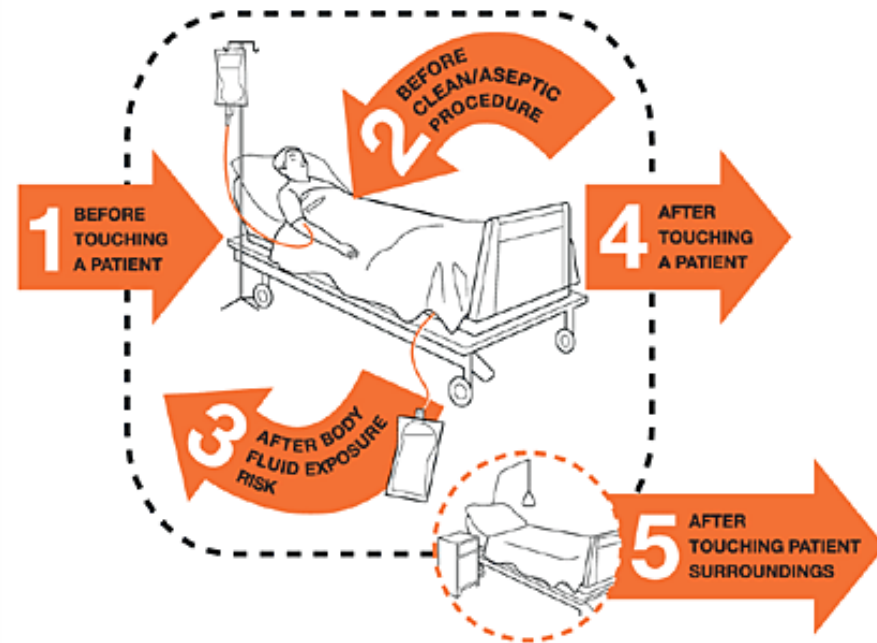
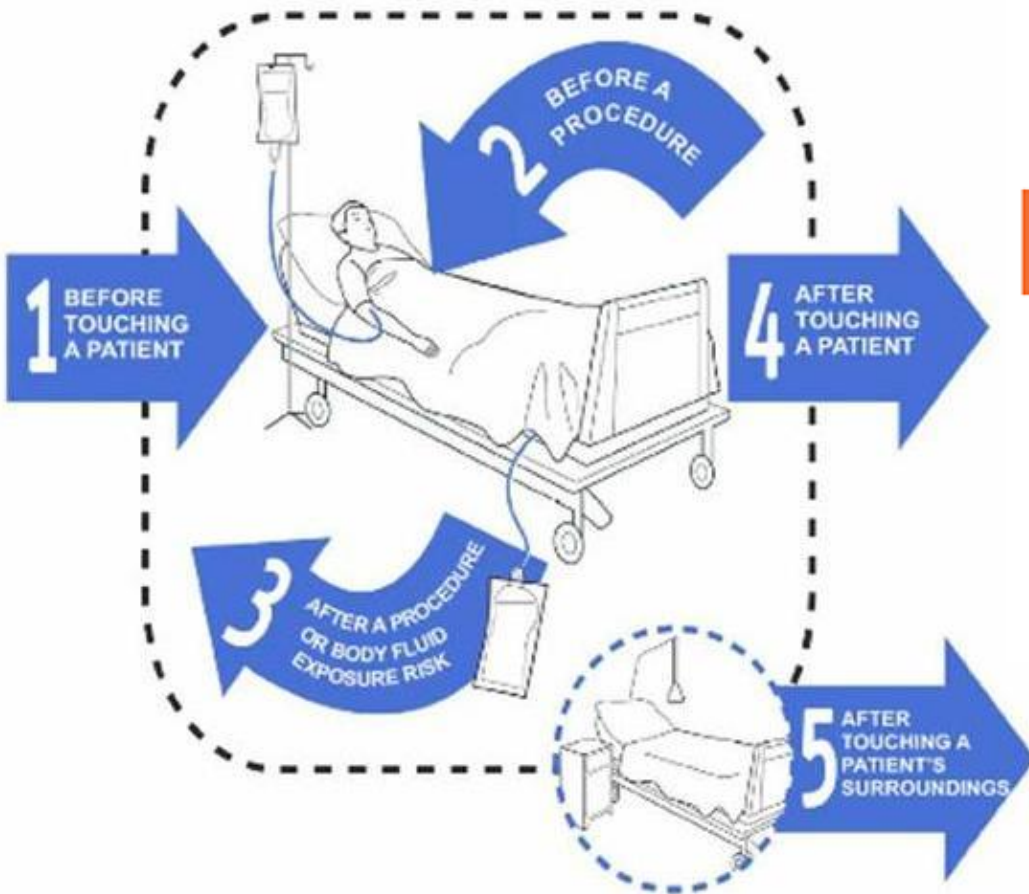
Germ Farm



Scrub'em!

www.1st-in-handwashing.com

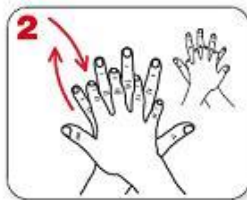
5 Moments for HAND HYGIENE







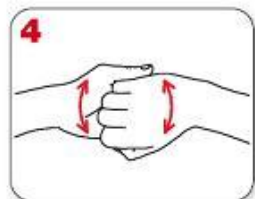
Rub hands palm to palm



right palm over left dorsum with interlaced fingers and vice versa



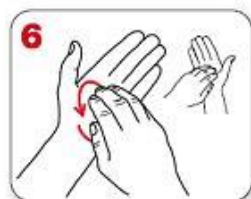
palm to palm with fingers interlaced



backs of fingers to opposing palms with fingers interlocked



rotational rubbing of left thumb clasped in right palm and vice versa



rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa



Wet hands with water



apply enough soap to cover all hand surfaces.



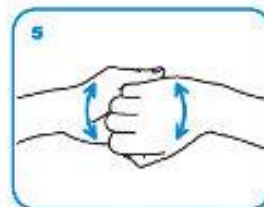
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rotational rubbing of left thumb clasped in right palm and vice versa



rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.



Rinse hands with water



dry thoroughly with a single use towel



use towel to turn off faucet



...and your hands are safe.

Hand Hygiene How-To

Does it matter how I wash my hands?

You have to rub your hands for at least 20 seconds to get rid of the bacteria. Follow these instructions:



How do I clean my hands with alcohol-based hand sanitizer?

Use enough to cover all the surfaces of your hands.



Washington Department of Health
 Food Safety Center
 625 N. River St., PO Box 54275, St. Paul, WA 98154
 800-221-5416, TTY: 800-221-4797
 www.doh.wa.gov

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Ask
Me
If I've
Washed
My Hands

www.jcrinc.com



clean hands
save lives

efficacy of hand washing



- suitable agent
- adequate volume
- proper equipment and manipulation with it
- good technique covering all surfaces of the hands
- right time
- correct duration of time
- proper drying of the hands already washed
- non-touch technique (particularly in surgical disinfection)

Dressing trolley

Top shelf (sterile)

Bottom shelf (clean)

Surgical instruments

Main groups of instruments

Small surgical procedures

Test your knowledge I.

- What is the difference between medical and surgical asepsis?
- Summarize the principles and rules of hand care except hand washing.
- When to use different types of hand washing procedure?
- What is the time exposure to antiseptic hand rub agent in hygienic hand disinfection and in surgical hand disinfection?
- Describe and explain how to hold wet sterile handling forceps during establishing a sterile field while adding necessary sterile supplies.
- Name risk factors predisposing the patient to latex allergy reaction.

Wound care

**Collaborative level –
responsibilities of a nurse
and a physician**

Wound

- ... any break in the continuity of the skin, mucous membranes, bone or any body organ
- different types of wounds/classifications:
 - *intentional* (incisions, venipunctures, radiation burns) or *unintentional* (accidental) wounds
 - *open* or *closed* wounds
- *according to a cause*: incision, contusion, abrasion, puncture, laceration, penetrating wound
- *according to likelihood and degree of contamination*: clean, clean-contaminated, contaminated, dirty
- *according to depth (the tissue layers involved in the wound)*: partial-thickness, full-thickness
- *according to course and duration of wounds*: acute, chronic

Classification of open / secondary intention healing wounds - RYB colour code

- **red (or pink)**
- clean, granulating (new healthy tissue) and epithelializing wound, healing well; red or pink granulation tissue
- the goal of wound management is *to protect red wounds* and *cover* them
- selection of transparent film or hydrocolloid dressing maintaining clean and slightly moist wound environment and *minimize damage* to healing tissue (i.e. gentle cleansing, avoiding use of dry gauze or wet-to-dry saline dressings, changing the dressing as infrequently as possible)

- **yellow wounds**

- wound coated by dead subcutaneous fat tissue, liquid or semi-liquid slough (grey necrotic slough) often accompanied by purulent drainage
- the goal of wound management is to *cleanse yellow wounds* (to absorb drainage and remove non-viable tissue) by selection of moisture-retentive dressings enhancing debridement (wet-to-wet or wet-to-dry dressing, impregnated non-adherent dressings, hydrocolloids, hydrogels, alginates, other exudates absorbers), wound irrigations

- **black wounds**
- covered with black eschar (representing full-thickness tissue destruction) – a thick leathery necrotic devitalized tissue with no proper circulation thus providing excellent medium for bacterial growth
- require *debridement* (removal of infected and necrotic material)
- the goal of wound management is to *debride black wounds* by chemical enzymes (autolytic debridement with the use of occlusive or semioclusive dressings), mechanical debridement (surgical necrectomy)

3 phases of wound healing

Inflammatory phase

- essential for healing, initiated immediately after injury, lasts 3-4 days
- haemostasis (the cessation of bleeding by means of vasoconstriction of large blood vessels in the affected area, retraction of injured vessels, deposition of fibrin and formation of blood clots) – *scab is formed* on the wound surface, a thin wall of epithelial cells develops across the wound
- inflammatory response – increased blood supply to the wound to bring substances and nutrient needed in healing process – *localised redness and oedema*
- cellular responses – cell migration (leukocytes – neutrophils, macrophages) – phagocytosis, angiogenesis factor (AGF) secretion



Proliferative phase

- extends from day 3-4 to about day 21 after injury
- synthesis of collagen (whitish protein substance adding strength to the wound) – *raised “healing ridge”* appears under the intact suture line (can be felt along a healing wound)
- development of *granulation tissue* – translucent red colour, fragile tissue, risky for bleeding
- epithelialization – epithelial cells migrate to matured granulation tissue proliferating over this connective tissue base to fill the wound – *pink scar*

Maturation (remodelling) phase

- from day 21 to 1-2 years after injury
- continue in the synthesis of collagen – *scar becomes more thin, less elastic, white line*

3 types of healing

- by the amount of tissue loss – primary, secondary and tertiary intention healing
 - *primary intention healing* (first intention healing, per primam intentionem)
 - *secondary intention healing* (per secundam intentionem)
 - *tertiary intention healing* (delayed or secondary closure, per tertiam intentionem)

Primary

- e.g. in clean surgical incisions in which wound edges were pulled together with sutures, staples or adhesive tapes
- the tissue surfaces have been approximated, closed and there is minimal or no tissue loss (minimal granulation tissue and scarring occurs)
- healing occurs by connective tissue deposition

Secondary

- e.g. in open extensive wounds with considerable tissue loss (such as pressure ulcers) in which the edges cannot be approximated (there is some gap between edges)
- in such healing the repair time is longer as granulation tissue gradually fills in the area of the wound with scar tissue, the scarring is greater, the surface closure is thicker and the susceptibility to infection is greater due to the slowness of the process
- healing occurs by granulation tissue formation and contraction of wound edges

Complications of wound healing

- haemorrhage (persistent bleeding)
- infection
- keloid formation (excessive amount of connective tissue in the scar surface in secondary intention healing wounds)
- dehiscence (partial or total rupturing of a wound due to absence of the “healing ridge”)
- with possible evisceration (protrusion of the internal viscera through an incision)

Tertiary

- indicated when there is a reason to delay suturing a wound (because of poor circulation in the area, or to allow oedema or infection to diminish) to the time after the initial stage of deposition of granulation tissue (usually for 3 to 5 days)
- e.g. healing in opened abdomen

Cleaning a wound and applying a sterile dressing

- in the practice...

Test your knowledge II.

- What type of gloves would you wear to remove a soiled wound dressing?
- Would you use gloves to assess the characteristics of a wound or wound healing? If yes, when and what type of gloves?
- How would you cleanse a surgical wound by mechanical cleaning? Explain procedure, equipment, principles.

Extras for further study

- factors affecting wound healing
 - promotion of normal wound healing
 - signs and symptoms of wound infection
 - wound assessment
 - care for accidental wounds (first aid)
-
- teaching considerations concerning wound care
 - drains and drainage systems





Questions?

Thank you for your attention....

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