

Nursing Care in the Intraoperative Period





Intraoperative Period

- From time enter the surgical suite until go to Post Anesthesia Care Unit (PACU) or Same Day Surgery.
- Actual surgery takes place



Perioperative Nurses

- Many hazards and concerns for patient during surgery
- Main concerns for Perioperative Nurses:
 - Safety
 - Advocacy







Fig. 17-3. A, A typical operating room.



Geographical Isolation

“Danger: Authorized Personnel ONLY”

- Isolated section of hospital to promote:
 - quiet
 - privacy
 - Clean
- restriction of flow of people traffic
- often close to critical care units
- adjacent to post anesthesia care unit (PACU)



Operating Room Site

- 3 Distinct Areas:

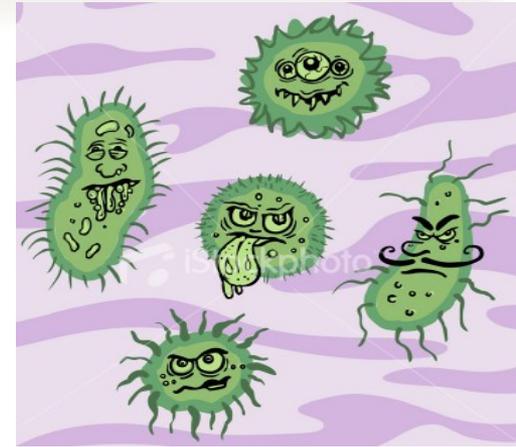
1. _____-street clothes-point of entry for patients.

2. _____-Authorized personnel must wear scrubs.

3. _____ - OR, scrub sink, clean core.

Bacteriological Isolation

- special clothing & footwear
- separate water supply
- separate air flow system
 - filters, controlled air flow, ↓ dust
- separate laundry & disposal systems
- own sterilization system
- **PEOPLE** are main obstacle to clean environment



Centralization of Equipment



Centralization of Trained Personnel





Physical Design & Equipment

4 Basic Designs

- central corridor or “hotel” plan
- double central corridor/clean core plan
- peripheral corridor/race track plan
- grouping or cluster plan

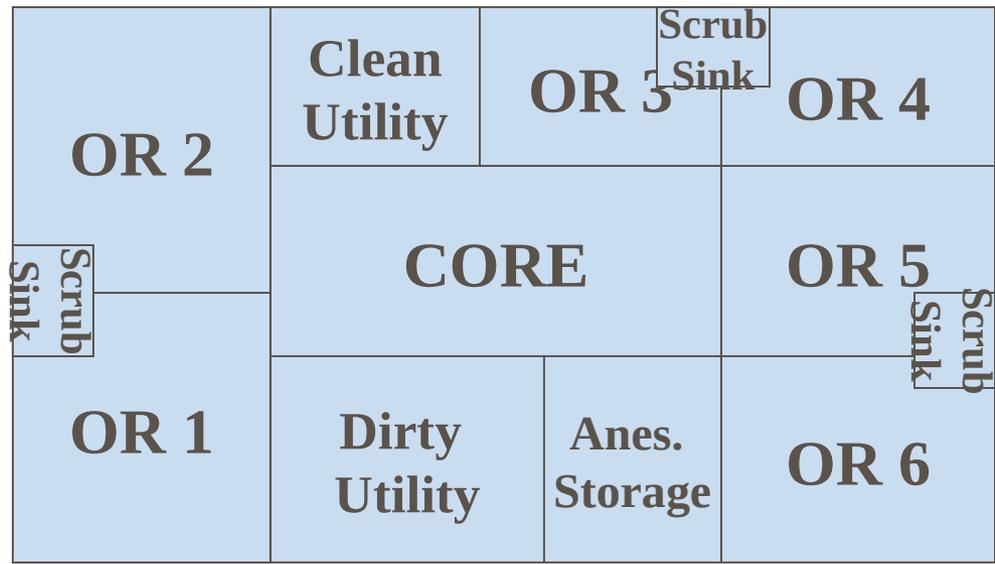
Beebe Design: Peripheral Corridor “Racetrack”

Hall

Hall

Lounge

DESK



Hall

Door

Included in OR Layout

- Patient Receiving /Preholding Area
 - Special waiting area outside the OR
 - TIME OUT
 - Final Chart Review







Ventilation

- Fresh, filtered air for infection control
 - prevents accumulation of anesthetic gases
 - 25 air exchanges/hr
 - filters & controls airflow for dust control
 - humidity -maintained at 30–60 %
 - Positive pressure air flow prevents contaminated air from entering room
 - Temperature at 68-75 °

CORE

- Processing rooms:
 - utility rooms for clean-up
 - instrument preparation for sterilization

- Storage

- Communication System





Equipment in OR

- 2 or 3 kick buckets on swivel casters
- two mayo stands
- two instrument tables
- small table for gowns, gloves, prep
- one sponge basin on swivel casters



Equipment in OR

- anesthesia table
- anesthesia cabinets for equipment
- equipment shelves
- linen cabinets, linen hamper



Video Equipment

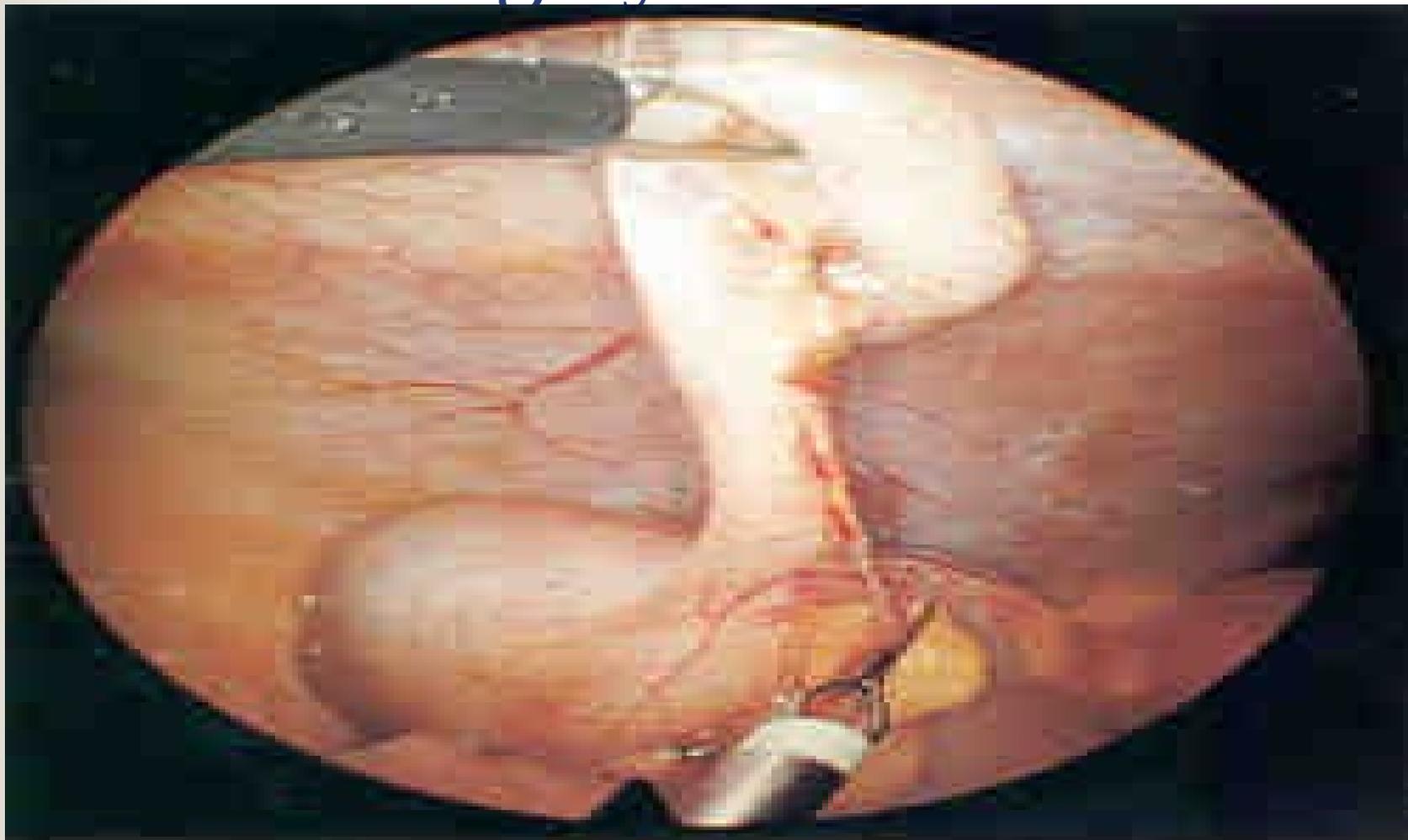


Video and Monitoring Equipment





Video Surgery



The Human Factor in the OR





The Human Environment

- OR Team Concept: a group of people who recognize common goals & coordinate efforts to achieve them.
 - delivery of a psychologically & physiologically prepared patient to surgery



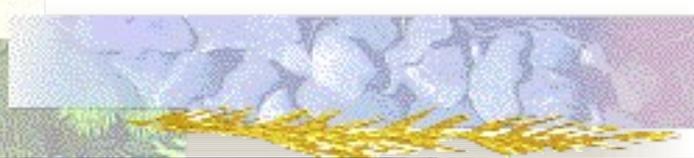
Roles of Surgical Team

- **Scrubbed sterile team: enter sterile field**
 - operating surgeon
 - assisting surgeons
 - scrub nurses and technicians

- **Unscrubbed, unsterile team**
 - anesthesiologist, circulating nurse, x-ray, pathologist, sales representative
 - Do NOT enter sterile field



Fig. 17-2. Setting up the sterile table.





Roles of the Surgical Team

- **Surgeon assistant (MD, PA or RNFA)**
 - assists surgeon during procedure.
 - exposes site – holds retractors
 - assists with hemostasis & suturing
 - May perform portions of procedure under supervision of surgeon
 - Legal Scope of Practice for each state determines what can do





Roles of the Surgical Team

Anesthesia Care Providers

- Administer agents during surgery
- Alert surgeon to any problems
- Monitor cardiac/respiratory function/vitals
- Administer fluids, electrolytes, meds or blood products – monitor I & O
- Supervise post anesthesia recovery in PACU& for first 24 hours post-op
- Supervises PCEA for duration of use

Roles of the Surgical Team

RN – perioperative nurse

- implements care based on *nursing process*
 - function dependent of whether sterile or non-sterile member
- Several roles during op period





Roles of the Surgical Team

SCRUB NURSE

Sterile Team

- Set up sterile field, prepare room
 - scrub, gown, & glove self and others
 - prepare instrument table & organize equipment
 - assist with draping
 - pass instruments to surgeon & assistants
 - count sponges, needles, instruments
 - monitor aseptic technique
-
- Irrigation solutions measured in and out for calculating blood loss



imageofsurgery.com



Roles of the Surgical Team

Circulating Nurse

Non-sterile team member

- Coordinates, oversees, & participates in care – patient advocate
- Checks equipment & environmental factors
- Ensures needed items are available & sterile
- Receives and identifies the patient
- Positions and monitors patient
- Inserts foley, IV, NG, labels specimens
- Monitors aseptic technique



Roles of the Surgical Team

Circulating Nurse

- Monitors blood loss
- Counts syringes, needles, instruments (with scrub nurse)
- Completes the intraoperative record
 - Ongoing assessment
 - Pertinent information
 - Times all activities



Roles of the Surgical Team

Circulating Nurse

- Patient Advocate
- Patient Safety
- Critical thinking
- Accompanies patient to PACU
- Gives report to PACU nurse



Other Surgical Team Members

- Holding area nurses
 - Coordinates & manages care in pre-surgical holding area
 - Verifies documentation, assesses patient
 - Ensures patient ready for surgery
- Specialty nurses
 - Trained in particular type of surgery
 - Cardiac, ortho, ophthalmic, laser



Nursing Diagnoses



















Nursing Management of Surgical Patient

- Prior to Surgery
 - Circulating nurse meets patient in holding area to identify
 - Reviews pre-op checklist
 - Psychosocial assessment: anxiety, spiritual, cultural, provide human contact
 - Physical assessment: baseline vital signs, allergies, musculoskeletal concerns for positioning, risk factors
 - Confirms surgical site with patient

Admitting Patient to OR

- Patient Identification:





- Physical Assessment



- Risk factors





Source: Smith, B. MS, RN, COHN, CHA, Staff Development Specialist, Children's Care Health System, Newark, NJ



Psychosocial Assessment

- Pre-op concerns communicated to OR team
- Anxiety level/communication barriers
- Knowledge of surgery and outcomes
- Location of family
- Spiritual/Cultural Concerns
 - Jehovah's Witness – no blood transfusion
 - Islam – left hand dirty
 - Native American – all tissue must be buried

Chart Review

- Pre-operative checklist complete
- Medication list
- Pre-operative medication given
- Consents signed
- History and Physical on chart
- All pre-op diagnostics on chart
- Allergies



Universal Protocol

“TIME OUT”

- Required on ALL procedures
- *Final* verification of patient, procedure, site
- Involves entire OR team
- Many hospitals use checklist
 - Correct patient
 - Correct side and site
 - Agreement of procedure being done
 - Correct patient position
 - Equipment and implants available



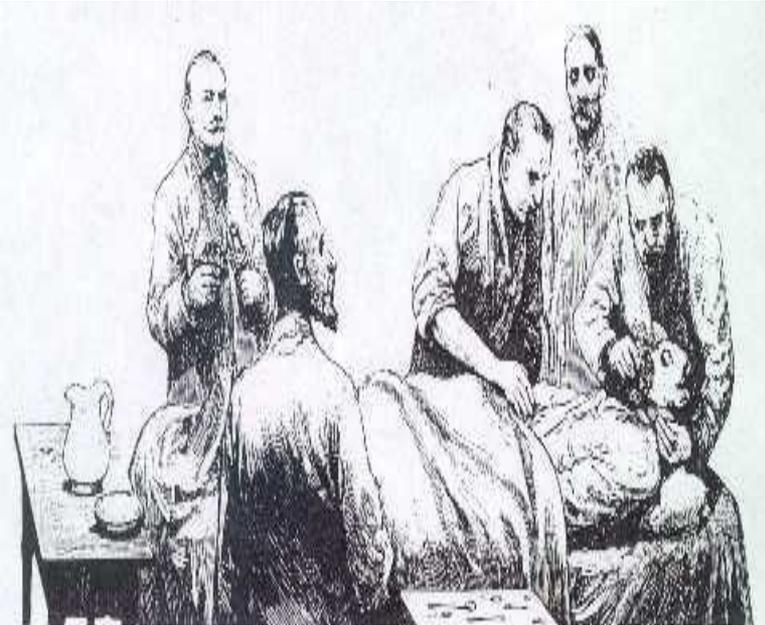
World Health Organization Surgical Safety Checklist

- Ten essential objectives for safe surgery
- Part of Time Out session
- Three components
 - Before induction of anesthesia
 - Before skin incision
 - Before patient leaves operating room

Surgical Team Takes Time Out for Patients



Anesthesia



**“I attended on 2 occasions operating theatre at Edinburg. I saw 2 very bad Operations. One on a child, but I rushed away before they were completed...for hardly any inducement would have been strong enough to me make do so. This being long before days of chloroform. The cases fairly haunted me for many a long year. “
Charles Darwin**

Anesthesia

- Induced state of partial or total loss of sensation
- Occurs with or without loss of consciousness



Goals of Anesthesia

- Block nerve impulse transmission
- Suppress reflexes
- Promote muscle relaxation
- Achieve controlled level of consciousness



General Anesthesia



General Anesthesia

- Given by IV or Inhalation (gases)
- Blocks awareness centers in brain
- Total loss of all sensation & consciousness
 - Protective reflexes – cough and gag reflex
 - Memory loss
 - Insensibility to pain
 - Hypnosis (artificial sleep)
 - Relaxation
- Unconscious and unaware





Advantages of General Anesthesia



Disadvantages of General Anesthesia



Stages of General Anesthesia

Stage I

Analgesia, Sedation,
Relaxation



Stages of General Anesthesia

Stage 2

Excitement

Delirium



Stages of General Anesthesia

Stage 3

Operative anesthesia

Sensations are lost



Stages of General Anesthesia

Stage 4

Danger

Depression of vital functions

Regional Anesthesia





Regional Anesthesia

- Interruption of nerve impulses to specific area of body
- Involves a central nerve (spinal) or group of nerves (plexus)
- Always injected
- May also involve moderate sedation



Types of Regional Anesthesia

- Topical
- Local
- Nerve block
- Spinal block – subarachnoid space
- Epidural block – epidural space

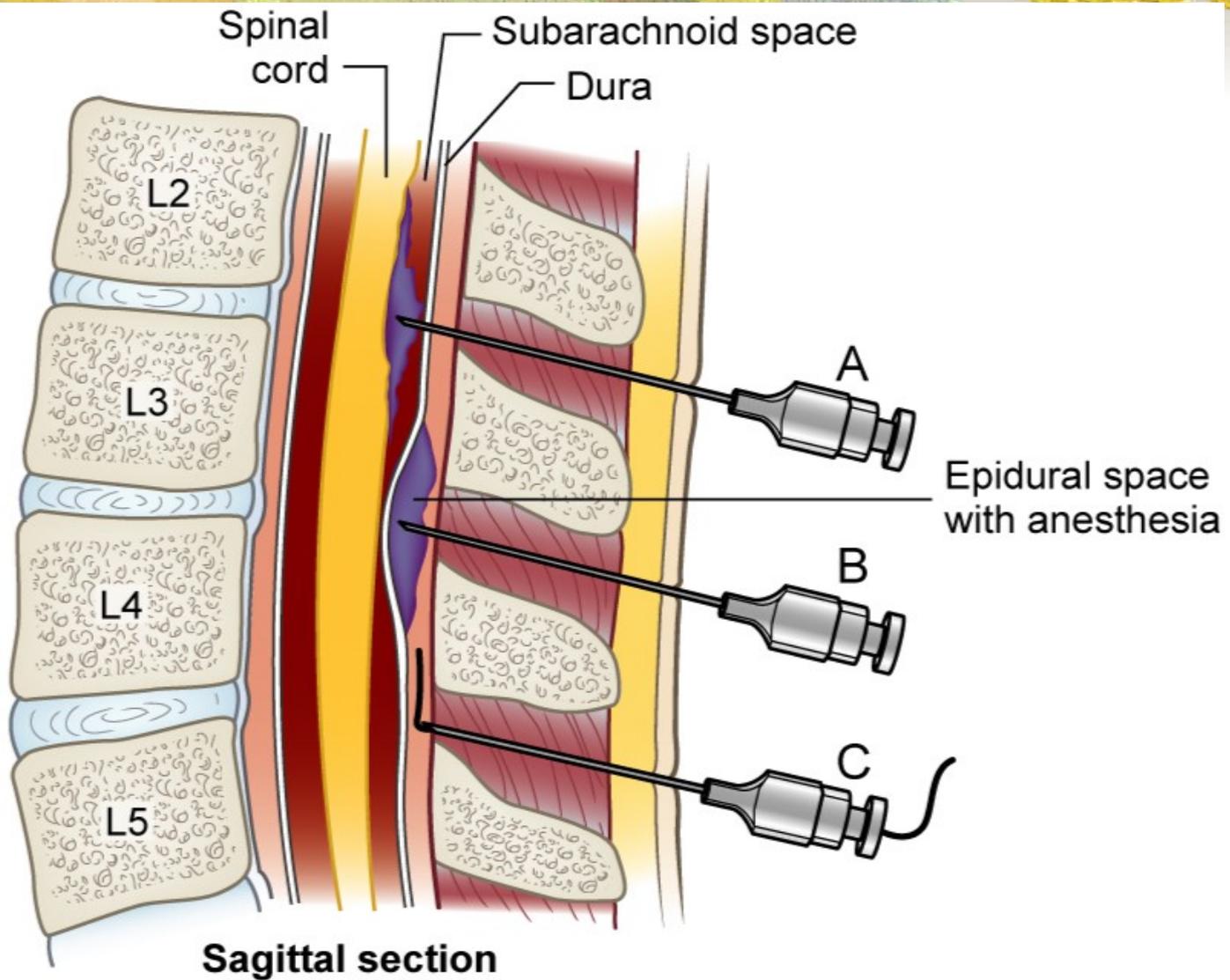


Fig. 19-6. Location of needle point and injected anesthetic relative to dura and spinal cord. **A**, Spinal anesthesia. **B**, Single-injection epidural. **C**, Epidural catheter. (Interspaces most commonly used are L2-3, L4-5, L3-4.)



Advantages of Regional Anesthesia



Disadvantages of Regional Anesthesia



Moderate Sedation

- Minimal depression of consciousness
- Retains ability to maintain airway
- Can respond appropriately to commands
- Increases pain threshold
- Induces degree of amnesia
- Quick emergence/ rapid return to normal

Anesthesia

Preoperatively

Patient assessed by anesthesiologist





Anesthesia Classification

- P1-normal.
- P2-mild systemic disease.
- P3-severe disease that limits activity but is not incapacitating.
- P4-severe disease that is a constant threat to life.
- P5- moribund patient not expected to survive 24 hrs with or without surgery.
- P6-brain dead, removing organs.



Anesthesia

- Risks classified based on physical status
 - High
 - Medium
 - Low

Three Phases of Anesthesia

- Induction
- Maintenance
- Emergence

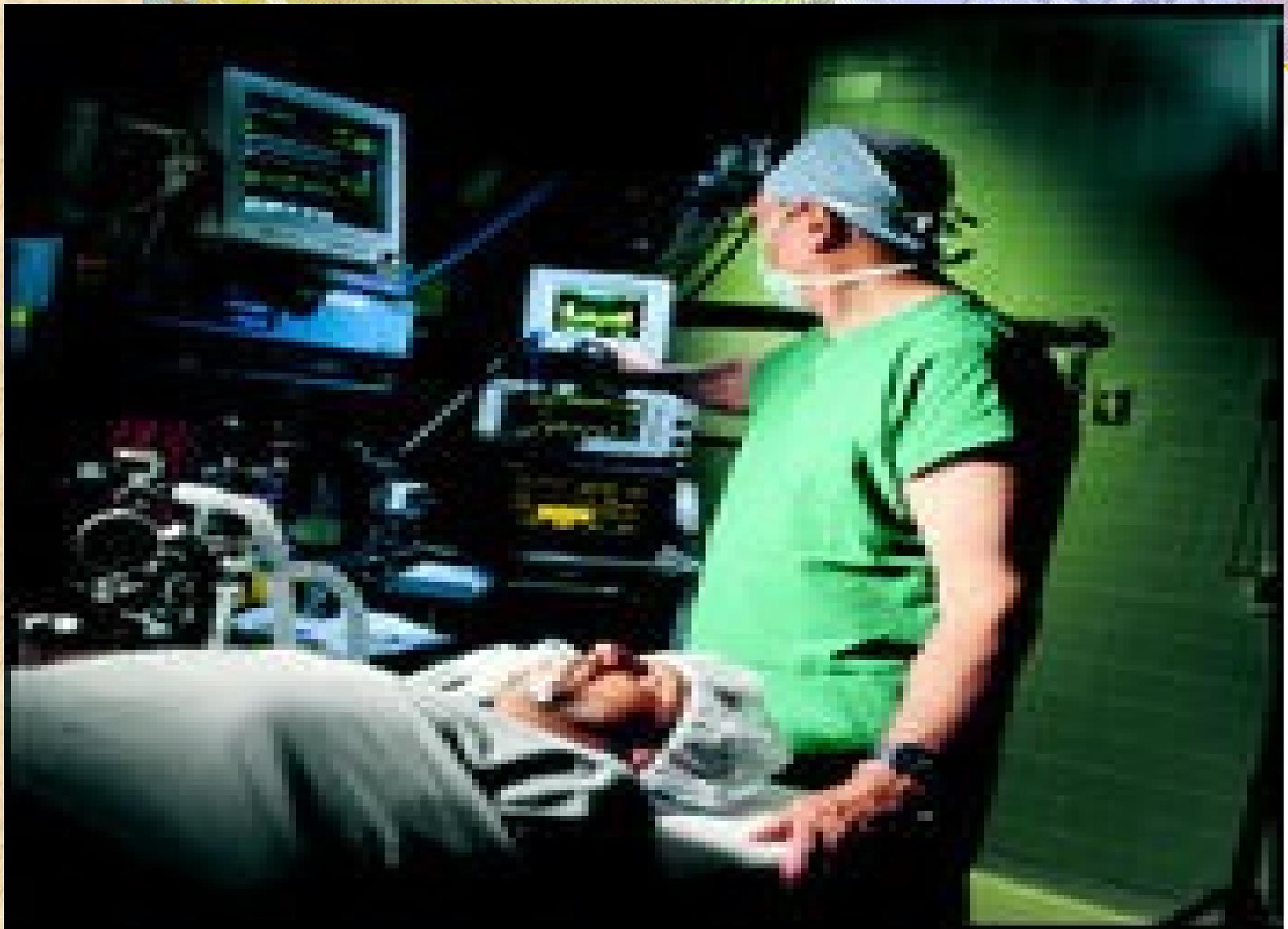




Anesthesia

Intraoperatively

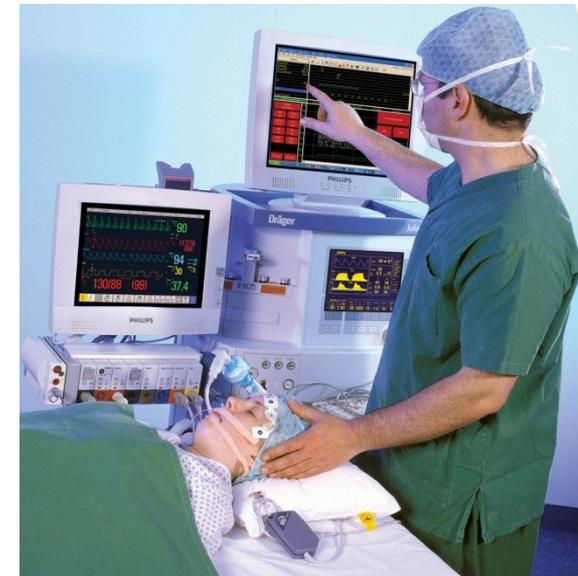
- **Induction occurs**
 - Awake/sedated or unconscious
 - Administration of anesthetic agent
 - Intubation
- **Maintenance of anesthesia**
 - monitoring- IV, Monitors, EKG, BP, Temperature, FI02, ETC02, Sa02 A-line, Pa-Line, Cardiac output, SVR.



Anesthesia

Postoperatively

- **Emergence – waking up**
- Postoperative Follow-up
 - Experience memory (amnesia)
 - *H/A*
 - *N/V*
 - Pain
 - Complications





Complications of Anesthesia

- General Anesthesia
 - Overdose
 - Hypoventilation
 - Intubation complications
 - Aspiration
 - Laryngospasm/bronchospasms
 - Sore throat/hoarseness = Edema of larynx
 - Allergic reaction
 - Hypotension



Complications of Anesthesia

- Regional Anesthesia
 - Nerve damage
 - Hematoma at injection site
 - Spinal headache
- Local Anesthesia
 - Safe with rare complications



Malignant Hyperthermia

- Reaction to certain anesthesia drugs
- Succinylcholine primary trigger
- Genetic manifestation
- Altered control of calcium level in muscles
- Hypermetabolism of skeletal muscles
- Leads to muscle contracture
- Leads to acidosis



Malignant Hyperthermia

- Tachycardia, Tachypnea
- Dysrhythmias
- Muscle rigidity and stiffness
- Hypotension
- Kidney failure/Dark brown urine
 - Myoglobinuria
- Elevated temperature is a late sign



Anesthesia in the Elderly

- Titrate for elderly.
- Age affects not just anesthesia but blood loss, fluid loss, replacement, hypothermia, pain.
- Closely monitored
- Some have trouble with communications.
- Skin sensitivity: tape, pressure, blankets

Teaching Important!





Transferring Patient

- Transfer patient from stretcher to OR table
 - Adequate personnel to transfer, wheels locked
- Grounding pad placed to pt. thigh
- Monitor leads attached
- IV started if not done
- When anesthesia induced, circulating RN stays with patient to ensure safety
- Insertion of NG tubes, foley, skin prep, etc.
- Surgical Site Prep and Drape



Positioning for Surgery

- **Safety is primary concern in positioning patient**
- Combined effects of anesthesia & positioning can cause skin, muscle, & joint trauma
- Need to assess for any special needs/protection

Positioning for Surgery

- Criteria for positioning





Types of Positioning

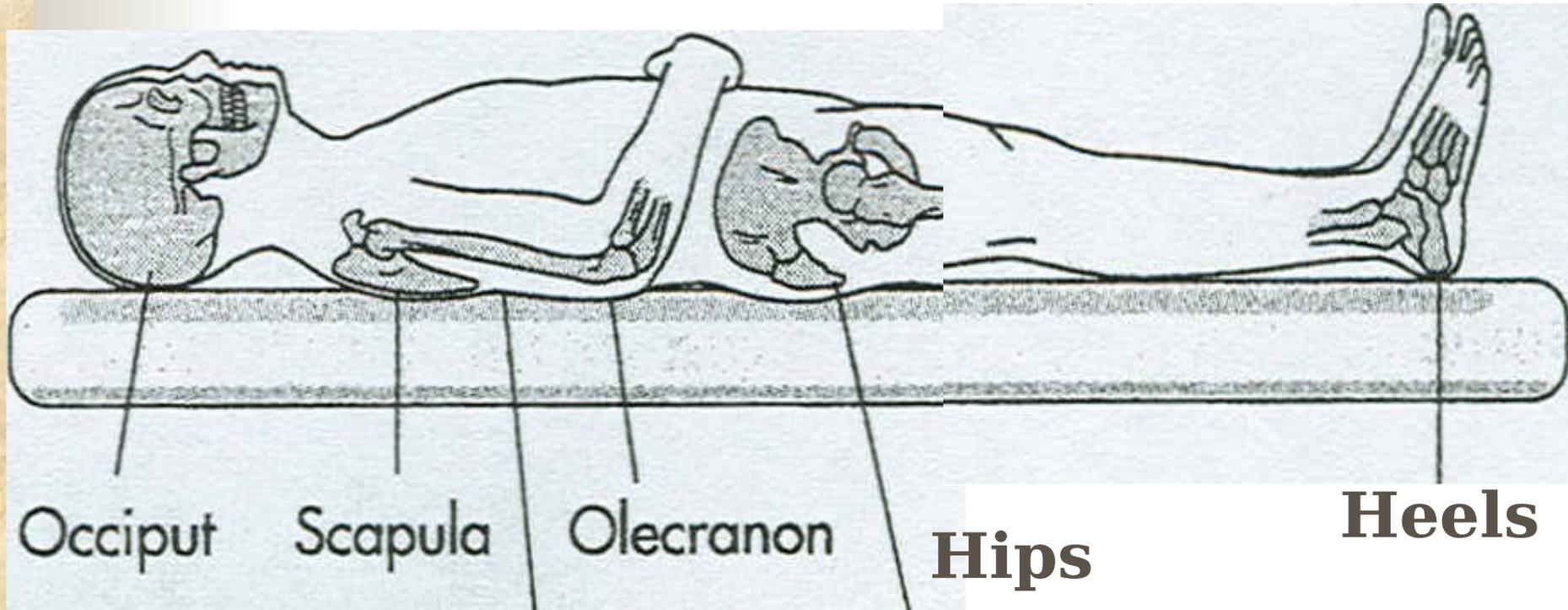
- Variety of positions used
- Primarily variation of 3 basic positions
 - **SUPINE**
 - **PRONE**
 - **LATERAL**
- devices may be used to maintain correct position & prevent injury



Types of Positions

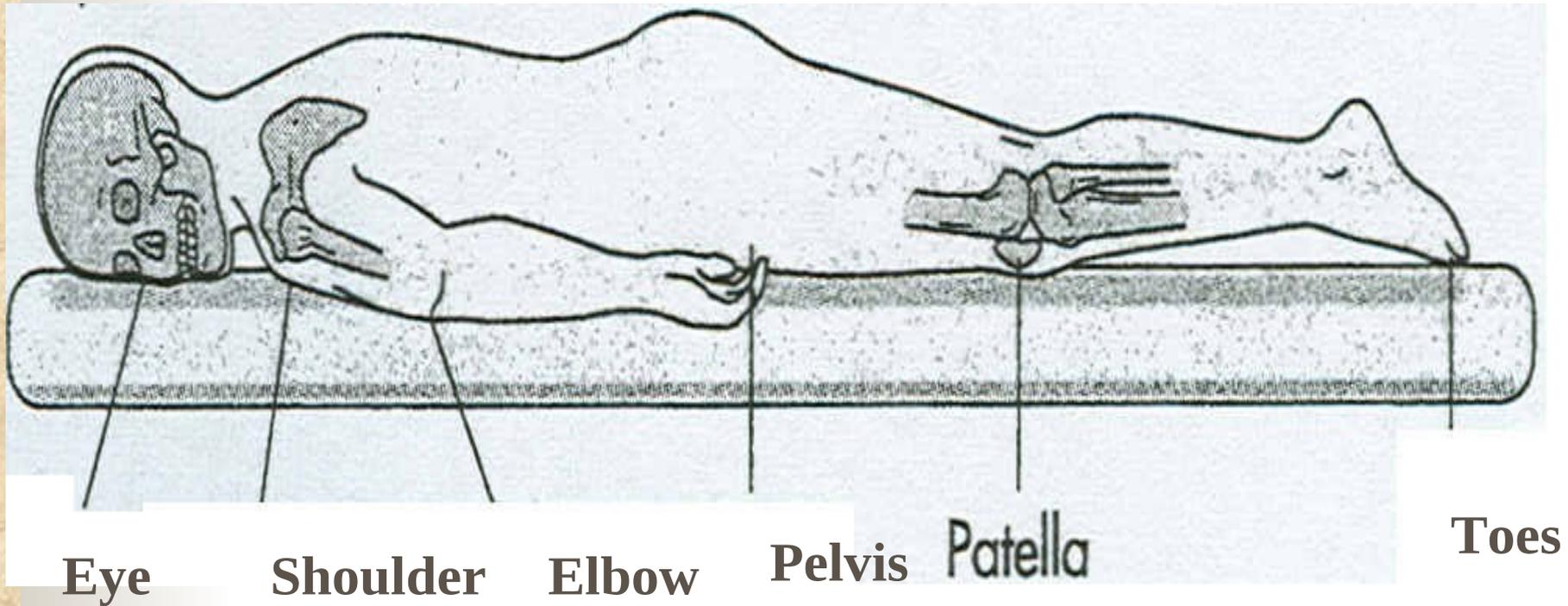
- Other positions include
 - Trendelenberg
 - Lateral
 - Kidney
 - Lithotomy
 - Jack Knife
 - Sitting

Supine Position



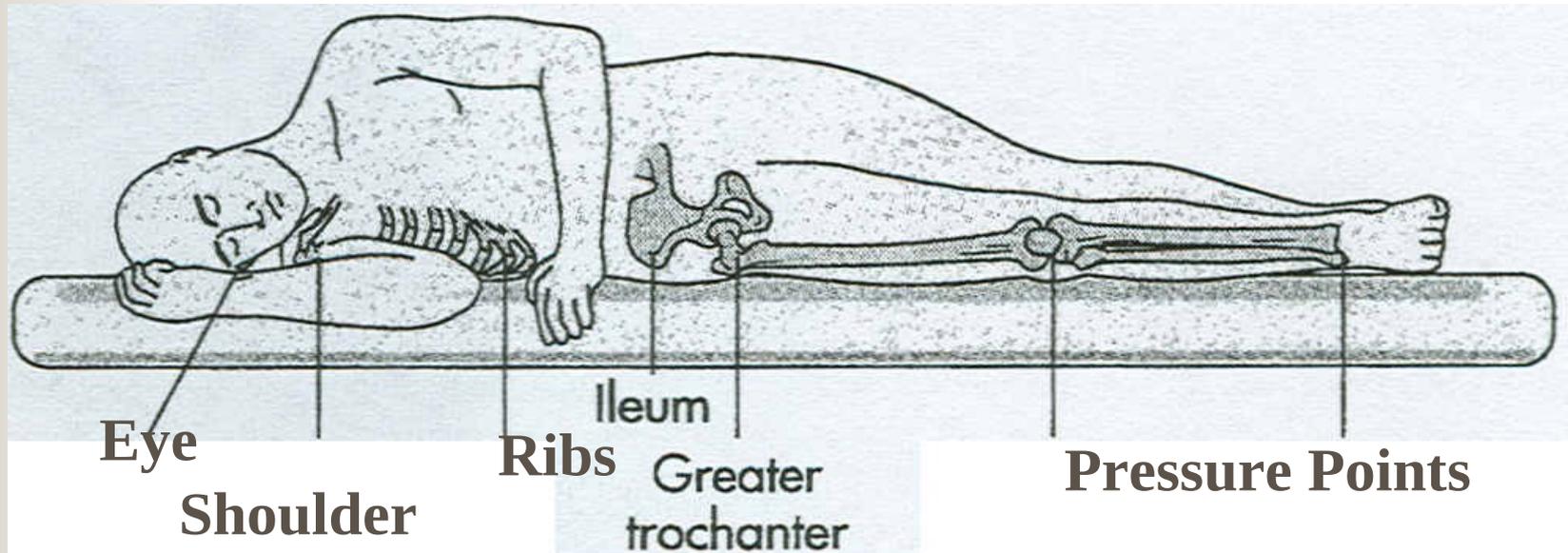
used in abdominal and chest surgeries. Can cause breakdown of Heels, elbows, sacrum, pressure alopecia, lumbar pain.

Prone Position



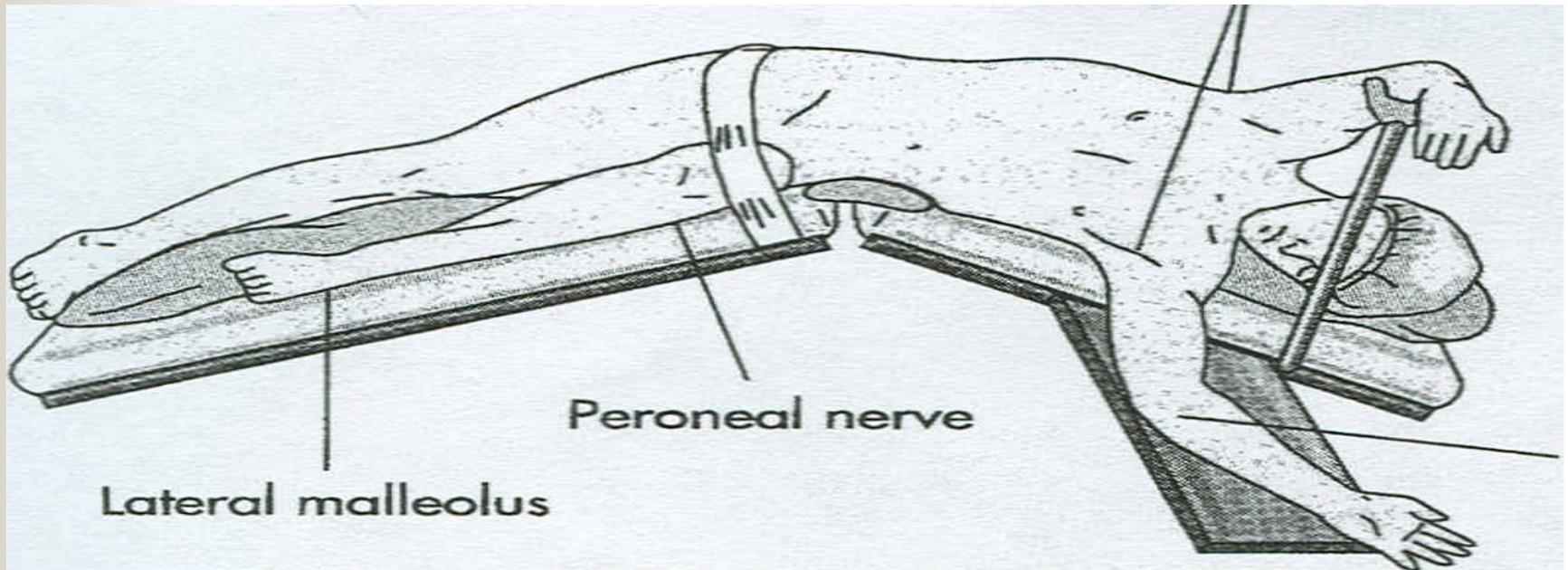
Used in _____ . Can
Cause skin breakdown on _____ .

Lateral Position



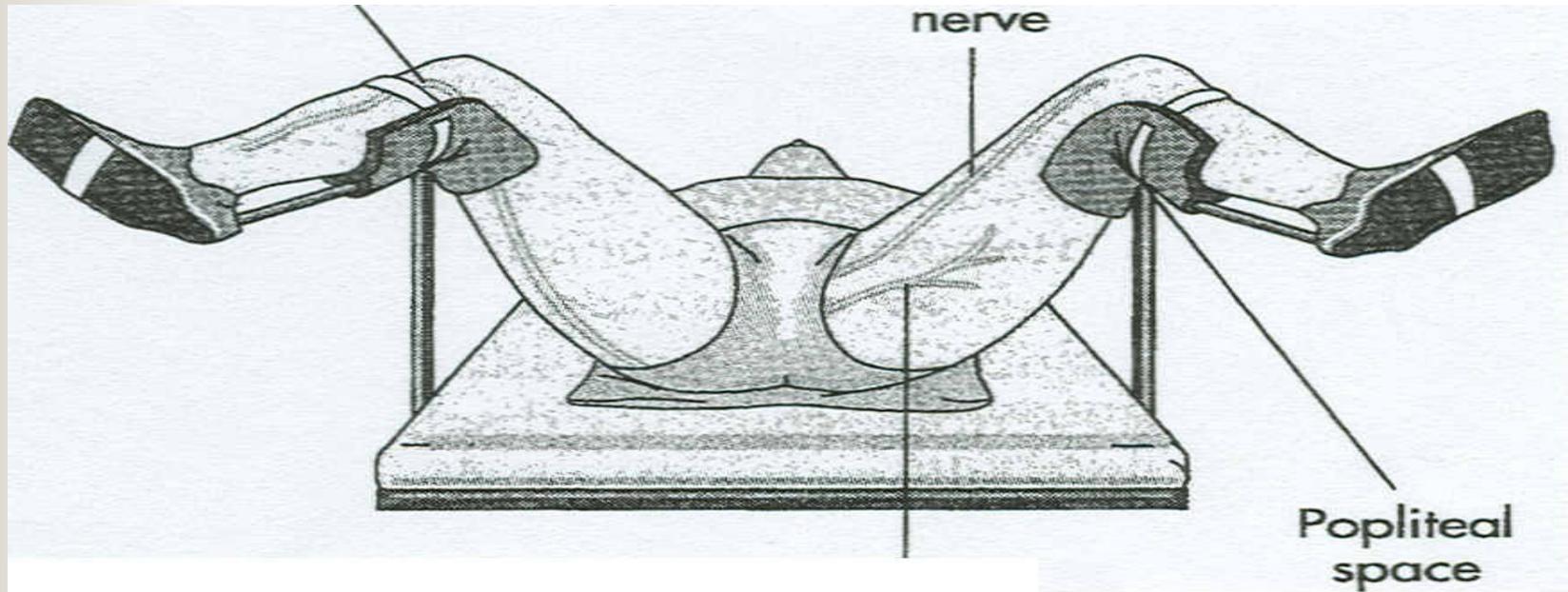
Used in _____ surgeries. Can cause _____.

Lateral/Kidney Position



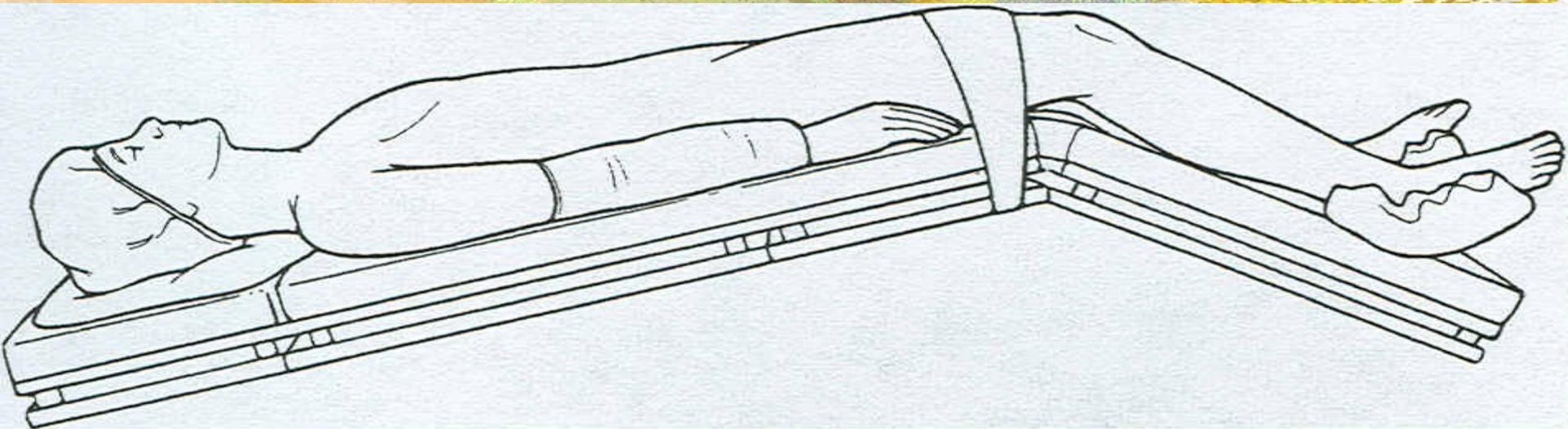
**Used in _____ . Can
cause _____ .**

Lithotomy Position

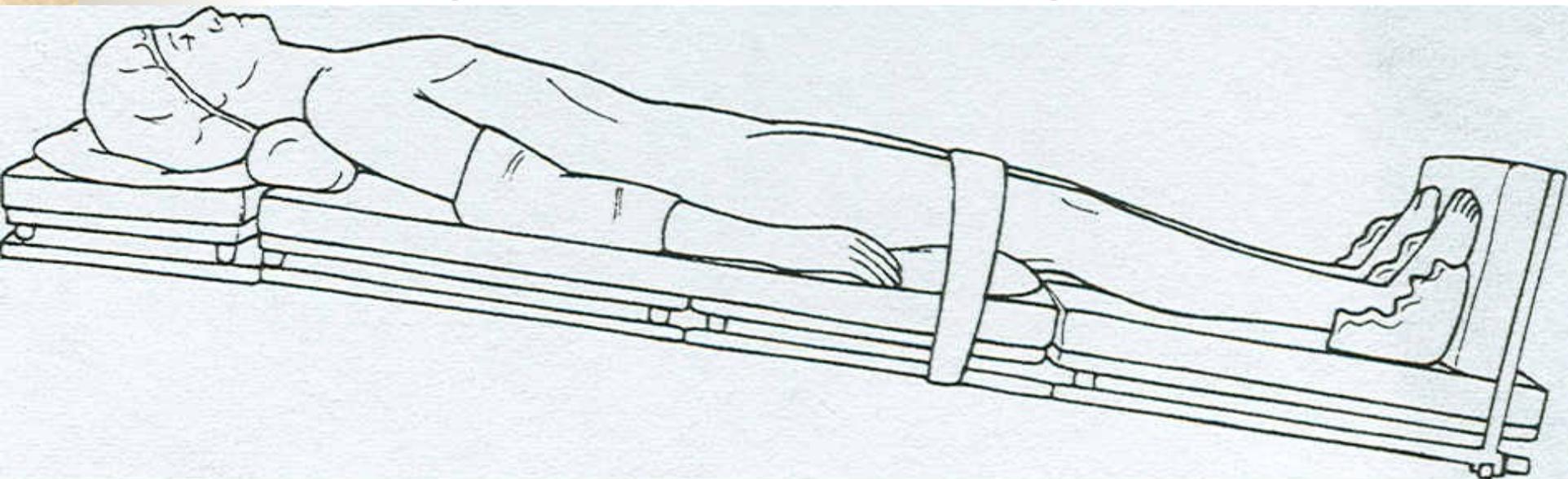


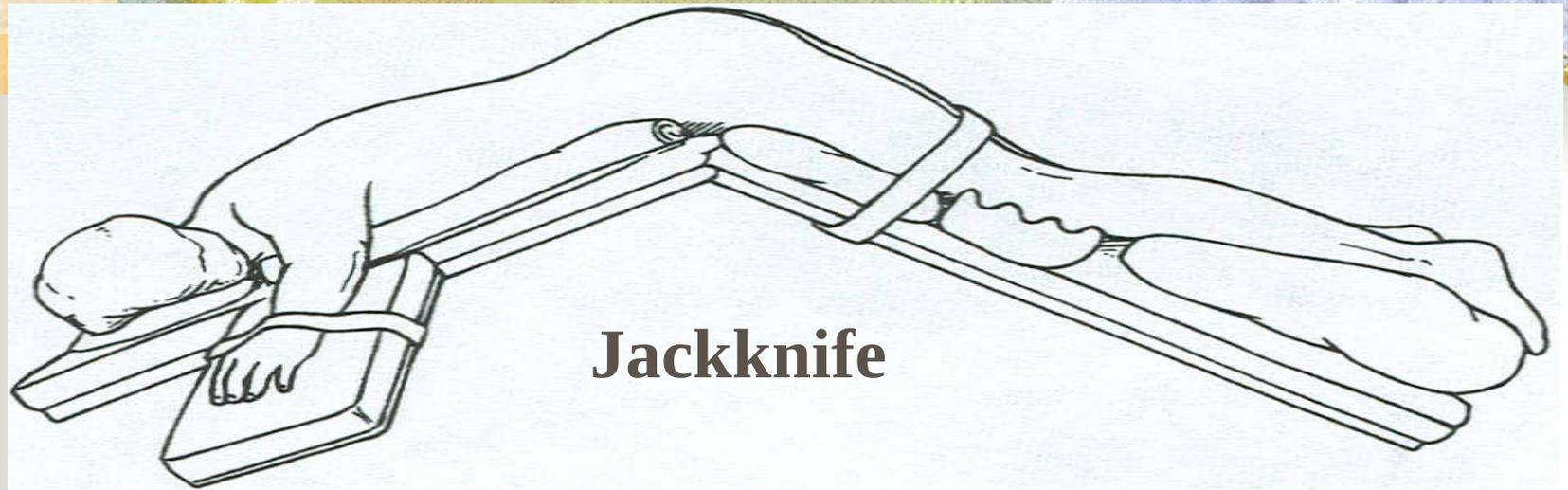
Used in _____.

Can cause _____.

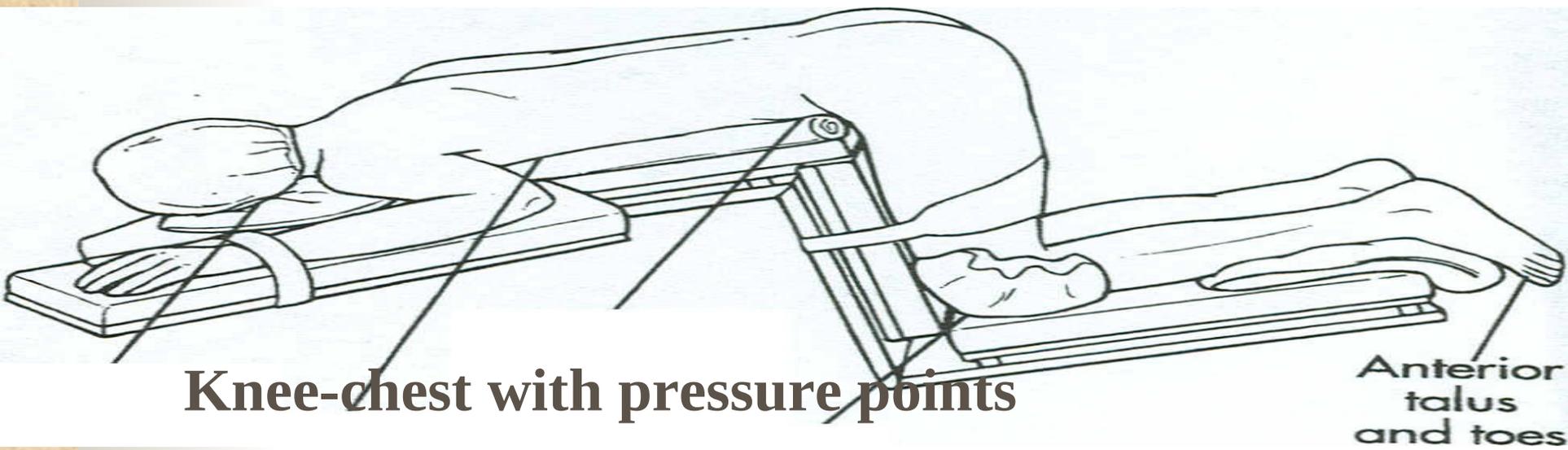


Trendelenburg & Reverse Trendelenburg





Jackknife



Knee-chest with pressure points

Anterior talus and toes

Used in back and rectal procedures. Can cause skin breakdown and neck pain



**Safety is prime
concern in the
OR**



Safety in the Operating Room

- never leave a sedated patient unguarded
- use good body mechanics & adequate restraints
- correctly identify patient, operative sites, drugs/medications
- create, maintain, & control an optimally therapeutic environment in the OR
- assure mandatory aseptic principles are adhered by the entire team at all times



Safety in the Operating Room

- prevent foreign body from remaining in the patient
- Careful handling & accurate labeling of all specimens & cultures
- Respect equipment. Proper care & handling
- Documentation of all that occurs
- Adhere to established standards of safety



Safety in the Operating Room

- Burns
 - With use of chemical skin cleaners
 - Lasers cause burns
- Electrocautery – grounding pad on patient to prevent electrical shock and burns.
 - No jewelry or metal on patient
 - Place grounding pad on thigh or thick tissue away from surgical site and pacemakers

Implementing Aseptic/Sterile Technique





Aseptic Technique

- Eliminating all modes and sources of contamination to the extent that is possible
- People are the **BIGGEST** source of bacteria



Modes of Contamination

Source of contamination - two types

- _____ – from within the patient
 - Skin, hair, blood, respiratory, GI, GU

- _____ – from outside the patient
 - People and environment

Sources of Contamination

- Scrub team skin
- Patient skin
- Patient circulating blood (hematogenous)
- Patient respiratory tract
- Patient GI/GU tract
- Scrub team respiratory tract
- Scrub team hair
- Circulating air
- Linens, instruments, sutures





Modes of Transmission

- Contact – direct or indirect
- Vehicle – food, water, drugs, blood
- Airborne – carried with circulating air
- Vector – insect, rodent, etc. (hopefully not a concern in the OR 😊)



Modes of Contamination

- Contact (direct or indirect) between non-sterile & sterile surface
 - surgeon's back touching sterile basin
 - puncture in sterile glove
 - contact by circulating nurse to sterile field



Modes of Contamination

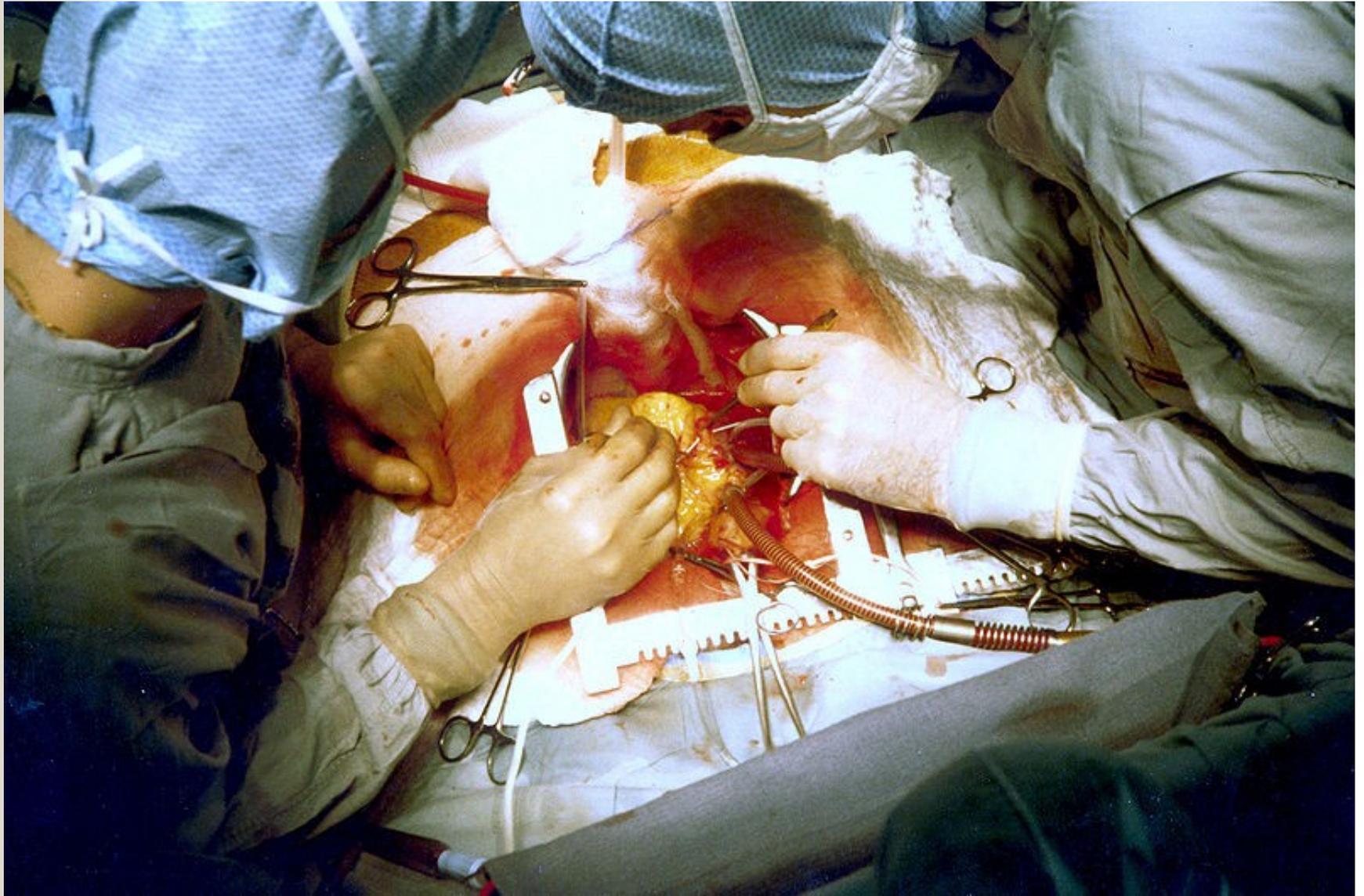
- Droplets falling on sterile surface
 - droplets passing through surgeon's mask
 - beads of perspiration falling into wound
 - perspiration occurring through sterile gown

Modes of Contamination

- Non-sterile air circulating over sterile surface
- Contaminated equipment/linens
- Break in sterile field
- Hematogenous - from patient's own circulating blood
 - WBCs elevated, preop infection
 - Trauma cases



Name possible sources of contamination





Implementing Aseptic Technique

- <http://www.youtube.com/watch?v=5Dki5jFlE8o>
- **Create & maintain sterile field**
 - Everything in sterile field is **STERILE!!!**
 - Center of sterile field is site of surgical incision
 - Articles surrounding center are surgical items
 - All equipment sterilized
 - Sterile liquids poured from point high enough to prevent touching of sterile container but to avoid splashing



Implementing Aseptic Technique

- Patient at risk if asepsis is broken
 - Increased infection
- Wide margin of safety between sterile and unsterile
 - **At Least ONE FOOT.**



Implementing Aseptic Technique

*If sterile item touches
non-sterile,
it becomes contaminated.*

- *Only sterile can touch sterile!!*



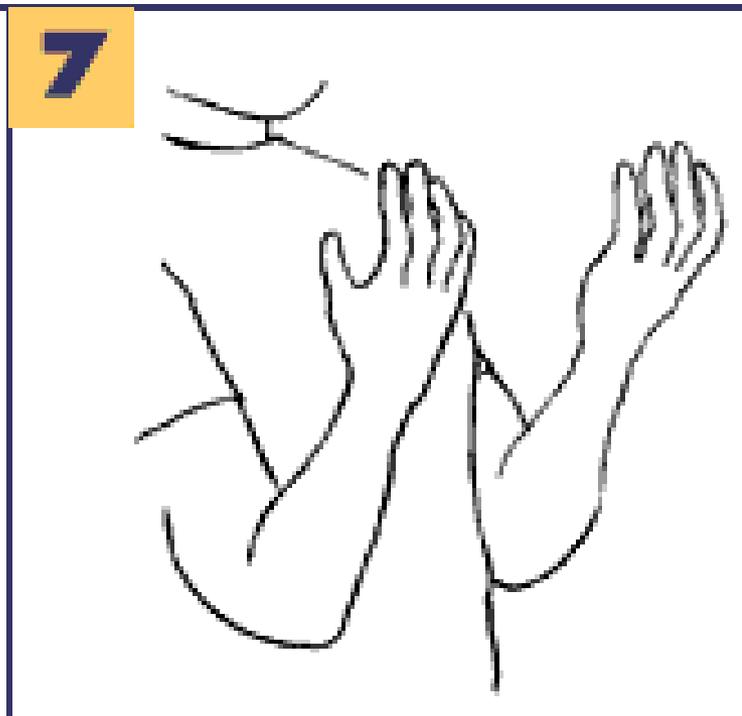
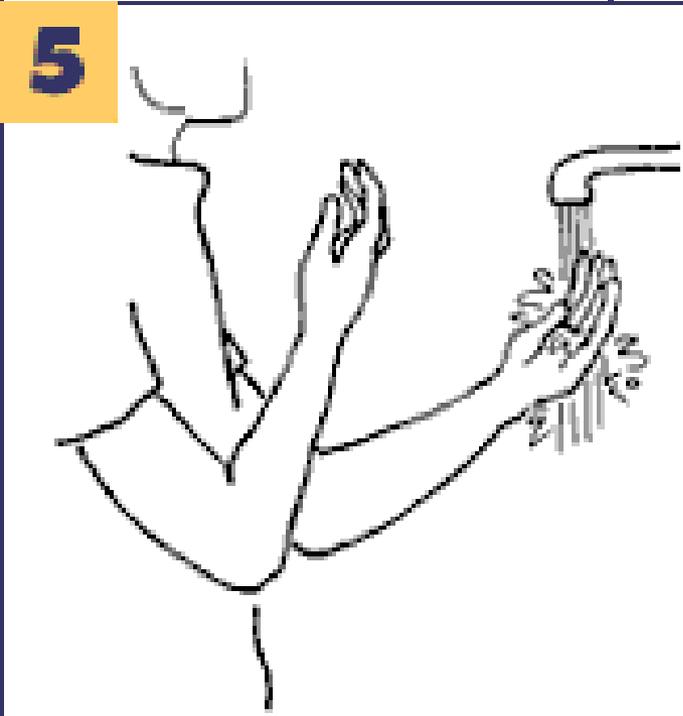
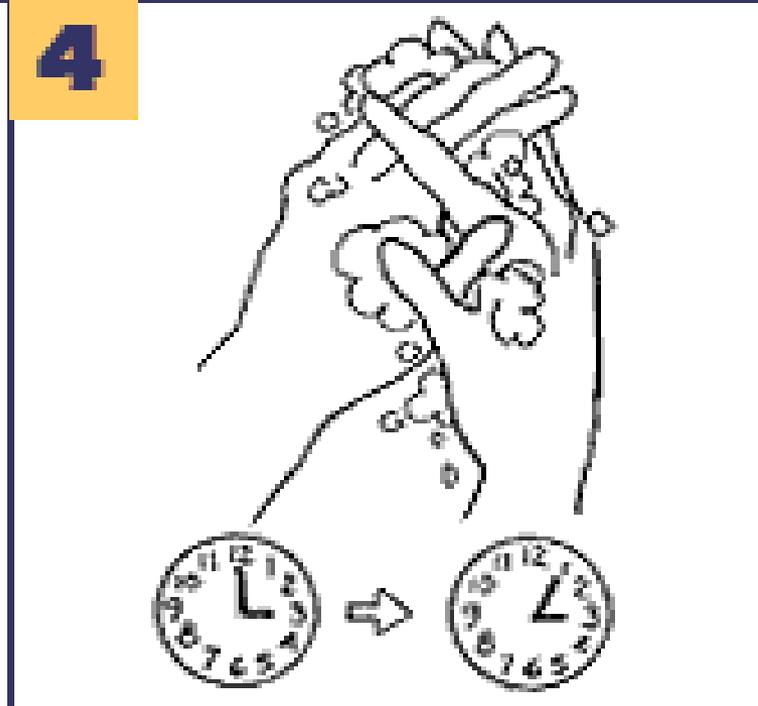
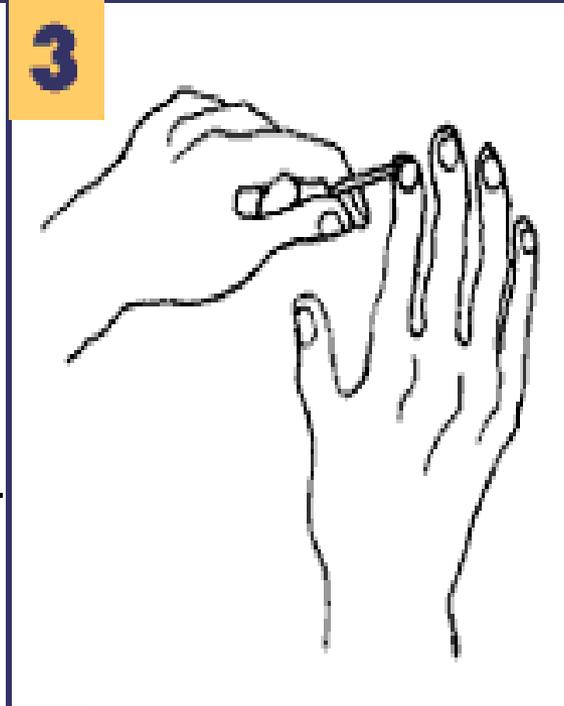
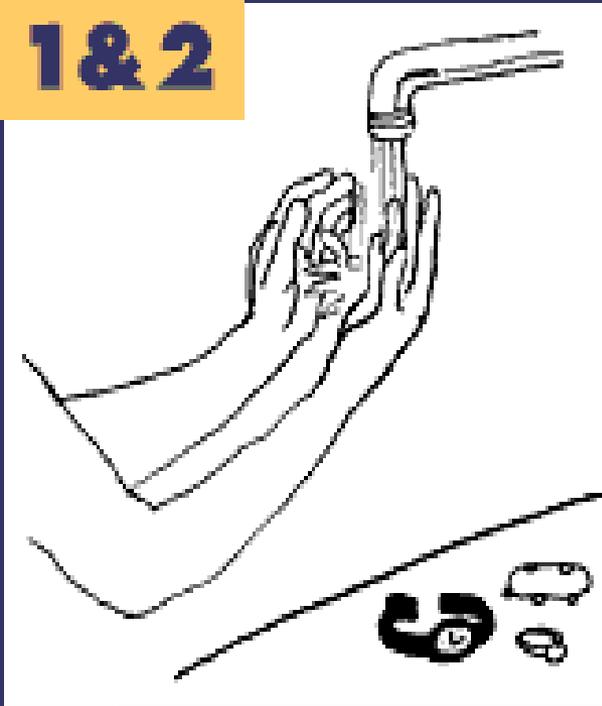
Implementing Aseptic Technique

- Only part of gown considered sterile is front from chest to table level and sleeves to 2 inches above elbow.
- Sterile field at table height...anything below is considered unsterile.
- If left unattended, sterile field considered contaminated

Surgical Hand Scrub

- hands washed first & lathered
- special brush scrubs fingers, hands, arms for FIVE minutes. Fingers, hands, arms to elbows
- water controlled by feet
- rinse with hands held higher than elbows
 - prevents water from draining from unclean(elbows) to clean (scrubbed area)
- once rinsed, dried with sterile towels
 - hold away from body, above waist
- Gloved & gowned with assistance





Sterile Gloving



<http://www.youtube.com/watch?v=jqi6HD645oU>



Steps of Sterile Gloving

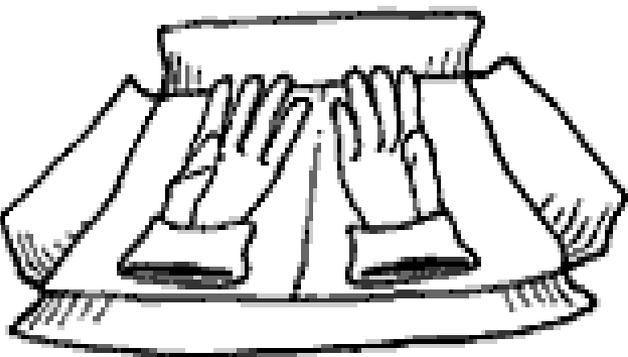
- **Step 1:** Prepare large, clean, dry area for opening gloves. Open outer package before surgical scrub or have someone assisting.
- **Step 2:** Open inner glove wrapper, cuffed gloves with palms up.
- **Step 3:** Pick up first glove by slipping fingers under cuffed edge, touching only underside of cuff

- 
- **Step 4:** While holding cuff in one hand, slip other hand into glove. (Pointing fingers towards floor keeps fingers open). DO NOT touch anything. Keep gloved hand above waist. If first glove not on correctly, wait to make adjustment with second glove on. Use sterile fingers of one glove to adjust sterile portion of other glove
 - **REMEMBER:** Only sterile can touch sterile!

- **Step 5:** Pick up 2nd glove by sliding fingers of gloved hand under cuff of 2nd glove. Be careful not to contaminate gloved hand with ungloved hand as put 2nd glove on.
- **Step 6:** Put 2nd glove on ungloved hand by maintaining steady pull through cuff.
- **Step 7:** Adjust glove fingers until gloves fit comfortably.



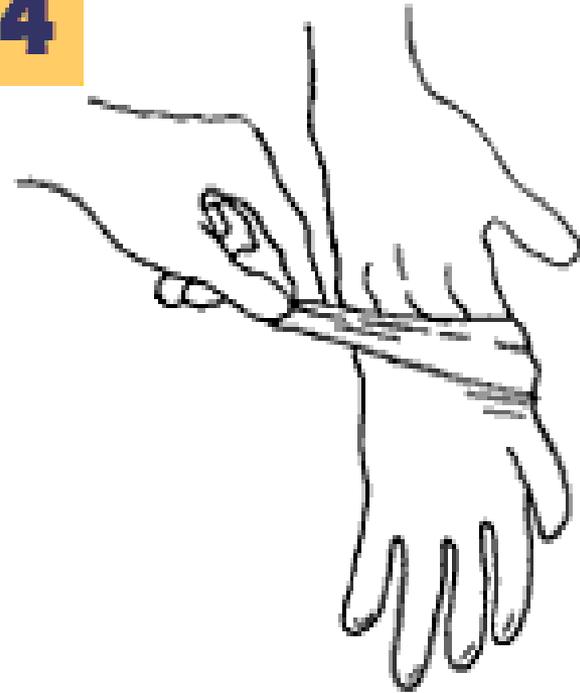
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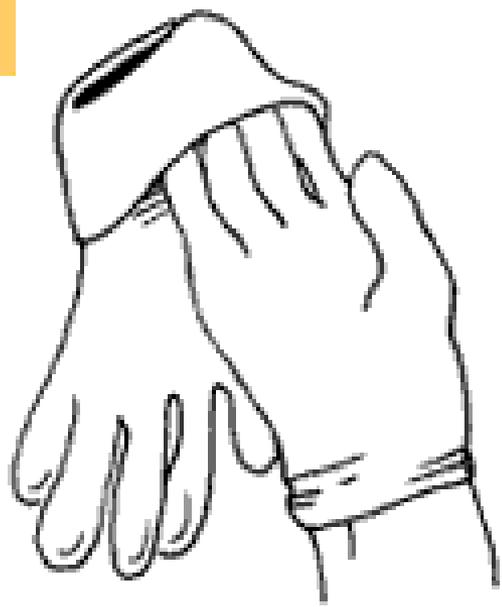
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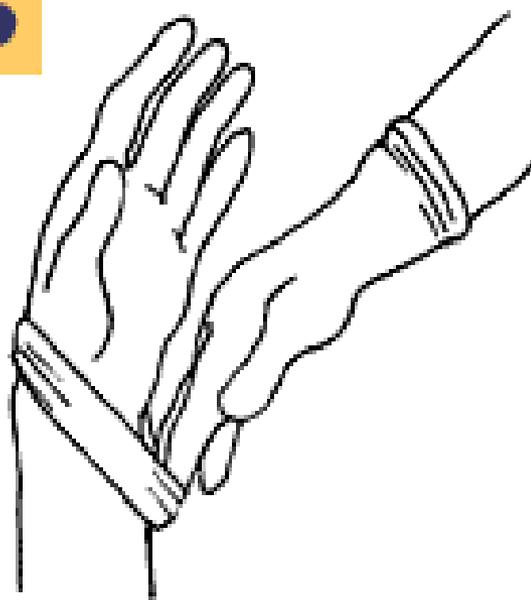
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5



6



**Donning
Sterile
Gloves**



Implementing Sterile Technique

- **Masks:**
- **Gowns:**
- **Waterproof apron:**
- **Footwear:**

Preparation of Operative Site

- Bacteria found in all levels of skin
 - **transient bacteria:** limited to exposed skin & easily removed by mechanical cleansing
 - **resident bacteria:** inhabit deep structure of dermis, sweat glands, hair follicles
- **Soaps/detergents**
 - emulsify & peptize skin bacteria & oils on skin surface to allow them to be rinsed away with running water



Preparation of the Operative Site

- Skin preparation objective
 - **remove dirt & transient microbes**
 - **reduce resident count as much as possible**
 - **prevent rapid rebound growth of microbes**
 - **minimal tissue irritation**



Preparation of Operative Site

- Antimicrobial agents disinfect skin
 - type chosen by ability to decrease microbial count skin, easily applied, & effective for period of time.
- Povidone-Iodine: potent germicidal
 - release gradually as brownish color fades
 - safe on mucous membranes
 - effective in presence of pus
- ChloroPrep: can be blue color



Preparation of Operative Site

- Hair Removal
 - wet shave
 - hair clip
 - depilatory
- Shave performed immediately prior to surgery in OR
 - time between pre-op shave & surgery has direct effect on wound infection rates



Preparation of Operative Site

- After patient on table, final skin prep done
 - final skin cleansing & disinfecting
 - done by circulating nurse or surgeon
 - begins at site of proposed incision & proceeds to periphery of area
 - *Cleanest area first- never dirty to clean*
- Wet drapes removed



Preparation of Operative Site

- Surgical drapes applied
 - **creates area of asepsis - sterile field**
- Draping material decreases passage of microorganisms from unsterile to sterile
 - Resistant to blood, aqueous fluid,
 - Lint free



Cloth Surgical Drape for Laminectomy



Preparation of Operative Site

- Disposable drapes
 - synthetic, light weight, lint free, moisture resistant.
 - May be penetrated by sharp instrument & violate field
- Plastic Incisional drapes; impermeable polyvinyl sheets applied directly to skin
 - surgeon makes incision directly through drape
 - Orthopedic procedures to decrease splattering and transmission of organisms.



Applying Plastic Incisional Surgical Drapes



Cloth and Plastic Surgical Draping

Care of Surgical Specimens



Surgical Specimen - Ovary



Blood Loss & Hemostasis

- Arrest or control of bleeding
 - naturally by clotting factors
 - artificially/chemically or combination
- Hemostasis in surgery
 - prevents hemorrhage
 - allows visualization of surgical field
 - promotes wound healing



Blood Loss & Hemostasis

■ Natural

- Normal defense mechanism of fibrinogen
- Platelets
- Prothrombin + Factor V
→Thrombin
- Fibrinogen → Fibrin



Blood Loss & Hemostasis

■ Artificial

- Instruments (hemostat clamps vessels)
- Manual Pressure
- Heat (cautery)
- Bonewax: refined beeswax used to control marrow oozing (neuro & ortho)
- Ligating clips
- Tourniquets



Blood Loss & Hemostasis

Chemical

- Thrombostat: enzyme extracted from beef blood accelerates clotting
- Gelfoam: gelatin sponge dipped in epinephrine or thrombostat placed on bleeding area. Absorbed by the body
- Tranexamic Acid/Amicar

Electrocautery



Wound Classifications

- Intentional or Unintentional
- Degree of wound contamination
- By depth or severity of injury



Intentional or Unintentional

- Intentional
 - Venipuncture
 - Surgical incisions
- Unintentional
 - Broken arm
 - Gun shot wound
- Open – skin or mucous membrane broken
- Closed – no break in skin



Degree of Contamination

- _____ – uninfected wound that does not enter the respiratory, GI/GU tract
- _____ – surgical wound enters respiratory, GI/GU tract
- _____ – open, fresh wound (surgical or accidental) with break in asepsis or trauma
- _____ – wound site with pathogens/signs of infection



By Depth

- Partial thickness wound
 - Confined to dermis and epidermis
 - Superficial
 - Heal by regeneration
- Full thickness wound
 - Involves dermis, epidermis, subcutaneous, muscle, or bone
 - Penetrating or Perforating
 - Requires connective tissue repair



Incision Closure

- Sutures

- Absorbable – natural material

- Digested or hydrolyzed by tissue in 7-10 days
- Collagen, Vicril

- Non-absorbable – metal, nylon, polyester

- Must be removed before healing complete
- Ethilon

Sutures

- Multiple layers of tissue closed with sutures. What kind would be used for internal tissue?
- Removal of sutures – usually 7-10 days post-op.
- Face – 3-5 days to reduce chance of scarring
- Pattern of removal –
 - EVERY OTHER ONE



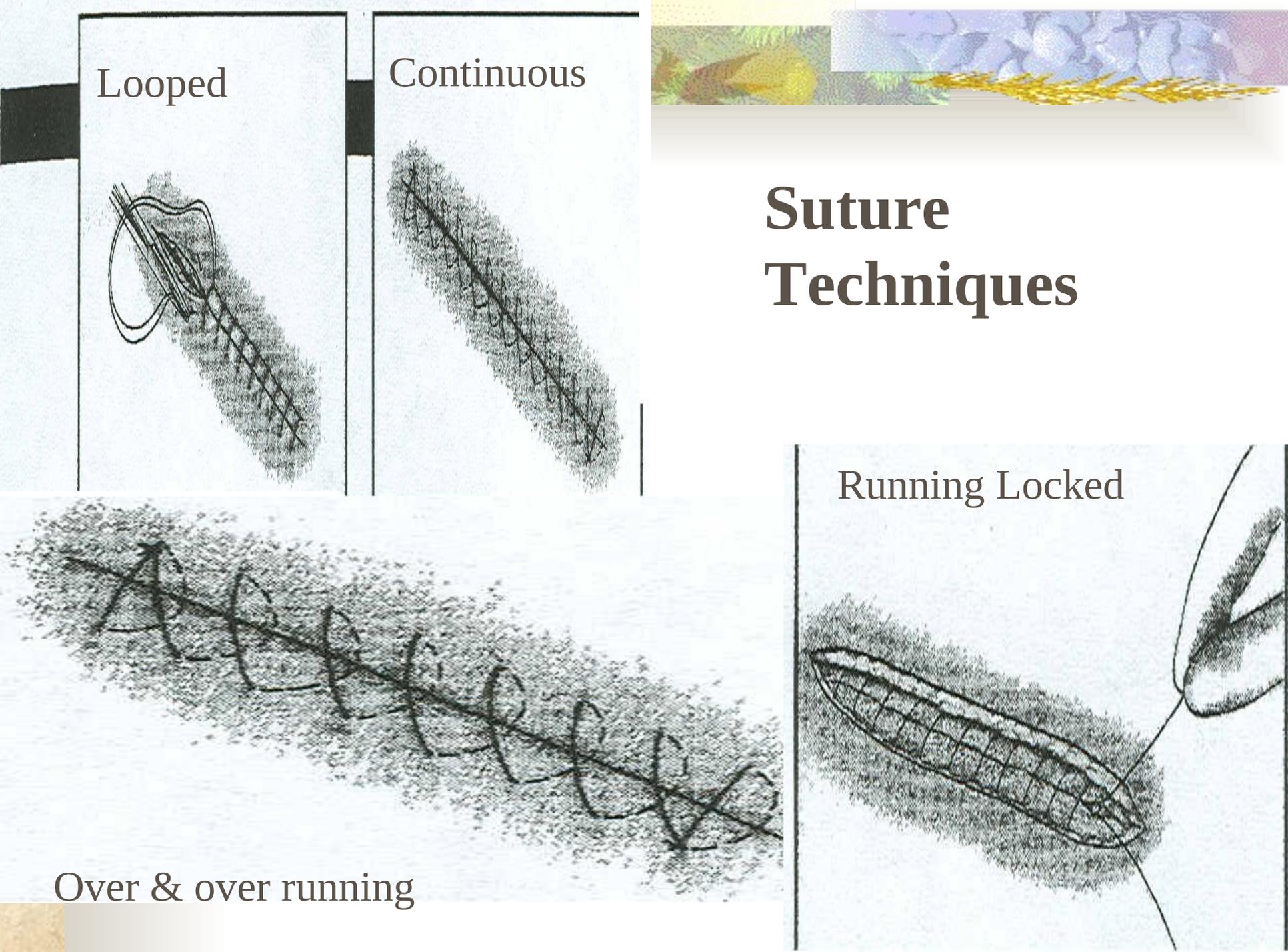
Looped

Continuous

Suture Techniques

Running Locked

Over & over running







Retention Sutures

- Retention Sutures (**Secondary Sutures**)
 - Large, rubber encased wire sutures
 - Used in areas with increased pressure on incision (abdomen)
 - Obese patients with high risk of dehiscence



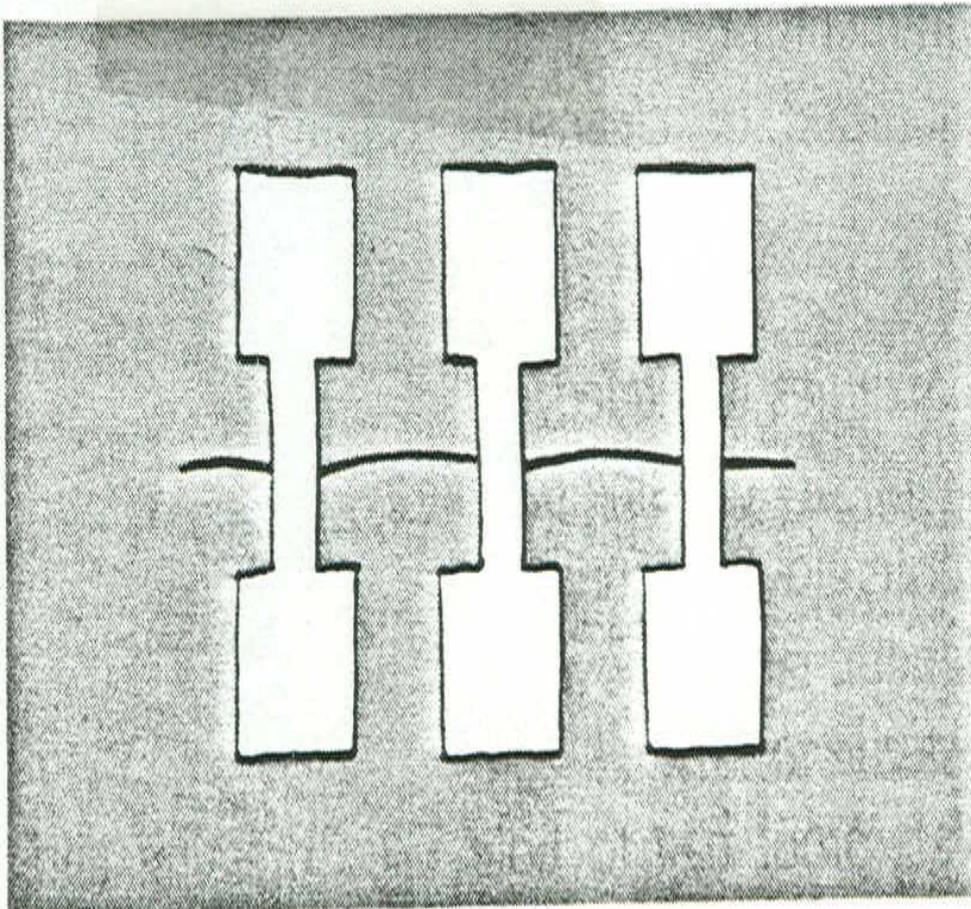
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Staples

- Staples
 - Metal so non-absorbable
 - Provide uniform tension on suture line
 - Applied with “staple gun”
 - Much faster to apply than sutures
 - Scarring if not removed within one week

Steri-strips/ Butterfly



Surgical Glue





Surgical Dressing

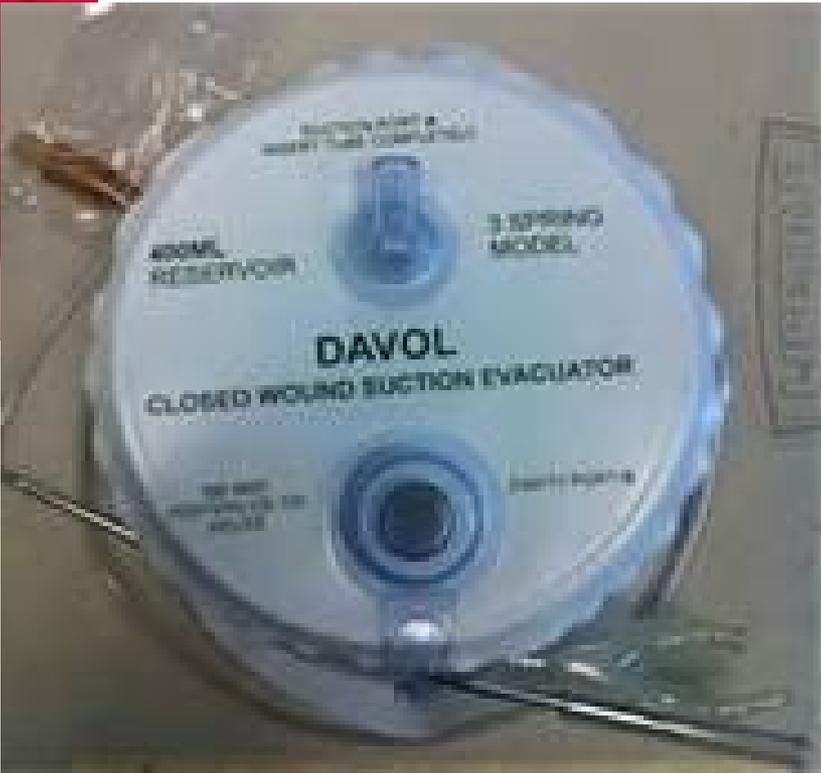
- Protect from microorganisms
- Aides hemostasis - pressure dressing
- Promotes healing



Incision Closure Materials Used

- Dry sterile Dressing: protects wound from environment contaminates and environment from wound contaminates
- Surgical Dressing - 3 layers
 - Contact or primary dressing: touches incision, skin, drainage, blood.
 - Absorbent layer: reservoir for secretions. Wick-like action, draws secretions away from wound
 - Outer layer: keeps organisms out of wound

Incision Drains



Placement of Drains:

- Where fluid expected to collect.
- Directly in wound
- Thru "stab wound"—separate small incision where drainage expected.



Types of Drainage Systems

- **Hemovac**



- **Jackson-Pratt (JP drain) /Blake Drain**

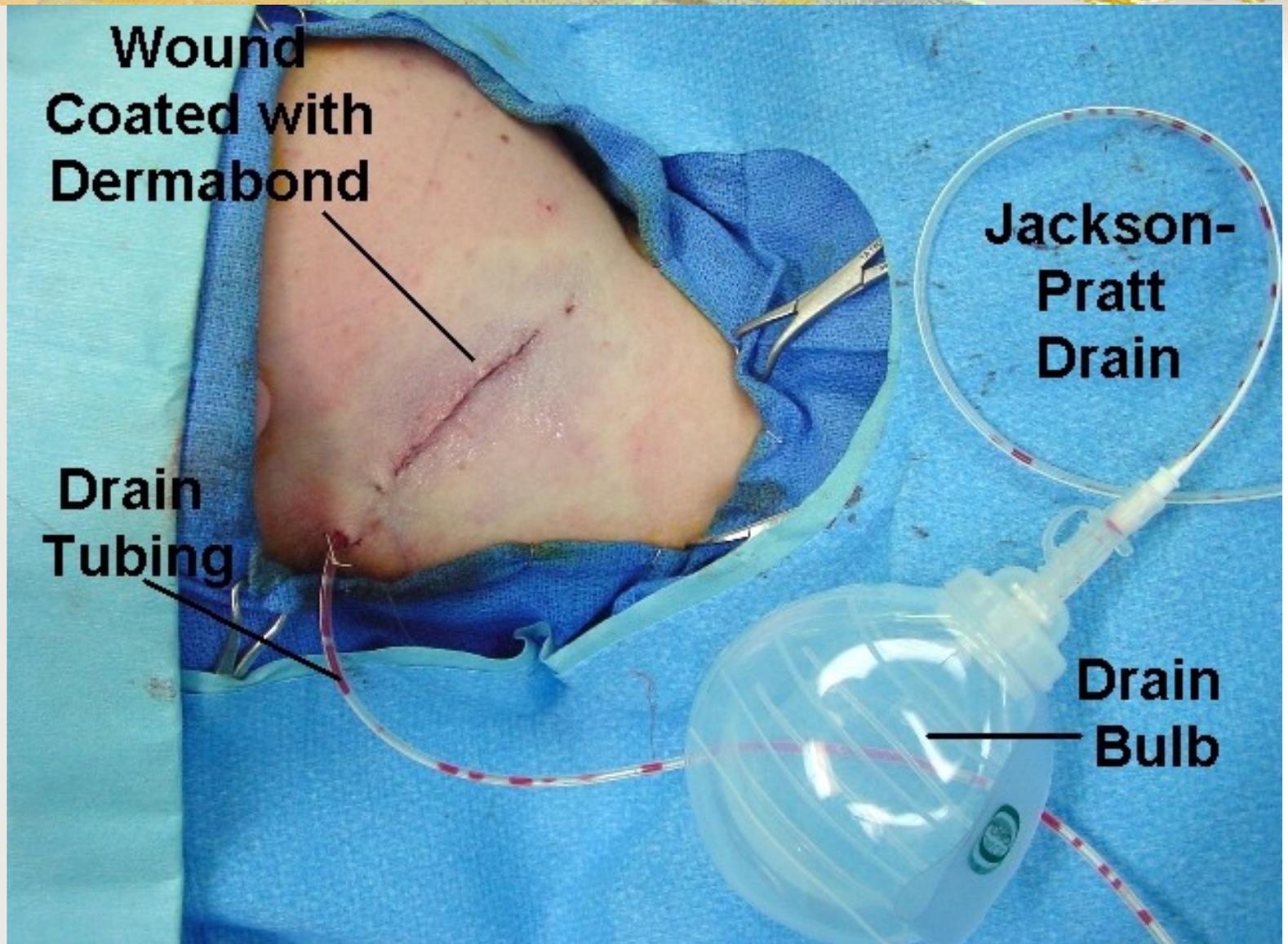


**Wound
Coated with
Dermabond**

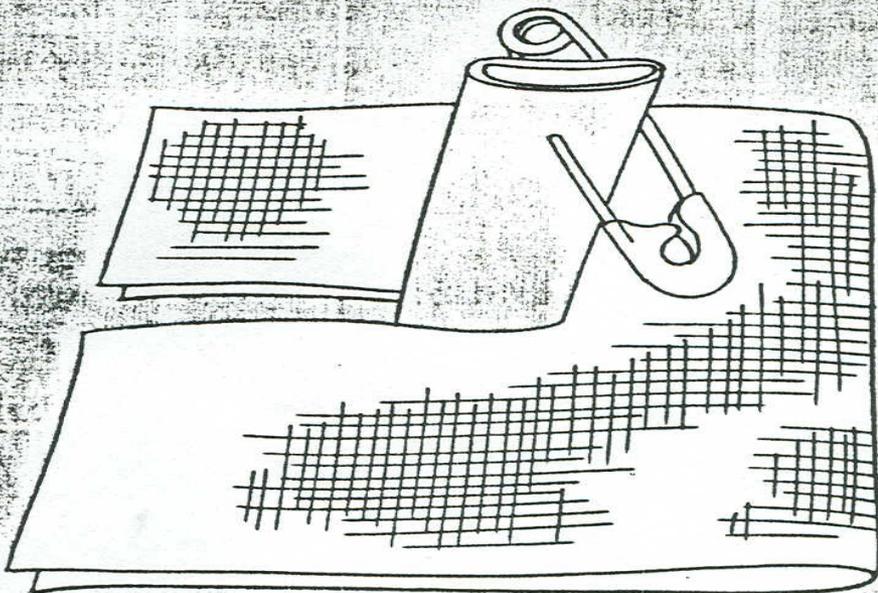
**Jackson-
Pratt
Drain**

**Drain
Tubing**

**Drain
Bulb**



Penrose Drain





Types of Drains

- **T -tube:** placed in common bile duct for bile drainage
- **Gauze wick, iodoform gauze:** allows healing from base of wound

Chest tube Pleuravac Drainage System

