Surgical Drains

Prof. Naveed Jabbar Bandesha

Chairman Department of Surgery & Allied

SMC/UOS

Sargodha

Introduction

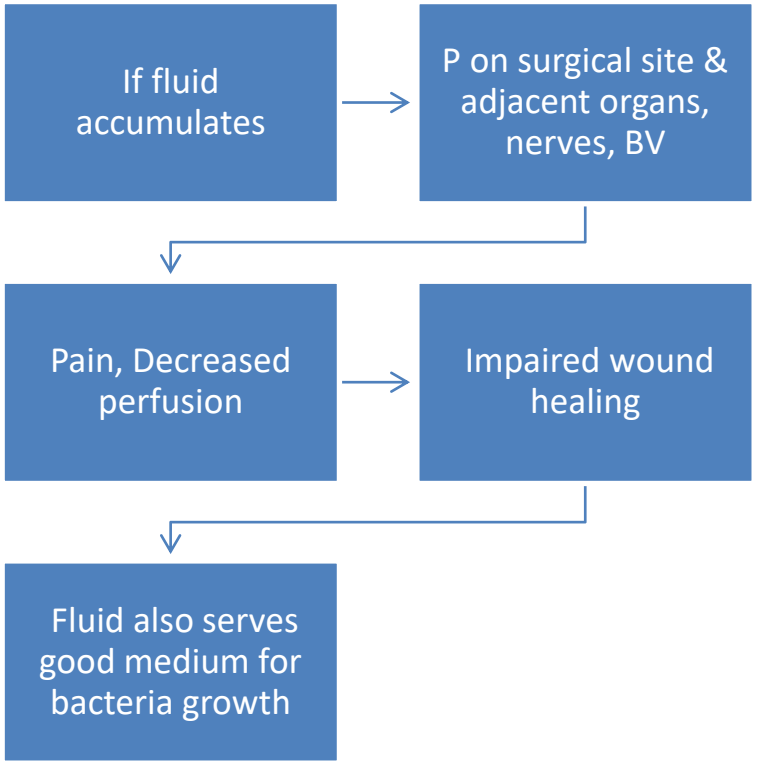
- Drains remove content of body organs, secretion of body cavities and other fluids
- Deliberate channels
- Use with prudence as useful & dangerous
- Use dates back to Hippocrates

Mechanism of Drain

- A Drain removes
- Contents of body as urine
- Excess secretions of body as in peritoneal & pleural cavities
- Tissues fluids as blood ,lymph

- Achieved by gravitational force or negative or positive pressures

Mechanism of Drain



- Efficacy of drain depends on
- Diameter , length
- Viscosity & consistency of fluid
- Force which could be +ve or –Ve pressure

Classification of Drains

Basis or Factor	Types	
Mechanism	Passive	Active
Nature	Tube	Sheet/ Flat
Disposition	Open	Closed
Location	Internal	External
property	Inert	Irritant

Passive Drains

- Act by the mechanism of capillary action, gravity or the fluctuation of intra-cavity pressure
- Used when drainage fluid is too viscous to pass through tubular drains

- Corrugated Rubber drain
- Penrose drain

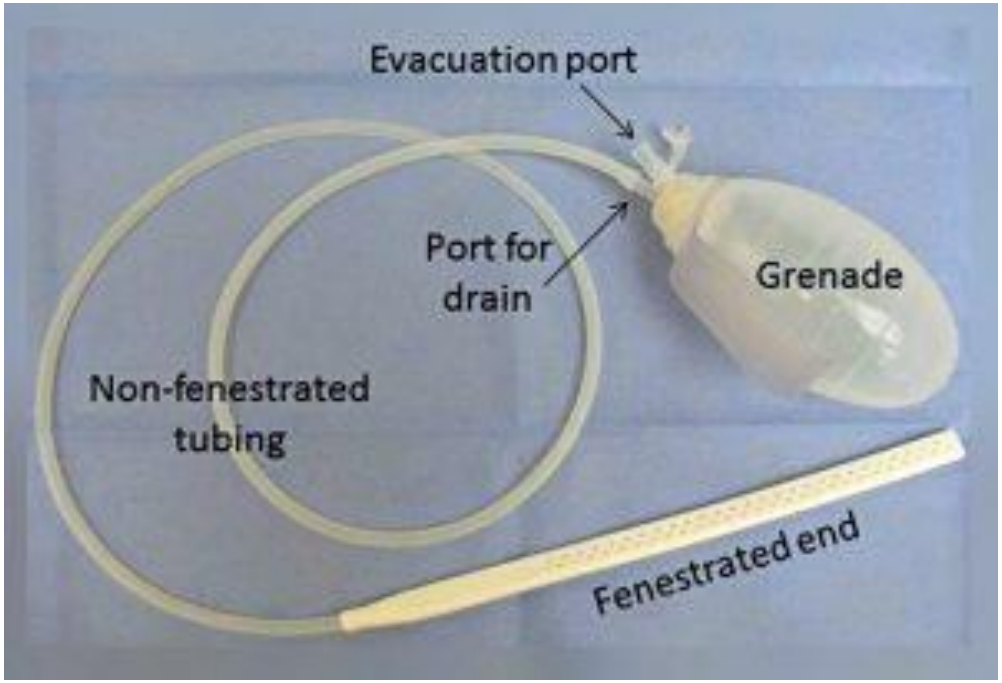
Active Drains

- Aided by active suction
- Can be
- Low continuous
- Low intermittent
- Or
- High suction

- Advantage are
- Reliable measurement of effluent
- Low risk of infection
- Minimal tissue trauma
- No skin excoriation

Examples of Active Drains

- Jackson-Pratt drain
- Surgivac drain
- Redivac drain

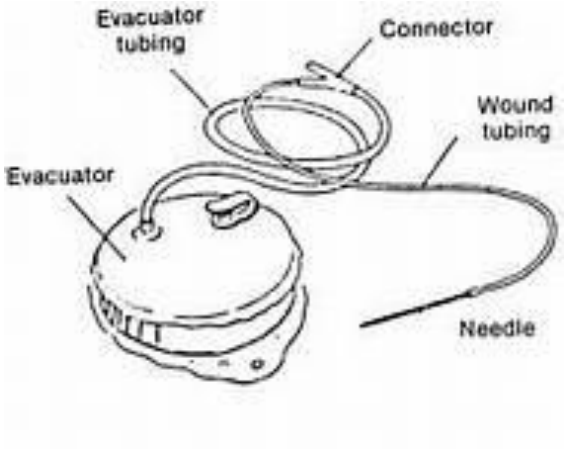


	Active	Passive
Function	Work by active suction	Depends on pressure difference
Pressure Gradient	Negative pressure	Positive pressure
Drain exit site	Dependent position not necessary	Dependent positon necessary for best function
Drain site dressing	Minimal or not needed	Bulky to absorb fluid output
Measurement of effluent	Reliable & accurate	Difficult to quantify
Fluid re-collection	Unlikely beacusenegative pressure improves tissue apposition	Likely because minimal effect on dead space
Retrograde studies	Lower incidence especially with close suction sysytem	High incidence especially with open system
Obstruction of drain	More common due to smaller diameter	Less common
Radiographic studies	Easy to perform	Difficult except in special circumstances like T-tube & NG tube
Pressure necrosis	High incidence	Low incidence

Tube Drains

- Hollow tubes of varying materials
- Brought out through body orifice or stab wound

- If connected to bag means closed drain



- If left alone means open drain
- Multiple holes necessary in case one hole becomes blocked

Sheet Drains

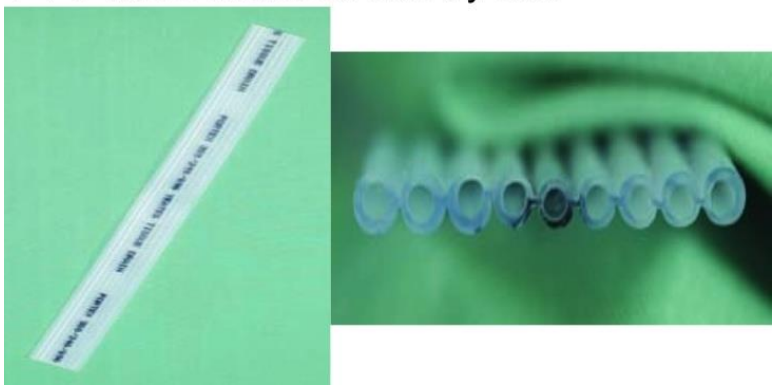
- Made up of sheet of gutters or parallel tubes through which fluid passes

- Corrugated drain

- Yeates drain

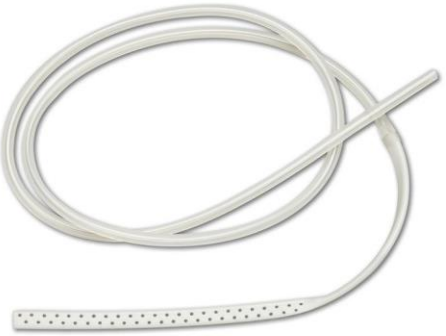
Yeates drain

series of approx 2mm diameter PVC tubes attached side by side



Flat Drains

- Made flat with ¾ or full length multiple perforations which can be connected to tubing system
- So convert it to close system or left opened
- Inner wall of flat segment has internal rib to prevent it from collapsing or kinking
- Used many surgeries like plastic

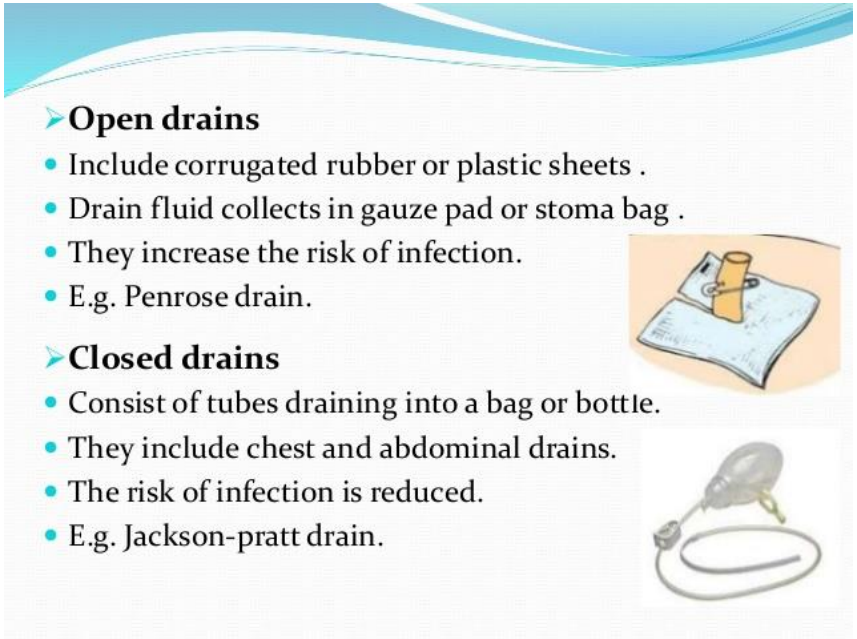


Open Drains

- Empty directly to exterior into wound dressing or stoma bag
- Corrugated rubber drain, Penrose, gauze wick drain and glove finger drain are examples
- Used mostly in superficial wound & cavities
- Drained fluid collects in gauze pad or stoma bag
- Difficult to measure quantity

Open Drains

- High rate of wound infection
- Trauma to the skin from repeated changing of dressing
- Skin excoriation and erythema due to irritation



External Drains

- These are drains that are brought out through the body wall to the exterior
- The fluid discharge is channeled from the deepest part of the cavity to the exterior.
- This can be passive or active drain.

Internal Drains

- These are drains that are placed internally within luminal organs to create a route or to connect two luminal organs
- Divert fluid from primary drainage site to distal body passage in order to overcome obstruction

- Used in

Neurosurgery

GI surgery

Malignant obstruction

Stent is an example

Irritant Drains

- Made of materials that are irritative to the tissue
- Leads to fibrosis & track formation

- Examples are
- Latex drains
- plastic drains
- Rubber drains

Inert Drains

- These drains are non-irritative to the tissue
- Do not provoke tissue fibrosis

- Examples include
- Solyvinyl chloride (PVC) drains
- Silastic drains
- Silicone drains

Ideal Drains

- Should be firm
- Should not be soft
- Smooth so not to allow fibrin to adhere
- Should be easily removable after use
- Material should be resistant to decomposition or disinfection
- Non electrolytic
- Non carcinogenic
- Non throbogenic

The Purpose of a Drain

- Therapeutic
- Palliation
- Prophylactic
- Monitoring
- Access route

Indications for Surgical Drains Therapeutic

- Tension pneumothorax
- Pleural fluid
- Abscess cavity Seroma
- Acute urinary retension
- Acute suppurative arthritis
- Infected cyst

Indications for Surgical Drains Palliative

- Advanced Ca esophagus
- Hydrocephalus

Indications for Surgical Drains
Diagnostic

- Biliary fistula
- T-tube cholangiogram
  for retained gall stones
  in common bile duct

Prophylactic Drains

- Cardiothoracic procedures
- Esophageal resection
- Duodenal stump following polya gastrectomy
- Elevation of extensive skin flap
- Post thyroidectomy Thoracotomy
- Uncomplicated cholecystectomy
- Splenectomy
- Pancreatectomy
- Patient on PPV post chest trauma

Monitoring Drains

- Gastrointestinal bleeding
- Urethral catheterizations

Dual indications (diagnostic + therapeutic) Drains

- Biliary fistula
- Gastrointestinal

Care of Surgical Drains

- safest shortest route
- Must reach deepest, most dependent part of cavity
- Bring out drain from stab wound & not from main wound
- No kink in drain
- Secure drain well
- Drain must be lower than incision all the times

Securing a surgical drain

- Need to secured
- System to prevent dislodgement
- Secured by various techniques
- Commonest is Roman Garter Technique
- Other techniques use
- Nylon suture safety pin, drain clip adhesive, Tie-lok

Post operative care of a surgical drain

- Skin around drainneed to clean,dry to prevent infection & irritation
- Meticulous skin care
- Aseptic technique
- Gauze dressing normally used

- Drain must be inexpensive
- Must be easy to apply & removed without dislodgement
- keep Output record
- Drain container or reservoir should be emptied at least once a day.
- Regular activation of the reservoir of active drains must be ensured

When to discontinue a surgical drain

- Remove when drainage stopped or output less than 25-50 ml/day, drain has stopped serving the desired function
- Shortening by withdrawing approximately 2cm/day thus allowing gradual healing of the site from it deepest part outwardly
- Drains that were intended to protect postoperative sites, anastomotic sites and require forming a tract should be delayed and removed when intended desire is achieved

Complications

- Tissue reaction
- source of contamination
- Delayed return of function
- Retained foreign body
- Bowel herniation
- Haemorrahage
- Plongrd healing time
- Drain entrapment & loss
- Fluid, electrolytes and protein loss
- Migration of the drain
- Erosion of viscera

Controversies

- In favour
- Remove accumulated fluid
- Early detection of leak, bleeding

- Against
- Risk of infection
- Increase hospital stay
- Delay tissue healing
- Causes tissue damage
- Induce anastomotic leak

Recent Advances

- One way entry valve
- Bottom drainage ports placed at the opposite end of the reservoir from entrance port
- Soft, supple and low profile drain
- Multiple sump lumens to create high internal flow rates
- Dual lumen
- Rotating garment clips
- Variable sizes
- Anti-thrombogenic coating of drain

Conclusion

- What purpose would a drain serve if placed
- What type of drains should be used
- How long should the drain be left in place?
- Once these questions are carefully and adequately answered each time a drain is used, the effectiveness and advantages can be maximized with minimal problems.