

Surgery

Edition 8.5

Marrow

Volume - 1

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Instructions

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PATIENT SAFETY, OT ZONES AND SURGERY POSITIONS

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Consents, IV Lines & Surgical Safety Checklist

00:01:58

Consents :

Components :

- Identification.
- Diagnosis.
- Procedure planned.
- Surgeon.
- Description.
- Patient specific complications.
- Procedure specific complications : Any complication > 1% incidence.
- Benefits.
- Alternate procedure.
- Signature of patient, surgeon, witness.

IV Lines :



Narrow ← Wide

Color-coding of IV cannulas :

Color	Gauge	Maximal Flow Rate(ml/min)
Yellow	24G	13 (10)
Blue	22G	31 (30)
Pink	20G	67 (60)
Green	18G	96 ml/min
Gray	16G	236 (240ml/min)
Orange (used in shock)	14G	270

Paediatric Patients

Complications :

Superficial thrombophlebitis : m/c

- Features : Tender, Cord-like swelling.
- Management : Topical heparinoid.



Superficial thrombophlebitis

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Surgical Safety Checklist :

Before induction of Anaesthesia (Ward to OT complex)	Before skin incision	Before Patient leaves operating room
Sign in	Time out	Sign out
1. Patient has confirmed : • Identity • Site (marked) • Procedure • Written consent	1. Confirm : • Patient name • Site of surgery • Procedure name • Time	1. Instruments, sponge & needle count
2. Known allergies	2. Antibiotic prophylaxis : Given within last 30 min	2. Specimen labelling (Including patient name)
3. Risk of >500 ml blood loss	3. Anticipated blood loss (By surgeon)	3. Actual blood loss (By anaesthetist)

Note :There is **no time in phase.**

Estimating amount of blood loss :

- Actual amount = Blood in suction - Irrigation fluid.
or
Wet mop weight - Dry mop weight.
- Soaked mop : 100 cc.
- Fist full of clots : 500 cc.

**OT Zones & Positions, Air Embolism and Patient Safety**

00:24:49

OT Zoning :

1. Protective Zone :

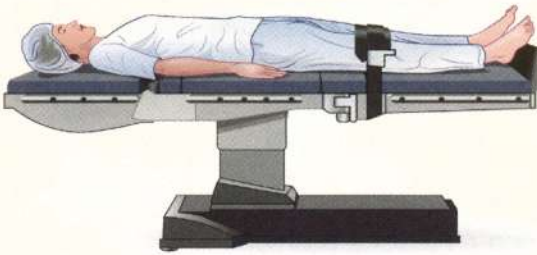
- Change rooms.
- Transfer bay.
- Pre & post op rooms.
- ICU/PACU.

2. Clean Zone (Connects protective zone to aseptic zone) :

- Equipment store room.
- maintenance workshop.

3. Aseptic zone : OT

4. Disposal zone.

OT Positions :

1. Supine position / neutral position :
m/c position used for abdominal and breast surgeries.



3. Reverse Trendelenberg position :
 • used in upper abdominal surgeries.
 • used in laparoscopic cholecystectomy with right side up.



CO₂ collects below right dome of diaphragm



Right shoulder tip pain : m/c complication.

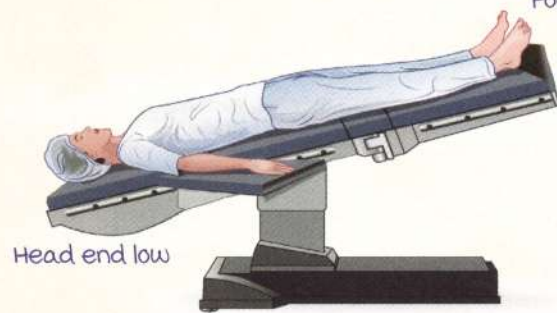
5. Lateral or Kidney position :

Uses :

- Thoracotomy.
 - Pyelolithotomy.
 - Nephrolithotomy.
 - Nephrectomy.
 - Breast reconstruction : Latissimus Dorsi Flap
- Increased risk for brachial plexus injury (D/t hyperextended arm).

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Foot end up

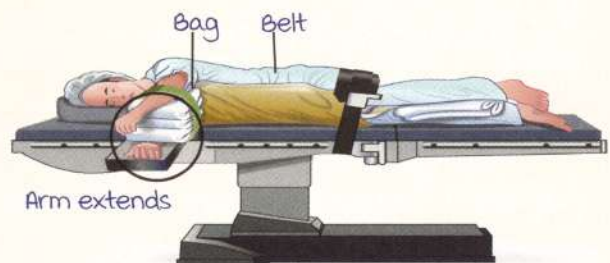


2. Trendelenberg position :
 used in Pelvic surgeries

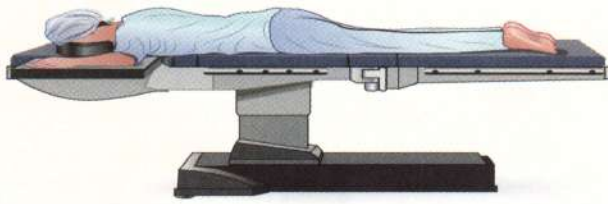


4. Lithotomy :

- Uses :
 - Obstetric procedures.
 - Gynecologic procedures.
 - urologic procedures (TURP).
 - Hemorrhoid Surgeries.
- Nerve injured if legs are not supported properly : **Common peroneal nerve**.



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6. Prone position :

Uses :

- Spinal surgery
- Pilonidal sinus surgery.



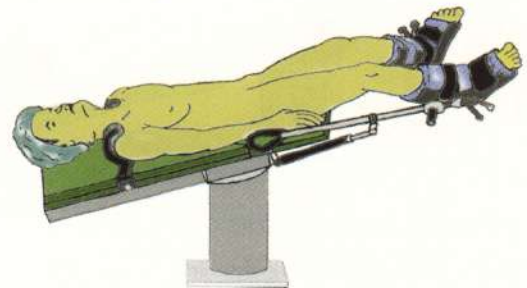
8. Jackknife position :

- Obsolete position.
- Previously used for hemorrhoid fissure surgeries.
- Complication : Positional asphyxia.



7. Sitting / Fowler's position :

- Used for posterior cranial fossa surgery.
- Advantages :
 - ↓ Blood loss (Blood less field).
 - ↑ Exposure.
- Disadvantages : ↑ Risk of air embolism.



9. Lloyd Davies position :

- Trendelenberg + Lithotomy position.
- Used in rectal cancer surgery.

Air Embolism :

Air (50-100cc) sucked into vein → Enter circulation → Dysregulates cardiac functioning.

Risk factors :

- Thyroid/Head & neck surgeries.
- Sitting/Fowler's position.

Clinical Features :

- Sudden desaturation.
- Dyspnea.
- Hypotension.

Prevention of air embolism in Fowler's position :

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1. Ligate vein before cutting.
2. Irrigate Field.

management :

Durant's position → Followed by → Aspirate air using direct puncture/central line.

- Right side up (Left lateral) + Legs up.
- used if suspicion of air embolism (+).

Events in Patient Safety :

An adverse event	An incident that results in harm to the patient
A near miss	An incident that could have resulted in unwanted consequences but did not, either by chance or through a timely intervention preventing the event from reaching the patient
A no-harm event	• An incident that occurs and reaches the patient but results in no injury to the patient. • Harm is avoided by chance or due to mitigating circumstances.

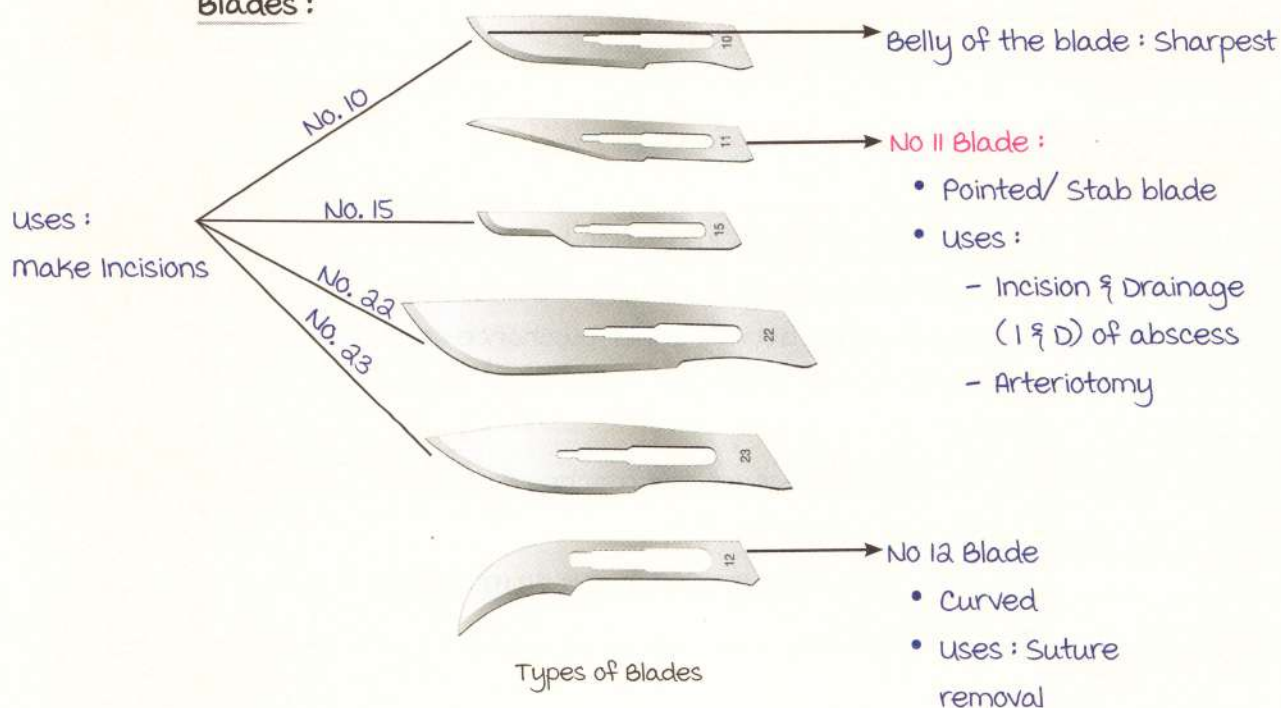
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SURGICAL BLADES & ENERGY SOURCES

Types of Blades & Incisions

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Blades :



- Passed in kidney tray / pointed end facing towards self.
- mounted on BP (Bard Parker) handle.



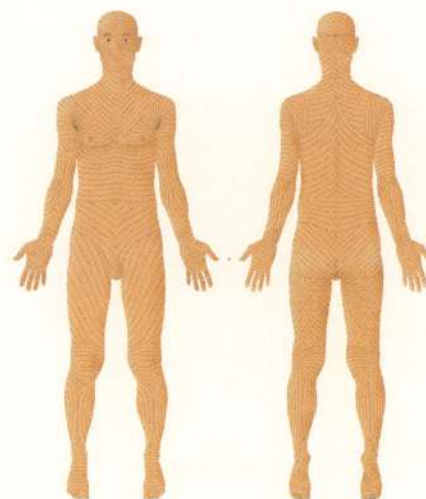
BP Handle

Incisions :

- Perpendicular to skin.
- Go far $\xrightarrow{\text{to}}$ Near.

Factors while planning an Incision :

- Langer's lines** (Relaxed tension lines) : orientation of dermal collagen fibers.
 - Incision placed parallel : Good scar.
 - muscle fibre action is perpendicular.
- Avoid injury to anatomical structures.
- Cosmetic factor : Parallel to Langer's lines / hidden in skin creases.
- Adequate access.

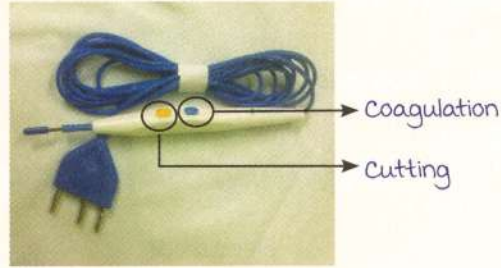
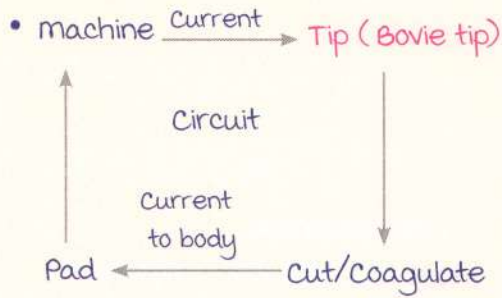


Langer's lines

Bleeding Control - Energy Sources

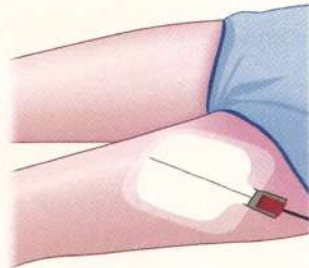
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1. Monopolar Cautery :

Cautery pad :

- Placed over well-vascularized area.
- Have wide area of contact.
- Small cautery pad : Burns at site.
- No cautery pad : Circuit incomplete.



monopolar will not work

Disadvantages :

- Lateral spread of current.



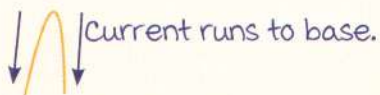
Thermal damage to nearby structures.

- Current interferes with cardiac conduction.



Avoid in patients with cardiac pacemakers.

- Pedicle $\rightarrow$ Channelisation of current.



Avoid close to end arteries.

Uses :

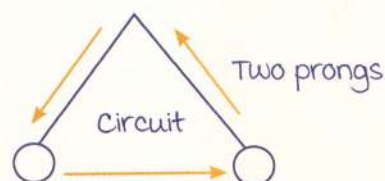
- Cutting
- Coagulation

Avoided in :

- CNS Sx
- Parotid/Thyroid Sx
- Ear lobule
- Penile region
- Patient with Pacemakers.

2. Bipolar Cautery :

- Circuit completed locally.



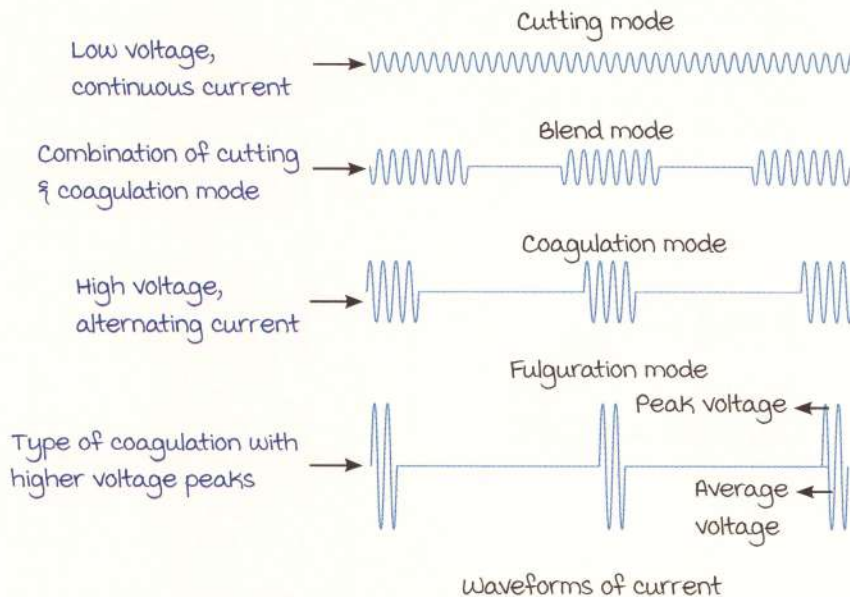
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Advantages :

- No cautery pad required.
- Safe close to vital structure and end arteries.

Uses :

- Coagulation only



Currents :

1. Cutting current :

Heat → Cell water explosion

2. Coagulation current :

Dehydration + Protein Denaturation

↓
Cell death.

3. LigaSure :

- Heat + pressure.
- Uses body collagen & elastin to seal & divide.
- **Feedback mechanism** : Regulate energy delivery.
- Automatic discontinuation on seal closure.
- Used till 7mm diameter vessels.
- Disadvantage : cannot be used close to vital structures.

4. Harmonic Scalpel :

- Works on ultrasonic principle.
- Oscillatory blade : Oscillates between 20000-50000 Hz.

Protein denaturation + coagulation **without heat production.**



Harmonic Scalpel

Advantages :

- Can be used close to vital structures.
- Precise cuts.
- Cut through scar tissue.

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Disadvantages :

- Time consuming

CUSA :

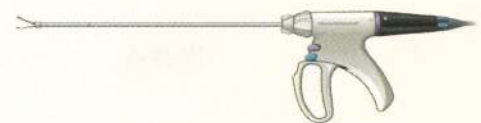
- Type of harmonic scalpel
- used for **liver resection** :
Hepatocytes susceptible to oscillatory fragmentation d/t high water content and low collagen.
- Better in non-cirrhotic liver.
- Can aspirate gases as well.

**5. Thunderbeat S :**

Features of both **Ligasure + Harmonic Scalpel**.

6. RFA (Radio Frequency Ablation) :

- High frequency, alternating current.
- Similar to electrocautery : Grounding pad needed.
- Use : Liver tumor resection upto 3 cm.



Thunderbeat S

7. Microwave :

- Between infra-red & radiowaves.
- Oscillation & frictional heat.
- Advantages :
 - No grounding pad required.
 - Less time than RFA.
 - Larger, more homogenous zone of ablation.

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SURGICAL DRAINS, KNOTS & SUTURES

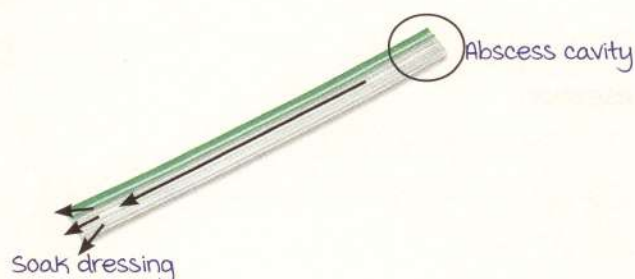
Drains & Knots

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Drain Types :

Open :

Obsolete.

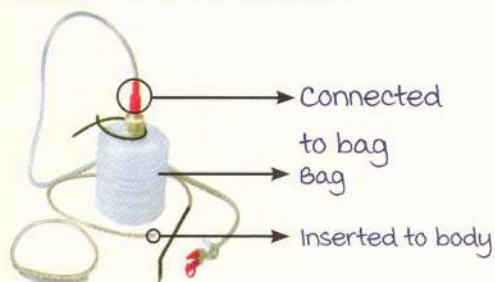


Closed :

Empty into a container/bag.

1. Romovac suction drain :

- Closed drain with -ve pressure.
- Used after mastectomy, thyroidectomy, neck dissection.
- Avoided in abdomen d/t rounded drain $\xrightarrow{\text{risk of}}$ Perforation.



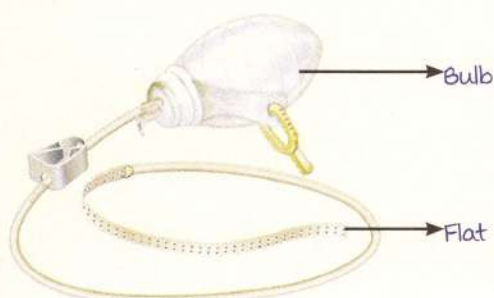
2. Minivac drain :

used after sentinel LN biopsy.



3. Jackson Pratt drain :

- -ve pressure drain.
- Flat tubes $\rightarrow$ Can be used in abdomen.



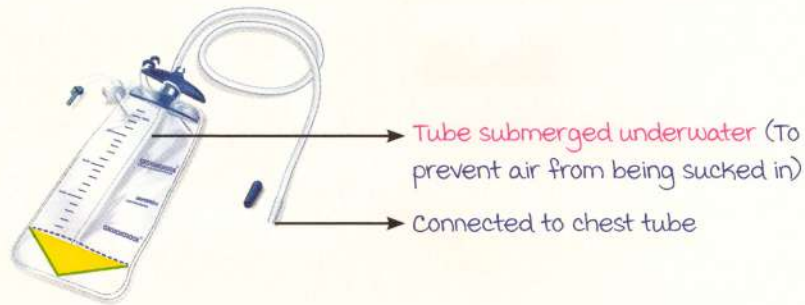
4. Abdominal drain :

Closed drain, no -ve pressure.

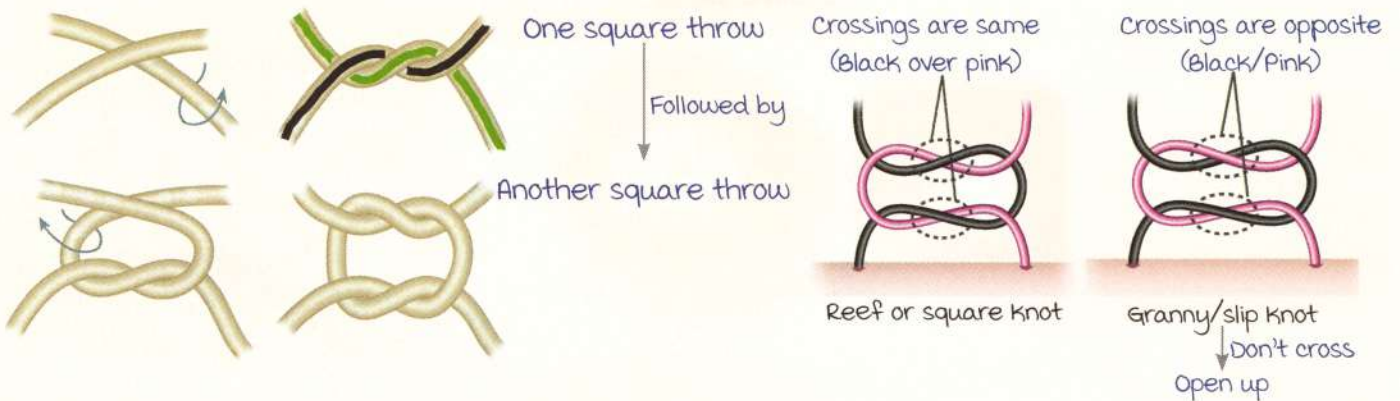


5. underwater seal bag :

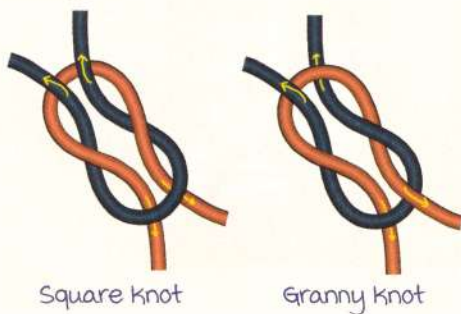
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Knot Types :

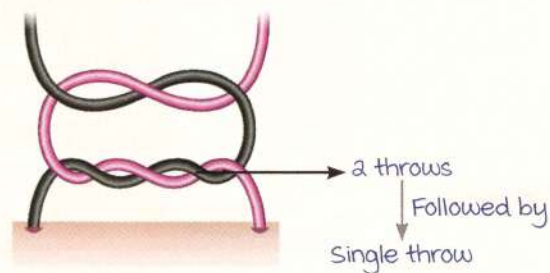
Square/Reef Knot : most basic knot.



Granny's v/s Reef knot :



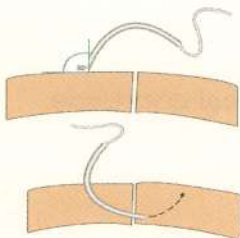
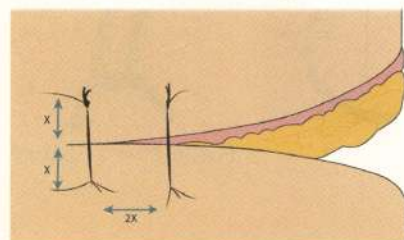
Surgeon's knot :

Sutures

00:11:55

Skin Suturing :

- Everted edges.
- Enter skin at 90°.

Principles of suturing :

- Bite on each side : x .
- Distance b/w 2 sutures : $2x$.

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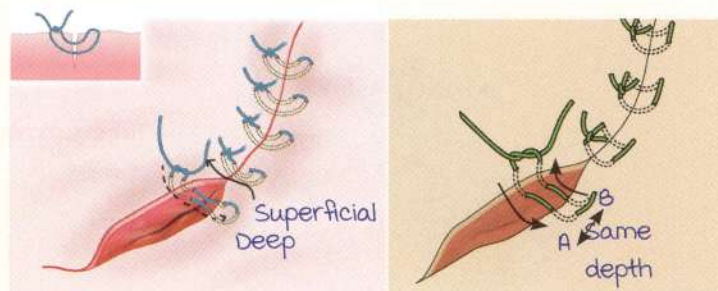
Suturing - Types :

1. Simple suture :

Fail to cause
eversion

2. Mattress suture :

- Cause eversion.
- Hemostasis.

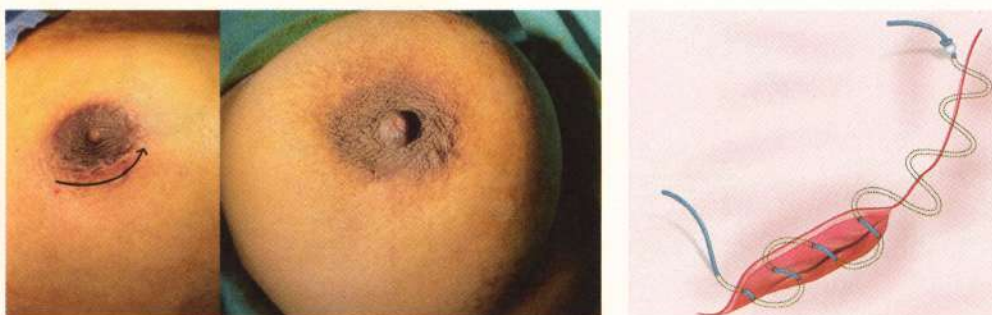


Vertical mattress

Horizontal mattress :
Least cut through rate

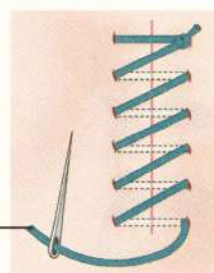
3. Subcuticular sutures :

- Cosmetically better (No marks).
- Suture material : 3-0 monocril on a cutting needle.

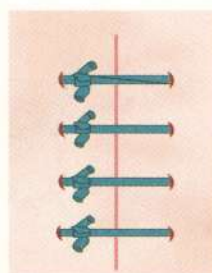


4. Other sutures :

Aberdeen's/Cobbler's
knot for closure



Continuous suture

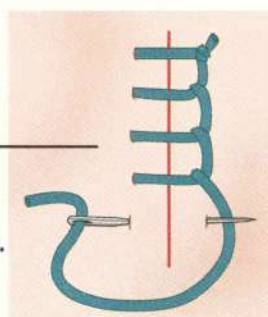


Interrupted suture

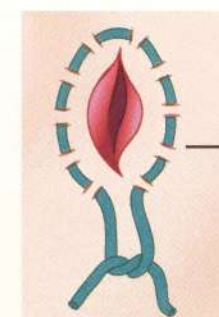


Buried mattress suture

- Continuous suture with locking.
- Distribution of tension.



Lock suture



Purse string Suture

Uses :

- Bury appendicular stump.
- Cervical encircage.