

closure material

wound

- Wound : damaged skin or soft tissue result from injury
- Two basic type of wound :
 - **Open wound** : the surface of the skin or mucous membrane is no longer intact .
 - **Closed wound** : no opening in the skin or mucous membrane .

Classification of wound

➤ Open wounds

- Incisions or incised wounds
- Lacerations
- Abrasions
- Avulsions
- Ulceration
- Puncture

➤ Closed wound

- Contusions

Open wounds

- **Incision wounds :**

a clean separation of skin & tissue with smooth , even edges



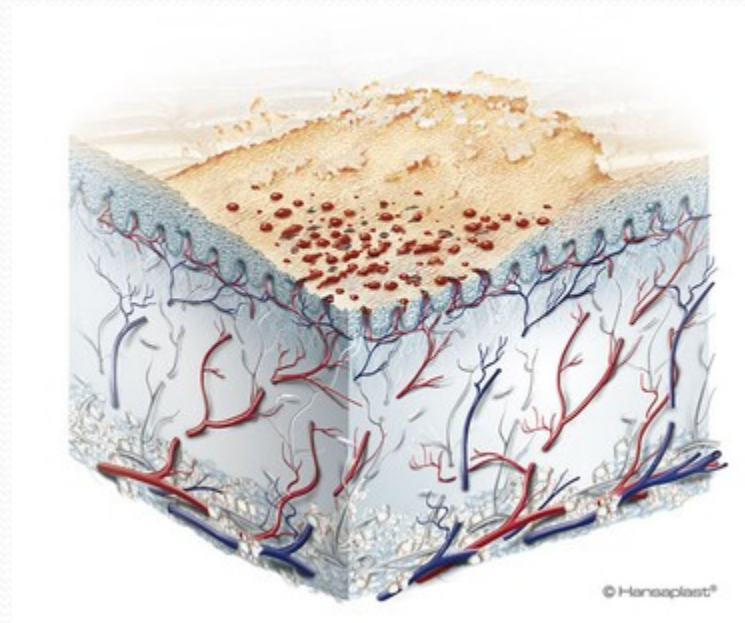
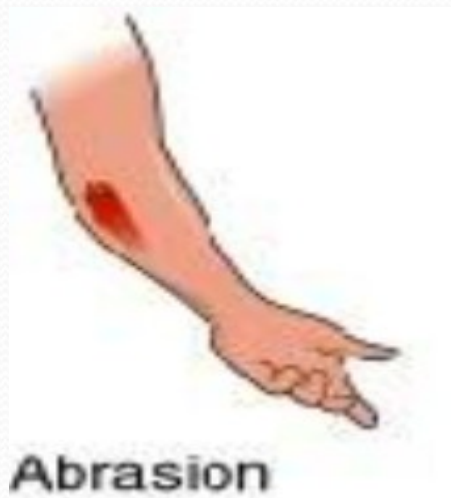
● **Lacerations :**

separation of skin & tissue in which the edges are torn & irregular



- **Abrasions :**

A wound in which the surface layers of skin are scraped away



● **Avulsions :**

stripping a way of large areas of skin & underlining tissue, leaving cartilage & bone exposed



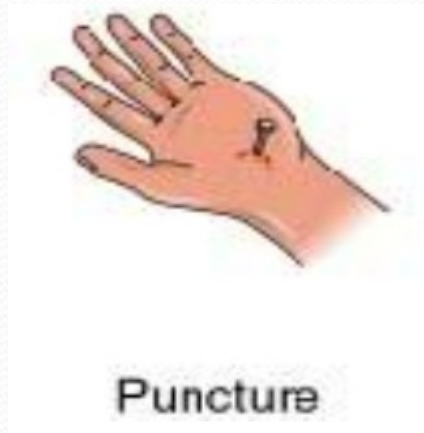
● **Ulceration :**

a shallow crater in which skin or mucous membrane is missing



● **Puncture :**

An opening of skin, underlining tissue, or mucous membrane caused by a narrow, sharp, pointed object



Closed wound

- **Contusions :**

injury to soft tissue underlining the skin from the force of contact with a hard object sometimes called a bruise



wound management

wound management : involve techniques that promote wound healing .

➤ **involve using :**

- Dressing
- Drain
- Bandage and binder
- Sutures & staples

Suture

A suture is a thread used for uniting wound edges eg. Suture material

- Nylon
- Silk
- Catgut
- Stainless steel suture

Sutures

➤ Goals

1. Provide an adequate tension of wound closure without dead space but loose enough to obviate tissue ischemia and necrosis
2. Maintain hemostasis.
3. Permit primary intention healing
4. Reduce postoperative pain
5. Provide support for tissue margins until they have healed and the support no longer needed
6. Prevent bone exposure resulting in delayed healing and unnecessary resorption
7. Permit proper flap position

Qualities of a suture material

- Adequate tensile strength
- Functional strength
- Non capillary
- Non reactivity
- Flexibility & elasticity
- Easy to handle
- Knotable

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- Easily sterilisable
 - Uniformity
 - Smooth surface
 - Monofilament
 - Absorbability

Suture Materials

➤ Absorbable

Those that are absorbed or digested by the body cells and tissue fluids in which they are embedded during and after the healing processes.

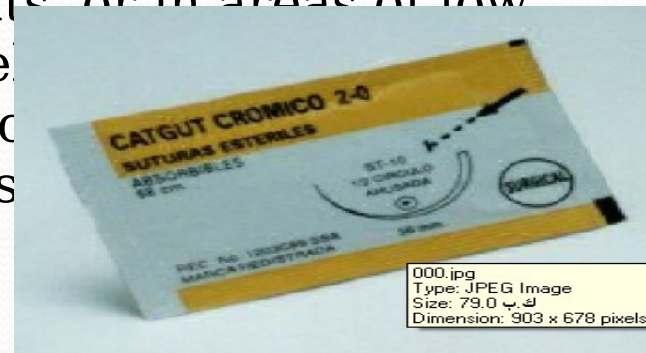
➤ Non-Absorbable

Those suture materials that can not be absorbed by the body cells or fluids.

Types of absorbable suture material

➤ Surgical Gut

- **Plain gut** loses its strength in 7-10 days and is completely digested by 60 days. It is seldom used now due to poor strength and high tissue reactivity (due to proteolytic enzyme degradation rather than hydrolysis).
- **Chromic gut** has been manufactured with chromium salts to reduce enzyme digestion and therefore maintains strength for 10-14 days making it useful for mucosal closures.
- **Fast-absorbing gut** is produced by pre-heating and can be used for attaching skin grafts or in areas of low tension where the wound is well apposed and suture removal would not be necessary. It maintains strength for 3-5 days.



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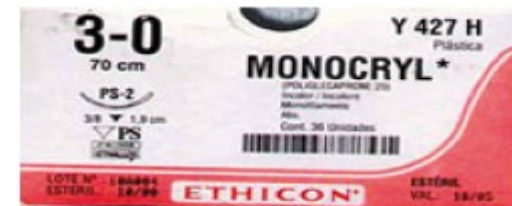
➤ **Polyglactin 910 (Vicryl®, Polysorb®)**

- A synthetic braided co-polymer which maintains 75% strength at 2 weeks, and 50% at 3 weeks. Absorption is usually complete by 3 months. It handles well, has minimal tissue reactivity. It may occasionally persist as a 'sp



➤ **Poliglecaprone 25 (Monocryl®)**

- Monofilament maintaining 50-60% strength at 7 days with complete absorption by 3 months. It offers better handling and knot security than most other monofilament sutures, with even less tissue reaction than Vicryl® and is therefore useful where minimal tissue reac



➤ Polydioxanone (PDS II®)

- Monofilament polymer with prolonged tensile strength (70% at 2 weeks, 50% at 4 weeks) and may persist for more than 6 months. Good for high-tension areas or contaminated wounds, but being a monofilament it has poor handling and knot security. Its minimal tissue reaction makes it good for repair of cartilage where inflammation would lead to significant discomfort.



➤ Polytrimethylene carbonate (Maxon®)

- A monofilament that combines the prolonged strength of PDS® and the good handling and knotting of Vicryl®. 80% strength at 2 weeks, 60% at 4 weeks, and complete absorption by 6 months. Minimal tissue



➤ **Glycomer 631 (Biosyn®)**

- A monofilament similar to Monocryl® in characteristics but with prolonged strength akin to Maxon®.



Non-absorbable Sutures

- **Nylon (Ethilon®, Dermalon®, Surgilon®, Nurolon®, Nylene®)**
- Inexpensive monofilament with good tensile strength, and minimal tissue reactivity. Disadvantages are its handling and knot security, but it remains one of the most popular non-absorbable sutures in dermatological surgery. Surgilon® and Nurolon® are more expensive.



➤ **Polybutester (Novafil®)**

- A monofilament with good handling and excellent elasticity. It responds well to tissue oedema, and is also suited to subcuticular running



➤ Polypropylene (Prolene®, Surgilene®, Surgipro®)

- A monofilament polymer with a very low coefficient of friction making it the suture of choice for running subcuticular stitches. It has good plasticity but limited elasticity, poor knot security and is relatively expensive. Factors



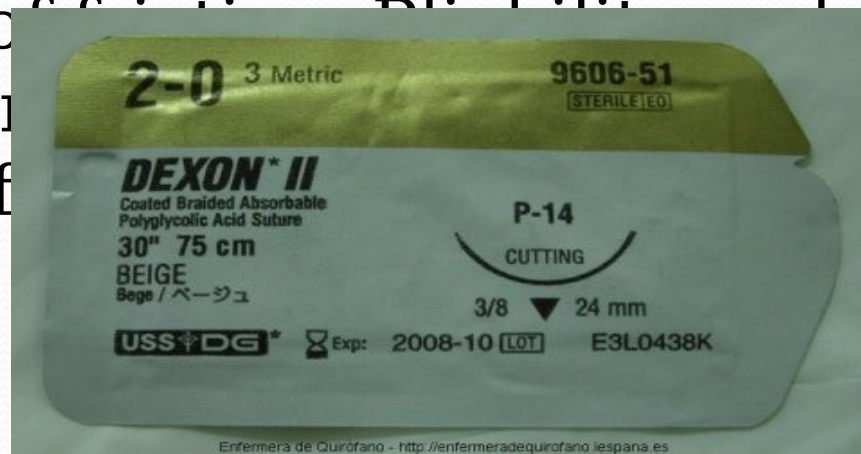
➤ **Silk (Dysilk®)**

- Braided natural protein with unsurpassed handling, knot security, and pliability (making it ideal for mucosal surfaces and intertriginous areas) but limited by its low tensile strength, and high coefficient of friction, capillarity, and



➤ Polyester (Dacron®, Mersilene®, Ethibond®)

- Braided multifilament suture with high strength, good handling, and low tissue reactivity. Ethibond is coated and has a low coefficient of friction. Dacron® has these excellent features but the reactivity of



Selecting the Gauge

Selection of the gauge depends on the strength of the repair required, the number of sutures to be used, the type of material used and the cosmetic requirements of the wound. In practice, the selection depends on experience of the surgeon and his knowledge of the material.

The gauging may seem confusing to the novice. Long before current suture materials were available, the finest thread was a 1 gauge with thicker threads being given a higher number depending on diameter. When a thread of smaller diameter than a 1 gauge was made, it was named a 0 gauge (1/0). Subsequent smaller threads were termed 00 gauge (2/0), 000 gauge (3/0), etc as the diameter decreased to the point where sutures of a 11/0 gauge are now used in microsurgery to join blood vessels less than a millimeter in diameter.



When we suture a wound on the face, we would look to using a very fine material with multiple sutures closely placed to obtain the best cosmetic result, for example a 6/0 monofilament nonabsorbable suture like Nylon. Closure of the abdominal wall following laparotomy requires a strong suture such as a 0 gauge monofilament. A tendon repair would require a small diameter suture with an inherently strong nonabsorbable material such as a polyester (3/0 Ticron).

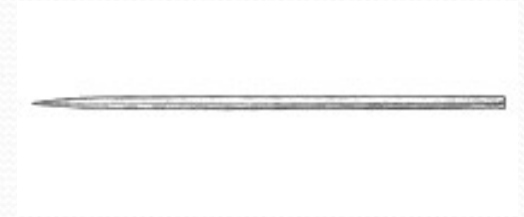
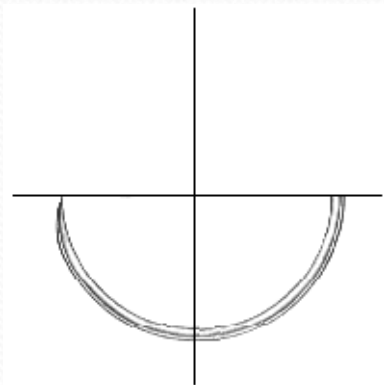
Needle Characteristics

There are 5 factors which we take into account when we select an appropriate needle.

- Method of Use: The needle can either be hand-held or instrument held.
- Shape of the Needle: The needle can either be straight or curved
- Length of the Needle: Needle length ranges from 2 to 60 mm.
- Tissue Penetration Characteristics: The tip of the needle can be either a round bodied for passing through soft tissues such as fat or muscle or a cutting point for penetration of tougher tissues such as skin.
- Attachment of Suture to Needle: The material can either be threaded through the eye of the needle or could be swaged into the end of a needle.

Suture needles types

1. straight needles
2. curved needles
 - Round needles
 - Cutting needles



Surgical Instruments



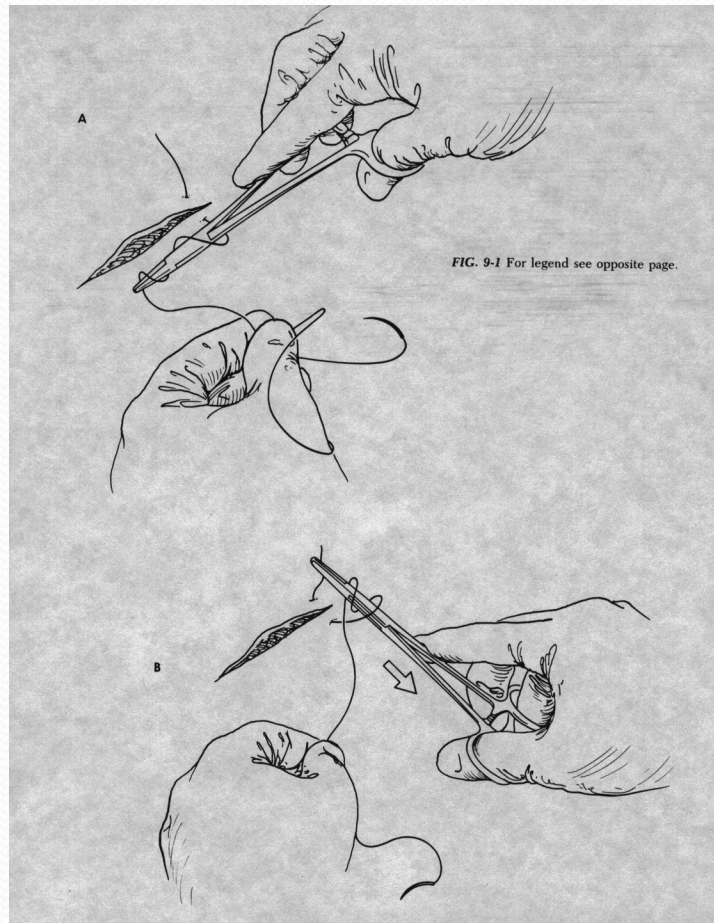
Techniques of Suturing

The aims of repairing a skin wound is to end up with a fine linear scar situated in a natural skin crease line without evidence of suture marks. The final appearance of a scar depends on the use of atraumatic technique, scar placement, the age of the patient, the region of the body, the skin type and complicating factors such as infection.

The principals of repair of wounds are as follows:

- Adequate debridement (removal of dead, contaminated tissues and foreign bodies)
- Atraumatic technique (gentle handling of tissues preventing inadvertent crushing of wound edges and desiccation)
- Haemostasis
- Closure of the wound in layers under minimal tension (“appose don’t necrose”) using fine, high quality instruments
- Early removal of sutures to prevent marks

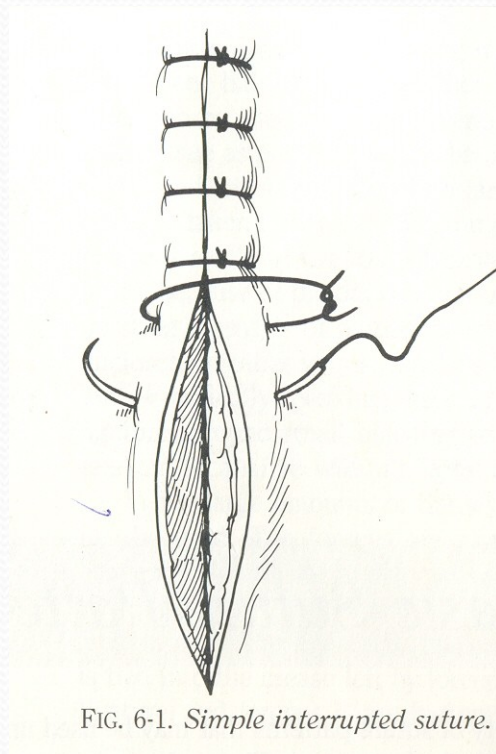
Suture Procedures



Suturing Techniques

1. Interrupted Pattern
2. Continuous Pattern

Simple interrupted suture



Simple continuous suture

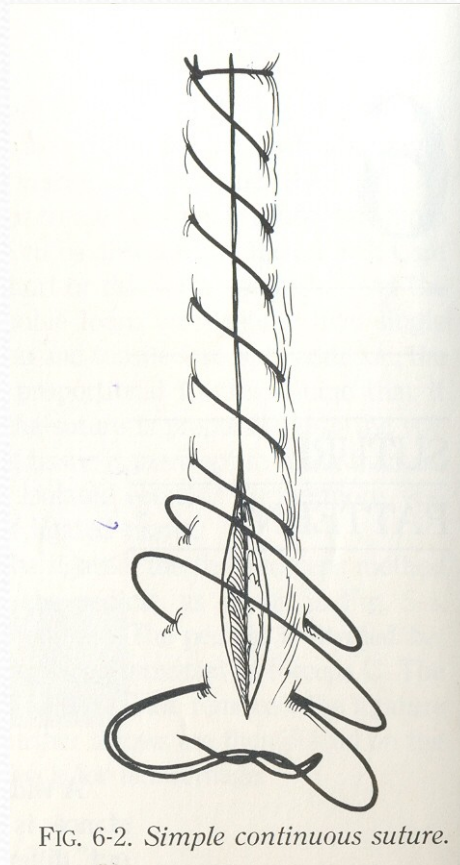
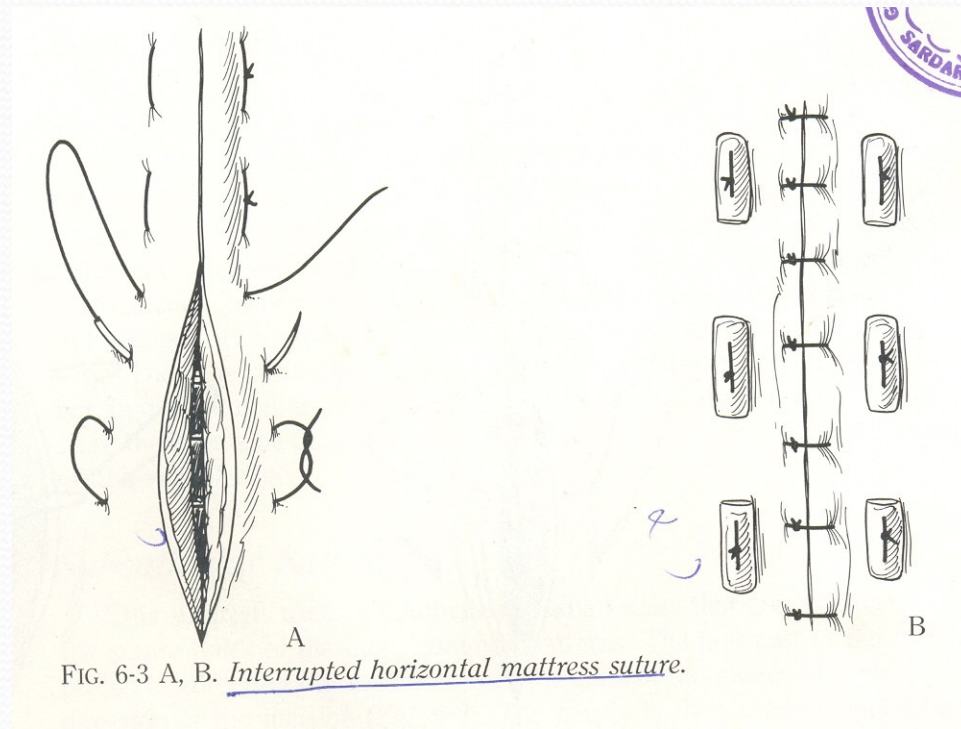


FIG. 6-2. *Simple continuous suture.*

Interrupted horizontal mattress suture



Continuous horizontal mattress suture

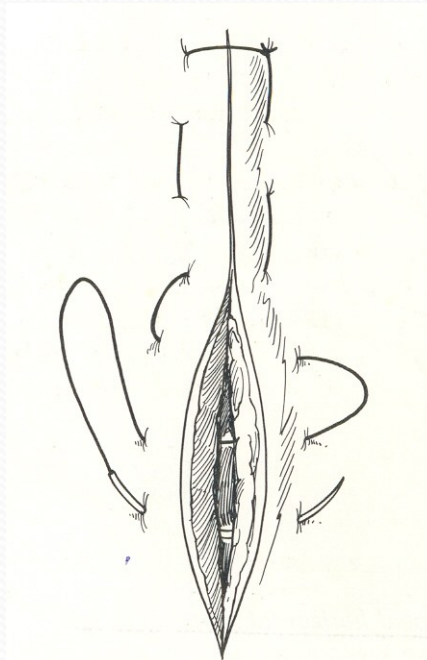


FIG. 6-4. *Continuous horizontal mattress suture.*

Vertical mettress suture

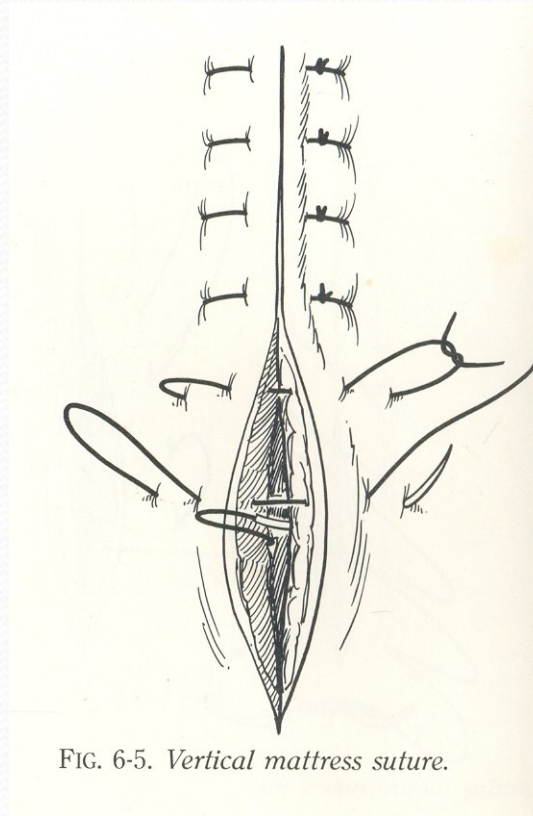
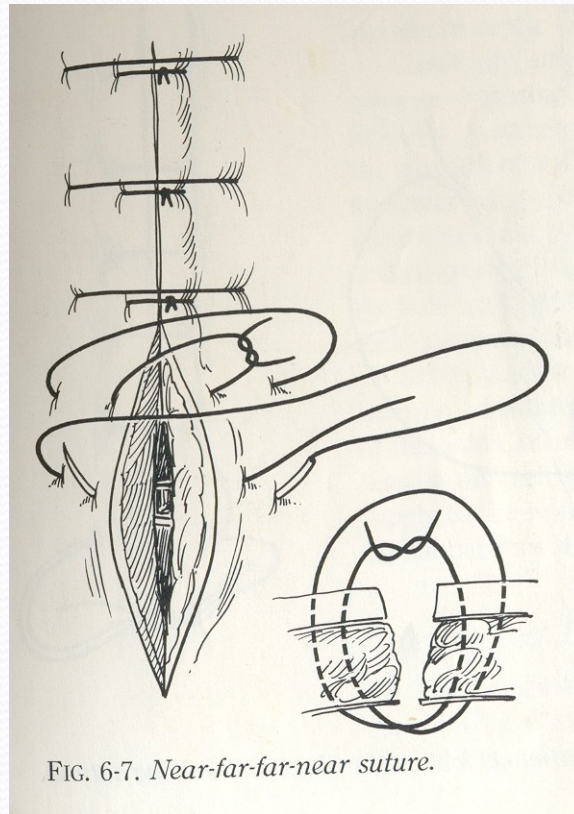
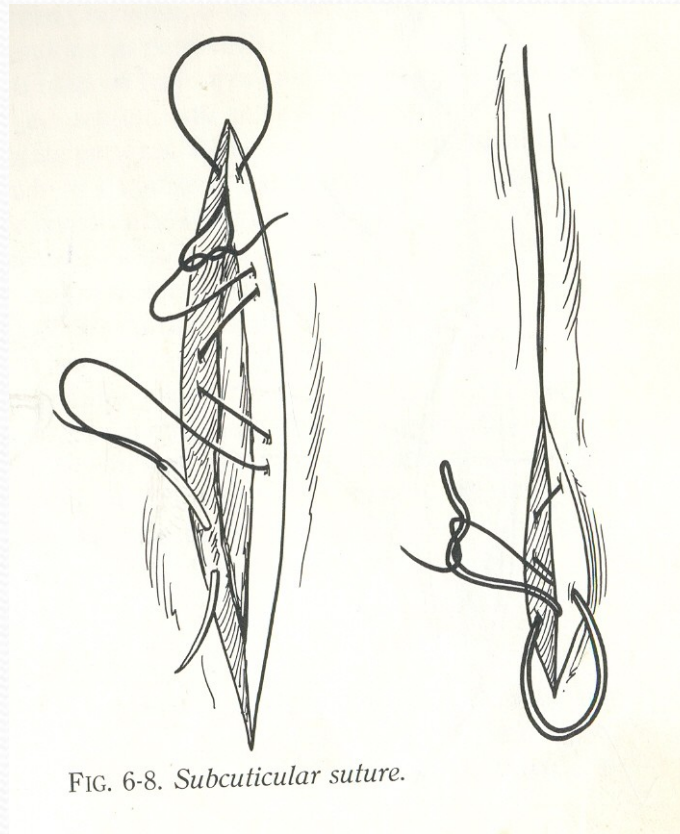


FIG. 6-5. Vertical mettress suture.

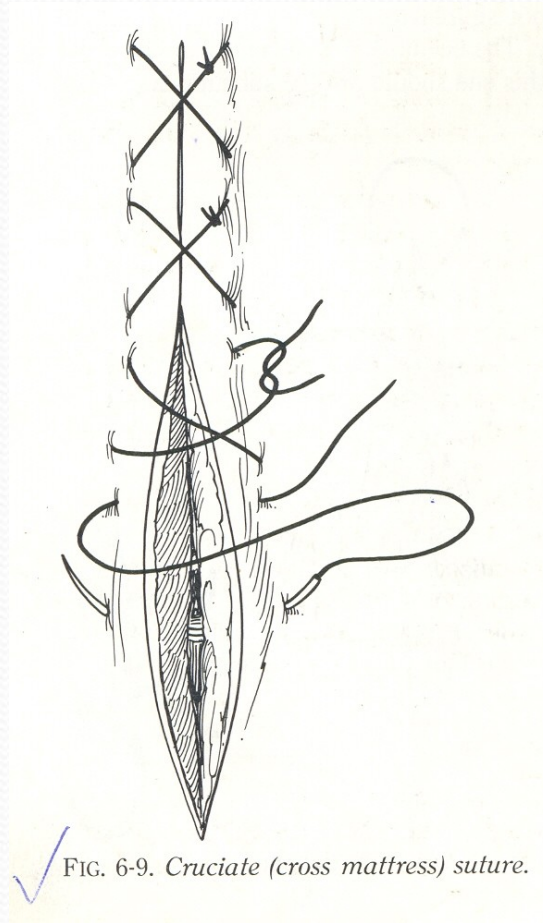
Near and Far suture



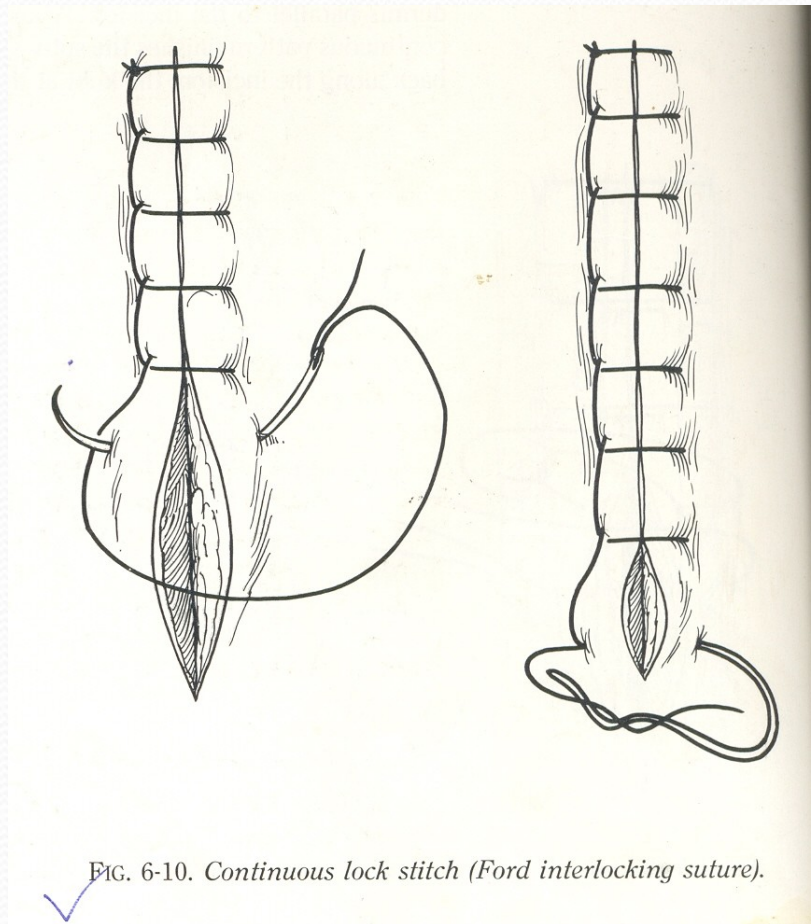
Sub cuticular suture



Cruciate suture



Continuous lock stitch



Dressing of the Wound

Do not underestimate the importance of a good, neat dressing on the wound as patients will judge your work partly on the only bit they can initially see, the dressing! Poor dressings look sloppy and are a reflection of your work and lack of attention to detail. The aims of a dressing are as follows:

- Occlusion of dirt, bacteria and inquisitive fingers
- Absorption of blood and exudate
- Wound immobilisation and pain relief
- Pressure application
- Medication carrier such as antibiotics and antiseptics
- Aesthetic wound covering

Suture Removal

Time frame for removing sutures:

Average time frame is 7-10 days

FACE: 4-5 days

BODY & SCALP: 7 days

SOLES, PALMS, BACK OR OVER JOINTS: 10 days

Any suture with pus or signs of infections should be removed immediately.

1. Clean with hydrogen peroxide to remove any crusting or dried blood
2. Using the tweezers, grasp the knot and snip the suture below the knot, close to the skin
3. Pull the suture line through the tissue- in the direction that keeps the wound closed - and place on a 4x4

Once all sutures have been removed, count the sutures

The number of sutures needs to match the number in record

