Suturing: basic

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Learning objectives

- Choose the appropriate type of local anesthetic and suture
- Administer local anesthesia
- Master simple interrupted, horizontal mattress and deep tissue suturing

Choose the type of local anesthetic


20 mL
Xylocaine
20 mL
Xylocaine
20 mL
Xylocaine
Alveda

With or without epinephrine ?

Benefits

- Better local hemostasis
- Increases duration of anesthesia
- Increases amount of anesthetic that can be used

Disadvantages

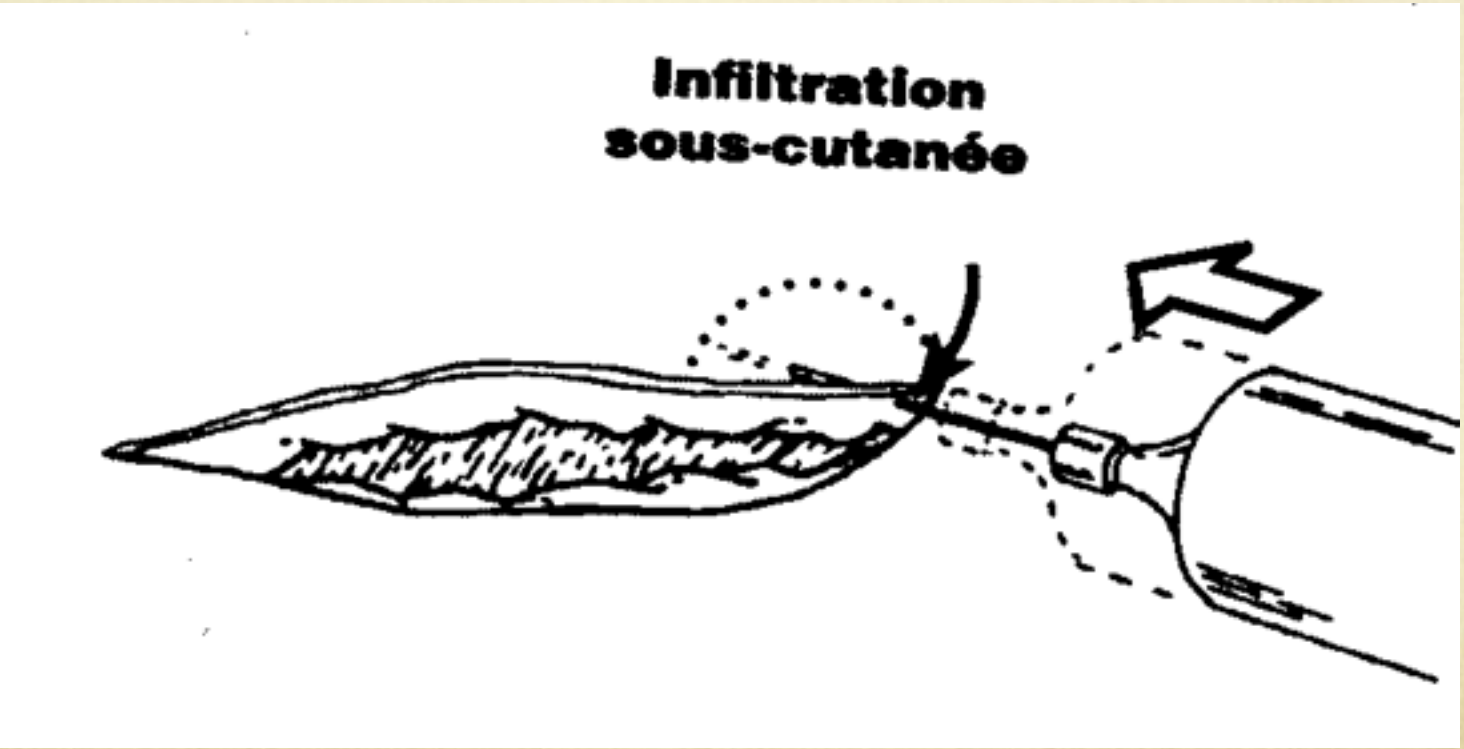
- Increases pain of infiltration
- Increases inflammation
- Increases the rate of infection
- Risk of ischemia (extremities, flap)
- Possible cardiovascular side effects

Maximum dose of anesthetic

- Lidocaine subcutaneous injection
  - Without epi : 5 mg/kg
  - With epi : 7 mg/kg
- Example
  - 10 kg patient
    - Max dose without epi (mg) = 5 x 10 = 50 mg
    - Lidocaine 1% : 1g /100 ml = 1000mg/100ml = 10mg/ml
    - Max dose in ml = 5 ml

Techniques to reduce the pain associated with local anesthesia

- Inject into the edges of the wound and not through the healthy skin



Techniques to reduce the pain associated with local anesthesia

- Inject s/c (not intra-dermal)

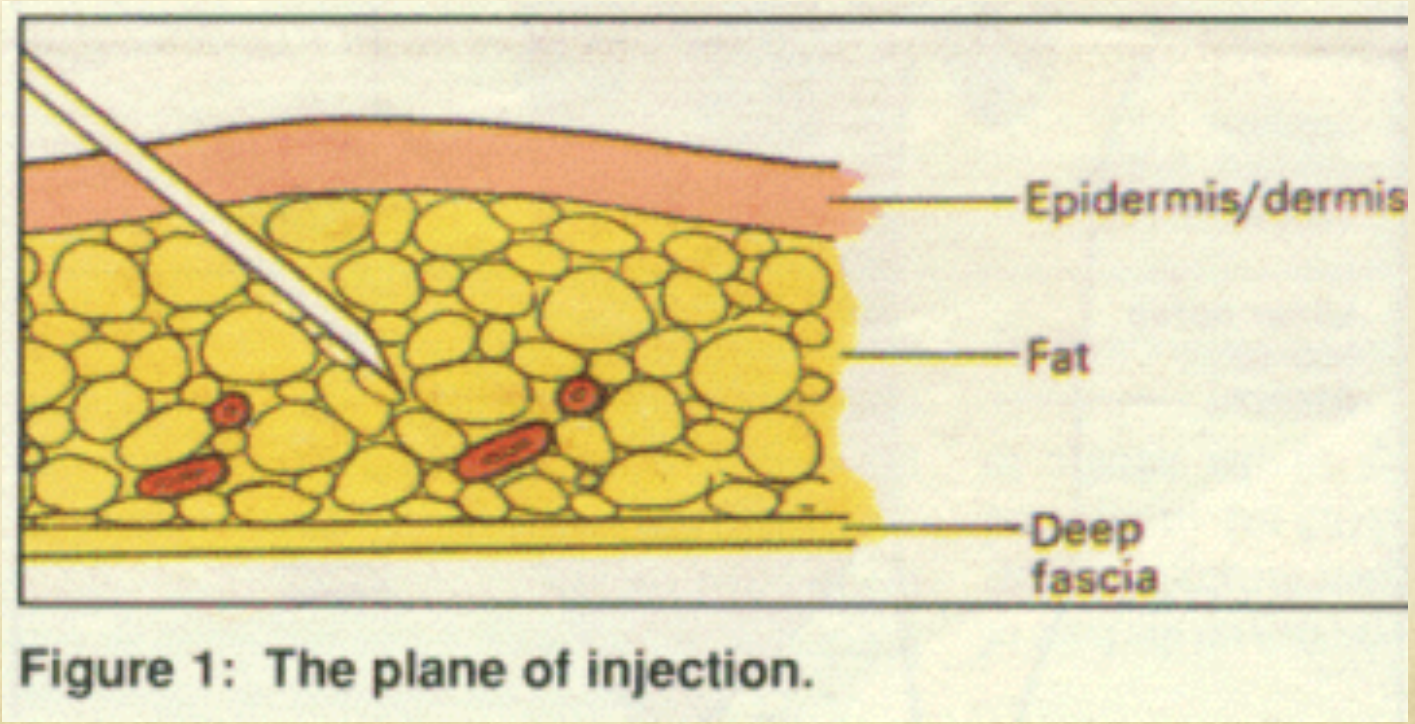
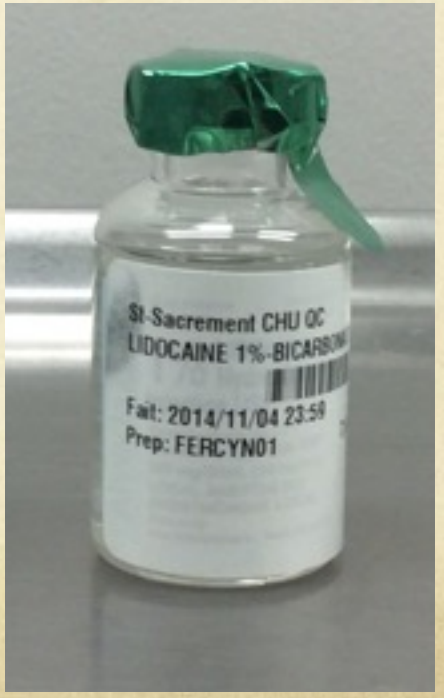


Figure 1: The plane of injection.

Techniques to reduce the pain associated with local anesthesia

- Use a small gauge needle (25G-30G)
- Inject slowly (0,1 ml/sec)
- Be patient
- Use distraction techniques
- Warm the solution (37°C)
- Use lidocaine with bicarbonate



Choose the type of suture

Table 11-1 *Suggested Guidelines for Suture Material and Size for Body Region*

Body Region	Percutaneous (Skin)	Deep (Dermal)
Scalp	5-0/4-0 Monofilament[1]	4-0 Absorbable[2]
Ear	6-0 Monofilament	—
Eyelid	7-0/6-0 Monofilament	—
Eyebrow	6-0/5-0 Monofilament	5-0 Absorbable
Nose	6-0 Monofilament	5-0 Absorbable
Lip	6-0 Monofilament	5-0 Absorbable
Oral mucosa	—	5-0 Absorbable[3]
Other parts of face/forehead	6-0 Monofilament	5-0 Absorbable
Trunk	5-0/4-0 Monofilament	3-0 Absorbable
Extremities	5-0/4-0 Monofilament	4-0 Absorbable
Hand	5-0 Monofilament	5-0 Absorbable
Extensor tendon	4-0 Monofilament	—
Foot/Sole	4-0/3-0 Monofilament	4-0 Absorbable
Vagina	—	4-0 Absorbable[3]
Scrotum	—	5-0 Absorbable[3]
Penis	5-0 Monofilament	—

1. Nonabsorbable monofilaments
   - Nylon: Ethilon, Dermalon
   - Polypropylene: Prolene
   - Polybutester: Novafil
2. Absorbable materials for dermal and fascial closures
   - Polyglycolic acid: Dexon, Dexon Plus
   - Polyglactin 910: Vicryl
   - Polydioxanone: PDS (monofilament absorbable)
   - Polyglyconate: Maxon (monofilament absorbable)
3. Absorbable materials for mucosal and scrotal closure
   - Chromic Gut
   - Polyglactin 910: Vicryl

Table 7-1 ***Absorbable Suture Materials***

Material	Structure	Tissue Reaction	Tensile Strength	Tissue ½ Life (Days)	Uses and Comments
Gut	Natural	++++	++	5-7	For mucosal closures, rarely used
Chromic gut	Natural	++++	++	10-14	For oral mucosa, perineal, and scrotal closures; can be annoying to patients because of stiffness
Polyglyolic acid-PGA (Dexon)	Braided	++	+++	25	For subcutaneous closure; coated version easier to use but requires more knots (Dexon-Plus)
Polyglactin 910 (Vicryl)	Braided	++	++++	28	Comes dyed and undyed; do not use dyed on face; irradiated polyglactin excellent for mucosal closures
Polyglyconate (Maxon)	Monofilament	+	+++++	28-36	For subcutaneous closure; less reactive and stronger than PGA and polyglactin
Polydioxanone (PDS)	Monofilament	+	++++	36-53	For subcutaneous closures that need high degree of security; stiffer and more difficult to handle than PGA or maxon

+ ligature vs. sq.

Table 7-2 ***Nonabsorbable Suture Materials***

Material	Structure	Tissue Reaction	Tensile Strength	Knot Security	Uses and Comments
Silk	Braided	++++	++	++++	Easy to handle but has increased potential for infection
Nylon (Ethilon, Dermalon)	Monofilament	++	+++	++	Commonly used in skin closure but high degree of memory; requires several throws for secure closure
Polypropylene (Prolene)	Monofilament	+	++++	+	High degree of memory, low tissue adhesion; good for subcuticular pull-out technique
Dacron (Mersilene)	Braided	+++	++	++++	Easy to handle, good knot security; like silk but less risk to tissue for inflammation and infection + Pr. 1a figure
Polybutester (Novafil)	Monofilament	+	++++	++++	Excellent handling, strength, and security; expands and contracts with changes in tissue edema

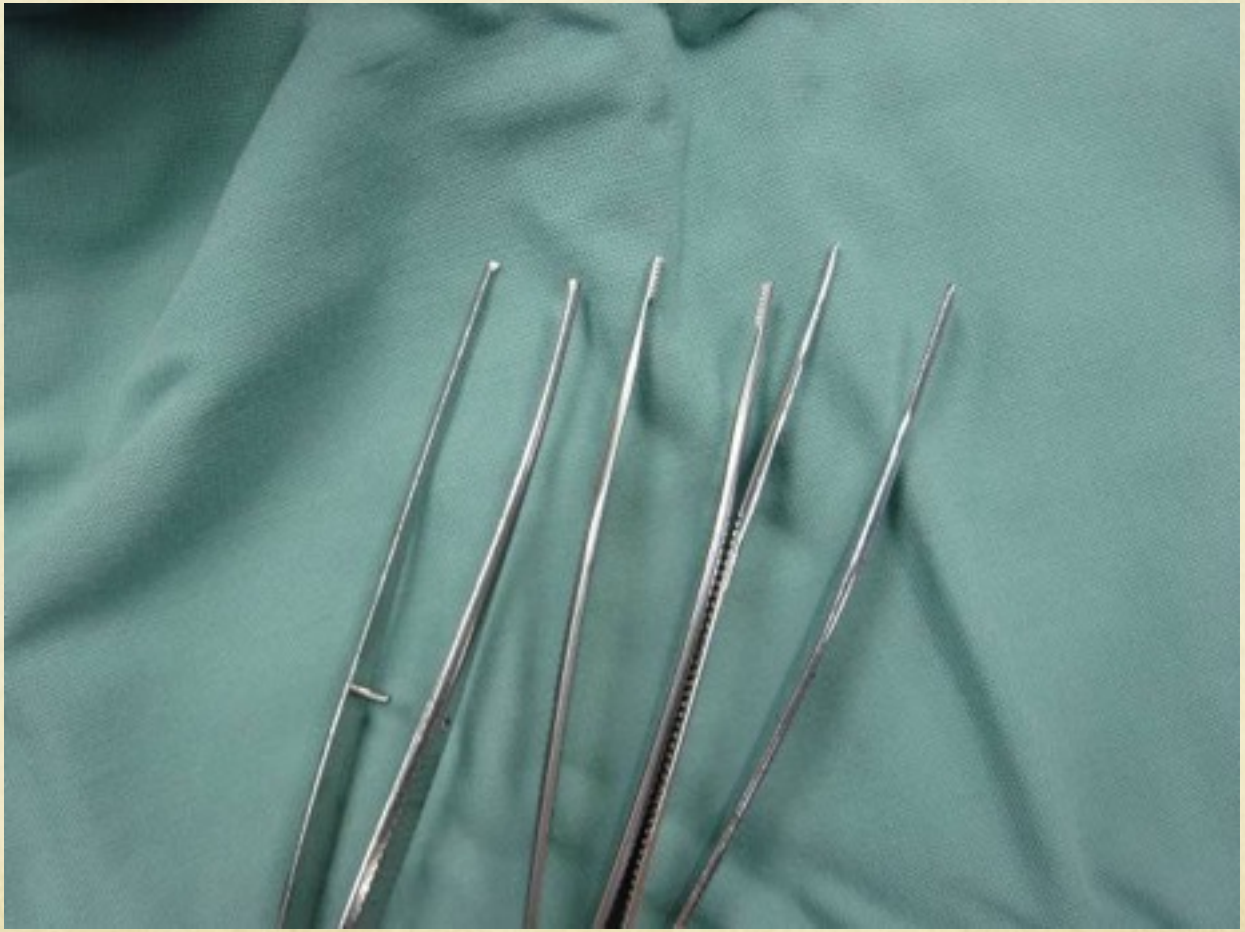
Suture removal

Part of body	Number of days
Face	5
Trunk, scalp	7
Extremities	7-10
Extension surfaces	14

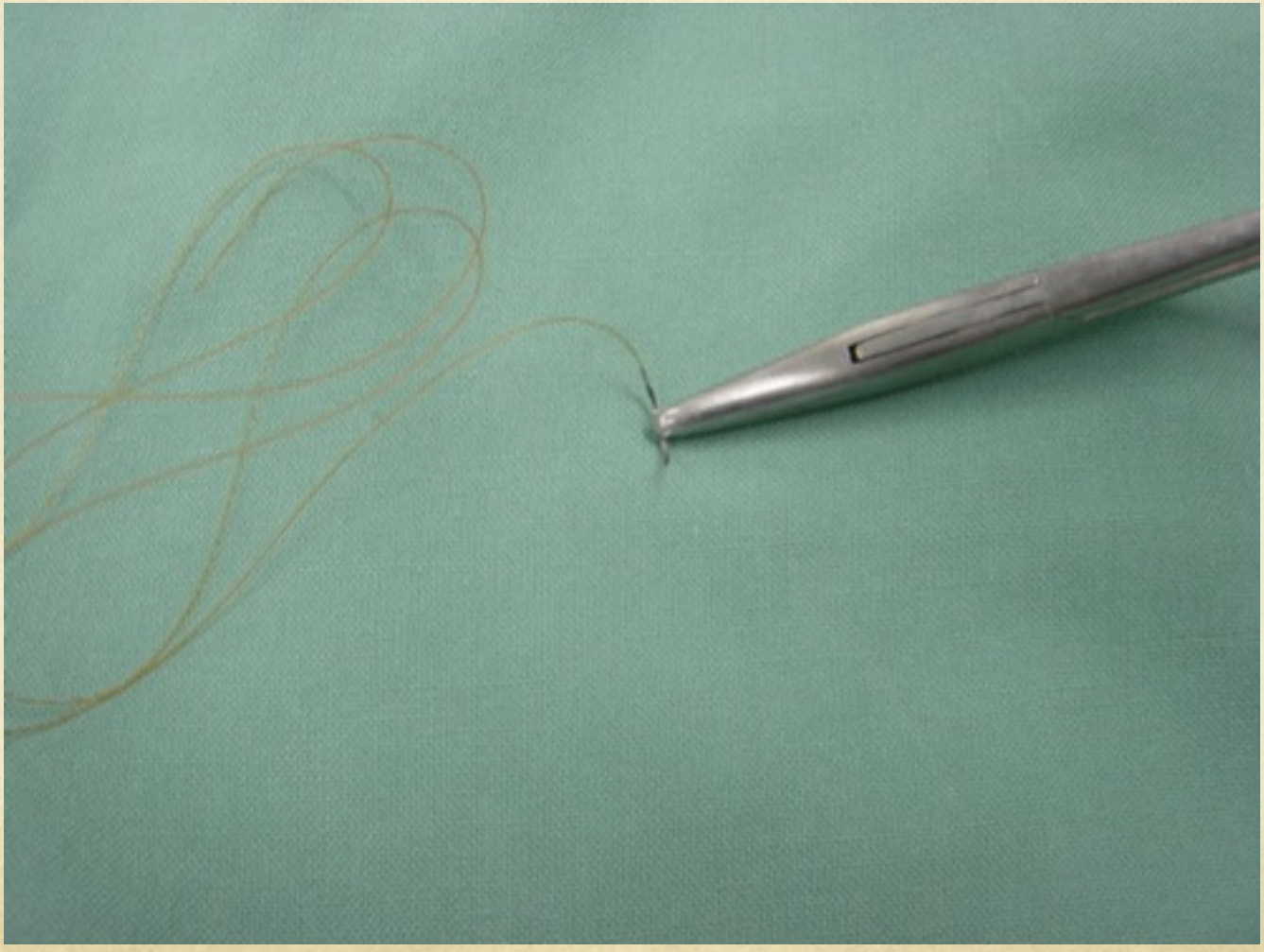
Administer local anesthesia

Repair techniques

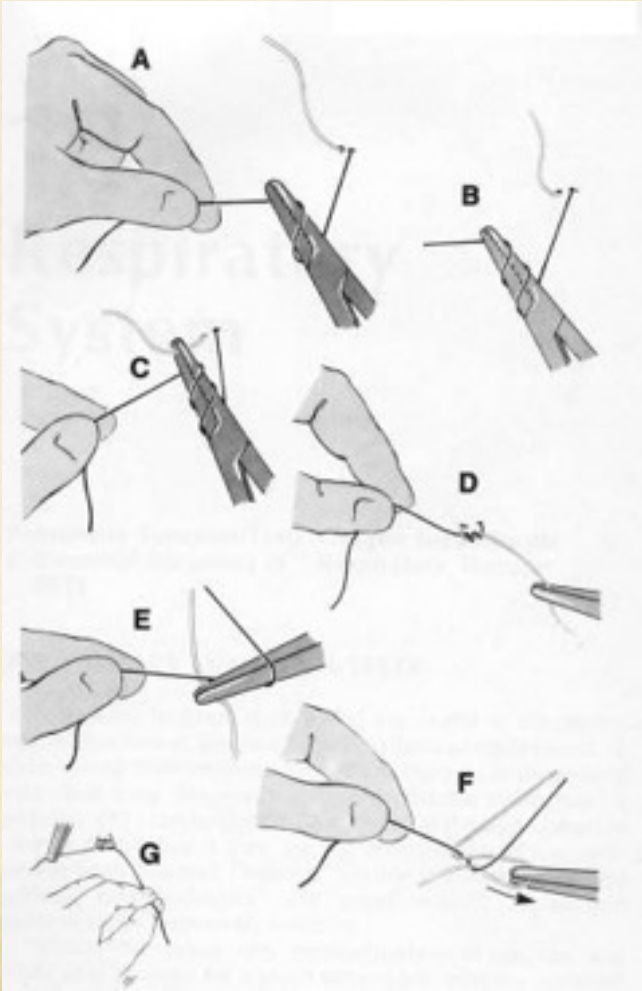
Tissue forceps



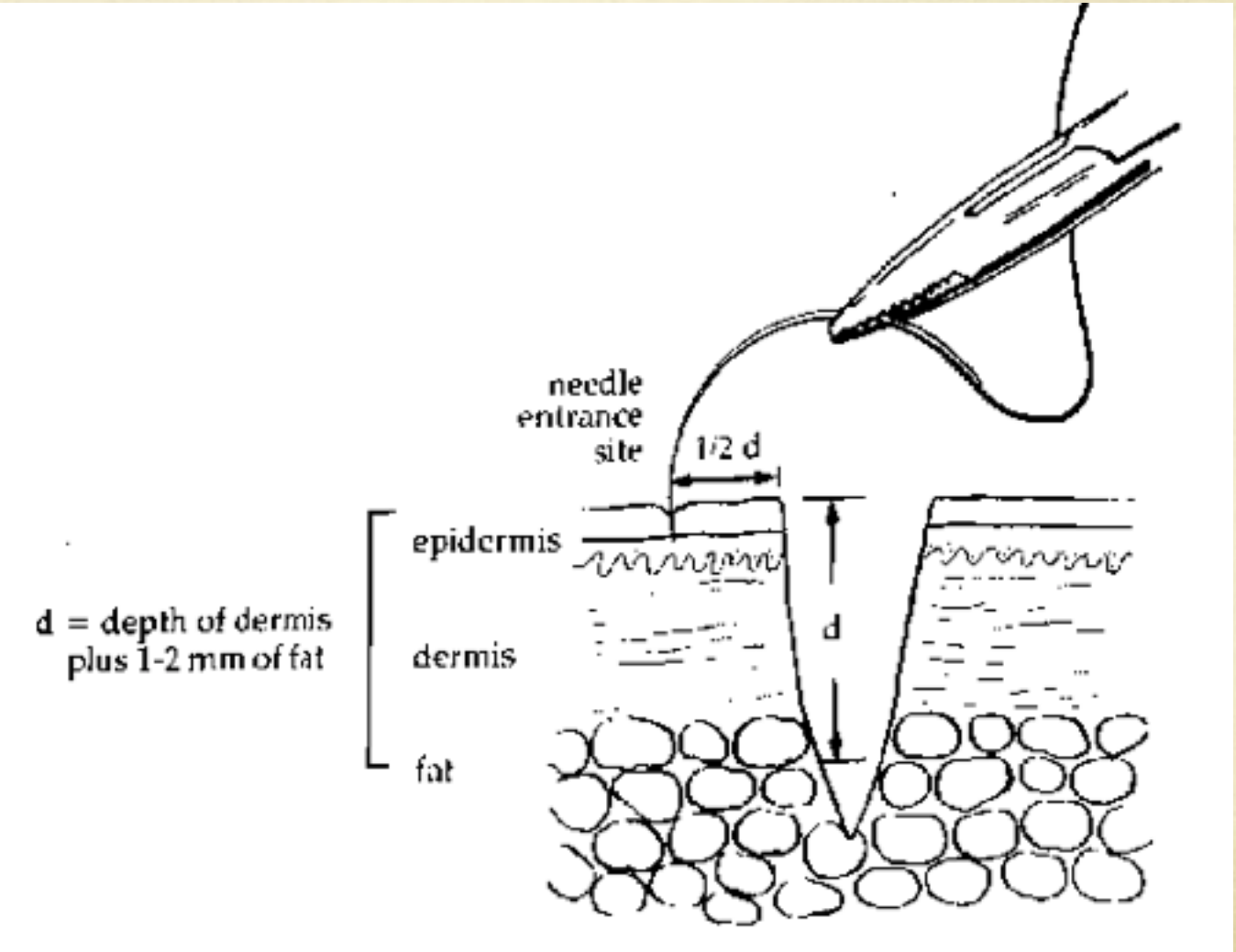
Needle 2/3 – 1/3



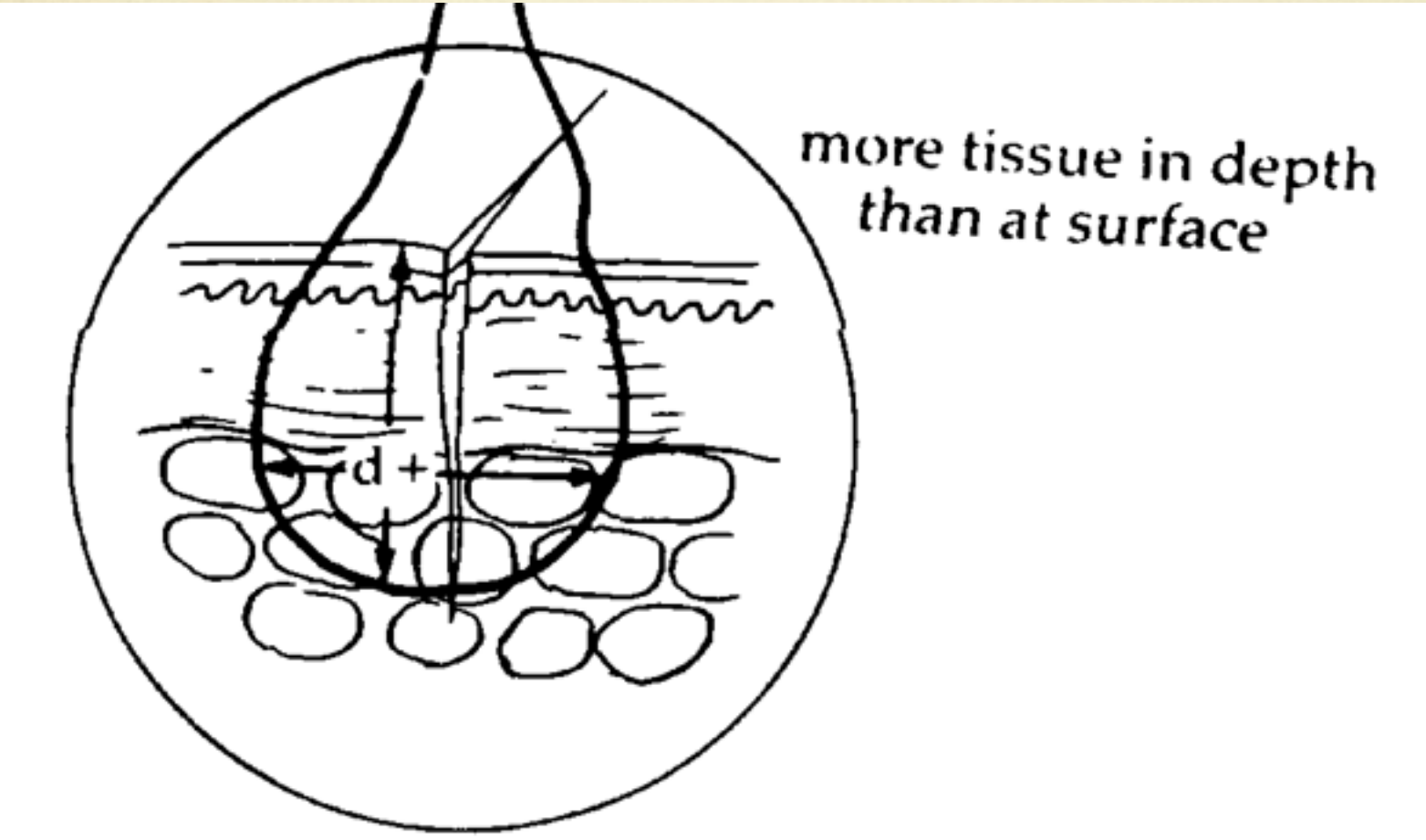
Instrument tie



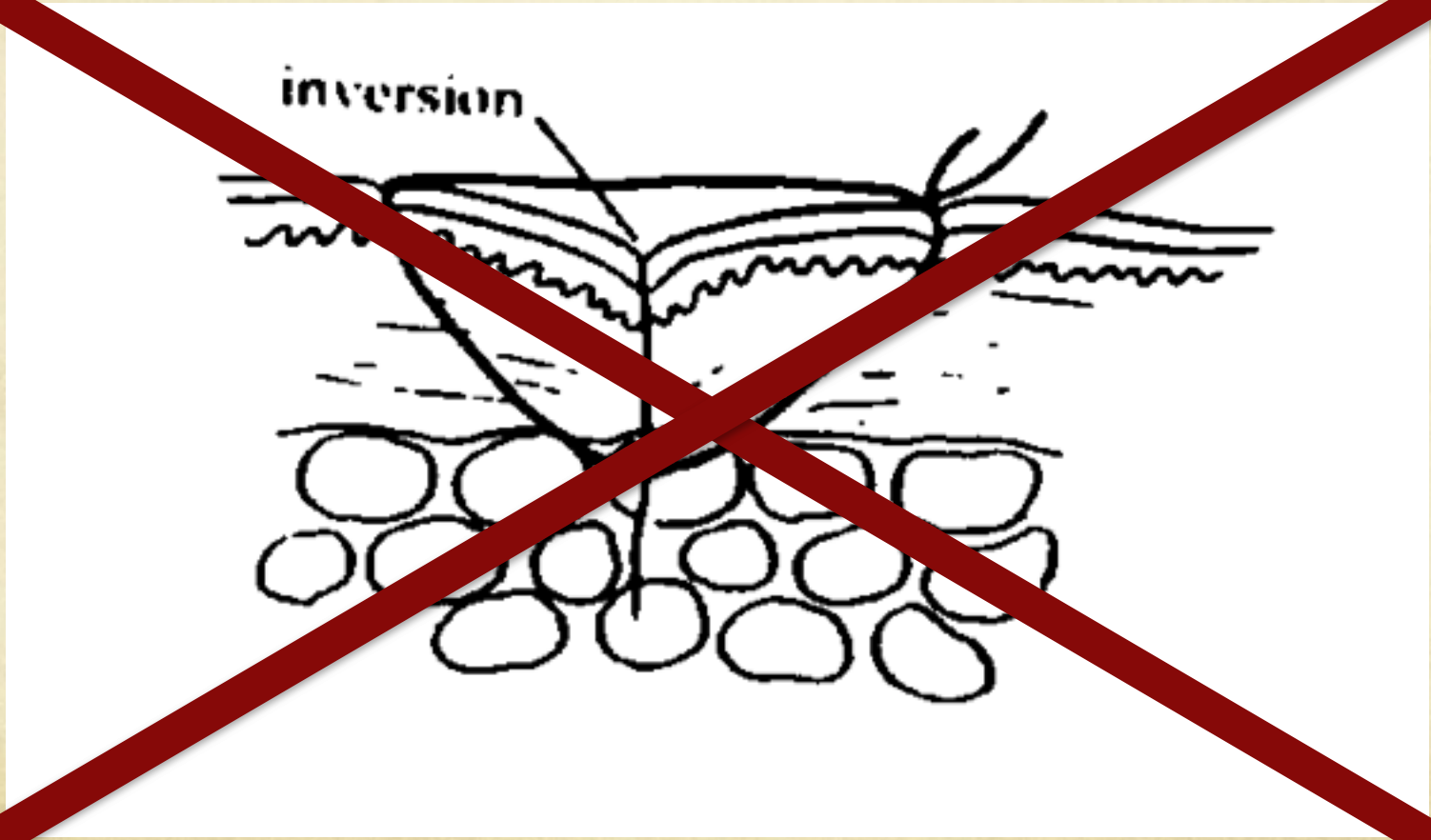
Simple interrupted



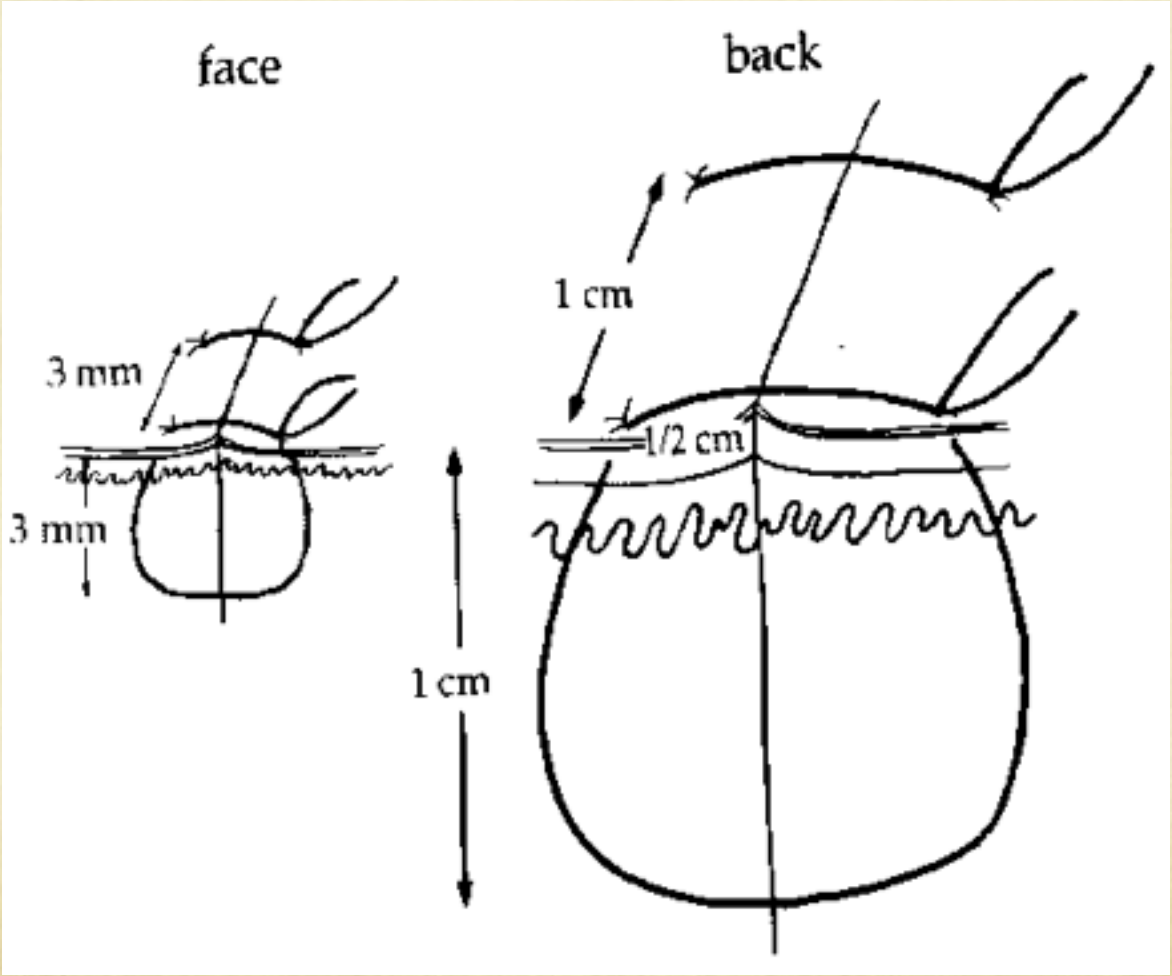
Simple interrupted



Simple interrupted



Simple interrupted



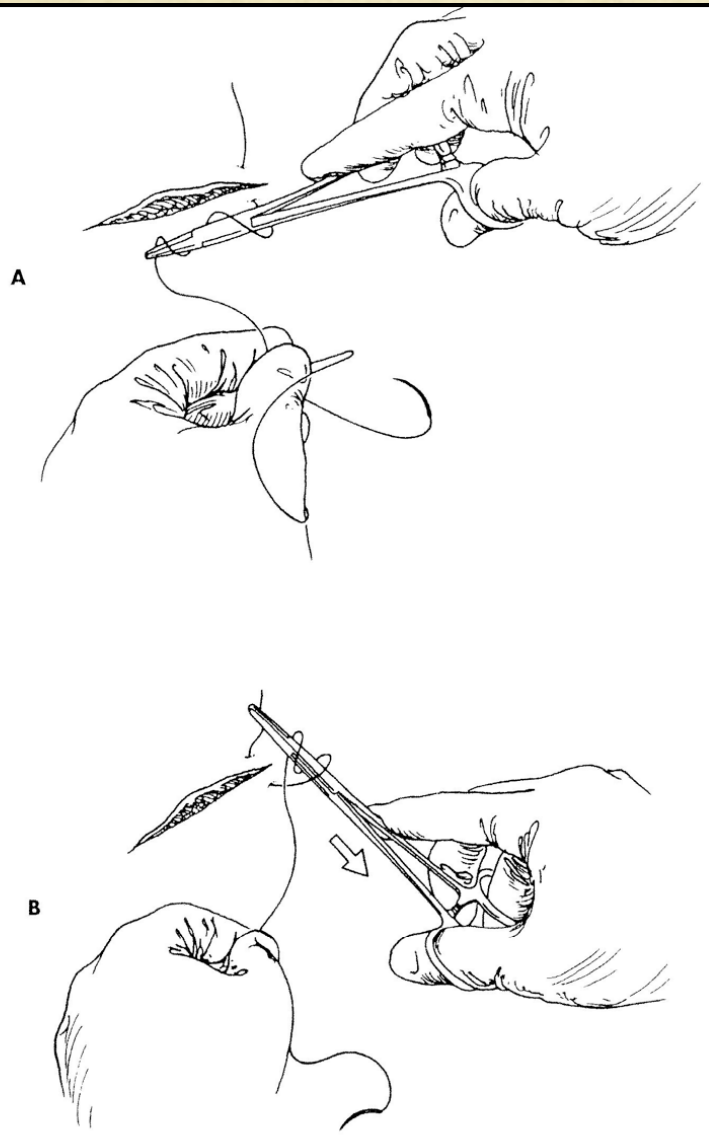


FIG. 9-1 For legend see opposite page.

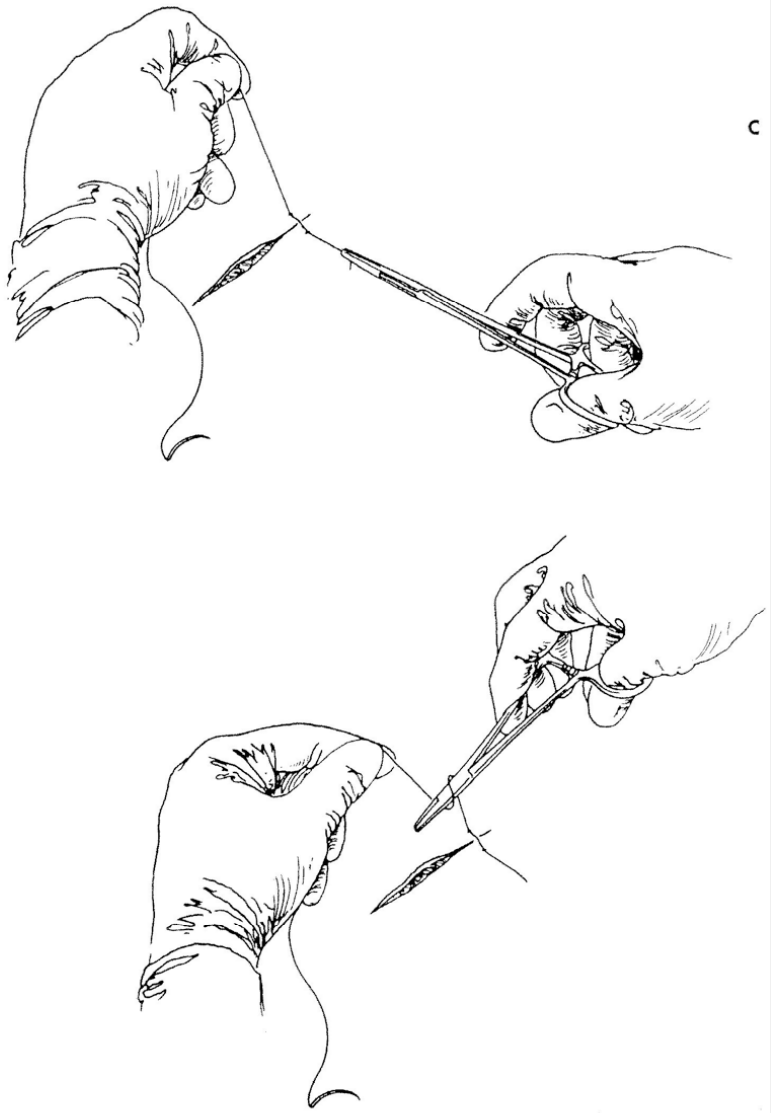


FIG. 9-1, cont'd Sequence for instrument tie of a standard percutaneous suture closure. Note in the boxed illustration in **G**, the surgeon's knot and final square knot configuration.

Continued

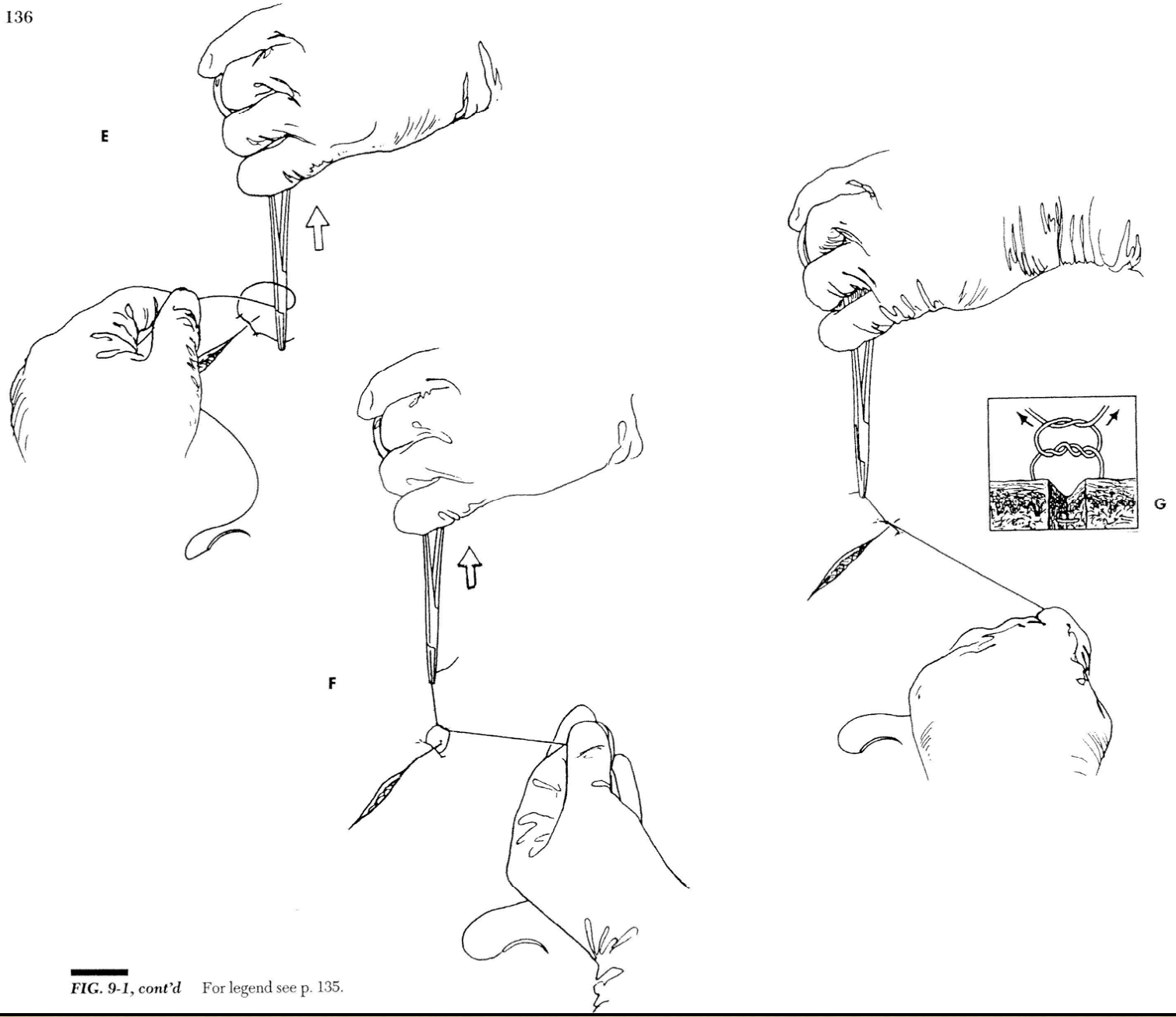


FIG. 9-1, cont'd For legend see p. 135.

Horizontal mattress

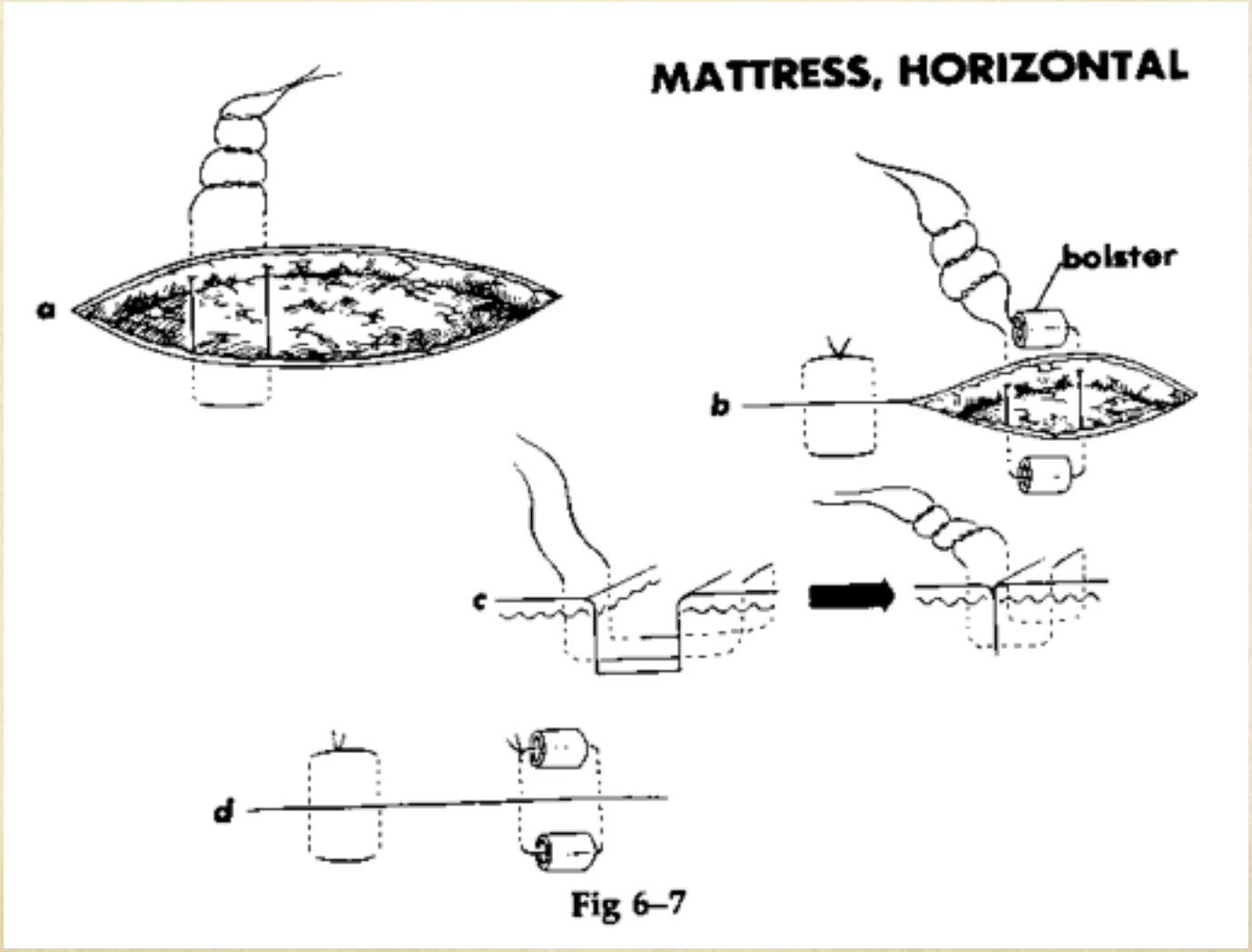


Fig 6–7

Horizontal mattress

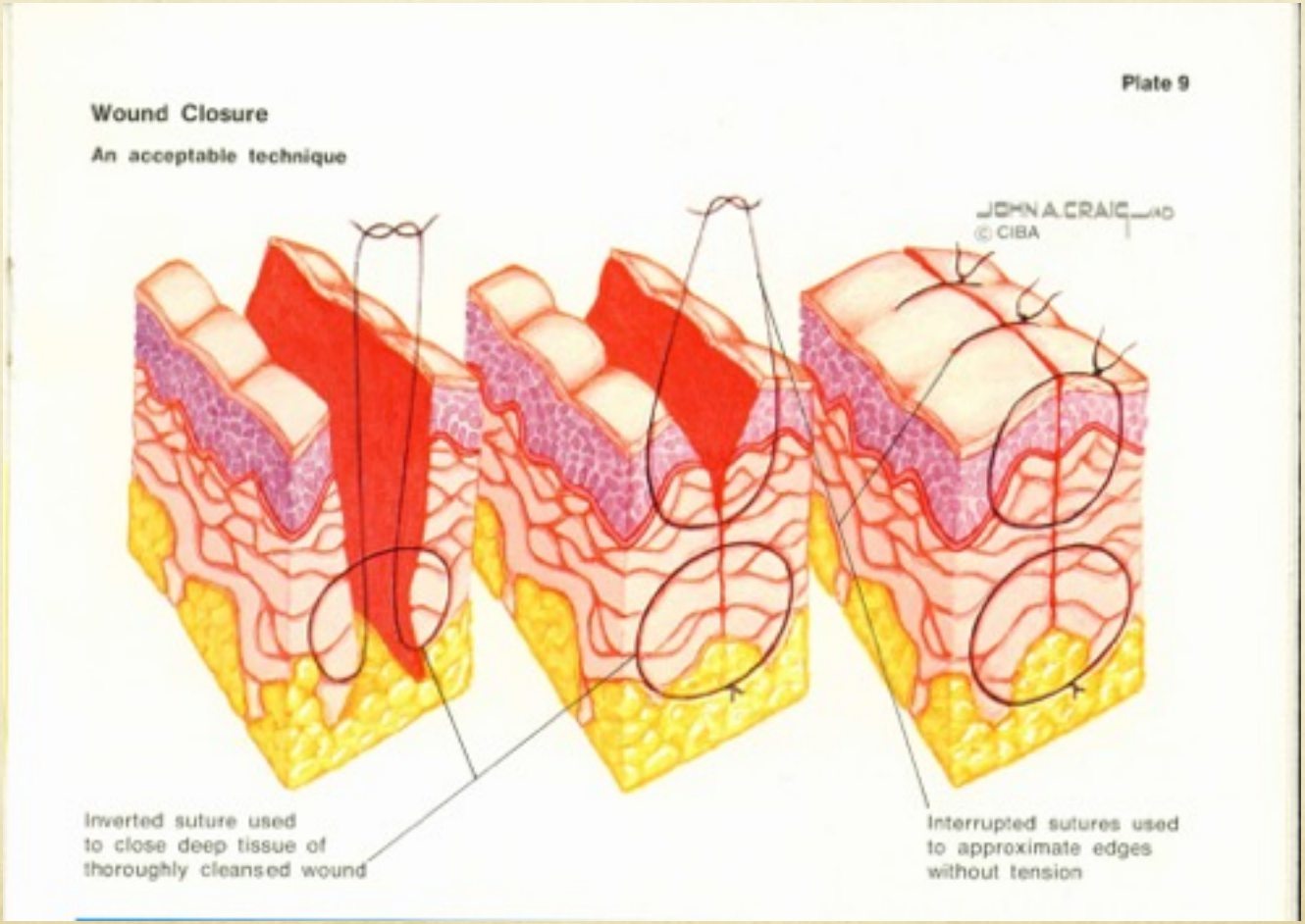
Benefits

- Good wound eversion
- Closing of the dead space
- Hemostasis
- Wounds under tension

Disadvantages

- Scars
- Risk of epidermal necrosis

Deep tissue suturing



Deep tissue suturing

- Better distribution of tension
- No dead space that could lead to abcess, hematoma
- Facilitates eversion
- Better healing

References

- Trott, Alexander T. - Wounds and Lacerations : Emergency Care & Closure. – Mosby Inc, 2005.