

# WHAT ARE YOU LEARNING?

- 1- Skin Anatomy
- 2- Skin Incisions
- 3- Abdominal wall incisions
- 4- Abdominal wall closure
- 4- Skin closure techniques
- 5- Wound healing process
- 6- Factors affecting wound healing

# Anatomy Of the Skin

Largest and most visible organ

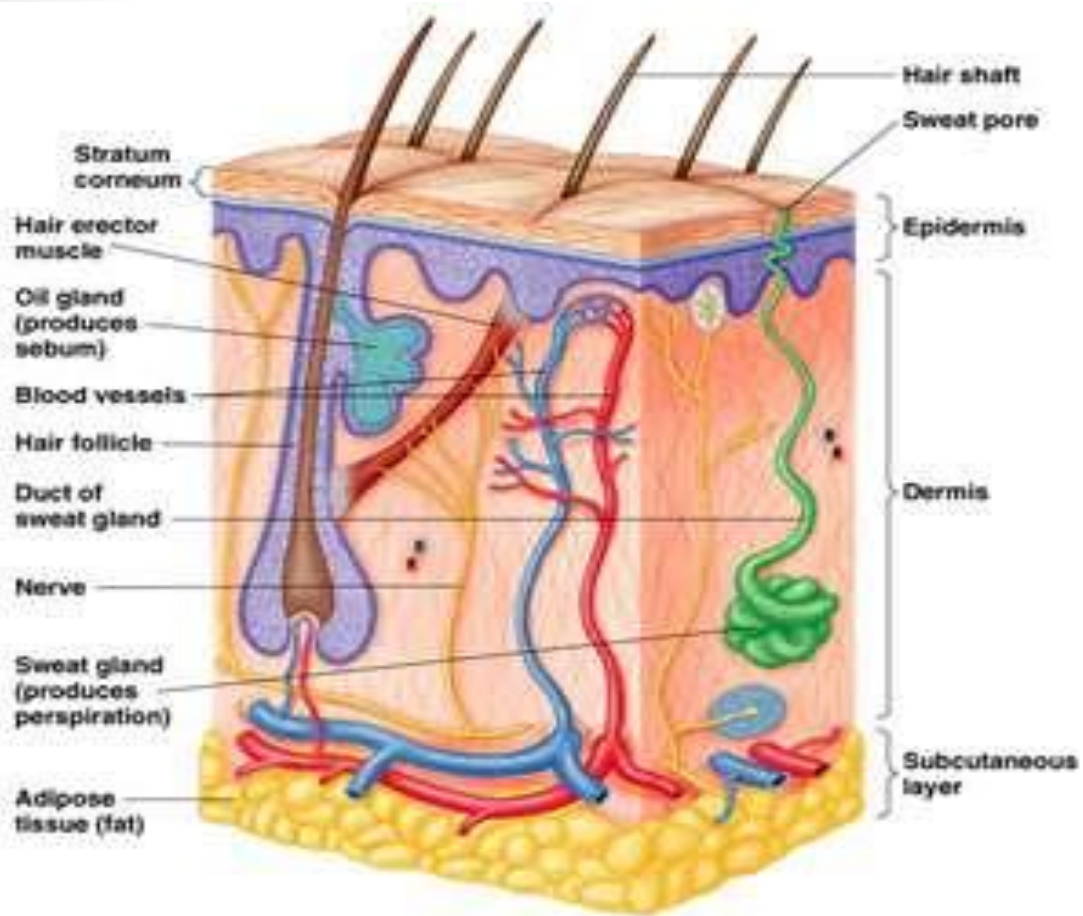
Made up of two main layers:

**Epidermis**(Cuticular) very thin layer and is firmly attached to the dermis at the dermo-epidermal junction (avascular)

**Dermis** - made up of collagen and elastin which give skin its strength and elasticity. (highly Vascular)

Below dermis is **subcutaneous layer**, this provides support to the dermis and stores fat which protects the internal structures.





Copyright © 2000 Pearson Education, Inc., publishing as Benjamin Cummings.

## Epidermis (Cuticular)

- Dead cells, No nuclei, filled with keratin, (Cuticles)
  - No blood vessels, feeding from the dermis
  - The deepest part (basal layer): live cells
  - Contains melanocytes, pigment cells that produce melanin
- Protect the skin from the ultraviolet

## Dermis (Subcuticular)

- Contains collagen fibers
- Contains arteries, veins, and neurons,
- Contains hair follicles, oil glands, and sweat glands

## Subcutaneous Tissue

- loose, connective tissue
- adipose tissue ( fat storage)
- conserve internal body heat

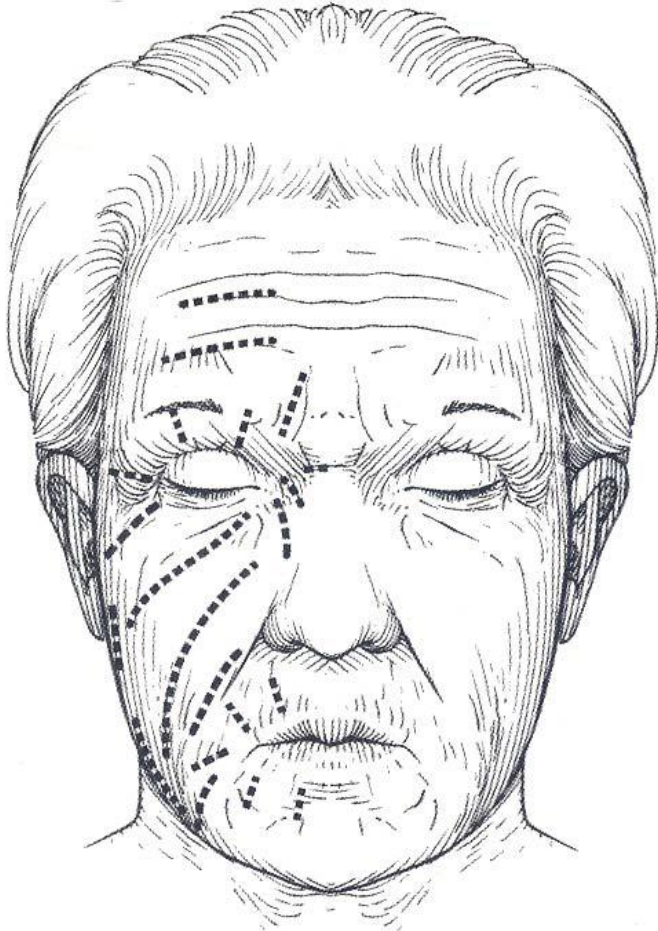


# Skin incision

the surgeon and the assistant stretch the skin with sterile towels on both sides of the operative field.

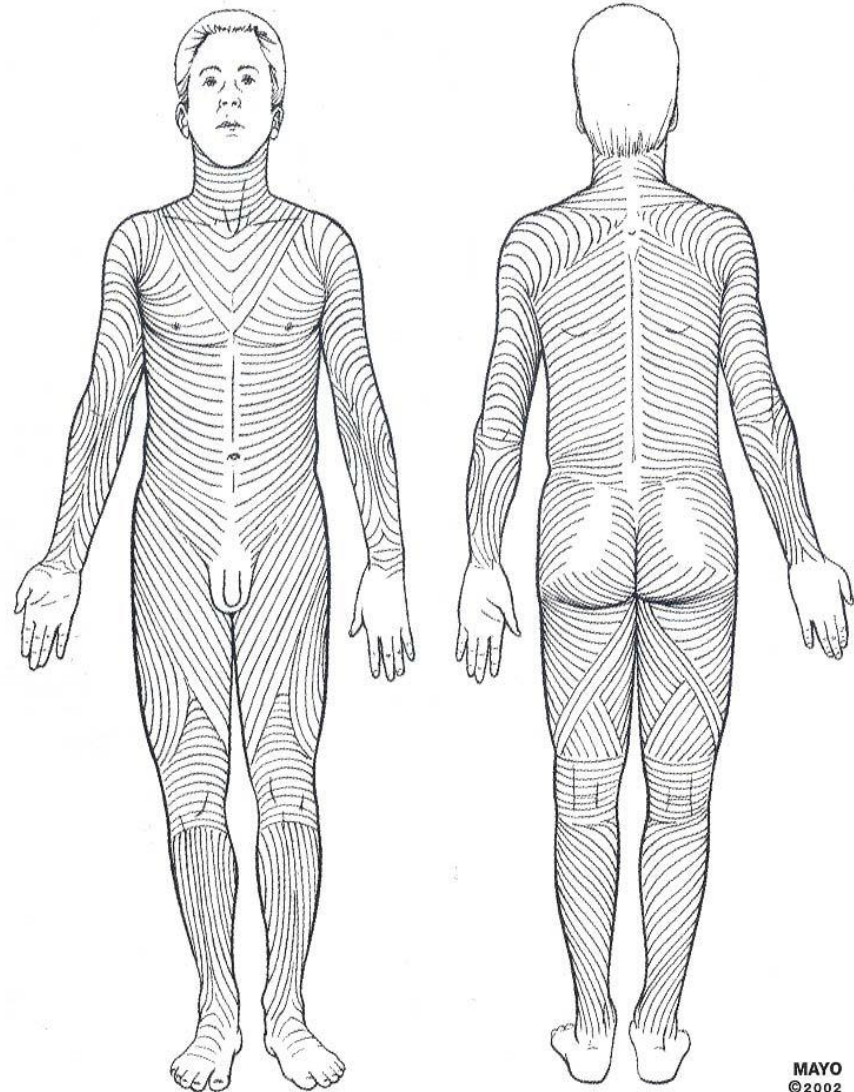


**Relaxed skin tension lines —  
Lines for incision placement.**



**Relaxed skin tension lines  
(wrinkles).**

Dotted lines for incision options.

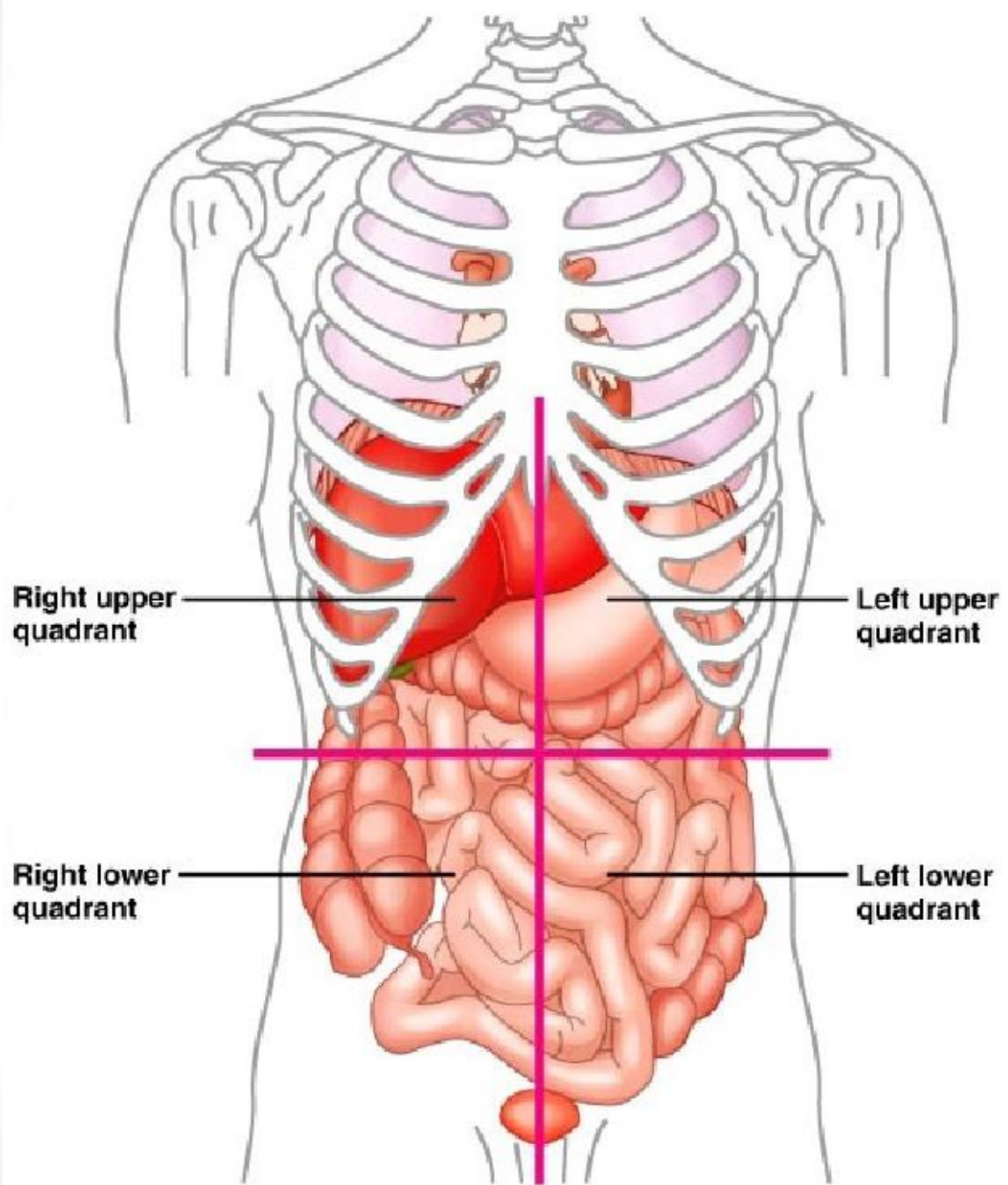


- **Incision is** - perpendicular to the skin,
  - made with a single, definite cut.
  - parallel to Langer's lines(better wound healing, less scar formation),
  - toward oneself, from left to right.

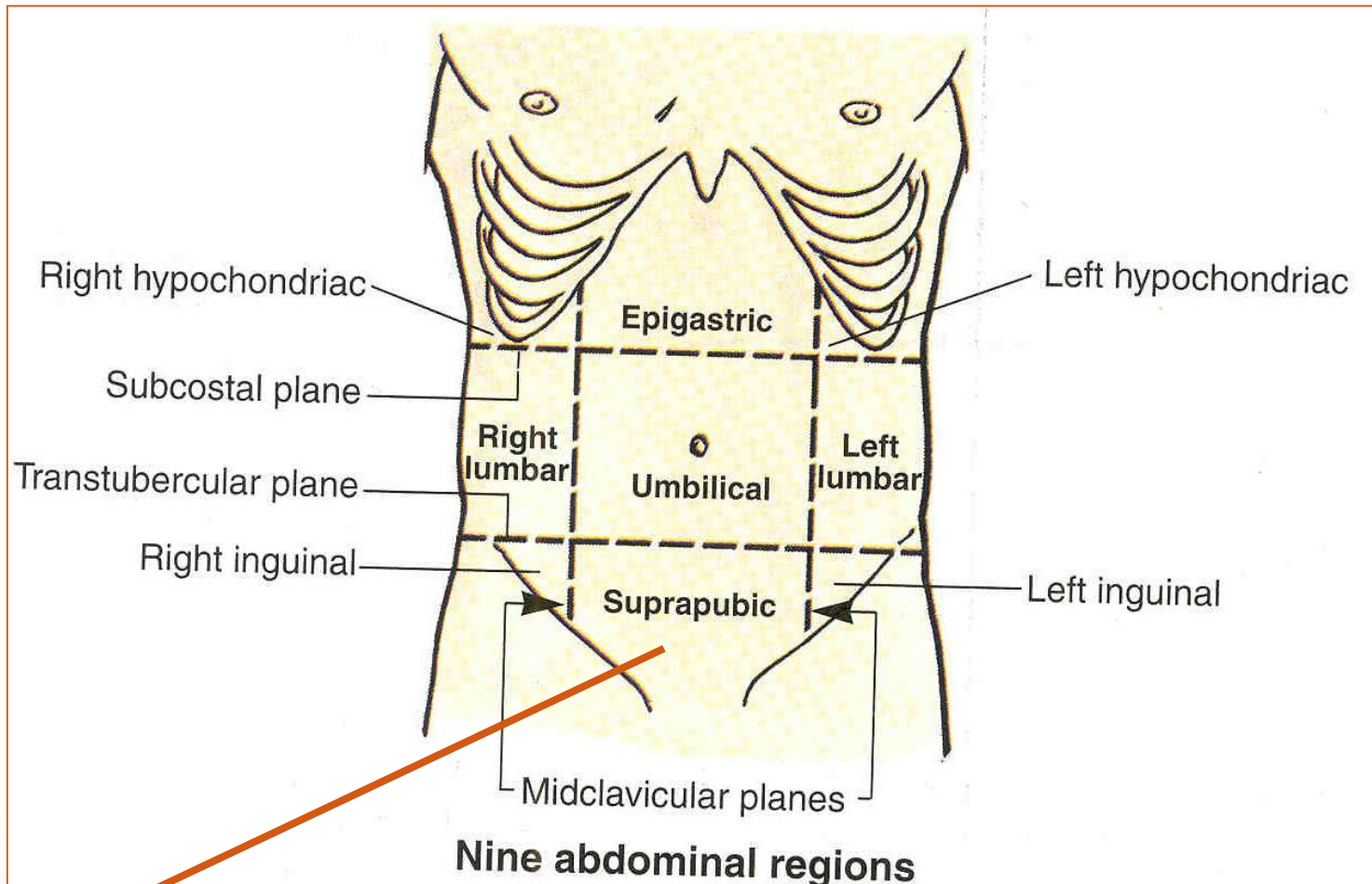
# Skin Incision Cut Down Method



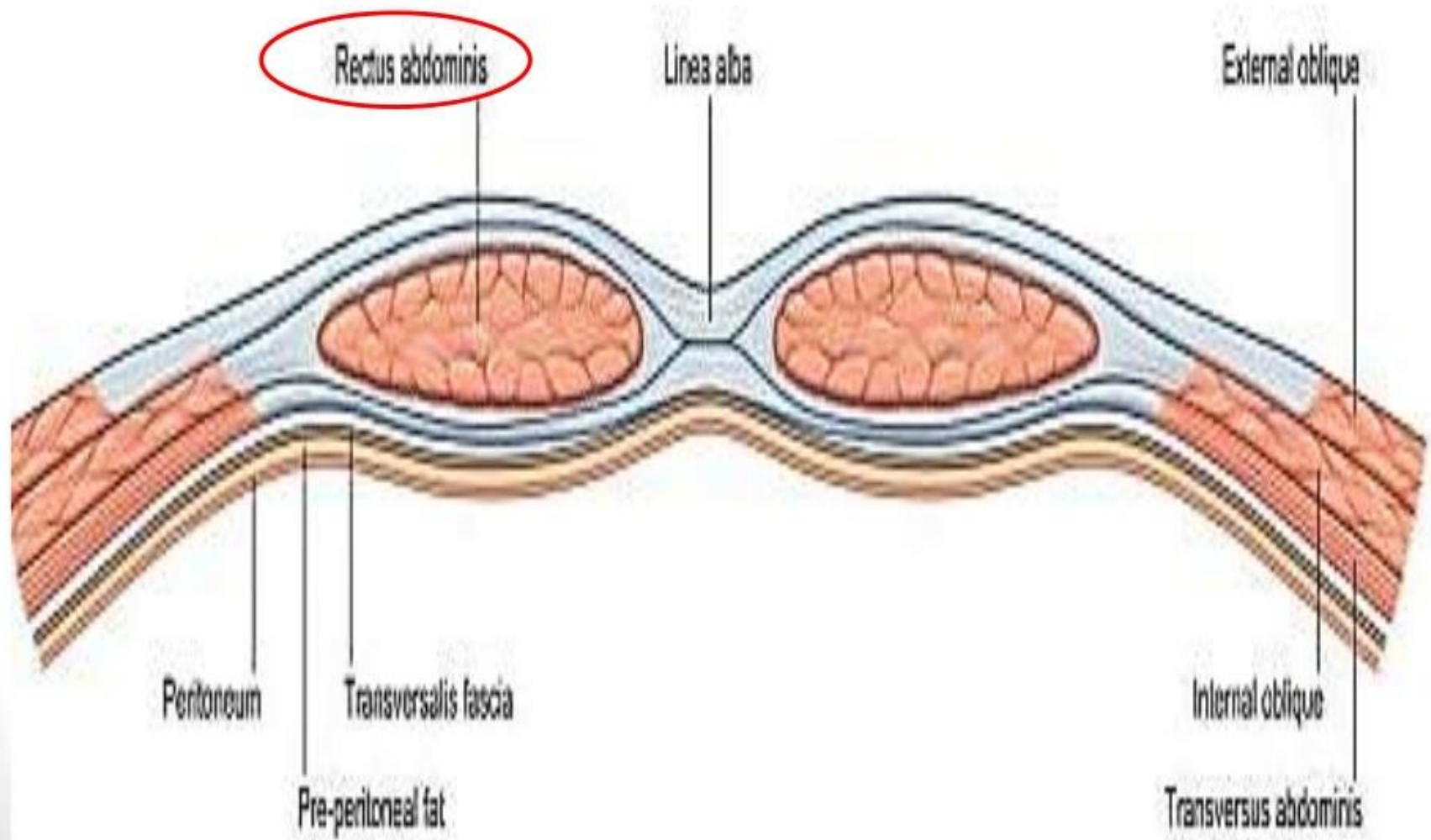




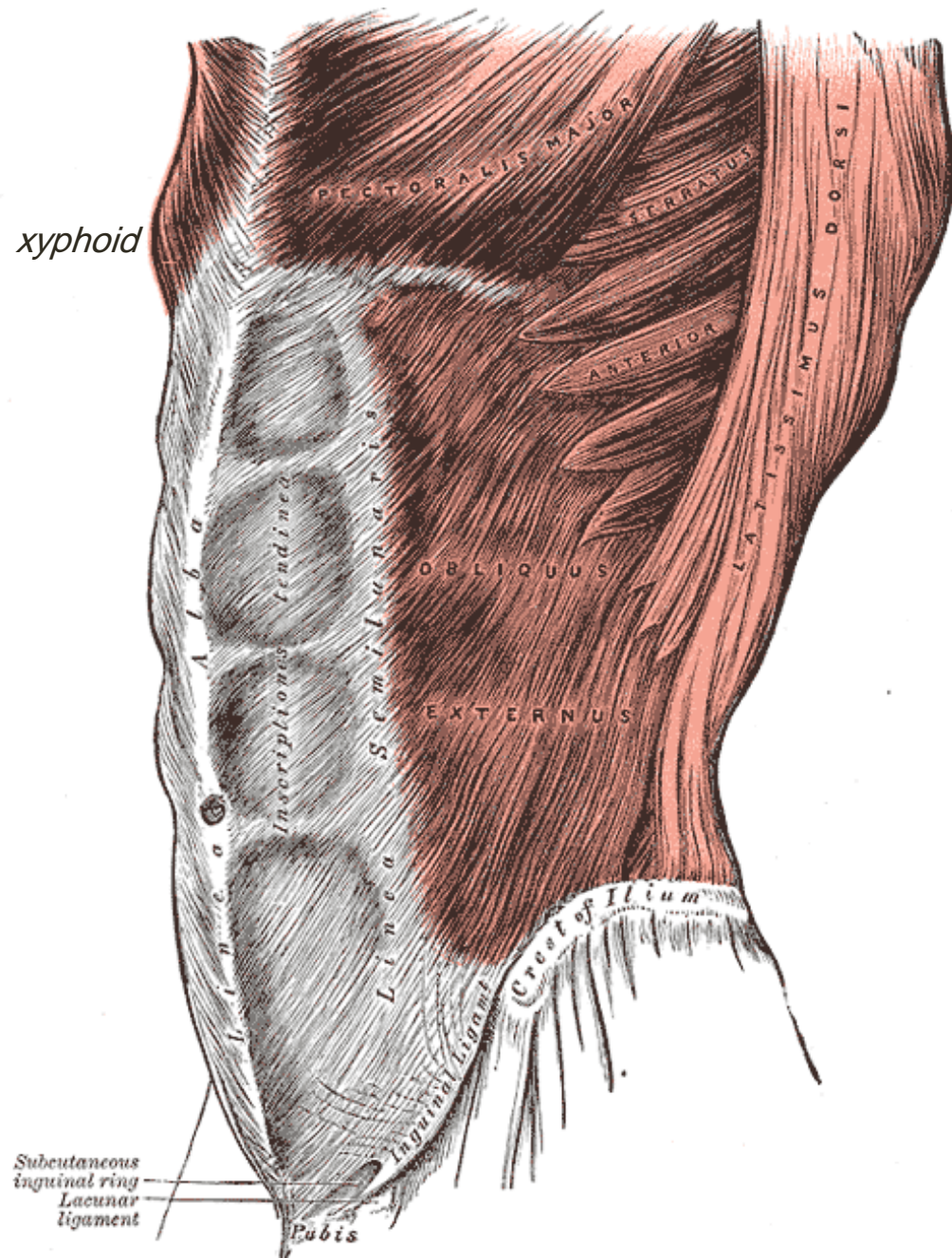
# 9 abdominal regions



hypogastric region

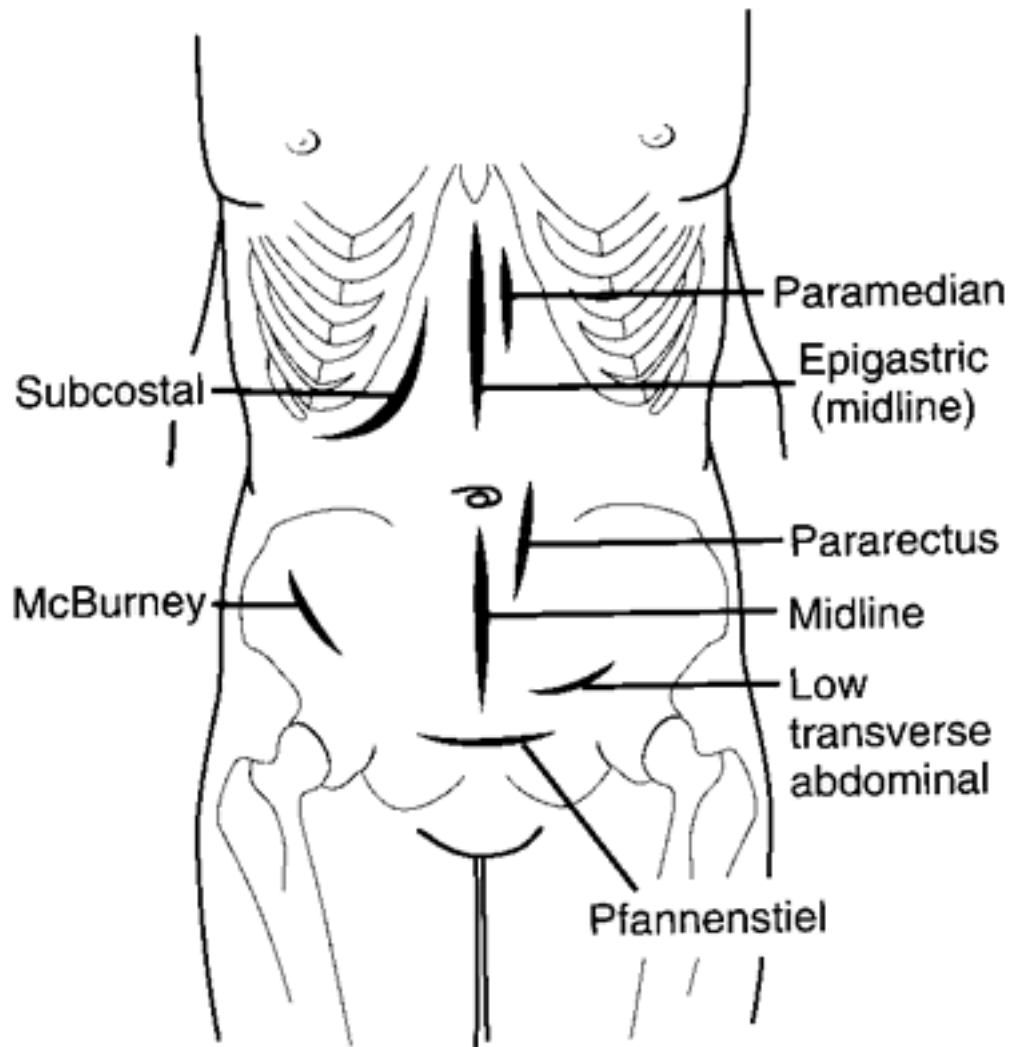


*xyphoid*



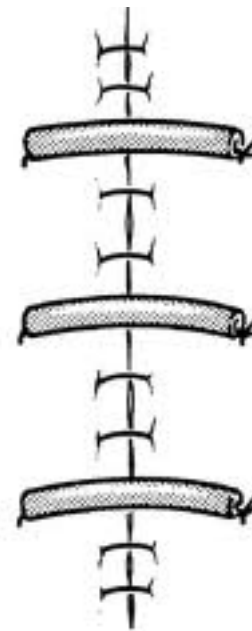
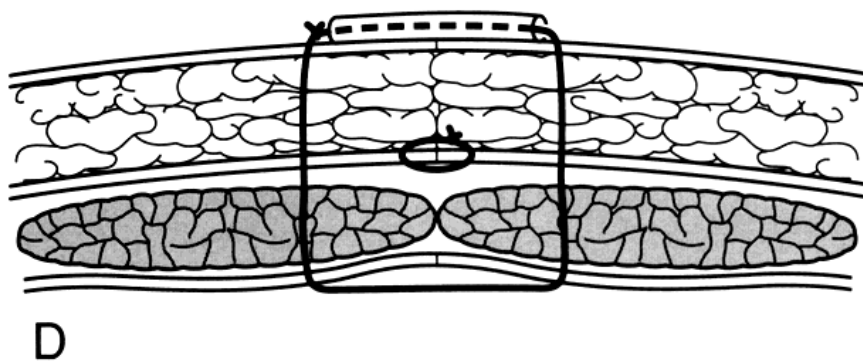
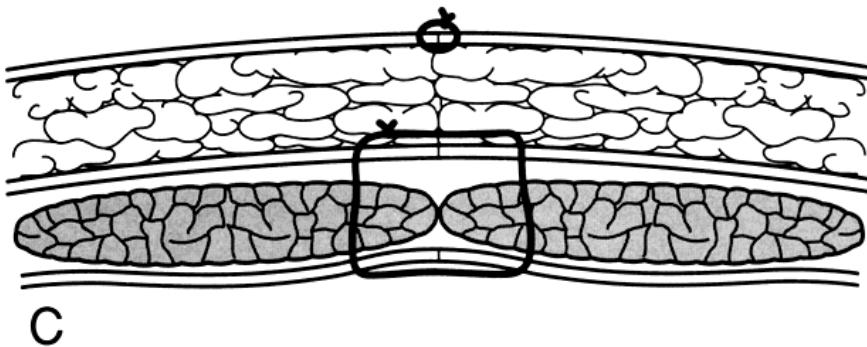
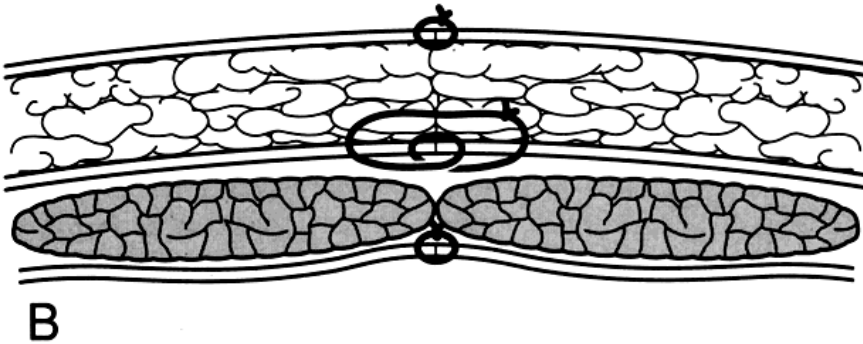
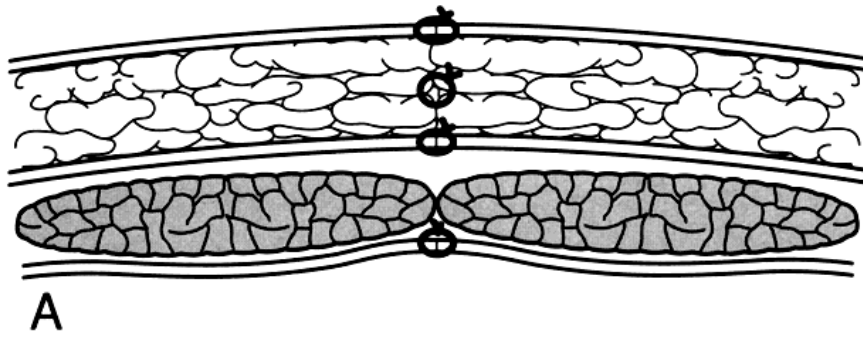
# Abdominal Incision Types

- **Right Upper Paramedian**  
stomach, duodenum, pancreas
- **Left Lower Paramedian**  
pelvic structures, colon
- **Midline**  
Laparotomy
- **McBurney**  
appendix
- **Lower Transverse (Pfannensteil)**  
uterus, ovaries, and fallopian tubes

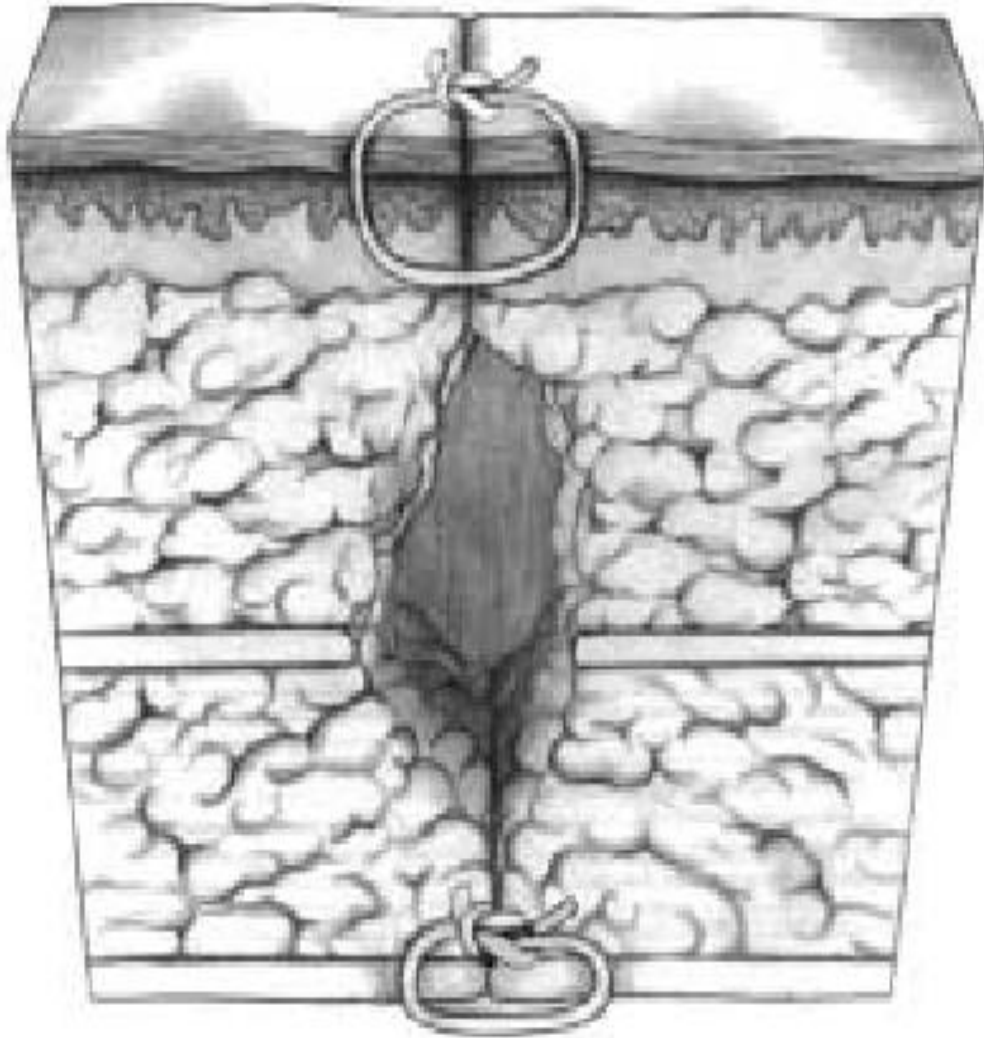


## Techniques of abdominal wall closure.

- A. Layered closure.
- B. Modified Smead-Jones closure.
- C. Mass closure.
- D. Retention suture.



## Elimination of dead space in the wound





## *Peritoneum closure:*

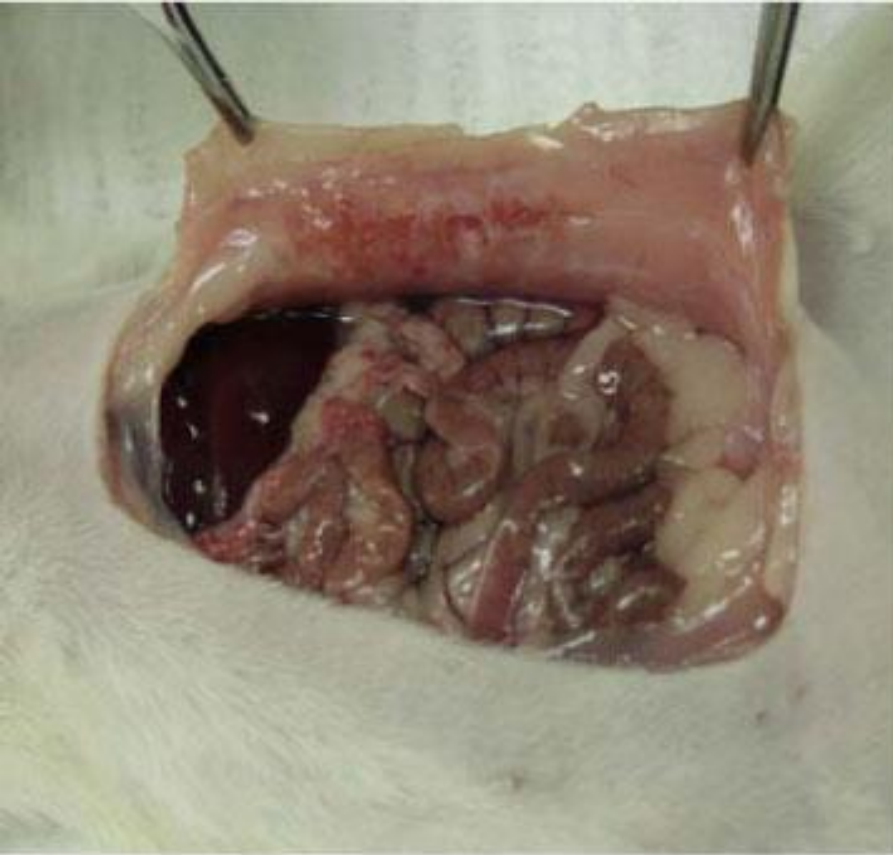
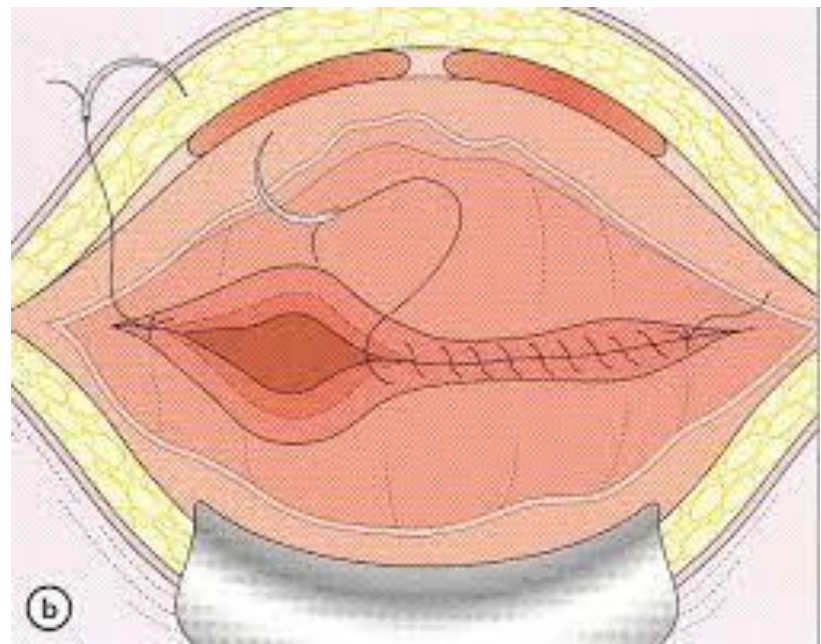


FIGURE 3 - Rat 8, group 2 (females)



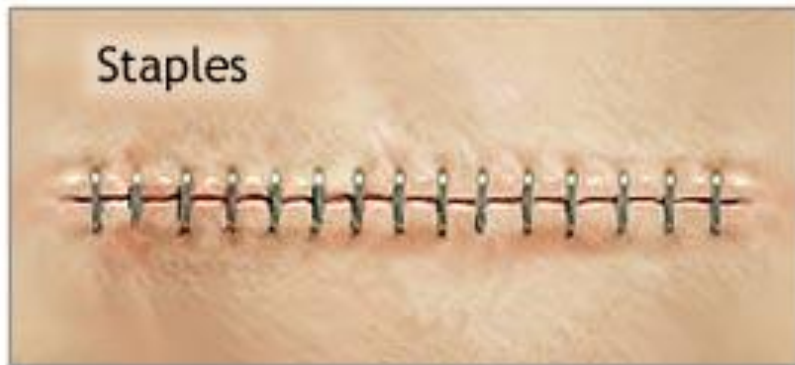
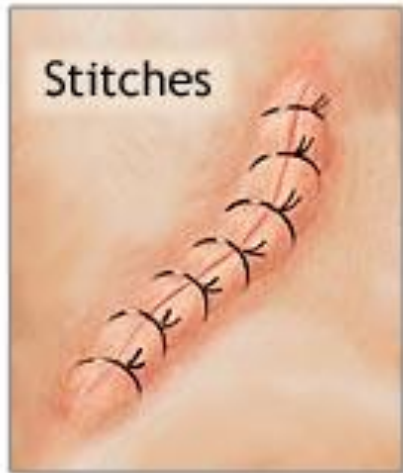
## *Linea Alba Closure:*



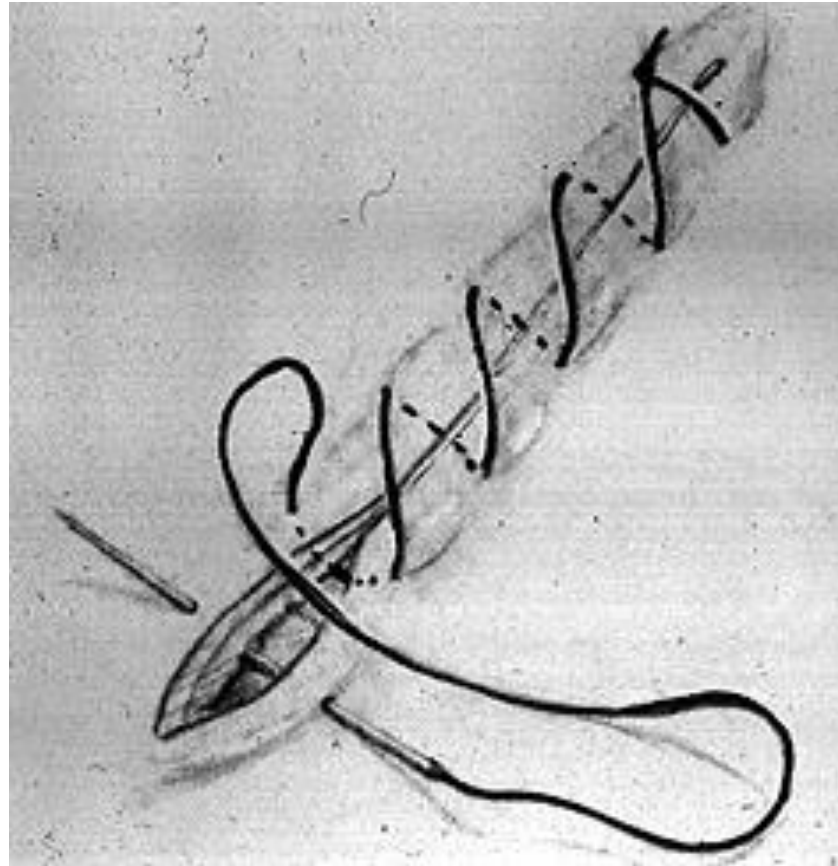
## ***Subcutaneous closure:***



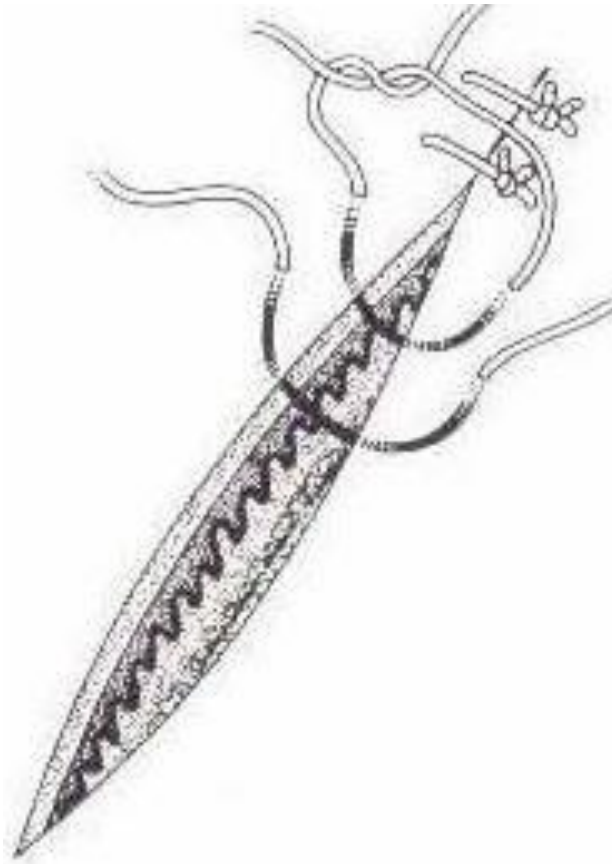
# *Skin Closure:*



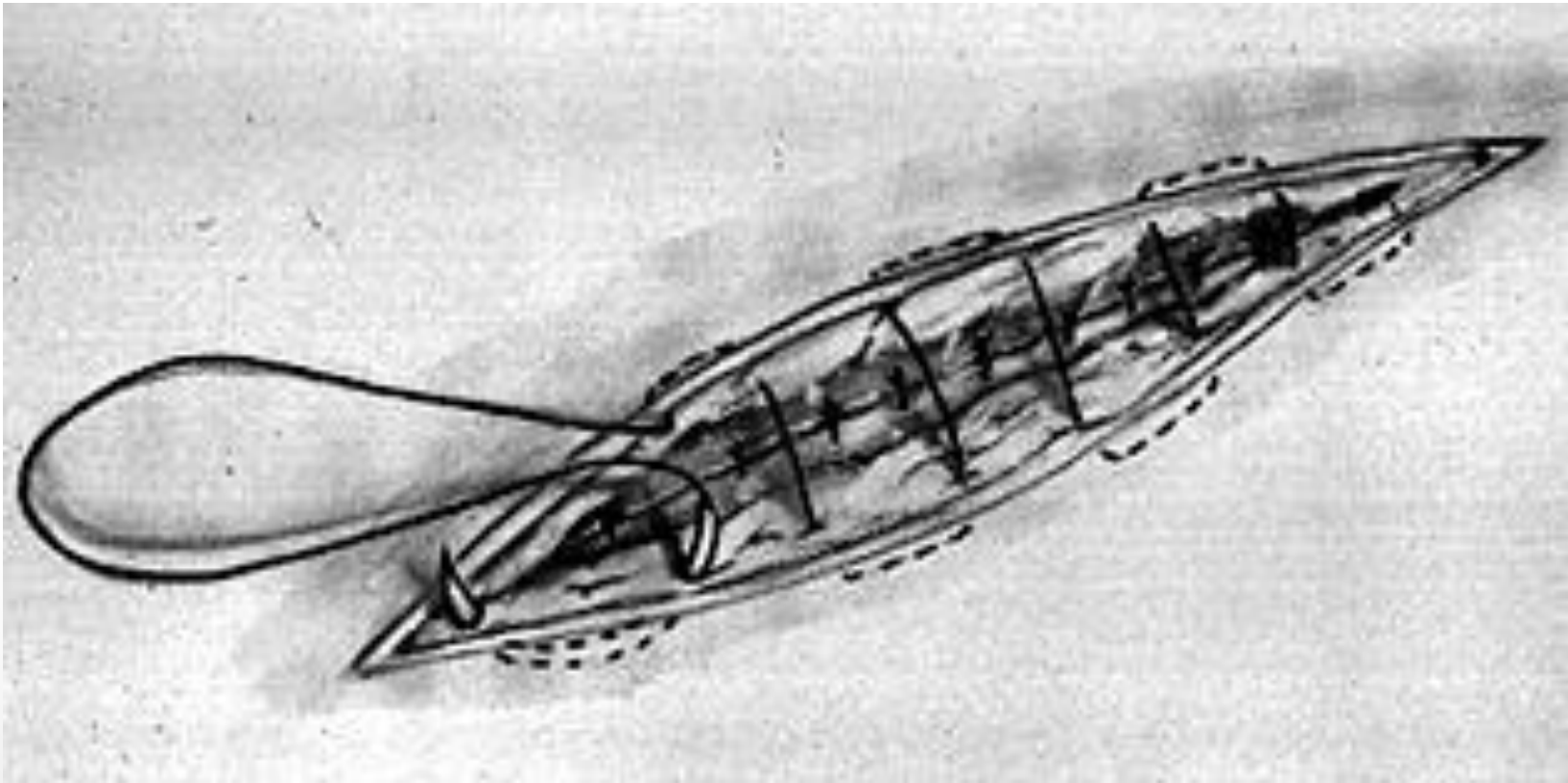
# Simple Continuous



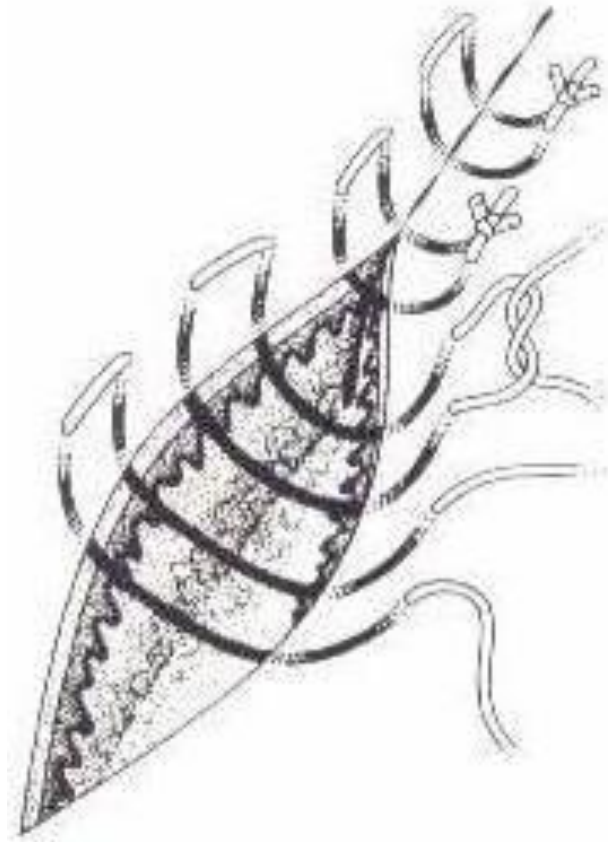
# Simple Interrupted



# Simple Subcuticular



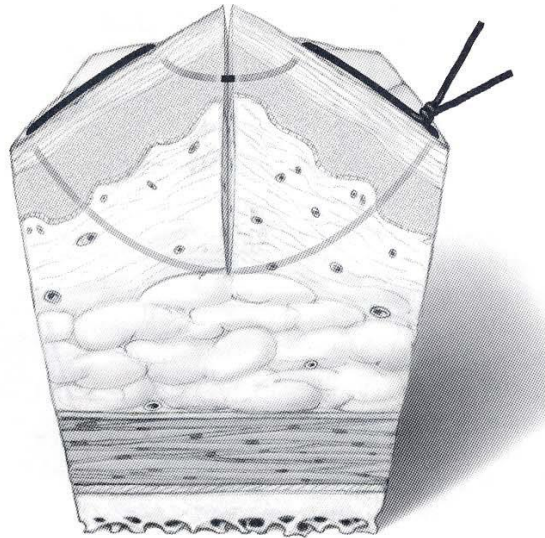
# Horizontal Mattress



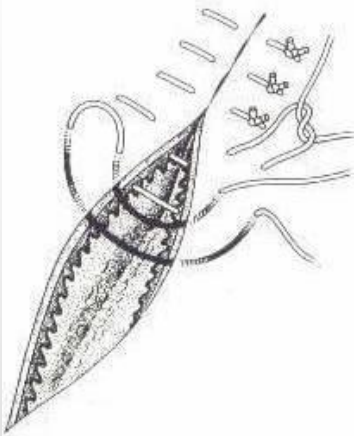
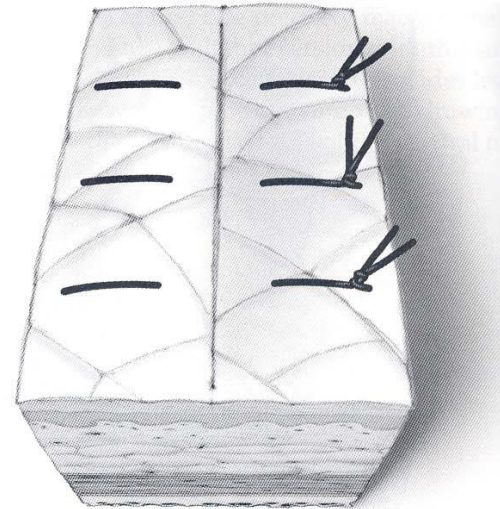


# Vertical Mattress

Tie



Vertical mattress



# Common Suture Use

	Skin (interr.)	sub cu.	
Location			
Face	5-0, 6-0 nylon Prolene	4-0 or 5-0 synthetic absorbable	4-7 days
Extremities, trunk	4-0 or 5-0 nylon	3-0 or 4-0 synth. Abs.	7-14 days

# Classification of Wounds Closure

- **Healing by Primary Intention:**

- All Layers are closed. The incision that heals by first intention does so in a minimum amount of time, with no separation of the wound edges, and with minimal scar formation.

- **Healing by Secondary Intention:**

- Deep layers are closed but superficial layers are left to heal from the inside out. Healing by second is appropriate in cases of infection, excessive trauma, tissue loss, or imprecise approximation of tissue.

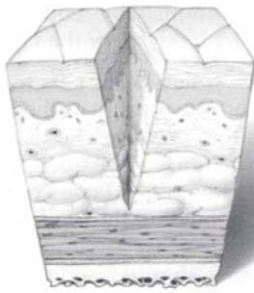
- **Healing by Tertiary Intention:**

- Also referred to as delayed primary closure.

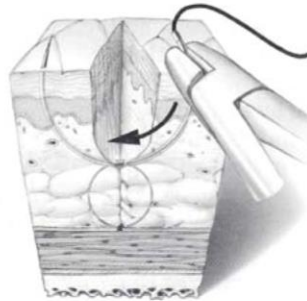


## SUMMARY OF THREE METHODS OF HEALING

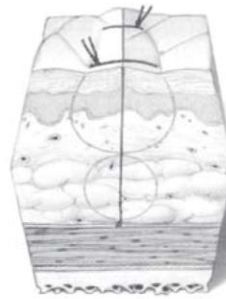
### *a. HEALING BY PRIMARY INTENTION*



Surgical wound  
(knife)

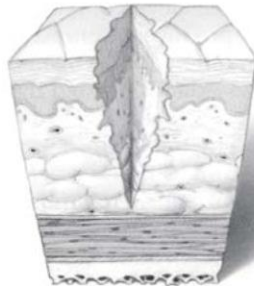


Suturing

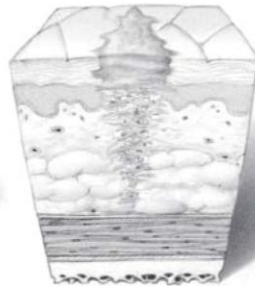


Surgical closure  
(immediate)

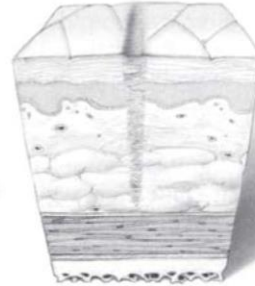
### *b. HEALING BY SECONDARY INTENTION*



Rough wound  
(injury)



Granulation tissue closes  
wound without sutures

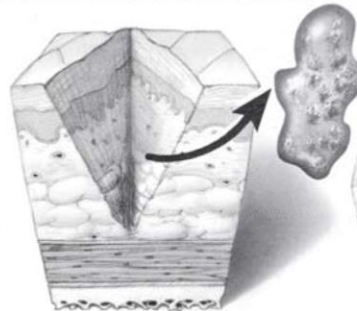


No surgical closure,  
depressed scar formation

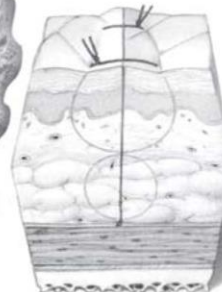
### *c. HEALING BY TERTIARY INTENTION*



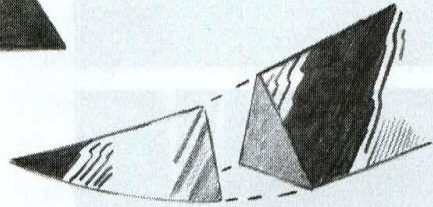
Rough wound  
(deep injury)



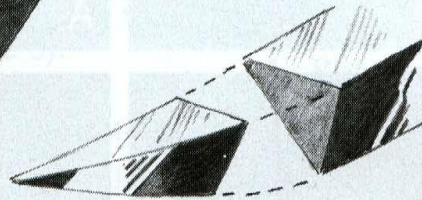
Surgical debridement  
(delayed 4-6 days post injury)



Surgical closure  
(delayed)



Conventional Cutting



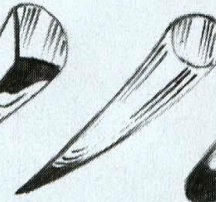
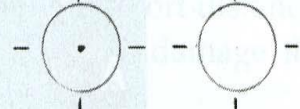
Reverse Cutting



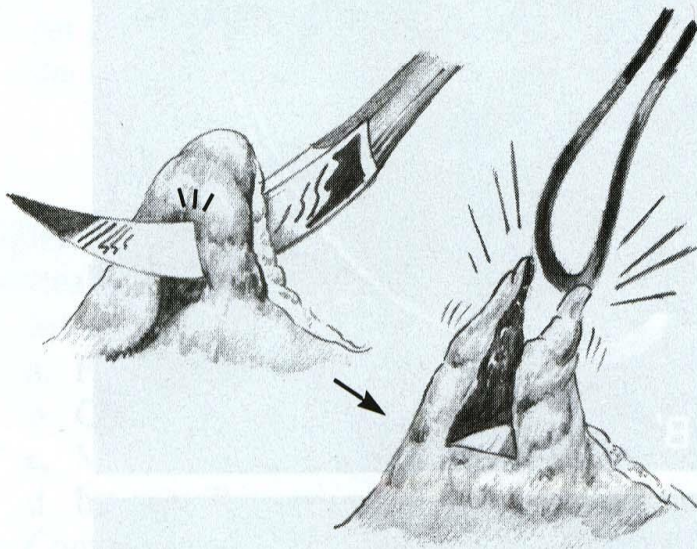
Tapper



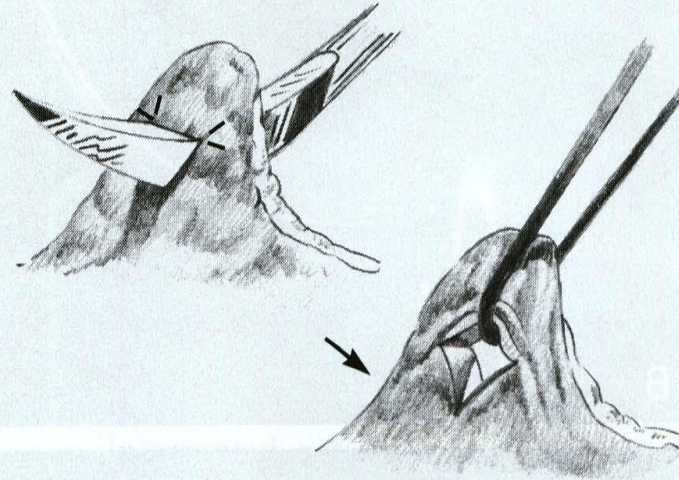
Tappercut



Blunt

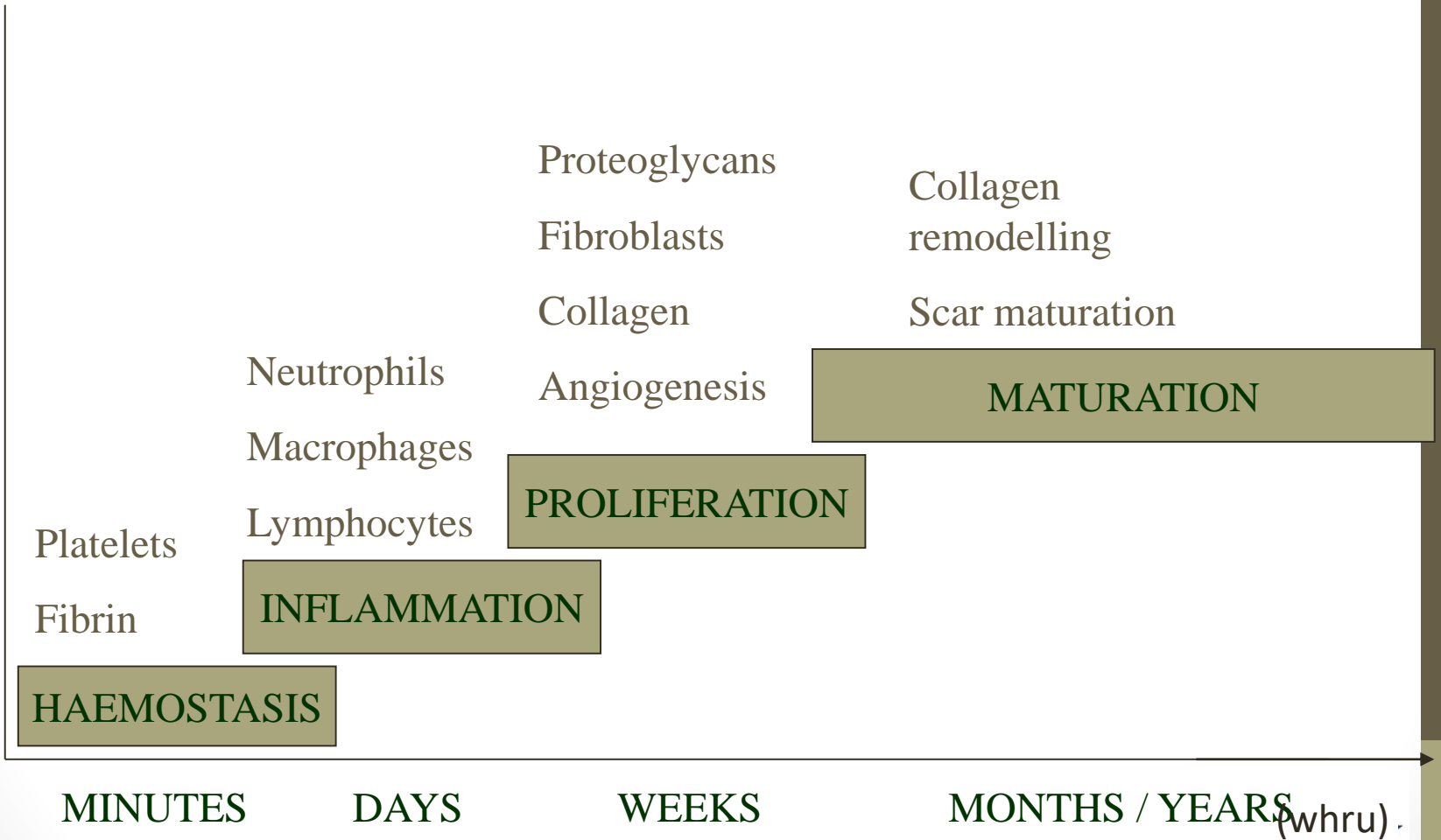


CONVENTIONAL CUTTING

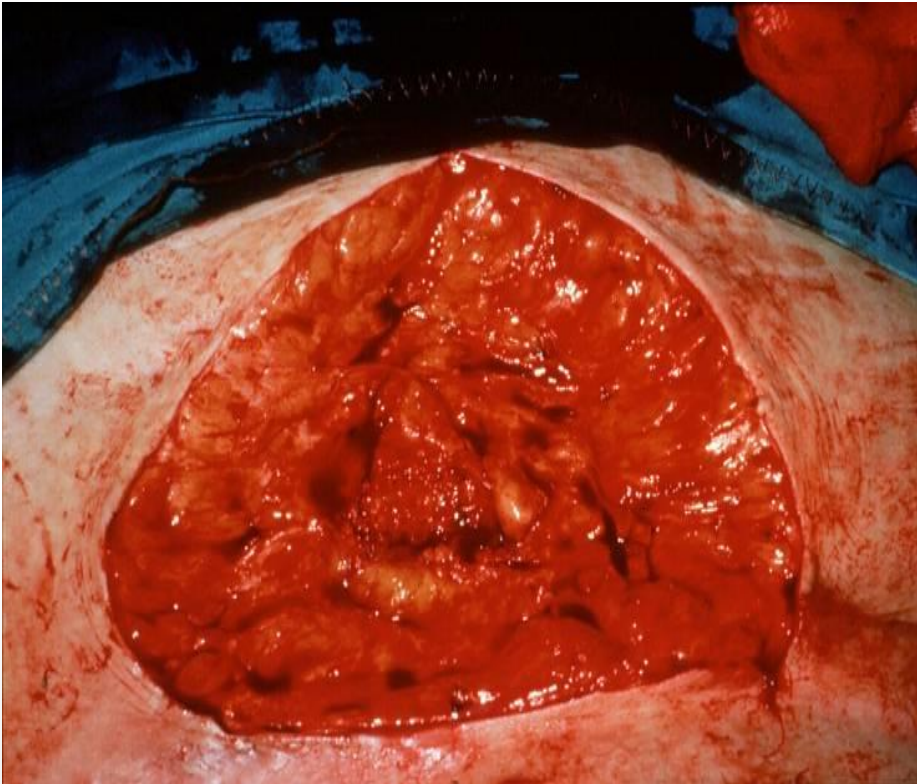


REVERSE CUTTING

# Normal Wound Healing Response



# Haemostasis



- Starts immediately after injury.
- Blood vessel contraction (vasoconstriction)

# Inflammatory phase



- Occurs between days 1-4

Damaged endothelial cells release cytokines that increase expression of integrands in circulating WBC.

neutrophils removes cellular debris and release further cytokines acting as attracting agents for macrophages



# Proliferation



- days 4-21
  - Fibroblasts now migrate into the wound, and secrete collagen type III.
  - Angiogenesis occurs by 48 hours.
  - The greatest increase in wound strength occurs during this phase

# Maturation



- day 21 – 2 years
- Closure of wound and re-epithelisation.
- Scar maturation

tensile strength continues to increase up to 80% of normal tissue

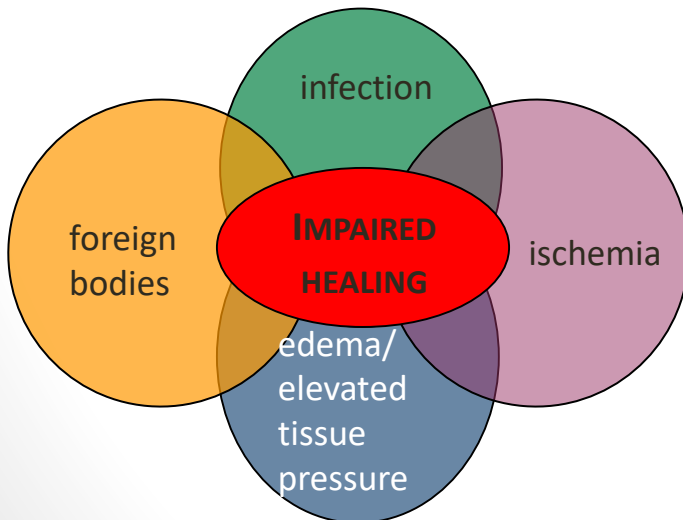
# Factors affecting wound healing

- Local

- Ischemia
- Infection
- Foreign body
- Edema, elevated tissue pressure

- Systemic

- Age and gender
- Sex hormones
- Stress
- Ischemia
- Diseases
- Obesity
- Medication
- Alcoholism and smoking
- Immunocompromised conditions
- Nutrition



# *Suture Removal*

Average time frame is 7-10 days

FACE: 4-5 days

BODY & SCALP: 7 days

SOLES, PALMS : 10 days

- Any suture with pus or signs of Infections should be removed immediately.
- Pull the suture line through the tissue- in the direction that keeps the wound closed

