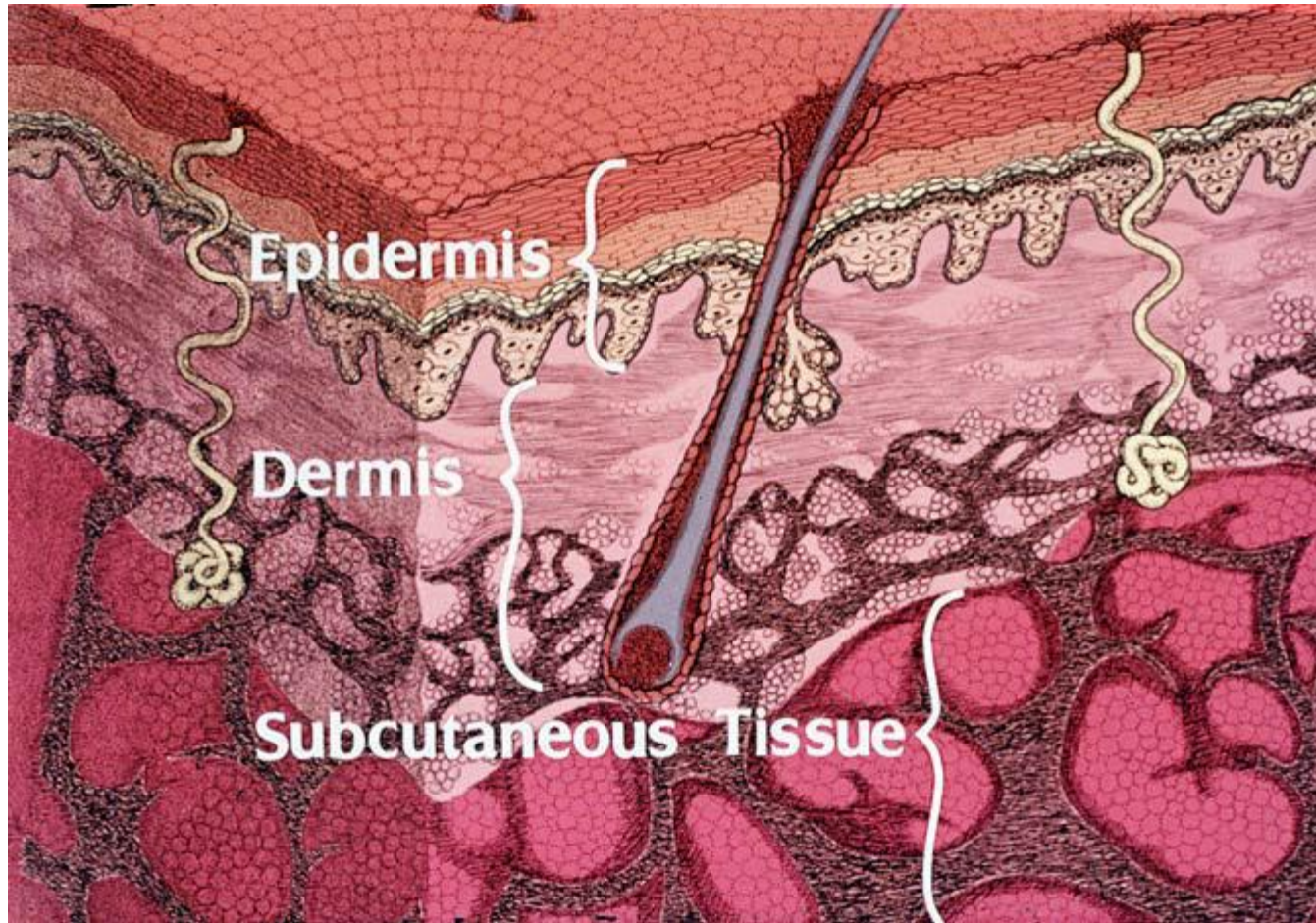


Basic Suturing

Major Tim Harrelson PA-C, USAF

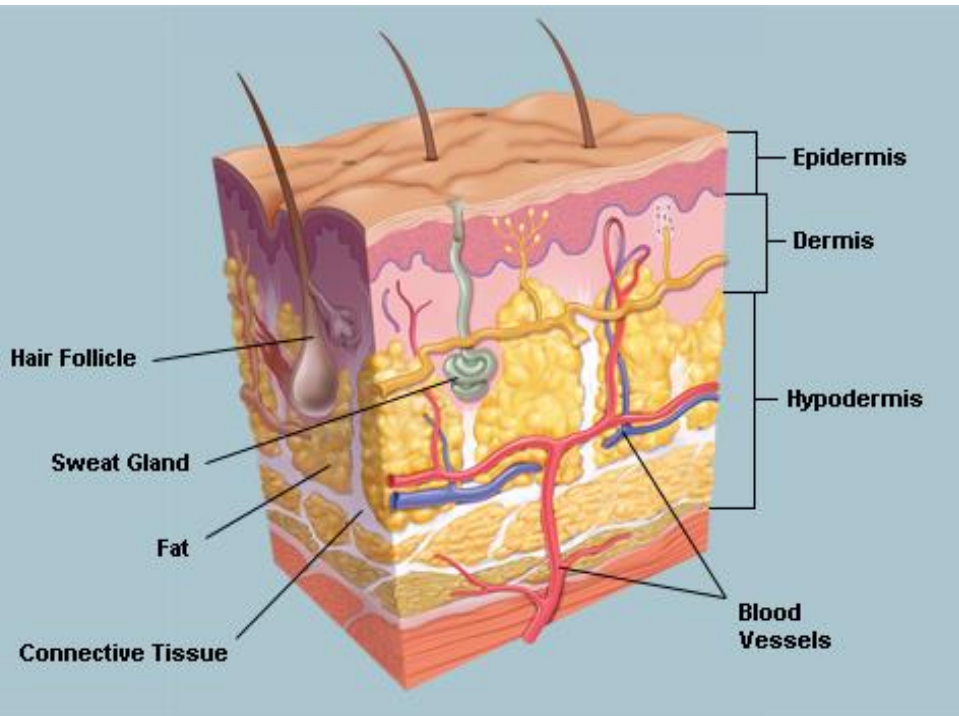
September 2014



A 150 lb person has 18 sq ft of skin,
16,723 sq cm and weighs about 12 lbs!

- 1 sq cm of skin has:
 - 100 sweat glands
 - 4 yards of nerves
 - 300,000 epidermal cells
 - 3,000 sensory cells
 - There are 929 sq cm in 1 sq ft of skin

The Skin is a Complex Organ

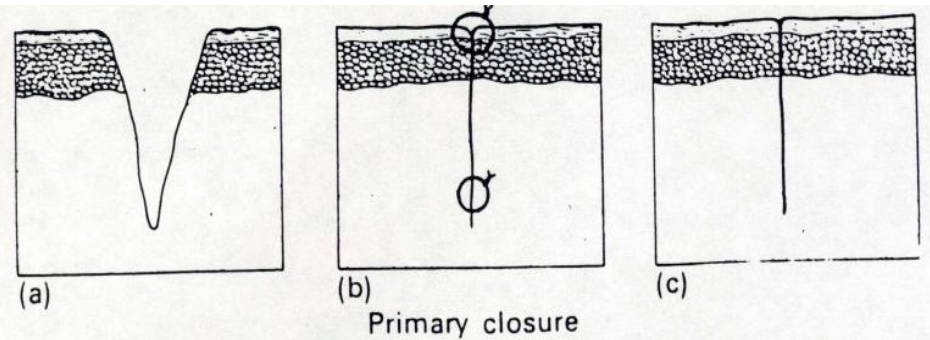


- Epidermis
 - Regenerative
 - Rich in afferent nerves
 - Varies in thickness throughout the body
 - Nonvascular layer
- Dermis
 - Collagen and elastin
 - Blood vessels
 - Lymphatics
 - Nerves – both afferent and efferent
 - Epithelial Appendages (hair, nails, glands)
- Subcutaneous Tissue
 - Adipose and areolar tissue
 - Anchored by collagen fibers
 - Function
 - Shock absorption
 - Body insulation
 - Unable to regenerate if damaged

Wound Care Options

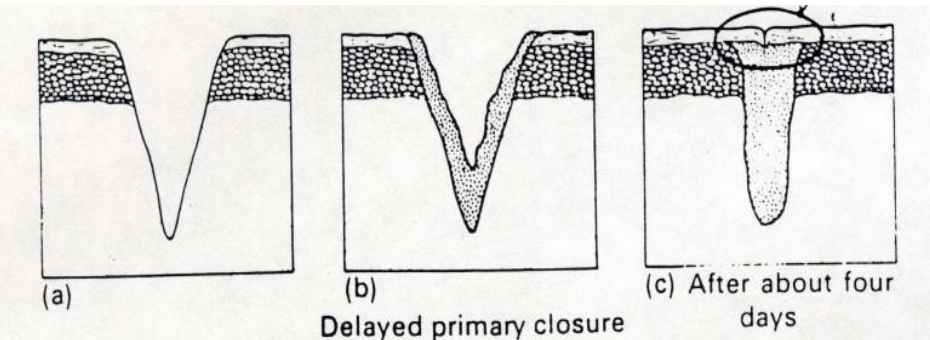
- **Primary Closure**

- Non-contaminated wounds
- Adequate resources
- Methods: suture, staple, glue



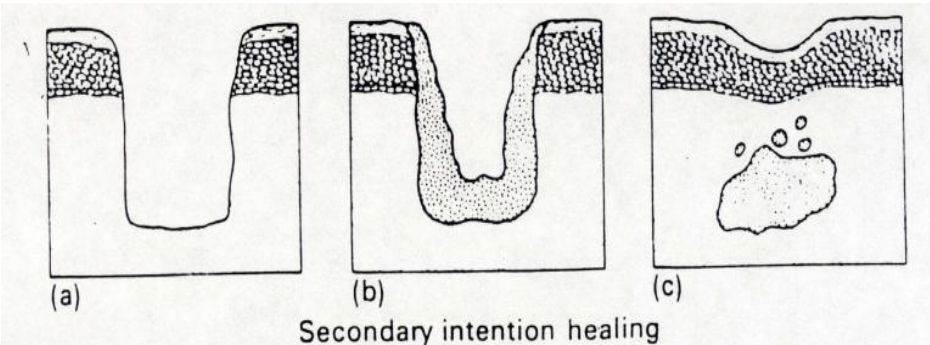
- **Delayed Primary closure**

- Wound open to monitor infection Closed day 2-4
- Monitored for signs of infection



- **Secondary Intention**

- Wound debrided and allowed to fill Significant tissue loss
- Open wound, moderate drainage



SNAPSHOT OF NORMAL HEALING

- **Inflammatory Phase (0-5 days)**
 - Seen Clinically - erythema, warmth, edema, pain
 - Cellular Level - vasoconstriction/dilation, leukocytes & macrophages are active
 - Fibrinogen-Fibrin
- **Repair Phase (4-14 days)**
 - Seen Clinically - granulation tissue, thin epithelial layer, wound shrinkage
 - Cellular Level - epithelial migration, collagen synthesis
- **Maturation Phase (14 days - 3 Mo's or >)**
 - Seen Clinically - Shrinking, thinning and paling
 - Cellular Level – Collagen remodeling and organization

IMPEDIMENTS TO HEALING

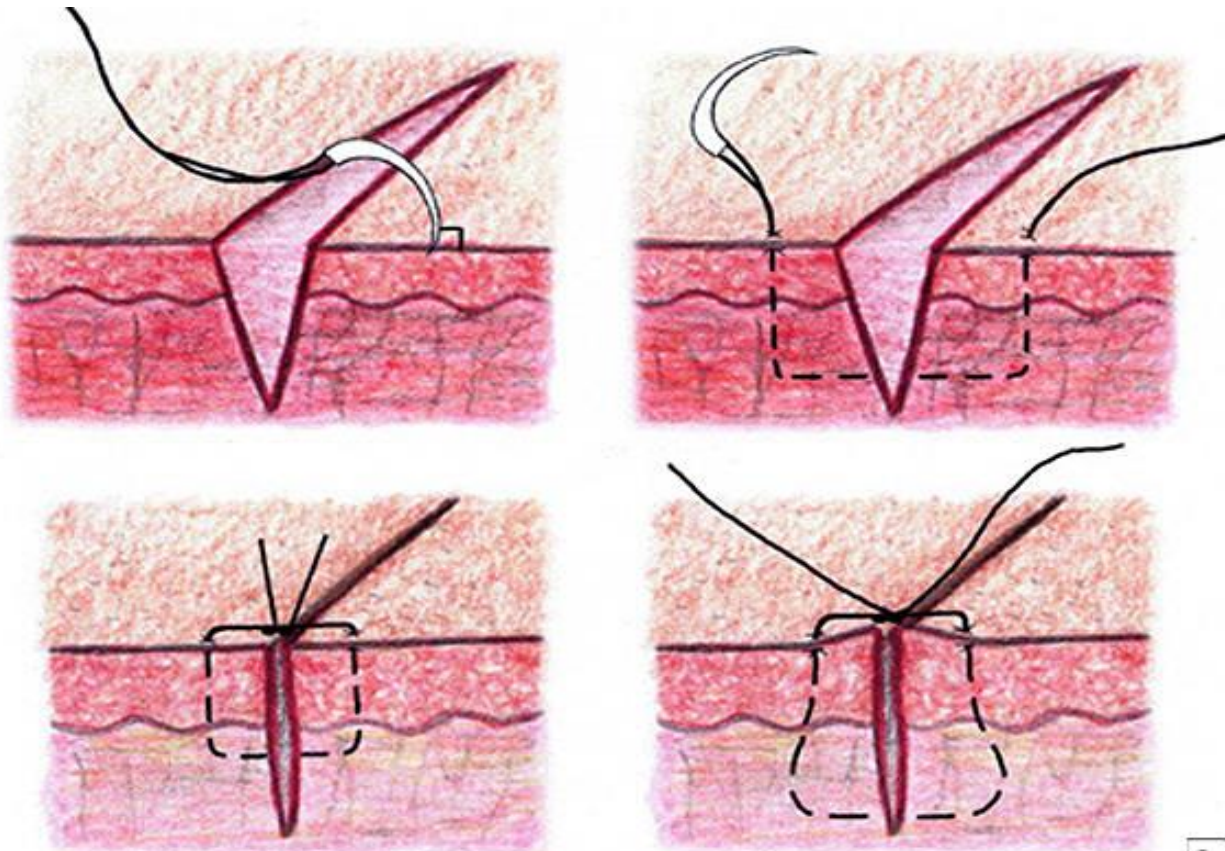
- Medical: Diabetes; Vascular disease
- Age: Older is worse
- Nutrition: Inadequate
- Iatrogenic: Antibiotics; Wound Cleaning
- Environment: Wound pressure; Patient understanding
- Other: Patients medications (**blood thinner, immune modulator?**)

Cleaning Wounds - Syringe Irrigation

- Advantages:
 - Remove debris
 - Helps reduce infection and enhance granulation
 - Readily available
- Technique:
 - Use normal saline or tap water (not distilled water)
 - Use 10cc syringe or larger
 - 22 gauge needle will increase pressure of stream
 - Direct flow at right angles to the tissue
 - Use a basin to collect the wound debris

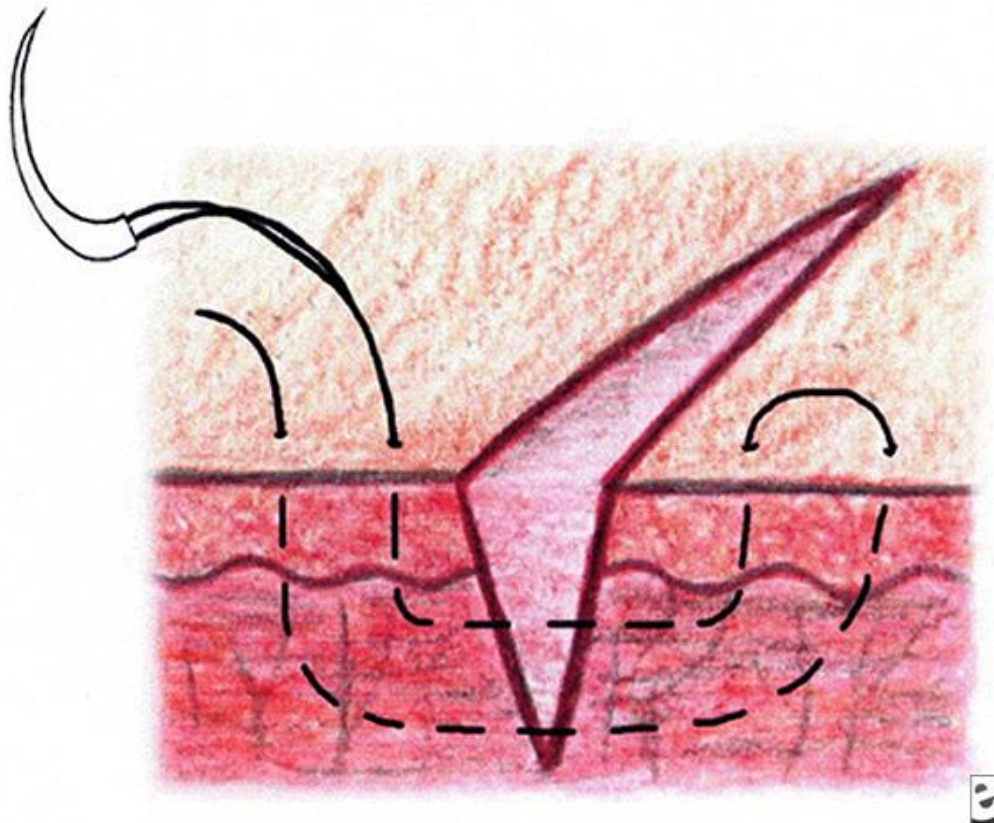
Wound Closure Techniques

- **Simple Interrupted Suture (shallow simple wound)**
 - Start in middle and include depth of wound
 - Do not close under pressure
 - Tie knots to one side of the wound



Wound Closure Techniques

- **Vertical Mattress Suture (deep wounds)**
 - Start wide and include depth of wound
 - Approximate skin surface accurately
 - Do not use excessive pressure



Wound Closure Techniques

- Tying the Surgeon's Knot vs. a Square Knot



Square knot



Granny knot



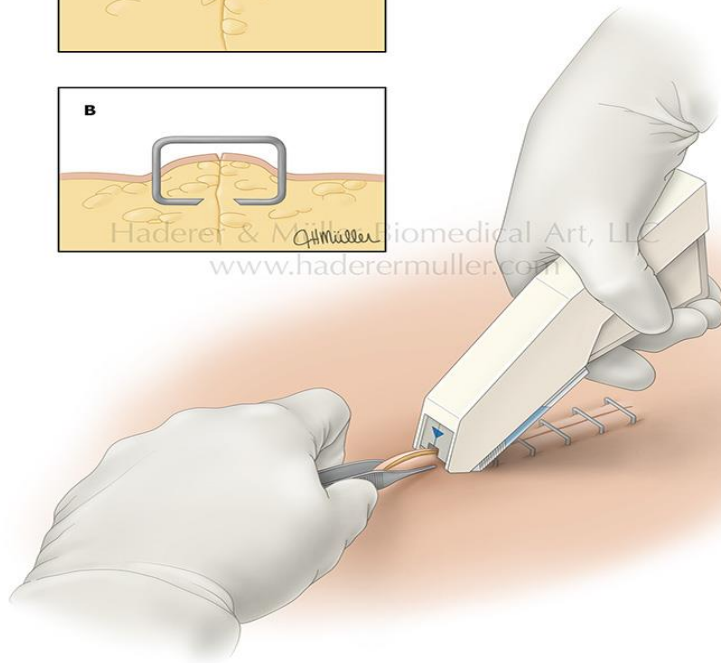
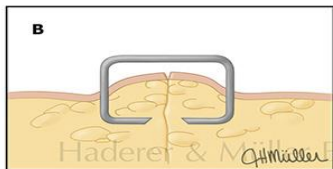
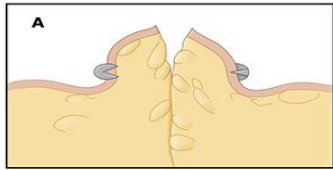
Surgeon's knot

Use the Surgeon's Knot!!!

Wound Closure Techniques

- **Medical Staples**

- Fast closure
- Less reaction from the skin than sutures
- Associated with decreased wound infection rates (increased morbidity in C-section closure)
- DISADVANTAGE – Need a second operator to evert and re-approximate skin edges



Haderer & Müller Biomedical Art, LLC
www.haderermuller.com