

Biopsy and Excision Techniques

Introduction

- 6 main methods of biopsy
 - Curettage
 - Snip/Scissor
 - Shave
 - Punch
 - Incisional
 - Excisional *in toto* (also curative)

Wrecked 'em Protect 'em

- Wear eye protection!
- Wear gloves!
- Use standard precautions!
- Dispose of sharps properly!
- Get your vaccinations!
- PHOTOGRAPH!!!

Table 146.3 Preoperative history.

PREOPERATIVE HISTORY

Allergies

Medications, including nutritional supplements and over the counter preparations

Past reactions to local anesthesia

Difficulties with hemostasis during previous procedures

Past problems with wound healing, including infection, keloid formation

Pacemaker or implantable cardioverter-defibrillator

Disease or past replacement of the cardiac valves

Past orthopedic surgery with joint replacement

Hypertension

Diabetes

Immunosuppression

Infectious or vascular compromise at the biopsy site

Possible pregnancy

Where do you Bx?

- Accurate histologic info
- Tumor
 - Avoid necrotic or crusted tissue
 - Thickest part of the tumor
- Inflammatory process
 - Early lesion
 - Erythematous edematous papule
- Blister/Ulcer/Necrotic
 - Straddle affected skin and normal skin

Table 146.1 Biopsy site selection.

BIOPSY SITE SELECTION	
Disorder	Appropriate site
Tumor	Thickest part of the tumor
Blister	Edge of lesion, including some normal skin
Ulcerated/necrotic lesion	Edge of lesion including some normal skin
Generalized polymorphous eruption	Lesion of recent onset
Vasculitis with purpura	Lesion of recent onset
Vasculitis with livedo pattern	Deep portion of recently involved skin

Depth/Location of Bx?

- Superficial epidermal disorder?
- Thick nodule?
- Vasculitis?
- Panniculitis?
- Disorders of collagen and elastin?

Table 146.2 Biopsy technique selection.

BIOPSY TECHNIQUE SELECTION				
Method technique	Indication	Type of specimen obtained	Anesthetic	Closure
Curettage	BCC	Fragmented	Wheal	Secondary
Scissors biopsy	Pedunculated tumor	Tissue above connection to the epidermis	None or wheal	Secondary
Shave biopsy	Superficial process elevated above surrounding normal skin	Epidermis and superficial dermis	Wheal	Secondary
Punch biopsy	Depressed lesion or process primarily in the dermis	Epidermis, dermis, and usually some fat	Wheal or deep	Primary Simple suture
Incisional biopsy	Lesions present in deep subcutaneous fat or in the fascia	Subcutaneous fat with overlying dermis and epidermis	Deep	Primary Layered closure
Excision in toto	Lesions not uniform in pathology. Biopsy intended to be definitive treatment	Full-thickness skin and subcutaneous tissue	Deep	Primary Layered closure

Depth/Location of Bx

- Superficial epidermal process--shave
- Thick nodule/panniculitis--deep punch or incisional bx
- Collagen and elastin disorders--often need some normal nearby skin
- Vasculitis
 - Palpable purpura often affects superficial venules in dermis
 - Necrotic and livedo processes often involve larger vessels in subq fat

Contraindications

- Most patients can safely undergo biopsy
- No specific absolute contraindications
- Exercise caution:
 - Erb's point
 - Temple
 - Pulsatile mass
 - Posttraumatic or cystic midline mass
 - Central chest, deltoid skin, or upper back in patients with keloid tendency

Handling the Specimens

- Generally placed in 10% neutral buffered formalin
- Formalin begins the fixation process
- Tissue culture (eventually ground up)
 - Saline moistened gauze
 - Avoid bacteriostatic saline
- If you're going to perform IF/immunoperoxidase or electron microscopy
 - Michel's medium (a carrier medium)
 - Or saline moistened gauze in a container delivered quickly or packed in ice

Documentation

- Patient ID
- Path form
- Tracking system
- Path book
- Follow-up

Informed Consent

- Discuss reason, site, technique
- Risks: bleeding, infection, scar, discomfort
- Bleeding and infection are rare
- Unless infected area or on mucosa, no preprocedure antibiotics in high-risk patients
- Considered a clean procedure

Site Preparation

- Mark site with surgical marker (gentian violet)
- Cleanse with soap and water, chlorhexidine (avoid eyes, ears), povidone iodine, isopropyl alcohol
- May drape with fenestrated drape, gauze, sterile cloths
- Rate of infection less than 1% for minor cutaneous surgical procedures—related to technique

Site Preparation

- Resident flora:
 - *S. epidermidis*, *Corynebacterium*, *Brevibacterium*, *Propionibacterium*, and *Pityrosporum*
- Transient flora: Group A and B strep, and gram negative rods
- Colonization with *S. aureus* more common in those with:
 - Psoriasis
 - Atopic dermatitis
 - IV drug users
 - Diabetes
 - Isotretinoin therapy

Anesthesia

- Generally use 1% or 2% lidocaine
- Lido with epinephrine 1:100,000 or 1:300,000 prolongs anesthesia and helps with hemostasis
- Problems with epi?
 - Arrhythmias, beta-blockers?, pheo, hyperthyroid
- Allergy to lidocaine?
 - Paraben or ester class
- Adverse reactions to local anesthetics?
 - Vasovagal

It Hurts So Good

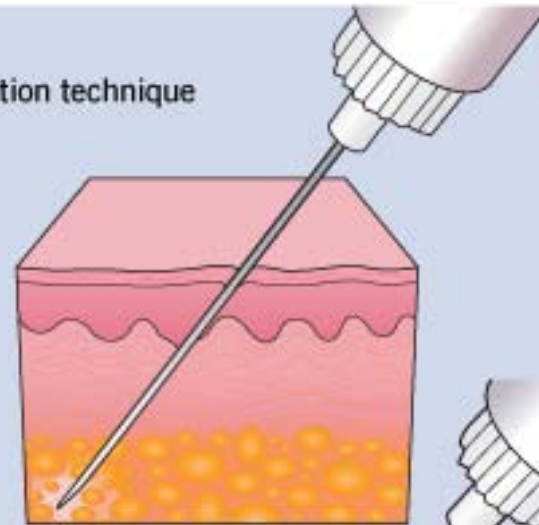
- Decrease pain with:
 - Slow infusion through small bore needle (30 gauge)
 - Buffer with NaHCO_3
 - Pinch or tap site
 - Ice or Ethyl Chloride
 - EMLA--doesn't help with burning

Anesthesia

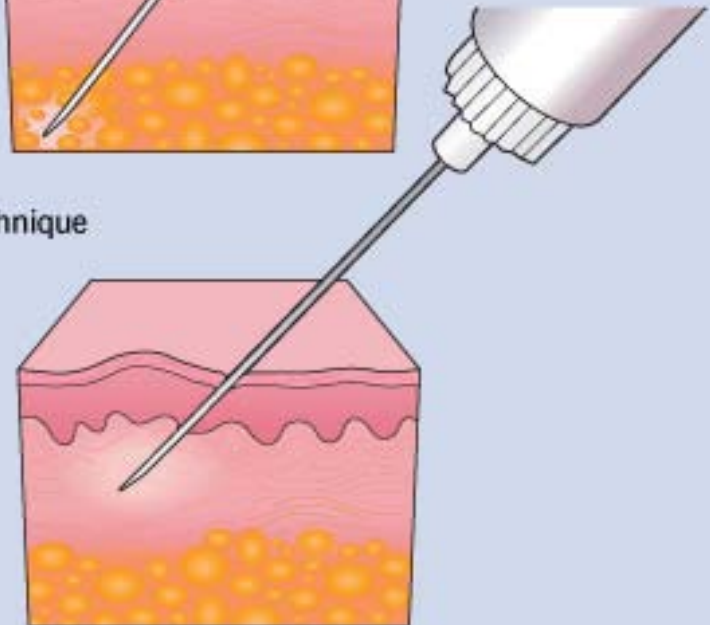
- Superficial infiltration (dermal)
 - Produces a wheal (for a shave)
 - Quick. . . but more painful
- Deep infiltration (subq)
 - Punch, incisional, excisional
 - 5-10 minutes to reach surface--massage
 - Can later inject superficially

LOCAL ANESTHESIA INJECTION

A Subcutaneous infiltration technique



B Dermal infiltration technique producing a wheal



Epinephrine

- How long does it take to achieve maximal vasoconstriction?

Epinephrine

- 15 minutes!
 - So you may want to go see another patient

Flow Heme Flow

- Hemostasis with:
 - Shave--Drysol[®] (aluminum chloride hexahydrate), Monsel's solution (ferric subsulfate)
 - Caутery
 - Pressure
 - Absorbable hemostatic sponge (Gelfoam[®] or Instat[®])
 - QR Powder
 - Suture--vessels and skin edge

Hemostasis

- Can you char too much?
- Endpoint of bleeding?
- Cautery after DrySol?
- What do you use if the patient has ICD/Pacemaker?
 - Bipolar or heat cautery
 - Monitoring

Closing the Wound

- Secondary intention--granulation tissue, epidermal cell migration and contraction
- Primary intention--Suture same but more related to fibroblast activity and collagen deposition--for wound strength

Primary Intention

- 1-2 weeks postoperatively, what is the wound's intrinsic strength?
- 5 weeks postoperatively?

Primary Intention

- 1-2 weeks--7-10%
- 5 weeks--60%
- Dermal sutures remain in place 8-12 weeks while the wound is acquiring tensile strength

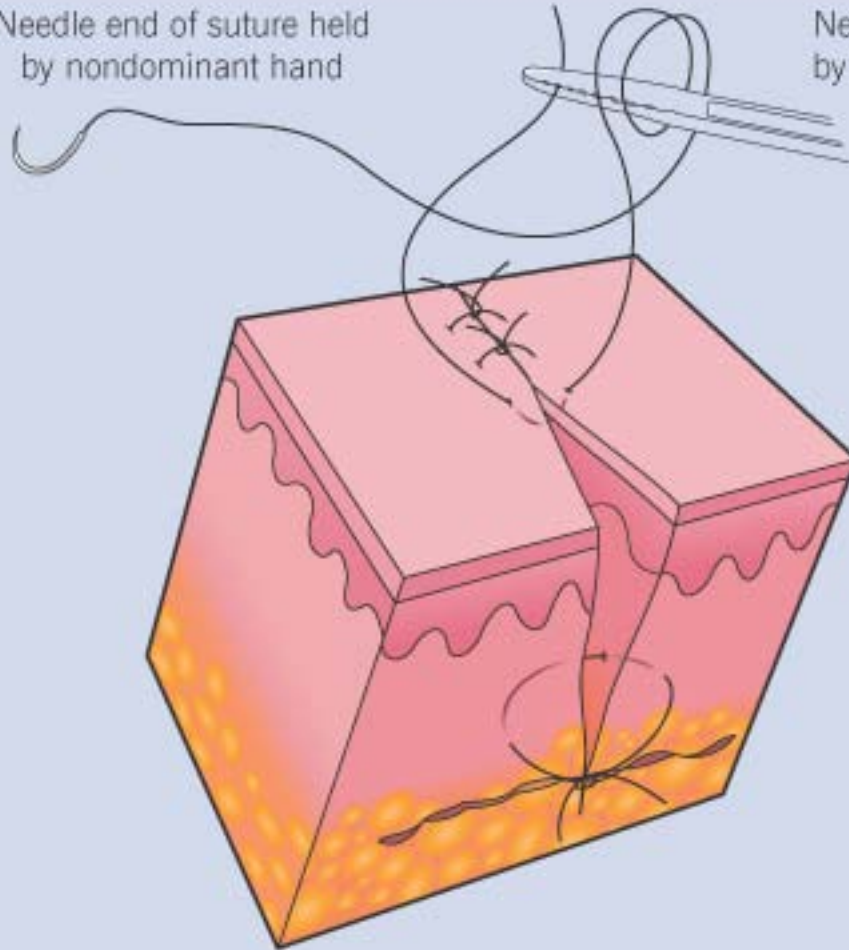
Primary Intention

- Full-thickness suture or layered closure?
- Full-thickness suture
 - Fulfill both deep and superficial
- Layered closure
 - Oppose subq and dermis
 - Eversion
 - Hemostasis
 - Strength--prevent dehiscence and spread of scar

INSTRUMENT TIE

Needle end of suture held
by nondominant hand

Needle holder held
by dominant hand



Primary Intention

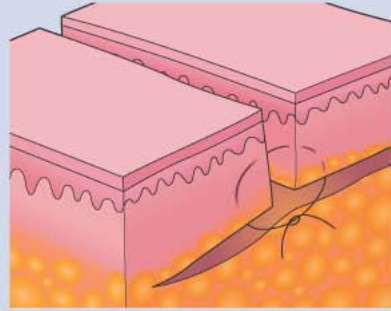
- Pearls
 - Into the mouth of the “C”
 - Loop in opposite directions each throw
 - 3-6 throws
 - Loose loop in 2nd throw for swelling

Subepidermal Suture

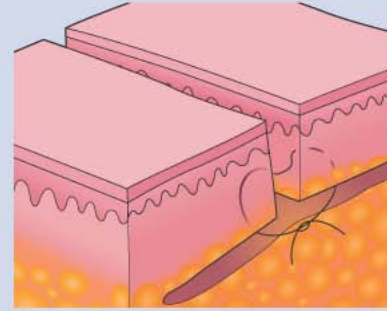
- Polyglactin 910 (Vicryl®)
- Polydioxanone (PDS®)
- Interrupted buried dermal suture
 - Enter in undermined surface, exit mid dermis
 - Enter dermis at same level, exit deep surface
 - Bury knot
- Buried vertical mattress
- Running dermal suture (deeper in the dermis)--
only with low tension

COMMON SUTURING TECHNIQUES

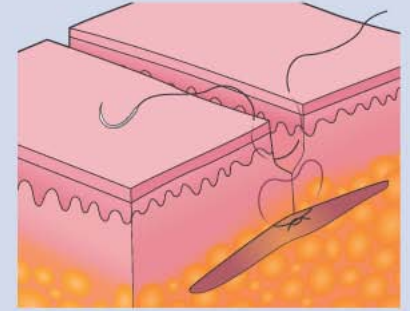
A Interrupted buried dermal stitch



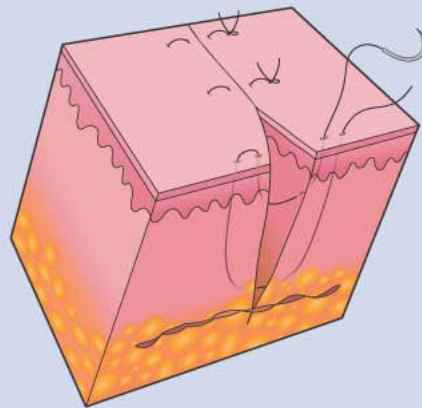
B Buried vertical mattress stitch



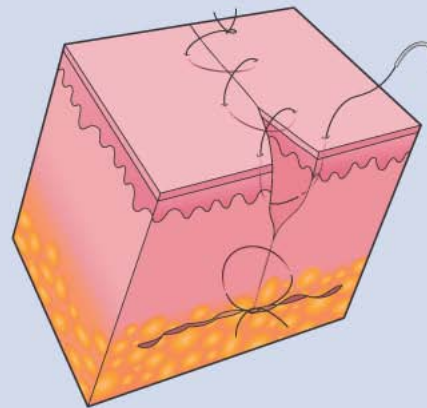
C Simple interrupted epidermal stitch



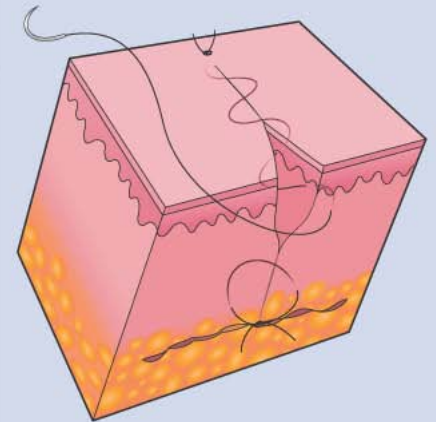
D Vertical mattress suture



E Simple running stitch

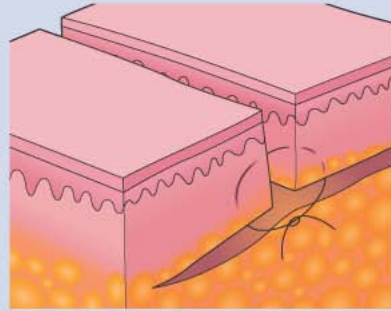


F Subcuticular running stitch

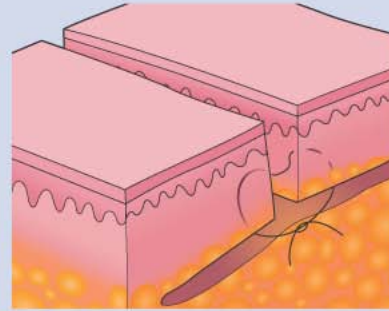


COMMON SUTURING TECHNIQUES

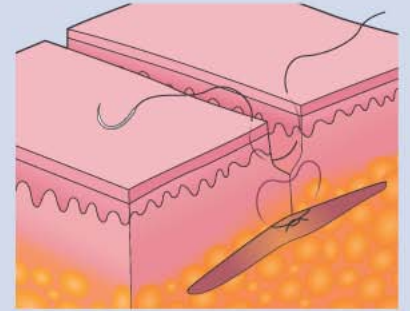
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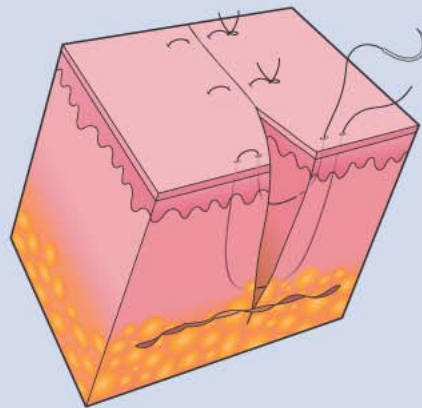
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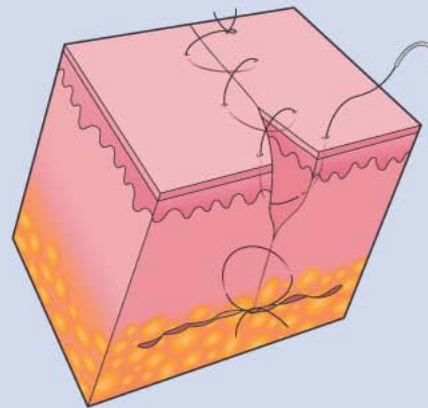
C Simple interrupted epidermal stitch



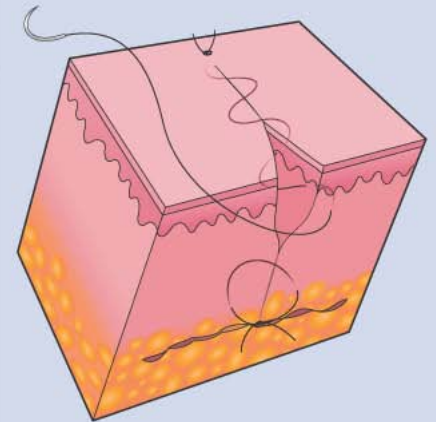
D Vertical mattress suture



E Simple running stitch



F Subcuticular running stitch

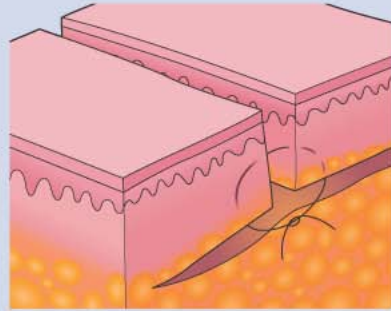


Epidermal Suture

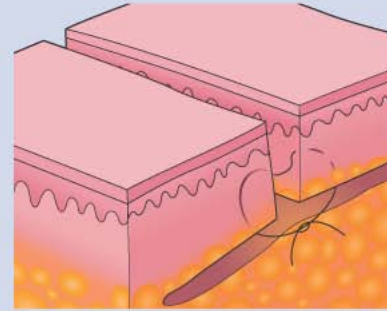
- Nylon (Ethilon)--monofilament
- Polypropylene (Prolene)--mono
- Through the epi into the superficial dermis just above buried suture
- Into dermis at same level of exit on opposite side
- Flask shape for eversion

COMMON SUTURING TECHNIQUES

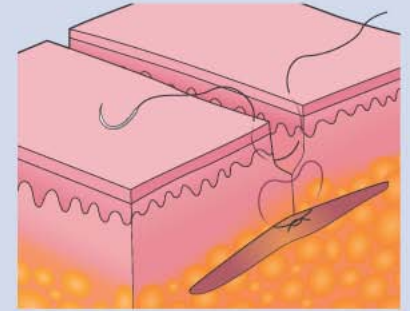
A Interrupted buried dermal stitch



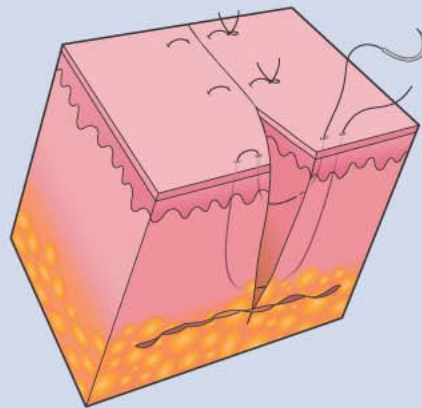
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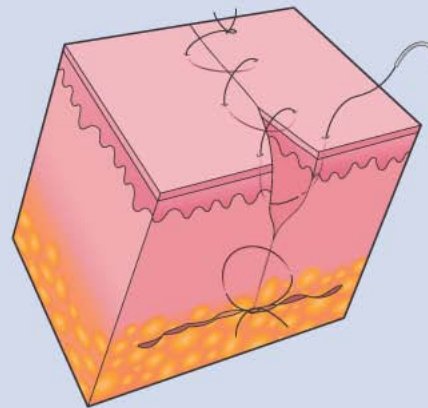
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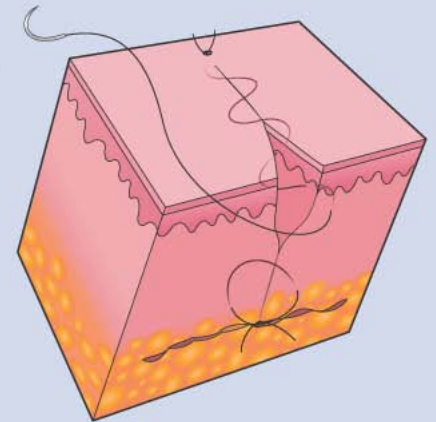
D Vertical mattress suture



E Simple running stitch

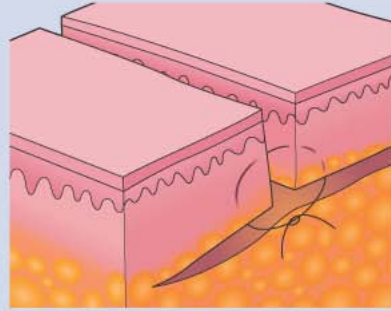


F Subcuticular running stitch

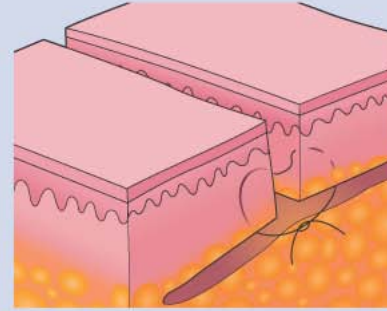


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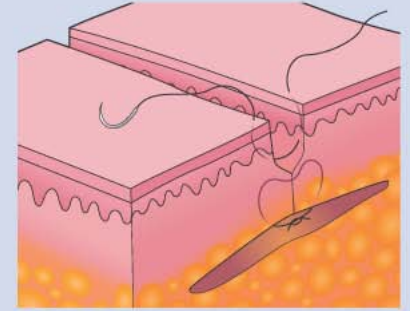
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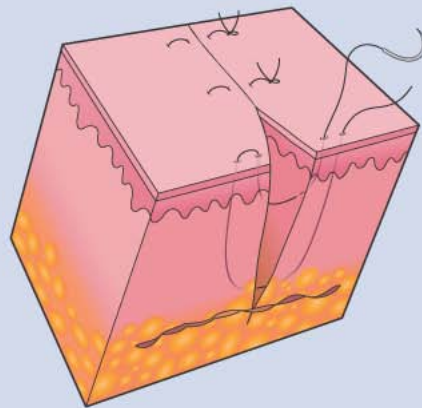
B Buried vertical mattress stitch



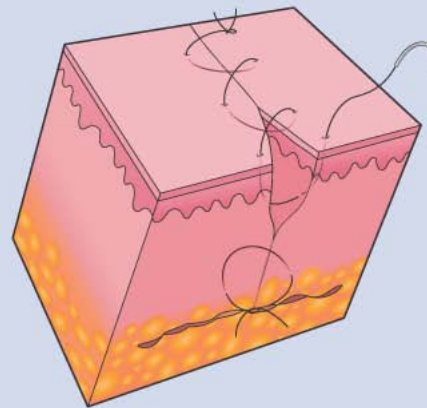
C Simple interrupted epidermal stitch



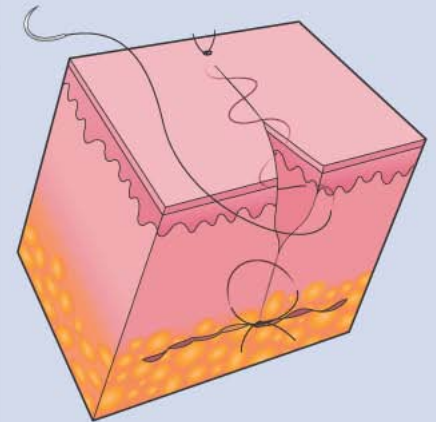
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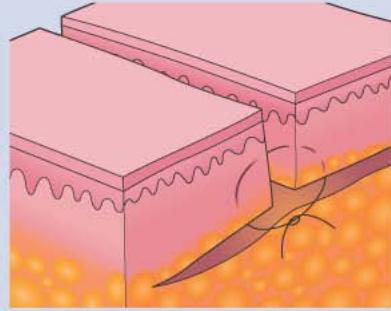


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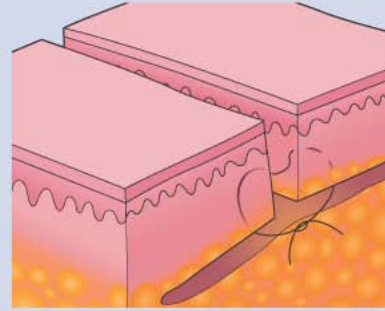


COMMON SUTURING TECHNIQUES

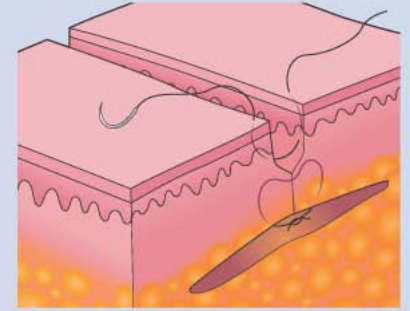
A Interrupted buried dermal stitch



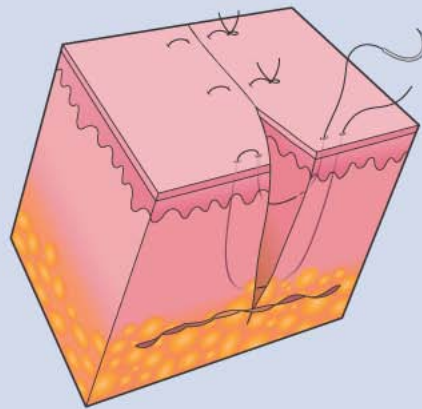
B Buried vertical mattress stitch



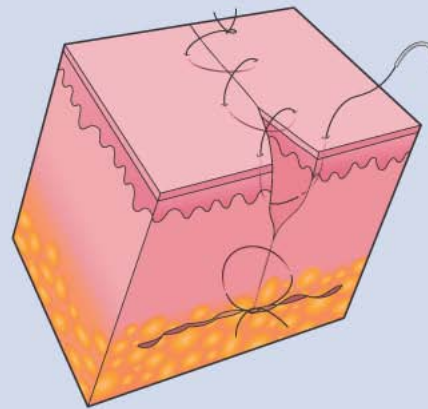
C Simple interrupted epidermal stitch



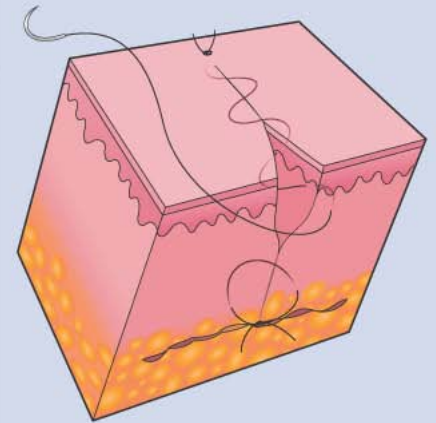
D Vertical mattress suture



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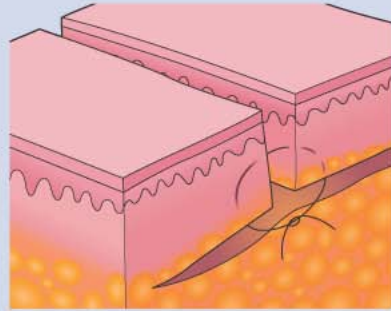


F Subcuticular running stitch

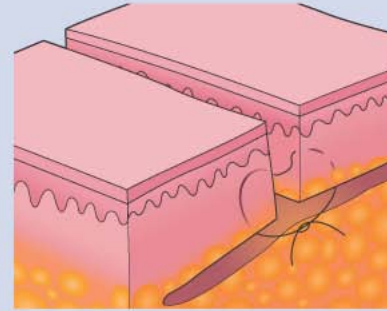


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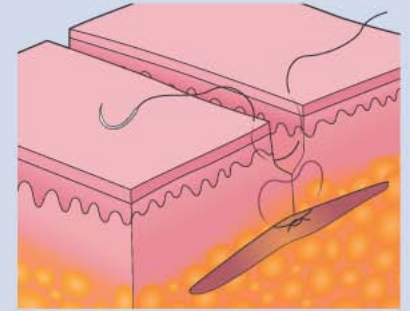
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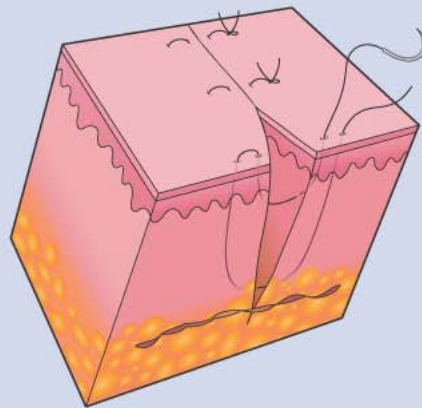
B Buried vertical mattress stitch



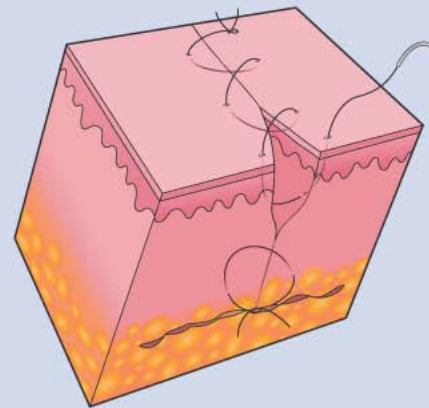
C Simple interrupted epidermal stitch



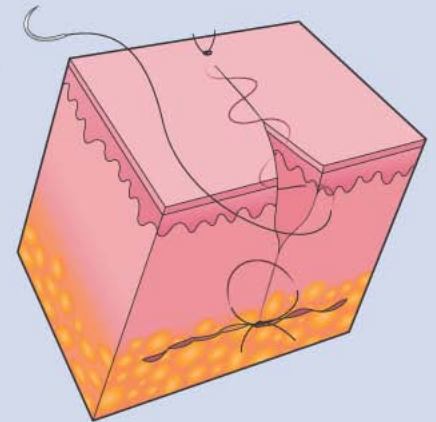
D Vertical mattress suture



E Simple running stitch



F Subcuticular running stitch



Primary Intention

- Track marks
 - Inflammatory response of suture
 - Sutures in place too long
 - Tension
 - Inadequate undermining
 - Ineffective dermal sutures
 - Poor placement of epidermal sutures

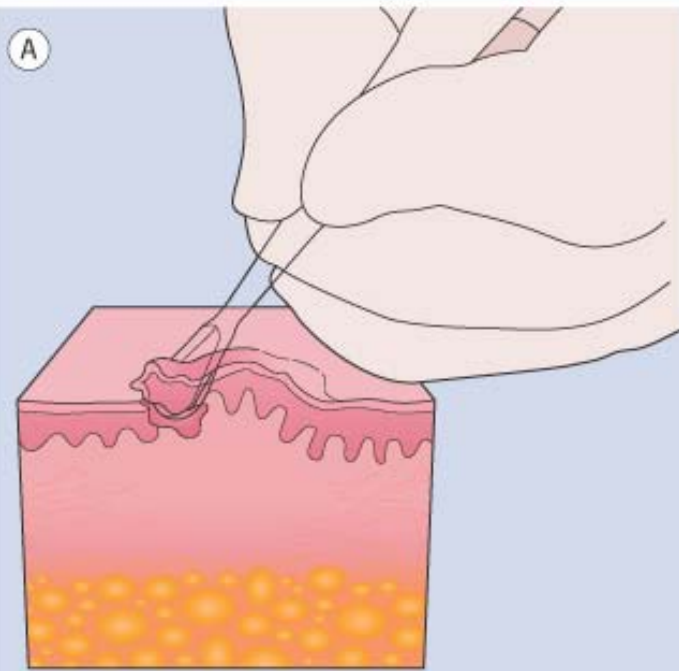
Primary Intention

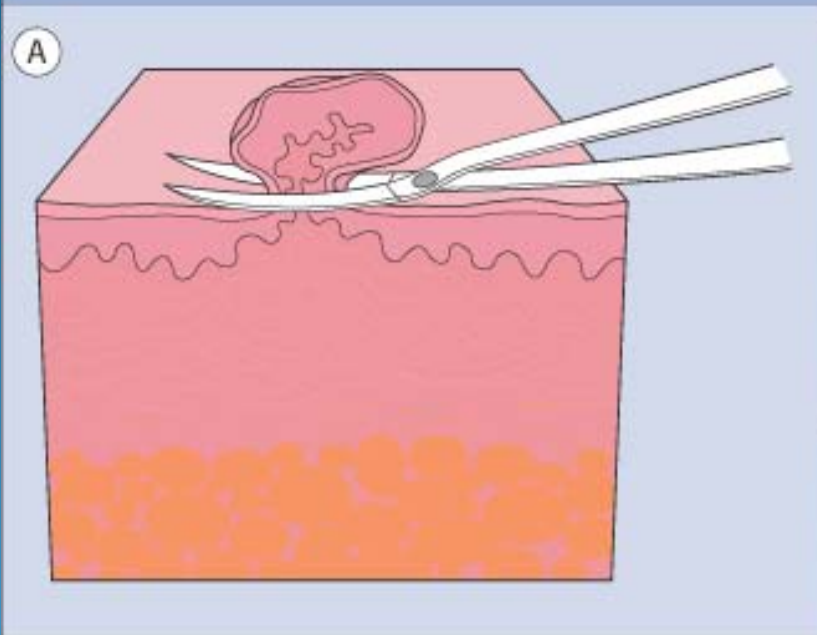
- Steristrips[®]
 - No eversion
 - Don't use with tension!
 - Often placed after suture removal or with running subcuticular sutures

Suture Removal

- Eyelid 2-4 days
- Face 4-7 days
- Neck 5-7 days
- Scalp 5-7 days
- Trunk 7-12 days
- Extremities 10-14 days

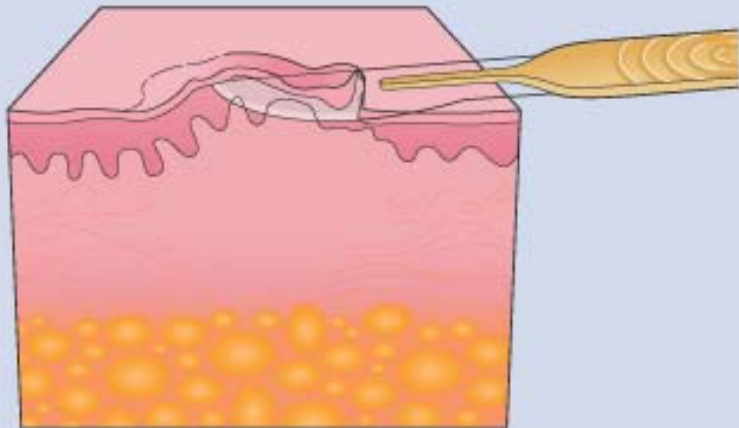
CURETTAGE





SHAVE BIOPSY

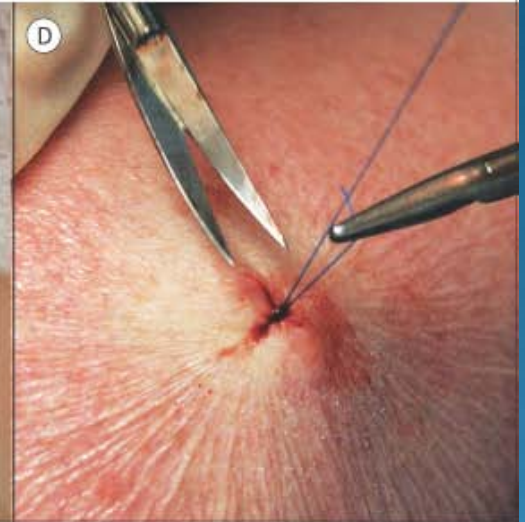
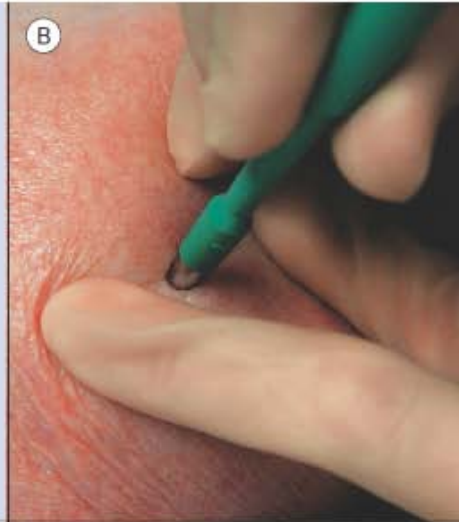
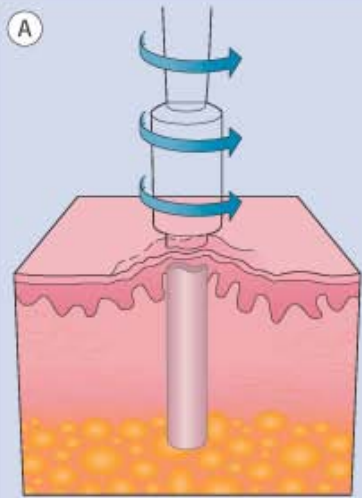
(A)



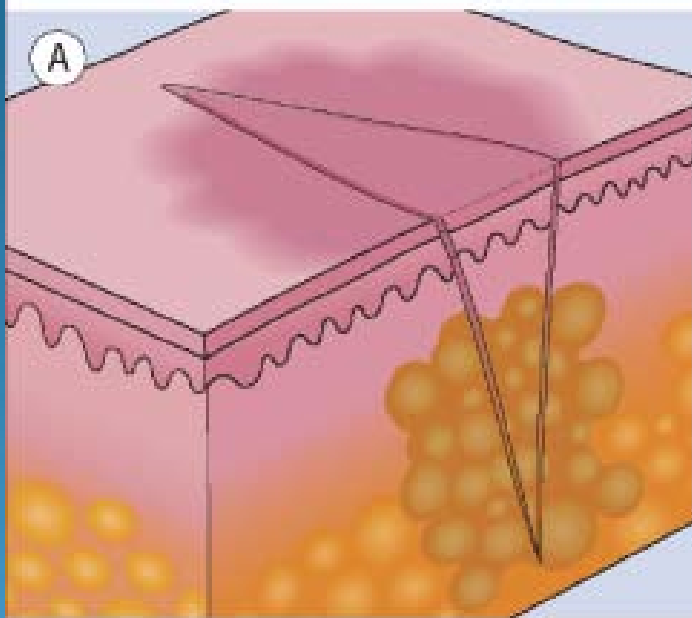
(B)



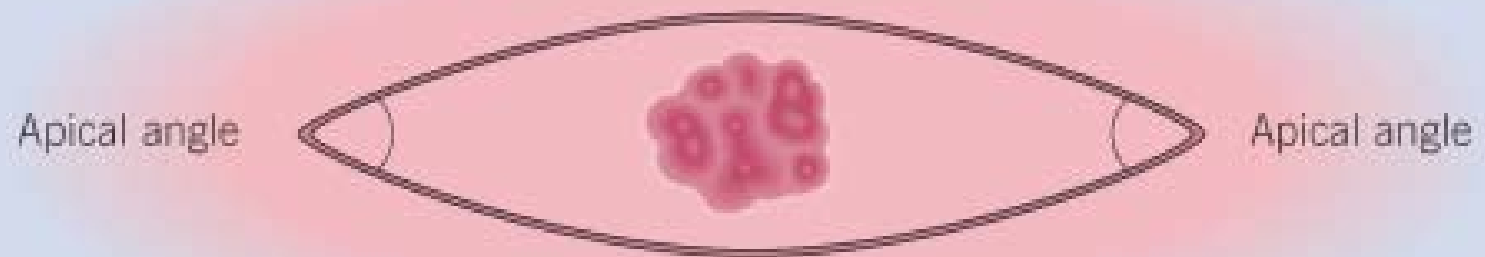
PUNCH BIOPSY

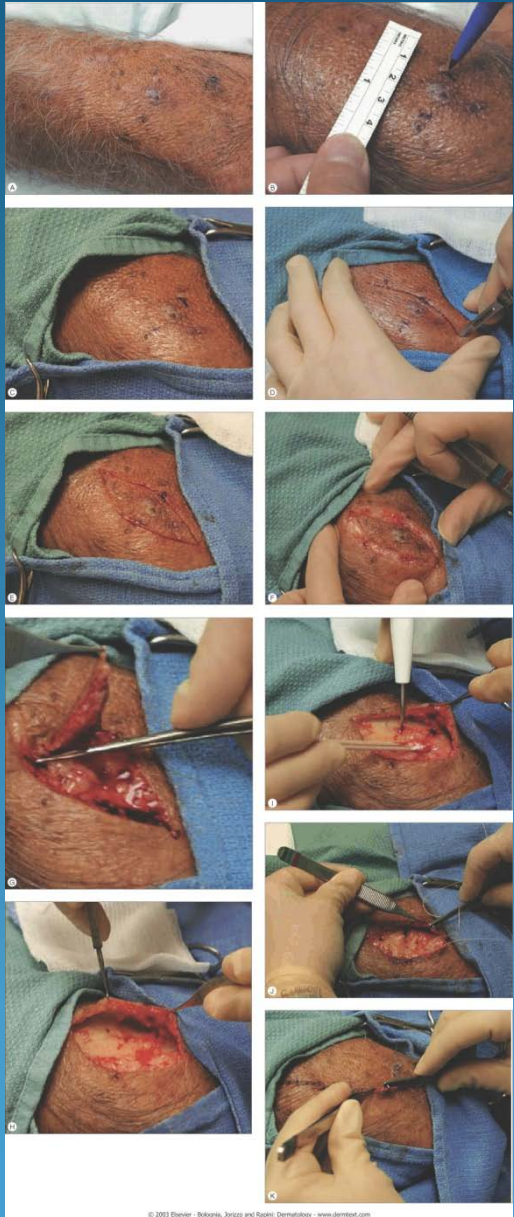


INCISIONAL BIOPSY



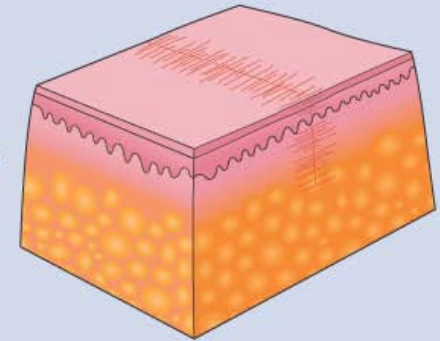
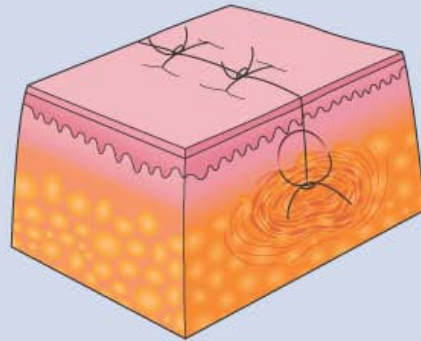
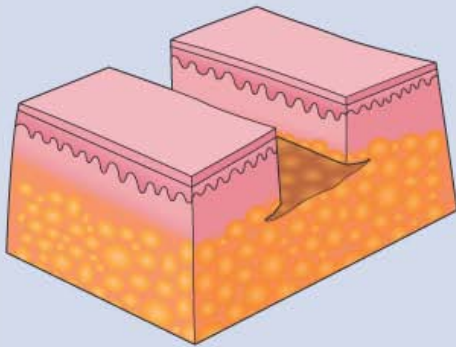
FUSIFORM EXCISION



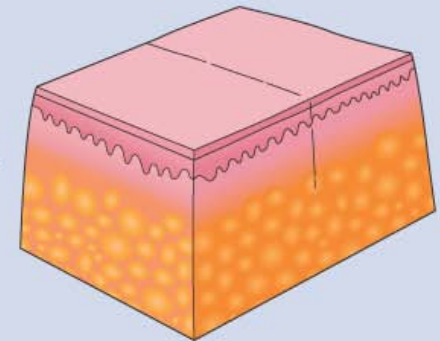
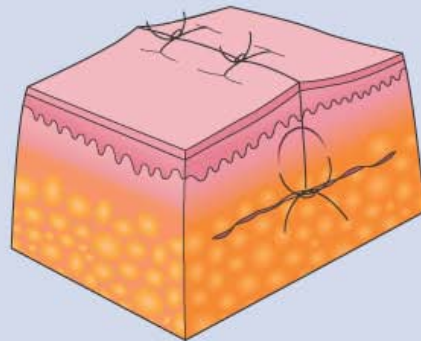
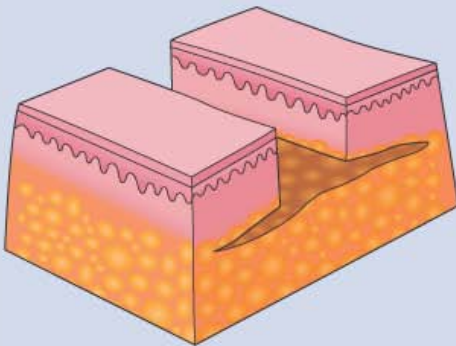


UNDERMINING

Without undermining

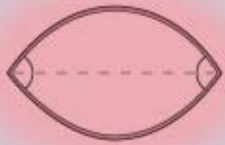


With undermining



FOUR CAUSES OF FORMATION OF DOG-EARS: GEOMETRIC FACTORS

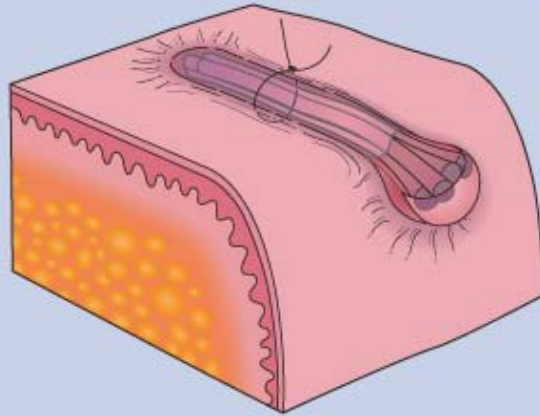
A Large apical angles



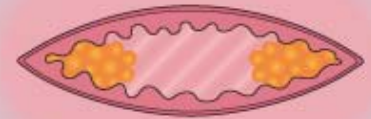
B Sides of unequal length



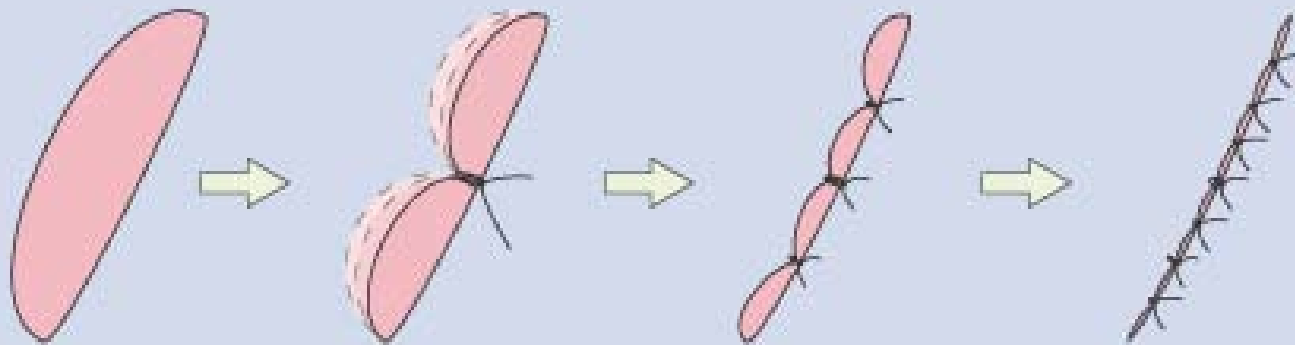
C Dog-ears on convex surface



D Excess subcutaneous tissue at the apical angles



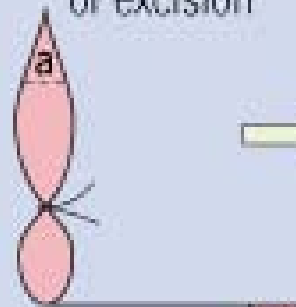
REPAIR OF DOG EARS BY RULE OF HALVES



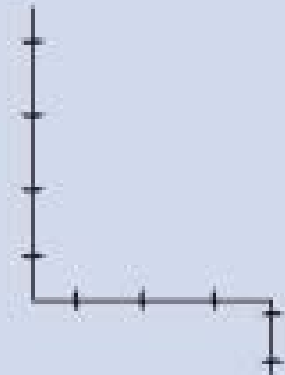
DISPLACEMENT OF DOG-EAR

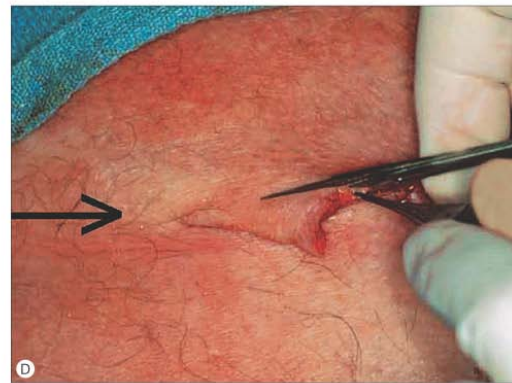
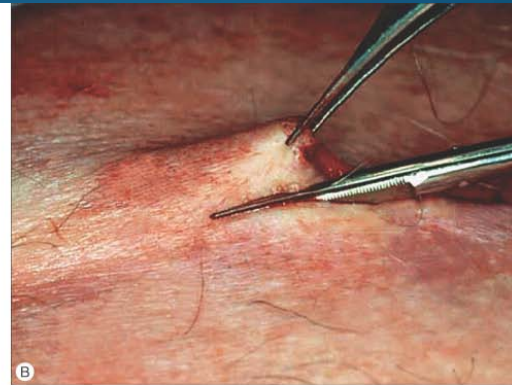
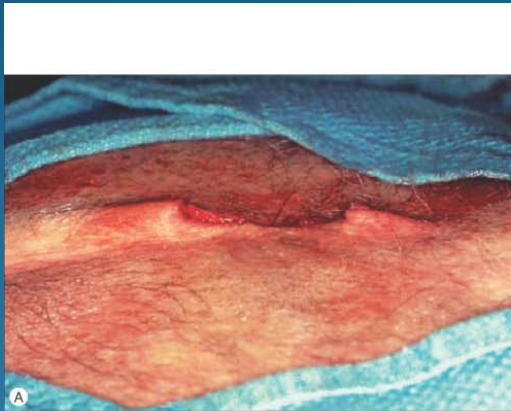


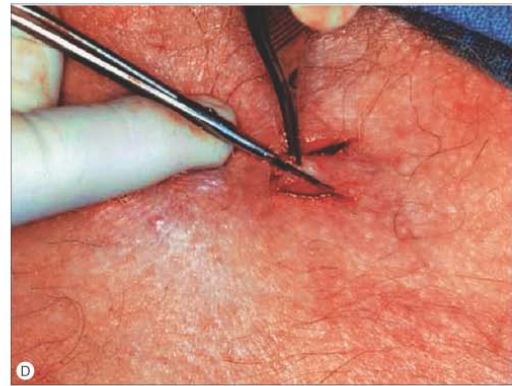
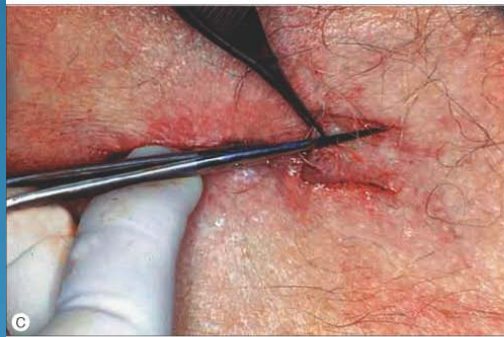
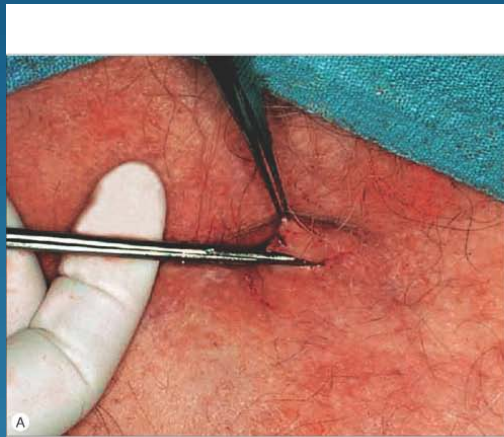
a Burow's triangle
at upper pole
of excision



b Displaced
Burow's triangle







Suture Materials

- Absorbable
- Nonabsorbable
- Monofilament
- Braided

Definitions

- Capillarity
 - Ability of suture to absorb and transfer fluid
 - Braided >> Monofilament
- Multifilament Braided
 - Increased risk of infection
 - Handle and tie more easily
- Monofilament
 - Low coefficient of friction
 - Lower risk of infection

Definitions

- USP size
 - Diameter of the suture needed to achieve a given tensile strength
 - Expressed in zeros
 - Smaller the diameter, the more zeros
 - 5-0 is finer than 3-0
 - Diameter depends on suture composition
 - 4-0 Gut is larger in diameter than 4-0 Prolene because Prolene is innately stronger
 - Use smallest suture that gives adequate strength

Definitions

- Elasticity
 - Ability to regain its original length after being stretched
 - Polybutester (Novafil[®]) allows for swelling then maintain tension on wound edges after swelling resolves
- Plasticity
 - Ability to retain its new length after being stretched
 - Sutures with high plasticity may be stretched in edematous tissue without cutting into tissue--Prolene[®]

Definitions

- Memory
 - Tendency to retain its natural configuration
 - Determined by elasticity and plasticity
 - Difficult to handle
 - Lower knot strength--require greater number of ties
 - Prolene has high memory
 - Silk has low memory--easy to handle, rarely unties

Definitions

- Coefficient of Friction
 - Ease with which a suture slides through tissue
 - Prolene[®] has a low coefficient of friction
 - Good for running subcuticular sutures
 - Knot strength directly proportional to coefficient of friction
 - Slippery suture unravels

Definitions

- Tensile strength
 - Force in pounds required to snap a suture
 - Determined by composition and diameter
 - Synthetic materials stronger than natural
 - Knotted suture has $\sim 1/3^{\text{rd}}$ the strength of the same suture unknotted
- Pliability
 - How easily the suture is bent
 - Braided sutures are the most pliable
 - More pliable, more easily tied into a knot

Definitions

- Coating
 - Suture may be coated with materials to improve coefficient of friction or antibacterial or antitumor materials
 - Polyglactin 910 coated with triclosan
- Tissue Reactivity
 - Degree of foreign body inflam
 - Natural materials (gut and silk) more reactive than synthetic materials (nylon, polypropylene)

Table 144.1 Commonly used absorbable sutures. Adapted from Wheeland *et al.*, 1994¹¹ with permission from WB Saunders Company.

COMMONLY USED ABSORBABLE SUTURES						
Suture	Configuration	Tensile strength	Ease of handling	Knot security**	Tissue reactivity	Uses
Surgical gut (plain)	Virtually monofilament	Poor at 7–10 days	Fair	Poor	Moderate	Rarely used today in skin
Surgical gut (chromic)	Virtually monofilament	Poor at 21–28 days	Poor	Poor	Less than plain	Skin grafts
Surgical gut (fast-absorbing)	Virtually monofilament	50% at 3–5 days	Fair	Poor	Low	Skin grafts, surface sutures
Polyglycolic acid (Dexon®)	Braided*	20% at 21 days	Good	Good	Low	
Polyglactin (Vicryl®, Polysorb®)	Braided*	75% at 14 days; 50% at 21 days	Good	Fair	Low	Subcutaneous closure, vessel ligation
Polydioxanone (PDS II®)	Monofilament	70% at 14 days; 50% at 30 days; 25% at 42 days	Poor	Poor	Low	Subcutaneous closure (high-tension areas)
Glycolic acid (Maxon®)	Monofilament	81% at 14 days; 59% at 28 days	Fair	Good	Low	Subcutaneous closure (high-tension areas)
Poliglecaprone 25 (Monocryl®)	Monofilament	50–60% at 7 days	Good	Good	Minimal	When minimal tissue reactivity is essential
Glycomer 631 (Biosyn®)	Monofilament	75% at 14 days; 40% at 21 days	Good	Poor	Minimal	Subcutaneous closure (high-tension areas)

* Multifilament.
 ** Directly proportional to the friction coefficient and indirectly proportional to memory.

Table 144.2 Commonly used non-absorbable sutures. Adapted from Wheeland *et al.*, 1994¹¹ with permission from WB Saunders Company.

COMMONLY USED NON-ABSORBABLE SUTURES

Suture	Configuration	Tensile strength	Ease of handling	Knot security**	Tissue reactivity	Uses
Silk	Braided*	None in 365 days	Gold Standard	Good	Moderate	Mucosal surfaces
Nylon:						
Ethilon®	Monofilament	20% per year	Good to fair	Poor	Low	Skin closure
Dermalon®	Monofilament	Good	Good to fair	Poor		
Surgilon®	Braided*	Good	Good	Fair		
Nurolon®	Braided*	Good	Good	Fair		
Polypropylene (Prolene®, Surgilene®, Surgipro®)	Monofilament	Extended	Good to fair	Poor	Minimal	Running subcuticular suture
Polyester (Dacron®, Mersilene®, Ethibond®)	Braided*	Indefinitely	Very good	Good (coating decreases)	Minimal	Mucosal surfaces
Polybutester (Novafil®)	Monofilament	Extended	Good to fair	Poor	Low	

* Multifilament.

** Directly proportional to the friction coefficient and indirectly proportional to memory.

Table 144.3 Commonly utilized sutures by site. Note that there is considerable variation depending upon the preference of the surgeon (bias of authors and editors is admitted).

COMMONLY UTILIZED SUTURES BY SITE			
Site	Deep suture	Surface suture	Other suture
Face	5-0 or 6-0 polyglactin or poliglecaprone	5-0 or 6-0 nylon or polypropylene	
Neck and distal extremities	4-0 polyglactin or poliglecaprone	4-0 or 5-0 nylon or polypropylene	
Trunk and proximal extremities	3-0 or 4-0 polyglactin or polytrimethylene carbonate	3-0 or 4-0 nylon or polypropylene	
Mucosa	None	5-0 silk or polyester	
Vascular ligature			4-0 or 5-0 polyglactin

EXAMPLES OF NEEDLE NOMENCLATURE

Ethicon

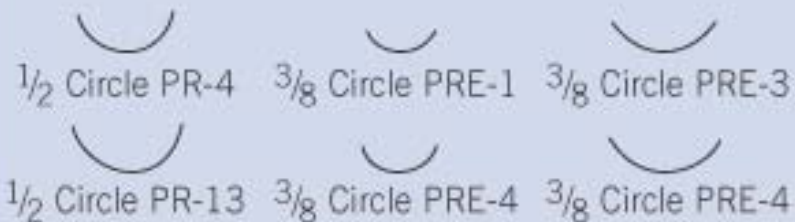
Precision point needles



Precision cosmetic needles



Davis + Geck



Scale 0 10mm

NEEDLE ANATOMY

