Dermatology, Wound Care & Suturing

CANADIAN HEALTH CARE AGENCY

EXPERIENCE THE NORTH

Module 24

History and Assessment

- Bacterial Infections
  - Impetigo
  - MRSA
  - Cellulitis
- Viral Infections
  - Herpes Zoster (Shingles)
- Fungal Infections
  - Tinea (ringworm)
  - Candida (yeast)
- Infestations
  - Pediculosis
  - Scabies
- Inflammatory Conditions
  - Atopic Dermatitis (Eczema)
  - Urticaria (Hives)
- Skin Cancer Screening

Skin Emergencies

- Emergency Burn Treatment
- Frostbite
- Lacerations and Suturing

Outline

DDx: VITAMIN CDE

- V = Vascular
- I = Infectious
- T = Trauma
- A = Autoimmune
- M = Metabolic
- I = Idiopathic/Iatrogenic
- N = Neoplastic

https://www.youtube.com/watch?v=qI4E9JDs2Tw

- C = Congenital
- D = Degenerative
- E = Endocrine

Systematic Dermatology Assessment

Non Palpable Primary Skin Lesion	Palpable Primary Skin Lesion	Fluid Filled Primary Skin Lesion	Secondary Skin Lesions	Arrangement
Macule (<1cm)	Papule (<1cm)	Vesicle (clear fluid <1cm)	Crusts	Grouping
Patch (>1cm)	Plaque (>1cm)	Bulla (clear fluid >1cm)	Fissure	• annular
	Nodule (dome shaped)	Pustule (purulent fluid)	Lichen	• nummular
	Wheal		Erosion	• arcuate
			Ulcer	• reticular
			Excoriations	Individual
			Atrophy	• nummular
				• annular

Signs and Symptom Table

What do you see?

- A common acute superficial bacterial skin infection (pyoderma).
- Characterised by pustules and honey-coloured crusted erosions ("school sores").
- Contagious – caused by *Streptococcus, Staphylococcus* or both
- Commonly located at edge of mouth and nose.
- Consider community-acquired MRSA
- Predisposing factors: local trauma, insect bites, skin lesions from other disorders (for example, eczema, scabies, pediculosis)

BACTERIAL INFECTIONS: Impetigo

Non-pharmacologic Interventions

- Warm saline compresses to soften and soak away crusts q.i.d. and prn
- Cleanse with an antiseptic antimicrobial agent to decrease bacterial growth

Client Education

- Counsel parents or caregiver about appropriate use of medications (including dose, frequency and compliance)
- Offer recommendations about hygiene as necessary, including single use of towels, and wash clothes while acute infection is present
- Cut fingernails to prevent scratching
- Counsel parents or caregiver about prevention of future episodes
- Suggest strategies to prevent spread to other household members (for example, proper hand-washing, use of separate towels)

Pharmacologic Interventions

- Apply topical antibiotic preparation:

  WHICH ONE?

- Oral antibiotics may be necessary if there are multiple lesions that appear infected:

  WHICH ONE?

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Pharmacologic Interventions

- Apply topical antibiotic preparation:
  - *mupirocin cream (Bactroban), tid for 7 to 10 days (MD/NP Order)*
- Oral antibiotics may be necessary if there are multiple lesions that appear infected:
  - *cephalexin (Keflex), 25-50 mg/kg/day, divided q.i.d. for 7 to 10 days (maximum 4 g/day) (Rx code C)*
- For penicillin allergy:
  - *erythromycin 30-40 mg/kg/day, divided q6-8h, PO for 7 to 10 days (maximum 2 g/day) (Rx code C)*
- Topical antibiotics such as mupirocin (Bactroban) may be used alone for small areas or in conjunction with oral antibiotics for larger areas.

BACTERIAL INFECTIONS: Impetigo

- Bacteria of the *Staphylococcus aureus* group (S aureus)
- Resistant to the usual antibiotics
- Traditionally MRSA stood for methicillin resistance but the term increasingly refers to a multi-drug resistant group. MRSA now is usually categorised into two types.
  - Hospital acquired (HA)
  - Community acquired (CA)

CA-MRSA mainly presents with:
- Bacterial folliculitis
- Boils
- Impetigo
- Cellulitis

BACTERIAL INFECTIONS: MRSA

- **Cellulitis** = Subcutaneous tissue infection that is spreading.
- **Etiology**: S. Aureus, Group A Strep
- **Diagnostic:** C & S, blood culture if bacteremia is developing.
- **Pharm:** Beta-lactam (Cephalexin) and if strep is cultured then Pen V or Amoxil may be considered.

What if my patient has MRSA (Community Associated)?

WHICH ANTIBIOTIC?

Consult if osteomyelitis infection is suspected. (i.e. probes to bone in diabetic patients)

BACTERIAL INFECTIONS

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What if my patient has MRSA (Community Associated)?

First line is TMP/SMX 1 DS tab QID for mild to moderate infections (MD/NP consult)

Also consult if osteomyelitis infection is suspected. (i.e. probes to bone in diabetic patients)

BACTERIAL INFECTIONS

Mild:

Physician consult is not generally required and patient can be treated on an outpatient basis

- warm compress to affected areas QID
- elevate, rest, gently splint affected limb
- encouraged proper hygiene
- RX: Keflex, Cloxacillin
- If allergy to Penicillin; Azithromycin
- Tylenol for pain
- Follow up daily to ensure infection is controlled
- RTC if lesion becomes fluctuant, pain increased or fever develops

BACTERIAL INFECTIONS: Cellulitis

Moderate to Severe

Referral is required and IV antibiotic therapy

- Ancef 1g IV/IM Q8hours or Ancef 2g IV Q24hrs PLUS Probenecid 1g once daily given 30 minutes prior to Ancef
- If penicillin allergy: clindamycin 600mg IV/IM Q8hrs
- Tylenol for fever or pain
- monitor VS and affected area frequently for progression

Empiric treatment is "best guess" and cultured wounds or cellulitis is preferred. Can become severe if diabetic or immuno-compromised.

BACTERIAL INFECTIONS: Cellulitis

- Herpes zoster is a localised, blistering and painful rash caused by reactivation of varicella zoster virus (VZV). It is characterised by dermatomal distribution, i.e. the blisters are confined to the cutaneous distribution of one or two adjacent sensory nerves.
- Herpes zoster is also called shingles.

Who gets herpes zoster?

- Anyone that has previously had varicella (chickenpox) may subsequently develop zoster.
- This can occur in childhood but is much more common in adults, especially the elderly.
- People who have had zoster rarely get it again; the risk of getting a second episode is about 1%.
- Herpes zoster often affects people with poor immunity.

VIRAL INFECTIONS: Herpes Zoster

Prodrome

Itching/Burning/Tingling

Acute Phase

Fever/Malaise

Neuritis with grouped vesicles on erythematous base in 3-4 days pustules

Recovering Phase

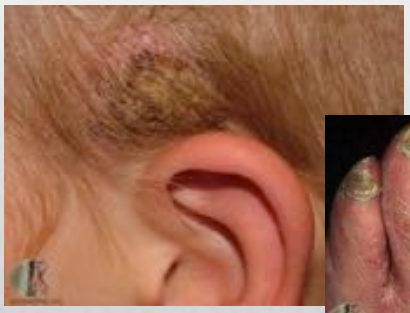
Resolution of rash 14-21 days

Pain: Postherpetic neuralgia

Zostavax/ Shingrix vaccine available for patients aged 65 to 70 – consult MD/NP

Herpes Zoster

- Superficial fungal infection of skin
  - On feet: tinea pedis (athlete's foot)
  - In groin: tinea cruris (jock itch)
  - On body: tinea corporis
  - On scalp: tinea capitis (cradle cap)
- Tinea versicolor, a generalized skin yeast infection (Pityrosporum ovale)



FUNGAL INFECTIONS: Tinea

- Yeast like fungi which are commonly part of the normal flora of the body, can cause a number of infections.
  - Oral candidiasis (oral thrush)
  - Angular cheilitis
  - Vulvovaginal candidiasis
  - Balanitis (penile infection)
  - Diaper rash
  - Chronic paronychia (nail fold infection)

FUNGAL INFECTIONS: Candidiasis

Non-pharmacologic Interventions

- Apply compresses (Burow's solution) bid or tid to dry and relieve itch (for tinea pedis and tinea cruris only).

Client Education

- Recommend elimination of moisture and heat
- Suggest that client modify socks and footwear
- Recommend avoidance of restrictive clothing, nylon underwear, prolonged wearing of wet bathing suit or work clothes
- Recommend proper hygiene (client should change socks frequently and avoid wearing rubber shoes)

Pharmacologic Interventions

Tinea pedis and tinea cruris: topical antifungal agent for at least 2 weeks; continue until 1 week after resolution of lesions:

- Clotrimazole skin cream (Canestan), bid or tid

Tinea corporis:

- topical antifungal agent such as clotrimazole for 4 weeks.

Tinea versicolor,

- selenium sulfide (2.5%) lotion or shampoo, daily to affected areas for 10-15 minutes, followed by shower, for 7-14 days.

Candidiasis

- Asymptomatic - no treatment is necessary.
- Symptomatic: clotrimazole (Canestan), 1% cream intravaginally daily for 6 or 7 days or 3-day combi-pak therapy
  or
- fluconazole 150 mg PO; 1 dose is effective--contraindicated in pregnancy

FUNGAL INFECTIONS

Cat and Dog Bites

Etiology:

- Strep viridans
- P. multocida
- Bacteroides
- Fusobacterium
- P. Multocida
- S. aureus

Pharmacological Interventions

Adult: Clavulin 875mg x 3 - 5 days

Child: Clavulin 40mg/kg/day ÷ TID x 3-5 days

Follow Up:

Rule of Thumb, bring them back in 48 hours

Consider need for rabies prophylaxis

Cat and Dog Bites

Human Bites

- Human bites are considered amongst the most dangerous.
- Infection rates are as high as 50%.
- Usually a mixed flora is cultured.
- Staph, strep, gram negatives and anaerobes have all been cultured

Treatment

- Prophylactically
  - Clavulin 875 PO BID for 3-5 days

    Child: Clavulin 40mg/kg/ day for 3-5 days
- Infection present
  - Clavulin 875mg PO BID for 7-10 days

    Child: Clavulin 40mg/kg/ day for 7-10 days

Pediculosis

Pediculosis

Assessment

- Small grey-white nits cemented to base of hair shafts
- Lice may be visualized
- Excoriation of skin

Treatment

Nonpharmacological:

- Remove nits
- HOT wash clothes, bedding (or bags)
- Vegetable oil and vinegar

Pharmacological:

- Permethrin (Nix)
- Pyrethrin (R&C)
- FU in 7 days and repeat

Scabies

- Contagious skin disease caused by mite called Sarcoptes scabiei.
- Erupts in folds of skin

Assessment

- Severe itching (worse at night)
- Rash of heads and feet, flexural folds
- Transmission: contact including sexual contact and sharing clothes
- Symptoms take 6 weeks to develop
- Hypersensitivity to mite and its products

Non-pharmacological:

- Prophylactic therapy essential for all household members
- All bed, linen and clothing should be laundered in hot water (or bag for 5-7 days)
- May remain in daycare after treatment

Pharmacological:

- Permethrin 5%(Nix)

  Leave on skin for 8-14 hours. Reapply after 1 week PRN.

Scabies

- **Etiology:** Overexposure to sun

Types:

1. ***Basal Cell:*** Most common, slow growing "Pearly Dome Nodule"
2. ***SCC Squamous Cell Carcinoma***
3. ***Malignant Melanoma***

Skin Cancer

Atopic eczema

- Chronic, itchy skin condition that is very common in children but may occur at any age. It is also known as eczema and atopic dermatitis.
- It is the most common form of dermatitis.
- Atopic eczema usually occurs in people who have an 'atopic tendency'. This means they may develop any or all of three closely linked conditions; atopic eczema, asthma and hay fever (allergic rhinitis).
- Often these conditions run within families with a parent, child or sibling also affected. A family history of asthma, eczema or hay fever is particularly useful in diagnosing atopic eczema in infants.

Inflammatory Conditions: Atopic Dermatitis

Nonpharmacologic Interventions

- Advise client to stop using steroid preparations once acute lesions have healed, since steroids do not have any preventive benefit and may further irritate and damage skin
- If lesions are wet, promote drying and cooling with compresses q.i.d. prn (aluminum acetate [Burow's solution] or normal saline)
- If lesions are dry, promote lubrication with Glaxal base or petroleum jelly (Vaseline) bid, after bathing and prn

Client Education

- Encourage proper hygiene to prevent secondary bacterial infection
- Recommend loose-fitting cotton clothing
- Recommend avoidance of coarse materials and wool
- Recommend use of a soap substitute (for example, Aveeno) and avoidance of soaps
- Suggest that cotton gloves be worn inside rubber gloves when client works with liquids
- Suggest that greasy lubricants (such as Lubriderm) be applied within minutes of leaving shower or bath to "lock in" moisture

Pharmacologic Interventions

Reduce inflammation if itch moderate or severe:

- hydrocortisone 1% cream (Topicort), bid-tid for 1-2 weeks
- Gels and creams are used for acute, weeping eruptions. Ointments are used for dry or lichenified lesions. Lotions are used for hairy areas.

Pruritus associated with eczema is not mediated by histamine, so histamine blockade is generally ineffective. Hydroxyzine (Atarax) may provide some relief through central sedation. Sedative effect of hydroxyzine is useful to break the itch-scratch cycle.

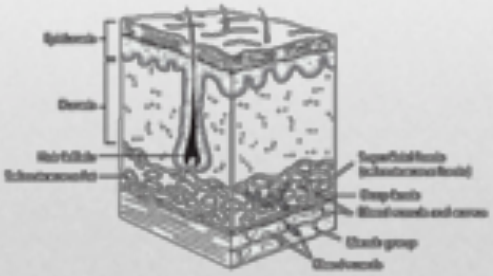
- hydroxyzine (Atarax), 10-25 mg PO bid and hs prn
- Start with 10 mg if client is small, elderly or taking anxiolytics.

Atopic Dermatitis

Burns

- First Degree
  - Involves epidermal layer of skin only
- Second Degree
  - Superficial: epidermis and superficial portions of the dermis
  - Deep: extends deeper dermis
- Third Degree
  - Extends through and destroys dermis

- **Thermal**
- **Electrical**
- **Chemical**
- **Radiation**



Rule of Nines

Minor
- <10% total body surface (TBS) (2d)
- <2% TBS (3d)

Moderate
- 10-20% TBS (2d)
- 2-5% TBS (3d)
- High voltage injury
- Suspected inhalation injury
- Circumferential burn
- Medical problem predisposing to infection

Severe
- >20% TBS (2D)
- >5% TBS (3d)
- Any sig. burn to hands, feet, face, eyes, ears, perineum or joints
- Any know inhalation injury
- High voltage burn
- Significant associated head injury, fracture or soft tissue trauma

Burn Management

- **First Degree**
  - Cleanse with NS or sterile water
  - Dressing: cover area lightly with sterile, dry gauze, hydrogel sheet or a non adherent mesh gauze dress

- **Second Degree**
  - Remove attached clothing
  - Cleanse with sterile water or NS
  - Apply "cool" saline soaked gauze for 15-30 minutes (decreases burn pain)
  - Monitor core body temperature (especially if > 10%)
  - Use warm IV fluids to maintain temperature
  - Gently debride using sterile technique
  - Dressing: silver-coated, low adherent drsg (Acticoat), can be used as an antimicrobial barrier layer for partial or full thickness
  - Topical antibiotics
  - Non adherent porous mesh gauze for superficial partial thickness

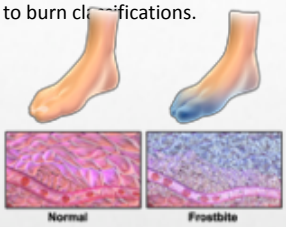
Frostbite

What is frostbite?

- Exposure of skin or other tissues to cold temperatures causing freezing.
- Initial symptom is typically numbness
- May be followed by clumsiness with a white or blue discolouration of the skin
- Swelling or blistering may also occur following treatment.
- The hands, feet, and face are most commonly affected

Skin and tissues exposed to prolonged below-freezing temperatures can develop ice crystals and blood clots, which can cause superficial (1st and 2nd degree) to major (3rd and 4th degree) injury, up to and including hypothermia and compartment syndrome.

Areas that are usually affected include cheeks, ears, nose and fingers and toes. Frostbite has been classified by degrees according to skin and sensation changes, similar to burn classifications.



First degree
- superficial, surface skin damage that is usually not permanent.
- primary symptom is loss of feeling in the skin.
- skin is numb, and possibly swollen, with a reddened border.
- In the weeks after injury, the skin's surface may slough off.

Second degree
- develops clear blisters early on, and the skin's surface hardens.
- In the weeks after injury, this hardened, blistered skin dries, blackens, and peels.
- At this stage, lasting cold sensitivity and numbness can develop.

Third degree
- the layers of tissue below the skin freeze.
- Symptoms include blood blisters and blue-grey discoloration of the skin.
- In the weeks after injury, pain persists and a blackened crust (eschar) develops.
- There can be longterm ulceration and damage to growth plate.

Fourth degree
- structures below the skins are involved like muscles, tendon, and bone.
- Early symptoms include a colorless appearance of the skin, a hard texture, and painless rewarming.
- Later, the skin becomes black and mummified.
- The amount of permanent damage can take one month or more to determine.
- Autoamputation can occur after two months.

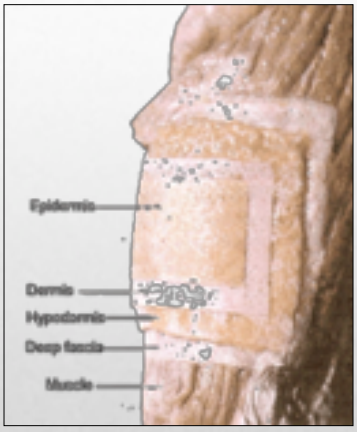
Frostbite

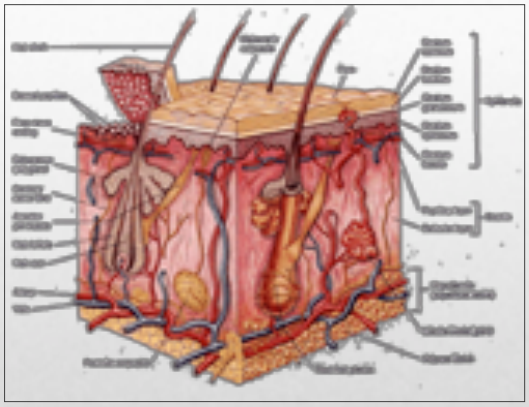
- Hurley, K (2005) OSCE and Clinical Skills Handbook, Elsevier Toronto.
- Dunphy, Winland-Brown (2001) Primary Care. F.A Davis, Philadelphia.
- Bernstein, L (2011). Physical Diagnosis, 7th Ed. MsGraw Hill, New York.
- Anti-infective Guidelines (2010).Mums Guidelines Clearing house, Toronto.

References

Suturing 101

Theory & Practice Skills





Anatomy review

- Mechanism of injury, risk of foreign body
- Contaminants (i.e. rust, dust, manure)
- Time of injury
- Amount of blood loss
- Loss of function (i.e. tendons, ligaments, nerves)
- Mental illnesses (i.e. DMII, cancer, PVD)
- Allergies (i.e. drugs, dressings, local anesthetics)
- Medications (i.e. steroids, anticoagulants)
- Status of tetanus vaccination

History

- Temperature
- HR and BP (depending on blood loss)
- Dimensions of the wound, including depth
- Assess for signs of infection
- Assess the integrity of underlying structure;
  - Vascular injury
  - Neurologic injury
  - Tendon injury
  - Bone injury
  - Foreign Bodies

Physical

- Size (longest and widest aspect of the wound; then multiple LxW)
- Depth (pick the depth and thickness appropriate to the wound)
- Edges
- Undermining assessment
- Necrotic tissue types
- Exudate types
- Skin colour surrounding the wound
- Peripheral tissue edema
- Peripheral tissue induration
- Granulation tissue
- Epithelialization

Documentation

BWAT, 2001

GOALS OF TREATMENT:

- Restore function
- Minimize risk of infection
- Repair tissue integrity

What is the patient's prognosis?
What is the patient's quality of life?
Is current pain control adequate?

Management

- Is the wound wet of dry?

OVERALL GOAL: increasing moisture and removing slough

Slightly Wet Goal: maintain environment

- Moisture retentive drsg (Alldress) & hydrogel (Intrasite gel)

Moderately Wet Goal: absorbing excess exudate

- Allevyn or Mepilex border

Completely Saturated Goal: control the excess exudate

- Hydrofiber (Aquacel) or calcium alginate (Kaltostat) + cover drsg

Dressings

Appropriate use of dressings include matching the dressing function to the wound condition.

- How deep is the wound?
- What does the wound bed look like?
- Is the wound infected?

Dressings

NO Complex Lacerations

- Tendons/Muscle
- Decreased sensation
- Decreased motor
- Boarders such as eyelid, lip or eyebrow
- Crush injuries/Open fractures
- Older than 12 hours
- Dog bits/Human bites

These require medevac and plastics consults

Simple Laceration: YES

- Can be jagged
- May require debridement
- Clean dirty lacerations

Ensure Tetanus is UTD in last 5 years for a dirty laceration

What can you suture?

Control the bleeding!

DIRECT PRESSURE IS FIRST LINE

Products:

- Kaltostat
- Surgifoam
- Lidocaine with Epi

Artery involvement:

- Apply pressure
- Surgifoam
- Lidocaine with Epi
- Consult if inadequate response

If fracture is involved, immobilization will help control bleeding

Bleeding

- In immunocompetent patient with uncomplicated lacerations
- No clinical difference in infection rates

Ann Emerg Med. 2004 Mar; 43(3): 362-70

Use Clean, Non-sterile Gloves

DOs

- **DO:** Start close to wound edge and cleanse outward
- **DO:** Providone-iodine solution around wound
- **DO:** Clip hair around wound
- **DO:** part hair
- **DO:** put NS soaked gauze inside wound if needed

DON'Ts

- **DON'T:** pour providone-iodine solution in wound (irrigate only with saline)
- **DON'T:** shave hair
- **DON'T:** scrub inside wound
- **DON'T** suture infected wounds

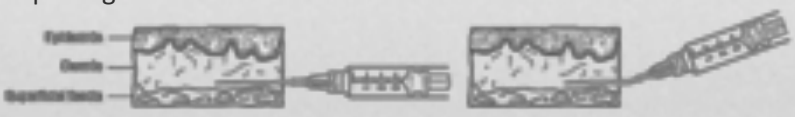
Disinfection

"To Epi or not to Epi?" Why are you asking the question? Suture already….

…fingers, toes, penis, nose or any "tips"…

Suturing 101

- 27 G 1 ½" needle
- No angle
- Intradermal (wound edge)
- NS for irrigation
- Bevel Up
- Inject as you draw back
- Peak at 30 seconds (give 5 minutes to be effective)
- Splash guard!



Freezing Tips

Debridement:

- Aseptic technique
- Remove devitalized tissue
- Avoid taking healthy tissue

Irrigation:

- Normal Saline (isotonic and non-cytotoxic)
- Warm to room temperature
- Use 60ml syringe with 18-19g IV catheter

Exploration:

- All wounds should be examined

100cc NS bottle with irrigation tip | 35 ml syringe with a 19 gauge angiocath

Wound preparation

- In immunocompetent patient with uncomplicated lacerations
- No clinical difference in infection rate
- Between a max of 2 minutes irrigation under tap water and min 200ml of sterile NS

Acad Emerg Med 2007 May; 14(5): 404-10

first check if community is on boil water advisory

Cleansing the Wound

Any wound: < 6-8 hours old; **unless**

Face and scalp: <12-18 hours (excellent vascularity)

Feet: <4-6 hours old

Wound Closure

Suture Materials

Surgipro

- Nylon
- # 3.0 - 4.0 Scalp
- #5.0 – 6.0 Forehead
- # 3.0, 4.0, 5.0 Back and Torso & Limbs

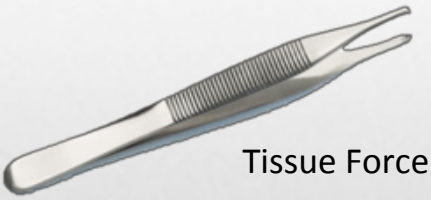
Prolene

- Nylon coated with polypropylene
- #5.0, 6.0 Face
- Monofilament

Plaingut

- Absorbable suture; clear in color
- Typically #4.0-5.0
- Used for under the primary dermal layer for subcutaneous tissue and muscle

Needle Driver



Tissue Forceps

Scissors

Instruments

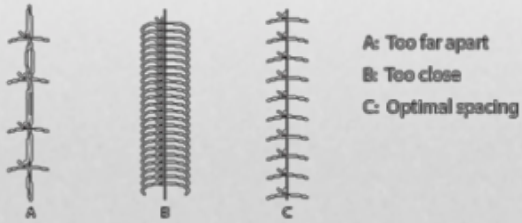
Forceps

- Can you open and close with one hand?
- Can you do that on both hands?
- Can you load your needle properly?

"Approximate – DO NOT asphyxiate!"

Suturing

- Shallow wounds without significant tension on lateral edges of the wound
- Closure of skin, after placement of dermal structure
- Tension can be adjusted individually



Simple interrupted

- Review signs and symptoms of infection
- Do not get sutures wet for 24 hours
- Encourage coverage with an occlusive dressing
- Review when to return for suture removal

Patient education

	Adults	Children
Face	5 days	3-5 days
Scalp	7 days	5-7 days
Chest and Extremities	8-10 days	
High tension (joints, hands)	10-14 days	
Back	10-14 days	

- Wound appears clean and healed
- Wound appears dry, no drainage present
- For larger wounds; remove every other suture to ensure approximation
- Steri-strips can be used after removal for additional reinforcement

Suture removal

MD/NP Order is Required

Staples
- ½ cm apart
- Max 1 inch laceration without freezing
- Approximate with hand
- Gun is disposable one time use (35 staples)

Tissue Adhesive (DermaBond)
- Lacerations need to be clean, with minimal bleeding or dry
- Laceration is above the fascia, acute (<12 hours old), 5 cm or less in length and 0.5 cm or less in width, edges can be approximated easily
- Approximate the wound edges.
- Apply small amounts of TA (droplets) along the wound edges and extending 0.5 cm past wound ends.
- Reapply TA twice more, waiting 15 - 30 seconds between applications.
- Hold wound in approximated position for at least one minute after final application to allow sufficient drying time.

Staples and Adhesive

- After 12-24 hours
- Inspect wound daily for SHARP
  - Swelling
  - Heat
  - Ache
  - Redness
  - Pus
- Cleanse gently with mild soap and water to minimize infection; pat dry and reapply topical antibiotic x 3 days

Wound Management and Monitoring

- Topical antibiotics?
- Antibiotic prophylaxis?
- Animal bites (dog, cat, sasquatch)
- Hair apposition technique (HAT)

- REMINDER: Do not use personal devices to photograph wounds/ eruptions for consultation. Most nursing stations have digital cameras and/or telemedicine for this purpose.

Final thoughts

References

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