Lecture Content

• Skin Infections + Blisters
  • Module 1: Dermatologic Terms
  • Module 2: Bacterial Infections
  • Module 3: Viral Infections
  • Module 4: Fungal Infections
  • Module 5: Parasitic Infections
  • Module 6: Blistering Disorders
  • Module 7: Skin trauma
The following cutaneous lesion was noted after the patient went to an “all you can eat” crab feast. Which of the following would most accurately describe the lesion.

A. Macule  
B. Patch  
C. Plaque  
D. Wheal
### Module 1: Macroscopic Dermatologic Terms

<table>
<thead>
<tr>
<th>Term / Change</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excoriation</td>
<td>Break in the epidermis usually due to scratching</td>
</tr>
<tr>
<td>Lichenification</td>
<td>Thick skin characterized by prominent markings due to rubbing / chronic irritation.</td>
</tr>
<tr>
<td>Macule</td>
<td>Flat, circumscribed lesion 5 mm or smaller</td>
</tr>
<tr>
<td>Papule</td>
<td>Elevated lesion less than 5 mm</td>
</tr>
<tr>
<td>Plaque</td>
<td>Elevated flat-topped lesion usually greater than 5 mm</td>
</tr>
<tr>
<td>Pustule</td>
<td>Discrete pus-filled lesion</td>
</tr>
<tr>
<td>Scale</td>
<td>Dry, plate-like excrescence</td>
</tr>
<tr>
<td>Vesicle</td>
<td>Fluid-filled raised lesion less than 5 mm; bulla is greater than 5 mm.</td>
</tr>
<tr>
<td>Wheal</td>
<td>Itchy, transient, elevated lesion with variable blanching and erythema formed as the result of dermal edema.</td>
</tr>
<tr>
<td>Erythema</td>
<td>Redness of the skin</td>
</tr>
<tr>
<td>Erosion</td>
<td>Circumscribed break in epidermis with beefy red central portion. Frequently secondary to ruptured blister.</td>
</tr>
</tbody>
</table>
**Module 1: Dermatologic Terms**

- **Wheals** = Urticaria
- **Scaly Plaques** = Psoriasis
- **Papule** = Basal Cell Carcinoma
- **Erosion (ruptured vesicle)** = Herpes Virus
- **Scale** = Icthyosis
- **Macule** = Lentigo
A 5 year old otherwise healthy child presents to pediatric dermatology clinic with crusted lesion of the chin and bilateral cheeks. He has a history of atopic dermatitis and seasonal allergies. His mother reports his eczema had been “acting up” and two days prior she saw some small blisters in the area. Which of the following best describes the child’s current condition:

A. Atopic dermatitis that has been scratched
B. Bullous Impetigo
C. Ecthyma
D. Staph Scalded skin syndrome
Module 2: Bacterial Infections

- Staphylococcus aureus = most common cause of skin infections
  - Bullous Impetigo
  - Furuncles / Boils / Carbuncles
  - Superficial folliculitis
  - Staphylococcal Scalded skin syndrome
  - Staphylococcal cellulitis
  - Toxic shock syndrome
  - Staphylococcal scarlet fever
Module 2: Bacterial Infections

- Bullous Impetigo
  - Most common cause is Staphylococcus but group A beta hemolytic Streptococcus is also common
    - Specifically exfoliative toxins A and B from Phage II Group 71 staphylococci attack epidermis resulting in subcorneal splitting.
    - Most common in children presents as flaccid blisters that collapse easy resulting in honey colored crust
  - Topical treatment
    - MRSA mupirocin
Subcorneal blister with neutrophils and bacteria present.

Microbiology Correlation: Gram stain of the blister contents shows gram positive cocci in clusters.
Staphylococcal Scalded Skin Syndrome

- Usually occurs in infants or immune compromised adults
- Presents as full body erythema with flaccid blisters resulting in desquamated erythematous base
- Also caused by group II exfoliatoxin except infection is not in the blister but rather at a distant site (conjunctivitis or abscess)
  - Sterile subcorneal blister
Module 2: Bacterial Infections

- Cellulitis
  - Most common cause is Staphylococcus but group A beta hemolytic Streptococcus is also a cause.
    - MRSA should be considered
  - Often on extremity, usually preceded by injury.
    - Tinea pedis infection of foot is common portal.

Erythema, swelling, +/− bulla formation
Module 2: Bacterial Infections

- Streptococcal infections
  - Impetigo (see previous slides)
  - Blistering distal dactylitis
  - Ecthyma
  - Erysipelas
  - Necrotizing fasciitis
Module 2: Bacterial Infections

- **Ecthyma**
  - Vesicle with rapid progression to punched out ulcer with raised border most common on shins/dorsal feet

- **Erysipelas**
  - Acute B-hemolytic group A streptococcus infection involving the superficial dermal lymphatics
  - Local redness, heat, swelling with **raised indurated border**
    - Most common on legs and face.
Module 2: Bacterial Infections

- Necrotizing fasciitis
  - Acute infection involving the fascia
    - Causes include anaerobes and aerobes: staphylococcus, streptococci, enterococci, *Pseudomonas*, and *Bacterioides*.
  - May follow surgery, penetrating trauma, or arise de novo
  - Pain and redness that rapidly progresses to patches of dusky blue discoloration
  - Treatment: Early surgical debridement and antibiotics
  - Poor prognosis in patients over 50, immunocompromised, diabetic, and neonates.
Module 2: Bacterial Infections

- *Pseudomonas aeruginosa* infections
  - Ecthyma gangrenosum:
    - Vesicular and erosive lesions following pseudomonas septicemia.
  - Septic vasculitis
  - Folliculitis “Hot tub folliculitis”
    - Diffuse truncal eruption of follicular-based erythematous papules
  - External Otitis Media

*Pyoverdin pigment in *P. aeruginosa* fluoresces yellow-green on Wood’s light exam.*
Module 2: Bacterial Infections

- *Borrelia burgdorferi* infection
  - “Lyme” Disease
  - Transmitted by bite by ticks of genus *Ixodes*
  - $\frac{3}{4}$ of those infected develop erythema chronicum migrans
    - Begins as a papule and progresses to annular erythema.

*Common annular rashes include: Lyme disease, granuloma annulare, superficial fungal infection, and erythema multiforme.*
Module 2: Bacterial Infections

Sexually transmitted infections by *Treponema pallidum* = Syphilis

- Primary and Secondary types have skin findings.
  - Primary: Chancre on the genitalia (ulcer with raised border)
  - Secondary: about 6 weeks later.
    - Condylomata lata: grayish, broad, flat papular lesion on genitalia
    - Maculopapular rash: Widespread distribution frequently involving palms and soles
  - Spirochete visualized in cutaneous tissue by silver stain or dark field microscopy (not universally available).
    - Serologic tests (VDRL, RPR, FTA-ABS)
Module 2: Bacterial Infections

• Infections with acid fast *Mycobacterium*

  • Leprosy: *Mycobacterium leprae*
    • Variable skin lesions. May be annular with central cutaneous anesthesia and adjacent nerve enlargement.

  • Tuberculosis: *Mycobacterium tuberculosis* complex
    • Lupus vulgaris: involvement of the skin or mucous membranes by *M. tuberculosis* originated at another site.
    • Scrofuloderma: firm subcutaneous nodule on the neck, submandibular, or supraclavicular area. Also a secondary, progressive lesion from underlying lymph node or bone involvement.

• Atypical mycobacteria: variable skin lesion ranging from nodule to ulcerative lesion.
Module 2: Bacterial Infections

- *Rickettsia rickettsii* = Rocky Mountain Spotted Fever
  - Transmitted by tick
  - Southeast and South Central US
  - Fever, headache, rash
    - Erythematous macules that spread from wrist and ankles to *palms and soles*, then trunk.
An 88 year old man presents with linear vesicular eruption on his trunk. A sample of the blister content is obtained and a Tzank smear is performed and shows multinucleated cells with molded nuclei and marginated chromatin. The most likely cause of the patient’s eruption is which of the following?

A. Primary infection with a double stranded DNA virus of the pox virus family.
B. Primary infection with a single stranded DNA virus of the human herpes virus family.
C. Infection with coxsackie virus A16
D. Reactivation infection with a double stranded DNA virus from the human herpes virus family.
Viral exanthems = rash that may be caused by ANY viral infection

- Morbilliform eruption = pink macules and papules
- Acral papules in children (papular acrodermatitis of childhood / Gianotti-Crosti syndrome)
- Vesicular eruptions (diffuse or localized)
- Erythemas (diffuse or localized redness)
- Purpura of hands and feet

- Non-exanthem viral infections
Module 3: Viral Infections

- Morbilliform eruptions: most common
  - Measles
  - Rubella
  - Enteroviruses
  - Human Herpes virus 6 & 7 (HHV 6 & 7)
  - Epstein-Barr virus (EBV)
  - Cytomegalovirus (CMV)
Module 3: Viral Infections

• Measles aka rubeola or morbilli
  • Spread by respiratory droplets
    • Unvaccinated account for most infections.
  • Morbilliform rash appears 1-7 days after prodrome of fever, malaise and upper respiratory symptoms often on anterior scalp and behind ears toward trunk and extremities 2\textsuperscript{nd} or 3\textsuperscript{rd} day
  • Koplick spots = 1 mm white papules on buccal mucosa. Appear during prodrome
Module 3: Viral Infections

- Human Herpes Virus 6 & 7 (HHV 6 & 7)
  - 85% of adults and 100% of children are seropositive.
  - Acute seroconversion in children results in 2/3 of cases of roseola infantum
    - High fever followed by morbilliform rash on neck, trunk, and buttocks.
Herpes simplex virus (HSV) 1&2 and varicella zoster virus (VZV)

- Both part of the human herpes virus family.
- Both double stranded DNA virus with similar mechanisms for infection and ability to cause both primary and reactivated (latent) infection
- Both cause a vesicular viral exanthem
- Positive Tzanck or direct fluorescence antibody (DFA) (rapid) of the blister contents and positive by viral culture
Module 3: Viral Infections

HSV1 / HSV 2:
First infection often asymptomatic
Primary or latent infection can present as vesicle or erosions.
Oral = more commonly HSV 1
Genital = more commonly HSV 2

3M’s = molding, multinucleated, margined chromatin seen in tissue or Tzanck Smear
Hutchinson’s sign: HSV involvement of the nose alerts the physician to the possibility of ocular involvement which can result in vision impairment if not treated promptly.
Primary VZV infection = chicken pox
Vesicles on red base / papules / crusted erosions (all stages present)
Transmitted by respiratory secretions and cutaneous lesions (four days prior until all lesions crusted). Vaccination available

Reactivation of infection = shingles
Focal unilateral / dermatomal distribution unless disseminated.
Painful/pruritic vesicle most common on trunk
Increased in patients over 50 or immunocompromised.
Module 3: Viral Infections

• Hand, foot, and mouth disease:
  • Caused by coxsackie virus A16 or enterovirus 71
  • Oral-oral or oral-fecal route
  • Fever, sore throat followed by macules, vesicle, and ulcers on hands, feet, and oral mucosa.

• Ecthyma Contagiosum: ORF
  • Caused by parapox virus
  • Contracted from sheep or goats
  • Dome-shaped, firm bullae on the hands and forearms.
Module 3: Viral Infections

• Parvovirus B19
  • Erythema infectiosum (Fifth Disease)
    • Erythema of cheeks (slapped cheek disease) in children in late winter/early spring followed by macules and papules and/or lace-like erythema of trunk.
      • Exanthem appears after viral shedding.
      • Recurring stage after resolution seen after exposure to heat.
  • Papular purpuric gloves and socks syndrome
    • Pruritus, edema, and erythema of hands and feet which become purpuric after a few days.
    • Oral ulcers and erosions including koplick spots.
Module 3: Viral Infections

- **Non-exanthem viral infections:**
  - Verruca (Warts): caused by Human papilloma virus (HPV) of variable type.
    - Common wart (verruca vulgaris)
      - Flesh-colored to brown rough papules
      - Black dots indicate thrombosed capillaries
      - Commonly HPV types 2,4,7
    - Plantar warts
      - Commonly HPV types 1,4
    - Flat wart (verruca plana)
      - Small and flat pink papules
      - Commonly HPV types 3,10
Module 3: Viral Infections

• Genital wart (condyloma acuminatum)
  • Soft, small-based pink to brown verrucous or papillomatous papules, non-keratotic
  • Located in genital, perineal, and perianal skin
  • HPV subtypes 1,2,6,10,11,16,18,31,32,33,34
  • HPV 16,18, and 31 are high risk for cervical cancer
    • Account for about 75% cervical cancer
    • Vaccine for prevention of cervical cancer based on these HPV subtypes
Module 3: Viral Infections

Verruca Vulgaris

Condyloma Acuminatum
Module 3: Viral Infections

- Non-exanthem viral infections:
  - Molluscum contagiosum:
    - Umbilicated papule common on children, immune compromised adults, or sexually transmitted.
    - Caused by DNA virus of the Pox family = pathognomonic cellular inclusions
Module 3: Viral Infections

• Non-exanthem viral infections:
  • Hairy leukoplakia:
    • White painless plaques on tongue
    • EBV mediated
    • Increased in HIV positive patients
A 13 year old girl presents with an annular and erythematous lesion with a scaly edge on her thigh. You suspect Tinea corpora. If you are correct a scraping and KOH preparation should reveal which of the following?

A. Pseudohyphae
B. Hyphae forms
C. Yeast forms
D. Gram positive bacteria
Module 4: Fungal Infections

• Superficial fungal infections
  • Dermatophytes (fungus that live in/on keratin)
    • Often an annular lesion
    • Most common genera are Microsporum, Trichophyton, and Epidermophyton.
      • Seen as hyphae on KOH prep and on PAS stain of tissue.
      • Classified according to location of infection
  • Tinea versicolor
    • Hypo or hyper pigmented macules predominately on trunk.
    • Malassezia globosa organisms (spaghetti and meatballs) on tissue slide and yellow on Wood’s lamp
  • Tinea nigra
    • Tan-brown patches on palms or soles.
    • Pheoanellomyces (Exophiala) werneckii pigmented hyphae on tissue and KOH preparation
  • Candidiasis: Intertrigo, Thrush, Paronychia
    • Candida albicans: pseudohyphae and yeast forms
Tinea Pedis

Tinea Cruris

Tinea Corpora

Tinea Capitis
Module 4: Fungal Infections

Onychomycosis: dermatophyte infection of the nail.

PAS stain

KOH preparation
Module 4: Fungal Infections

Tinea versicolor presents as macules and patches of hypo/hyperpigmentation on trunk.

Hyphae and yeast forms can be seen on H&E.
Module 4: Fungal Infections

• Deep fungal infections
  • Subcutaneous: from direct inoculation of skin.
    • Sporotrichosis, chromomycosis, phaeohyphomycosis, and mycetoma.
  • Systemic (usual respiratory based).
    • Blastomycosis, histoplasmosis, coccidiomycosis, paracoccidiomycosis.
  • Opportunistic (immune compromised).
    • Cryptococcosis, aspergillosis, penicilliosis, mucormycosis.
Module 4: Fungal Infections

- Sporotrichosis: begins at site of inoculation and ascends along lymphatics.
  - Caused by *Sporothrix schenckii* that resides in soil, rose thorns, animal paws.
    - Dimorphic fungus
  - Rarely see organisms
  - Must culture on Sabouraud’s
Module 4: Fungal Infections

• Chromomycosis and phaeohyphomycosis
  • Both dematiacious (pigmented) fungi
  • Chromo = copper pennies in tissue
  • Phaeo = hyphal forms in tissue

• Mycetoma:
  • Nodules in the skin that drain pus with characteristic granules.
    • 70% on the foot
    • Granules represents little balls of fungus (although similar findings are seen with filamentous bacteria and actinomycetes)
Module 4: Fungal Infections

Blastomycosis
Mississippi / Ohio River Valley

Histoplasmosis
S. Central United States

Coccidioidomycosis
S. California, Arizona, Mexico, SW Texas, N. Mexico

Paracoccidioidomycosis
New S. America

Mucormycosis
1/3 patients diabetic

Aspergillosis / Fusariosis
Acute angle branching hyphae

Cryptococcus neoformans
Encapsulated yeast from pigeons. HIV patients
You have volunteered for an exciting summer program in Africa. On your first day of clinic you have a patient that presents with massive scrotal edema. Your attending tells you he suffers from parasitic infestation. Which of the following parasites can cause elephantiasis?

A. *Strongyloides stercoralis*
B. Larva of dog and cat hookworms
C. Leishmaniasis
D. *Wuchereria bancrofti*
Module 5: Parasitic Infections

- Larva migrans = creeping eruption
- Larva currens = racing eruption
- Enterobius vermicularis (pinworms)
- Elephantiasis: Filariasis, loiasis, onchocerciasis
- Leishmaniasis
- Swimmer’s itch
- Seabather’s eruption
Creeping eruption – cutaneous larva migrans

Larva of dog/cat hookworms penetrate skin and migrate through epidermis.

- Cannot penetrate epidermis to complete life cycle and die 2-8 weeks.

Racing eruption = *Strongyloides stercoralis* has the ability to penetrate in a few days, complete life-cycle internally and cause systemic infection.

Pruritic, serpiginous burrow
Module 5: Parasitic Infections

• Elephantiasis
  • May affect the limbs or genitalia.
    • Filariasis from *Wuchereria bancrofti* *Brugia malayi* transmitted by mosquito.
    • Ochocerciasis = river blindness transmitted by black fly
    • Loiisis: loa loa transmitted by horse/deer fly

Elephantiasis due to lymphatic obstruction causes massive enlargement, woody induration, and warty growths.
Module 5: Parasitic Infections

- Leishmaniasis:
  - Transmitted by biting sand fly.
  - Nodules and ulcers.
  - *L. mexicana* type can be acquired in US. Other types acquired elsewhere.
  - Amastogotes in macrophages in tissue best seen with Giemsa stain.
Module 5: Parasitic Infections

- **Swimmer's itch**: a schistosomiasis that usually affects birds causes a prickly eruption on exposed skin in the water. Usually resolves spontaneously.

- **Sea bather's eruption**: larval forms of marine jellyfish held close to skin by clothing cause pruritic macules in a bathing suit distribution.
Parasites: Sizes

Bedbug

Head louse

Crab louse

Mite

Nit attached to scalp hair
Module 5: Parasitic Infections

- Scabies Mites: Very itchy infestation with *Sarcoptes scabiei*
  - Predilection for interdigital spaces of hands
  - Burrows (linear papule), crusted papules, nodules, areas of eczema, and excoriations
  - All household members need Tx, otherwise “ping-pong” infestation
  - Mites can be seen on histologic sections in burrows in the stratum corneum
Module 5: Parasitic Infections

• Pediculosis: highly contagious infestation with lice
  • Very pruritic, infested areas may show eczematous response and lymphadenopathy
  • Lice feed on blood
  • Pruritus from immune response to louse saliva
  • Secondary impetigo and lymphadenopathy common
Module 5: Parasitic Infections

- *Pediculus humanus var. capitis*, head louse
  - Live on scalp
  - Attach eggs (nits) to hair
- *Pediculus humanus var. corporis*, body louse
  - Live and lay eggs in cloth seams
  - Move to skin for feeding
- *Phthirus pubis*, crab louse
  - Pubic/axillary area, nits on local hair
  - May infest eyelashes in small children
Module 5: Parasitic Infections

- Bed bugs: *Cimex lectularius*, a flat tan insect
- Feeds on human blood
- Attracted by exhaled CO$_2$
- Leaves pruritic urticarial bite marks
- Hides in cracks of bed frame and comes out for feeding during the night
An 85 year old male presents with tense blisters filled with clear fluid on his thighs. You suspect Bullous pemphigoid. Which of the following histologic findings would confirm your suspicions.

A. Subepidermal blister with numerous eosinophils and granular IgA in the dermal papilla
B. Subepidermal blister with numerous eosinophils and linear IgG along the basement membrane.
C. Suprabasalar blister with linear IgG along the basement membrane.
D. Suprabasalar blister with net-like IgG in an intracellular location.
Module 6: Blistering Disorders

- Antibodies to structural components of the epidermis.
  - Bullous Pemphigoid
  - Pemphigus Vulgaris
  - Dermatitis Herpetiformis
- Blisters from other causes
  - Porphyria Cutanea Tarda
  - Epidermolysis Bullosa
Module 6: Blistering Disorders

• Vesicles or bulla at any level of epidermis
• Direct immunofluorescence (most common) or indirect immunofluorescence frequently necessary for diagnosis.
• Diagnosis depends on assessment of three features:
  1. Anatomic level of split
  2. Underlying mechanism responsible for split
  3. Nature of inflammatory infiltrate
Module 6: Blistering Disorders

- **Direct immunofluorescence (DIF)**
  Demonstrates presence of autoantibodies in the epidermis of patient skin biopsy
  - IgG, IgA, IgM, C3 most commonly used
- **Indirect immunofluorescence (IIF)**
  May demonstrate binding of circulating antibodies to basement membrane zone
Module 6: Blistering Disorders

- **Bullous Pemphigoid:**
  - Older individuals
  - **Tense** bullae
  - Inner aspects of thighs, flexor surfaces of forearms, axillae, groin, and lower abdomen
  - Subepidermal blister with eosinophils.
  - IgG antibodies to hemidesmosomes where bullous pemphigoid antigen resides.
    - BPAG1: 230-kD
    - BPAG2: 180-kD = collagen XVIII
Module 6: Blistering Disorders

- **Pemphigus Vulgaris**
- Most common type of pemphigus
- Superficial vesicles and bullae that rupture easily, leaving shallow, crusted erosions
- Acantholysis results in suprabasalar clefting = tombstoning.
  - Dissolution due to IgG antibodies against desmogleins
  - Net-like IgG and C3 on direct immunofluorescence.
Module 6: Blistering Disorders

• **Dermatitis Herpetiformis**

• Pruritic papules / vesicles on erythematous base

• Associated w/ celiac disease, both the vesicular dermatitis and the enteropathy respond to a gluten-free diet
  • Antibodies to gliadin

• Granular IgA deposits on direct immunofluorescence.
Module 6: Blistering Disorders

- Epidermolysis Bullosa
  - Inherited defects in structural proteins of the epidermis and basement membrane resulting in subepidermal blister
  - Simplex type: defects in keratin 5&14
  - Junctional type: blisters at the level of the lamina lucida
  - Scarring dystrophic type: beneath the lamina densa at the anchoring fibrils due to defects in collagen VII
Module 6: Blistering Disorders

- Porphyria cutanea tarda:
  - Disturbances in porphyrin metabolism (pigments in hemoglobin)
  - Inherited or secondary to drugs
  - Cutaneous manifestations: vesicles on sun exposed skin
  - Histopathology: Subepidermal blister with thickening of the blood vessel of the superficial dermis.
A man is caught in a house fire trying to save his dog. He has flame burns over 20% of his body surface area. On exam the burns extend into the dermis but do not involve the deep tissues. This is most consistent with what degree of burn

A. 1\textsuperscript{st} degree
B. 2\textsuperscript{nd} degree
C. 3\textsuperscript{rd} degree
D. 4\textsuperscript{th} degree
Module 7: Skin Trauma

- Burns
- Frostbite
- Decubitus / pressure ulcers
Module 7: Skin Trauma

• Burns:

• Types of Burns
  • Damage due to exposure of the skin to chemicals, friction, electricity, radiation, and heat / flame
<table>
<thead>
<tr>
<th>Degree</th>
<th>Layers involved</th>
<th>Appearance</th>
<th>Pain</th>
<th>Healing</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>First degree</td>
<td>Epidermis</td>
<td>Redness</td>
<td>Yes</td>
<td>&lt; 1 week</td>
<td>Increased risk of skin cancer</td>
</tr>
<tr>
<td>Second Degree (superficial partial thickness)</td>
<td>Superficial/papillary dermis</td>
<td>Red with blisters. Blanches</td>
<td>Yes</td>
<td>2-3 weeks</td>
<td>Local infection</td>
</tr>
<tr>
<td>Second Degree (deep partial thickness)</td>
<td>Extends to reticular dermis</td>
<td>Red/white bloody</td>
<td>Yes</td>
<td>Weeks or may progress</td>
<td>Scarring</td>
</tr>
<tr>
<td>Third degree (full thickness)</td>
<td>Entire dermis</td>
<td>White / brown</td>
<td>No</td>
<td>Requires excisions</td>
<td>Scarring, contracture, amputation</td>
</tr>
<tr>
<td>Fourth Degree</td>
<td>Subcutis and underlying bone/muscle</td>
<td>Black; charred with eschar</td>
<td>No</td>
<td>Requires excisions</td>
<td>Amputation, impairment, gangrene, death.</td>
</tr>
</tbody>
</table>
Module 7: Skin Trauma

- Frostbite
  - Exposure to temperatures < 32 degrees F results in vasoconstriction of peripheral vessels to shunt blood to core
  - Lack of blood (oxygen and nutrient) supply results in tissue damage in extremities
Module 7: Skin Trauma

- **Frostbite**
  - 1\textsuperscript{st} degree = frost nip. Only affects the surface of the skin
    - Symptoms include itching and pain, usually resolves
  - 2\textsuperscript{nd} degree: results in blisters
    - Area often permanently insensitive
  - 3\textsuperscript{rd} and 4\textsuperscript{th}: Involves dermis, muscles, tendons. Hard and waxy
    - Use of area lost (maybe permanently)
    - Infection and amputation a concern
Decubitus / Pressure Ulcers

- AKA “bed sores”
- Due to pressure or friction
- Similar progression as burns
- Prevention with frequent position changes (2 hours), padding, and good nutrition and hygiene
Module 7: Skin Trauma

- Decubitus / Pressure Ulcers
  - Range from mild erythema to deep open wound extending into bone and even internal organs
    - Stage I: Erythema which resolves with relief of pressure
    - Stage II: Blistering of skin involving superficial areas of skin (epidermis)
    - Stage III: Extends into dermis. Infection a concern.
    - Stage IV: involves underlying muscle, tendons, or bone
    - Stage V: involves bone and / or organs
  - Treatment involves keeping area clean and removing necrotic (dead) tissue and antibiotics if infected