

Common skin infections

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- **Bacterial:**

Impetigo, Erysipelas, Cellulitis, Furuncle, Carbuncle, Folliculitis, Ecthyma, Ecthyma gangrenosum, Erythrasma, SSSS

- **Viral:**

Warts, Molluscum contagiosum, Herpes simplex, Varicella, Herpes zoster

- **Fungal:**

Candida, Dermatophyte inf., Pityriasis versicolor

- **Protozoal:** Leishmaniasis

- **Infestations:**

Scabies, Pediculosis capitis

Why does skin get infected?

- There are multiple types of organisms which are normally present on the skin as normal flora such as : Staphylococcus epidermidis and yeasts
- The presence of bacteria does not automatically lead to a skin infection
- What is the difference between colonisation and infections???

Colonisation: Bacteria are present, but causing no harm

Infection: Bacteria are present and causing harm.

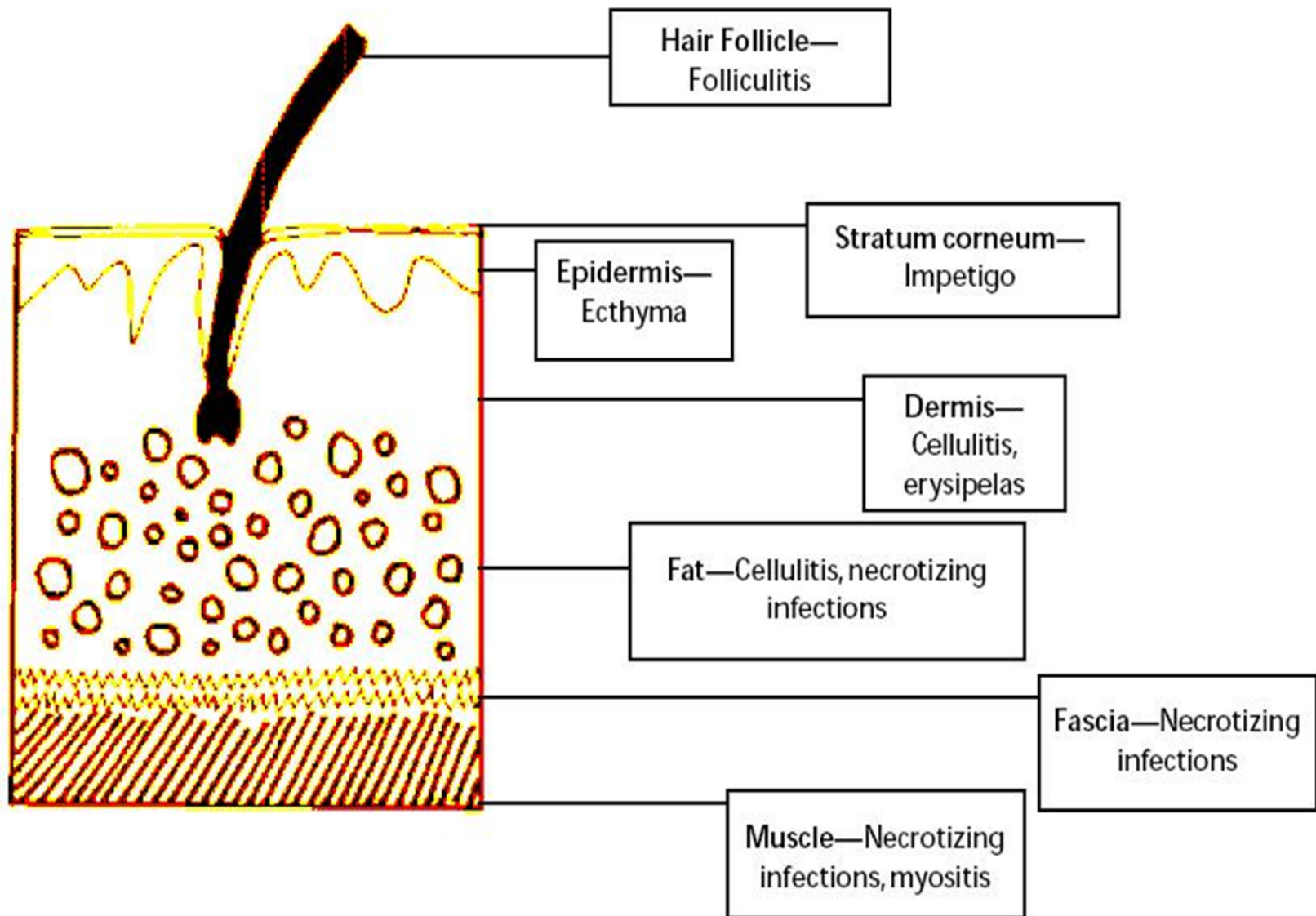
- A break in the epidermal integrity can allow organisms to enter and become pathogenic. This can occur as a result of trauma, ulceration, skin disease such as eczema



Bacterial skin infections



Figure 1. Skin And Soft Tissue Anatomy And Infection Types.



Impetigo

- Acute superficial cutaneous Infection
- 2 forms (bullous 30%, non-bullous 70%)
- The causative organism is usually *Staphylococcus Aureus* (>90% cases), but less often can be *strept. Pyogenes* (gp A beta-hemolytic streptococci).
- Very contagious, auto-inoculation is common.
- Can cause systemic symptoms (fever, LAD)
- Children, Adult



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IMPETIGO (non-bullous)

Begins as tiny erythematous papule/pustule.

Develops thin roofed vesicle/bulla with rim of erythema

Vesicle ruptures, releases thin yellow fluid which cause golden-yellow crust

Predisposing factors:-

Warm, humid climate, poor hygiene, trauma, insect bites and immunosuppression.



Bullous Impetigo

- Due to staph aureus.
Phage group 2 toxins
which cleave desmoglein-
1
- Newborn and in renal
patients
- Face, hands , diaper area
- Bullae(flaccid) on grossly
normal skin



Impetigo (Non-Bullous)



Non-bullous impetigo is a superficial skin infection that manifests as clusters of vesicles or pustules that rupture and develop a honey-colored crust.

Impetigo (Bullous)



Bullous impetigo is a superficial skin infection that manifests as clusters of vesicles or pustules that enlarge rapidly to form bullae. The bullae burst and expose larger bases, which become covered with honey-colored varnish or crust.

Prognosis:

Scarring is unusual, but postinflammatory hyperpigmentation or hypopigmentation

Complications:

Post-strept. GN

⦿ Nephrogenic syndrome associated strains
49,55,57, 59

⦿ Rare

Investigation

Swab : Gram stain and culture show gram positive cocci

Treatment

Remove crust

Localized:-Topical Abx (bactroban, bacitracin)

- compresses to loosen crusts.

- intra-nasal mupirocin for periodic decolonization in carriers/
recurrent impetigo(BIDx5d/month)

Severe or widespread: use systemic antibiotics (must cover both staph/GABHS) such as:

- Penicillinase- resistant PCN, 1st/2nd generation cephalosporin,
clindamycin,or erythromycin (esp, if penicillin allergic)

Folliculitis

- Inflammation of the hair follicle.
- Presents as itchy or tender papules and pustules at the follicular openings.
- Complications include abscess formation and cavernous sinus thrombosis if upper lip, nose or eye affected.



Folliculitis

Superficial infection of follicle ostium

Most common cause is Staph Aureus.

Other organisms to consider include:

- Gram negative bacteria – usually in patients with acne who are on broad spectrum antibiotics
- Pseudomonas (“Hot tub folliculitis”)
- Yeasts (candida and pityrosporum)
- Demodex

Folliculitis

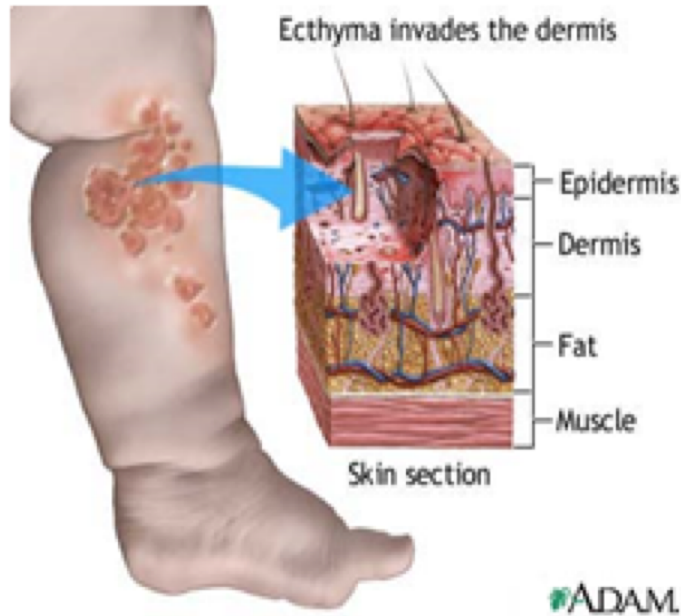
- Topical antiseptics such as Chlorhexidine
- Topical antibiotics, such as Fusidic acid, Mupirocin or clindamycin.
- More resistant cases may need oral antibiotics (similar to impetigo).
- Hot tub folliculitis (*P. aeruginosa*)– usually self limited (ciprofloxacin in severe cases).
- Gram negative – trimethoprim , isotretinoin

Furunculosis (boils) and carbuncles

- Deeper Staphylococcal abscess of the hair follicle
- Coalescence of boils leads to the formation of a carbuncle
- presents as red tender nodule
- Treatment is with systemic antibiotics and may need incision and drainage.
- Consider looking for underlying causes, such as diabetes



Ecthyma and Ecthyma gangrenosum



Ecthyma is a skin infection similar to impetigo, but more deeply invasive. Usually caused by a **streptococcus infection**, ecthyma goes through the outer layer (epidermis) to the deeper layer (dermis) of skin, possibly causing scars.



Ecthyma gangrenosum is a bacterial skin infection (caused by ***Pseudomonas aeruginosa***) that usually occurs in immunocompromised individuals

Erysipelas

- Superficial infection with marked lymphatics involvement.
- Sharply demarcated unilateral, red edematous.
- infants, young children, & elderly patients (**most commonly..**)
- Face, leg
- **Beta hemolytic gp A Strept.**
- Risk factor ; Minor abrasion / lymphatic dysfunction - sup. Lymph vessels
- Might be associated with Leukocytosis & fever



Erysipelas

Management :

Smear for gram stain and culture (fluid, blood)

Cold compressor

Oral antibiotics or I.V. for severe infection

Oral penicillin or Erythromycin

Cellulitis

- Deeper involvement of the SC
- Acute, raised, hot, tender, erythematous(**leg**)
- Strept. Pyogenes, **staph.aureus**
- Cutaneous abrasion or ulcer
- Palpable, tender LN
- Fever, leucocytosis
- **Risk factors:**
- DM, HTN, obesity, immunocompromised patients , vascular insufficiency .
- Complicated by lymphedema if recurrent

Cellulitis



Cellulitis

Management :

Swab + blood culture

Semisynthetic Penicillin or Erythromycin if allergic.

If severe or in immunocompromised , may require admission for IV antibiotics.

After the acute attack has settled, especially in recurrent episodes – consider the underlying cause

CELLULITIS vs ERYSIPELAS



- Dermal and SC
- Ill-defined
- Indolent
- Less systemic symptoms



- Dermal lymphatics
- Well-demarcated
- Acute onset
- More systemic symptoms

Erythrasma

- Colonisation of axillae or groin with *Corynebacterium Minutissimum*.

- Gram positive bacilli

- Red, brown

- asymptomatic, flexoral

- Management :

Swab

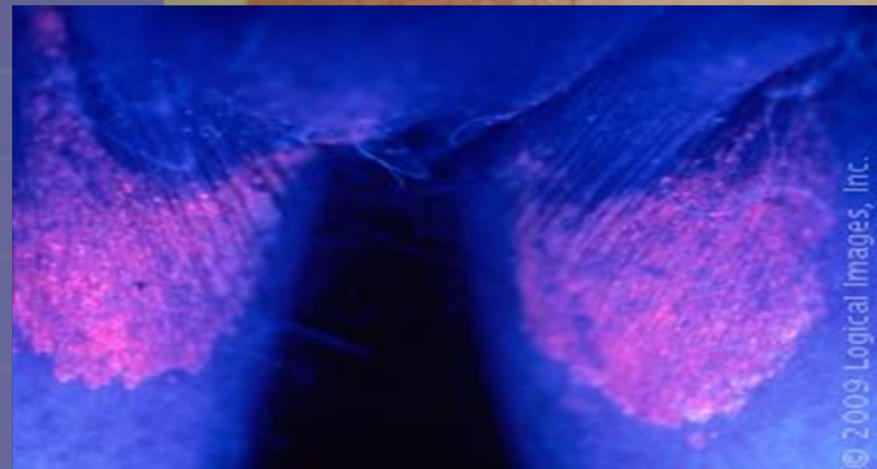
wood's lamp: coral-red fluorescence

Topical: - erythromycin

- fucidic acid

- clindamycin

Oral erythromycin X 7 d



Staphylococcal Scalded Skin Syndrome (SSSS)

- A superficial blistering condition caused by exfoliative toxins of certain strains of Staph Aureus
- Usually in children less than 5 years old
- Characterized by blistering and desquamation of the skin and Nikolsky's sign (shearing of the epidermis with gentle pressure), even in areas that are not obviously affected



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SSSS

- Begins with a prodrom of pyrexia and malaise, often with signs and symptoms of an upper respiratory tract infection
- discrete erythematous areas then develop and rapidly enlarge and coalesce, leading to generalized erythema - often worse in the flexures with sparing of the mucous membranes
- large, fragile bullae form in the erythematous areas and then rupture



SSSS

- Complications include hypothermia, dehydration and secondary infection.
- **Treatment:** ABC, admit for IV antibiotics and fluids, may need referral to burn center



Viral



Warts

- Caused by Human papilloma virus HPV (DNA virus)
- More than 100 subtypes of HPV have been identified with different epithelial preferences (skin vs mucosa) and different clinical patterns .
- **Clinical variants :**
 - common warts (verruca vulgaris)
 - plantar warts (verruca plantaris)
 - plane (flat) warts(verruca plana)
 - Genital warts (condyloma acuminata and bowenoid papulosis)
 - Mucosal warts

Common warts (verruca vulgaris)

- Caused by HPV type 1,2,3,4,7,54
- Affects the Hands , could be periungual
- Common in Children
- Presents as hyperkeratotic (verrucous) papules
- Koebner phenomenon d.t autoinoculation



Plane warts (Verruca plana)

- Affects Face, back of hands
- Caused by HPV type 3,10, 28
- Flat skin colored papules

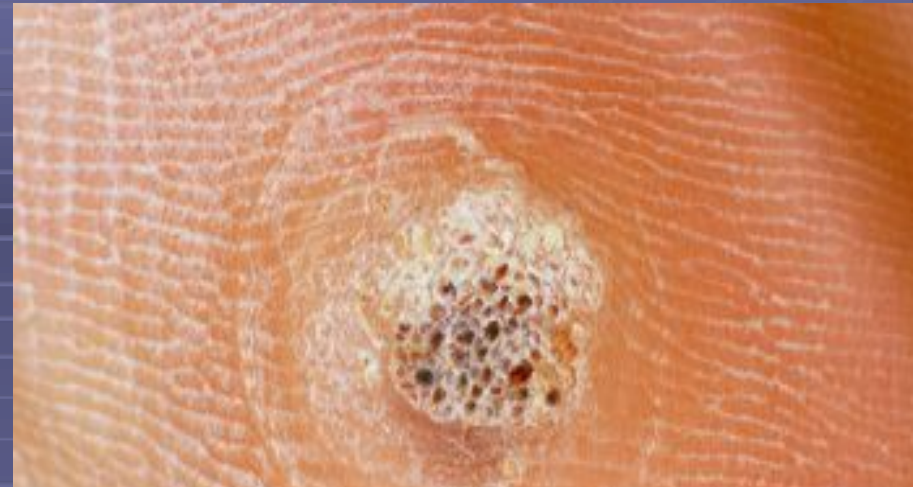


Plantar warts (verruca plantaris)

-affects the soles

-caused by HPV type 1,2,4, 60,63

- To be differentiated from plantar corn



Management

- Involute spontaneously
- Cryotherapy
- Topical keratolytics : Salicylic acid , TCA
- Electrocautery, curettage
- Laser
- -Topical retinoids in flat warts
- Others : bleomycin , cantharidin
- PPD , Candidal antigen



Genital wart:

- Most common STD
- Condylomata acuminata
- Cauliflower like
- Penile, vulvar skin, mm, perianal area
- Sexual partner
- Child--- ?sexual abuse
- Caused by HPV type 6,11, 16, 18
- Oncogenic strains :16, 18
- Vaccination

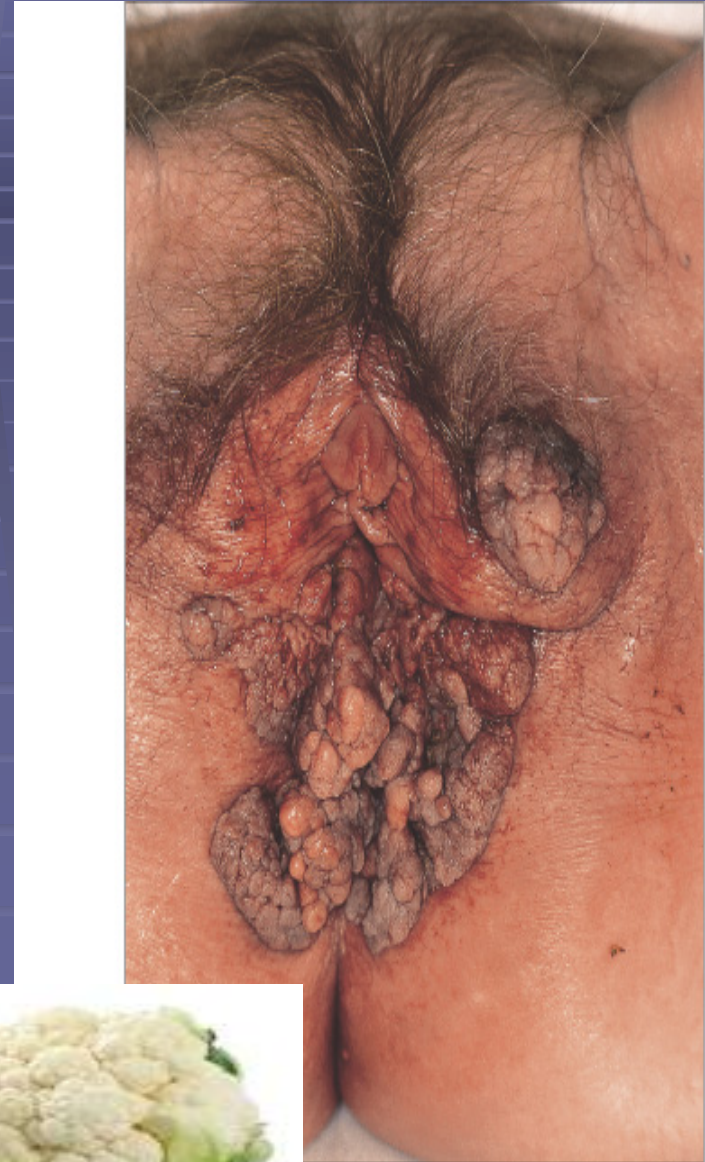


Table 79.2 Management of anogenital warts with grading of recommendations. Grading of recommendation: (1), based on randomized, controlled trials of good quality and consistency; (2), well-conducted clinical studies but no randomized clinical trials⁶⁷.

MANAGEMENT OF ANOGENITAL WARTS WITH GRADING OF RECOMMENDATIONS

Cytotoxic agent

- Podophyllotoxin 0.5% solution, 0.15% cream (1)

Physical destruction

- Cryotherapy (liquid nitrogen, cryoprobe) (1)
- Trichloroacetic acid (TCA) 80–90% solution (1)
- Electrosurgery (1)
- Scissors excision (1)
- Laser vaporization (2)

Immunomodulatory

- Imiquimod 5% cream (1)

Table 79.1 Clinical manifestations and associated HPV types.

CLINICAL MANIFESTATIONS AND ASSOCIATED HPV TYPES		
	Frequently detected	Less frequently detected
Skin lesions		
<ul style="list-style-type: none"> • Common, palmar, plantar, myrmecial and mosaic warts • Flat warts • Butcher's warts • Digital squamous cell carcinoma and Bowen's disease • Epidermodysplasia verruciformis (EV) • EV – squamous cell carcinoma 	<p>1, 2, 4</p> <p>3, 10</p> <p>7, 2</p> <p>16</p> <p>3, 5, 8</p> <p>5</p>	<p>26, 27, 29, 41, 57, 60, 63, 65</p> <p>28, 29</p> <p>1, 3, 4, 10, 28</p> <p>34, 35</p> <p>9, 12, 14, 15, 17, 19–25, 36–38, 46, 47, 49, 50, etc.</p> <p>8, 14, 17, 20, 47</p>
Mucosal lesions		
<ul style="list-style-type: none"> • Condylomata acuminata • High-grade intraepithelial neoplasias (including cervical condylomata plana, bowenoid papulosis, erythroplasia of Queyrat) • Buschke–Löwenstein tumor • Recurrent respiratory papillomatosis, conjunctival papillomas • Heck's disease (focal epithelial hyperplasia) 	<p>6, 11</p> <p>16</p> <p>6, 11</p> <p>6, 11</p> <p>13, 32</p>	<p>42–44, 54, 55, 70</p> <p>18, 31, 33–35, 39, 40, 51–59, 61, 62</p>

Molluscum contagiosum



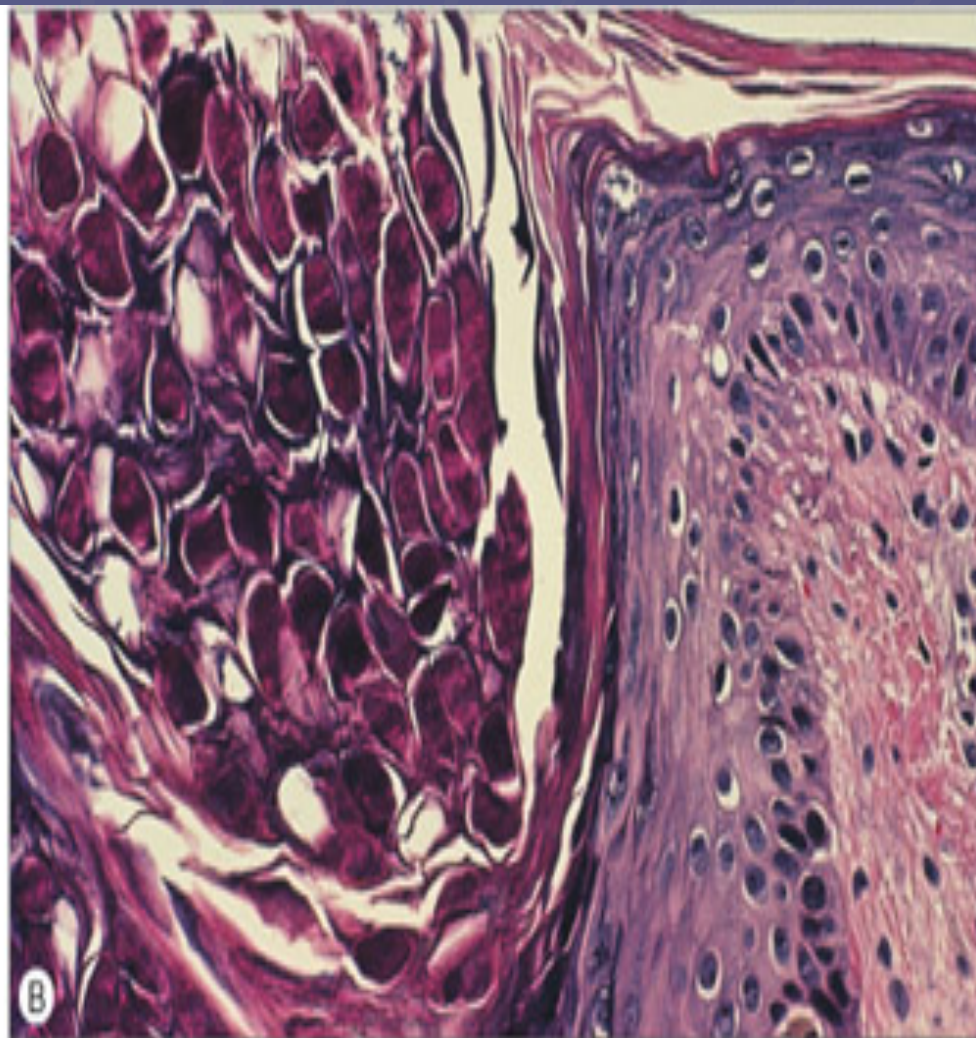
Molluscum contagiosum

- Caused by Poxvirus (DNA virus)
- Common Children by contact
- In adults : immunosuppression , STD
- Face, neck
- Skin colored papules with Central punctum (umbilication)
- Koebner phenomenon d.t autoinoculation
- H/P: Hunderson-patterson bodies

Management :

Involute spontaneously
curettage, cryotherapy

Other : Salicylic acid

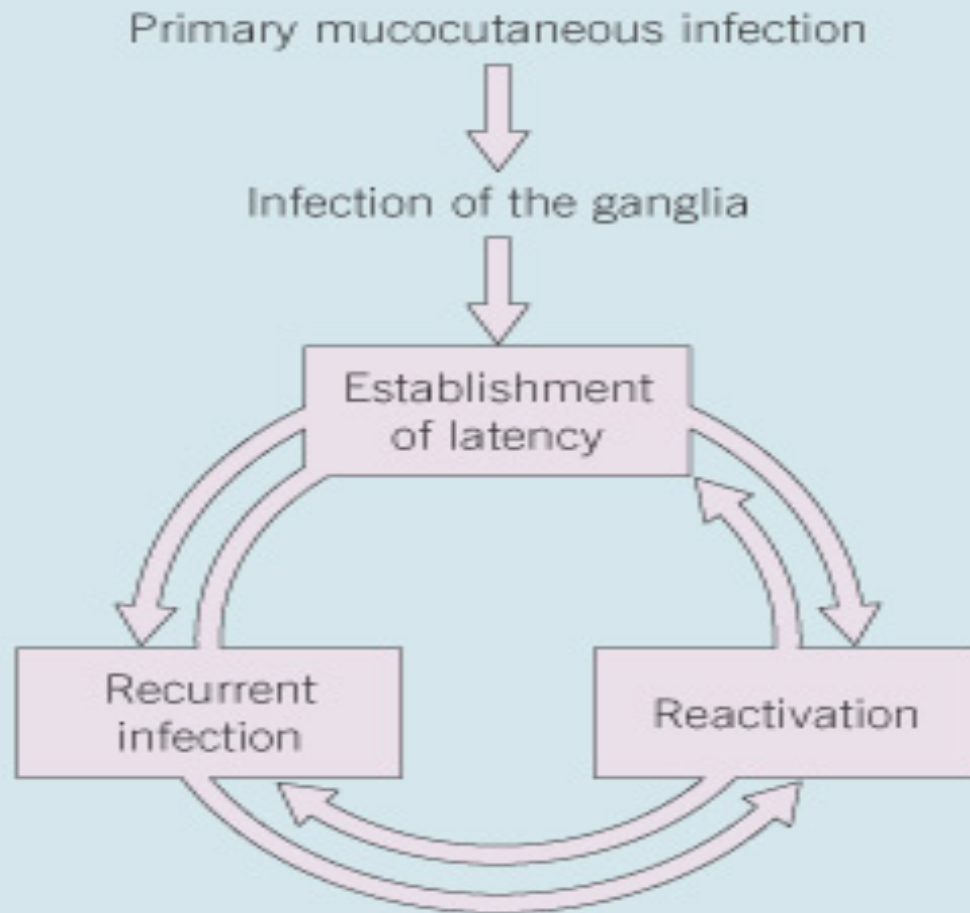


Herpes simplex

- Group of small blister
- HSV-1(H. labialis)
- HSV-2(genital herpes)
- Herpetic whitlow
- Eczema herpeticum:

Infection with HSV in patients with previous skin disease (eg: atopic dermatitis, pemphigus, Darrier disaese)

BASIC PATHOGENESIS OF HUMAN HERPESVIRUS INFECTIONS





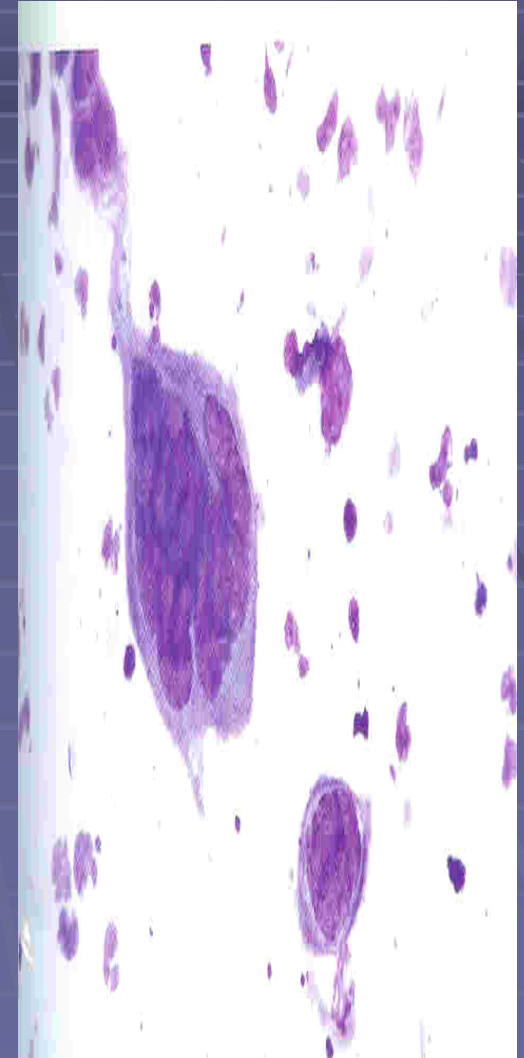


Diagnosis :

- Tzanck Smear
- Direct fluorescent antibody(DFA)
- Viral culture- most definitive

Treatment :

Oral / IV acyclovir for
Genital, Recurrent, immune
suppressed, neonatal, Eczema
Herpeticum .



Varicella (chicken pox)



Varicella (chicken pox)

- initial infection with varicella zoster virus (VZV)
- Incubation period : 2 weeks
- Prodrom of respiratory coryza followed by disseminated red macules with central vesicles or pustules .
- The whole illness : 3 weeks
- The patient contagious 5 days before and 5 days after skin eruption
- Children
- Adults : immunosuppression , pneumonia
- **Diagnosis** : tzank smear , DFA , Viral culture
- **Treatment** : symptomatic for itching , Systemic antiviral in immunocompromised patients

Varicella (chicken pox)

- Vaccination
- Varicella in pregnancy :
 - 1st and 2nd trimester : risk of varicella embryopathy syndrome , abortion
 - 3rd trimester congenital varicella

pregnant patients with varicella should receive VZ immunoglobulin and antiviral therapy

Herpes zoster

- Following initial varicella infection VZV remain latent in sensory ganglia when reactivated it will affect skin dermatome supplied by this ganglia
- Adult , immunocompromised
- Prodromal pain—dermatomal (grouped blisters and vesicles on background of erythema)—post-herpetic neuralgia

Diagnosis :

Tzanck Smear

Direct fluorescent antibody(DFA)

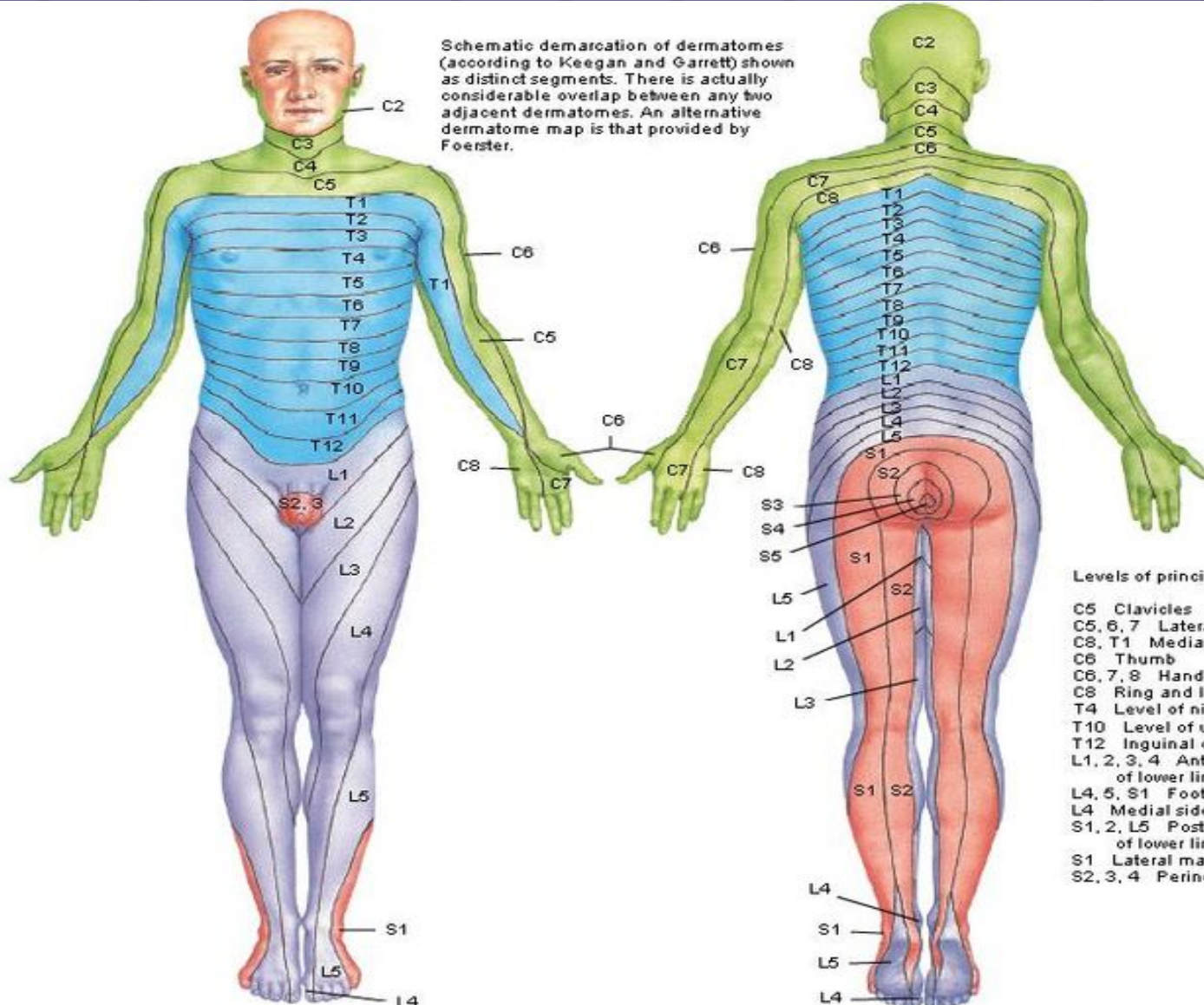
Viral culture

Treatment :

Analgesia,

ANTIVIRAL : immune-suppressed, wide spread

Schematic demarcation of dermatomes (according to Keegan and Garrett) shown as distinct segments. There is actually considerable overlap between any two adjacent dermatomes. An alternative dermatome map is that provided by Foerster.



Levels of principal dermatomes

- C5 Clavicles
- C5, 6, 7 Lateral parts of upper limbs
- C8, T1 Medial sides of upper limbs
- C6 Thumb
- C6, 7, 8 Hand
- C8 Ring and little fingers
- T4 Level of nipples
- T10 Level of umbilicus
- T12 Inguinal or groin regions
- L1, 2, 3, 4 Anterior and inner surfaces of lower limbs
- L4, 5, S1 Foot
- L4 Medial side of great toe
- S1, 2, L5 Posterior and outer surfaces of lower limbs
- S1 Lateral margin of foot and little toe
- S2, 3, 4 Perineum

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Fungal

Superficial mycosis

Table 77.2 Superficial mycoses of the skin.

SUPERFICIAL MYCOSES OF THE SKIN

	Cutaneous disorder	Pathogen(s)
Minimal, if any, inflammation	Pityriasis (tinea) versicolor Tinea nigra Black piedra White piedra	<i>Malassezia furfur</i> (<i>Pityrosporum ovale</i>) <i>Exophiala werneckii</i> <i>Piedraia hortae</i> <i>Trichosporon beigeli</i>
Inflammatory response common	Tinea capitis, barbae, faciei, corporis, cruris, manuum, pedis Cutaneous candidiasis	<i>Trichophyton</i> , <i>Microsporum</i> , <i>Epidermophyton</i> spp. <i>Candida albicans</i>

Candidiasis

physiological (old age , neonate and pregnancy)

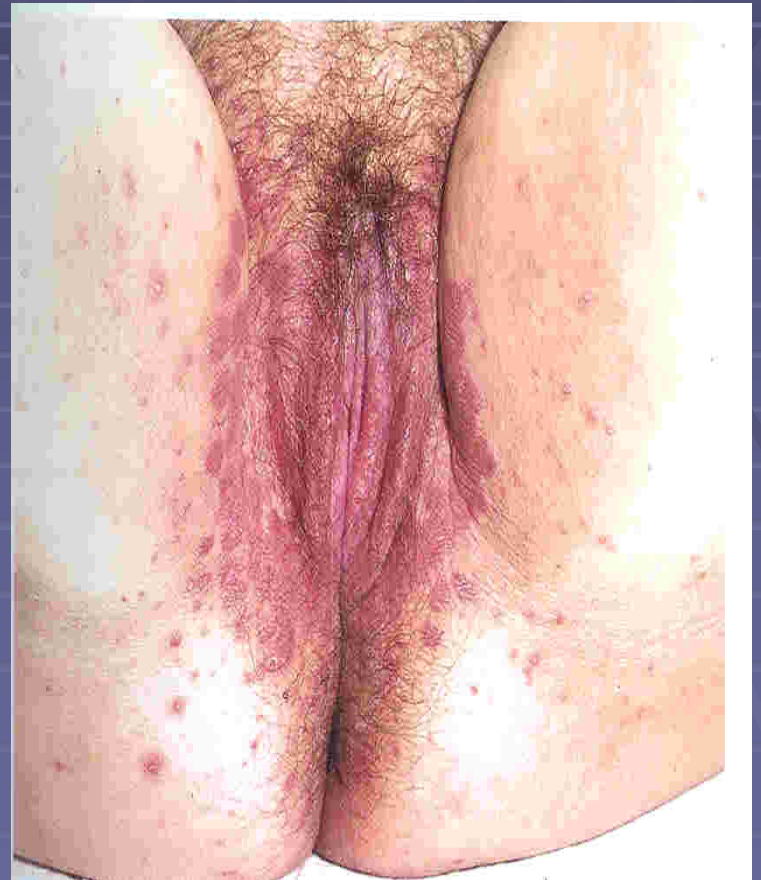
pathological (DM, HIV and organ transplant, on immunosuppression)

Iatrogenic (long course of Antibiotics)

Candidiasis

Candida albican (normal commensal of GIT)

- Napkin candidosis & Intertrigo (satellite lesions)
- Paronychia
- MM--oral, urogenital and oesophagus.
- Vulvovaginitis---irritation, discharge
- *Candida* folliculitis
- Generalized Systemic infection
- Chronic mucocutaneous candidiasis





Candidiasis

Management :

Swab and KOH

Alter moist warm environment

Nystatin-containing cream

Imidazole (Daktarin, canastein)

Oral antifungal (itraconazole): immune suppressed,
persistent infection

A 22 year old lady returns from a holiday in Spain after She has a tan. She noticed hypopigmented lesions on her chest and back.



pityriasis versicolor

- Malassezia furfur (hyphae)
- Pityrosporum orbiculare (yeast)
- Upper Trunk
- Asymptomatic
- Yellowish- brown or hypopigmented scaly patches
- Once the rash has gone, it leaves hypopigmented macules which takes time to tan



pityriasis versicolor

Investigation :

Wood's lamp (coppery-orange fluorescence)

Scraping for KOH and fungal c/s

Skin biopsy for PAS stain

Treatment :

Topical imidazole (nizoral) creams or shampoo

Oral Antifungal (azoles)

Recurrence

Dermatophyte infections

3 main genera:

Trichophyton

Microsporum

Epidermophyton

Invade the keratin of the stratum corneum

Can be:

Anthropophilic – contracted from humans

Zoophilic – contracted from animals

Geographic – contracted from soil

Clinical appearance depends on the organism involved, the site and the host reaction

Dermatophyte infection

- Skin
- Hair
- Nails

Tinea pedis

1. Erosive interdigitalis (web space),
athletes
2. Hyperkeratotic type (*T. rubrum*)
3. Inflammatory type (*T. mentagrophyte*)



Table 77.9 The four major types of 'tinea pedis' (including dematiaceous and dermatomycoses).
 *Because of the thickness of stratum corneum on plantar surfaces and the inability of *T. rubrum* to elicit an immune response sufficient to eliminate the fungus¹⁶. ‡Often *Pseudomonas*, *Proteus* or *Staphylococcus aureus*. †Allergic reaction to fungal elements presenting as a dyshidrotic-like eruption on the fingers and palms (culture-negative for fungus). CMI, cell-mediated immunity.

THE FOUR MAJOR TYPES OF 'TINEA PEDIS' (INCLUDING DEMATIACEOUS AND DERMATOMYCOSES)

Type	Causative organism	Clinical features	Treatment considerations
Moccasin	<i>T. rubrum</i> E. floccosum	Diffuse hyperkeratosis, erythema, scaling, and fissures on one or both plantar surfaces; frequently chronic and difficult to cure*; may be associated with fungal CMI deficiency	Topical antifungal plus product with urea or lactic acid; may also require oral antifungal therapy
	<i>S. hyalinum</i> <i>S. dimidiatum</i>		
Interdigital	<i>T. mentagrophytes</i> (var. interdigitale) <i>T. rubrum</i> <i>E. floccosum</i>	Most common type; erythema, scaling, fissures, and maceration occur in the web spaces; the two lateral web spaces are most commonly affected; associated with the 'dermatophytosis complex' (fungal infection followed by bacterial invasion‡); pruritus common; may extend to dorsum and sole of foot	Topical antifungal; may require topical or oral antibiotic if superimposed bacterial infection
	S. hyalinum <i>S. dimidiatum</i> <i>Candida</i> spp.		
Inflammatory (vesicular)	<i>T. mentagrophytes</i> (var. <i>mentagrophytes</i>)	Vesicles and bullae on the medial foot; associated with the dermatophytid reaction†	Topical antifungal usually sufficient
Ulcerative	<i>T. rubrum</i> <i>T. mentagrophytes</i> <i>E. floccosum</i>	Typically an exacerbation of interdigital tinea pedis; ulcers and erosions in the web spaces; commonly secondarily infected with bacteria; seen in immunocompromised and diabetic patients	Topical antifungal; may require topical or oral antibiotics if secondary bacterial infection

 Dermatophytes  Non-dermatophytes

Tinea unguum

Different presentation including:

- White Onychomycosis
 - Onycholysis
 - Distal or proximal Sub-ungual hyperkeratosis
 - Thickening of nail plate
- Caused by *T. rubrum*, *T. mentagrophytes*



Tinea manuum

diffuse dry scaling over the palm



12 YRS old boy with 2 weeks hx
of very itchy skin lesions ?



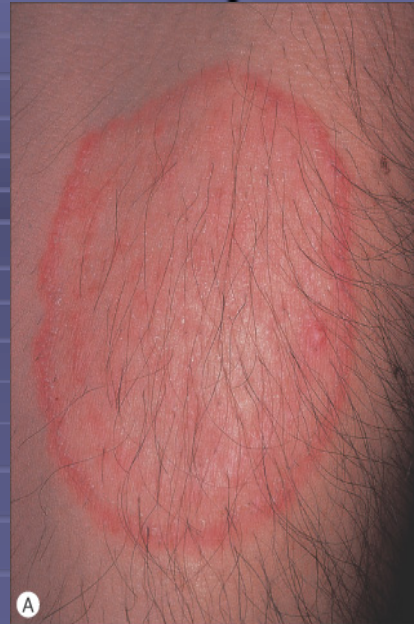
Tinea corporis

- 2 Types :

1. Hyperkeratotic type (*T. rubrum*) well-demarcated annular red hyperkeratotic plaque with central clearing (Ring worm)

2. Inflammatory type (*T. mentagrophyte*) well-demarcated edematous red plaque with superimposed pustules

- Trunk



T. cruris



Tinea capitis

Well circumscribed pruritic scaling area of hair loss

- Black dot endothrix (T. tonsurans)
- Ectothrix (M. canis , M. audouinii),
- Kerion (T. verrucosum)
- Favus (T. schoenleinii)



Tinea Capitis – commonest in children.
Presents as non-itchy patches of hair loss
with broken hairs.

KERION





Mx:

Education

Scraping, hair plug, nail clippings---
KOH and culture

Wood's light ----

Topical (terbinafine, daktarin)

Oral (Griseofulvin, terbinafine,
itraconazole): extensive, Hair, nail



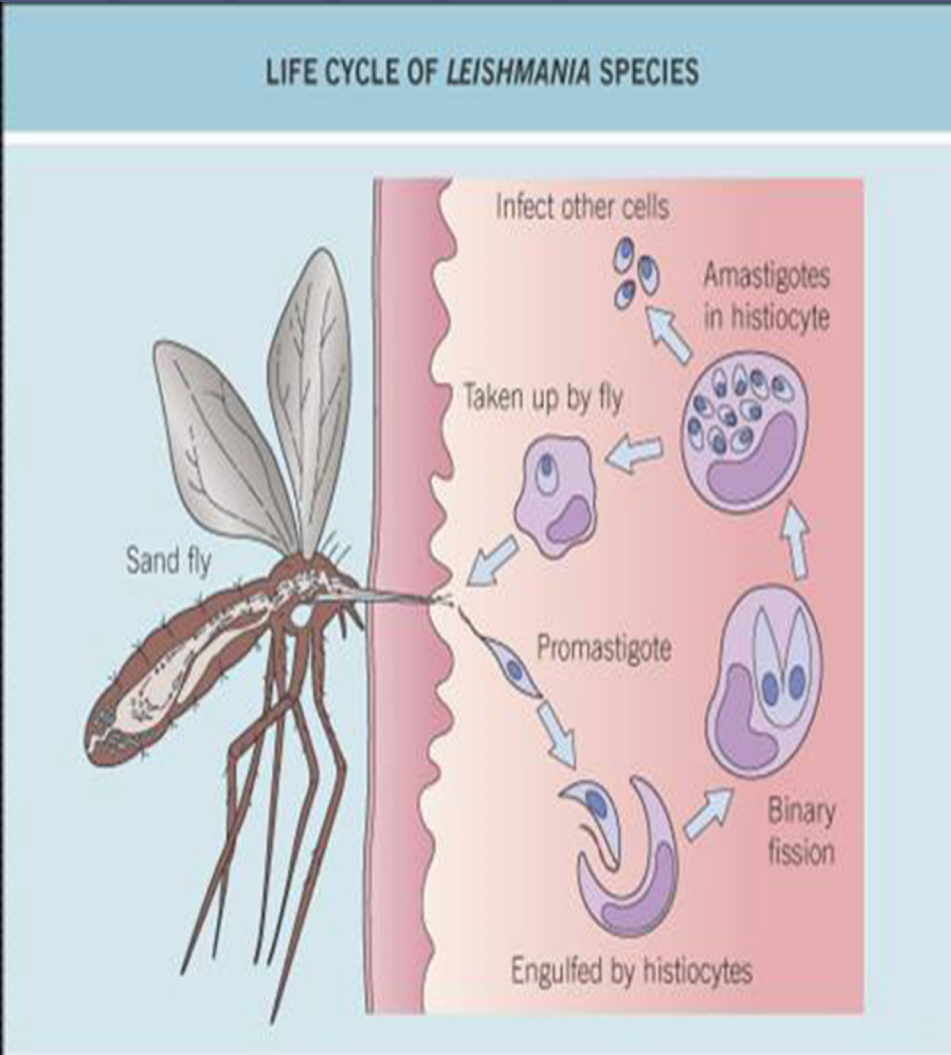
Leshmaniasis

- includes a spectrum of chronic infections in humans and several animal species.
- There are three major clinical patterns:
 - (1) **Cutaneous**, (localised or diffuse)
 - (2) **Mucocutaneous**, which affects both the skin and mucosal surfaces
 - (3) **Visceral (post kala-azar)**, which affects the organs of the mononuclear phagocyte system, e.g. liver, spleen



Leshmaniasis

- Transmitted by sand fly
- *L. tropica* , *L. major*
- Sand fly (promastigote)
- Macrophage (Amastigote)
- Leshman-Donovan bodies



Leshmaniasis

- Painless papule slowly enlarge over several weeks into a nodule or plaque then become ulcerated or verrucous.
- Exposed sites such as face, neck, arms, and legs are most commonly involved

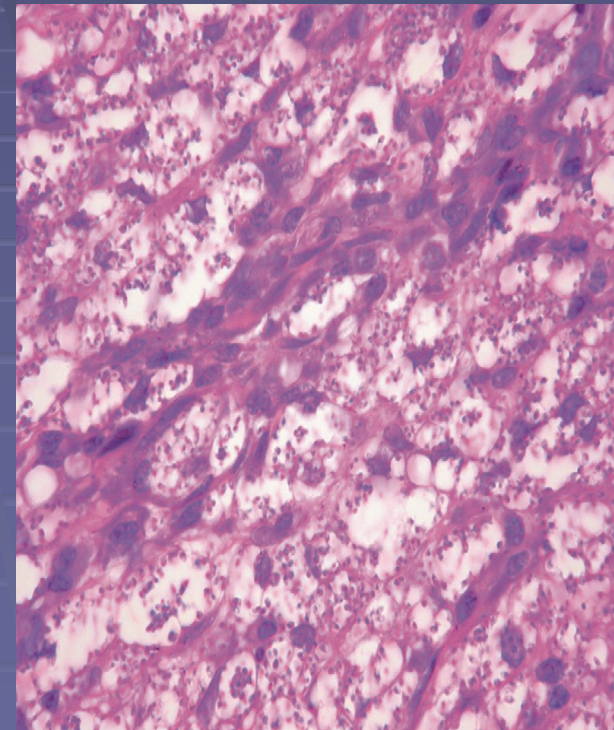


Leshmaniasis



Dx

- Confirmed by demonstrating the presence of amastigotes in dermal macrophages within skin biopsy specimens, tissue impression smears (touch preparations), and smears of dermal scrapings
- Giemsa stain
- ulcer is the location of choice for dermal scrapings, a biopsy specimen or a needle aspirate; the latter two types of samples may be used for culture and PCR
- Leishmanin test
- PCR-based methods are the most sensitive & specific diagnostic tests,



Management

- Resolve spontaneously leaving a scar
- Intralesional pentavalent antimony
- Parenteral pentavalent antimonials (Sodium stibogluconate) are the treatment of choice for cutaneous and mucocutaneous leishmaniasis.
- Liposomal amphotericin B for visceral leishmaniasis
- Topical Paromomycin sulfate
- Fluconazole or itraconazole
- Cryotherapy

Scabies

The female *Sarcoptes scabiei* var *hominis* mite lays 60-90 eggs in her 30-day lifespan, although less than 10% of the eggs result in mature mites.



Scabies

- Mite: *Sarcoptes scabiei var. hominis*
- It residue in **burrows** in the stratum corneum laying eggs then dying and the eggs will mature in 2 weeks period and the cycle repeated
- Severe itching worse after bathing and at night
- Skin lesions are secondary eczematous eruption due to immune reaction to the mite and eggs
- Sites: finger webs, flexor of the wrist, axillae, areolae, umbilicus, lower abdomen and scrotum
- Linear burrows are a **pathognomonic** sign that represent intraepidermal tunnel
- Small erythematous papules are present in association with a variable degree of excoriation Vesicles, indurated nodules or crustation .
- Might be complicated by secondary bacterial infection



Scabies



Scabies



When to suspect scabies ?

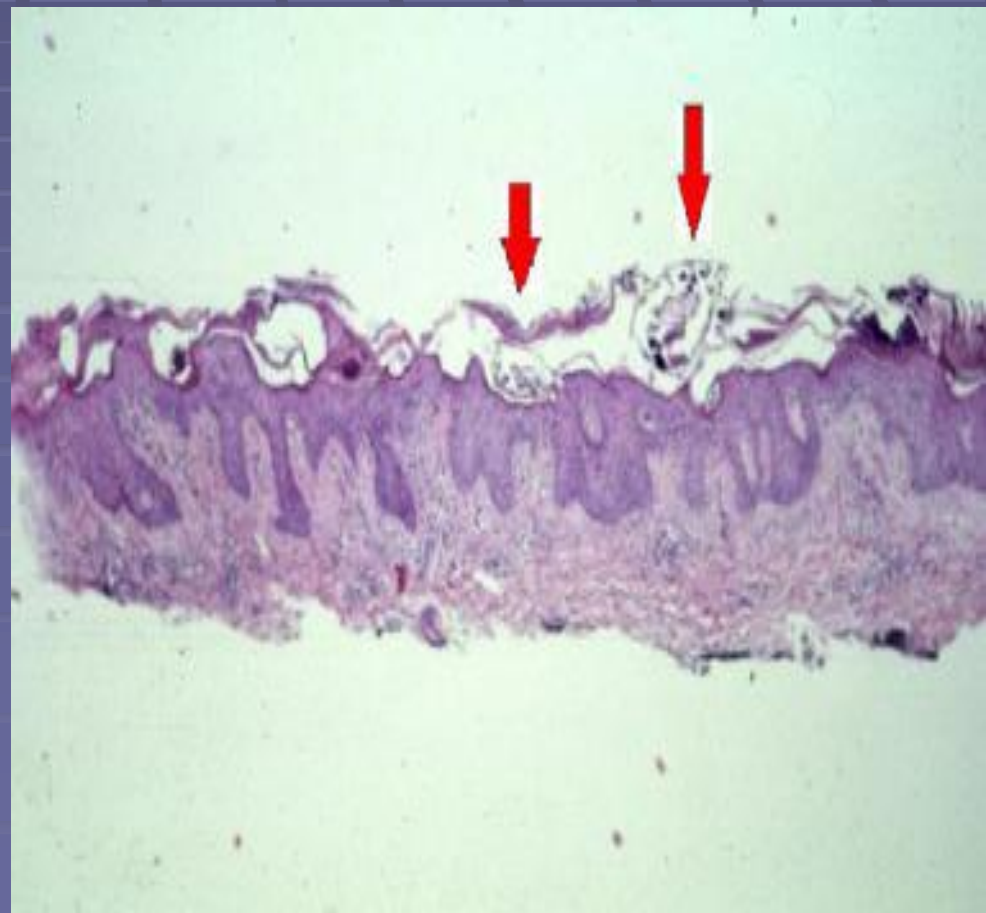
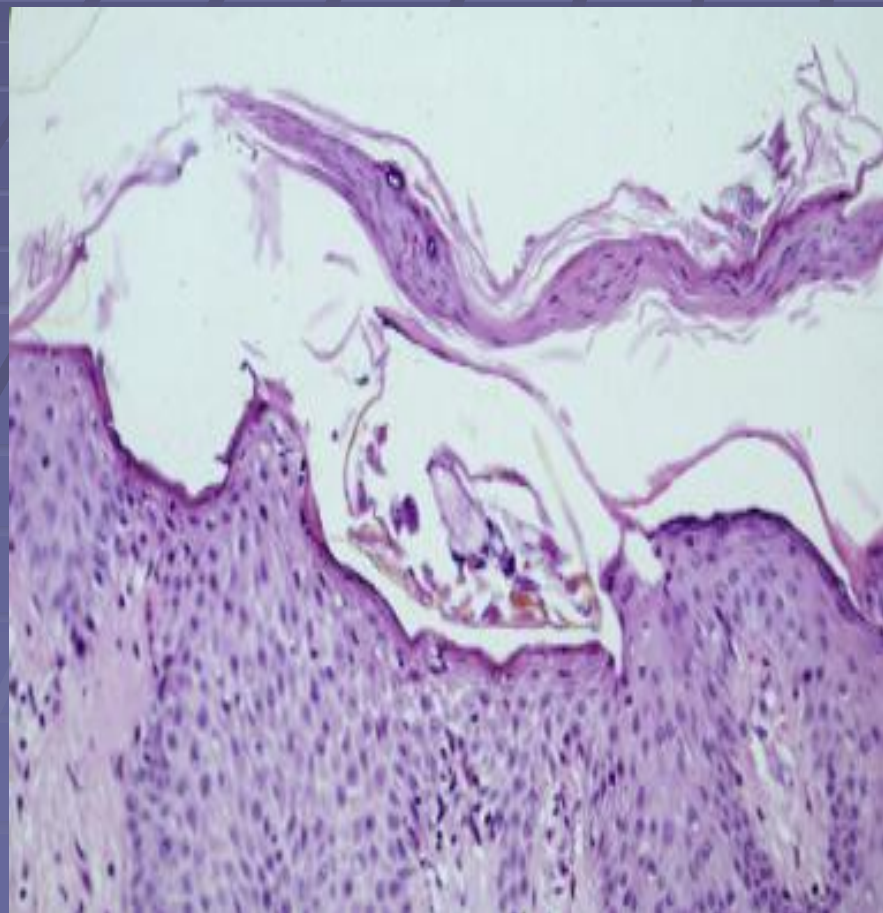
1. pruritus mainly at night
2. Other member of the family also having severe pruritus
3. Pruritus and skin eruption is more severe in the flexors

Investigation :

- India ink or gentian violet then removed by alcohol to identify the burrows
- A drop of mineral oil on the lesion then scraped away with a surgical blade
- Demonstration of the mite under the microscope



Scabies



Management

- Treatment of family members and contact even if asymptomatic!
- Washing clothing and bed linen in hot water (60 c)
- Permethrin 5% cream (standard topical scabicide)
- Lindane 1% lotion or cream (not safe in children d.t neurotoxicity)
- Crotamiton 10% cream for 5 days
- 2.5% Sulfur preparation (safe in children and pregnancy)
- Itching may persist for up to a month, even following successful treatment



Pediculosis capitis

- Common in school children
- Caused by head louse (*pediculus humanus var capitis*)
- A mature female head louse lays 3-6 eggs (nits) per day. Nits are white and less than 1 mm long. Nymphs (immature lice) hatch from the nits after 8-9 days, reach maturity in 9-12 days, and live as adults for about 30 days
- Severe itching of the scalp
- Posterior cervical LN
- secondary bacterial impetigo



Management

- Examination of other family members and treated simultaneously
- Wash all fomites (combs , hats ,scarves)in hot water (louse dies at temp. 53.5 c)
- Combing with a metal nit comb
- Pyrethrin and Permethrin lotion or cream or shampoo 1% and 5% for 10 min then rinsed off
- Malathion 0,5% lotion
- Lindane (neurotoxicity)
- Topical Ivermectin 0.5%

