FUNGAL INFECTIONS

SUPERFICIAL MYCOSES

DEEP MYCOSES

MIXED MYCOSES

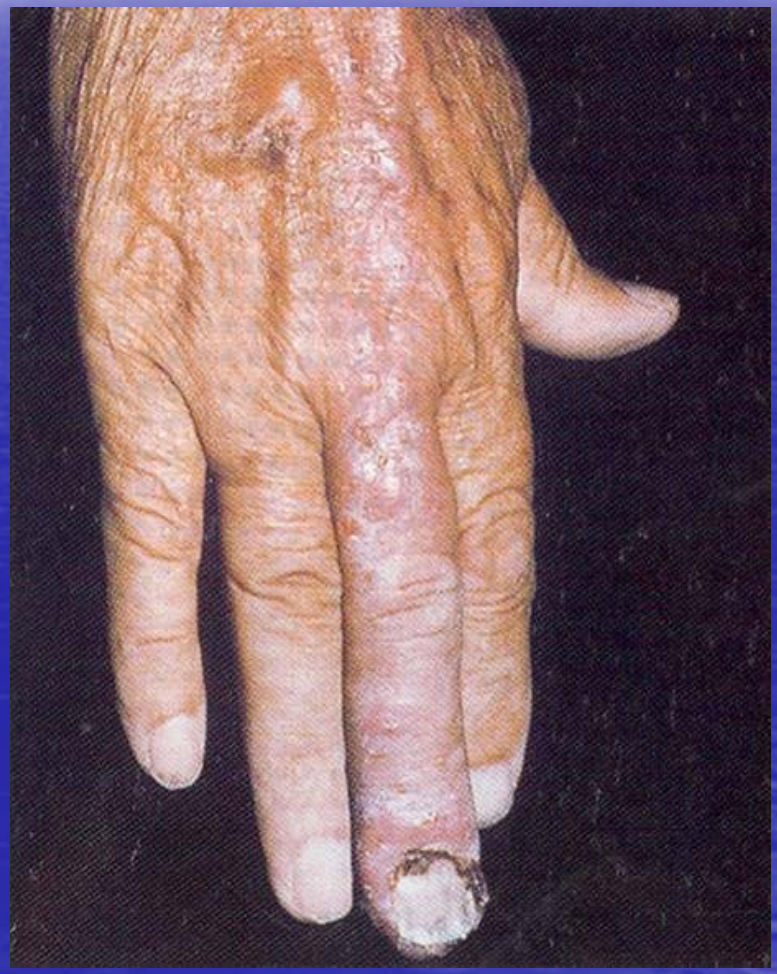
- Subcutaneous mycoses : important infections
- Mycologists and clinicians
- Common tropical subcutaneous mycoses
- Signs, symptoms, diagnostic methods, therapy
- Identify the causative agent
- Adequate treatment

Clinical classification of Mycoses

CUTANEOUS	SUBCUTANEOUS	OPPORTUNISTIC	SYSTEMIC
Superficial mycoses Tinea Piedra Candidosis	Chromoblastomycosis Sporotrichosis Mycetoma (eumycotic) Phaeohyphomycosis	Aspergillosis Candidosis Cryptococcosis Geotrichosis	Aspergillosis Blastomycosis Candidosis Coccidioidomycosis
Dermatophytosis		Zygomycosis Fusariosis Trichosporonosis	Histoplasmosis Cryptococcosis Geotrichosis Paracoccidioidomycosis Zygomycosis Fusariosis Trichosporonosis

Sporotrichosis

- Deep / subcutaneous mycosis
- *Sporothrix schenckii*
- Saprophytic , I.P. : 8-30 days
- Geographical distribution



Clinical varieties (Sporotrichosis)

Cutaneous

- Lymphangitic or lymphocutaneous
- Fixed or endemic

Systemic

Pulmonary
Renal
Bone
Joint
Meninges

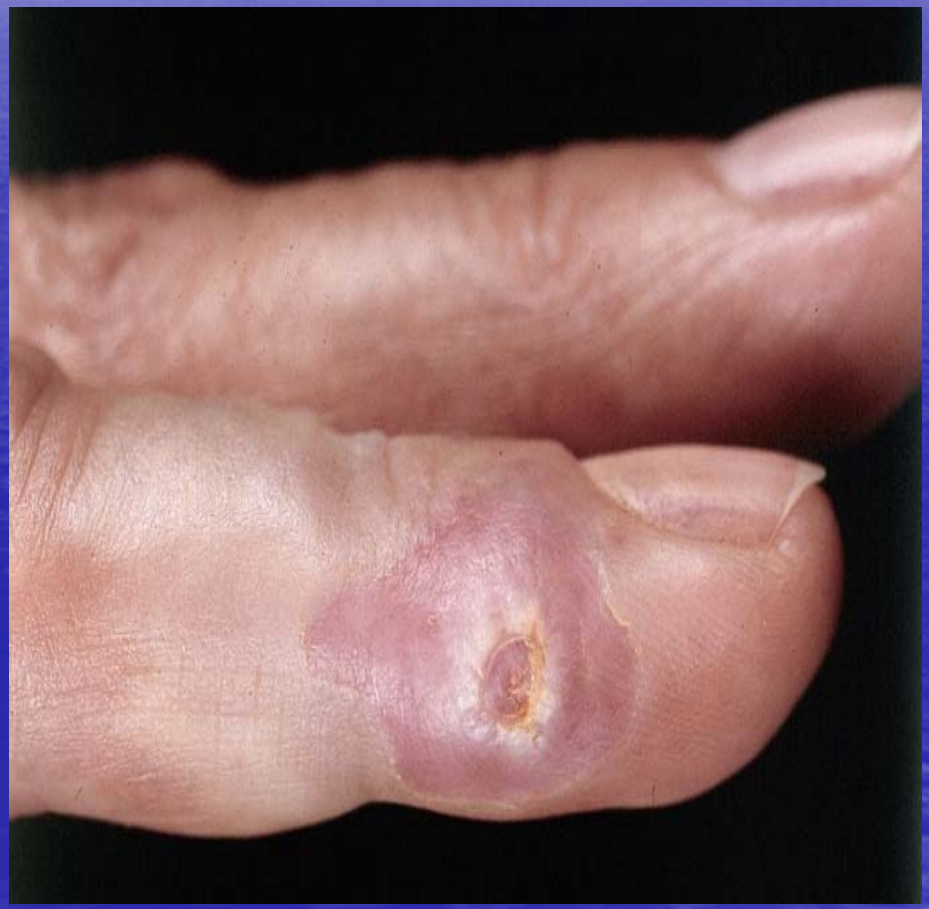
- Mycetoma like
- Cellulitic

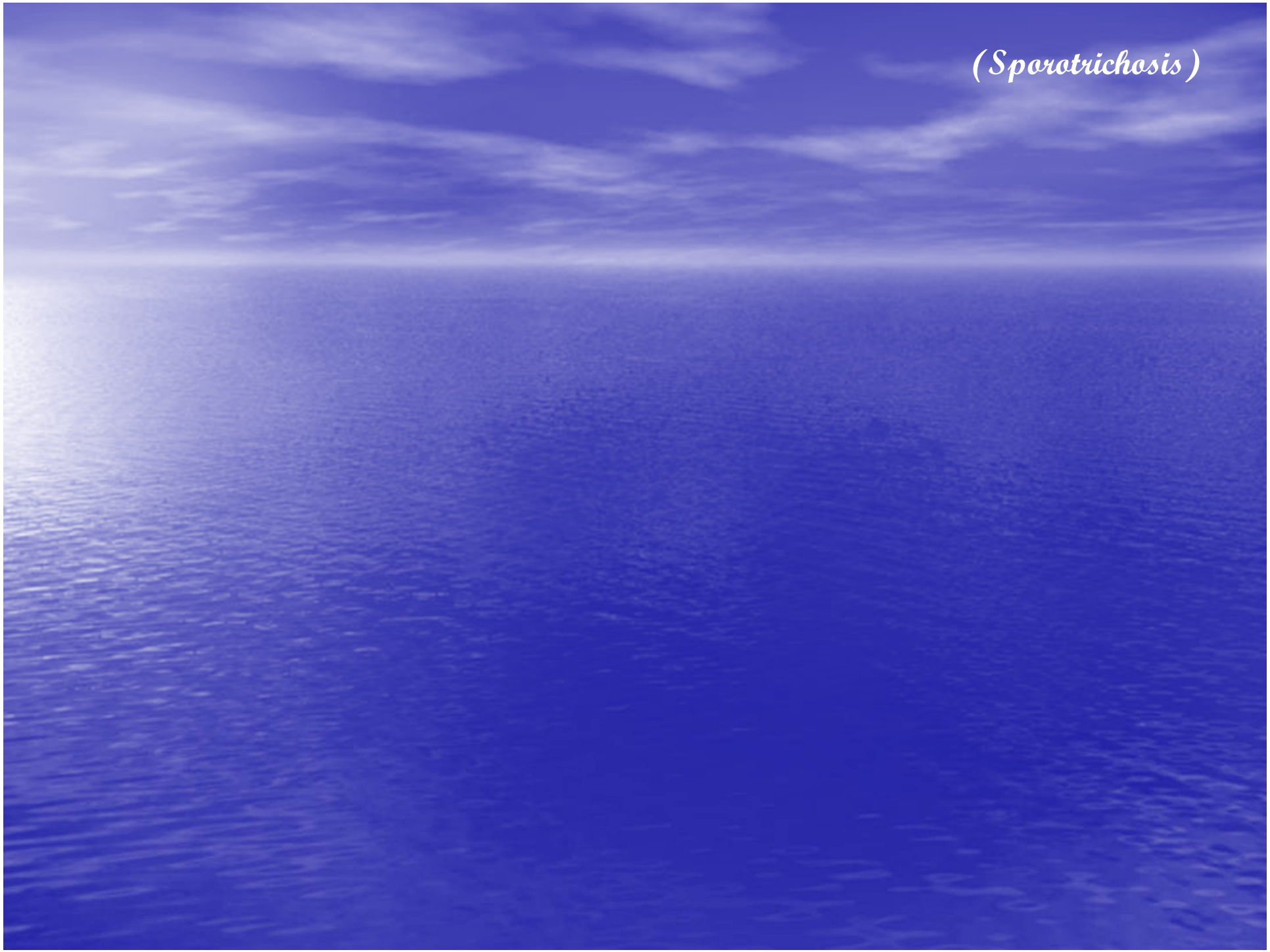
Lymphangitic form *(Sporotrichosis)*

- Commonest
- Exposed sites
- Dermal nodule

→ pustule
→ ulcer

sporotrichotic chancre

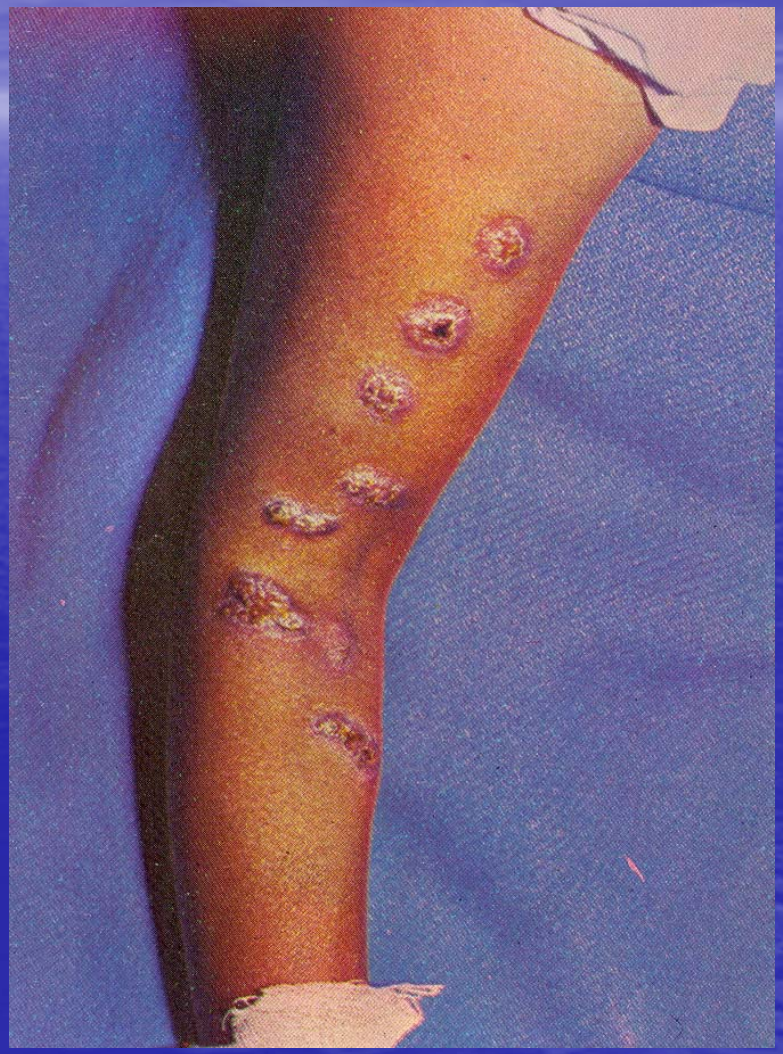



(Sporotrichosis)

- Draining lymphatic inflamed & swollen

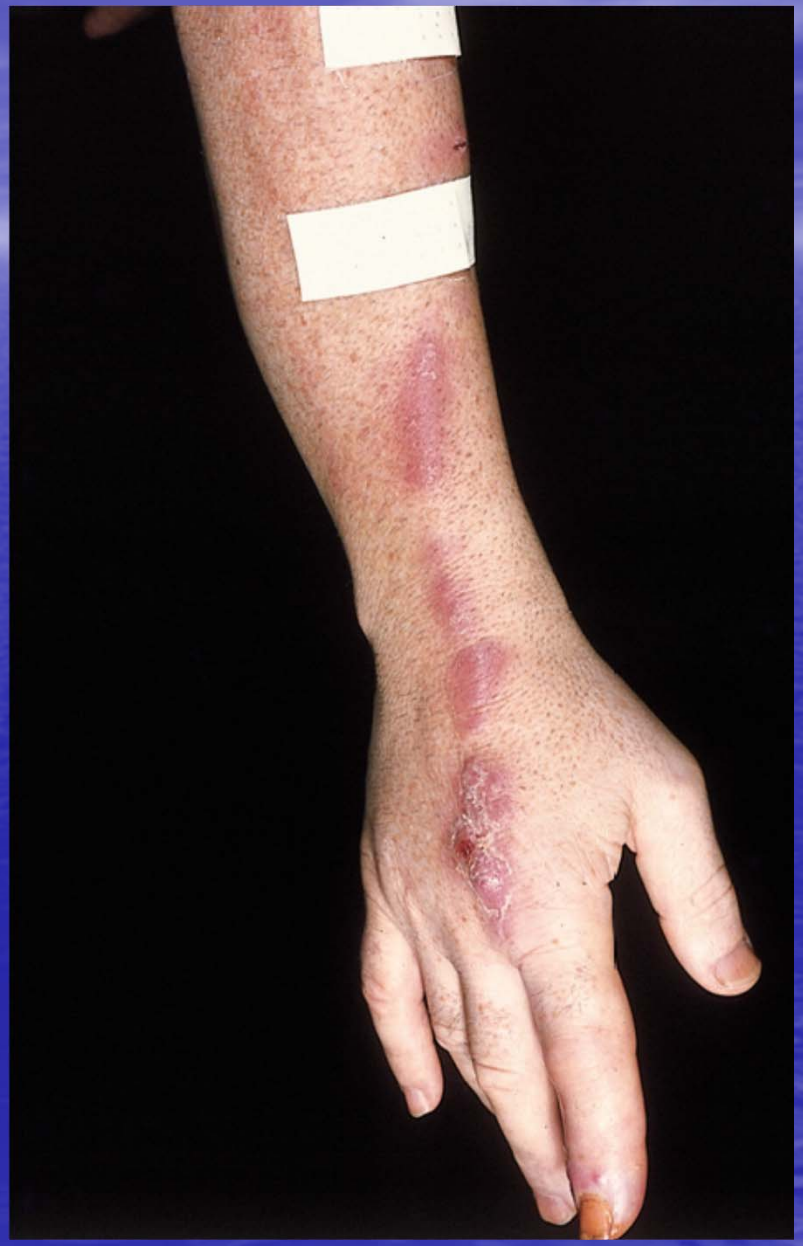
- Multiple nodules along lymphatics

(Sporotrichosis)

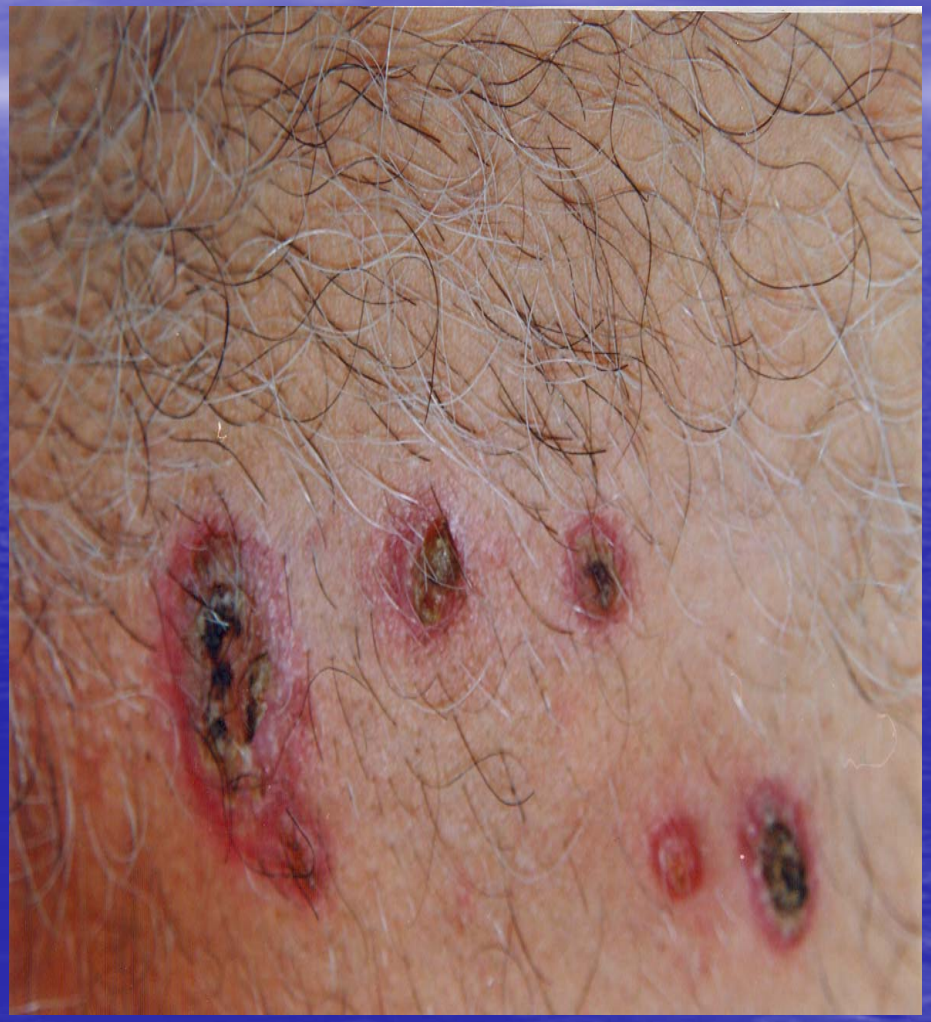


- New nodules - every few days
- Thin purulent discharge
- Chronic - regional lymph nodes swollen
  - break down
- Primary lesion may heal spontaneously
- General health
  - may not be affected

(Sporotrichosis)



(Sporotrichosis)

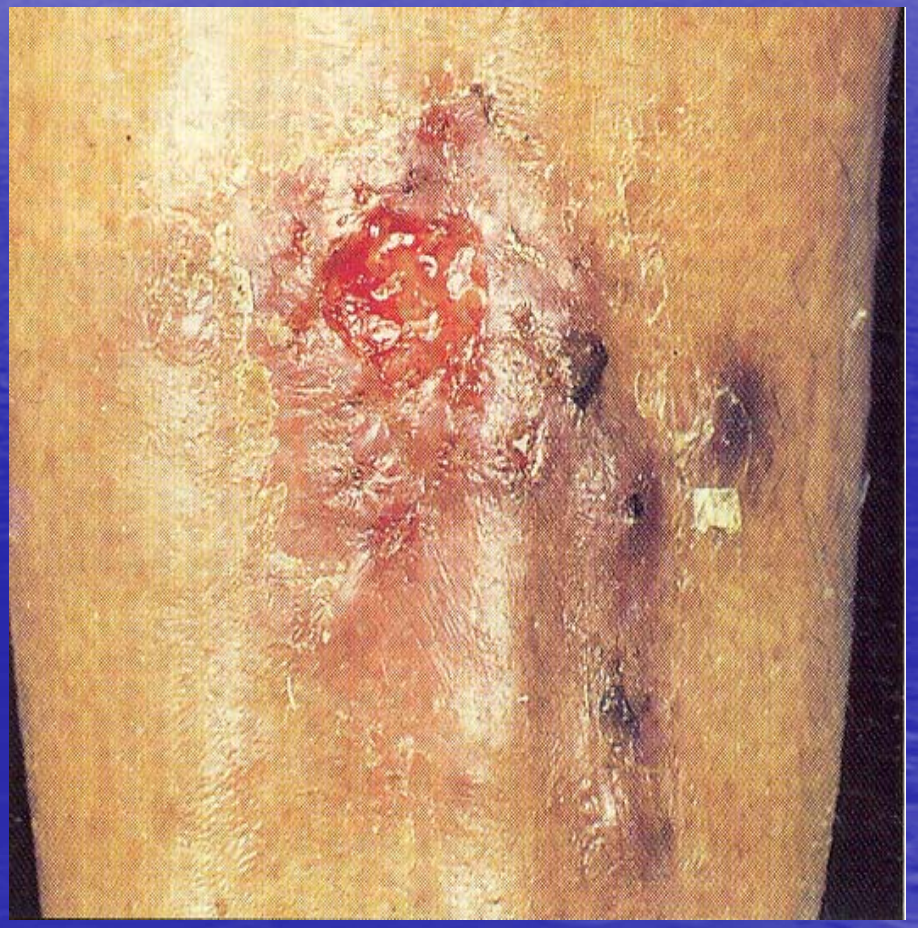


(Sporotrichosis)

Fixed / Endemic variety

(Sporotrichosis)

- Less common - 15%
- Acneiform, nodular, ulcerated, verrucous
- Infiltrated plaques, red scaly patches



Systemic form

(Sporotrichosis)

- Follows inhalation
- Develop anywhere
- Chronic lung nodules cavitation
- Widely disseminated lesions

  (kindey,joints, meninges, skin)
- Immunosuppressed patients
- if untreated - fatal

Laboratory Diagnosis *(Sporotrichosis)*

- Direct microscopy
- Fluorescent antibody
- HPE-multiple tissue sections
- Culture : Pus/biopsy
- PCR

(Sporotrichosis)

Treatment *(Sporotrichosis)*

- Potassium iodide: saturated solution
  - 100 mg / 100 ml
  - 5 drops thrice
  - increase till side effects

- Itraconazole : 100-200mg

Treatment *(Sporotrichosis)*

- Fluconazole
- Ketaconazole
- Terbinafine : 400 mg 250 – 500 mg
- Amphotericin B
- Hyperthermia : ° - C
- Pregnancy – azoles : not indicated
- AIDS - Amphotericin B + Itraconazole : 42

Chromoblastomycosis

- Verrucous dermatitis
- Subcutaneous mycosis
- Slow growing lesions

- Multiple etiologies : dematiaceous

  - *Fonsacaea pedrosoi*
  - *Phialopora verrucosa*
  - *F. compacta*
  - *Wangiella dermatitidis*
  - *Cladosporium carrionii*

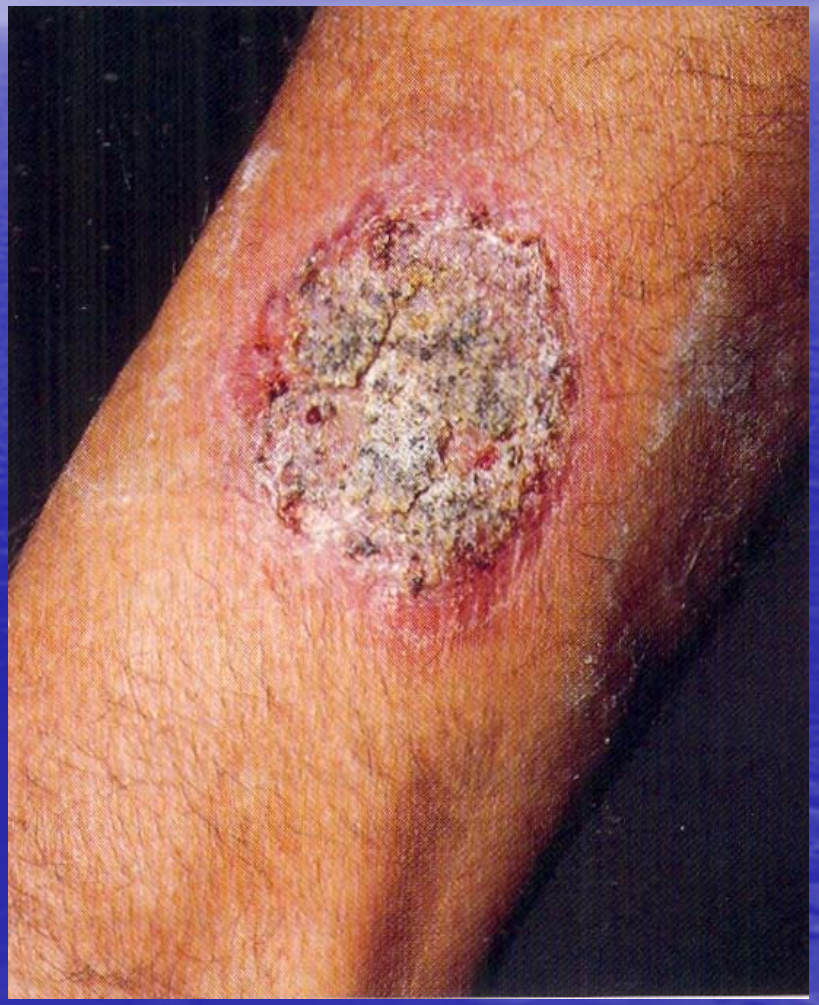
Clinical features

- Exposed sites

(feet, legs, arms, face,neck)

- Warty papule
- Warty plaque
- Ulcer

Chromoblastomycosis



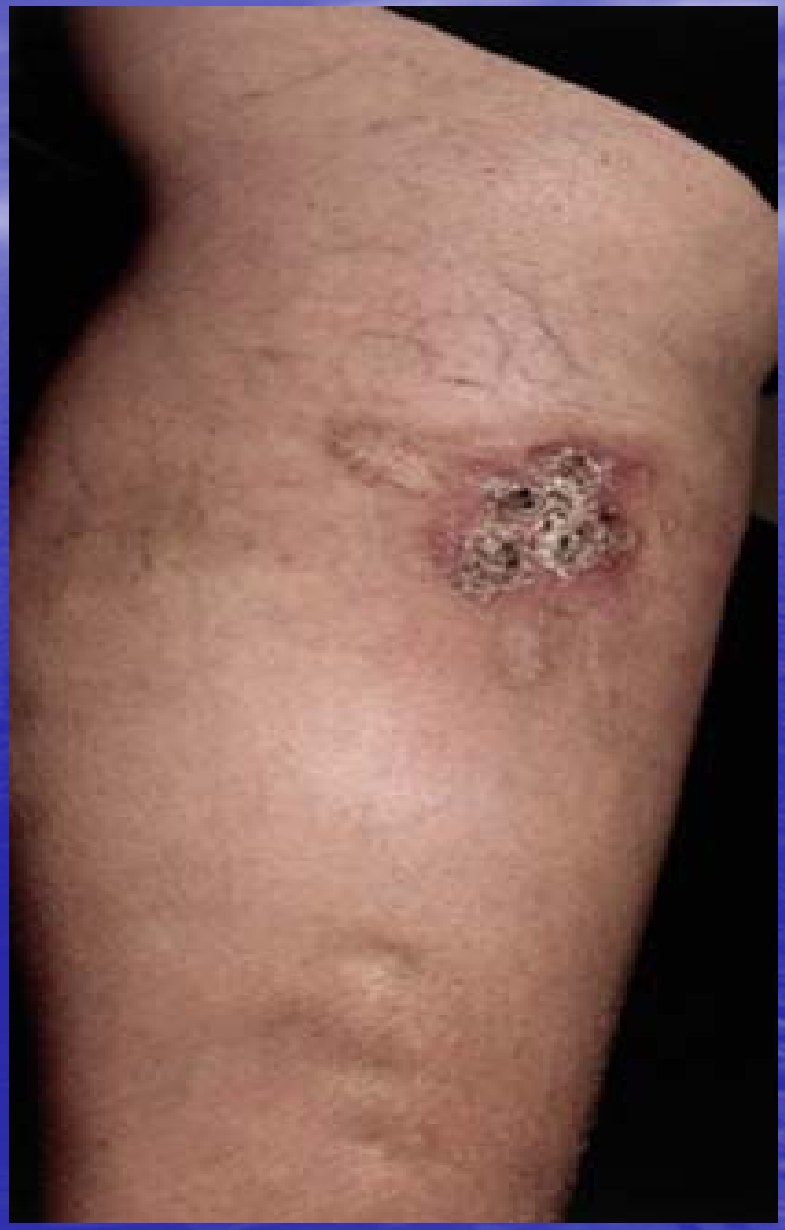
Chromoblastomycosis

Chromoblastomycosis

-Secondary ulceration

- Secondary infection

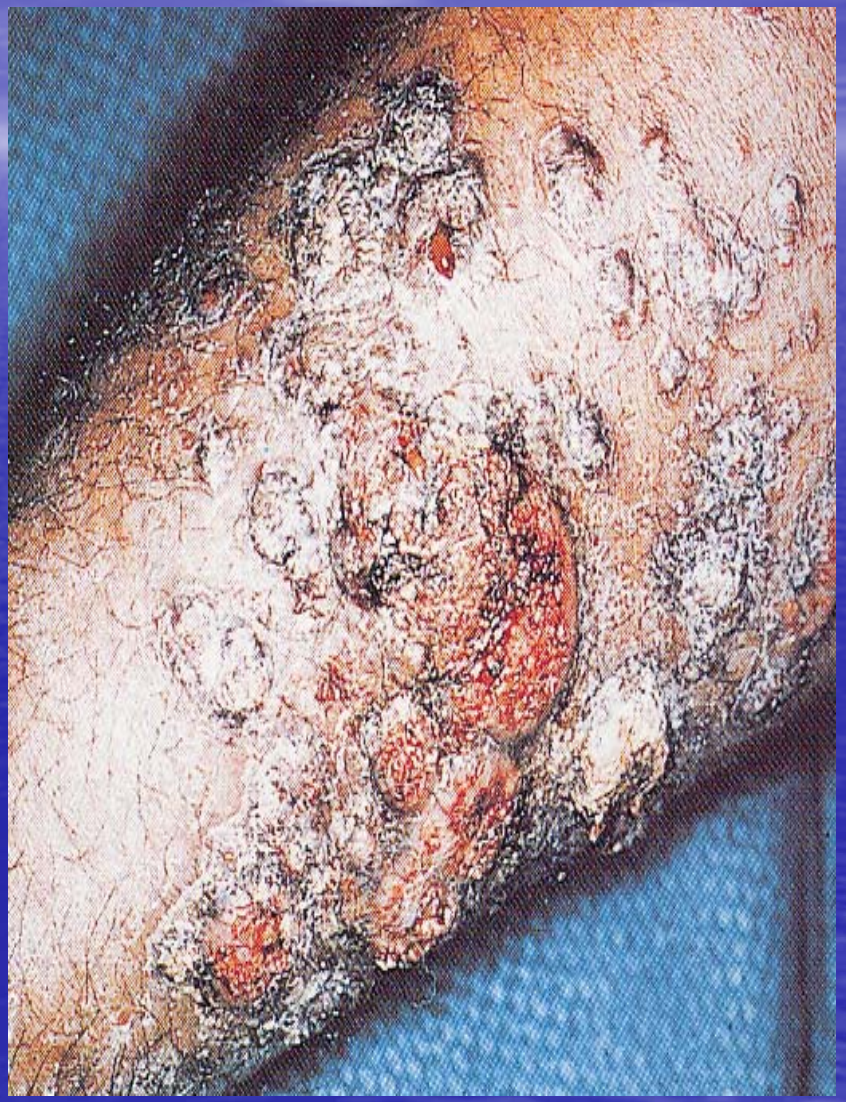
- Itching & pain



After months/years

- Large hyperkeratotic masses
- Scratching- satellite lesions
  - lymphatic spread
  - haematogenous spread - rare

Chromoblastomycosis



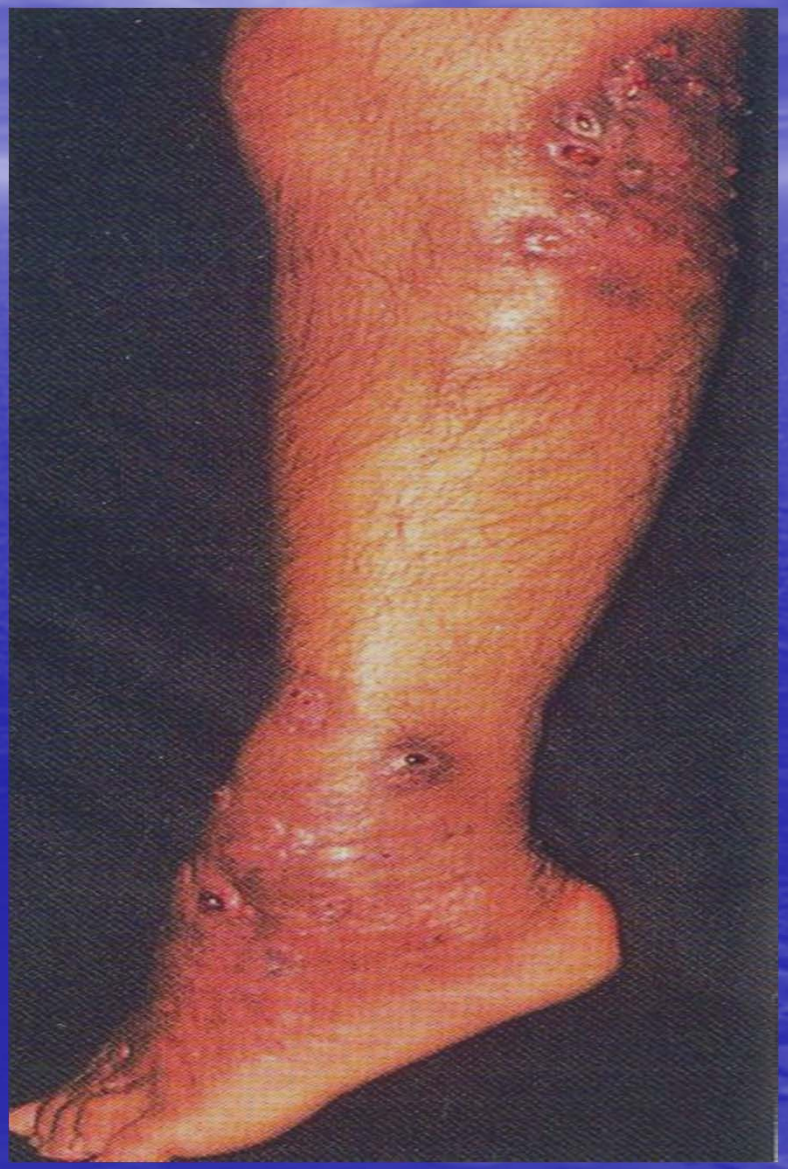
Complication

- Secondary infection

  - lymphatic stasis
  - elephantiasis

- Squamous cell carcinoma

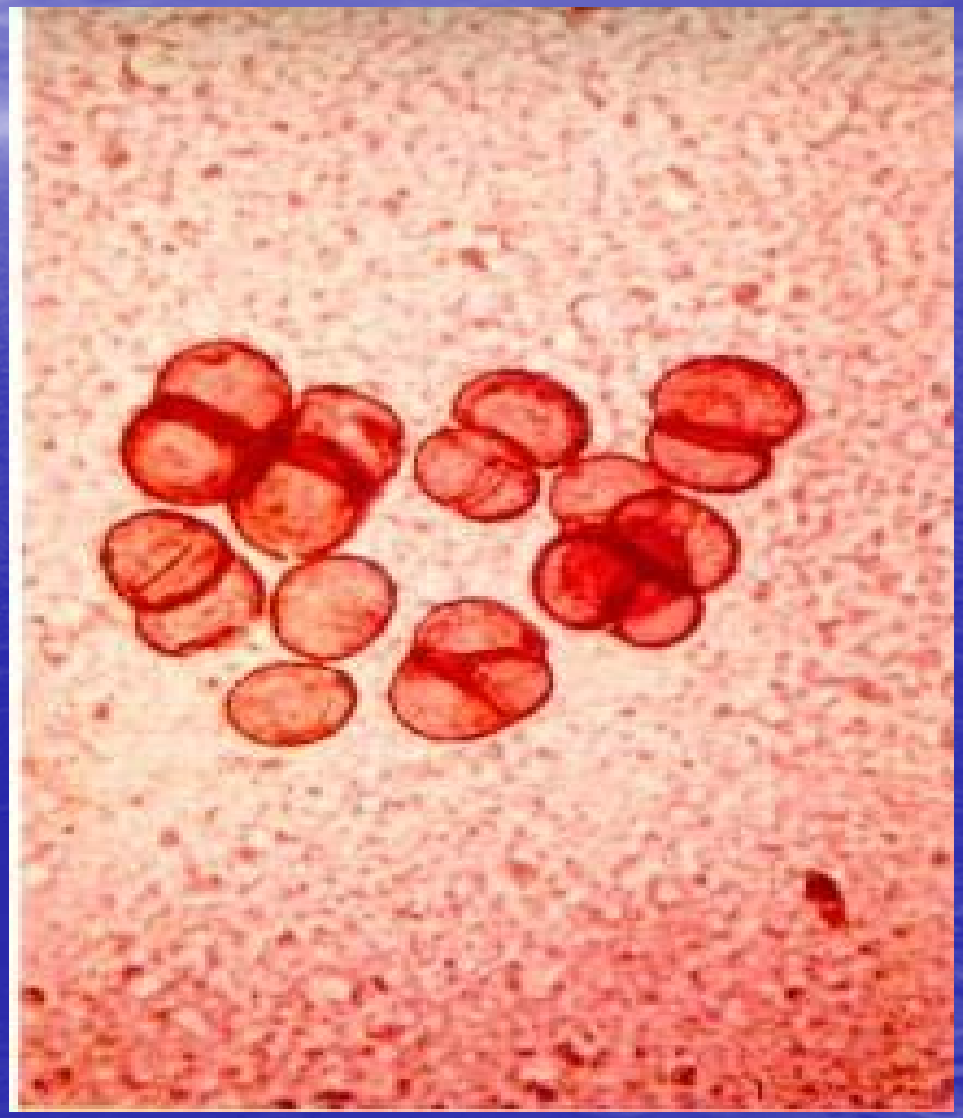
Chromoblastomycosis



Lab Diagnosis

- Collection of skin scrapings
- Microscopy - 10-20% KOH - muriform bodies
- Biopsy from active margins
  - Histopathology
  - Culture

Chromoblastomycosis



Treatment

Chromoblastomycosis

- Itraconazole
- Terbinafine
- Itraconazole / Flucytosine / Amphotericin B
- Thiabendazole
- Cryotherapy / Local heat
- Surgical excision - small lesions

Mycetoma

Maduromycosis (Madura foot)

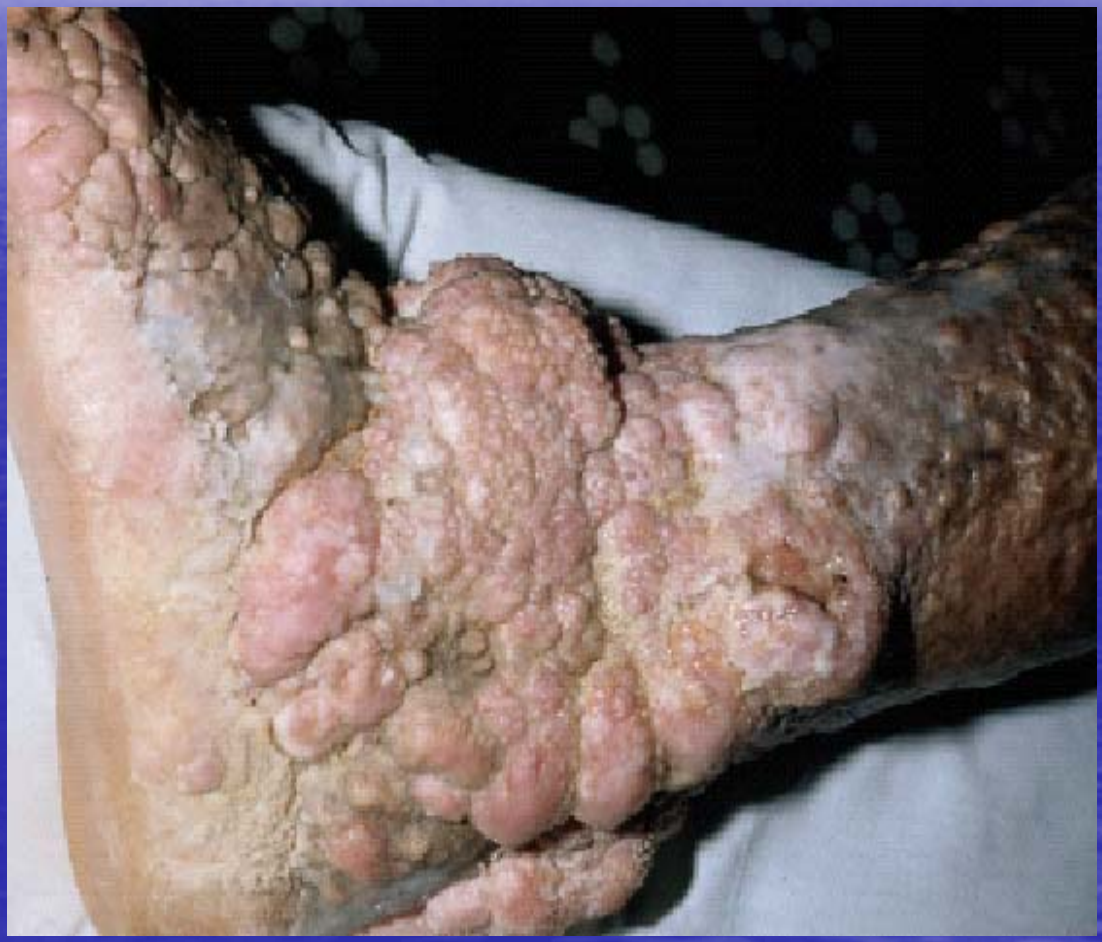
- Localized cutaneous infection

- Eumycetoma

Fungi

- Actinomycetoma

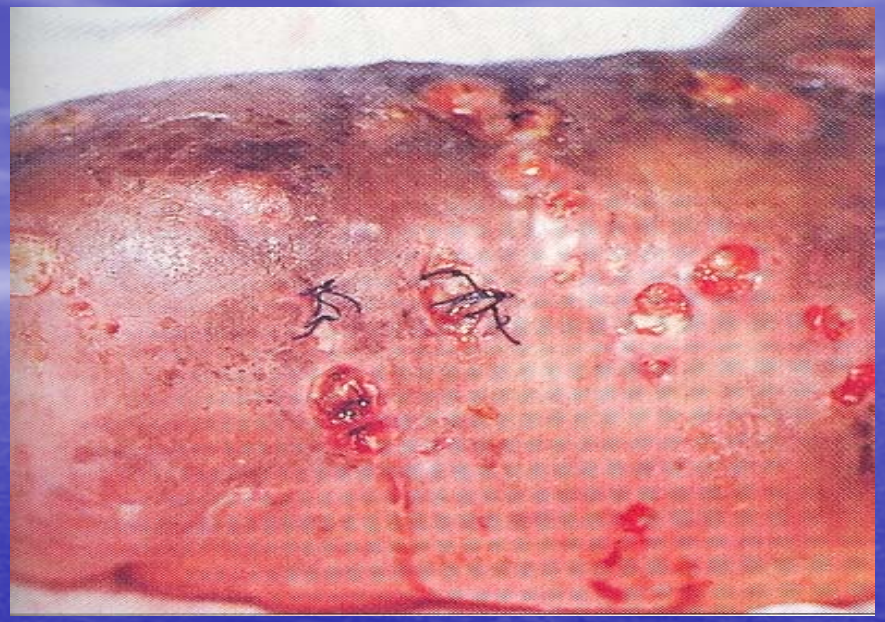
Bacteria

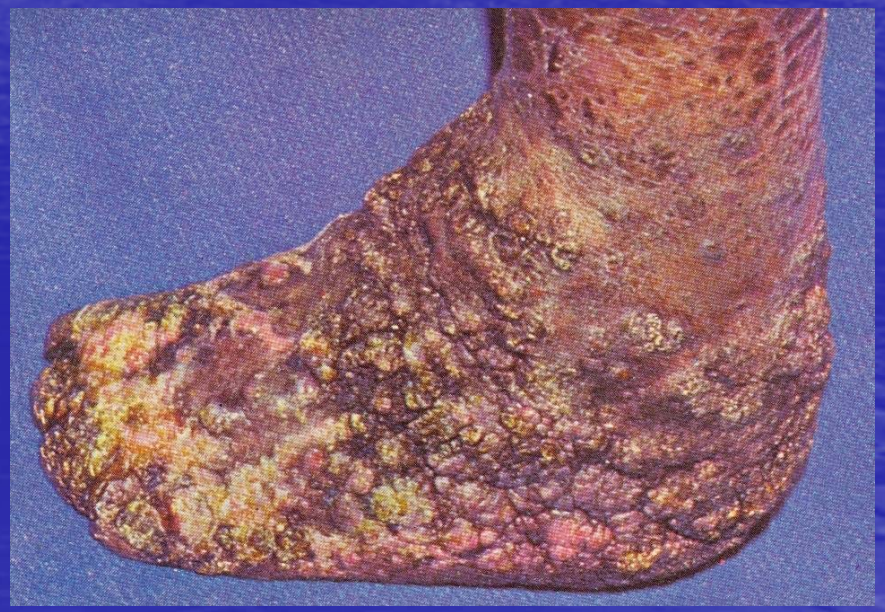


Clinical features

- Foot, lower leg - commonest
- Firm, painless nodule
- Many nodules - lumpy appearance
- Break down - discharge pus
- Pus - granules
- Extension to underlying

Mycetoma

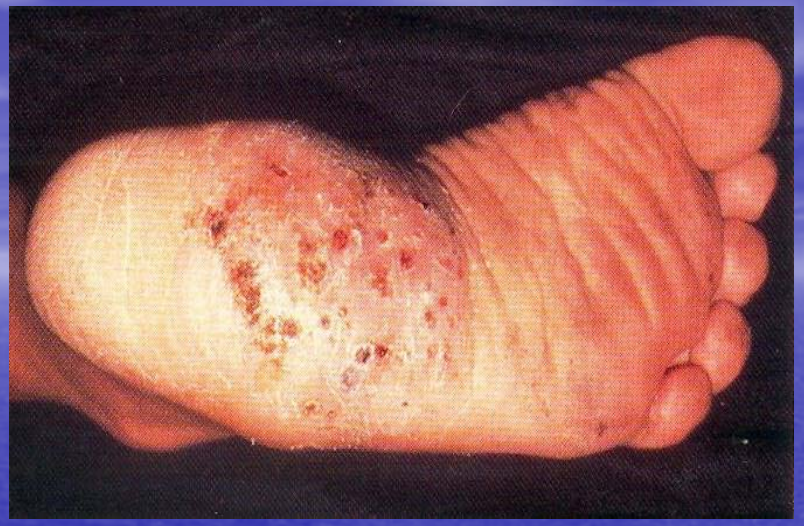


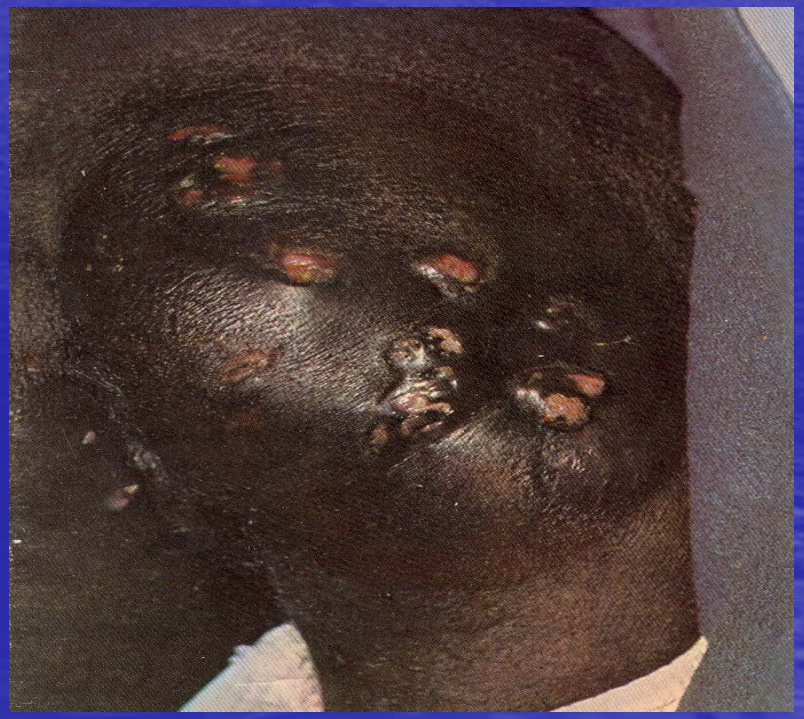


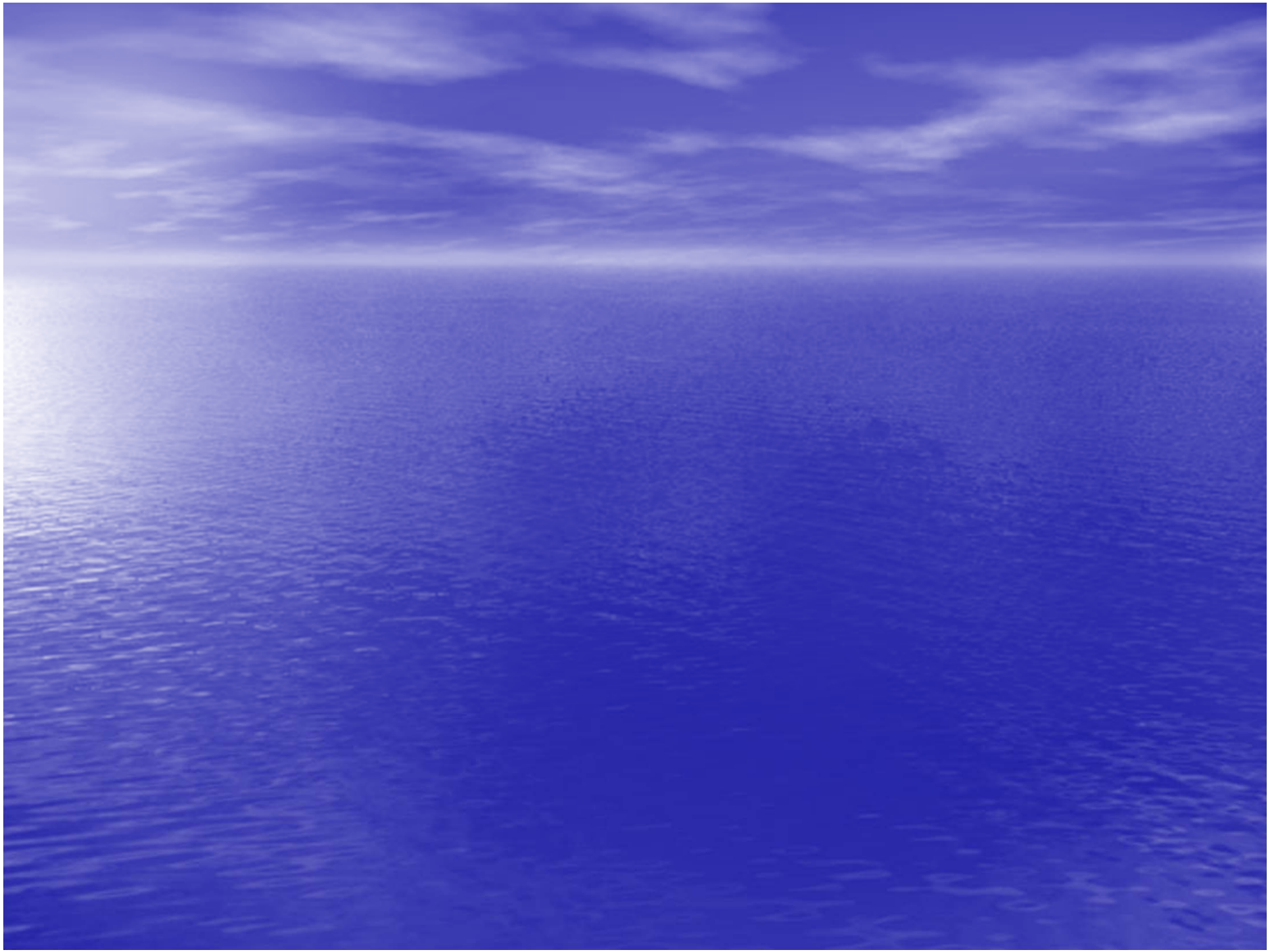
Mycetoma

- Bones & joints

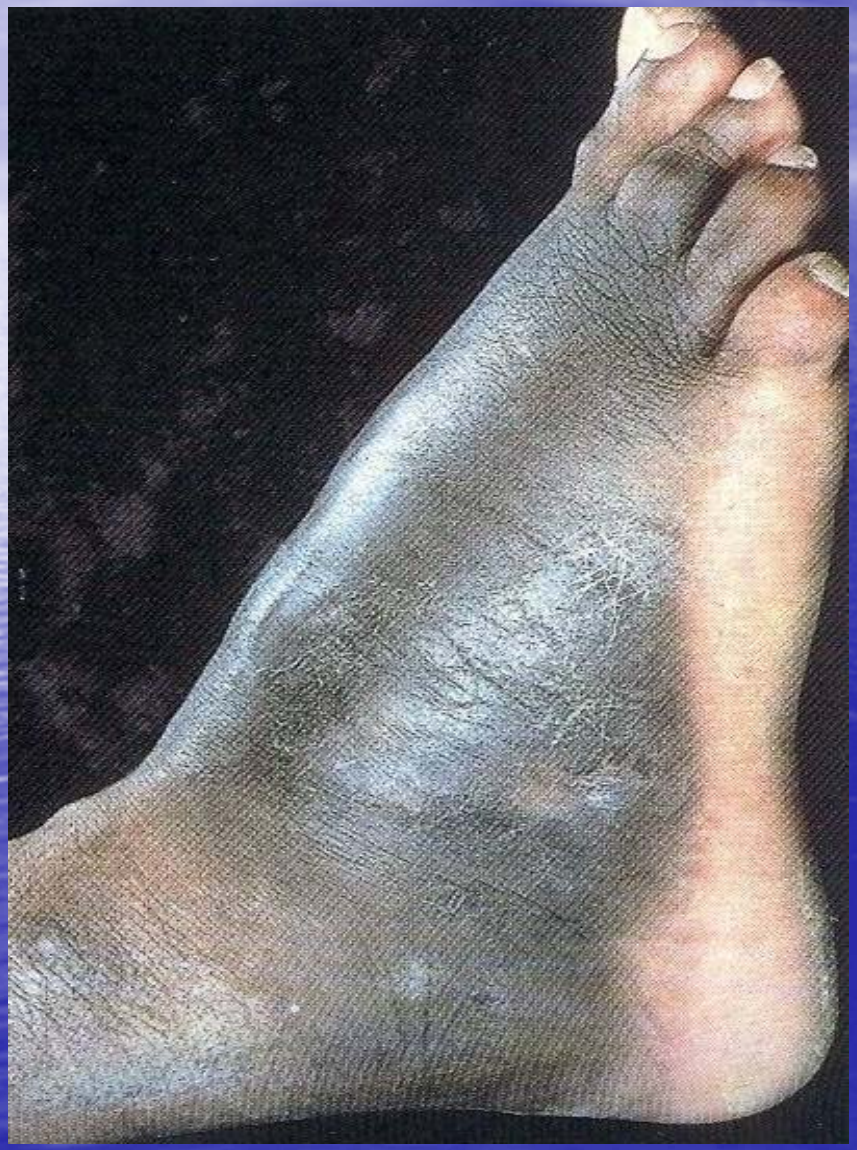
  (periostitis,oeteomyetitis,arthritis)
- Destruction of bone - may be complete
- Multiple sinus tracts draining pus
- May remain open for months / close & re open
- Purulent /seropurulent discharge
- Enormous swelling
- Lymph node involvement - rare







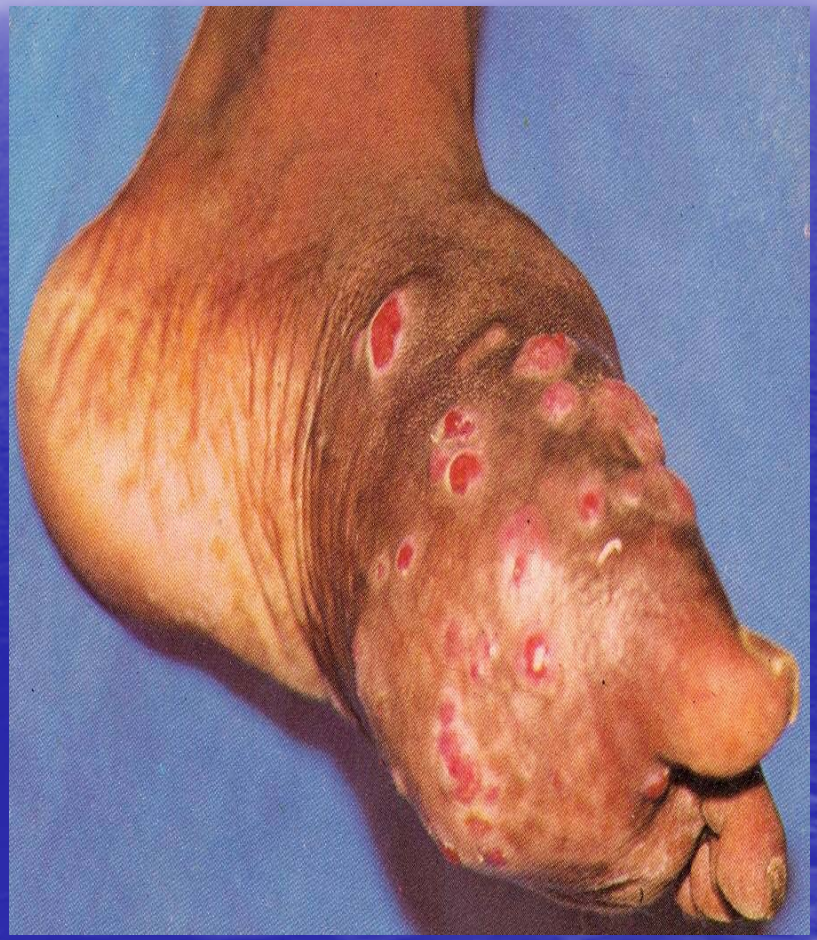
Mycetoma



Laboratory Diagnosis

- **Granules :**
  - Color
  - KOH
  - Gram stain
  - Microscopy
  - Culture
- **Pus :**
  - KOH
  - Microscopy
  - Culture

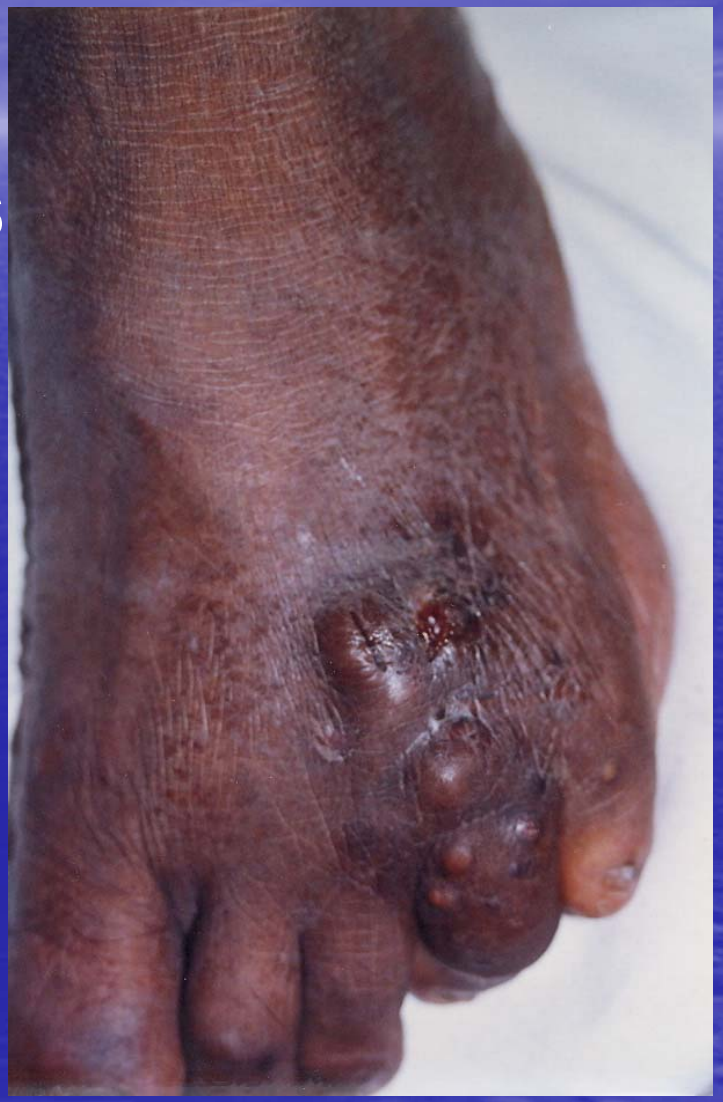
Mycetoma



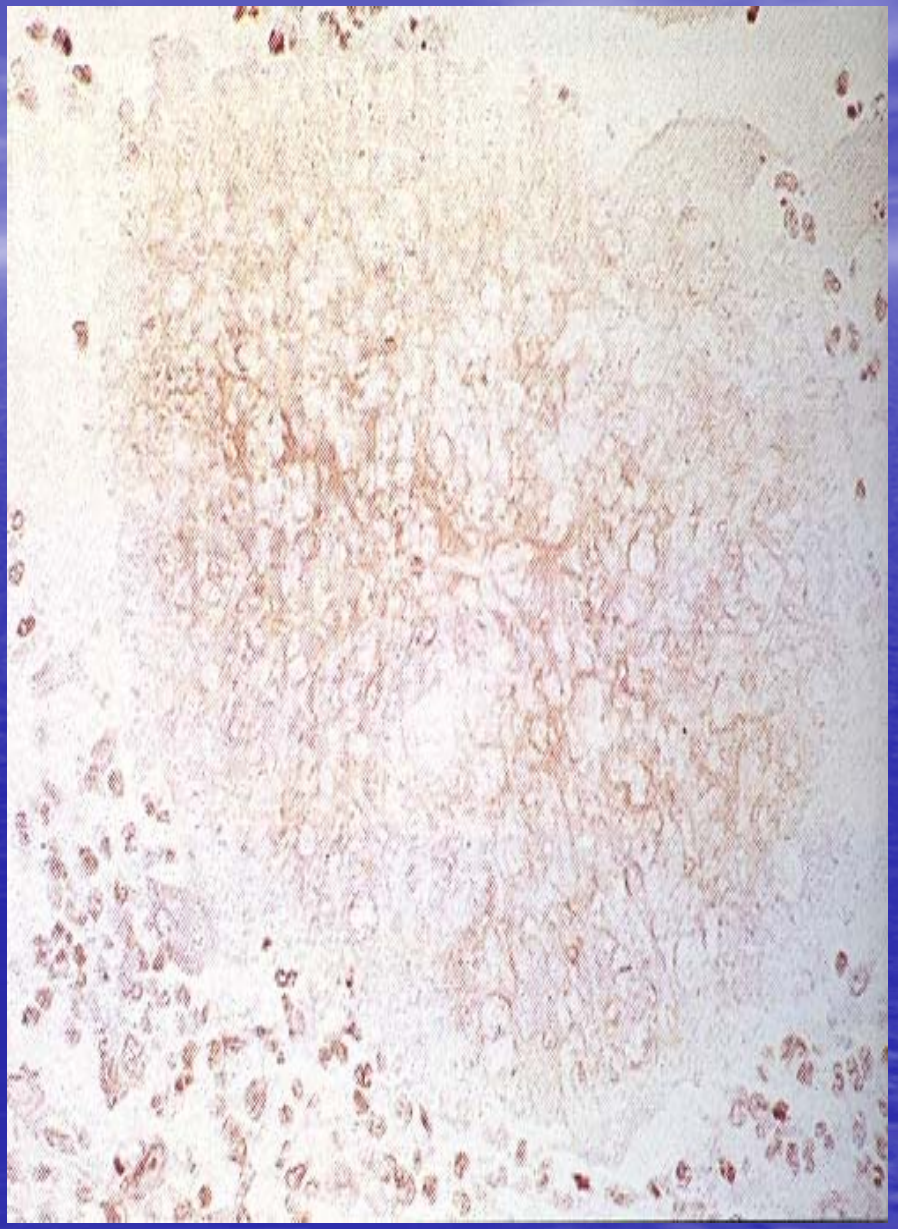
- **Serodiagnosis :**
  - **ELISA**
  - **Immunodiffusion tests**
  - **Ultrasound**
  - **FNAC**
  - **Surgery**

- **Deep biopsy : HPE**

Mycetoma



Mycetoma



Treatment

Actinomycetoma

- Dapsone
- Cotrimoxazole
- Streptomycin
- Rifampicin
- Amikacin

Eumycetoma

- Amphotericin B
- Grisofulvin
- Ketaconazole
- Excision

Subcutaneous Zygomycosis

- Basidiobolomycosis:

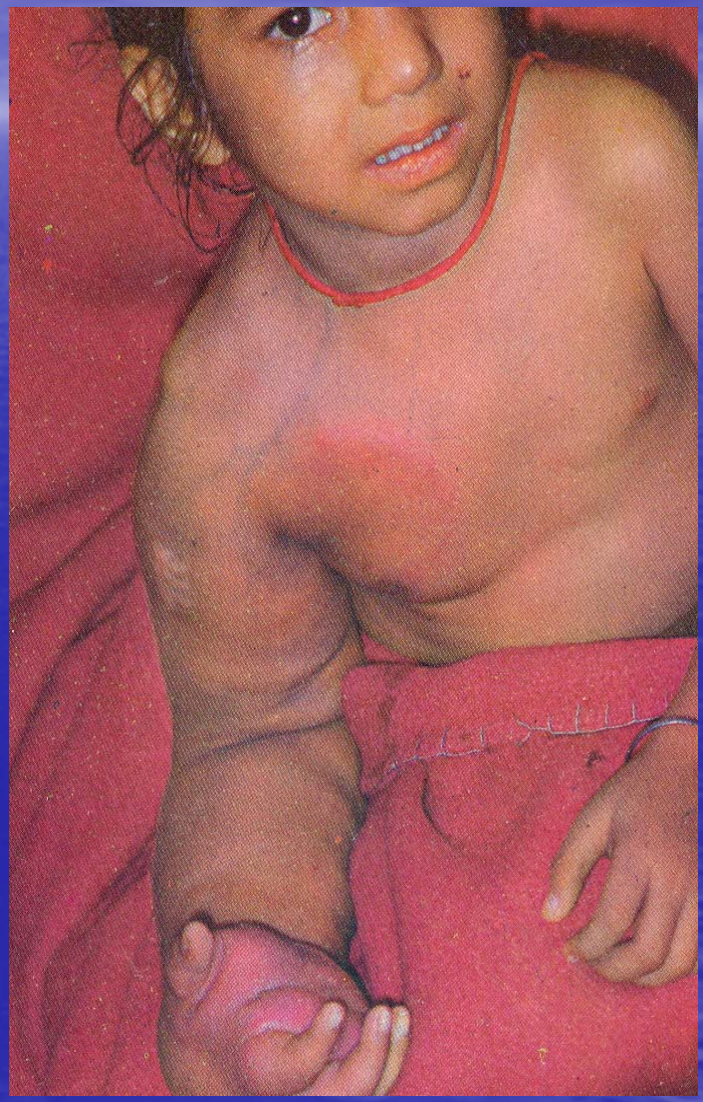
  Basidiobolus haptosporus

- Conidiobolomycosis:

  Conidiobolus coronatus

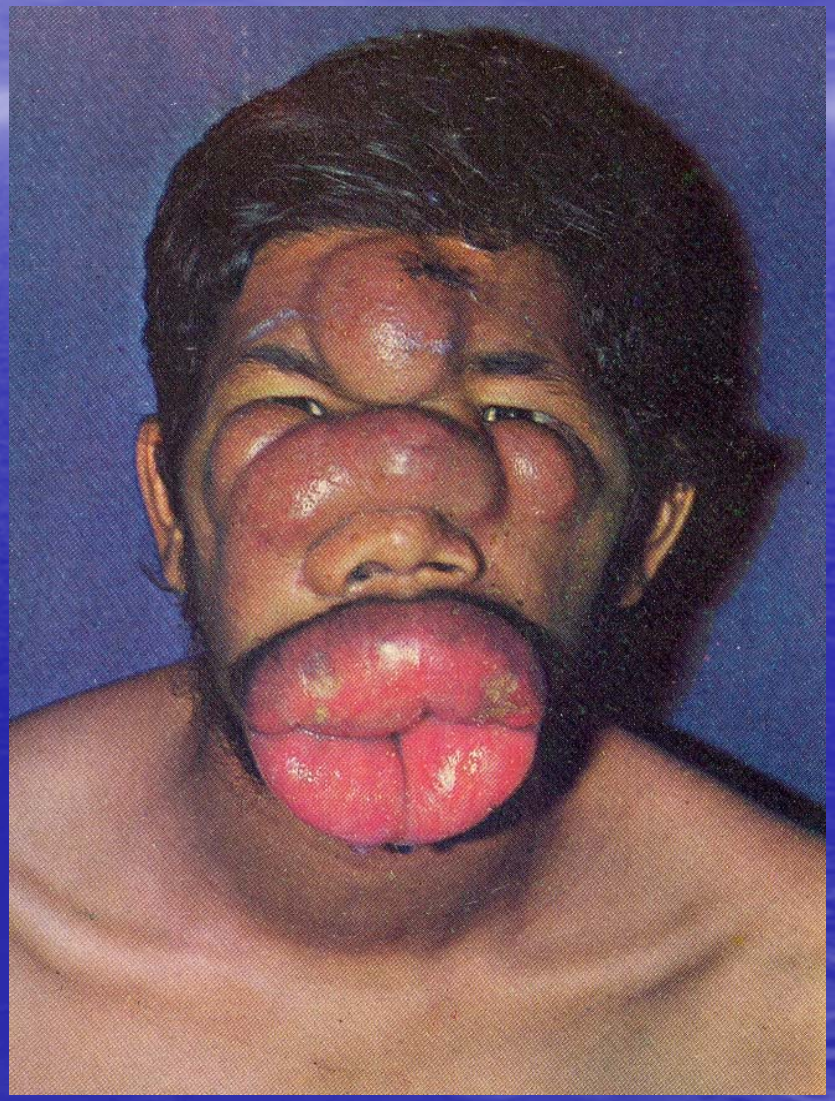
- Single
- Subcutaneous swelling
- Painless, disc shaped plaque
- Slowly spreading,indurated
- Multiple satellite lesions

Subcutaneous Zygomycosis



- Consistency of firm India rubber type
- Do not pit
- Attached to overlying skin
- Freely mobile over deeper structures

Subcutaneous Zygomycosis



Treatment

- Potassium iodide: saturated solution
  - 100 mg / 100 ml
  - 5 drops thrice
  - increase till side effects

Cutaneous Zygomycosis

- Necrotizing opportunistic infection
  - Cutaneous
  - Fascial

Organisms :

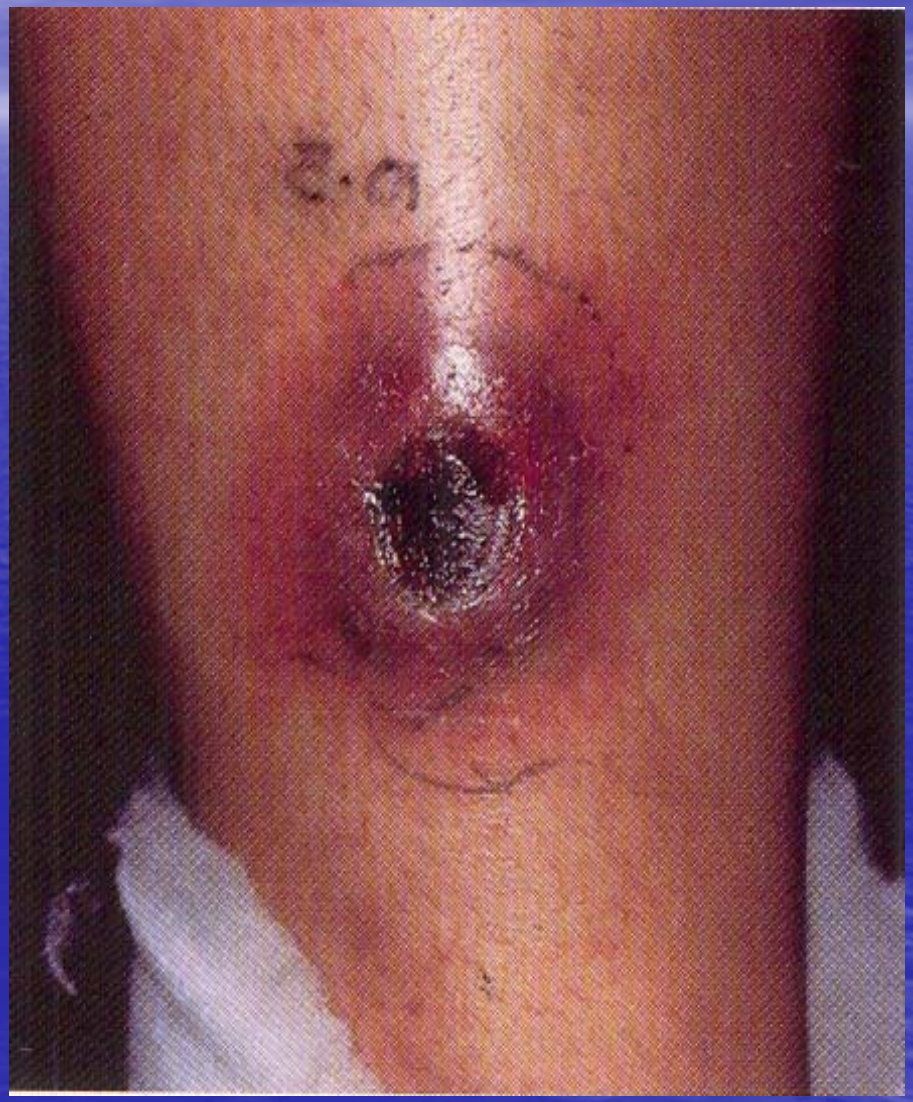
- *Apophysomyces elegans*
- *Saksenaea vasiformis*
- *Rhizopus arrhizus*
- *Mucor species*
- *Absidia corymbifera*

- 16% cases of zygomycosis

- Primary lesion
  - direct inoculation

- Secondary lesions
  - dissemination

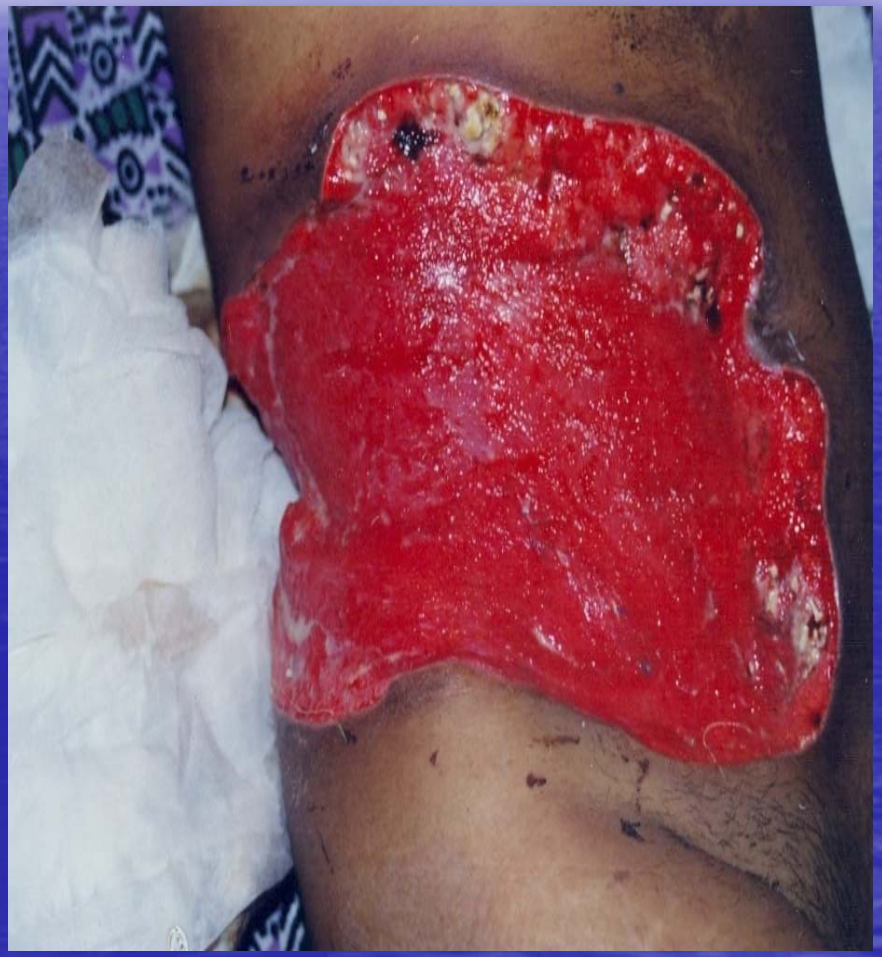
Zygomycosis



Clinical Features

- Indolent non-healing ulcer
- Rapidly progressing necrotizing infections of subcutis
- Superficial nodular lesions
- Cellulitis with underlying osteomyelitis

Zygomycosis



Predisposing factors

Local

- Local surgery
- burns
- motor vehicle related trauma
- contaminated needles
- dressings
- insect bites
- other types of trauma

Predisposing factors

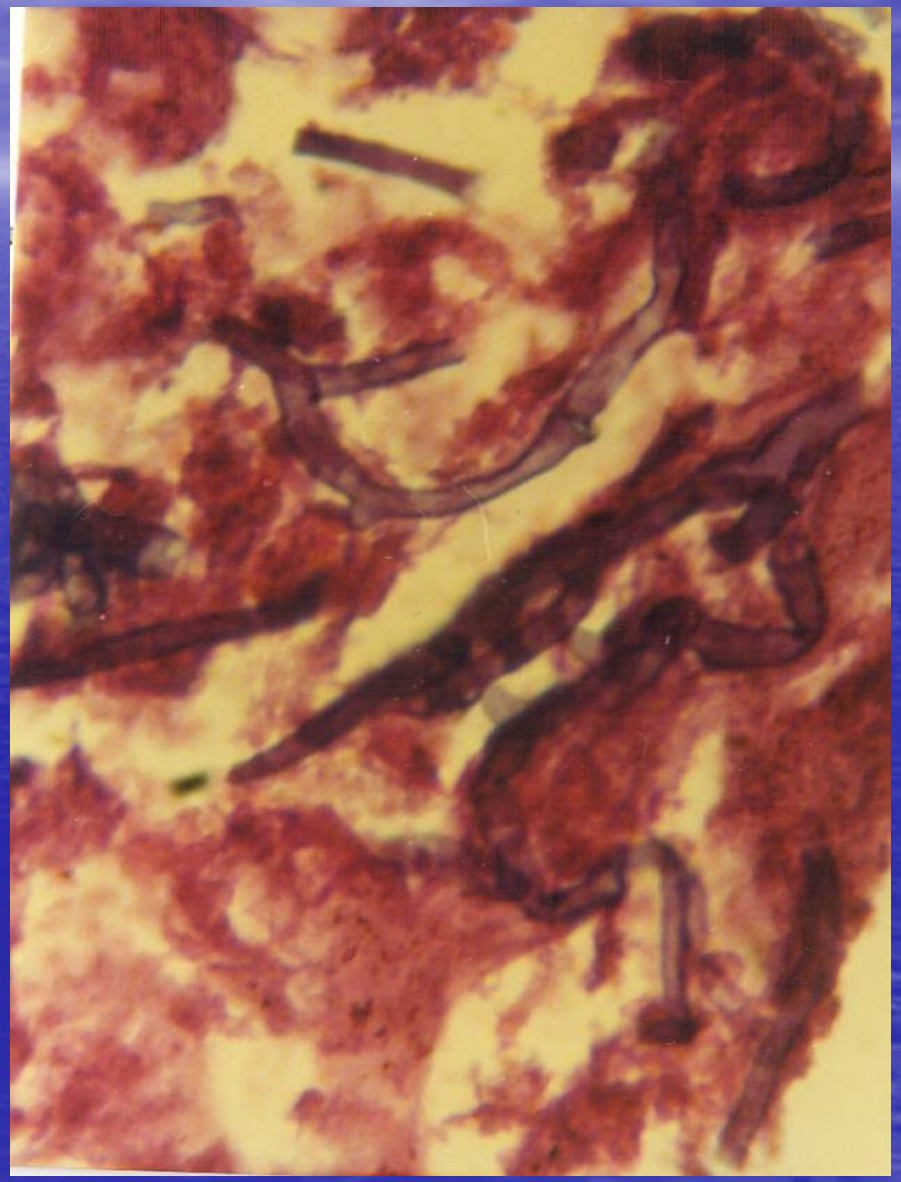
Systemic

- Leukemia , diabetes mellitus
- Corticosteroids
- malnourishment
- bone marrow transplantation
- AIDS / immunosupression

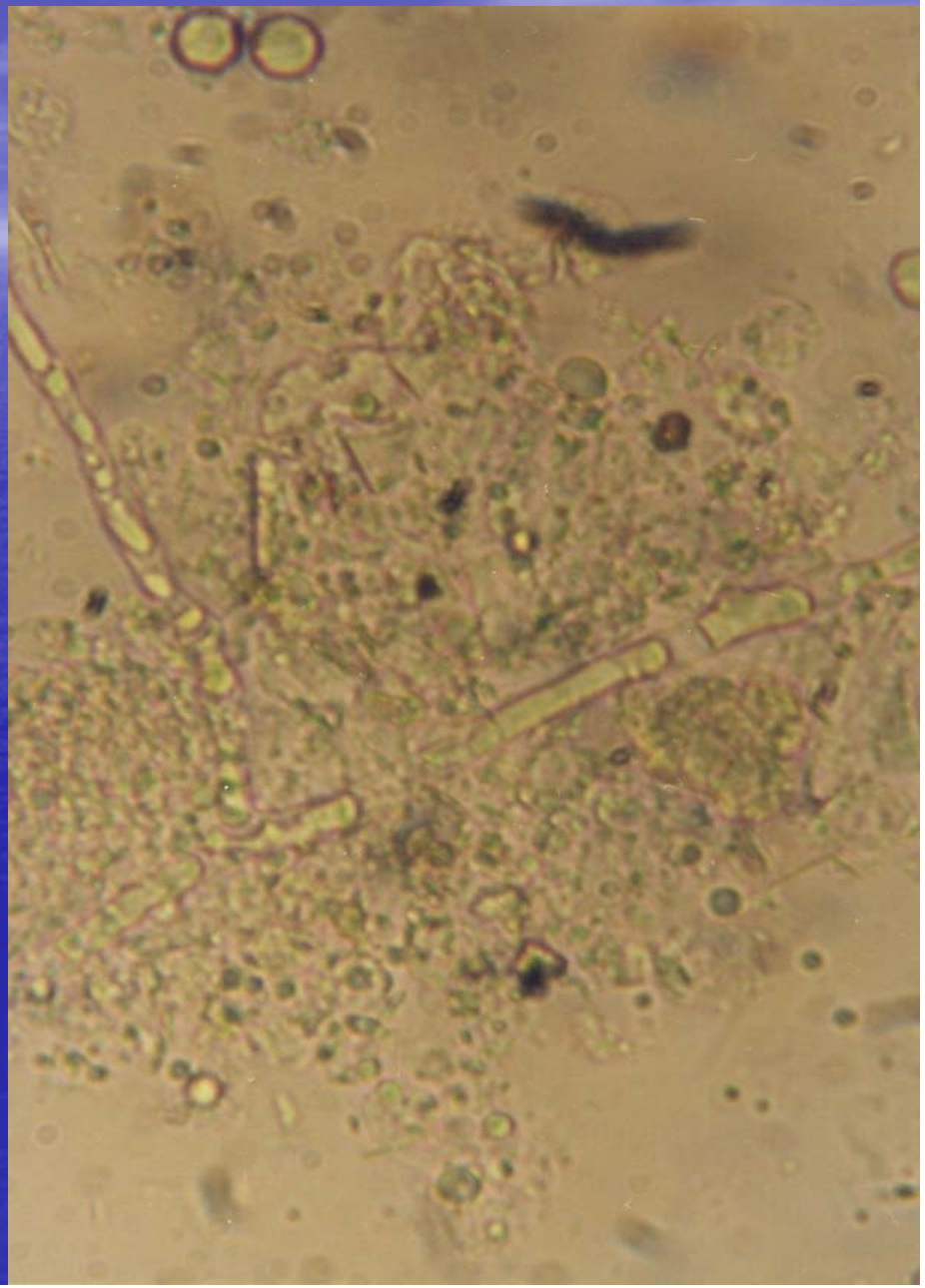
Diagnosis

- Wet mount smear of necrotic material
- edge of ulcer - hyphae
- Histopathological examination
- Fungal culture

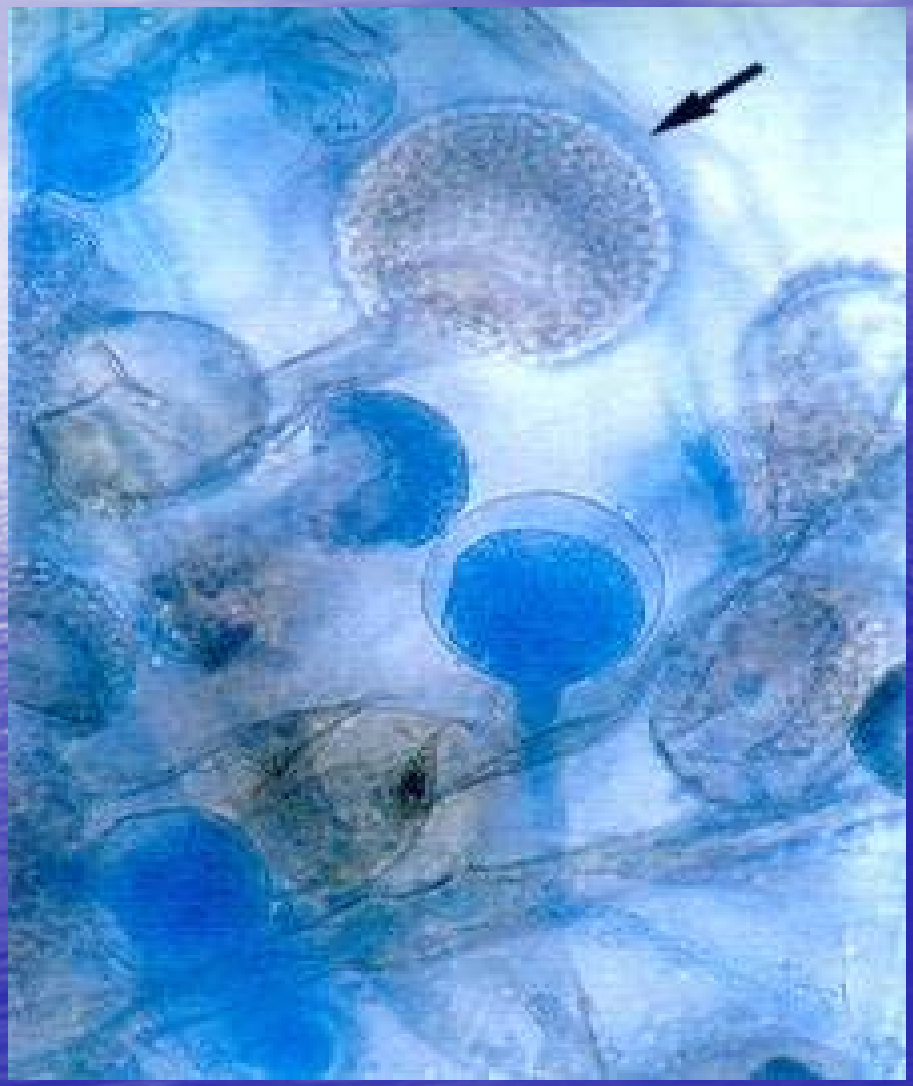
Zygomycosis



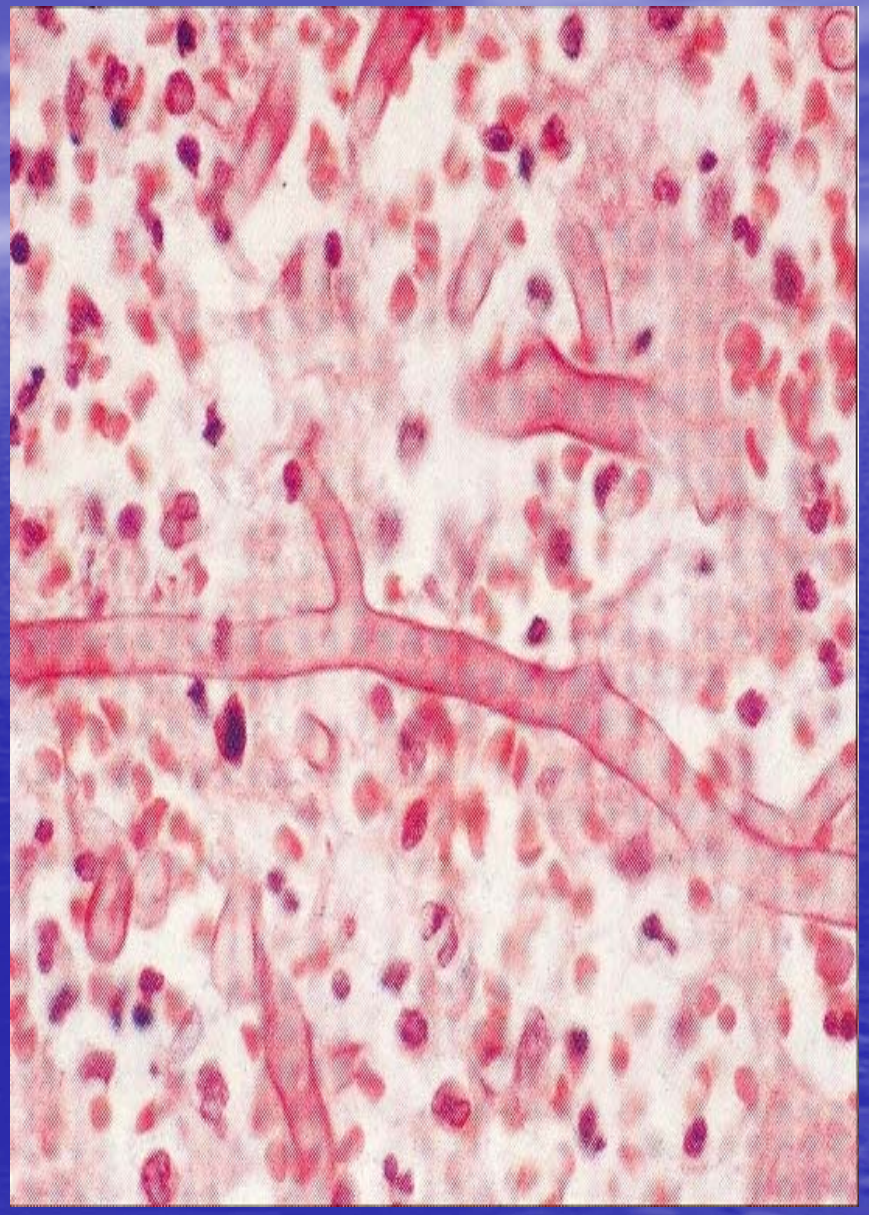
Zygomycosis



Zygomycosis



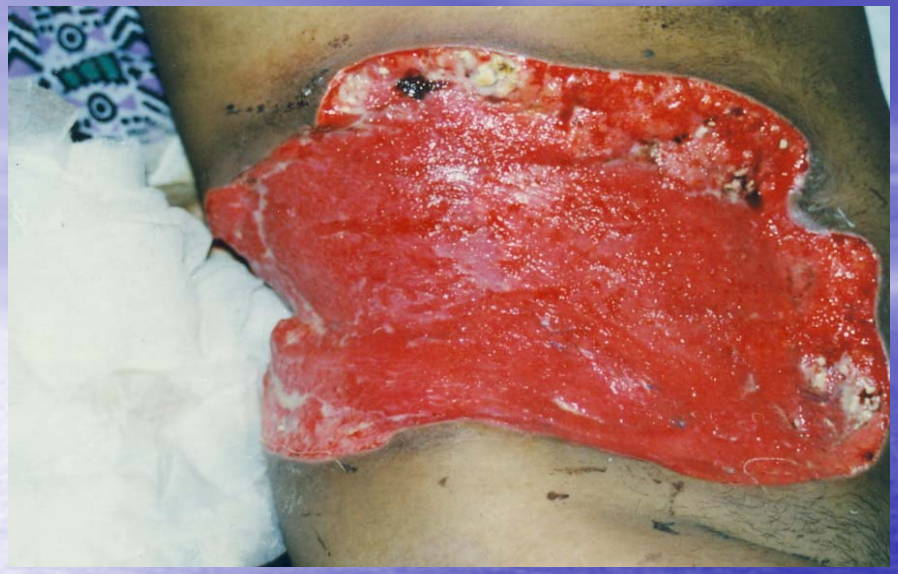
Zygomycosis

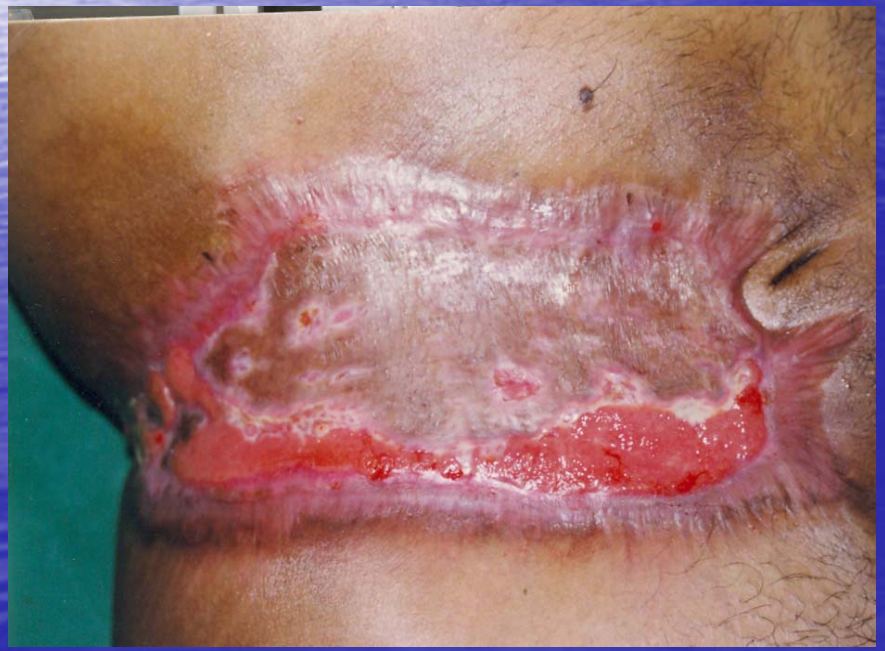


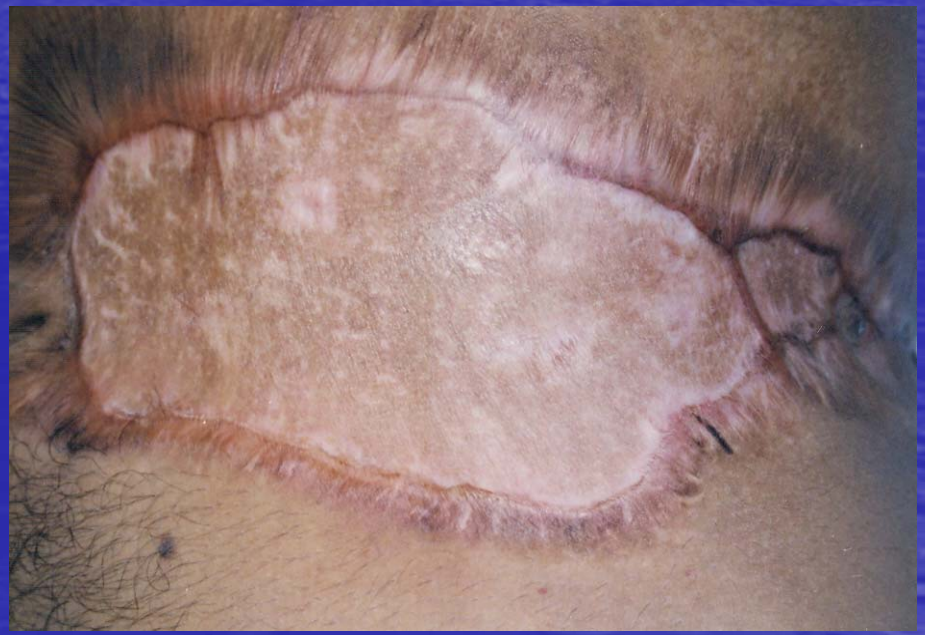
Management

- Extensive surgical debridement
- Complete resection of necrotic & infected tissue
- Parentral amphotericin B
- Potassium iodide
- Oral azoles
- Cotrimoxazole
- Hyperbaric oxygen
- Skin grafting

Zygomycosis







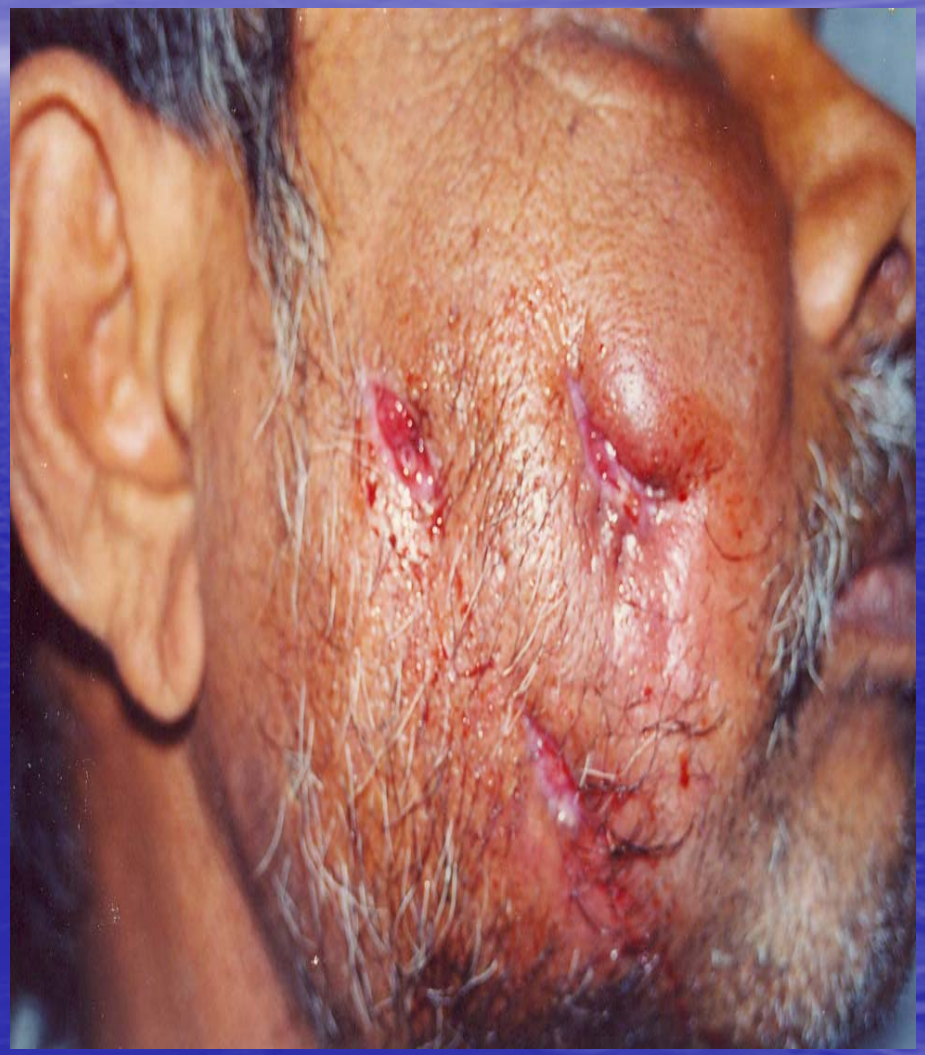
Actinomycosis

- Chronic suppurative granulomatous disease
- *Actinomyces israelii*
- Endogenous infection

Cervicofacial

- Dull red indurated nodule (cheek or submaxillary region)
- Multiple sinuses,
- Indurated skin
- puckered Scarring
- Sulphur granules
- Sinuses close temporarily
- Primary lesion
  - mandible/ maxilla

Actinomycosis



Thoracic type

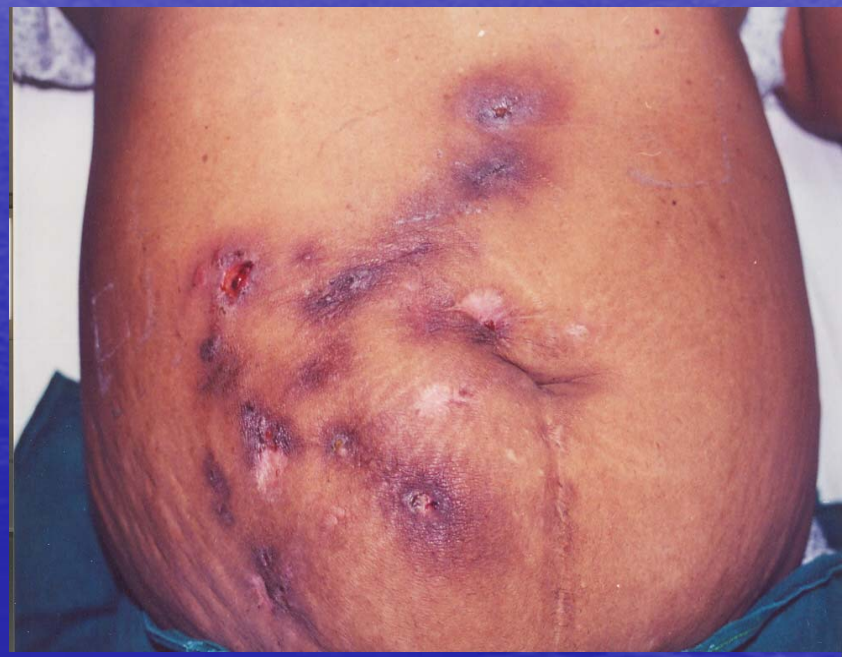
Actinomycosis

- Cough, haemoptysis, night sweats, weight loss
- No cutaneous changes
- Rarely chest wall secondarily infected
- Infection from lungs
- Osteomyelitis of ribs - skin

Actinomycosis

Abdominal

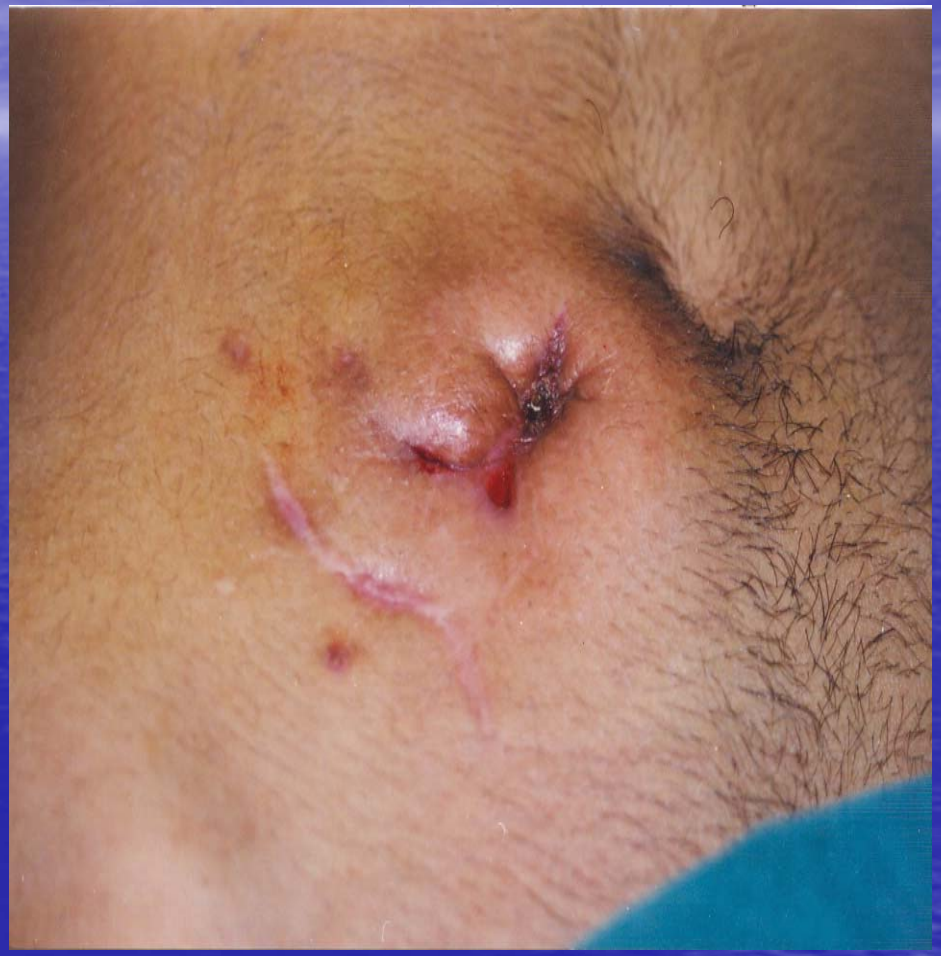
- Appendix ,caecum
- Liver,ovaries,kidneys, bladder, spine
- Abdominal wall - Sinuses



Pelvic

- IUCD
- Skin not affected

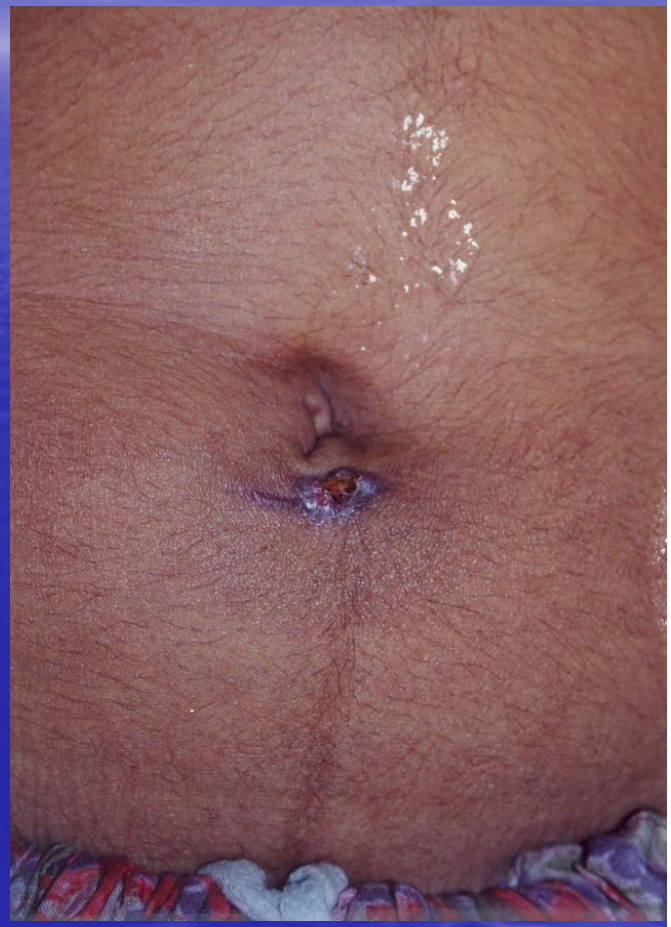
Actinomycosis

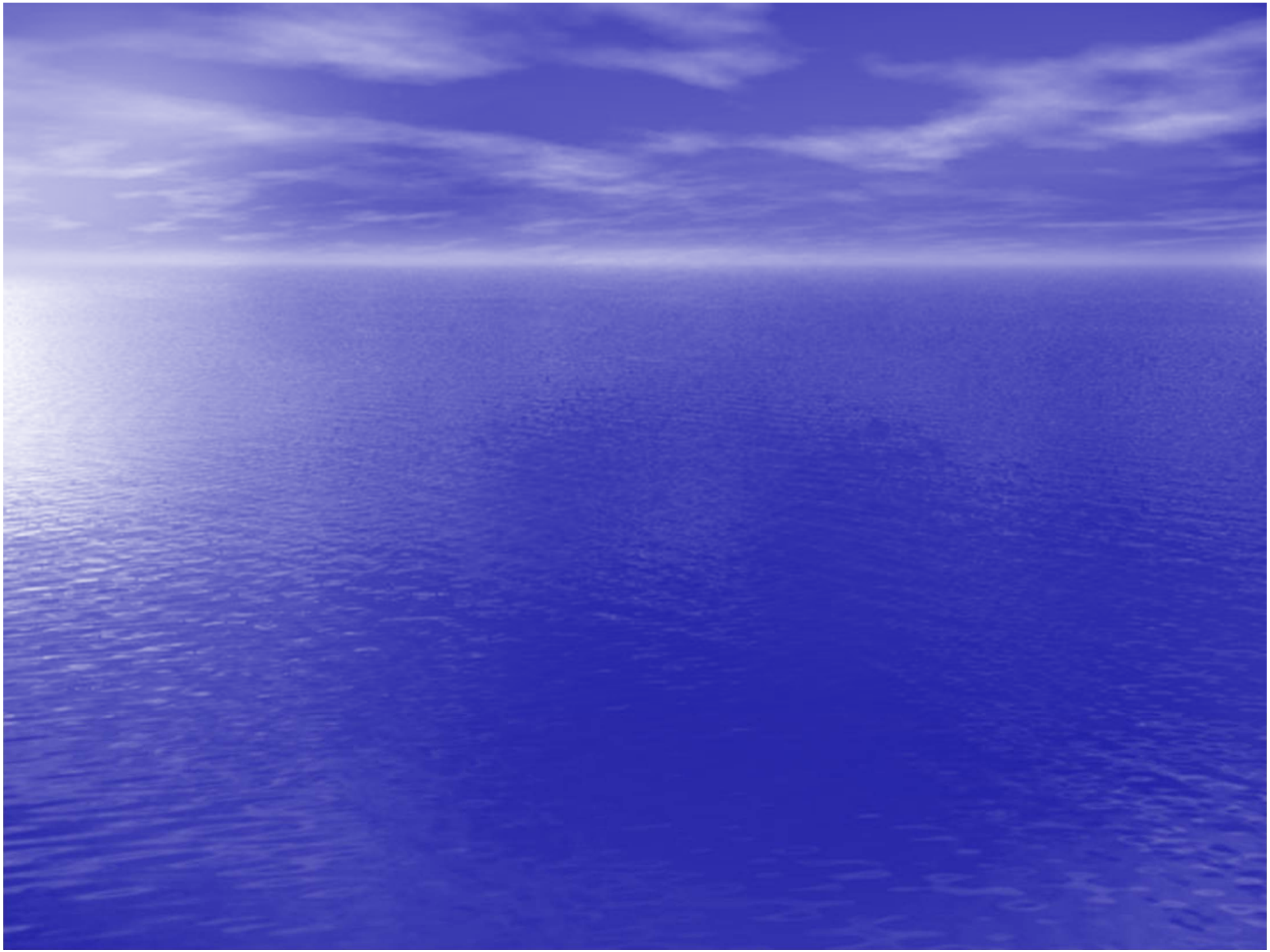


Primary Cutaneous

- Uncommon
- Exposed skin
- Subcutaneous nodules
- Sinuses
- Regional lymphadenopathy

Actinomycosis





Lab Diagnosis

- Detection of sulphur granules
- Granules - crushed
  - microscopy
  - culture
- HPE

Treatment

- I/V penicillin 10-12 million units daily
  x 30-45 days
- Wide surgical excision
- I/M Penicillin 2-5 million units
  x 12-18 months

Nocardiosis

- Acute - Chronic suppurative disease
- Aerobic Actinomycete *Nocardia*
- Opportunist pathogen
- Primary infection by inhalation

  - pulmonary

Etiology

- *Nocardia asteroides*
- *N. brasiliensis*
- *N. otitidis caviarum*

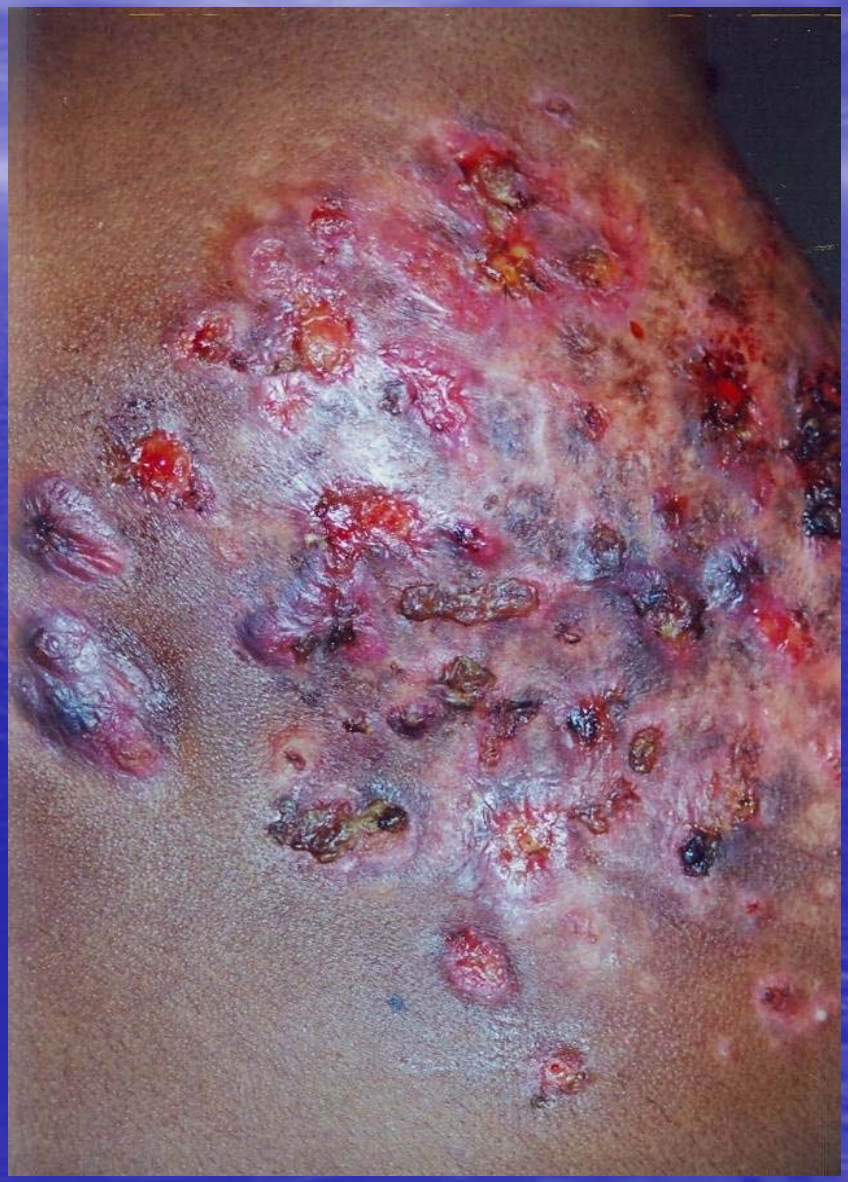
Clinical Features:

- Pulmonary involvement : 75%
- CNS involvement : 30%
- Skin involvement : 30%

Cutaneous Lesions

- Primary chancriform
- Multiple abscesses
- Muscles & bones
- Lymphangitic
  - multiple suppurative nodules

Nocardiosis



Lab diagnosis

- Pus / sputum smears

  - Gram stain

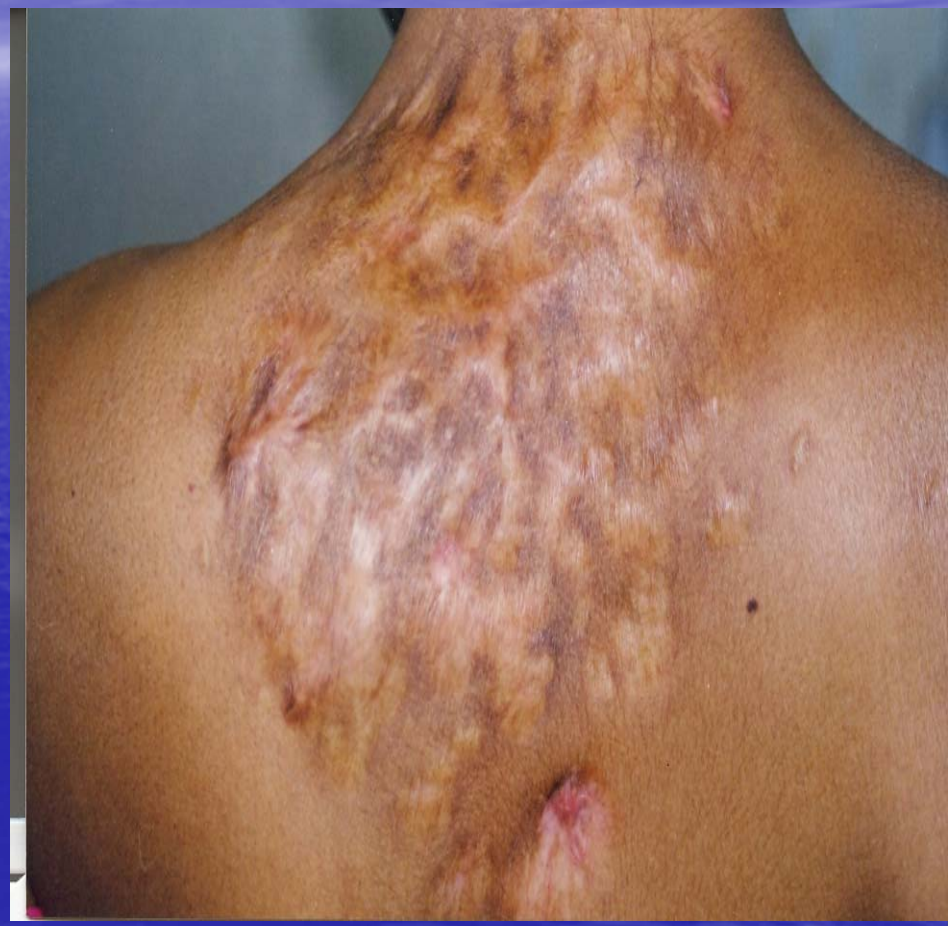
  - Acid fast stain (differential)

- Culture

Treatment

- Cotrimoxazole
- Sulphonamides
- Ampicillin
- minocycline
- Amikacin
- Imipenem

Nocardiosis



CANDIDIASIS

Syn. CANDIDOSIS, MONILIASIS, THRUSH

CANDIDA ALBICANS

C. tropicalis	-	Yeast
C. glabrata	-	Pseudohyphae
C. Krusei	-	True hyphae

- **DIMORPHISM**

- Yeast - Commensal

- Mycelia - Pathogenic

- **SITES**
  - Skin
  - Mucosa

  } Mucocutaneous junction
  - Endocarditis
  - Meningitis
  - Septicemia

- **Normal flora**
  - Vagina
  - Gut
  - Oral mucosa
  - Skin - NEVER

  - Most infections – own commensal organism

PREDISPOSING FACTORS

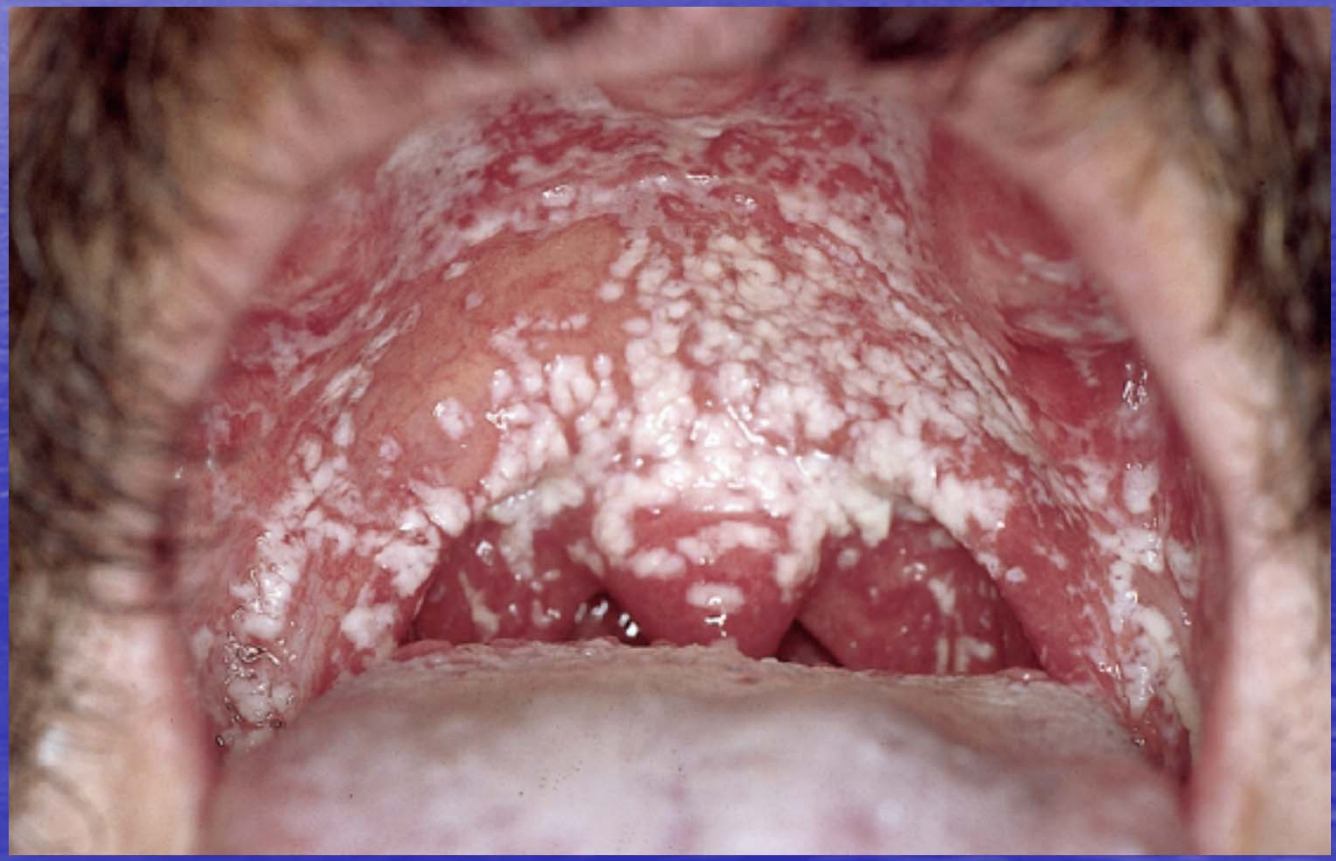
- Immuno deficiency
  - HIV
  - Steroids
  - Cytotoxic drugs
  - Leukemia/Lymphoma

- Diabetes mellitus
- Broad spectrum antibiotics
- Low saliva flow rates
- Ch. Illness, old age, neonate

- Food debris - nail folds
- Oral contraceptives
- Pregnancy
- IUCD, foreign bodies

CLINICAL MANIFESTATIONS

1.Acute pseudo membranous candidiasis



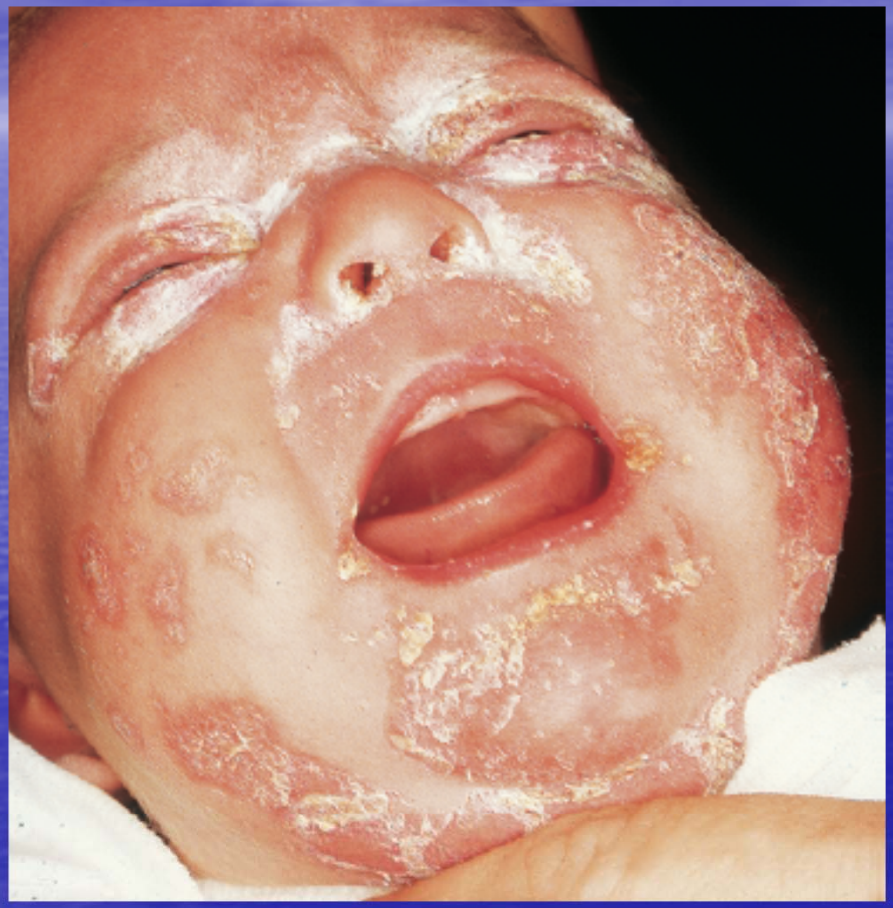
2. Acute atrophic oral candidiasis

3. Chronic hyperplastic candidiasis
4. Chronic atrophic candidiasis
5. Median rhomboid glossitis

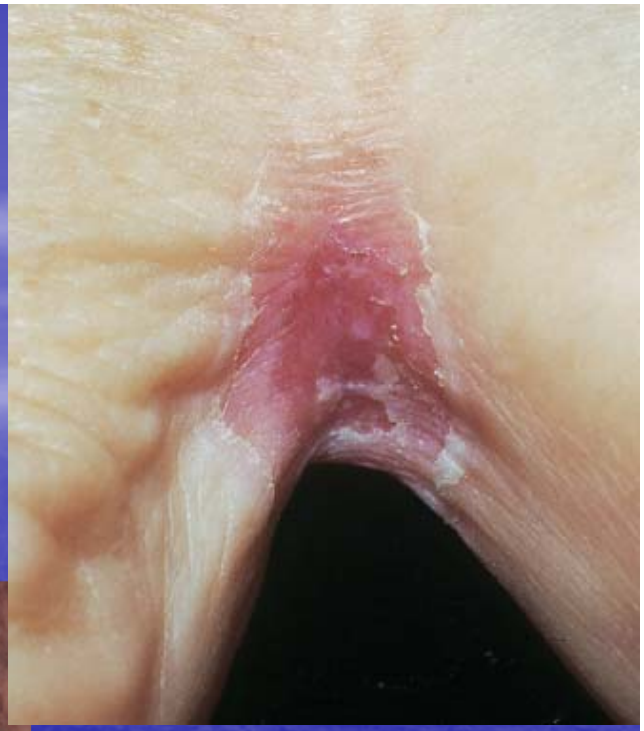
6.Angular cheilitis

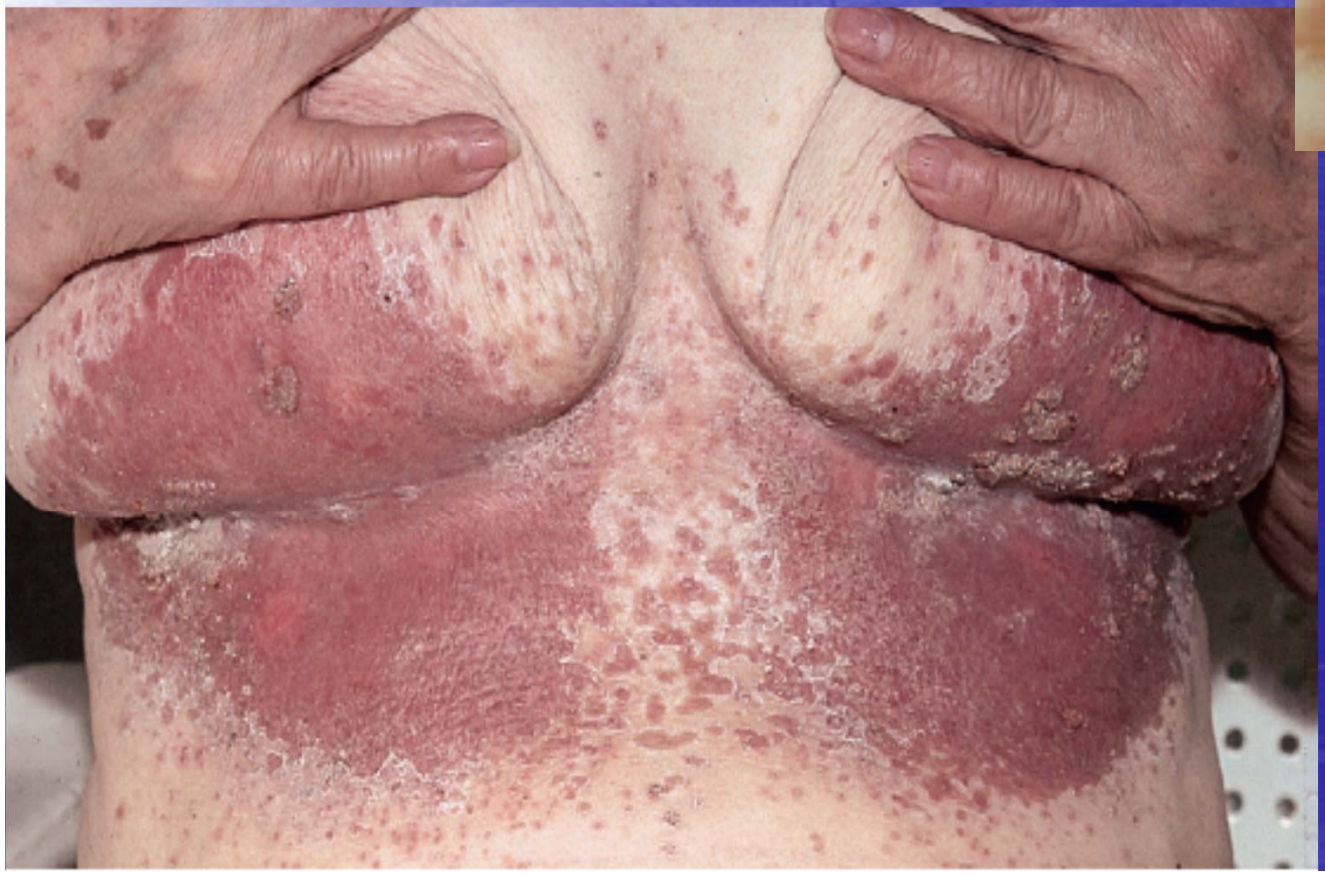
7.Candida cheilitis

8. Cutaneous candidiasis

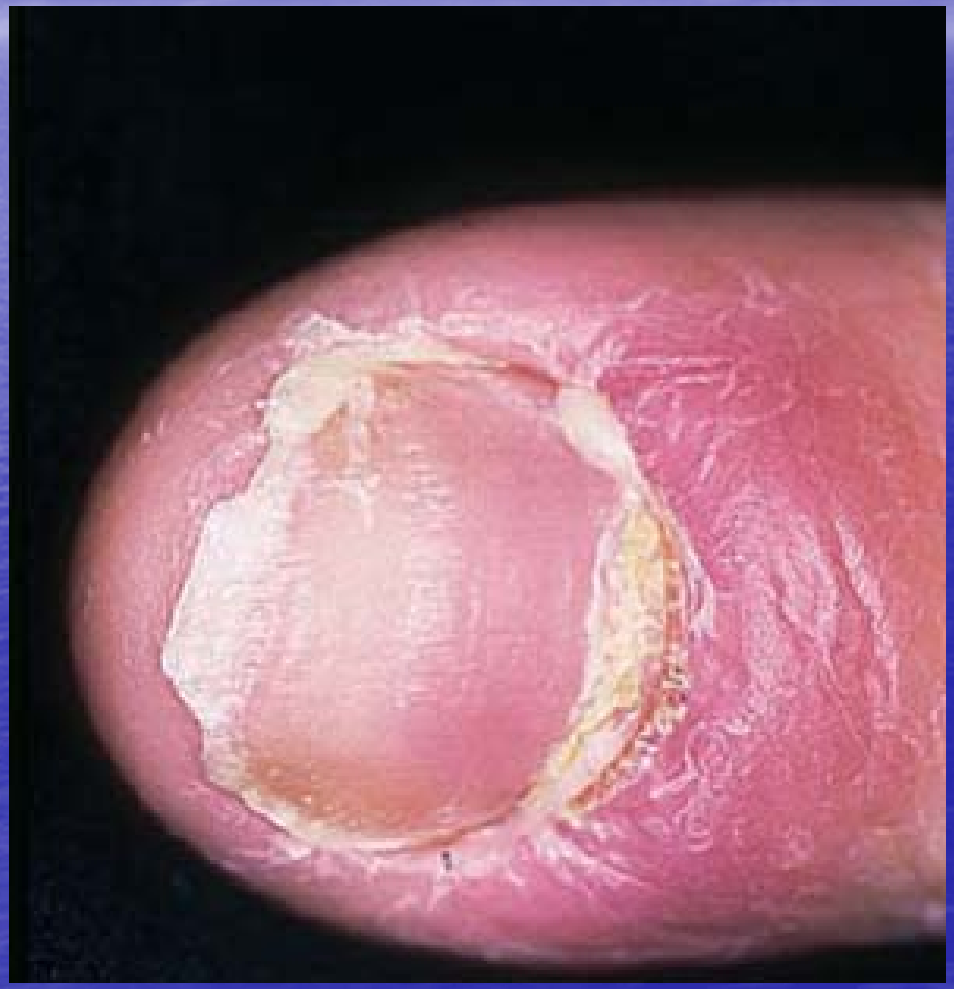


9.Candidal intertrigo





10. Candidal Paronychia



11. Candidal vulvovaginitis

12. Candidal Balanoposthitis

13. Napkin candidiasis

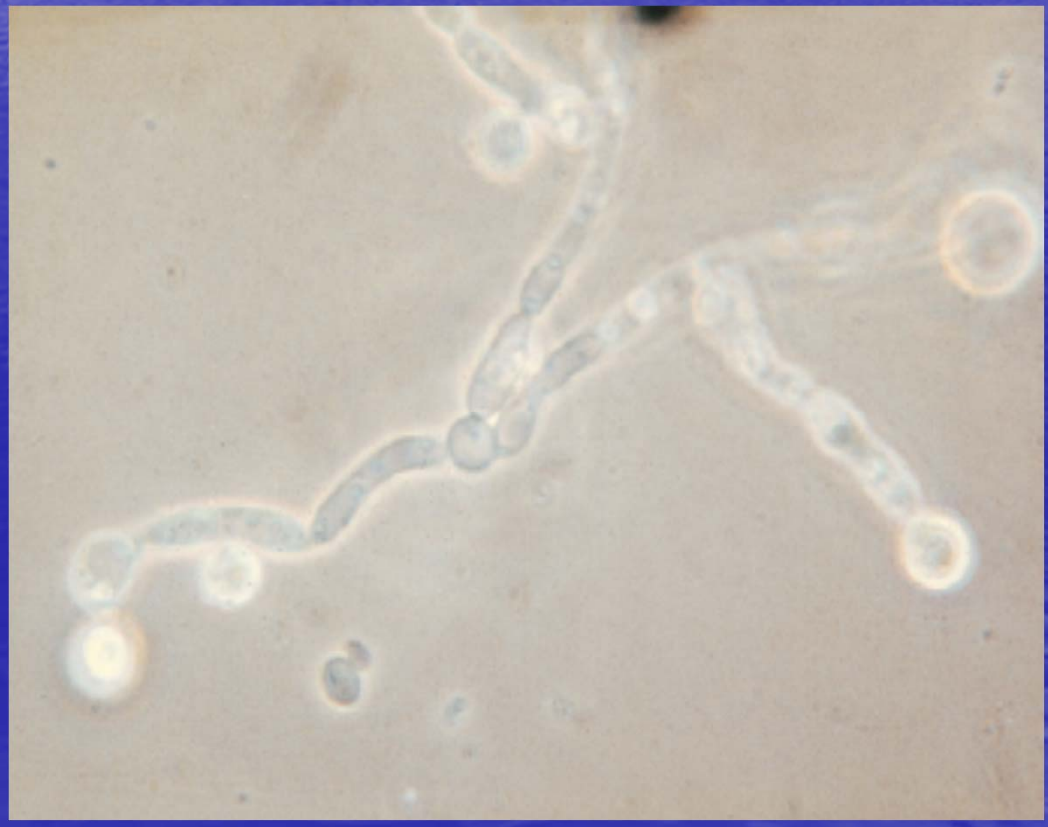
LAB. DIAGNOSIS

- DIRECT ISOLATION

-KOH 10%

-Gram staining

-Indian Ink



- **CULTURE**

  - SDA MEDIUM
  - Maize meal agar

  } 1-3 days

  - Germ tube test (serum tube test)

TREATMENT

- Topical
  - Clotrimazole 1%
  - Miconazole 1%
  - Nystatin
  - Natamycin

- Systemic
  - Itraconazole 100mg BD x 7 days
  - Ketaconazole
  - Fluconazole
  - Amphotericin B
  - Flucytosine
- Treatment of predisposing factor


Thank you