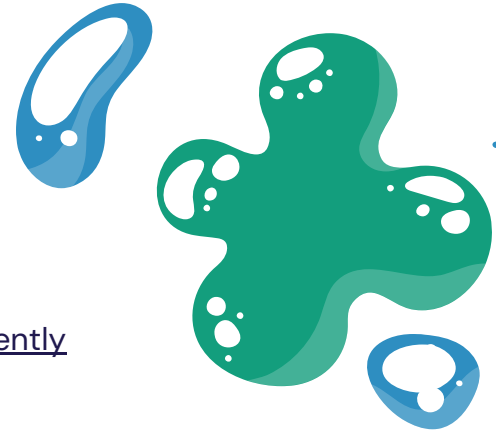


Mycetoma

Color Index :

- Main text
- Important**
- Girls Slides
- Boy Slides
- Notes
- Extra

Any future correction will be in the editing file , so please check it frequently



Objectives :



Acquire the basic knowledge about mycetoma and the clinical features of the disease.



Acquire the basic knowledge about other common subcutaneous mycosis and their clinical features.



Know the main fungi that affect subcutaneous tissues, muscles and bones.



Identify the clinical settings of such infections.

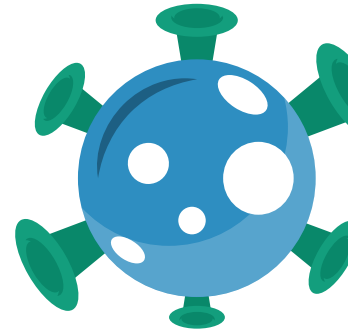
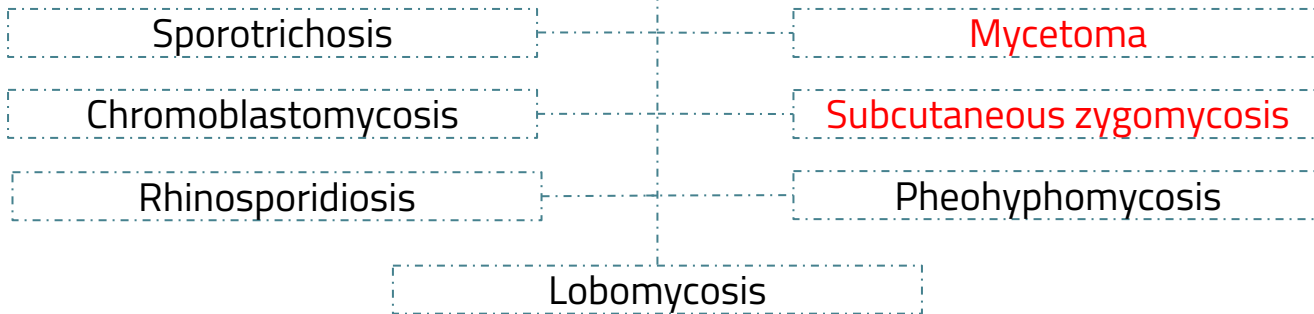


Know the laboratory diagnosis, and treatment of these infections.

Subcutaneous Mycoses

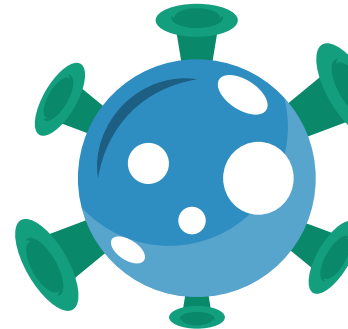
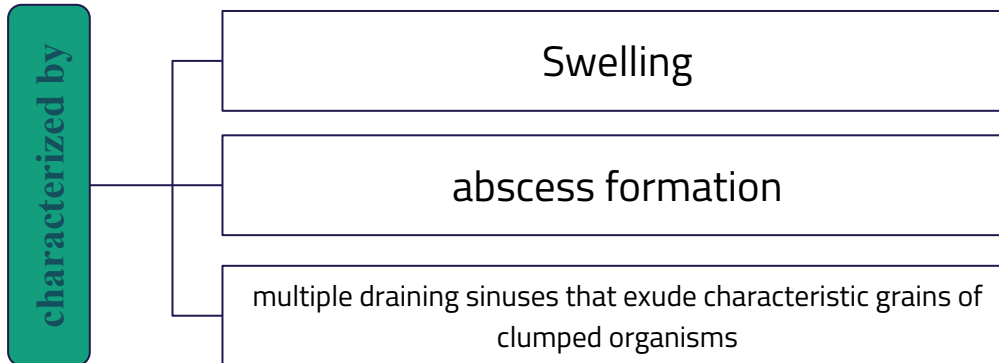
- Subcutaneous Mycoses: Fungal infections involving the dermis, subcutaneous tissues, muscle and may extend to bone. *extend to the bone when it's not treated*
- Initiated: by **trauma** to the skin. *any kind of trauma that allow the fungi to penetrates the tissue*
- Treatment: difficult, so surgical intervention is frequently employed
- Affect: both healthy host and immunocompromised host (more severe)

Examples of Subcutaneous Mycoses:



1) Mycetoma (Madura foot) :

- **chronic** granulomatous disease of the skin and subcutaneous tissue, which sometimes involves muscle, and bones. **once the bone is infected, it will be difficult to treat so most of the time they will amputate the limb**
- typically affects (depend on the sites):
 - 1- The **lower extremities** mainly, **foot is the most common site**
 - 2- other areas of the body e.g. hand, back and neck.
- The disease was first described in the Madura district of India in 1842, (**Madura foot**).
- Is endemic in **tropical**, subtropical, and temperate regions. **Sudan**, Senegal, Somalia, India, Pakistan, Mexico, Venezuela
- Is more **common in men than in women** (ratio is 3:1) and Commonly in people who work in **rural areas, framers**.



Classification & Etiology:

	Eumycetoma	Actinomycetoma
Etiology	<p>several mould fungi The most common are</p> <ul style="list-style-type: none"> • Madurella mycetomatis • Madurella grisea <p>(Both two above are most common)</p> <ul style="list-style-type: none"> • Pseudallescheria boydii 	<p>aerobic filamentous bacteria (Actinomycetes). gram positive.</p> <ul style="list-style-type: none"> • Actinomadura madurae • Streptomyces somaliensis • Nocardia brasiliensis
Clinical findings	<p>similar for both. but Eumycetoma usually more localized than actinomycetoma</p>	
Color of grains "depend on the etiology"	<p>black or white</p>	<p>yellow, white, yellowish-brown, pinkish-red.</p>

➤ Important: Don't confuse Actinomycetoma with Actinomycosis (which is an infection caused by Actinomycetes, Gram +ve anaerobic bacteria).

Dr's notes: it's important to know the **etiology** of the disease, so you can know how to treat it, symptoms are not useful because they are similar for both Eumycetoma and Actinomycetoma)

Pathogenesis /Clinical Presentation of Mycetoma

Trauma of the skin (Break skin barrier)

Start as a painless subcutaneous swelling (history of trauma)

Years later, painless subcutaneous firm nodule is observed

Massive swelling + skin rupture + sinus tract formation

➤ old sinuses close and new ones open, draining exudates with grains (granules)

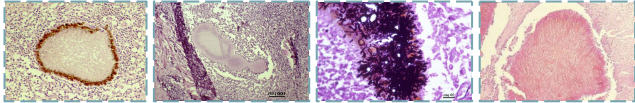
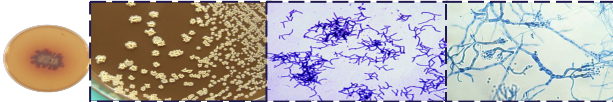
➤ Grains may sometimes be seen with the naked eye.



Diagnosis:

Clinical samples:

- 1) **Biopsy tissue** is Superficial samples of the draining sinuses are inadequate (**the best**) 2) Pus 3) Blood (for **serology** only)

Direct microscopic examination Microscopic examination of tissue or exudate from the draining sinuses	Histological sections	Hematoxylin-Eosin
	smears	Fungi: stain with 1) Giemsa 2) Gomori methenamine silver 3) periodic acid-Schiff stain Actinomycetes: stain with 1) Gram 2) ZN (Actinomycetes)
	Grains	Observing the <u>size</u> of the filaments , the <u>color</u> of the grain Examples: White-to-yellow grains indicate: P . boydii, Nocardia species, or A. madurae infection. Black grains indicate: Madurella species infection. Red-to-pink grains indicate: A . pelletieri infection.
Culture	<p>Media such as Sabouraud dextrose agar (SDA) to isolate fungi Fungi are identified based on the macroscopic and microscopic features.</p> <p>Blood agar to isolate bacteria For Actinomycetes biochemical and other tests are used for identification</p>	
Serology	<ul style="list-style-type: none"> -Detect the antibodies using culture filtrate or cytoplasmic antigens of mycetoma agents Antibodies can be determined by immunodiffusion, enzyme-linked immunosorbent assay . - Helpful in some cases for diagnosis and follow-up. 	

Treatment :

> **Eumycetoma** (fungi):

1) **Itraconazole**

2) Voriconazole

3) Amphotericin B

> **Actinomycetoma** (bacteria):

Combination of 2 drugs is **used**

1) Trimethoprim-sulfamethoxazole

2) Dapsone

3) Streptomycin

> Therapy is suggested for **several months or years** (1-2 years or more)

long time

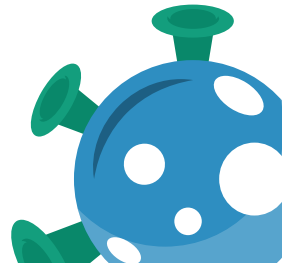
> **Actinomycetoma generally respond better to treatment than eumycetoma**

> **Surgical Care:** In eumycetoma, surgical treatment (debridement or amputation) in patient **not** responding to medical treatment alone and if bone is involved. usually, in case of eumycetoma, medication by it self doesn't kill all the fungi so we need surgery

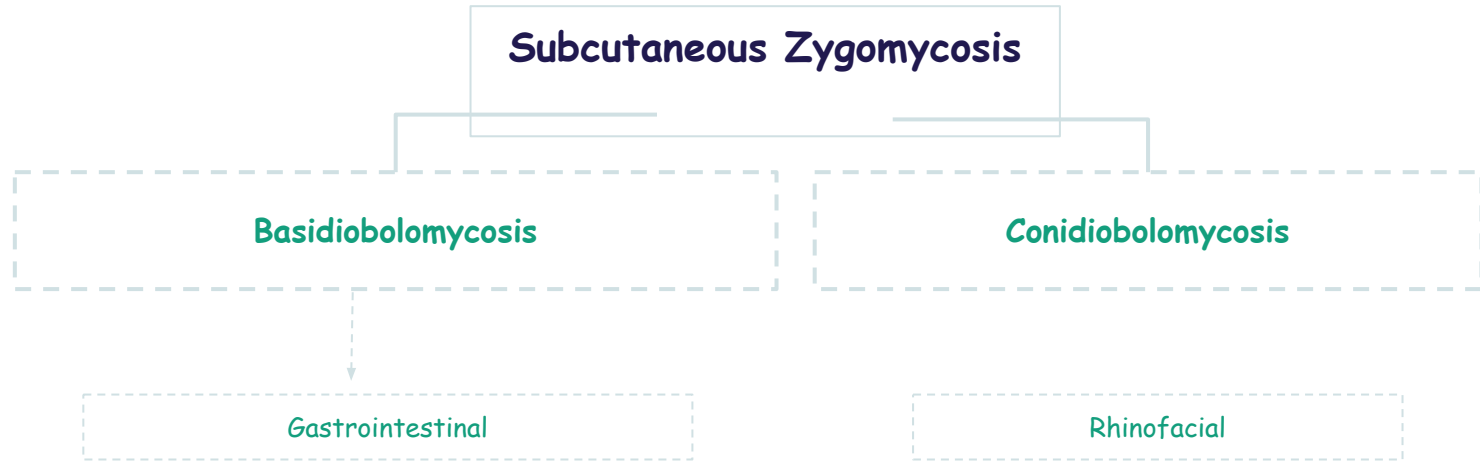
> **Radiologic tests** (bone radiographs): if bone involvement is suspected (Multiple lytic lesions or cavities, Osteoporosis)

Note 1: It's very important because we can see the bone

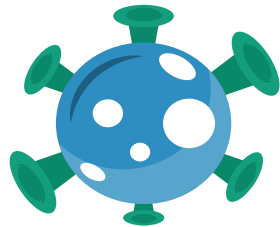
Note 2: it's impotent for all mycetoma patients for management and follow up



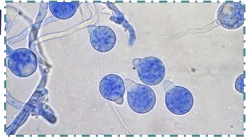
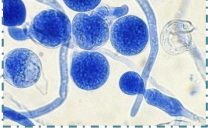



2) Subcutaneous Zygomycosis :

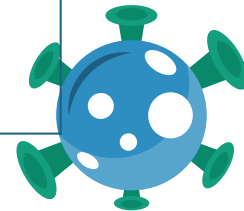


It will be discussed in the next slide




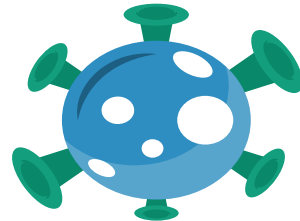
2) Subcutaneous Zygomycosis :

What is it?	Chronic localized firm subcutaneous masses
Location	Facial area or other like hand, arm, leg, thigh
Etiology	<p>Mould fungi of the Zygomycetes : (Entomophthorales, Mucorales)</p> <p>1- Mucorales : Mostly in immunocompromised</p> <ul style="list-style-type: none">➤ Rhizopus➤ Mucor <p>2- Entomophthorales : Mostly in immunocompetent</p> <ul style="list-style-type: none">➤ Conidiobolus coronatus➤ Basidiobolus ranarum  <p>Basidiobolus ranarum</p>  <p>Conidiobolus coronatus</p>
Clinical Features	<ul style="list-style-type: none">- Firm swelling of site with intact skin-Distortion.- Direct spread to adjacent bone and tissue   
Acquired via	Traumatic implantation of spores, needle-stick, tattooing, contaminated surgical dressings, burn wound. (Inhalation of spores)



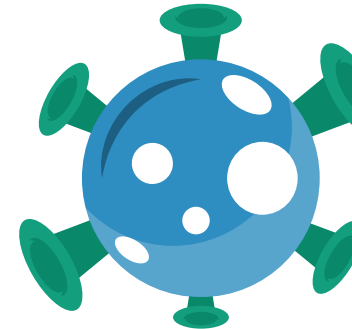
-Basidiobolomycosis (Gastrointestinal)

What is it ?	<p>Basidiobolus is a species of filamentous fungi that belongs to the order Entomophthorales, Zygomycete</p> <p>Patient comes with abdominal mass + pain, and commonly this is misdiagnosed as tumor. It will be surgically removed. However, later on it appears to be fungi. And it is common in KSA!! 65% of cases appear in children</p>
Laboratory Diagnosis	<ul style="list-style-type: none">➤ Specimen: Biopsy tissue.➤ Direct microscopy: stained sections or smears: broad non-septate hyphae.➤ Culture: Culture on SDA (Sabouraud dextrose agar) 
Treatment	<ul style="list-style-type: none">➤ Oral Potassium iodide(KI)➤ Amphotericin B. (DRUG OF CHOICE)➤ Posaconazole (the other alternative)



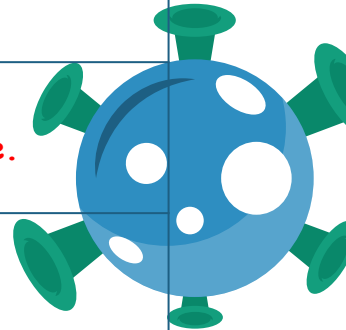
3) Sporotrichosis: Abdominal pain

Location	<ul style="list-style-type: none">- Subcutaneous- Deep cutaneous- Systemic fungal infection <p>From 437: This infection is common in gardeners.</p>
Etiology	<p>★ <i>Sporothrix schenckii</i> (Dimorphic fungus). Can be yeast / filamentous fungi depending on temperature.</p>
Clinical Features	<p>By Inoculation into the skin can present as</p> <ul style="list-style-type: none">- plaque (subcutaneous nodules).- Lymphangitic- Disseminated
Laboratory Diagnosis	<ul style="list-style-type: none">➤ Specimen: Biopsy tissue, ulcerative material .➤ Direct Microscopy: smear will show Finger-like yeast cells or Cigar shaped.➤ Culture: On SDA at room temperature and at 37C.
Treatment	<ul style="list-style-type: none">- Itraconazole (best),-KI (Potassium iodine).



4) Phaeohyphomycosis:

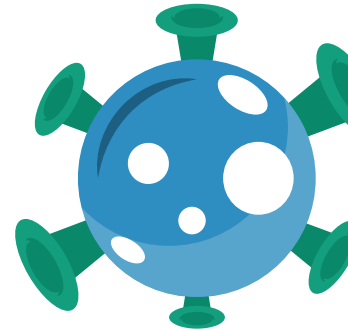
What is it?	group of fungal infections caused by dematiaceous (darkly pigmented) fungi widely distributed in the environment .
Location	Thigh, Legs, Feet, and Arms.
Etiology	Dematiaceous mold fungi (Common) <ul style="list-style-type: none">- Cladosporium.- Exophiala.- Wangiella.- Cladophialophora.- Bipolaris.
Clinical Features	Subcutaneous or brain abscess Presents as nodules or erythematous plaques with no systemic involvement.
Diagnosis	Specimens: Pus, biopsy tissue. Direct Microscopy: KOH & smears will show brown septate fungal hyphae. Culture: On SDA.
Treatment	-the treatment of choice Surgical excision of the lesion - Antifungal (Itraconazole, Posaconazole).



5) Chromoblastomycosis

What is it?

- Subcutaneous chronic fungal infection different dematiaceous fungi.
- The initial lesion is single nodule, then new nodules appear.
- The lesions become large with a cauliflower aspect and black dots, hyperkeratotic, Verrucous, Ulcerative



Summary

special thank for 443

	Mycetoma	Subcutaneous zygomycosis	Sporotrichosis	Chromoblastomycosis	Phaeohiphomycosis
Etiology	1) <u>Eumycetoma</u> 2) Actinomycetoma	Mould fungi	Dimorphic fungus	Dematiaceous (darkly pigmented) mould fungi	Dematiaceous mould fungi
The most common	1) *Madurella mycetomatis *Madurella grisea *Pseudallescheria boydii 2) *Actinomadura madurae *Streptomyces somaliensis *Nocardia brasiliensis	Zygomycetes - Entomophthorales: Conidiobolus coronatus, Basidiobolus ranarum - mucorales: Rhizopus, Mucor	Sporothrix schenckii	-	- Cladosporium - Exophiala - Wangiella - Cladophialophora - Bipolaris
Diagnosis “Clinical sample”	- Biopsy tissue - Pus - Blood (for serology only)	Biopsy tissue		Biopsy tissue	
Diagnosis Direct Microscopy	- Histo: Hematoxylin-Eosin - Stain with Giemsa, Gomori methenamine silver, periodic acid-Schiff stain (Fungi) - Stain with Gram, zn (Actinomycetes)	Broad non-septate hyphae	- Finger-like yeast cells or Cigar shaped - Elongated yeast cells	Muriform cells (sclerotic bodies)	brown septate fungal hyphae
Diagnosis Culture	- SDA to isolate fungi - Blood agar to isolate bacteria	SDA (Sabouraud dextrose agar)	SDA (Sabouraud dextrose agar) at room temperature and at <u>37C</u> .	-	SDA (Sabouraud dextrose agar)
Treatment	1) Itraconazole, Voriconazole, Amphotericin B 2) Trimethoprim-sulfamethoxazole Dapsone and Streptomycin. “Combination of 2 drugs” - Surgical care	- Oral Potassium iodide (KI) - Amphotericin B - Posaconazole	- Itraconazole - KI	Surgery (Antifungal therapy)	- Surgical excision of the lesion - Antifungal (Itraconazole, Posaconazole)
Clinical Features	- swelling and abscess formation. - multiple draining sinuses and discharge contain grains. - involves the extremities (specifically FOOT)	- Firm swelling of site with intact skin-Distortion. - Direct spread to adjacent bone and tissue	Subcutaneous or systemic infection Nodular subcutaneous lesions, verrucous plaques or Lymphatic	Subcutaneous Verrucous plaques cauliflower aspect, hyperkeratotic, Ulcerative	Subcutaneous or brain Abscess Nodules and erythematous plaques

Summary

	Sporotrichosis	Phaeohyphomycosis	Chromoblastomycosis
Clinical features	Subcutaneous or systemic infection Nodular subcutaneous lesions, verrucous plaques or Lymphatic	Subcutaneous or brain Abscess Nodules and erythematous plaques	Subcutaneous Verrucous plaques, cauliflower aspect, hyperkeratotic, Ulcerative
Etiology	Dimorphic fungus <i>Sporothrix schenckii</i>	Dematiaceous (darkly pigmented) mould fungi	Dematiaceous mould fungi
Clinical sample	Biopsy tissue	Biopsy tissue	Biopsy tissue
Direct Microscopy	Elongated yeast cells	Brown setpate hyphae	Muriform cells (sclerotic bodies)
Treatment	Potassium iodide Itraconazole	Surgery (Antifungal therapy)	Surgery (Antifungal therapy)

MCQs:

Q1: How Subcutaneous Mycoses initiated?

A) Bacteria

B) Trauma

C) Fungi

D) Virus

Q2: which is the common part of the body that mycetoma typically affect?

A) Hands

B) Hip joint

C) Back and spine

D) Foot

Q3: What is the type of immunity of people who get Subcutaneous Mycoses?

A) Healthy host

B) Animals

C) Both A & D

D) immunocompromised host

MCQs:

Q4: Which one of the following cause brain abscess?

A) Phaeohyphomycosis

B) Sporotrichosis

C) Subcutaneous
zygomycosis

D) Mycetoma

Q5: To isolate fungi we use....

A) Chocolate agar

B) Blood agar

C) Neomycin agar

D) SDA

answer: 1-B 2-D 3-C 4-A 5-D

SAQ:

1- Explain the clinical presentation of Mycetoma?

Slide 5

2- compare between Eumycetoma and Actinomycetoma in terms of etiology, Color of grains and treatment

Slide 5,7

3-The preferred treatment for Sporotrichosis ?

Itraconazole

Meet The Team :



Norah Al Bahily

Leaders

Yazeed Al Ghazi

Noreen Almarabah



Mohammed Alsahli



Al Jawharah Alyahya

Members

Khalid Alghamdi

Lujain Darraj

Abdulrahman Almutairi