**2.6.1.3. Lecture nr.3 – Mucocutaneous mycosis.– 2 hours**

**Dermatomycoses: definition and characteristics**

Dermatomycoses are infections of the skin, hair or nails by fungi. The principal causative agents are dermatophytes, which are subdivided into three groups: Microsporum spp., Trichophyton spp. and Epidermophyton floccosum.

Besides the dermatophytes, yeasts are also capable of causing skin disorders. The most frequent agents in this case are Candida spp. and Pityrosporum.

**Etiology of dermatomycoses**

- Dermatophytons of 3 genera: Trichophyton, Microsporum and Epidermophyton
- Keratophytons of some yeast species: Pityrosporum ovale, Pityrosporum orbiculare, Malassezia furfur
- Candida genus (Candida albicans)
- Pseudofungi (Corynebacterium minutissimum and Actinomyces israelii)
- Moulds (Scopulariopsis, Aspergillus, Penicillium, etc.).

**Dermatophytes – development of dermatophytosis**

As already mentioned in the introduction, fungal infections do not occur without reason. As dermatophytes are not commensals, a prerequisite for the development of an infection is exposure to the fungus. This is possible, for example, by direct contact with infected persons or animals, but it is more often a question of contact with fungal spores. These spores are contained in epithelial (skin) elements of infected persons everywhere in our environment. The floors of communal shower stalls and changing rooms are major sources of infection. For the development of an infection, however, more is needed than contact alone. Dermatophytes prefer warm, moist conditions. This is why a dry, intact skin constitutes a virtually impenetrable barrier. But the chance of infection is encouraged by everything that has an adverse influence on the situation.

**Dermatophytes – their host**

Dermatophytes do not have an exclusive preference for human beings. Some of the infections in humans even originate in (domestic) animals. On the basis of the original host, a distinction is made between anthropophilic, zoophilic and geophilic dermatophytes. This distinction is very important, chiefly because in the event of infection of human beings by zoophilic dermatophytes, the source of the infection (the animal) must be co-treated. In the case of geophilic infections one can try to avoid further contact with the source.

**Yeasts**

The two major species of yeast capable of causing skin infections are Candida albicans and Pityrosporum ovale. The most striking property of these yeasts is that they are commonly part of the normal flora. We are therefore dealing with real opportunists. This also means that the way in which an infection develops is quite
different to an invasion by dermatophytes. In the case of yeast infections, particular importance attaches to predisposing factors.

**Candida**

There are about 100 known species of the Candida genus. Not all Candida species are present in human beings as commensals or pathogens, not by any manner of means. It is only in exceptional cases that another yeast than Candida albicans plays a role. C. albicans is normally present as a commensal in the mouth, the gastrointestinal tract and the vagina.

There are various predisposing factors which are conducive to the transition from commensal to pathogenic. A moist skin, a high pH and the presence of sugars and certain amino acids create a favourable climate for Candida. In the host, reduced cellular immunity is a major predisposing factor. Diabetes mellitus is also frequently implicated in Candida infections.

**Dermatomycoses – classification**

Dermatomycoses can be classified in various ways.

The simplest of all would seem to be a systematic arrangement on the basis of the causative agents: trichophytosis, epidermophytosis, microsporosis, candidosis (candidiasis) and pityrosporosis.

A classification focused more on the epidemiology and method of dissemination is one that is based on the original host of the various fungi. This produces such terms as anthropophilic, zoophilic and possibly geophilic agents: fungi which therefore have human beings, an animal or the soil as their primary habitat.

The most widely used classification is largely based on the site of the clinical picture. As mentioned earlier, the largest group of dermatomycoses consists of disorders which are caused by dermatophytes. They are designated by the name 'tinea'. A distinction is made between the tinea group (dermatophyte infections), which is subdivided according to the site of the infection, and a group of yeast infections, in which the subclassification is on the basis of the causative agent.

**Tinea capitis**

In tinea capitis, also called ringworm of the scalp, the lesions are typically ring-shaped and the skin and hair are infected. The hairs break off and leave bald patches.

Four subgroups of tinea capitis can be distinguished: Microsporosis, Trichophytosis (herpes tonsurans), Favus, Kerion.

**Tinea corporis**

Every dermatophyte can be the causative agent of tinea corporis. The nature of the dermatophyte may help to indicate the source.

Clinical picture: the general characteristics are annular scaling patches and a slowly expanding edge with inflammation which is frequently somewhat elevated. The lesion spreads peripherally and tends to heal in the centre. After several months, depending in part on the species of fungus involved, spontaneous healing can occur.

**Tinea cruris**

Tinea cruris is usually caused by Epidermophyton floccosum or Trichophyton rubrum. The disorder occurs quite often in association with tinea pedis.
Clinical picture: Tinea cruris begins with arcuate erythematous plaques in the perineal fold which spread to the thighs. Itch and a burning sensation are the patient's major complaints. Scaling is not always present.

**Tinea pedis interdigitalis**

In tinea pedis three species of fungus play a role: Trichophyton mentagrophytes, T. rubrum and Epidermophyton floccosum. Infection is produced by direct contact with a fungus. Infection is mainly encouraged by warm, moist conditions.

Clinical picture: Tinea pedis is known by various names. It is popularly called athlete's foot. Tinea pedis can best be described as an intertriginous dermatitis with scaling of the skin, cracking and maceration -- especially of the skin in the space between the toes. The lesion can subsequently spread to the lower and upper surfaces of the toes and even to the entire sole of the foot. The patient complains of itch, an unpleasant smell and a manifest inflammatory reaction.

**Tinea unguium**

The principal agent is Trichophyton rubrum, which is frequently also the cause of tinea pedis.

Clinical picture: The usual clinical findings are atrophy, discoloration and subungual hyperkeratosis. Onychomycosis may be the patient's only disorder, but in many cases the skin is also affected. Tinea pedis is frequently attended by an onychomycosis of the toenails.

**Candidosis**

Candida albicans is the most widely known and most pathogenic species of yeast. C. albicans is normally present as a commensal in human beings, especially in the gastrointestinal tract and in some women also in the vagina.

In skin disorders, Candida infections are most often found in the large and small flexure lines; this is frequently referred to as intertrigo. The patient often experiences itch and a burning pain. Infection of the mucosa and the adjacent skin are quite often concomitant. The course of a Candida infection is frequently chronic, albeit varied. Besides dermatological problems, Candida species are also capable of causing other syndromes.

**Pityriasis versicolor**

For a long time the causative agent of pityriasis versicolor was called Malassezia furfur. This yeast species is always present on the skin of human beings as a commensal, especially in ear wax, on the scalp and at other sites where many sebaceous glands are present.

Pityriasis versicolor is a disorder which is characterized by discoloration of the skin and very fine scaling.

**Diagnosis**

The examination of dermatomycoses can be subdivided into two parts:

- Dermatological examination, which is primarily a question of observation, can be supplemented with examination using Wood's light.
- Laboratory mycological examination: microscopic test and culture
Treatment

Fungal infections of the skin are treated with systemical and topical antifungal drugs such as Griseofulvin, Itraconazol, Ketoconazol, Fluconazol, etc.