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# **Agents of skin-manifested infections – I**

**The 10th lecture for 3rd-year students of dentistry  
9th December, 2010**

# Common superficial injuries – revision

- *Staphylococcus aureus*
  - *Streptococcus pyogenes*
  - beta-hemolytic streptococci of other groups (above all G, F, C)
- ! Attention in case of a foreign body in the wound (splinter, thorn) and in case of deeper stab wounds (esp. caused by horse manure soiled fork): *Clostridium tetani***

# Severe contused wounds – revision

- **Agents of clostridial myonecrosis (mostly *Clostridium perfringens*, *C. septicum*, *C. novyi*, *C. histolyticum*)**

**clostridial myonecrosis = anaerobic  
traumatosis = gas gangrene (crepitation of  
afflicted tissue) or malignant edema**

- ***Clostridium tetani***
- ***Staph. aureus*, *Strept. pyogenes* & other  
pyogenic bacteria**

# Wounds sustained in water – revision

- In fresh water:

*Pseudomonas aeruginosa*

*Aeromonas hydrophila*

other pseudomonads and aeromonads

- In salt water:

*Vibrio parahaemolyticus, V. vulnificus*

*Mycobacterium marinum* (also in fresh-water swimming pools, tanks and aquaria)

# Injuries sustained in the tropics – revision

## Mainly on feet

- **soil nocardiae** (*Dermatophilus congolensis*, *Rhodococcus equi*)
- **atypical mycobacteria** (*Mycobacterium ulcerans*, *Mycobacterium haemophilum*)
- **micromycetes** (*Sporothrix schenckii*, *Paracoccidioides brasiliensis*)

# Surgical wounds – revision

***Staphylococcus aureus***

**coagulase-negative staphylococci (mainly  
*Staphylococcus epidermidis*)**

***Enterobacteriaceae* (*Escherichia coli*,  
*Proteus mirabilis*)**

***Streptococcus pyogenes***

**anaerobes (*Peptostreptococcus micros*,  
*Peptostreptococcus anaerobius*,  
*Bacteroides fragilis*)**

# Burns – revision

Almost everything, but predominantly:

*Pseudomonas aeruginosa*

*Staphylococcus aureus*

*Streptococcus pyogenes*

other streptococci

enterococci

candidae and aspergilli

# Man-inflicted bites – revision

members of oral microflora

- „oral streptococci“ (*Streptococcus sanguinis*, *S. oralis*, *S. anginosus*)
- anaerobes (*Fusobacterium nucleatum* ssp. *nucleatum*, *Porphyromonas gingivalis*)

*Staphylococcus aureus*



# Animal bites – revision

**Most often:**

***Pasteurella multocida* (cats, dogs)**

**Less often:**

***Staphylococcus aureus* (any animal)**

***Capnocytophaga canimorsus* (dogs)**

***Streptobacillus moniliformis* (rats)**

***Spirillum minus* (mice, rats, cats, dogs)**

***Francisella tularensis* (cats)**

**& many others**

# Other injuries by animals – revision

*Francisella tularensis* (rodents, hares – tularemia)

*Bartonella henselae* (cat scratch disease)

*Erysipelothrix rhusiopathiae* (pigs, carps – erysipeloid)

*Bacillus anthracis* (herbivores – skin anthrax, pustula maligna)

*Burkholderia mallei* (horses, donkeys – glanders, malleus)

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# Infections with skin symptoms

1. primary skin infections
2. secondary infections of already diseased skin
3. skin symptoms of systemic infections

**Etiology:** bacterial

viral

fungal

parasitic

# Primary acute bacterial skin infections – I

acne vulgaris – *Propionibacterium acnes*

carbunculus nuchae – *Staphylococcus aureus*

ecthyma gangraenosum – *Pseudom. aeruginosa*

erysipelas – *Streptococcus pyogenes*

erysipeloid – *Erysipelothrix rhusiopathiae*

erythema migrans – *Borrelia burgdorferi*

erythrasma – *Corynebacterium minutissimum*

# Primary acute bacterial skin infections – II

- folliculitis – *Staph. aureus, P. aeruginosa*
- furunculosis (boil) – *Staphylococcus aureus*
- hidradenitis suppurativa – *Staph. aureus*
- hordeolum (stye) – *Staph. aureus*
- impetigo – *Staph. aureus, Str. pyogenes*
- lymphangoitis – *Streptococcus pyogenes*
- panaritium – *Staphylococcus aureus*
- paronychium – *Staphylococcus aureus*
- sycosis barbae – *Staphylococcus aureus*

# Primary chronic bacterial skin infections

**actinomycosis** – *Actinomyces israelii*

**chronic subcutaneous abscesses** – *A. israelii*, *Nocardia asteroides*,  
*Rhodococcus equi*

**skin granulomas** – *Mycobacterium marinum*, *M. haemophilum*, *M. chelonae*

**leprosy** – *Mycobacterium leprae*

**lupus vulgaris** – *Mycob. tuberculosis*

**scrophuloderma** – *M. tuberculosis*, *M. bovis*

# Secondary infections of skin lesions

**decubitus (bedsore), trophic ulcer** – neighbouring and endogenous flora (staphylococci, streptococci, enterococci, enteric bacteria, pseudomonads and other Gram-negative non-fermenting rods, anaerobes, yeasts)

**infected atheroma** – *S. aureus*, *Propion. acnes*

**infected intertrigo (raw)** – *S. aureus*, *P. acnes*

**sec. infected dermatomycoses** – *S. pyogenes*

**infected wounds** – discussed in previous lecture

# Skin symptoms of systemic bacterial infections

**roseola** (rash in typhoid fever) – *Salmonella Typhi*

**disseminated gonorrhoea** – *Neisseria gonorrhoeae*

**infective endocarditis** – to be dealt with by sepsis

**meningococemia** – *Neisseria meningitidis*

**scarlatina** (scarlet fever) – *Streptococcus pyogenes*

**SSSS** (staphylococcal scalded skin syndrome) –  
*Staphylococcus aureus*

**toxic shock syndrome** – *S. aureus*, *S. pyogenes*

**syphilis** – *Treponema pallidum*



# Etiology of skin fungal infections

## Etiology differs in

- **superficial mycoses, like pityriasis versicolor**  
– *Malassezia furfur* (prev. *Pityrosporum ovale*)
- **mucocutaneous mycoses** – *Candida albicans*  
and other species of candidae
- **cutaneous mycoses** – typical dermatophytes
- **subcutaneous mycoses**
- **opportunistic skin mycoses** in immunodeficient

# Etiology of cutaneous mycoses

**tinea pedis** – *Trichophyton rubrum*, *Trich. mentagrophytes* var. *interdigitale*,  
*Epidermophyton floccosum*

**onychomycosis** – *T. rubrum*, *E. floccosum*

**tinea corporis** – *T. rubrum*, *Microsporum canis*, *M. gypseum*, *T. mentagrophytes* var.  
*mentagrophytes*, *E. floccosum*

**tinea capitis**, type **ectothrix** – *M. gypseum*, *M. canis*, *M. audouinii*, *T. mentagrophytes* var.  
*mentagrophytes*, *T. verrucosum*

type **endothrix** – *T. tonsurans*

**favus** – *Trichophyton schoenleinii*

# Etiology of subcutaneous mycoses

- pheohyphomycosis** (lesions with pigmented hyphae) – genera *Alternaria*, *Aureobasidium*, *Cladosporium*, *Culvularia*, *Exophiala*, *Phaeoannelomyces*, *Phoma*, *Wangiella* & others
- chromoblastomycosis** (wartlike nodules with sclerotic bodies) – *Cladophialophora*, *Fonsecaea*, *Phialophora*
- mycetoma eumycoticum** (swollen lesion with draining tracts containing small grains) – *Acremonium*, *Exophiala*, *Madurella*, *Pseudoallescheria* (= *Scedosporium*)
- sporotrichosis** (dimorphic fungus) – *Sporothrix schenckii*

# Etiology of opportunistic skin mycoses in immunodeficiencies

*Fusarium solani*, *Fusarium oxysporum*,  
*Fusarium verticillioides*

*Pseudoallescheria boydii* (= teleomorph,  
sexual phase of anamorph *Scedosporium*  
*apiospermum*)

*Penicillium marneffei* (systemic infection  
with skin manifestations)

*Scopulariopsis brevicaulis*

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# Homework 7 – solution

**Edvard Munch (1863-1944):  
Death in a Sickroom (1893)**



# Homework 7

**Successful homework solvers:**

**Stephen Symeonides**

**Congratulations!**

# Homework 8

**Albert Anker (1831-1910):  
The Quack Doctor (1879)**



# Homework 8

**Successful homework 8 solvers:**

**Sorry, no answers have been received**



# Homework 9

Jan Havickzoon  
Steen (1626-1679):  
The Sick Woman  
(c. 1665)



# Homework 9

Another two pictures by Jan Havickzoon Steen (1626-1679)  
on the similar topic:  
The Lovesick Woman (1960) The Doctor's Visit (1960-63)



# Homework 9

**Successful homework 9 solvers:  
Stephen Symeonides**

**Congratulations!**

# Homework

## 10

Please give the name  
of the author and of  
the painting



# Answer and questions

The solution of the homework and possible questions please mail (on 6.30 a.m. at the latest) to the address

[mvotava@med.muni.cz](mailto:mvotava@med.muni.cz)

Thank you for your attention