

# Focal infection

Restorative dentistry – differential diagnosis  
Seminar 1

**M U N I  
M E D**

**The influence of oral microbes  
and oral inflammations on  
distant tissues and organs**

# Oral microbiom

- Microbs living in oral cavity are saprophytic and opportunistic pathogens
- Most of them live in the biofilm
  - Dental biofilm (plaque) – on teeth or dentures
  - Oral mucous membrane biofilm

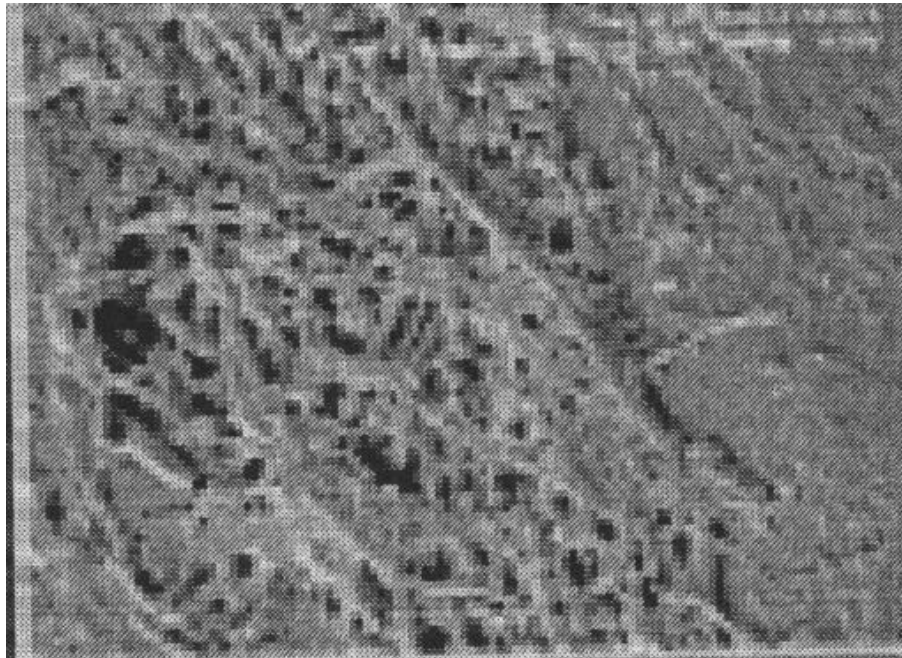
Microbs are in a close contact with tissues

# Dental biofilm



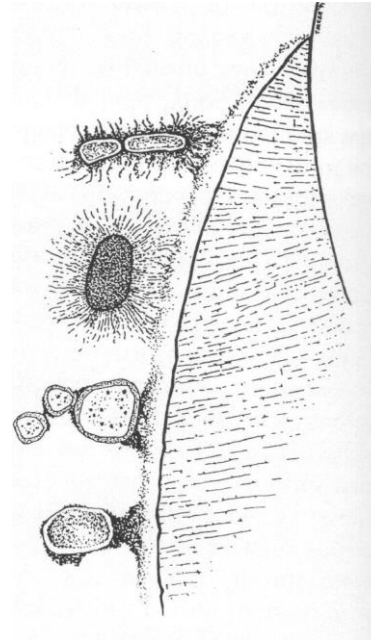
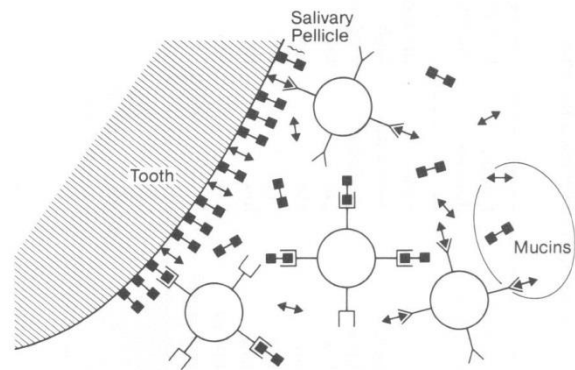
# Pelicle

- A layer of proteins from saliva that precipitate on the tooth



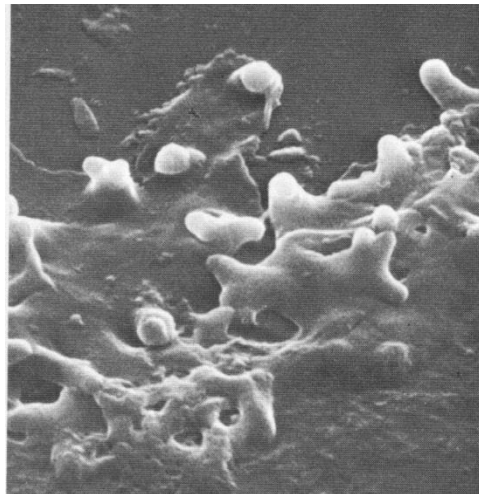
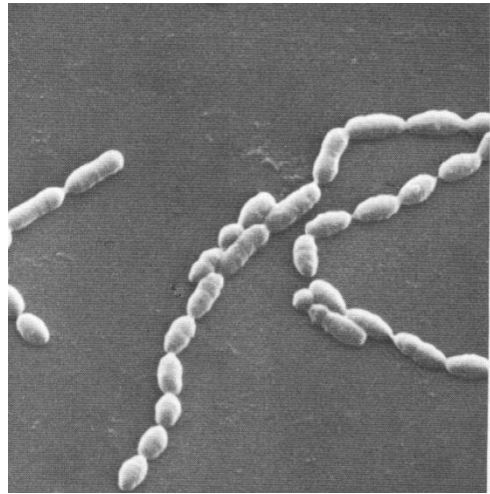
# Dental biofilm

- Adherence



# Dental biofilm

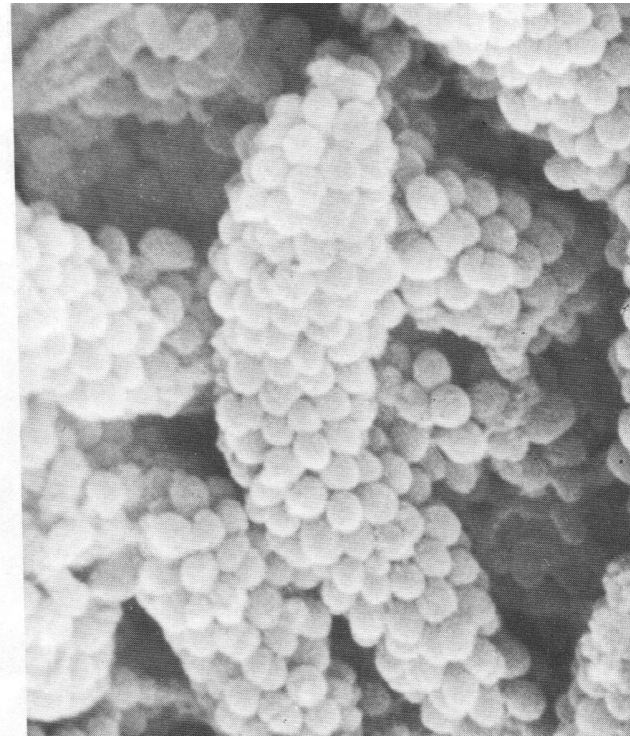
- Colonization and coaggregation





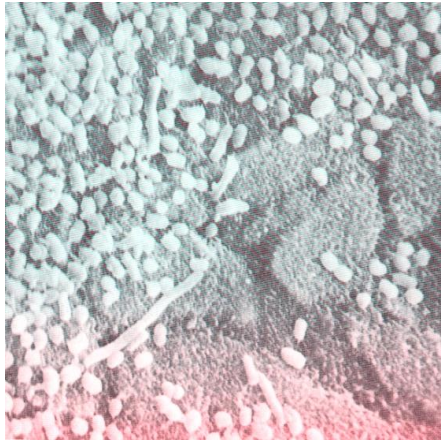
# Dental biofilm

- Maturation

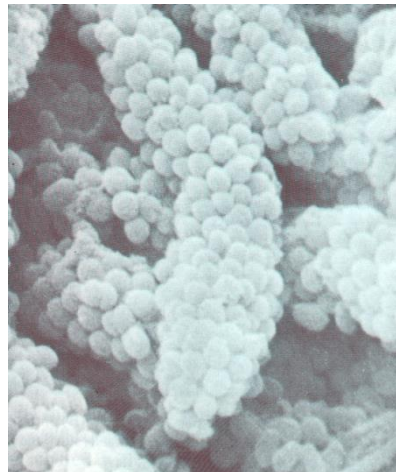
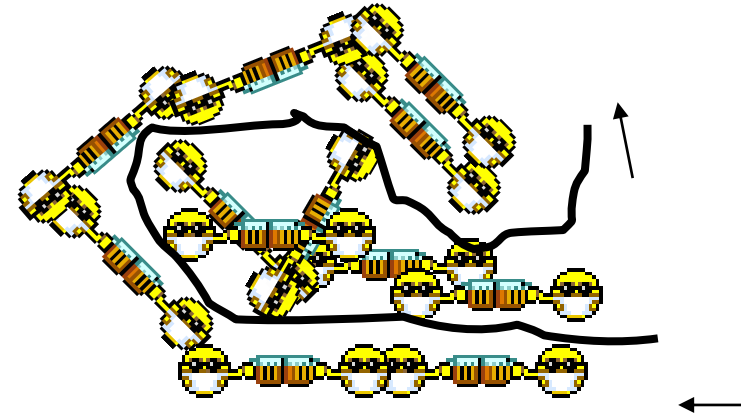
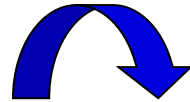




# Dental biofilm



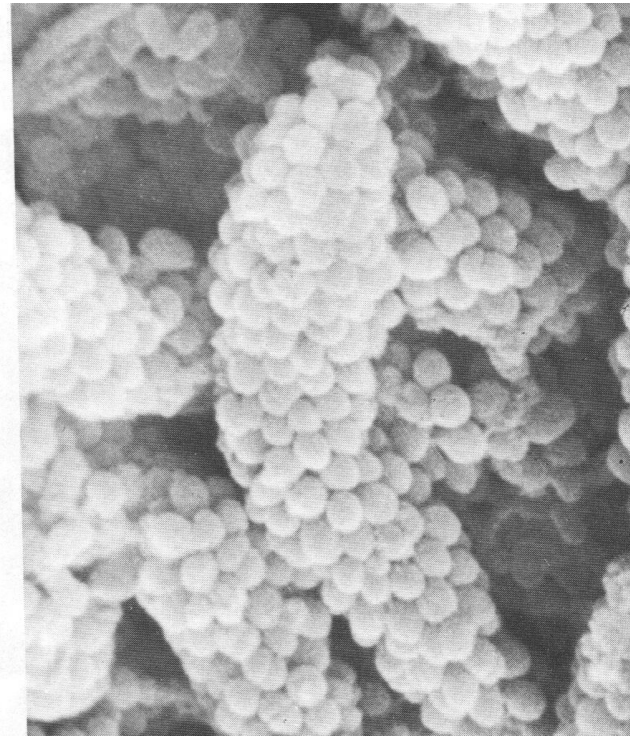
**Community**



More species,  
Better conditions for survival  
Higher resistancy  
Higher virulency



# Structure of the biofilm



# Inflammation in oral cavity

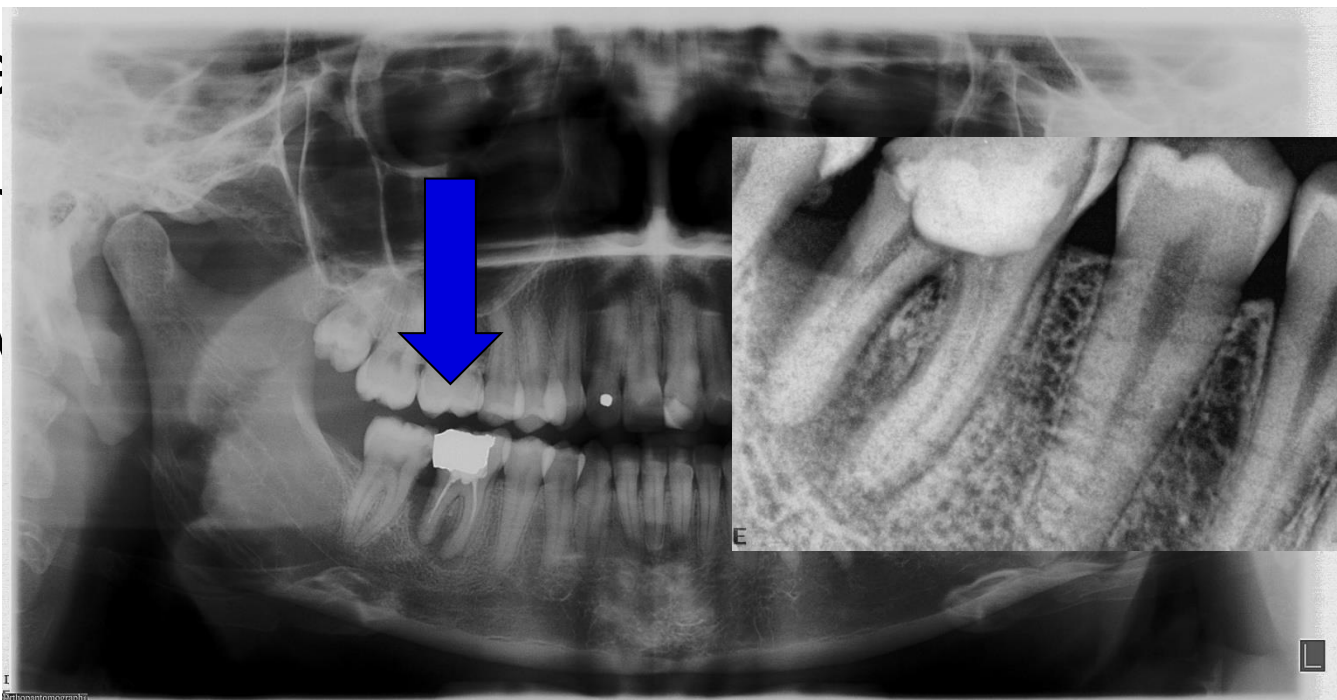
- Infectious origin or secondary contamination (e.g. traumatic aethiology)
- The most common diseases:
  - dental caries
  - periodontitis

# Dental caries

– Penetration to dental pulp –

invasion of microbes, pulpitis, necrosis, gangraena, apical

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# Dental caries

– Penetration to dental pulp –

invasion of microbes, pulpitis, necrosis, gangraena, apical  
periodontitis:

The inflammation affects connective tissue in periodontal space and  
alveolar bone



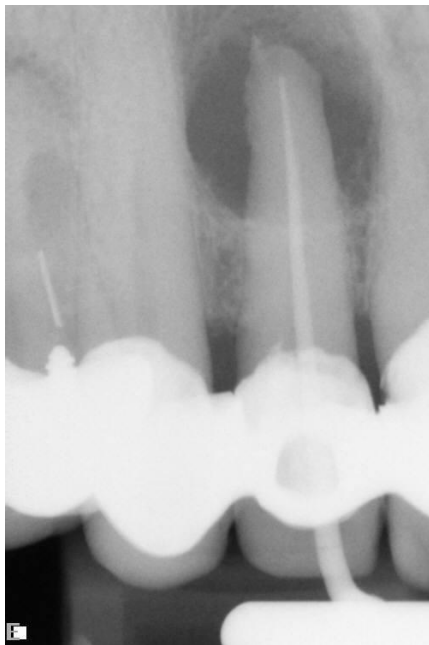
# Periodontitis

- Penetration of microbes into soft tissues, connective tissues in periodontal space and alveolar bone.

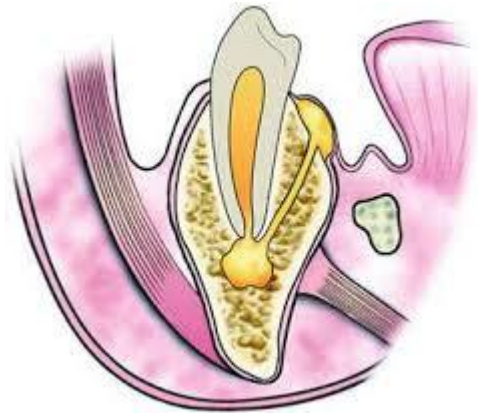


# Dentitio difficilis, radicular cysts, apical periodontitis

- The infection can penetrate per continuitatem into soft tissues around mandible or maxilla as well as into the bone.



# Spreading of infection per continuitatem



Source: anat.l.if.cuni.cz

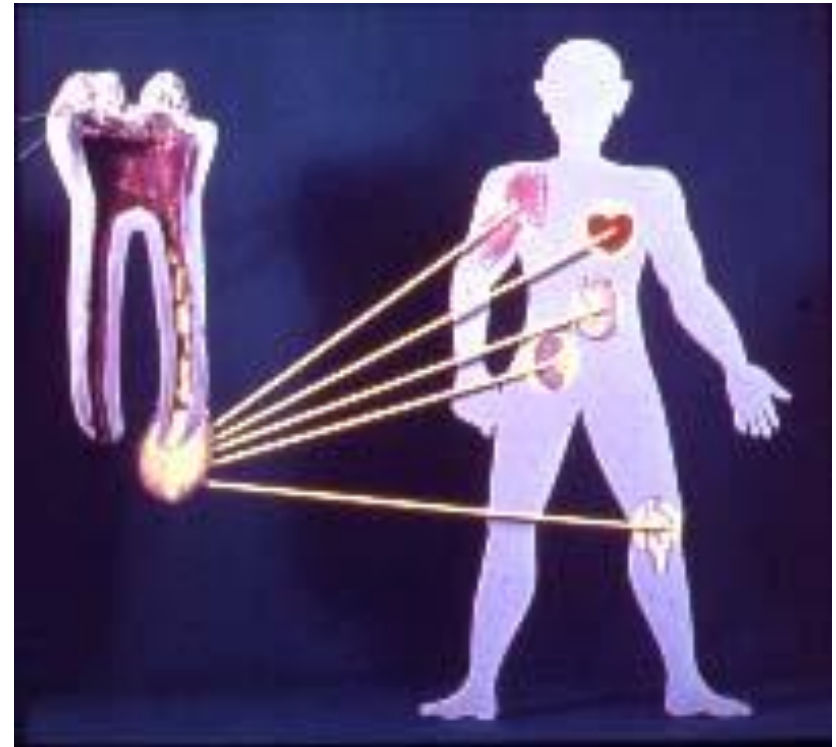


Source: telemedicina.med.muni. z



# Microbs from oral microflora as well as microbs from inflammatory focus

Can have an influence on distant structures without any signs of propagation per continuitatem



Source: [www.zuby.cz](http://www.zuby.cz)

# Three ways of microbial injury

- Metastatic infection
- Immunomodulation and immunotoxic injury
- Metastatic toxic injury



# Metastatic infection

– Dissemination of saprophytic and opportunistic microflora

Bacteriemia – adherence microbes on surfaces other tissues esp.  
when damaged due to pathologic process

Streptococci, staphylococci, actinobacilli

Endocard and endothel when damaged

# Metastatic infection

Endocarditis

Vasculitis

Inflammation of the socket of arteficial valve

# Immunomodulation and immunotoxic effect

- Bacterial antigens provoke immune response that can damage similar antigens from tissue of organism



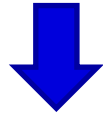
Sterile consequences of angina, erysipiel, glomerulonephritis or pancreatitis

# Immunomodulation and immunotoxic effect

– Bacterial antigens + circulating antibodies



Immunocomplexes



Adsorption in tissues



Activation of pathological processes

*Uveitis, iridocyclitis, rosacea, glomerulonephritis, rheumatic fever*

# Metastatic effect of bacterial toxins

- Parts of bacterial cells – endotoxin, lipopolysacharids, peptidoglykan



Histotoxic and cytotoxic properties

Toxic damage of neurons (algia or paresis), pyrexins (subfebriles),  
damage of leucocytes and macrofags (immunodefect)



# Reasons of bacteraemia

- Mastication
- Practising of oral hygiene
- Dental treatment procedures
- Inflammatory focuses

Pathological consequences can be expected esp. when immunity of the organism is decreased

# Focal infection

– Two principal levels of the approach:

Diagnostic-therapeutical

Prophylaxis of the distant effect of oral microflora

# The dentist can be asked for

- Exclusion of focal infection in certain diagnosis
  
- Exclusion of possible risks in certain situations

# Causal consequences

- Increased temperature (subfebril temperature)
- Uveitis, iridocyclitis
- Orofacial neuralgia and paresis of unknown origin
- Rheumatic fever (subacute)
- Neuralgia n. trigemini
- Endocarditis
- Cellulitis (localised abscesses of unknown origin)
- Asthma bronchiale

# Prophylactic approach

- Preparation for transplantation
- Immunosuppressive therapy
- Intensive chemotherapy
- Surgical intervention on open heart and big blood vessels
- Valve and vessel implantation



# Dentists can ask general practitioner or specialist for consultation in patients with

- Congenital and aquired immunodeficiency
- Disorders of leucocytes and reticuloendothelial system
- Decompensated diabetes mellitus and hypoproteinaemia
- Congenital and aquired disorders of endocard
- Endocarditis in patient's history
- Active glomerulonephritis
- Preparation for radiotherapy in orofacial region
- Drug addiction
- Status post splenectomy

# Examination of the patient

- History
- Clinical examination
- Imaging methods – x ray
- Laboratory examinations should be available

# History

- Possible relation between problems in oral cavity and other disease.

# Clinical examination

- Non vital teeth esp. periapical lesions
- Cysts of odontogenic or other origin
- Impacted teeth
- Roots
- Periodontal status – periodontal pockets esp. when BOP is positive or if the suppuration is present
- Dentitio difficilis

# Clinical examination

- Regional lymphatic nodes
- Oral hygiene
- Iatrogenic damage
- Therapeutical suggestions

# Radiographic examination

– OPG and i.o. examination of necessary

Investigation:

Apical and other radiolucences

Osteolytic focuses

Periodontal pockets

Residual roots

# Laboratory examinations

- FW (sedimentation of erythrocyts)
- CRP
- Leucocytosis

Others



# Report - conclusion

- Clear statement if focal infection could be excluded or not.
- If not: suggestion:

*Treatment of high quality*

*Extraction*

*Endodontic treatment (if good prognosis is predictable)*

*Antibiotic prophylaxis*

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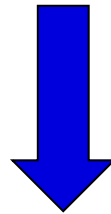
*Endodontic treatment (if good prognosis is predictable)*

*Antibiotic prophylaxis*

*Individual approach is necessary!!!*

# Antibiotic prophylaxis

- Short antibiotic medication before and sometimes after the treatment, high dosis.
- Aim: elimination of microbes from blood circulation



Minimized risk of the metastatic infection

# Prophylaxis of bacterial endocarditis

Degree of risk:

- 1. High degree • Patients with surgically replaced heart valve • Patients with recent surgical repair of a cardiovascular defect • Patients with a history of a previous attack of infective endocarditis
- 2. Moderate degree • Congenital heart disease • Rheumatic heart disease • SLE
- 3. Low degree • Coronary sclerosis • Cardiac pacemaker

# Indication ATB prophylaxis

– Cardiologic indication:

High risk:

Artificial valves, vessel implants

Endocarditis in the history

Cyanotic heart faults

Surgical reconstructions of pulmonary nad heart vessels

# Indication of atb prophylaxis

– Cardiologic indication:

– Standard risk:

Other congenital heart malformations

Aquired valve dysfunctions

Hypertrophic cardiomyopathy

Prolaps of the mitral valve with regurgitation

# Atb prophylaxis is not strictly required

- Low risk:
- Isolated defect of auricle septum
- Status post surgical reconstruction of auricle or ventricle septum
- Before arterial coronary bypass
- Prolapsus of the mitral valve without regurgitation
- Implanted Pacemakers and defibrillators
- Slight murmur
- Status post rheumatic fever without valve dysfunction

# Atb prophylaxis – other indications

Status post angioplasty and application of the stent till 4 weeks after the treatment

- Non compensated diabetes mellitus (insulin or pad)
- Chronic renal insufficiency (invasive treatment in dialysed patients, dosage. Consultation)
- Arteficial joint
- Autoimmune diseases (e.g. Systemic lupus erythematoses)



# Procedures that requires atb prophylaxis in indications

- Extractions
- Surgical treatment of periodontal tissues including the scaling
- Enosseal implantation
- Reimplantation
- Endodontic treatment (instrumentation in the root canal – with the possibility of penetration through the apex)
- Subgingival application of therapeutical tools (e.g. Retraction cords)
- Application of orthodontic wires
- Intraligementary anaesthesia
- Scaling, root planning, dental calculus removal
- Removal of implants

# Atb prophylaxis is not necessary

- Restorative and prosthetic procedures
- Local anesthesia
- Endodontic treatment when apex is not reached (preparation for root canal inlay)
- Application of rubber dam
- Surgical suture removal
- Application of removable dentures and orthodontic appliances

# Atb prophylaxis is not necessary

- Local fluoridation
- Intraoral radiogram
- Cementation of brackets
- Extraction of completely resorbed primary tooth

# ATB prophylaxis

– Standard:

Amoxicilin p.os.: adults 2g. Children 50 mg/kg 1 hour before the treatment

If it is not possible p. os: adults ampicilin 2g, children 50 mg/kg i.m. or i.v. 30 min before the treatment

# ATB prophylaxis if allergy on PNC

- Clindamycin p.os: adults 600 mg, children 60 mg/kg 1 hour before the treatment
- Cephalexin p.os: adults 2g, children 50 mg/kg 1 hour before the treatment
- Azithromycin p.os: adults 500 mg, children 15 mg/kg 1 hour before the treatment.

# ATB prophylaxis if allergy on PNC and p.os is not possible

- Clindamycin:
- Adults 600 mg, children 20 mg/kg iv.v 30 min before the treatment

ASA Group	Physical status - description	Importance for oral care
ASA 1	Healthy patients	No limitations
ASA 2	Mild to moderate systemic diseases medically well controlled	Low importance for dental care. Precaution when the status aggravated. Treatment in standard dental offices
ASA 3	Severe disease process which limits activity but is not incapacitating	Consultation with the physician or specialist is strongly recommended. The treatment could be performed according to this recommendation in dental office or the patient must be sent to the institution with special care. Minimize stress!
ASA 4	Severe incapacitating disease process that is a constant threat to life	Only necessary treatment after consultation. The care should be performed in the hospital (dental clinic)
ASA 5	Moribund patient not expected to survive 24 hours	No dental care
ASA 6	Declared brain dead patient, organs can be removed for donor purposes	No dental care



# Good level of the dental care all the time is the best prevention of metastatic infection







Orthopantomograph

53 Definujte zápatí – název prezentace nebo pracoviště



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Orthopantomograph

55 Definujte zápatí – název prezentace nebo pracoviště





Orthopantomograph

57 Definujte zápatí – název prezentace nebo pracoviště

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58 Definujte zápatí – název prezentace nebo pracoviště