Dental pathology

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Dentistry

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Dental caries

Dental caries is an unique infectious disease caused by special strains of bacteria leading to the damage of teeth structure.

„acidogenic theory“ – Miller 1889 – acid formed from the fermentation of dietary sugars by oral bacteria leads to a progressive decalcification of tooth substance
Dental caries

Predisposition - factors

- oral cavity hygiene – production and persistence of dental plaque
- diet – rich for sugars (mainly in childhood), frequency
- fluor content in water (low)
- susceptible dental surface (fissures - molars) – tooth morphology
- tooth position
- saliva

- genetic susceptibility (polygenic – tooth development disorders – enamel composition, immunity, composition of saliva...)


Classification

By site

- **Pit or fissure** – occlusal surfaces
- **Smooth surface** – tooth contact areas
- **Cemental or root** – after gingival recession
- **Recurrent** – around restoration

By rate of progression

1. **Acute (rampant)**
   young, quickly reaches pulp
2. **Chronic**
   older, slowly progressing
1. **Enamel caries**

macroscopical - white spot (early lesion) – decalcification

**smooth surface** - contact surface, cone-shaped, slow progression

**pit and fissures** - wider in the deep part, faster progressing –
enamel is thinner at the pits and fissures

zonation reflects different degrees of demineralization:
- **translucent zone** (initial demineralisation)
- **dark zone** (remineralisation)
- **body of the lesion** (max.demineralisation)
- **surface zone** (little changed in early lesions, later cavity)
Dental caries

2. Dentine caries
   faster progression, porous
   bacteria capable of proteolytic E production
   defence reaction (beneath - reactive dentine formation, sclerosis)

zonation:
   fatty degeneration — breakdown of dentine
   → lipid release
   translucent zone — dentinal sclerosis
   (hypermineralisation)
   demineralization
   brown discoloration — distended dentinal tubules packed with bacteria, necrotic tissue
   cavitation
Dental pulp disease – pulpitis

**Ethiology**

- ***infectious*** (penetration of microorganism into the pulp)
  - caries
  - hematogenic infection
  - retrograde pulpitis (osteomyelitis)
- ***non-infectious***
  - trauma
  - chemic and termic injury
  - dental material irritation
  - barotrauma (air crew flying at high altitudes, diving)

**Clinical symptoms**

- pain, „dull aching“ pain, radiating into the face, ear or neck, continuous
- with no previous history of pain
Dental pulp disease

Reversible
- sharp
- elicited (cold, hot)
- < 20 min
- unaffected by body position
- easily localized

Irreversible
- dull
- spontaneous
- > 20 min
- affected by body position
- difficult localized

PAIN

? treat without removing the pulp, remove pulpal tissue or tooth
Dental pulp disease

**Acute pulpitis**
- children, adolescents
- virulent bacteria
  - Serouse – hyperemia, oedema
  - Purulent – diffuse, circumscribed

**Chronic pulpitis**
- older
  - less virulent bacteria
  - Exudative
  - Productive – fibrosis, calcification (denticles)

**Complications** – A – periodontitis, osteomyelitis
- CH - periapical granuloma
Periapical lesions

- Acute periodontitis
- Chronic periodontitis

- Serose – hyperemia, oedema
- Purulent

- Periapical (dentoalveolar) abscess
- Osteomyelitis
- Periostitis, Cellulitis

Periapical (radicular) cyst

Periapical granuloma (191)

Periapical granuloma (313)
Chronic periapical lesions – Periapical (radicular) cyst

• most common cyst of the jaws
• chronic inflammation → epithelial proliferation (rest of Malassez) in periapical granuloma → cyst lining (nonkeratinized stratified squamous epithelium)
• fibrous capsule with lymphocytes and plasma cells
• central lumen with proteinaceous fluid and cellular debris
• destruction of the bone of the jaws
• higher risk of squamous cell carcinoma
• treatment - enucleation
# Odontogenic tumors

## EPITHELIAL ODONTOGENIC TUMORS
- Ameloblastoma
- Calcifying epithelial odontogenic tumor
- Adenomatoid odontogenic tumor
- Calcifying odontogenic tumor
- Squamous odontogenic tumor

## CONNECTIVE TISSUE ODONTOGENIC TUMORS
- Odontogenic fibroma
- Odontogenic myxoma
- Cementoblastoma

## MIXED ODONTOGENIC TUMORS
- Ameloblastic fibroma
- Odontoma
- Ameloblastic fibro-odontoma

## MALIGNANT ODONTOGENIC TUMORS
- Malignant ameloblastoma
- Ameloblastic carcinoma
- Odontogenic carcinoma
- Primary intraosseous carcinoma
Odontogenic tumors

Ameloblastoma (71)

- benign, but locally invasive neoplasm with the slow growth
- derived from odontogenic epithelium
- predominantly mandible (molar areas), 20-40y
- rare tumor
- facial deformation, teeth loss, X-ray – multilocular cyst, „soap bubble“
- high recurrence rate if not widely excised

- fibrous stroma with islands or strands of columnar and cuboidal peripheral cells considered to be preameloblasts
- reverse polarization – nucleous is on the opposite site to the basement membrane
- follicular and plexiform pattern

- malignant form - metastasis
Odontogenic tumors

Odontoma (241)

- 70% of odontogenic tumors
- hamartoma containing enamel, dentin, pulp, cementum in a tooth shape (compound) or as a solid, disorganized mass (complex)
- over unerupted teeth, 1st-2nd decade, maxilla