

# Oral Manifestations of Systemic Diseases

V. Žampachová

I. ÚP

# Risk assessment

Can we provide dental treatment to this patient without endangering his/her (or our) health and well being?

**Yes.** No problems are anticipated, and treatment can be delivered in the usual manner.

**Yes.** The potential for problems exists, however, modifications can be made in the delivery of treatment that reduces risk to an acceptable level.

**No.** Potential problems exist that are serious enough to make it inadvisable to provide elective dental treatment.

# Most common medical emergencies in dental practice

- Syncope
- Postural hypotension
- Hyperventilation
- Mild allergic reaction
- Asthmatic attack
- Anaphylaxis
- Cardiac arrest
- Myocardial infarction
- Angina pectoris
- Seizures
- Epinephrine reaction
- Insulin shock

Many of these events are preventable, or at least the chances of them occurring can be lessened

# Oral and systemic diseases

- **Primary oral diseases influence on systemic/other organs conditions (i.e. periodontitis → bacteremia → endocarditis)**
- **Symptoms/manifestations of systemic diseases in oral cavity (i.e. anaemia → pale mucosa)**
- **Sequels of systemic therapy on oral cavity (i.e. chemotherapy – mucositis)**

# Oral health-related quality of life

- Nutrition: Oral dysfunction can seriously impact nutritional status
- Edentulous patients (fully or partially) favor diets higher in carbohydrates, lower in protein content (! maintaining muscle mass), fibre (!constipation).
- Eating and chewing - missing teeth qualitatively linked to a poorer diet
- Chewing ability declines as tooth loss increases, regardless of denture replacement

# Oral health-related quality of life

- Sleep issues: 3 to 5% percent of the population reported trouble sleeping because of pain or discomfort from dental problems
- Mostly chronic pain + insomnia are exacerbated by depression and vice versa

# Oral examination

- Many diseases (systemic or local) have signs that appear on the face, head + neck or intraorally
- Complete examination can help to provide differential diagnoses in cases of abnormal findings + event. treatment recommendations based on accurate assessment of the signs + symptoms of disease

# Selected symptoms in dentistry

- **Oedema:** inflammatory (local, part of systemic infl., allergic, traumatic, toxic)
- congestive (venostatic)
- lymphostatic
- oncocytic - hypoproteinemia (malnutrition, renal, hepatic)
- possible combined etiology, i. e. in tumors (local vessel blockage + inflammation + malnutrition), endocrinopathy (hypothyreosis → myxedema, Cushing sy → moon face)



# Focal oedema

Usually part of local reactive changes

- Local inflammation
- Cysts incl. retention cyst (salivary)
- Tumors

# Bad taste - dysgeusia

## Local problems

- Aging
- Heavy smoking
- Poor oral hygiene
- Dental caries
- Periodontal disease
- Dry mouth
- Intraoral malignancies

## Distant/systemic problem

- Diabetes
- Hypertension
- Medication
- Oesophageal diseases (reflux, diverticulum, tumor)
- Stomach diseases (vomiting, bleeding)
- Respiratory tract dis. (cough+ sputum, tumors)
- Uremia
- Neurogenic disorder
- Psychosis

# Too much saliva

- May be related to psychosomatic problem
- New denture insertion, increased or decreased vertical dimension

# Xerostomia

- **Symptom:** feeling of oral dryness, ↓ amount of saliva in the mouth, commonly + hyposalivation
- **Physiologic:** excessive speaking, during sleep, old age
- **Pathologic causes:** local inflammation, incl. infection, atrophy + fibrosis of salivary gland (i.e. autoimmune Sjogren's syndrome, HIV-associated salivary gland disease, ...)
- Dehydration state, alcoholism, psychic disturbances
- Diabetes, hyperthyroidism
- Iatrogenic: medications (antihypertensive, tricyclic antidepressants, antihistamines, sympathomimetics), chemotherapy or radiation

# Dry mouth



From: Oral pathology dept KMHU

# Xerostomic mucositis

Clinical manifestation of salivary gland dysfunction, not a disease entity.

## ■ Clinical features:

- Diffuse erythema.
- Pain particularly on the gingiva.
- Major salivary glands → no salivary flow.
- Progressive dental caries, periodontal diseases, secondary candidiasis.

# Selected symptoms in dentistry

- **Bleeding:** acute local causes (injury, teeth extraction, gingivitis), local vessel problems, tumors, ...
- **Systemic causes:** coagulopathy (haemophilia, liver insufficiency...),  
thrombocytopenia/-pathy (bone marrow disorders incl. haemathological malignancies, therapy...)  
vasculopathy (inborn; acquired incl. vitamin C deficiency, ...)



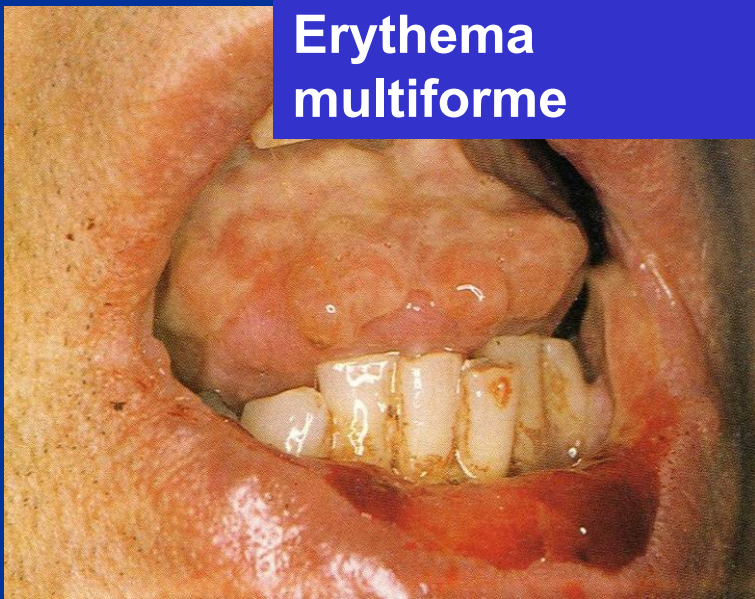
# Bleeding



Periodontitis



Hematoma



Erythema  
multiforme



HIV



# Haematological disorders

## - haemorrhagic diseases

- bleeding after tooth extraction > 1 day

### 1. coagulopathy - clotting disorders

long severe bleeding after short delay

### 2. platelet disorders

purpura, petechiae, ecchymoses

imm. following trauma → commonly spontaneous  
stop

### 3. vascular disorder

vessel rupture after minor trauma, pressure

# Haematological disorders

## - coagulopathy

- **Haemophilia A** (X inheritance)
  - most common
  - FVIII deficiency
  - childhood
  - bleeding into muscles or joints (haemarthros)
- **Acquired disorders**
  - liver diseases (common, may be unknown to the patient)
  - vitamin K deficiency
  - anticoagulant treatment – heparin, warfarin, aspirin

# Haematological disorders

## - thrombocytopenia/pathy

### ■ Idiopathic thrombocytopenic purpura

- antibodies x platelets → low number in periph. blood
- children, young women
- atypical combination of thrombocytopenia + thrombosis, immune mediated, possible reaction postvaccination, in heparin therapy, very rare

### ■ von Willebrand's disease (AD inheritance)

- thrombocytopathy + low level of vW factor (part of FVIII)

### ■ drug associated

- aspirin

# Selected symptoms in dentistry

## Mucosal surface colour changes

- nonspecific inflammatory hyperemia
- specific colour changes in viral/bacterial infections (Koplik spots, ...)
- intoxication (cherry tint in carbon monoxide i., cyanosis in methemoglobinemia – nitrates i.)
- systemic cyanosis (cardiac and/or respiratory insufficiency)
- pigmentations – endogenous (jaundice, graphite spots in Addison's disease); exogenous

# Selected symptoms in dentistry

- **Soreness** - presence of mucosa inflammation or ulcers
- **Burning sensation** - thinning or erosion of the surface epithelium;

Burning mouth syndrome: in xerostomia, anemia, vitamin deficiencies (esp. on tongue), psychic disturbances, infections (viral, fungal, chron. bacterial).

# Selected symptoms in dentistry

Contracture (difficulty in mouth opening)

- Local oral causes (inflammation - molars, myogenic, arthrogenic – temporomandibular joint, neurogenic, traumatic)
- Extraoral local causes (parotitis, peritonsillar abscess, scarring)
- Systemic causes (paralysis, tetanic spasm – trismus)

# Oral health and diabetes mellitus

- **Type I** – periodontal disease frequent + rapidly progressive
- **I + II** – diabetic sialadenosis (bilateral parotid enlargement), mycotic infections: oral candidiasis, zygomycosis; benign migratory glossitis; xerostomia (1/3 of diabetic p.)

# Oral health and diabetes mellitus

- Diabetes mellitus + smoking – risk of periodontitis with loss of tooth-supporting bone 20x higher.
- Chronic periodontal disease possibly can disrupt diabetic control
- Increased susceptibility to infection, impaired host response, excessive production of collagenase found in periodontal disease – possible important roles in periodontitis



## DM associated gingivitis



# Oral health and heart disease

- Oral bacteria → bacteremia → attaching to fatty plaques in the coronary arteries contributes to clot formation.
- Risk of fatal heart disease double for persons with severe periodontal disease.
- Complete dental treatment incl. extraction prior to organ transplantation.
- Exacerbation of existing heart conditions. Patients at risk for infective endocarditis may require antibiotics prior to dental procedures.

# Cardiovascular diseases

## ■ Infective endocarditis

- source: bacteraemia after tooth brushing dental procedure, mixed flora possible, i.e. viridans strep. group, Staph., HACEK group (Haemophilus, Actinobacillus, Cardiobacterium, Eikenella, Kingella)
- valve defects: congenital x rheumatic fever
- prosthetic valves
- colonisation of cardiac valves → vegetations → valve destruction
- **ATB cover** in selected patients may be necessary

# Cardiovascular diseases

- antihypertensive drugs
  - calcium channel blockers → gingival hyperplasia
  - anticoagulative therapy → risk of increased bleeding
  - diuretics → xerostomia
- implanted pacemakers, defibrillators
  - risk of interference with stomatologic equipment

# CNS diseases

- Possible relationship between periodontal disease and stroke.
- Patients with acute cerebrovascular ischemia were found more likely to have an oral infection
- possible association of periodontal lesions with increased risk of dementia, esp. Alzheimer's
  - dysbalance in microbiome – dysbiosis - may contribute to chronic systemic inflammation
  - possible ↓ of nitrite oxide production
  - access of the healthy x pathogenic bacterias into blood / brain

# Respiratory diseases

- Oral bacteria may be aspirated into the lung → respiratory inflammation (pneumonia), exacerbation of existing respiratory disease (COPD), due to decreased local immunity.
- Highly dangerous aspiration pneumonia (purulent – putrid - gangrene) from fragments of carious teeth

# Respiratory tract diseases

## ■ Oral tuberculosis

- rare complication of open lung TBC
- painless ulcer on dorsum of tongue
- cervical lymphadenopathy
- Micro: caseating epithelioid granulomas with multinucleated Langhans' cells

# Respiratory tract diseases

## ■ Sarcoidosis

- chronic granulomatous disease of unknown origin
- lungs, LN (hilar), salivary glands; almost any tissue
- oral: painless swelling – gingivae, lips
- oral ulcerations possible
- **diagnosis: biopsy of labial glands**
- Mi: non-caseating tuberculoid granulomas + fibrosis, possible calcifications



# Lethal midline granuloma syndrome

- clinically: destruction of central facial tissue + fatal outcome possible
- **Granulomatosis with polyangiitis (Wegener)**  
systemic necrotising vasculitis (ANCA+)
  - granulomas of upper and lower RT
  - oral ulceration, „strawberry“ gingivitis – red, granular, swollen; biopsy necessary
  - glomerulonephritis
- **Angiocentric NK/T cell lymphoma**

# Gastrointestinal diseases

## ■ Crohn's disease

- part of chronic inflammatory bowel diseases, immunologically mediated
- ileocaecal region – regional intestinal wall thickening and ulceration, fistulae,
- Mi: mucosal changes, transmural lymphoplasmocytic infiltrate + small granulomas

# Oral Crohn's disease

- 10-20% of Crohn's patients, commonly prior to the intestinal lesion
- 90% have granulomas on biopsy
- Metallic dysgeusia
- Gingival bleeding
- „Metastatic“ Crohn's – non-caseating granulomatous skin lesions in patients with Crohn's.

# Oral Crohn's disease

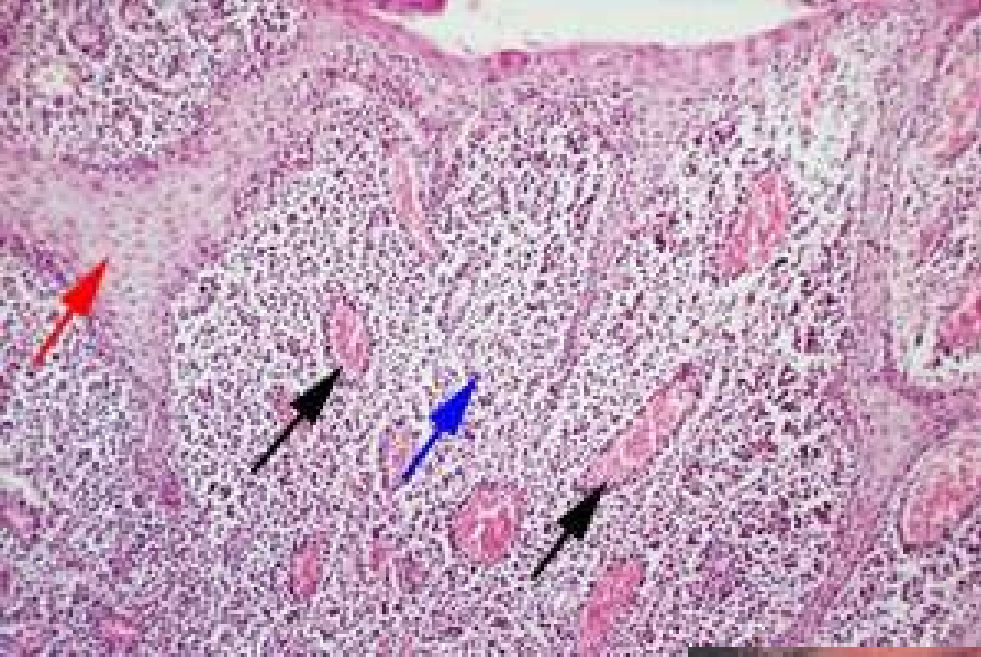
- Diffuse labial, gingival, mucosal swelling (pain, cosmetic problems)
- Cobblestoning of the buccal mucosa and gingiva (inflammatory hyperplasia of oral mucosa), fissuring
- aphthous ulcers
- mucosal tags
- angular cheilitis
- deep ulcers – linear, buccal vestibule;

# Oral Crohn's disease



# Pyostomatitis vegetans

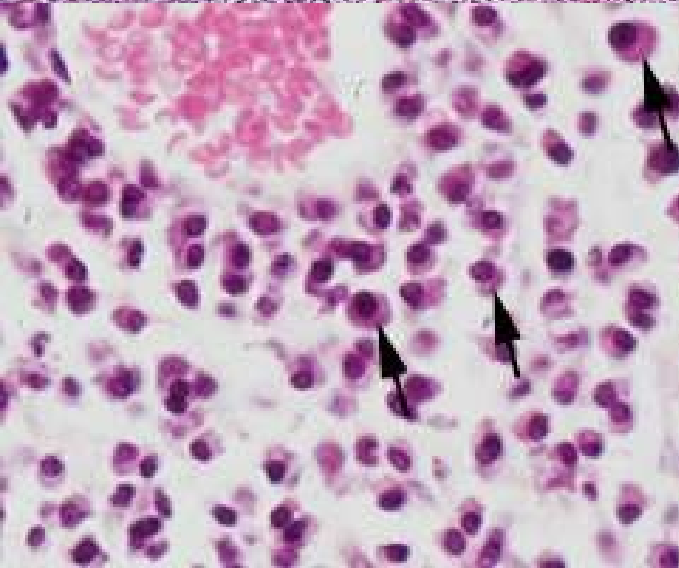
- Inflammatory stomatitis in setting of ulcerative colitis or Crohn's disease, uncommon
- Edema and erythema with deep folding of the buccal mucosa, pustules, small vegetating projections, erosions, ulcers and fibrinopurulent exudate.
- Pustules fuse into shallow ulcers resulting in characteristic „snail track“ ulcers
- Mixed inflammatory infiltrate, + numerous eosinophils



Red – oedema

Black – perivascular infiltrate

Blue – abscess formation with eosinophils



# Ulcerative colitis

- Inflammatory bowel disease restricted to colon
- Oral manifestations (aphthous ulcerations, haemorrhagic ulcers) possible (5-10%), during exacerbations of colonic lesions



# Gastroesophageal reflux

- Regurgitation of gastric content
- Very low pH in the oral cavity – enamel dissolution, usually on palatal surfaces of the maxillary dentition – erosion + dentin exposure (temperature changes sensitive) – irreversible, restoration procedures necessary

# Gastrointestinal diseases

- **Gardner's syndrome** (AD inheritance)
  - multiple jaw osteomas + polyposis coli
    - multiple adenomas with malignant potential
  - dental defects, epidermal cysts
  
- **Peutz-Jaeghers syndrome**
  - pigmented macules around lips + intestinal non-malignant polyposis (small intestine), but ↑ life-long risk of variable cancers (GIT, genital, ...)

# Chronic liver disease

- Jaundice, primary on the soft palate + sublingual region
- Coagulopathy (fibrinogen + other coagulation proteins production ↓, vitamin K resorption ↓) – oral petechiae, excessive bleeding in minor trauma - !dental surgical procedures
- Oral lichen planus (white reticular lesions) in chronic hepatitis C, !drug lichenoid reaction – NSAID, antihypertensive drugs

# Uremic stomatitis

- possible complication of renal insufficiency, usually acute
- white plaques on mucosa (!x leukoplakia)
- uremic foetor ex ore

# Nutritional deficiencies

## ■ vitamin A

- squamous metaplasia → keratinisation (leukoplakias ?), dryness (ocular – ulcers, blindness)

## ■ vitamin B2 (riboflavin)

- angular stomatitis - painful red fissures at angles
- glossitis
- swelling and erythema of oral mucosa

## ■ vitamin B3 (niacin)

pellagra (dermatitis, dementia, diarrhea); stomatitis + glossitis – red, smooth, raw

- **vitamin B6 (pyridoxine)** deficiency in pyridoxine antagonists drugs, cheilitis + glossitis

# Nutritional deficiencies

- **vitamin B12** (cobalamin) + intrinsic factor - pernicious anaemia in autoimmune atrophic gastritis
  - glossitis, erythema + atrophy
  - burning sensations

# Pernicious anemia

- **Pernicious anemia:** no absorption of vitamin B<sub>12</sub>.
- Macrocytic anemia (huge red blood cells)
- Signs of anemia, weakness, pallor, fatigue during physical activity. nerve degeneration
- Nausea, diarrhea, abdominal pain, loss of appetite.
- Oral manifestations of pernicious anemia: angular cheilitis (ulceration and redness at the corners of the lips), mucosal ulceration, loss of papillae on the tongue – atrophic glossitis, commonly early sign!, a burning + painful tongue.

Pernicious anemia: red and smooth dorsum of the tongue





# Haematological disorders

## - anaemias

- **iron deficiency** (microcytic a.)
  - chronic menstrual blood loss
  - chronic bleeding from peptic ulcer

# Haematological disorders

## - anaemias

- nonspecific general changes of anaemia
- mucosal and skin pallor + fatigue + breathlessness + tachycardia
- atrophy of filiform papillae - glossitis
- angular stomatitis
- candidiasis

# Plummer–Vinson syndrome

**Iron-deficiency anaemia + glossitis + dysphagia**

- **Smooth** red painful tongue with atrophy of filiform and the fungiform papillae
- **Atrophy** of mucosa of the mouth pharynx and oesophagus and oesophagus
- **Angular cheilitis**
- **Dysphagia** or feeling of food sticking in the throat
- **Dysphagia** due to web in oesophagus (chronic oesophagitis) or stenosis of the oesophageal mucosa (early indicator of carcinoma )
- Possible immune dysregulation + metabolic lesions

**Premalignant lesions (oral, oesophageal ca)**



# Nutritional deficiencies

- **vitamin C** - scurvy – inadequate collagen synthesis, delayed healing, bleeding
  - gingival swelling and bleeding, ulcerations
  - tooth mobility + loss, ↑ periodontal infection
- **vitamin D** – rickets in infancy, osteomalatia in adults – poorly mineralized bone

# Nutritional deficiencies

- **Vitamin E** (α-tocopherol), deficiency rare, neurologic signs
- **Vitamin K** - coagulopathy

# Gingivitis associated with systemic factors

- Endocrine gingivitis:

- Puberty
- Pregnancy
- Menstrual cycle



- Modified inflammatory response to estrogen and progesterone levels within the gingival tissue → greater response to plaque → more inflammation + ↑vascular component

# Hormonal disturbances

- Pyogenic granuloma - overgrowth of granulation tissue.



- Puberty gingival enlargement - swollen gingival tissues in adolescents (like pregnancy gingivitis), disappear after normal hormone balance returns.

# Endocrine disorders

- **Pituitary hyperfunction** of growth hormone
  - gigantism
  - acromegaly
    - jaws (condylar growth) + hands + feet



# Endocrine disorders and pregnancy

## ■ Pregnancy

- gingivitis
- pregnancy epulis formation
- recurrent aphthae

# Pregnancy gingivitis

- hyperplasia + erythema, in 5 %
- Possible pseudotumorous polyps.
  - Both of these clear up after hormonal balance returns to normal.



# Endocrine disorders

- **Adrenocortical diseases**
  - **Addison's disease** = cortical insufficiency (autoimmune, infections, tumors)
  - failure of cortisol and aldosteron secretion
  - early sign – brown oral pigmentations (melanin), diffuse or focal; gingiva, buccal mucosa, lips

# Endocrine disorders

- **Cushing's syndrome** – hypercortisolism  
(adrenal, ACTH, secondary – therapy)
- „moon face“ - round
- hirsutism, poor healing, osteoporosis,  
hypertension
- secondary after prolonged corticosteroid therapy  
(autoimmune disease, transplantation, ...)

# Endocrine disorders

## ■ Hyperparathyroidism – excess PTH

stones formation – renal calculi, metastatic calcifications

Osseous changes – loss of lamina dura surrounding teeth  
roots, brown tumor identical to jaw giant cell  
granuloma (in bones, + hemosiderin, multinucleated  
giant cells)

Duodenal ulcers

# Haematological neoplasia - leukaemias

- neoplastic disorder of bone marrow
- acute x chronic
- lymphoblastic x myeloblastic
- ALL - children
- CLL, CML, AML - adults
- anaemia + infection + bleeding tendency
- hepatosplenomegaly + lymphadenopathy
- oral: gingival swelling + mucosal ulcerations + purpura

# Leukemia associated gingivitis



# Autoimmune diseases

- commonly middle aged women
- antibodies in blood possible
  
- rheumatoid arthritis
- Sjögren´s syndrome
- lichen planus
- systemic lupus erythematosus
- systemic sclerosis (incl. IgG4 systemic sclerosing disease)



# Autoimmune diseases

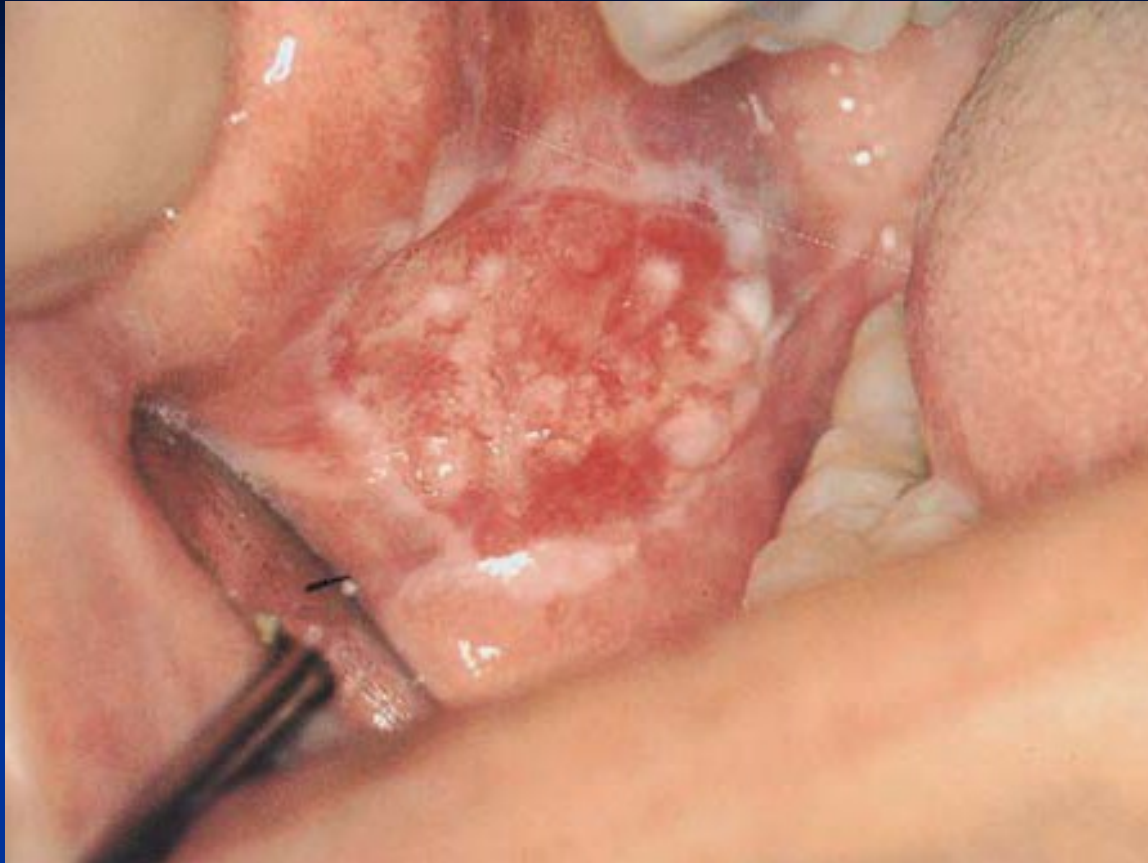
## ■ Systemic lupus erythematosus

- antinuclear factors
- ~ 20% patients have oral symptoms
- skin rash (butterfly) + arthritis + pleuritis + glomerulonephritis
- oral: lichenoid lesions, ulceration, cheilitis

■ Systemic LE ( multisystem disease, systemic manifestation, serological abnormalities; antinuclear “ANA” and anticytoplasmic antibodies )

■ Discoid (localized) LE

Mucocutaneous disease, no serological abnormalities



Discoid lupus erythematosus: typical lesion on the buccal mucosa

# SLE

- Discoid erythematous, central red ulcerated or atrophic lesion – plaque, sm. peripheral white fine lines
- Butterfly rash: facial erythema
- Skin: elevated red, purple macules, scales, ( follicular plugging )
- Raynaud's phenomenon: pallor or cyanosis and tingling of toes and fingers on exposures to cold or emotion due to paroxymal vasospasm.

# Autoimmune diseases

## ■ Systemic sclerosis

- subcutaneous and visceral fibrosis (GIT, lungs, ...)
- mask-like face + limited oral opening

# Autoimmune diseases

## IgG4 associated systemic sclerosing disease

- variable manifestation – incl. chronic sialoadenitis with Sjögren (sicca) syndrome
- small salivary gland biopsy

# Amyloidosis

- Deposition of pathologic fibrillar amyloid proteins
- Oral manifestation – macroglossia (in 20%), firm, loss of mobility
- Histopathology + special methods necessary for diagnosis

# Oral cavity health in systemic therapy

- Oral mucositis in chemotherapy
- Local microbiome changes + ↑ risk of mycotic overgrowth in antibiotic therapy
- ↑ risk of systemic spread of oral infection
- Variable problems in HIV/AIDS therapy
- Xerostomia

# Drug induced conditions

- Aphthous stomatitis
- Xerostomia
- Lichen planus
- Gingival hyperplasia
- Candidiasis
- ...