Oral Manifestations of Systemic Diseases

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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

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

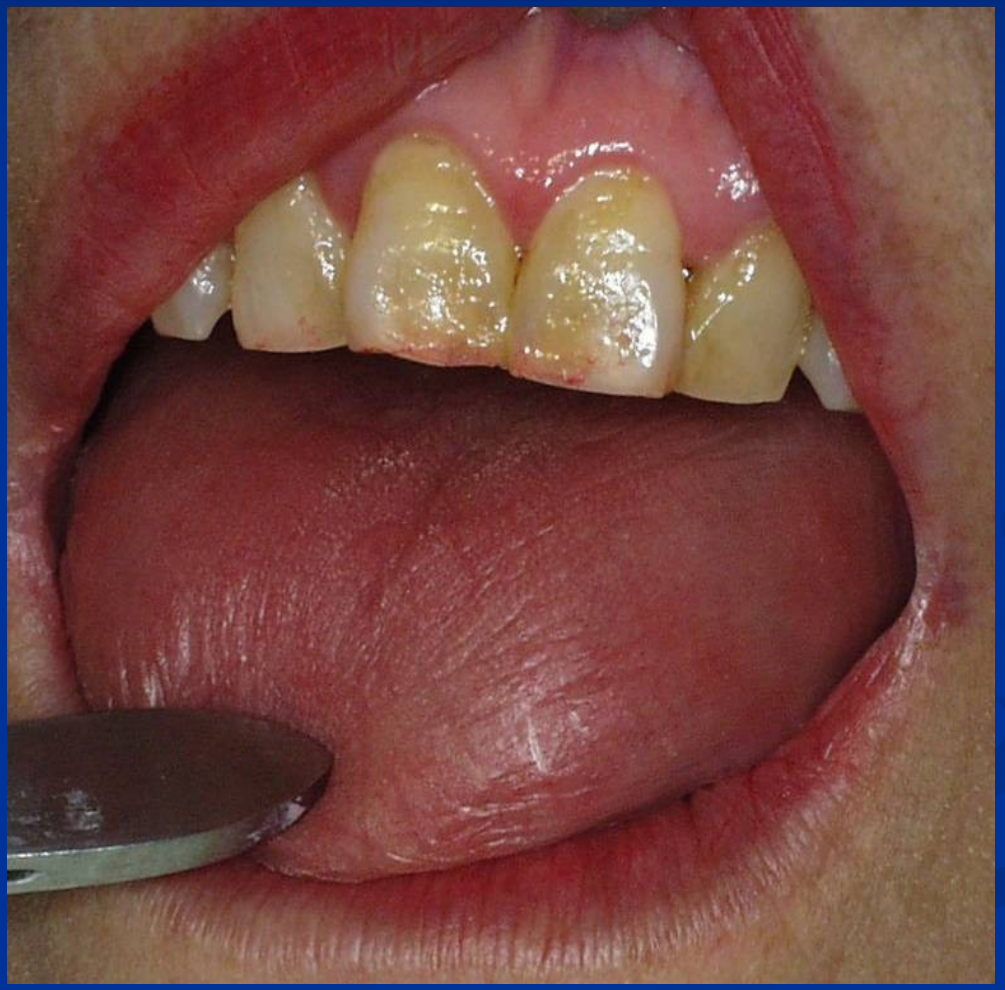
Too much saliva

- 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 + hyposialism
- Physiologic: excessive speaking , during sleep, old age
- **Pathologic causes**: local inflammation, incl. infection, atrophy + fibrosis of salivary gland (i.e. autoimmune Sjorgen'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 KMUH

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.
  - Progessive dental caries, periodontal diseases, secondary candidiasis.

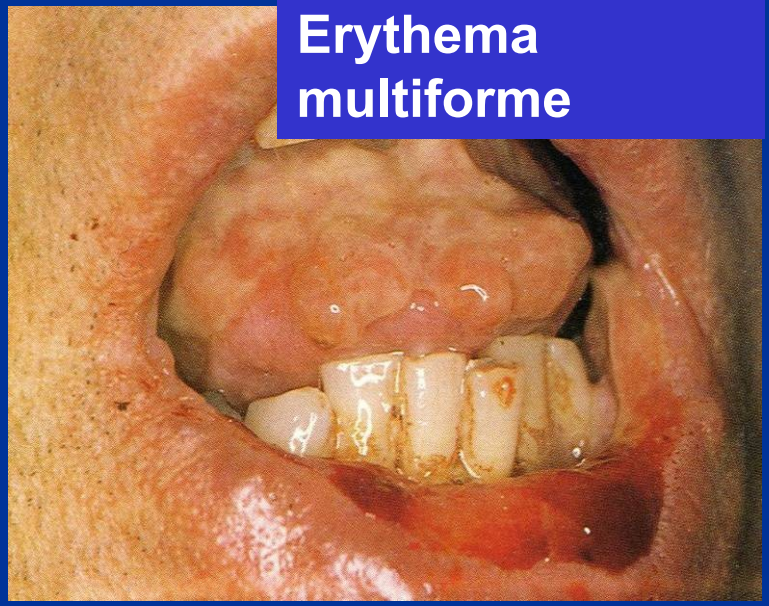
Selected symptoms in dentistry

- Bleeding: acute local causes (injury, teeth extraction, gingivitis), local vessel problems, tumors, …
- Systemic causes: coagulopathy (haemophilia, liver insufficiency…),

thrombocytopenia (bone marrow disorders incl. haemathological malignancies, therapy…)

vasculopathy (inborn; acquired incl. vitamin C deficiency, …)

Bleeding



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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
  - vitamin K deficiency
  - anticoagulant treatment – heparin, warfarin

Haematological disorders - thrombocytopenia/pathy

- **Idiopathic thrombocytopenic purpura**
  - antibodies x platelets → low number in periph. blood
  - children, young women
- **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, 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)

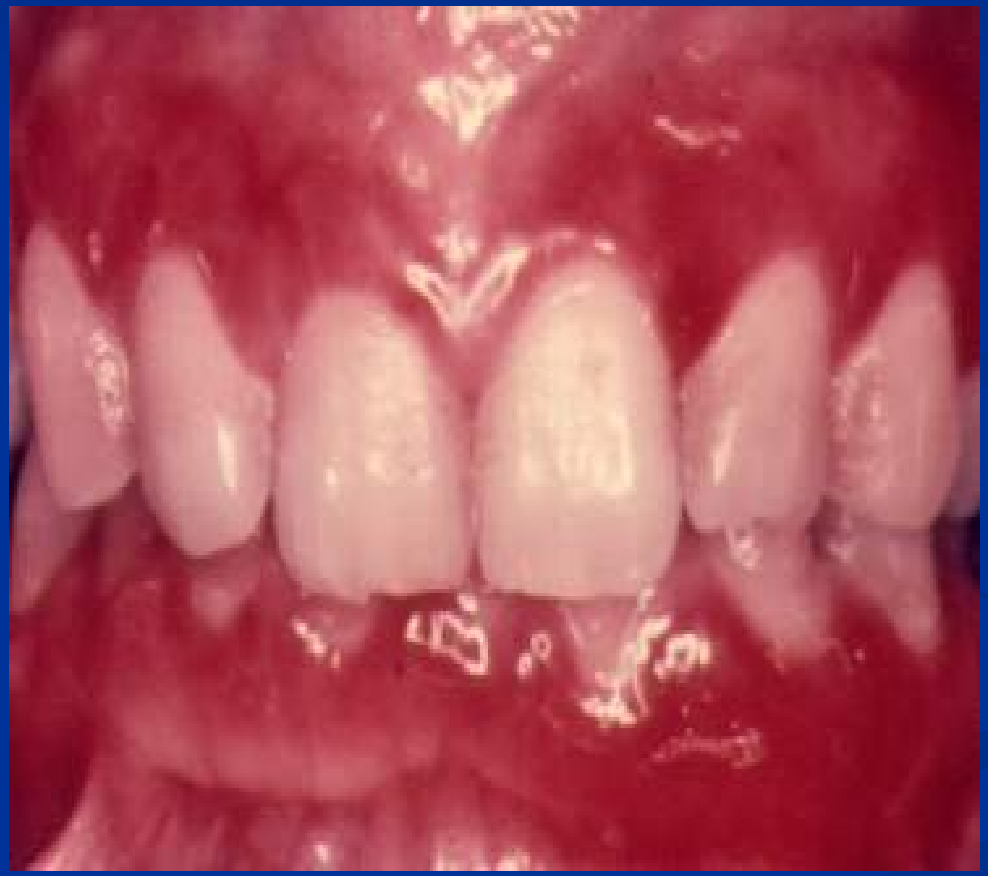
Oral health and diabetes mellitus

- Type I – periodontal disease frequent + rapidly progressive
- I + II – diabetic sialodenosis (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 interferention

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

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

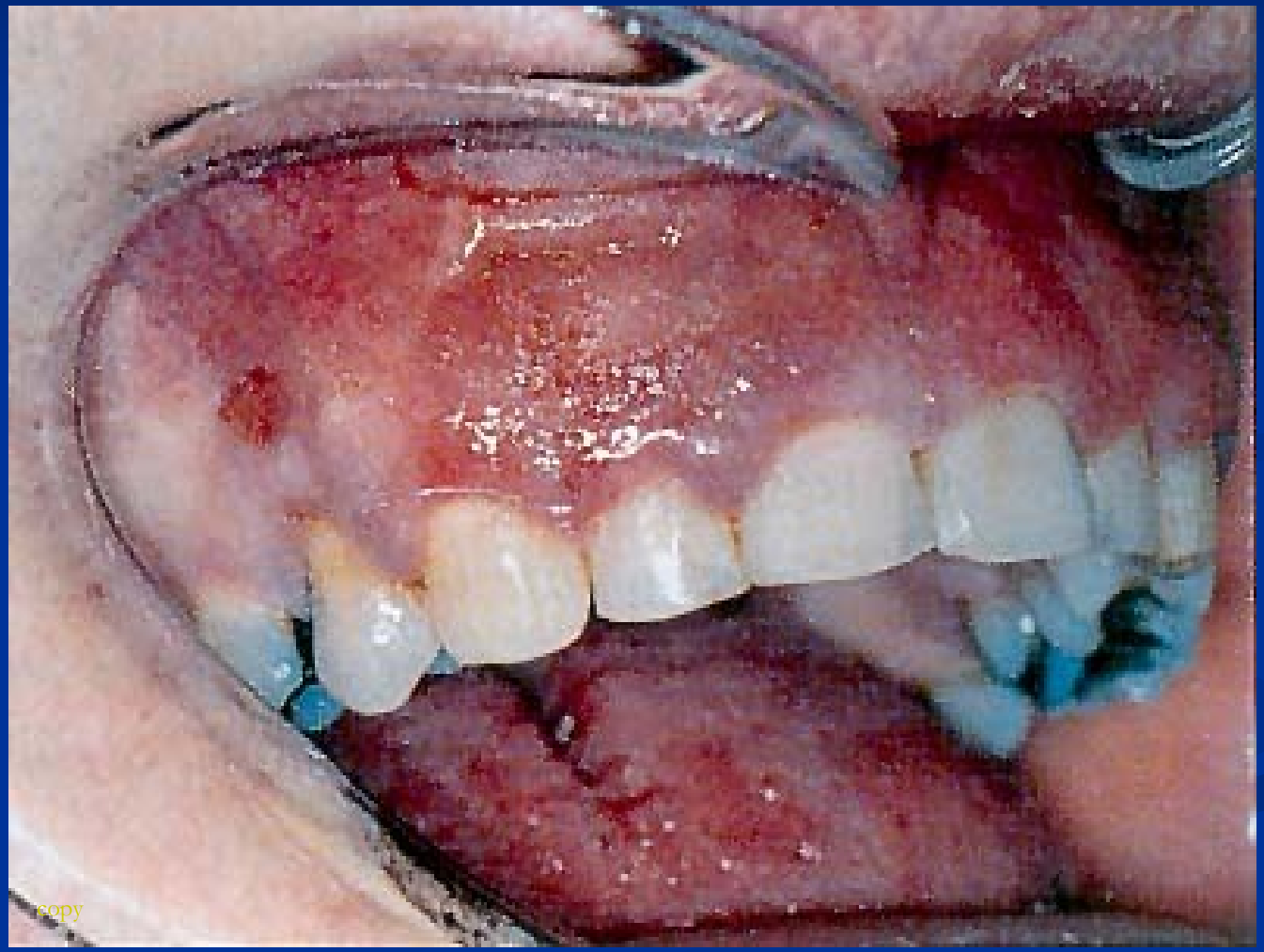
Oral Crohn's disease

- 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

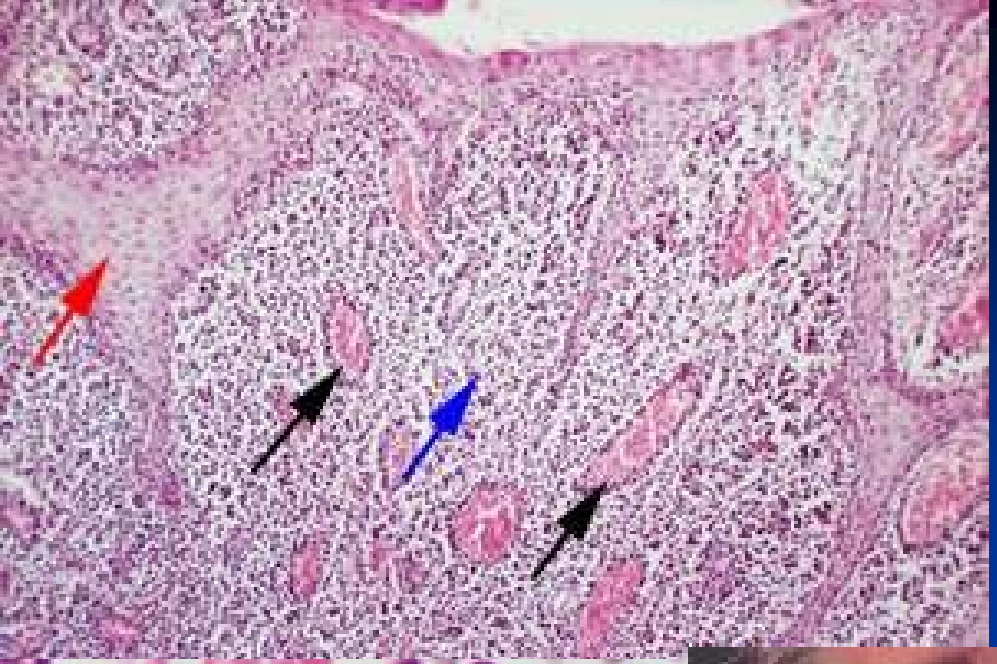
- Diffuse labial, gingival, mucosal swelling (pain, cosmetic problems)
- Cobblestoning of the buccal mucosa and gingiva(inflammatory hyperplasia of oral mucosa), fissuring
- aphthous ulcers
- mucosal tags
- angular cheilitis
- deep ulcers – linear, buccal vestibule;

Oral Crohn's disease



Pyostomatitis vegetans

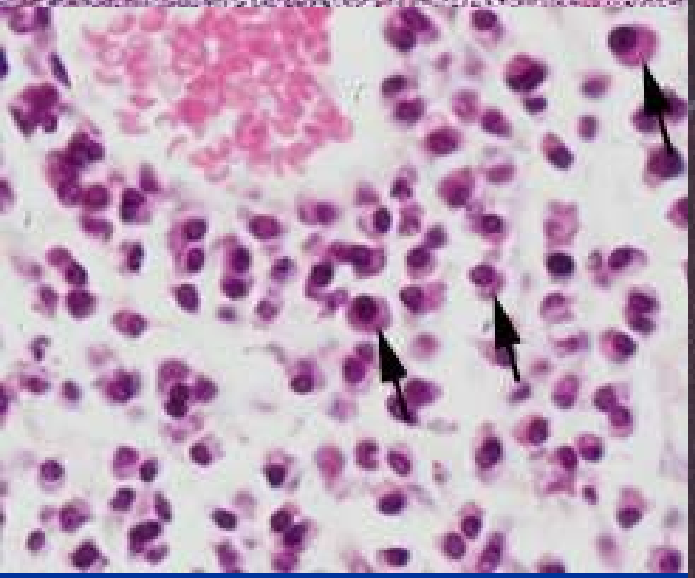
- Inflammatory stomatitis in setting of ulcerative colitis or Crohn‘s disease
- Edema and erythema with deep folding of the buccal mucosa, pustules, small vegetating projections, erosions, ulcers and fibrinopurulent exudate.
- Pustules fuse into shallow ulcers resulting in characteristic „snail track“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

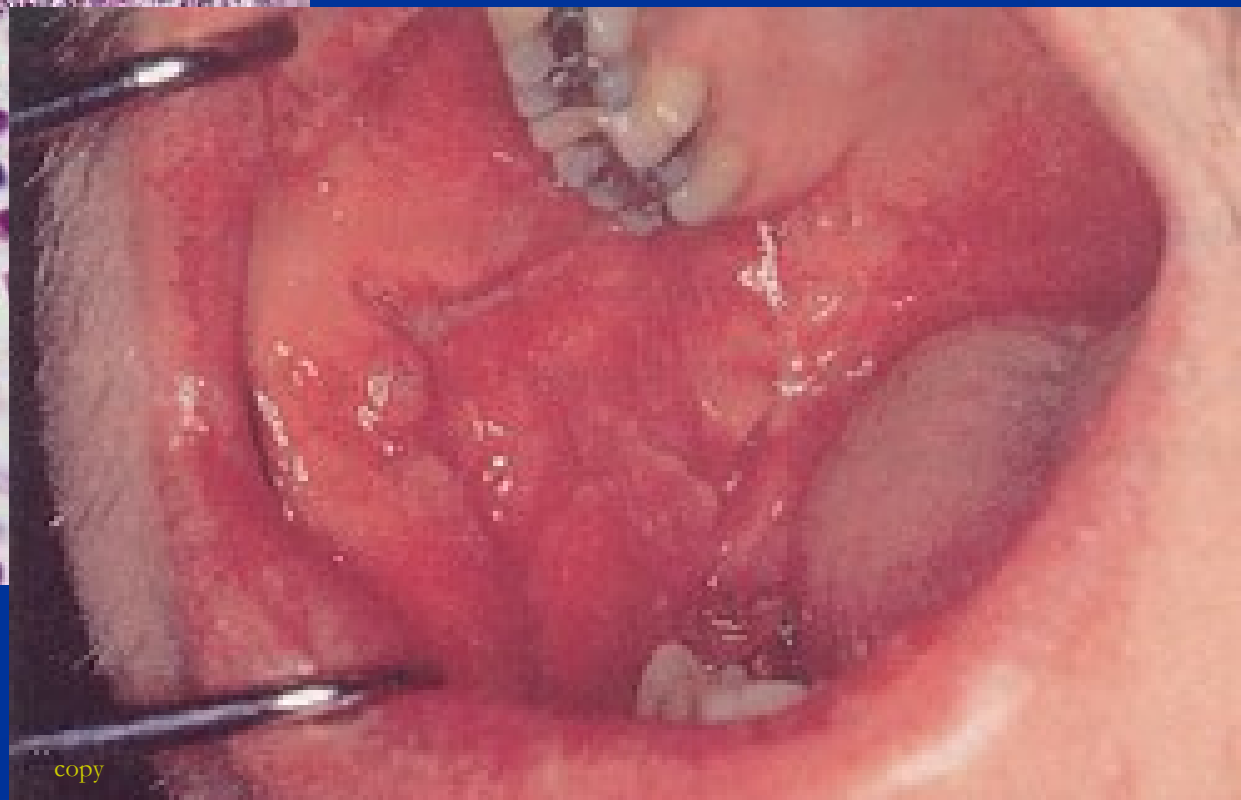


Red – oedema

Black – perivascular infiltrate

Blue – abcess formation with eosinophils





Ulcerative colitis

- Inflamatory 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 polyposis (small intestine)

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

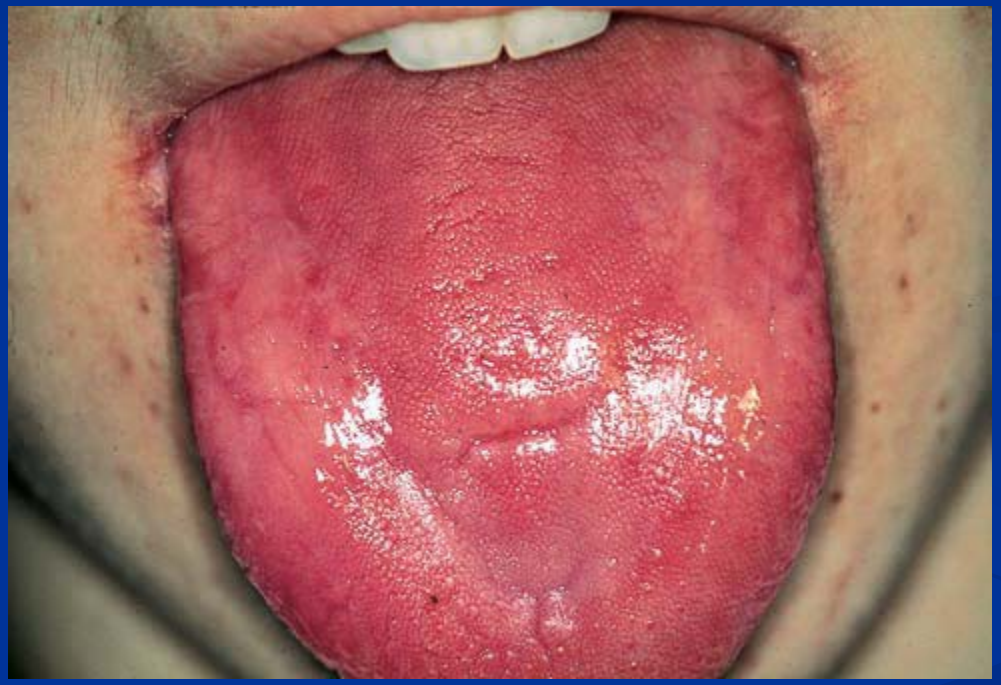
Nutritional deficiencies

- **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_{12}.
- Signs of anemia, weakness, pallor, and fatigue on exertion.
- Nausea, diarrhea, abdominal pain, and 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, and a burning and 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
- **pernicious anaemia** (macrocytic a.)
  - middle aged women
  - autoimmune chronic gastritis → vitamin B12 deficiency

  + neurological disease: degeneration of spinal cord

Haematological disorders - anaemias

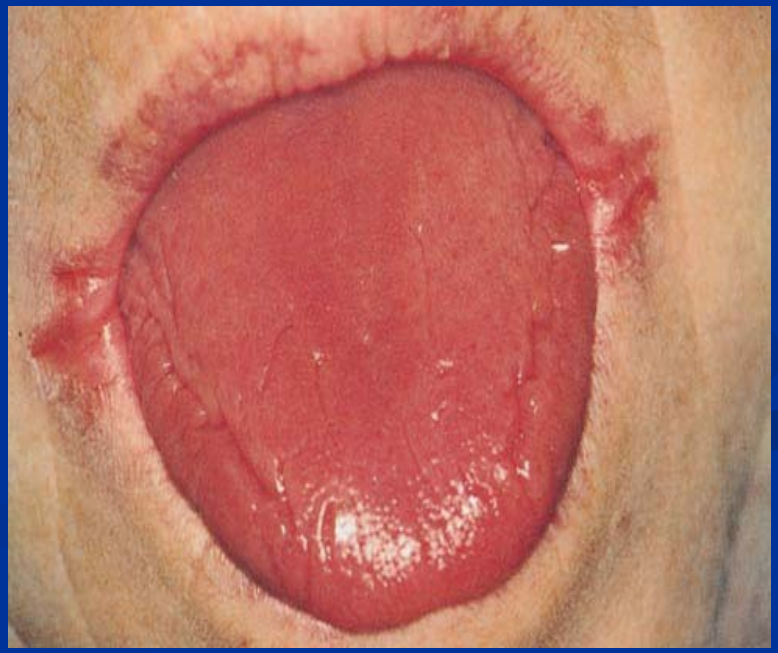
- mucosal and skin pallor + fatigue + breathlessness + tachycardia
- atrophic glossitis (B 12) - first sign
- atrophy of filiform papillae
- angular stomatitis
- candidiasis

Plummer–Vinson syndrome

Iron-deficiency anaemia + glossitis + dysphagia

Premalignant lesions (oral, oesophageal ca)

- Smooth red painful tongue with atrophy of filiform and the fungiform papillae
- Atrophy of mucosa of the mouth pharynx and essophagous and ophagous
- Angular cheilitis
- Dysphagia or feeling of food sticking in the throat
- Dysphagia due stenosis of the esophagal mucosa (early indicator of carcinoma)



Nutritional deficiencies

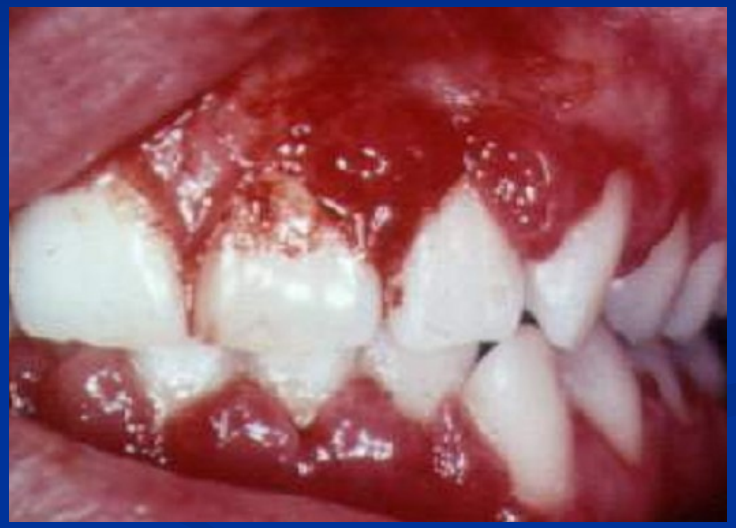
- **vitamin C** - scurvy – inadequate collagen synthesis, delayed healing, bleeding
  - gingival swelling and bleeding, ulcerations
  - tooth mobility + loss, ↑ periodontal infection
- **vitamin D** – rickets in infancy, osteomalatia in adults – poorly mineralized bone

Nutritional deficiencies

- **Vitamin E** (a-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

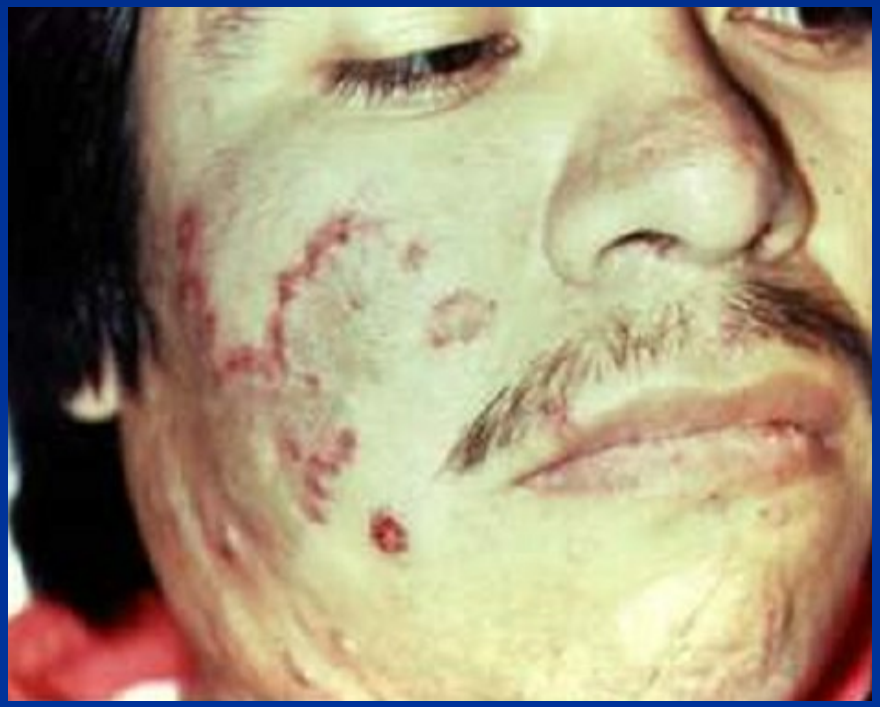
Osseous changes – loss of lamina dura surrounding teeth roots, brown tumor identical to jaw giant cell granuloma (in bones, + hemosiderin, multinucleated giant cells)

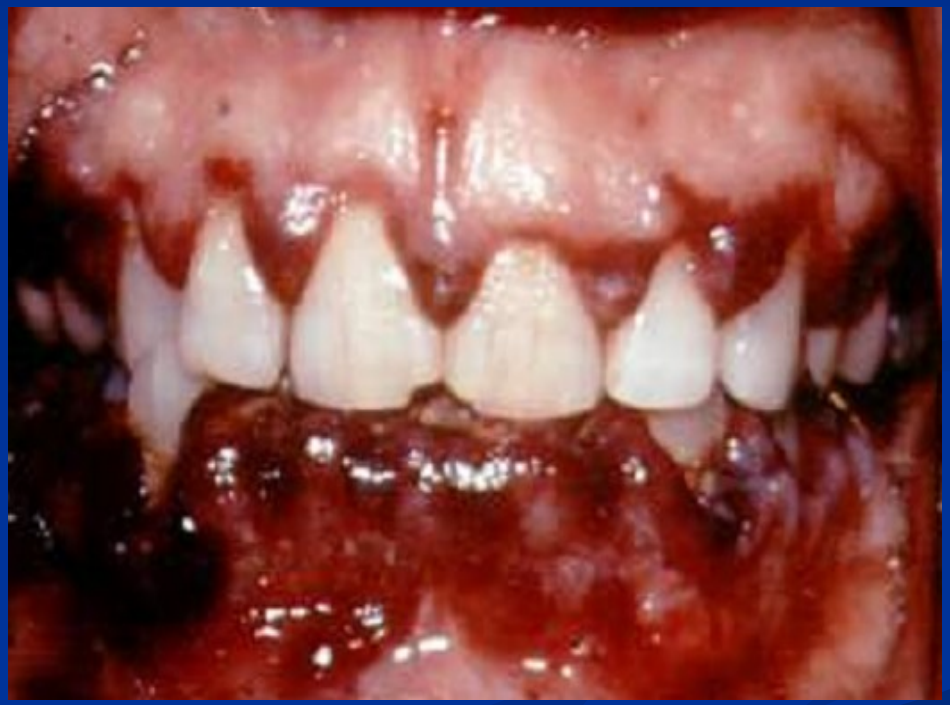
Duodenal ulcers

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





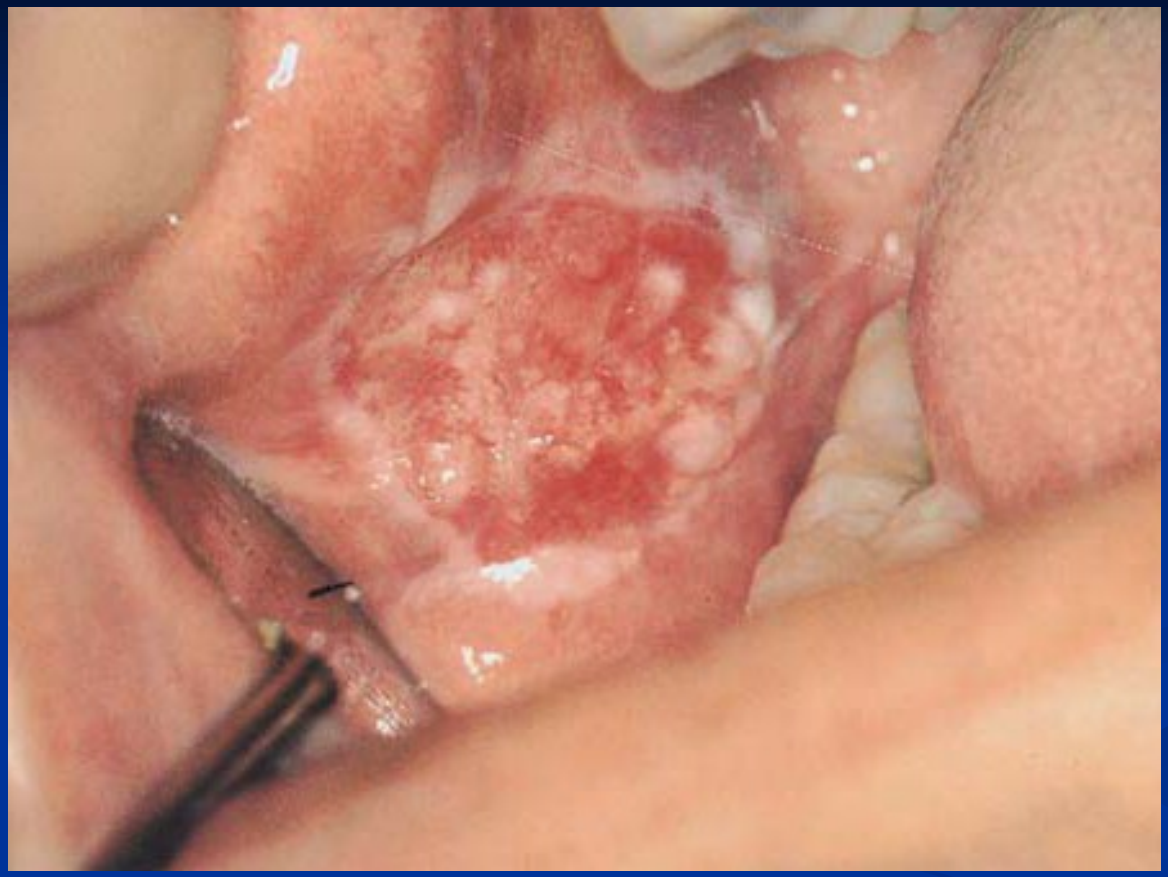
Autoimmune diseases

- 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
- 1- Systemic LE (multisystem disease, systemic manifestation, serological abnormalities; antinuclear "ANA" and anticytoplasmic antibodies)
- 2- 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.

SLE

- Differential diagnosis:
  - Erosive lichen planus. Candidiasis, allergic mucositis, erythema migrans, multifocal precancerous erythroplakia.
  - Immunofluorescence.
- Treatment: immunosuppression

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

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
- …