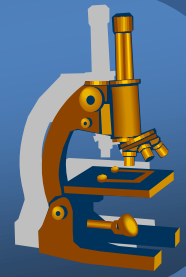


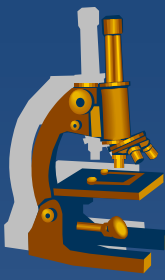
***Soft tissue tumors
and lesions. Bone
pathology.***



Oral pathology

Shatokhina Tetiana

Soft tissue tumors and lesions



- x mesenchymal tumor-like lesions
- x true neoplasms
- x majority are rare in oral cavity
- x Diff. dg : hyperplastic lesions

Fibrous lesion of the oral mucosa



Hyperplastic lesions:

- epulides (fibrous, vascular, giant cell);
- pyogenic granuloma;
- fibroepithelial polyp;
- denture irritation and papillary hyperplasia

Neoplastic and neoplastic-like lesions:

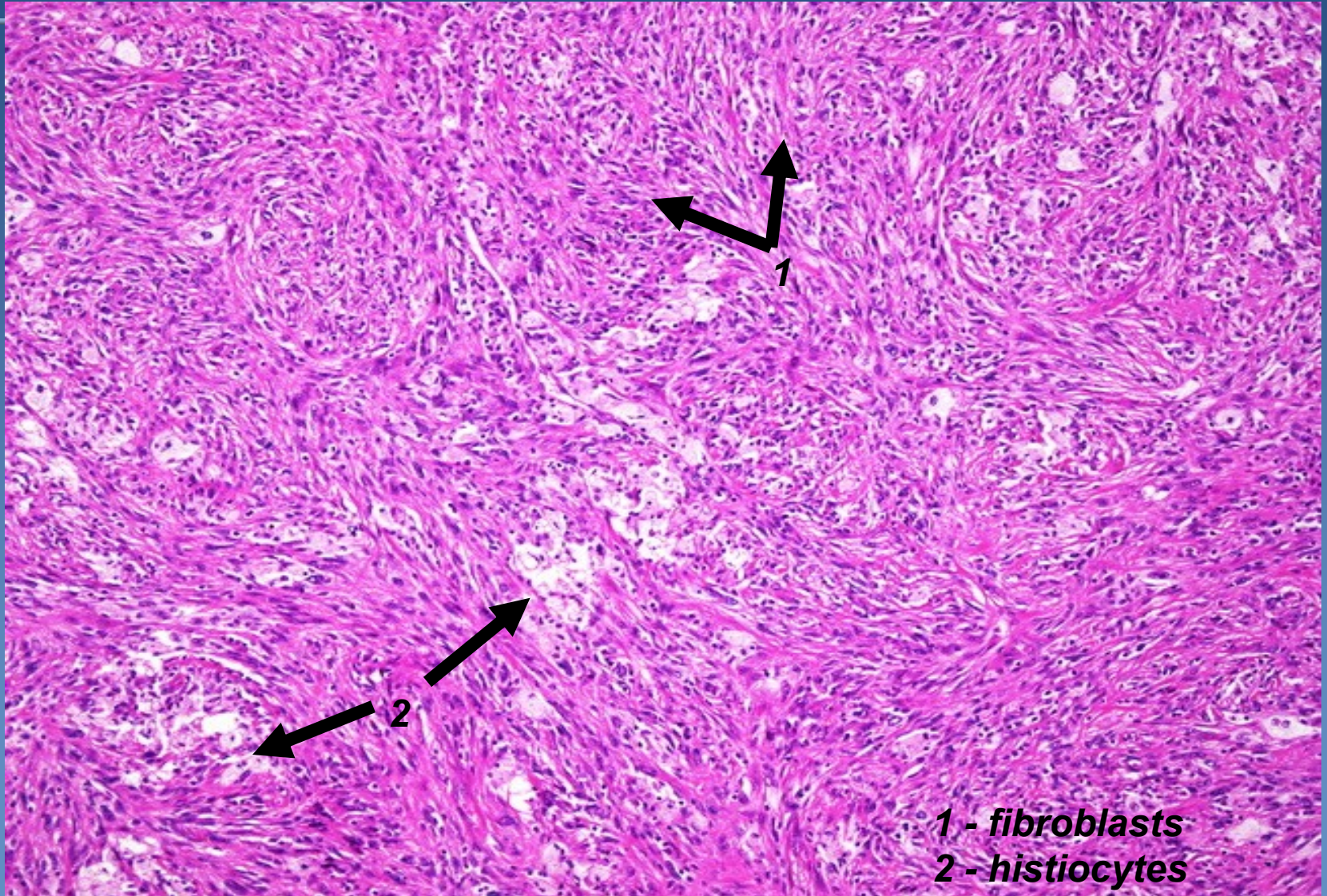
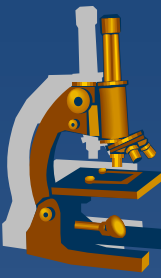
- peripheral odontogenic fibroma
- fibrosarcoma
- fibrous histiocytoma
- nodular fasciitis
- fibromatosis

Fibrous histiocytoma



- x show both fibroblastic + histiocytic differentiation
- x middle-aged and older adult
- x buccal mucosa and vestibule
- x nodular mass vary in size

Fibrous histiocytoma



Nodular fasciitis



- ✗ rare in oral cavity
- ✗ reactive, non-neoplastic lesion
- ✗ cause unknown
- ✗ rapidly growing but self-limiting
- ✗ histologically may resemble fibrosarcoma

Fibromatosis



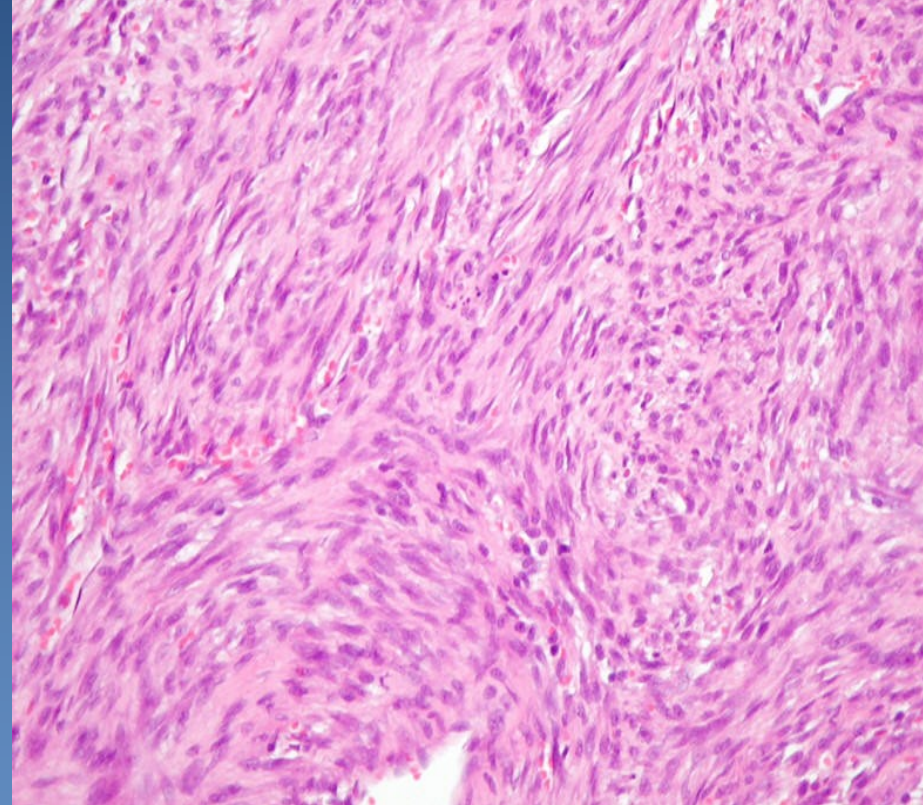
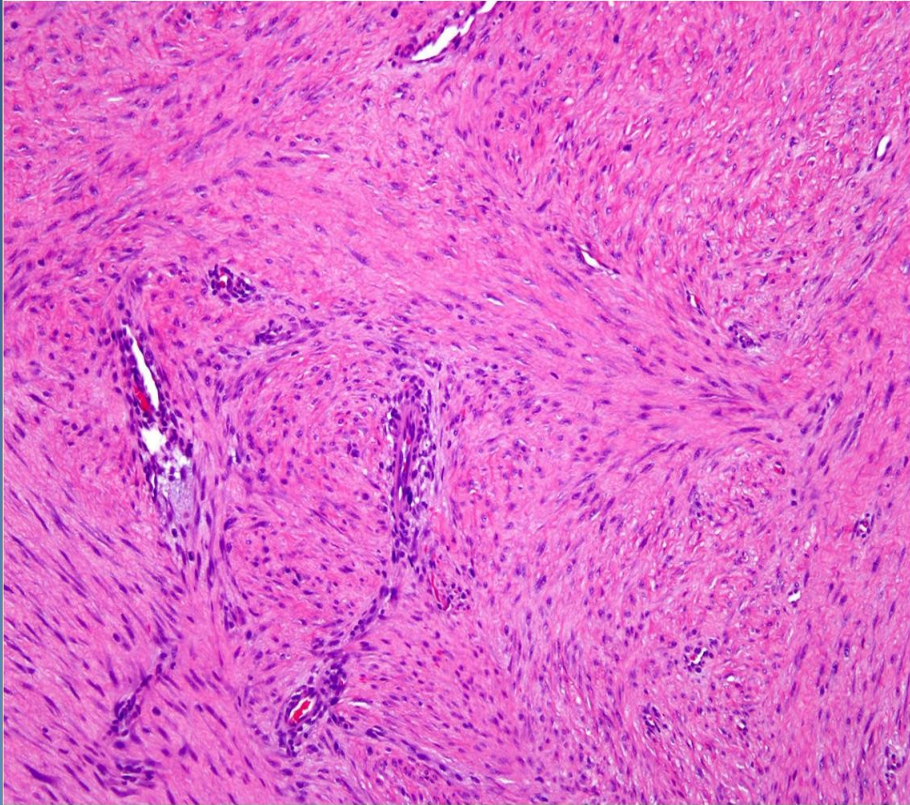
- × non-neoplastic but infiltrative fibrous lesion
do not metastasize!!!
- × children or young adults (juvenile fibromatosis)
- × paramandibular soft tissue region
- × vary in size → facial disfigurement
- × firm mass with rapid growth + destruction adjacent bone

Micro: *proliferation of spindle-shaped cells, no cytonuclear atypia*

Treatment: *wild excision*

recurrence rate 23%

Fibromatosis



proliferation of spindle-shaped cells, without cytonuclear atypia

Fibrosarcoma



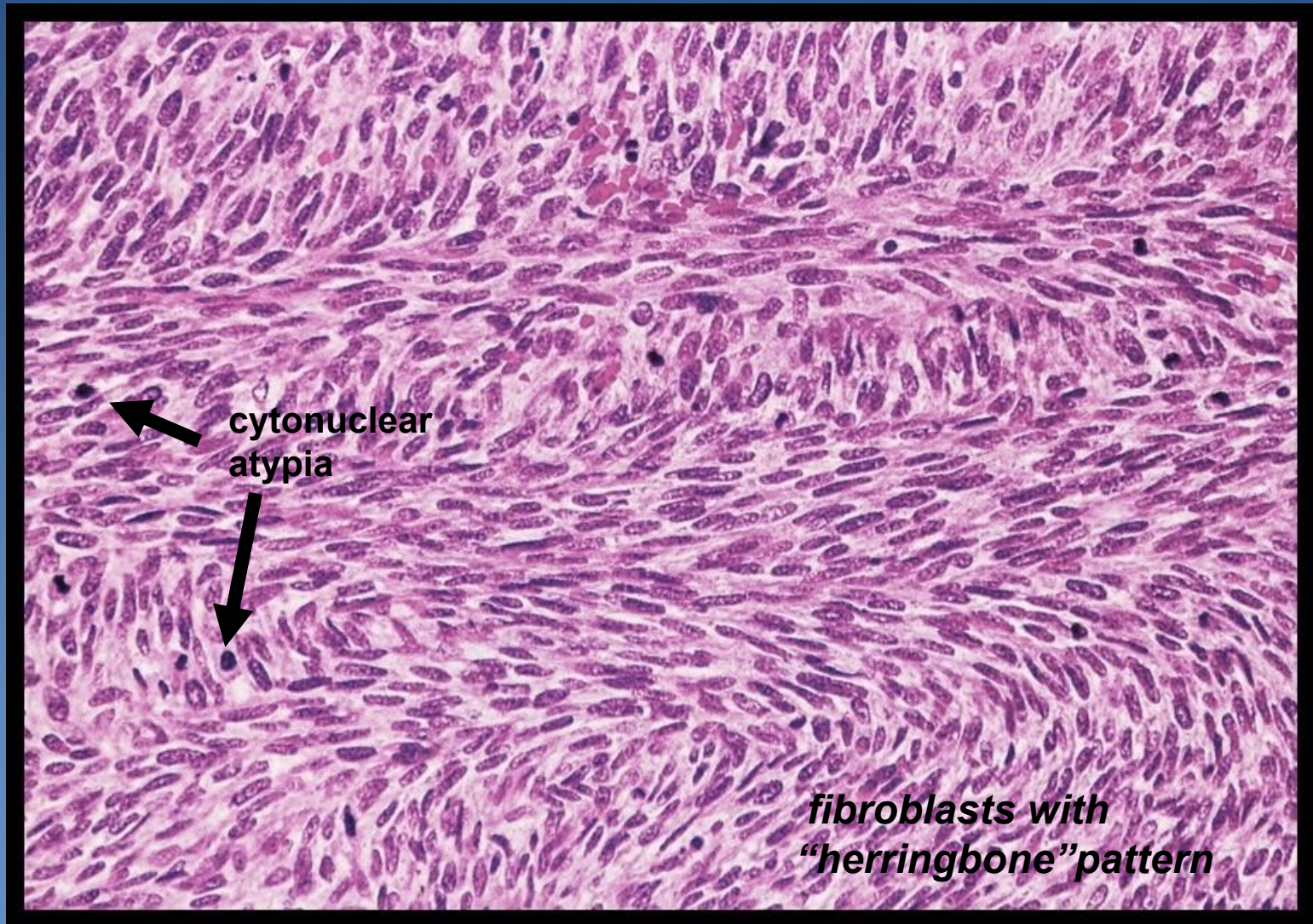
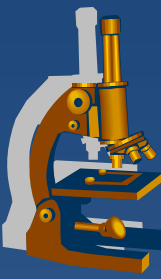
- x** malignant tumor of fibroblasts
- x** rare in oral cavity

have good prognosis

- x** young adults and children

Micro: *fascicles of fibroblasts that forms “herringbone” pattern*

Fibrosarcoma



Tumors of adipose tissue



Lipoma – benign tumor of adipose tissue

- 40 yrs or older

- mucosa of cheeks and tongue

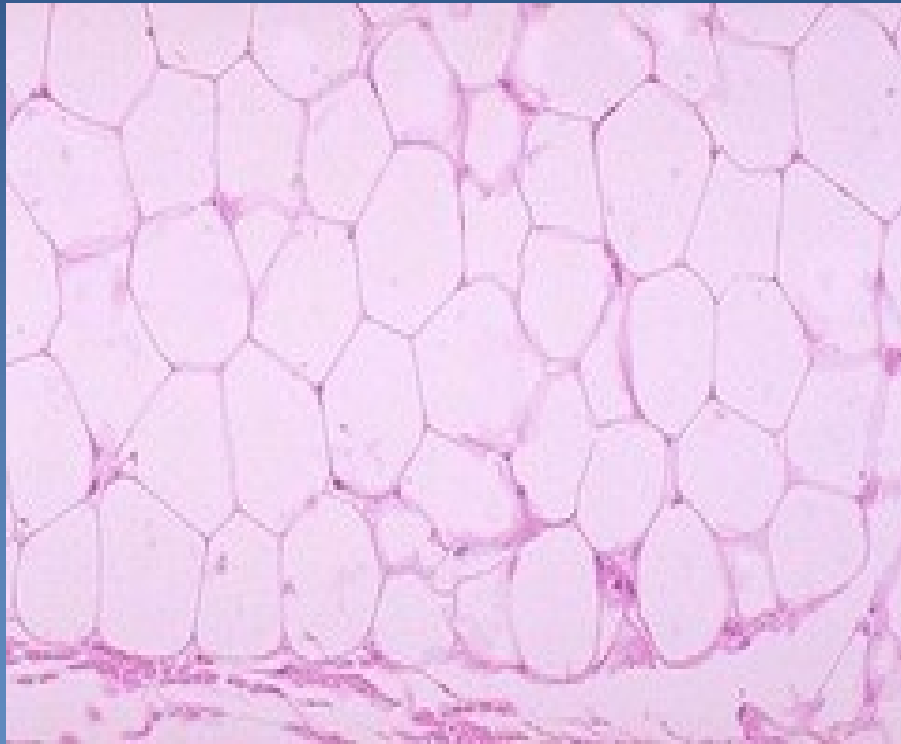
!!! ulcerated tumor-like masses of partly necrotic fat in very young children - the result of traumatic herniation of cheek's mucosa

Gross: *soft, yellowish-colored swelling*

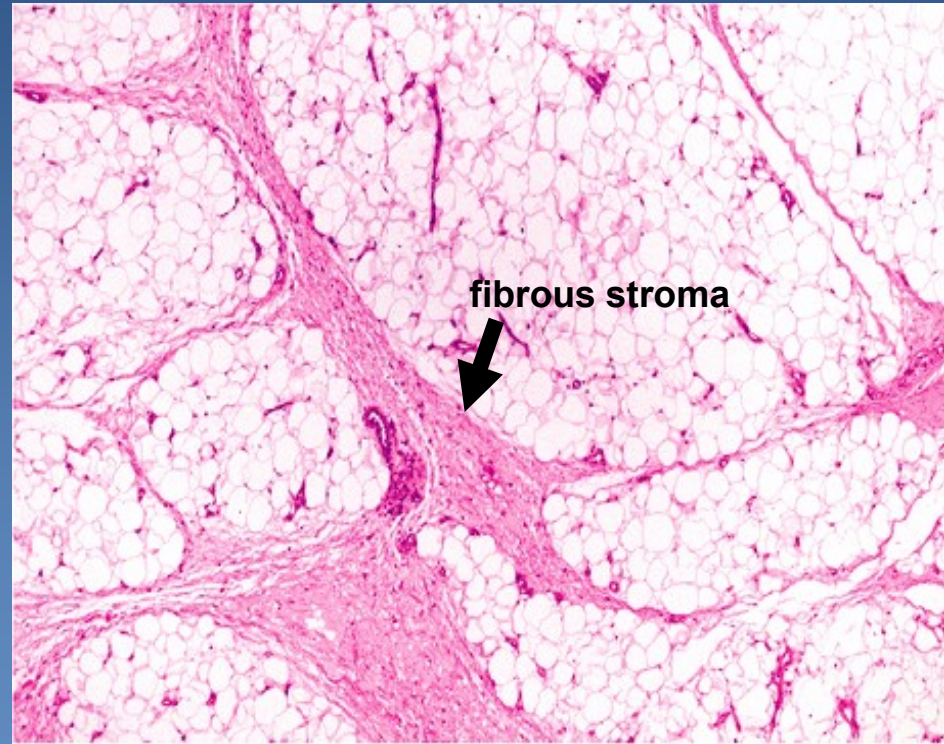
Micro: *mature adipose tissue, thin fibrous capsule*

Fibrolipoma – *lipoma with increasing amount of fibrous stroma*

Tumors of adipose tissue



lipoma



fibrolipoma

Tumors of adipose tissue

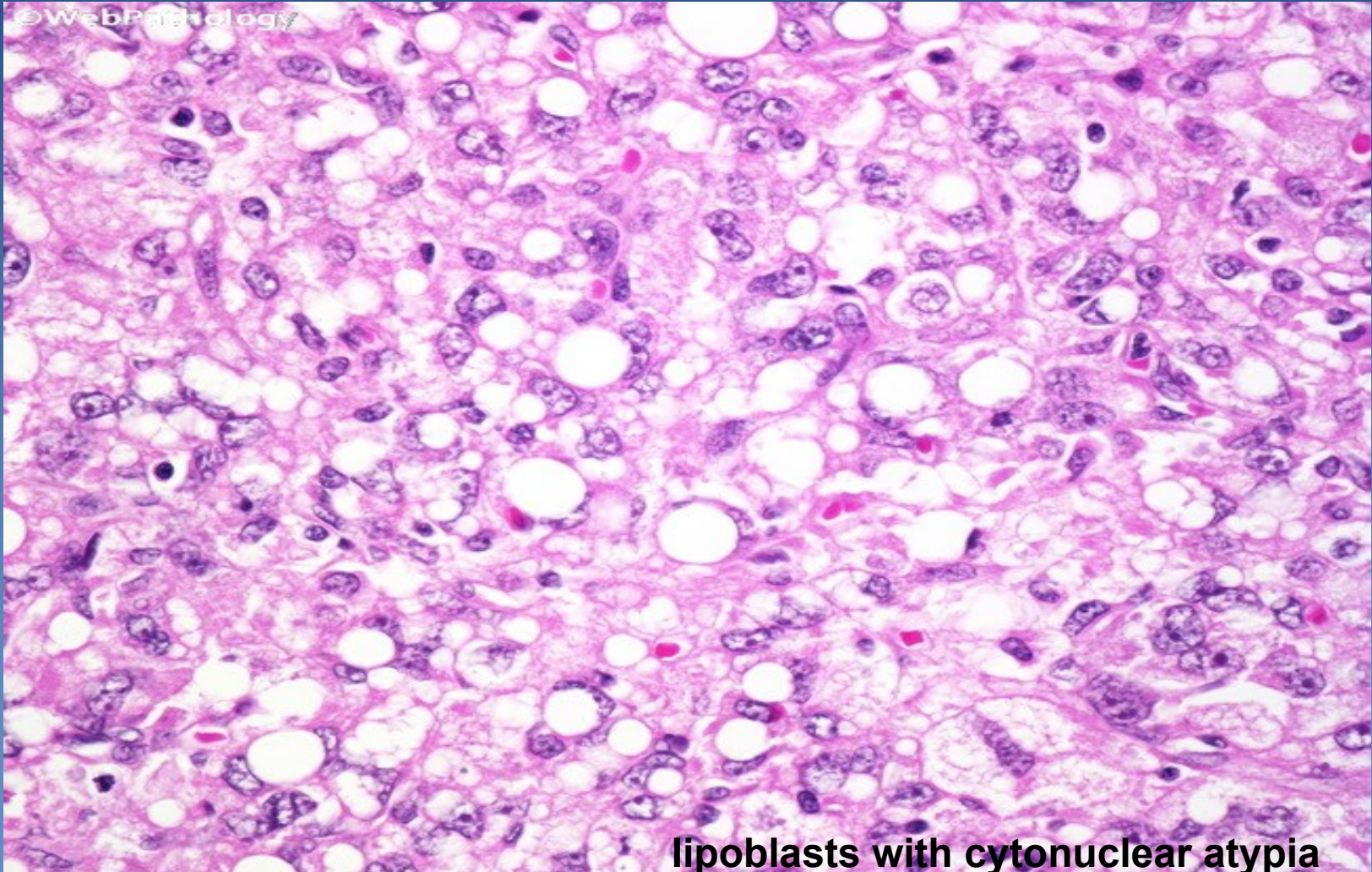


Liposarcoma – malignant tumor of adipose tissue

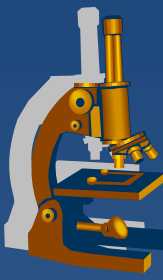
- peak 40-60 yrs
- cheeks, floor of the mouth, tongue
- resemble benign lipoma + atypical hyperchromatic nuclear
- *myxoid, round-cell, well-differentiated, pleomorphic, dedifferentiated*

Have a good prognosis in oral cavity

Liposarcoma



lipoblasts with cytonuclear atypia



Tumors of vascular tissue

Hemangioma — benign hamartomatous tumor

- 1-year-old children, F:M 3:1
- lips, tongue, cheeks or palate

Gross: *solitary, flat or raised, dark reddish-purple in color typically blanch on pressure*

Hereditary haemorrhagic telangiectasia – AD, multiple telangiectases in skin, mucous membrane, internal organs

Sturge-Weber syndrome – haemangiomatous lesions of the face (n. trigeminus) + haemangiomas and calcification of leptomeninges + limbs affecting

Hemangioma



Histological types: *capillary, cavernous, mixed*

Complications: *ulceration*
thrombosis
organization
calcification

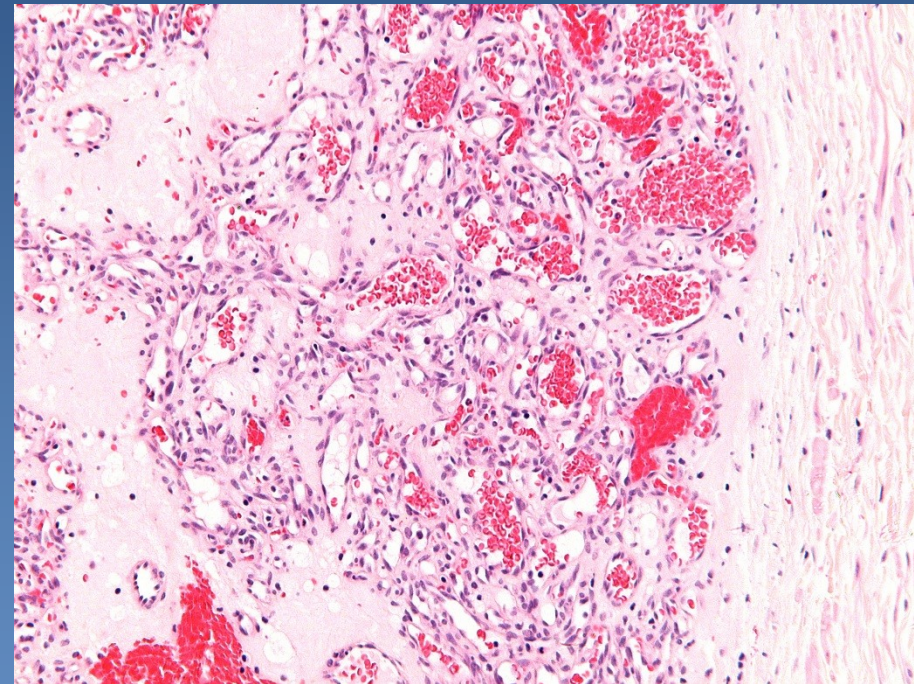
Treatment: *“watchful neglect”, occur regression*

Sublingual varicosities - *purplish venous ectasia on the ventral (undersurface) of the tongue after the age of fifty.*

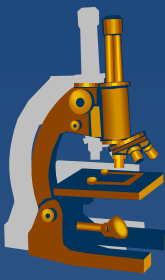
Hemangioma



sublingual hemangioma



capillary type – proliferation of capillary-sized vessels



Tumors of vascular tissue

Lymphangioma - benign hamartomatous tumor
lymphatic vessels

- early childhood
- anterior 2/3 of the tongue (macroglossia)
trauma → sudden increase in size

Gross: *pebbly surface*

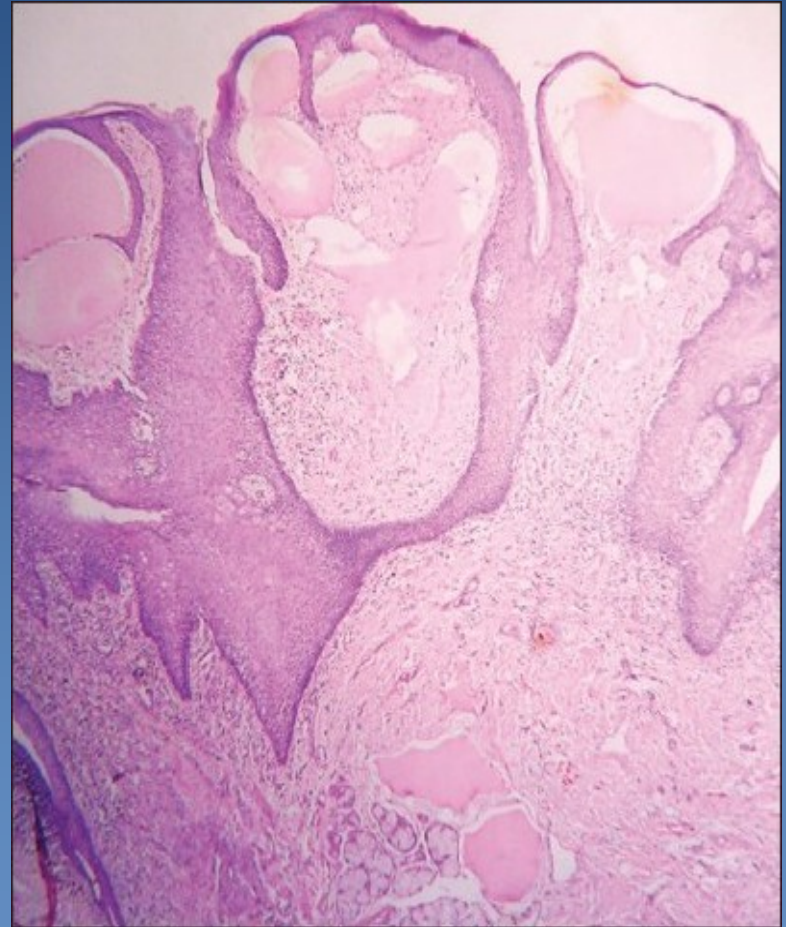
Micro: *endothelial-lined spaces containing lymph*

Cystic hygroma – *large, fluctuant swelling (>10 cm) of the head and neck region, may extend to oral cavity.*

Lymphangioma



pebbly surface of the tongue



dilated lymphatic vessels beneath the epithelium

Tumors of peripheral nerves



1. Neurofibroma
 - solitary
 - multiple
2. Neurinoma (Schwannoma)
3. Multiple mucosal neuromas (MEN sy)
4. Traumatic neuroma
5. Granular cell tumor

Tumors of peripheral nerves



Neurofibroma – mixture proliferation of Schwann cell and fibroblasts

- young adults, children

Solitary lesion – *tongue, buccal mucosa, well-circumscribed nodules*

Multiple lesions associated with neurofibromatosis (**von Recklinhouse's disease of nerves**) – AD, mutations in NF1 gene, located 17q11.2

skin pigmentation (coffee and milk) + involving of cutaneous nerves + axillary freckling + **oral lesions**

!!! May be associated with tumors of CNS, leukemia, RMS, WT...

Tumors of peripheral nerves



Oral lesions:

- ✗ mucosal swelling of the tongue, gingiva
- ✗ enlargement of the fungiform papilla
- ✗ enlargement of mandibular foramen
- ✗ increased bone density

Risk of malignization ⇒ MPNST (neurofibrosarcoma) 5-15%

Treatment: *no specific therapy*

Neurofibromatosis



Involving of cutaneous nerves + mucous swelling of the tongue, gingiva

Tumors of peripheral nerves



Neurinoma (Schwannoma) - benign neoplasm of Schwann cell origin

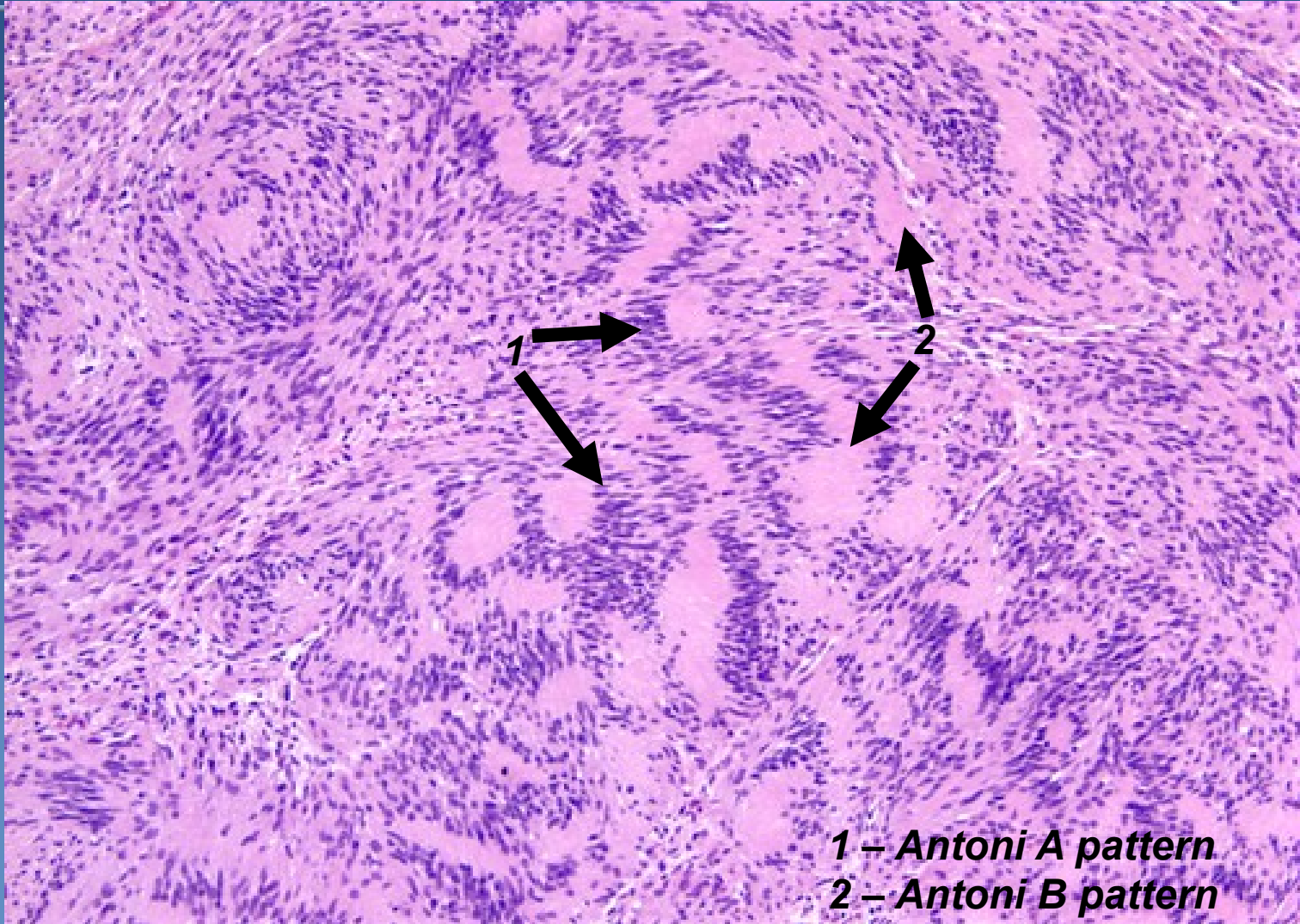
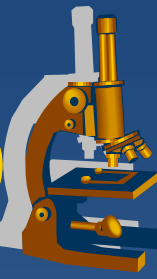
- young and middle-aged adults
- tongue, intraosseous in the posterior mandible

Gross: *vary in size, encapsulated tumor*

Micro: *2 patterns – Antoni A (palisaded nuclei, Verocay bodies)
Antoni B (less cellular fields)*

Treatment: *surgical excision*

Neurinoma (Schwannoma)



1 – Antoni A pattern
2 – Antoni B pattern

Traumatic neuroma



Traumatic neuroma (amputation neuroma) – tumor-like reactive proliferation of Schwann cells

- × cause: transection or other damage of a nerve bundle
- × middle-age adults, F>M
- × mental foramen area, tongue, lower lip
- × painful lesion!!!

Gross: *small nodule*

Micro: *proliferation of mature nerve bundles, fibrotic stroma, mild chronic inflammation*

Treatment: *surgical excision (incl. involved nerve bundle)*

Granular cell tumor



Granular cell tumor — tumor of unknown origin
(in the past was called the granular cell myoblastoma)

- wide age range
- dorsal surface of the tongue

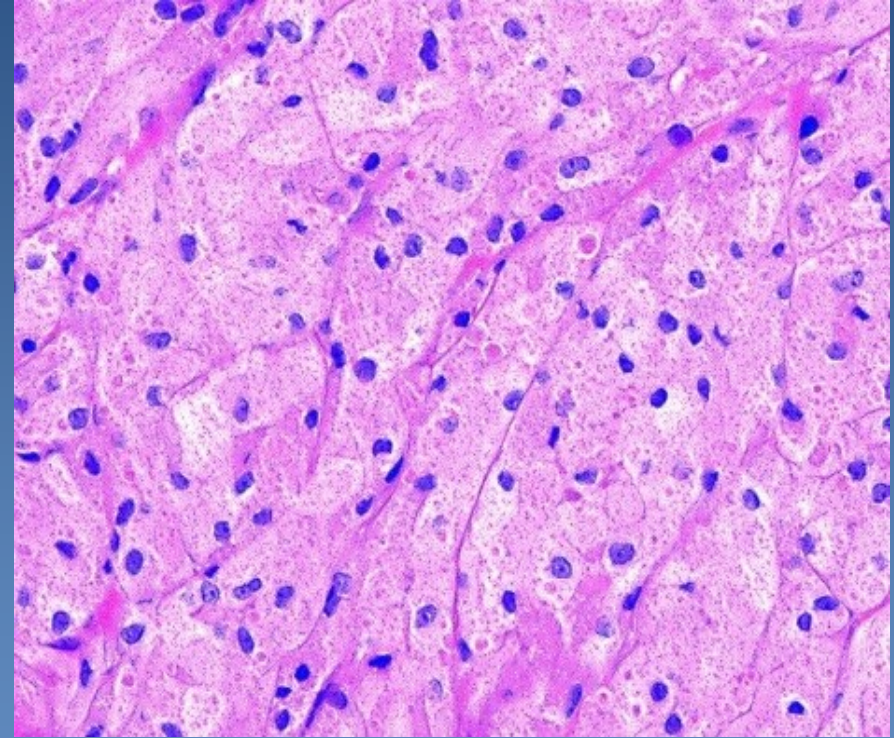
Gross: *non-encapsulated lesion*

Micro: *large cells with granular cytoplasm,
pseudoepitheliomatous hyperplasia of the overlying epithelium*

Granular cell tumor

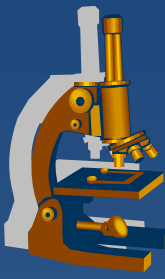


***non-encapsulated lesion of
tongue's mucosa***



large cells with granular cytoplasm

Tumors of muscle



Leiomyoma – benign smooth muscle tumors

probably, leiomyomas of the oral cavity have their origin from vascular smooth muscle

Leiomyosarcoma and rhabdomyosarcoma are both very rare in oral cavity



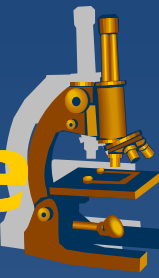
Bone pathology

Inherited and development disorders of bone



- x1. Osteogenesis imperfecta
- x2. Osteopetrosis
- x3. Cleidocranial dysplasia
- x4. Achondroplasia
- x5. Fibro-osseous lesions
- x6. Cherubism

Inherited disorders of bone



- ✘ uncommon diseases
- ✘ jaw involvement variable
- ✘ orofacial manifestations include:
 - abnormalities in number, form, structure of teeth
 - malocclusion
 - abnormal facial appearances

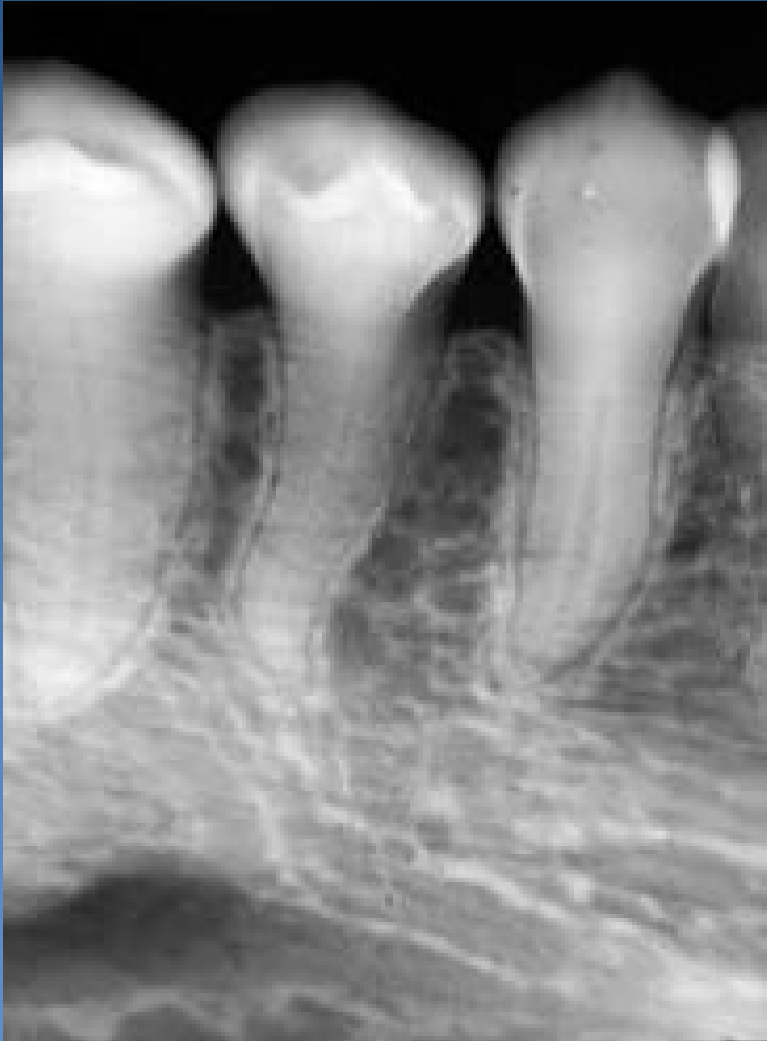
Osteogenesis imperfecta



- × AD, mutations in the genes that code for type-1 collagen (80-90%)
- × generalized osteoporosis (slender bones)
Clinically 4 main type:
 - × Type I (classic type) – *AD, blue sclera, deafness, +/- dentinogenesis imperfecta*
 - × Type II (perinatal lethal) – *AD*
 - × Type III (progressively deforming) – *AD/AR, severe osteoporosis, progressive deformities, dentinogenesis imperfecta*
 - × Type IV – *AD, similar to type I, but more severe*

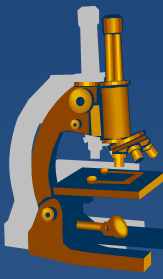
Micro: *immature, woven bones of cortex*

Osteogenesis imperfecta



Dentinogenesis imperfecta:
note delicate bone trabeculae
+ obliteration of pulp
chambers

Osteopetrosis (marble bone disease)



- × excessive density of all bones
- × obliteration of marrow cavities → secondary anemia
- × defect in osteoclastic activity, failure in the remodeling of the developing bone
- × bones mechanically weak, common fractures!!!

Symptoms: *delayed eruption of teeth, osteomyelitis (after tooth extraction)*

Radiography: *mandible >> maxilla, invisible roots of the teeth*

Cleidocranial dysplasia (cleidocranial dysostosis)



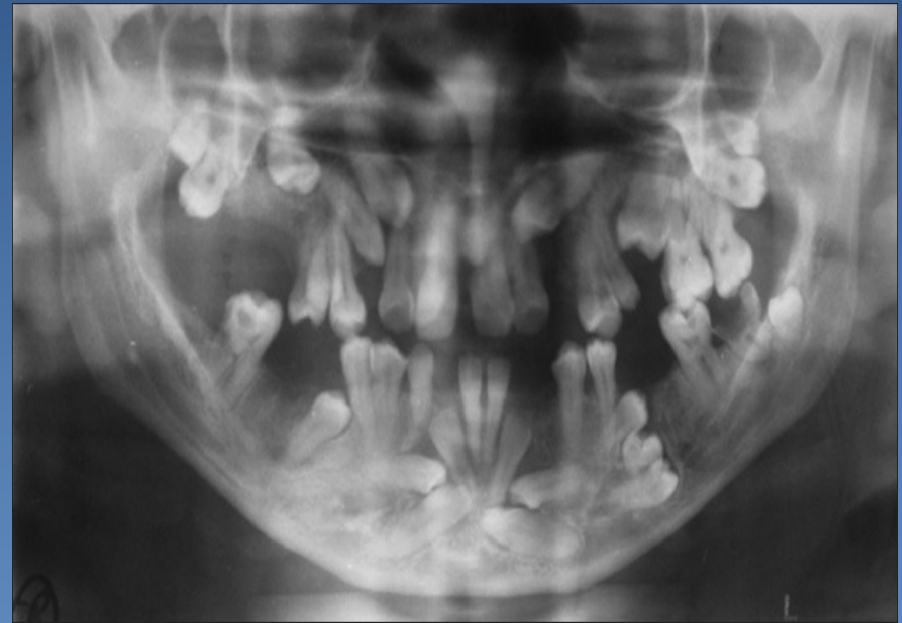
- ✗ AD, mutations to the RUNX2 gene
- ✗ disturbance of differentiation of osteoblasts from precursor cells
- ✗ abnormalities of the skull, jaws, clavicle (partial/complete absence)
- ✗ maxilla with a high, narrow arched palate
- ✗ delayed or non-eruption of the permanent dentition, supernumerary teeth

Radiography: *thin teeth's roots*

Cleidocranial dysplasia



Complete absence of clavicles



***Retention of deciduous teeth +
multiple impactions of permanent
teeth***

Fibro-osseous lesions



Divided into:

I. Osseous dysplasia

1. Fibrous dysplasia (monostotic/polyostotic)
2. Cemento-osseous dysplasia

II. Benign neoplasia (ossifying fibroma)

- ✗ replacement of normal bone by cellular fibrotic tissue
- ✗ contain woven bone + acellular islands of mineralized tissue develop

Fibrous dysplasia (FD)



× development disorder, but not inherited

Monostotic FD: *much more common!*

× childhood, adolescence

 reactivation of quiescent lesion during pregnancy

× affected 1 bone: limb, skull bones, **particularly the jaws**

 maxilla>>mandible

Craniofacial fibrous dysplasia – 1 bone is affected (maxilla) +
 involvement of adjacent bones

Symptoms: *painless swelling of the maxilla (buccal)* → *facial asymmetry*
 rapid and extensive growth → *exophthalmos*
 mandibular lesion → *fusiform expansion + displacement of teeth*

Gross: *ill-defined smooth enlargement*

Radiography: *ground-glass/orange-peel-stippling effect*
 displaced teeth, separated roots

Fibrous dysplasia (FD)



Fibrous dysplasia

- Monostotic form more common in the craniofacial region
- Ground glass change with areas of sclerosis (arrows)
- More ill-defined border compared to ossifying fibroma

Fibrous dysplasia (FD)



Polyostotic FD

- ✗ affected several bones, segmentally lesions
- ✗ affected sites: limb (lower), **skull bones**, vertebrae, ribs, pelvis
- ✗ childhood, F:M 2-3:1

expansion usually stops with skeletal maturation

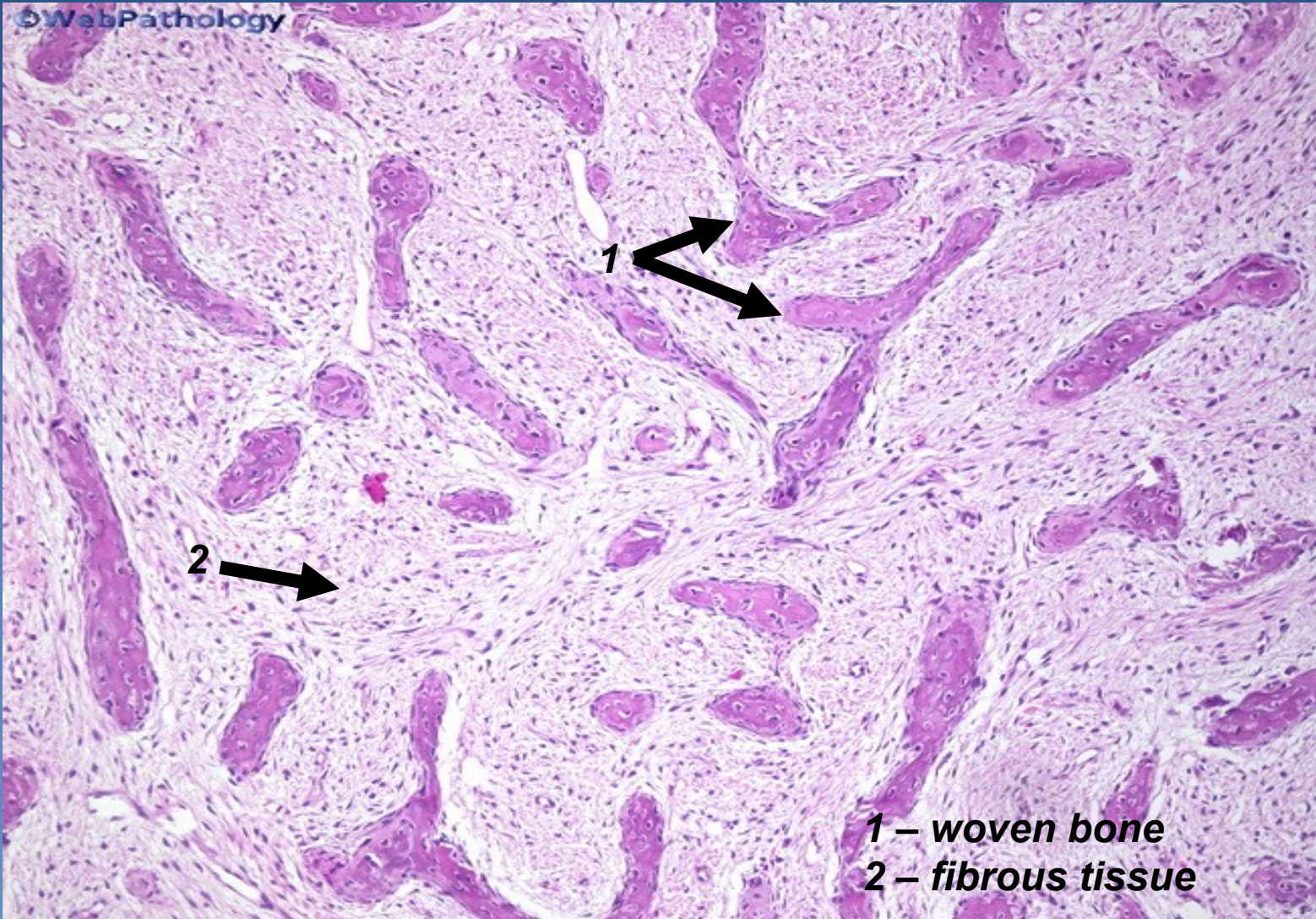
McCune-Albright syndrome – bone lesions are accompanied by skin pigmentation, sexual precocity, endocrine abnormalities

Micro: *delicate trabeculae of woven bone + fibrous tissue*

Remodelling of woven to lamellar bone may occur with increasing age!!!

Treatment: **not radiosensitive !!!** (risk of malignant transformation to *fibrosarcoma*)

Fibrous dysplasia (FD)



Cemento-osseous dysplasia



- × osseous dysplasia of jaws, which involves the tooth-bearing areas
- × F>>M, over 30 yrs old, mandible>>maxilla

Based on the clinical and radiographic features:

periapical, focal and florid cemento-osseous dysplasia

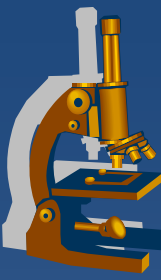
Clinically:

| | |
|---|---|
| multiple and small <1 cm | multiple and large >1 cm |
| associated with apical areas of the mandibular incisors | involve 1 or more quadrants in one or both jaws |

Micro: *fibrous tissue + bone/calcified acellular tissue develop*

Radiography: *radiolucent/mixed/radiopaque*

Inflammatory diseases of bone



- x1. Alveolar osteitis (dry socket)
- x2. Focal sclerosing (condensing) osteitis
- x3. Osteomyelitis
- x4. Chronic periostitis
- x5. Radiation injury and osteoradionecrosis

Osteomyelitis



- now is a rare disease
- polymicrobial infection

Predisposing factors:

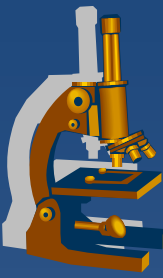
Local factors

- × trauma
- × radiation injury
- × Paget's disease
- × osteopetrosis
- × major vessel disease

Systemic factors

- × immune deficiency states
- × immunosuppression
- × DM
- × malnutrition
- × extremes of ages

Suppurative osteomyelitis



- × clinically: acute, chronic (>1 month)
- × mandible > maxilla
- × source of the infection – *dental abscess, fractures, penetrating wounds, extractions*

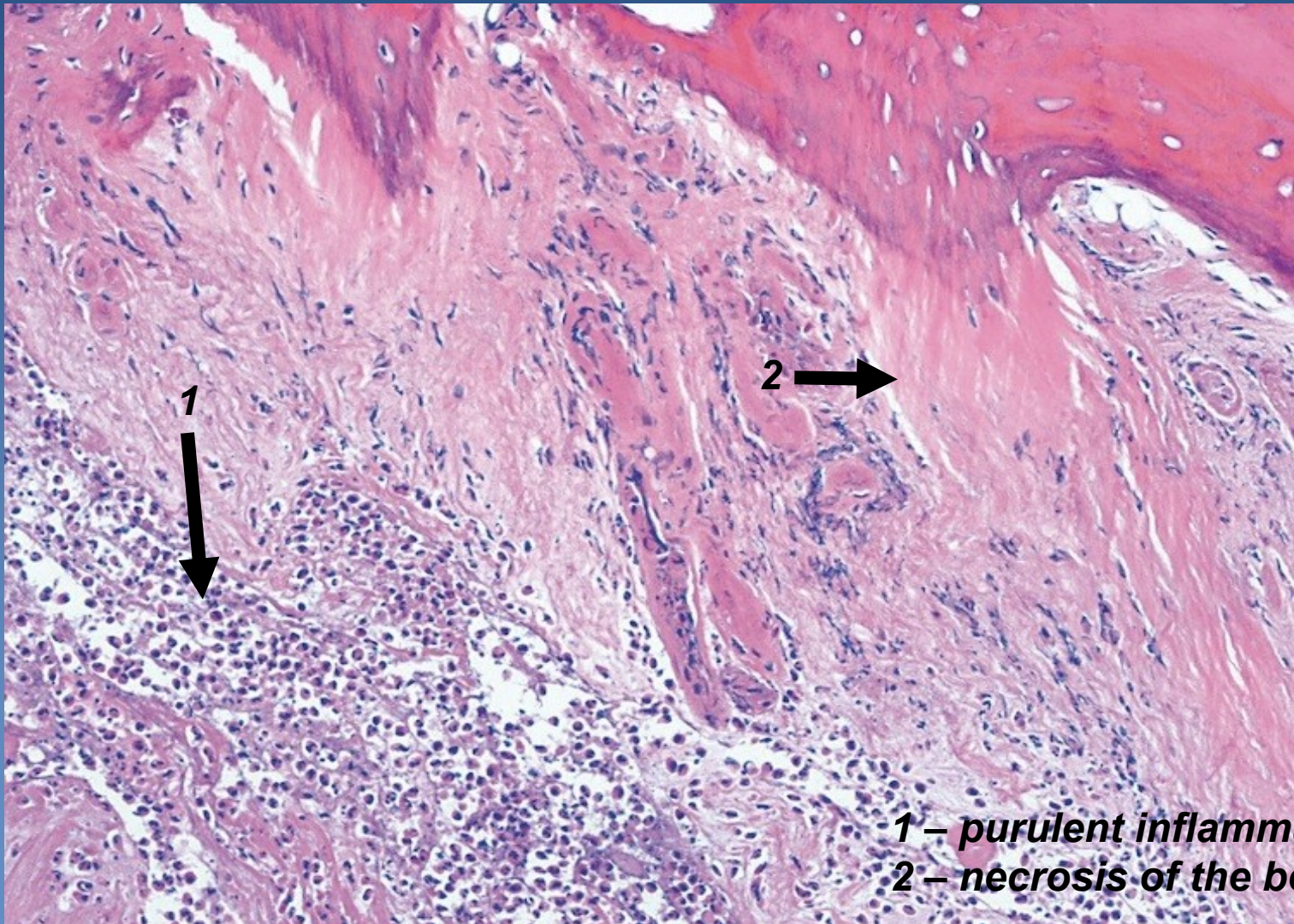
Symptoms:

acute lesion - *pain, swelling, pyrexia, malaise, mobility of teeth*
chronic – *discharge of pus through 1 or more sinuses*

Micro: *suppurative inflammation, necrosis of the bones, pus within marrow spaces, vascular thrombosis*

Complication: *sequestrum (exfoliated through a sinus)*
surgical removing

Suppurative osteomyelitis



*1 – purulent inflammation
2 – necrosis of the bone*

Chronic osteomyelitis with proliferative periostitis

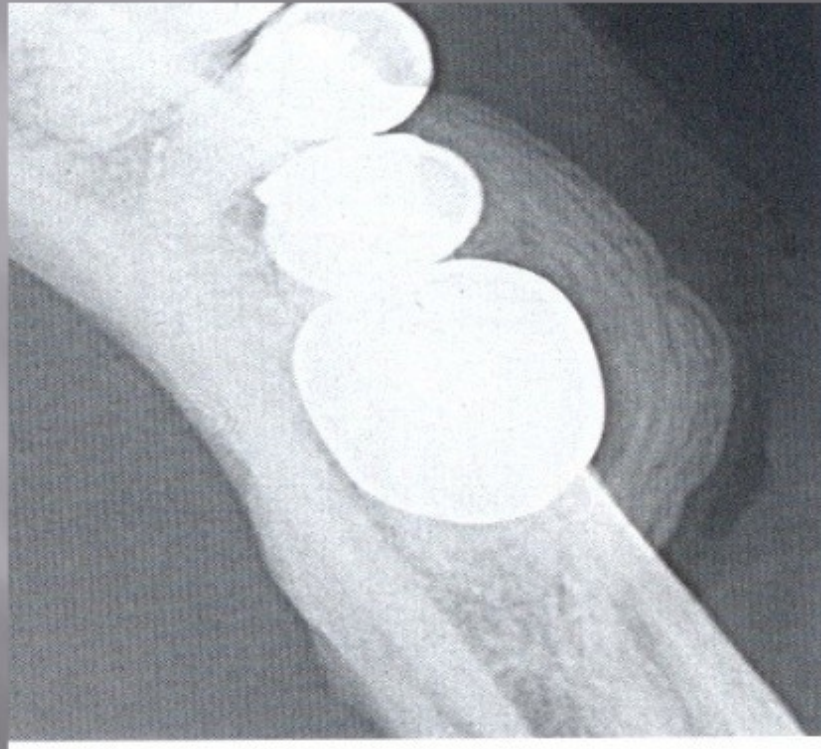


- x** syn. Garré's osteomyelitis, periostitis ossificans
- x** type of sclerosing osteomyelitis
- x** mandible, children and young adults

Gross: *swelling on the outer surface of the mandible*

Micro: *subperiosteal mass of trabeculae of woven bone + chronic inflammation in fibrous marrow*

Chronic osteomyelitis with proliferative periostitis



Garre's osteomyelitis

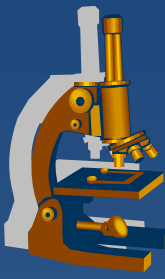
Subperiosteal mass in mandible

Metabolic and endocrine disorders of bone



- x1. Osteoporosis
- x2. Primary hyperparathyroidism
- x3. Secondary hyperparathyroidism
- x4. Rickets and osteomalacia
- x5. Acromegaly

Osteoporosis



- × excessive bone loss/when the apposition of bone is reduced
- × F:M 2:1
- × postmenopausal women (rate of bone's loss 1-8% per year)
- × edentulous patients (mandible)
- × accentuated in Cushing syndrome, thyrotoxicosis, primary hyperparathyroidism
- × osteoporotic bone is reduced in quantity

Radiography: *increased radiolucency, thin cortex*

Hyperparathyroidism



Primary

- × ↑ secretion of parathormone (adenoma/Ca, hyperplasia PG)
- × hypercalciemia, hypercalciuria + pathological metastatic calcification

Micro: *brown tumor (haemosiderin + fibrotic tissue + multinucleated, osteoclast-like giant cells)*

Secondary

- × response to chronic hypocalciemia (CRI)
- × may associated with rickets and osteomalacia

Micro: *uncalcified osteoid + brown tumor*

may affect jaws

Paget's disease of bone



- ✗ form of osteodystrophy, disorganized formation and remodeling of bone

- ✗ aetiology - unclear

genetic and environmental factors, paramyxovirus infection

- ✗ >40 yrs, more common in maxilla

Phases:

1. Osteolytic
2. Mixed osteolytic and osteogenesis
3. Osteoblastic

Paget's disease of bone

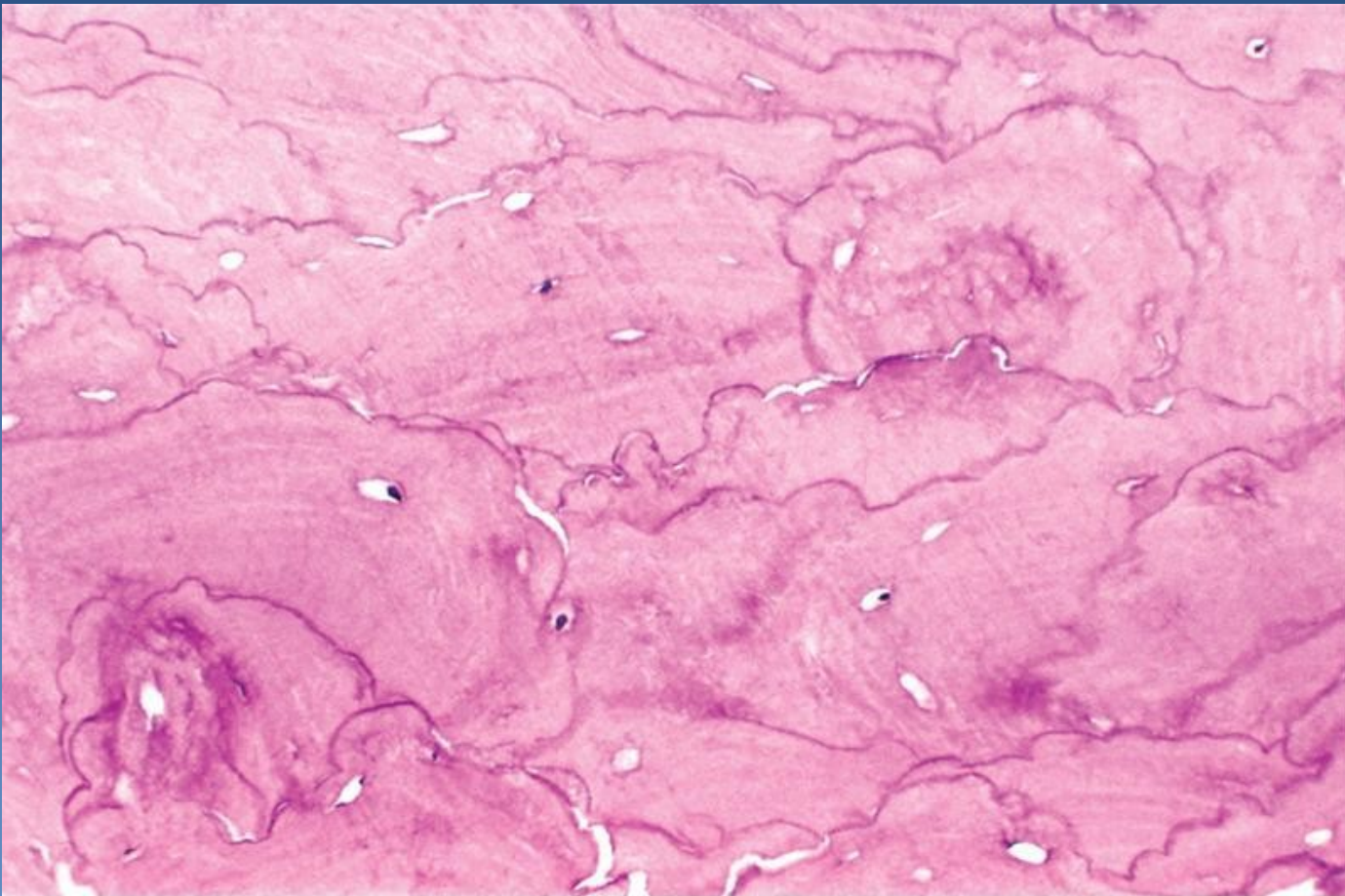


Symptoms: *bone pain, cranial nerve compression, facial deformity, difficulties in wearing dentures
hypercementosis, ankylosis → difficulty in extraction
root resorption (1 phase)
increased alkaline phosphatase*

Micro: *criss-crossing reversal lines, mosaic bone*

Complication: *risk of malignant transformation (osteosarcoma)*

Paget's disease of bone



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criss-crossing reversal lines, mosaic bone

Tumors of bone



1. Bone-forming tumors

| | |
|------------|--------------------------|
| Benign: | Osteoma Osteoblastoma |
| Malignant: | Osteosarcoma |

2. Cartilage-forming tumors

| | |
|------------|----------------|
| Benign: | Chondroma |
| Malignant: | Chondrosarcoma |

3. Marrow tumors:

Myeloma

4. Histiocytic and dendritic cell neoplasms

Langerhans cell histiocytosis

5. Vascular tumors:

Haemangioma of bone

6. Fibrous tumors:

Ossifying (cemento-ossifying) fibroma

7. Metastatic tumors

Bone-forming tumors



Osteoma – benign, slow-growing tumor

×adults, mandible>maxilla

GROSS: *solitary, well-circumscribe lesion*

multiple osteomas of the jaws occur as a feature of Gardner sy

MICRO: *compact type: dense lamellar bone*

cancellous type: interconnecting trabeculae + fibrous marrow

Osteoblastoma – rare tumor in the jaws

MICRO: *cementoblastoma (!!!not related to the roots of the teeth)*

Bone-forming tumors



Osteosarcoma – primary malignant Tu of bone

- × 30 yrs and older
- × relatively rare in jaws

Intramedullary type - *arise centrally within the jaws*

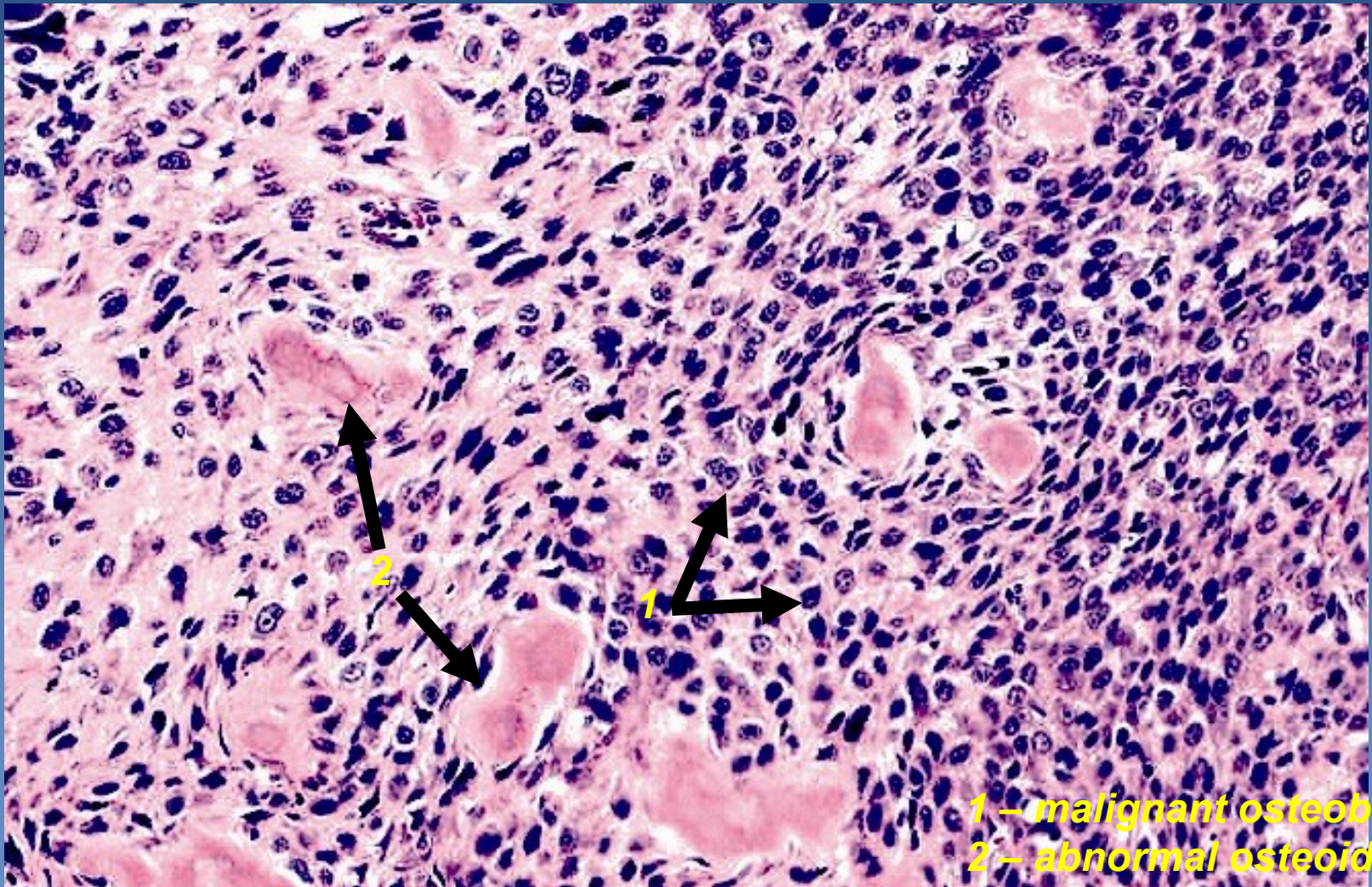
Juxtacortical type – *peripherally in the relation to the periosteum, better prognosis*

Micro: *malignant osteoblasts + abnormal osteoid*

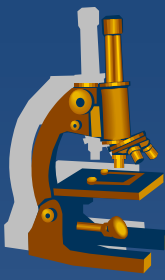
Metastasis: *RLN, lungs, brain*

Treatment: *neoadjuvant CT+ surgical removal + adjuvant CT*

Osteosarcoma



1 – malignant osteoblasts
2 – abnormal osteoid



Cartilage-forming tumors

Chondroma – rare benign Tu in the jaws

x 3-4 decades

x **Mandible** (*condylar process, posterior part*)

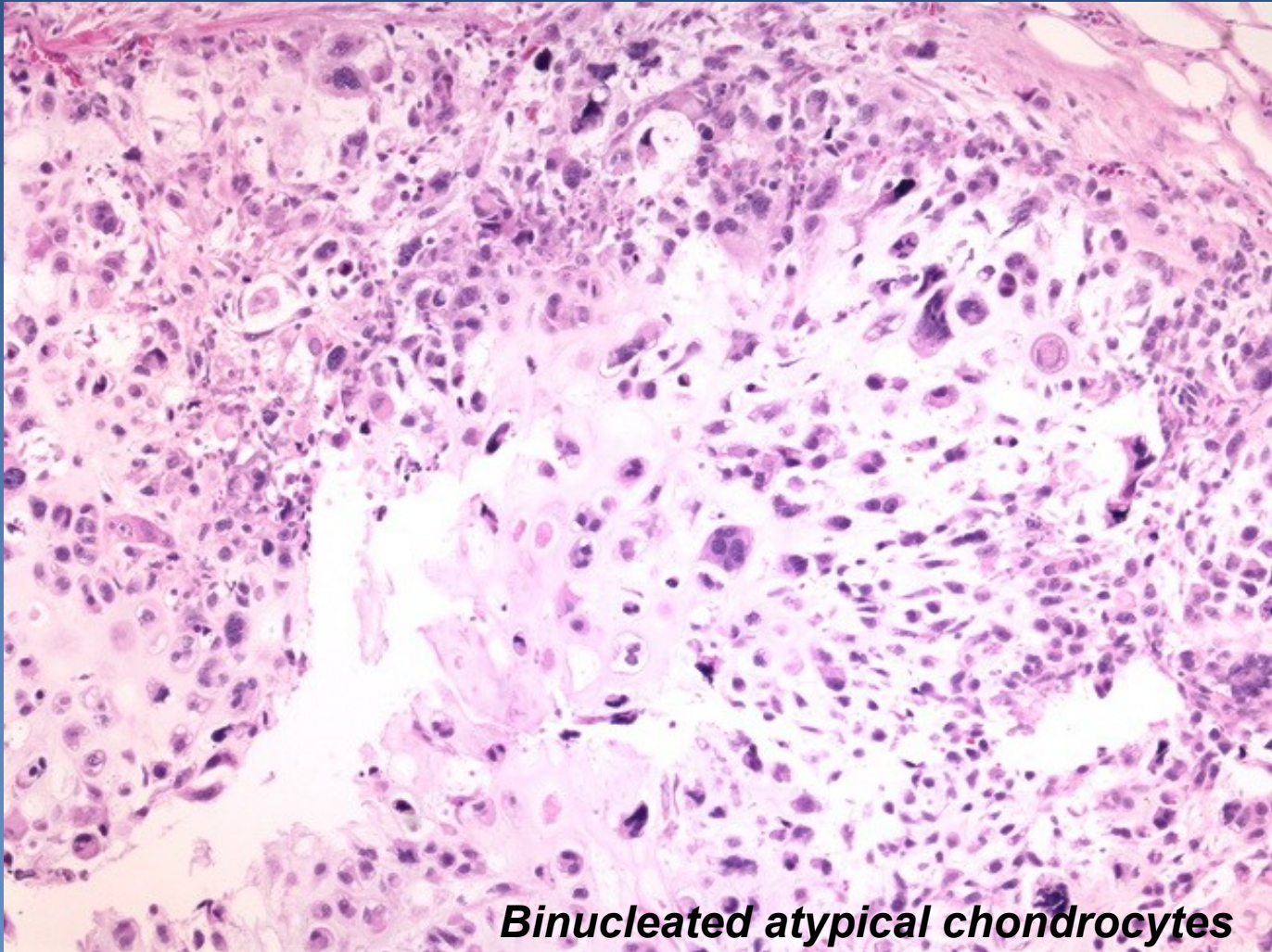
Maxilla (*anterior part*)

Micro: *circumscribed mass of mature hyaline cartilage*

↑ cellularity, binucleated cells ⇒ **susp well-differentiate chondrosarcoma !!!**

Prognosis: *better for mandibular lesions*

Chondrosarcoma



Binucleated atypical chondrocytes

Marrow tumors



Myeloma – plasma cells neoplasm

Multiple myeloma – *disseminated disease involving many bones*

Solitary myeloma (plasmocytoma) – *solitary lesion*

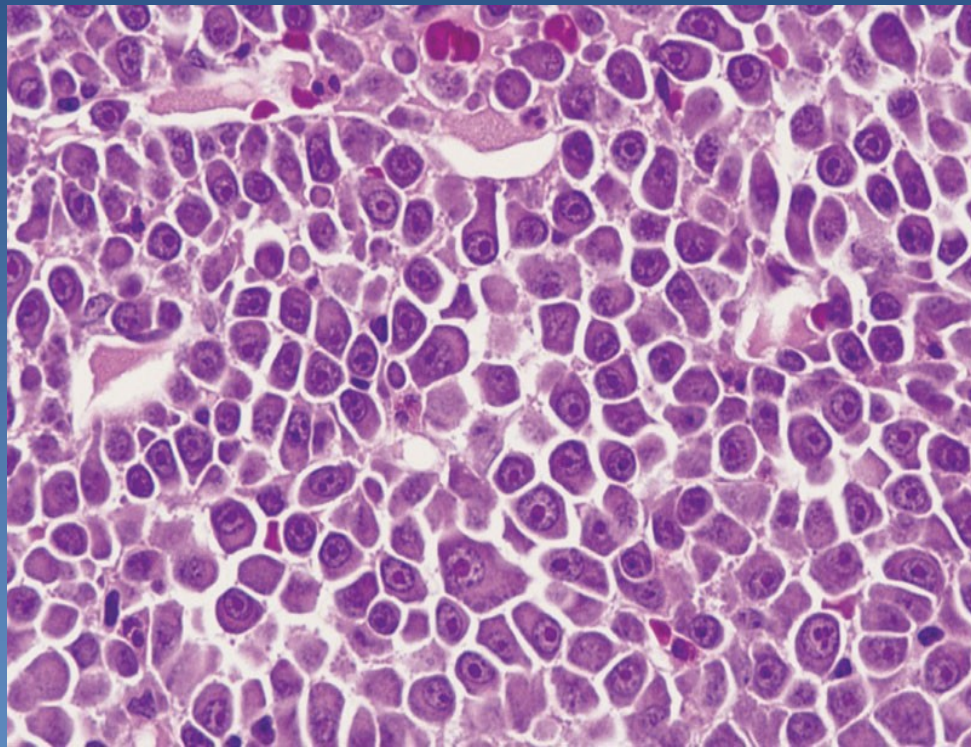
- × 50-70 yrs
- × **skull**, vertebrae, sternum...(sites with red marrow)
- × abnormally high levels of single homogenous type **Ig** in serum (paraprotein)

Radiography: *osteolytic lesions (punched-out radiolucencies)*

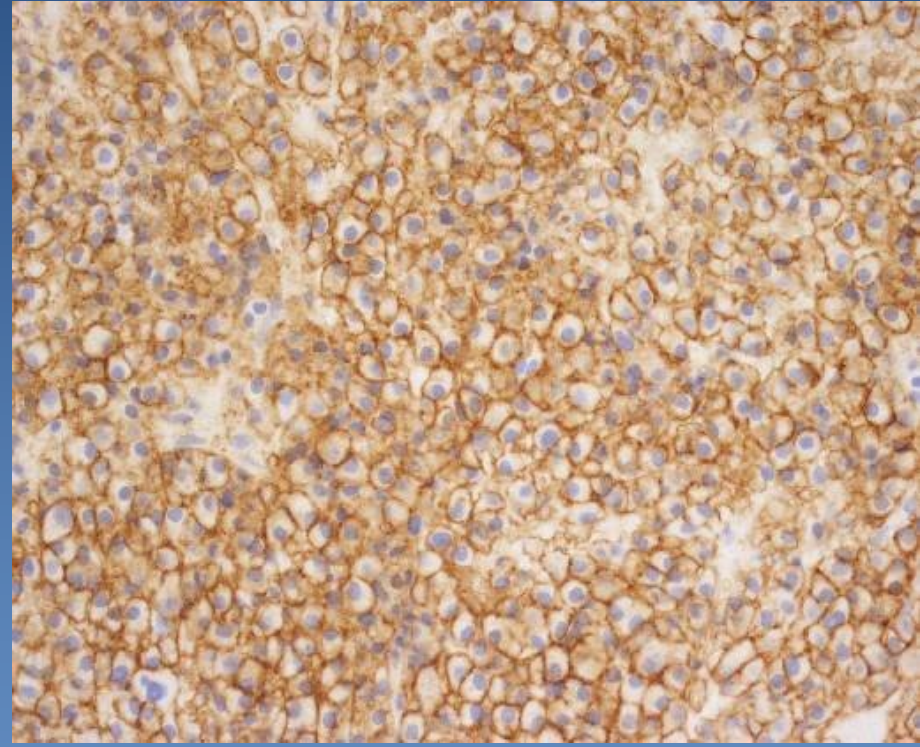
Micro: *cellular sheets of Tu cells resemblance to plasma cells*

IHC: *positivity of CD20, CD138, kappa, lambda*

Myeloma



Tumour's cells resemblance to plasma cells



IHC: positivity of CD138

Histiocytic and dendritic cell neoplasms



Langerhans cell histiocytosis – clonal proliferation of Langerhans-type cells

Solitary lesion in bone (unifocal eosinophilic granuloma)

Multifocal eosinophilic granuloma (bone + other organs)

Disseminated multiorgan disease (Litterer-Siwe disease)

Unifocal/multifocal eosinophilic granulomas:

- <20 yrs, M:F 2:1
- cranium and jaws (mandible)

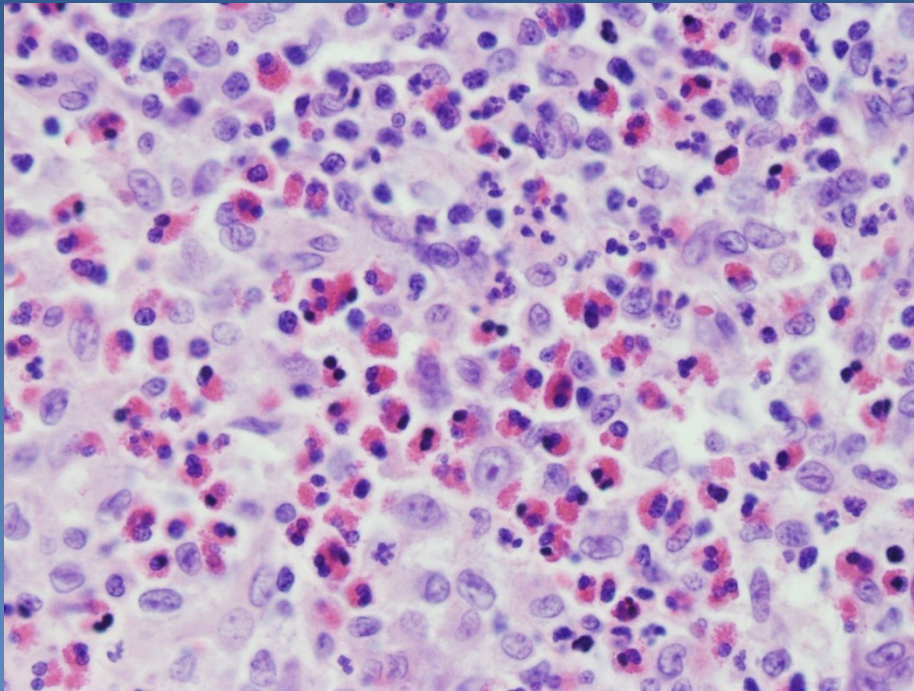
Radiography: *solitary/multiple osteolytic lesions*

Micro: *histiocytes + variable numbers of eosinophils*

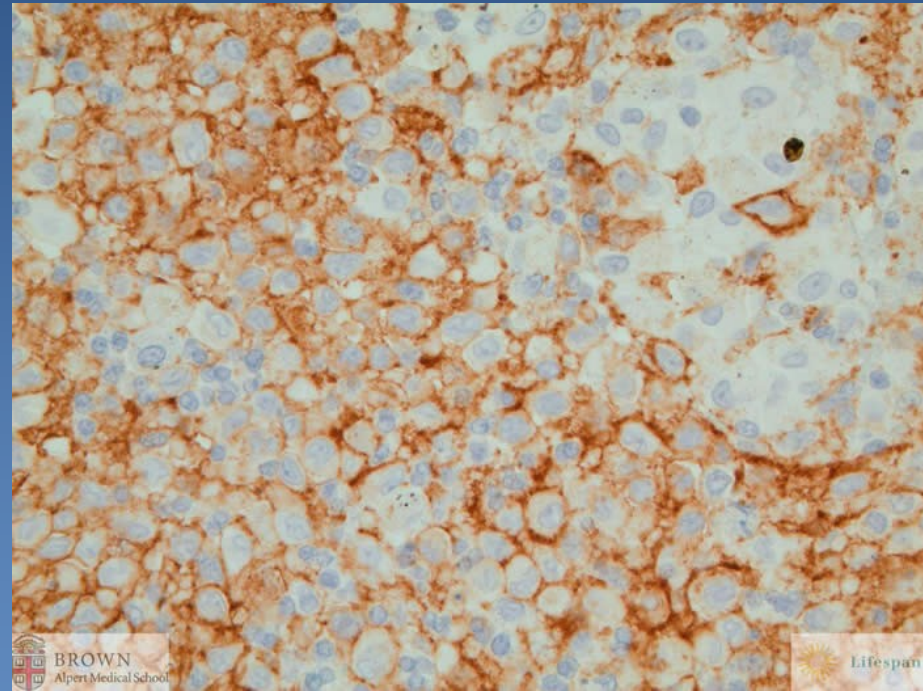
EM: *Birbeck granules*

IHC: *positivity of CD1 α , S100*

Langerhans cell histiocytosis



***Histiocytes + variable numbers of
eosinophils***



IHC: positivity of CD1a

Fibrous tumors



Ossifying (cemento-ossifying) fibroma – benign
well-demarcated !!! neoplasm

× wide age range, F>M

*rapid growth in children/adolescence - **juvenile ossifying fibroma***

Micro: *well circumscribed cellular fibrous tissue + trabeculae of bone*

Diff.dg: *fibrous dysplasia*

Juvenile ossifying fibroma – *richly cellular + high mitotic activity + immature-looking woven bone (recc. rate 30-60%)*

Diff. dg: *osteosarcoma*

Metastatic tumors



- ✘ 1% of malignant Tu of oral cavity
- ✘ Mandible >> maxilla
 - gingiva, alveolar mucosa, tongue
- ✘ Ca of breast, bronchus, kidney...
- ✘ Mts may cause: osteolytic changes
osteoblastic changes



***Thank you
for your attention...***