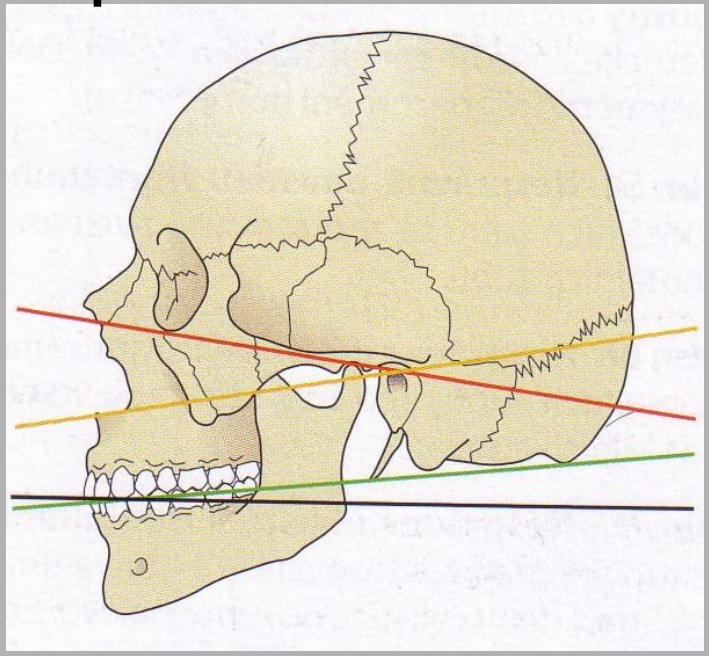
Radiology for stomatologists Lecture

Department of Radiology, University Hospital Brno
2013

Projections and Anatomy

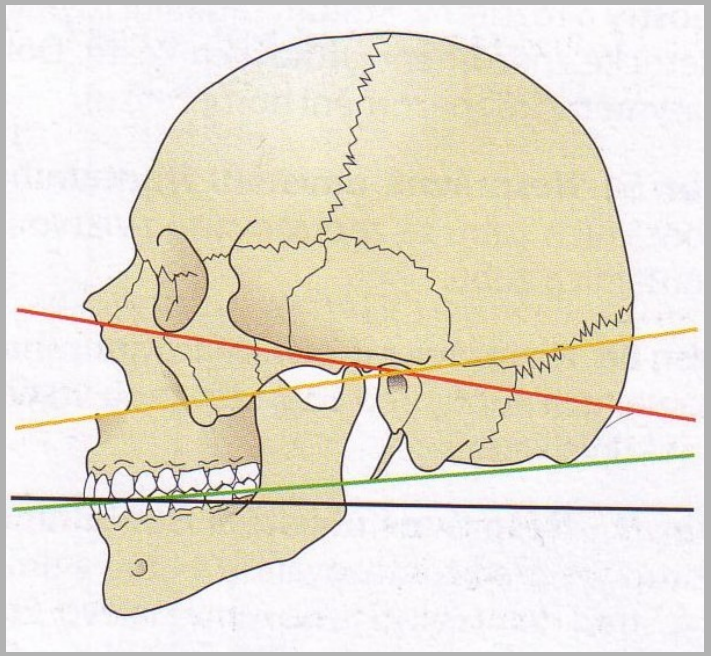
Lendmark lines

- ***Frankfurt´s*** horizontal, antropological basic plane, connects caudal part of obrit to external to auditory meatus.
- ***Camper´s*** plane connects the external auditory meatus to caudal part of nose.



Lendmark lines

- ***Occlusal*** plane should be horizontally (black line) oriented or slightly inclined down (at small children)

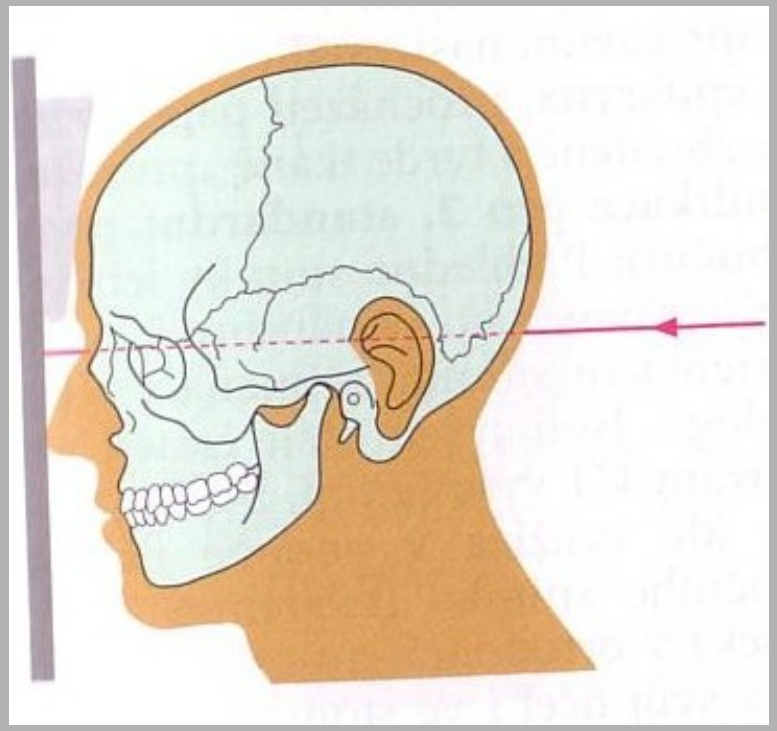


Extraoral skiagrams

- Panoramatic:
  - Picture of the cranium
  - Projection of the maxillar sinus
  - TMJ – Temporo-Mandibular Joint
  - Orthopantomograph (OPG)
- Tomography (CT, MRI)

- Film or detector is placed out of the patient mouth.
- Image of larger surface of mandibula, maxilla, soft tissues and the cranium

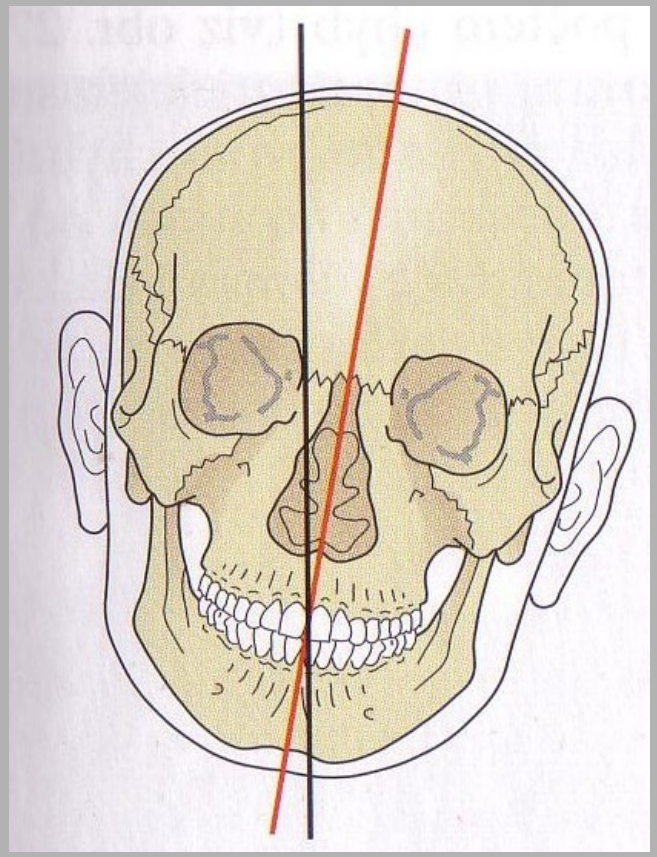
Cranium – dorso-ventral and lateral projection

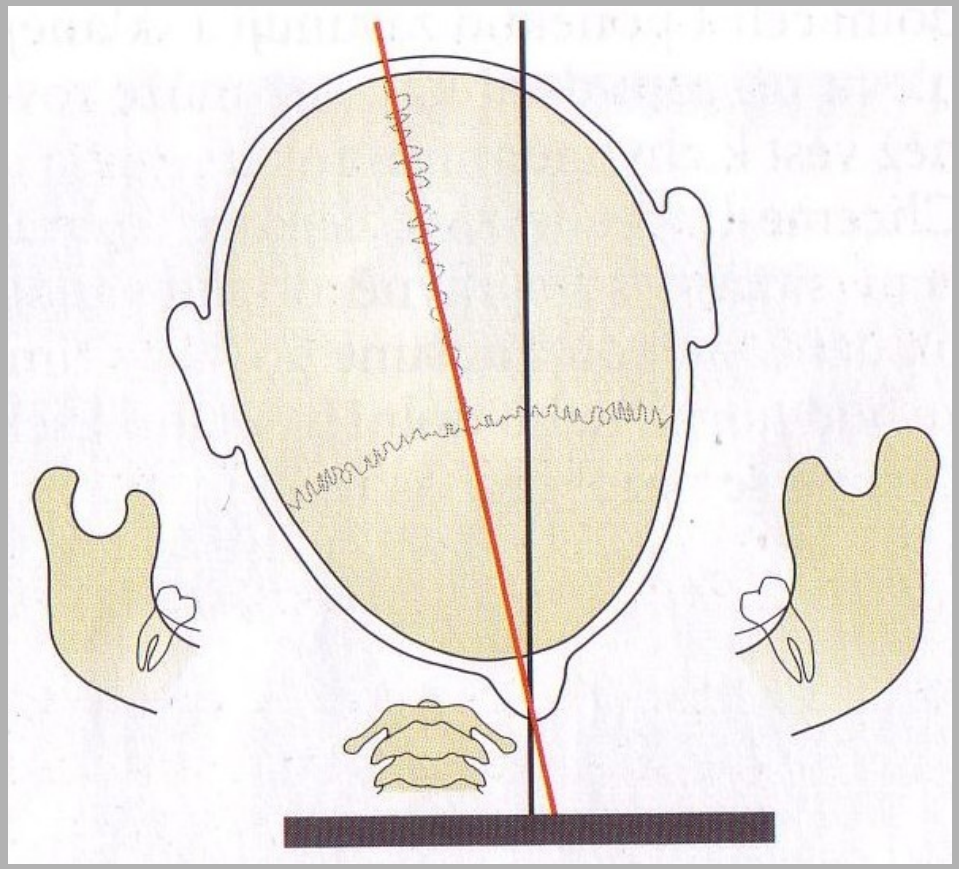


- Nose and forehead touch the cassette
- X-ray pass through the protuber. occipitalis perpendicularly to cassete

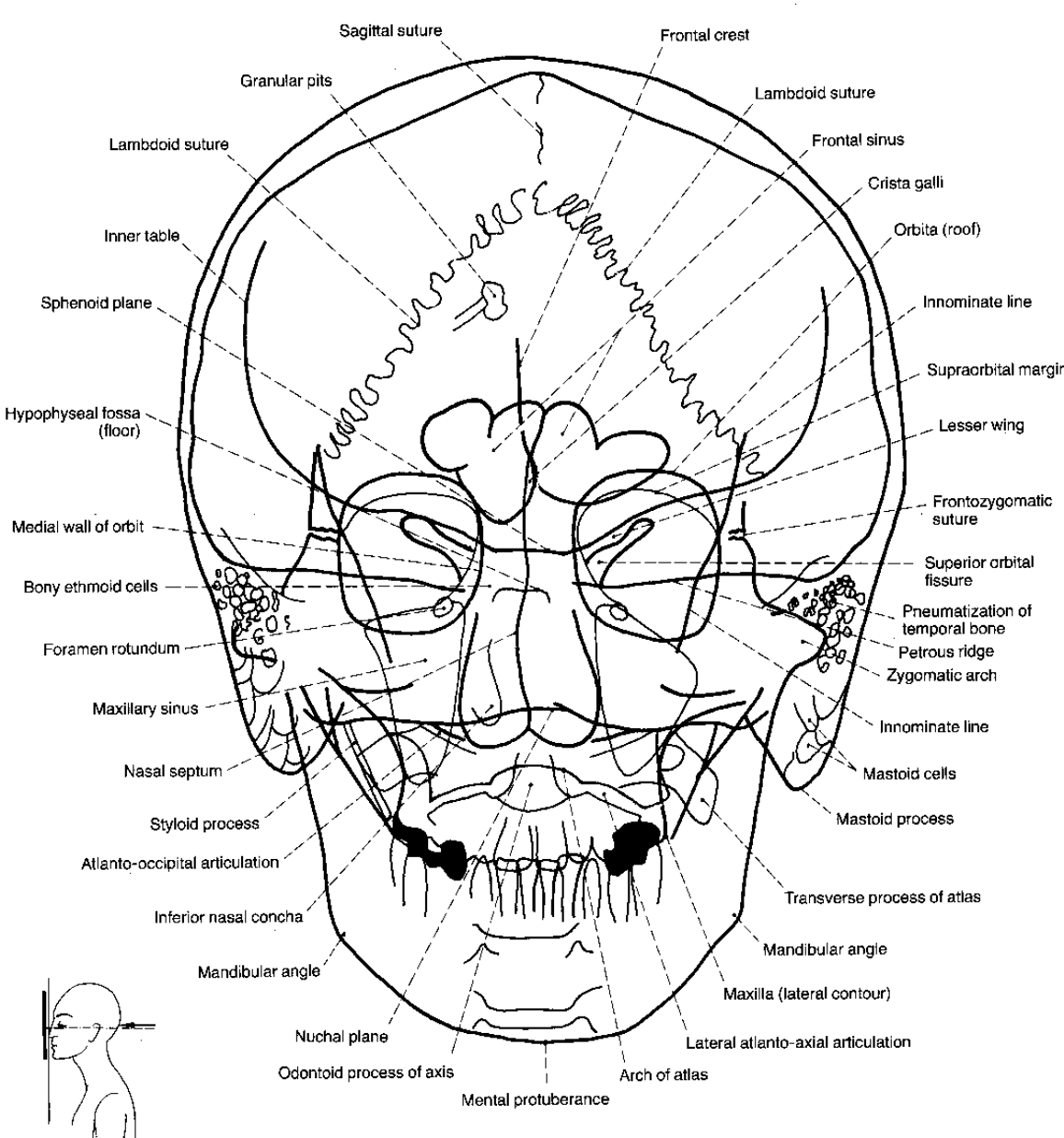
Cranium – dorso-ventral and lateral projection

- Centre
- Tilting,etc.

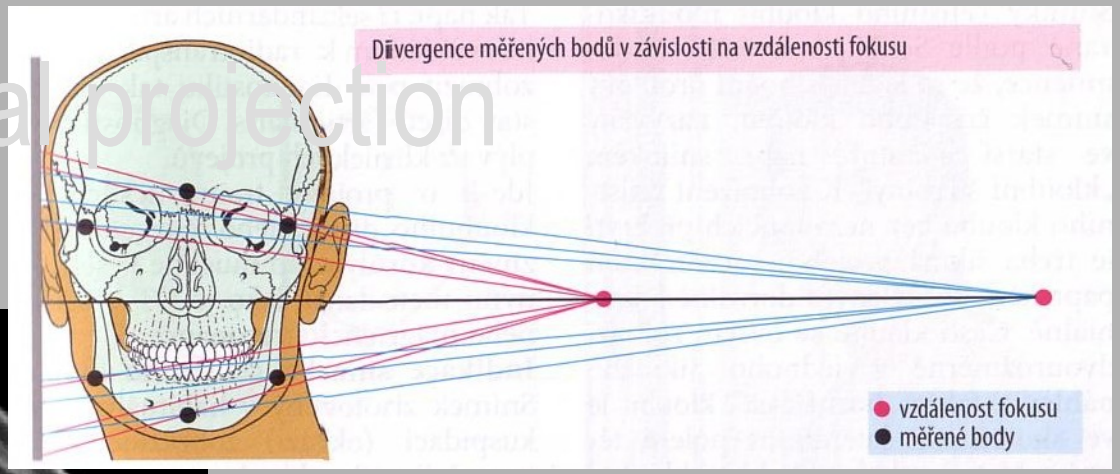


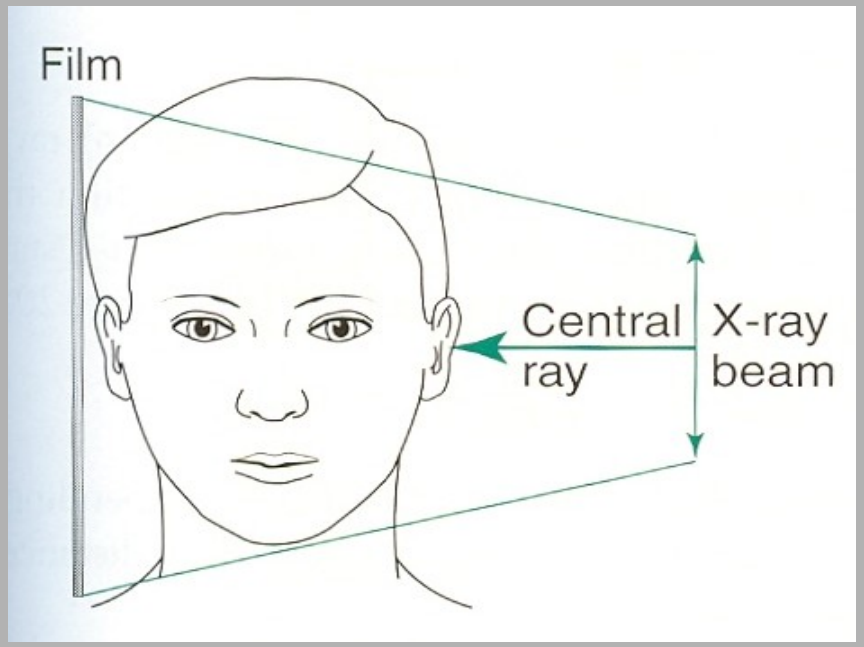


Cranium – dorso-ventral and lateral projection



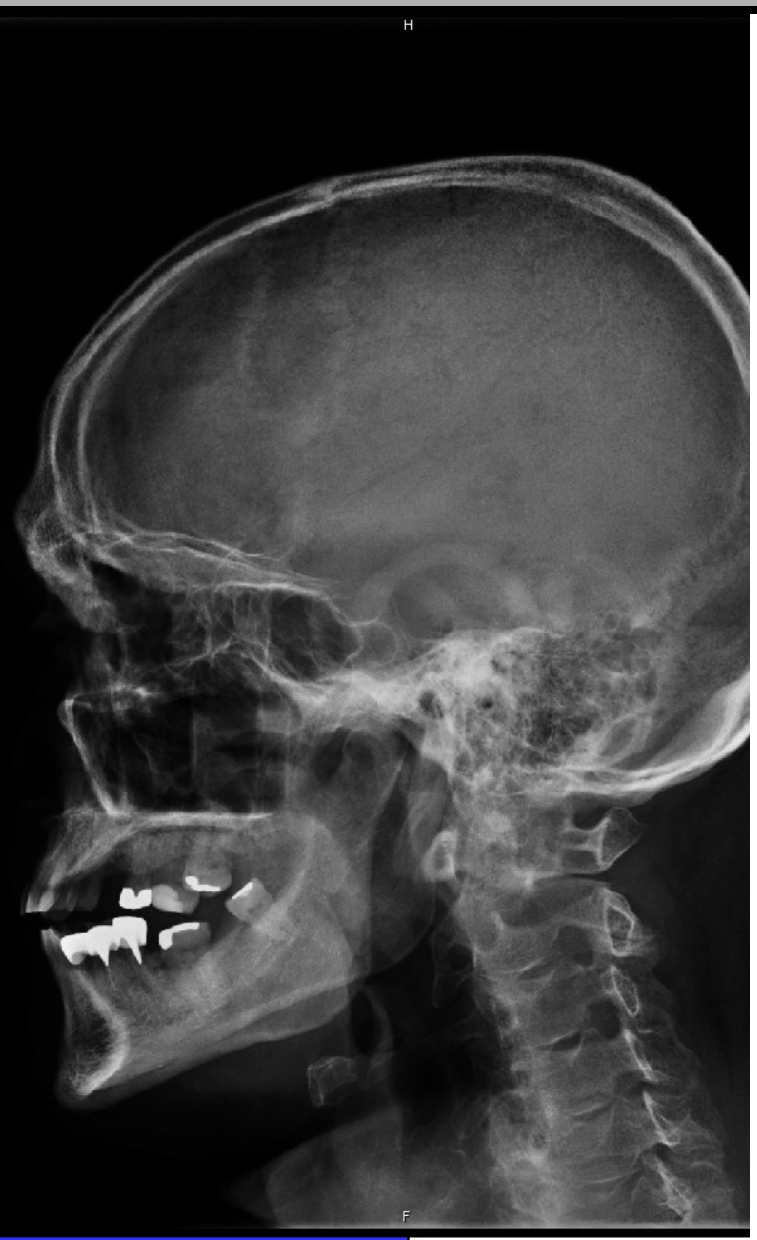
Cranium – lateral projection

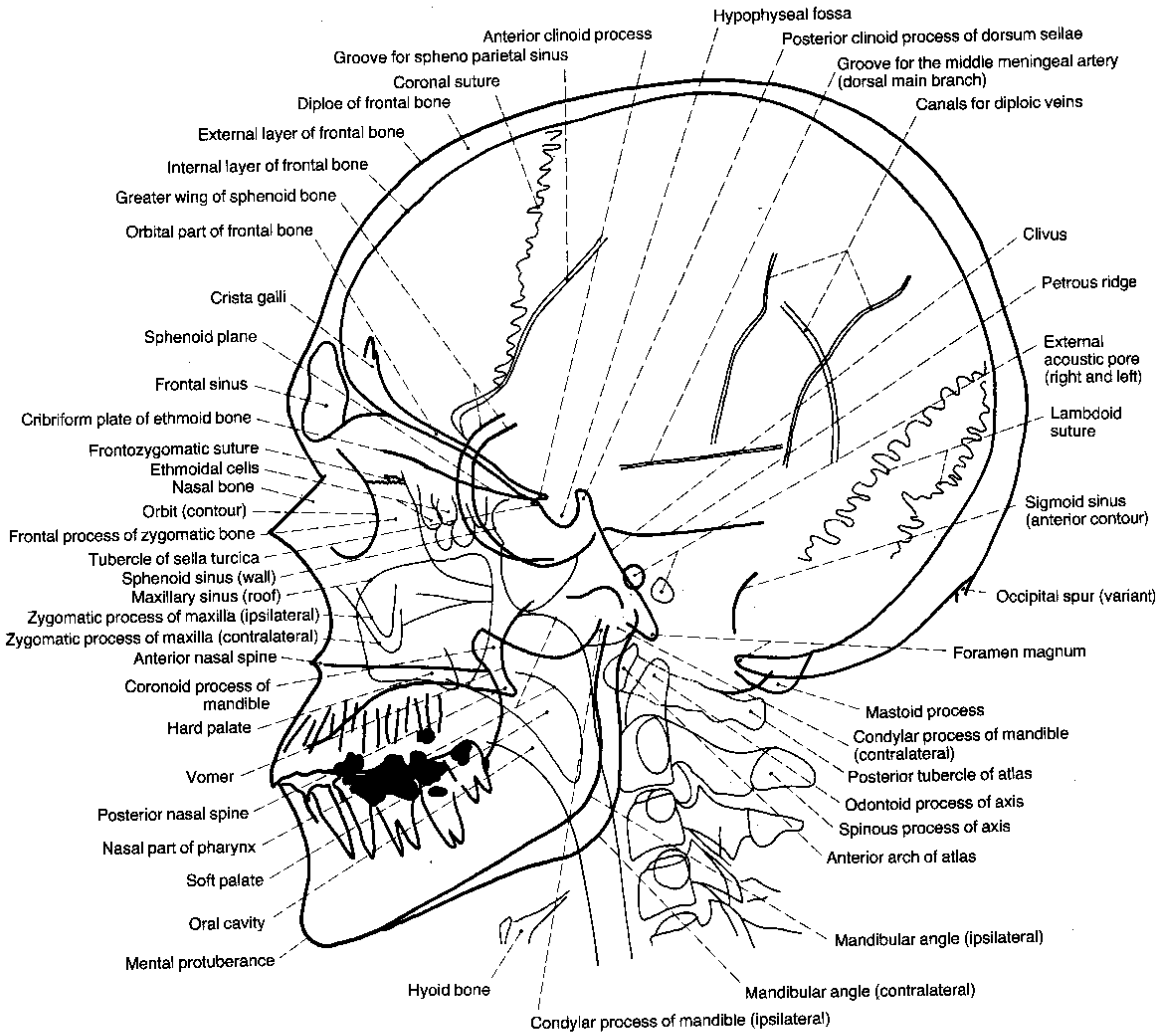


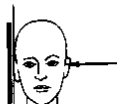


- Central beam goes through the acustic meatus
- Perpendicular to the cassette

Cranium – lateral projection

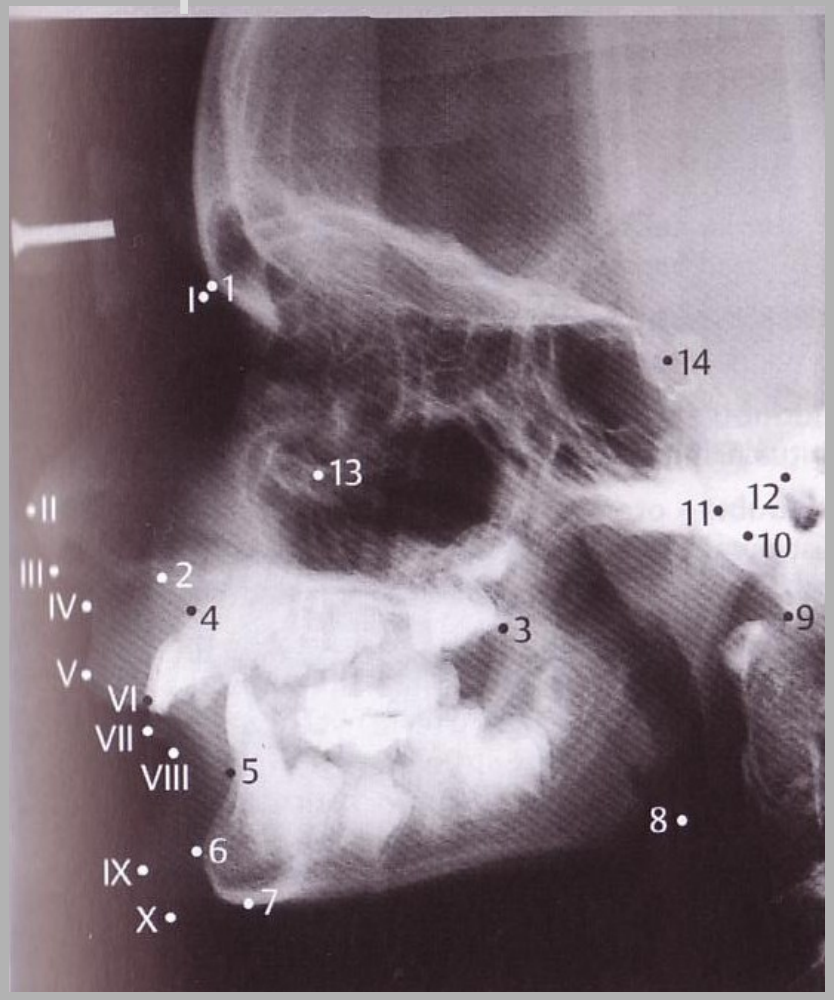






Cranium – lateral projection

- splanchnocranium centre



Skeleton Points

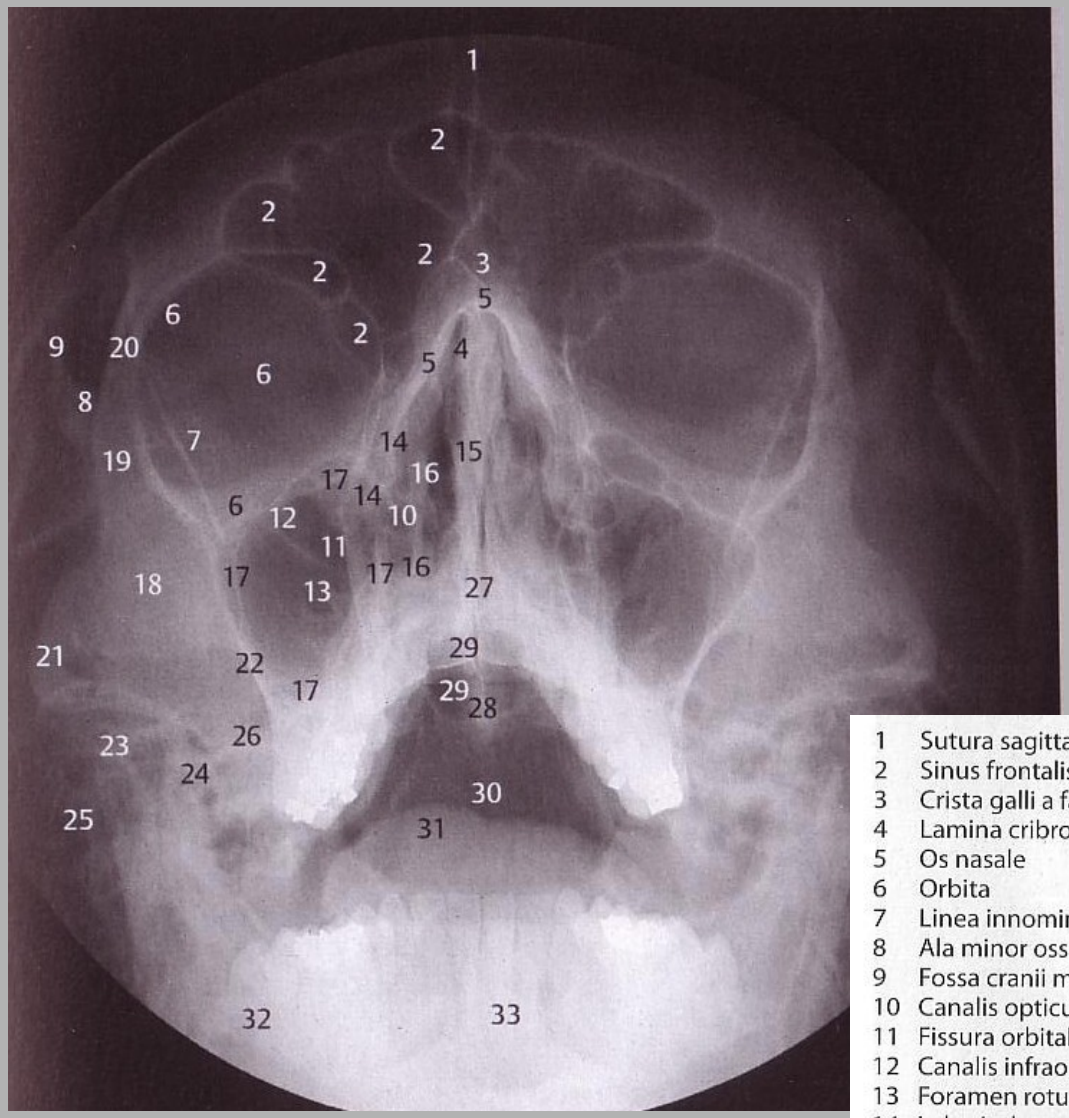
1	Nasion
2	Spina nasalis anterior
3	Spina nasalis posterior
4	Bod A
5	Bod B
6	Pogonion
7	Menton
8	Gonion
9	Basion
10	Articulare
11	Condylion
12	Porion
13	Orbitale

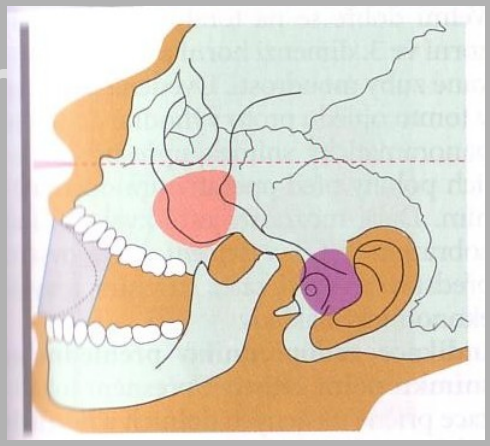
14 sella

Soft Tissue Points

I	Kožní nasion
II	Špička nosu
III	Subnasale
IV	Subspinale
V	Labrale superius
VI	Stomion
VII	Labrale inferius
VIII	Submentale
IX	Kožní pogonion
X	Kožní gnathion

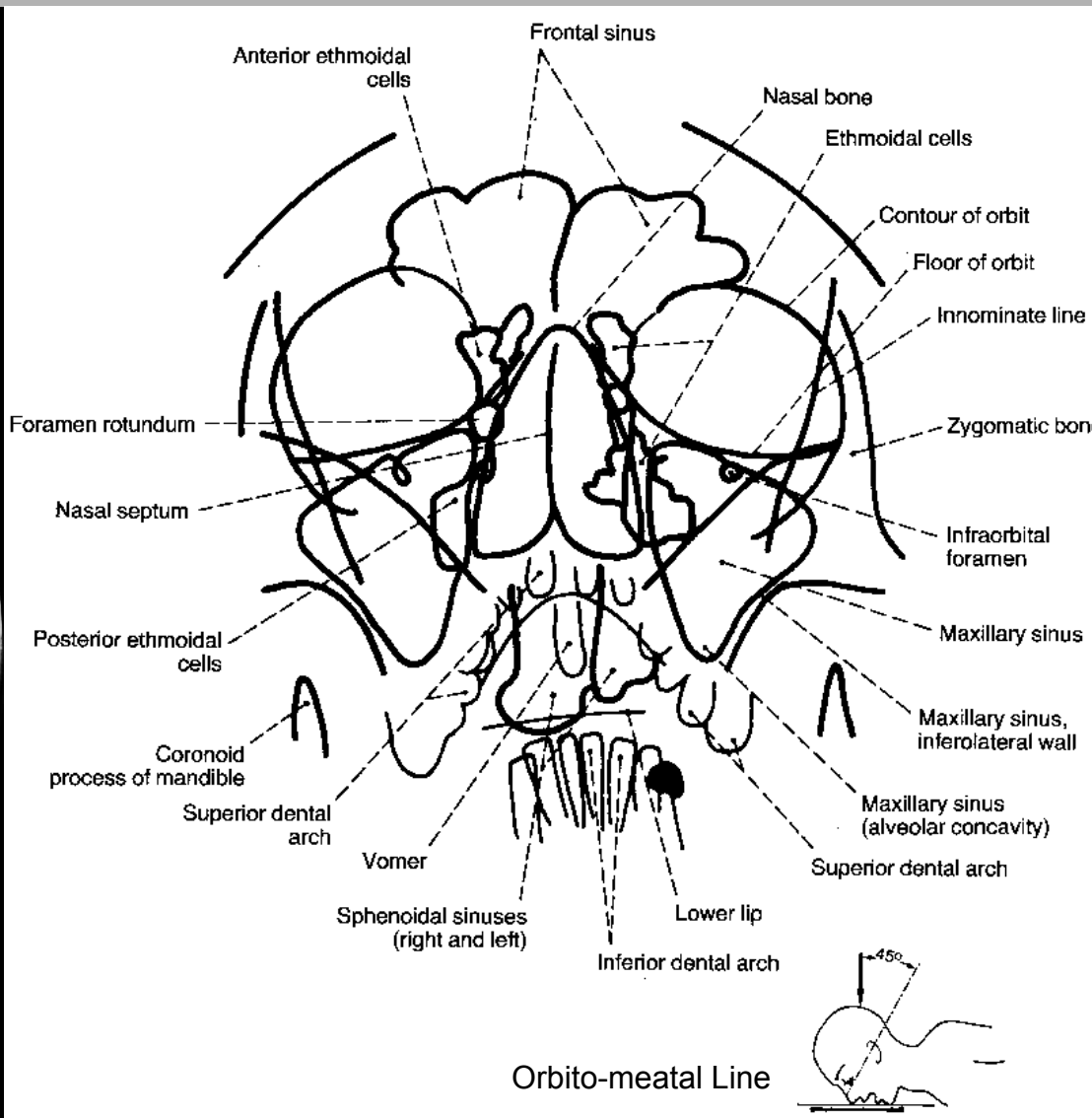
Cranium – semiaxial projection





1 Sutura sagittalis
2 Sinus frontalis se septy
3 Crista galli a falx cerebri
4 Lamina cribrosa ossis ethmoidalis
5 Os nasale
6 Orbita
7 Linea innominata (allae majores)
8 Ala minor ossis sphenoidalis
9 Fossa cranii media (ohraničení)
10 Canalis opticus
11 Fissura orbitalis superior
12 Canalis infraorbitalis
13 Foramen rotundum
14 Labyrinthus ethmoidalis
15 Septum nasi osseum
16 Conchae nasales
17 Sinus maxillaris
18 Os zygomaticum
19 Processus frontalis ossis zygomatici
20 Sutura zygomaticofrontalis
21 Arcus zygomaticus
22 Crista zygomaticoalveolaris
23 Processus condylaris mandibulae
24 Processus muscularis (coronoideus) mandibulae
25 Celullae mastoideae
26 Pars petrosa ossis temporalis
27 Spina nasalis anterior
28 Spina nasalis posterior
29 Spina sphenoidalis
30 Pars basilaris ossis occipitalis
31 Dorsum linguae
32 Massa lateralis atlantis
33 Dens axis (epistrophei)

Paranasal sinuses – Water´s projection



Paranasal sinuses – dorso-ventral projection

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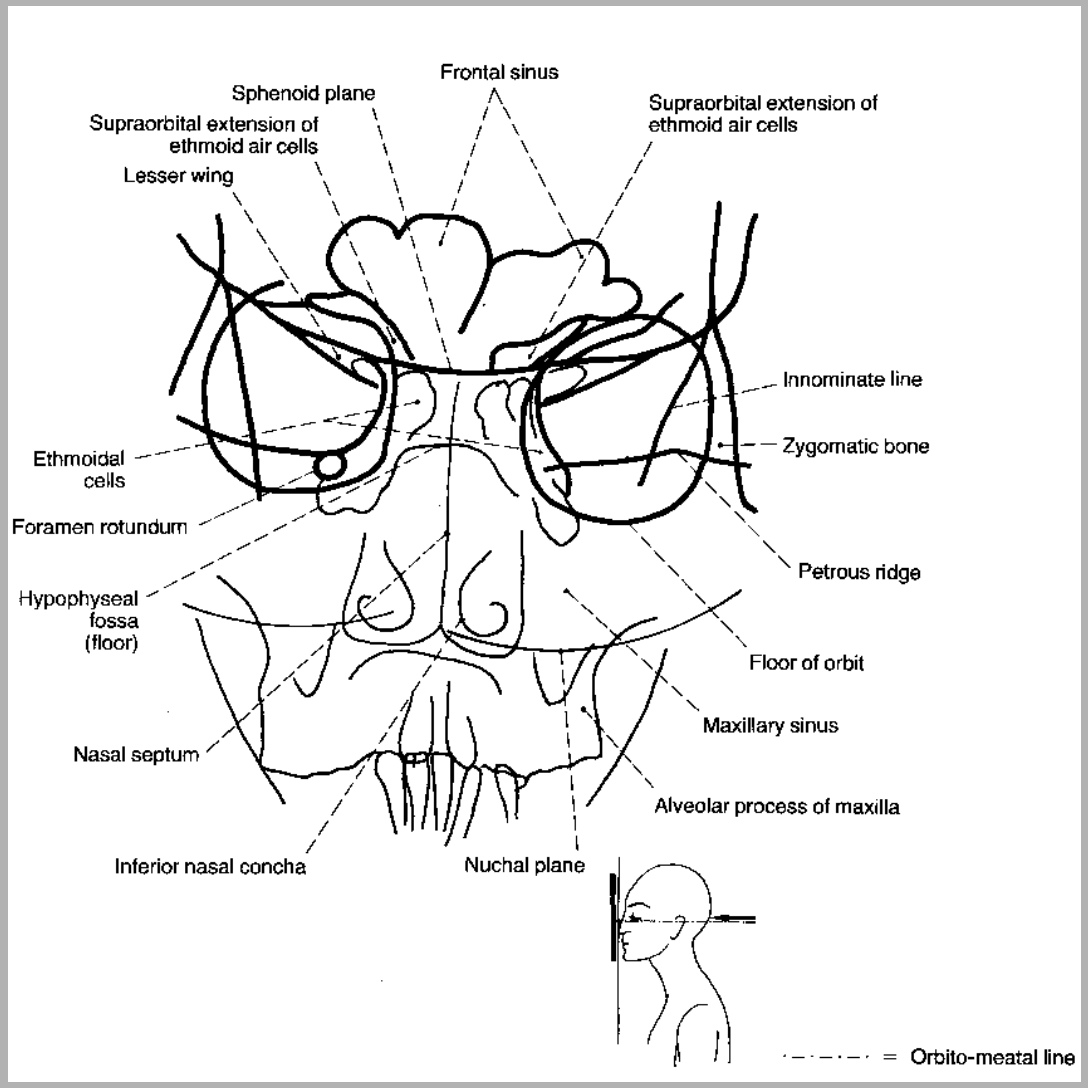
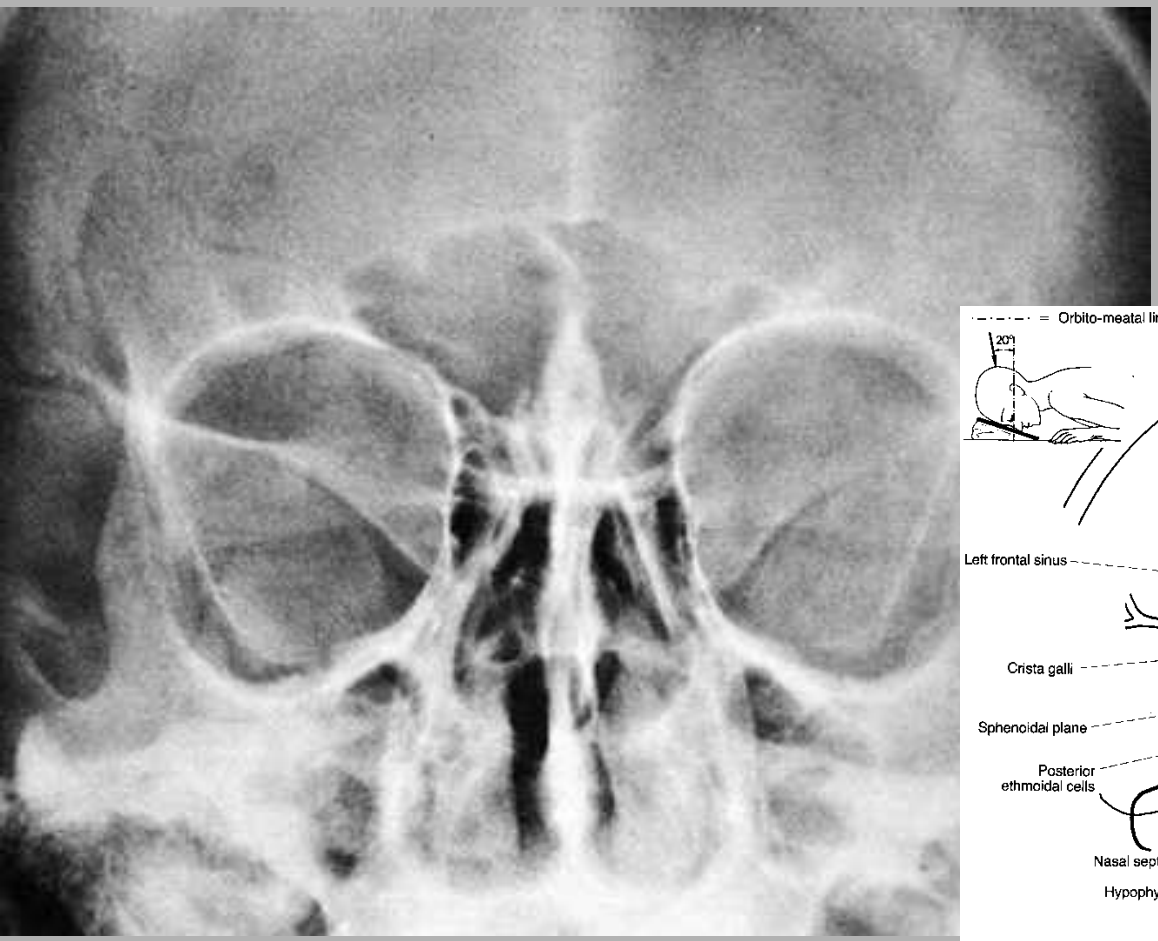
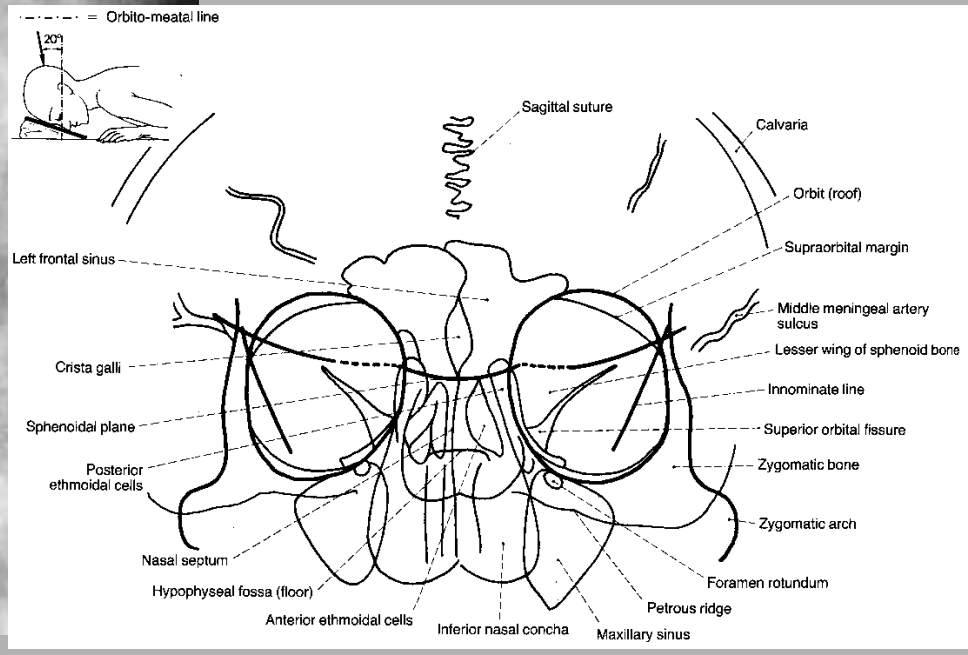
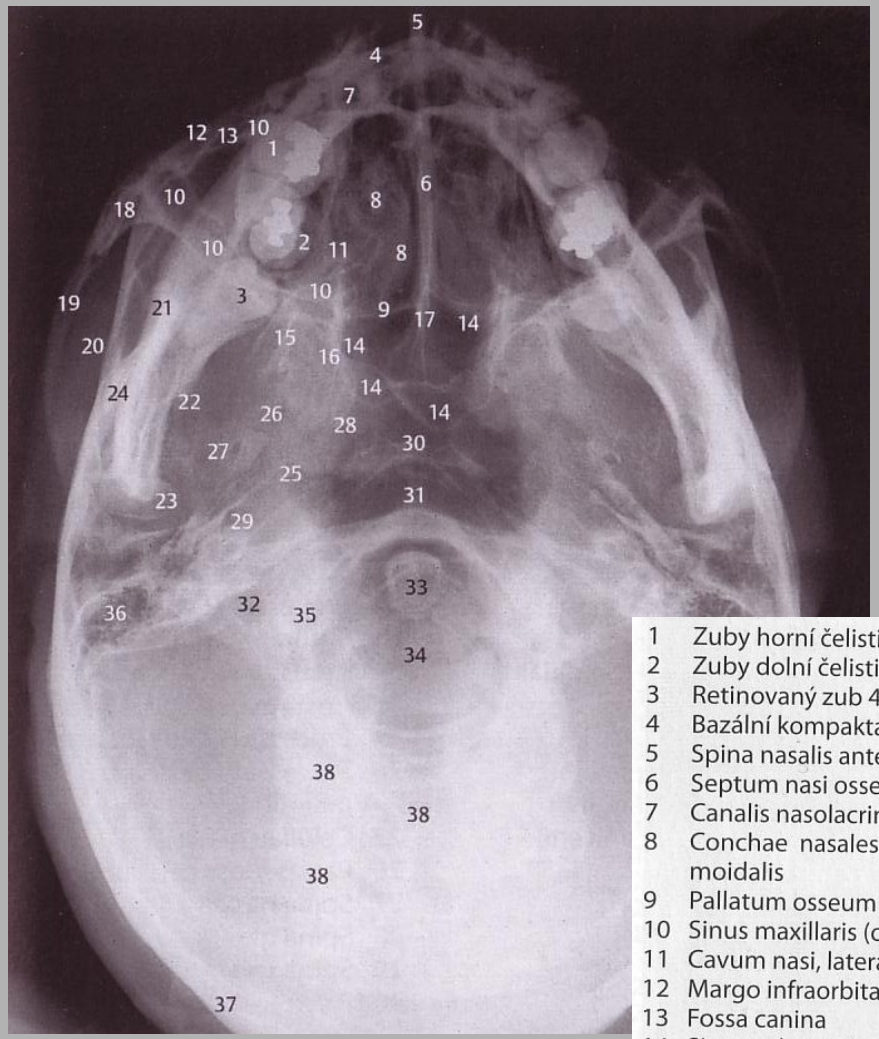


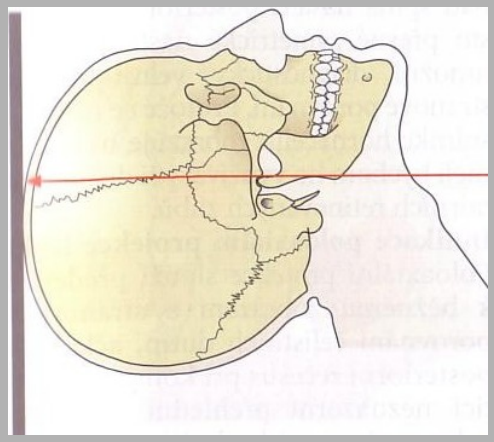
Orbits – dorso-ventral projection

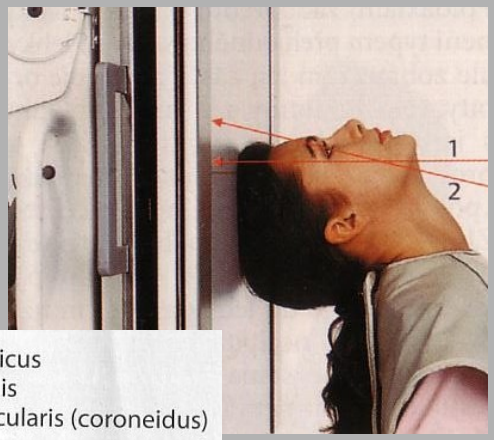




Cranium – axial projection

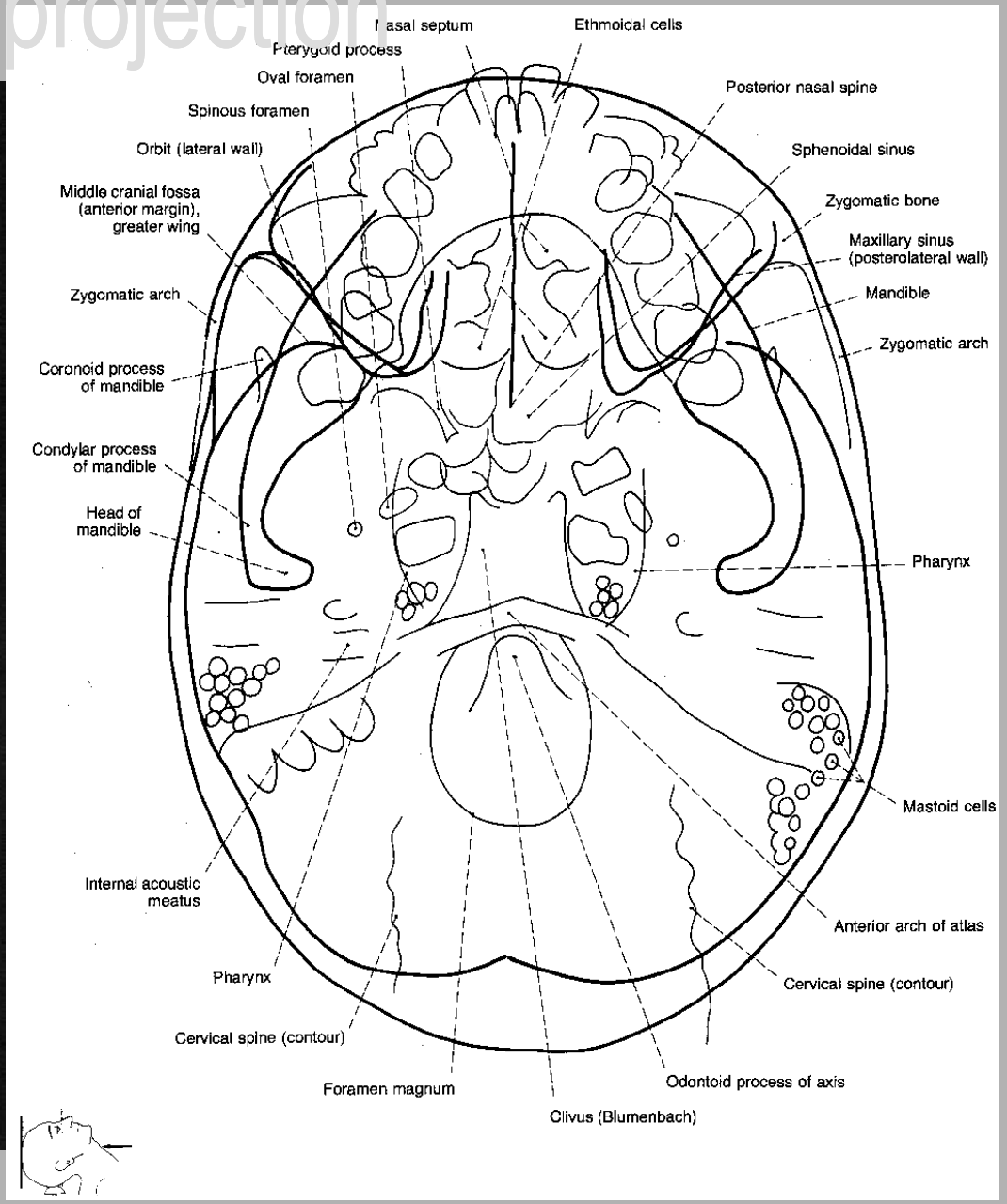






1 Zuby horní čelisti
2 Zuby dolní čelisti
3 Retinovaný zub 48
4 Bazální kompakta mandibuly
5 Spina nasalis anterior
6 Septum nasi osseum
7 Canalis nasolacrimalis
8 Conchae nasales et labyrinthus ethmoidalis
9 Pallatum osseum (dorzální hranice)
10 Sinus maxillaris (ohraničení)
11 Cavum nasi, laterální stěna
12 Margo infraorbitalis
13 Fossa canina
14 Sinus sphenoidalis
15 Processus pterygoideus, lamina lateralis
16 Processus pterygoideus, lamina medialis
17 Spina nasalis posterior
18 Os zygomaticum
19 Arcus zygomaticus
20 Fossa temporalis
21 Processus muscularis (coroneidus) mandibulae
22 Lingula
23 Condylus mandibulae
24 Angulus mandibulae
25 Sutura coronalis
26 Foramen ovale
27 Foramen spinosum
28 Foramen lacerum
29 Canalis caroticus
30 Dorsum sellae
31 Tuberculum anterius atlantis
32 Foramen transversarium atlantis
33 Dens axis (epistrophei)
34 Foramen magnum
35 Condylus occipitalis
36 Celullae mastoideae
37 Os occipitale
38 Obratle krční páteře

Cranium – axial projection



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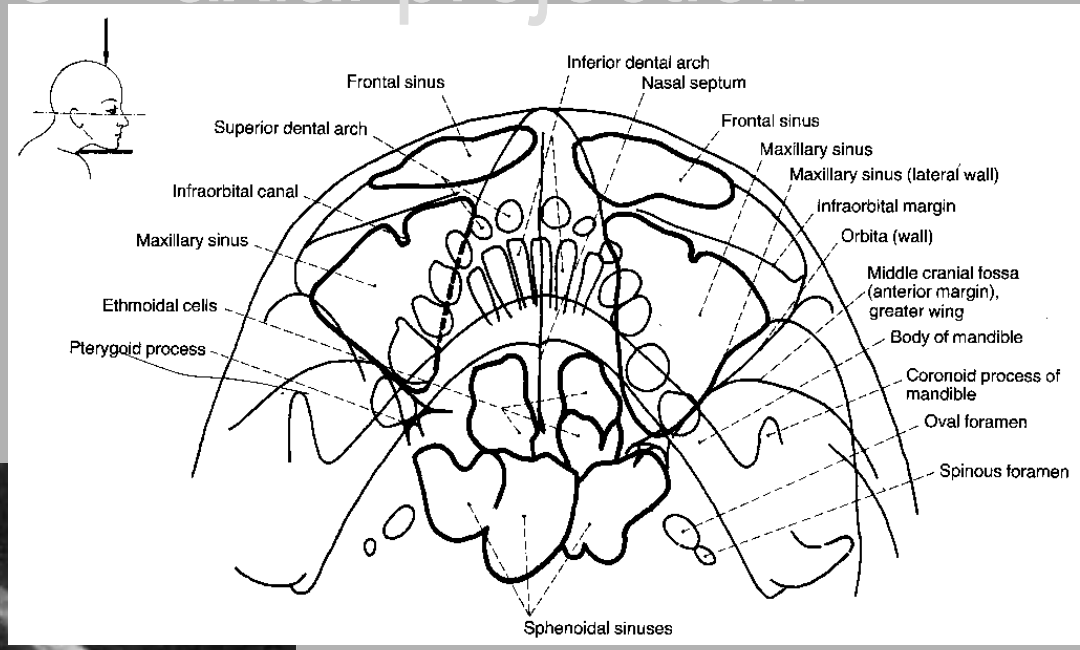
Paranasal sinuses – axial projection



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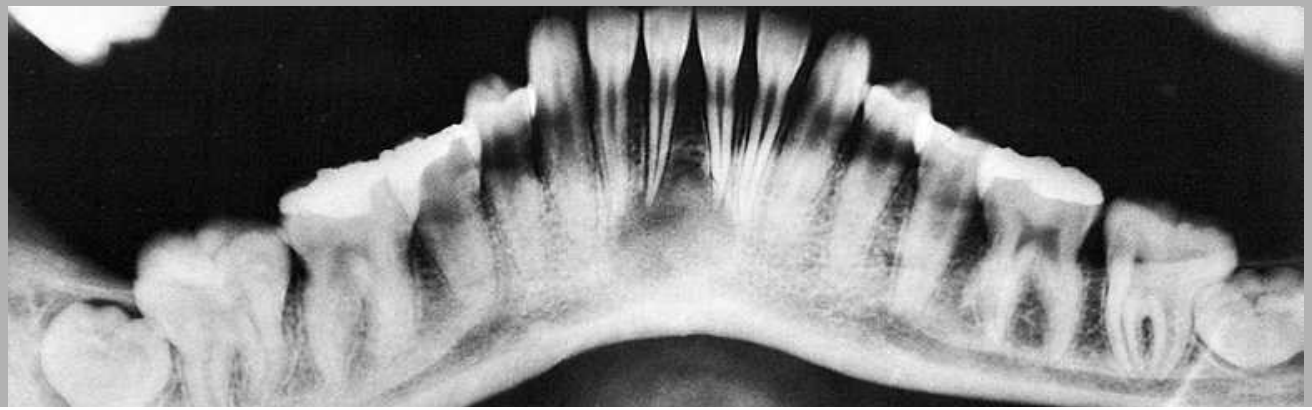
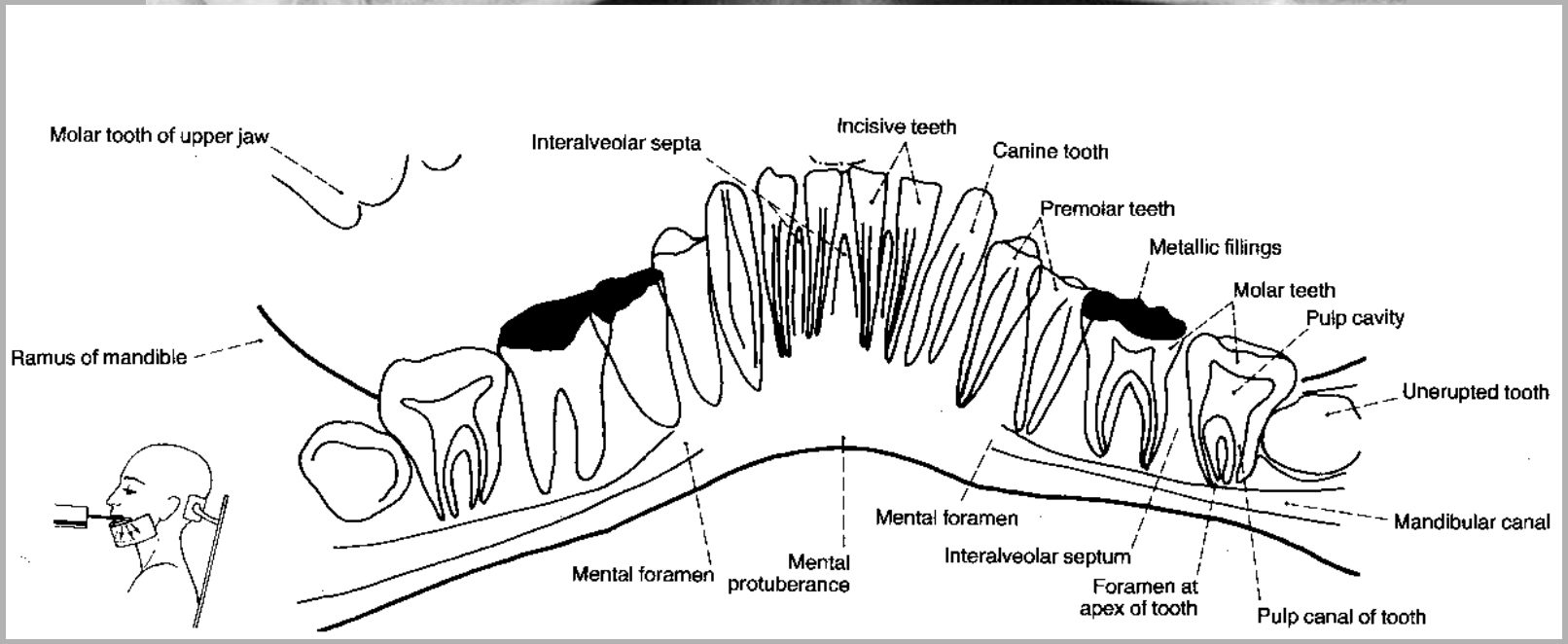
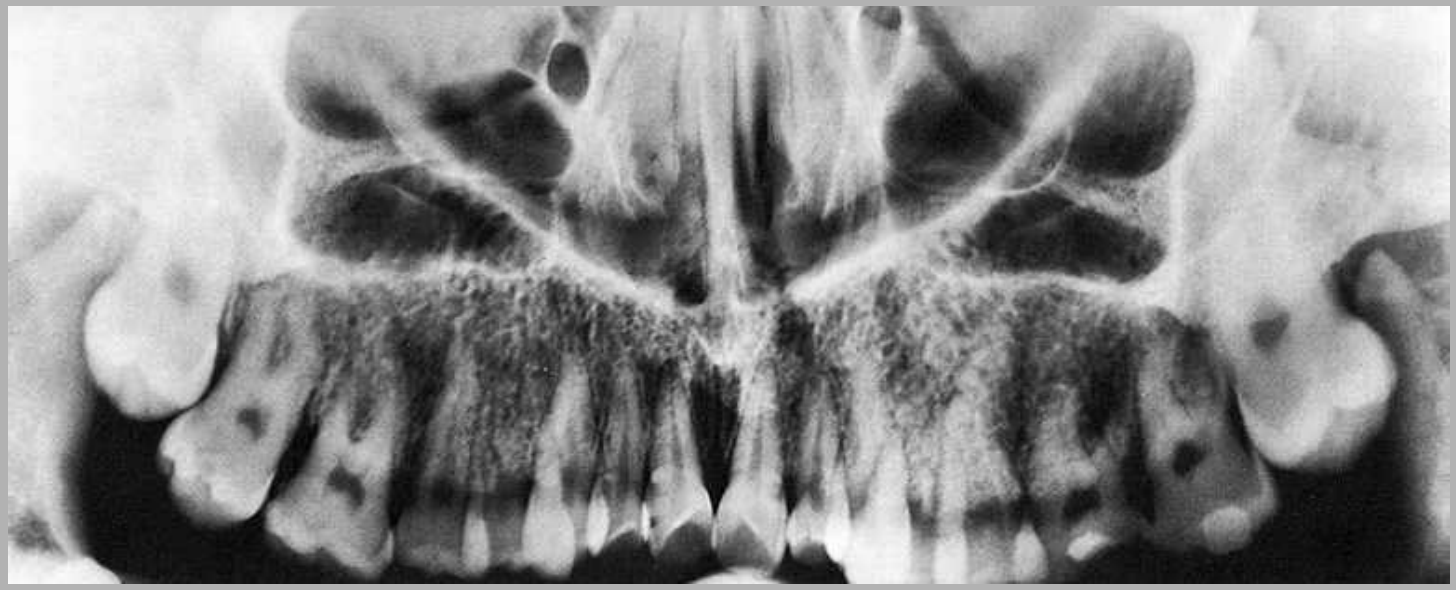
Mandible – panoramic projection

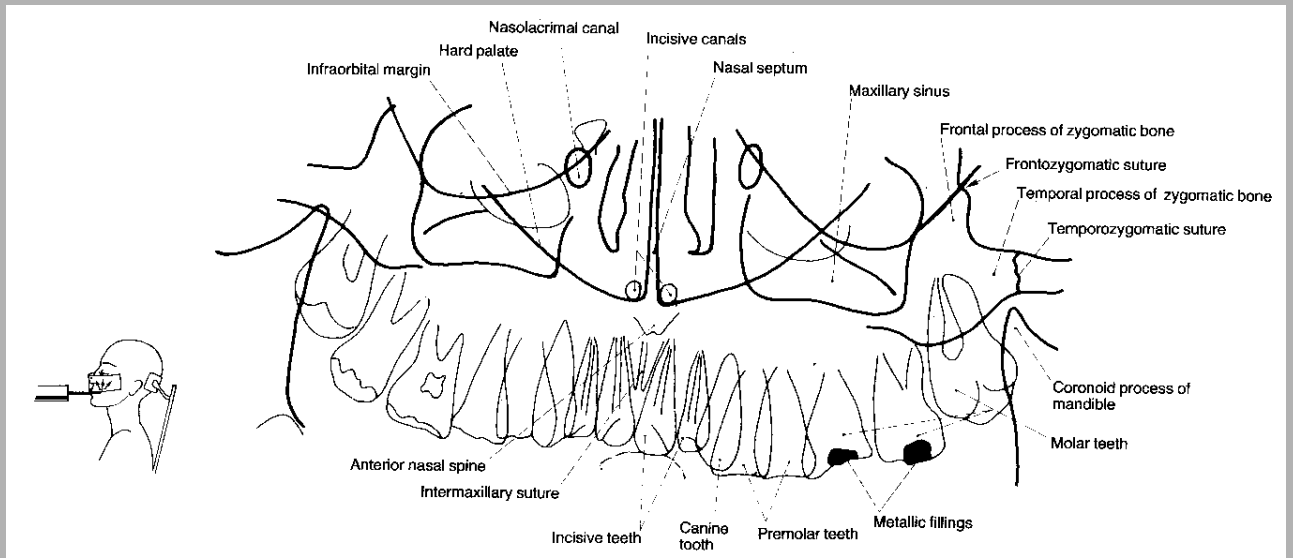
- http://rtg.misto.cz/_MAIL_/hlava/15.jpg



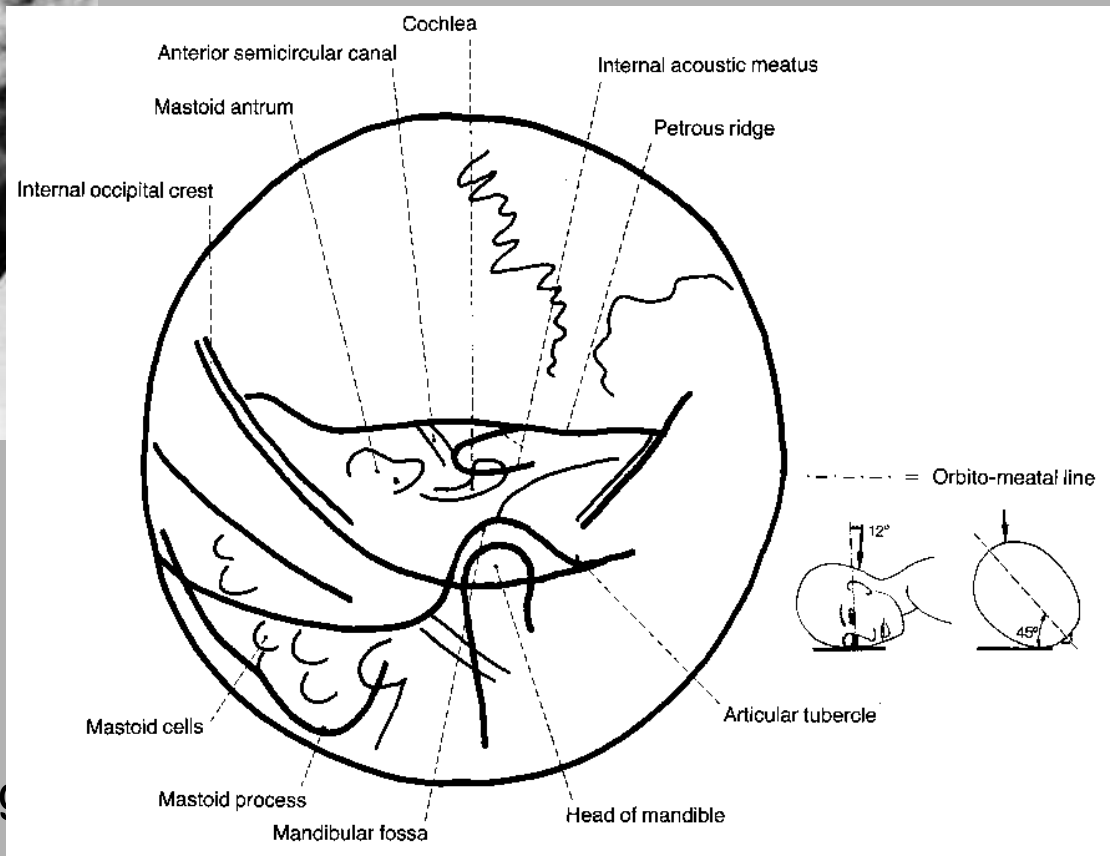


Upper jaw – panoramic projection





Os temporale – Stenver´s – semisagital pr.



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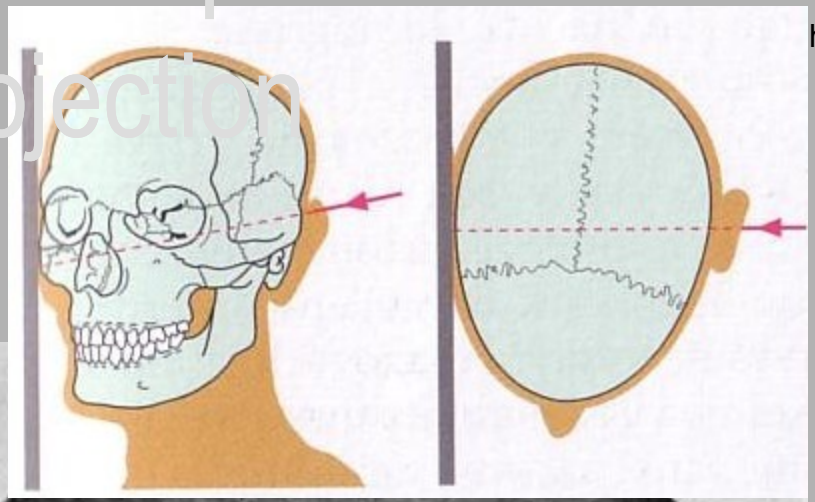
Os temporale – Schüller´s – semilateral projection



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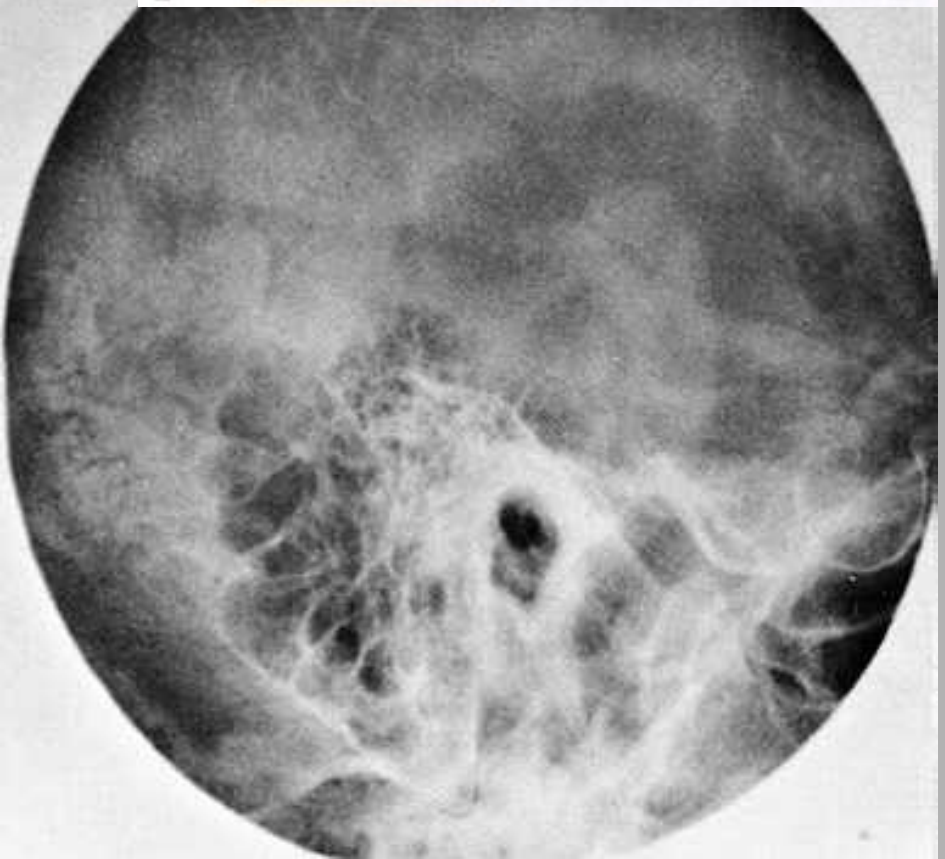
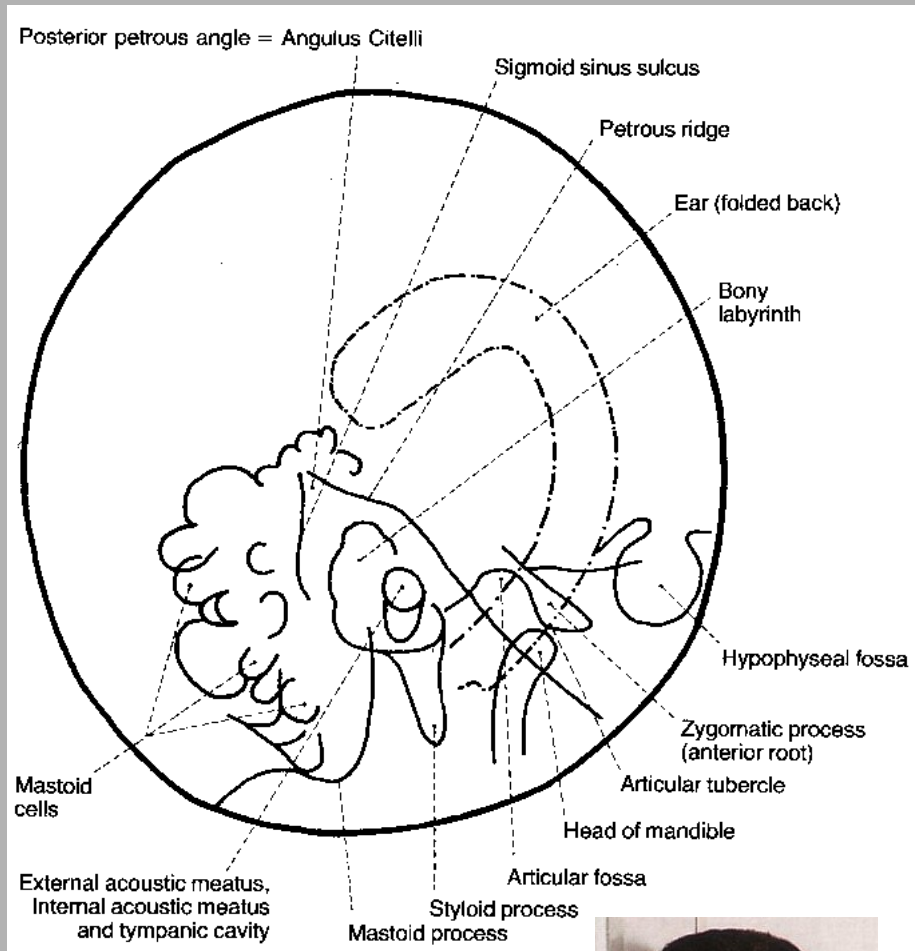
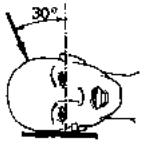
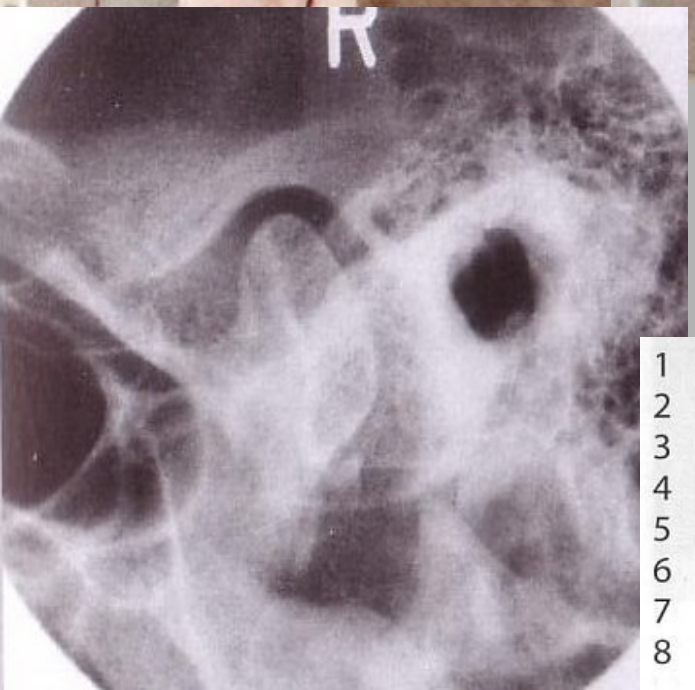


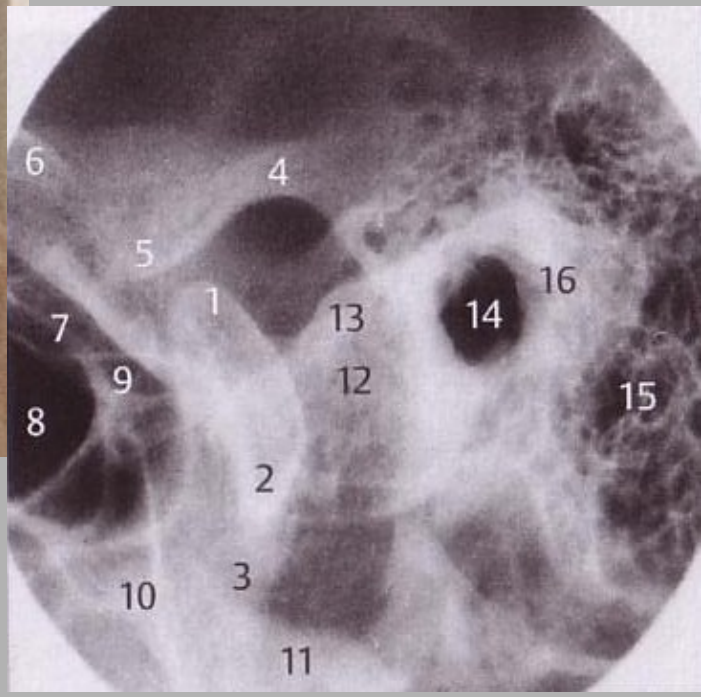




= Orbito-meatal line

Os temporale – Schüller´s – semilateral projection

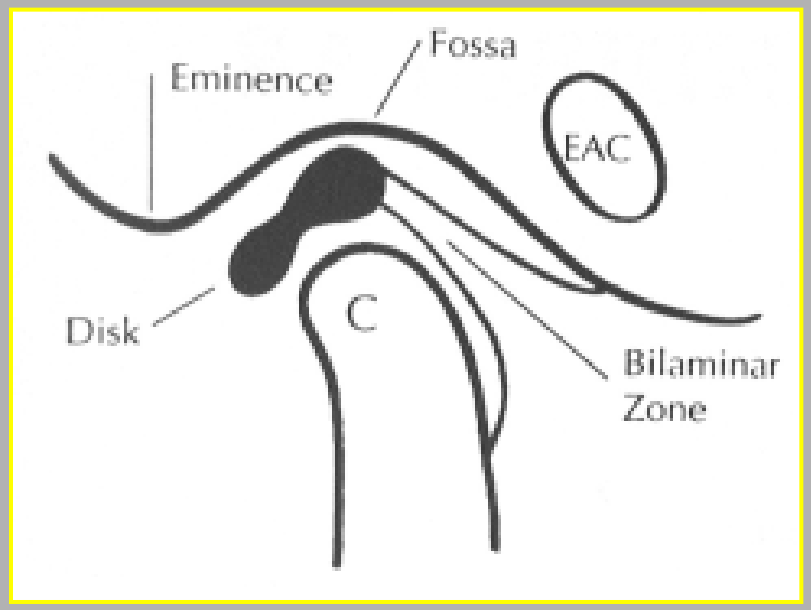


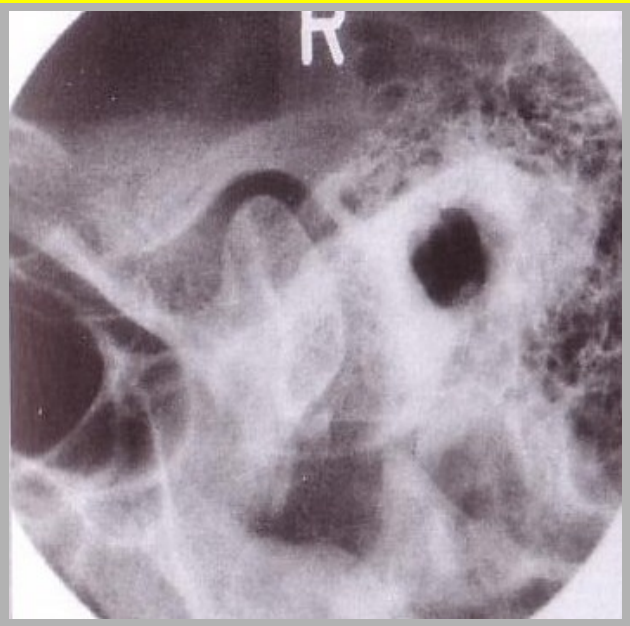


1	Kondylus, laterální pól
2	Kondylus, mediální pól
3	Processus condylaris mandibulae
4	Fossa glenoidalis, laterální části
5	Eminentia articularis, laterální části
6	Arcus zygomaticus
7	Sella turcica
8	Sinus sphenoidalis
9	Processus clinoideus posterior
10	Clivus
11	Pars petrosa (vzdálenější)
12	Pars petrosa (přilehlá)
13	Horní hrana pyramidy (přilehlá)
14	Porus acusticus externus
15	Celullae mastoideae
16	Pars tympanica ossis temporalis

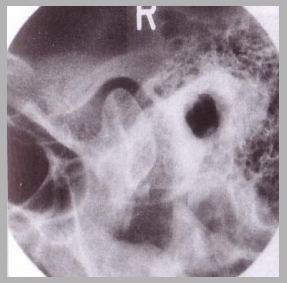
Temporomandibular joint (TMJ)

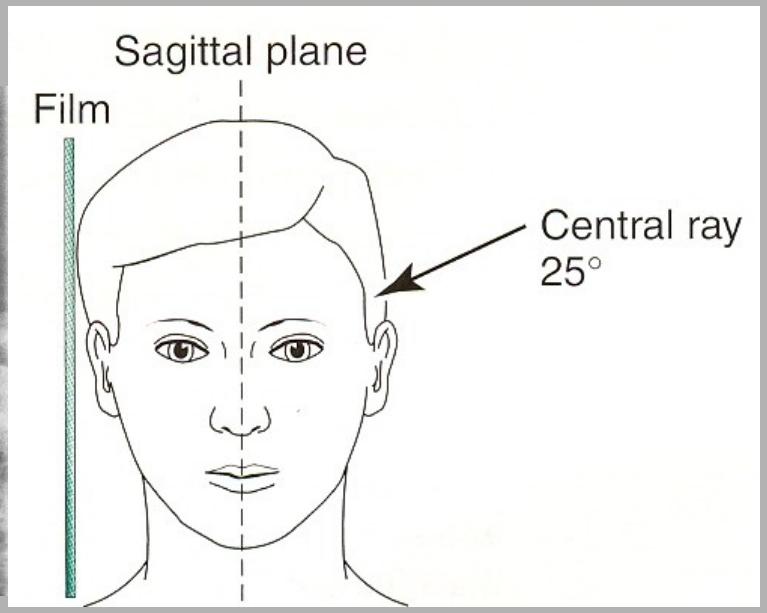
- biconcaval disc,
- correct position protect mandible joint (TMJ)
- Intracapsul. dissease = diskopathy
- Diskopathy =
  - disc dislocation
    - ✓ With/ without reposition
    - ✓ adhese





Temporomandibular joint - TMJ





serial radiogram TMJ

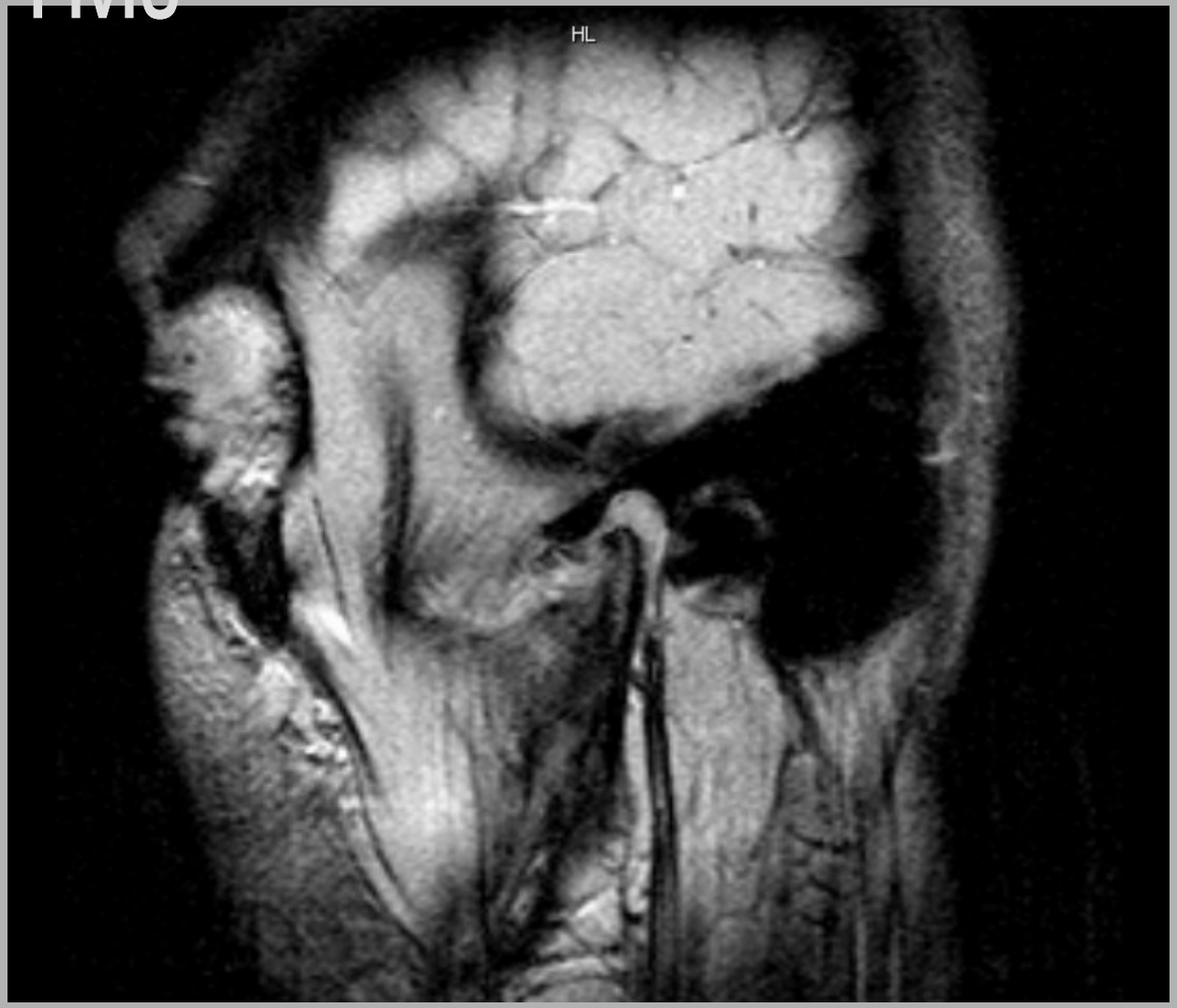
- x-ray beam passes vertical +25° to center of film
- entering 6-7cm over meatus acusticus.

- condyl head
- fossa glenoidalis
- close mouth
- open mouth

MRI - TMJ

MRI - TMJ

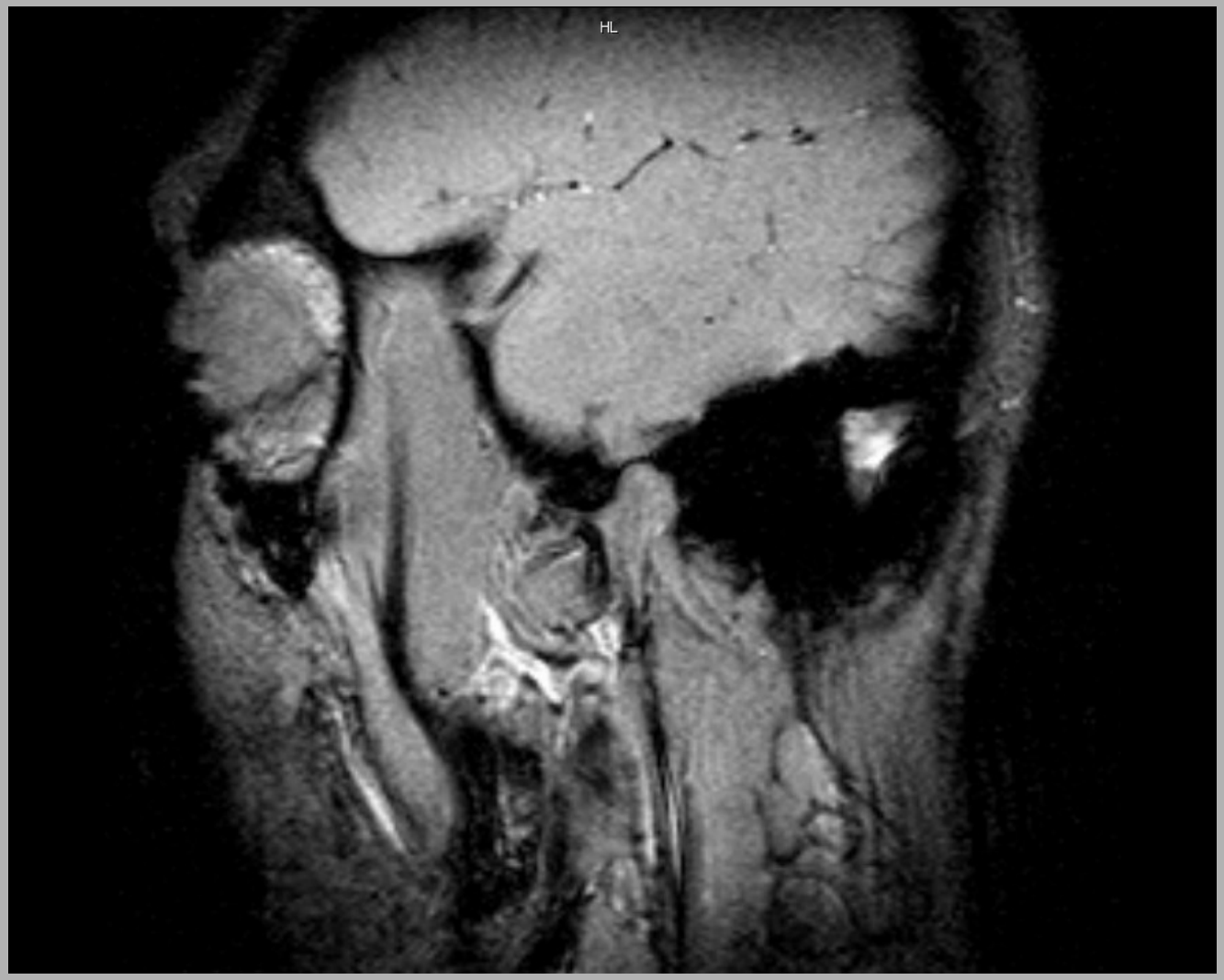
MRI - TMJ



MRI - TMJ

MRI - TMJ

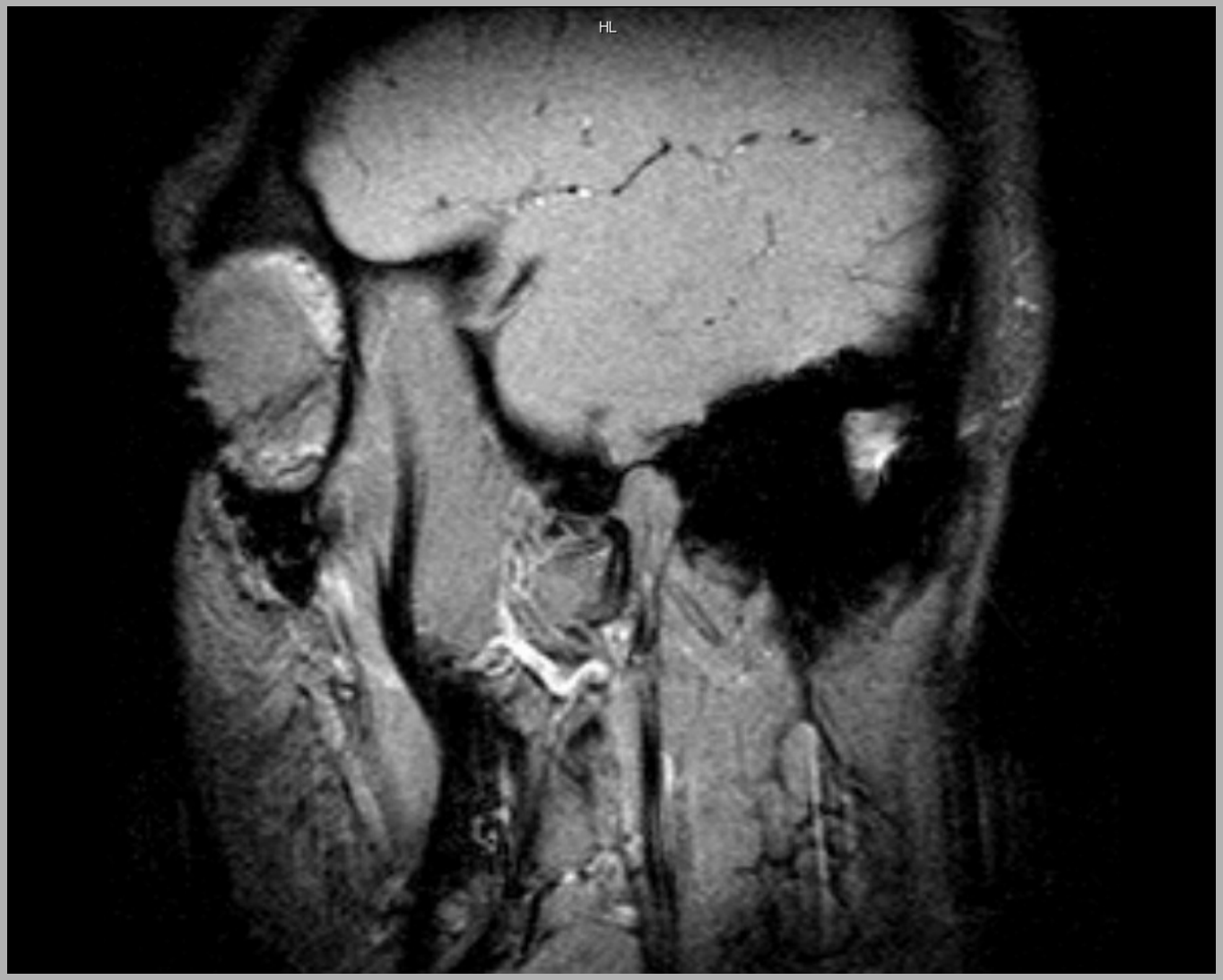
MRI - TMJ



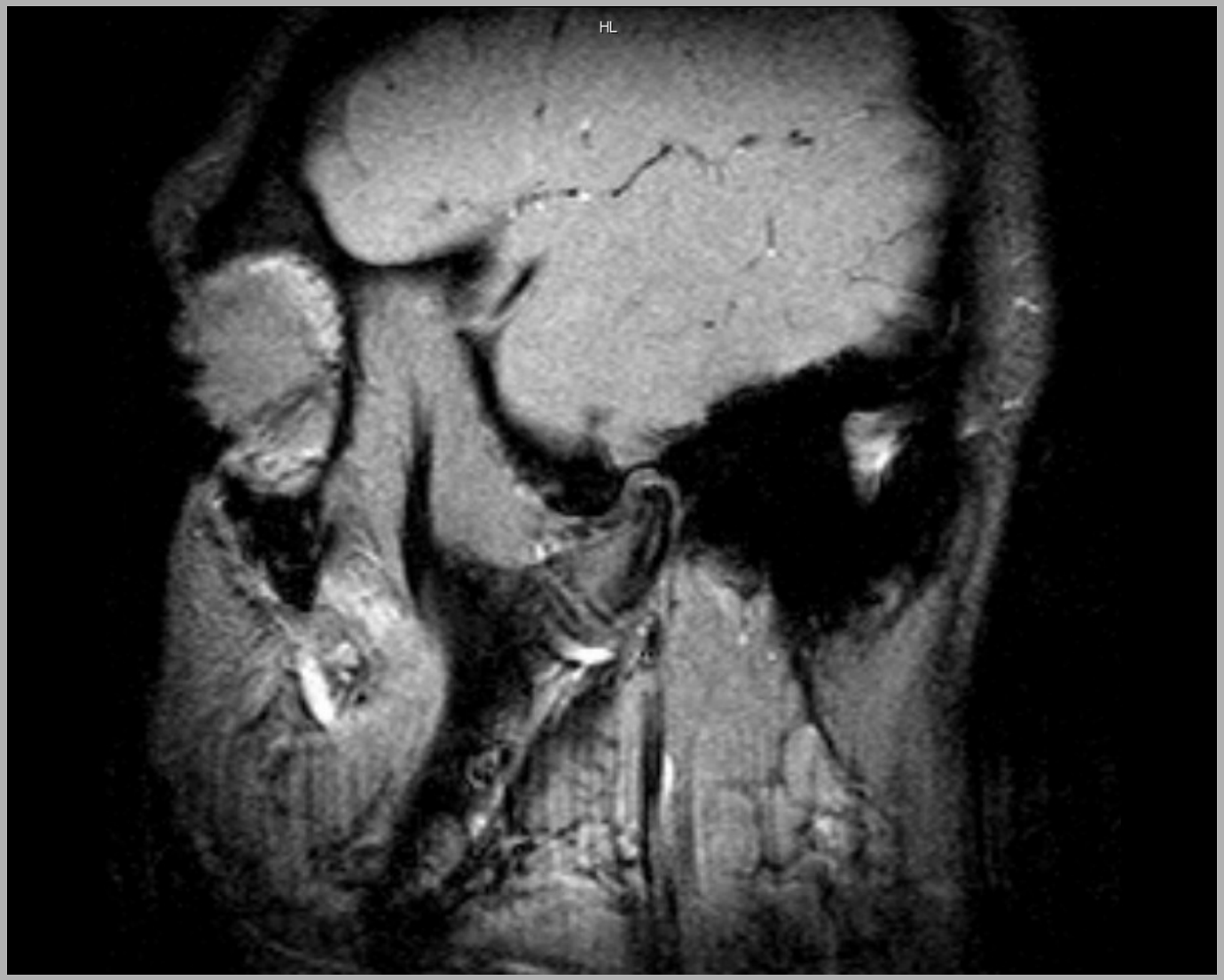
MRI - TMJ

MRI - TMJ

MRI - TMJ



MRI - TMJ

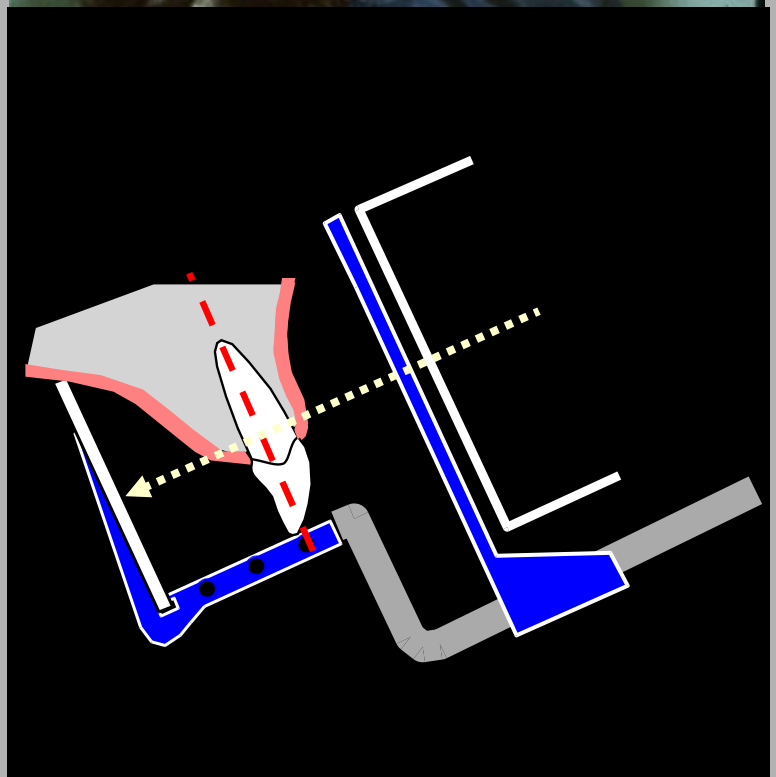


Ultrasound - TMJ

Intraoral exposures

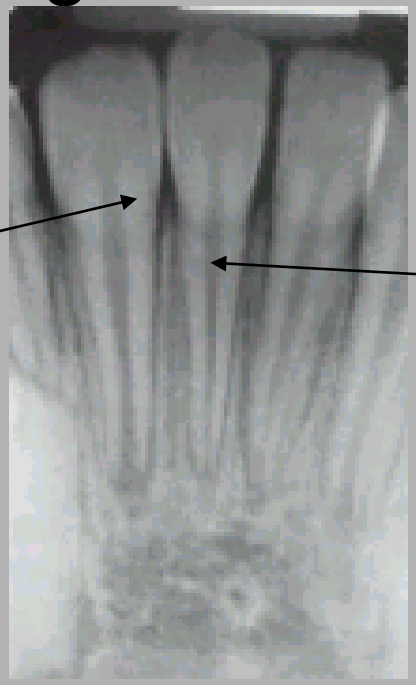
Intraoral X-ray device

- voltage of X-ray tube
  - 50-90 kV
- filtration of primary beam
  - 1,5 mm Al - U<70 kV
  - 2,5 mm Al - U > 70 kV
- body tube
  - length of body tube = 10-30 cm



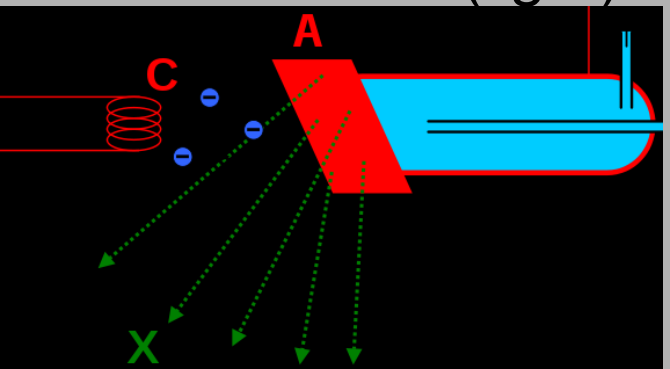
X-ray - attributes

- Electromagnetic radiation of short wavelength produced when high-speed electrons strike a solid target (on anoda)
- Ability to pass through tissues where are partially absorbed



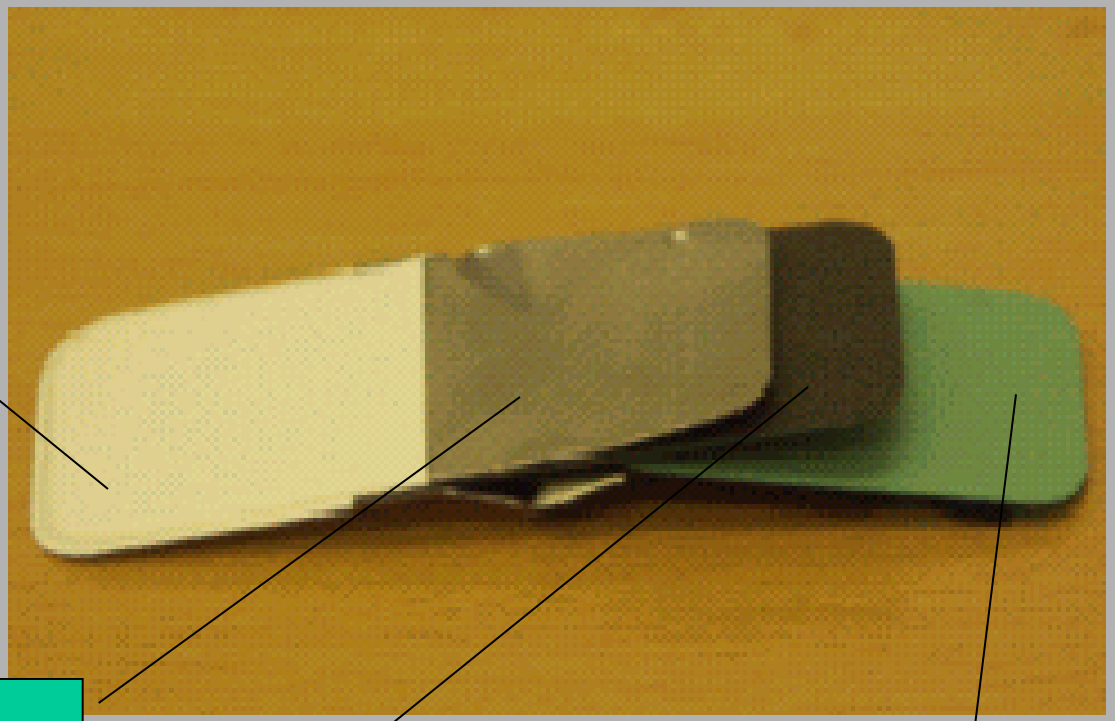
Radio-opacity (light)

Radiolucency (dark)



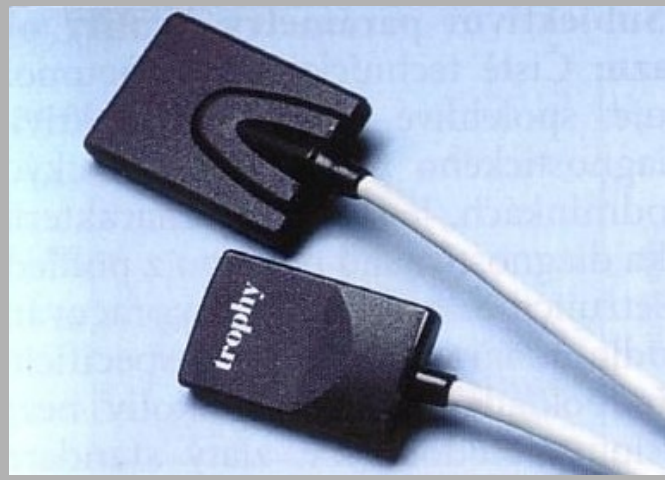
Films for intraoral exposure

- dental films - conventional



Convenctional and digital technique

- Digital:
  - CCD (charged coupled device) as a sensor

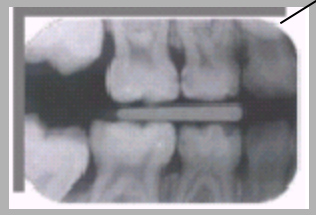


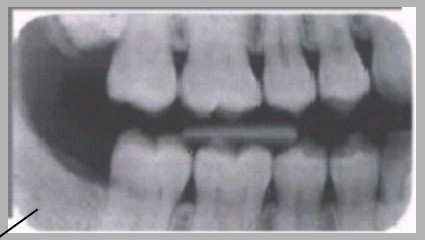
Films for intraoral exposures

- standard formats

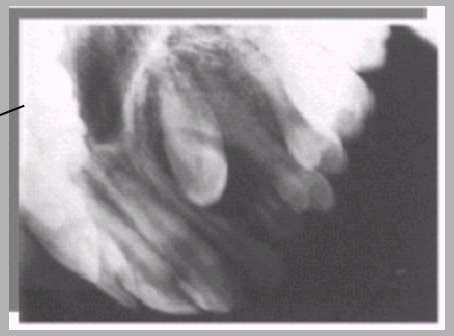
clasic 31x41 mm

child 22x35 mm





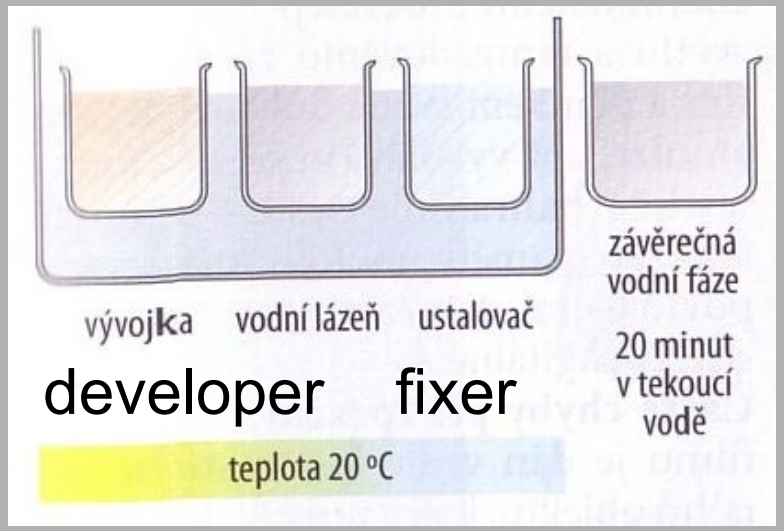
special 27x54 mm

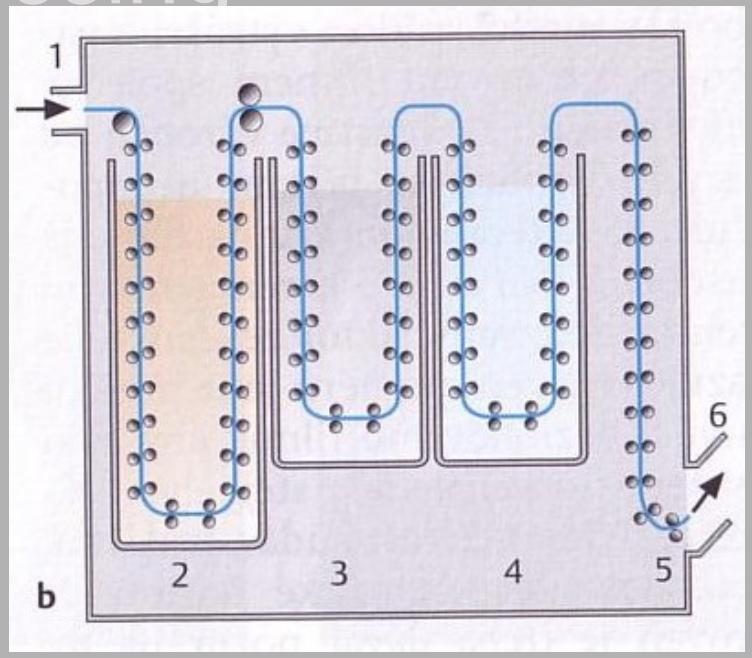


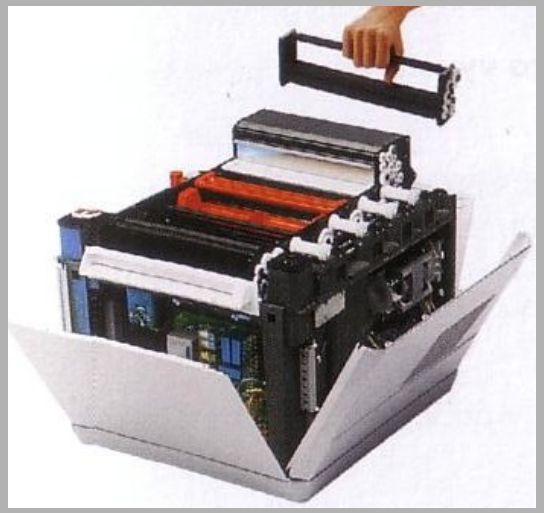
special 57x76mm

- The film covering is larger than film (over 1 mm)

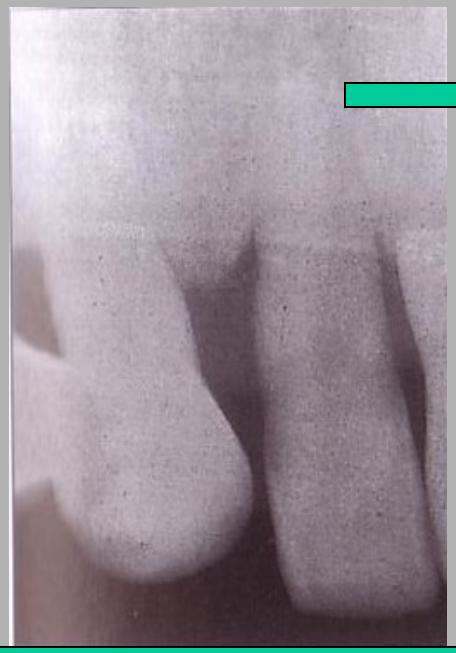
Conventional film processing







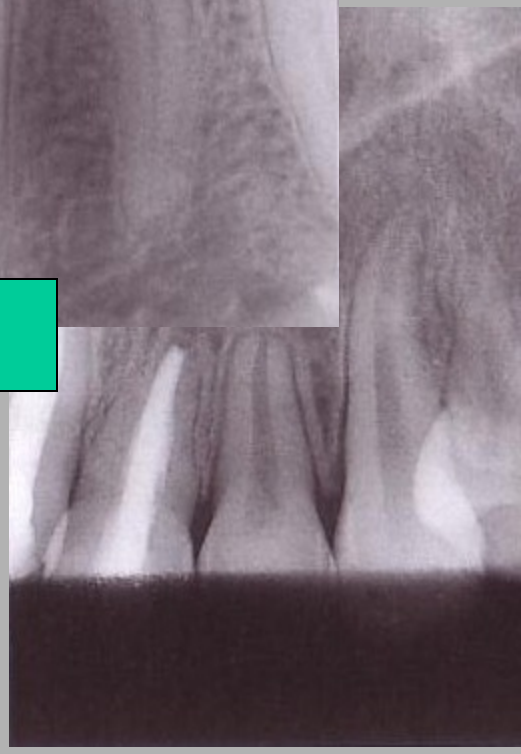
Conventional film processing - artefacts



cold chemicals
film is grainy

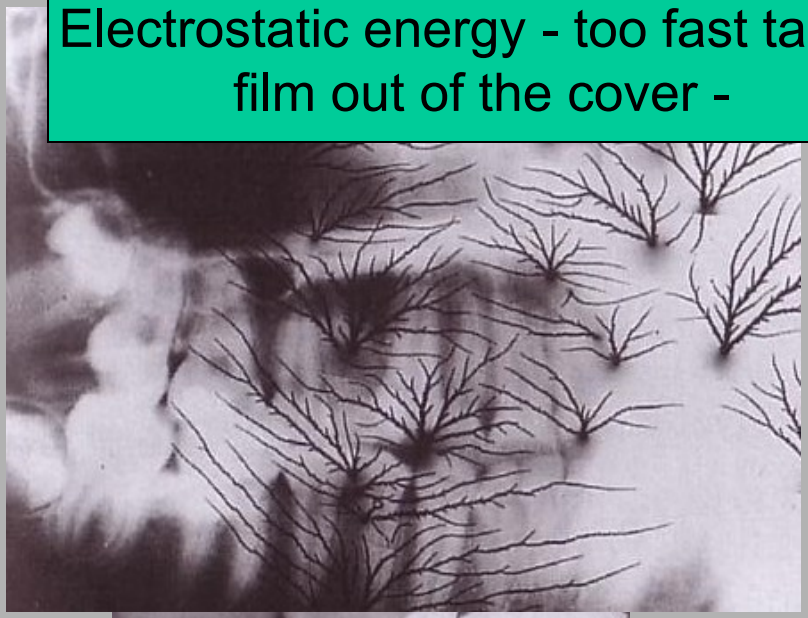
correct temperature

little developing liquids



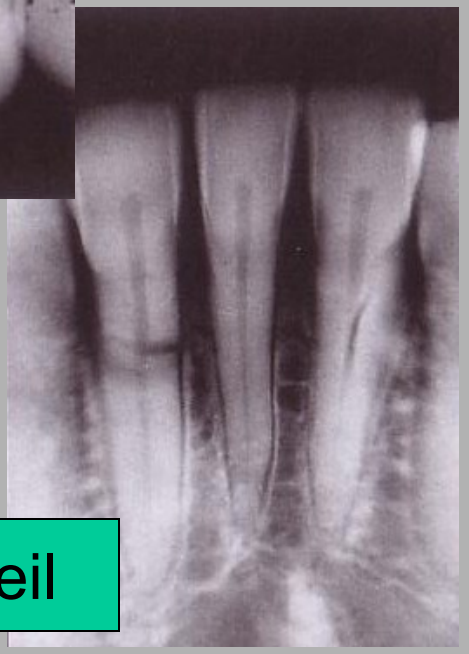
Conventional film processing - artifacts

Electrostatic energy - too fast taking film out of the cover -



developer

dirts



drop of water

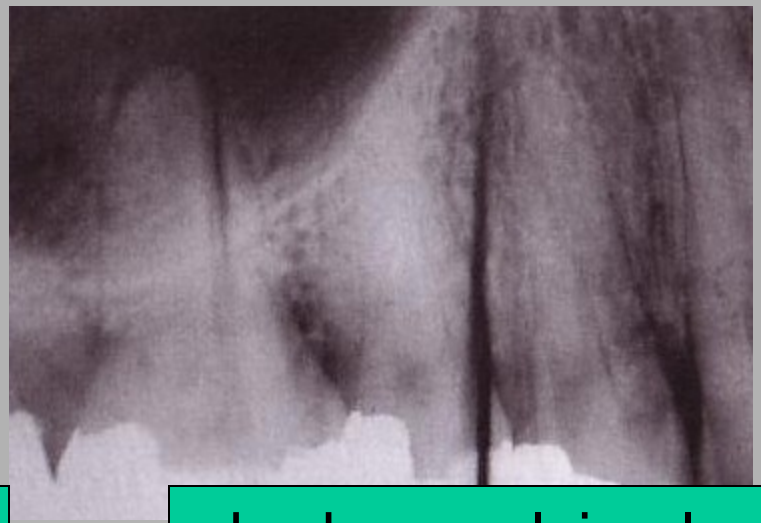
neil

Conventional film processing - artefacts

fingerprint

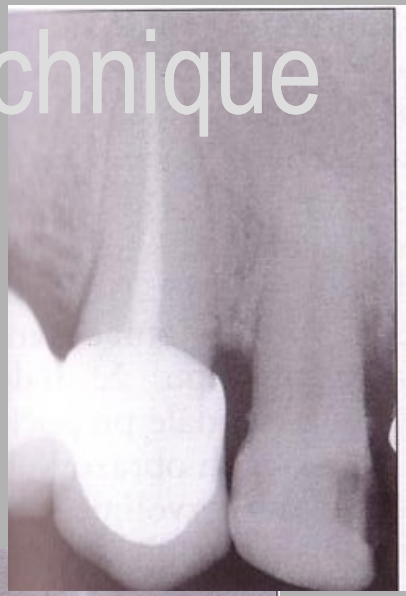
contact with other film

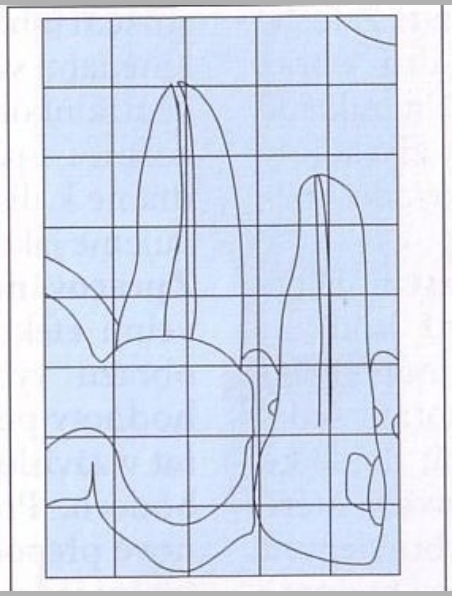
too high temperature during developing



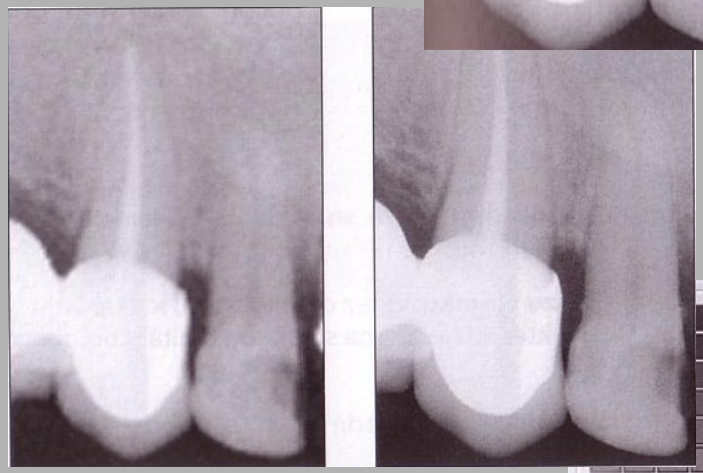
brake emulsion layer up

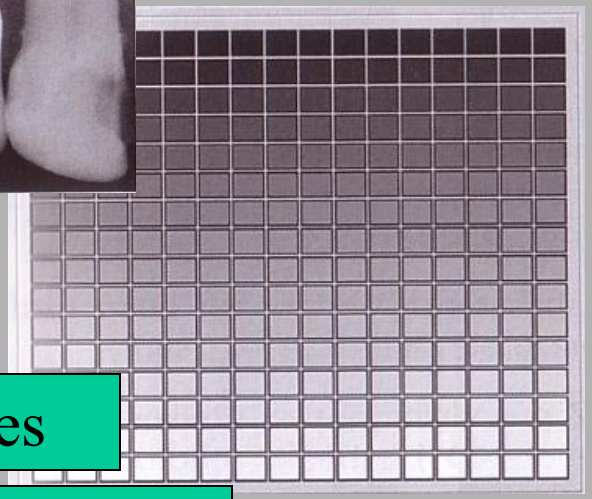
Digital technique





5	5	5	5	4
4	4	4	5	5
4	5	5	5	4
3	4	5	5	5
7	5	4	5	3
7	7	7	5	7
2	5	6	5	0
0	0	0	0	0

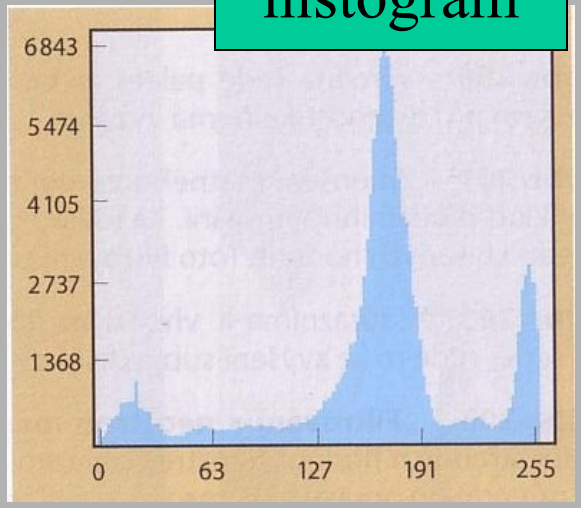




256 gray shades

no transitive shades

histogram



Digital technique - advantages

- filmless performance
- frendly inspecting and storage of pictures
- repeated exposure without medium changing
- lower dose?

Basic types of radiogram

Basic types of radiogram

Bitewing

Periapical

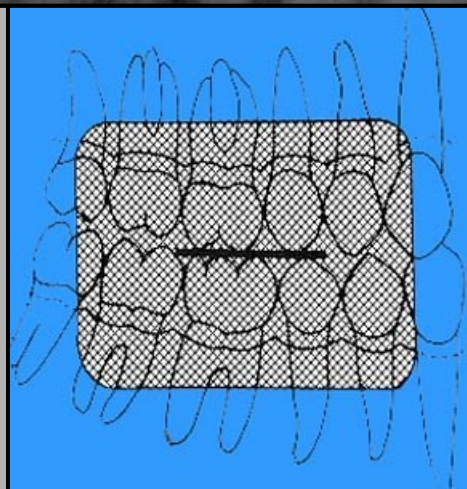
Panoramic - OPG

Bitewing

Shows crowns of upper and low jews simultaneously.

Indications:

- examintation of the occlusal line
- examination of:
  - tooth caries
  - tooth loss
  - monitoring pictures, e.g. cured teeth
  - assessment of periodontal status



Usually of posterior teeth but can be anterior teeth.

Periapical exposures

Indications:

- apical infection detection
- trauma – tooth and alveolus
- root assessment
- Orthodoncia

  diagnostics, plan, theraphy, follow up

Ortopanthomography - OPG

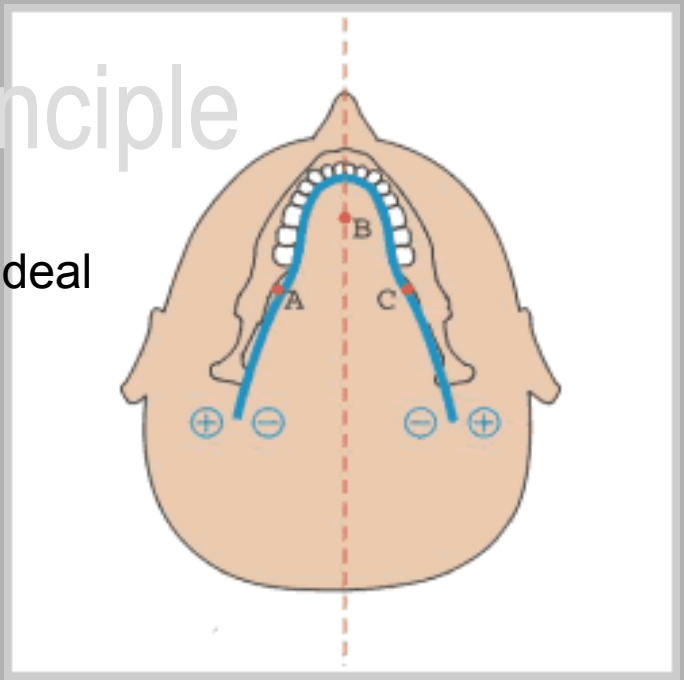
- one exposure demonstrates:
- jaws
- teeth
- joints
- aleveolar recesses of jaw cavities

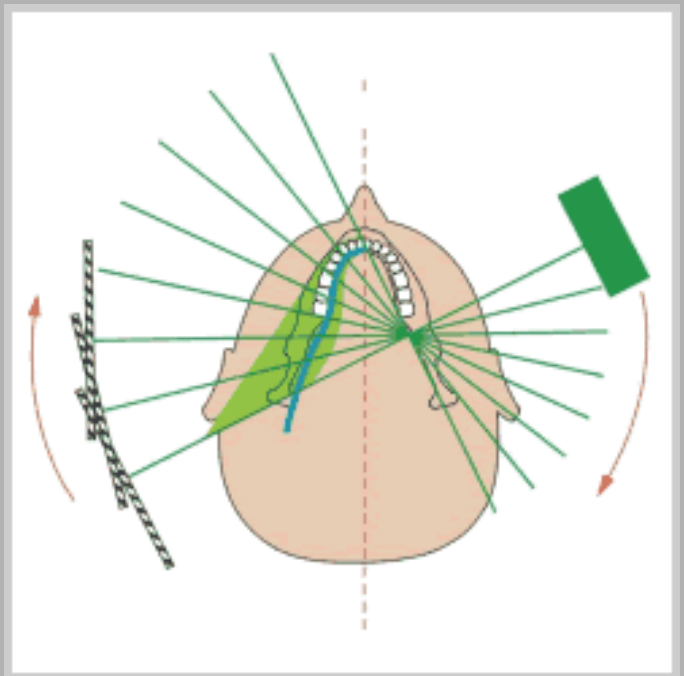
Ortopanthomography - OPG

- comfort
- low radiation dose
- better than intraoral RTG STATUS (traditional series of teeth)

Ortopanthomography - principle

- X-ray tube goes around the head on the track of ideal teeth occlusion - parabola
- There are 3 rotatory centra very next to the teeth occlusion

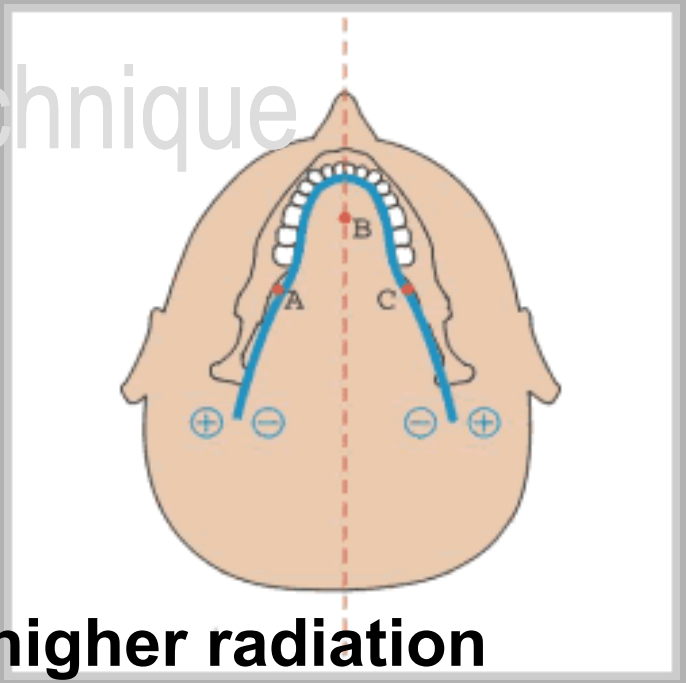




Ortopanthomography - assessment

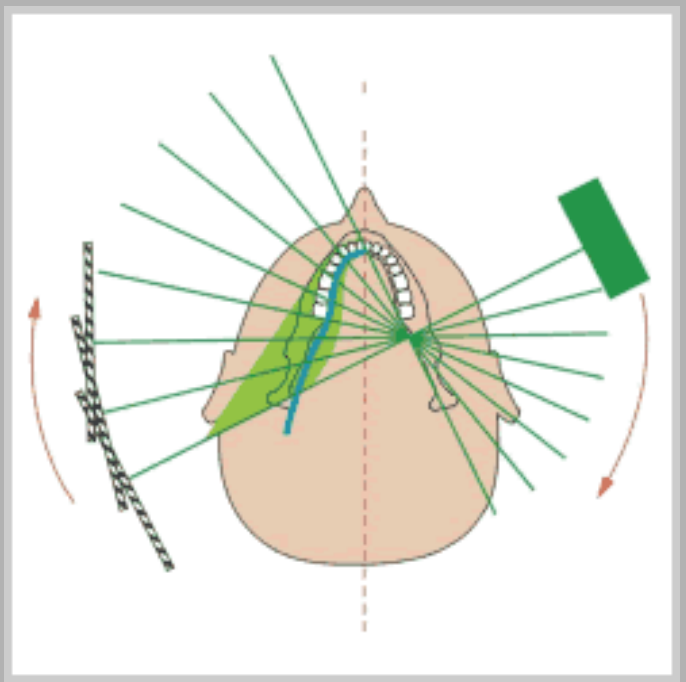
- Wisdom teeth
- TMJ
- Maxilar sinus
- Fractures and other skeleton pathology
- Orthodontia

Ortopanthomography - technique



- **leyer thickness**
  - ✓ from 9 mm (frontal part)
  - ✓ till 20 mm (in the area of TMJ)
  - – **thinner leyer = less artefacts, higher radiation dose**

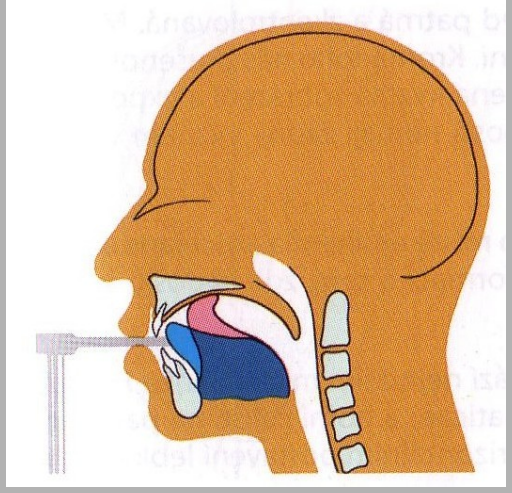
- defocus
- zoom
- possibility of mesuring



Zonograms

- = panoramic RTG exposures of different leyer thickness
- variable leyer thickness during exposition
- combination of zoom in (detail) technique
- to better exposure
  - reduction of cervical vertebra summation
    - ✓reduction of rotating velocity of X-ray tube
    - ✓increase the exposition parameters in the point of (x-ray) passing

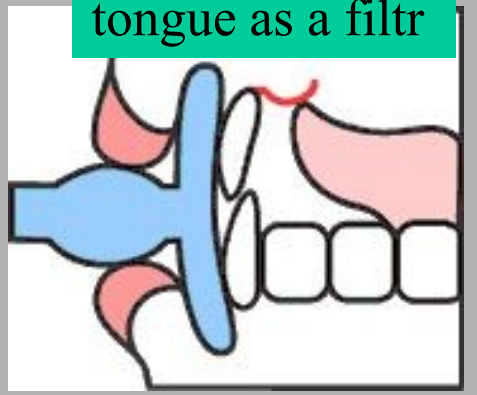
Burn-out effect



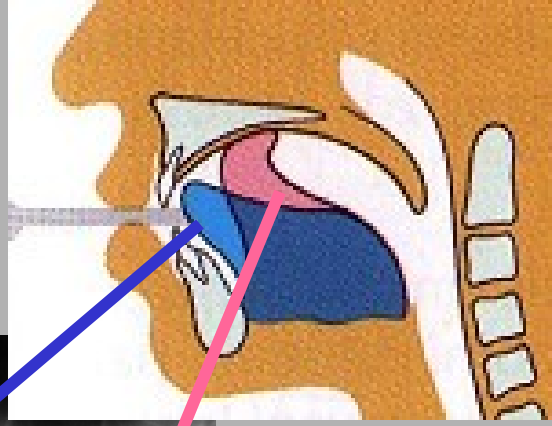
- incorrect tongue position
- x-ray beam is not reduced

= „overexposition“ of structures

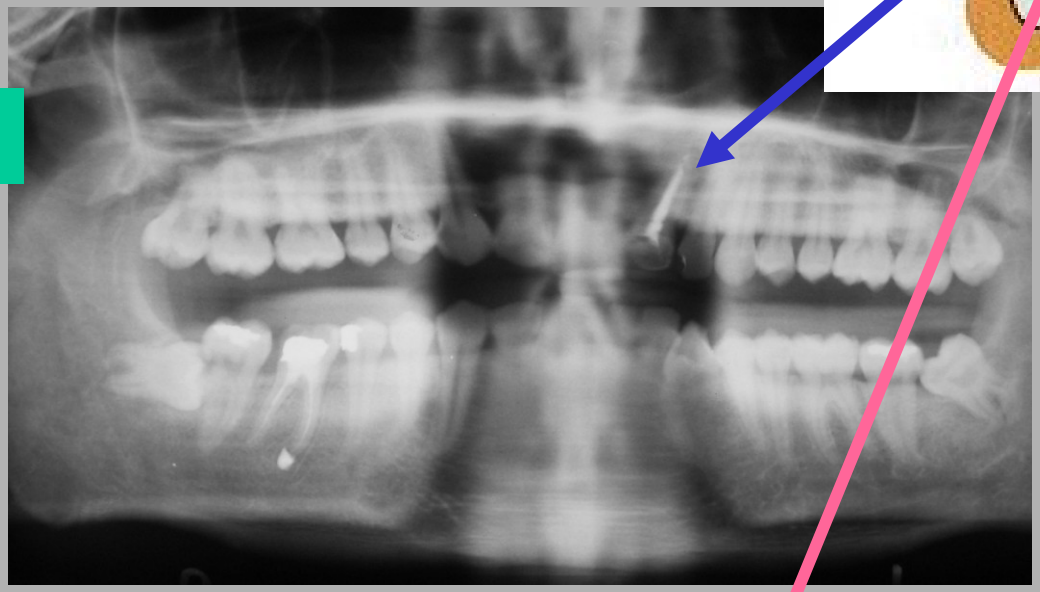
- **negative contrast of air** suppresses:
  - maxillar tooth roots
  - structures of maxilla
  - boundary of nasal and maxillar cavities
- **it is NOT possible to ASSESS**



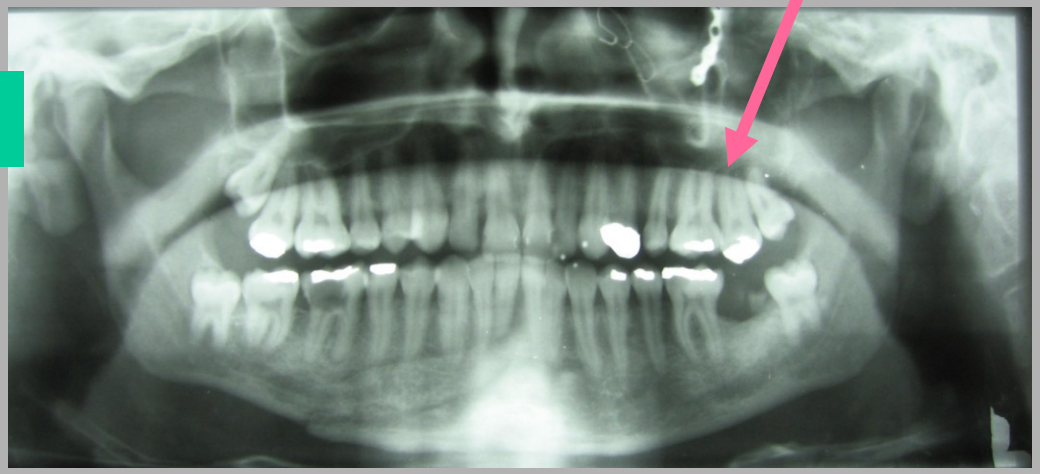
Burn-out effect



overexposed picture



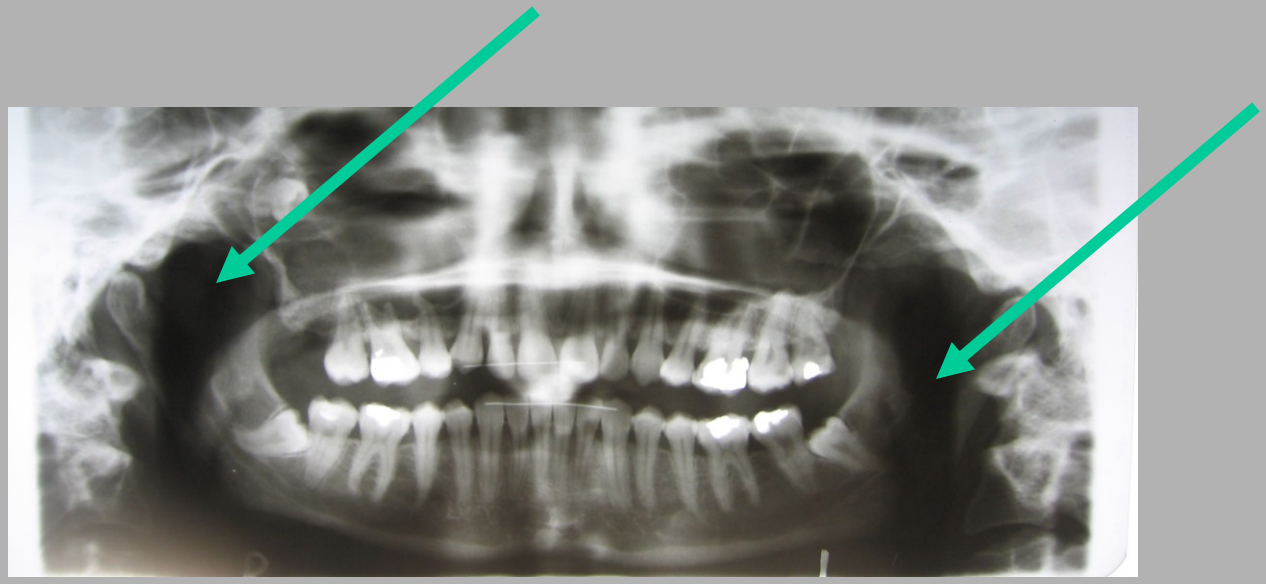
tongue as a filtr



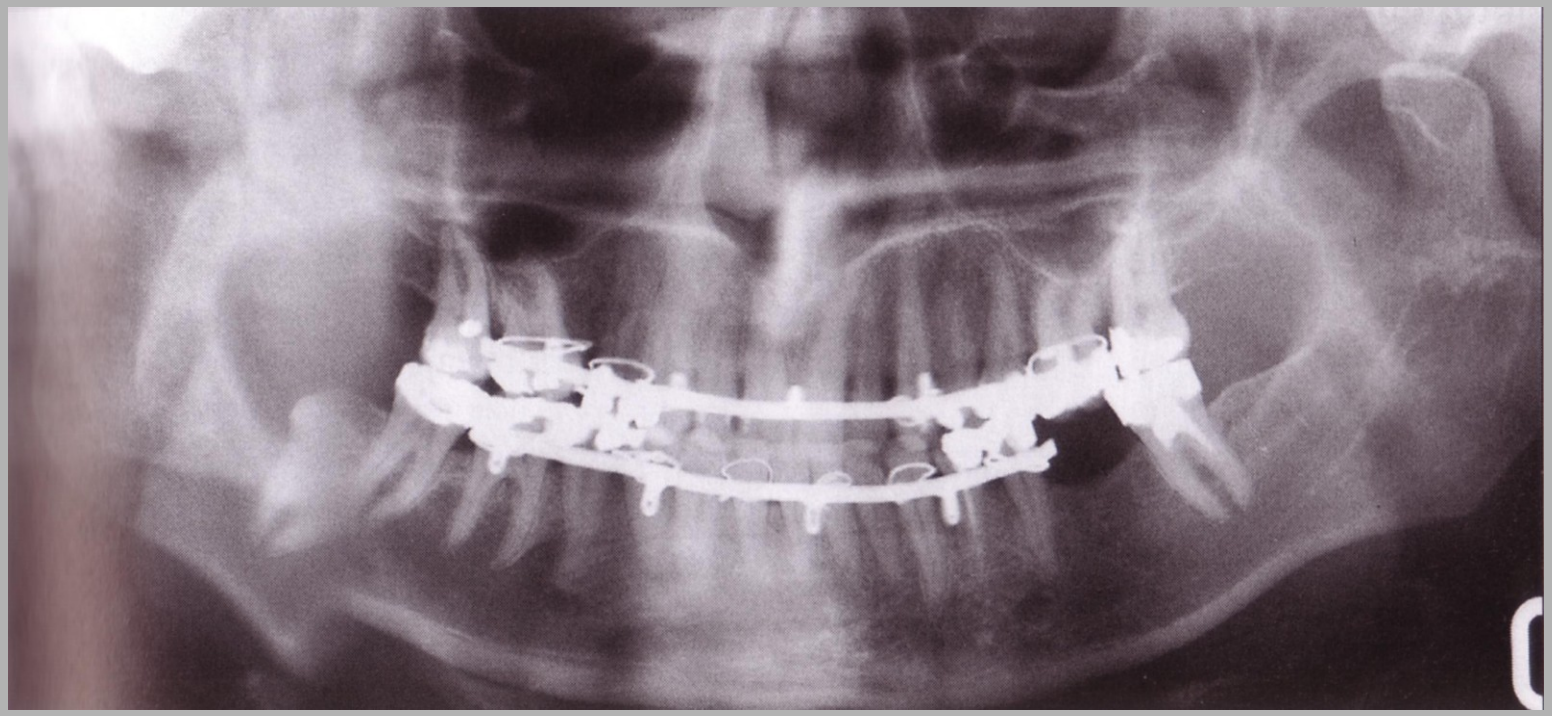
The breathig

„Don´t move and breathe calmly during the examination.“

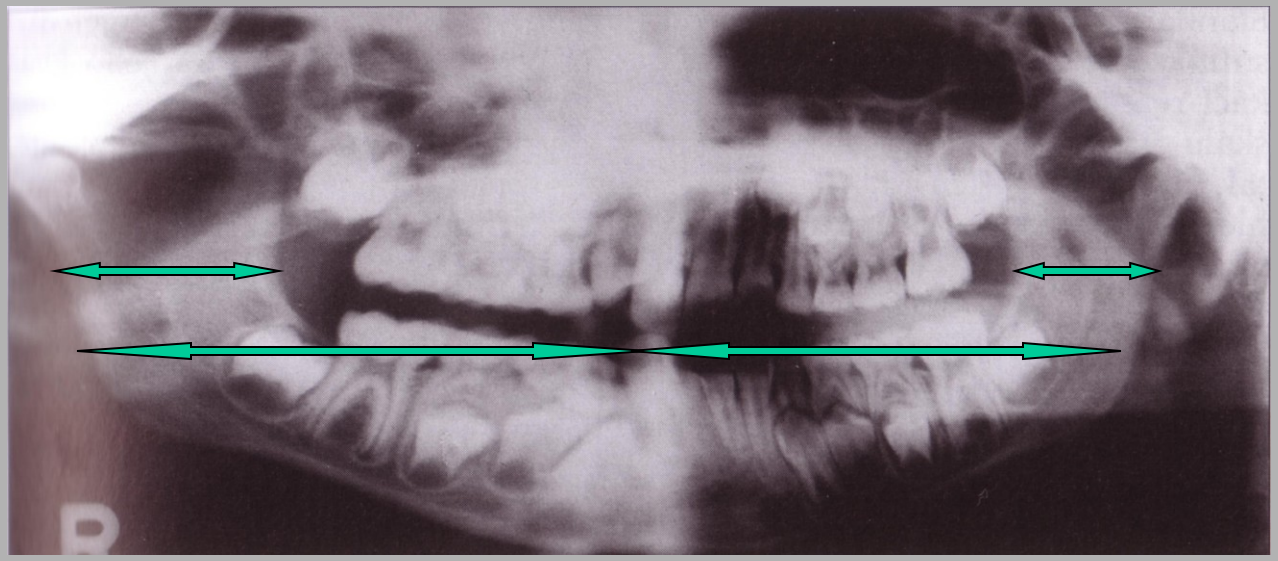
- deep breath and holded breath
- epipharynx is filled up with the air
  - incorrect exposure of lateral part of picture

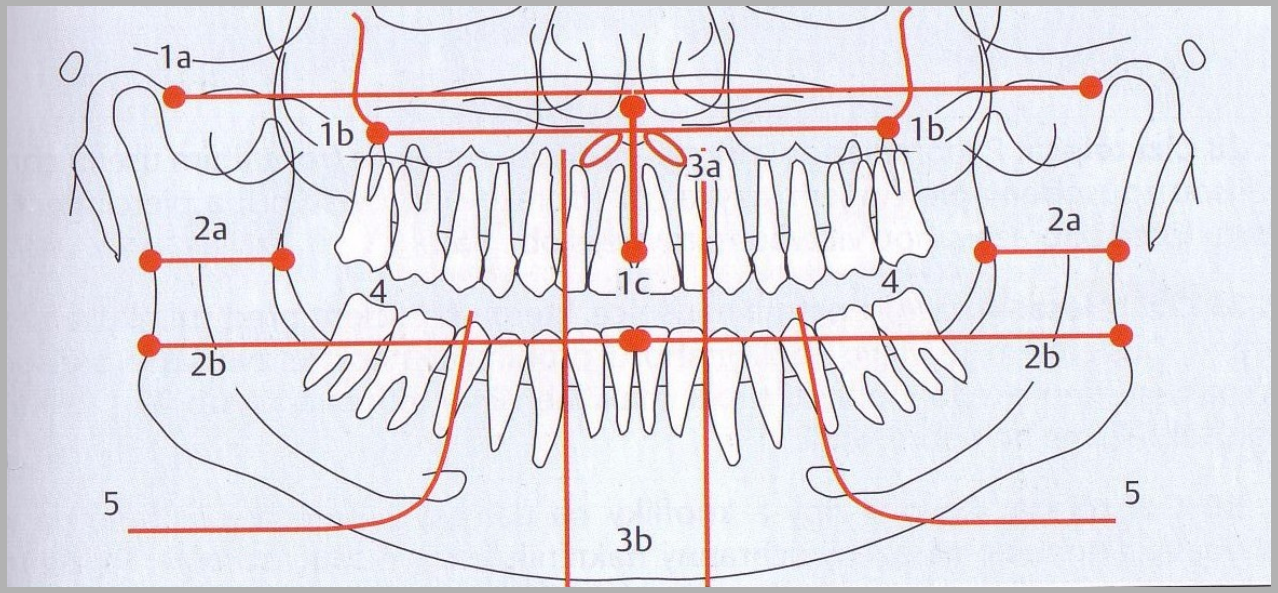


Movement artefacts



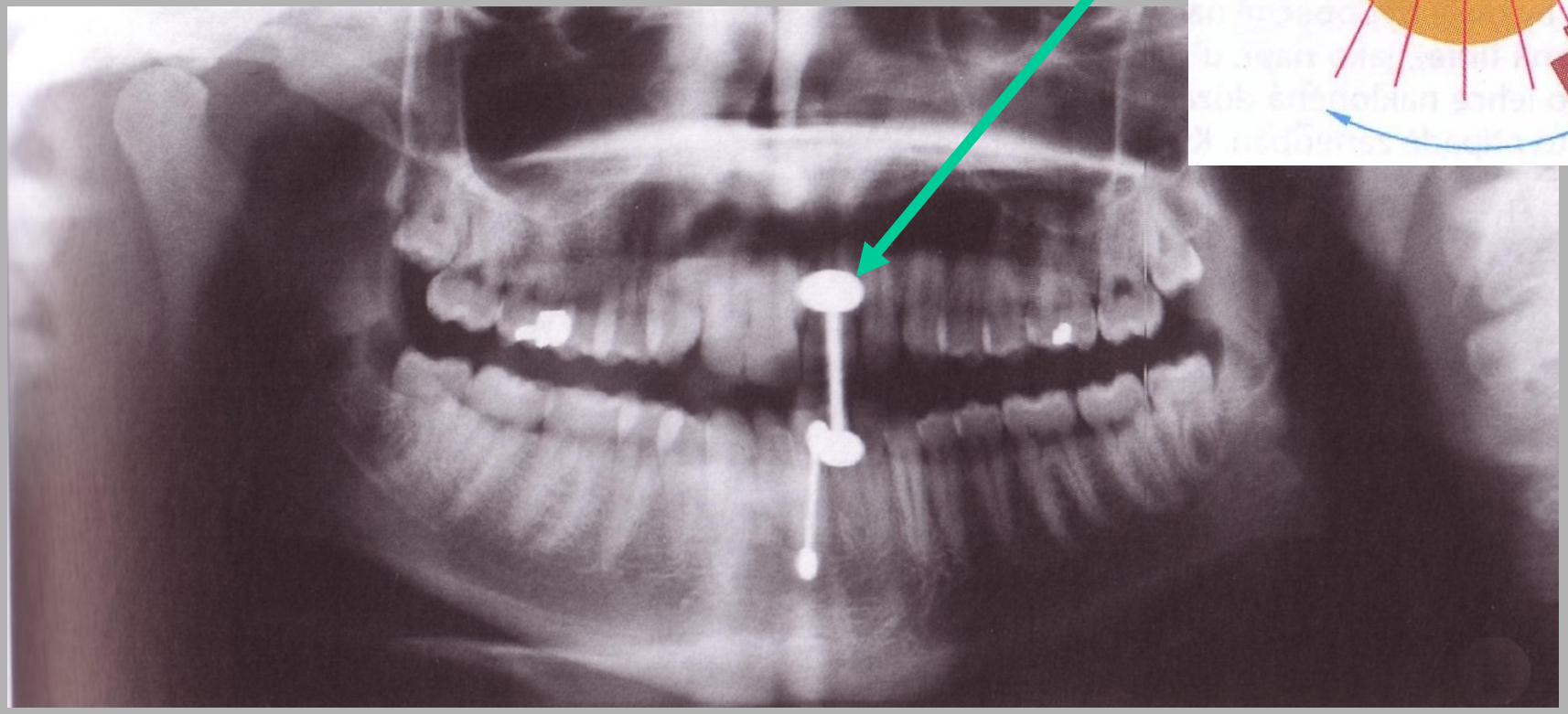
Asymetry of exposure

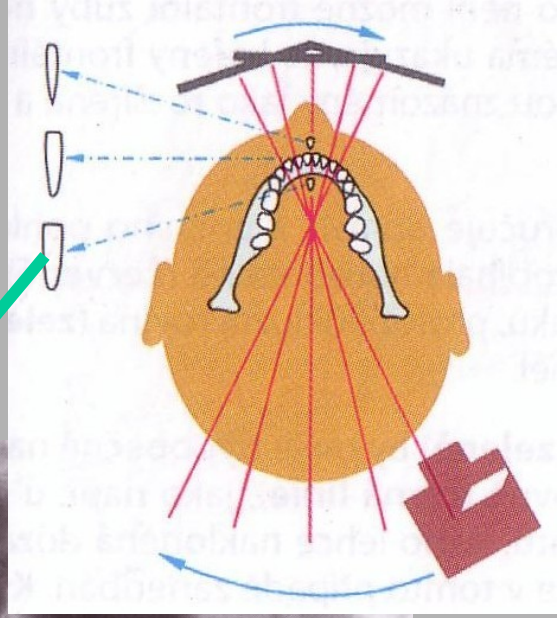




Pictured layer

piercing - tongue

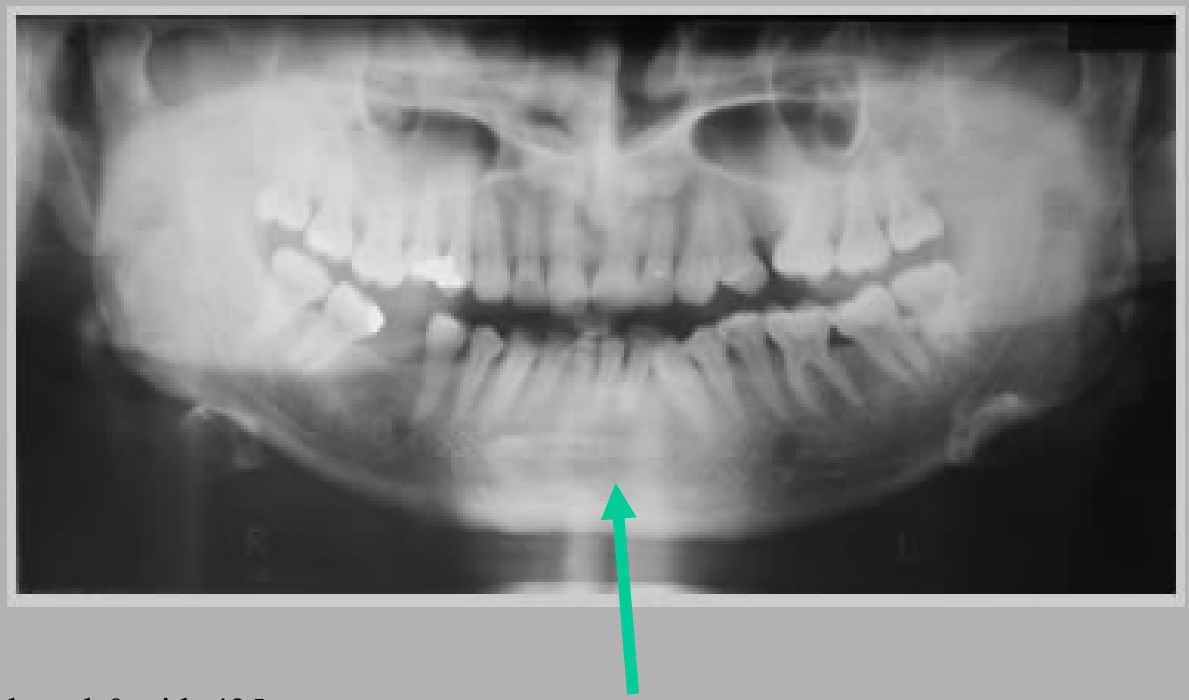




piercing - lip

Ortopanthomography - mistakes

- <u>The head hang (down)</u>
- the roots of caudal incisors are deviated of the plane
- out of focus



http://www.dentalcare.cz/odbclan.asp?ctid=auth&arid=425

Ortopanthomography - mistakes

- Tilting the head back
- the root of cranial incisors are deviated of the plane
- out of focus

http://www.dentalcare.cz/odbclan.asp?ctid=auth&arid=425

Ortopanthomography - mistakes

- <u>The head is too close to the film</u>
- The teeth in both jaws
  - are smaller
  - out of focus
- The cervical vertebras could summate with mandible arms

http://www.dentalcare.cz/odbclan.asp?ctid=auth&arid=425

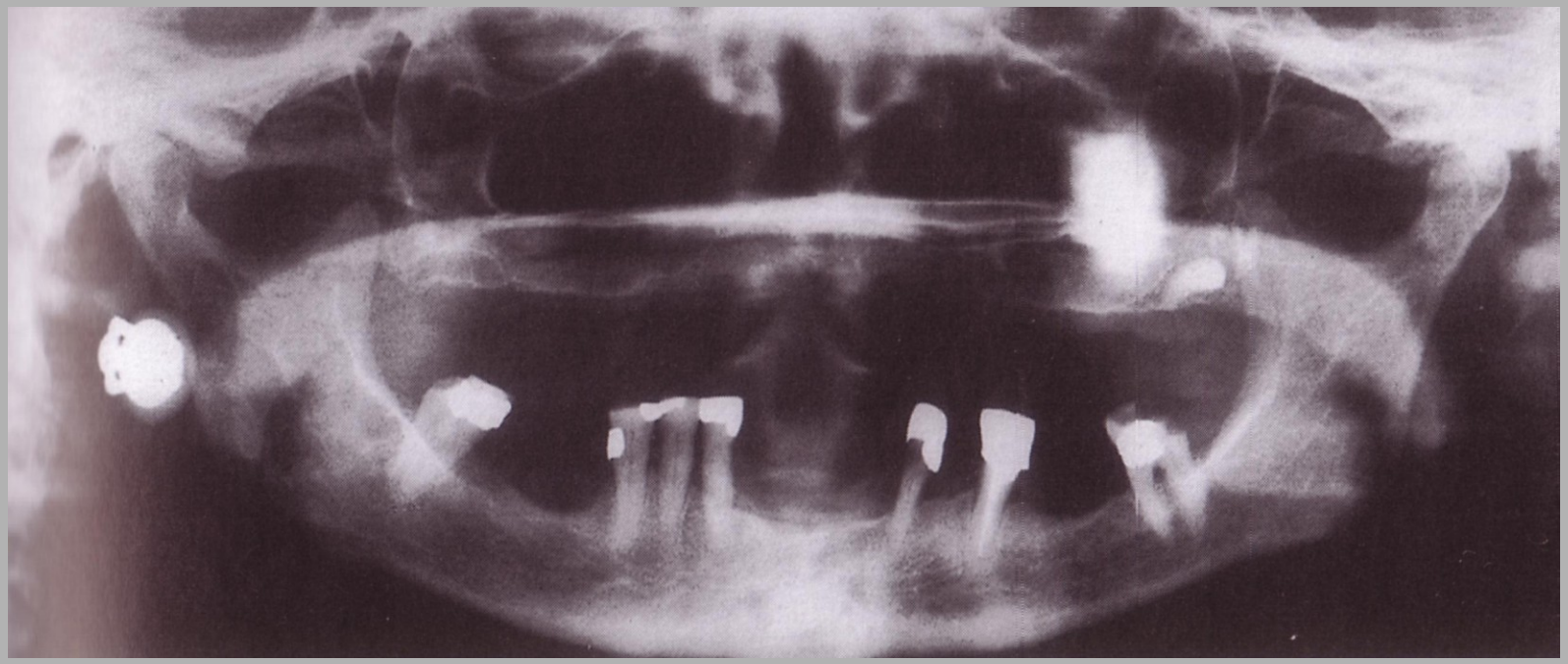
Ortopanthomography - mistakes

- <u>The head is far from the film</u>
- maxillar and manbidular teeth are
  - out of fucus
  - larger
- there are not mandible joints on the picture

http://www.dentalcare.cz/odbclan.asp?ctid=auth&arid=425

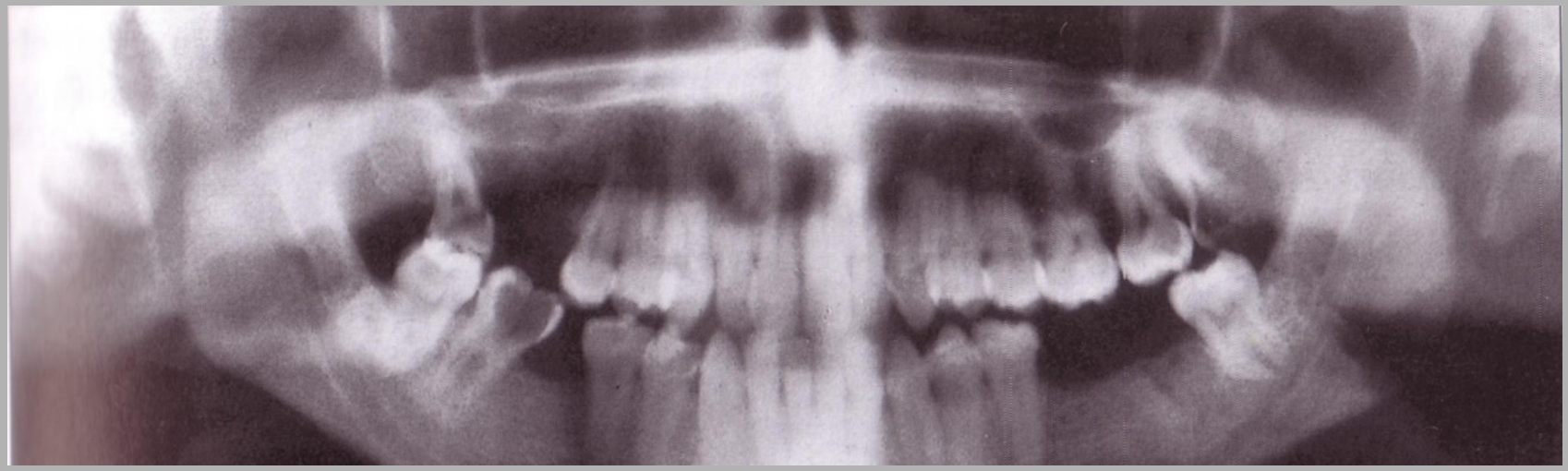
Alien body - artefacts

- Ear rign on the right.
- Artefact in the area of the left tuber maxillae.



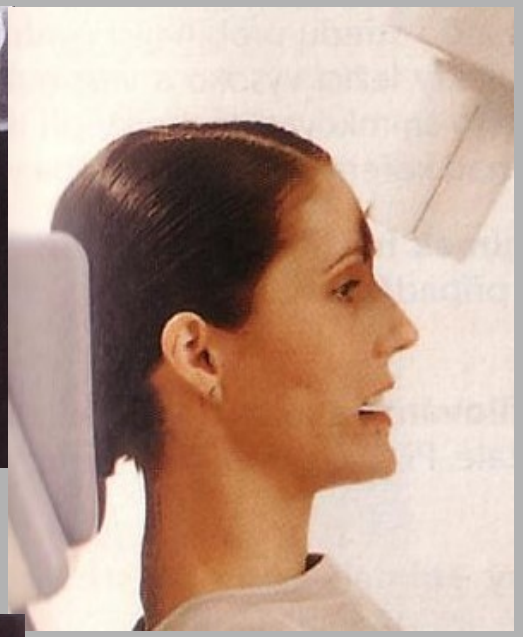
Alien bodies - artefacts

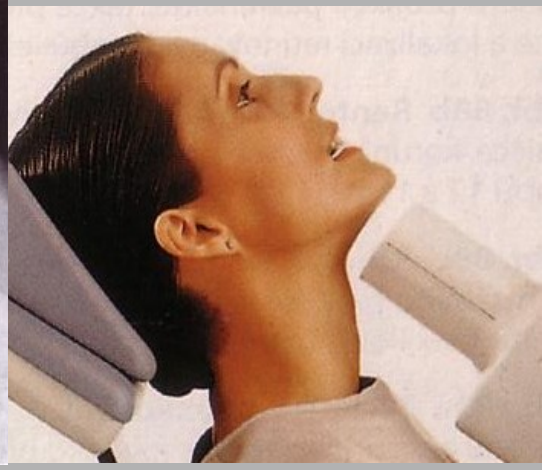
- Metal zips, buttons, glasses, carelessly attached protect collar
- = disturbing artefacts



Extraoral exposures

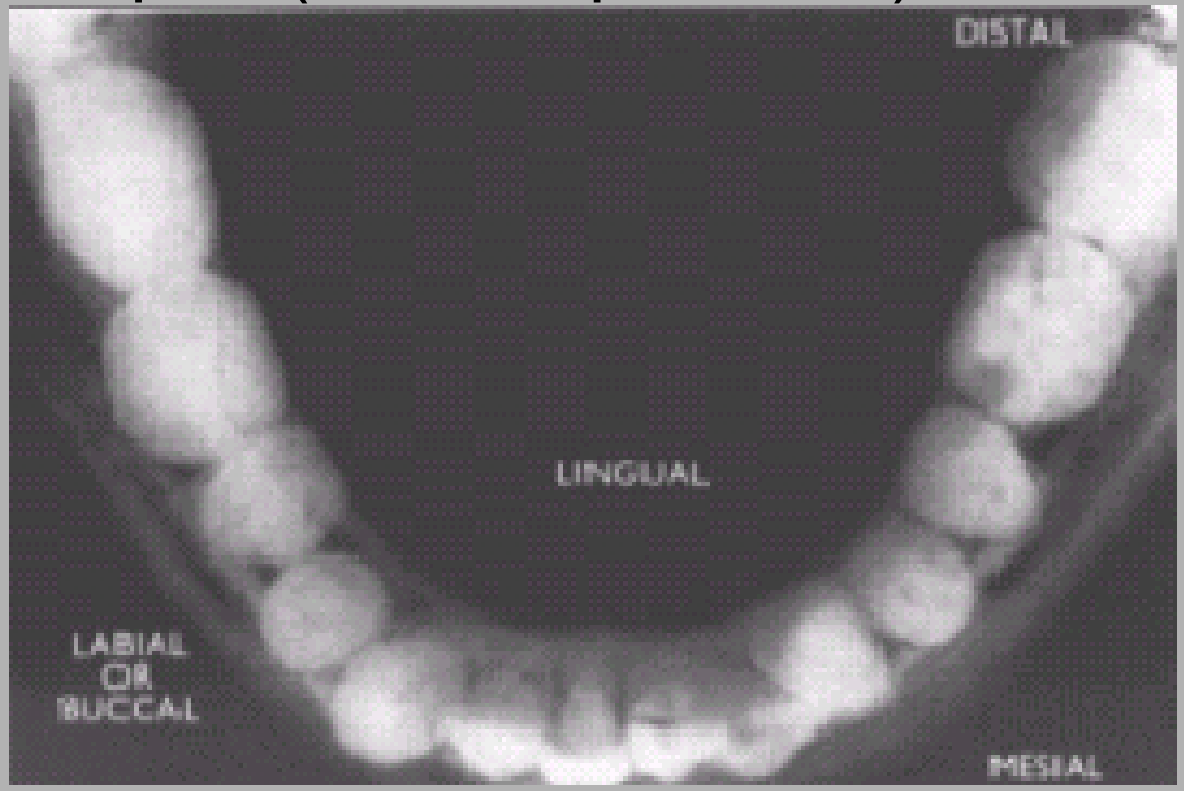
Occlusal exposure of upper and low jaw





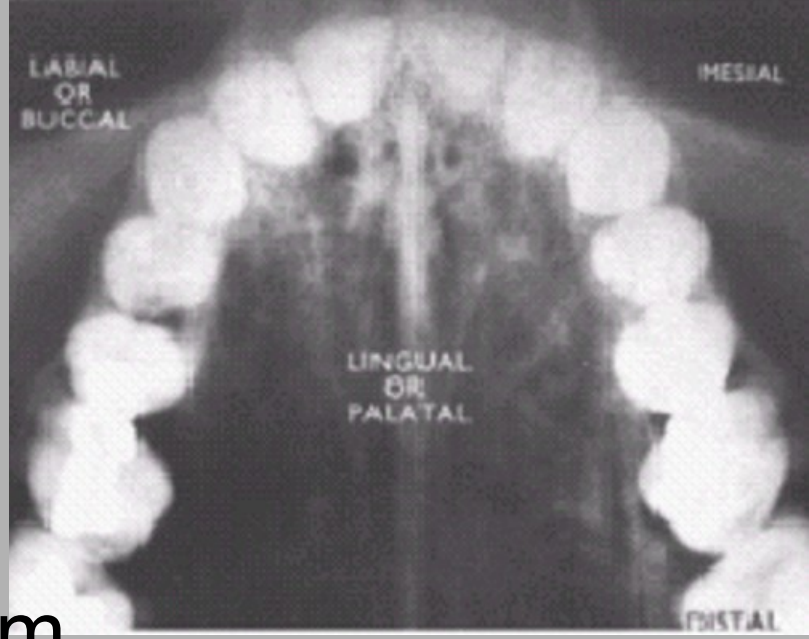
Teeth arch

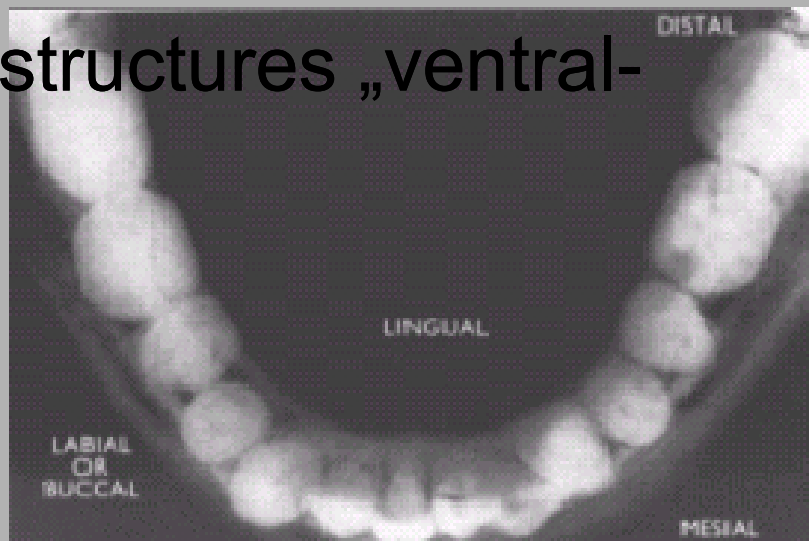
- Parabole
  - frontal part (curved part of parabole)
  - distal part (arms of parabole)



Topography

- buccal – towards cheek
- lingual – towards tongue
- labial – towards lip
- palatial – towards palatum
- distal
- mesial
  - label the ventral located structures „ventral-medial“



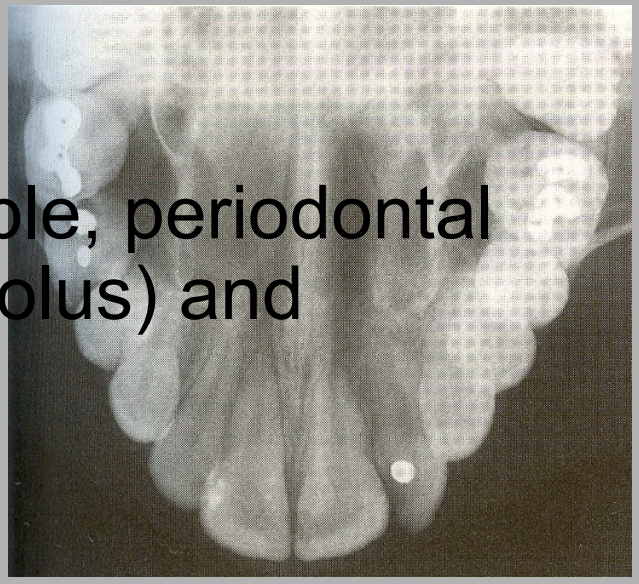


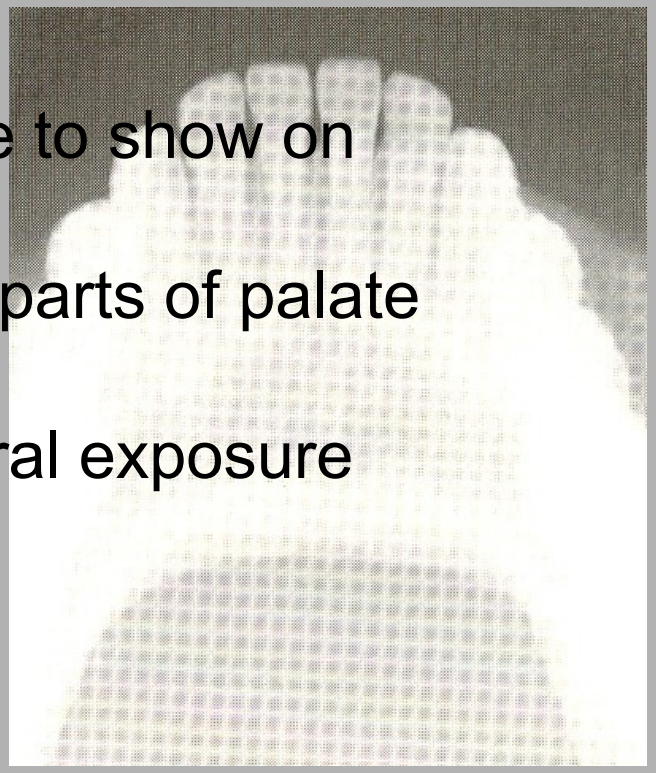
Oclussal exposures

Pictures of maxillar arch, mandible, periodontal ligaments, tooth sockets (alveolus) and adjacent bone

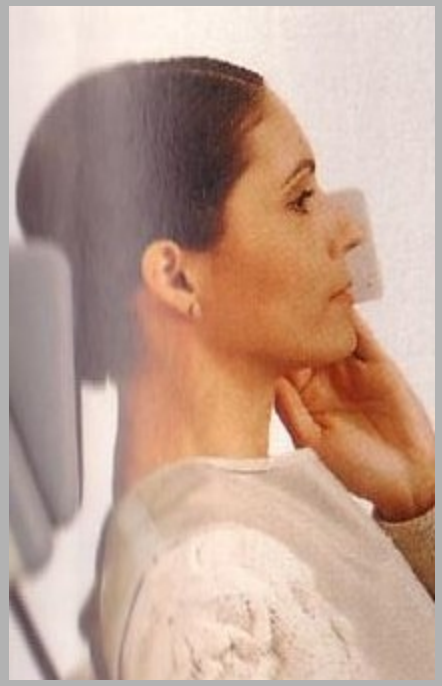
Indications:

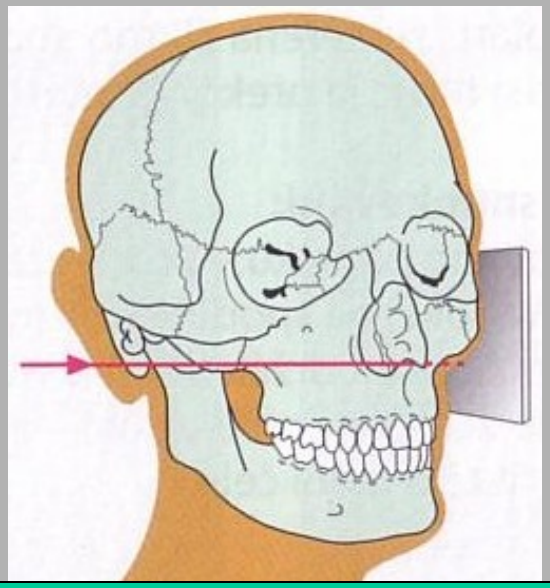
- teeth development monitoring
- redundant teeth
- pathology which is not possible to show on intraoral exposures
- contours of buccal and lingual parts of palate skeleton
- no possibility to perform intraoral exposure
  - limitation of mouth opening
  - no cooperation (children)



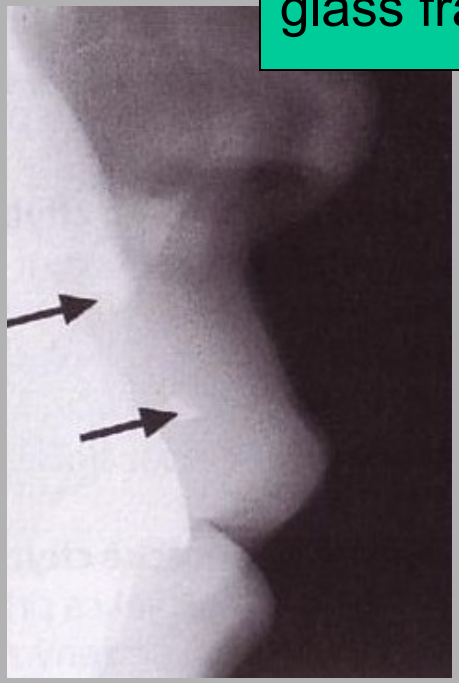


Extraoral lateral exposure of frontal upper frontal part





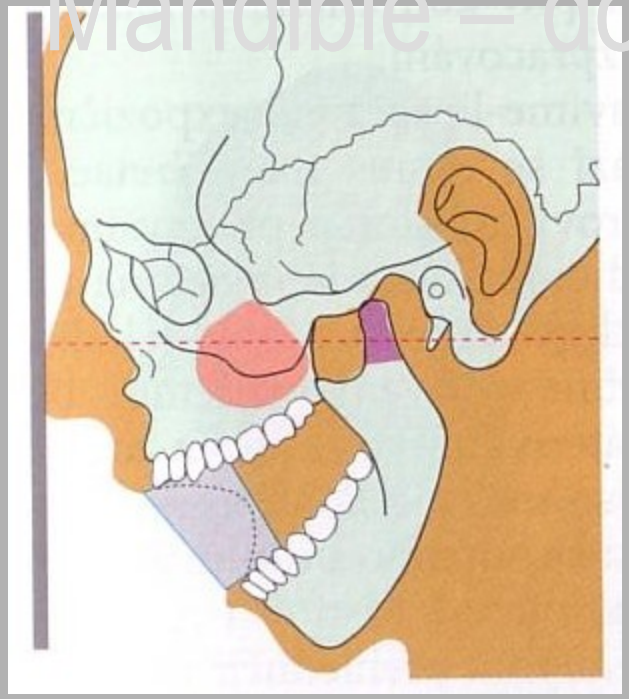
spina nasalis anterior perpendicular to film

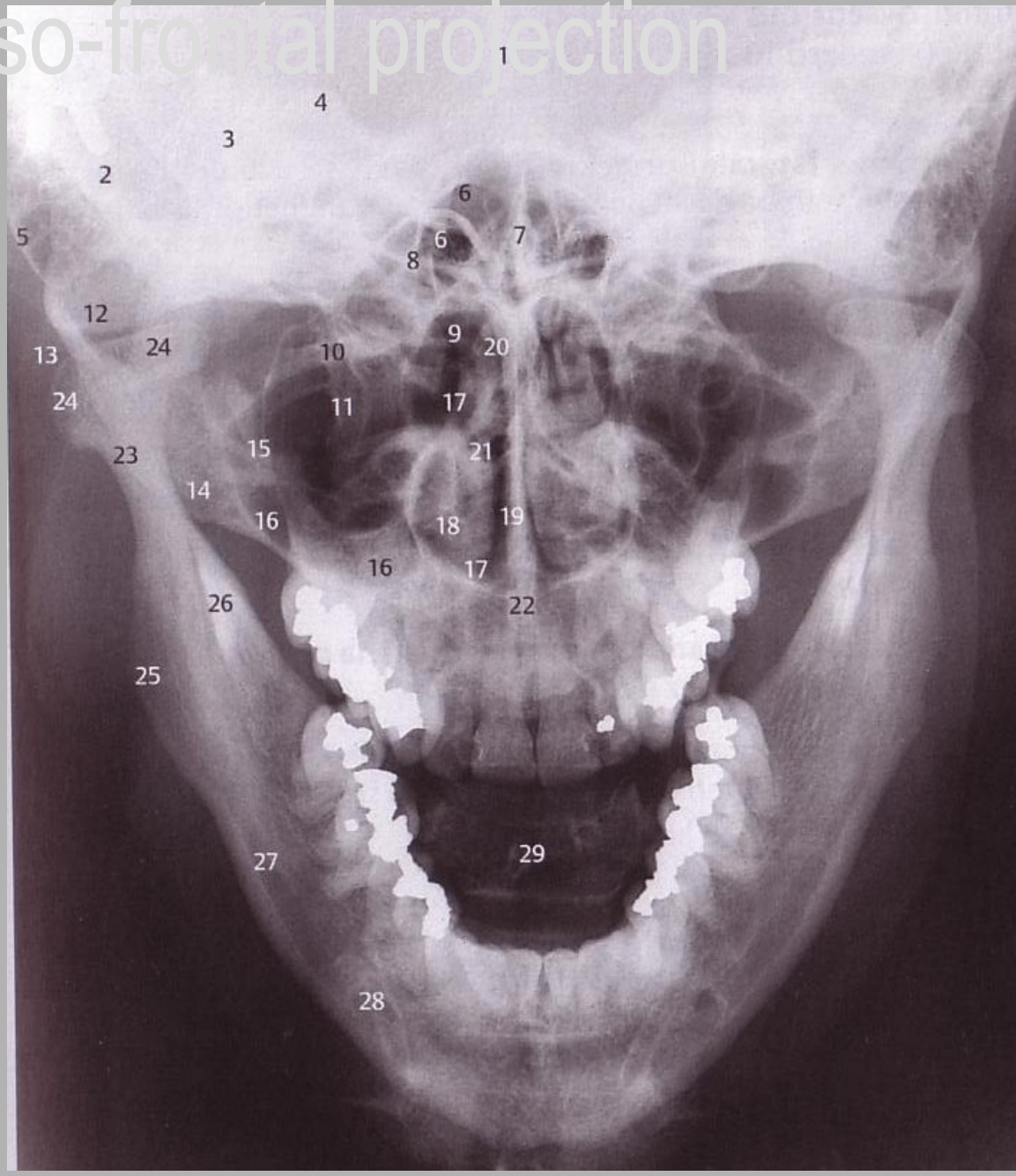


glass fragments

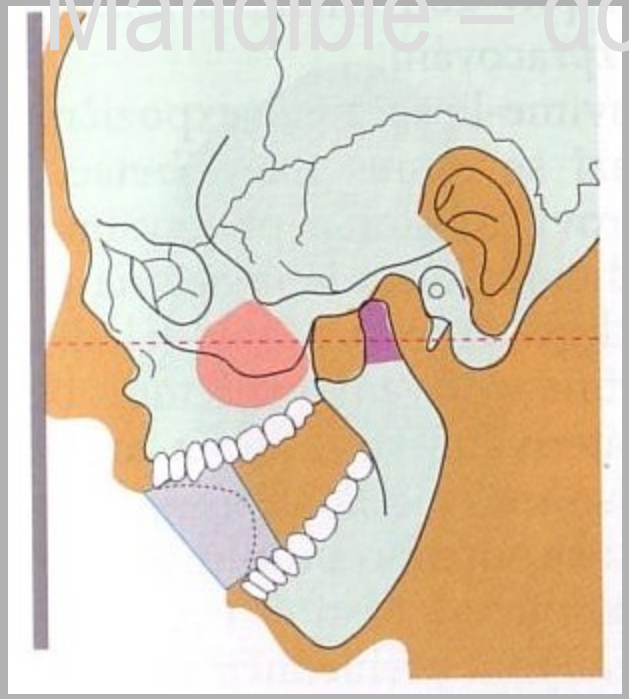
- depicture of nasal bones
- alien particles

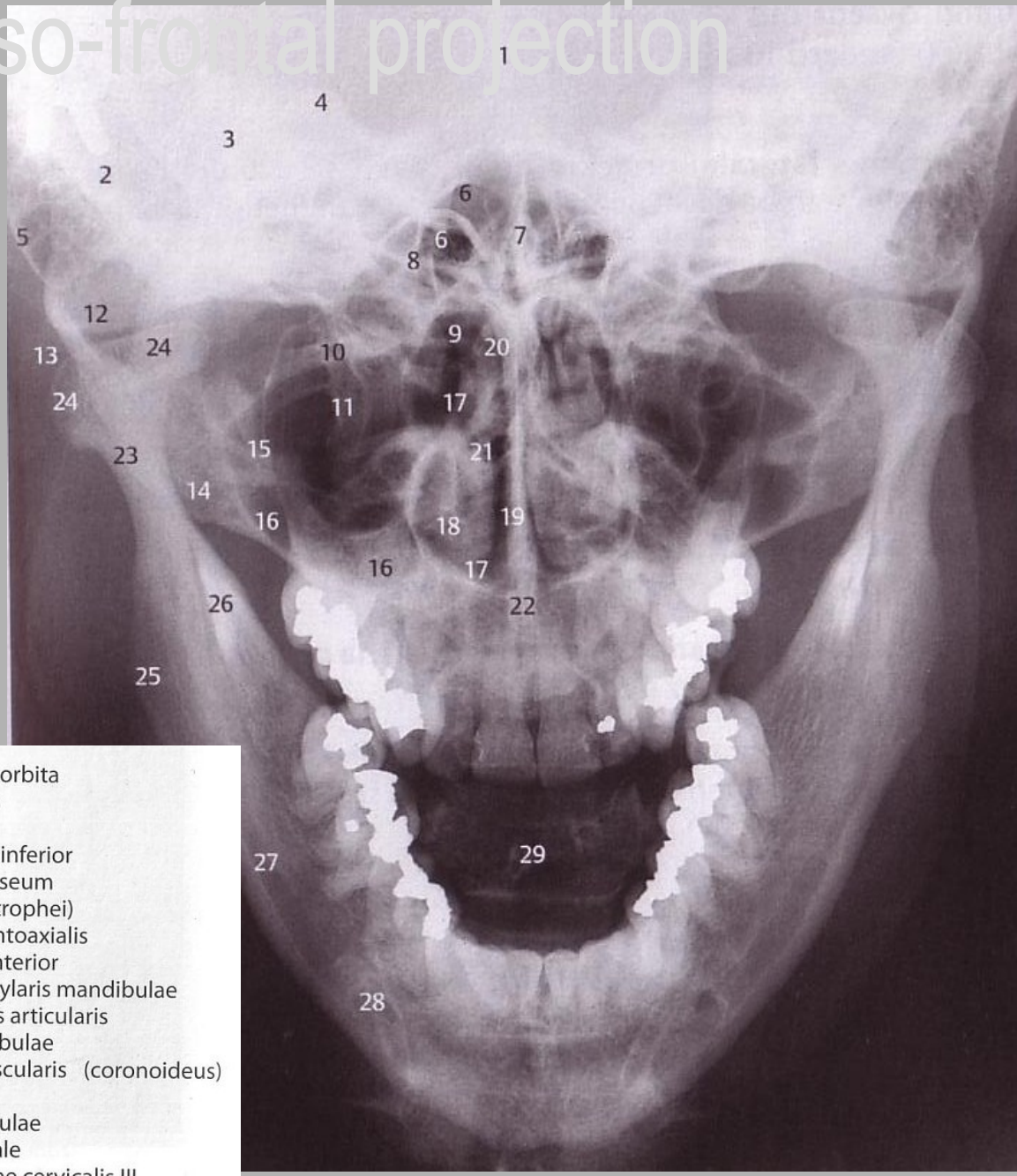
Mandible – dorso-frontal projection





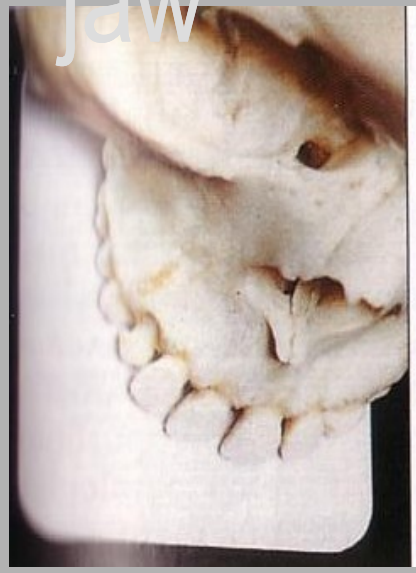
Mandible – dorso-frontal projection

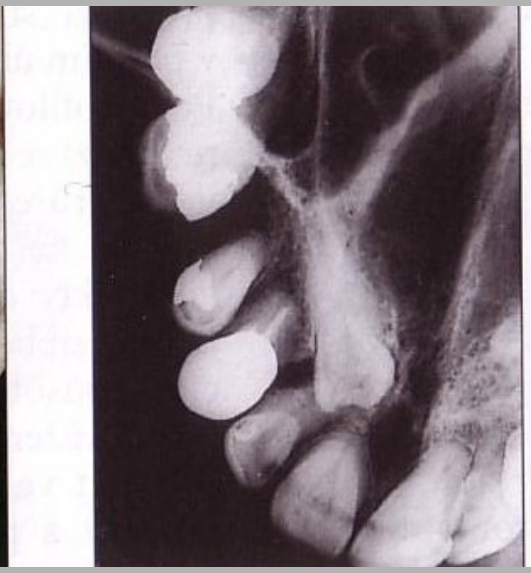


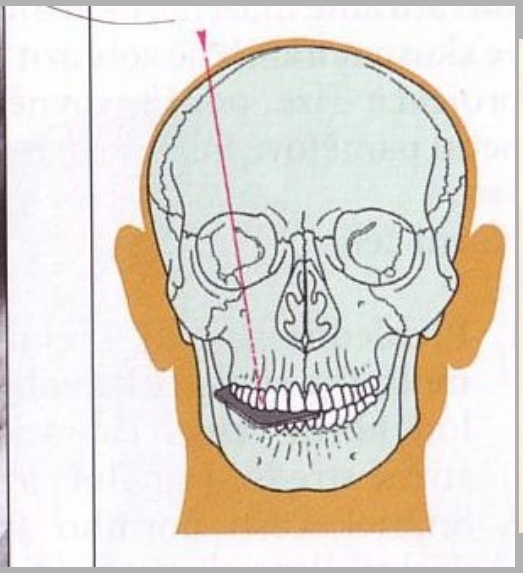


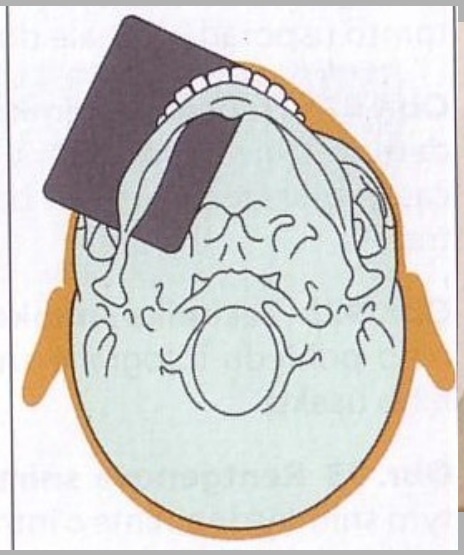
1 Crista frontalis
2 Squama ossis temporalis
3 Pars petrosa ossis temporalis
4 Eminentia arcuata
5 Processus mastoideus ossis temporalis
6 Sinus sphenoidalis v superpozici s částí sinus frontalis
7 Crista galli
8 Planum sphenoideum
9 Articulatio atlantooccipitalis
10 Processus transversum atlantis
11 Processus pterygoideus ossis sphenoidalis
12 Eminentia articularis
13 Arcus zygomaticus
14 Os zygomaticum
15 Margo inferior, orbita
16 Sinus maxillaris
17 Cavum nasi
18 Concha nasalis inferior
19 Septum nasi osseum
20 Dens axis (epistrophei)
21 Articulatio atlantoaxialis
22 Spina nasalis anterior
23 Processus condylaris mandibulae
24 Kondylus, facies articularis
25 Angulus mandibulae
26 Processus muscularis (coronoideus) mandibulae
27 Canalis mandibulae
28 Foramen mentale
29 Corpus vertebrae cervicalis III

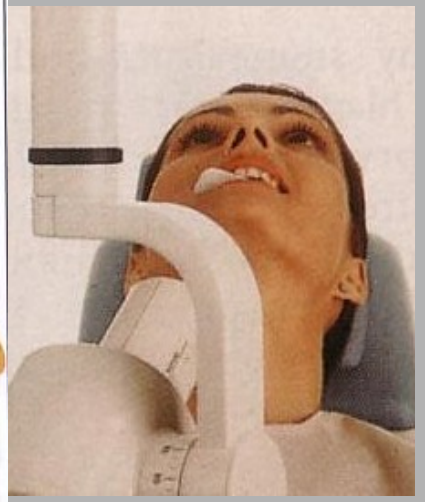
Semiprofile exposures of upper and low jaw



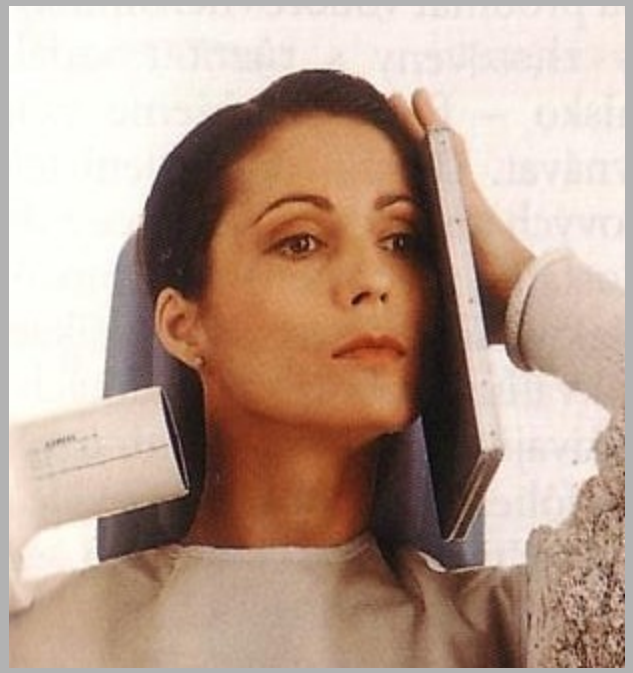


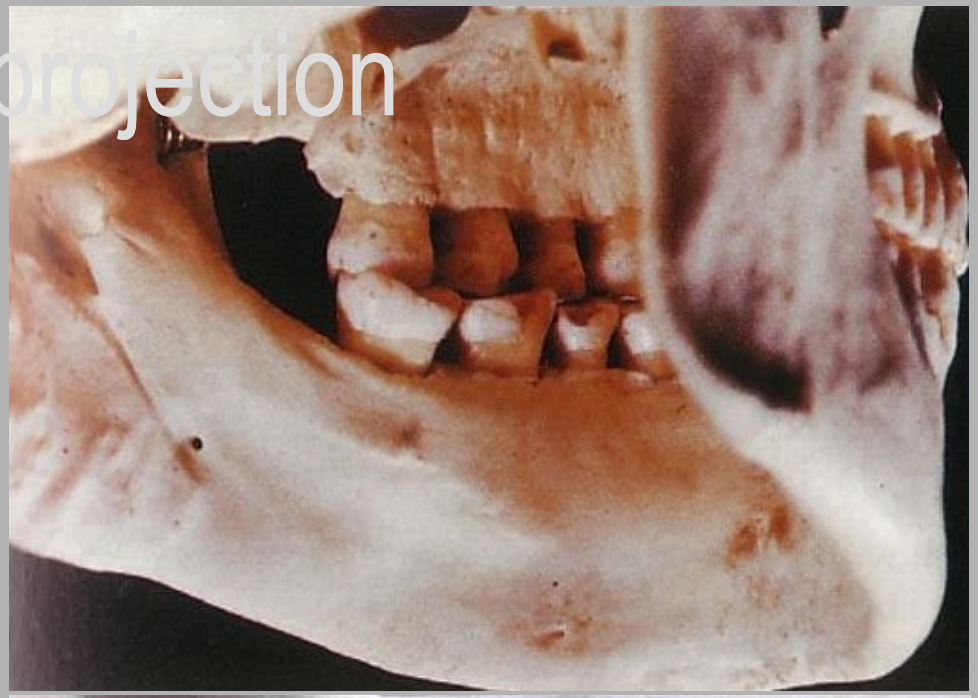


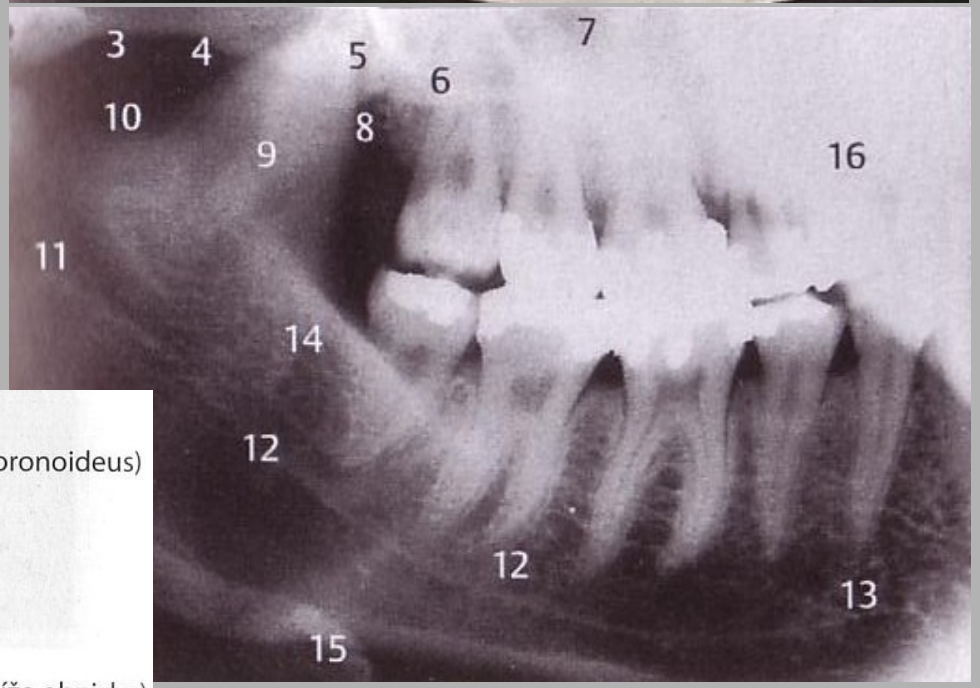




Mandible – lateral projection

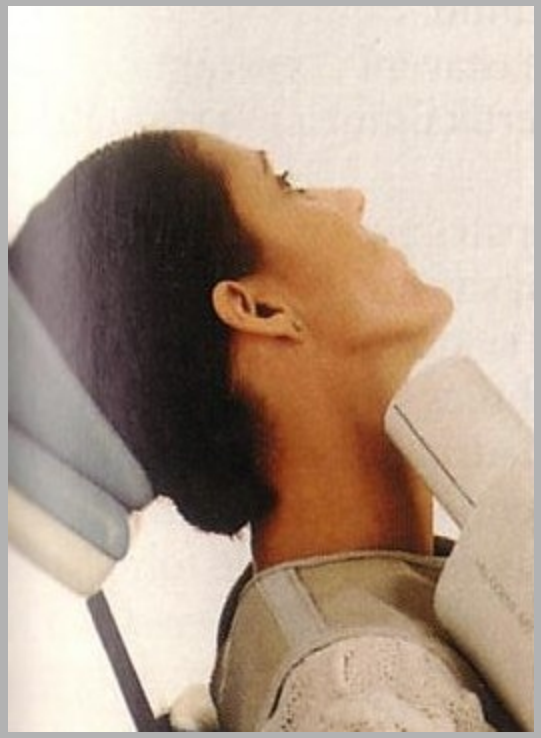






1 Kondylus
2 Eminentia articularis
3 Arcus zygomaticus
4 Sutura zygomaticoalveolaris
5 Processus pterygoideus ossis sphenoidalis
6 Os zygomaticum
7 Sinus maxillaris
8 Tuber maxillae
9 Processus muscularis (coronoideus)
10 Incisura semilunaris
11 Lingula
12 Canalis mandibulae
13 Foramen mentale
14 Crista temporalis
15 Os hyoideum
16 Angulus mandibulae (blíže ohnisku)

Caudal wisdom tooth



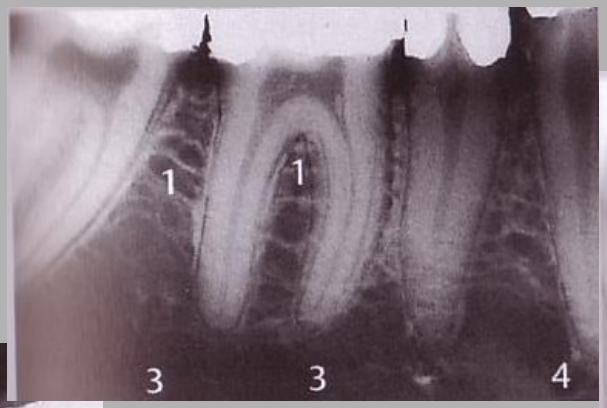
- The head is tilted on heathy side and back
- The x-ray beam passes through the wisdom tooth towards cranio-ventral oriented film cassette which is on the reverse side

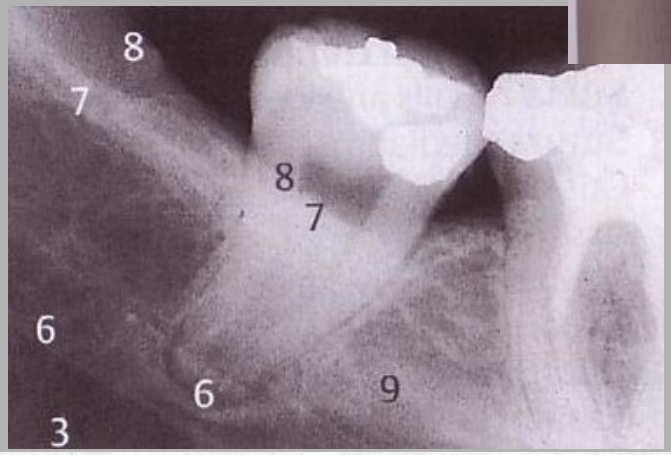
Chin exposure

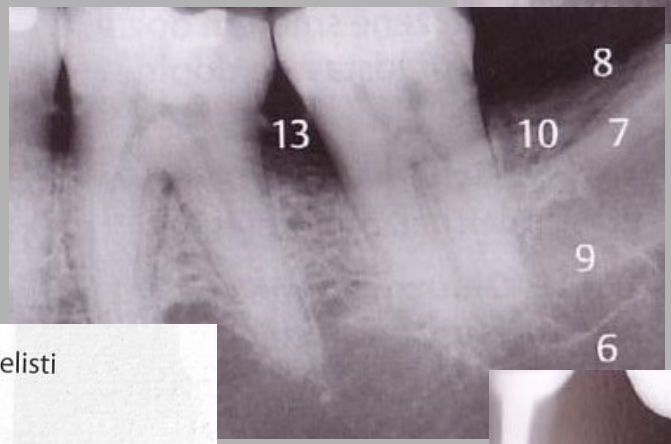
- horizontal placed film
- imaging toothless chin

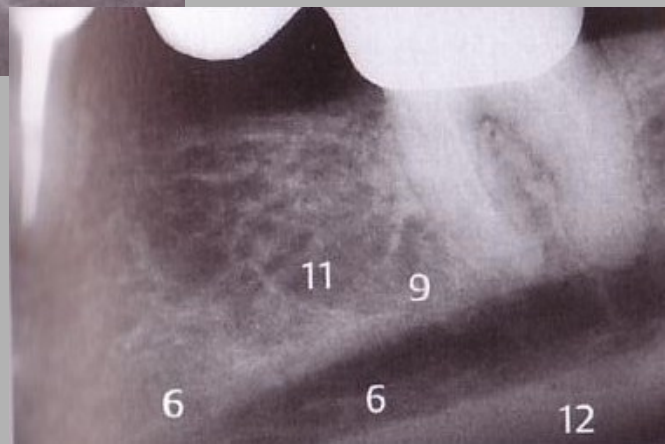
Premolars a molars

Anatomy





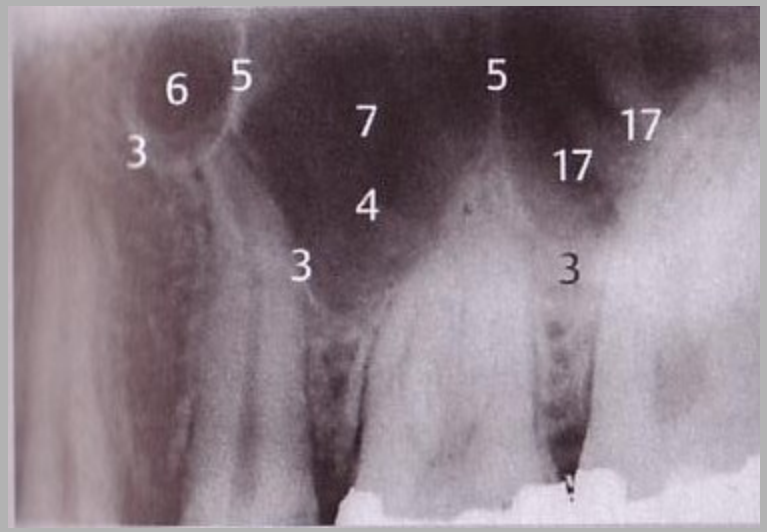


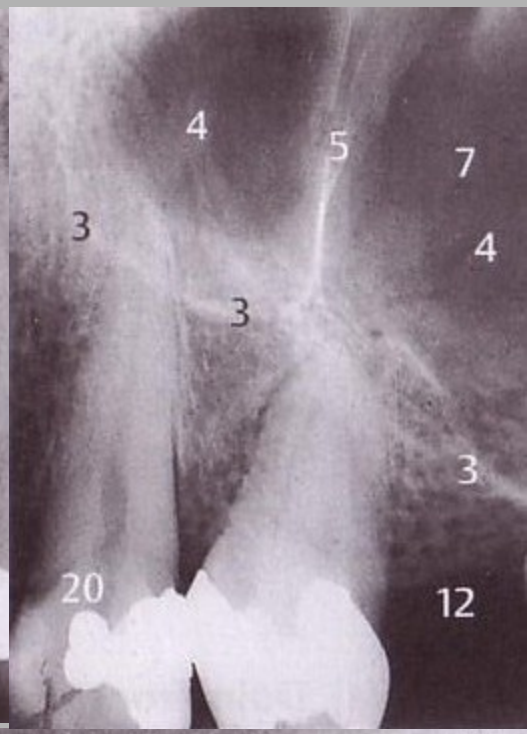


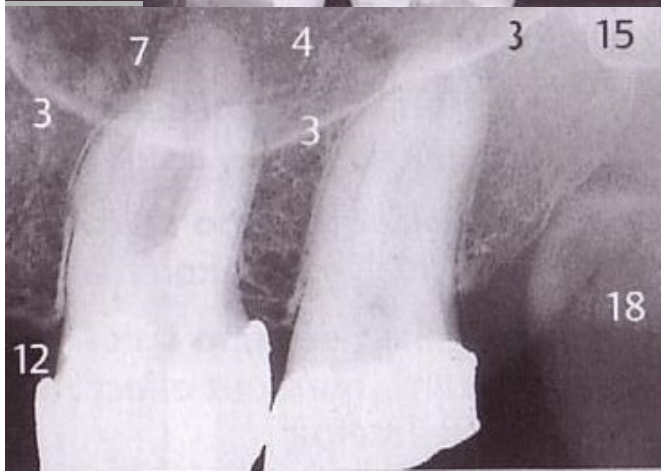
1 Typická trámčitá struktura alveolárního výběžku dolní čelisti
2 Projasnění – subtrakční efekt fovea submandibularis
3 Typická trámčina corpus mandibulae
4 Foramen mentale
5 Taurodontizmus
6 Canalis mandibulae
7 Linea obliqua interna (pokračování crista temporalis ramus mandibulae)
8 Linea obliqua externa (margo anterior ramus mandibulae)
9 Linea mylohyoidea
10 Trigonum retromolare (crus mediale a crus laterale)
11 Ohraničená struktura kosti po extrakci
12 Bazální kompakta dolní čelisti
13 Aproximální nánosy zubního kamene

Molars, premolars, area of the tuber

Anatomy



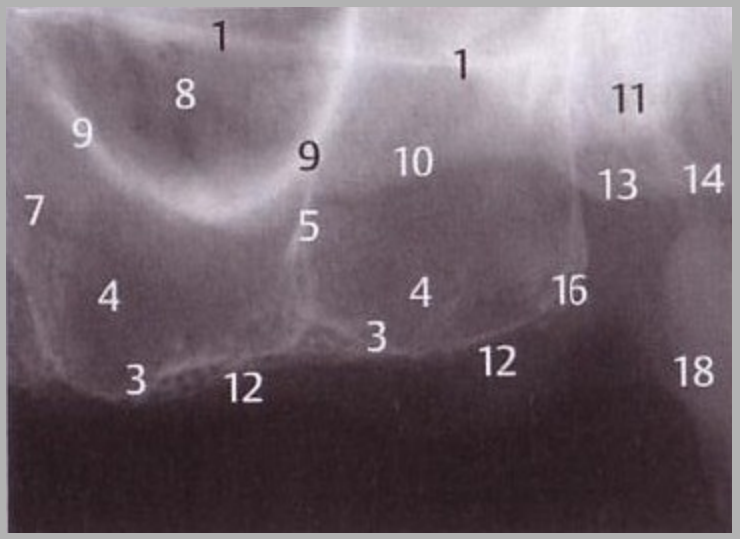


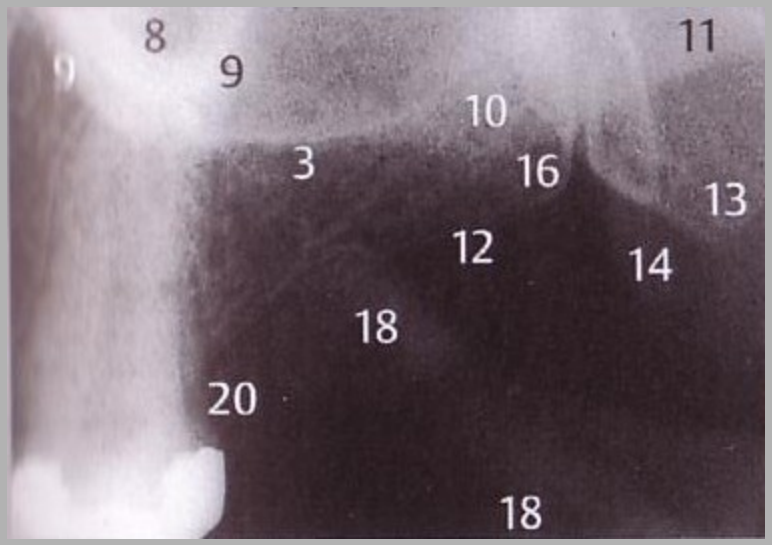


1 Laterobazální ohraničení nosní dutiny
2 Spodina nosní dutiny
3 Laterobazální ohraničení čelistní dutiny
4 Spodina (dno) čelistní dutiny
5 Septum sinuum
6 Anteriorní výběžek čelistní dutiny
7 Alveolární výběžek čelistní dutiny
8 Recessus zygomaticus čelistní dutiny
9 Processus zygomaticus čelistní dutiny
10 Corpus ossis zygomatici
11 Arcus zygomaticus
12 Alveolární hřeben
13 Lamina lateralis processus pterygoideus
14 Hamulus laminae medialis processus pterygoideus
15 Processus pyramidalis ossis palatini
16 Tuber maxillae
17 Sutura zygomaticomaxillaris
18 Processus coronoideus (muscularis)
19 Hroty kořenů 1. horního premoláru, delší kořen je palatinální
20 „Burn-out effect"
21 Sekundární kaz

Molars, premolars, area of the tuber

Anatomy





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20 „Burn-out effect"
21 Sekundární kaz

Literature

- Pasler F.A., Visser H.: Stomatologická radiologie. Kapesní atlas. 2007. ISBN 978-80-247-1307-6.
- http://rtg.misto.cz/_MAIL_/index.html

Pathology – differential diagnostics

Tartar

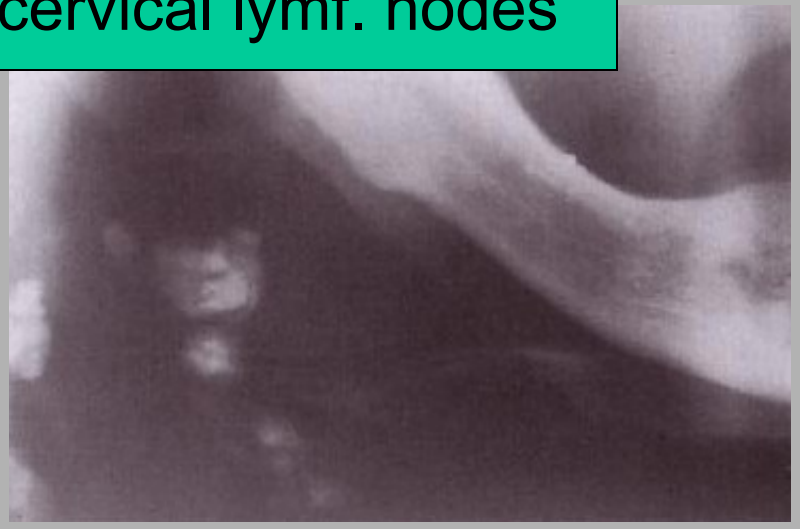
tartar is composed of mineralized tooth plaque + generalized bone reduction as a consequence of parodont pathology

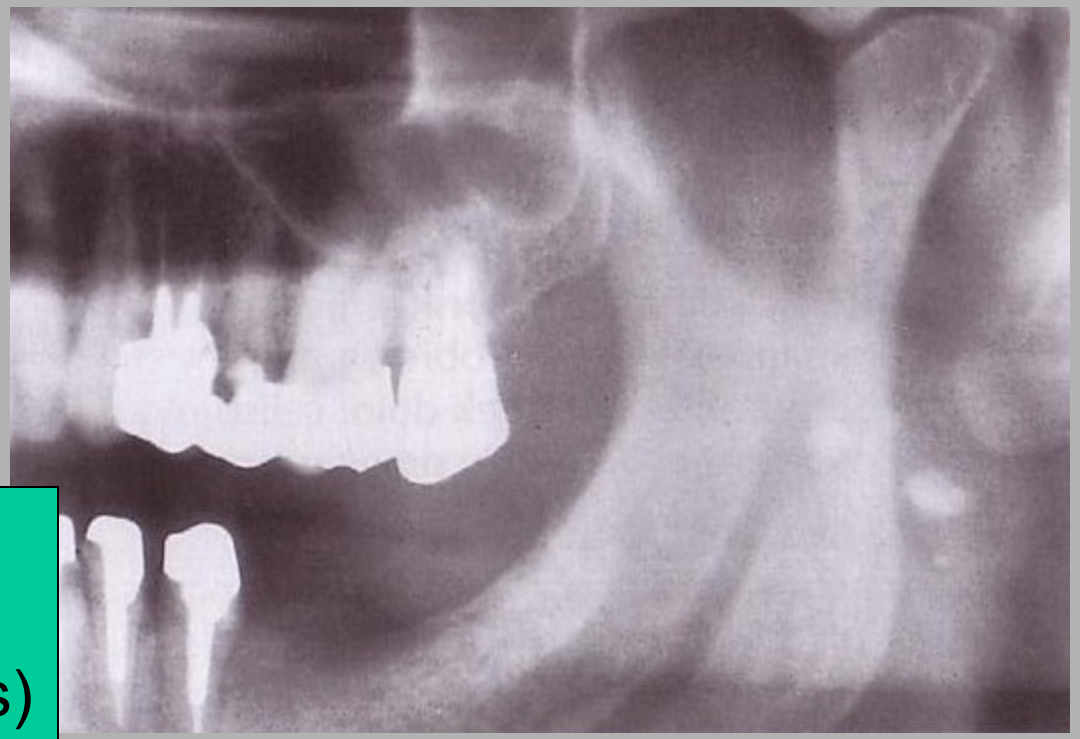
- origins in area of outfall of main salivary glands
- calcium phosphate
  - x-ray opacity

parodontitis marg. profunda
sublingual tartar

Concrements

calcified cervical lymf. nodes

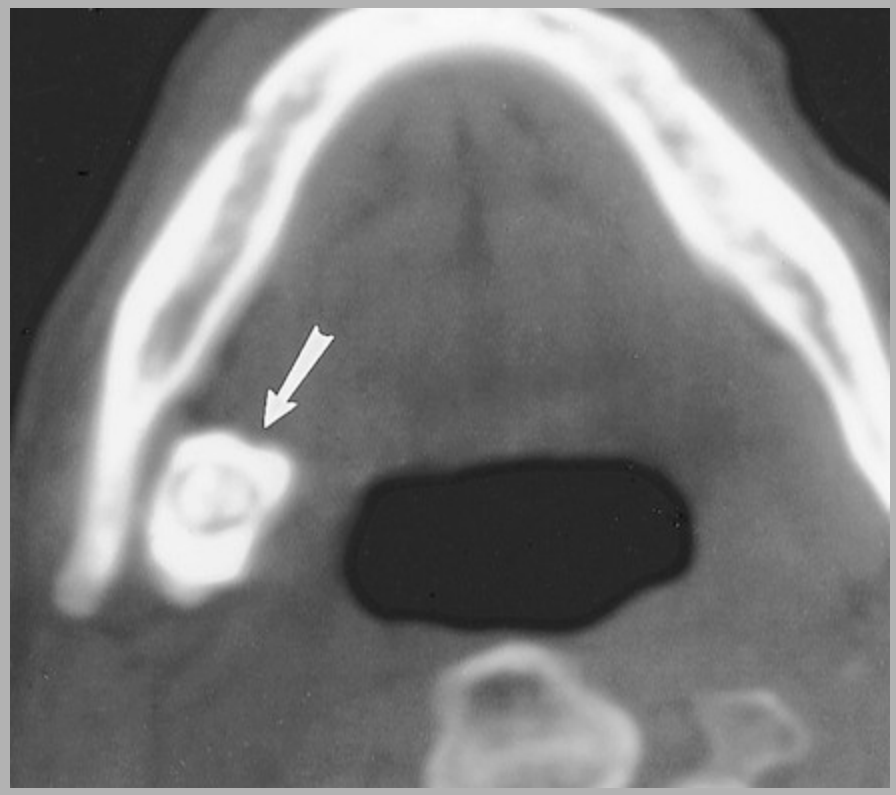




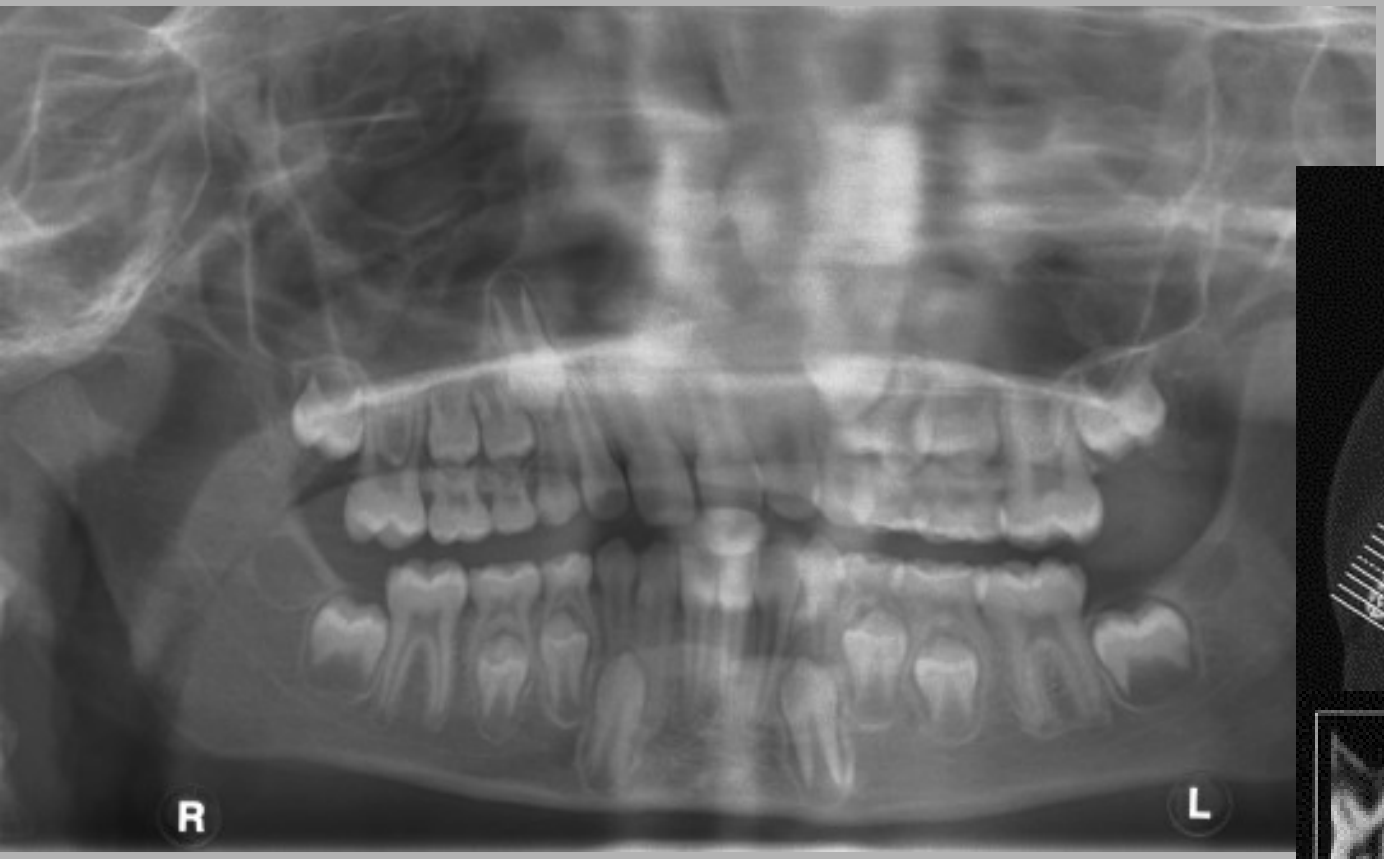
calcification of gl. parotis
as a consequence of
parotitis epidemica (mumps)

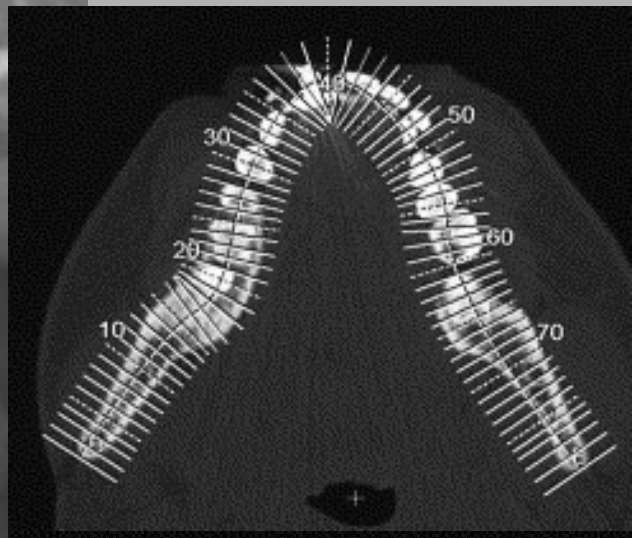
Glandula parotis calcification

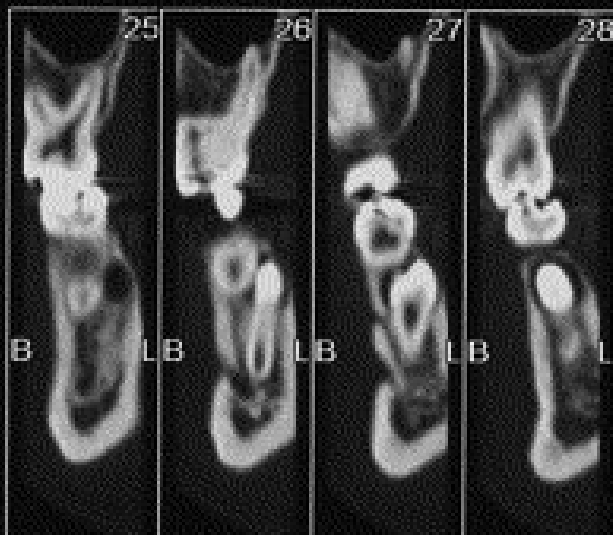
- Transverse CT scan of ductal and glandular calcifications
- Large solitary sialolith (arrow) in the right submandibular duct
- These glandular calcifications (arrows) could easily be mistaken for vessels on this contrast-enhanced CT scan



Retentio abundant teeth







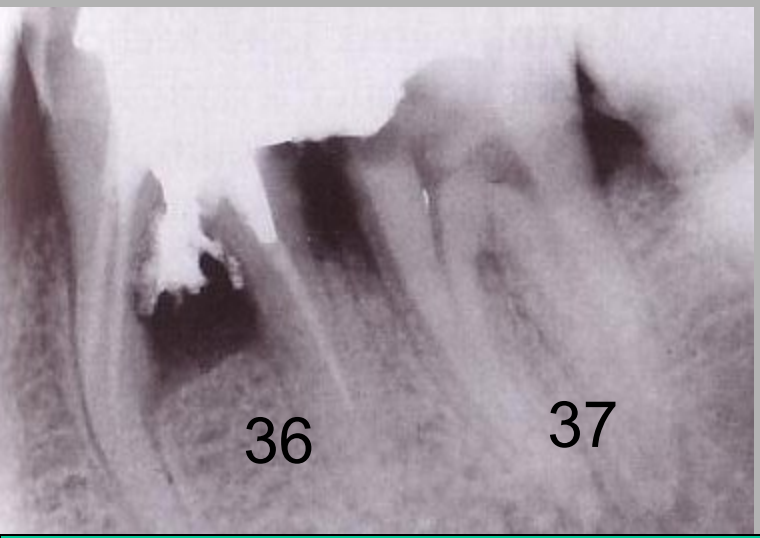
Processus styloideus

pain

long proc. styl.

Marginal periodontopathy

bone reducion between 35,37
as a consequence of amalgam overhang
caries 34,37,38



mesial posttraumatic
central granuloma

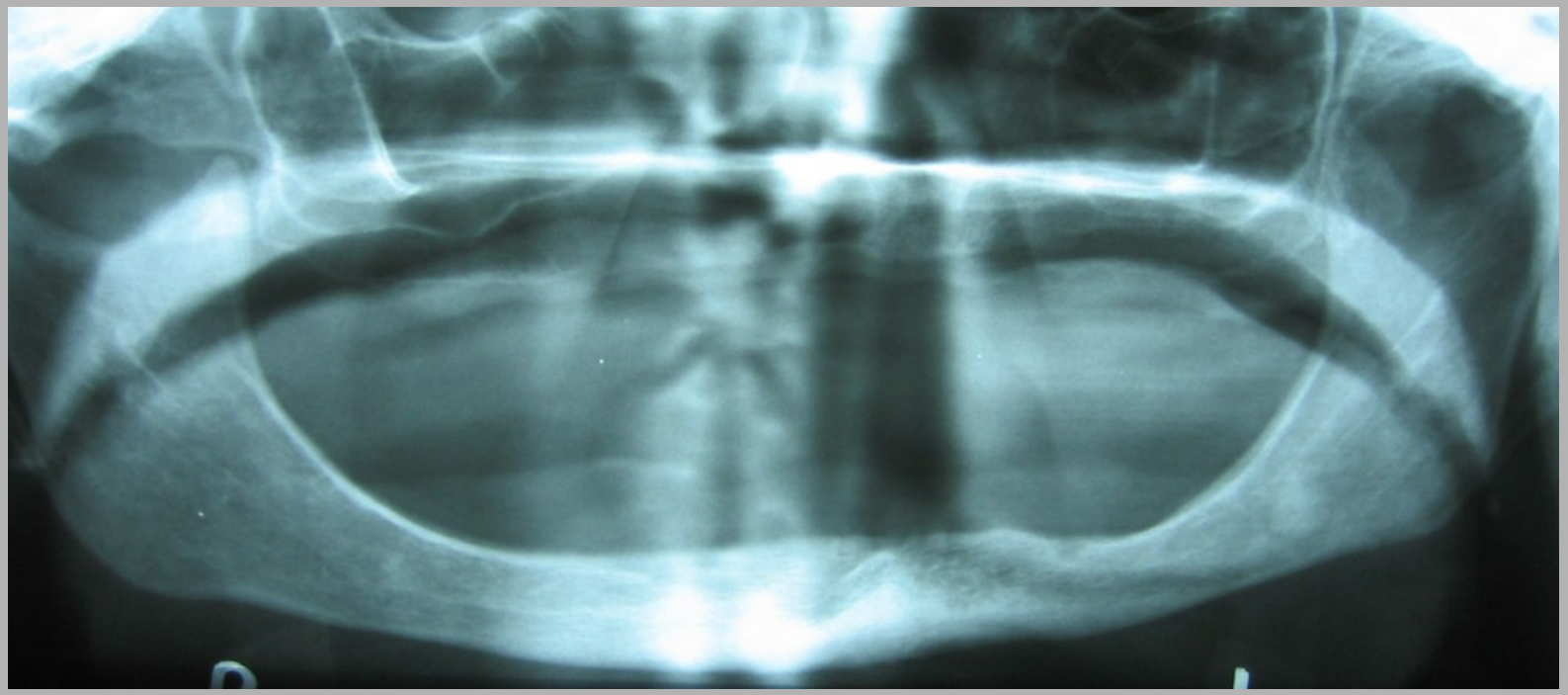
oversupply of root filling
injury to the desmodont and mesodont of tooth root
etiology: <u>via falsa</u>
= interradicullar bone loss

Marginal periodontopathy

traumatic occlusion
etiology: fixed bridgework
massive bone reduction
sclerotic reactive zone - apically (36,37)

Marginal periodontopathy

alveolar and mandible bone reduction
old age



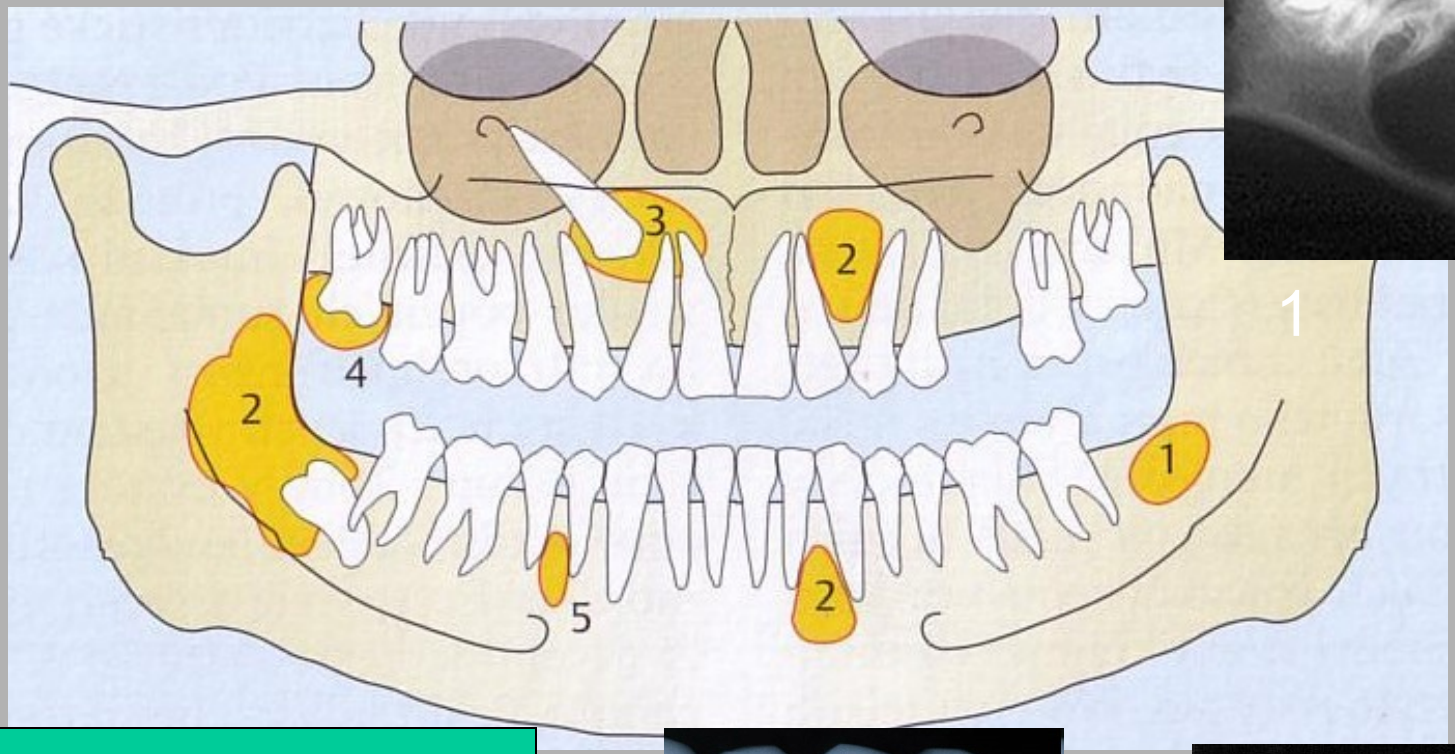
Chronic. apical periodontis

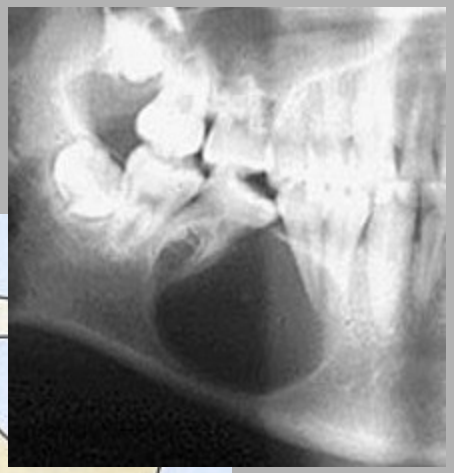
Periodontitis chronica

Cysts

- Odontogenic
- Non-odontogenic
- inflammatory

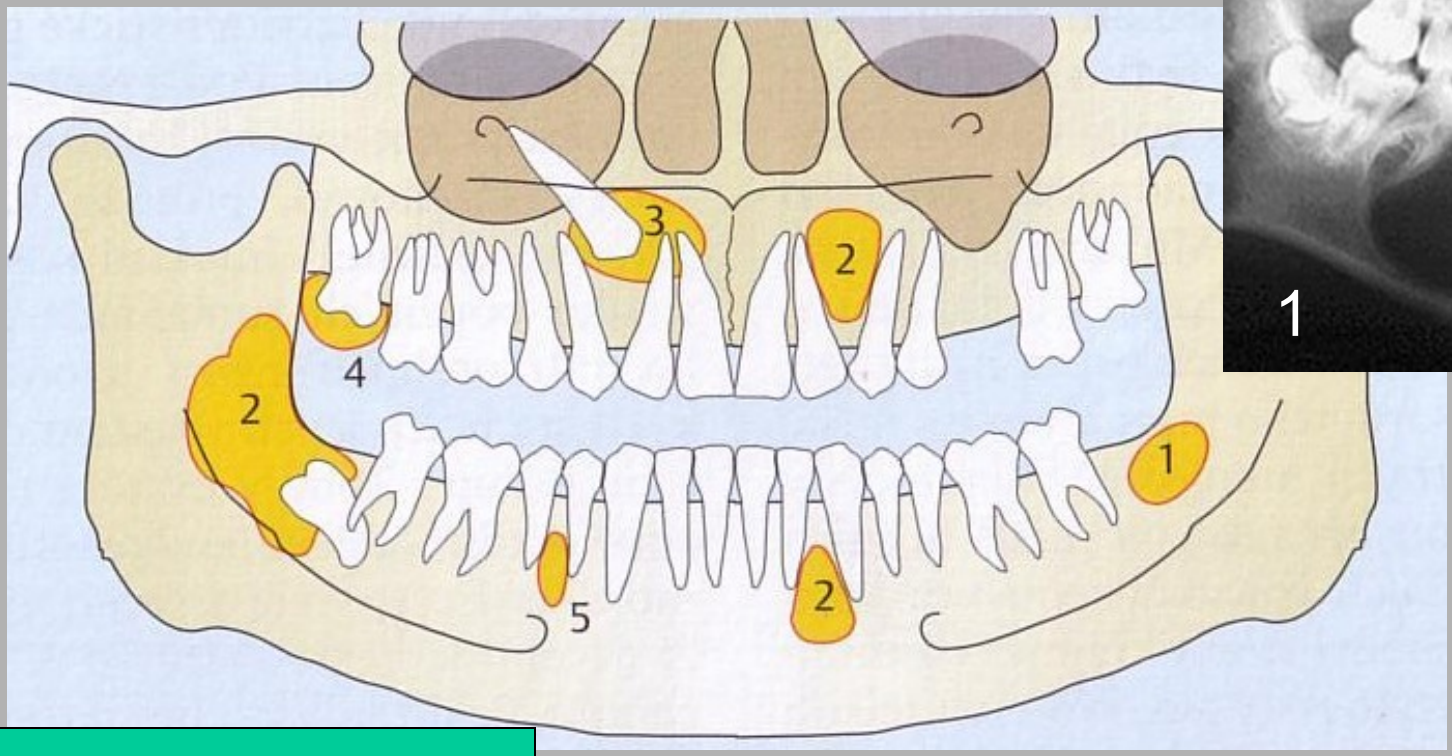
Cysts – odontogenic

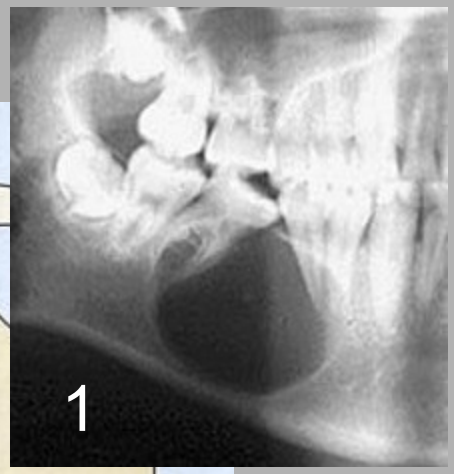




1. primordial c.
2. keratocyst
3. folikular c.
4. lateral parodontal c.

Cysts – odontogenic

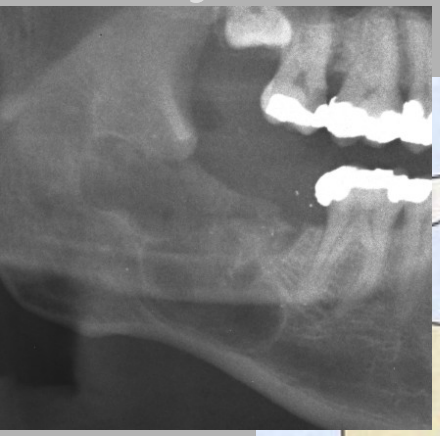


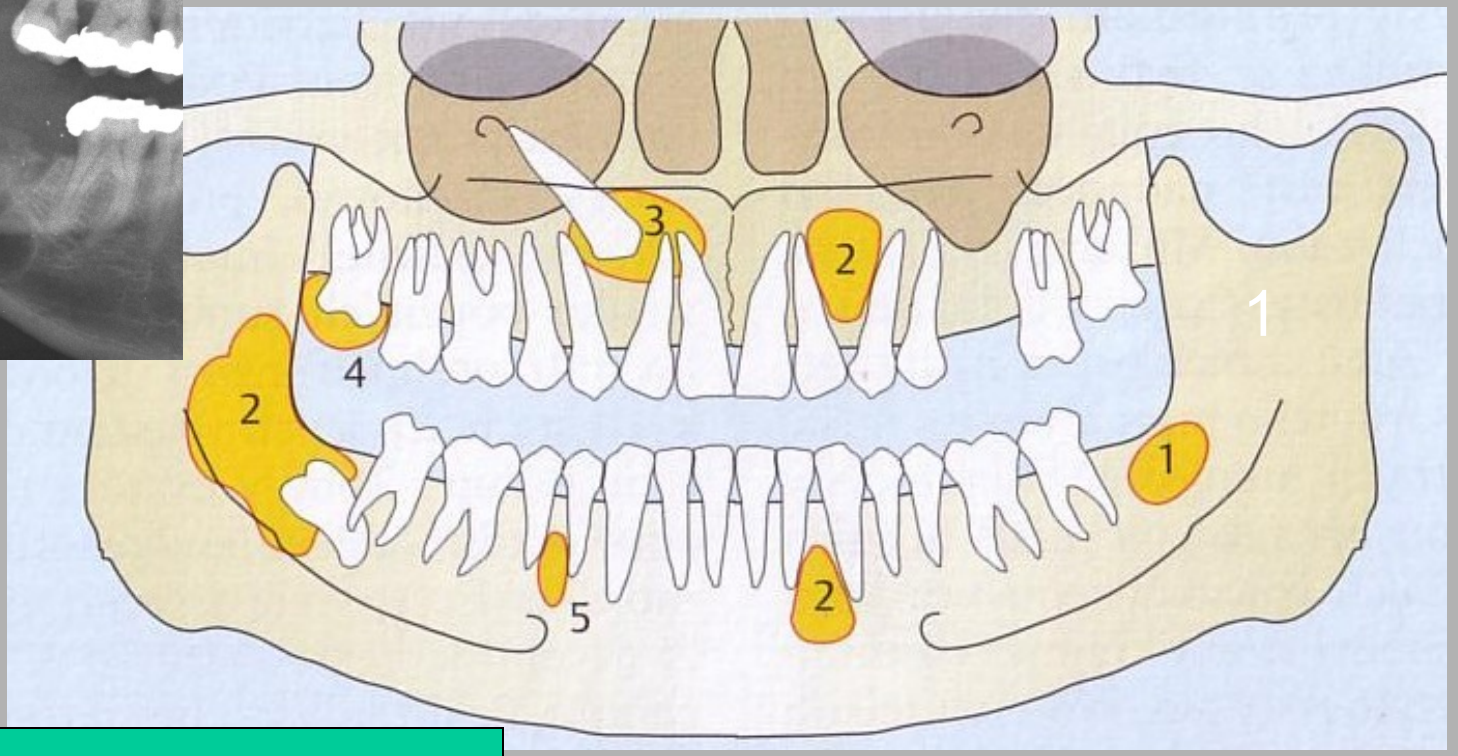


1. primordial c.
2. keratocyst
3. follicular c.
4. lateral periodontal c.

A primordial cyst is a devolepmental odontogenic cyst. It is found in an area where a tooth should have formed but is missing. Primordial cysts most commonly arise in the area of mandibular third molars.

Cysts – odontogenic

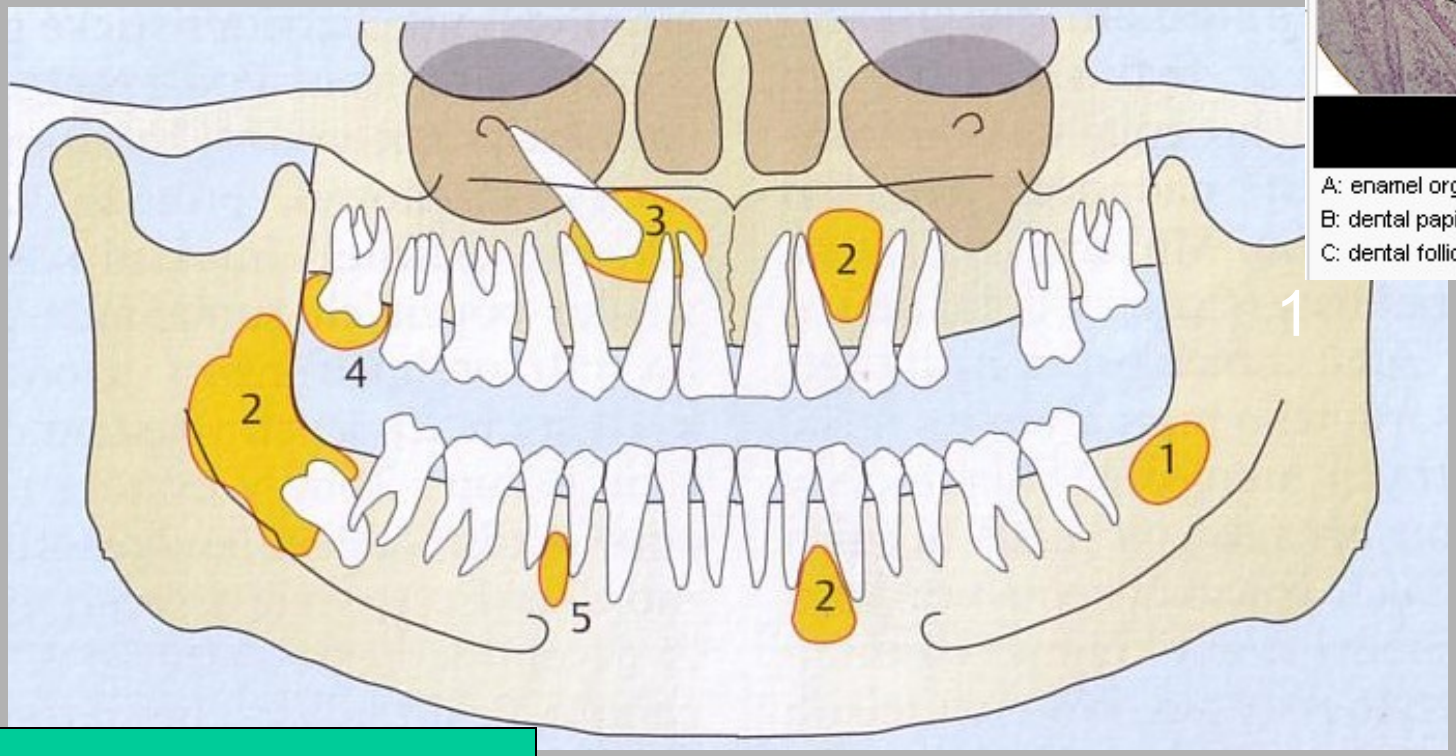


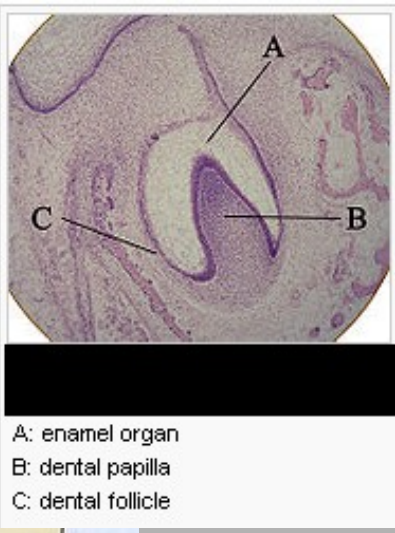


1. primordial c.
2. keratocyst
3. follicular c.
4. lateral periodontal c.

Keratocyst is a benign but locally aggressive developmental cystic neoplasm. It most often affects the posterior mandible.

Cysts – odontogenic



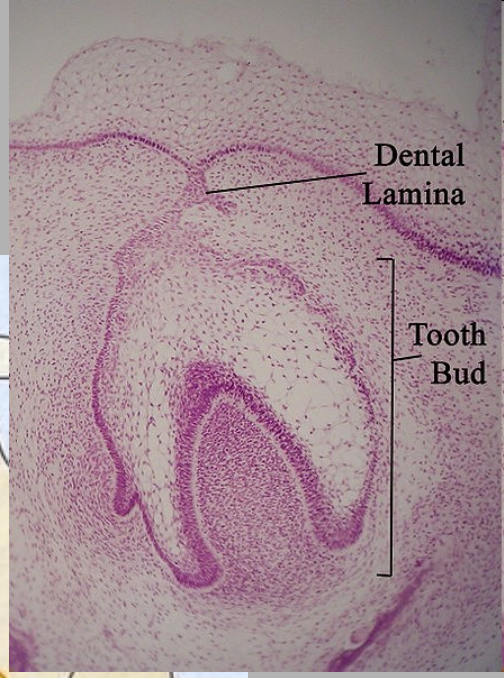


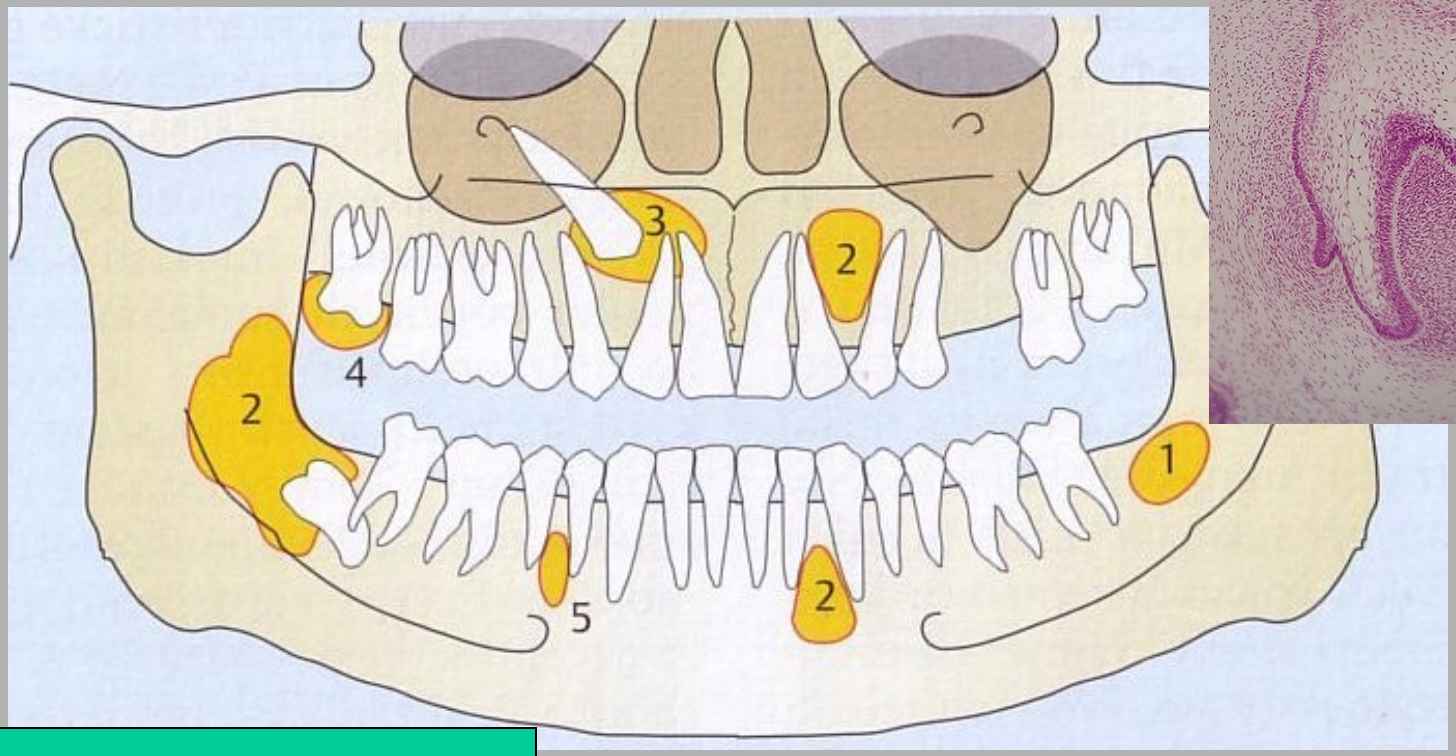
1. primordial c.
2. keratocyst
3. follicular c.
4. lateral periodontal c.

A follicular cyst is a cyst of dental follicle

The **dental follicle** is a sac containing the developing tooth and its odontogenic organ.

Cysts – odontogenic

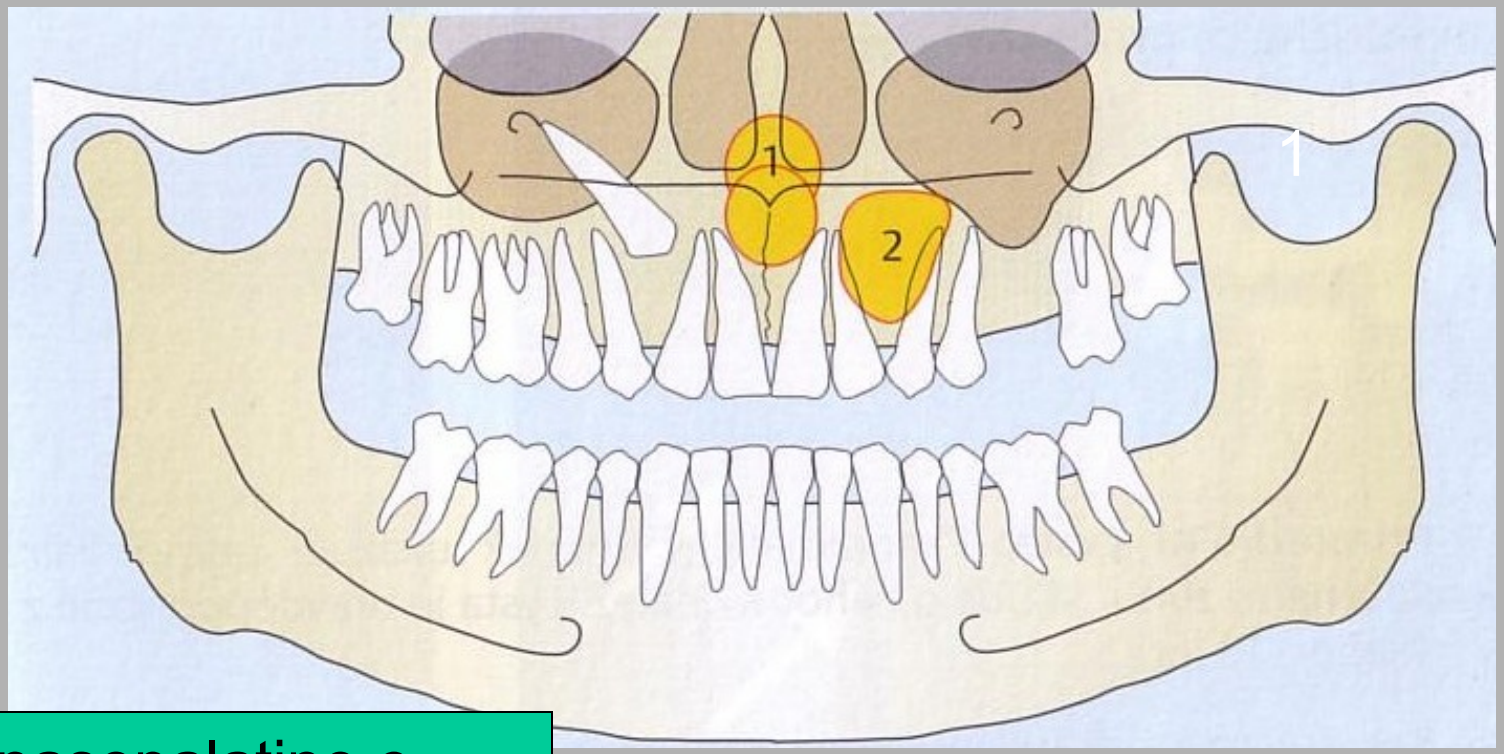




1. primordial c.
2. keratocyst
3. folikular c.
4. lateral parodontal c.

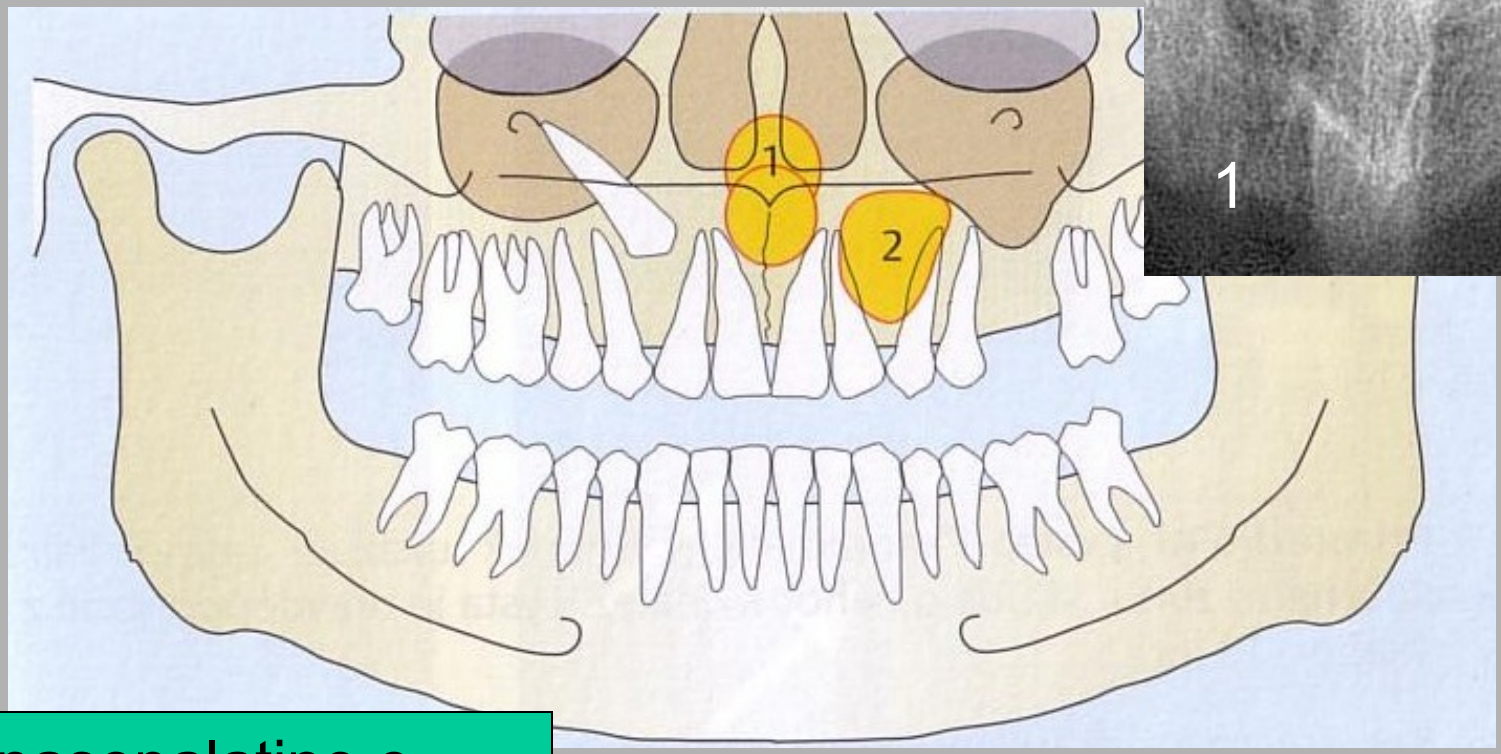
The **lateral periodontal cyst** is a cyst that arises from the rest cells of the dental lamina. It is more common in middle-aged adult males. Usually, there is no pain associated with it, and it usually appears as a unilocular radiolucency (dark area) on the side of a canine or premolar root. Microscopically, the lateral periodontal cyst appears the same as the gingival cyst of the adult.

Cysts – non-odontogenic



1. nasopalatine c.
2. nasolabial c.

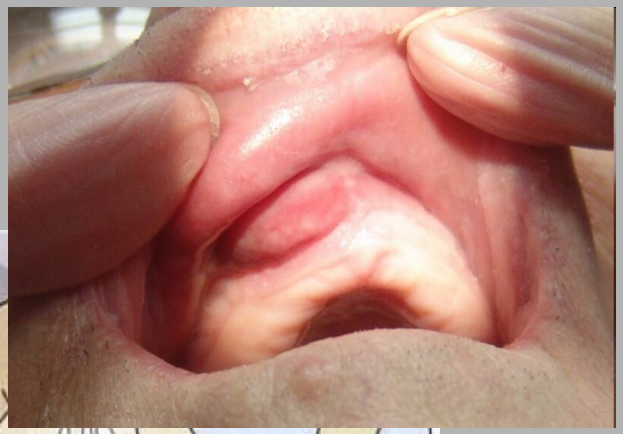
Cysts – non-odontogenic

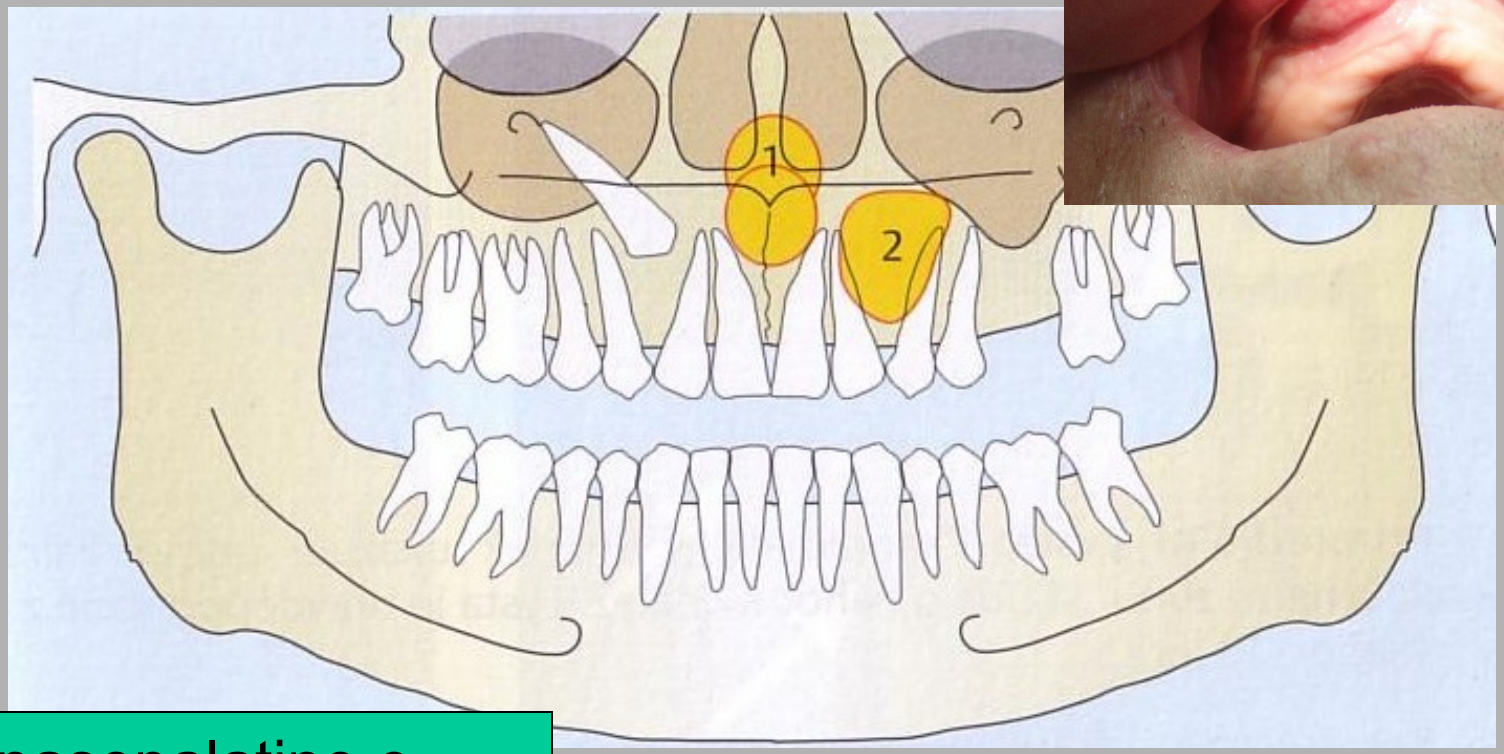


1. nasopalatine c.
2. nasolabial c.

Nasopalatine cyst occurs in the medial part of the palate.

Cysts – non-odontogenic

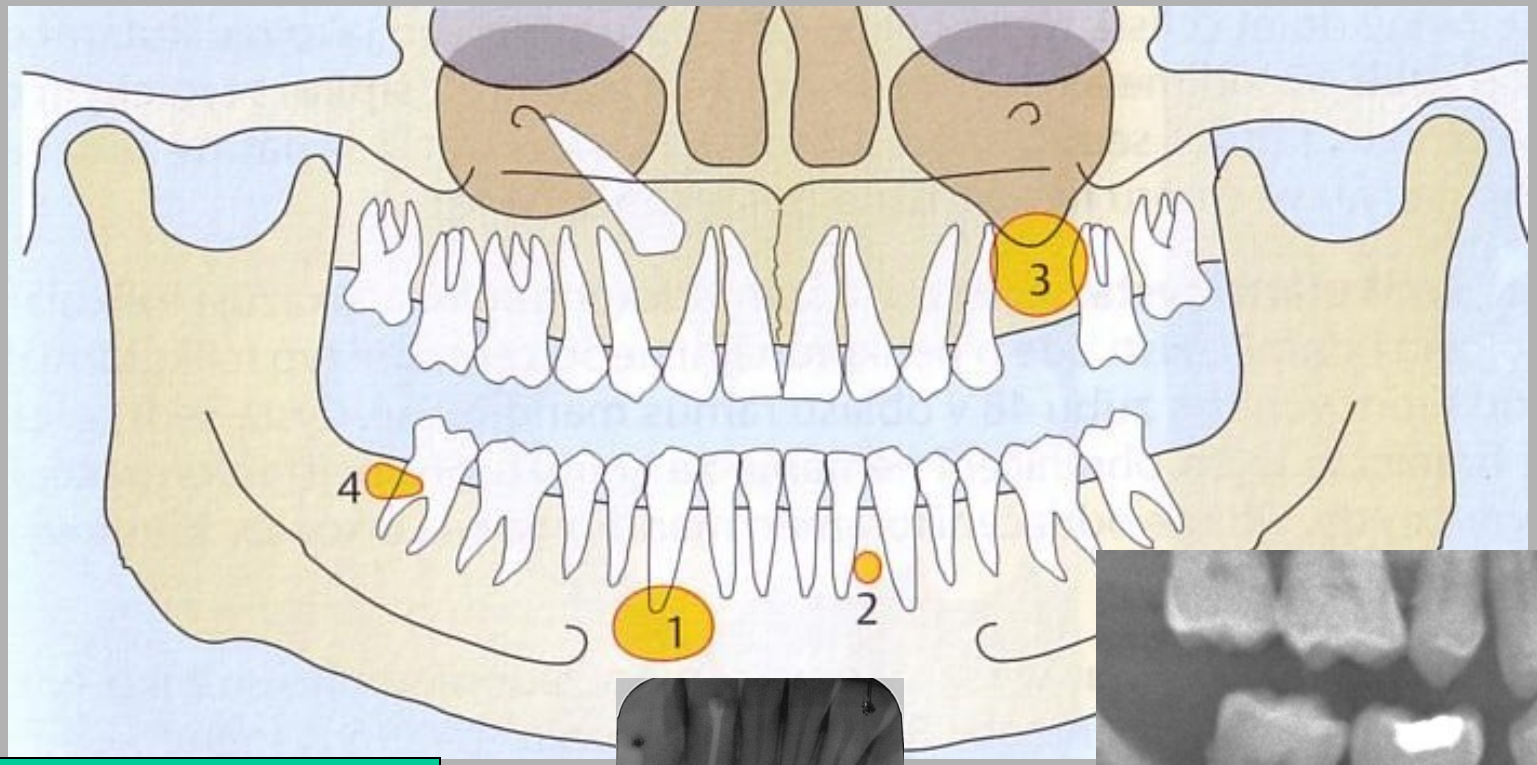




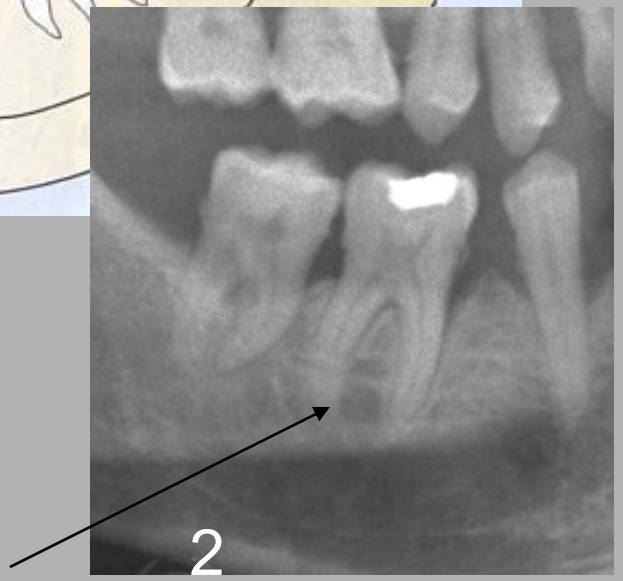
1. nasopalatine c.
2. nasolabial c.

Nasolabial cyst is located superficially in the soft tissues of the upper lip.
Unlike most of the other developmental cysts, the nasolabial cyst is an example of an extraosseous cyst.

Cysts - inflammatory

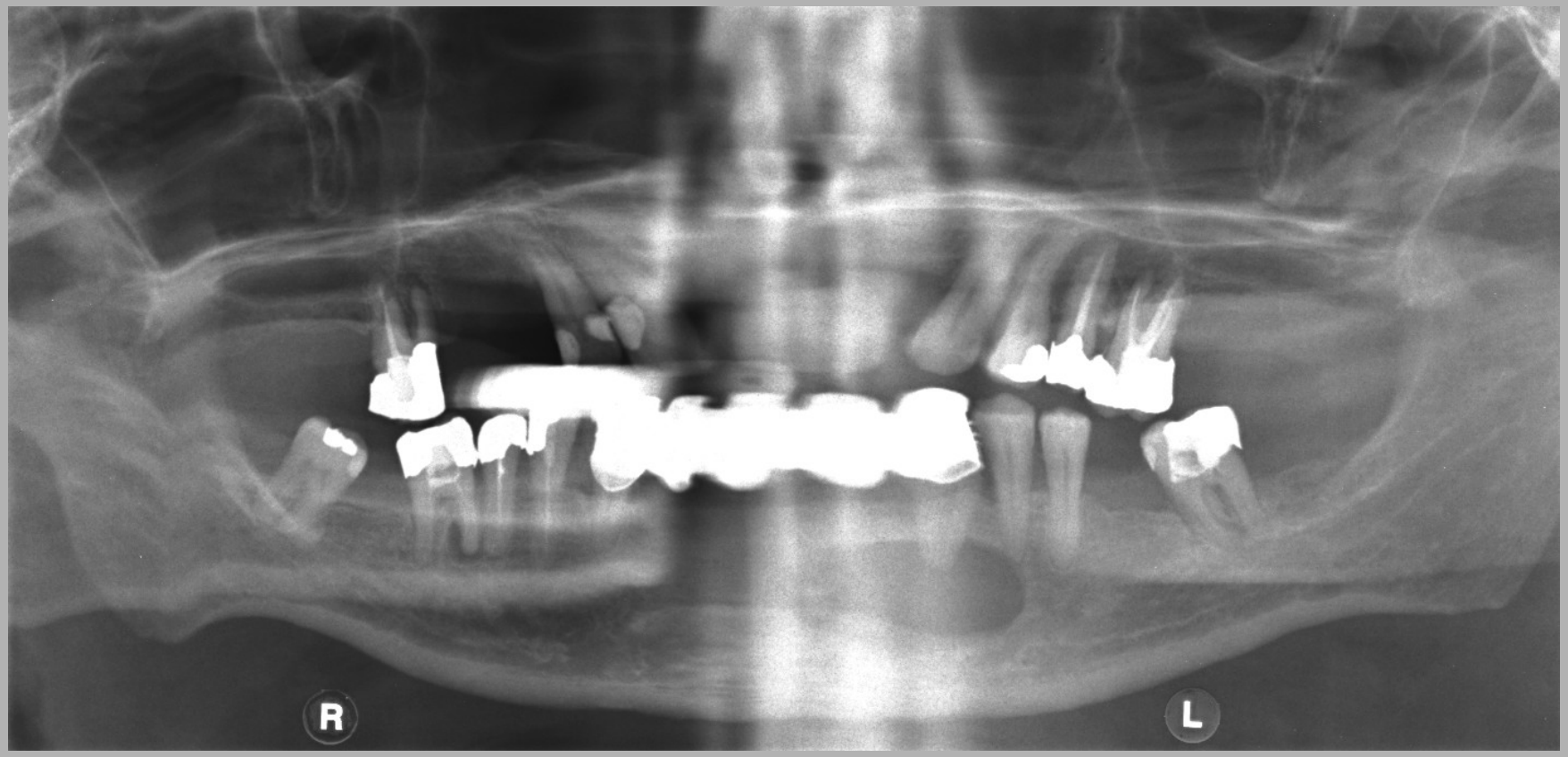


1. apical radicular
2. lateral radicular
3. residual lateral
4. parodontal (Craig´s) - wisdom tooth



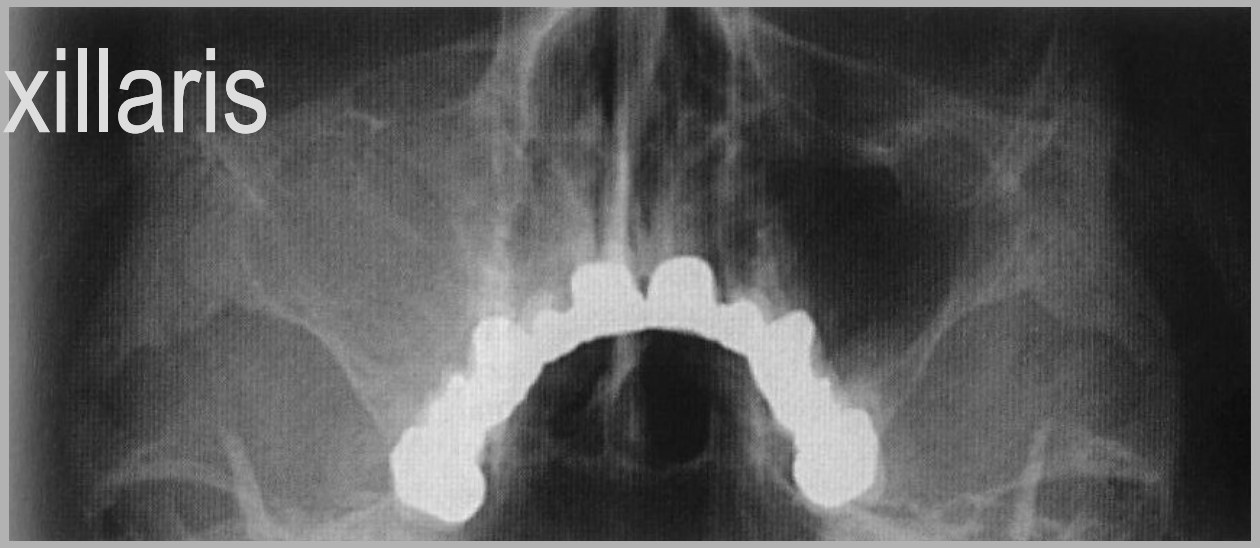
Radicular cyst

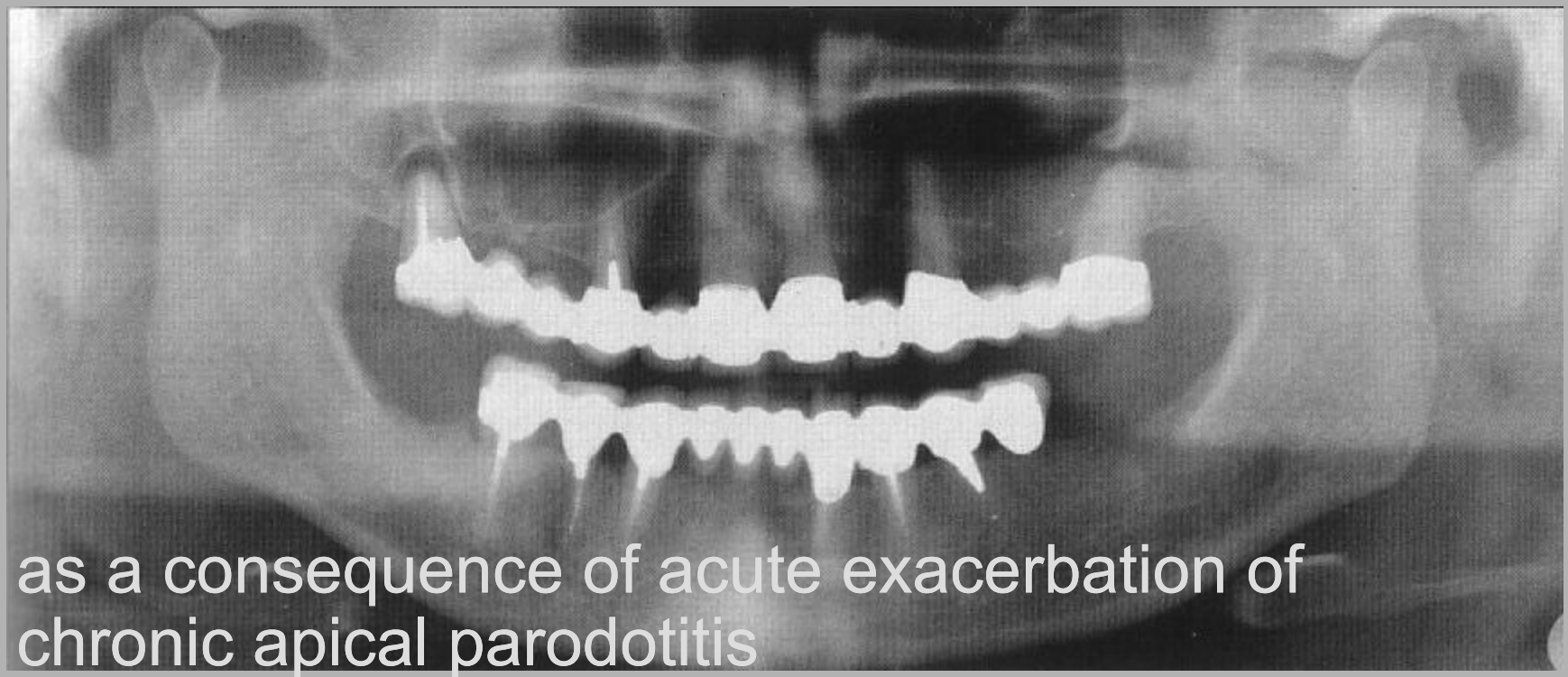
- cystis radicularis (234) purulenta
- after intraoral incision excretion of pus and blood.



Sinusitis maxillaris

female, 57 y





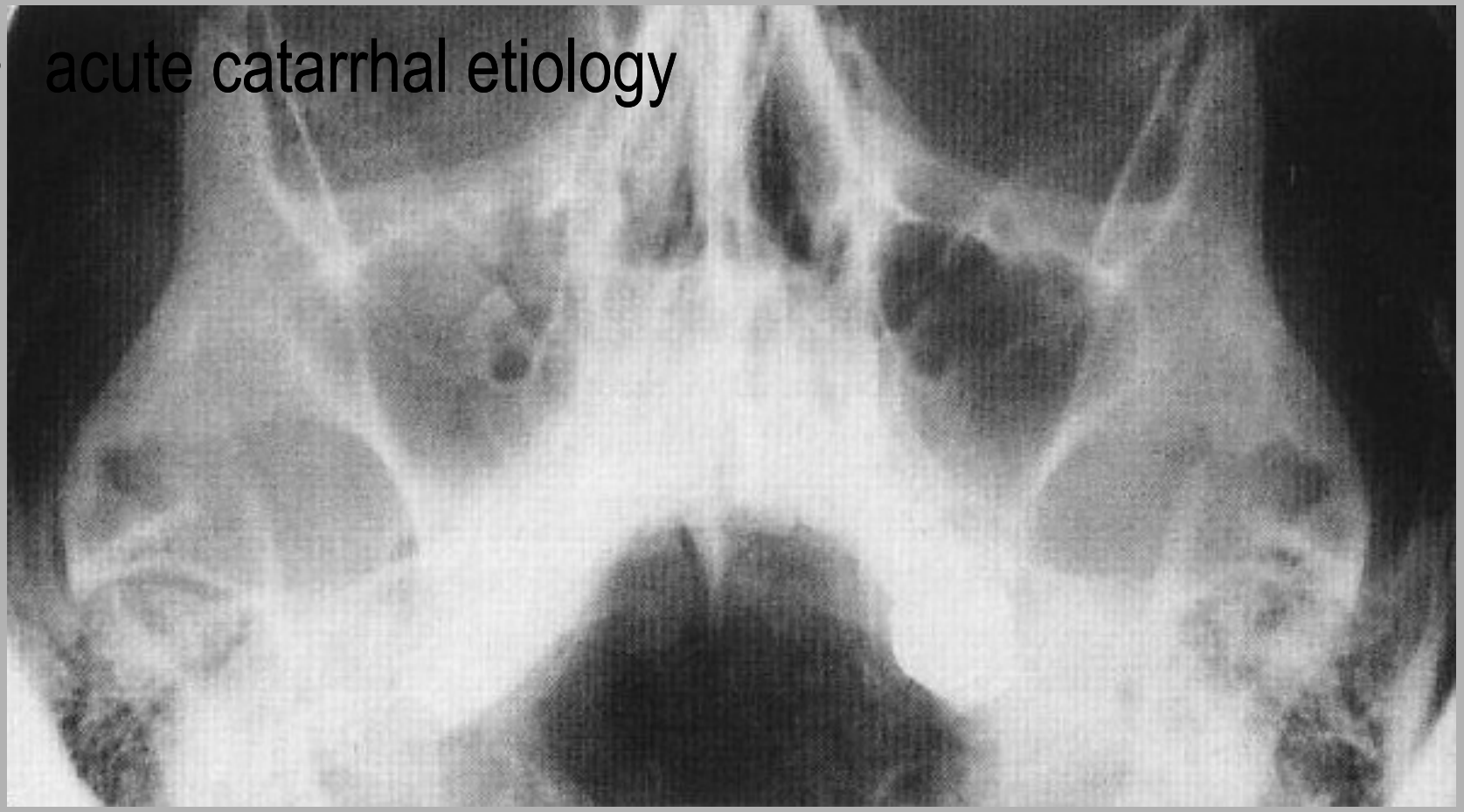
- as a consequence of acute exacerbation of chronic apical parodotitis

Sinusitis maxillaris

- Liquid surface

Sinusitis maxillaris - RTG

- woman, 17 y
- acute catarrhal etiology



Sinusitis maxillaris - CT

Sinusitis maxillaris - MRI

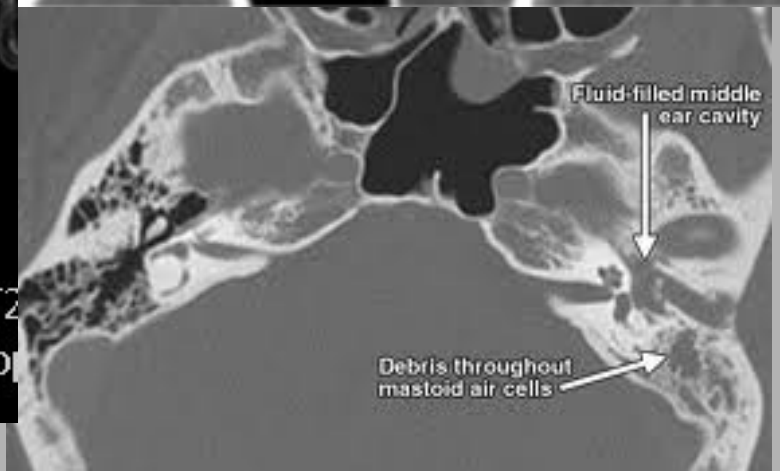
T2 weighed coronal

Ethmoid sinus, mastoid cells

T2

Ethmoid. sinusitis

Pathologic contents

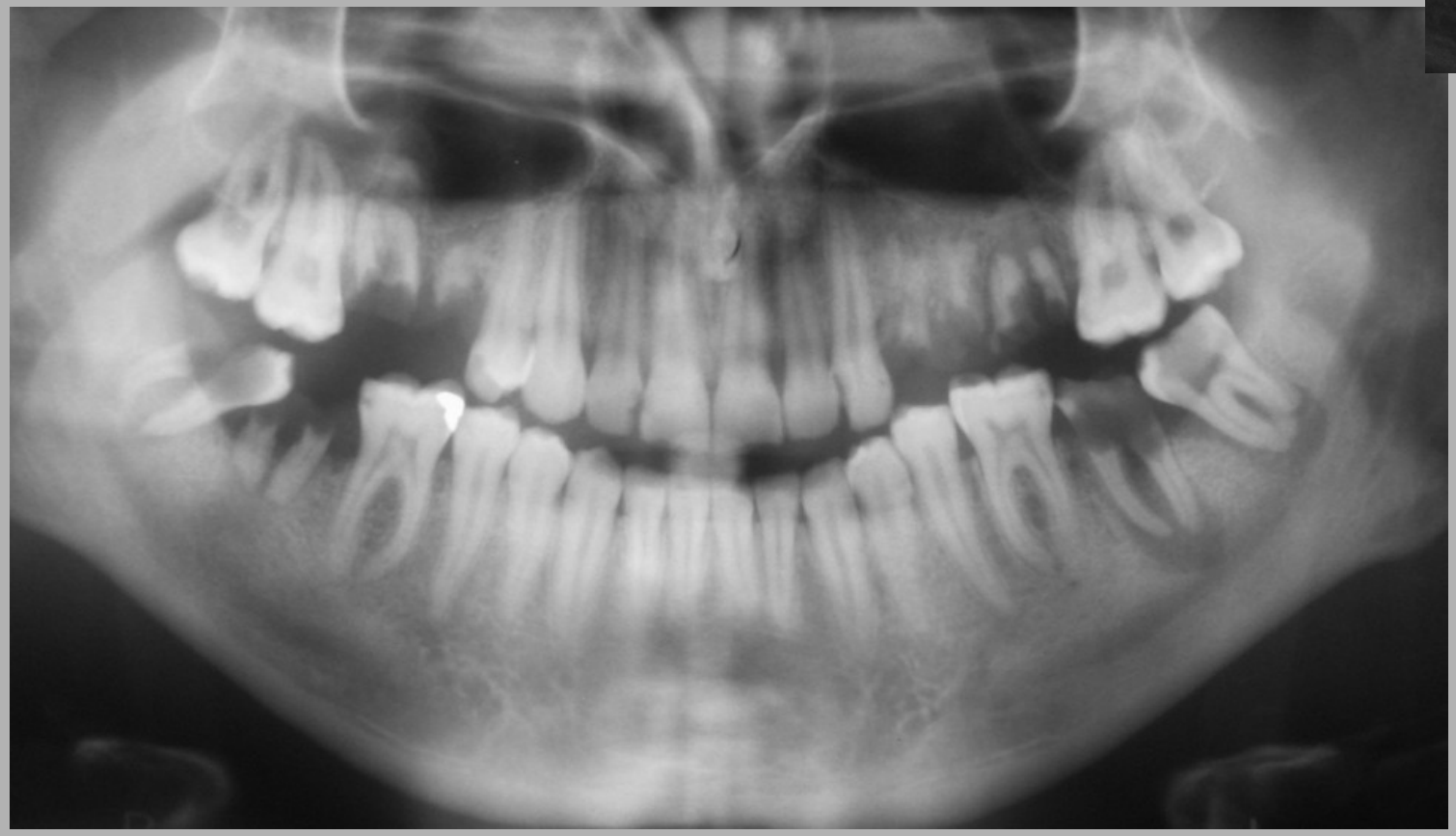


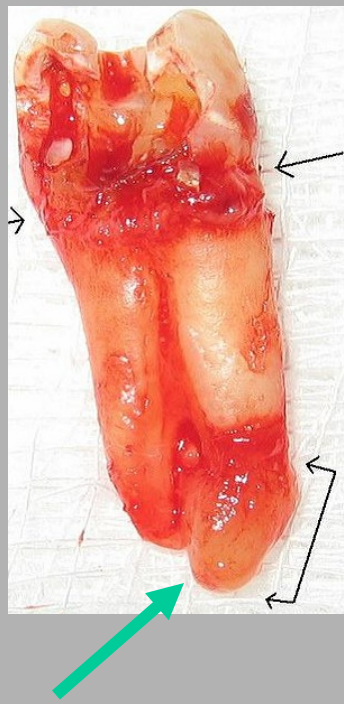
Periapical abscess

- Oral cavity abscess.
- Contrast-enhanced axial CT images obtained with soft-tissue and bone window settings show a fluid collection with rimlike enhancement in the left submandibular space.
- The bone window image better depicts the source of infection.

Periapical abscess

A **periapical abscess** is the result of a chronic, localized infection located at the tip, or apex, of the root of a tooth.

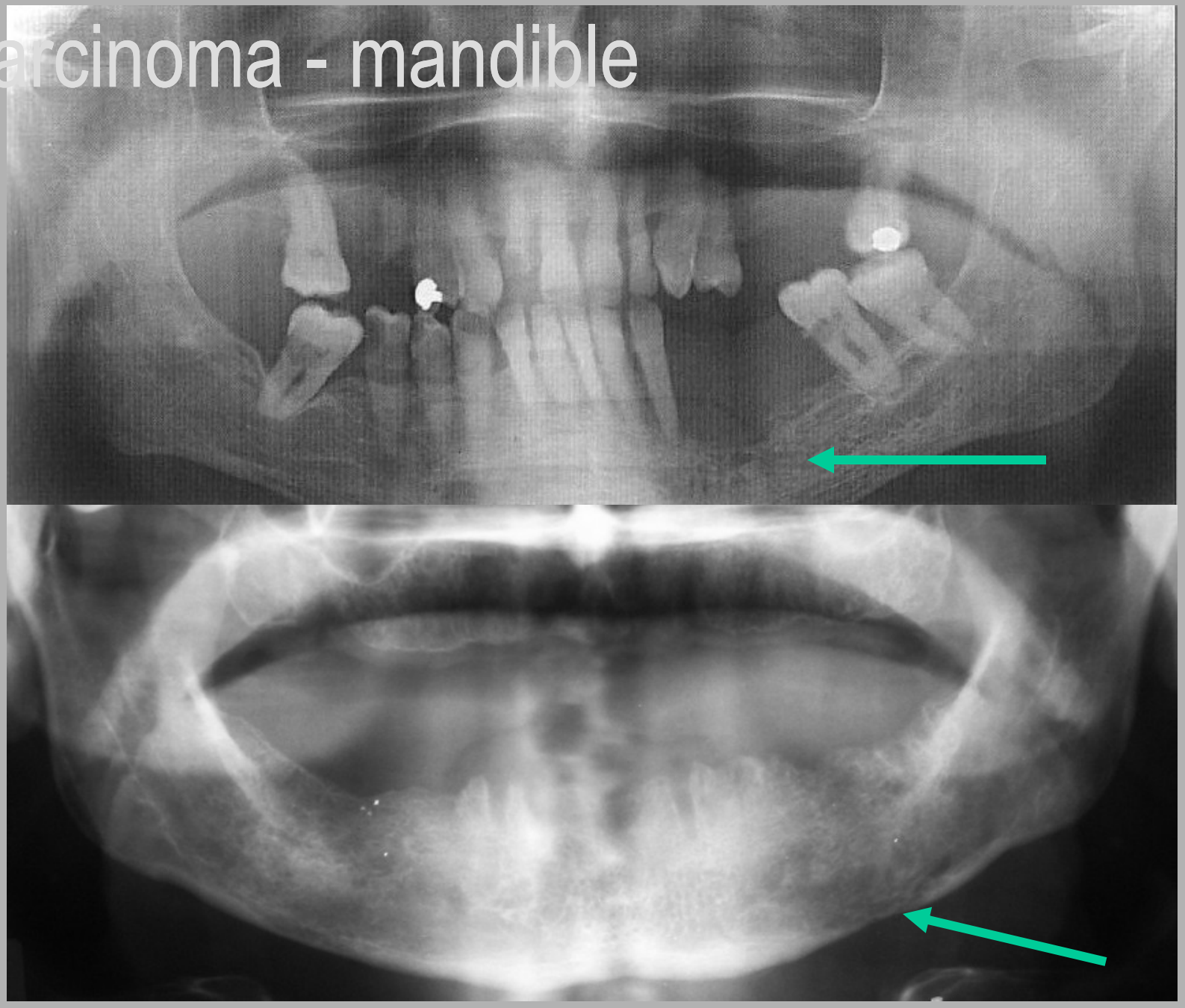




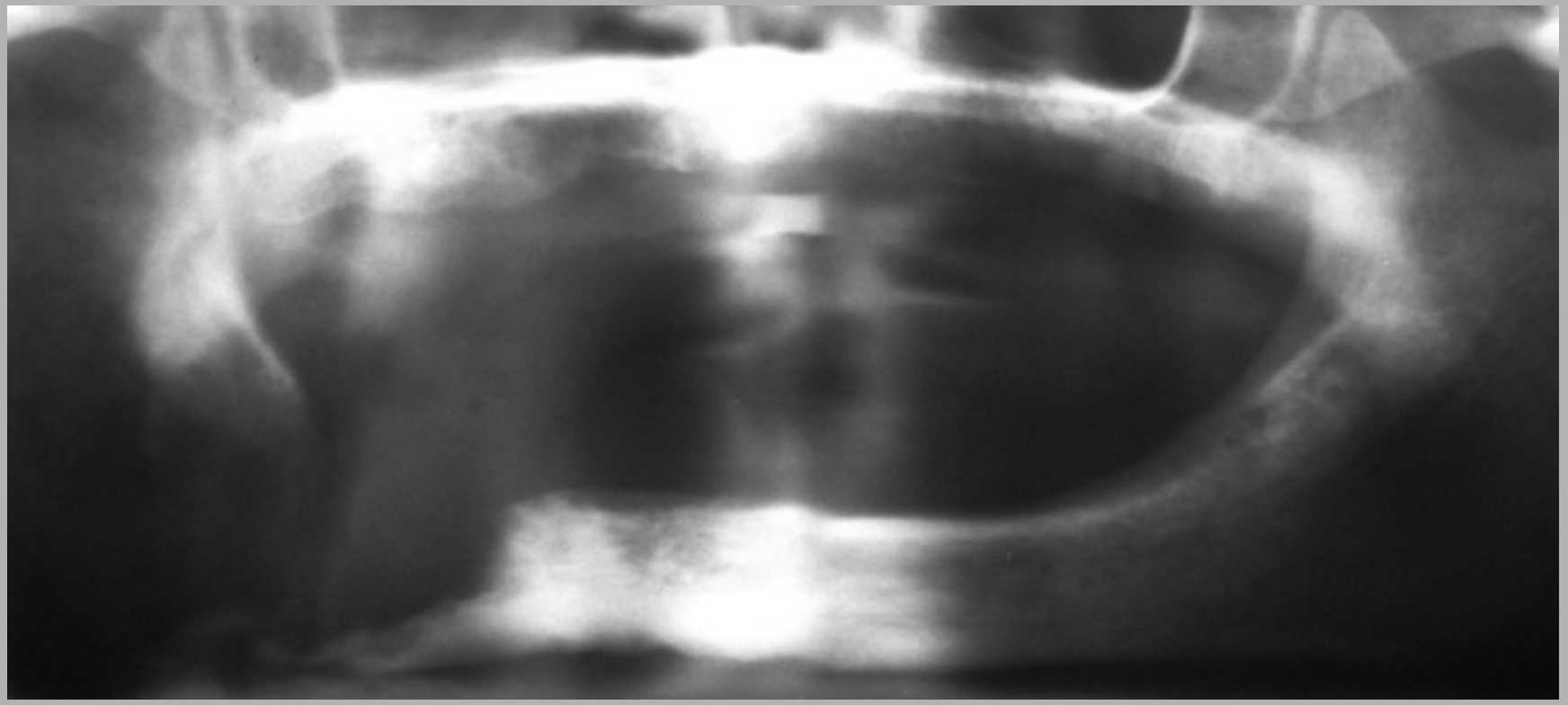
Carcinoma

- the most often carcinoma of oral mucosa.
- intraepitelial mucosal carcinoma
- infiltration of:
  - adjacent bones
  - lingual part of mandible
- osteolysis
- paresthesis
- smokers, older age

Carcinoma - mandible



Carcinoma - bone lysis



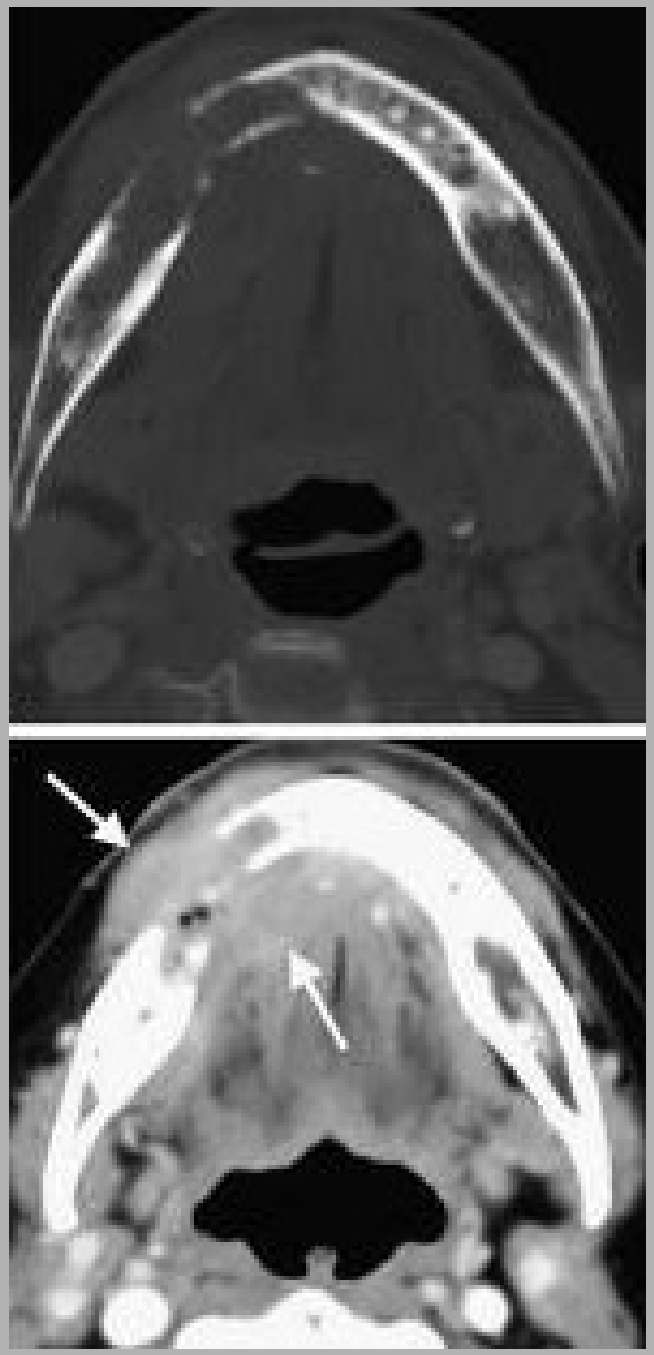
Carcinoma - mandible

Mucoepidermoid carconoma in posterior **mandible**

Carcinoma - mandible

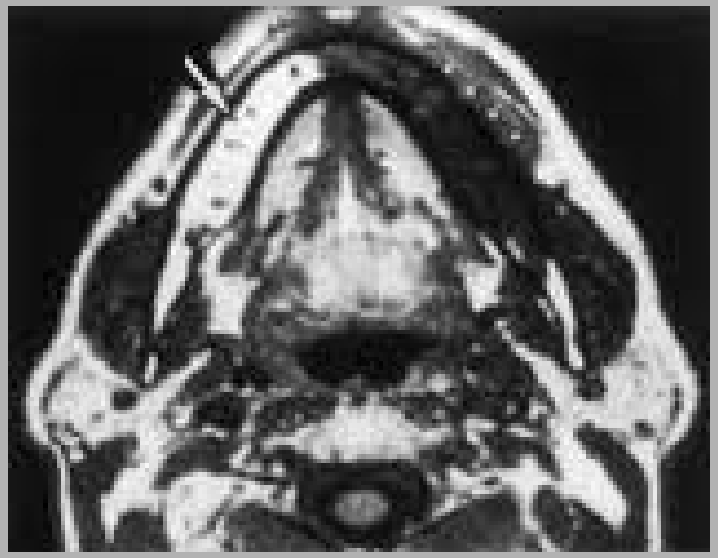
CT

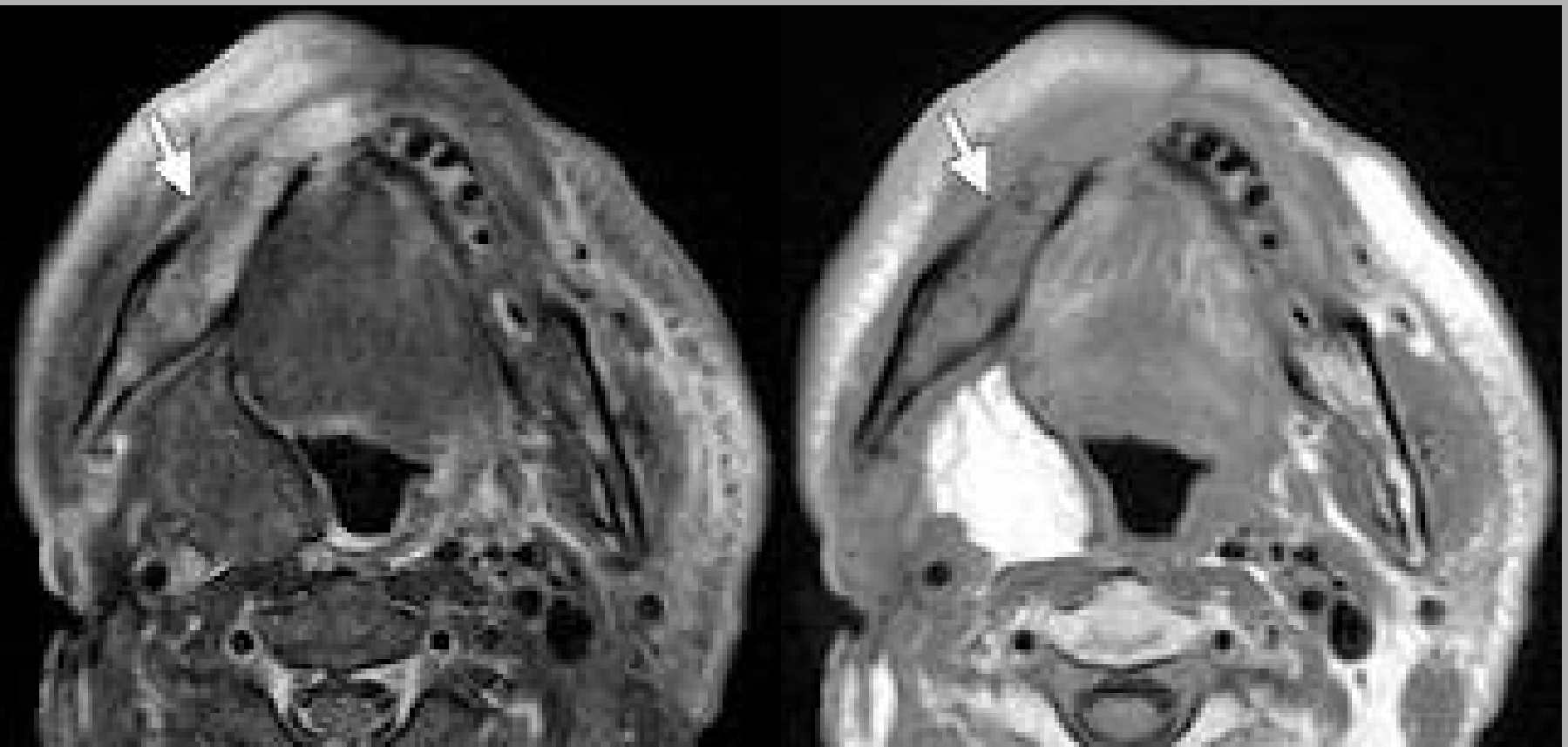
squamous carcinoma of mandible



Carcinoma - mandible

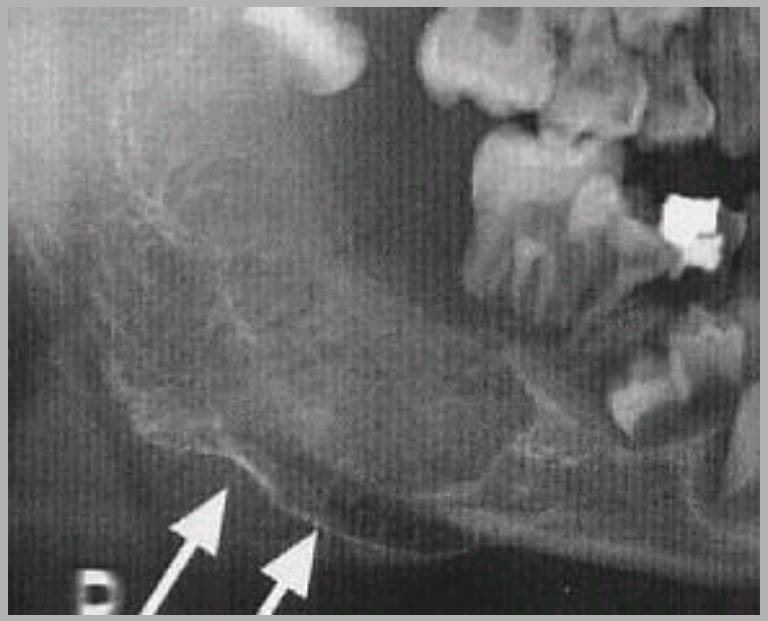
Squamous cell **carcinoma**
70 y old man



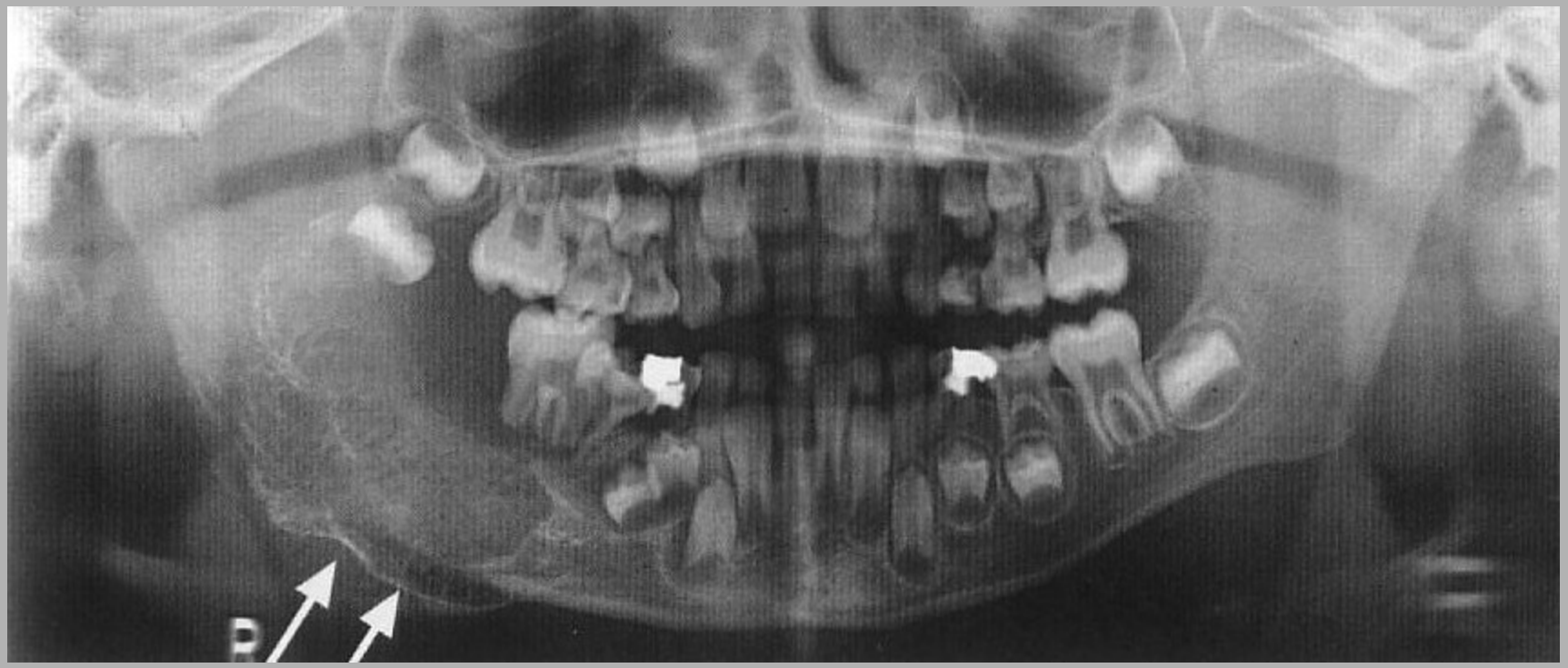


Ewing sarcoma

- children 10-20 y
- high grade malignant
- fast grow
- soon metastatis
- angle of mandible
- painfull
- X-ray: „slices of onion“
- Dif.dg.
  - osteosarcoma
  - endosteal hemangioma



Ewing sarcoma



boy, 7 y
difficulty clinics
oedema of low jaw
movement of teeth
periostal reaction

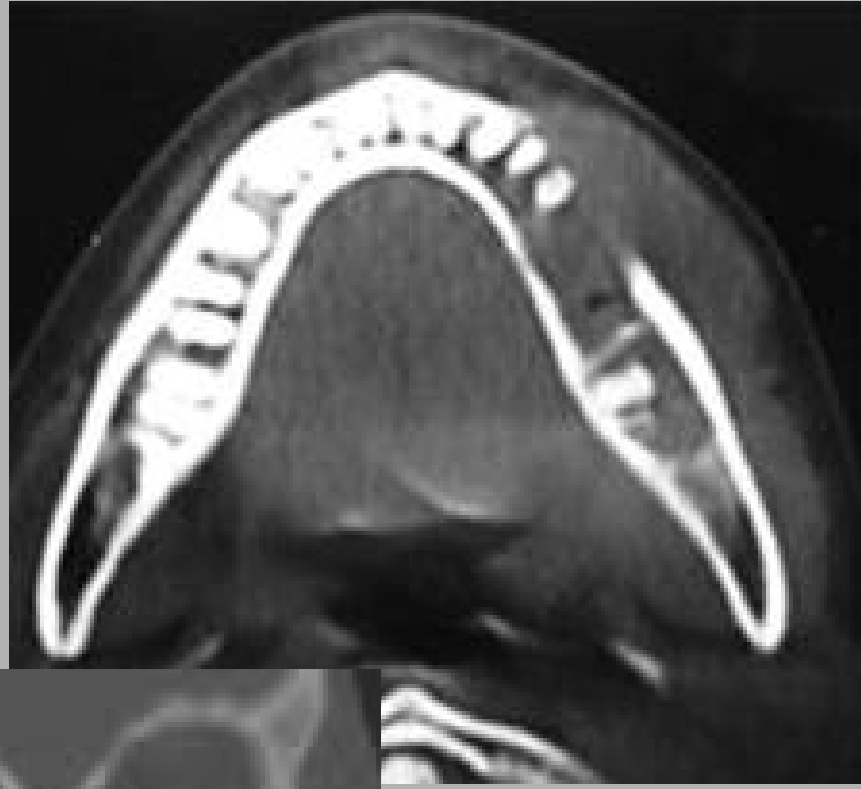
Ewing sarcoma

gold diagnostic standard
MRI

Ewing sarcoma.
Axial T1-weighted
MR image

Ewing sarcoma

Ewing sarcoma.
Axial and coronal
CT image



Osteosarcoma

- 2. and 3. decennium
- mesenchymal tumor
- histologic
  - osteoblasts
  - chondroblasts
  - fibroblasts

RTG

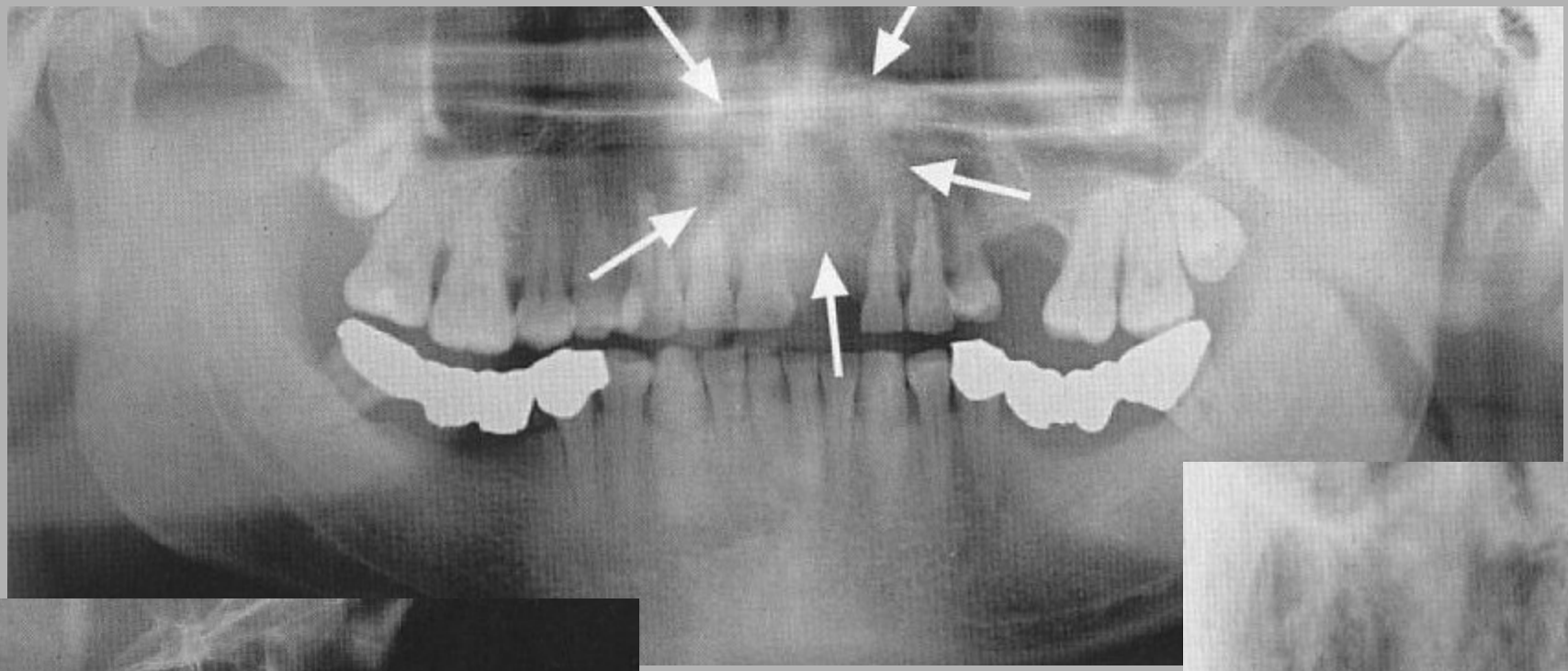
- osteoblastic + osteolytic

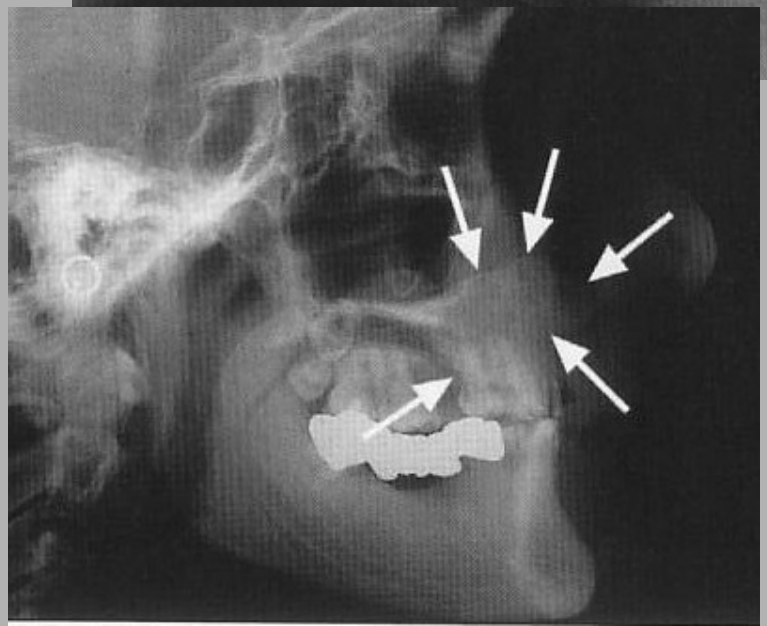
– various image

Osteosarcoma

female, 29 y

Osteosarcoma



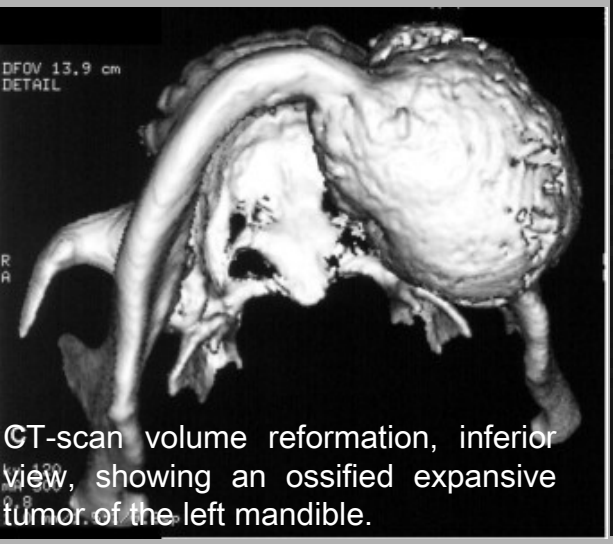


male, 40 y

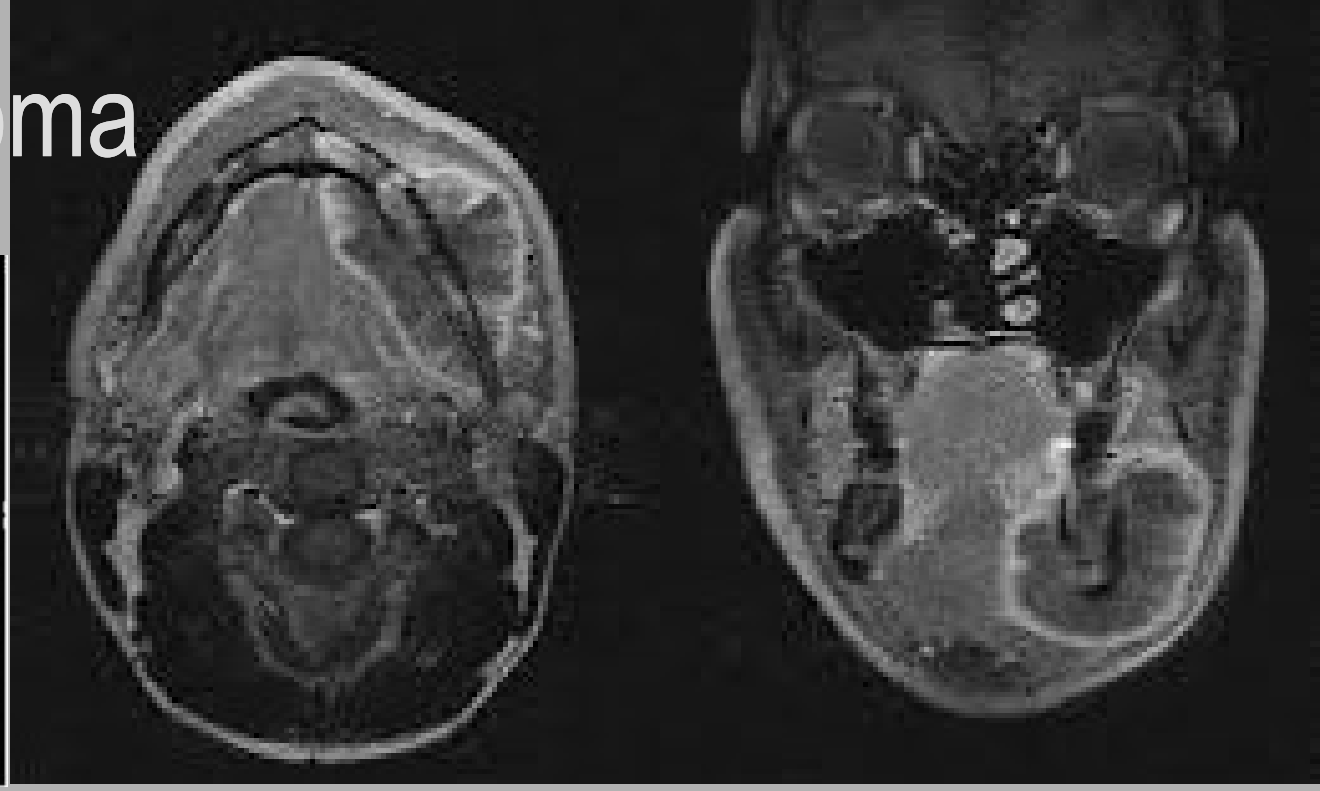
Osteosarcoma

Axial and coronal CT image

Osteosarcoma



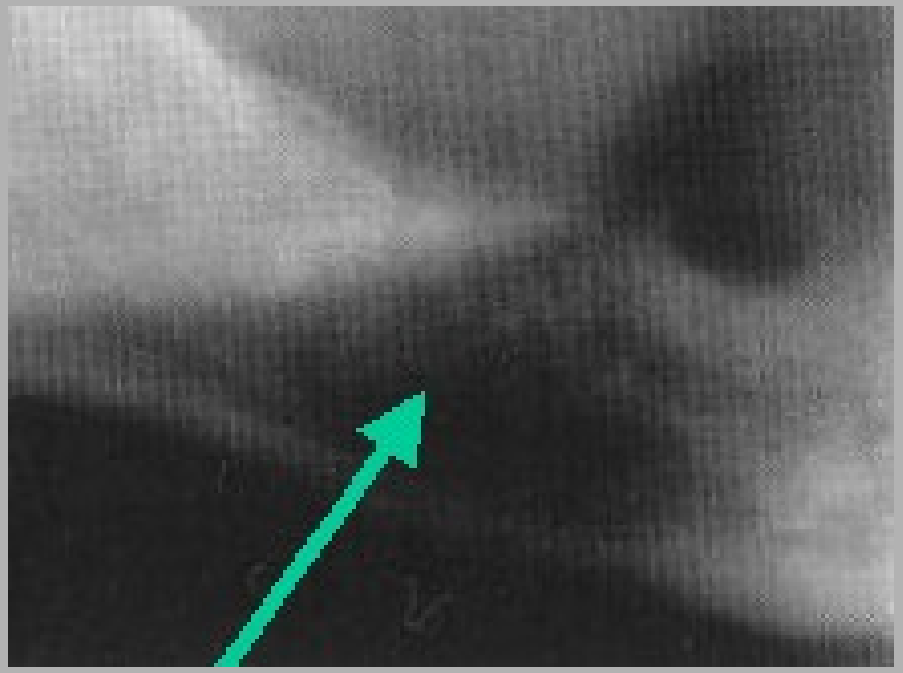
CT-scan volume reformation, inferior view, showing an ossified expansive tumor of the left mandible.



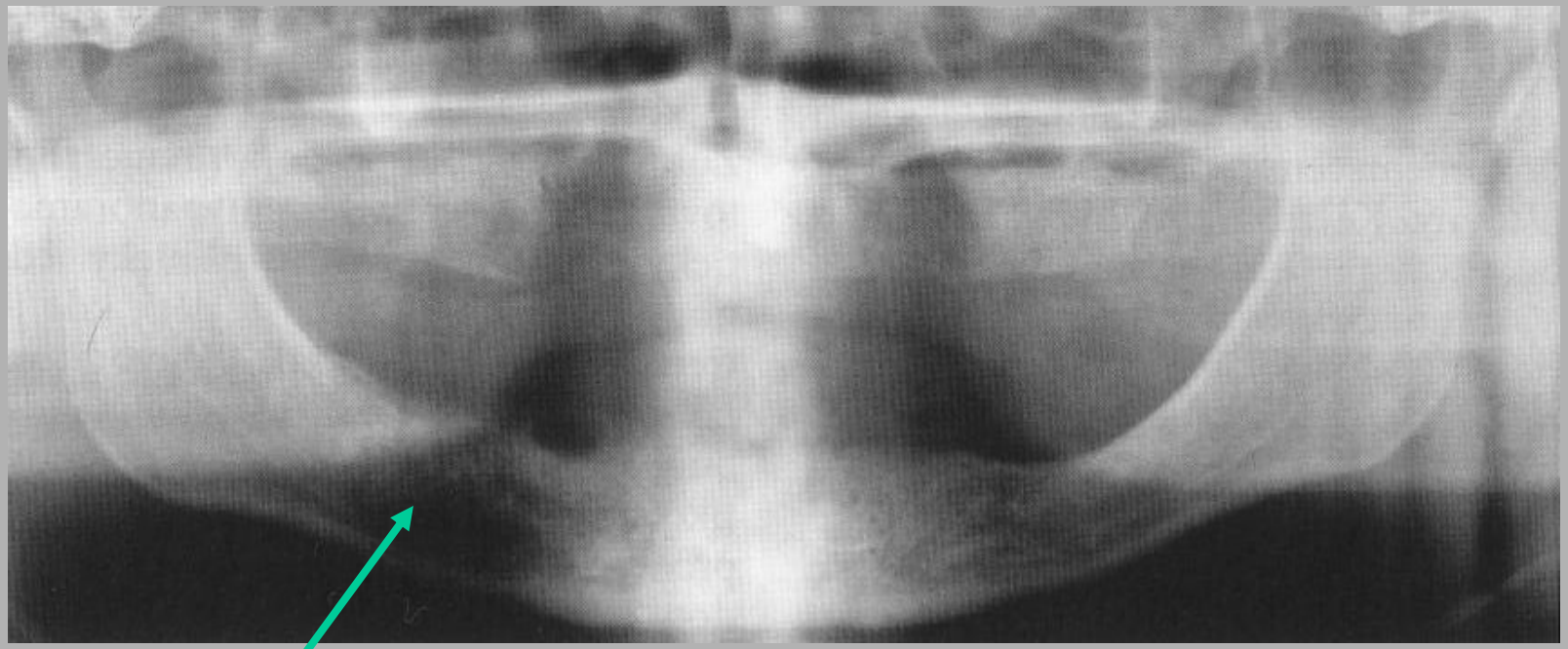
20 year-old woman with left high grade mandibular osteosarcoma. MRI axial and coronal FSE T1-weighted sequence after gadolinium injection showing a well defined juxtacortical mass (tumor bone formation) developed along the surface of the left mandible. This mass is hypointense with mild peripheral rim enhancement. The cortical of the mandible is interrupted and the medulla shows heterogenous enhancement indicating tumor invasion.

Metastasis

- carcinomas of:
  - mamma
  - lung
  - gl. thyreoidea
  - prostate
- blood spread
- clinics:
  - pain in the bones
  - „reasonless“ teeth release
  - paresthesis of lower lip
  - pathological fracture
- <u>suspicion = scintigraphy</u>

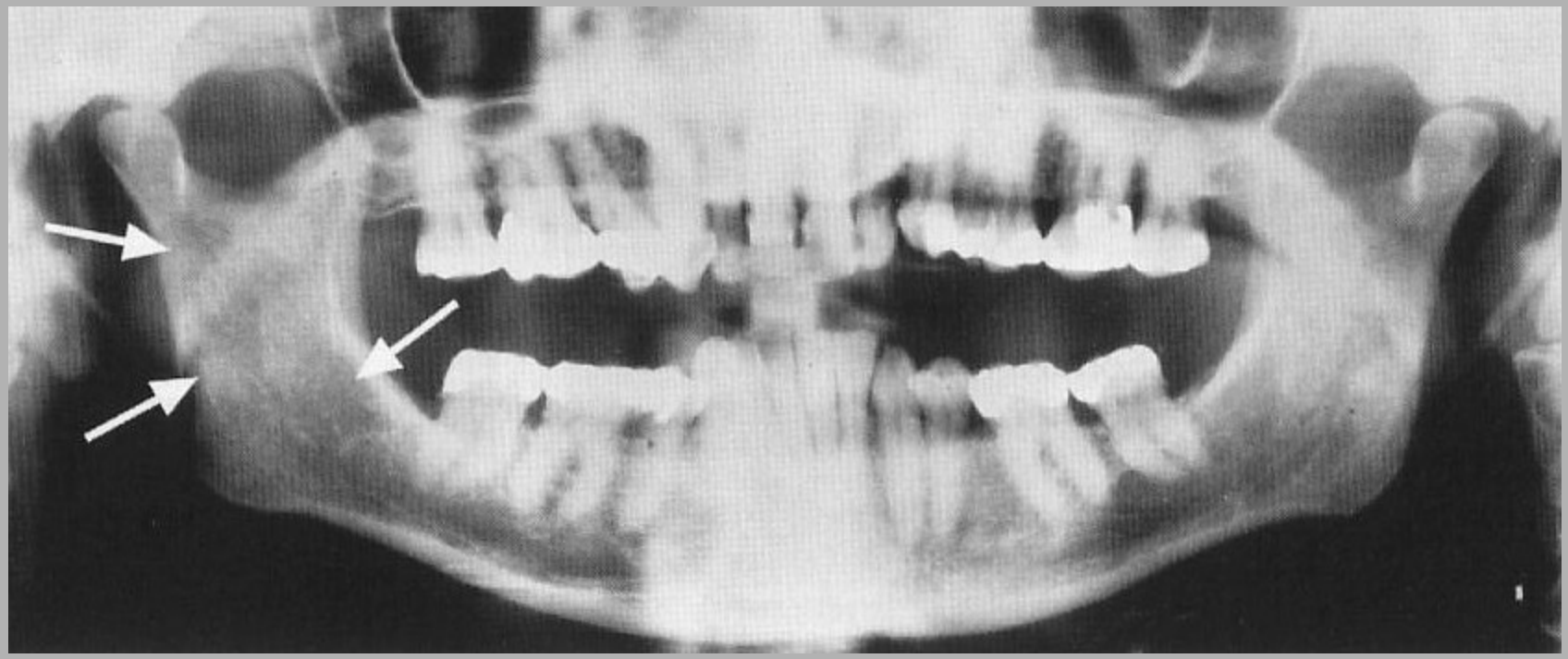


Metastasis



- male, 69 y
- prostate carcinoma
- transparency

Metastasis



- bowel carcinoma
- spotted, blurred

Metastasis

Metastatic hepatocellular carcinoma in a 61-year-old man.

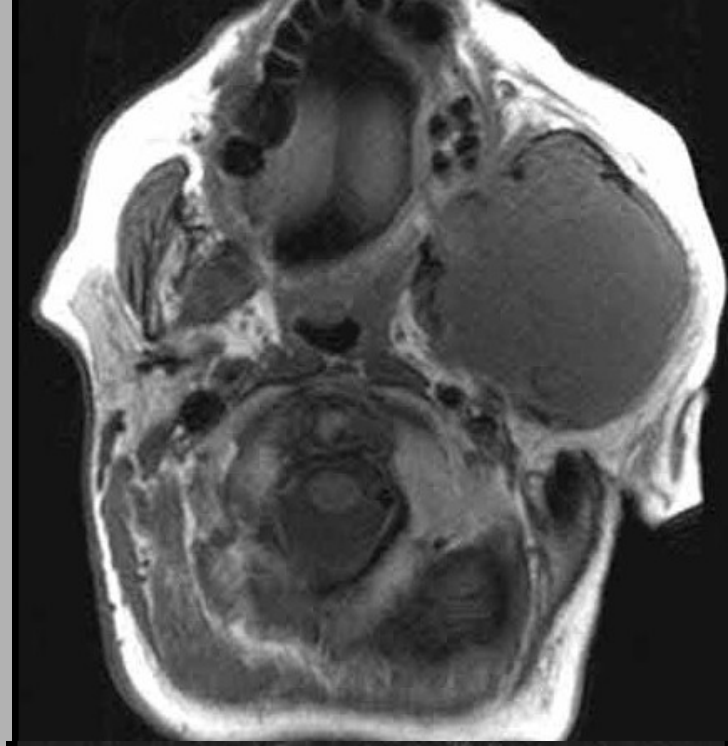
Contrast-enhanced CT scan demonstrates an expansile, osteolytic mass (arrows) within the right mandibular body.

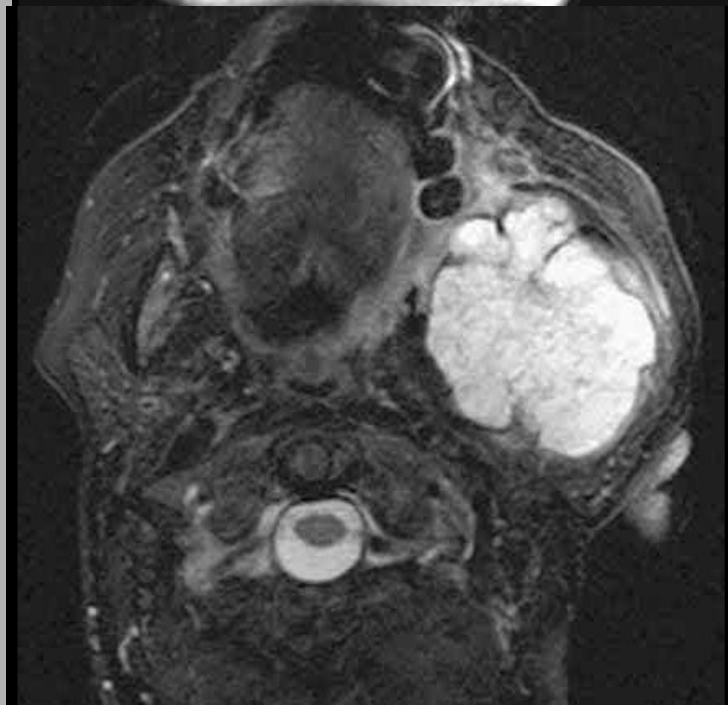
Metastasis

Mandibular metastasis from colonic adenocarcinoma

T1-weighted axial
T2 FS axial

A 63-year-old female with history of adenocarcinoma of the colon initially presented to her physician with a swollen left parotid gland. Presumptive diagnosis of saldenitis was made and the patient was treated with antibiotics. After no response to antibiotics, MRI was performed. Subsequently a fine needle aspiration of the left mandibular mass was performed demonstrating malignant cells derived from adenocarcinoma with mucinous features similar to prior pathology slides of patient's colonic adenocarcinoma.

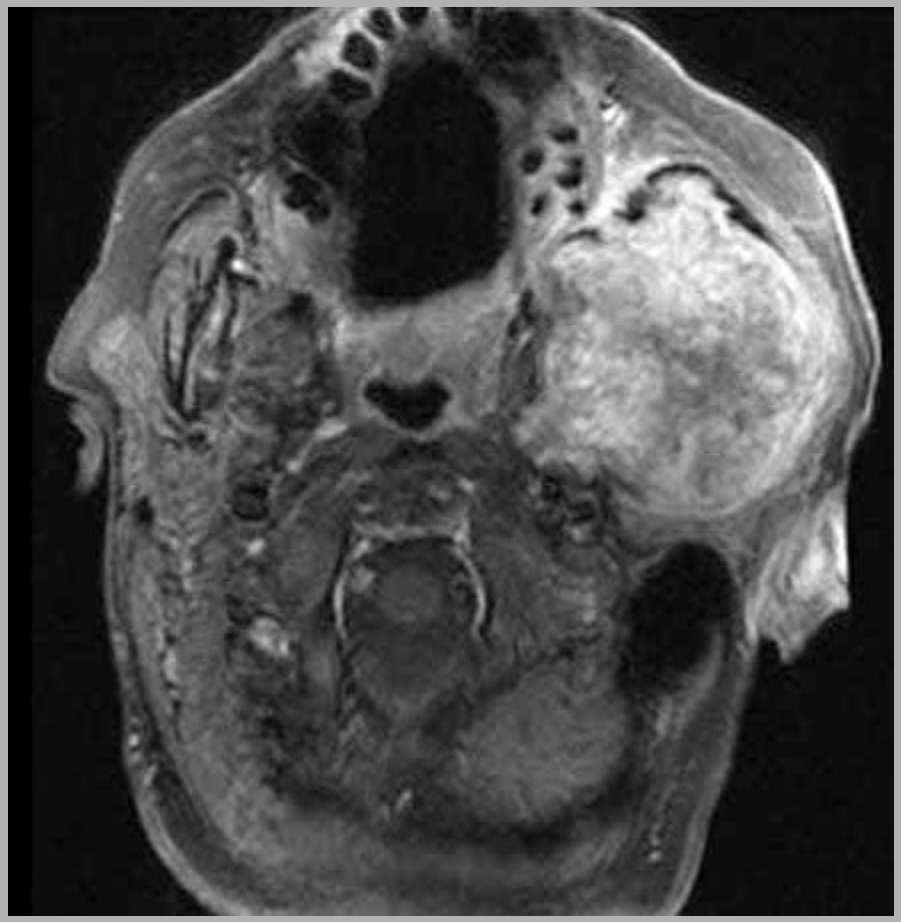




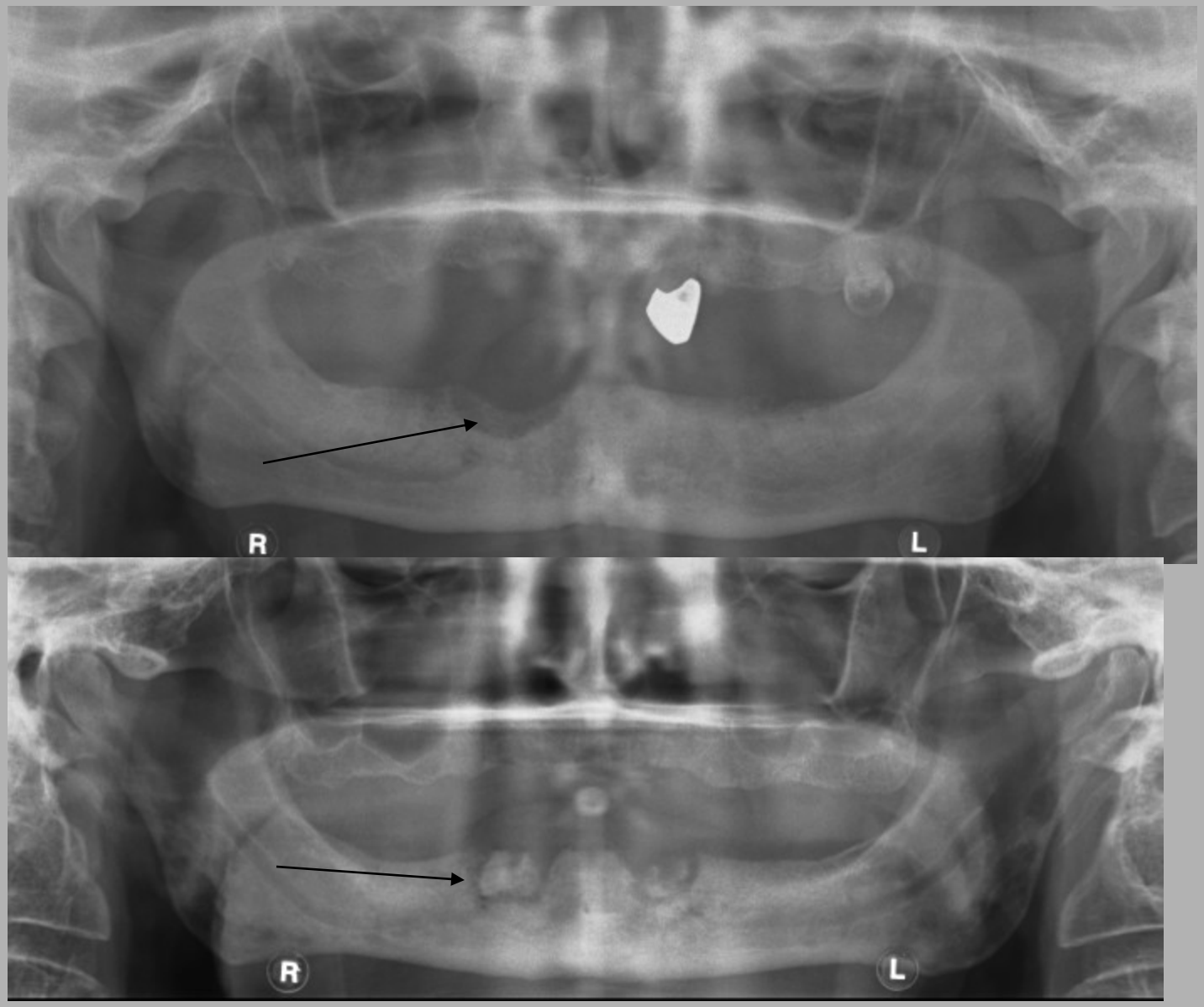
Metastasis

Mandibular metastasis from colonic adenocarcinoma

MRI - post-contrast T1



Osteonecrosis mandibulae



Osteonecrosis mandibulae - MRI

• 51-year-old woman with breast cancer.
• Oblique sagittal T1-weighted image shows focal lesion of osteonecrosis (*arrow*) affecting mandibular branch and involving mandibular canal.

Odont. myxoma

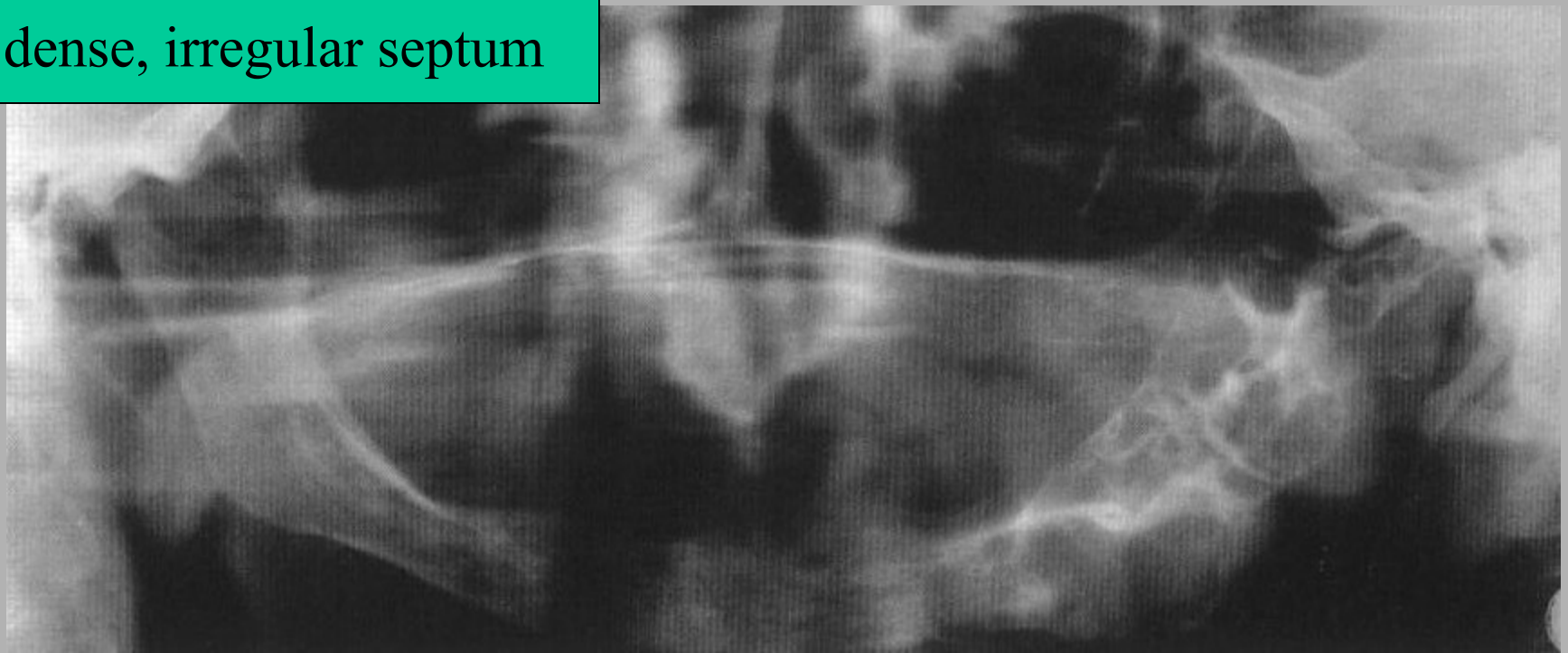
- age 10-50 years
- female/male 1:1
- jaws (only)
- most often in lower jaw - caput of man
- growth
  - fast
  - endosteal
  - muscle infiltration (occasionally)
- good bounded, irregular translucency
- often relaps

Odont. myxoma

female, 34 y

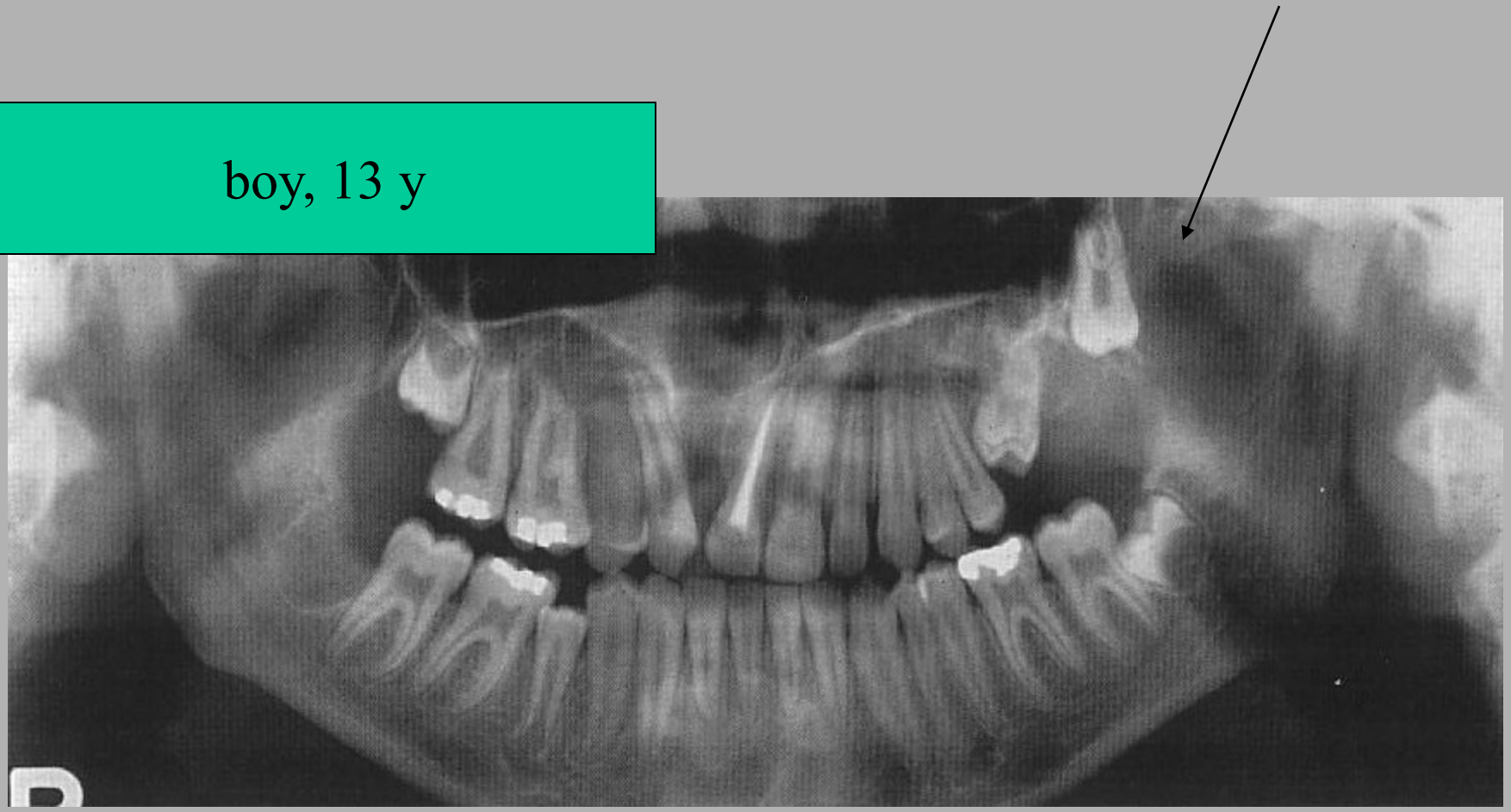
structure - net

dense, irregular septum



Odont. myxoma

boy, 13 y



Odontoma

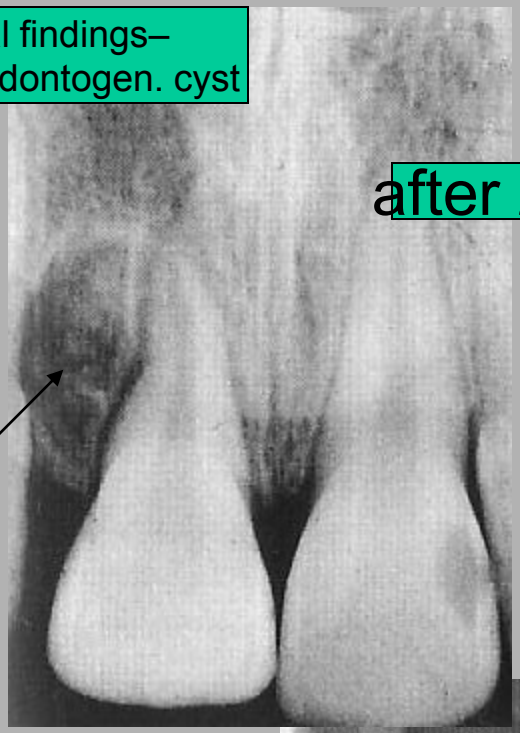
- similar to the hamartomas
- conglomerate of various tooth tissues
  - composite odontoma
    - ✓ contains several developed teeth
  - complex odontoma
    - ✓ contains basic tooth tissues in amorphous mass

composite

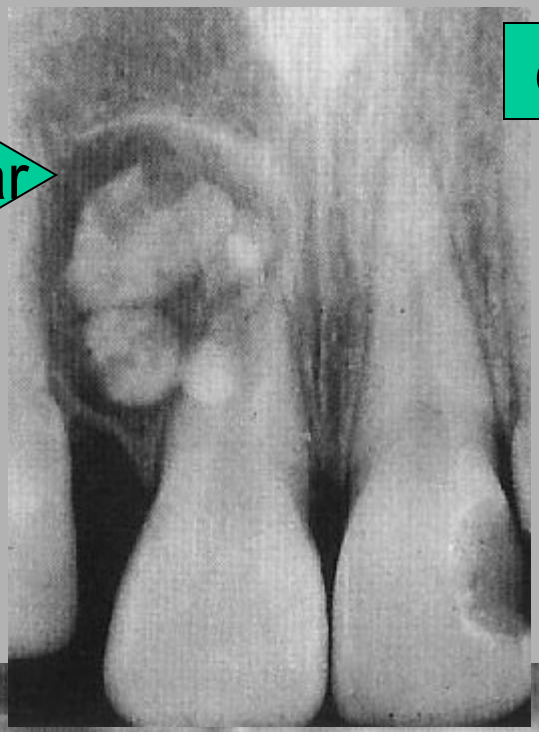
complex

Odontoma

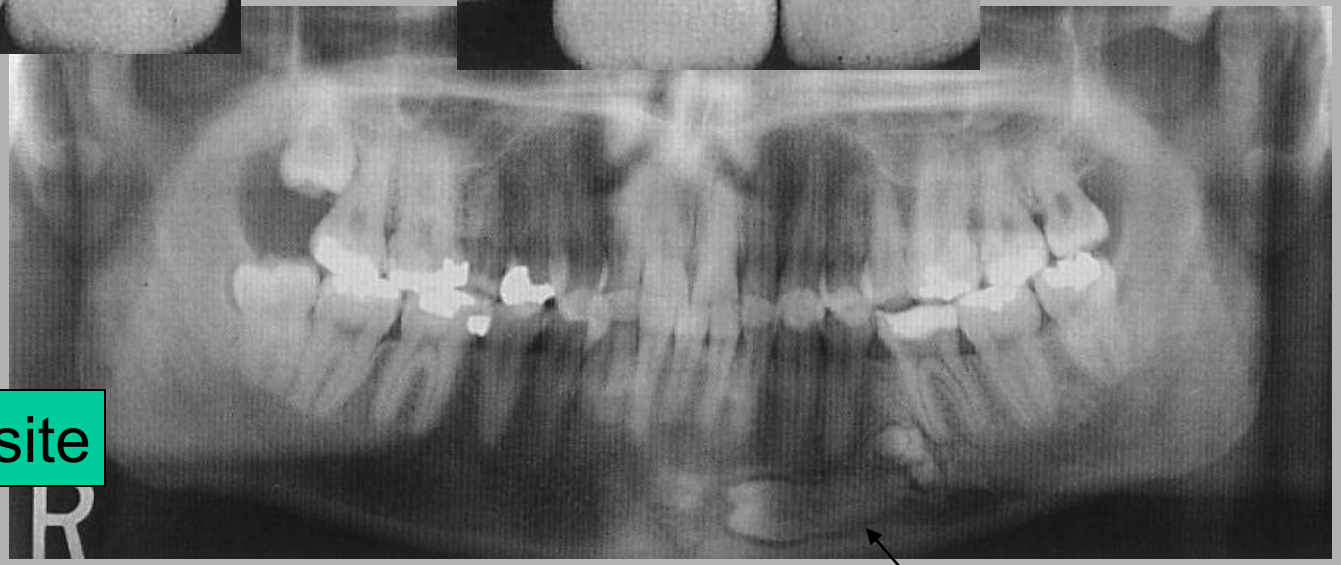
incidental findings–
susp. calc. odontogen. cyst



after 2,5 year

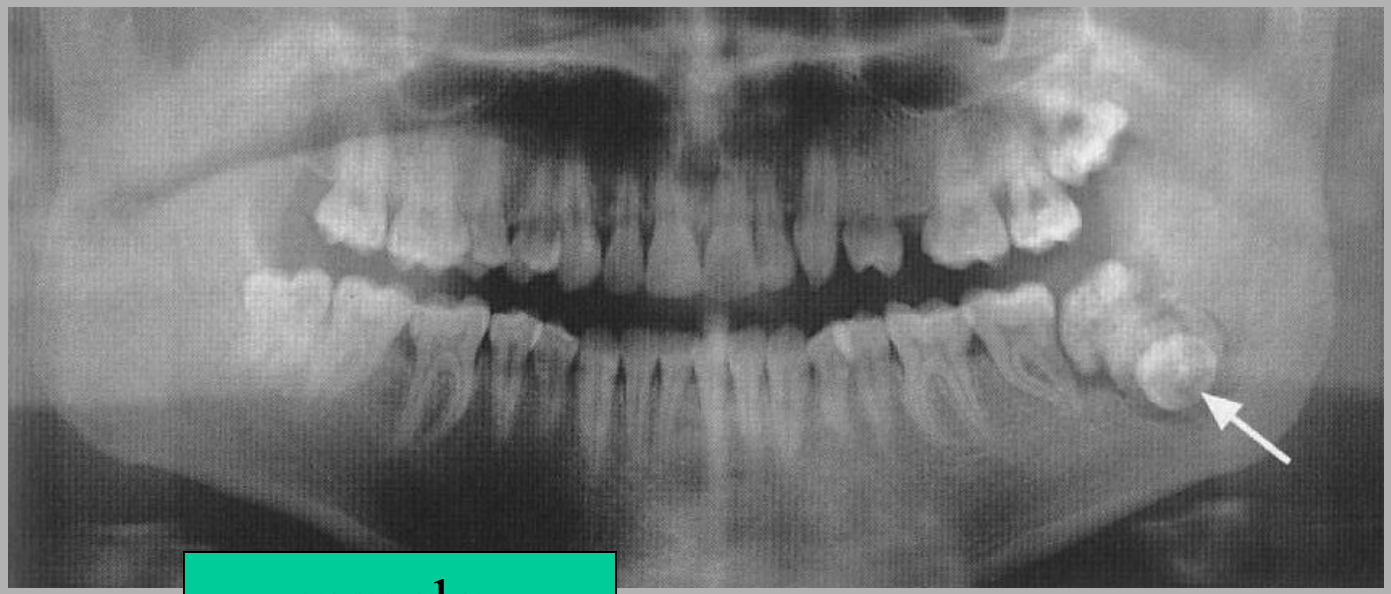


composite

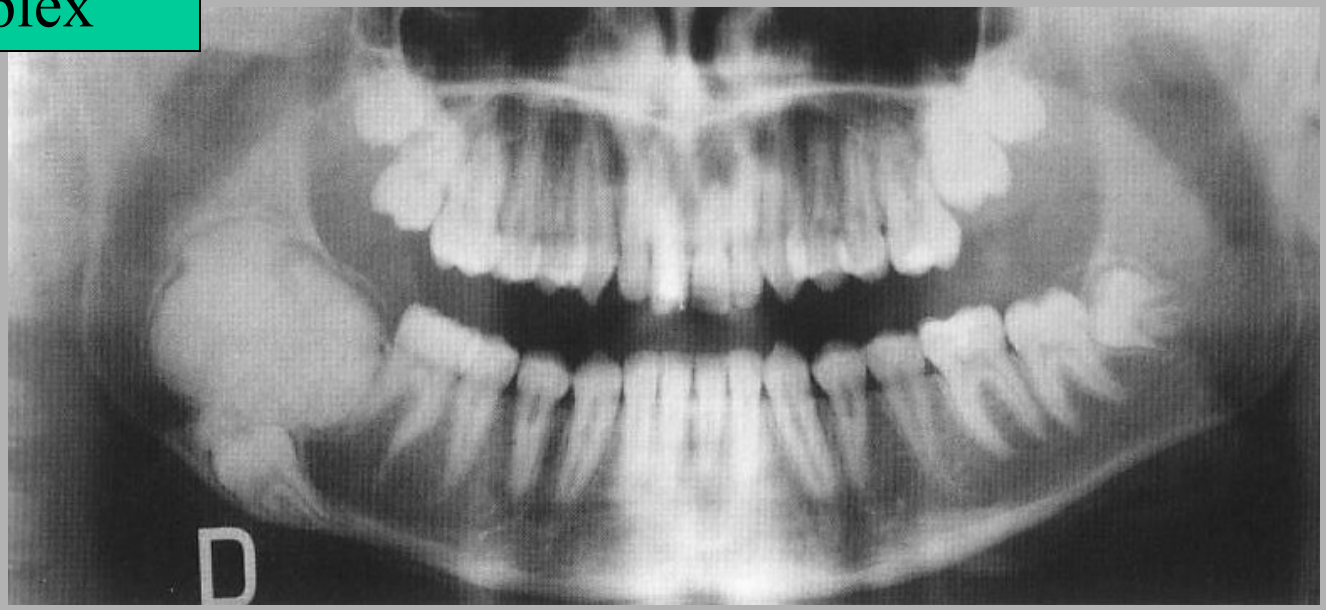


composite

Odontoma

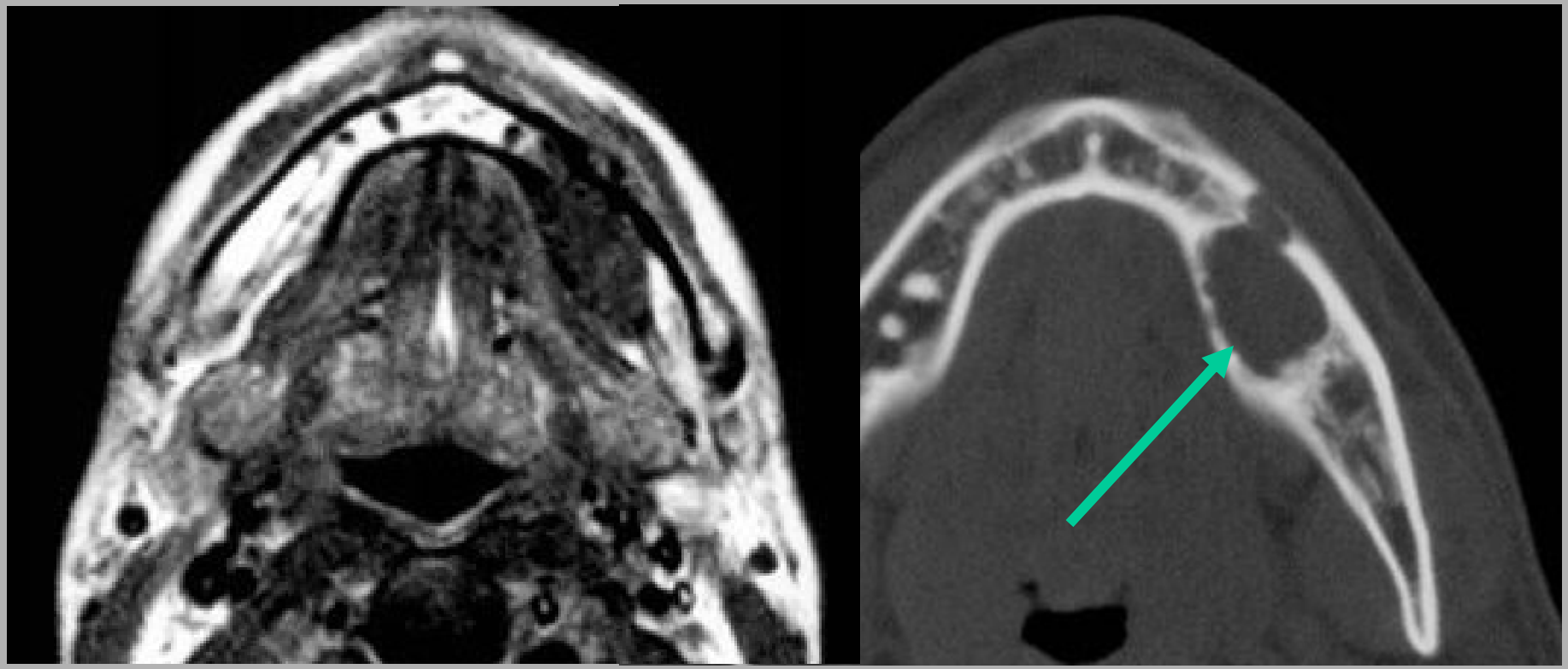


complex



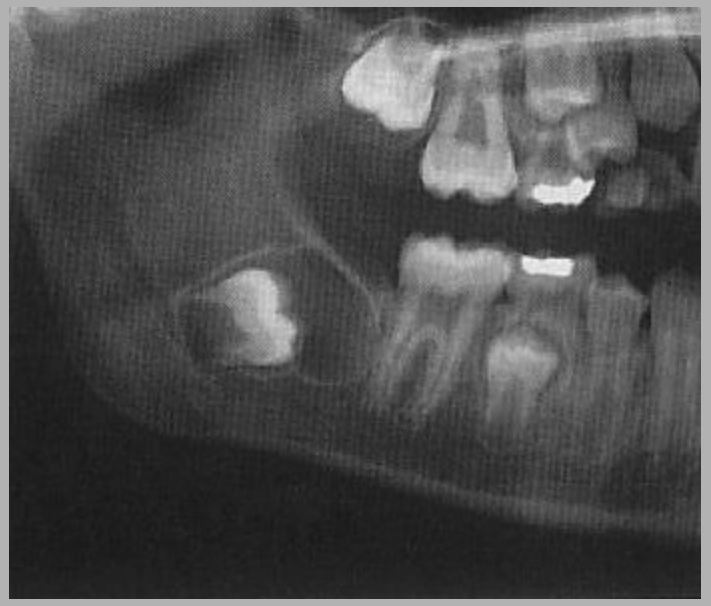
Fibroma

- **Fibromas** (or **fibroid tumors** or **fibroids**) are benign tumors that are composed of fibrous or connective tissue.



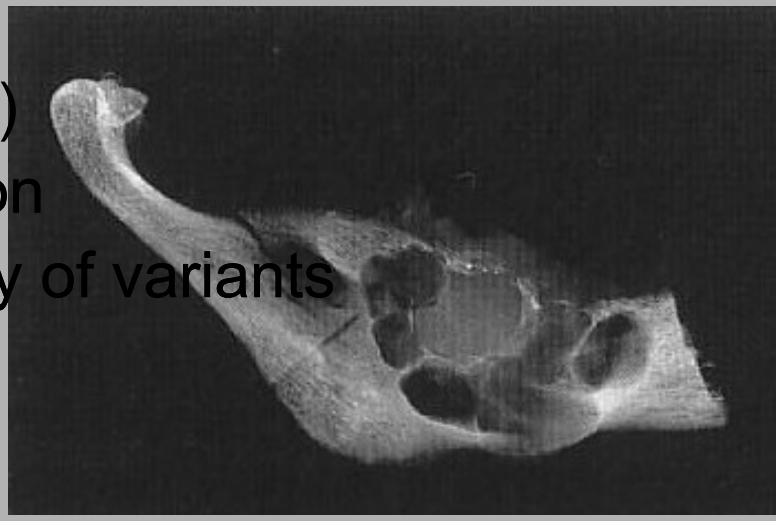
Ameloblastic fibroma

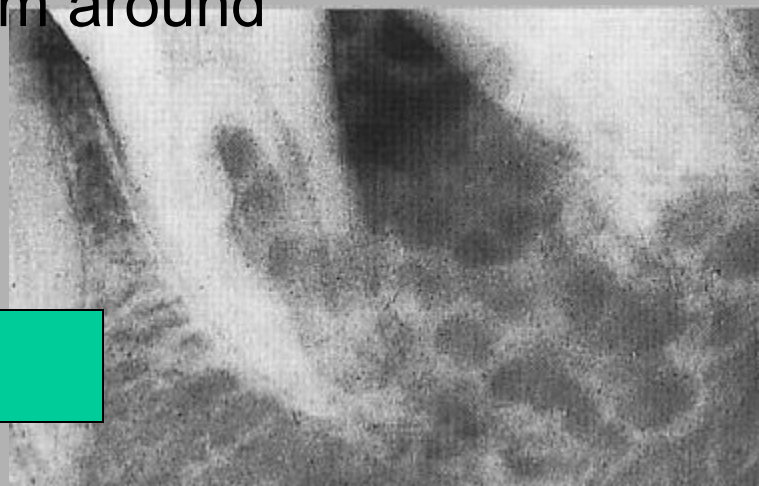
- The **ameloblastic fibroma** is an odontogenic tumor arising from the enamel organ or dental lamina
- tumor with odontogennal epithelium and ectomesenchyma
- benign
- 10-20 y, boys
- in molar mandible region
- dif.dg.
  - folicular cyst
  - ameloblastoma
- Does not relapse



Ameloblastoma

- is a rare, benign tumor of odontogenic epithelium
- male/female 1:1
- in a region of caudal molars (80%)
- long-term relaps = radical resection
- variable histological image – many of variants
- RTG
  - multilocular
  - multicystic
  - bubble transparency with septum around
  - compacta thin out
- slow growth, painless
- oedema, facial asymetry

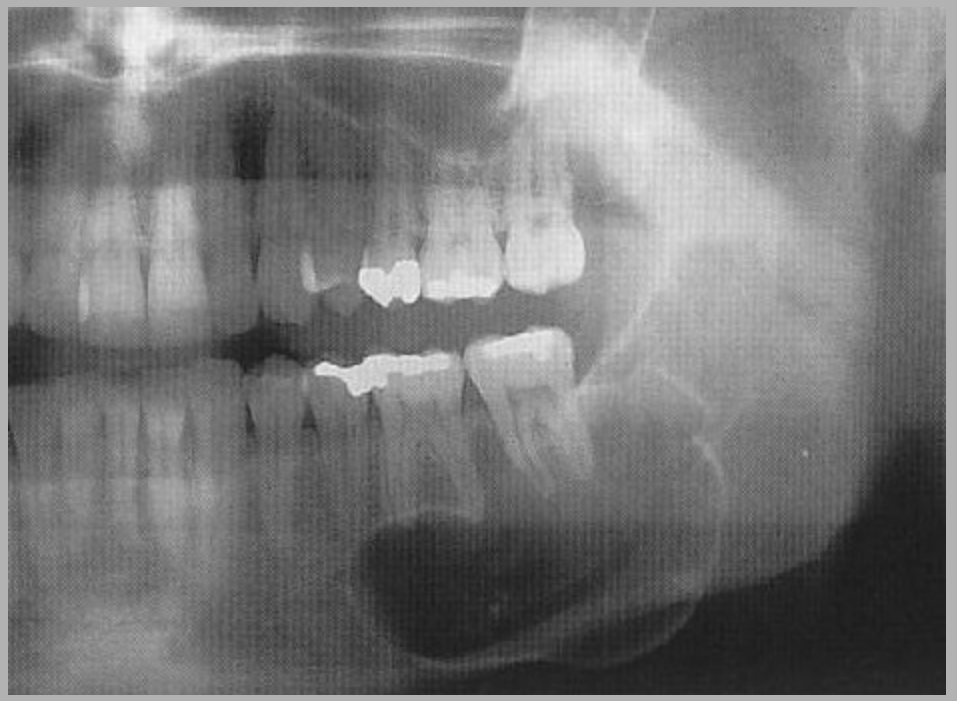


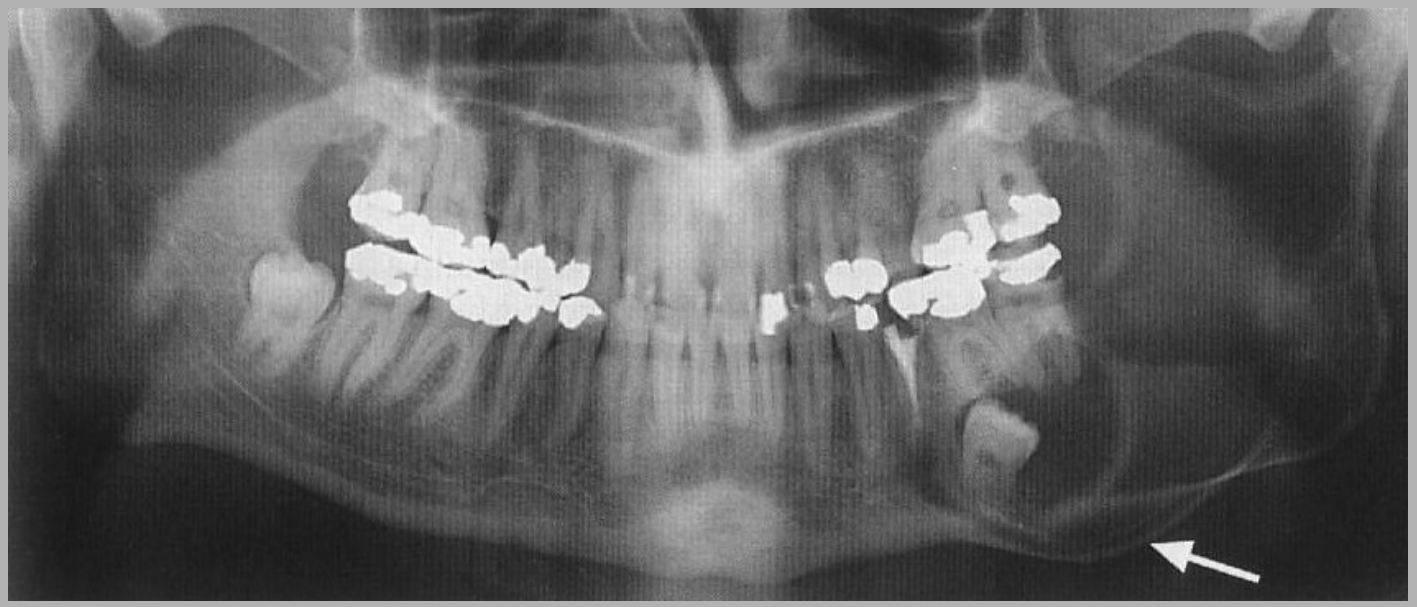


„honeycomb“ structure

Ameloblastoma

- dif.dg.
  - folicular cysts
  - keratocysts
  - ameloblastic fibroma
  - odontogennal myxoma
  - central eosinofil granuloma

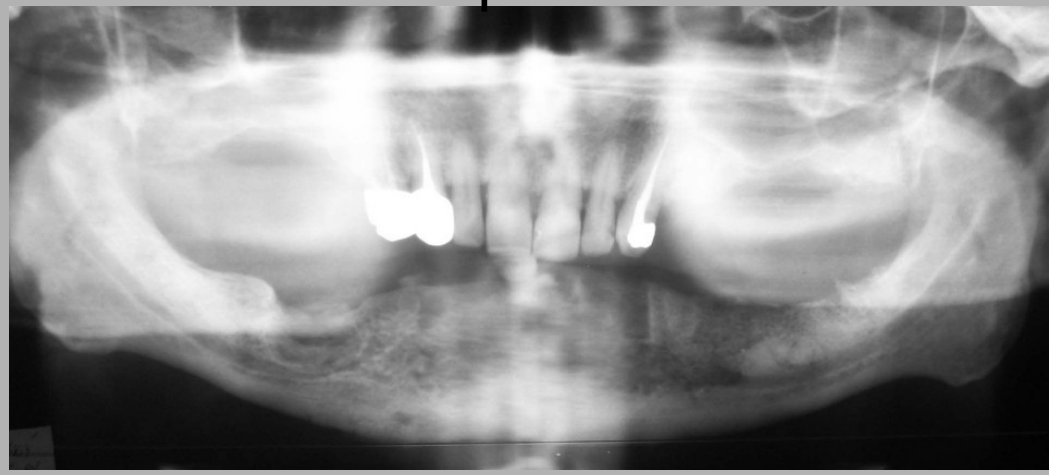


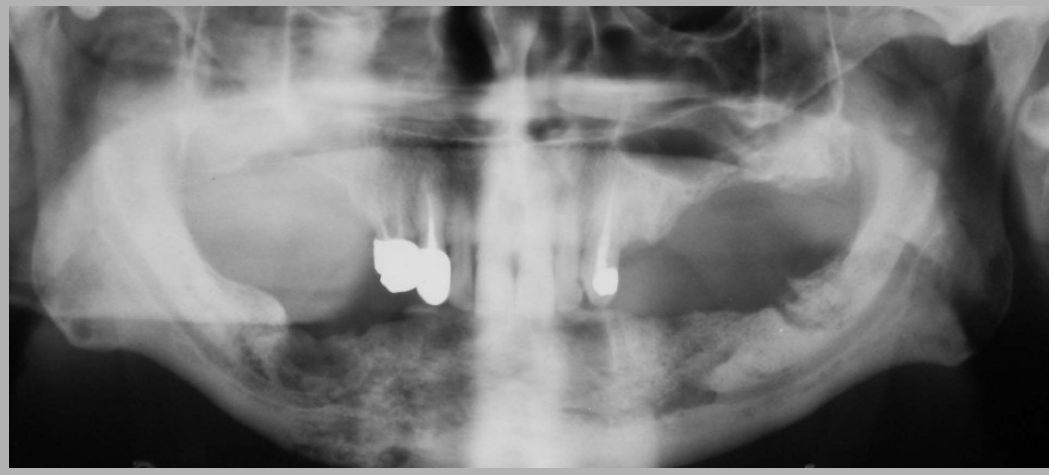


Myeloma

is a cancer of the white blood cells known as plasma cells.

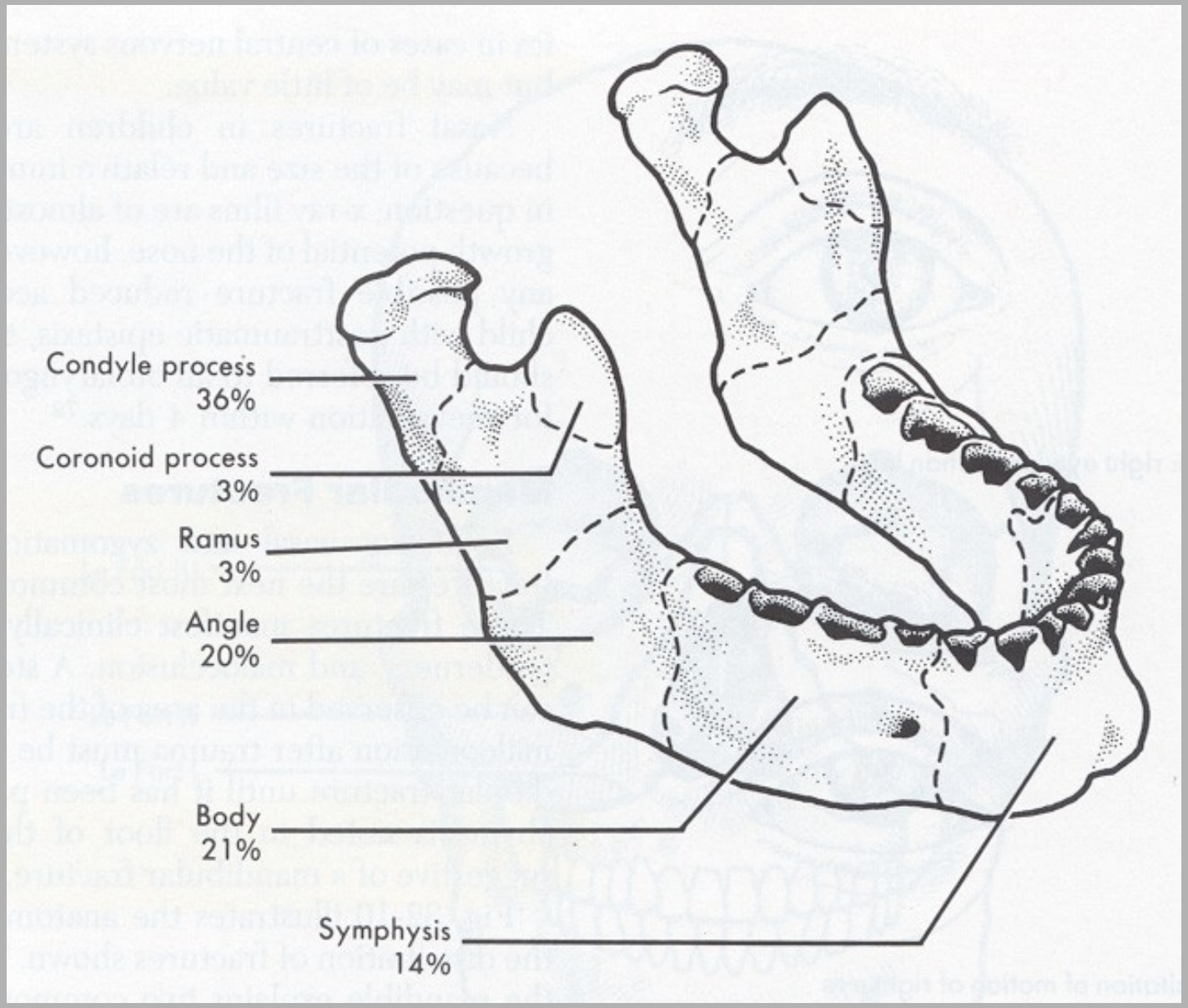
- Hypercalcemia (corrected calcium >2.75 mmol/L)
- Renal insufficiency attributable to myeloma
- Anemia (hemoglobin <10 g/dL)
- Bone lesions (lytic lesions or osteoporosis with compression fractures)
- Frequent severe infections (>2 a year)
- Amyloidosis of other organs
- Hyperviscosity syndrome



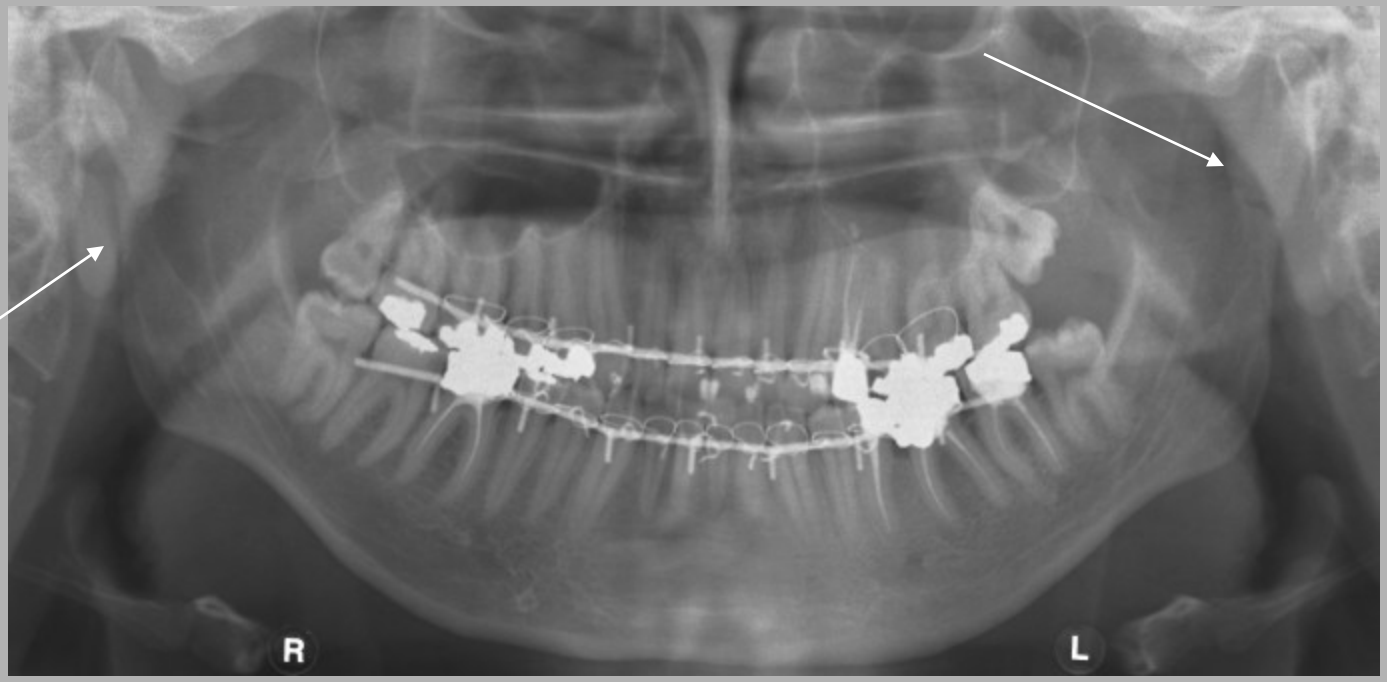


Mandible fractures

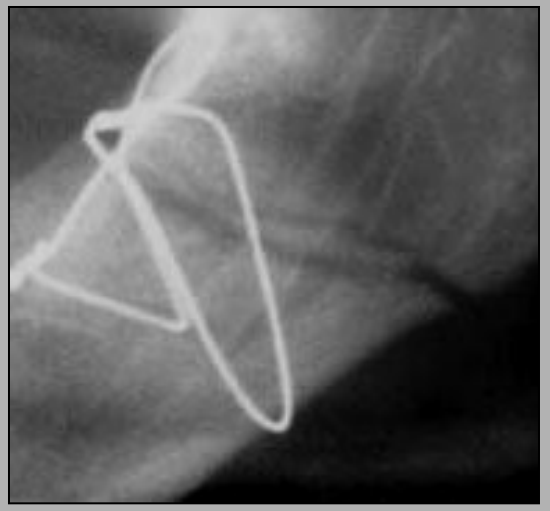
Mandible fractures



Fract. processus articul. mandibulae bilat.

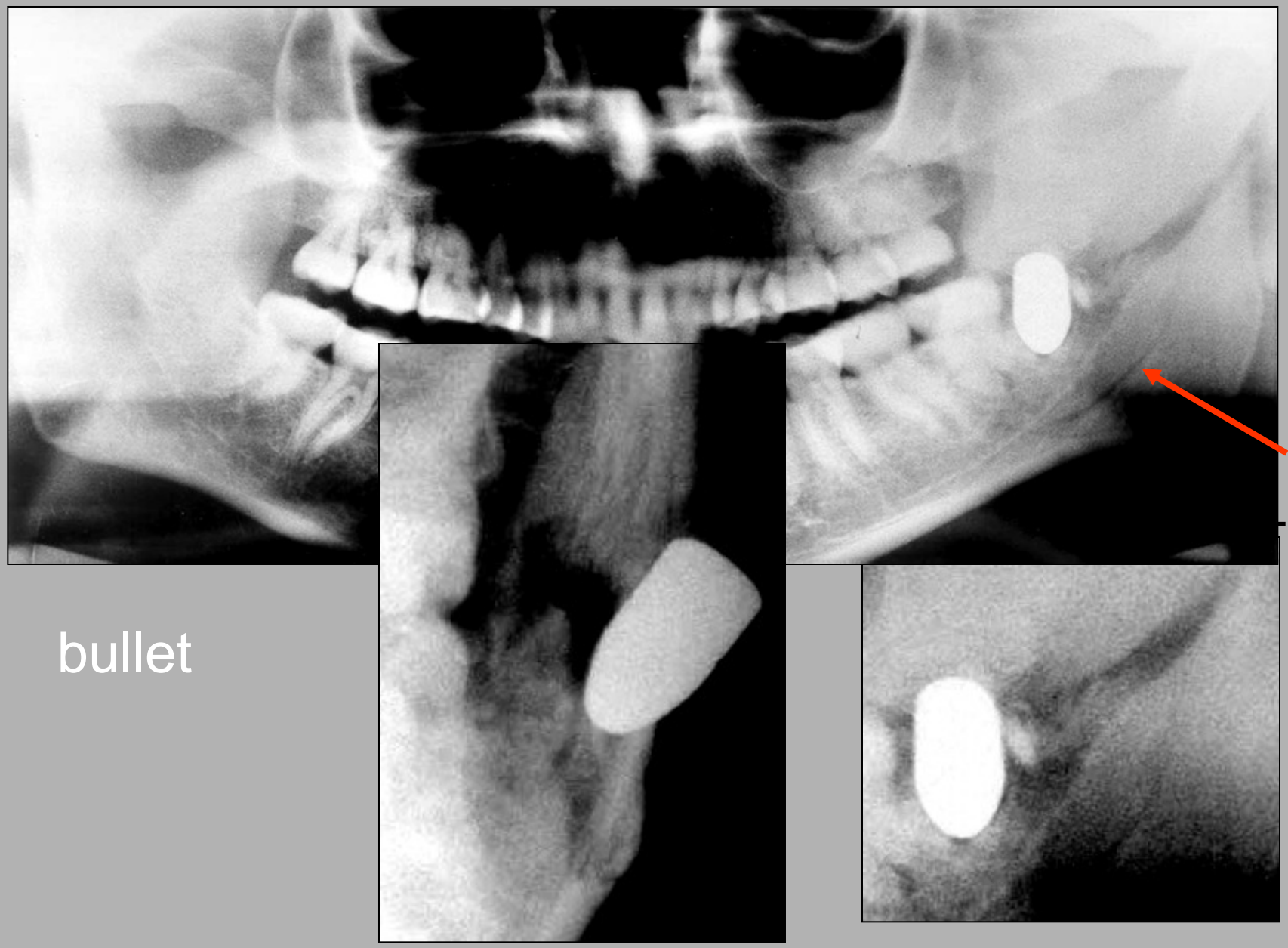


mandible angle - sutura



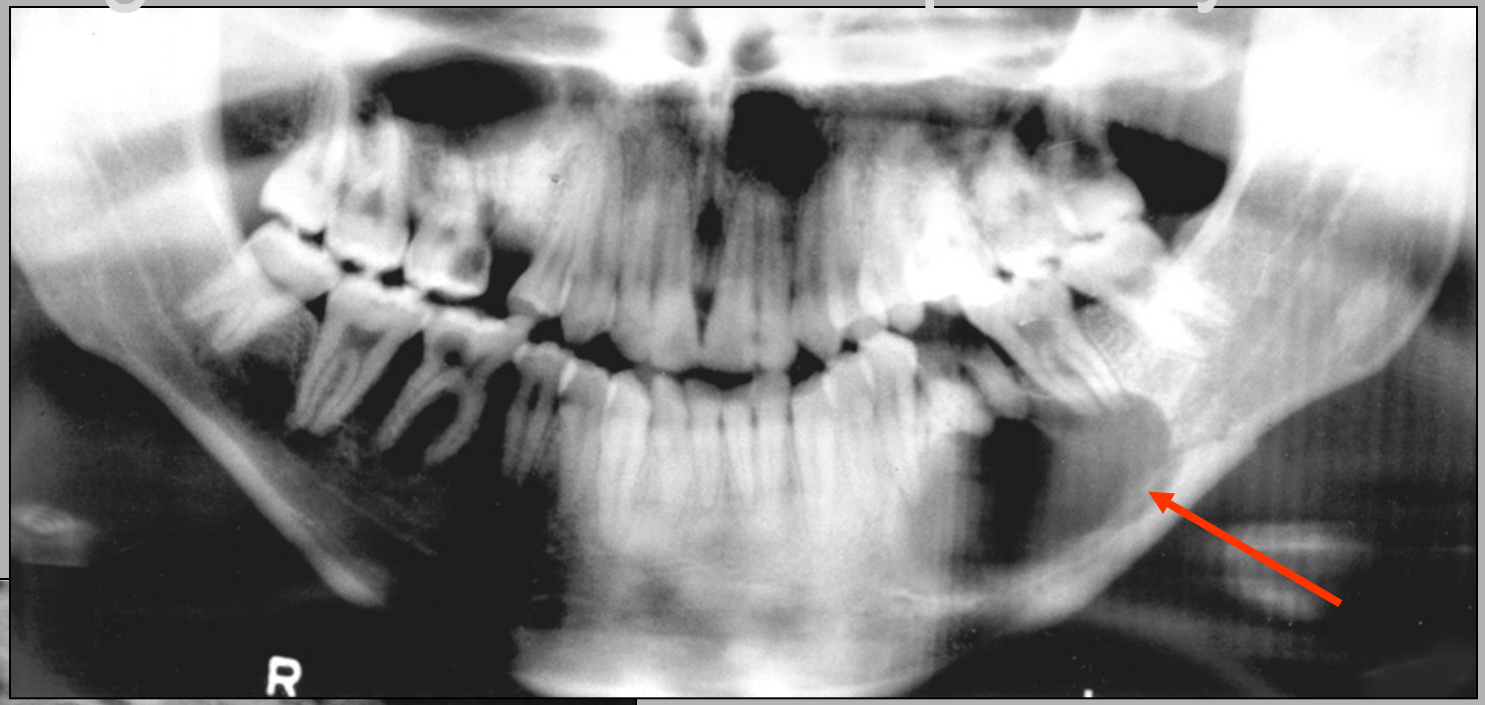
Body

Symphysis



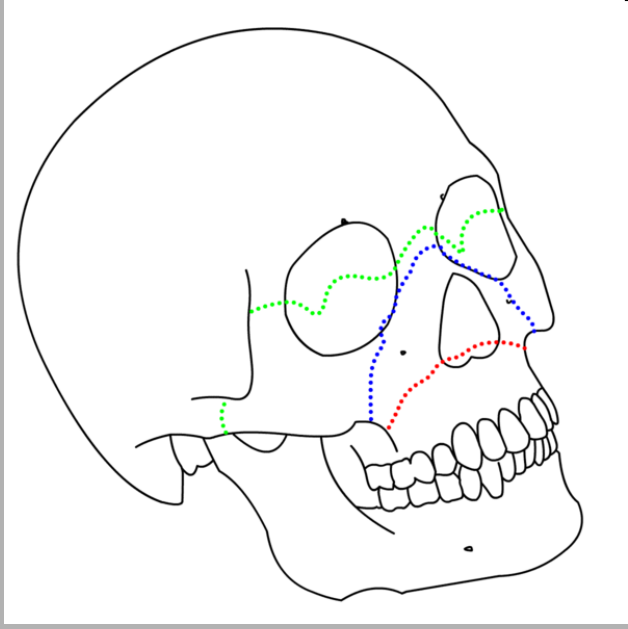
bullet

Pathological fracture and apical cyst



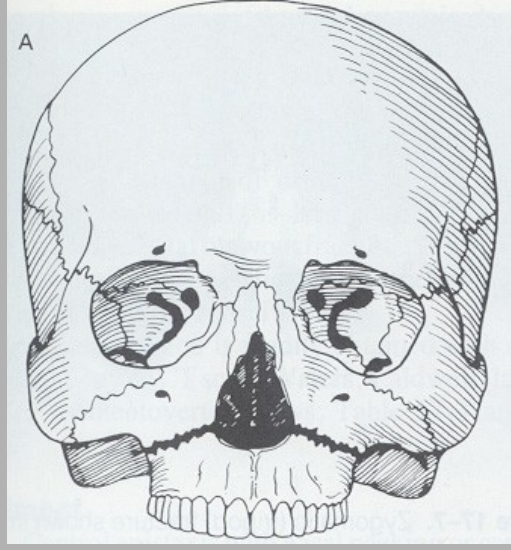
Maxillar fractures

Le Forte

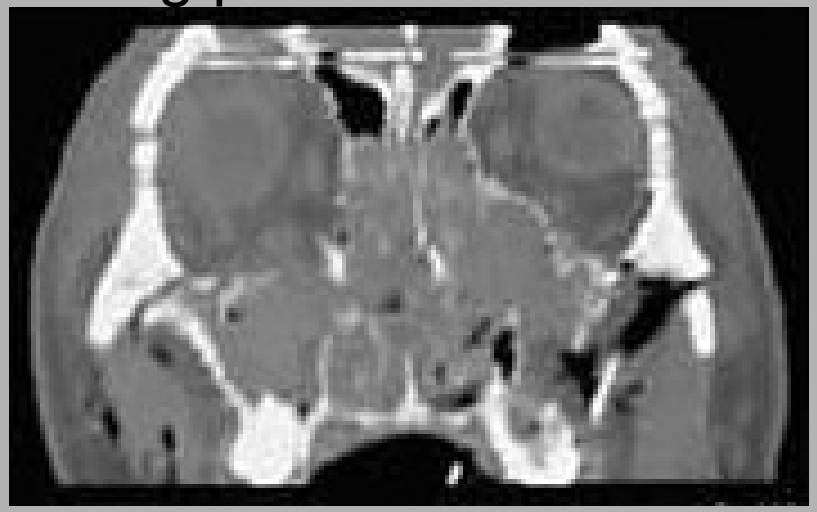


- fracture of the maxilla
- high energy trauma
  - 100 times the force of gravidity
- patient ussualy have multisystem trauma
- Classification: **Le-Forte I-III**
- all types Le Forte involve **processus pterygoideus**

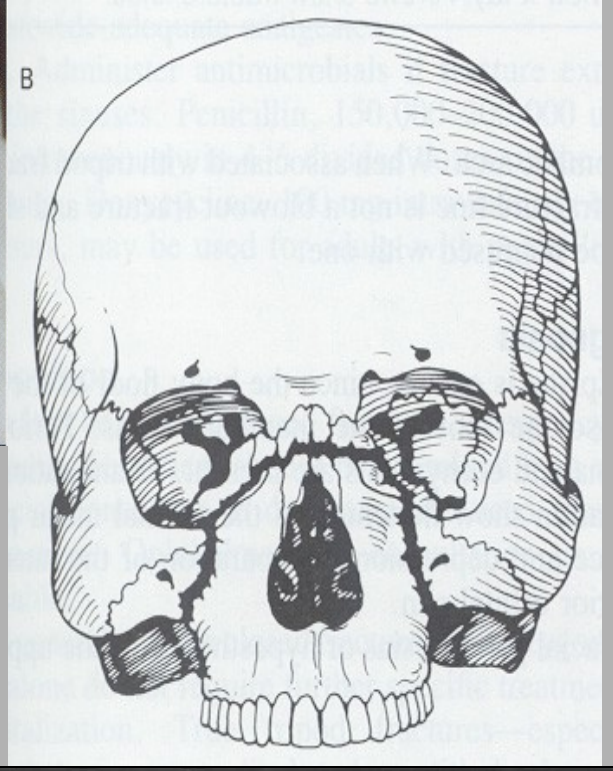
LeFort I



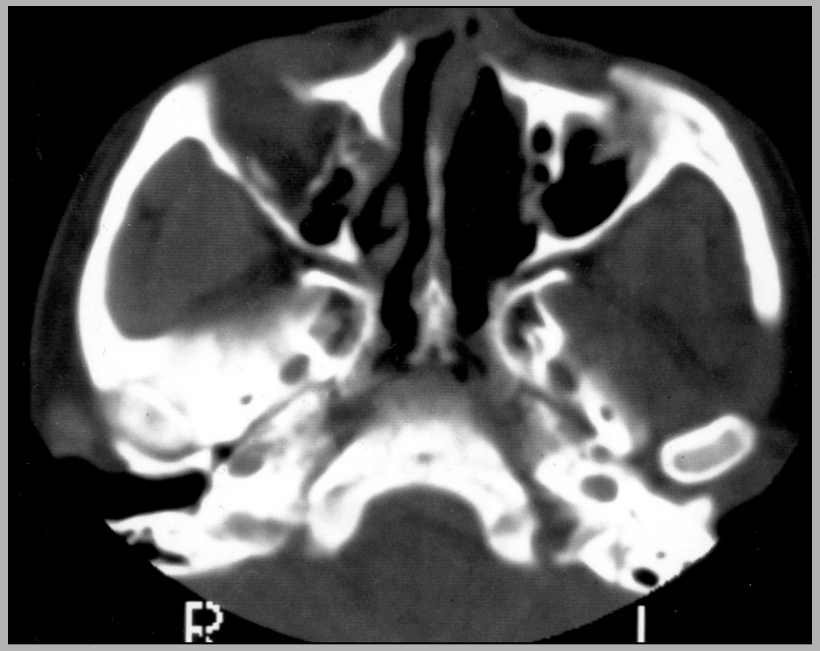
- horizontal fracture
- the fracture extends from the nasal septum travels horizontally above the teeth apices
- crosses below the zygomaticomaxillary junction, and traverses the pterygomaxillary junction to interrupt the pterygoid plates.
- floating palate

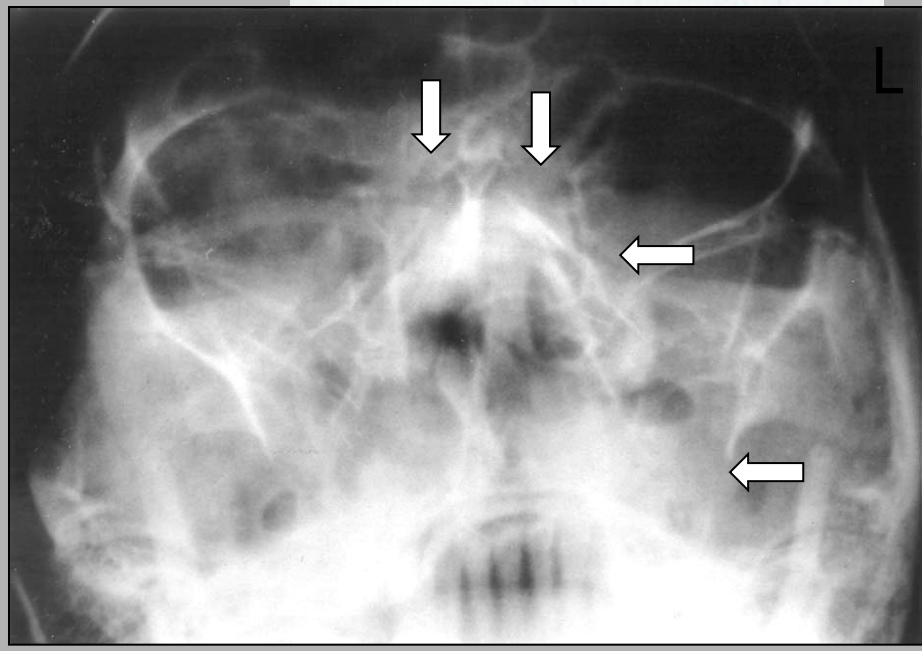


LeFort II

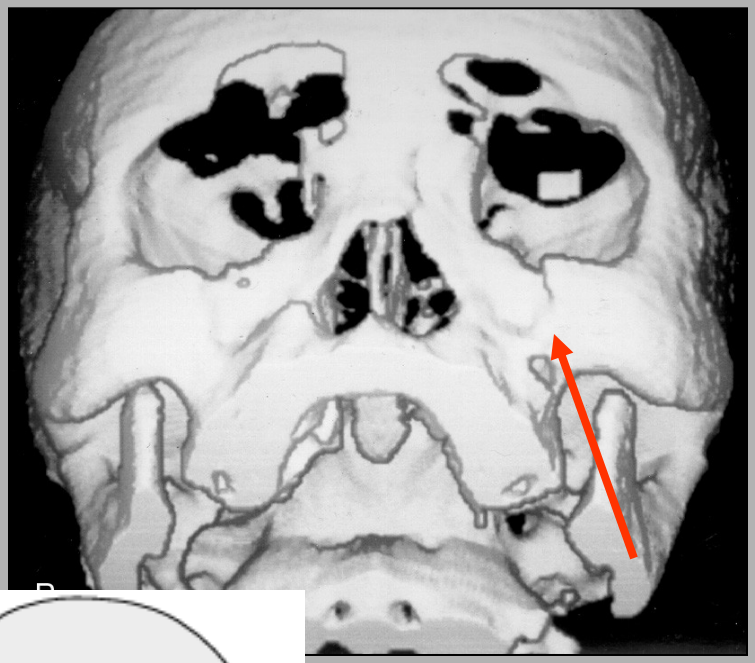


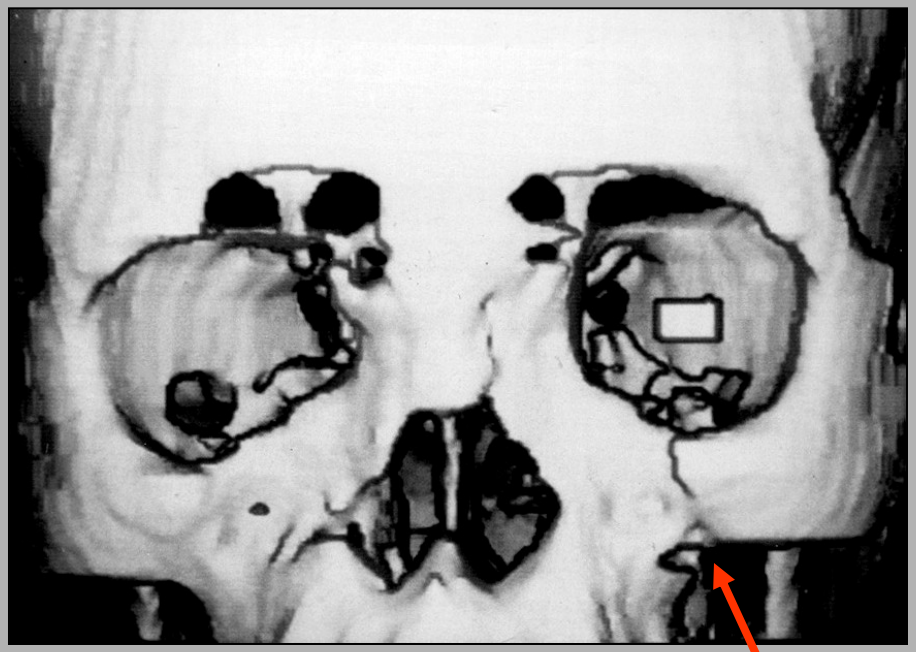
- ✓Maxilla
- ✓Medial portion of orbits
- ✓nasal bones

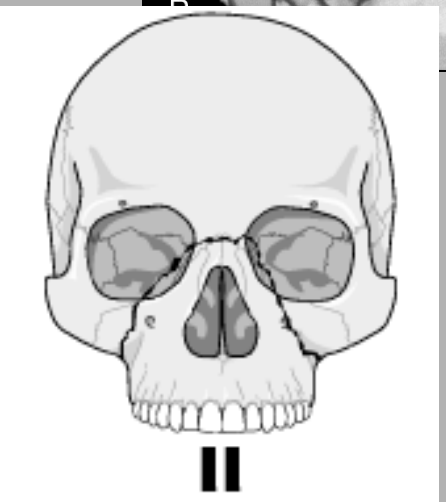




Le Fort II



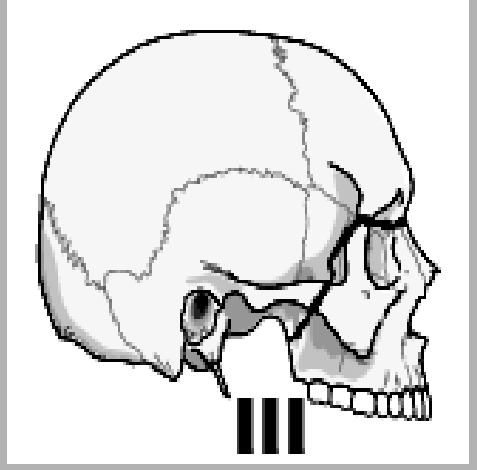


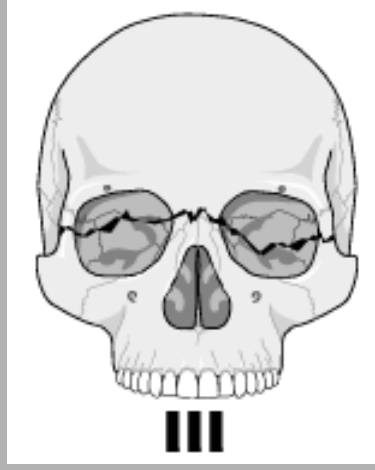


CT 3-D reconstruction

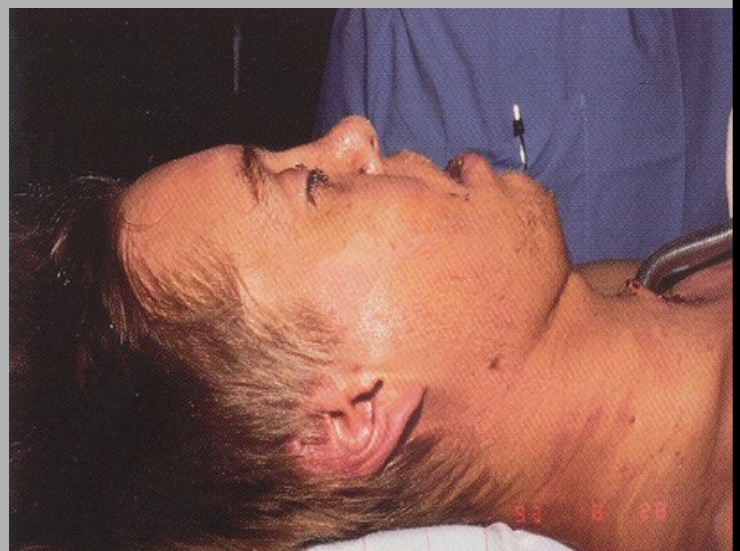
Le Fort II

Le Fort III

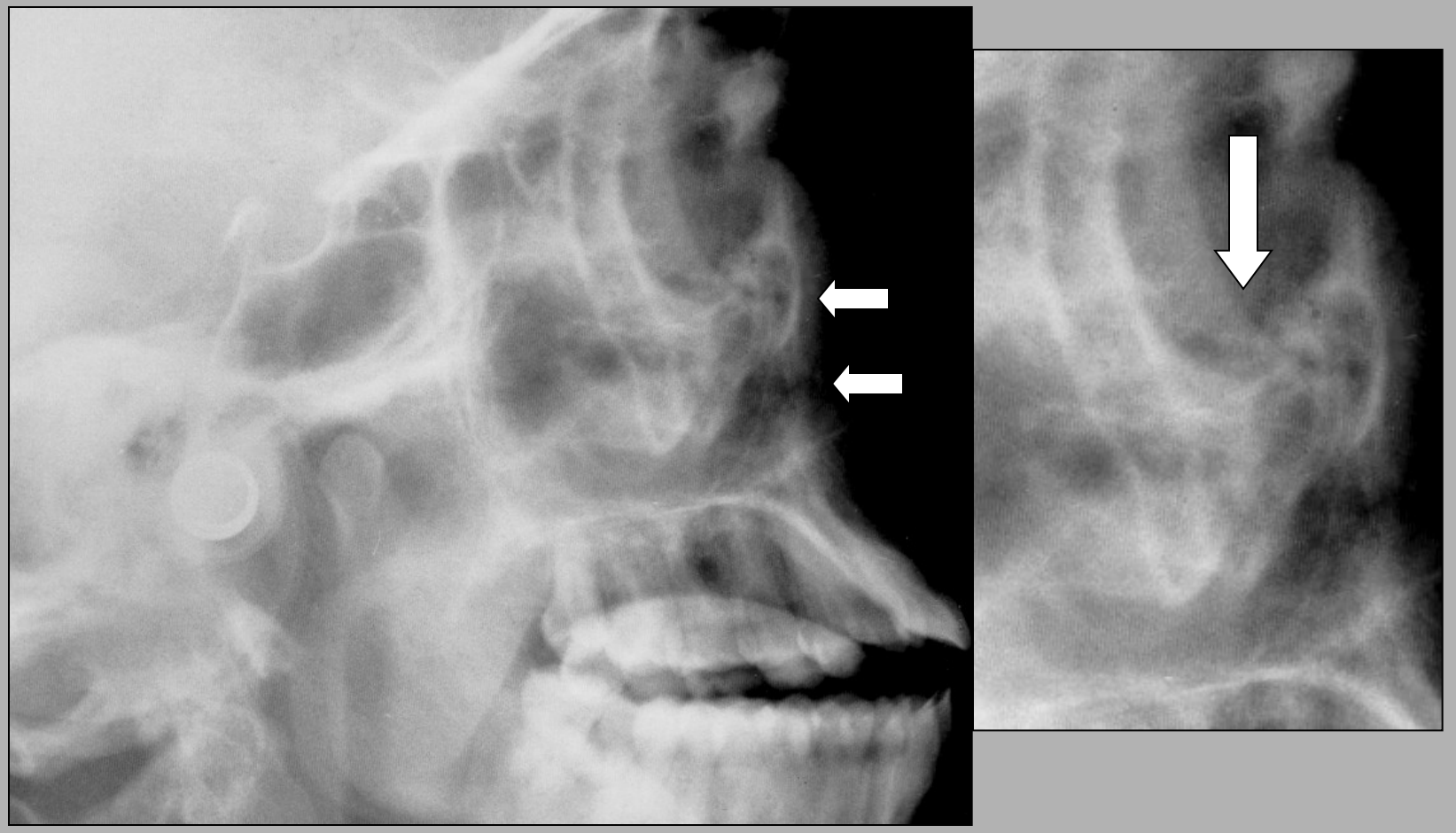




- Transverse fractures
- Zygomatic arch
- Nasofrontal and frontomaxillary sutures
- Nasolacrimal groove and ethmoid bones
- Known as craniofacial dissoci the zygomatic arch

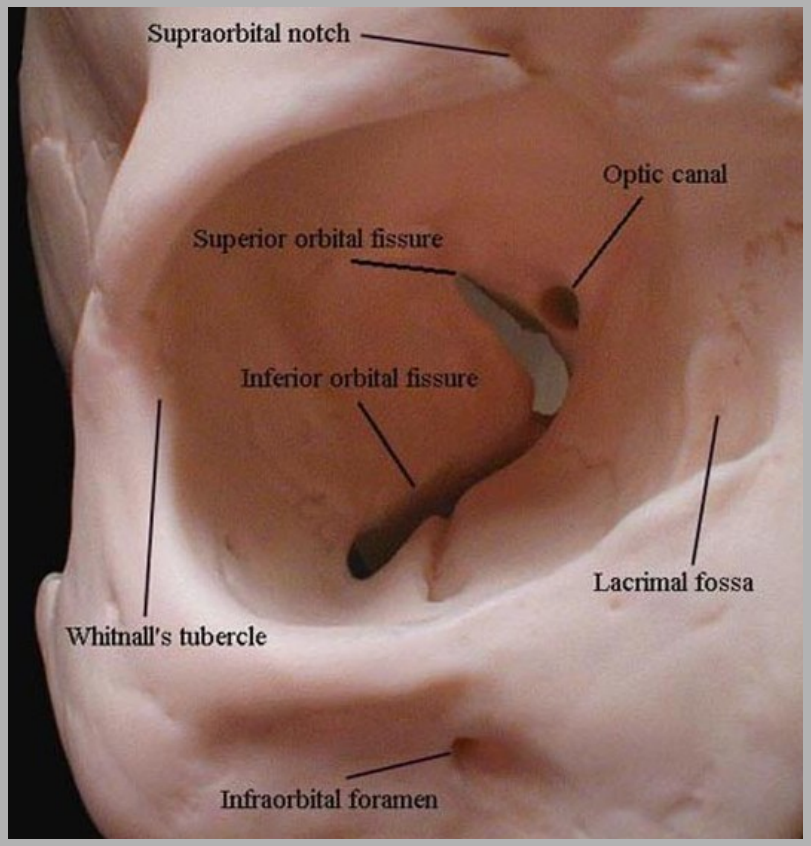


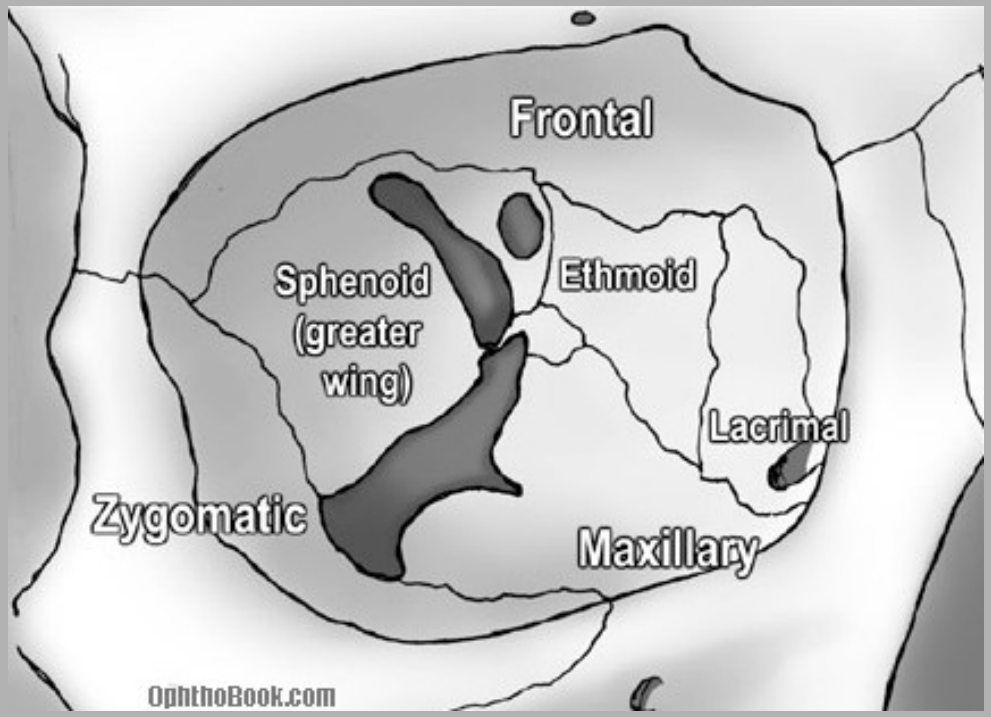
Le Fort III



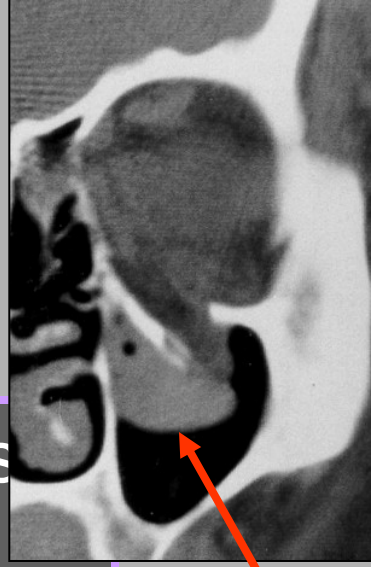
Orbital fractures

Orbita - anatomy



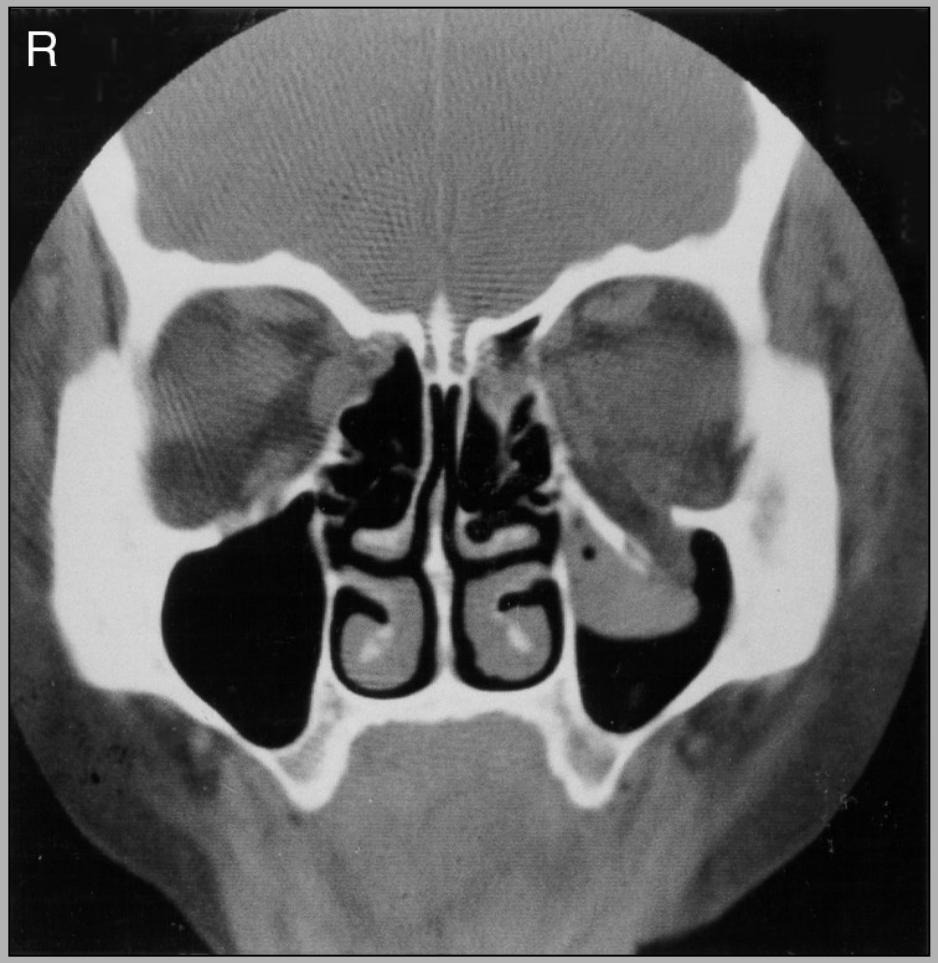


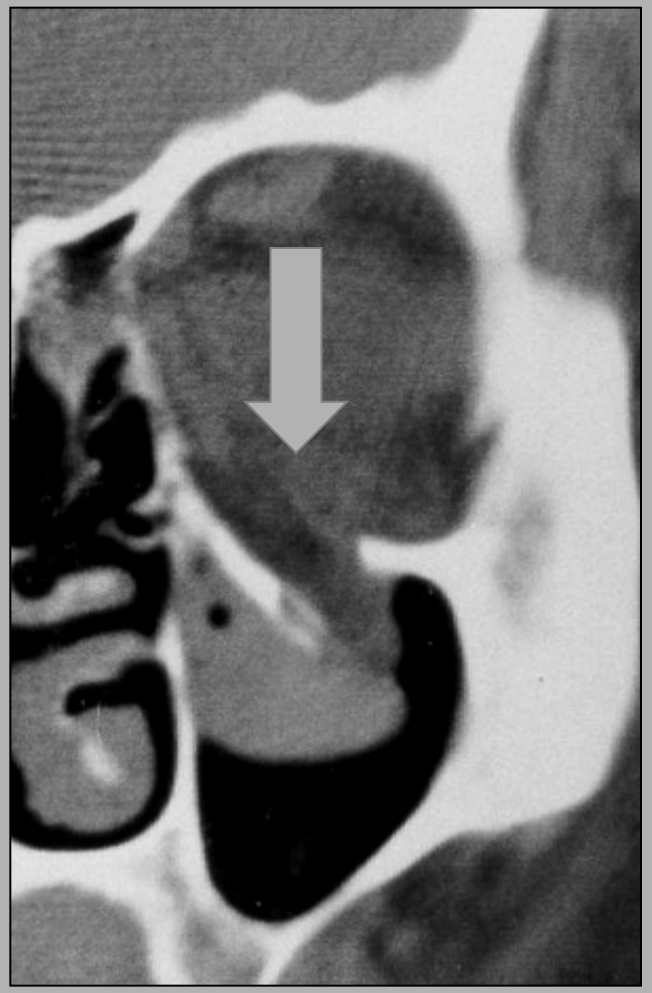
Blow-out fracture



- The force vector goes through thin orbit bas where arise fracture near infraorbital canal
- Soft tissue goes beyond orbital rim
- Injury of maxillar sinus
- Dislocation of orbital base
- Polypoid density at the upper maxillar edge and herniation orbital structures into the maxillar sinus
- Buccal parestesis

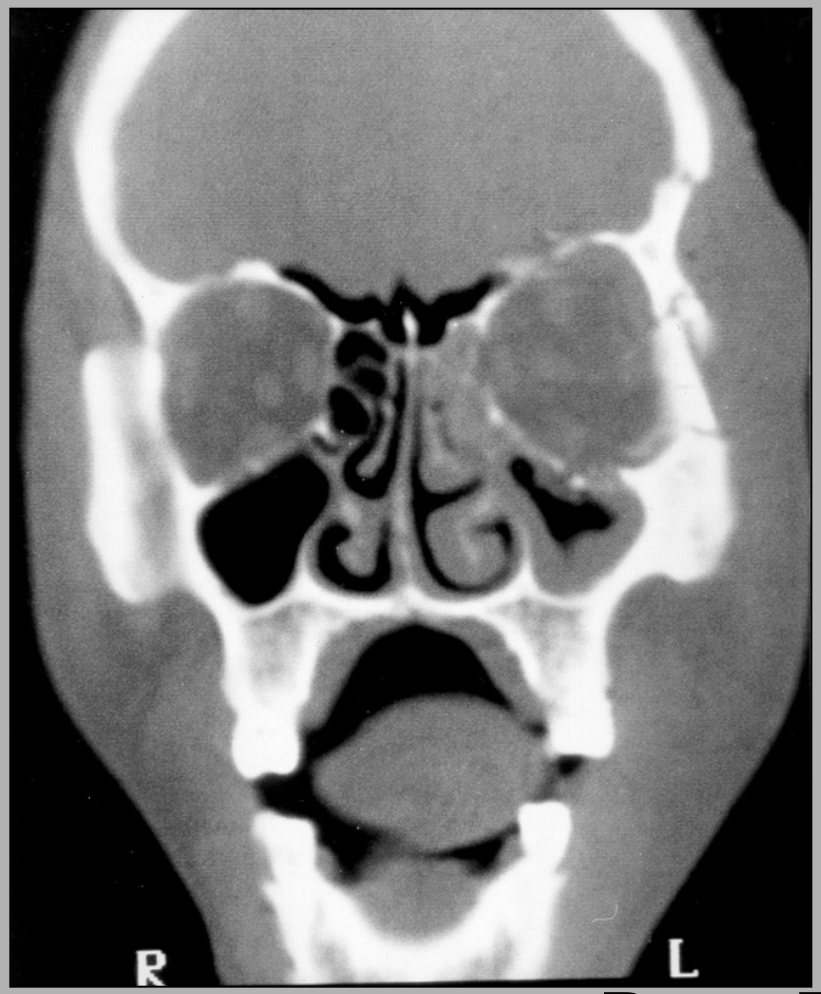
Blow-out fracture





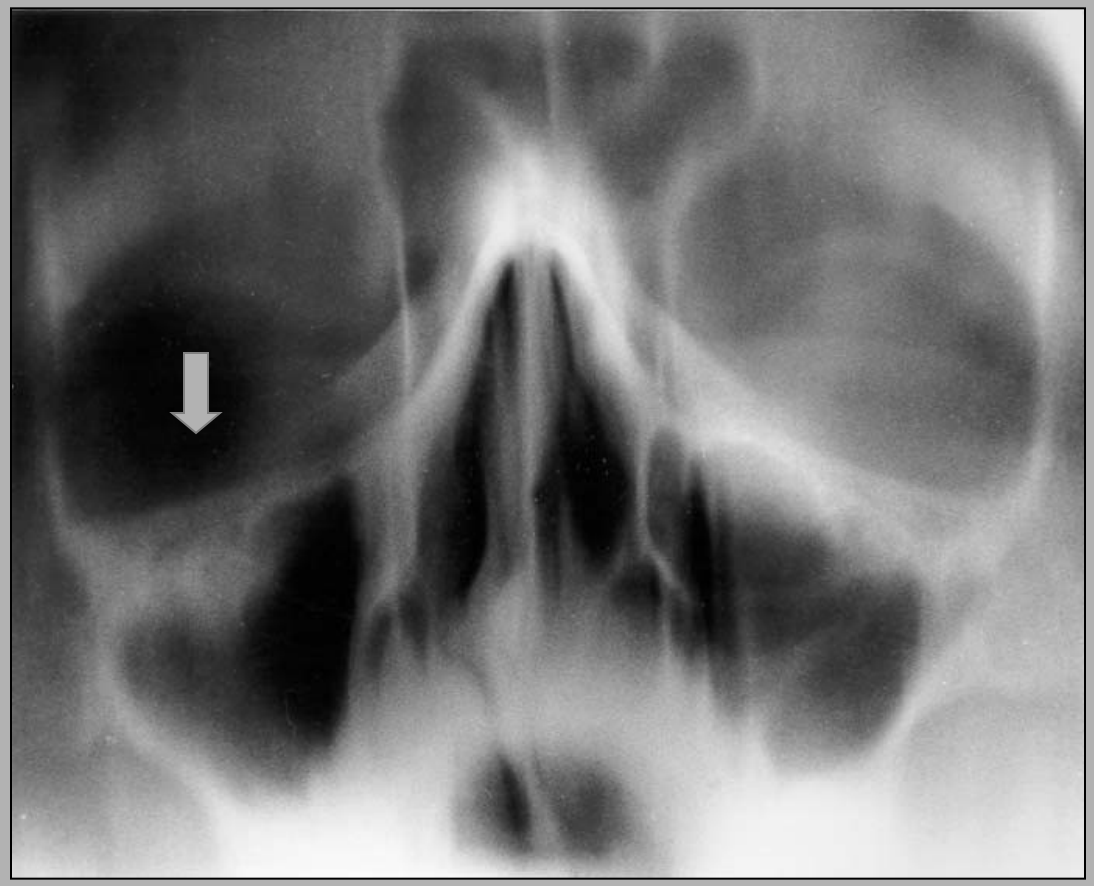
„Blow-out“ of left orbit and infraorbital canal
Coronal CT scans

Blow-out fracture



Proc. Frontozygomaticus fracture
+ „blow-out“ fracture of left orbit
Coronal CT scans

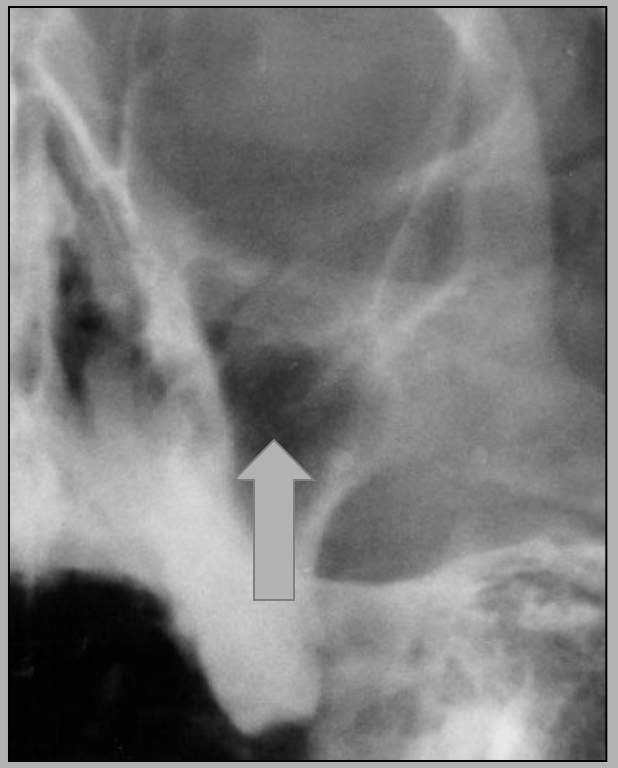
Blow-out fracture



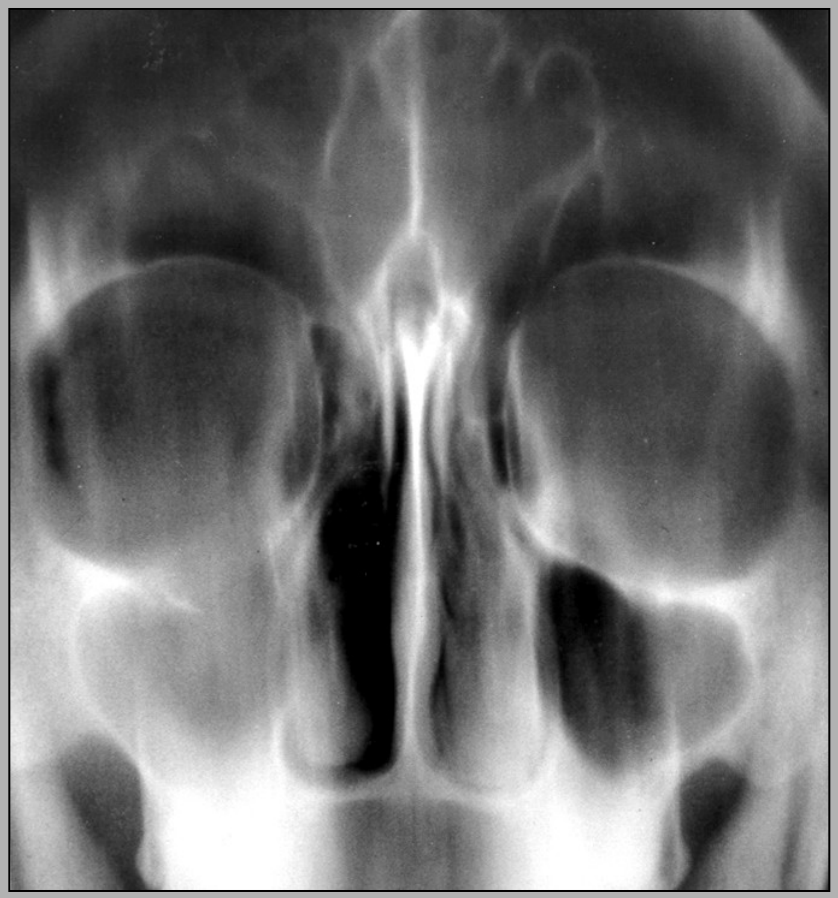
Blow-out fracture

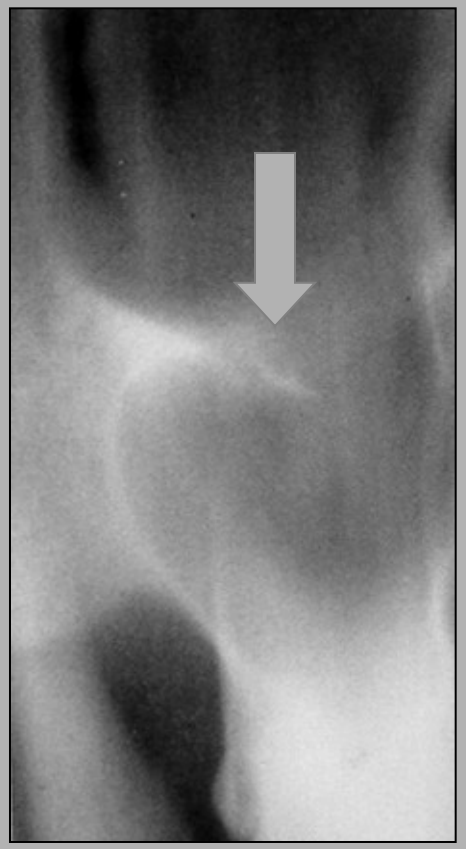
„Blow-out“ fract. Inferior part of right orbit with mucous enlargement

Blow-out fracture



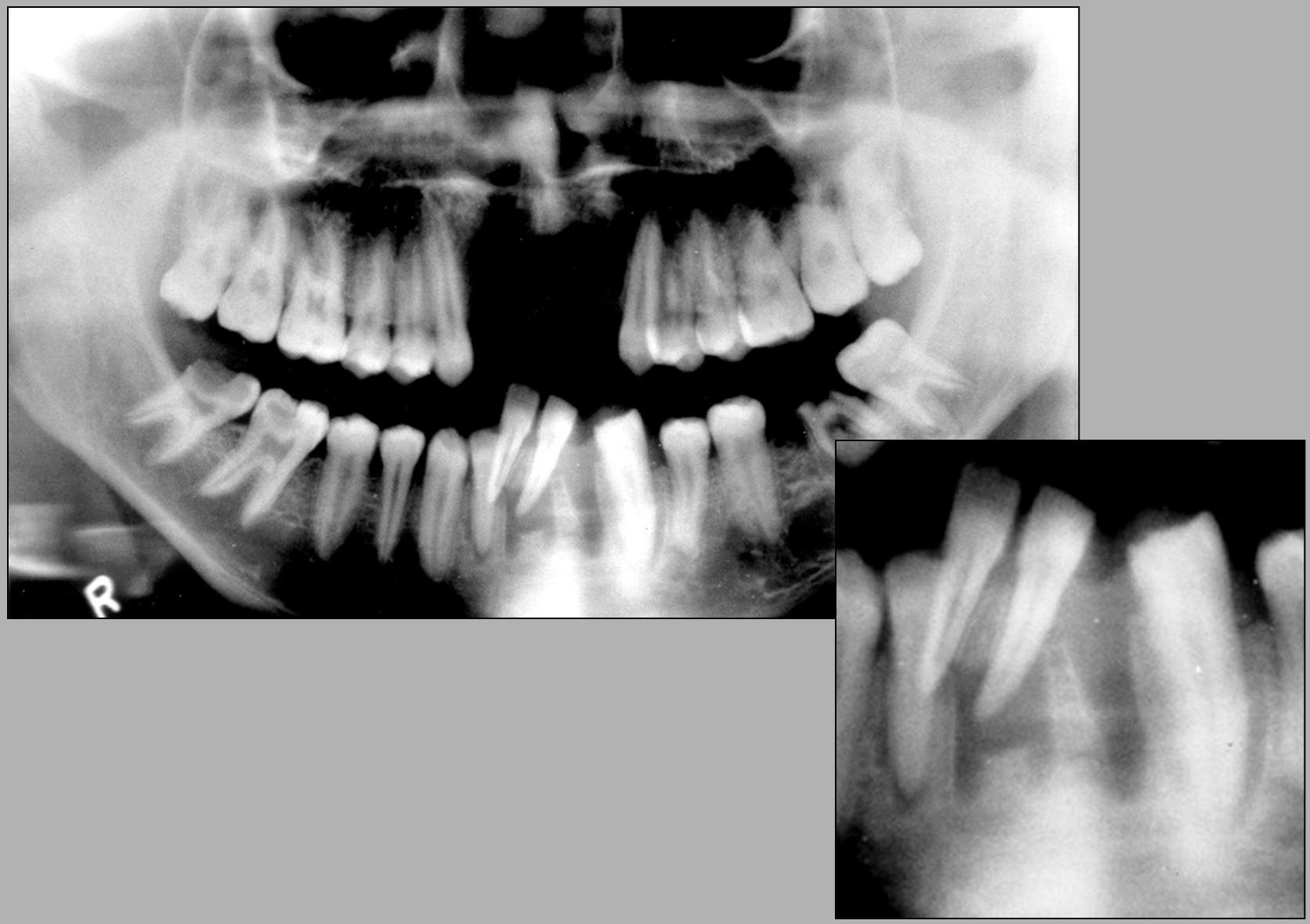
Blow-out fracture



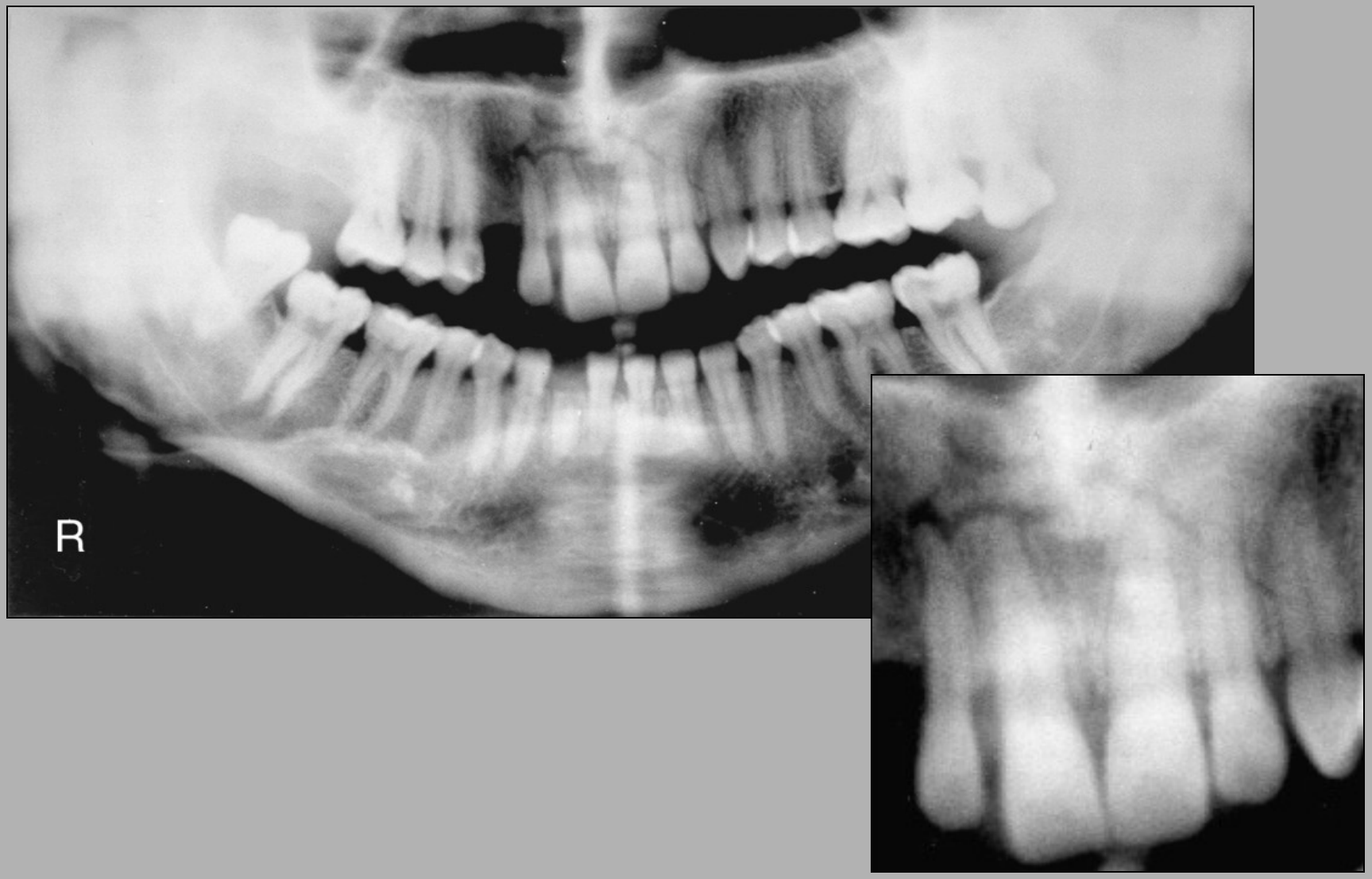


„Blow-out“ fract. of right orbit
“trap door” sign.

Teeth subluxation



Alveolar fracture



THE END

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2013