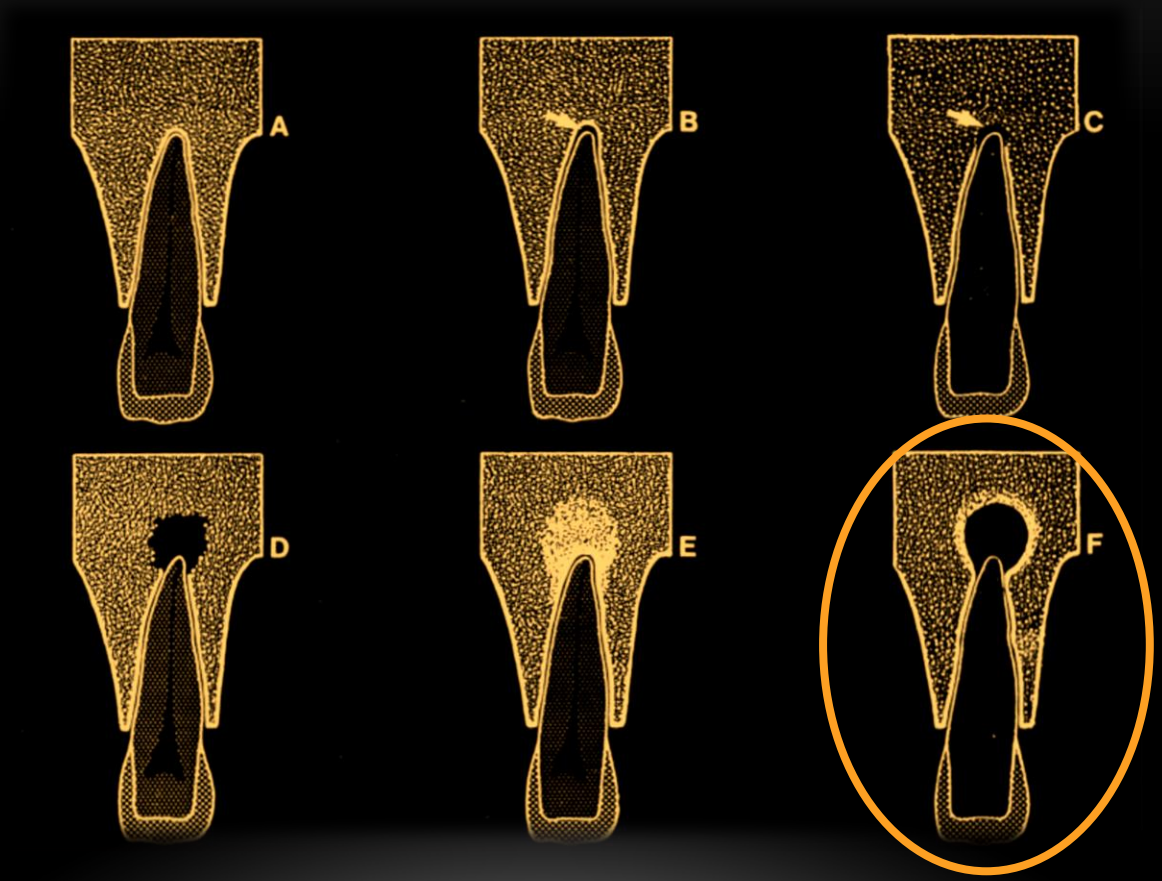
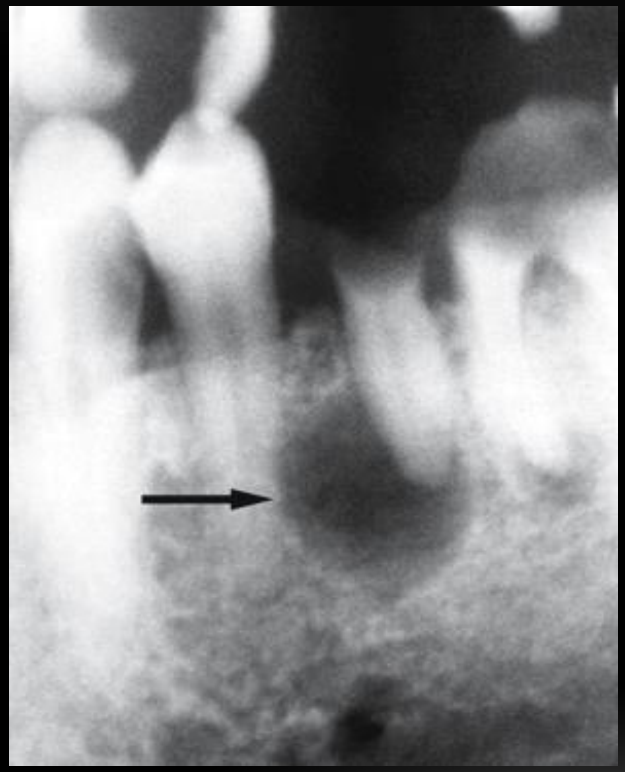
Cysts of the jaws

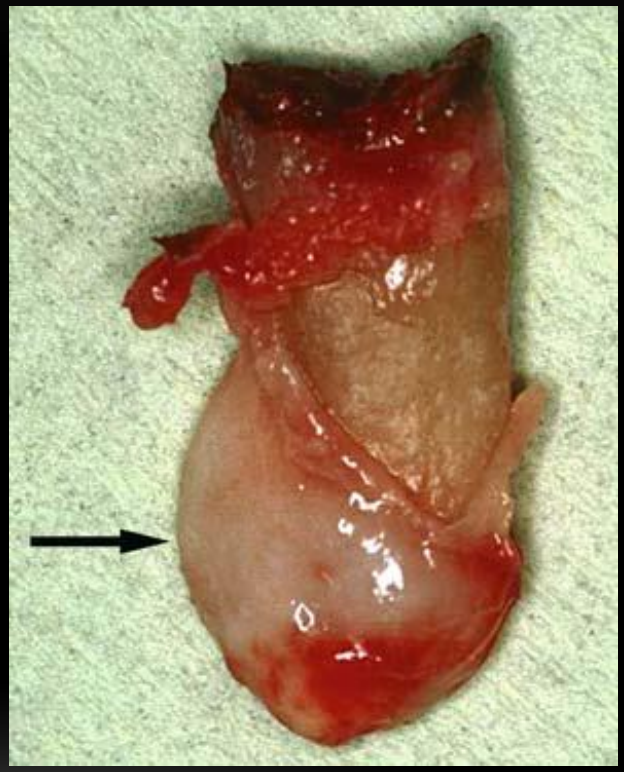
Bálint Vecsei dr.



Granuloma periapicale vs. Cysta radicularis

- *1992 – WHO: Histologic Typing of Odontogenic Tumours* included classification, definitions and histological descriptions of cysts of the jaws
- 1995 - WHO classification of *Head and Neck Tumours* - cysts were excluded, as they have been in all WHO classifications of tumours published since 2000.
- 2005 – Keratocyst as benign tumor in the classification!





RADIOLOGICAL DIFFERENTIAL DIAGNOSIS - **DESCRIBING A LESION**

- Despite the many different conditions that can affect the jaws, they present radiographically only as areas of relative *radiolucency or radiopacity* compared to the surrounding bone.
- Even this division based on radiodensity is not clear-cut - some lesions fall into both categories, but at different stages in their development.

- The recognition of the **pattern**s provides the key to interpretation and the formation of a radiological differential diagnosis.
- A detailed description helps identify these patterns and determine the lesion's basic characteristics.

  - For example, it can show whether the lesion is a cyst or a tumour, whether it is composed of hard or soft tissue and whether, in the case of a tumour, it is benign or malignant. This in turn often determines the mode of treatment. The final definitive diagnosis is almost always based on histological examination.

DETAILED DESCRIPTION OF A LESION

- A systematic description of a lesion should include comments on its:
  - Site
  - Size
  - Shape
  - Outline or edge
  - Relative radiodensity
  - Effect on adjacent structures
  - Time present, if known

SITE

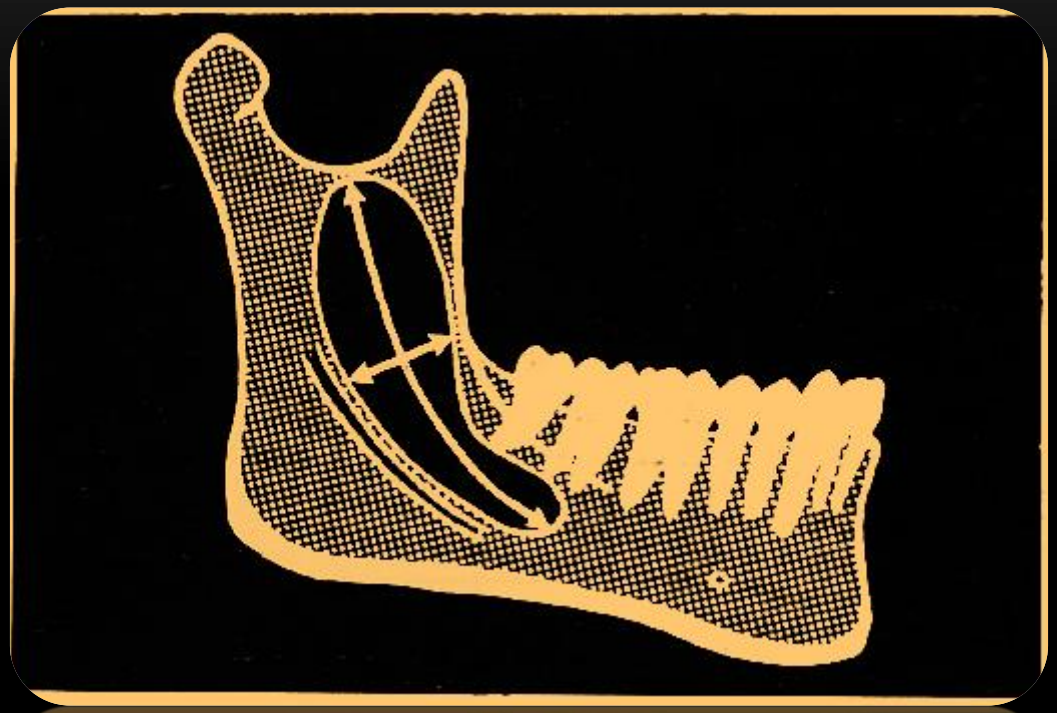
This should be stated precisely, for example the lesion(s) could be in:

- The mandible
    - Anterior region
    - Body, above or below the inferior dental canal, or related to the teeth
    - Angle
    - Ramus
    - Condylar process
    - Coronoid process
    - Bilateral
    - Several sites
- The maxilla
    - Anterior region
    - Posterior region
    - Bilateral
    - Several sites
- Both jaws
- Other bones
    - Multiple lesions may also affect the Cranial vault, long bones or cervical Spine.

SIZE

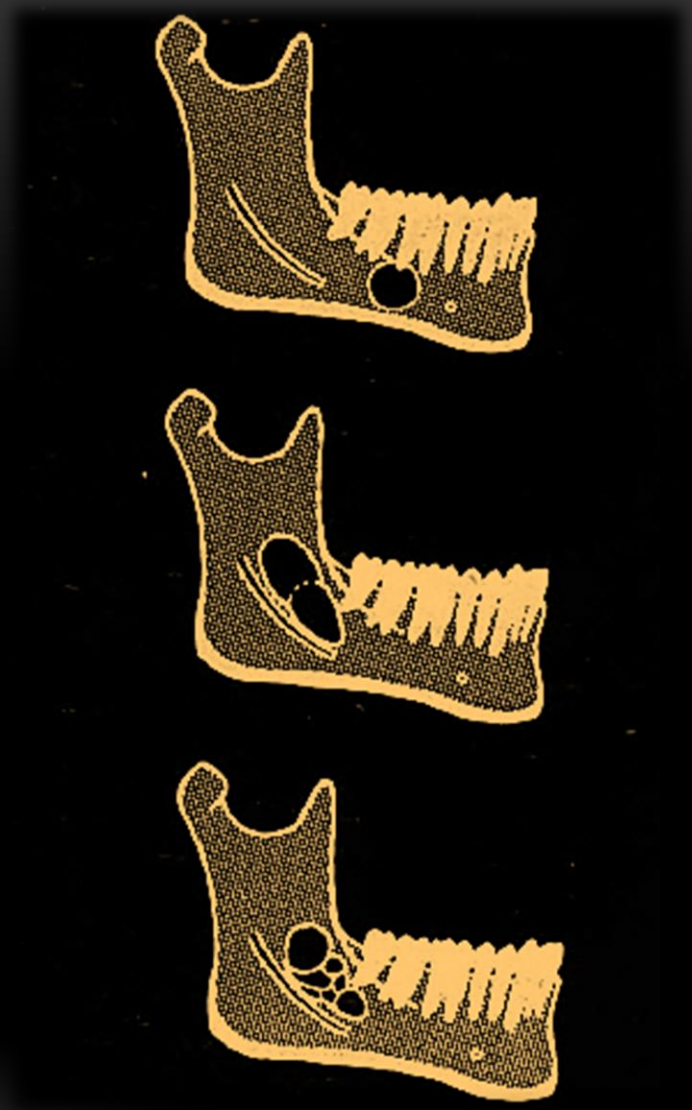
- Conventionally, the lesion is sized in one of two ways:
  - Measuring the dimensions in centimetres
  - Describing the boundaries, i.e. the lesion extends from... to... in one dimension and from... to... in the other dimension

- A few conditions have little or no growth potential and are therefore almost always small (2-3 cm), such as Stafne's idiopathic bone cavity. Tumours, such as ameloblastoma can grow, if untreated, to an enormous size (10 cm or more). The size of a lesion, while not being specific, may give some idea of the type of underlying condition.

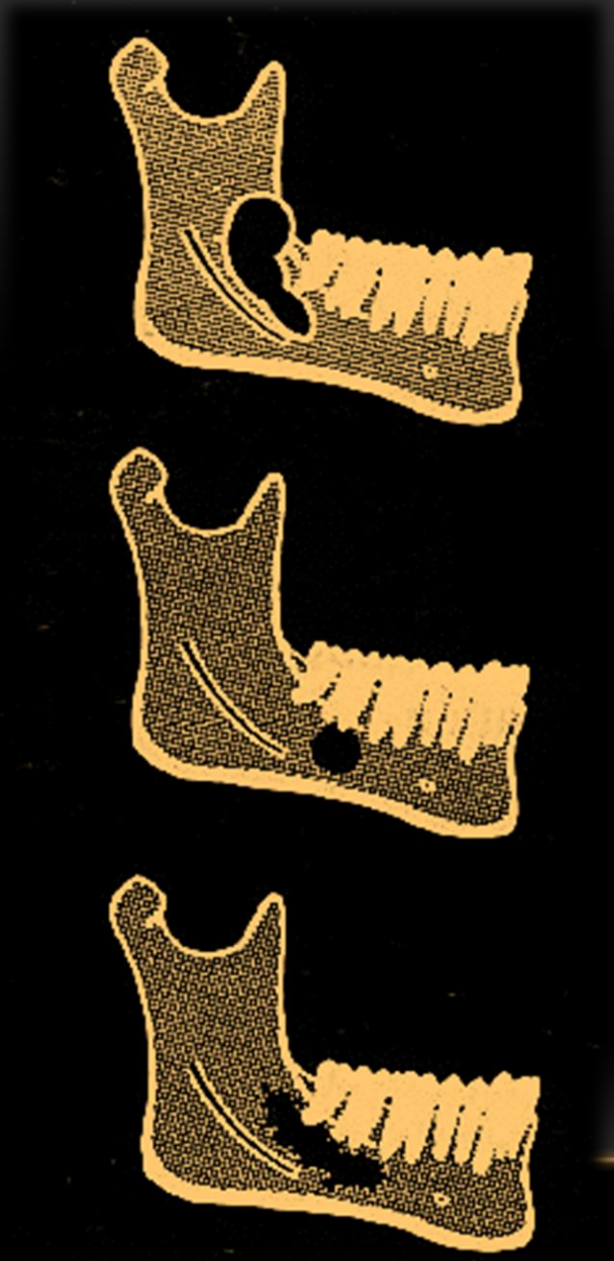


SHAPE

- Conventionally, the shape of the lesion is described using one or more of the following terms:
  - Monolocular
  - Multilocular
  - Pseudoloculated
  - Round
  - Oval
  - Irregular



The shape of a lesion is one of the most useful and specific characteristics contributing to radiological diagnosis.



OUTLINE OR EDGE

- *Definition of the outline*
  - Well defined
  - Moderately well defined
  - Poorly defined.
- *Cortication of the outline*

  The lesion may or may not be surrounded by a radiopaque (white) cortical margin of dense bone.

  The margin could be:
  - Well corticated, with a thick or thin cortex
  - Moderately well corticated
  - Poorly corticated
  - Not corticated.

RELATIVE RADIODENSITY

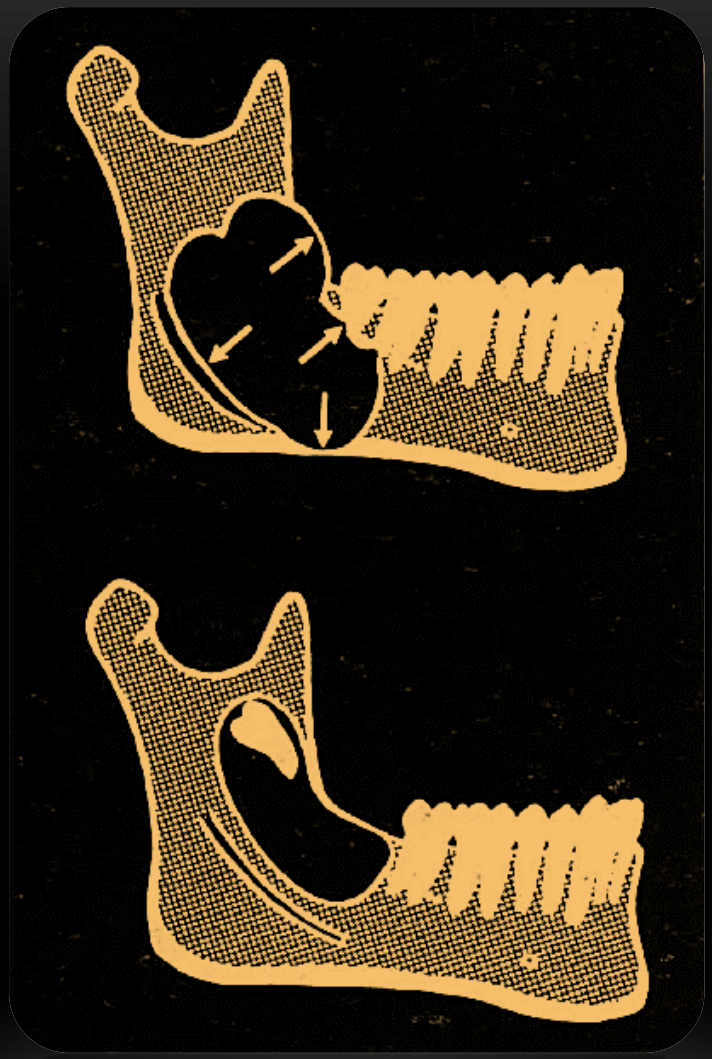
- The radiodensity of the lesion should be assessed relative to the surrounding bone, it could be:
  - Uniformly radiolucent
  - Variable radiolucency
  - Radiolucent with patchy opacities within
  - Radiopaque

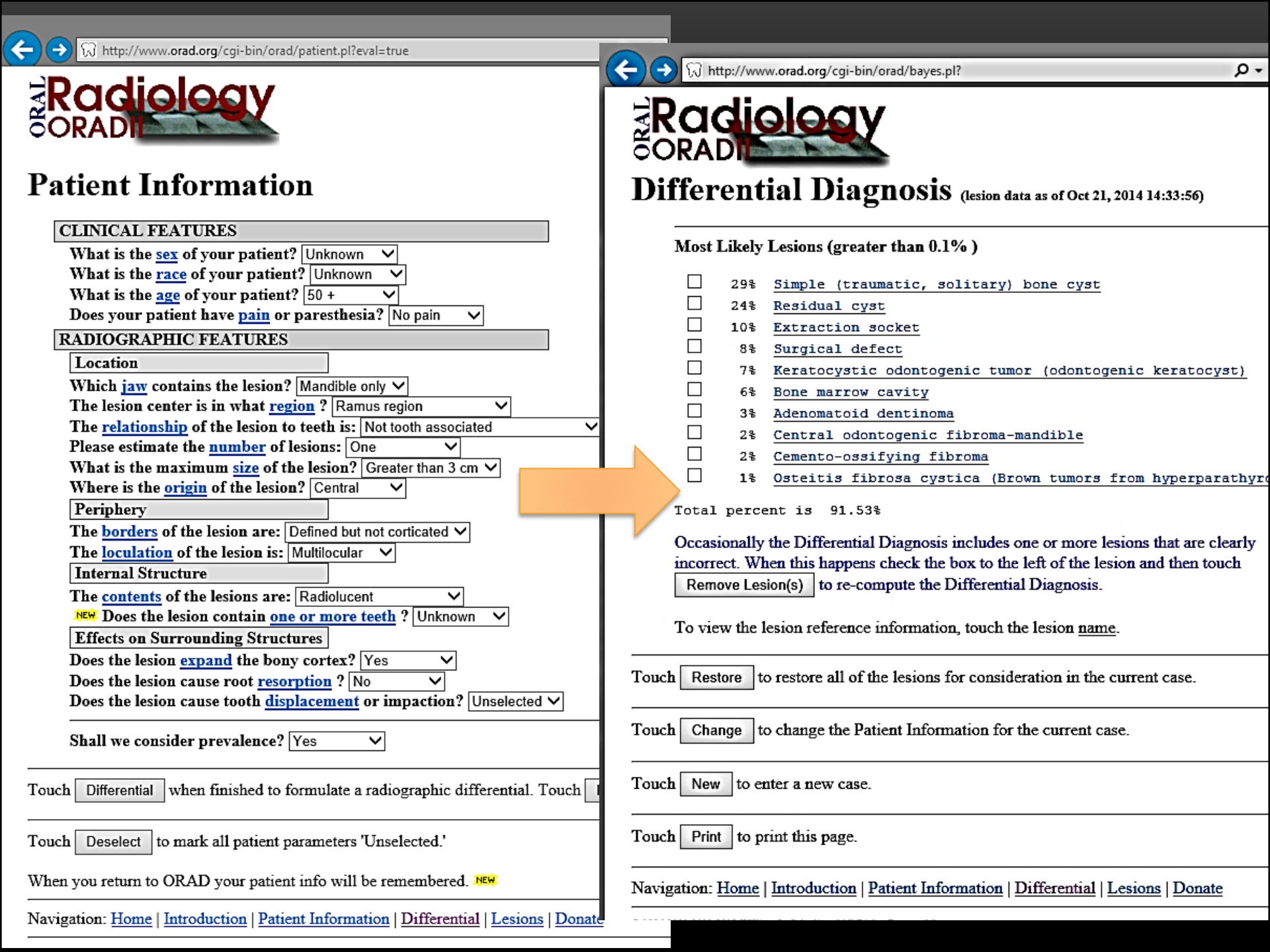
EFFECTS ON ADJACENT STRUCTURES

- The following structures need to be checked:
  - ***The teeth***
    - Resorption
    - Displacement
    - Delayed eruption
    - Disrupted development
    - Hypercementosis
  - ***Surrounding bone***
  - ***Surrounding soft tissues***

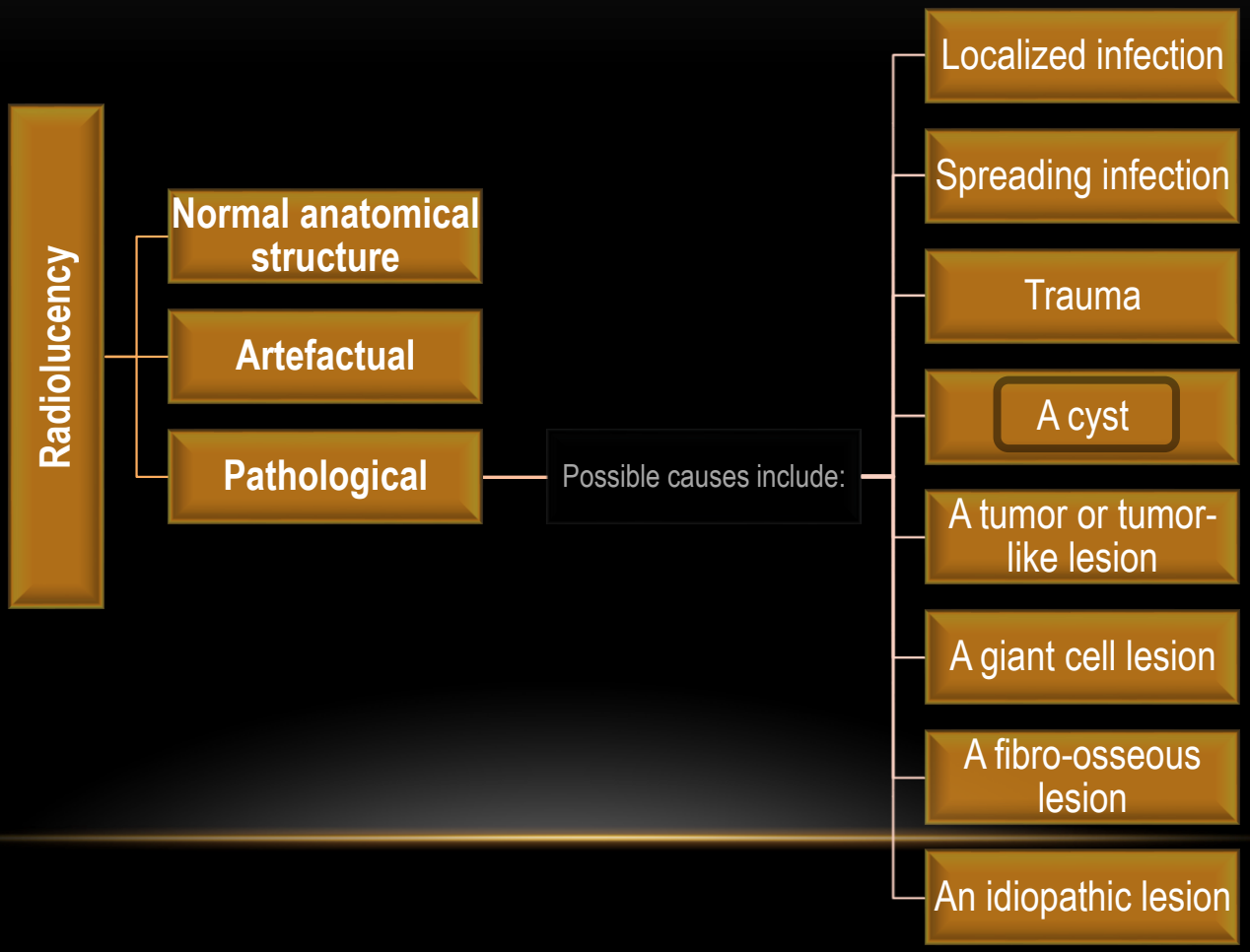
Surrounding bone

- Expansion:
  - Buccal
  - Lingual
  - In other directions
- Displacement or involvement of surrounding structures, including the:
  - Inferior dental canal
  - Mental foramen
  - Antra
  - Lower border of the mandible
  - Nasal cavity
  - Orbits
- Ragged destruction
- Alteration in the trabecular pattern or density
- Subperiosteal new bone formation.




http://www.orad.org/cgi-bin/orad/patient.pl?eval=true
ORAL Radiology ORADI
Patient Information
CLINICAL FEATURES
What is the sex of your patient? Unknown
What is the race of your patient? Unknown
What is the age of your patient? 50 +
Does your patient have pain or paresthesia? No pain
RADIOGRAPHIC FEATURES
Location
Which jaw contains the lesion? Mandible only
The lesion center is in what region ? Ramus region
The relationship of the lesion to teeth is: Not tooth associated
Please estimate the number of lesions: One
What is the maximum size of the lesion? Greater than 3 cm
Where is the origin of the lesion? Central
Periphery
The borders of the lesion are: Defined but not corticated
The loculation of the lesion is: Multilocular
Internal Structure
The contents of the lesions are: Radiolucent
NEW Does the lesion contain one or more teeth ? Unknown
Effects on Surrounding Structures
Does the lesion expand the bony cortex? Yes
Does the lesion cause root resorption ? No
Does the lesion cause tooth displacement or impaction? Unselected
Shall we consider prevalence? Yes
Touch Differential when finished to formulate a radiographic differential. Touch
Touch Deselect to mark all patient parameters 'Unselected.'
When you return to ORAD your patient info will be remembered. NEW
Navigation: Home | Introduction | Patient Information | Differential | Lesions | Donate
http://www.orad.org/cgi-bin/orad/bayes.pl?
ORAL Radiology ORADI
Differential Diagnosis (lesion data as of Oct 21, 2014 14:33:56)
Most Likely Lesions (greater than 0.1%)
29% Simple (traumatic, solitary) bone cyst
24% Residual cyst
10% Extraction socket
8% Surgical defect
7% Keratocystic odontogenic tumor (odontogenic keratocyst)
6% Bone marrow cavity
3% Adenomatoid dentinoma
2% Central odontogenic fibroma-mandible
2% Cemento-ossifying fibroma
1% Osteitis fibrosa cystica (Brown tumors from hyperparathyr
Total percent is 91.53%
Occasionally the Differential Diagnosis includes one or more lesions that are clearly incorrect. When this happens check the box to the left of the lesion and then touch Remove Lesion(s) to re-compute the Differential Diagnosis.
To view the lesion reference information, touch the lesion name.
Touch Restore to restore all of the lesions for consideration in the current case.
Touch Change to change the Patient Information for the current case.
Touch New to enter a new case.
Touch Print to print this page.
Navigation: Home | Introduction | Patient Information | Differential | Lesions | Donate

DIFFERENTIAL DIAGNOSIS OF RADIOLUCENT LESIONS OF THE JAWS



CYSTS OF THE JAWS

***Definition**: A cyst is an epithelial lined, pathological cavity having fluid, semi-fluid or gaseous contents, and surrounded by connective tissue.*

CYSTS - RADIOGRAPHICALLY

- Typically appear with a well-delineated border – (is lacking when inflammation is present)
- At the apex of non-vital tooth
- 1,5-3 cm diameter
- Their growth is slow
- Displaces the sorrounding anatomic structures – depending upon their resistance

- **ETIOLOGY:**
  - Developmental
  - Inflammatory
  - Traumatic
  - Neoplastic

I. ODONTOGENIC CYSTS (with epithelial lining)

1. Radicular cysts

- Apical cyst
- Lateral cyst

2. Periodontal cysts

3. Follicular cysts

- *Before formation of hard tooth substance*
  - Primordial cyst
  - Keratocyst
- *After formation of hard tooth substance*
  - Eruption cyst
  - Coronal cyst
  - Lateral cyst
  - Cyst with rudimentary tooth

4. Residual cysts of all types

II. NONODONTOGENIC CYSTS (with epithelial lining)

1. Nasopalatine cysts
2. Median (fissural) cysts
   - Median alveolar cyst
   - Median palatal cyst
3. Lateral (fissural) cysts
   - Nasoalveolar cyst
   - Globulomaxillary cyst
4. Median mandibular cysts
5. Residual cysts of all types

III. PSEUDOCYSTS (without epithelial lining)

1. Solitary bone cyst
2. Aneurysmatic bone cyst
3. Latent bone cavity (Stafne)

I. Odontogenic cysts

- 1. Radicular cysts
  - Apical cyst
  - Lateral cyst
- 2. Periodontal cysts
- 3. Follicular cysts
  - *Before formation of hard tooth substance*
    - Primordial cyst
    - Keratocyst
  - *After formation of hard tooth substance*
    - Eruption cyst
    - Coronal cyst
    - Lateral cyst
    - Cyst with rudimentary tooth
  - 4. Residual cysts of all types

II. Nonodontogenic cysts

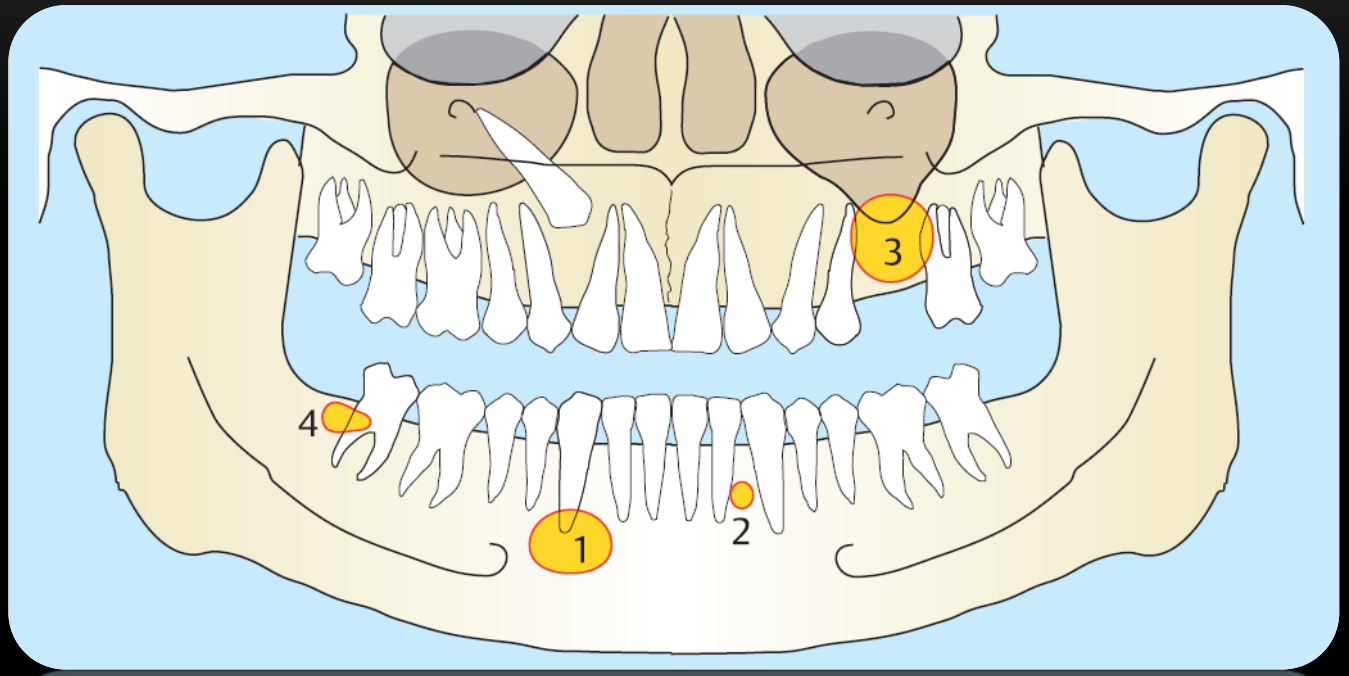
- 1. Nasopalatine cysts
- 2. Median (fissural) cysts
  - Median alveolar cyst
  - Median palatal cyst
- 3. Lateral (fissural) cysts
  - Nasoalveolar cyst
  - Globulomaxillary cyst
- 4. Median mandibular cysts
- 5. Residual cysts of all types

III. Pseudocysts

- 1. Solitary bone cyst
- 2. Aneurysmatic bone cyst
- 3. Latent bone cavity (Stafne)

INFLAMMATION-INDUCED CYSTS

- **I. Odontogenic cysts**
  - 1. Radicular cysts
    - Apical cyst
    - Lateral cyst
  - 2. Periodontal cysts
  - 3. Follicular cysts
    - *Before formation of hard tooth substance*
      - Primordial cyst
      - Keratocyst
    - *After formation of hard tooth substance*
      - Eruption cyst
      - Coronal cyst
      - Lateral cyst
      - Cyst with rudimentary tooth
  - 4. Residual cysts of all types
- **II. Nonodontogenic cysts**
  - 1. Nasopalatine cysts
  - 2. Median (fissural) cysts
    - Median alveolar cyst
    - Median palatal cyst
  - 3. Lateral (fissural) cysts
    - Nasoalveolar cyst
    - Globulomaxillary cyst
  - 4. Median mandibular cysts
  - 5. Residual cysts of all types
- **III. Pseudocysts**
  - 1. Solitary bone cyst
  - 2. Aneurysmatic bone cyst
  - 3. Latent bone cavity (Stafne)



1 Apical radicular cyst
2 Lateral radicular cyst
3 Residual radicular cyst
4 Paradental (Craig) cyst

DEVELOPMENTALLY INDUCED ODONTOGENIC CYSTS

I. Odontogenic cysts

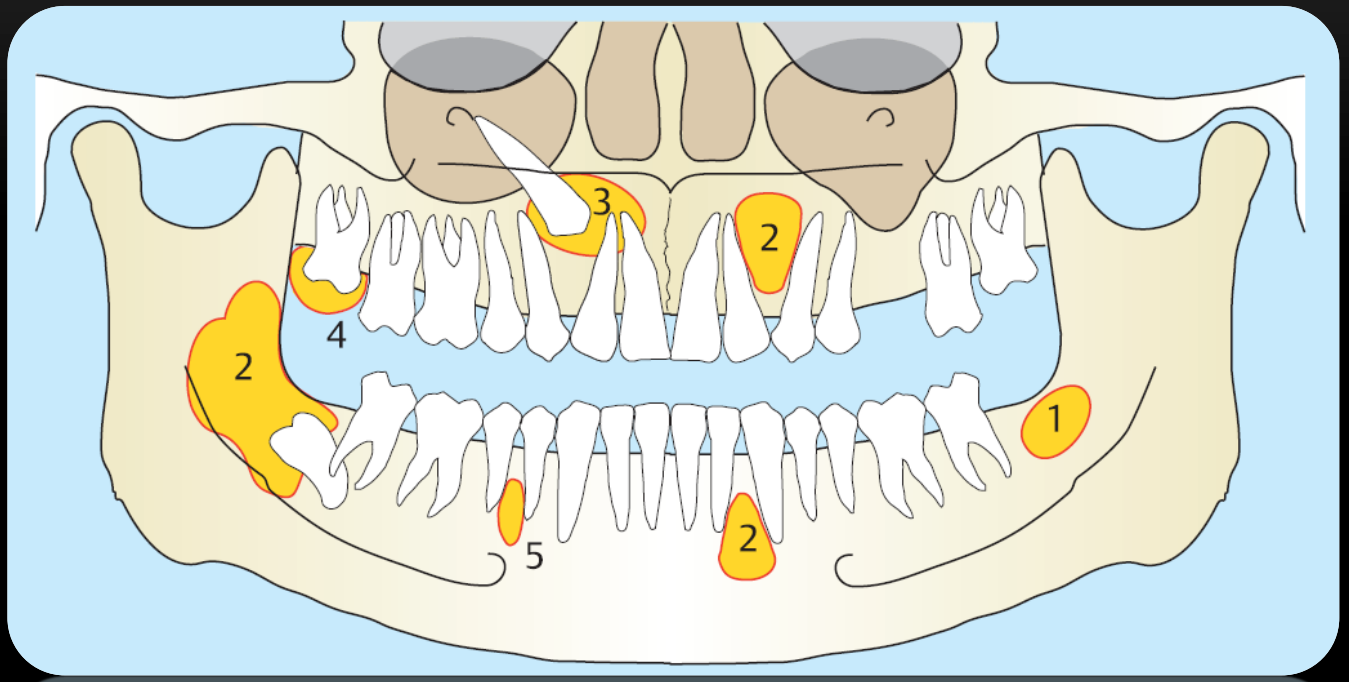
- 1. Radicular cysts
  - Apical cyst
  - Lateral cyst
- 2. Periodontal cysts
- 3. Follicular cysts
  - *Before formation of hard tooth substance*
    - Primordial cyst
    - Keratocyst
  - *After formation of hard tooth substance*
    - Eruption cyst
    - Coronal cyst
    - Lateral cyst
    - Cyst with rudimentary tooth
- 4. Residual cysts of all types

II. Nonodontogenic cysts

- 1. Nasopalatine cysts
- 2. Median (fissural) cysts
  - Median alveolar cyst
  - Median palatal cyst
- 3. Lateral (fissural) cysts
  - Nasoalveolar cyst
  - Globulomaxillary cyst
- 4. Median mandibular cysts
- 5. Residual cysts of all types

III. Pseudocysts

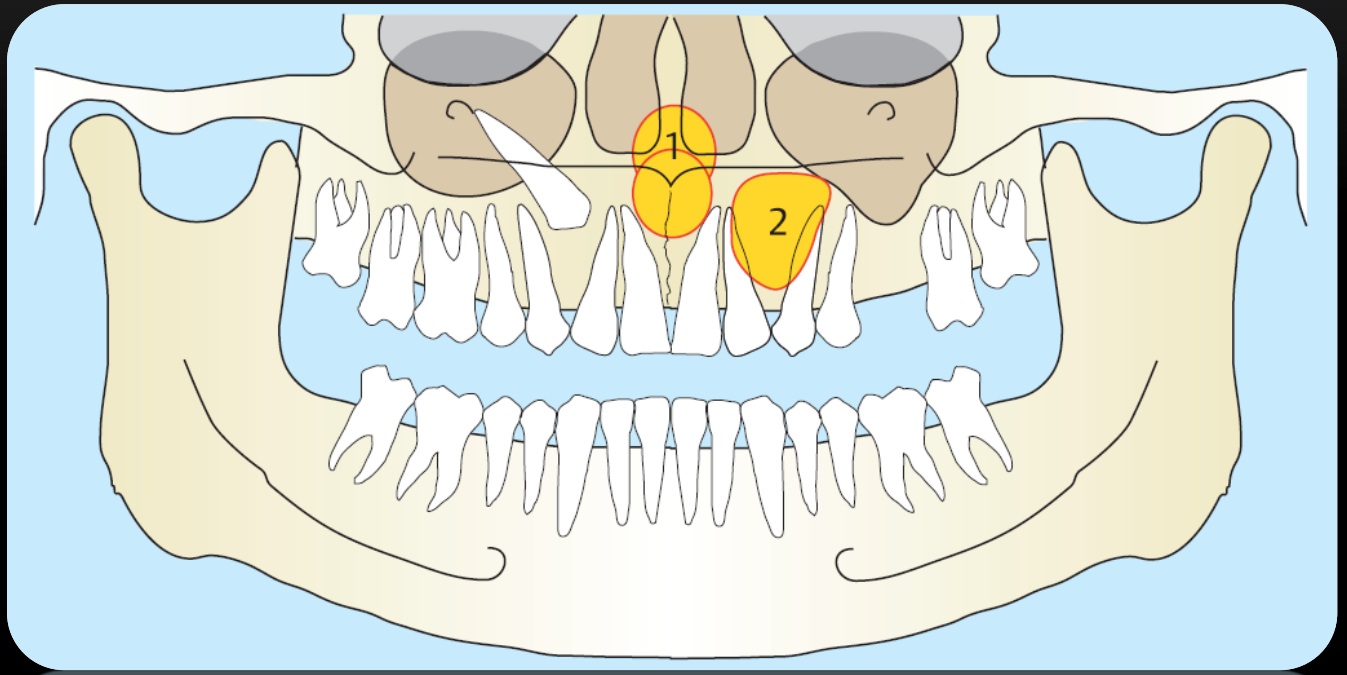
- 1. Solitary bone cyst
- 2. Aneurysmatic bone cyst
- 3. Latent bone cavity (Stafne)



1 Primordial cyst
2 Keratocyst
3 Follicular cyst (Coronal cyst)
4 Eruption cyst
5 Lateral periodontal cyst

DEVELOPMENTALLY INDUCED NONODONTOGENIC CYSTS

- **I. Odontogenic cysts**
  - 1. Radicular cysts
    - Apical cyst
    - Lateral cyst
  - 2. Periodontal cysts
  - 3. Follicular cysts
    - *Before formation of hard tooth substance*
      - Primordial cyst
      - Keratocyst
    - *After formation of hard tooth substance*
      - Eruption cyst
      - Coronal cyst
      - Lateral cyst
      - Cyst with rudimentary tooth
  - 4. Residual cysts of all types
- **II. Nonodontogenic cysts**
  - 1. Nasopalatine cysts
  - 2. Median (fissural) cysts
    - Median alveolar cyst
    - Median palatal cyst
  - 3. Lateral (fissural) cysts
    - Nasoalveolar cyst
    - Globulomaxillary cyst
  - 4. Median mandibular cysts
  - 5. Residual cysts of all types
- **III. Pseudocysts**
  - 1. Solitary bone cyst
  - 2. Aneurysmatic bone cyst
  - 3. Latent bone cavity (Stafne)



1 Nasopalatine cyst
2 Nasolabial (globulomaxillary) cyst

DISTRIBUTION OF 3498 JAW CYSTS ACCORDING TO DIAGNOSIS

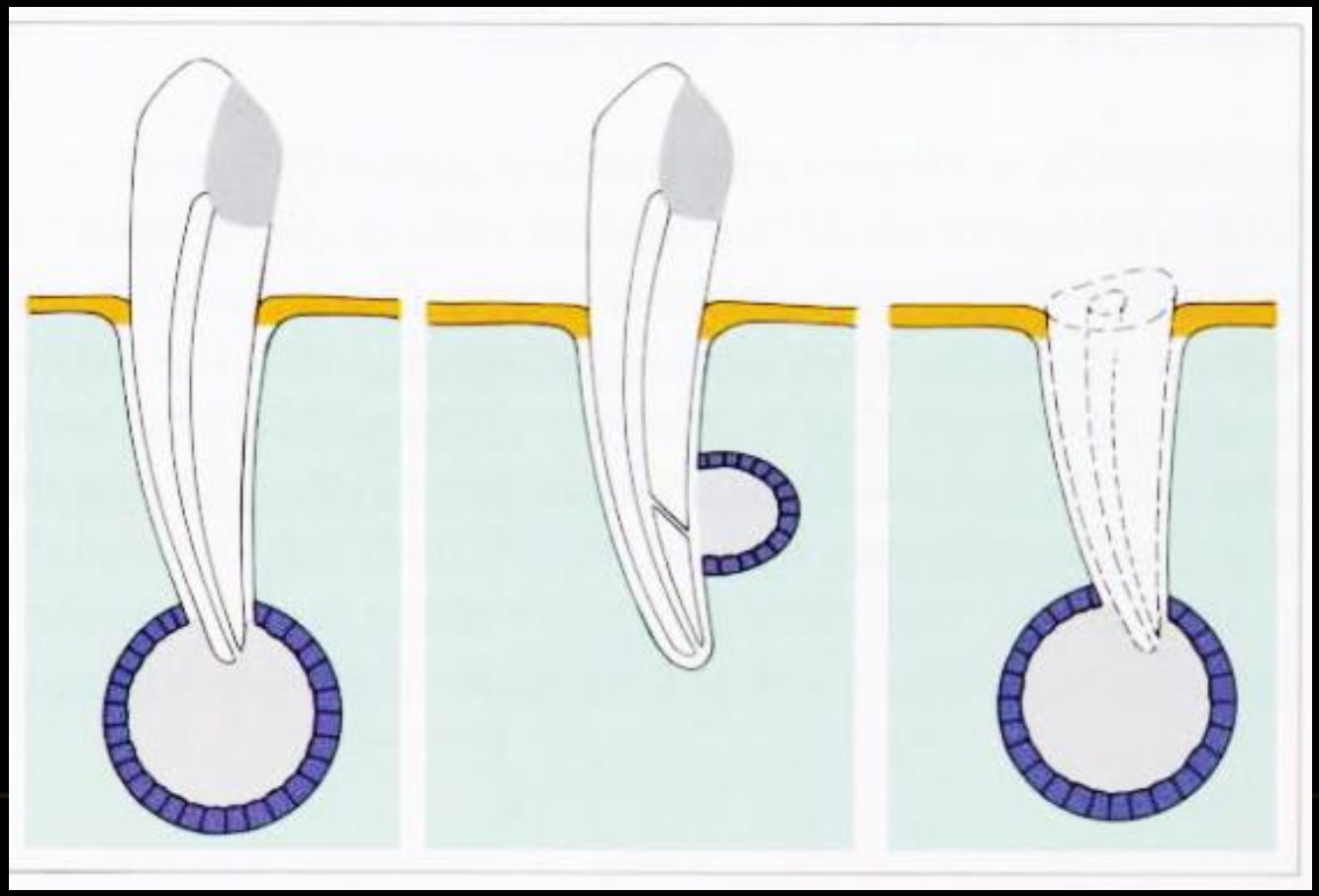
Cysts	Number	%
Radicular/residual cyst	1825	52.2
Dentigerous (follicular) cyst	599	17.1
Odontogenic keratocyst (including orthokeratinised)	355	10.2
Nasopalatine duct cyst	404	11.6
Paradental cyst (including juvenile type)	94	2.7
Solitary bone cyst	35	1.0
Calcifying cystic odontogenic tumour	28	0.8
Eruption cyst	27	0.8
Developmental lateral periodontal cyst	24	0.7
Nasolabial cyst	21	0.6
Gingival cyst of adults	21	0.6
So-called 'globulomaxillary' cysts	18	0.5
Inflammatory collateral cyst	15	0.4
Aneurysmal bone cyst	15	0.4
Glandular odontogenic cyst (since 1992)	6	0.2
Postoperative maxillary cyst	5	0.1
Mucosal cyst of maxillary antrum	4	0.1
Total	3498	100.00

DISTRIBUTION OF 7121 ODONTOGENIC CYSTS ACCORDING TO DIAGNOSIS. FROM JONES *ET AL*. (2006), SHEFFIELD.

Cysts	Number	%
Radicular cyst	3724	52.3
Dentigerous cyst	1292	18.1
Odontogenic keratocyst (including orthokeratinised)	828	11.6
Residual cyst	573	8.0
Paradental cyst	402	5.6
Unclassified odontogenic cysts	210	2.9
Lateral periodontal cyst	28	0.4
Calcifying odontogenic cyst	21	0.3
Gingival cyst	16	0.2
Eruption cyst	15	0.2
Glandular odontogenic cyst	11	0.2
Epstein pearl	1	0.0
Total	7121	100.00

RADICULAR CYSTS

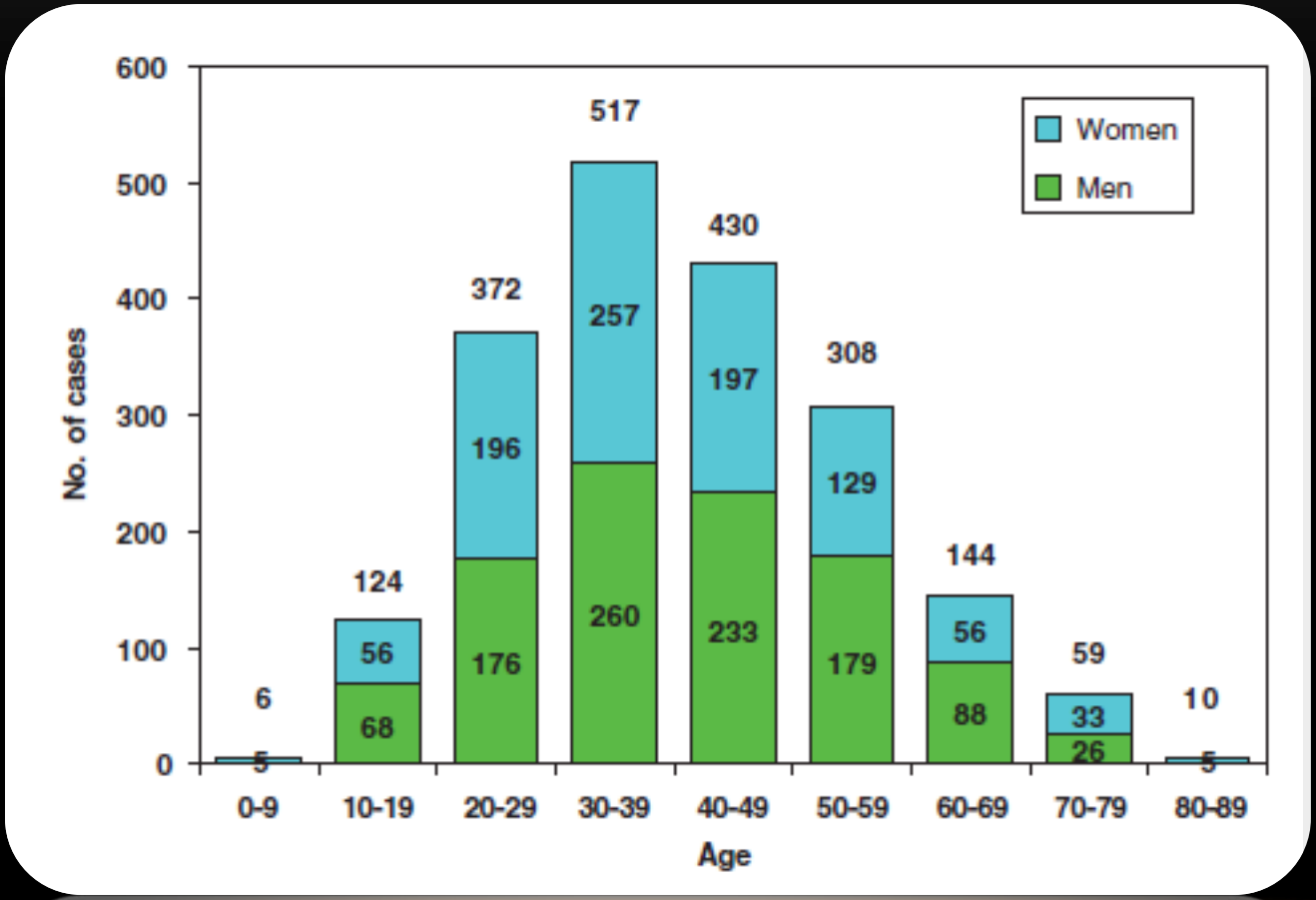
apical lateral residual



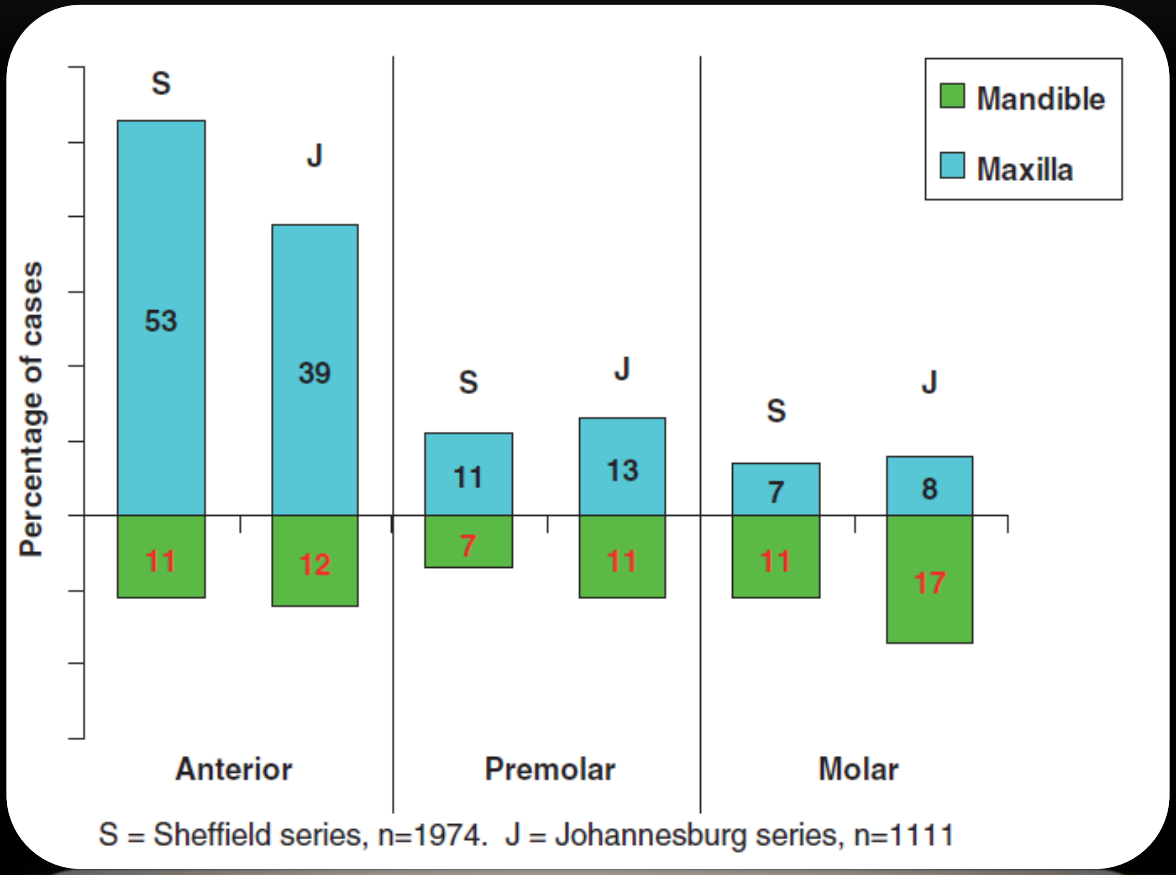
RADICULAR CYST

- Arise from epithelial remnants
- The rests of Malassez – the Hertwig epithelial sheat
- These cells proliferate as a result of inflammation
- Always derives from nonvital teeth

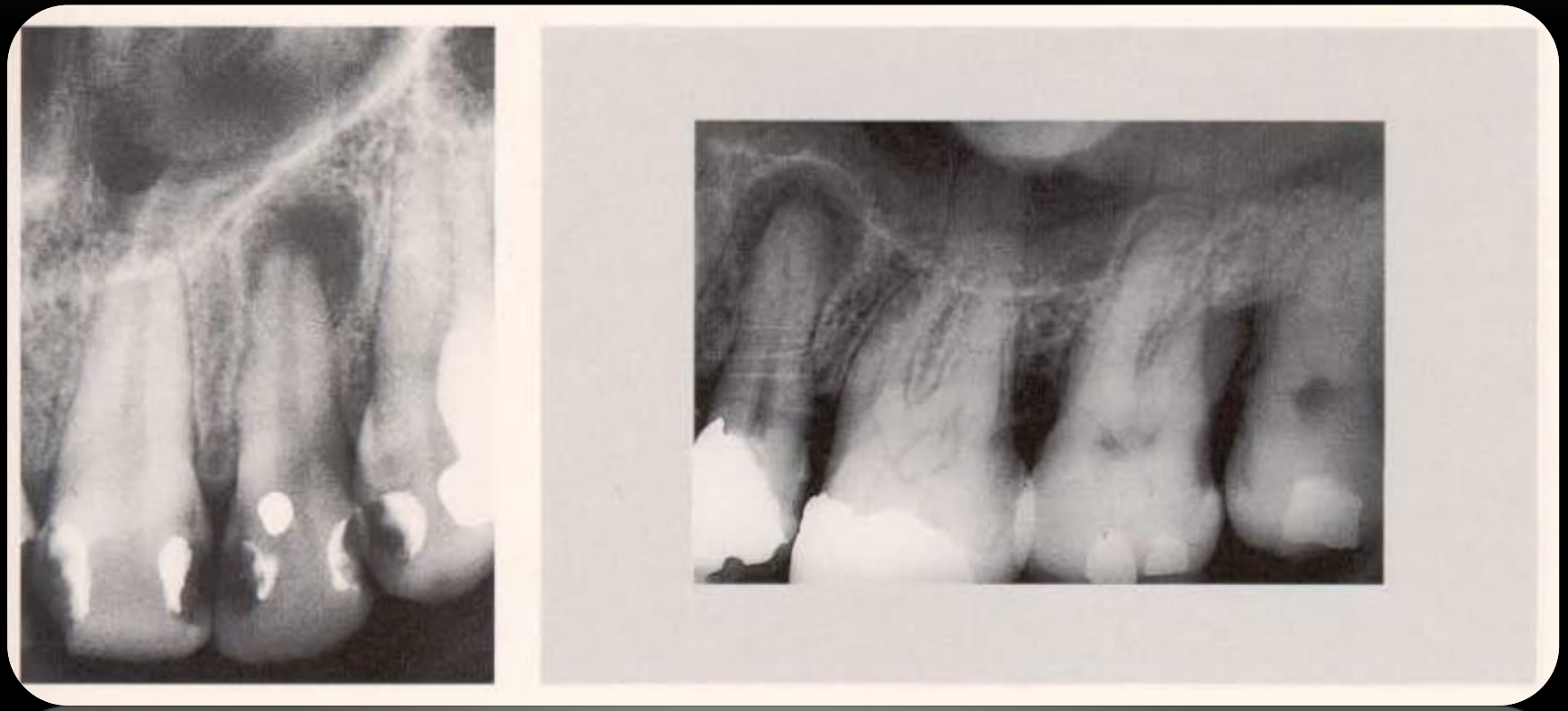
AGE DISTRIBUTION AGE DISTRIBUTION OF 1970 PATIENTS WITH RADICULAR CYSTS *SHEFFIELD*, ENGLAND, 1990–2004 (N=1970).



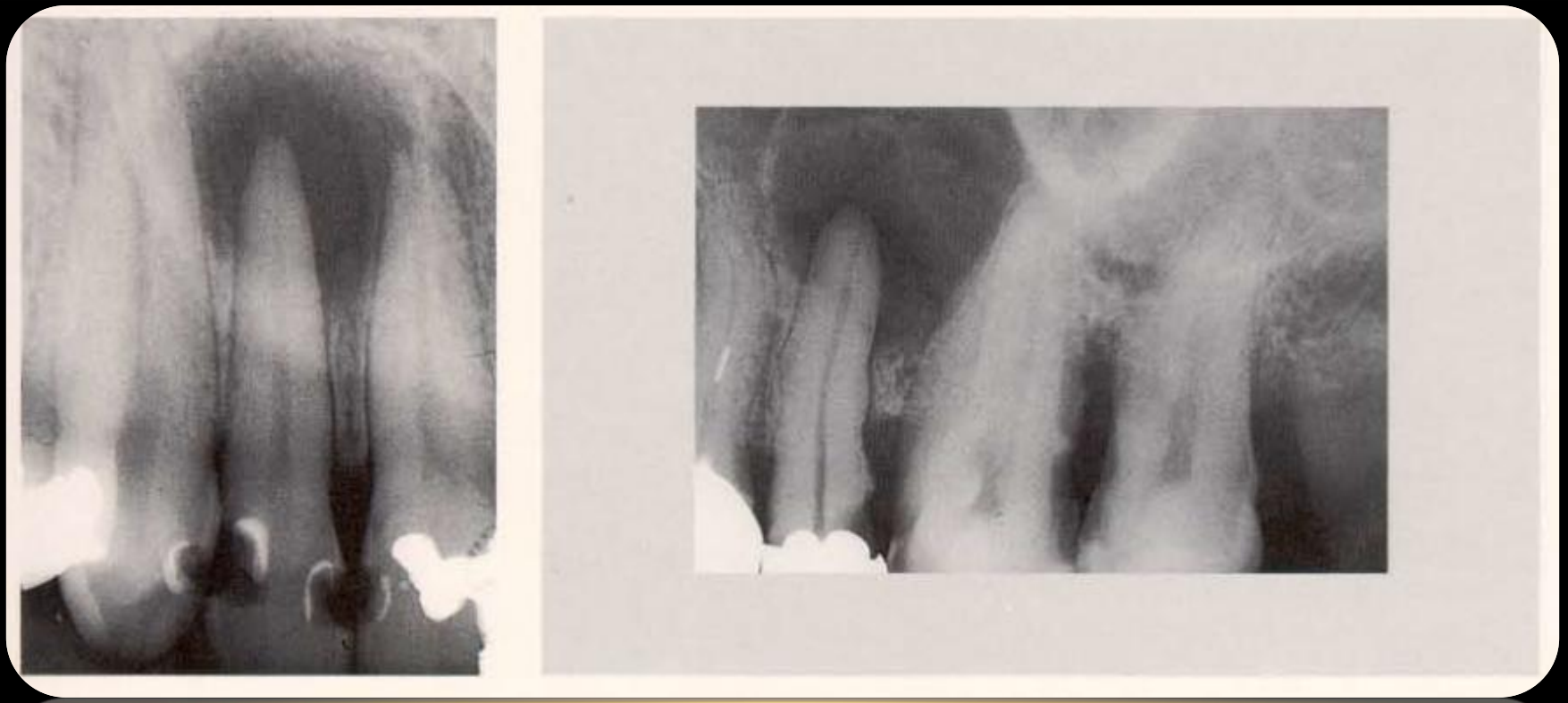
SITE DISTRIBUTION OF RADICULAR CYST



TYPICAL RADICULAR CYSTS



INFECTED RADICULAR CYST



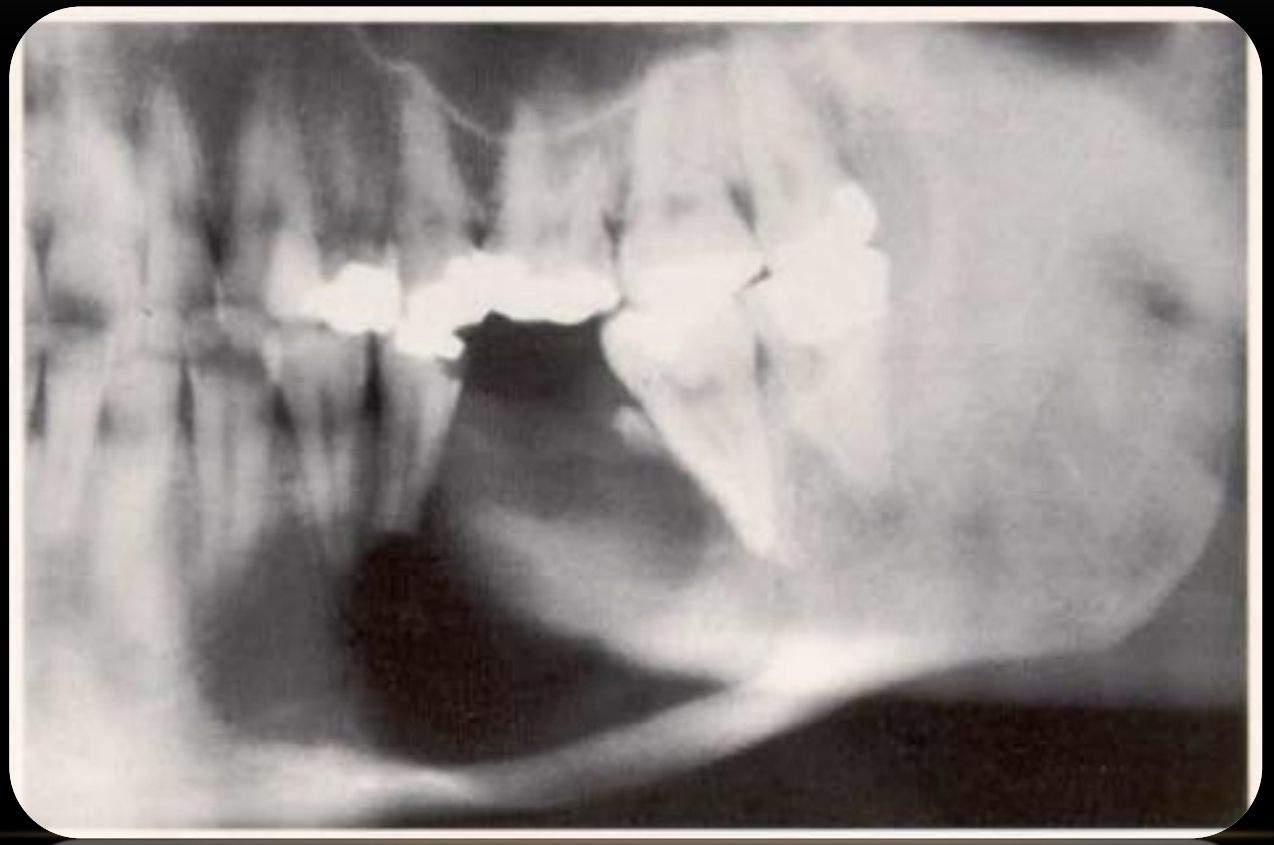
RADIOGRAPHIC SIGNS OF RADICULAR CYSTS

- Round radiolucency with an opaque border
- Apex of the tooth is within the radiolucency
- Adjacent teeth and structures are displaced

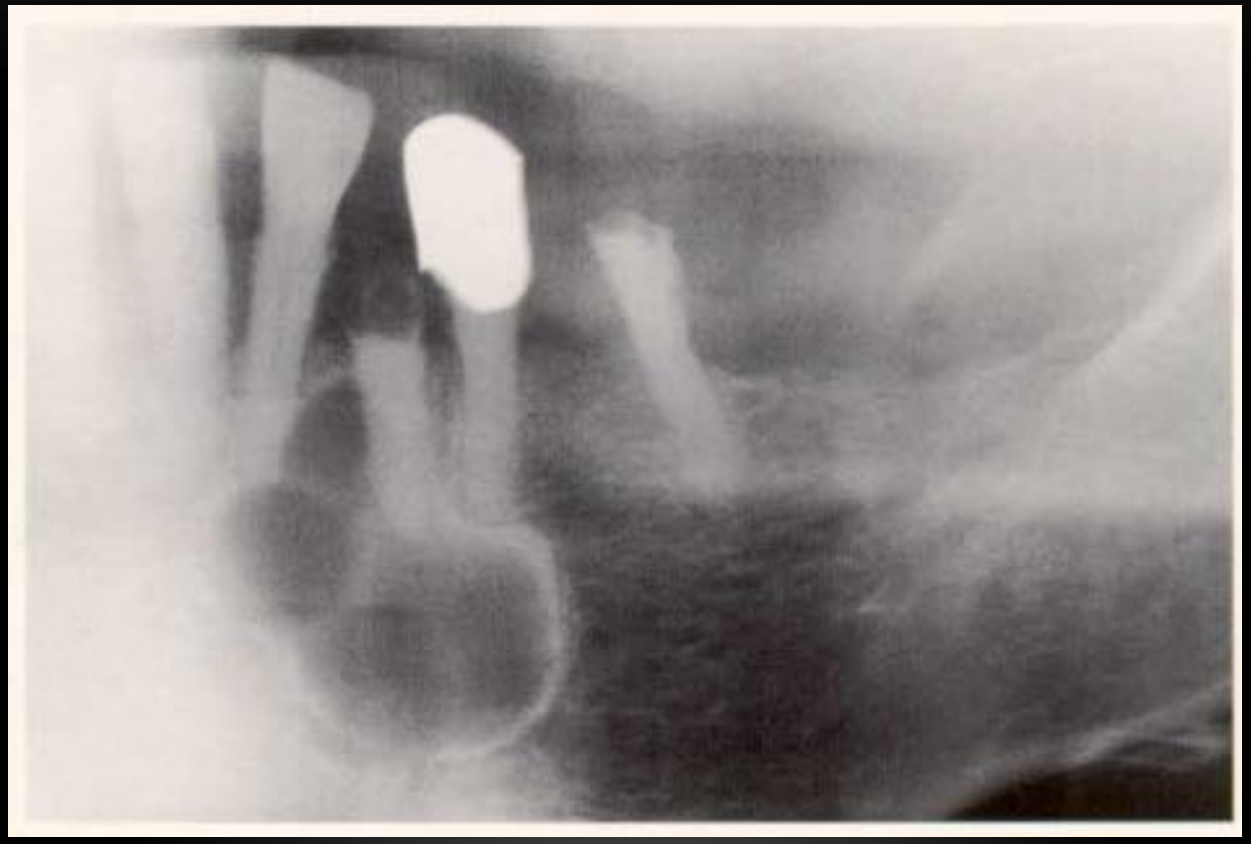
Infected cyst:

- Cystic cavity exhibits poorly demarcated borders.
- Background structures become invisible and the defect appears as tunneling.
- Periodontal ligament space around the involved tooth becomes widened.

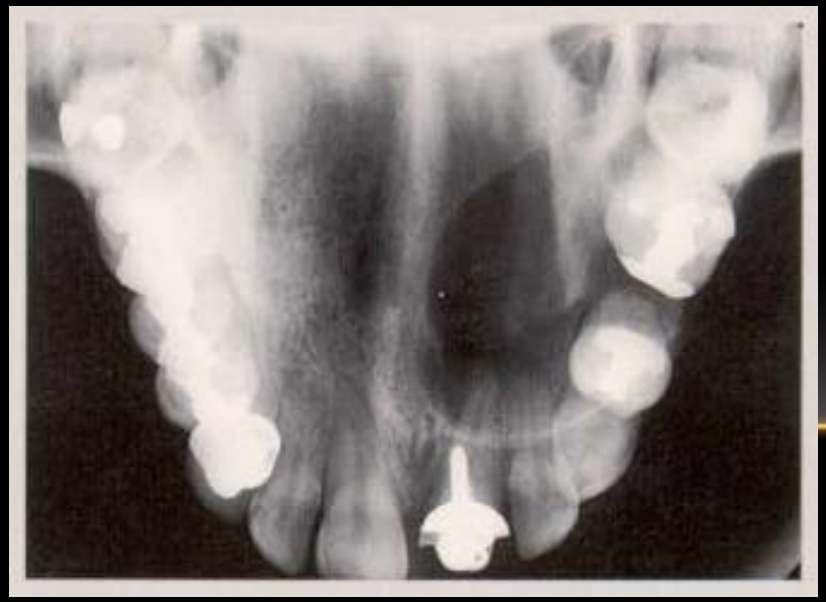
INFECTED RADICULAR CYST

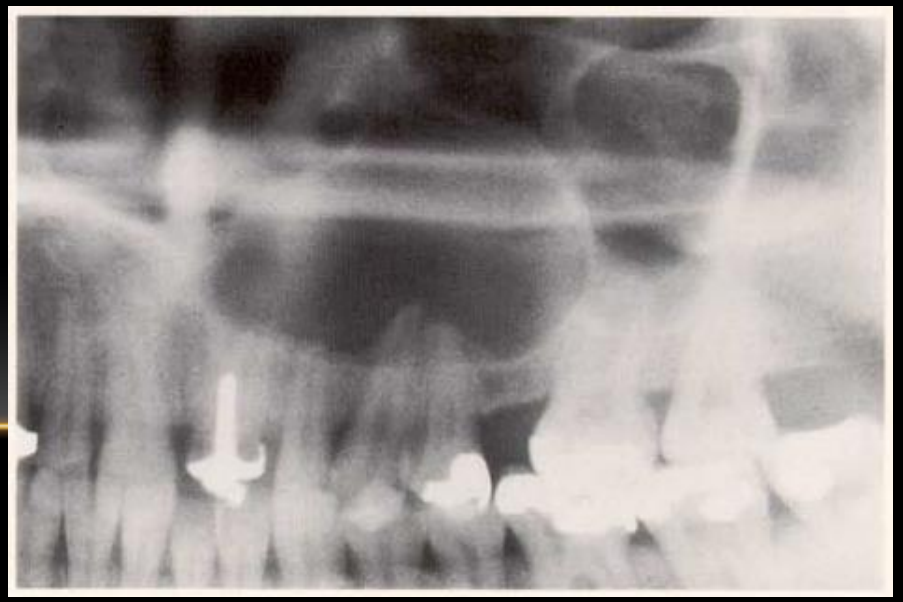


ATYPICAL MANIFESTATION OF MULTILOCULAR RADICULAR CYST

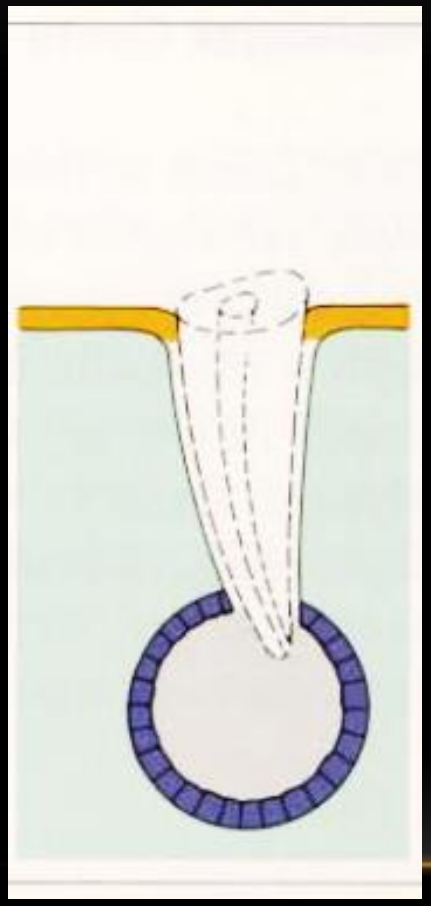


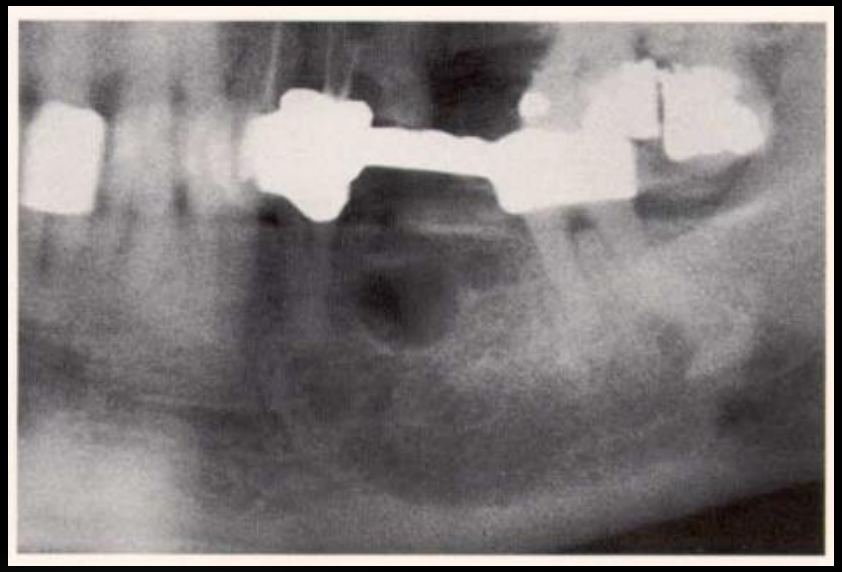
Differential diagnosis: ameloblastoma, giant cell granuloma, keratocys



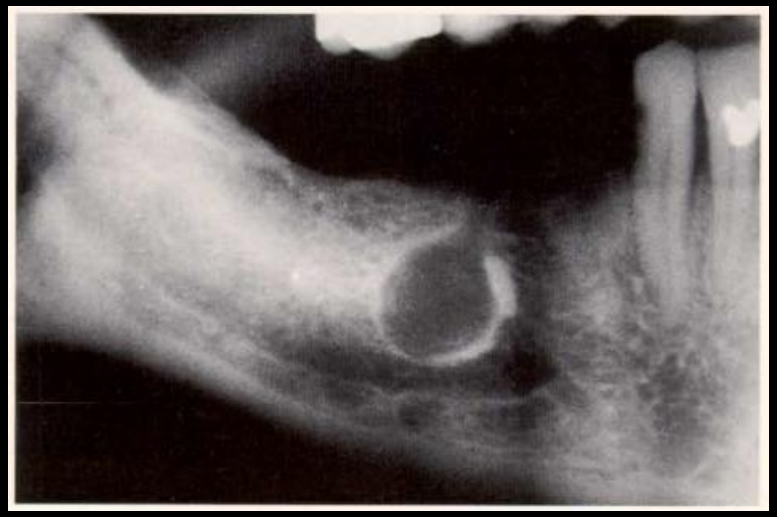


RESIDUAL RADICULAR CYST





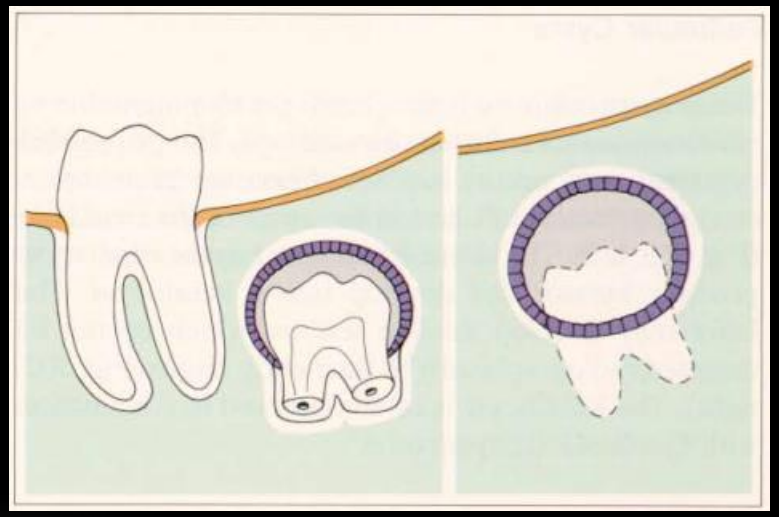
SHOULD BE SUBJECTED TO HYSTOLOGIC EXAMINATION



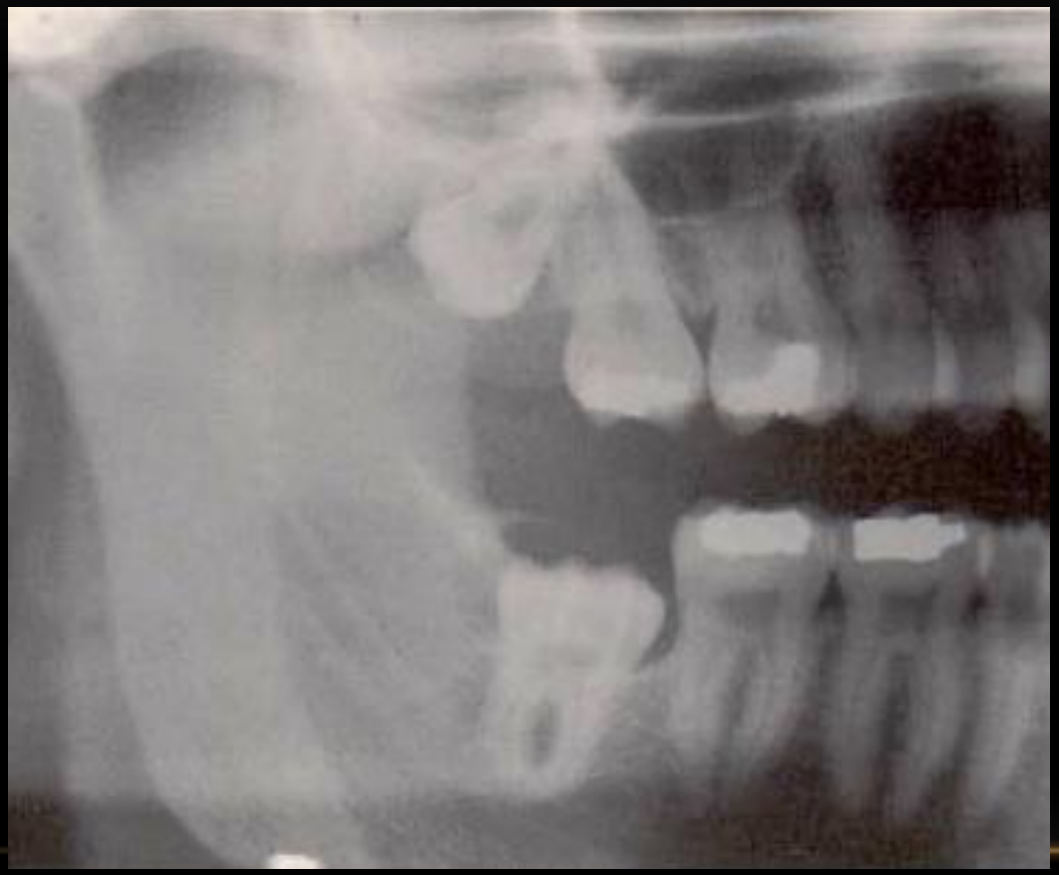
Residual cyst

Ossifying fibroma

FOLLICULAR CYST– CYSTA ERUPTIONIS



PARADENTAL CYST



FOLLICULAR CYST (DENTIGEROUS)

centralis

lateralis

Develops from the remnants of the enamel epithelium, after the tooth has formed

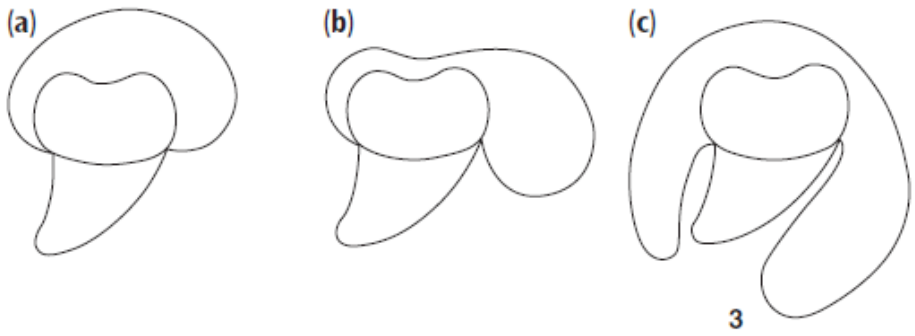
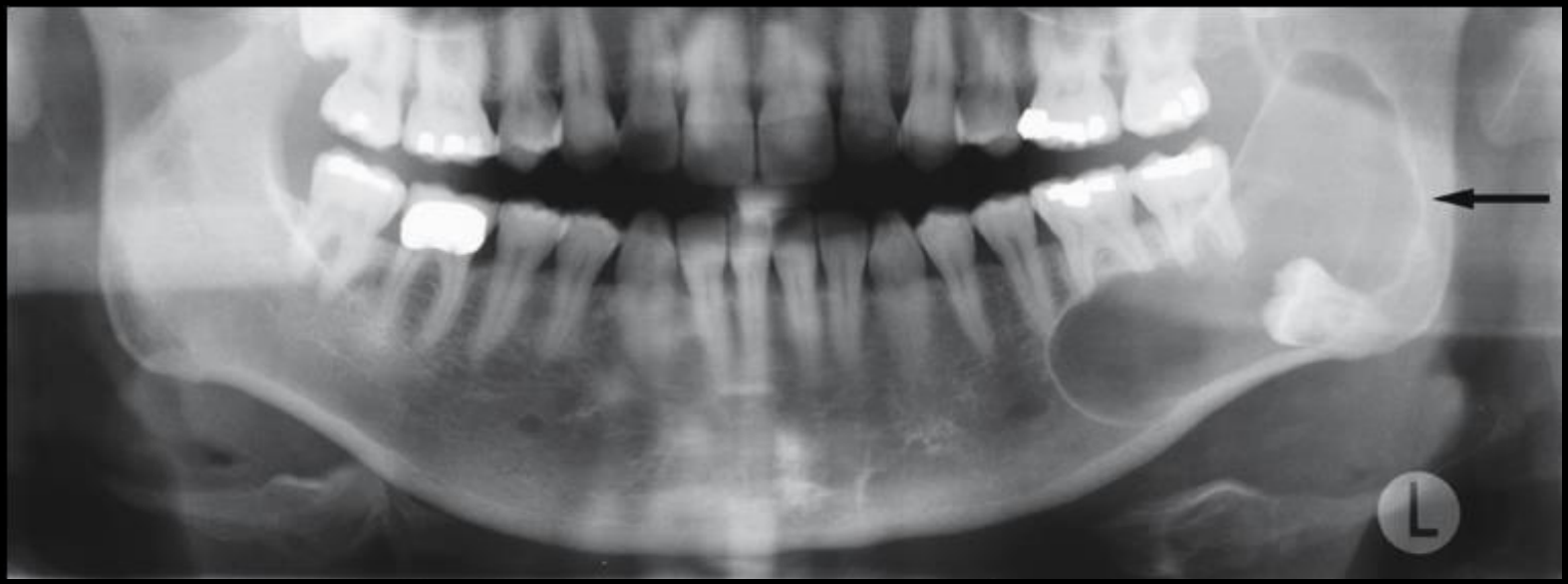


Fig. 4.10 Diagram illustrating the manner in which the dental follicle may expand to produce the radiographic appearances of (a) central; (b) lateral; and (c) circumferential types of dentigerous cysts.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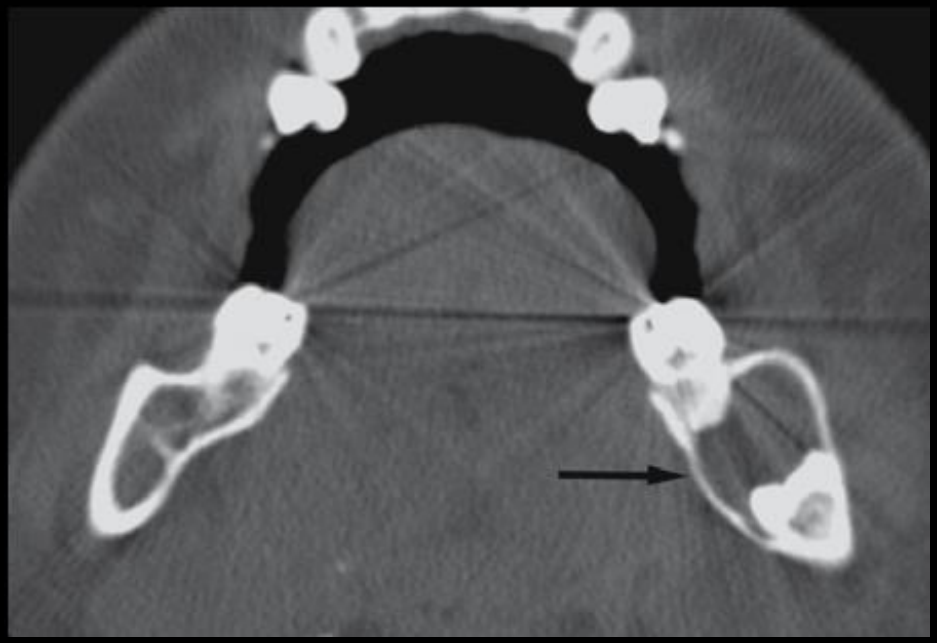

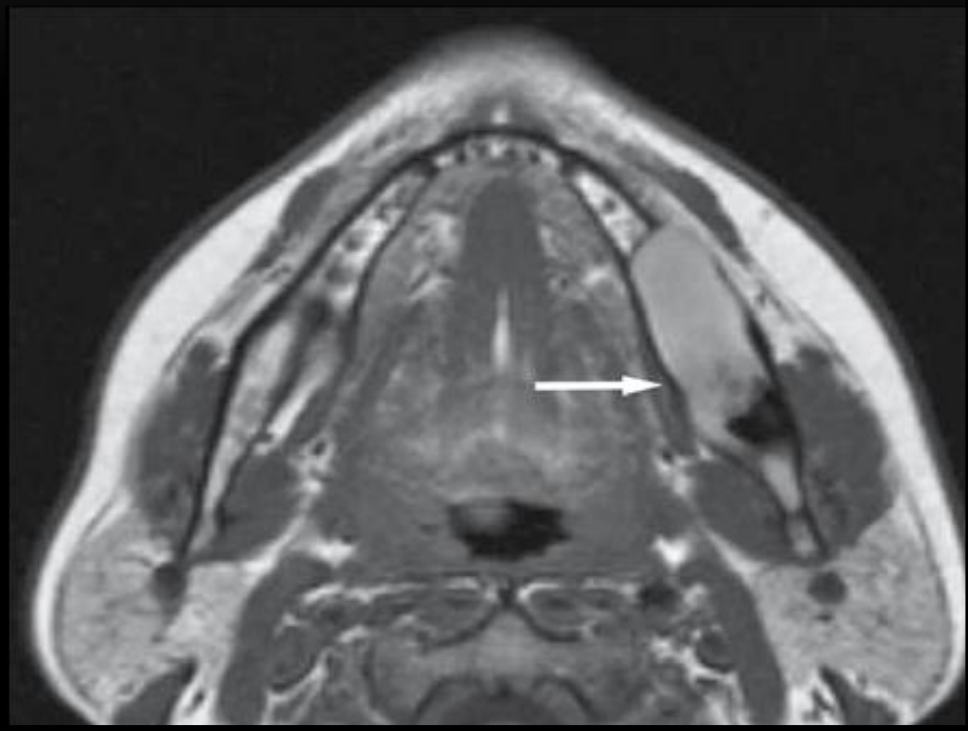


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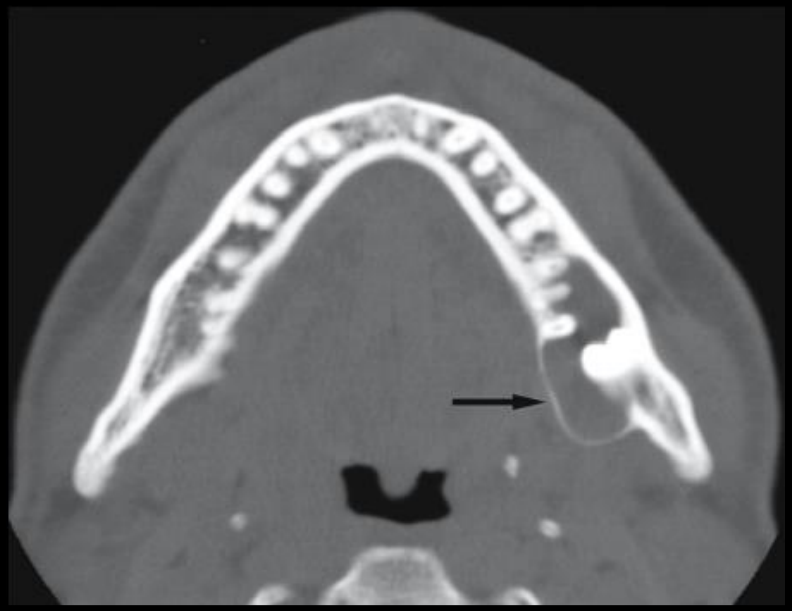
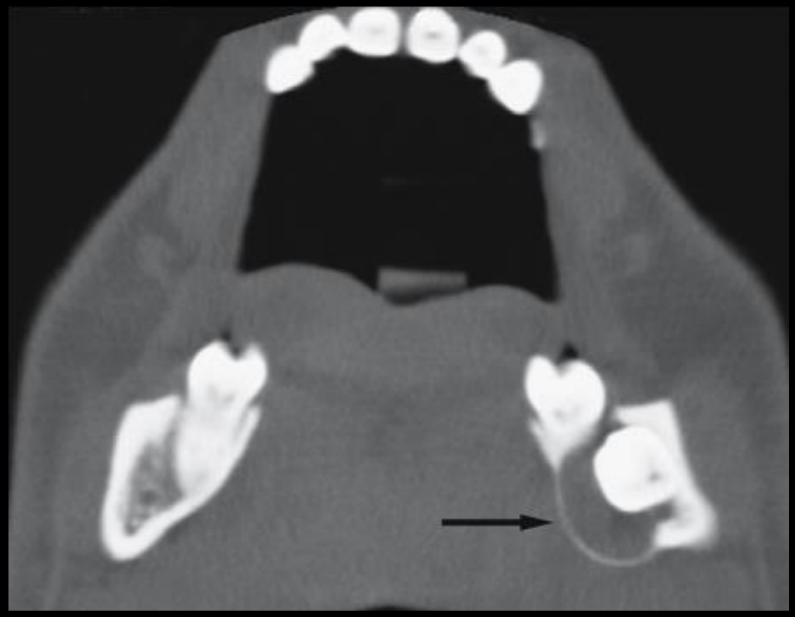
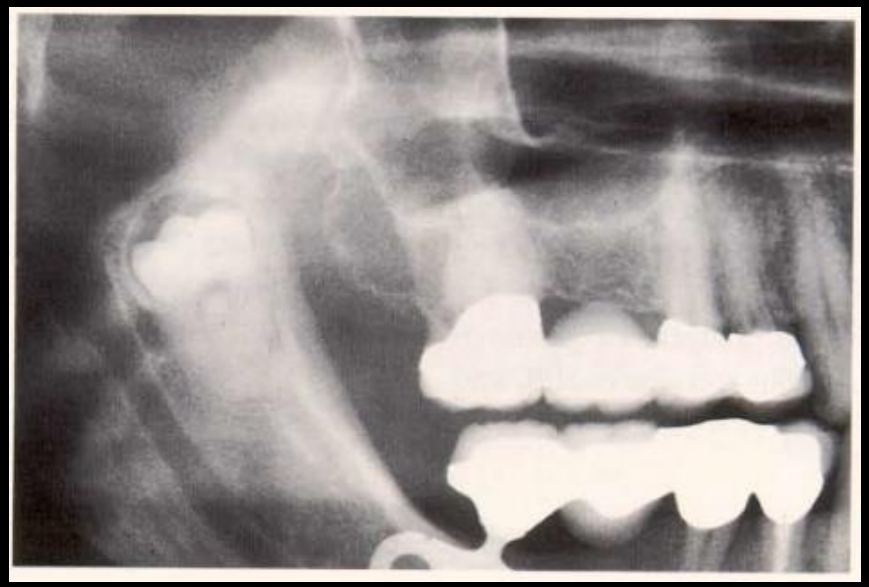
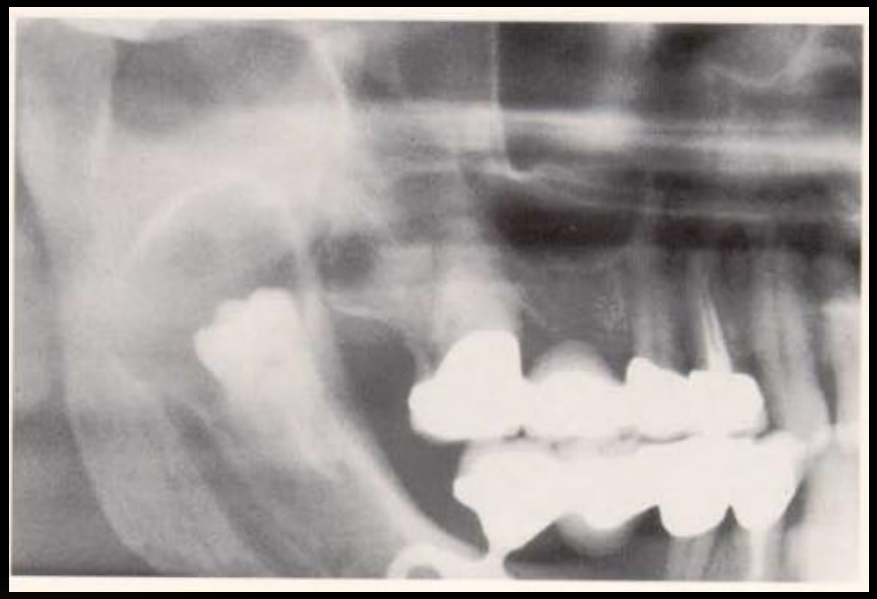


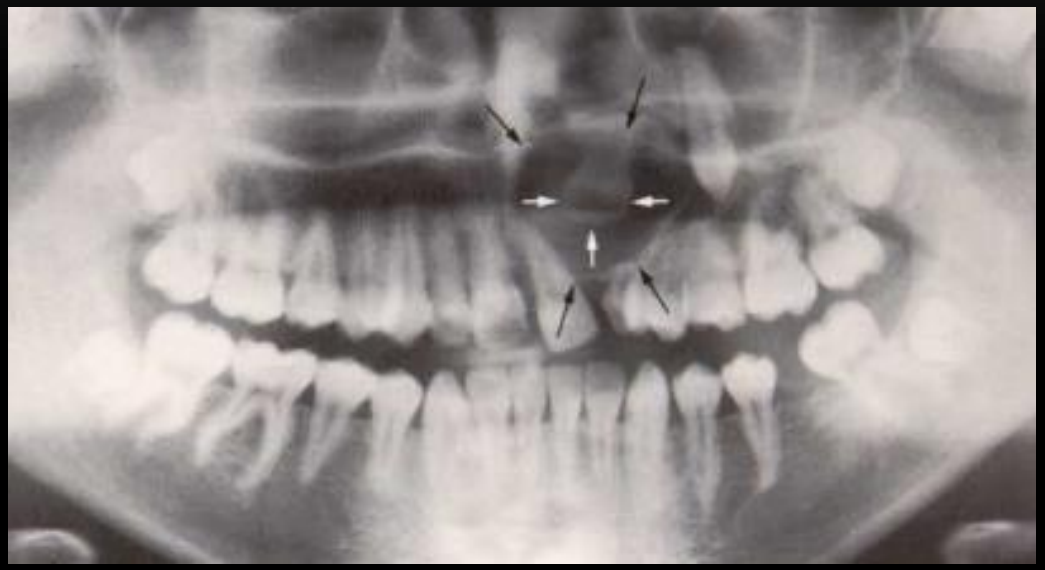


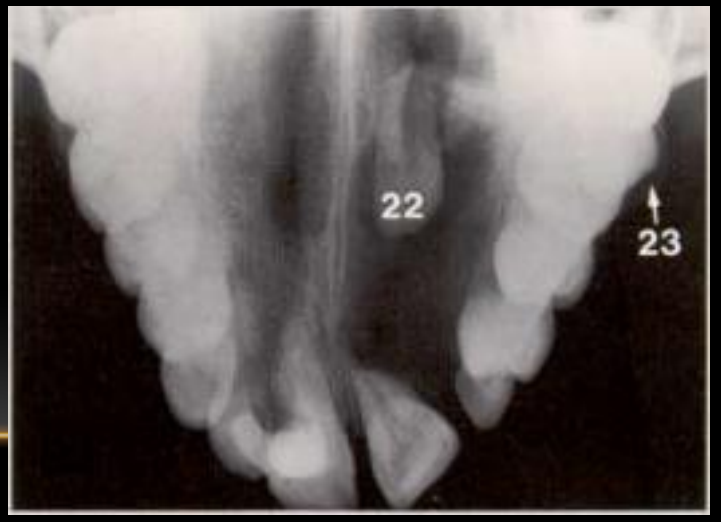
FOLLICULAR CYST





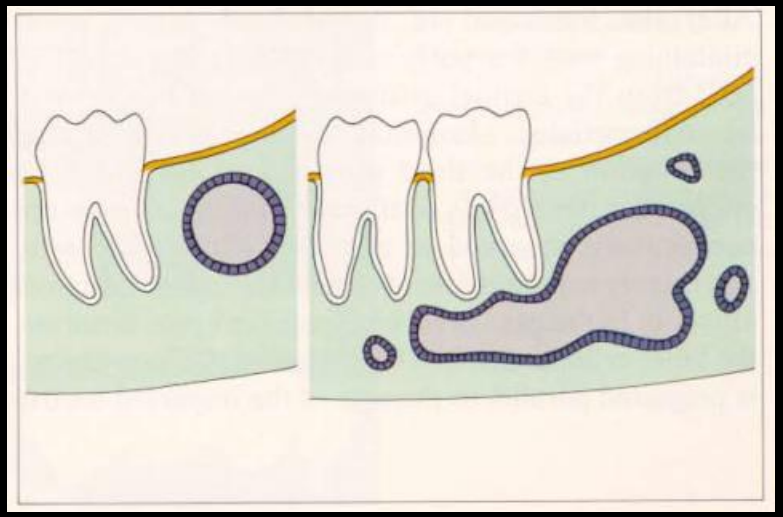
CYSTA FOLLICULARIS



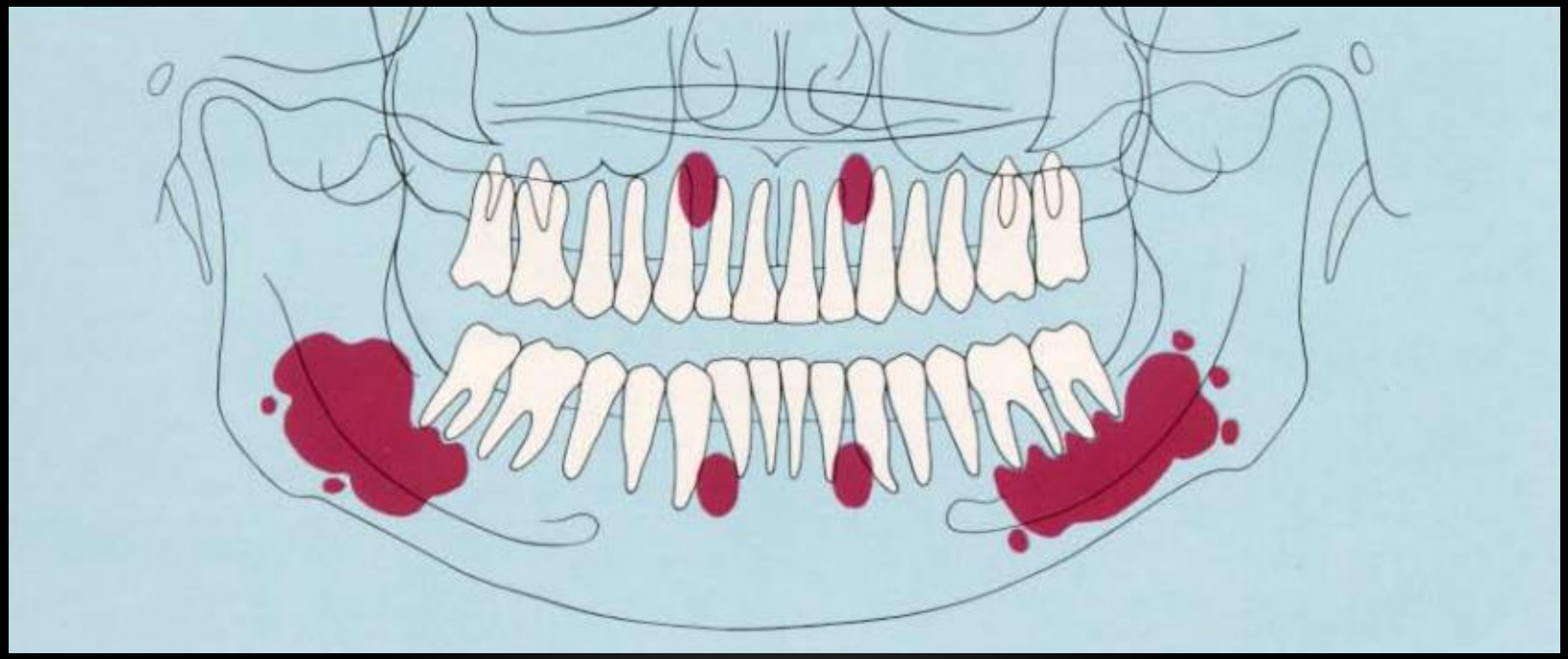


KERATOCYSTA ODONTOGENES - PRIMORDIAL

- Develops from the epithelium of the dental lamina
- Instead of the normal tooth, which is typically missing from the series
- Pseudolocular or multilocular

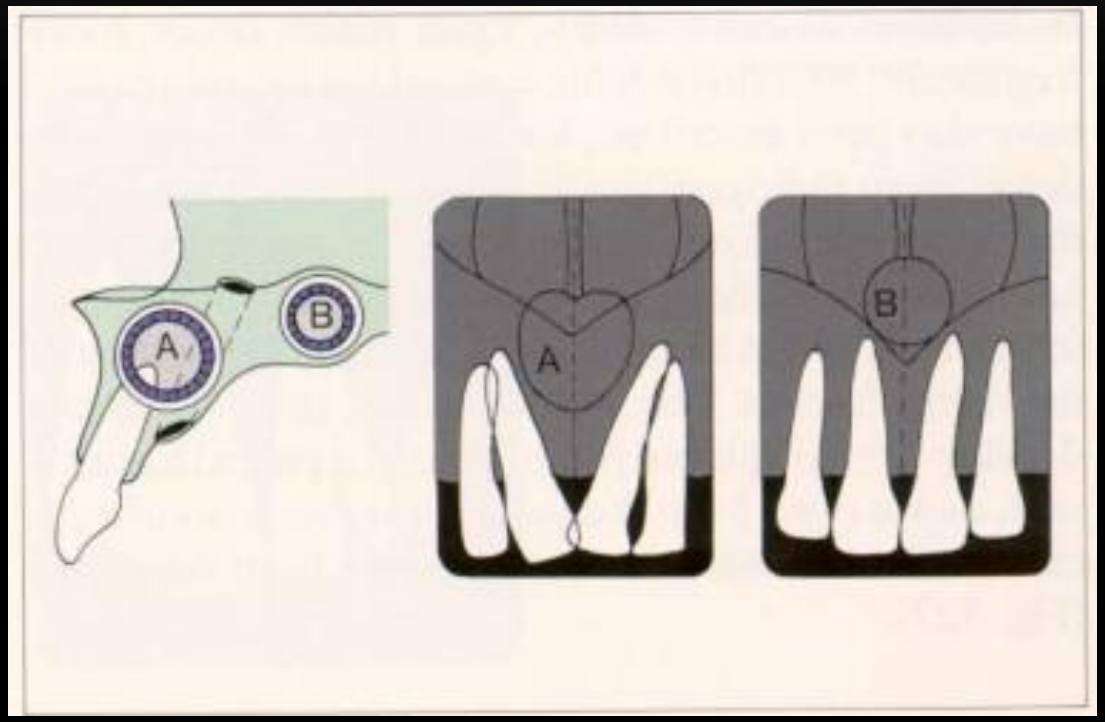


THE MOST IMPORTANT SITES OF KERATOCYSTS



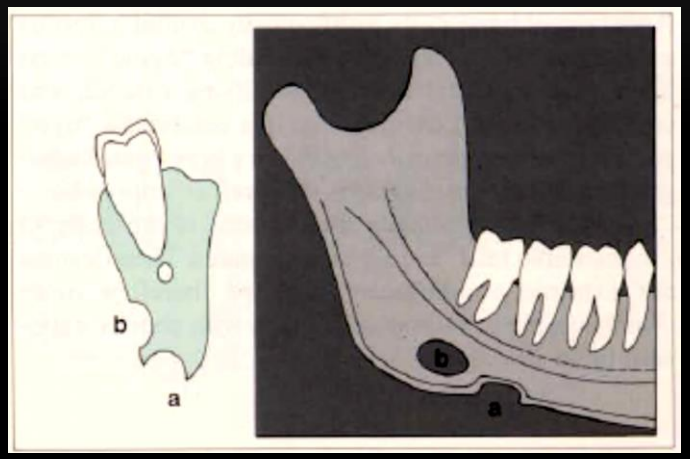
KERATOCYST

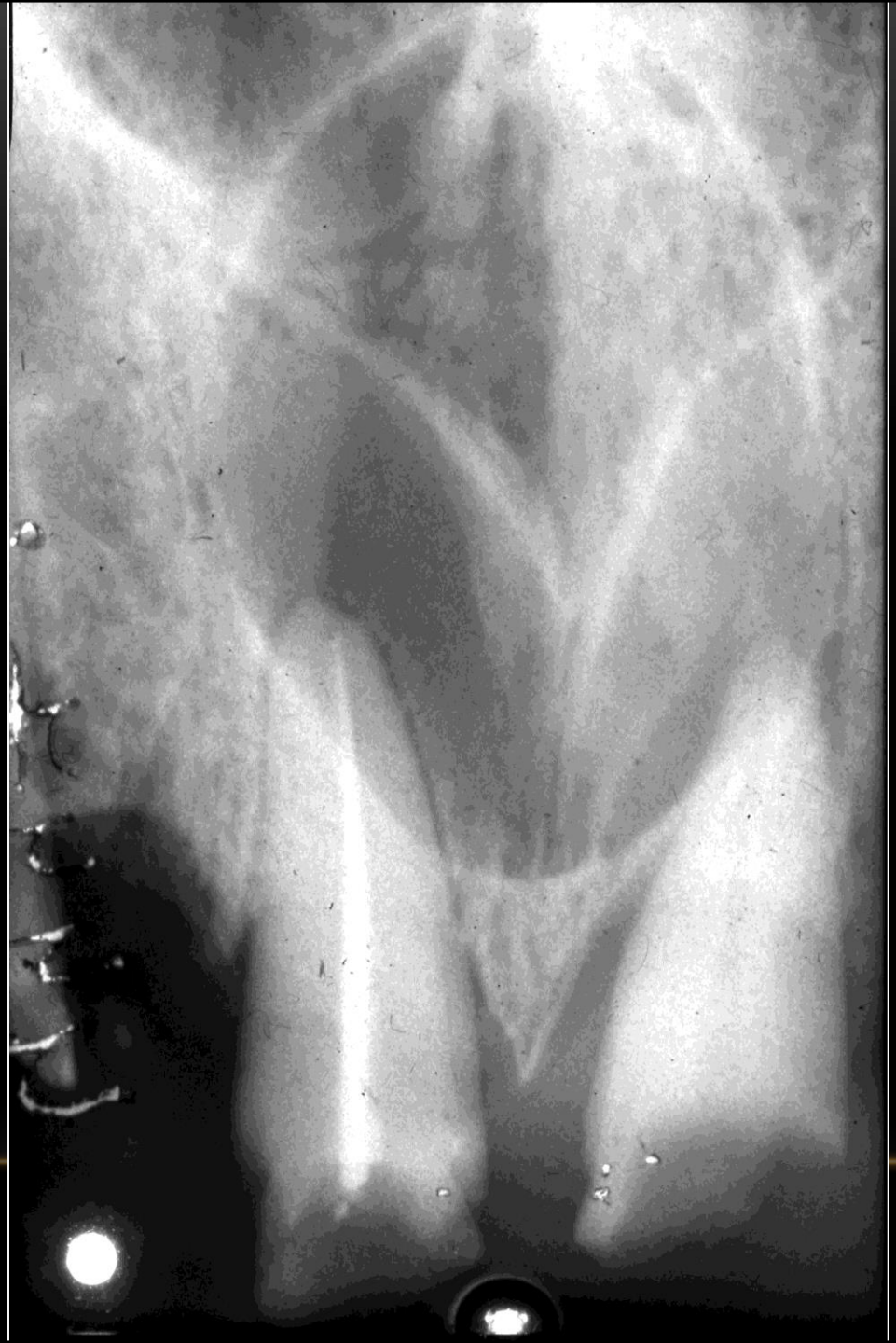
INCISIVE CANAL CYST – NASOPALATINE DUCT CYST



B: fissura mediana cysta

LATENT BONE CAVITY – STAFNE CYST





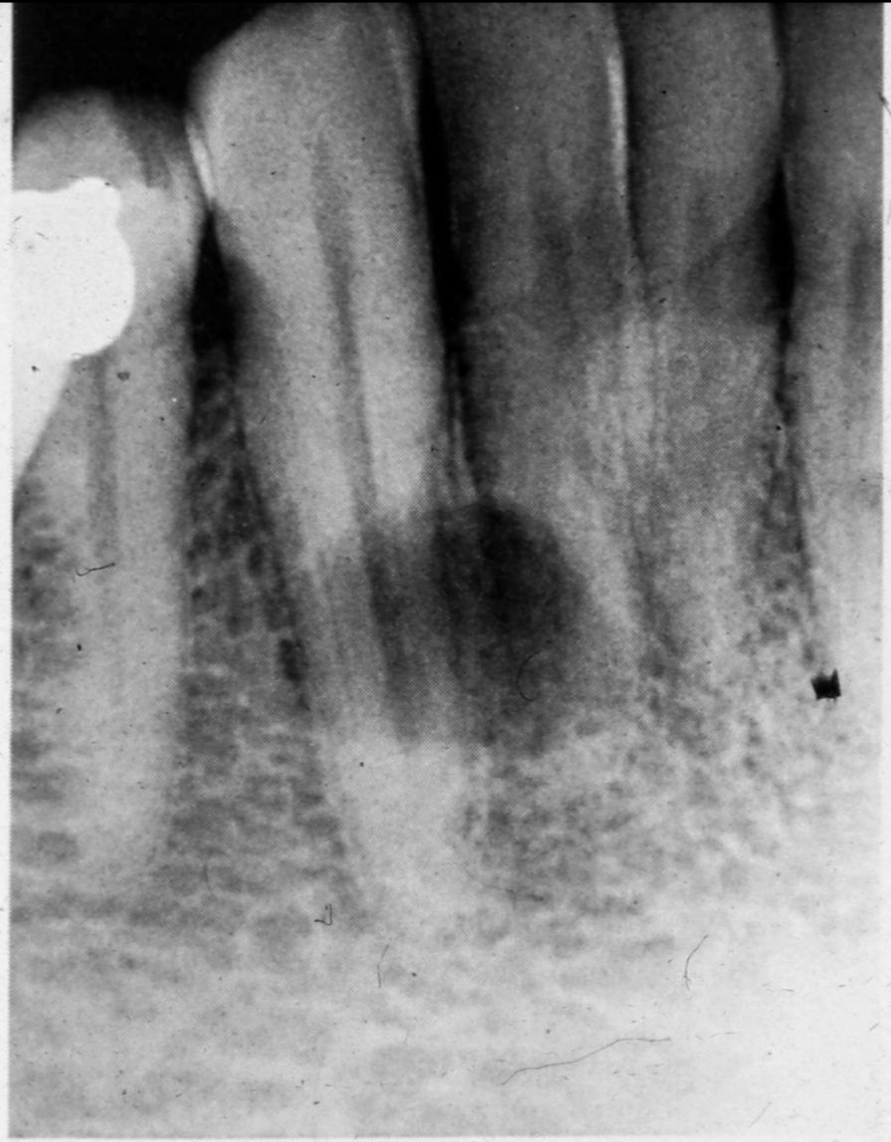
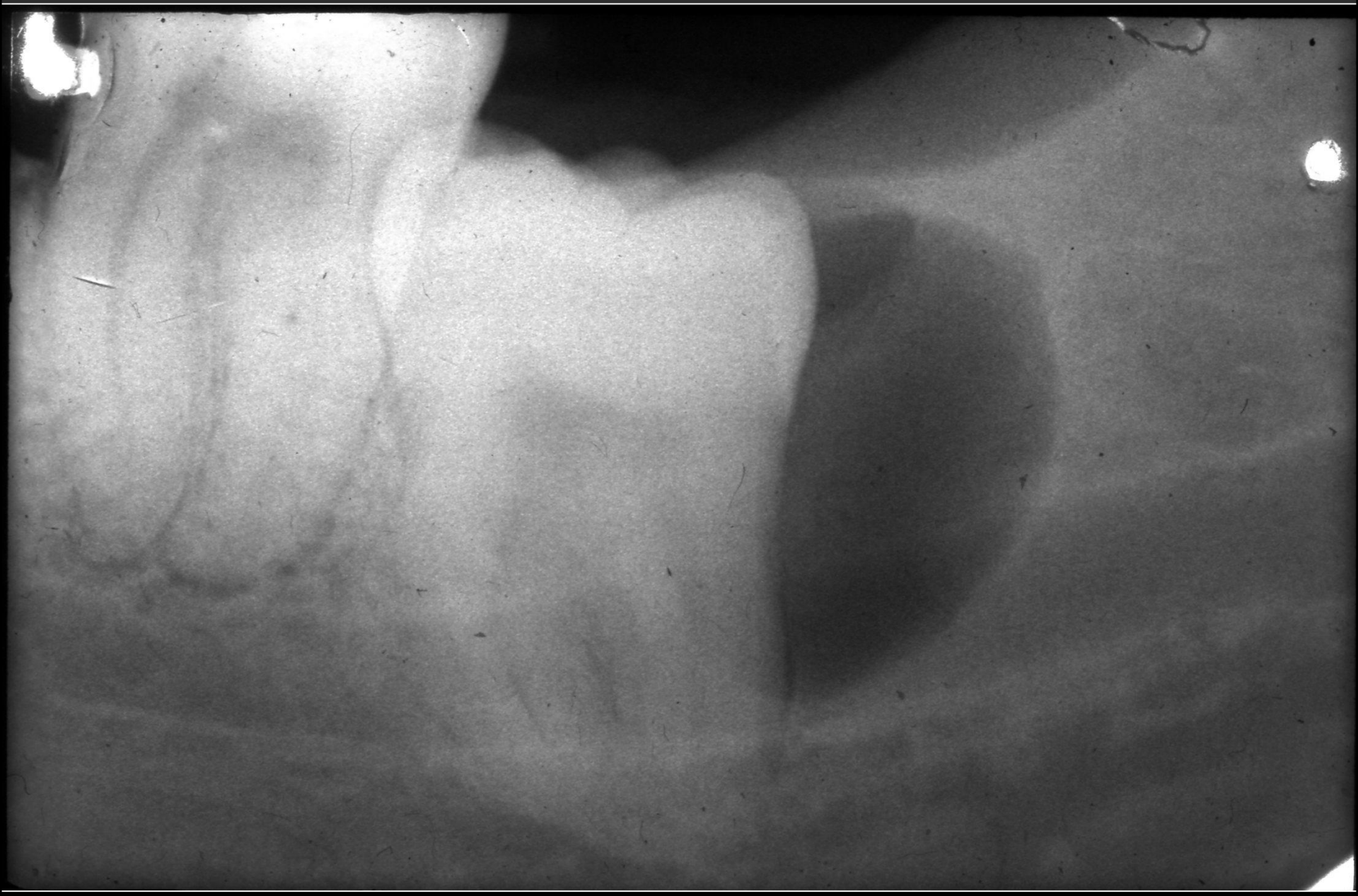
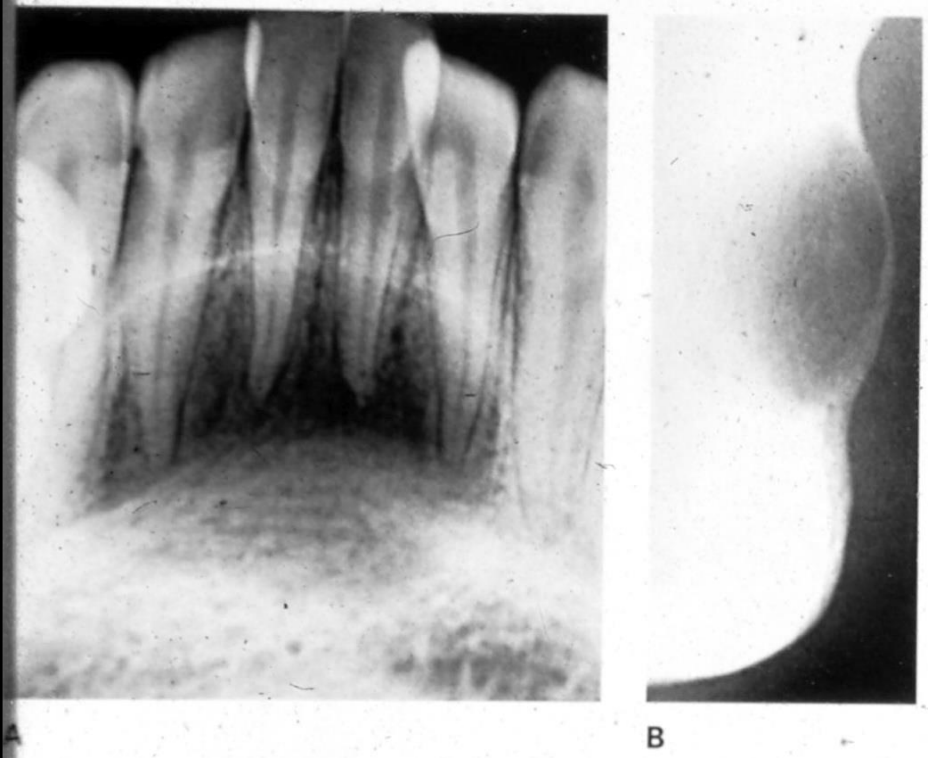


FIGURE 9–13.

Sublingual salivary gland depression: typical location without a sclerotic margin.





A B

FIGURE 10–17.

Median mandibular cyst. A, No obvious tooth with nonvital pulp can be seen. B, Expanded buccal cortex shows typical cystic morphologic characteristics; lesion was signed out as a median mandibular cyst. (Courtesy of Professor L. Alfaro, University of Chile School of Dentistry, Santiago, Chile.)

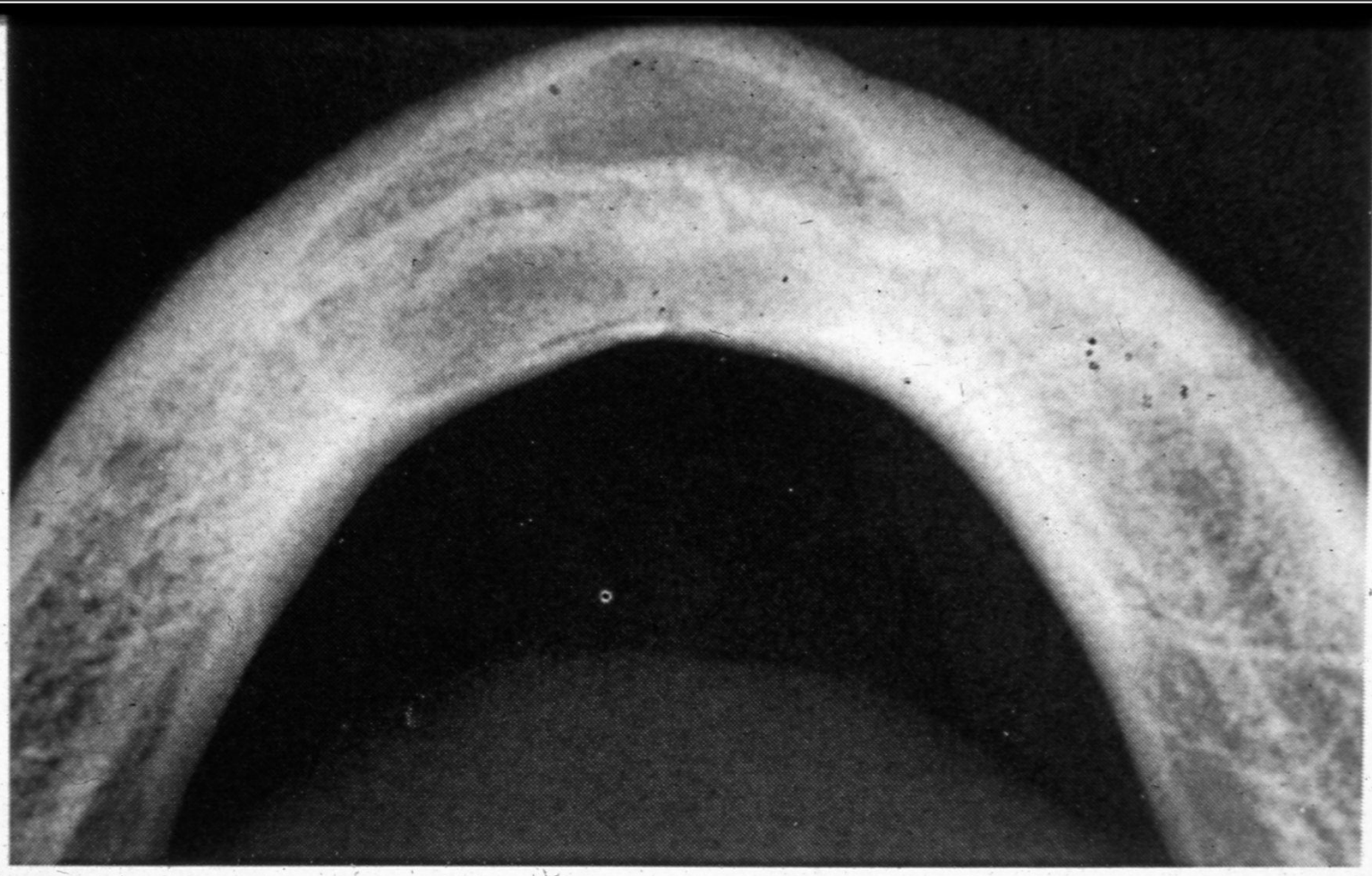


FIGURE 10–18.

Median mandibular cyst. Occlusal view. Case was a residual cyst.

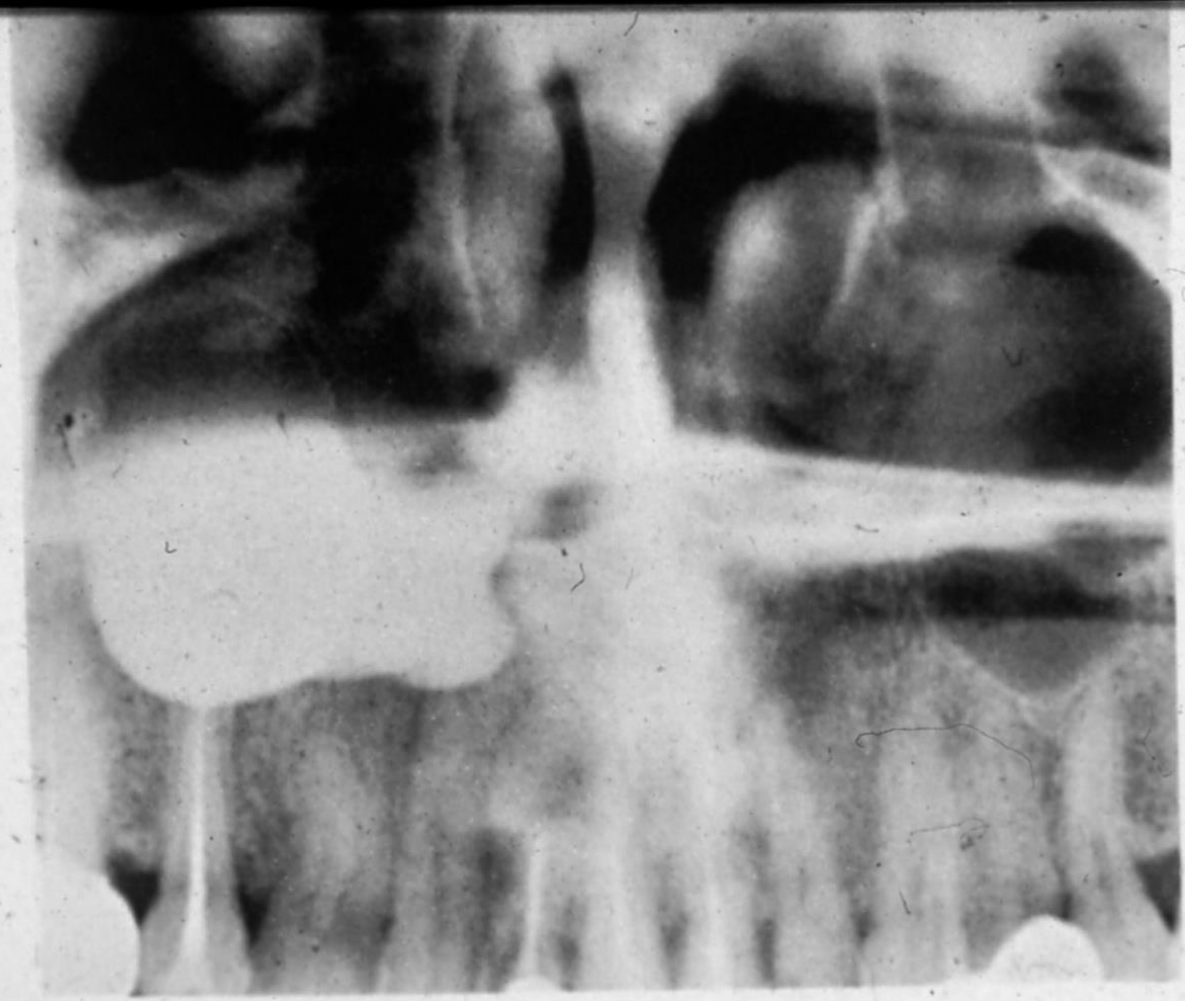
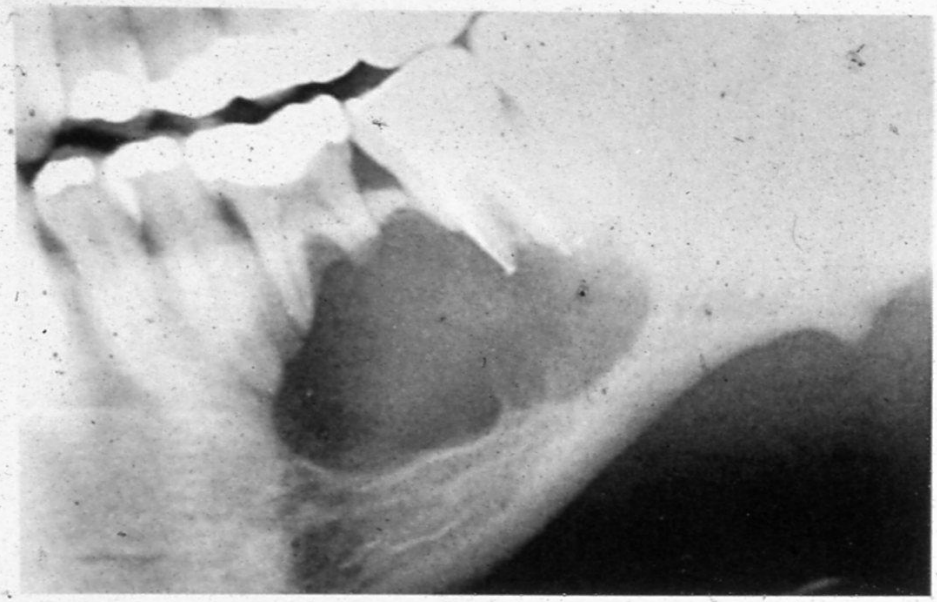


FIGURE 9–31.

Surgical ciliated cyst of the maxilla. The cyst has had contrast medium injected into the cyst lumen. (Courtesy of Drs. M. Araki and K. Hashimoto, Nihon University School of Dentistry, Tokyo, Japan.)



A

B

FIGURE 13–30.

Ameloblastoma arising in a cyst: The original lesion was interpreted as a radicular cyst of the second molar; endodontic therapy was performed. A, Three years later, healing had not occurred. The first molar and second premolar were treated endodontically. The lesion was excised and proved to be a radicular cyst histologically. B, Seven years after removal of the radicular cyst, this lesion proved to be an ameloblastoma. (Courtesy of Professor G. Tronje, Karolinska Institutet, Stockholm. Sweden.)