Syrian Private University
Faculty of Dentistry
Department of Oral Medicine

Tumors & tumor-like lesions

Lecture 10

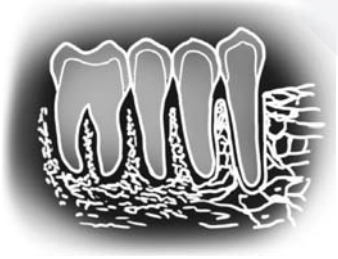
IMAD BRINJIKJI

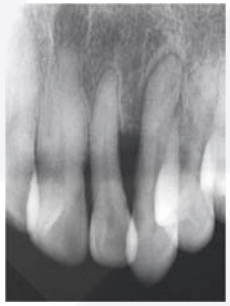
Principles of differentiating benign and malignant lesions

- Be careful that some features are not specific.

Ill defined borders

Principles of differentiating benign and malignant lesions

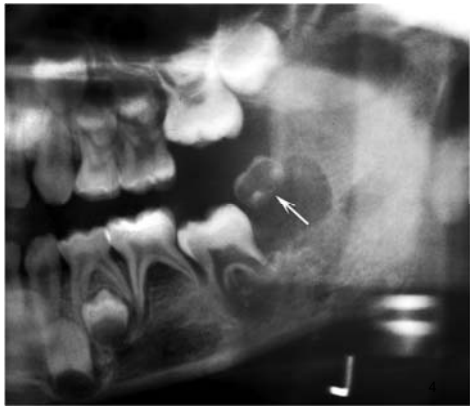




Irregular thickening of the periodontal space.

Principles of differentiating benign and malignant lesions

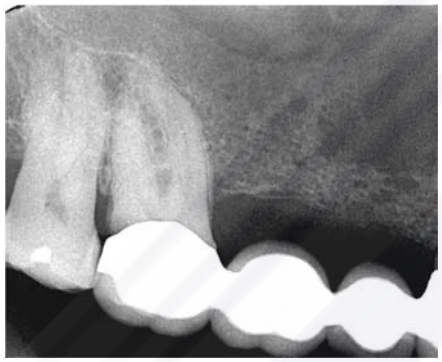
Displacing the developing tooth in an occlusal direction.



Principles of differentiating benign and malignant lesions

Effects on cortical bone and periosteal reaction

Destruction of the cortical boundary.



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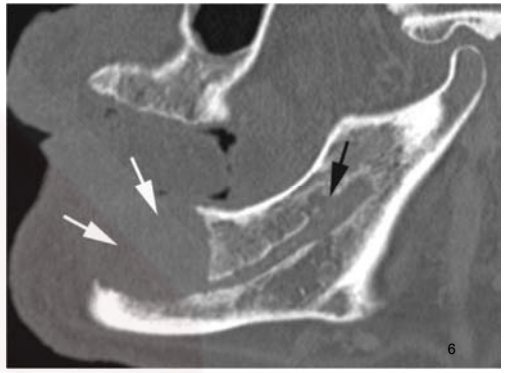
Principles of differentiating benign and malignant lesions

Effects on cortical bone and periosteal reaction

Destruction of the cortical boundary.



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Principles of differentiating benign and malignant lesions

Effects on cortical bone and periosteal reaction

Layers of new periosteal bone with cortical bone destruction.

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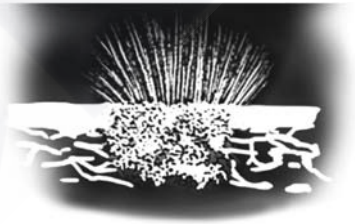
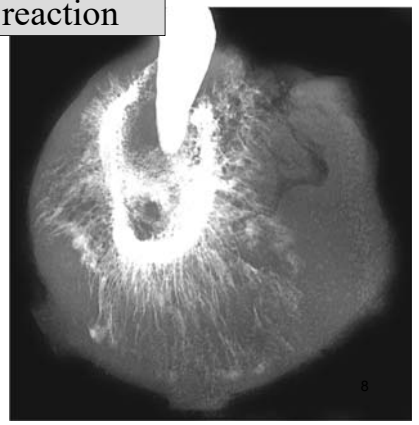
Principles of differentiating benign and malignant lesions

Effects on cortical bone and periosteal reaction



Sunray type of periosteal reaction



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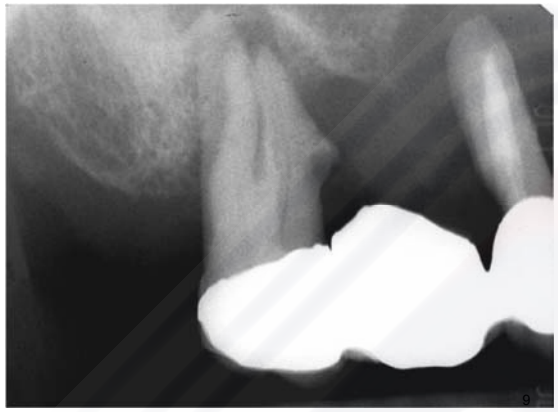
Principles of differentiating benign and malignant lesions



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Principles of differentiating benign and malignant lesions

On MRI:

- Most malignant tumors have high T2 signal.
- Less content of fibrous tissue (low signal on T1 and T2).
- Necrosis is higher (how it appears on MRI)?

↓ T1 / differ in T2 (low to high) / no Gd enhancement.

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Radiographic features of malignant tumors

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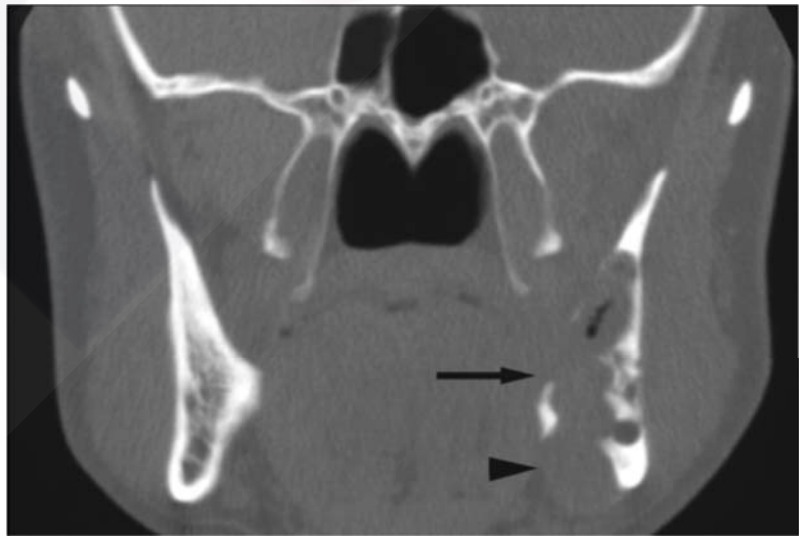

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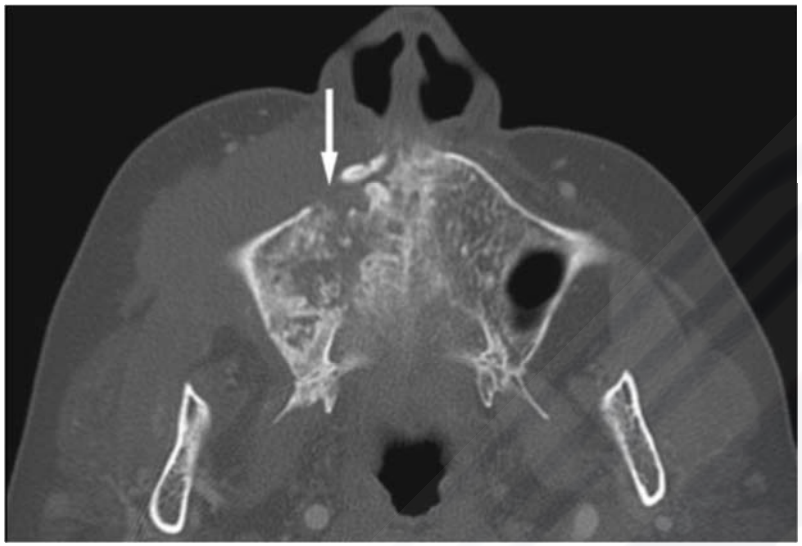

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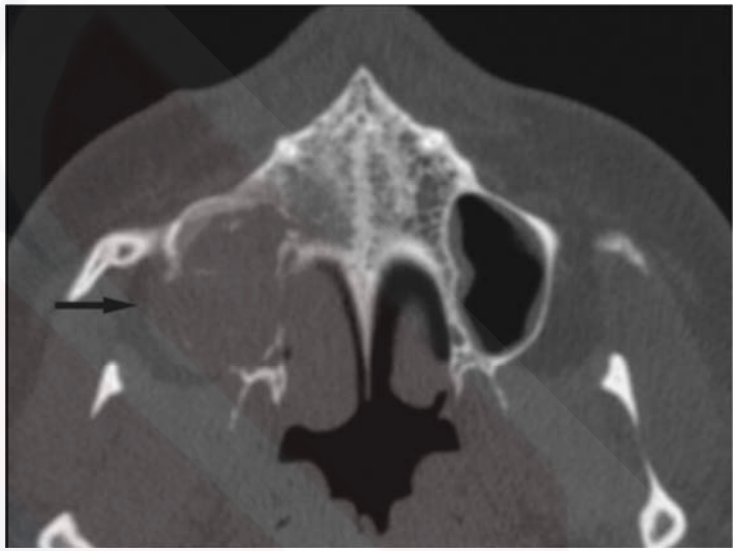

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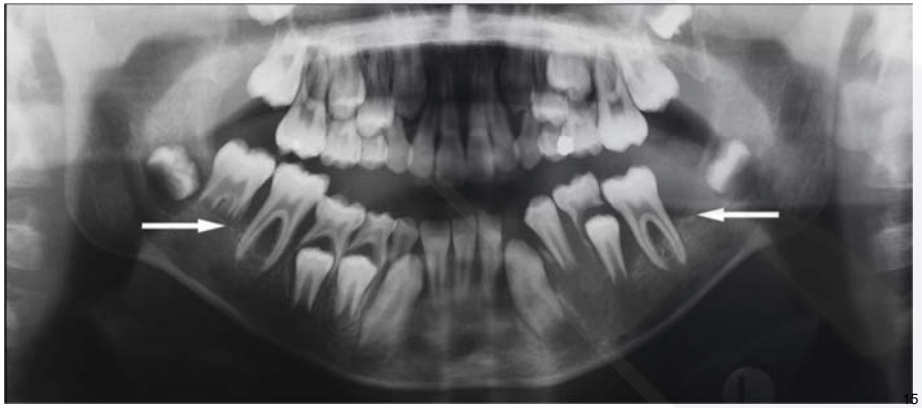

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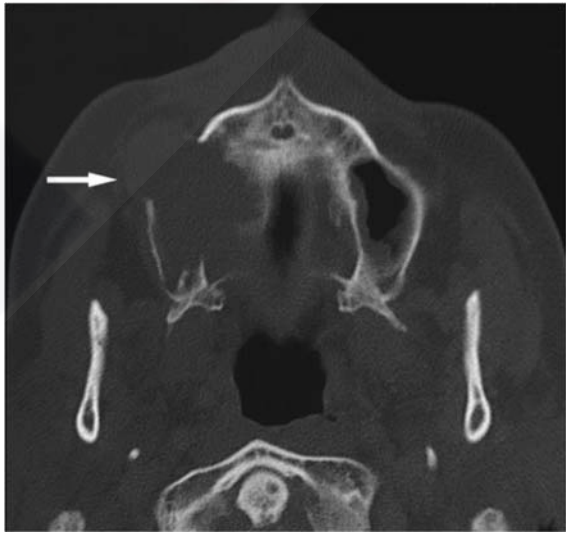

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WHO CLASSIFICATION

- MALIGNANT TUMORS
- BENIGN TUMORS
- OTHER TUMORS

Tumors

- Generally, malignant and benign tumors may be classified as odontogenic and non-odontogenic tumors.
- The most common malignant tumors in the jaws are:
  - **Carcinomas** (epithelial origin).
  - Metastatic lesions from distant sites.
  - Sarcomas (mesenchymal origin).
  - Malignancies of the hematopoietic system.

Characteristics of jaw tumors

- Odontogenic tumors comprised only 1% to 15% of all oral tumors (5% of jaw lesions).
- The most frequent tumor is either ameloblastoma or odontoma (It is not a real tumor, it is a hamartoma).

General characteristics of jaw tumors

- **Benign** odontogenic neoplasms **>>** their **malignant** counterpart (x 100).
- Often, malignant lesions are not recognized and are treated inappropriately as inflammatory disease.
- Dentist should expect malignancy when the suspected inflammatory lesion has uncommon features or uncommon treatment outcome are encountered.

Benign tumors / Hamartomas / Hyperplasia

- **Benign tumors have unlimited growth potential, do not metastasize and resemble the tissue of origin histologically.**
- **Hamartomas overgrowth of disorganized normal tissue that have a limited growth potential (e.g. odontoma).**
- **Hyperplasia is an overgrowth of the normal tissues but is not benign tumor. The tissue is in a normal arrangement.**

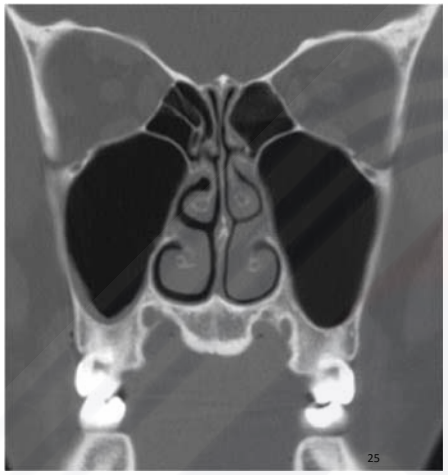
Hyperplasia

- Torus (palatinus / mandibularis).
- Hyperostosis.
- Dense bone island.

Torus

Tori (plural).
Torus (singular).

Torus



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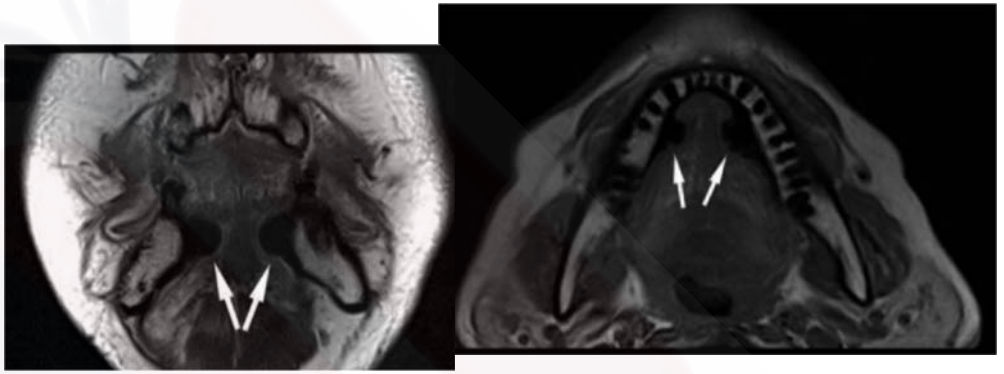
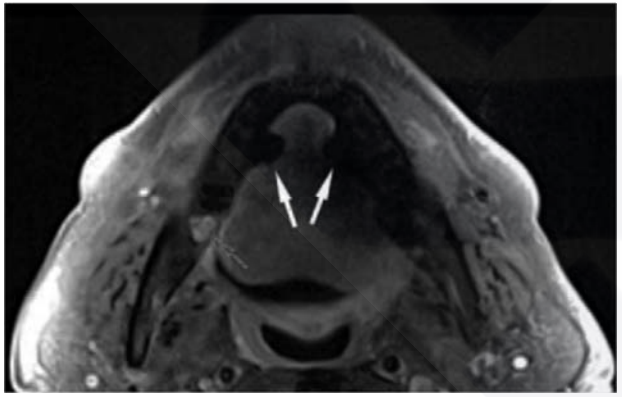
Torus



Very low signal intensity on all images and do not show contrast enhancement

Torus



Very low signal intensity on all images and do not show contrast enhancement

Hyperostosis

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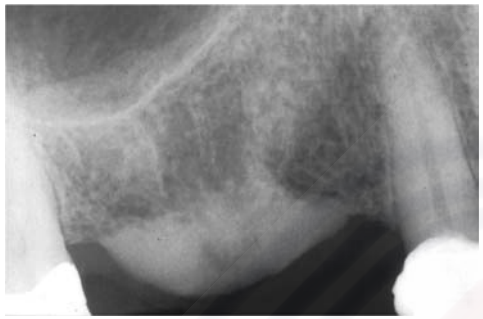
Hyperostosis



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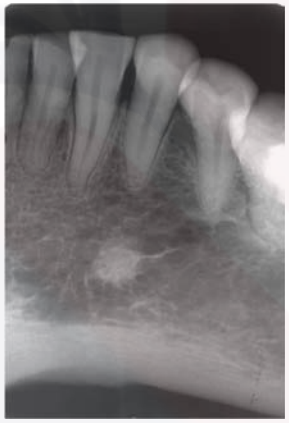
Dense bone island



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Differential diagnosis of dense bone island

- Dense bone island is also called idiopathic sclerosis.
- Periapical sclerosing osteitis: This lesion is centered on the root apex/ the tooth is non-vital/ widening of the periapical portion of the periodontium.
- Cementoblastoma or hyper-cementosis: soft tissue capsule.

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Benign tumors

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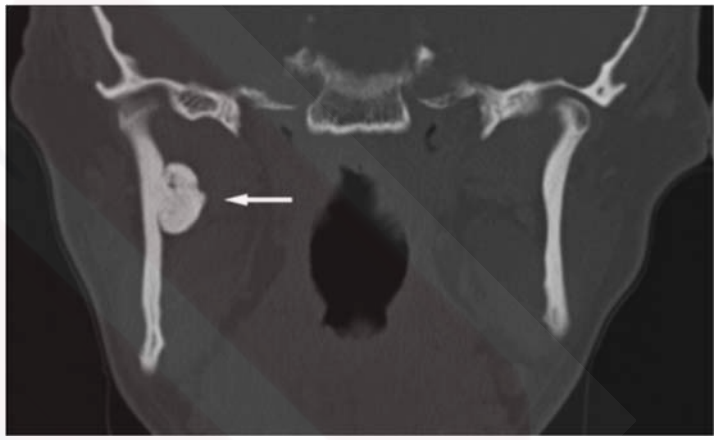
Osteoma

- Osteoma is a non-odontogenuc tumor.
- May have internal structure (trabecular bone) or not.
- Should be considered as the first differential diagnosis if raised in areas other than those of the torus and hyperostosis.

Osteoma



Ameloblastoma

- Has three types:
  - Multi-cystic
  - Unicystic (associated with teeth or single entity).
  - Desmoplastic
- Benign but aggressive tumor.
- Malignant ameloblastoma is exist (rare). It has generally the same radiographic characteristic of benign ameloblastoma

Ameloblastoma

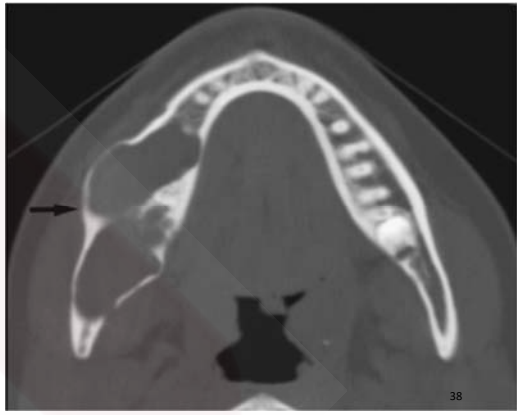
On X-ray modalities

- Radiolucency
- Unilocular round, oval, scalloped, or multilocular.
- Border sclerotic or not, thinned, expanded.
- Tooth root resorption is common.

Multi-cystic ameloblastoma

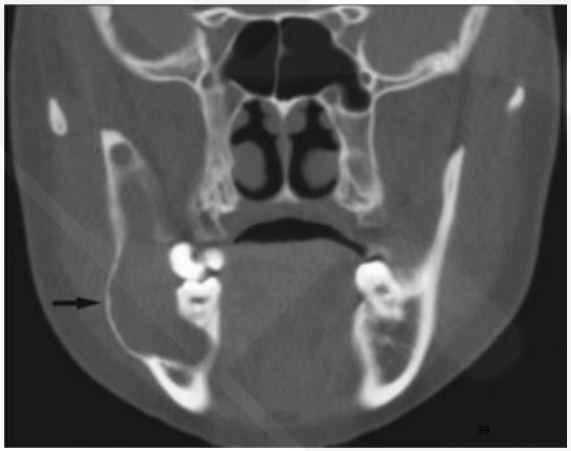
Multi-cystic ameloblastoma

Expanded cortical bone and partially scalloped border



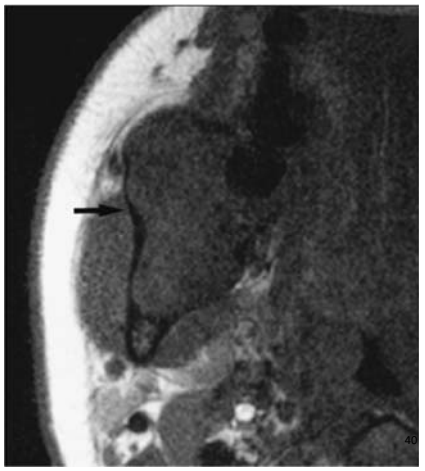
Multi-cystic ameloblastoma

Root resorption



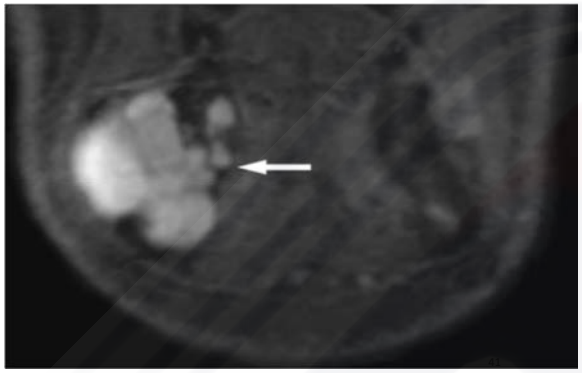
Multi-cystic ameloblastoma

T1-weighted MRI: intermediate signal



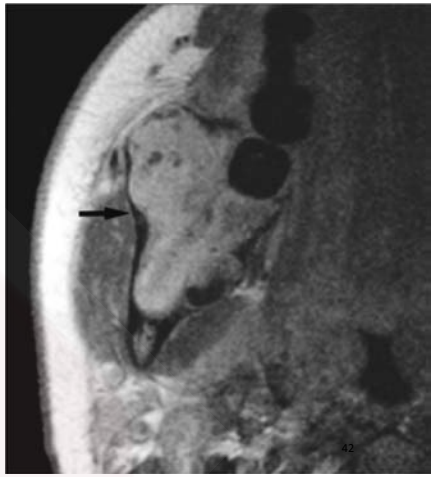
Multi-cystic ameloblastoma

T2-weighted and STIR MRI: intermediate to high signal



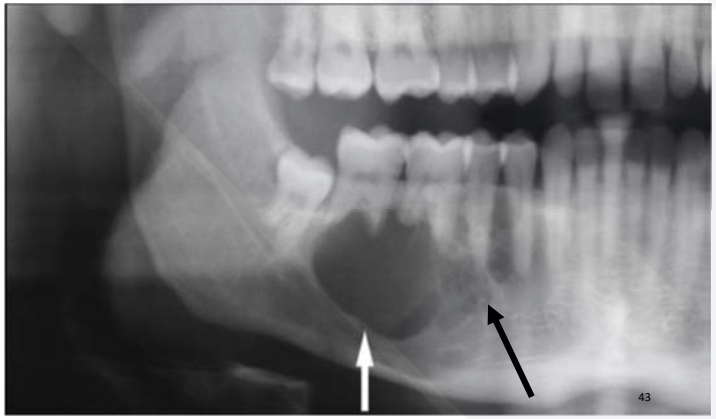
Multi-cystic ameloblastoma

T1-weighted post-Gd MRI: contrast enhancement of solid components, peripheral enhancement and septal enhancement.



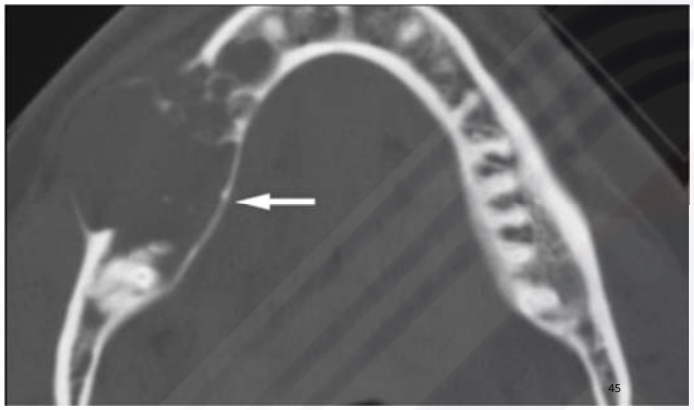
Unicystic ameloblastoma (single entity)

Root resorption



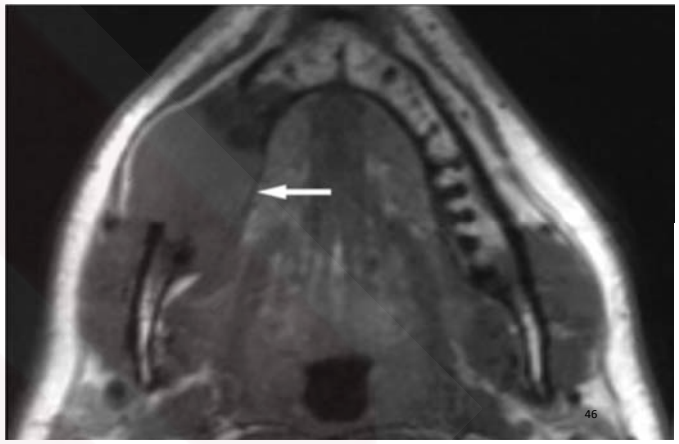
Unicystic ameloblastoma (associated with a teeth)

Unicystic ameloblastoma



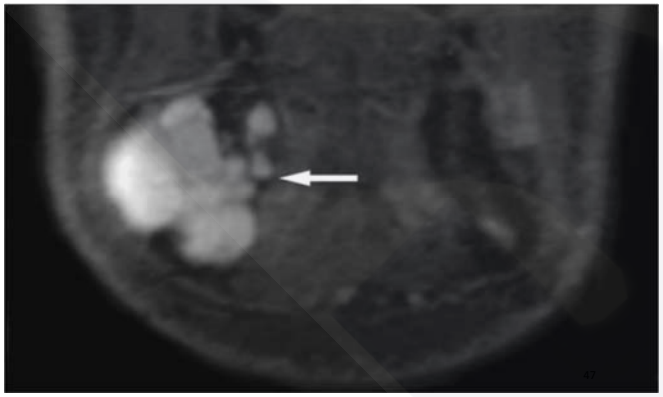
Unicystic ameloblastoma

T1



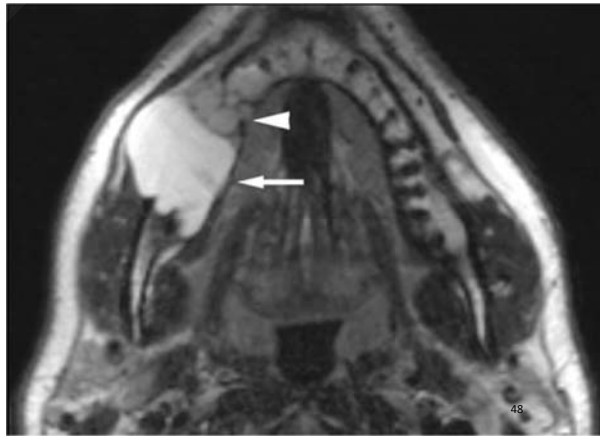
Unicystic ameloblastoma

STIR:
Intermediate to high signal



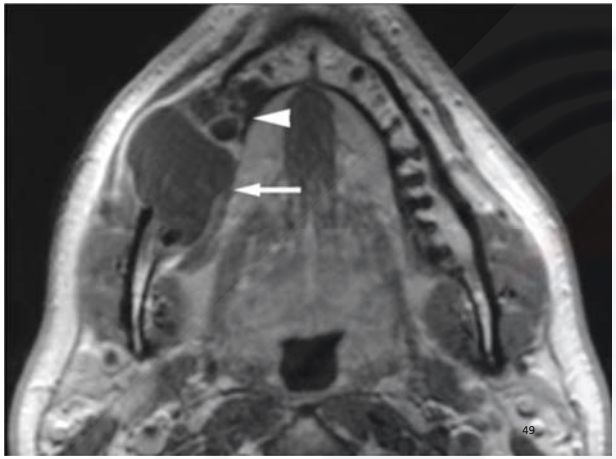
Unicystic ameloblastoma

T2
intermediate to high signal.



Unicystic ameloblastoma

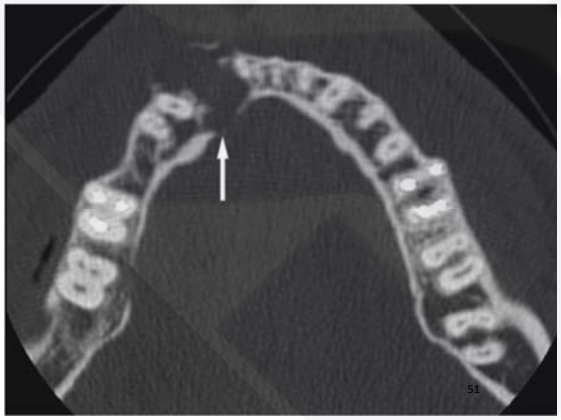
T1-post Gd enhancement peripherally



Desmoplastic ameloblastoma

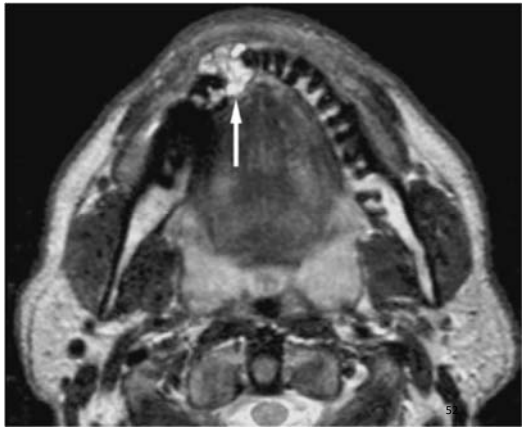
Desmoplastic ameloblastoma

Cortical expansion. Destruction buccally and lingually.



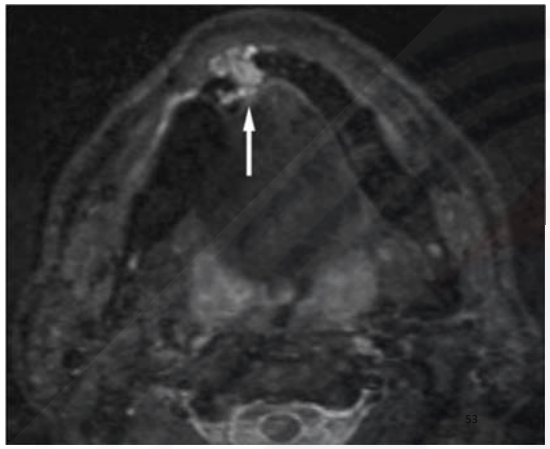
Desmoplastic ameloblastoma

T2-weighted shows high signal content and septal appearance.



Desmoplastic ameloblastoma

Axial STIR MRI shows intermediate to high signal and septal appearance.



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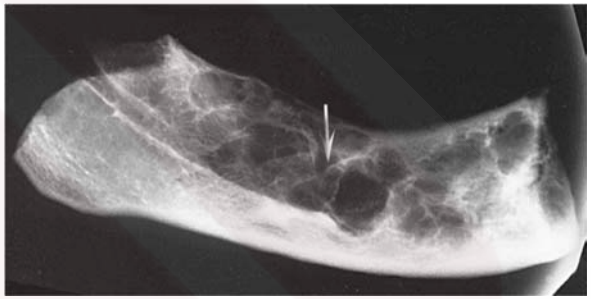
Myxoma / Myxofibroma



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Myxoma / Myxofibroma

- T1-weighted MRI: homogeneous intermediate/low signal.
- T2-weighted and STIR MRI: homogeneous high signal.
- T1-weighted post-Gd MRI: homogeneous contrast enhancement

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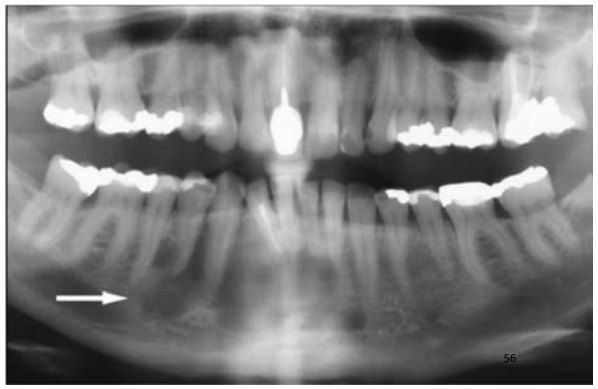
Myxoma / Myxofibroma



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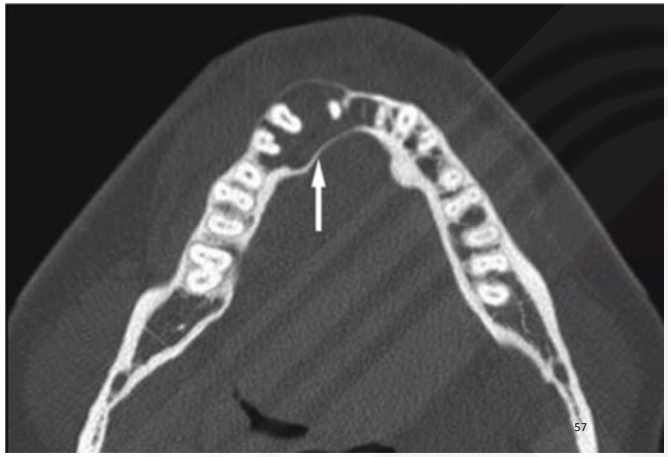
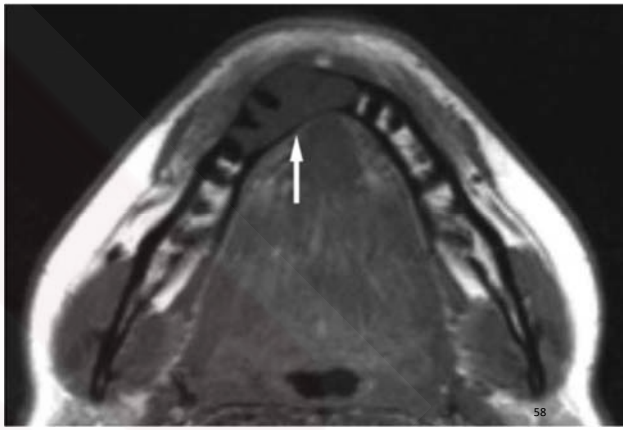
Myxoma / Myxofibroma

Expanded.
Intact buccal and lingual cortical bone.



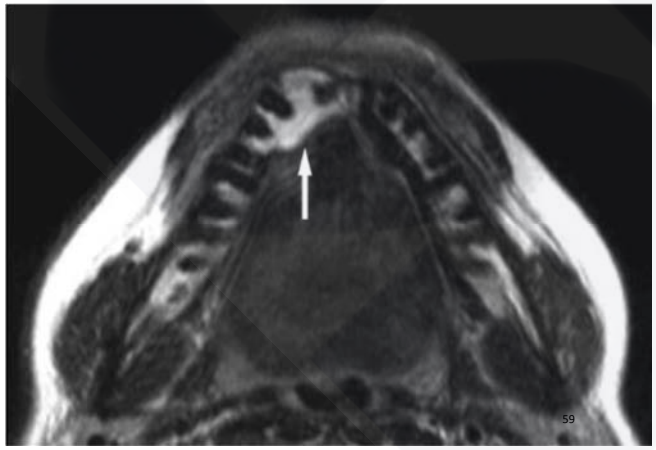
Myxoma / Myxofibroma

Axial T1-weighted pre-Gd MRI shows intermediate (to low) signal.



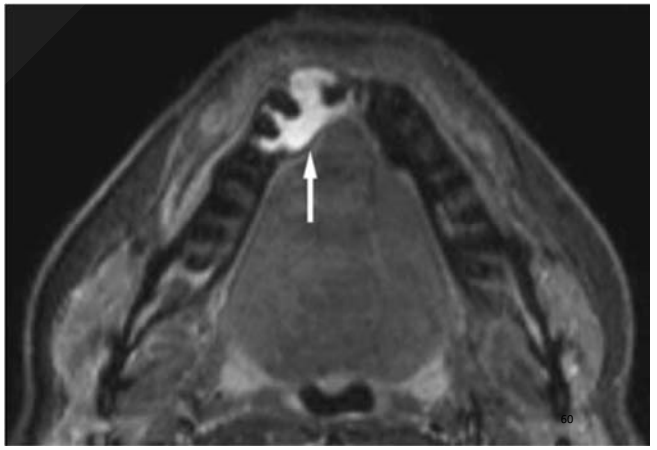
Myxoma / Myxofibroma

Axial T2-weighted MRI shows homogeneous high signal.



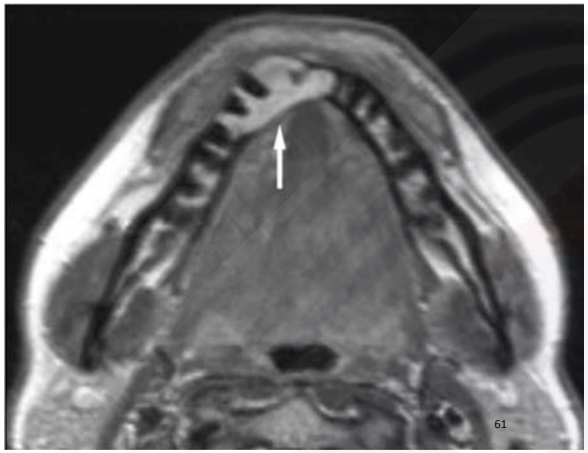
Myxoma / Myxofibroma

STIR MRI shows homogeneous high signal.



Myxoma / Myxofibroma

Axial T1-weighted post-Gd MRI shows homogeneous contrast enhancement.



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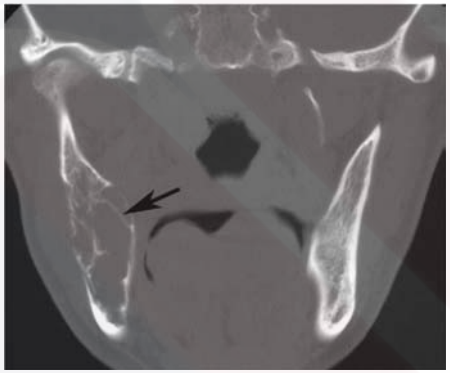
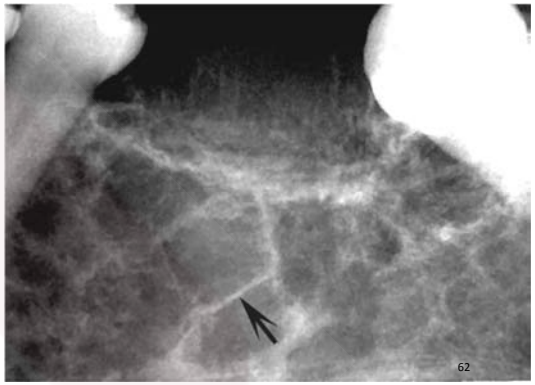
Myxoma / Myxofibroma





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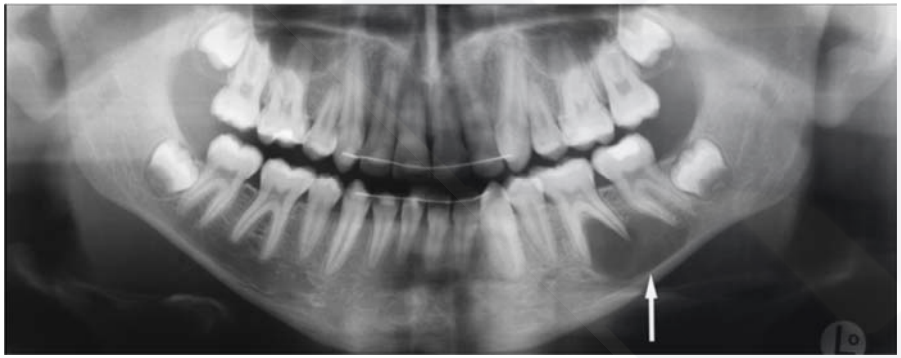
Simple bone cyst



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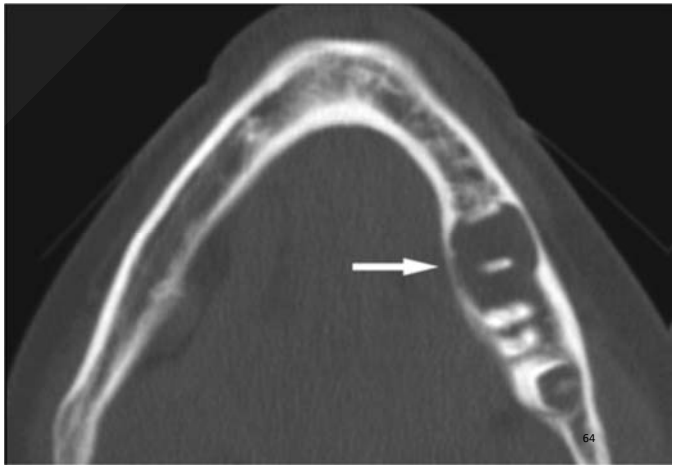
Simple bone cyst

Little expansion



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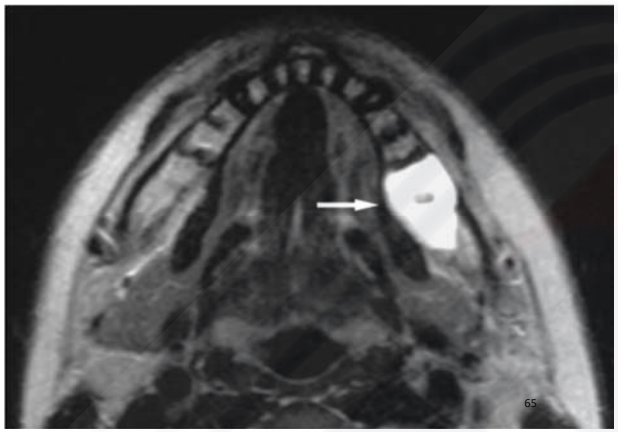
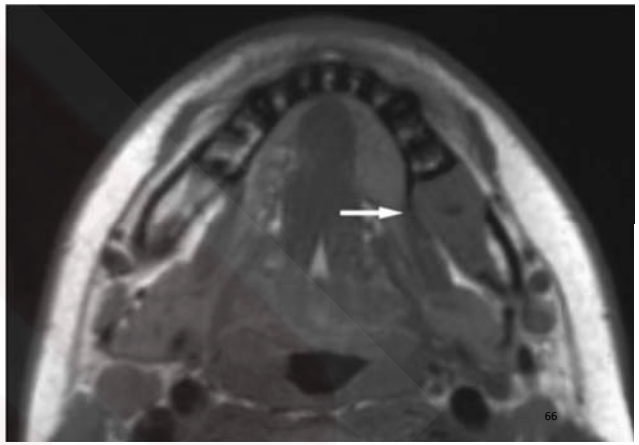
Simple bone cyst

Little expansion



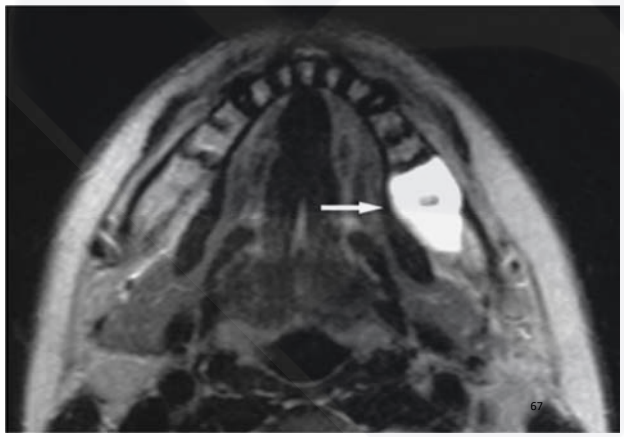
Simple bone cyst

T1-weighted pre-Gd MRI



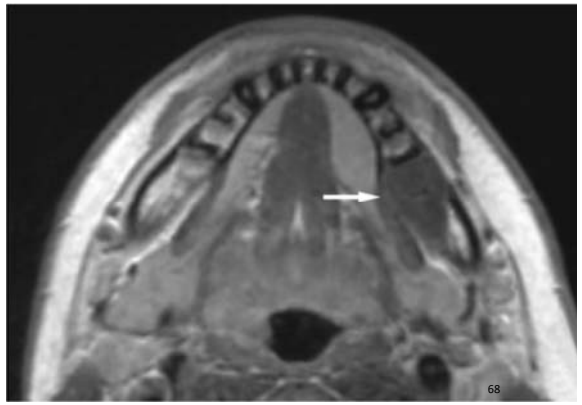
Simple bone cyst

T2-weighted MRI



Simple bone cyst

T1-post Gd
Peripheral contrast enhancement or no enhancement



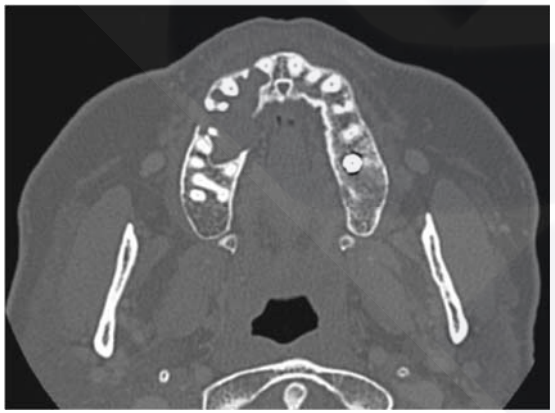
Differential diagnosis

- Ameloblastoma: tendency to cause extensive root resorption / large expansion.
- The diagnosis may be difficult when a uni-cystic ameloblastoma is located around the crown of an unerupted tooth.
- Keratocystic odontogenic tumor tends to grow along the bone without marked expansion.

Differential diagnosis

- Myxoma: usually one or two straight septa. Myxoma also rarely causes resorption of teeth (displaces and loosens the teeth).
- Odontogenic fibroma may have the same radiographic characteristics of myxoma and cannot be reliably differentiated from a myxoma on X-ray modalities.

Odontogenic fibroma



Hamartomas

Odontoma

- Corticated border and a soft tissue capsule which lies immediately inside and adjacent to the cortical border.
- This soft tissue capsule is important for the differential diagnosis of odontomas from other lesions.
- Odontoma is usually associated with unerupted tooth.

Odontoma

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All the best in your final exams…

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