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Oral Medicine of Soft and Hard Tissues in Paediatric Dentistry

2025

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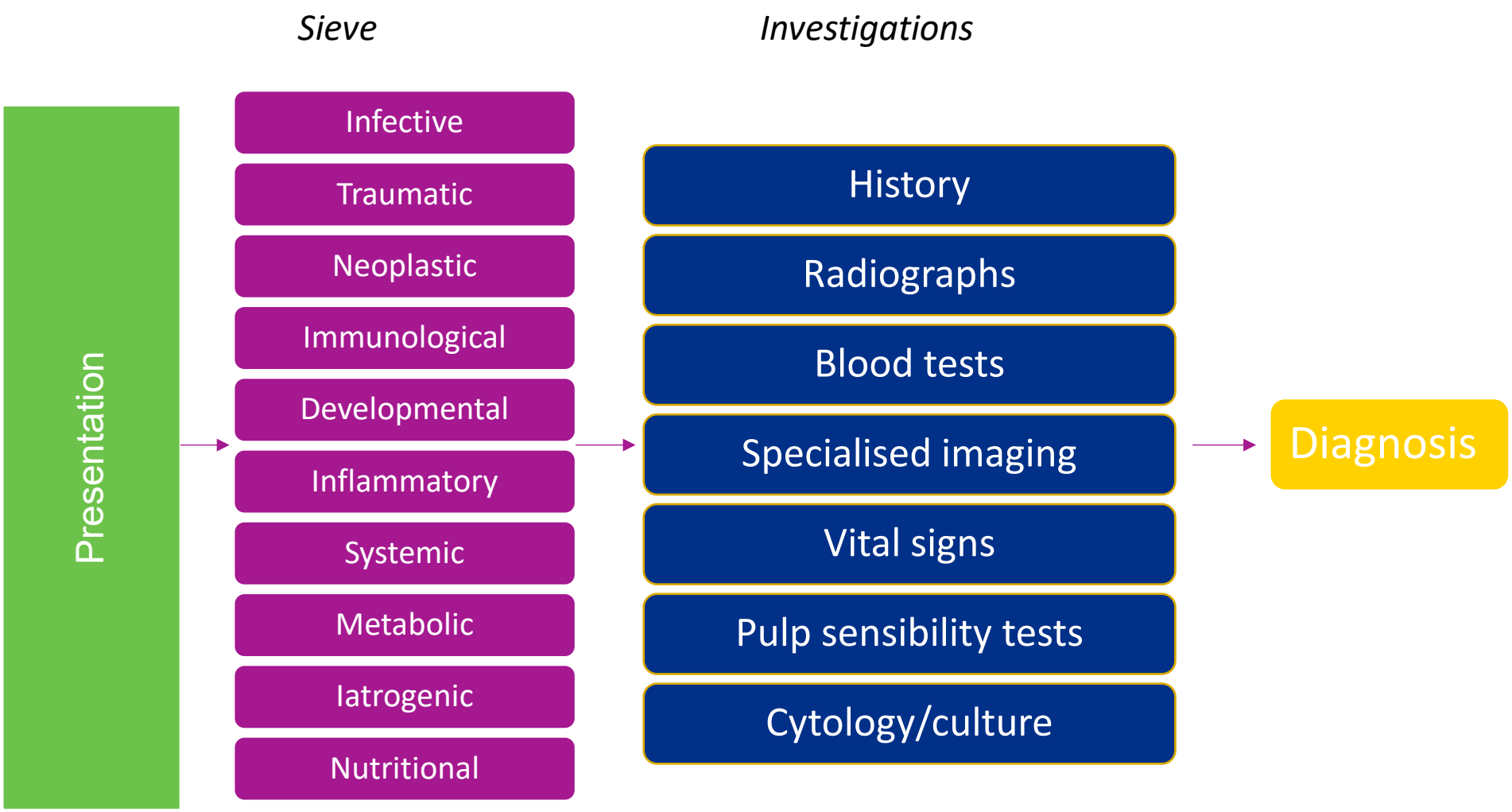
Topics Today

- Diagnosis
  - Sieve

- Oral Pathology in paediatric patients
  - Soft tissue lesions
  - Bony lesions and hard tissue pathology

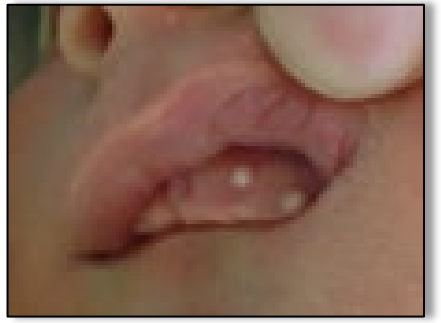
- Treatment options

Diagnosis


Sieve
Investigations
Presentation
Infective
Traumatic
Neoplastic
Immunological
Developmental
Inflammatory
Systemic
Metabolic
Iatrogenic
Nutritional
History
Radiographs
Blood tests
Specialised imaging
Vital signs
Pulp sensibility tests
Cytology/culture
Diagnosis

Newborns and Infants

- **Bohn nodules**
  - appearing on the buccal and lingual aspects of the alveolar ridges
- **Epstein pearls**
  - appearing at the junction of fusion of embryological processes, appearing at the midline of the hard palate
- **Dental Lamina Cysts**
  - appearing on the crest of the alveolar ridges



Nevzat Cizmeci et al. (2014)



Janelle Aby, MD



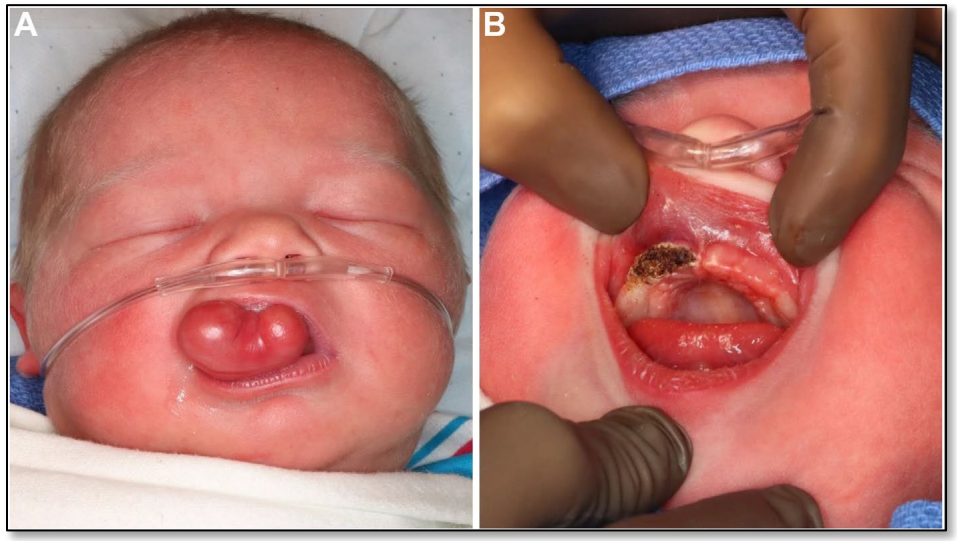
Leland Shenfield, DMD

Newborns and Infants

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Congenital Epulis

- A rare benign lesions of unknown origin found only in neonates
- No predilection for arch
  - More common in girls
- Arises from the gingival crest but not odontogenic in origin



Manlove et al Oral Maxillofacial Surg Clin N Am 2024;36:265-282

Pigmented, Vascular and Red Lesions

- Physiological pigmentation
- Eruption cyst (overlaps with hard tissue eruption pathology)
- Haemangioma, lymphangioma, AV malformations
- Petechiae – systemic and local causes

Physiological Pigmentation

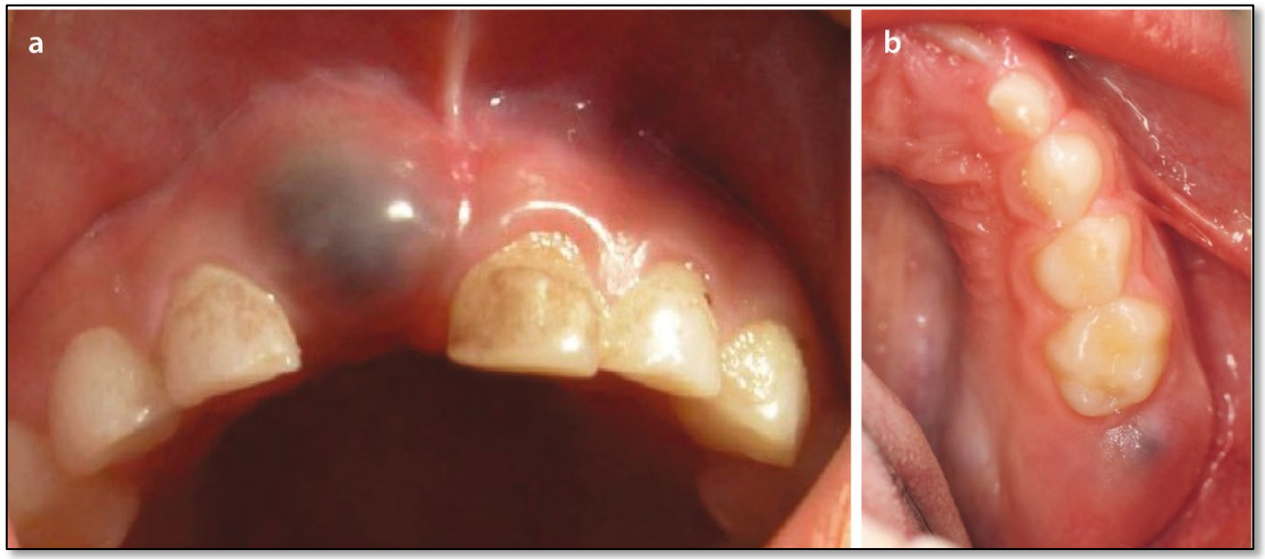
- Diffuse light to dark brown pigmentation of the oral mucosa
- Often on the attached gingiva
  - Not to be confused with heavy metal toxicity which is confined to the marginal gingiva



Courtesy Dr M Halane

Eruption Cysts

- Presenting as follicular enlargement just before eruption of the tooth
- Lesions tend to be blue/black as they contain blood
- Usually require no treatment
  - Reassurance
  - Review



Arhakis et. Al. 2022

Localised Juvenile Spongiotic Gingival Hyperplasia

- Bright red, sessile lesion
- Attached gingiva
- Anterior maxilla
- Girls> Boys
- Do not respond to oral hygiene





Illustration from Pediatric Dentistry A Clinical Approach 3rd Ed.

Vascular Lesions

- Haemangioma
  - Superficial, deep, compound
- Syndromes
  - Maffucci syndrome, Peutz-Jeghers syndrome



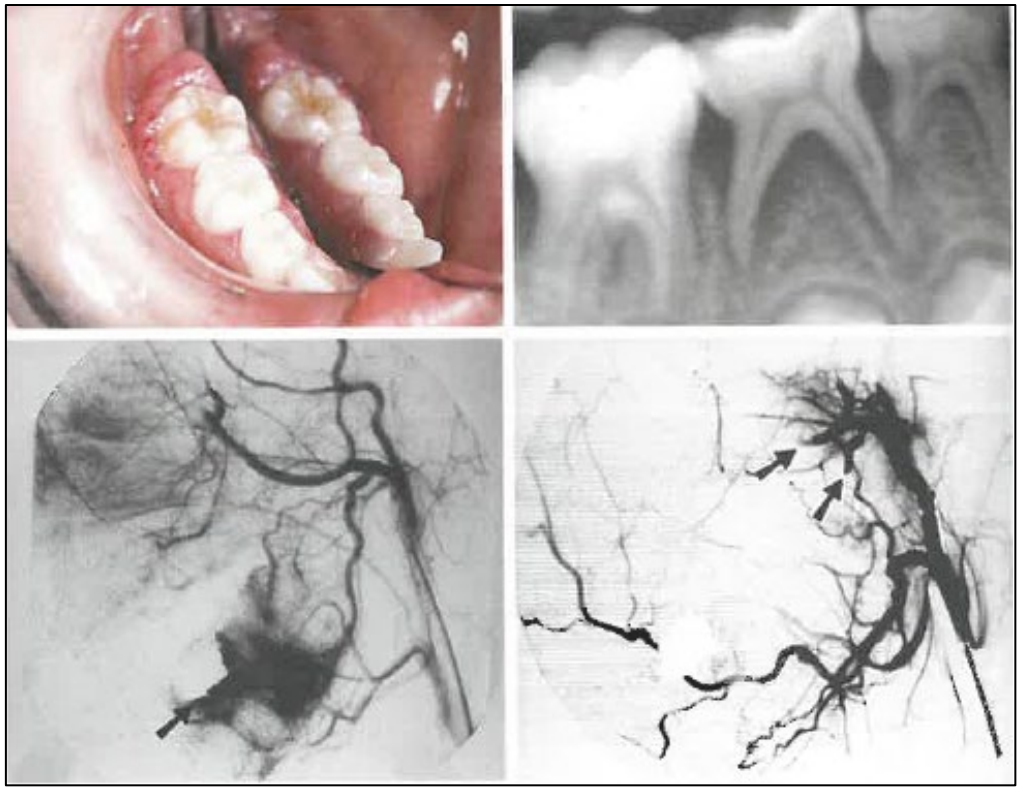
Haemangiomas. Cameron & Widmer



Vascular Malformations. Cameron & Widmer

Arteriovascular Malformations

- Prolonged bleeding from gingivae
- Warm and or pulse sensation
- Enlargement of periodontal space
- Abnormal trabeculae
- Mobile teeth
- Facial asymmetry



Vascular Malformations. Cameron & Widmer

Petechiae & Purpura

- **Petechiae**
  - Pinpoint spots, often <2mm
- **Purpura**
  - Larger, measuring between 2mm-1cm

- **Diagnosis**
  - History
  - Medications
  - Full blood counts



Dioguardi et al 2015

Infections

- Oral candidiasis (thrush)
- Primary herpetic gingivostomatitis
- Varicella, Hand-Foot-Mouth disease
- Syphilis (oral manifestations)

Oral Candidiasis

- **Acute pseudomembranous candidiasis**
  - Most common presentation in infants
  - Caused by Candida Albicans
- **Clinical**
  - Raised pearly-white patches overlying oral mucosa, most often on the buccal and labial mucosa, soft palate, and tongue
  - The plaques are easily removed with a dry gauze and the underlying mucosa is erythematous



NHS 2023

Oral Candidosis

Neonates and children <2y

- Address predisposing factors
- Nystatin
  - 100 000 units/mL suspension 1mL topically 4xdaily after feeding
  - 7-14 days
  - Continue 3 days after relief
- Miconazole 2%
  - 1.25 mL topically 4xdaily after feeding
  - 7-14 days
  - Continue 7 days after relief

Therapeutic guidelines: Oral and Dental

- Apply the dose in the anterior part of the mouth
- Do not share dummies, cups or eating utensils
- Regularly wash toys and other objects that children put in their mouths



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Primary Herpetic Gingivostomatitis

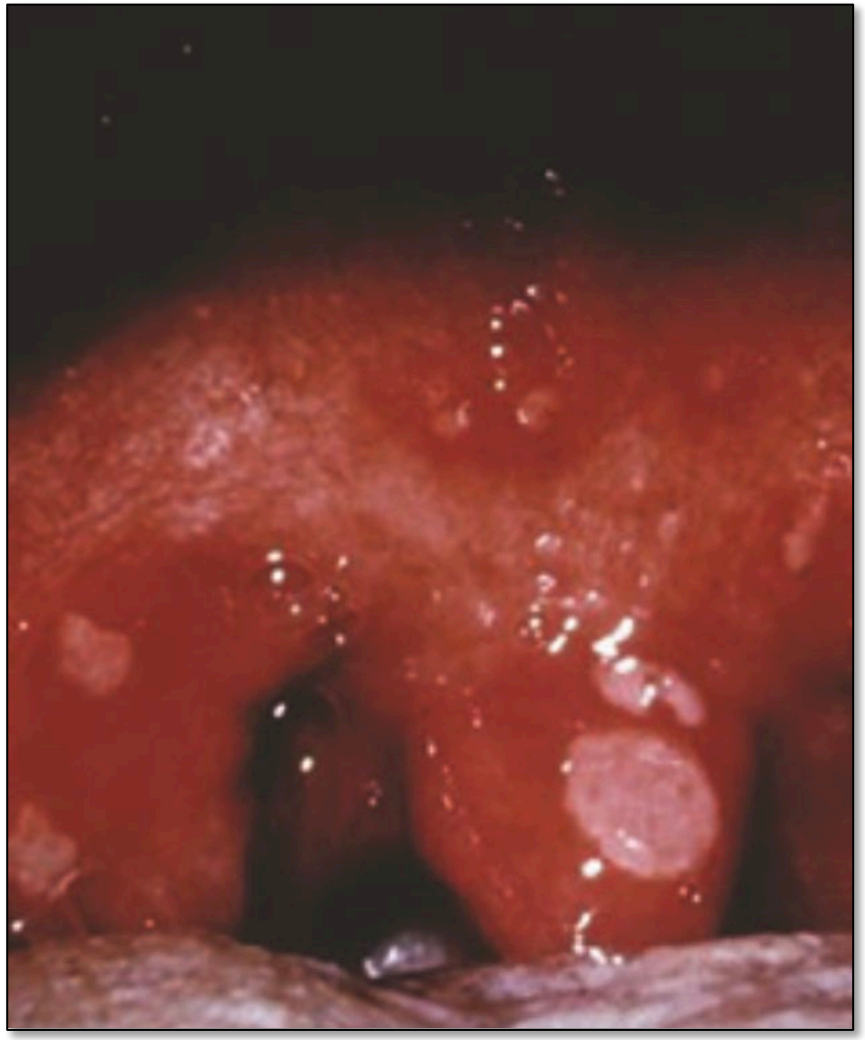
- The symptomatic presentation following initial exposure to herpes simplex virus 1
  - Rare cases from HSV-2
- Appearance
  - Numerous small vesicles which erupt into ulcers
  - stomatitis



Philipone, Yoon & Koutlas 2023

Hand Foot and Mouth / Herpangina

- Caused by the Coxsackie group of viruses
- Highly contagious, symptomatic and self limiting
- **Appearance**
  - Herpangina
    - Cluster of four to five vesicles on the palate/fauces/pharynx
  - Hand foot and mouth
    - Up to 10 vesicles around the mouth +hands and feet

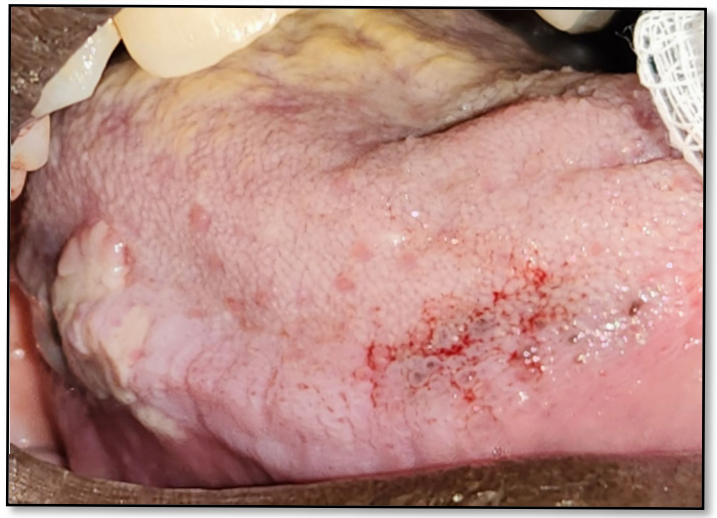


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Syphilis

- Initial presentation can be variable due to the different stages the patient can be in
  - Primary
  - Secondary
  - Latent
  - Tertiary
  - Congenital





Courtesy Dr J. Patel

Epulides & Exophytic Lesions

- Pyogenic granuloma
- Fibrous epulis
- Squamous papilloma
- Verruca vulgaris

Fibrous Epulis

- **Fibroepithelial reaction**
  - Response to local trauma or irritation
- **Appearance**
  - Smooth
  - Pink
  - Swelling of fibrous tissue
  - Sessile
- **Treatment**
  - Oral hygiene instruction
  - Surgical excision



Photo from Simms & Lewis, Dental Update 2024 48:4, 707-709

Pyogenic Granuloma

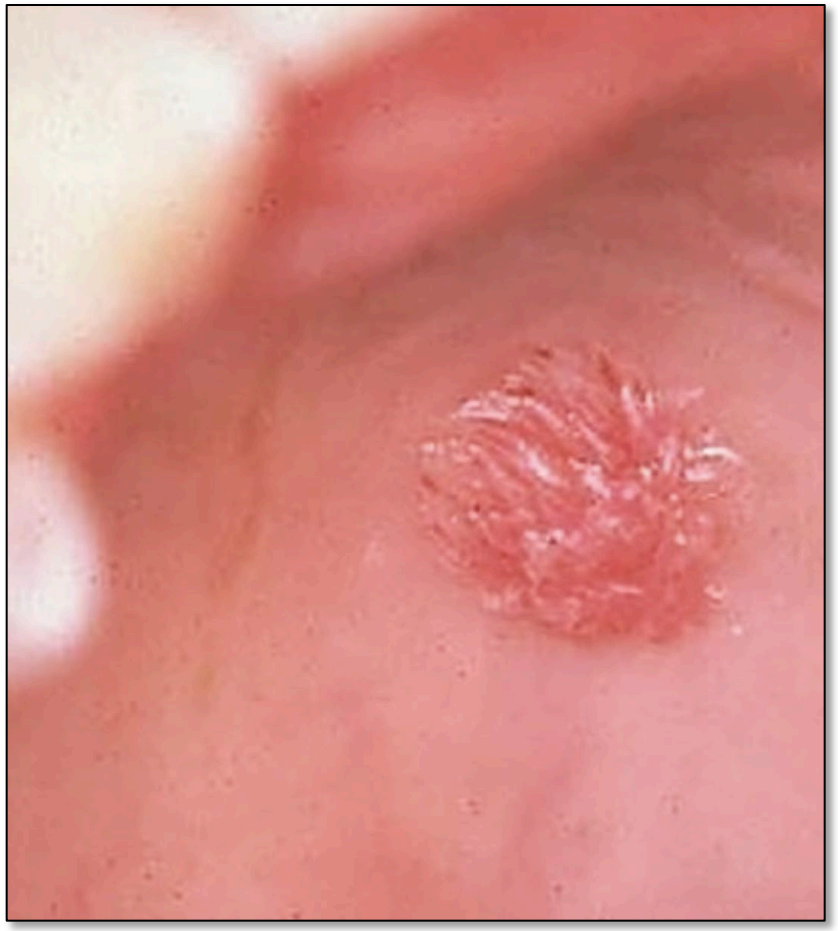
- **Misnamed lesion**
  - No pus
  - No granulomas
- An ulcerated lobulated capillary haemangioma
- **Appearance**
  - Smooth surfaced tissue mass that has a red appearance
  - Bleeds when manipulated
  - Often pedunculated
- **Aetiology**
  - Often resulting from local irritation (plaque) or trauma



Brittany Camenisch, D.M.D

Squamous Papilloma

- Benign neoplasm caused by human papilloma virus
- **Appearance**
  - Cauliflower like growth
  - Papillary
  - Exophytic
  - Colour depending upon keratinization amount

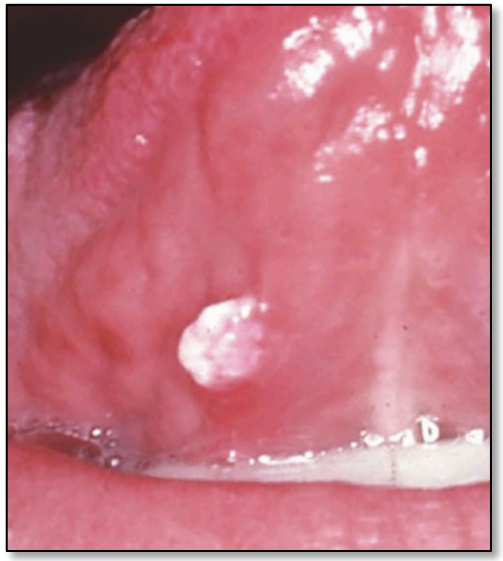


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Verruca Vulgaris

- Also known as the common skin wart
- Uncommon in the mouth; more frequently on the hands
- Caused by HPV
- **Appearance**
  - Papillary
  - Exophytic
  - White growth
  - May be single or multiple





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Gingival Enlargement

- Drug induced
- Syndromes with gingival enlargement

Drug Induced Gingival Enlargement

- **Causes**
  - Phenytoin
  - Cyclosporin A
  - Nifedipine
  - Verapamil
- Not all patients taking these drugs experience this



Photo from Simms & Lewis, Dental Update 2024 48:4, 707-709



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Hereditary Gingival Fibromatosis

- The most common syndromic cause of gingival enlargement
- Autosomal dominant condition usually appearing at the time of eruption of the permanent dentition
- Other hereditary conditions includes Zimmerman-Laband syndrome



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Systemic Disease Manifestations

- Crohn’s disease/Orofacial granulomatosis, Melkersson–Rosenthal syndrome

Crohn's Disease

- Chronic relapsing inflammatory bowel disease
- **Appearance**
  - Diffuse or localised swelling of the lips and buccal mucosa (orofacial granulomatotis)
  - Recurrent aphthous like ulcerations
  - Pyostomatitis vegetans
  - Mucosal tags or folds
  - Cobblestoning
  - Mucogingivitis
- **Management**
  - Medical management of the condition involving steroids/DMARDS



Upadhyaya & Mutalik 2023



Philipone, Yoon & Koutlas 2023

Salivary Gland Lesions

- Mucocele
- Ranula

Mucocele

- Also known as a mucous extravasation cyst
- Arises from damage to the duct of one of the minor salivary glands in the lower lip or cheek
  - Lip or cheek biting
  - Build up of mucous in the connective tissue that is then surrounded by fibrous tissue
- **Appearance**
  - Well circumscribed swellings
  - Can appear blue
  - Can have a keratinizaed surface following trauma
  - From a few mm to a cm
- **Treatment**
  - Some regress spontaneously
  - Surgical excision



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Ranula

- Is a mucocele of the floor of the mouth involving the sublingual or possible the submandibular gland
- A soft, blueish swelling on one side of the floor of the mouth
- A plunging ranula is when the lesions herniates through the mylohyoid muscle
- Occur lateral to the midline along the ducts
    - Midline indicating a different type of cyst



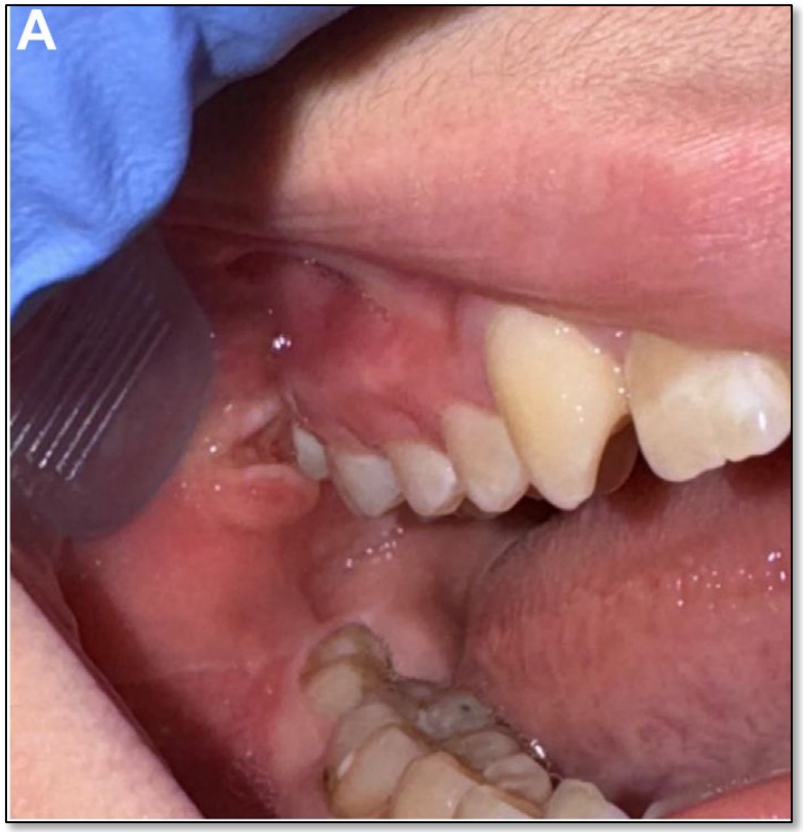
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Ulcerative & Vesiculobullous Lesions

- Traumatic ulcers
- Riga–Fede
- Immune-mediated:
  - RAU
  - Erythema multiforme

Traumatic Ulcers





McKernon et al Br Dent J 2023:235(4);255-261
Manlove et al Oral Maxillofacial Surg Clin N Am 2024;36:265-282

Riga-Fede

- A type of trauma induced ulcer on the ventral surface of the tongue caused by trauma froim the continual protrusive and retrusive movements of the tongue over the lower incisors
- Often noted alongside the presence of natal teeth or sharp incisors
- **Treatment** can involve conservative review, smoothing sharp edges of teeth or rarely extraction of the natal teeth





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Recurrent Aphthous Ulcers

- **Classified** according to size, duration and severity
  - Minor
  - Major
  - Herpitiform
- **Aetiology**
  - Not well understood
  - Nutritional deficiencies
  - Immune mediated
  - Trauma
- **Appearance**: Minor
  - Non keratinized mucosa
  - <1cm
  - Lasting 7-14 days
  - Heal without scarring
  - 1-5 in number



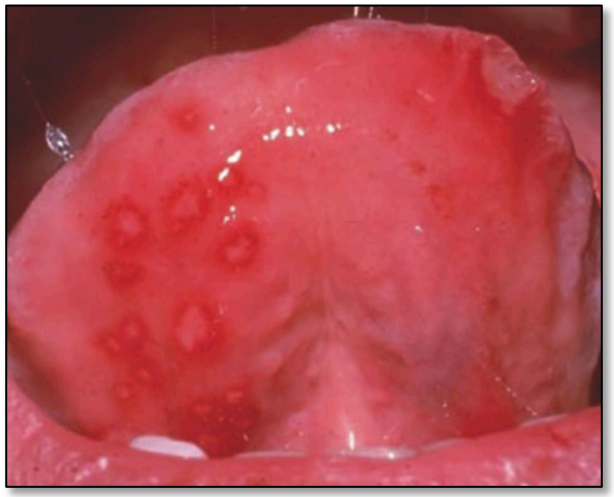


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Recurrent Aphthous Ulcers

- **Appearance**: Major
  - Smaller in number; 1-3
  - Larger in size hence the name; >1cm
  - Heal with scarring
  - Healing taking longer; up to 6 weeks
- **Appearance**: herpetiform
  - Resemble a primary herptic infection
  - Smaller than minor and occur in clusters
  - Healing within 7-10 days
  - Keratinized and non keratinized surfaces
  - Can coalesce to form large ulcers





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Erythema Multiforme

- Original description is that of a self limiting but recurrent seasonal skin disease with mucosa involvement in the oral cavity
- **Aetiology**
  - Considered a type IV hypersnesitrivity reaction
- **Appearance**
  - Target shape lesions on the skin
  - Ulceration of lips with blood staining
  - Oral lesions starting as erythematous patches that undergo necrosis and become ulcers
- **Treatment**
  - EM is self limiting but being aware of progression





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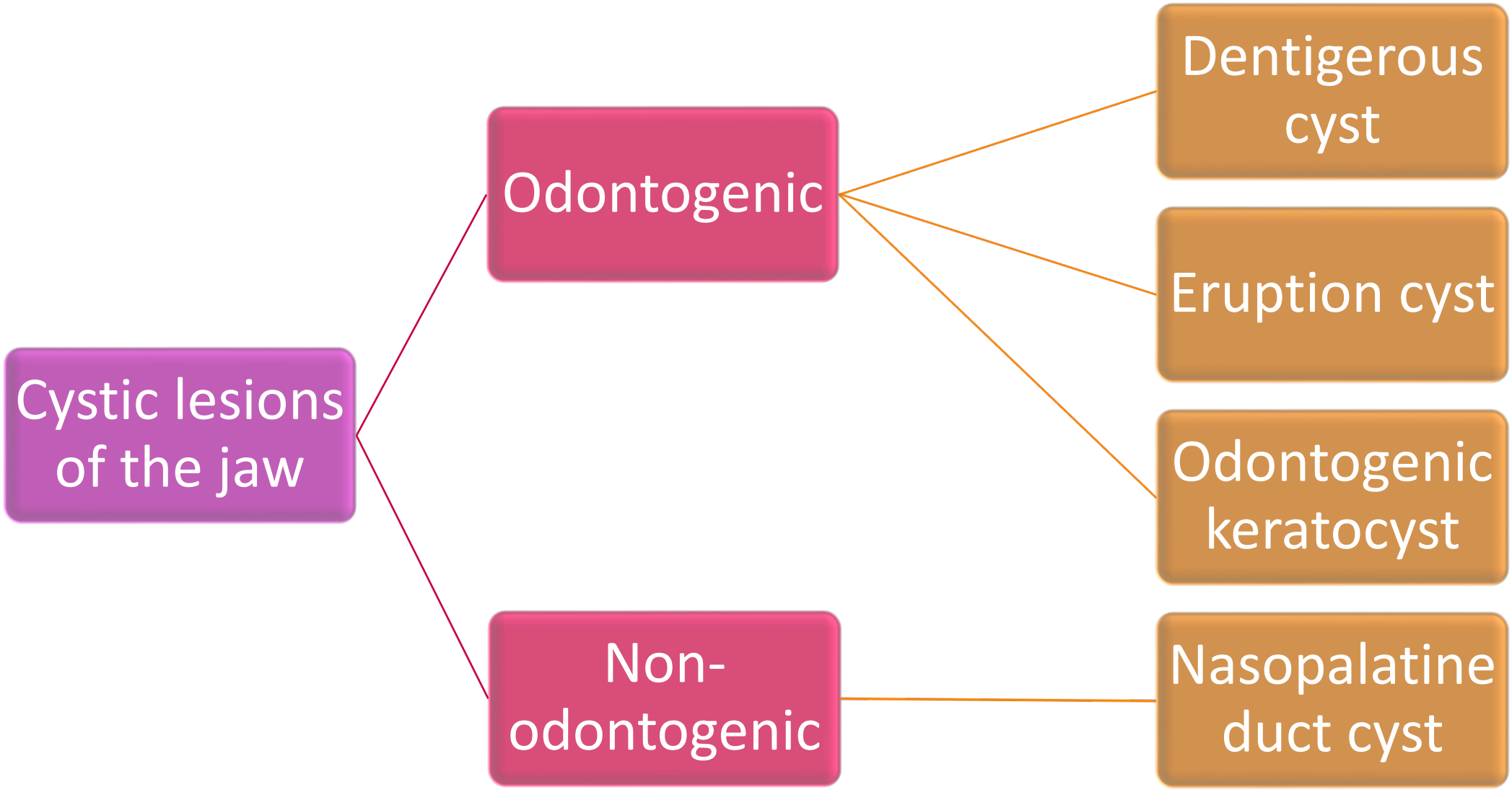
Bony lesions of the jaws

Hard Tissue Lesions

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- Cystic lesion
- Tumors of the jaw
- Other bony lesions

Cystic Lesions of the Jaws



Dentigerous Cyst

- Benign, odontogenic cyst that forms around the crown of an unerupted or developing tooth, attached to the CEJ
- **Aetiology**: accumulation of fluid between the reduced enamel epithelium and crown of the unerupted tooth
- **Site**: Most commonly in the mandible(75%); impacted third molars and canines



Dentigerous Cyst: Cameron & Widmer

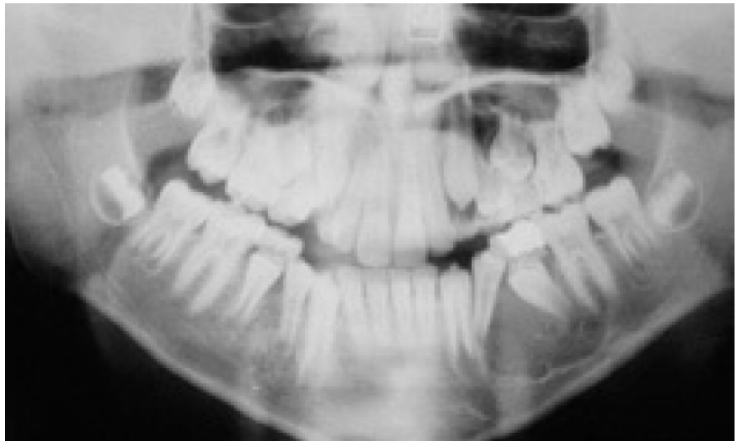
Dentigerous Cyst

- **Clinical**: usually asymptomatic, may be discovered incidentally
    - Swelling, delayed tooth eruption, displacement of adjacent teeth



Dentigerous Cyst: Cameron & Widmer

- **Radiographic**: well-defined, radiolucent lesion that surround the crown of an unerupted tooth and attach at the CEJ.

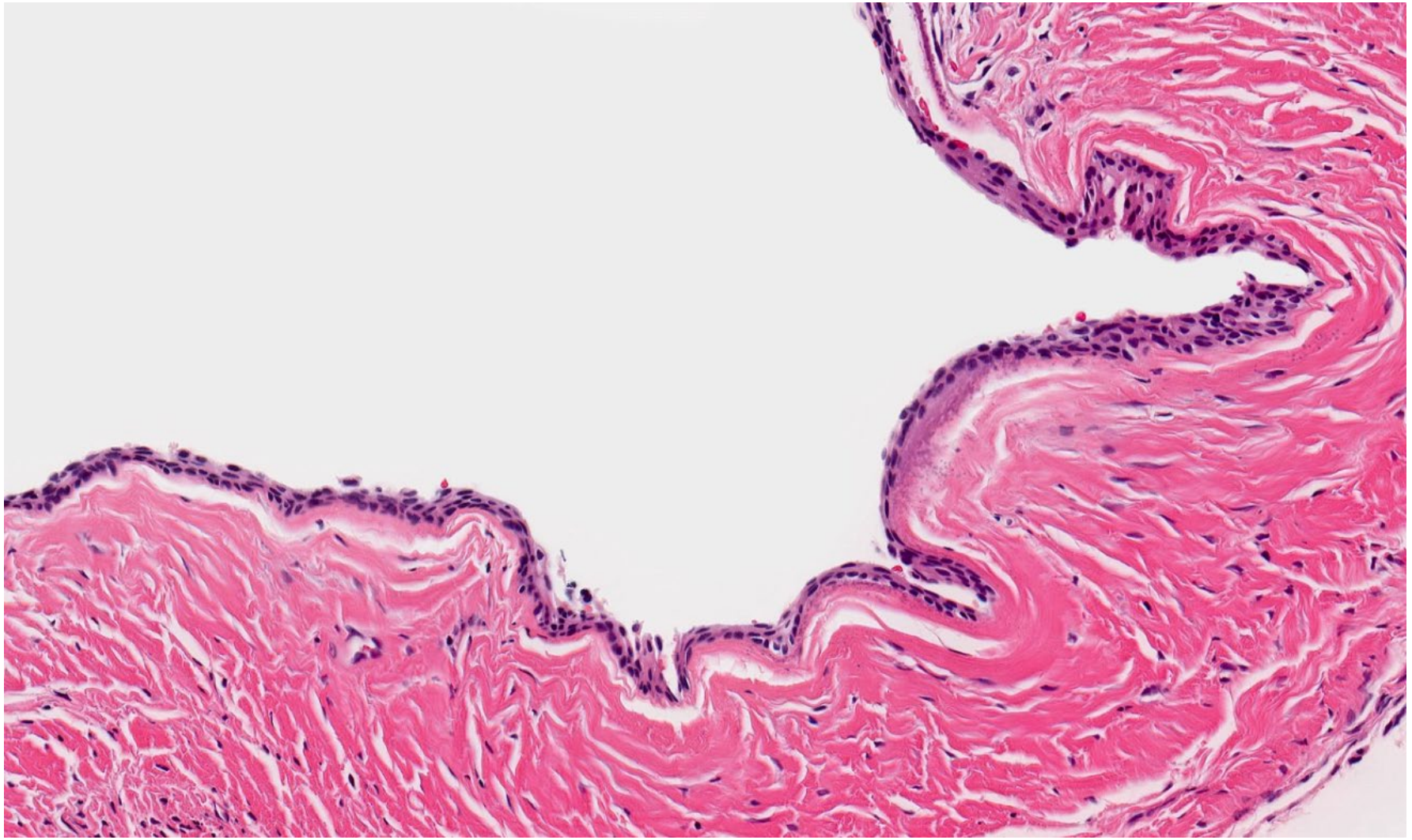


Dentigerous Cyst: Welbury

Dentigerous Cyst

- **Treatment**: enucleation or marsupialisation
    - Good prognosis, low risk of recurrence if removed completely

Dentigerous Cyst



Eruption Cyst

- Dentigerous cyst whose cyst lining becomes continuous with the oral epithelium
- **Clinical**: fluctuant bluish swelling overlying an unerupted tooth
- Usually self-resolving, may require marsupialization.



Eruption Cyst: Cameron & Widmer

Keratocystic Odontogenic Tumour

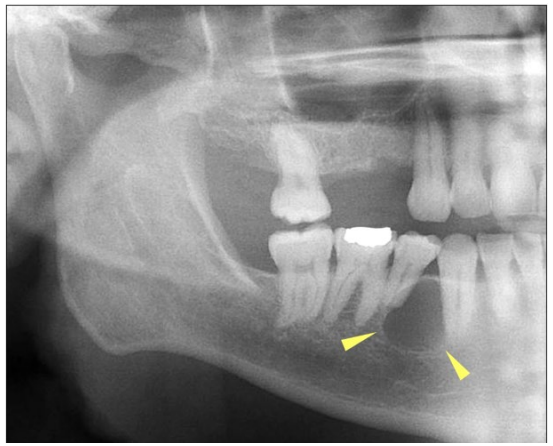
- Reclassified by WHO in 2005 as a true neoplasm
- Previously known as odontogenic keratocyst.
- Locally aggressive, developmental odontogenic origin
- **Aetiology**: dental lamina; involvement of sonic hedgehog signaling pathways in many cases; syndromic cases (Nevoid basal cell carcinoma syndrome)

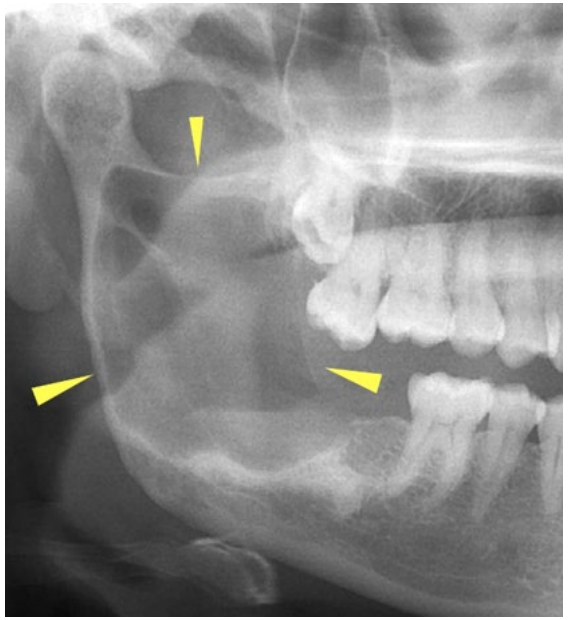


Gorlin Syndrome

Keratocystic Odontogenic Tumour

- **Site**: 70% occur in mandible, 50% in angle/ramus
- **Clinical**: may be small and asymptomatic, incidentally detected on radiographs
  - Large lesions produce a painless bony expansion which can displace teeth
  - Risk of pathological fracture
- **Radiographic**:
  - Unilocular or multilocular radiolucency with smooth or scalloped margins
  - Cancellous enlargement anterio-posteriorly

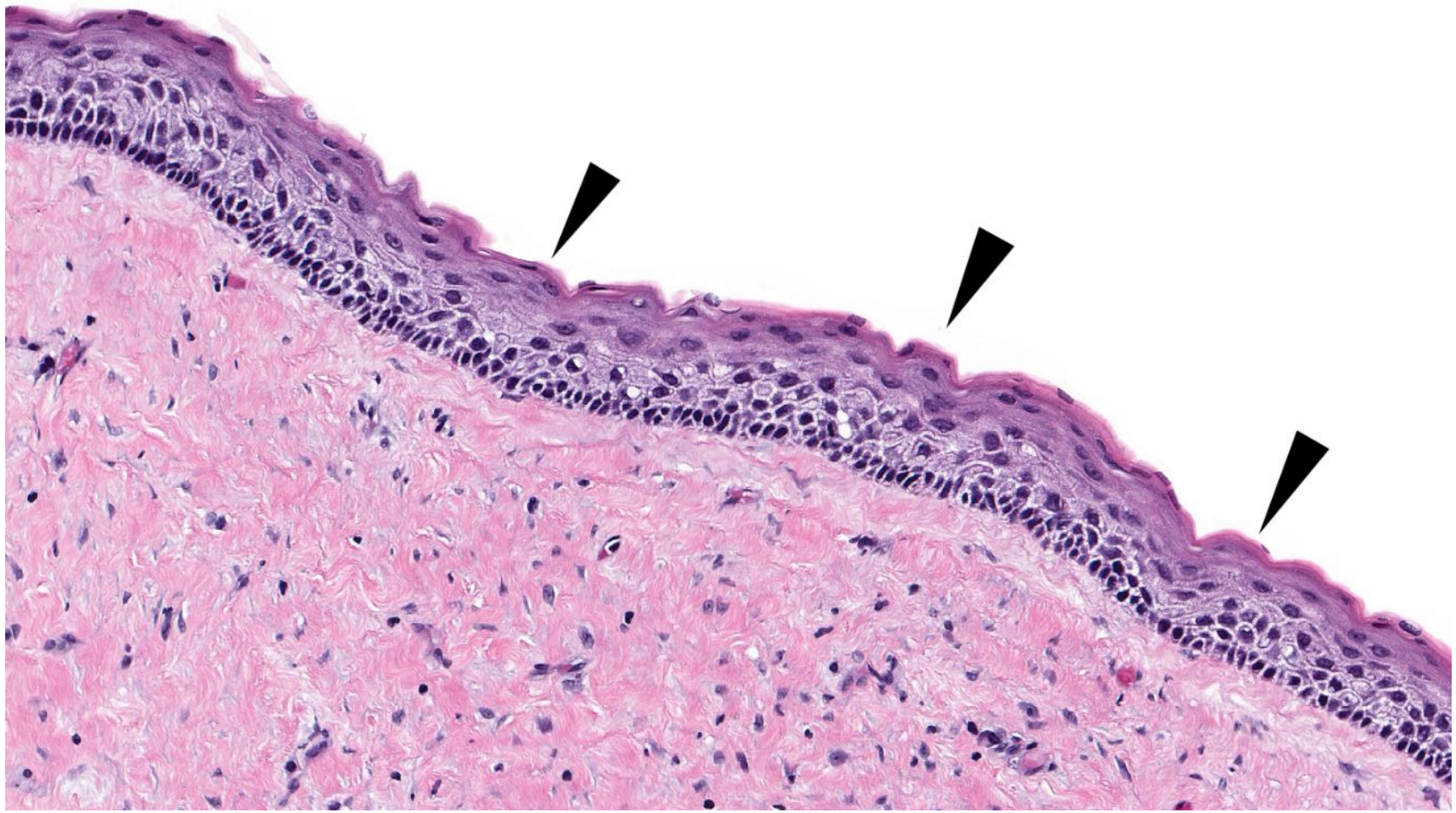




Keratocystic Odontogenic Tumour

- **Treatment**: Surgical enucleation ± curettage
  - Budding of satellite cysts from the basal layer = High risk of reoccurrence

Keratocystic Odontogenic Tumour



Nasopalatine Cyst

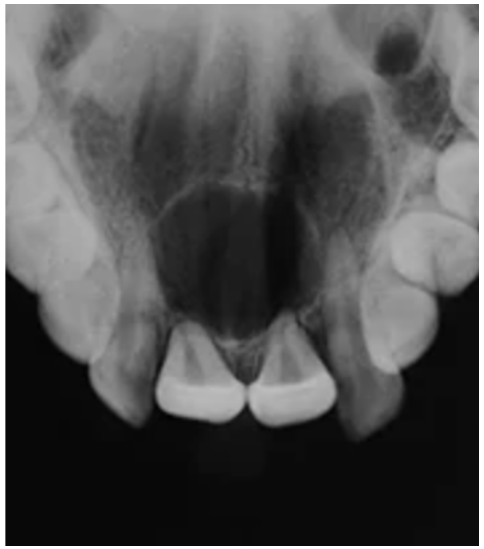
- Also called as Incisive cyst
- Benign, non-odontogenic cyst located in the midline of the anterior maxilla
- **Aetiology**: spontaneous proliferation of remnants of nasopalatine duct within the incisive canal

Nasopalatine Cyst

- **Clinical**: often asymptomatic, incidental findings on radiograph
  - Midline swelling in the hard palate
  - May be painful with exudate
  - Incisors are vital
- **Radiographic**: well circumscribed, rounded or heart shaped radiolucency of the anterior maxilla



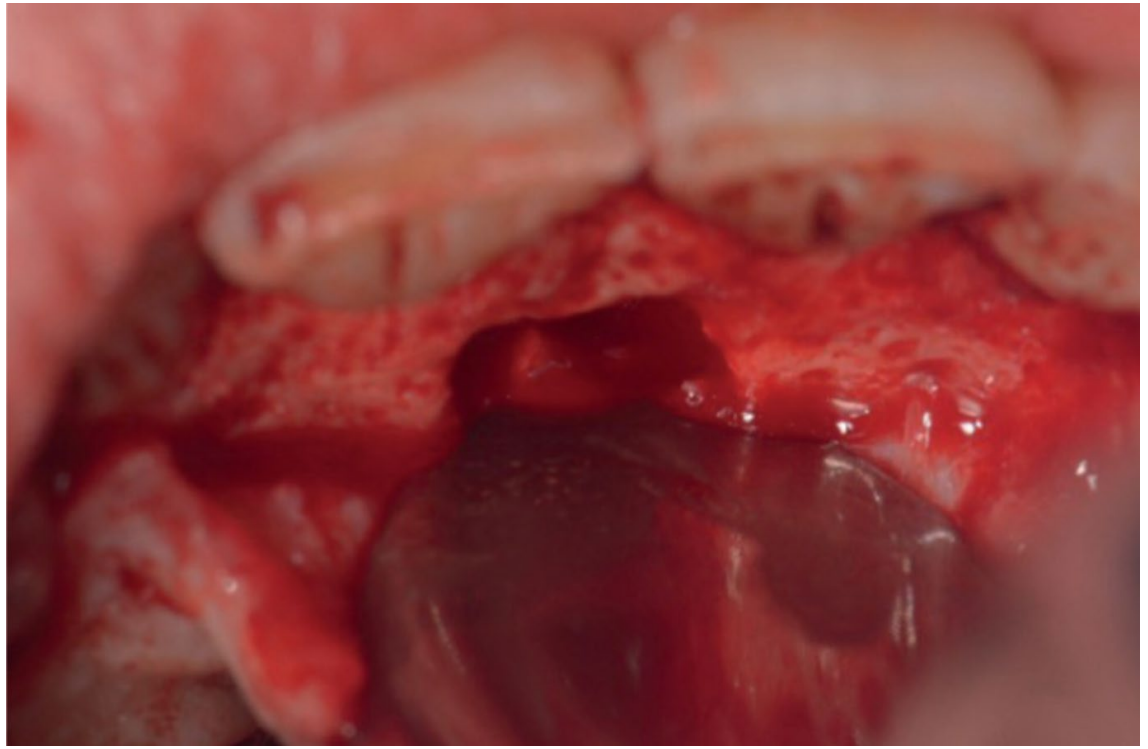
Incisive Cyst: Shrutha Prakasha



Incisive Cyst: Cameron & Widmer

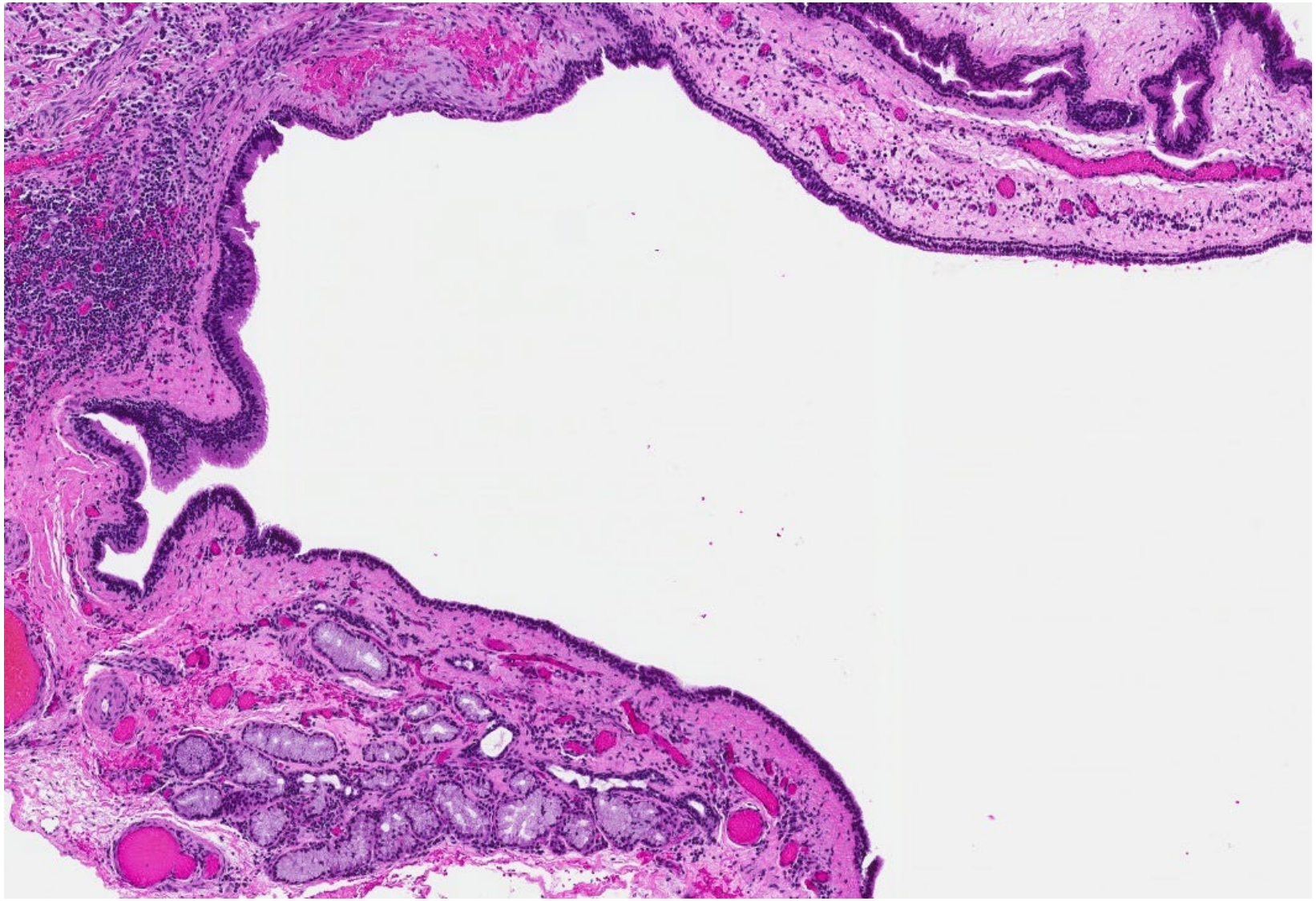
Nasopalatine Cyst

- **Treatment**: Surgical enucleation
  - Recurrence risk is low
- **Prognosis** : Excellent

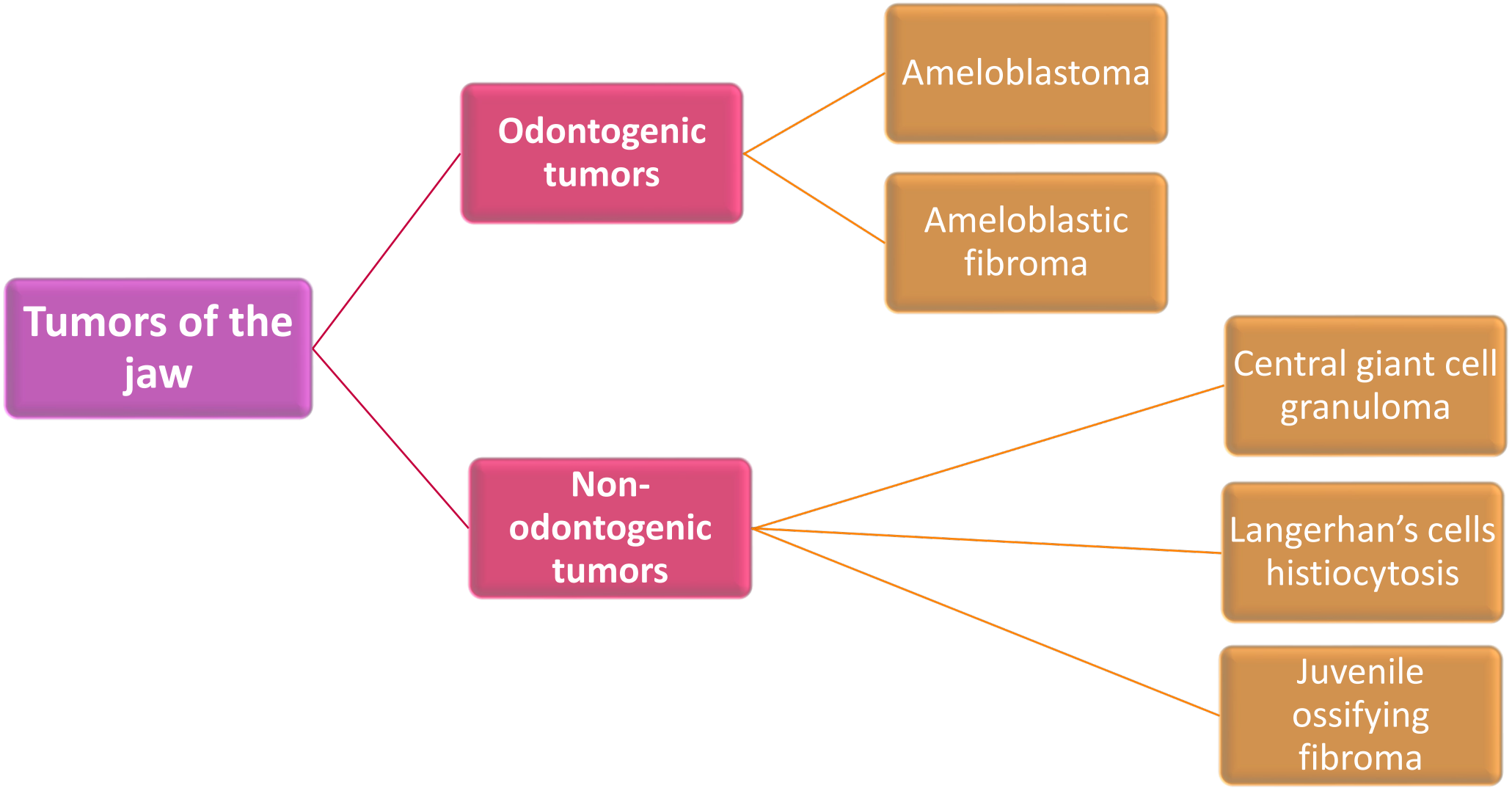


Enucleation : Dental update

Nasopalatine Cyst



Tumors

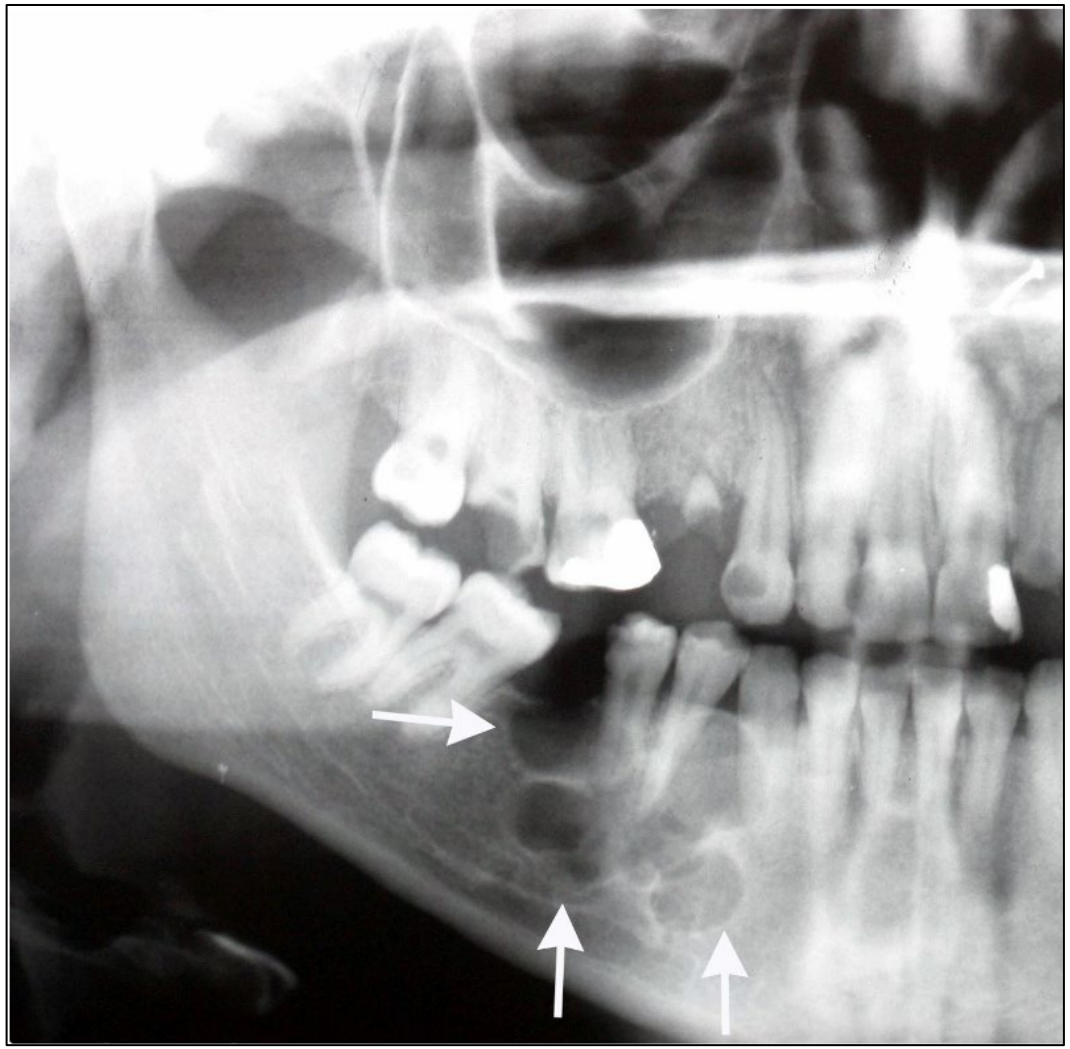

Tumors of the jaw
Odontogenic tumors
Ameloblastoma
Ameloblastic fibroma
Non-odontogenic tumors
Central giant cell granuloma
Langerhan's cells histiocytosis
Juvenile ossifying fibroma

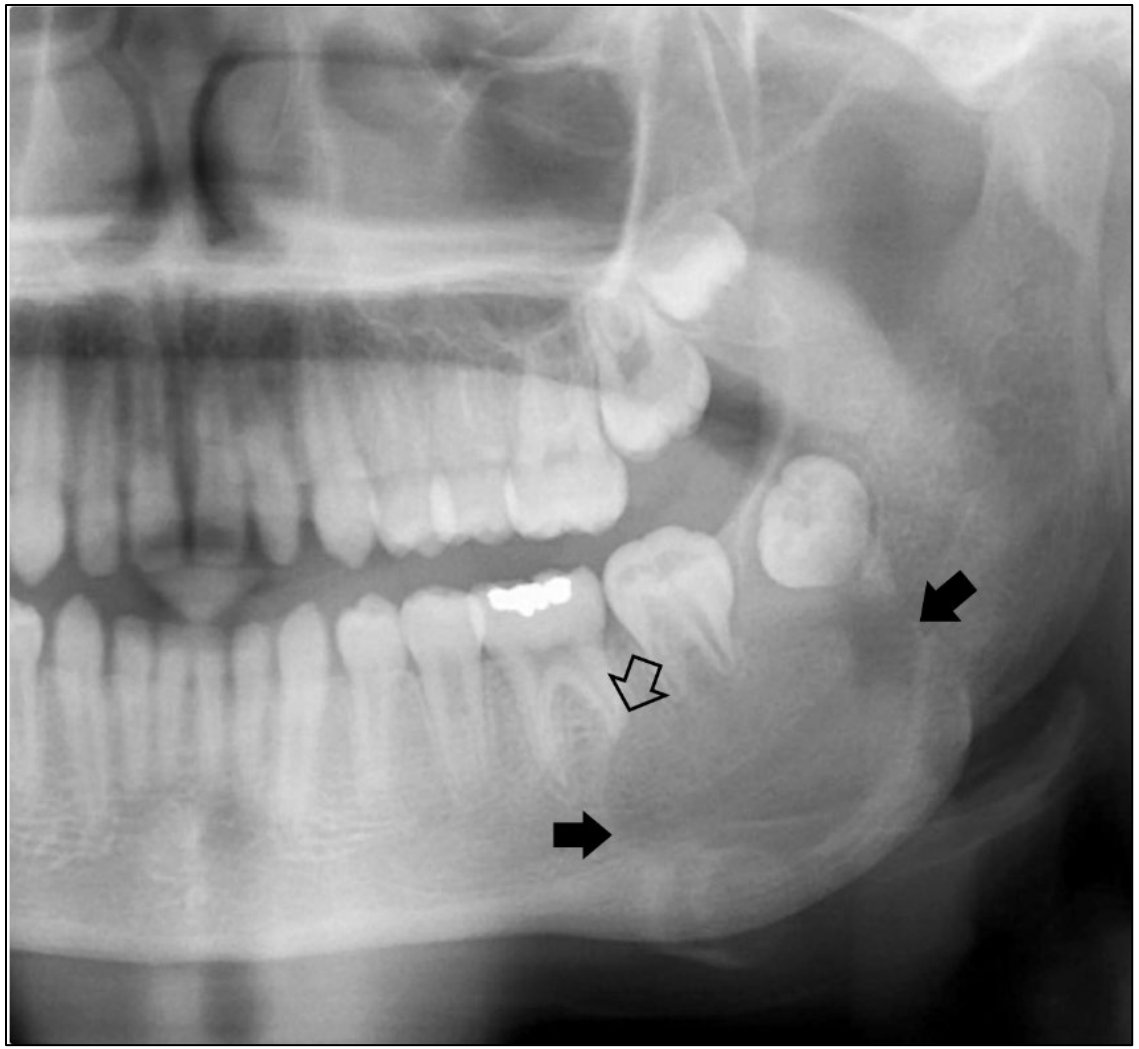
Ameloblastoma

- Benign but locally aggressive tumor
- More common after age 40
- **Aetiology**: Epithelial remnants of the dental lamina or enamel organ
- **Clinical**: Painless, slow-growing swelling of the jaw
    - Displacement of teeth, loose, teeth, malocclusion
    - Large tumours – facial deformity, restricted mouth opening, airway obstruction

Ameloblastoma

- **Radiology**:
  - Expansile, multi-locular radiolucency with well-defined corticated border
  - May see classic soap bubble appearance
  - Resorption or displacement of tooth roots
- **Treatment**: resection with uninvolved margins
  - Loss of bone and teeth
  - High rate of recurrence



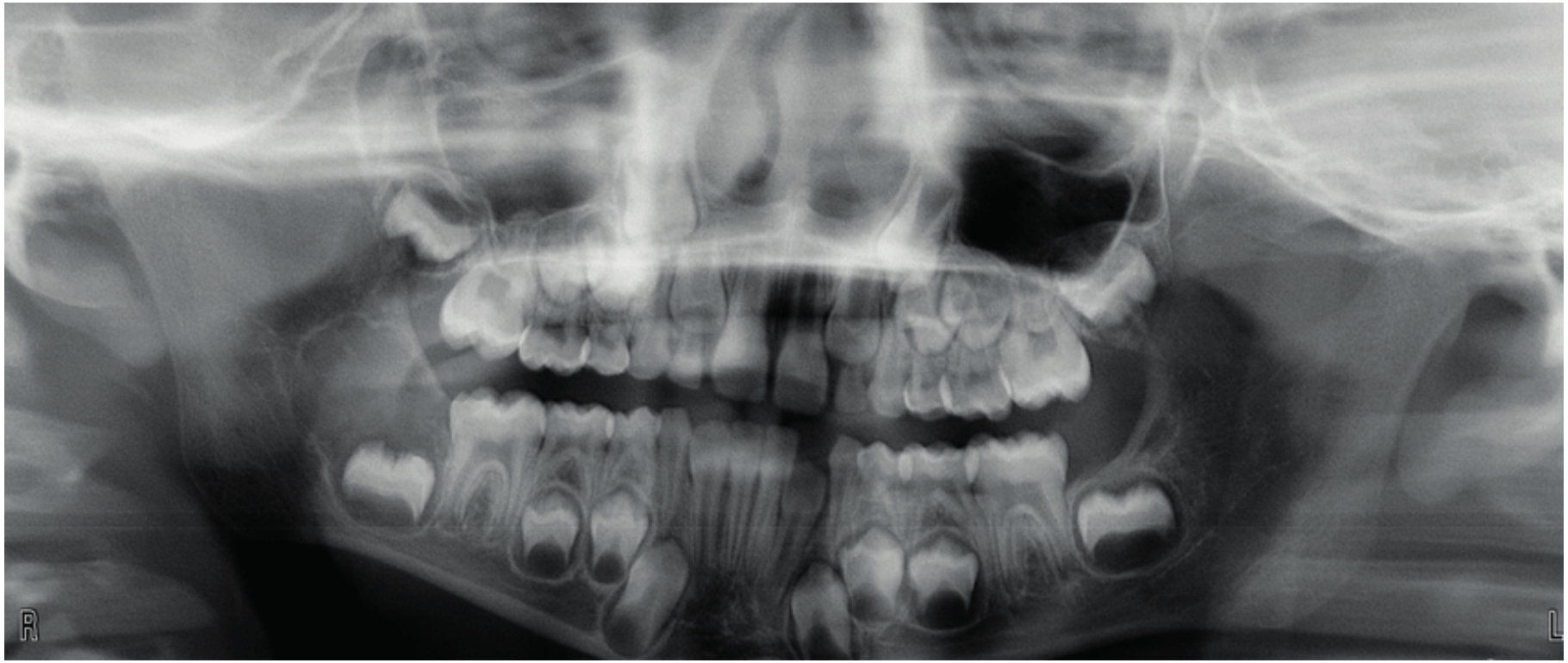


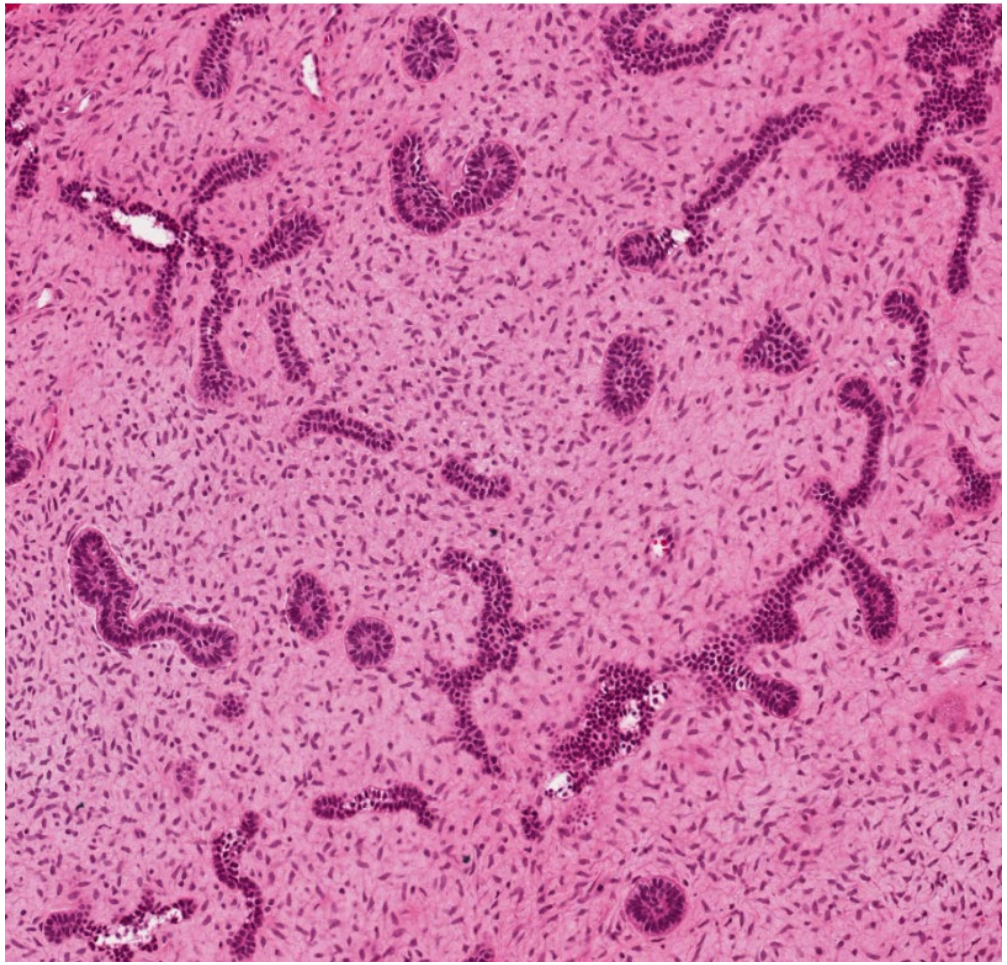
Ameloblastic Fibroma

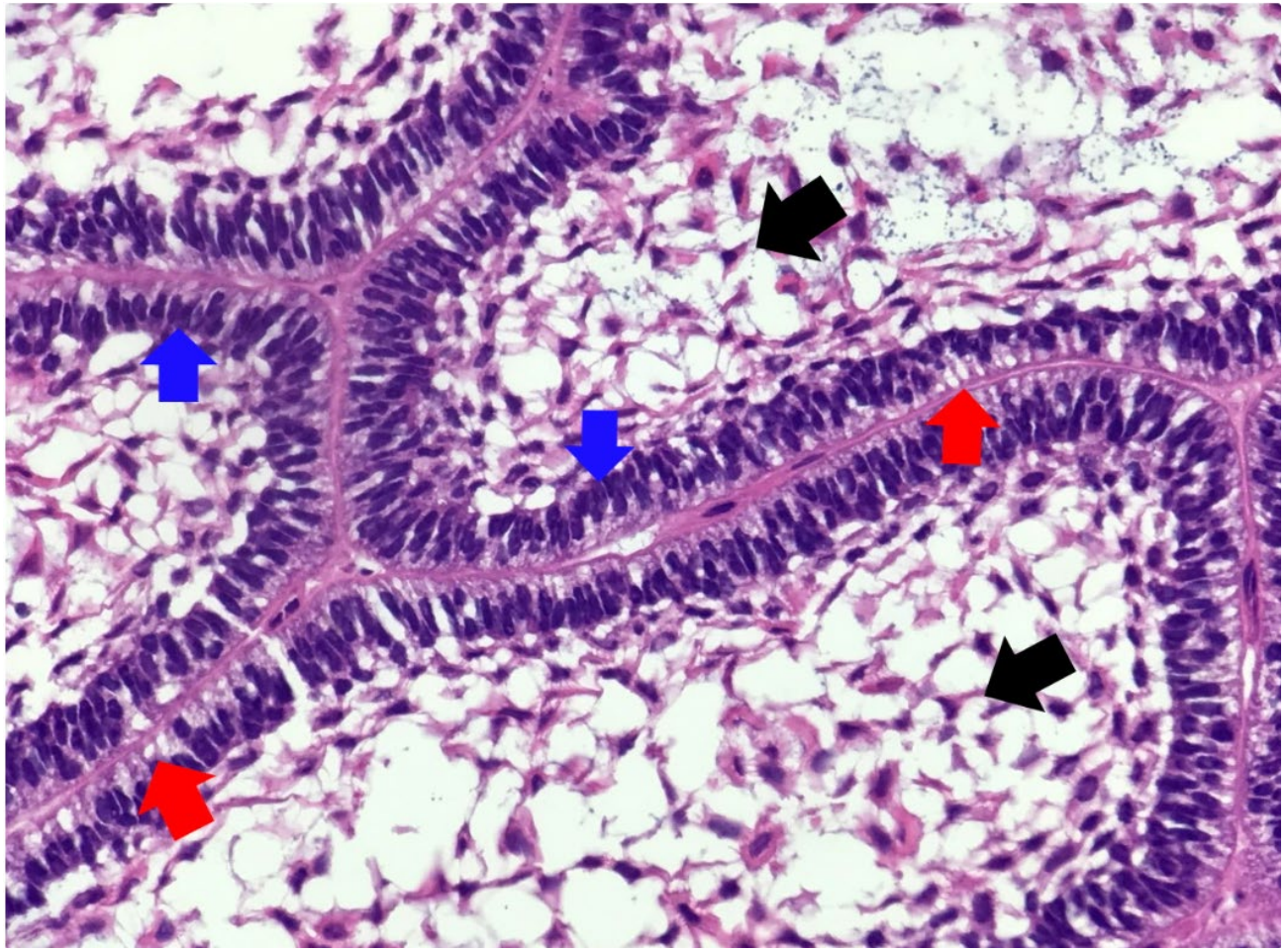
- True mixed odontogenic neoplasm containing both epithelial and mesenchymal tissues
    - Dentine in the specimen = ameloblastic fibro-dentinoma (tends to occur in young children)
- Slow growing, benign,
    - Less aggressive than ameloblastoma
- Usually <20 years
- Majority of cases occur in mandible

Ameloblastic Fibroma

- **Radiographic**: well-defined, corticated unilocular or multilocular radiolucency
- **Treatment**: complete removal but more conservatively than with ameloblastoma







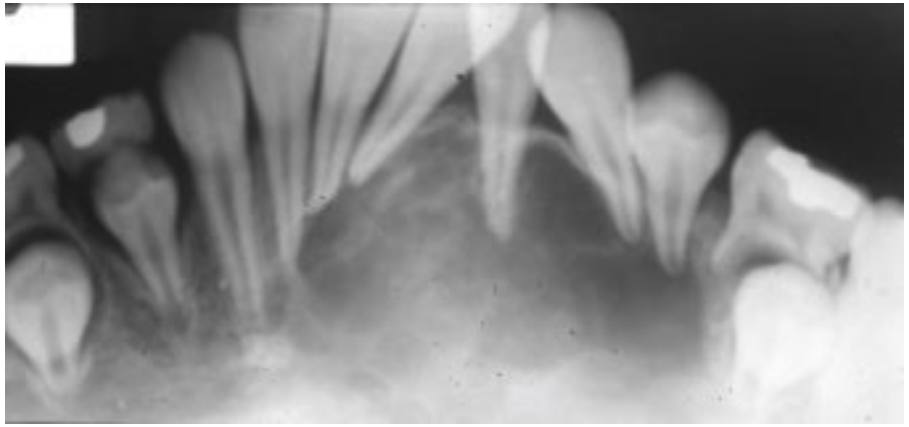
Non-Odontogenic Tumors

- Central giant cell granuloma
- Langerhans' cell histiocytosis
- Juvenile ossifying fibroma

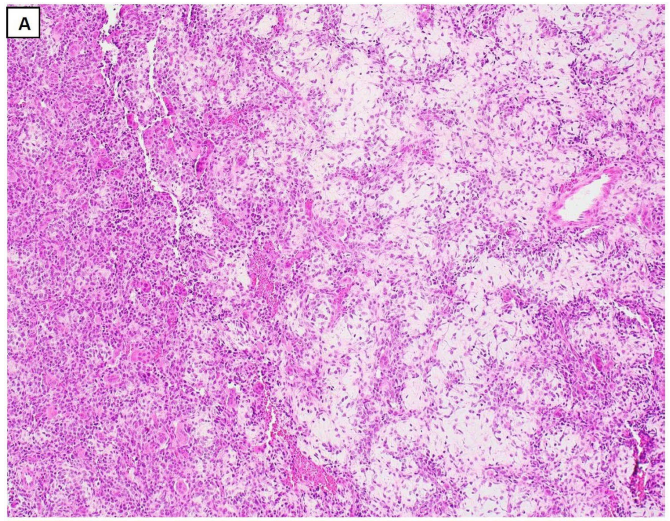
Central Giant Cell Granuloma

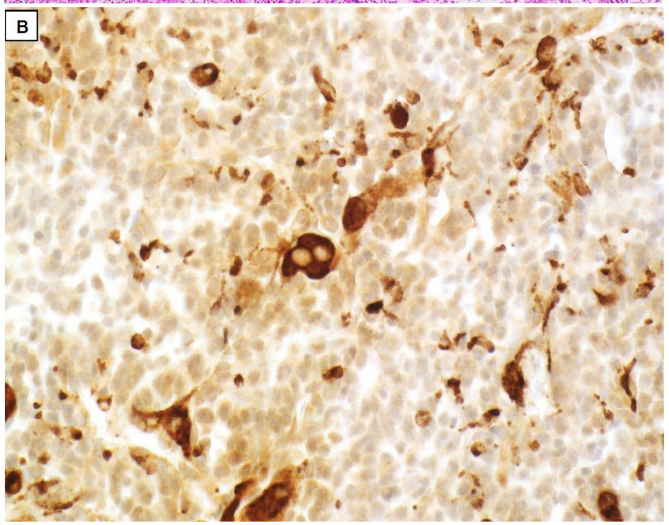
- Non-neoplastic non-odontogenic reactionary lesion
- **Site**: 70% anterior mandible
- F>M, majority <30 years of age
- **Clinical**:
  - Slowly growing asymptomatic swelling
  - Rapid growth, pain, resorption of teeth, cortical bone performation
- **Aetiology**: local trauma, repair processes, inflammatory lesions
- **Treatment**:
  - Surgical curettage, intra-lesional steroids, calcitonin, INFα2a, resection
  - High recurrence rate in paediatric patients – 41%

Central Giant Cell Granuloma









Diab et al 2022

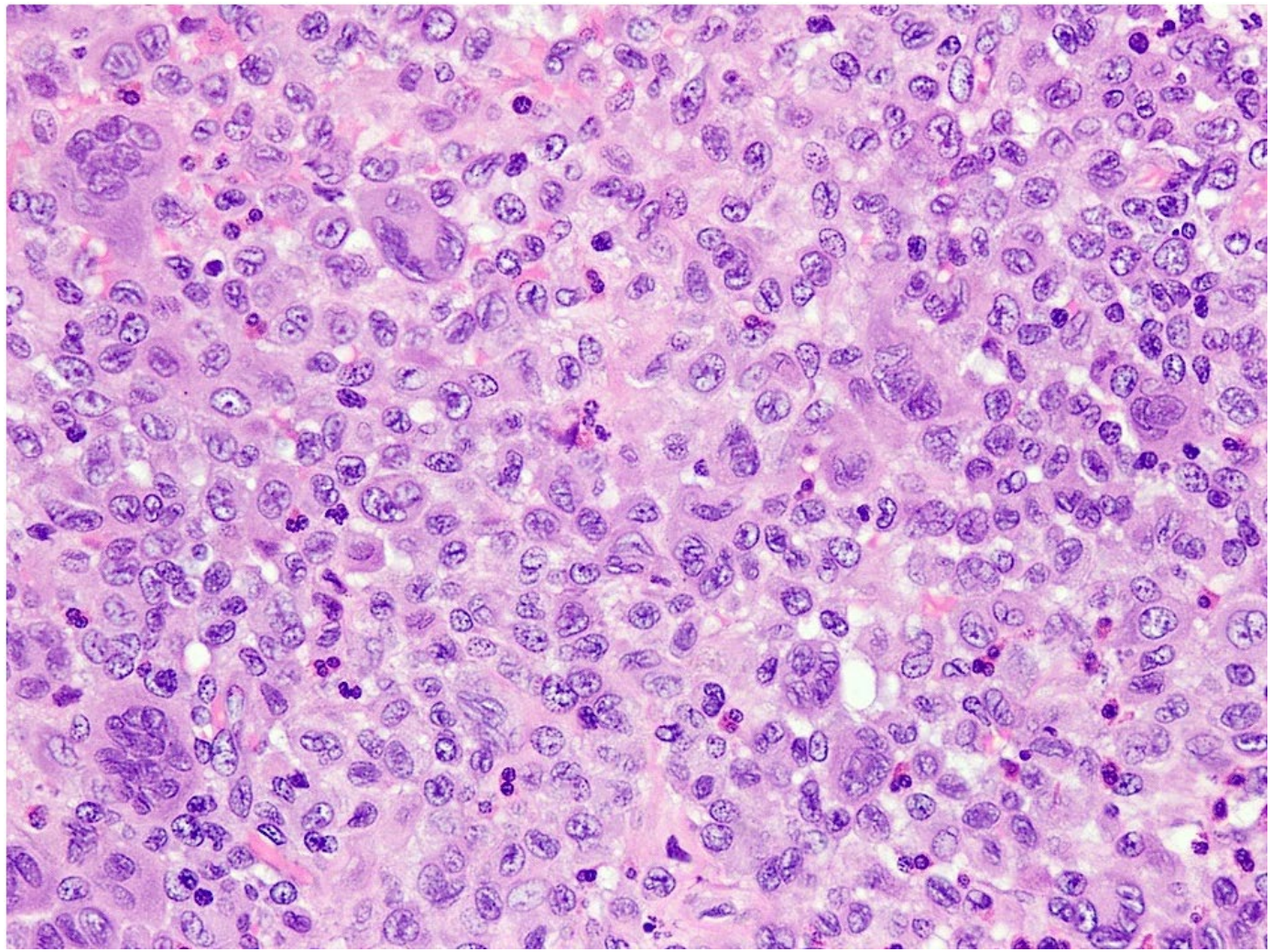
Langerhans' cell histiocytosis

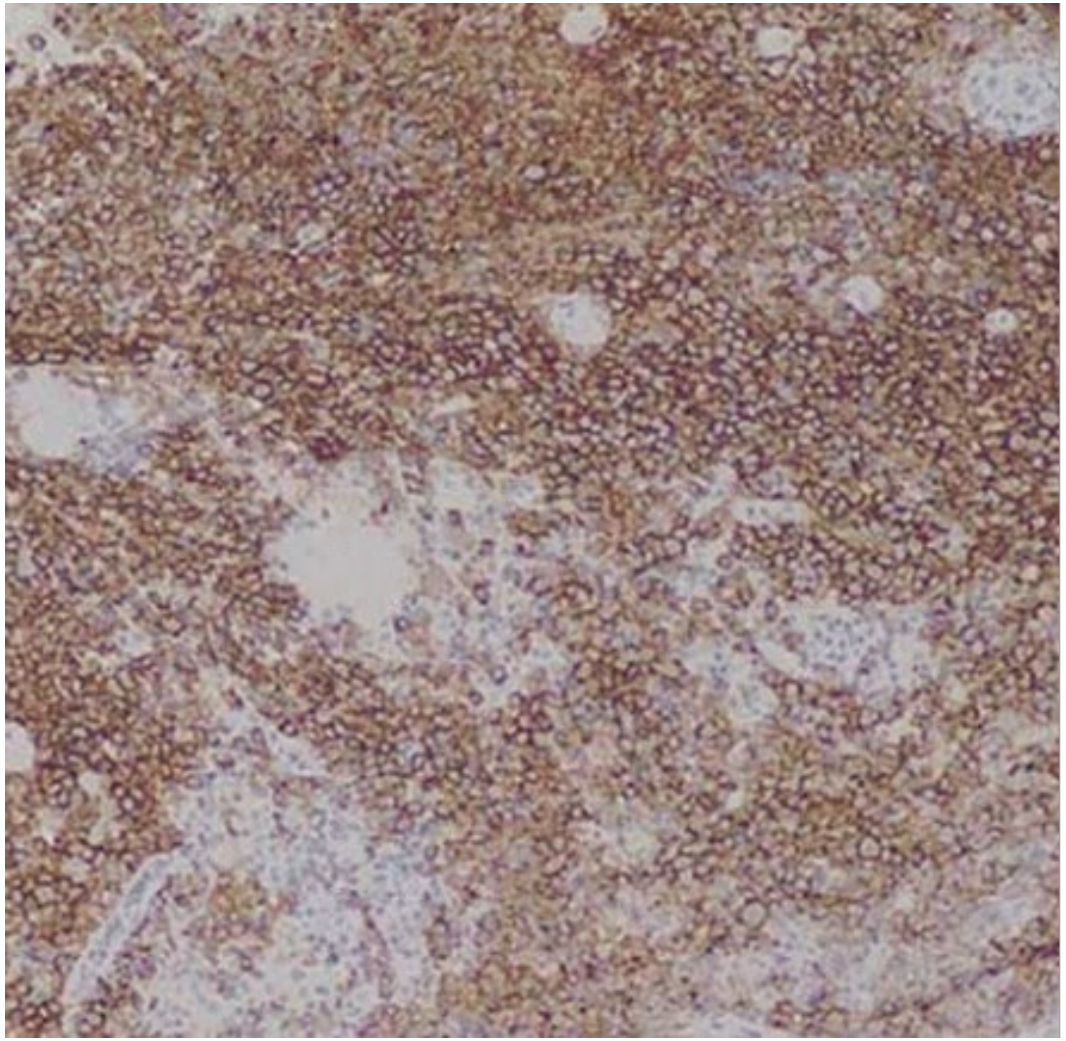
- Reactive, condition involving the proliferation of histiocytes involving almost any organ
- Children and adolescents > adults
- **Presentation**:
  - Solitary or multiple painful, well-defined and often ulcerated lesions in the mouth – gingiva, buccal mucosa, tongue
    - Typically, all four quadrants are affected
    - Lesions typically extend forward to the canines, but rarely involve the incisors
  - Early mobility and loss of primary teeth
  - Malaise
  - Skin manifestations - Anogenital and postauricular rash, cradle cap-like rash
  - Diabetes insipidus, growth hormone deficiency, thyroid dysfunction (pituitary gland involvement)

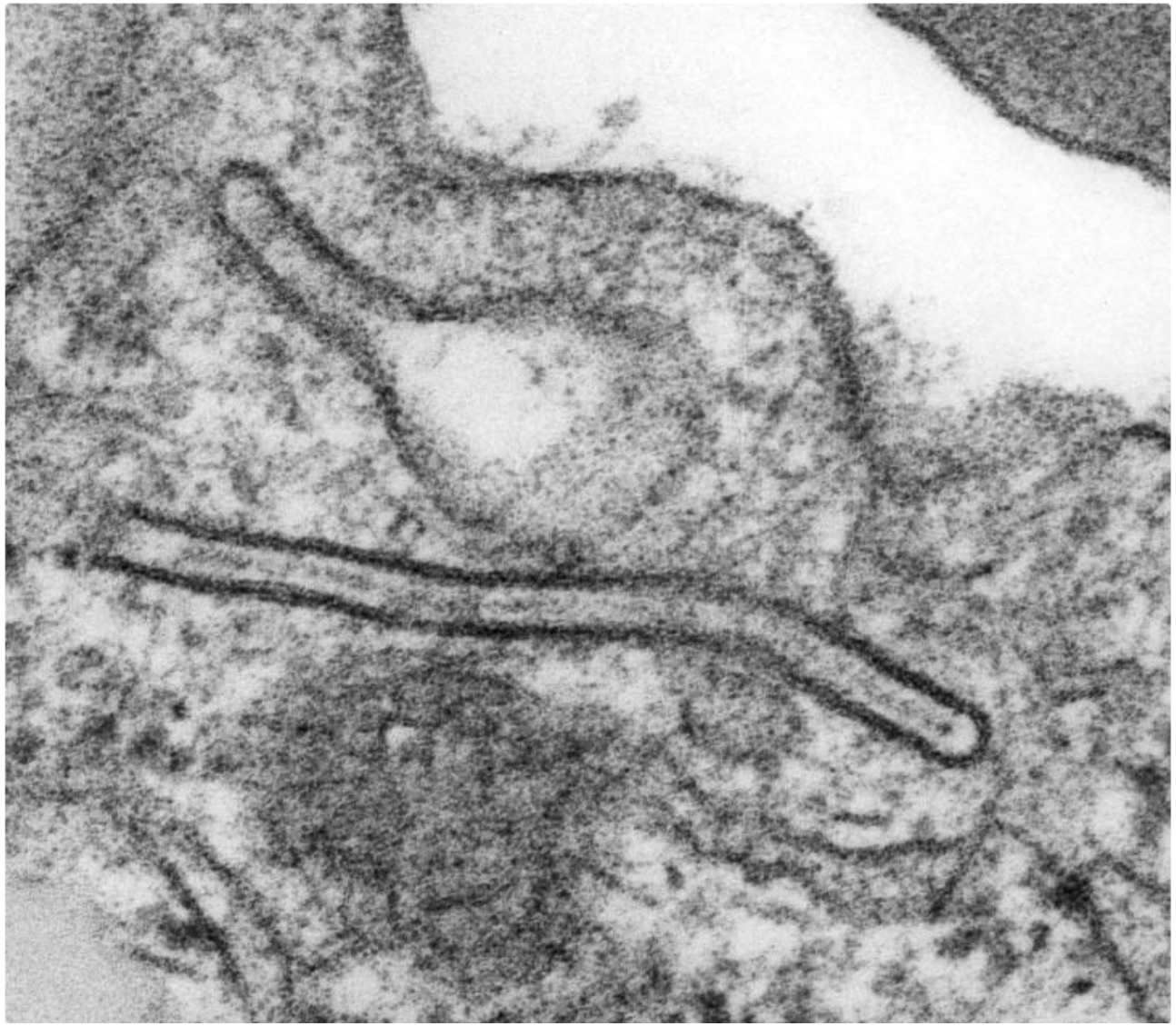
Langerhans' cell histiocytosis

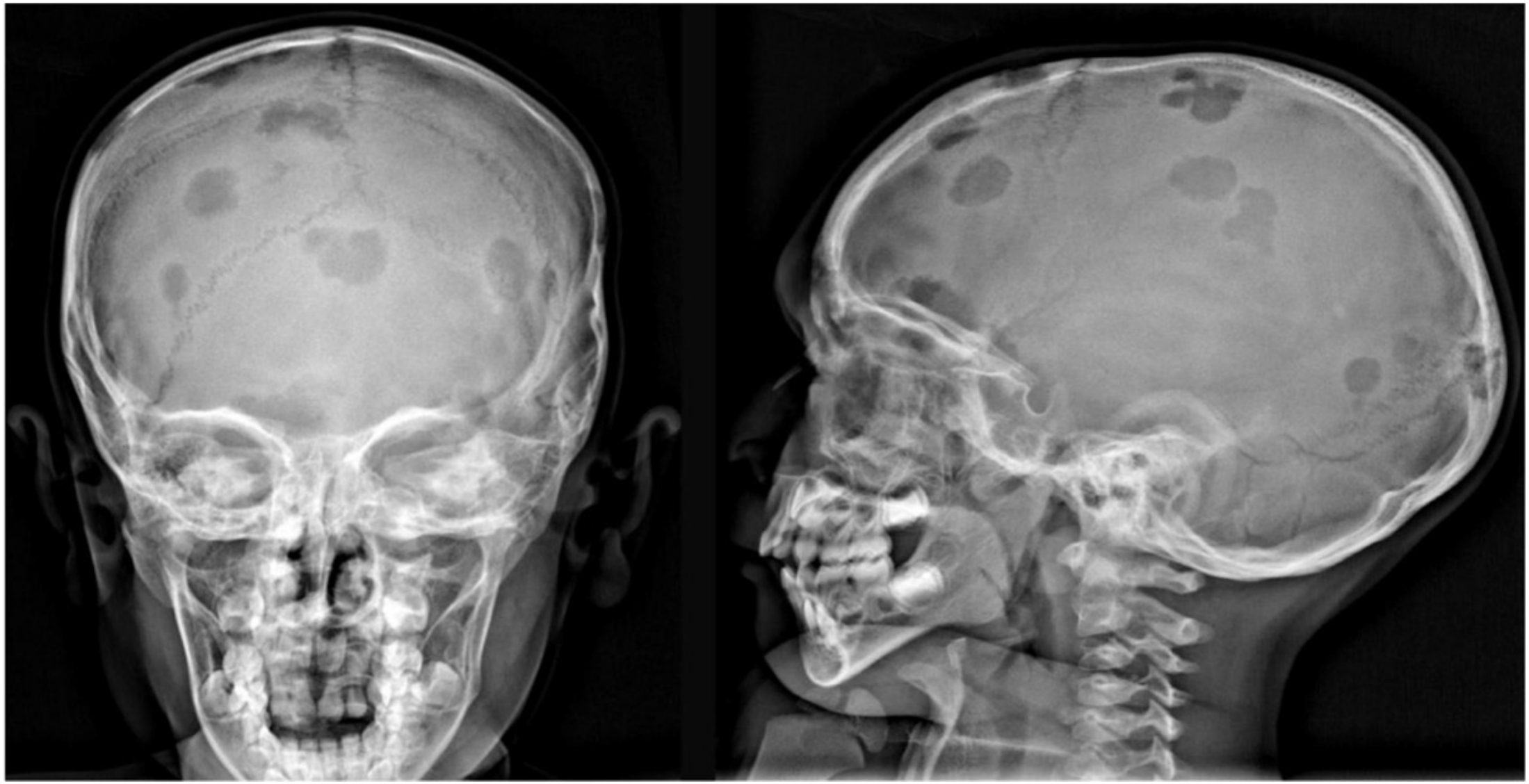
- **Diagnosis** – biopsy of lesions – cells positive for CD1a
- **Treatment**: excision and curettage of oral lesions and extraction of involved teeth
    - Multiagent chemotherapy is required for disseminated disease













Juvenile Ossifying Fibroma

- Rare variant of ossifying fibroma, a benign fibro-osseous lesion
- **Clinical**: slow-growing, painless swelling or mass in the jaw
  - Facial asymmetry or displacement of teeth
  - Functional issues such as difficulty in chewing or speaking
- Locally aggressive behaviour
- Primarily affects children and adolescents
- Trabecular variant – Maxilla and mandible
- Psammomatoid variant – paranasal sinuses

Juvenile Ossifying Fibroma

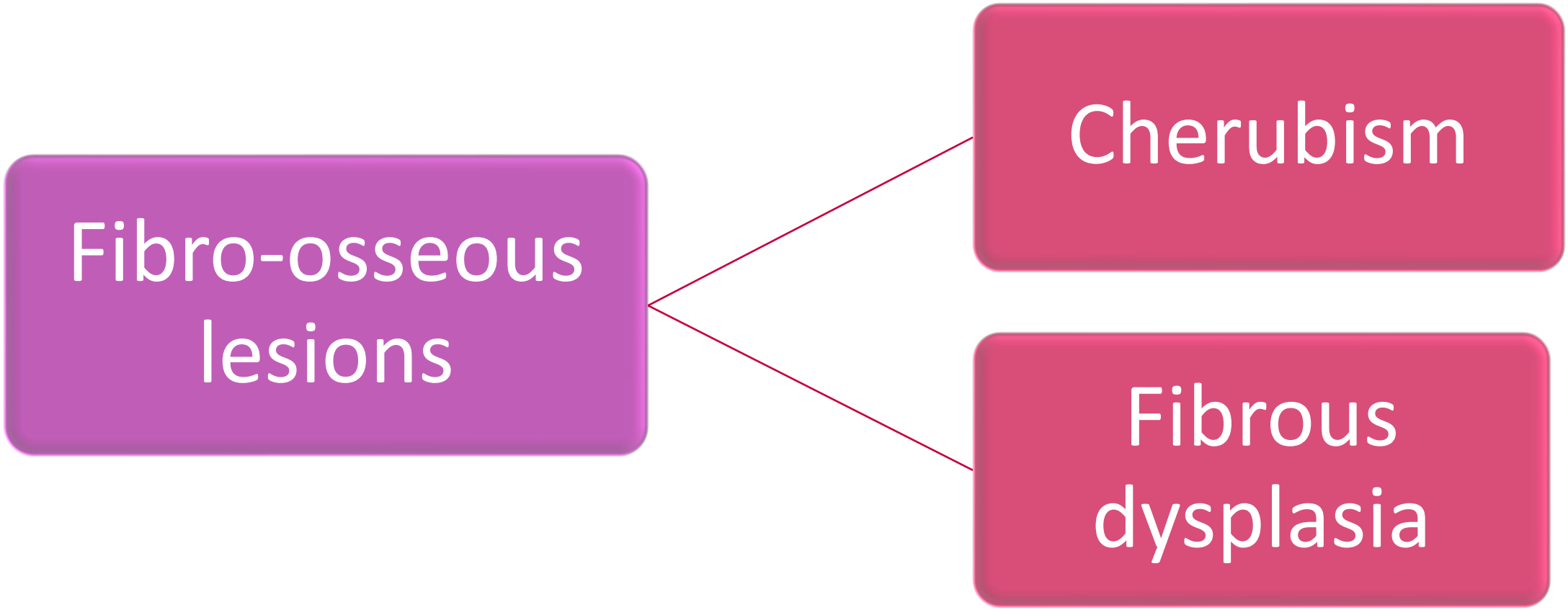
- **Radiographic**: well-defined, radiolucent area with varying degrees of radiopacity due to the mixed bone and fibrous tissue composition
    - May have corticated border and show expansion of the cortical bone
- **Treatment**: Surgical excision
    - High recurrence rate




RIGHT
LEFT



Fibro-Osseous Lesions

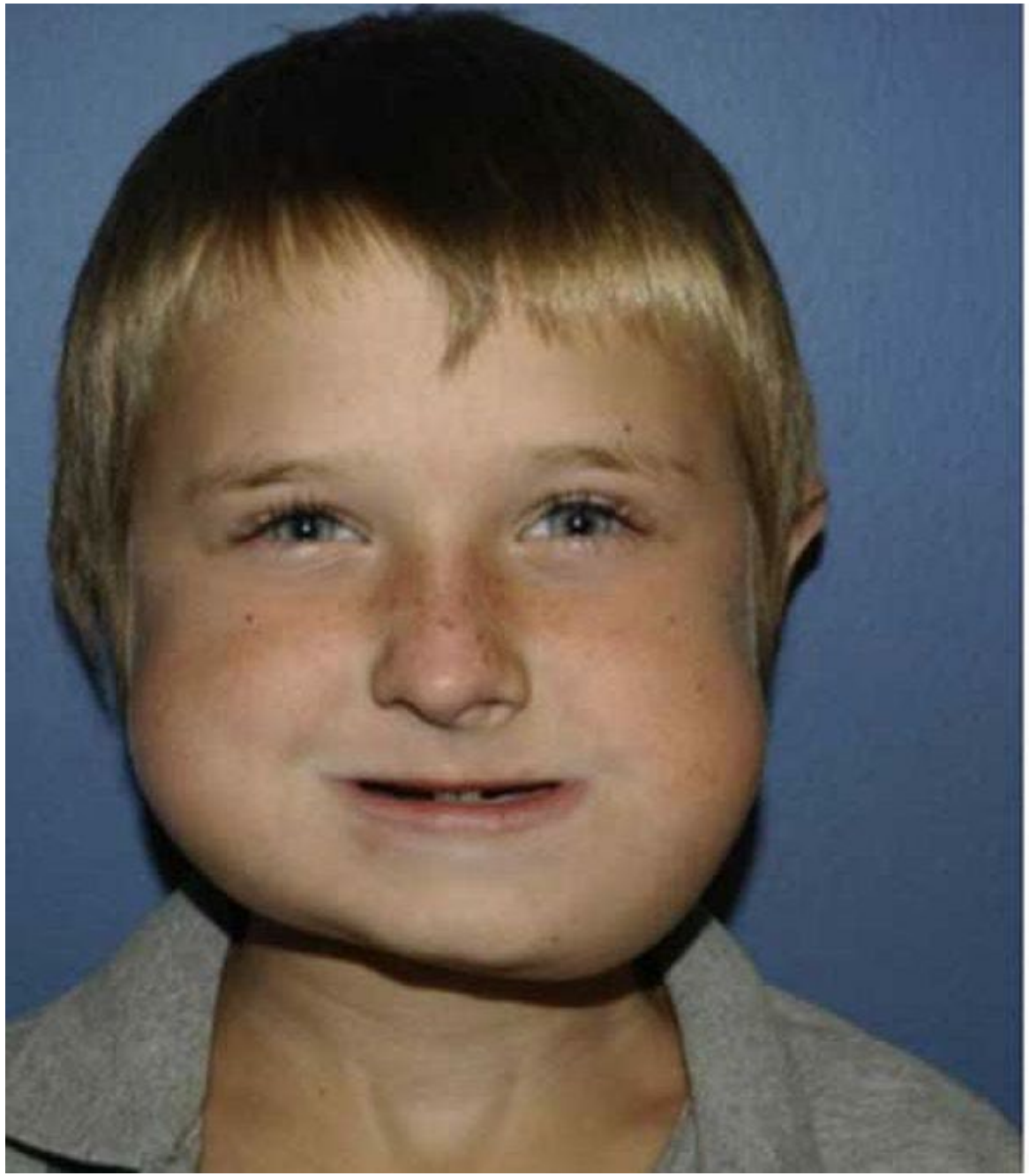


Cherubism

- Hereditary and intraosseous fibrous swellings of the jaws
- Autosomal dominant condition
- **Clinical**:
  - Present in childhood
  - Bilateral swelling of the mandible ± maxilla and ribs
  - Failed eruption and displacement of teeth (typically mandibular molars)

Cherubism

- **Radiographic**: multilocular radiolucencies, displaced teeth
- **Histology**: Multinucleate giant cells in a fibrous tissue stroma
- **Prognosis**: progresses into adolescence, then tends to resolve so that by 3rd and 4th decade may no longer see radiographic changes
- **Treatment**: regular review (mild) or surgical reduction (more severe)







Fibrous Dysplasia

- Benign monostotic or polyostotic fibro-osseous lesion
  - Polyostotic form more common in childhood
- Developmental disorder resulting in the failure in bone maturation
  - Failure to form mature lamellar bone, arrest as women bone, fibrous proliferation
- Mass forming developmental defect composed of woven bone and fibroblast-like spindle cells

Fibrous Dysplasia

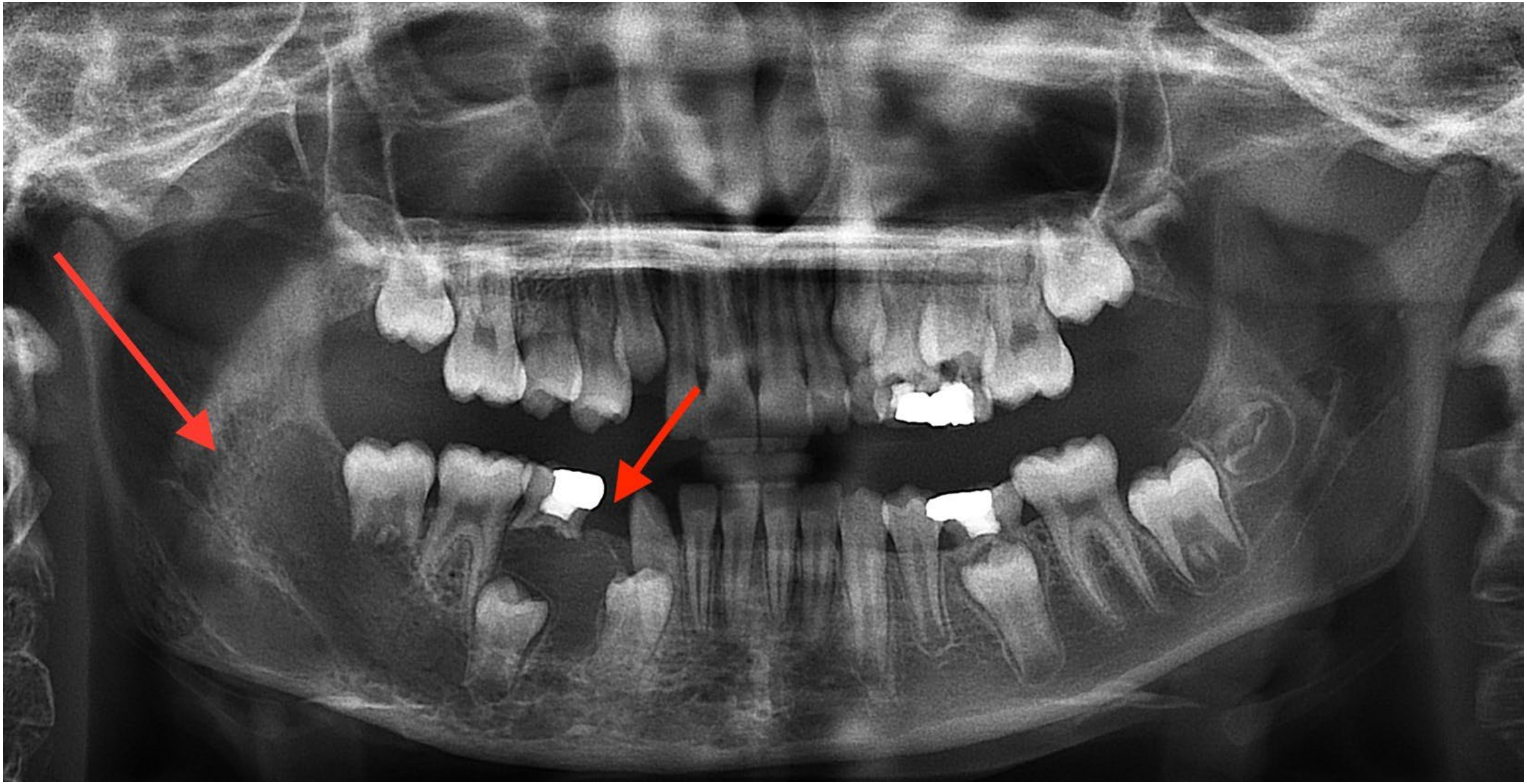
- **Clinical**: painless slow growing expansion of bone
  - Maxilla > mandible
  - Facial asymmetry, malocclusion due to displaced teeth
  - Headache, hearing loss
  - Laboratory test – elevated serum alkaline phosphatase
  - May have pain in affected limbs

Fibrous Dysplasia

- No treatment since growth is self limited and responsive to pubertal hormonal changes
    - Surgery in cases with fracture or bony deformity.
- McCune-Albright Syndrome: endocrine anomalies, café au lait spots, fibrous dysplasia











Take Home

- Systematic approach to diagnosis is essential
- Recognise overlap between soft tissue and hard tissue pathology
- Early referral and intervention improves prognosis
- Always consider systemic associations
- Special care in paediatric patients due to growth and development

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Thank you