

Imaging of Infection & Inflammatory Lesions of the Jaws

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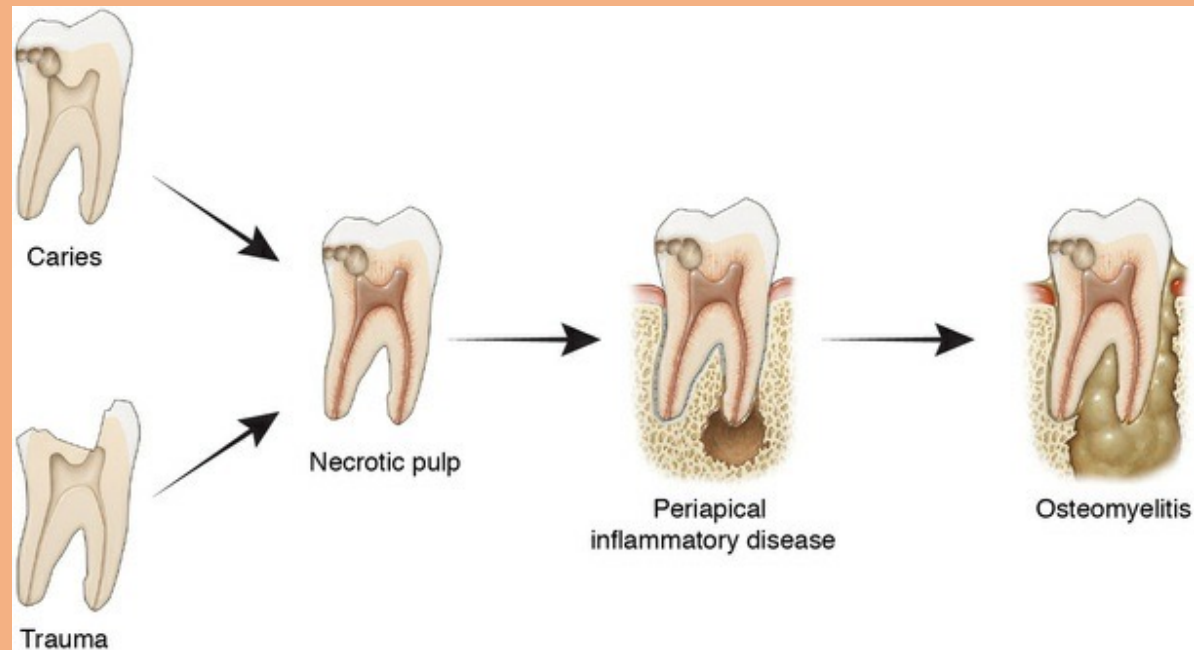
- Inflammatory lesions of the Jaws
- Imaging Modalities & Features of:
 - Periapical inflammatory lesions
 - Osteomyelitis
 - Jaw Infection involving Soft Tissues



Inflammatory Lesions of the Jaws

- Most common disease
 - Disruption of bone metabolism
 - **Imbalance** of osteoblastic (bone production) and osteoclastic (bone resorption) activities
 - Altered by the pathogenicity of bacterial microorganisms, the host immune response, tissue vascularity, and time.
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Periapical Inflammatory Lesion

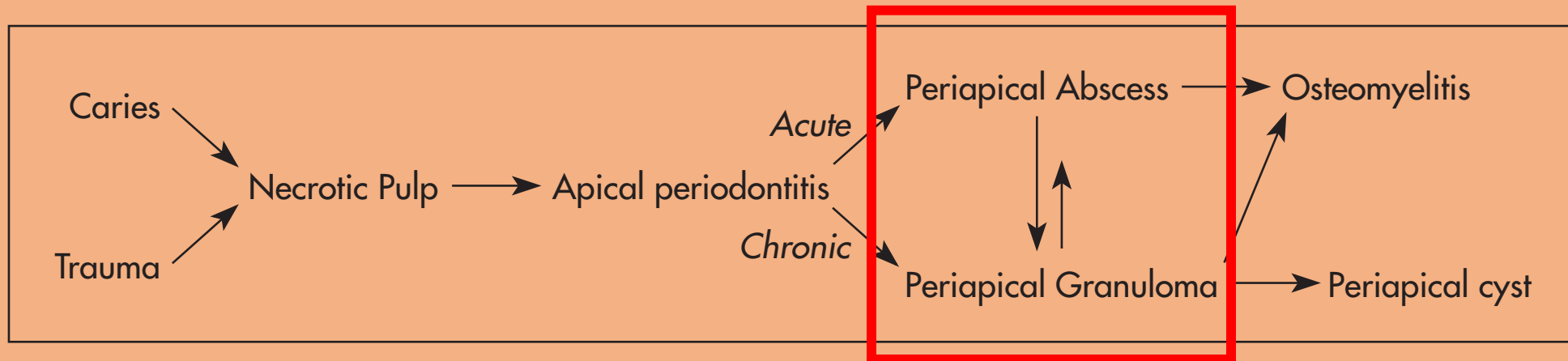
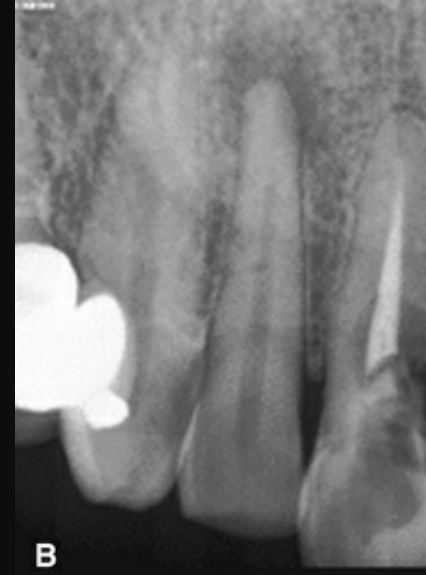
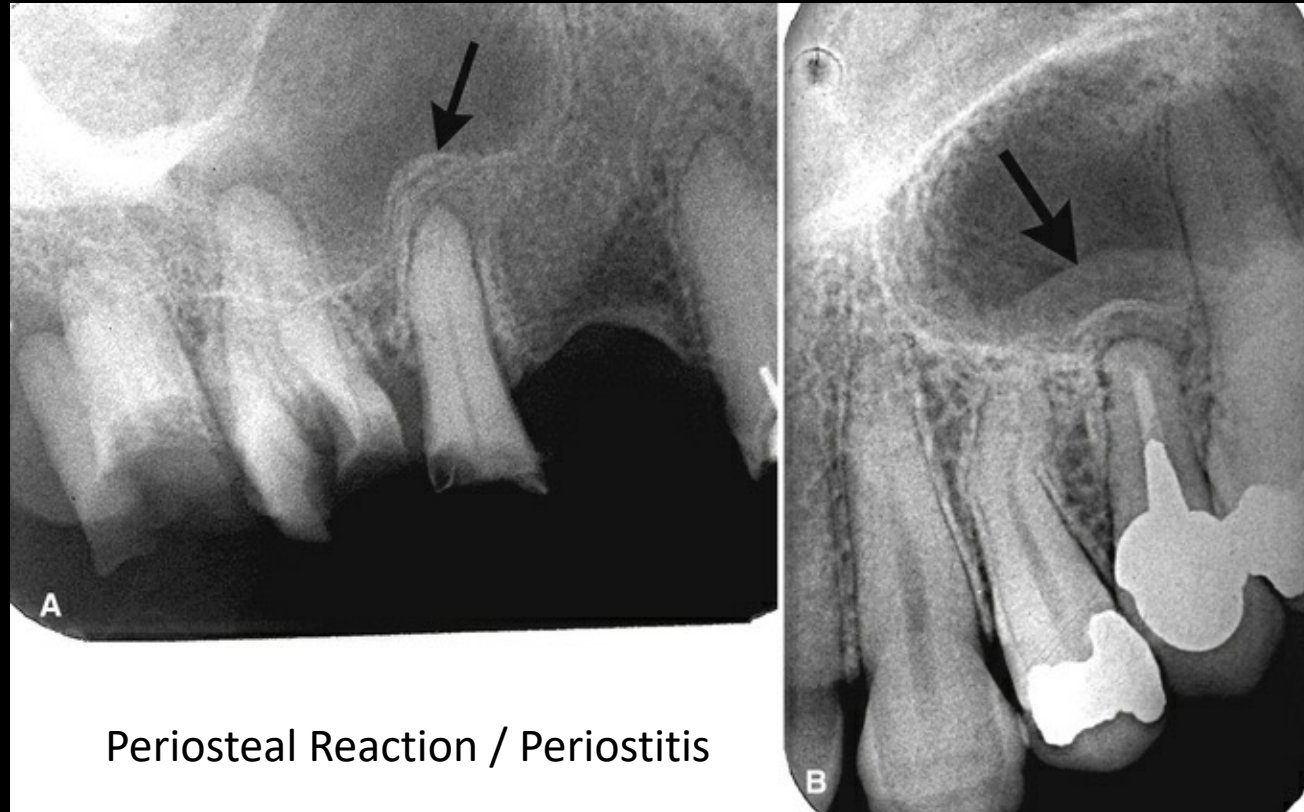


FIG. 20-1 Interrelationship of possible results of periapical inflammation.

Periapical Inflammatory Lesions

- Imaging Modalities
 - **Periapical Radiographs**
 - Panoramic Radiographs (OPG)
 - CT
 - *Both Cone beam CT & Multislice CT are more sensitive for periapical lesions than intraoral and panoramic radiographs.*
- General Imaging Features
 - Radiolucent → Can be well-defined or ill-defined
 - Centred at the apical foramen
 - Effacement of apical lamina dura
 - Surrounding reactive sclerosis
 - +/- apical root resorption
 - +/- cortical effacement
 - +/- periostitis of antral floor w/wo effacement







Case courtesy of Dr Bernard Koong

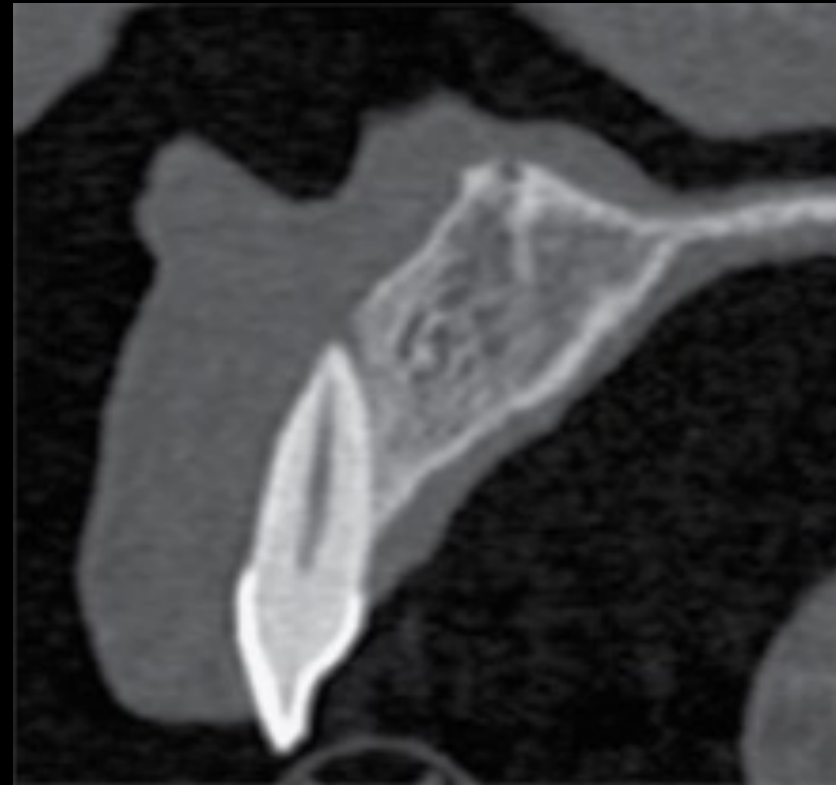
Multiple Inflammatory Lesions



PA of 11



11 on CBCT (sagittal view)

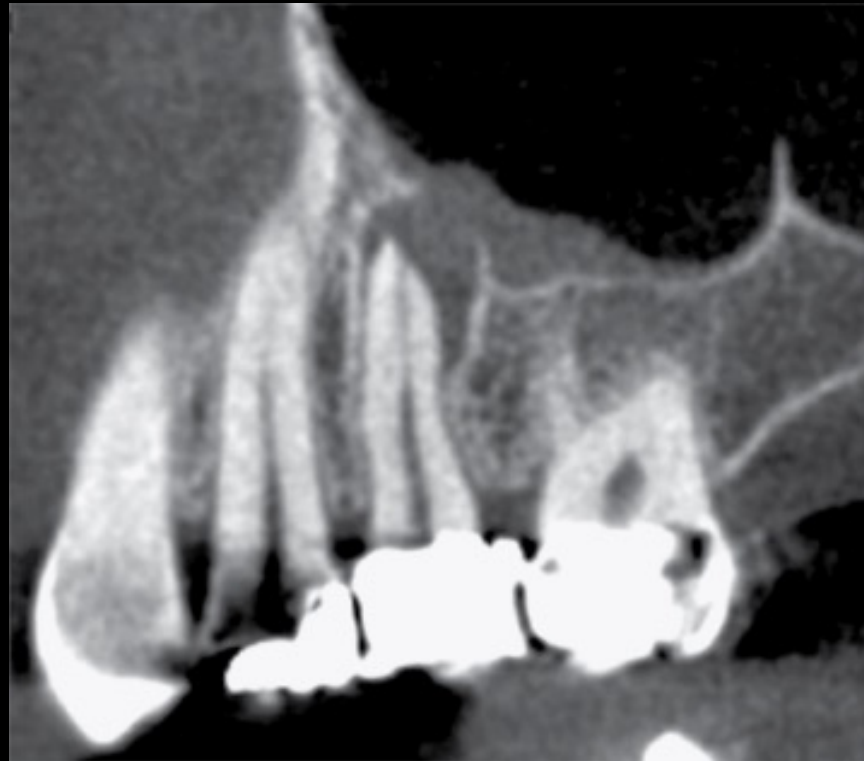


Cropped OPG



16 on CBCT (coronal view)

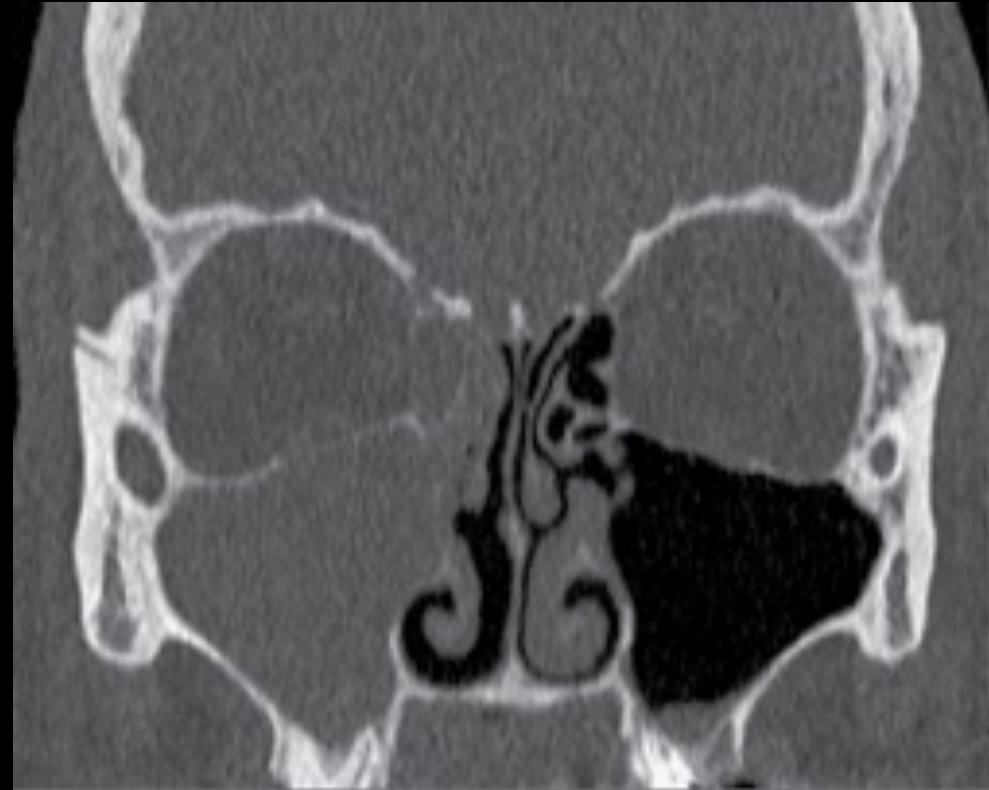
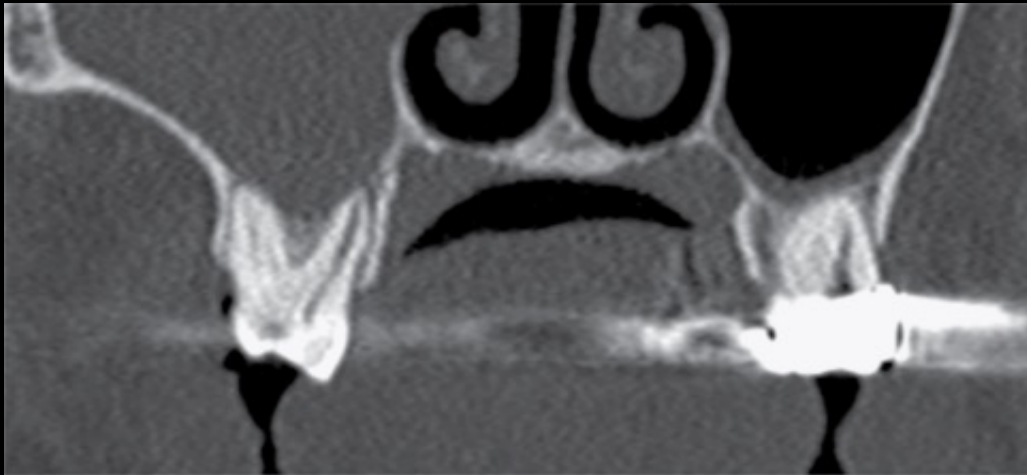


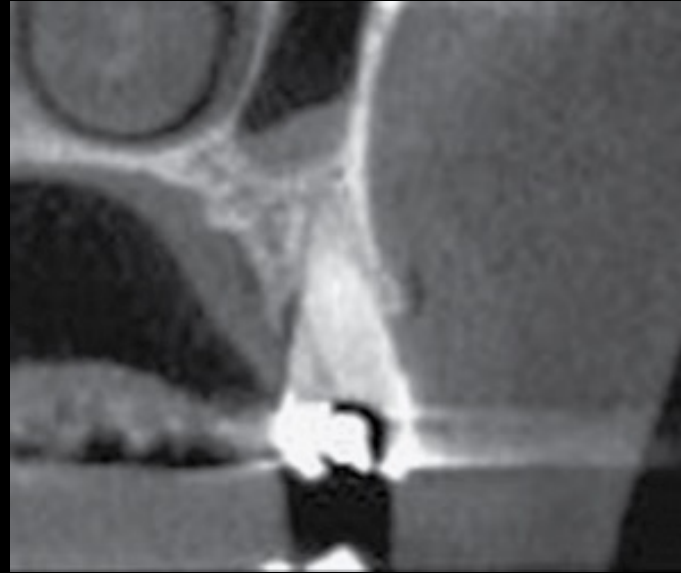


Case courtesy of Dr Bernard Koong

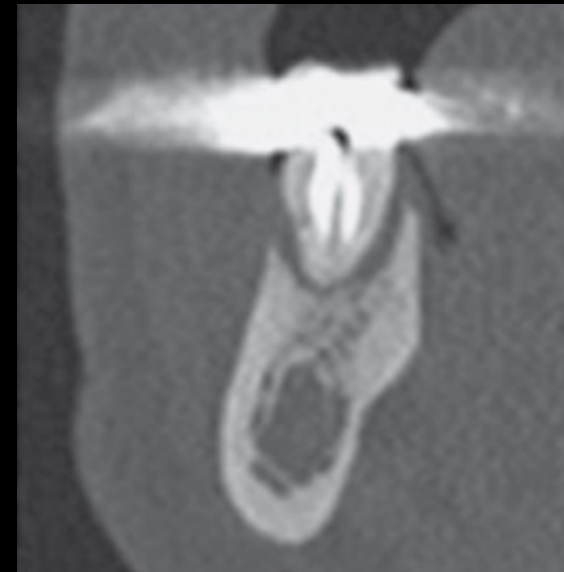
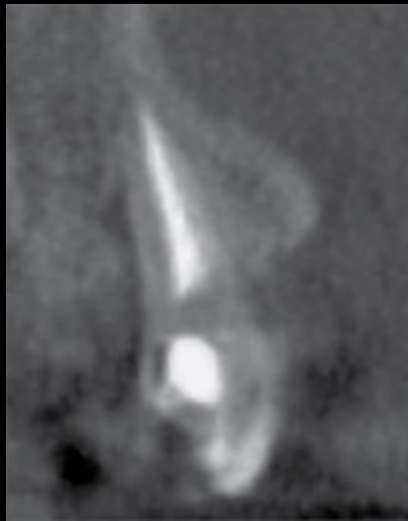
Inflammatory change in R paranasal sinuses
secondary to odontogenic infection

MSCT Sinus





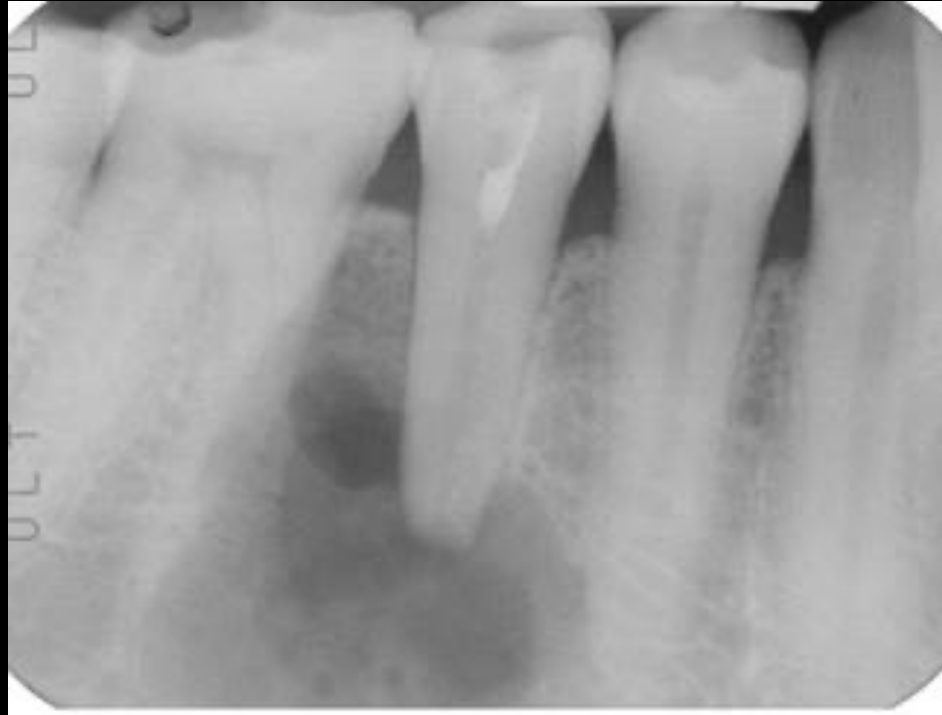
Find inflammatory lesions
Hint: **not** periapical







Ref. White and Pharoah's Oral Radiology: Principles and Interpretation 8th Edition



Case courtesy of Dr Bernard Koong

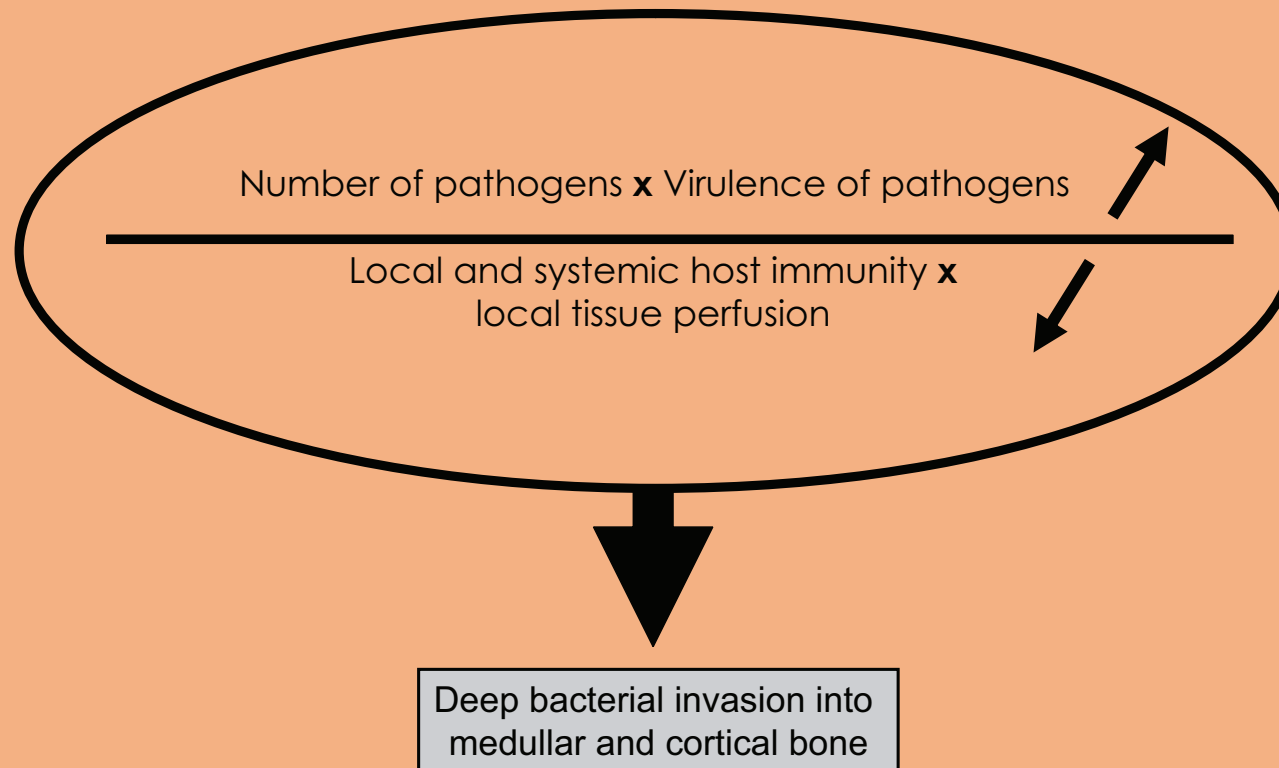


Case courtesy of Dr Bernard Koong

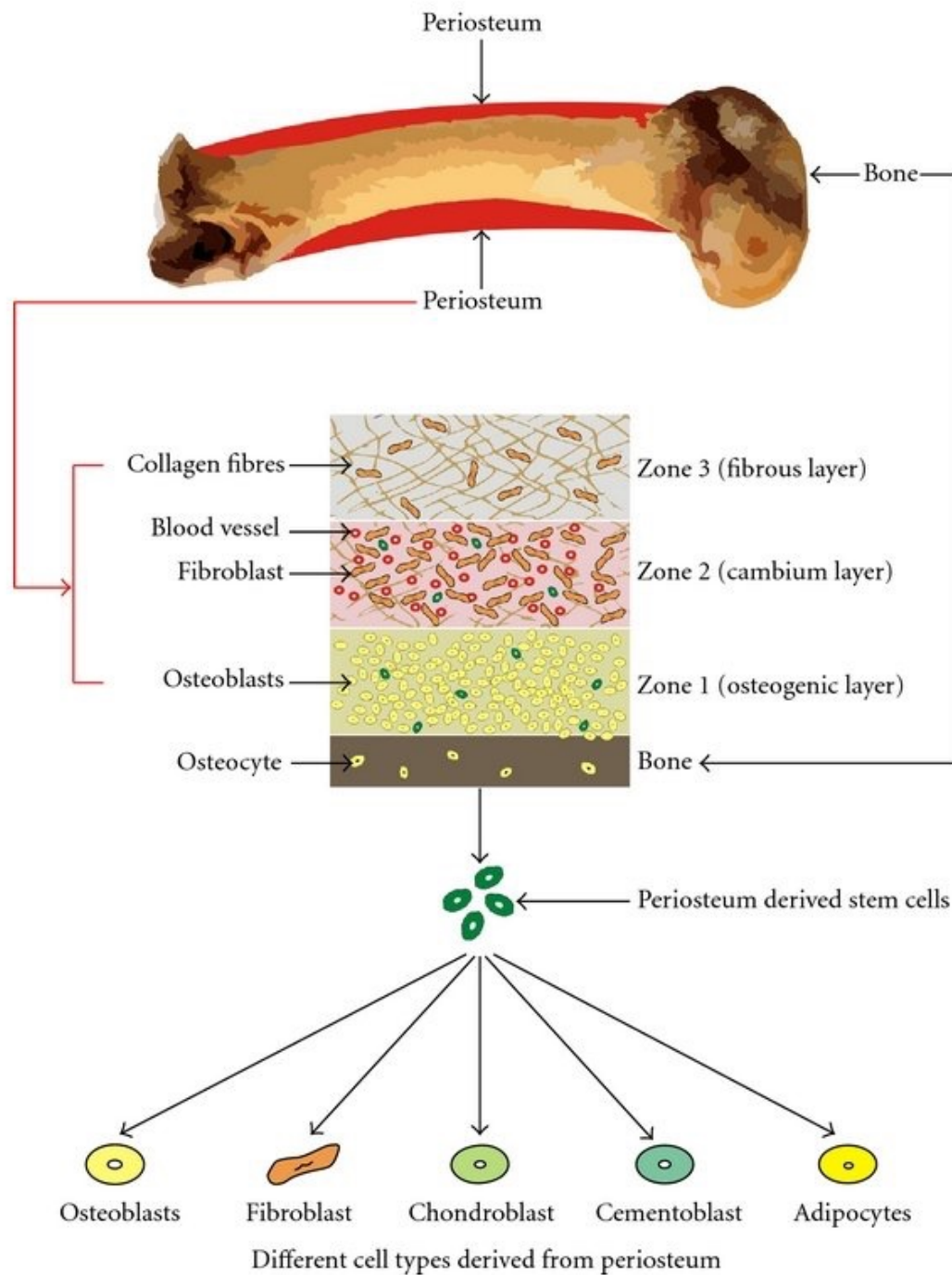
Osteomyelitis

- Widespread inflammation of bone
- Most are associated with odontogenic infections ie. periapical inflammatory lesions
 - Others: Trauma (esp. compound fractures) & Radiation Therapy
- Numerous Classifications... **2 Broad Groups:**
 - **ACUTE**
 - Suppurative & Rarefying
 - **CHRONIC (> 4 weeks)**
 - Non-suppurative & Sclerosing
- Most common in the posterior mandible

Pathogenesis of acute &
secondary chronic osteomyelitis

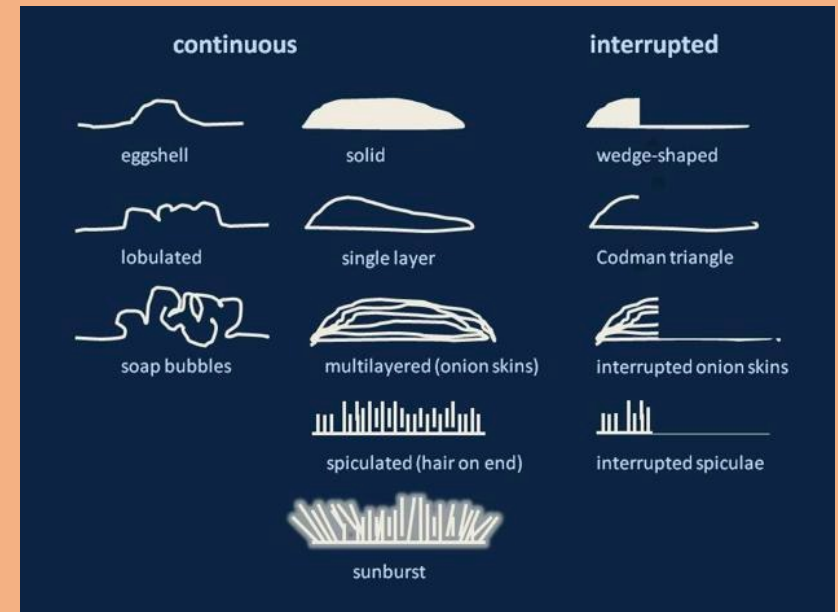


■ **Fig. 2.5** Schematic illustration showing the interaction of host and pathogens. If the balance is shifted to the advantage of the aggressor, deep bone infection will be established (Modified after Marx 1999 and Mercuri 1999)



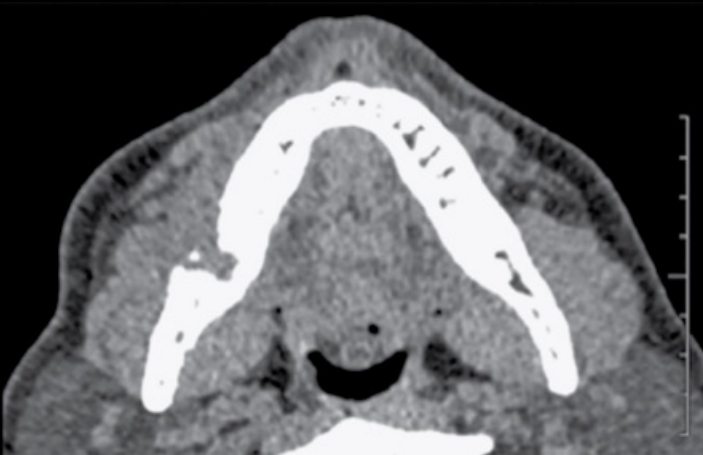
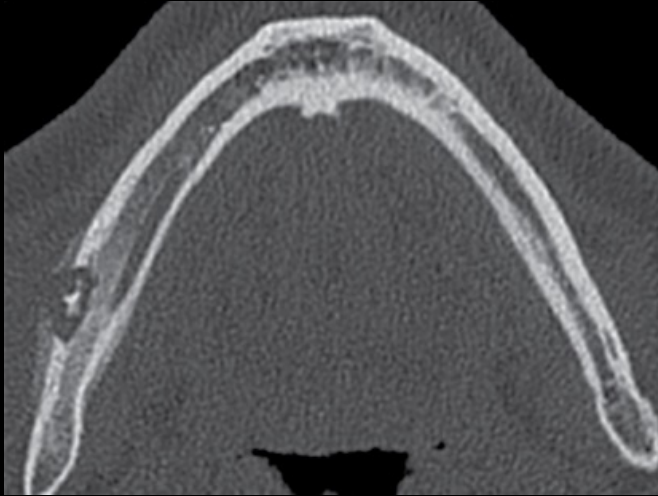
Pattern of Periosteal Reaction

- Single layer
- Solid
- Multilayered (lamellated / onion skin)
- Spiculated
 - Perpendicular “hair-on-end”
 - Divergent “sunburst”
 - Sloping “velvet”
- Complex
- Codman’s triangle

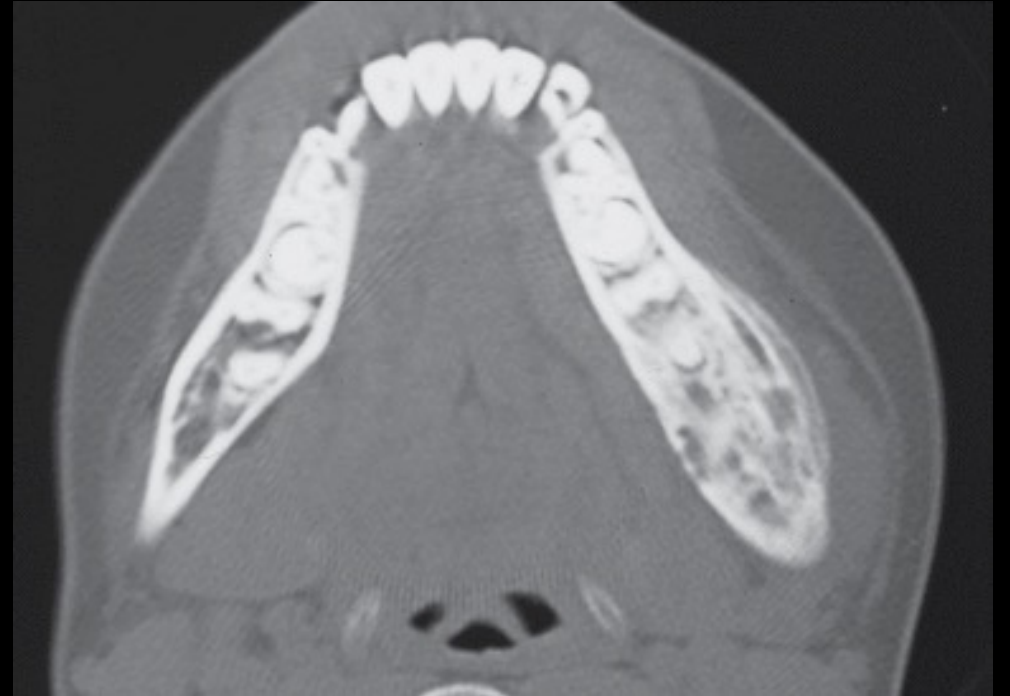
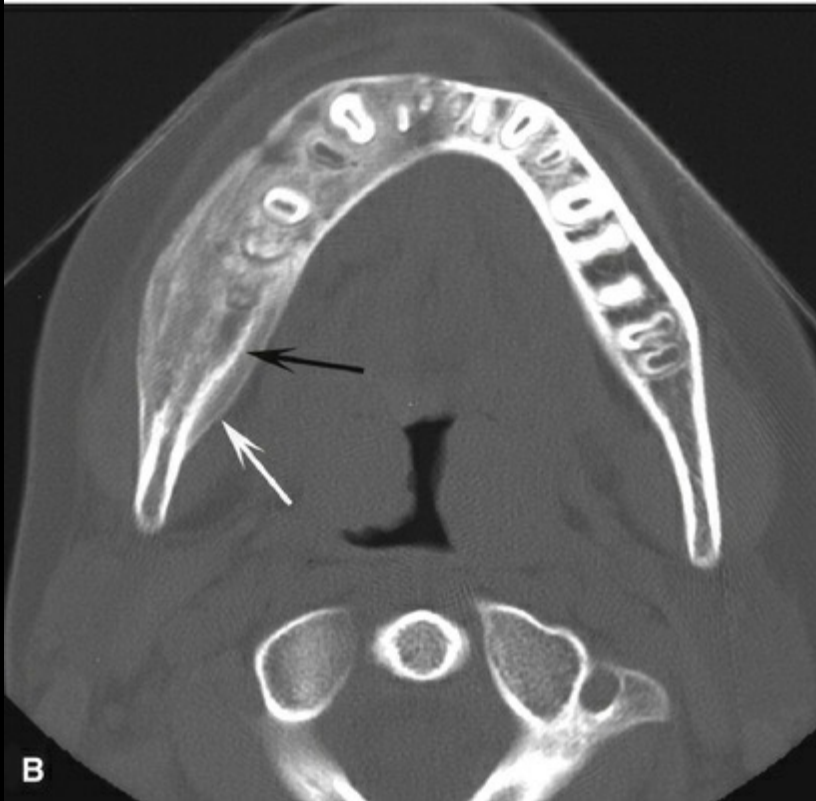


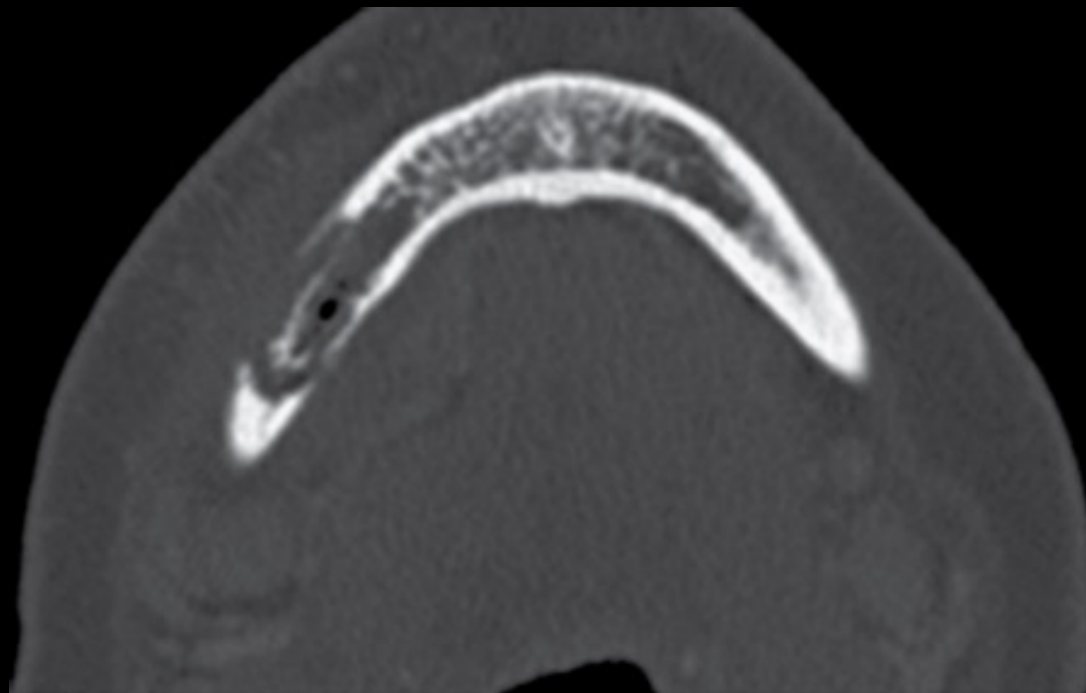
Osteomyelitis - Imaging

- Imaging Modalities
 - 2D imaging is insufficient
 - Cone Beam CT
 - **Multislice CT**
 - MRI
 - Nuclear Medicine Imaging (Gallium Scan)
- Imaging Features:
 - Ill-defined lucencies (lytic / destruction of bone) in ACUTE phase, becoming more well-defined in CHRONIC phase
 - Loss of normal trabecular pattern
 - Cortical destruction is common
 - Extensive adjacent sclerosis, depending on chronicity
 - Periosteal reaction (periosteal new bone formation)
 - **Sequestra formation → key feature**



The structure of periosteum varies with age. In children it is thicker, more vascular, active, and loosely attached as compared to adults where it is thinner, less active, and firmly adherent



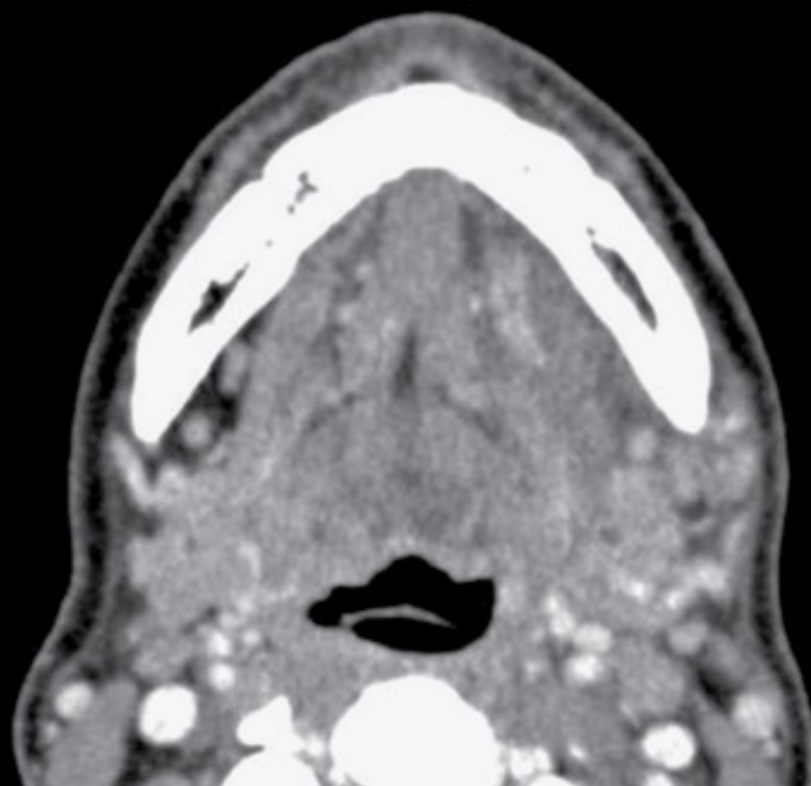
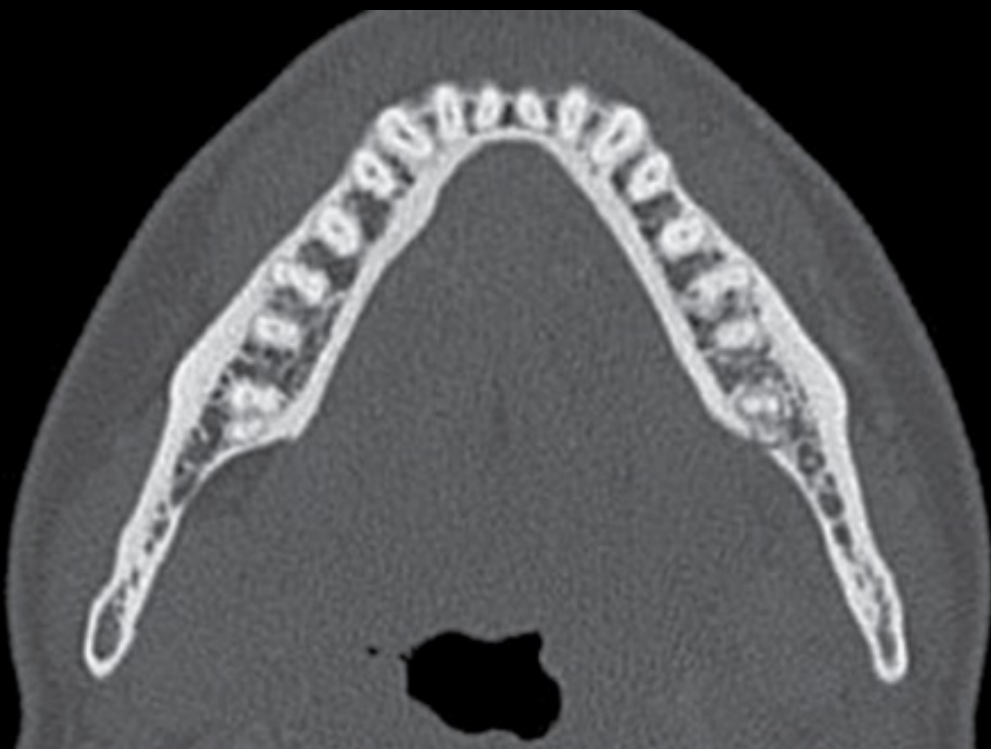


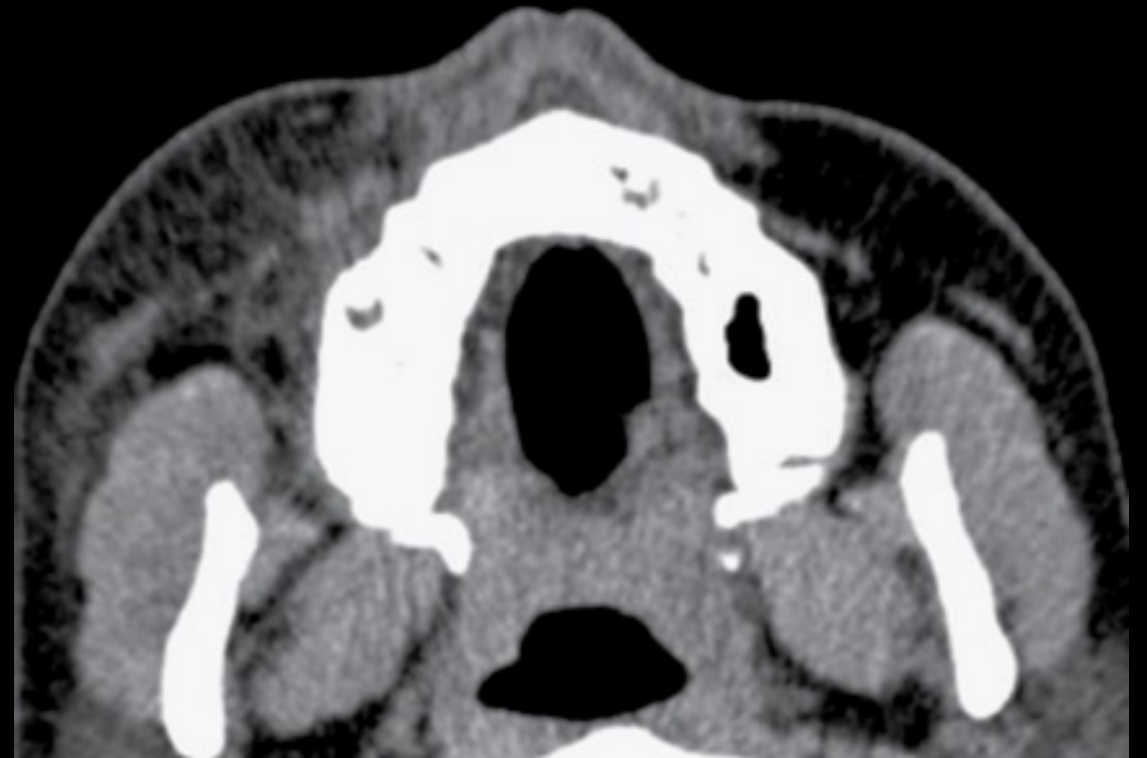
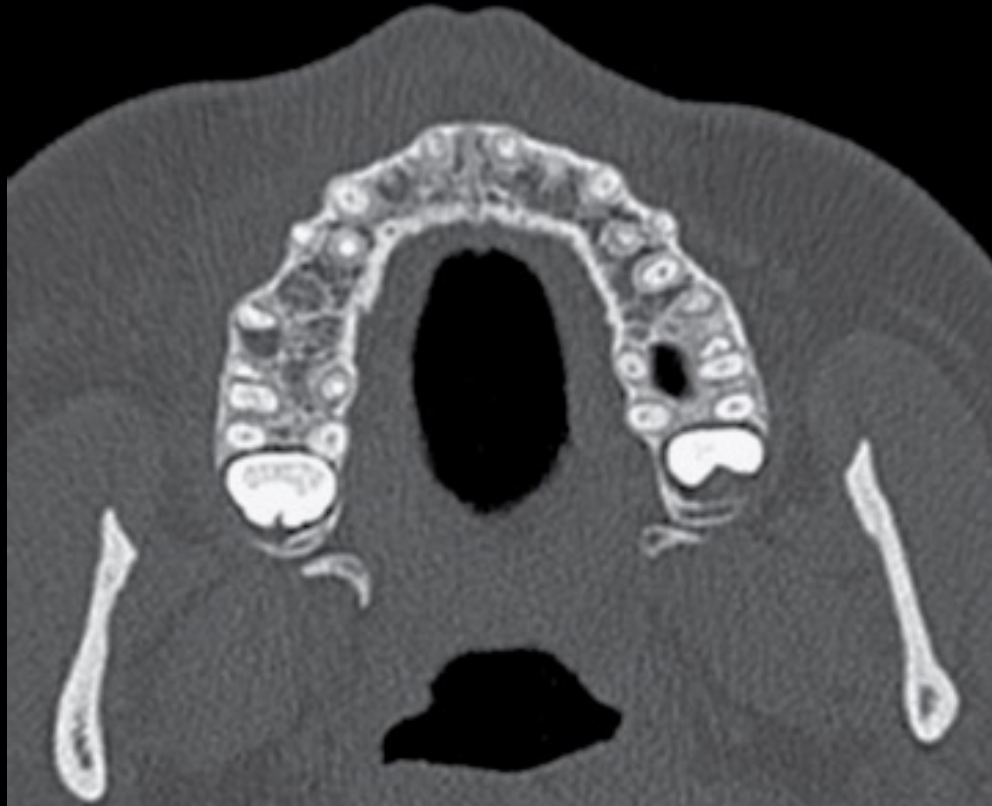
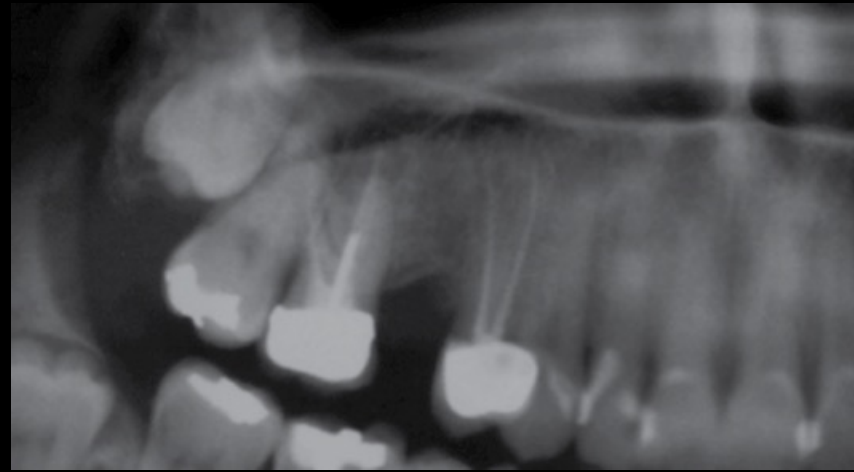
Jaw Infection involving Soft Tissues

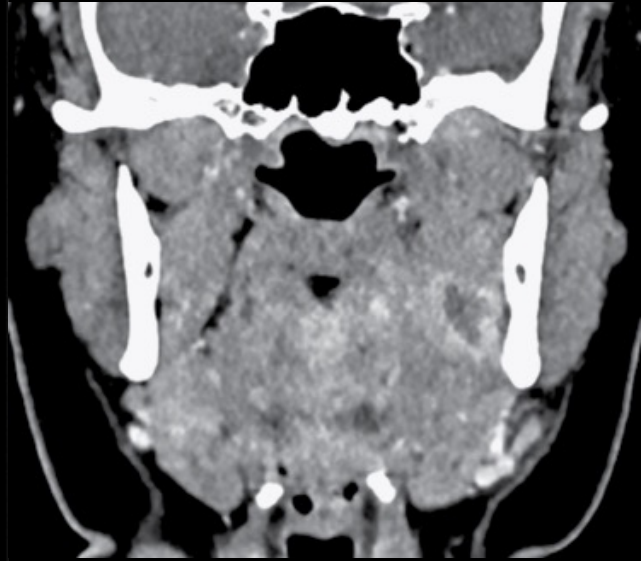
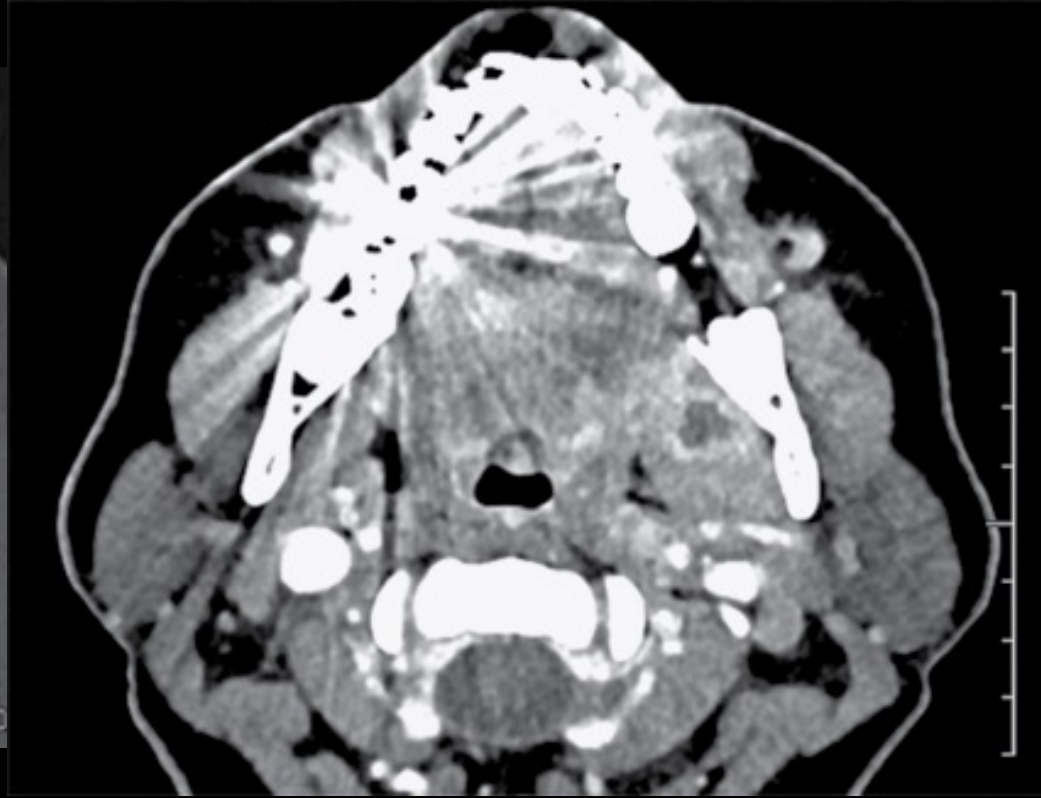
- Failed to drain into oral cavity
- May involve various spaces, including the submandibular, sublingual, masticator, parapharyngeal and parotid spaces.
- Cellulitis and abscess collection can be life threatening.
- Other potential complications include airway compromise, cavernous sinus thrombosis, cerebral abscess, orbital infections and mediastinitis.
- **Imaging Modalities:**
 - **Multislice CT with intravenous contrast is the first modality of choice**
 - **MRI is also useful**

Post-contrast Multislice CT

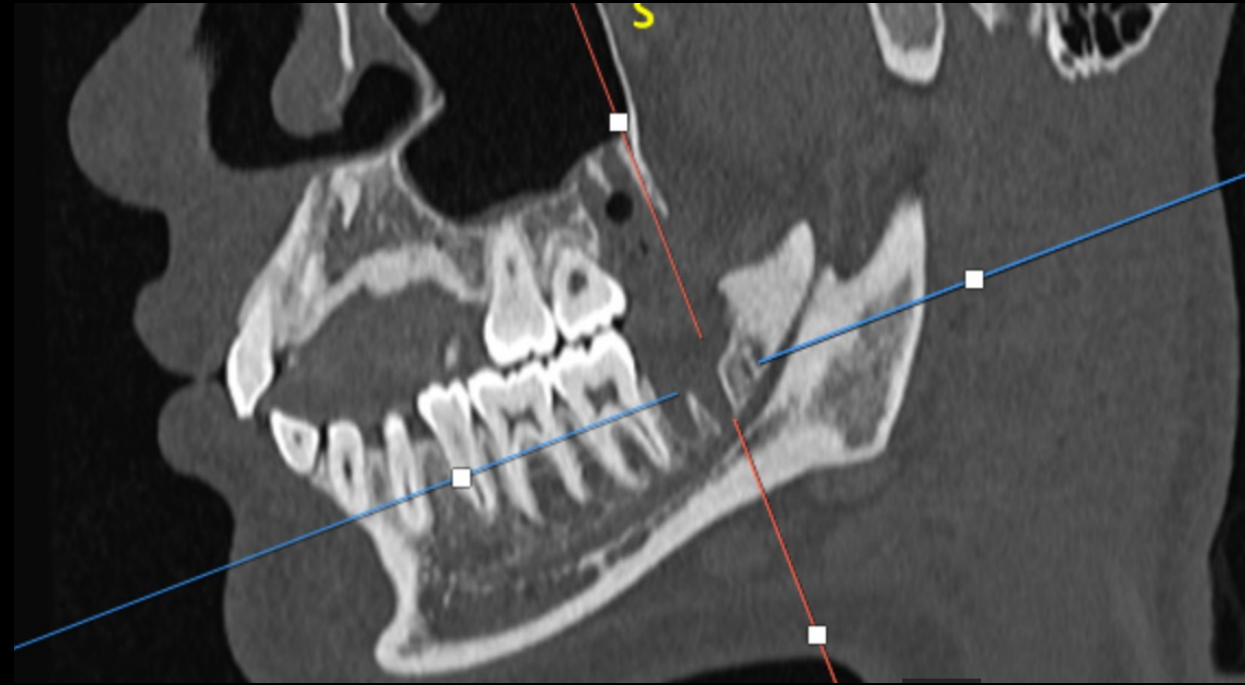
- Thickening of the skin and subcutaneous fat stranding
- Fat planes often demonstrate increased density 'dirty' from oedema
- Involved muscles are swollen and enhanced
- Abscess collection presents as a spherical or lobulated fluid density focus with rim enhancement.

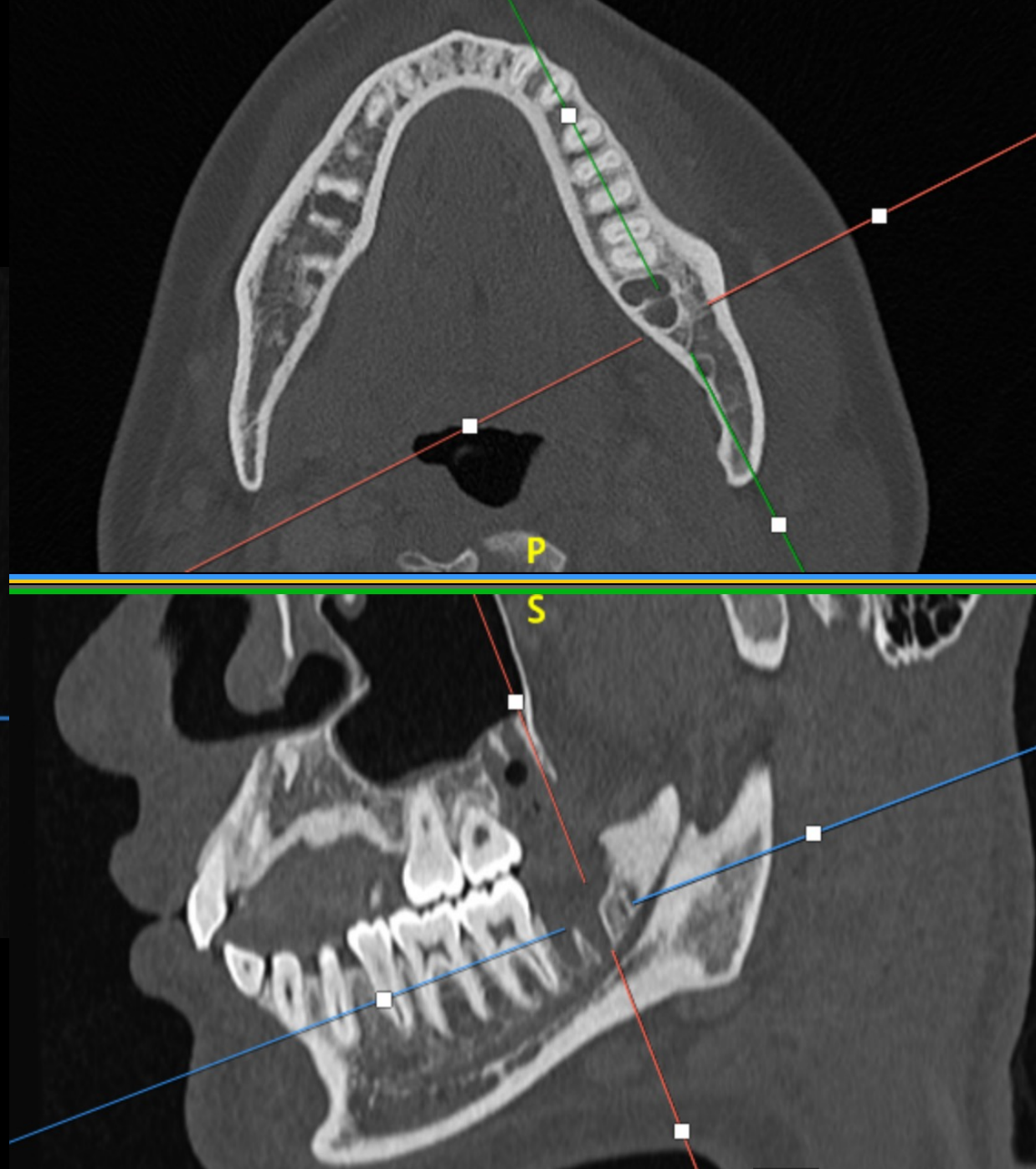
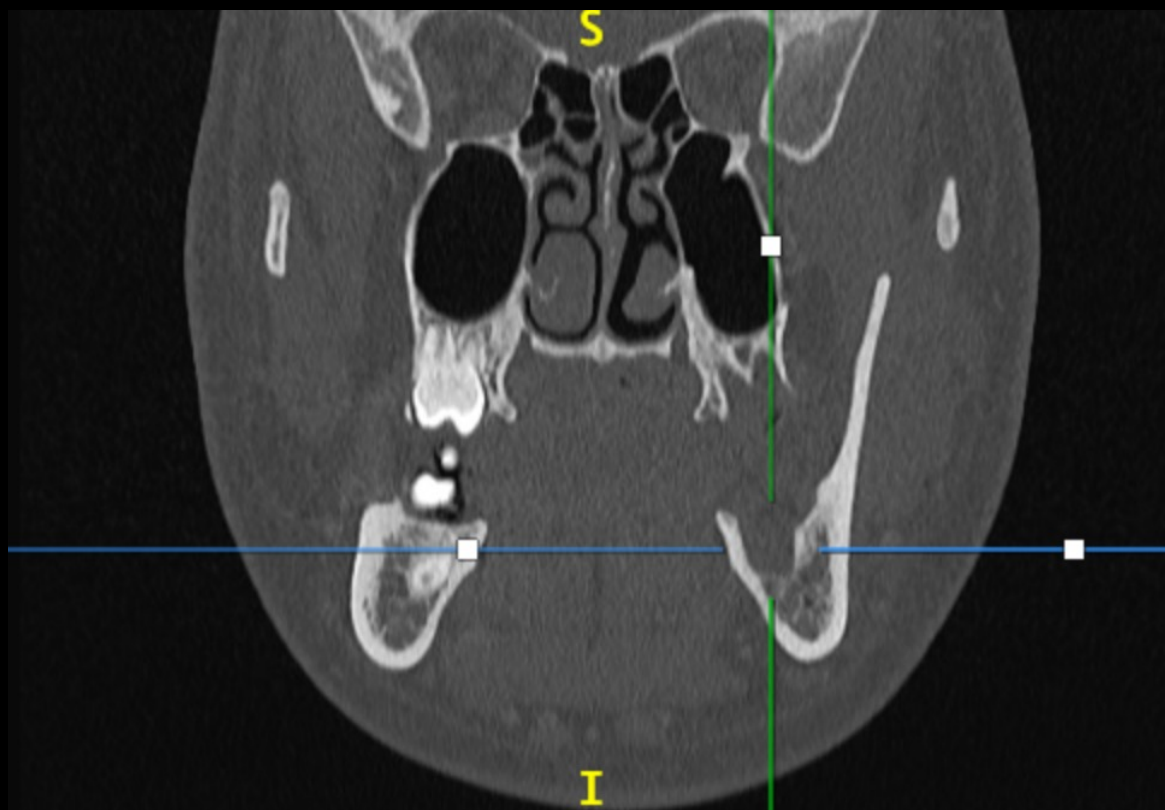




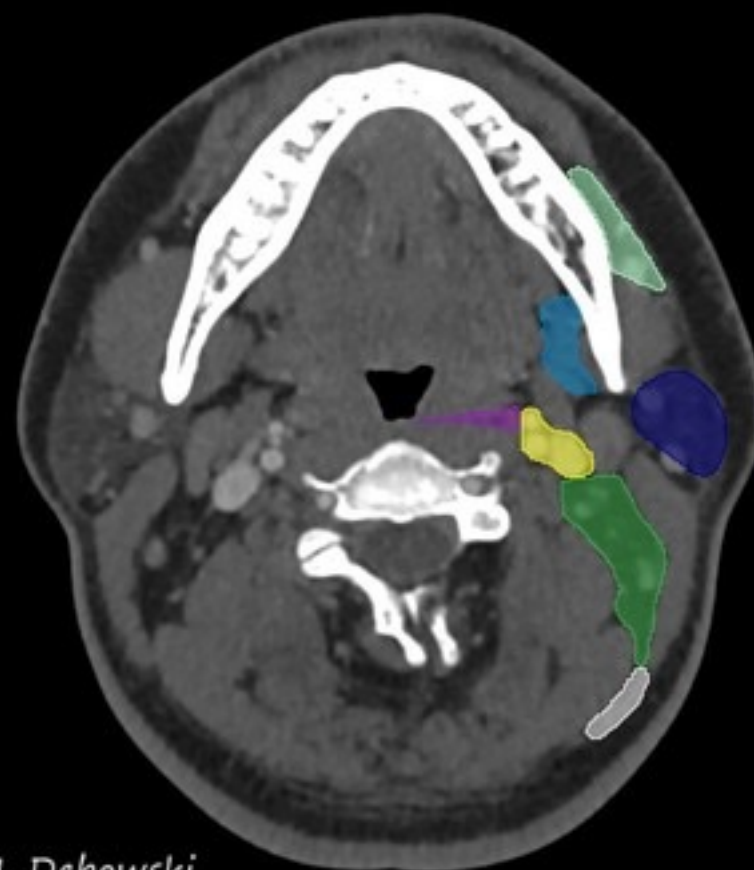
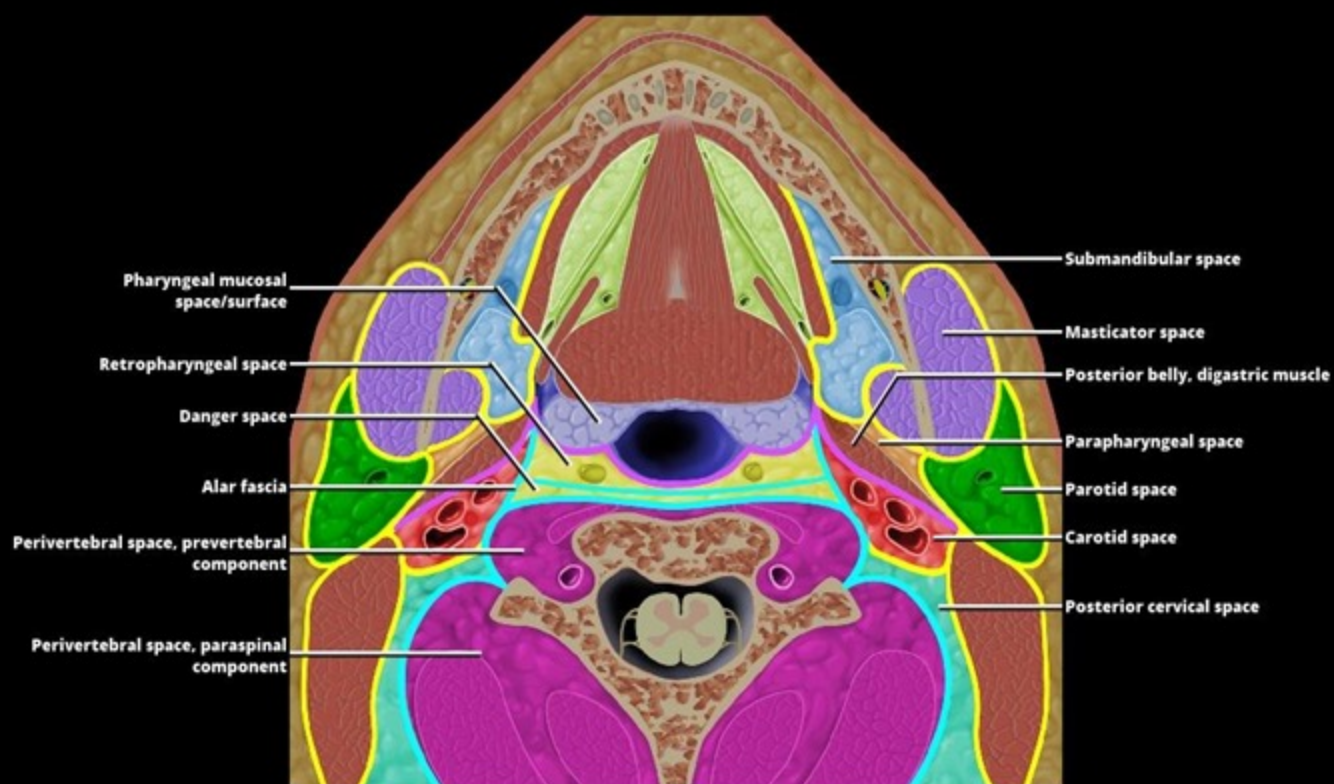


Post 28 & 38 Exo Infection



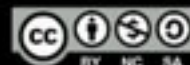




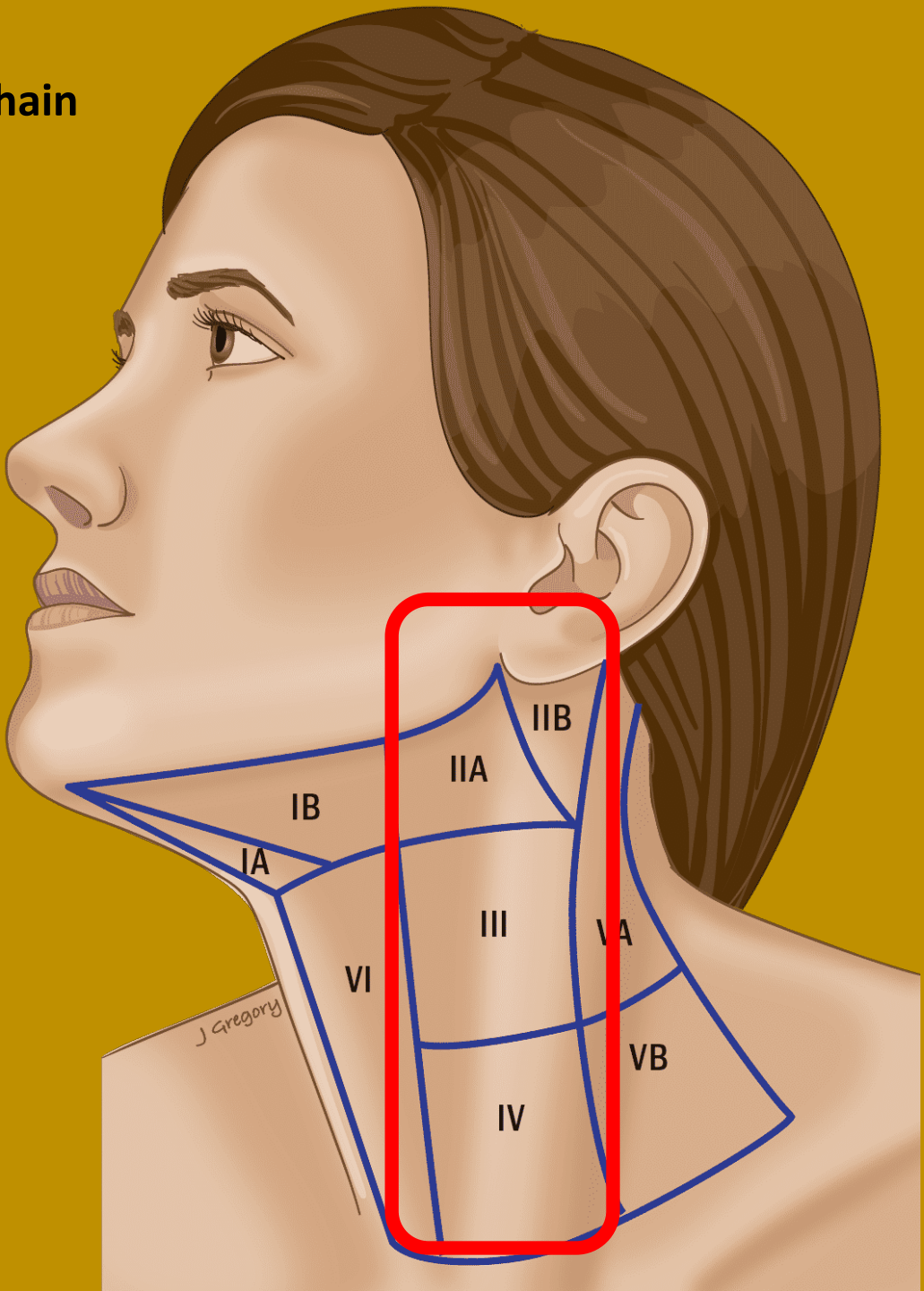
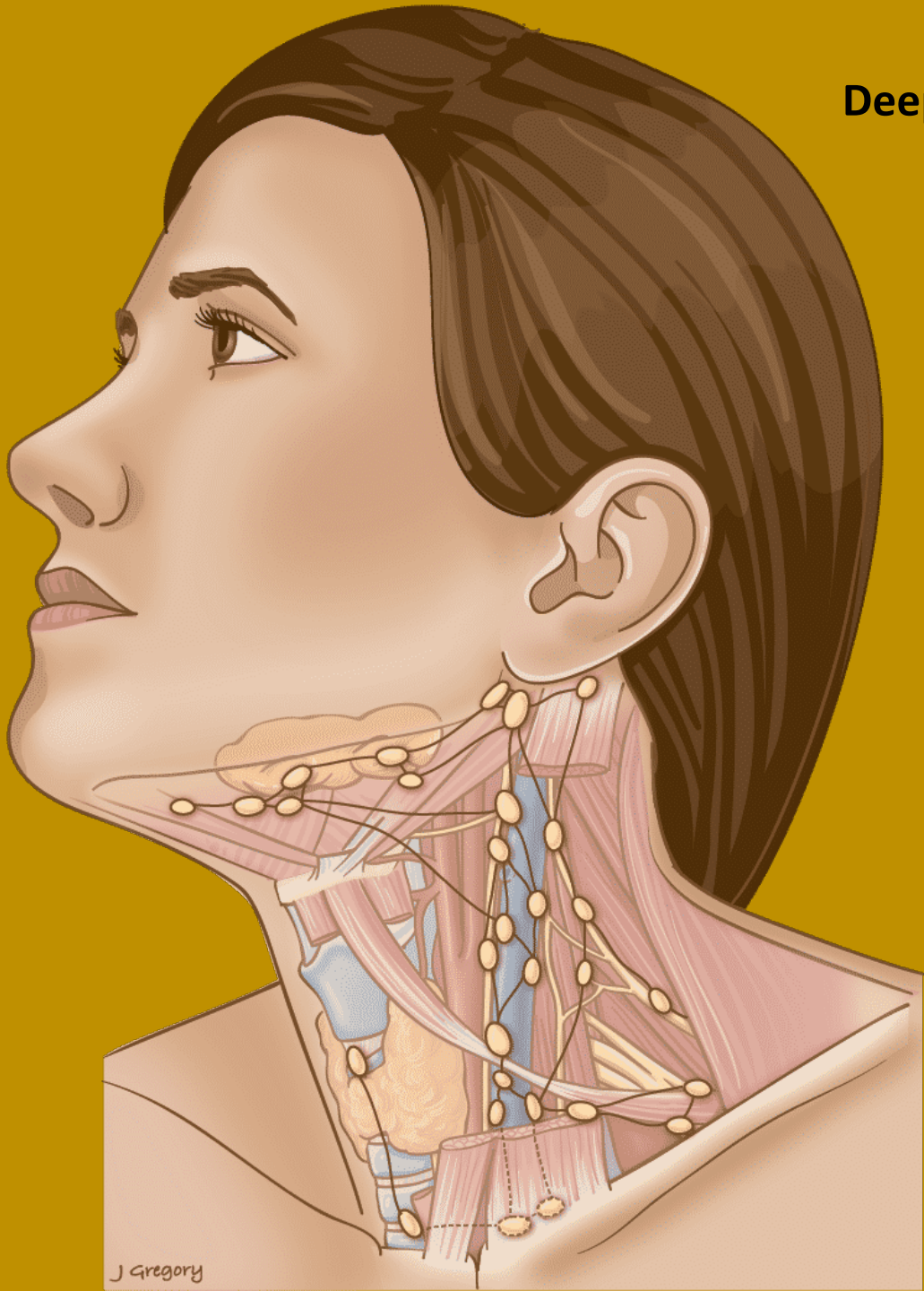


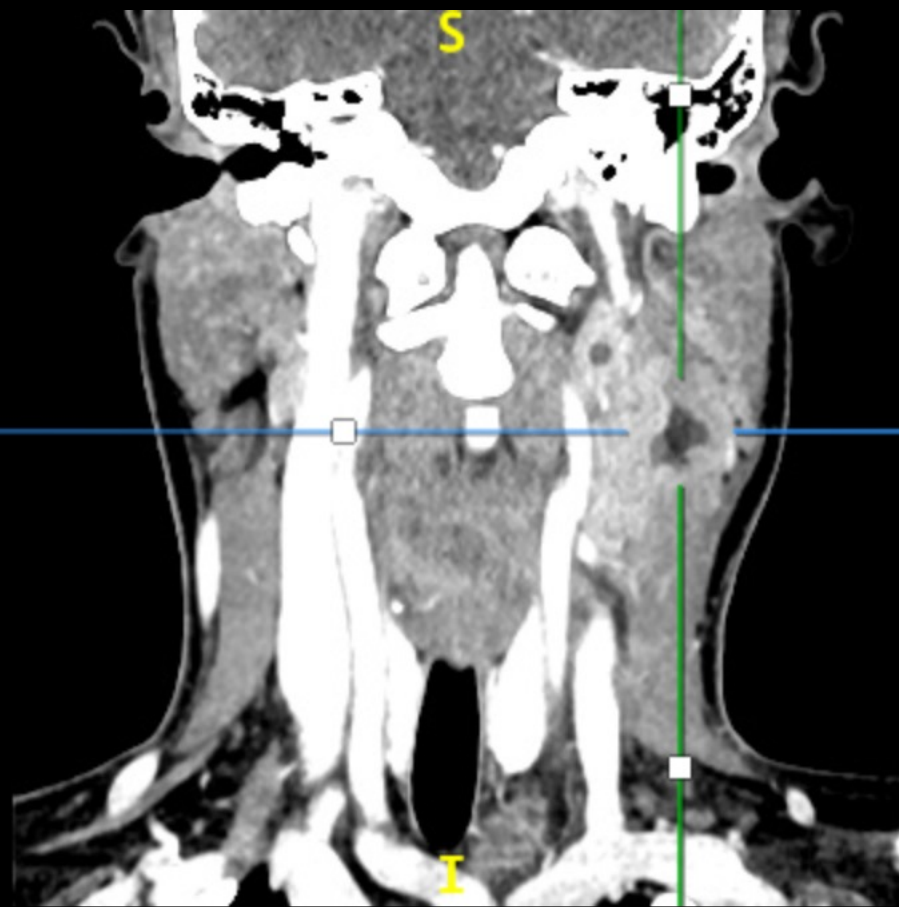
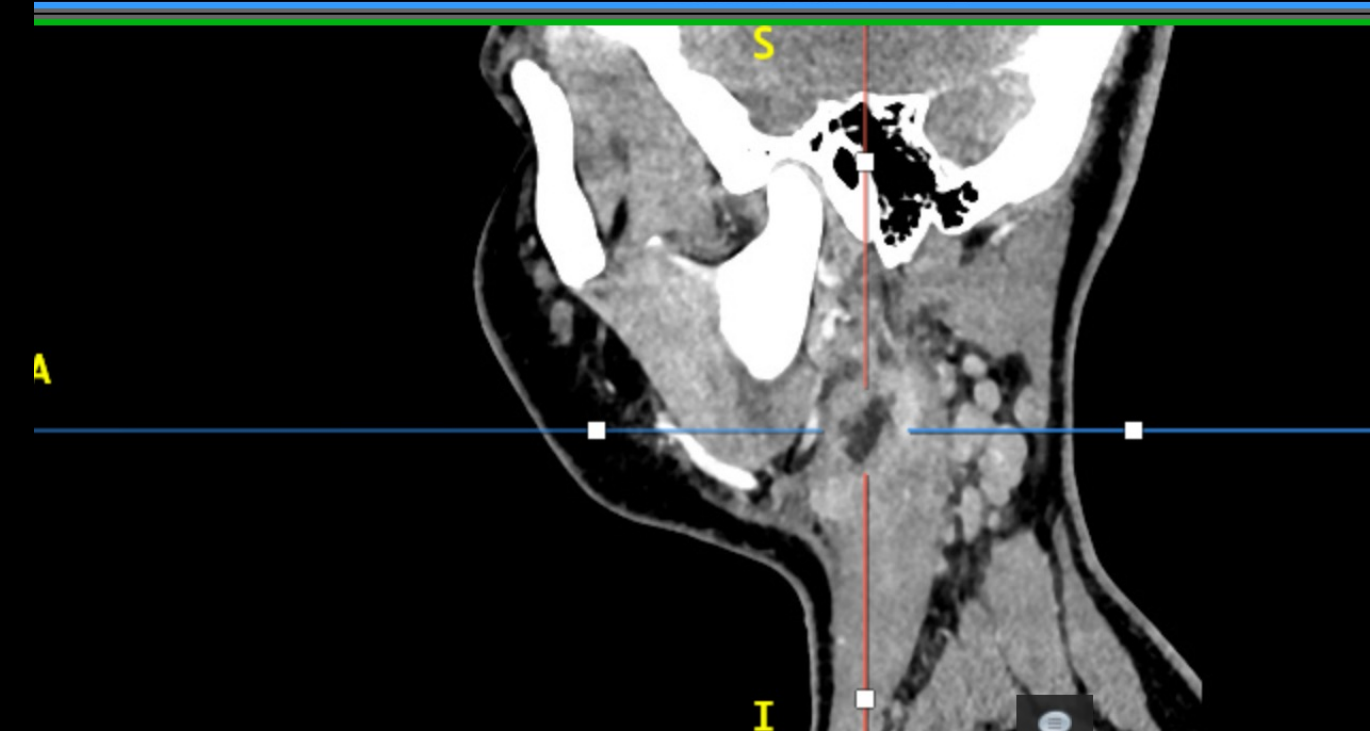
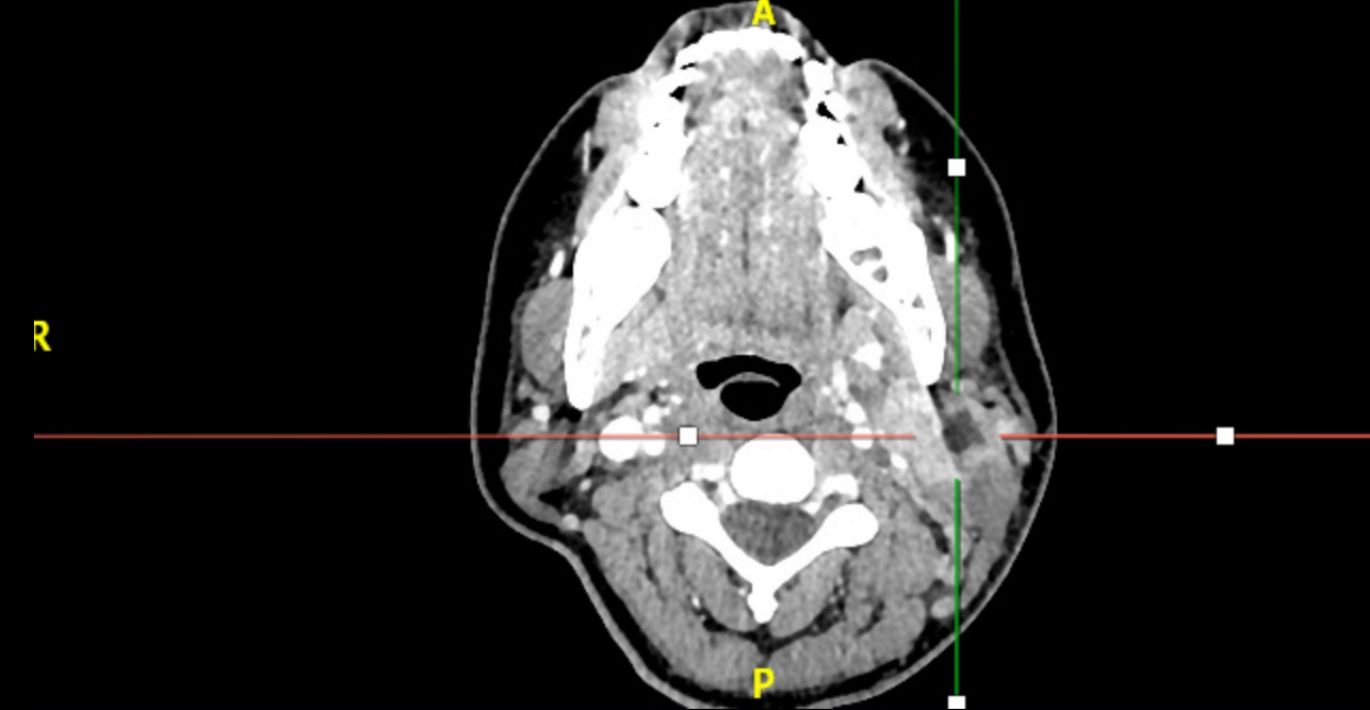
- Ia Submental
- Ib Submandibular
- IIa Upper jugular (anterior)
- IIb Upper jugular (posterior)
- III Mid jugular
- IVa Lower jugular
- IVb Medial supraclavicular
- Va Upper posterior triangle
- Vb Lower posterior triangle
- Vc Lateral supraclavicular
- VIa Anterior jugular
- VIb Para-tracheal
- VIIa Retropharyngeal
- VIIb Retro-styloid
- VIII Parotid
- IX Bucco-facial
- Xa Retro-auricular
- Xb Occipital

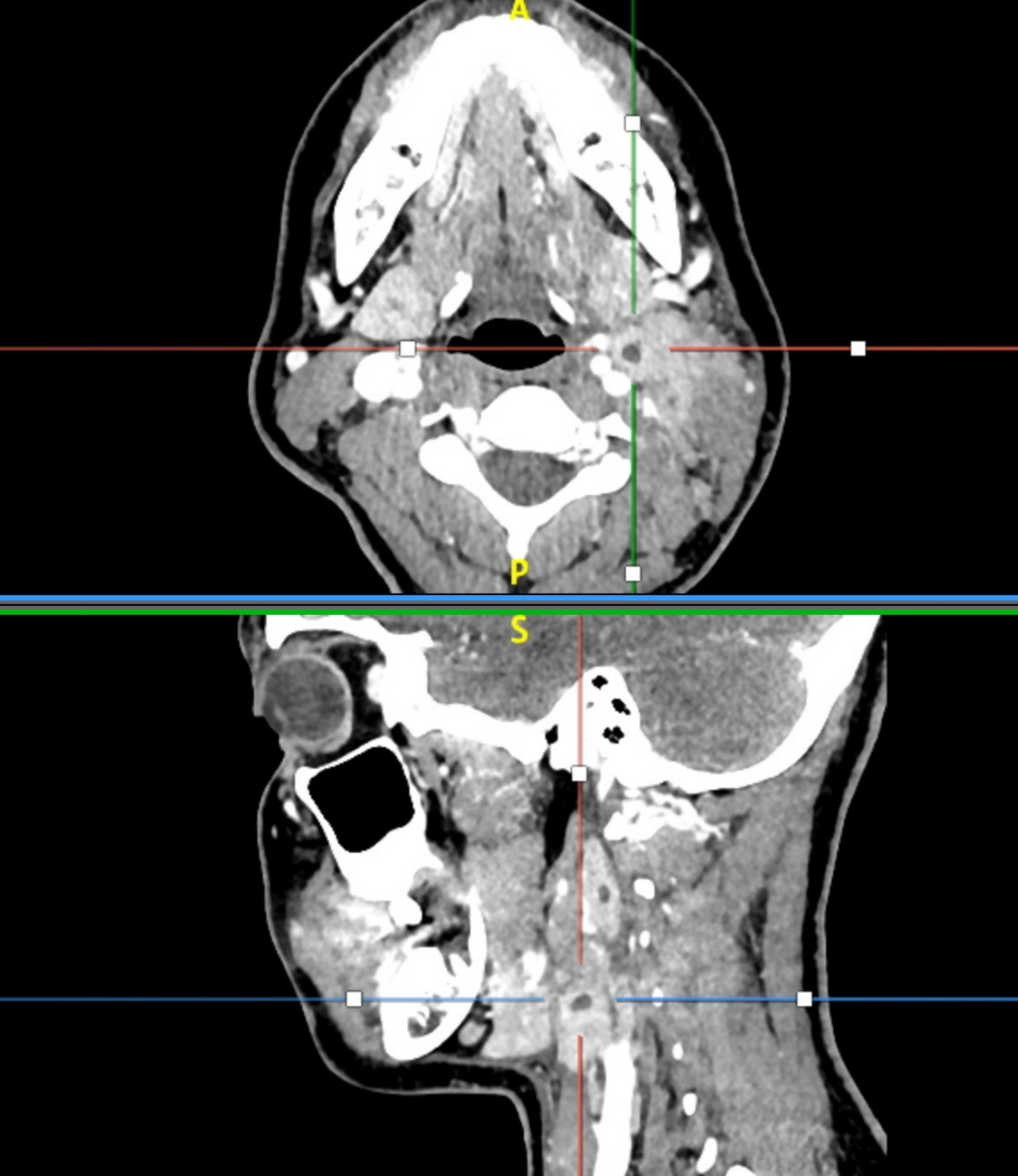
M. Debowski



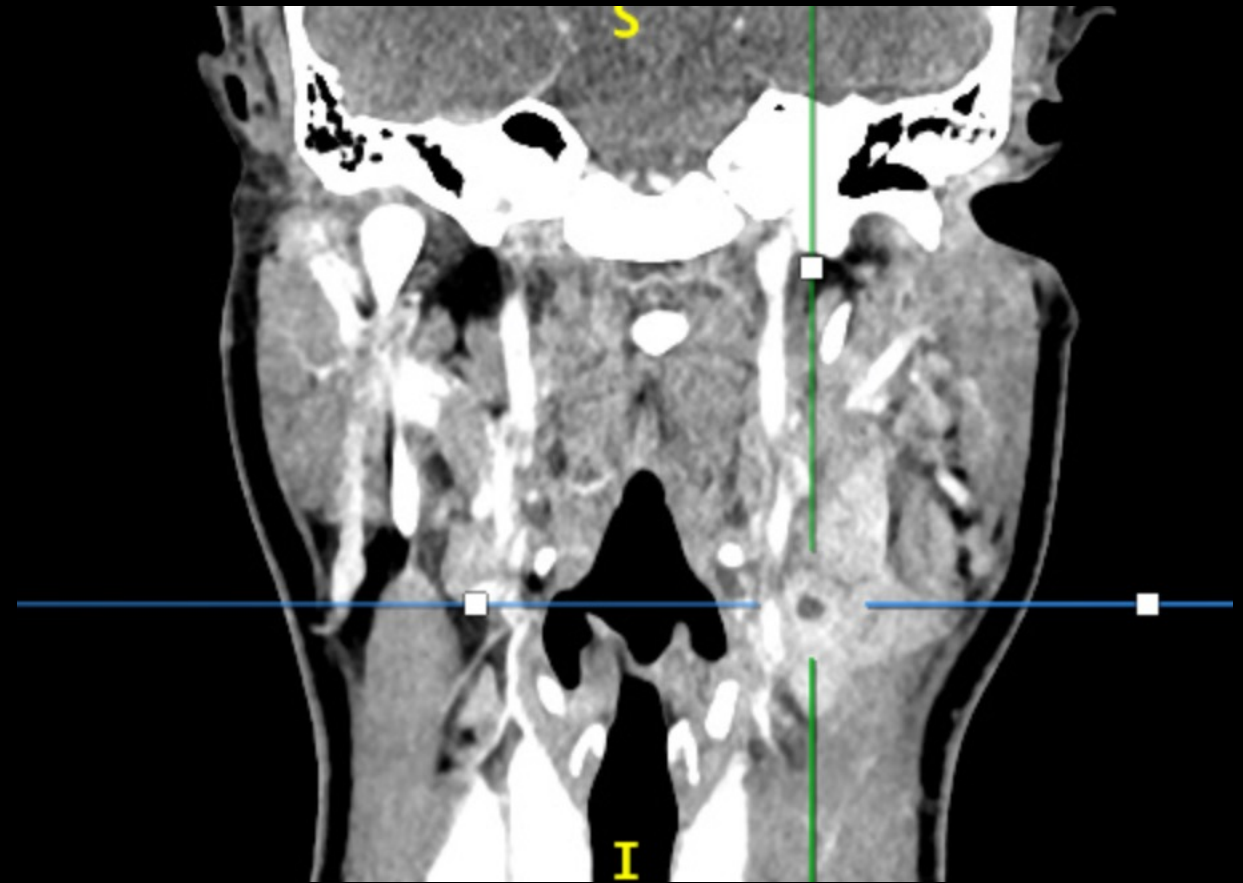
Deep cervical chain







- Necrotic mass with multiple foci of fluid collection
- posterior to the submandibular gland
 - superficial to the carotid sheath
 - anterior to the sternocleidomastoid muscle



Deep cervical infection associated with 38 socket



— Retropharyngeal Space

— Danger Space

■ Perivertebral Space: Prevertebral part

■ Perivertebral Space: Paraspinal part

■ Carotid Space

■ Pharyngeal Mucosal Space

■ Parotid Space

■ Masticator Space

■ Buccal Space

■ Parapharyngeal Space

R

L

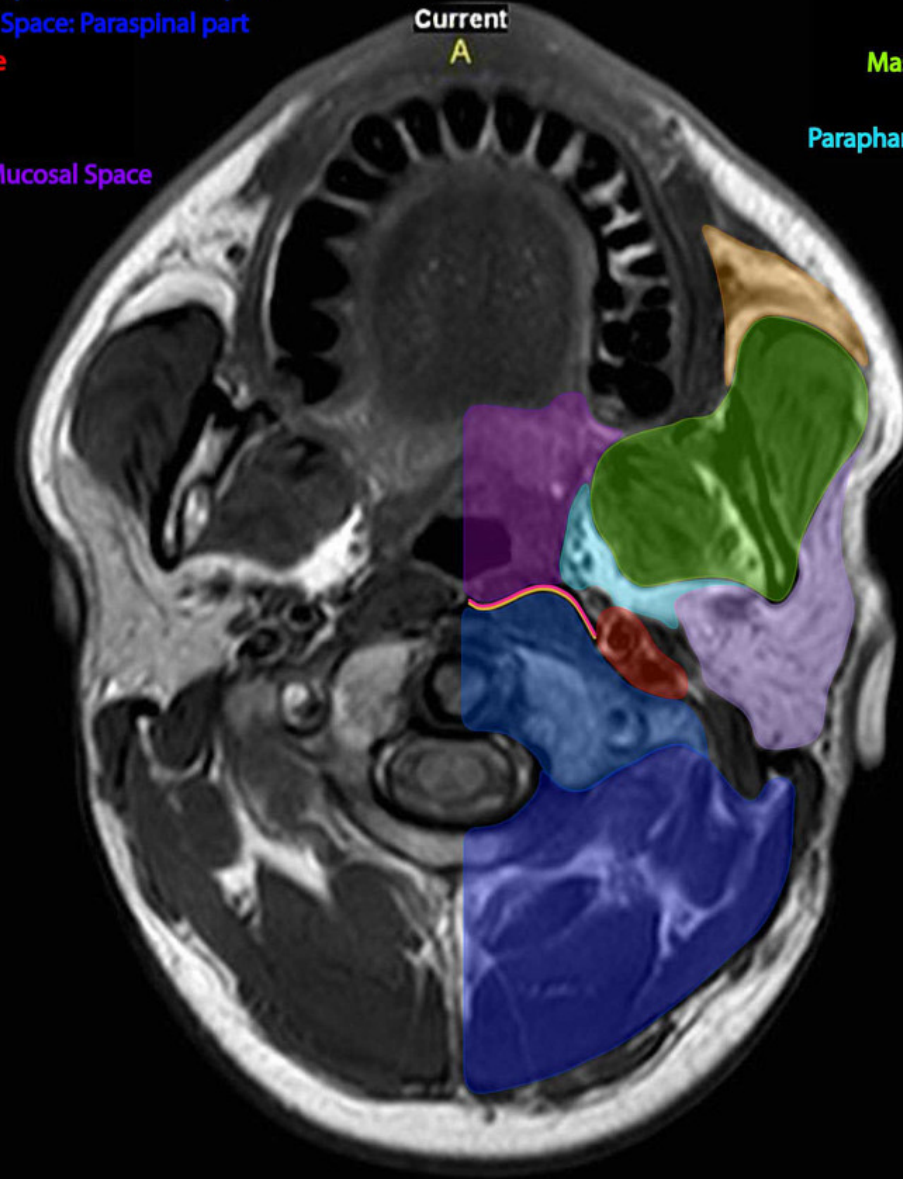
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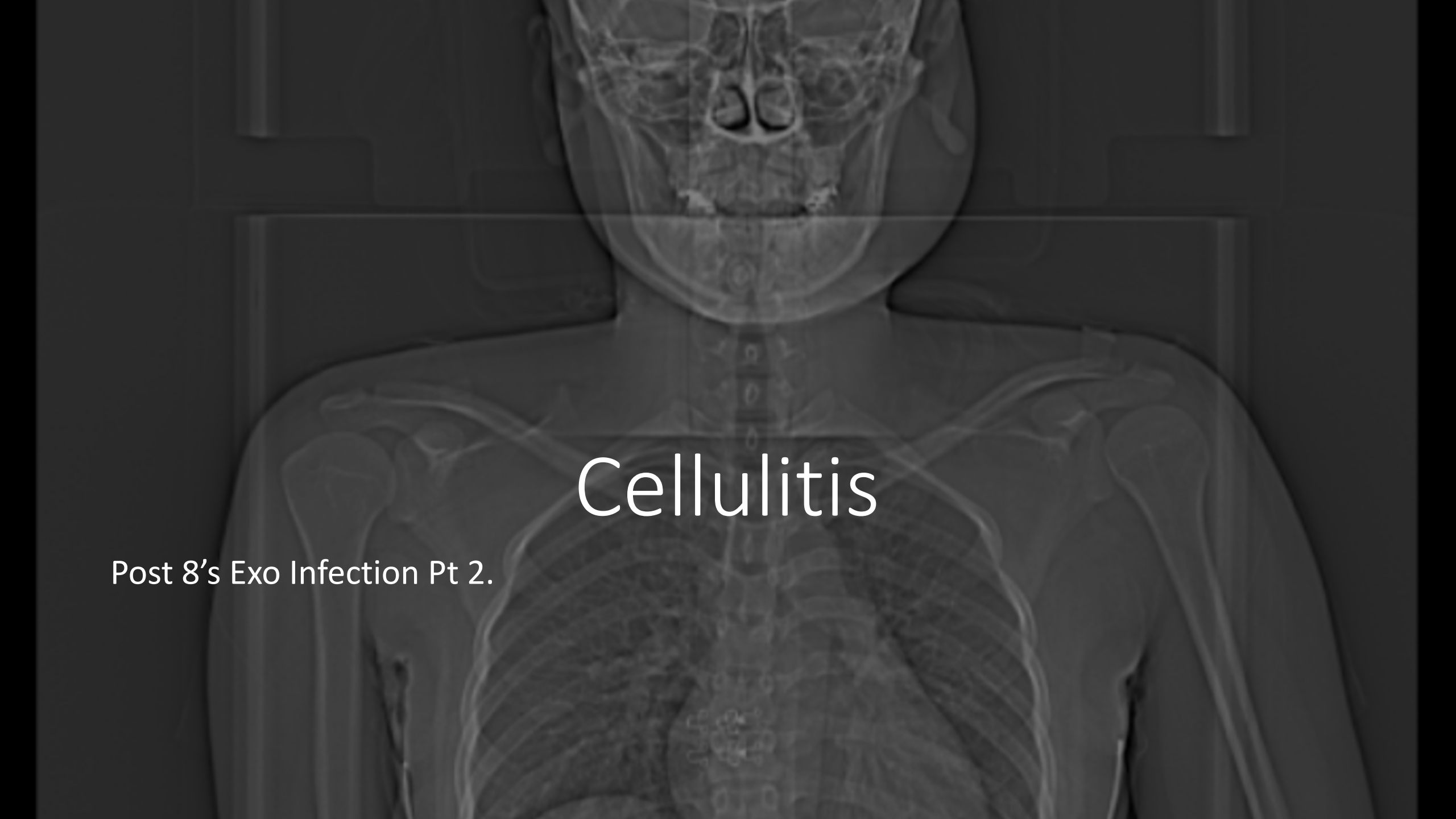
A

Zoom: 2.1
NEX: 4.0
FOV: 220.4x220.4mm

P

S Hacking
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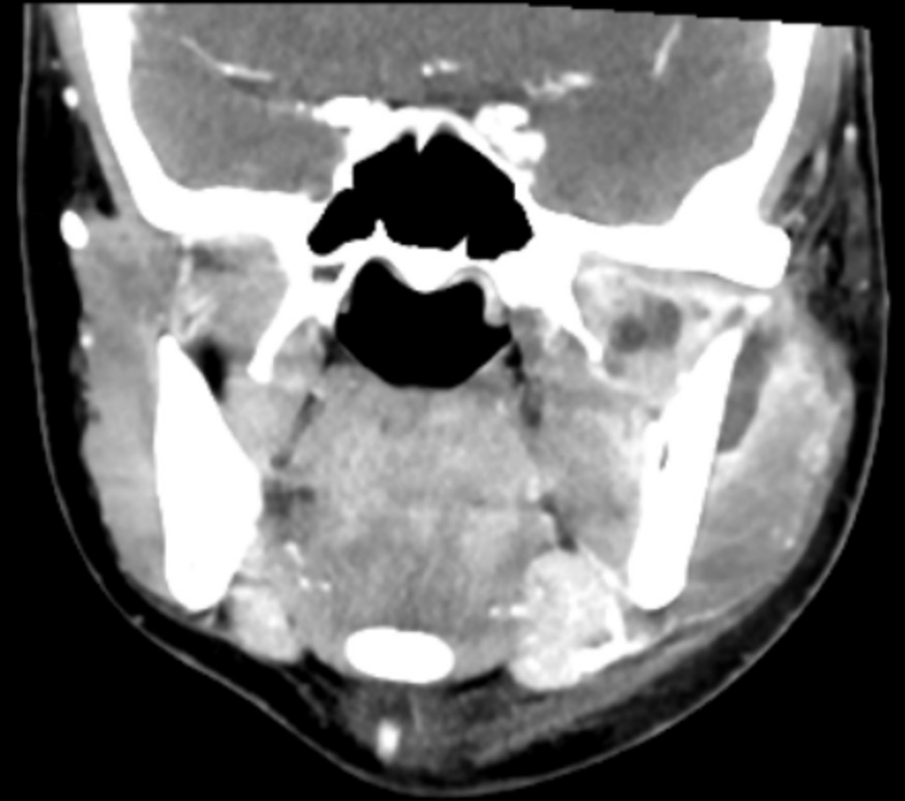
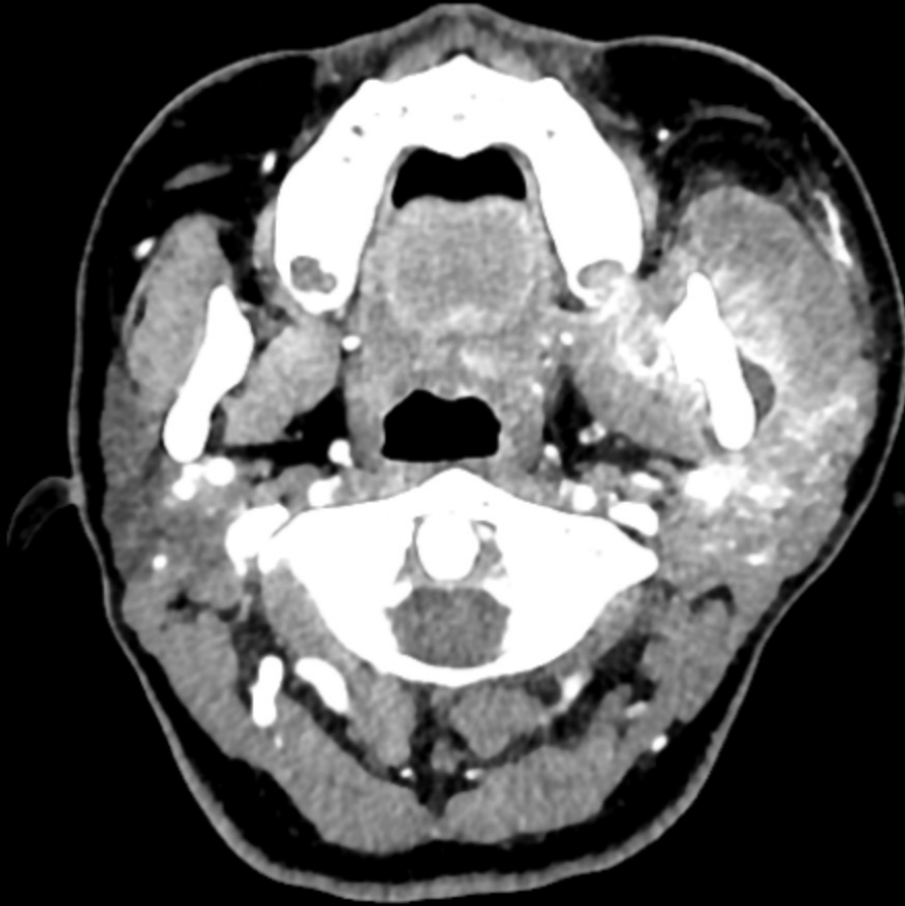


An anteroposterior (AP) radiograph of a human torso, showing the skull, cervical spine, and rib cage. The image is in grayscale and serves as a background for the text.

Cellulitis

Post 8's Exo Infection Pt 2.

Multiple foci of collection in the left masticator space medial pterygoid, lateral pterygoid and deep portion of the masseter and direct extension into the left temporomandibular joint



Oedema of affected muscles of mastication

Thickening of platysma muscle

Subcutaneous fat stranding / oedema

Fat stranding in left submandibular space. Reactive nodes (1B)

Parapharyngeal & pharyngeal mucosal spaces are normal

End.

