

Nasal Obstruction Case

A Self-Directed Learning Module

Department of Otolaryngology – Head & Neck Surgery
Schulich School of Medicine & Dentistry, Western University

[Click to Begin](#)

Case Presentation

A 22-year-old male university student presents to your family practice with a eight day history of nasal obstruction.



You are the family physician, click through the module to diagnose and treat this patient.

Obtain a history

Patient History

What brings you in today?

My nose has been plugged for the past eight days. I'm having a hard time breathing out of both sides of my nose, and it seems to be more plugged in the morning. I have also had a cough and headache for the past week as well as a fever for the past day or so. I have generally been feeling awful. I tried a decongestant (Otrivin) for the past 24 hours, but that only helped temporarily.

Have you noticed any other symptoms?

For the past five days, my face has been hurting. I have pain in my teeth and a bit in my ears. Further, my sense of smell has been mostly absent, my sense of taste has decreased, and I have felt pressure around my eyes. I have also had thick white-yellow discharge from my nose and my breath has been a bit foul smelling.

Patient History

How is your general health?

This sort of thing has never happened to me before. I'm generally quite healthy, have not had any recent injuries, and have no medical diagnoses to date. I have never been in the hospital or had any surgeries. I am not on any medications, other than the Otrivin, and I do not have any allergies.

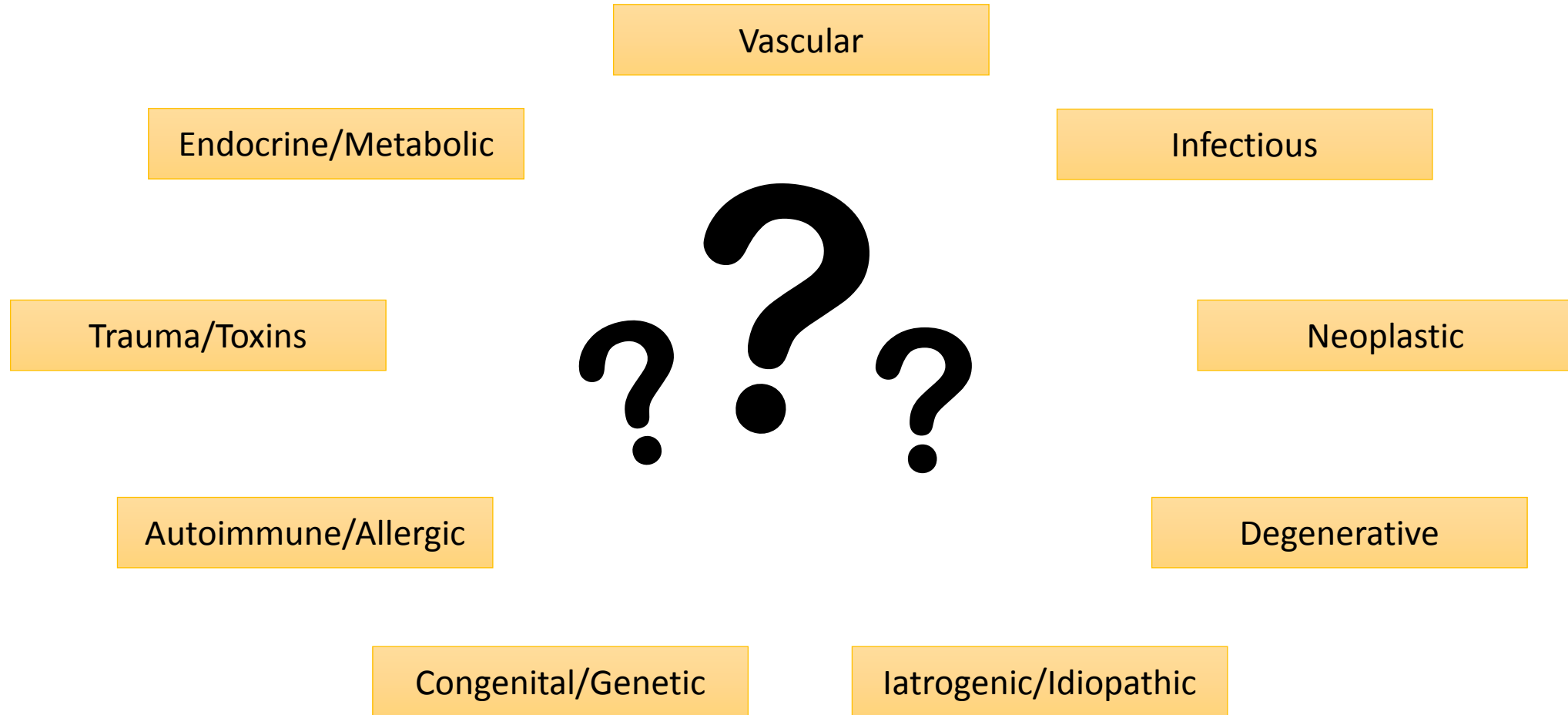
Social history?

I'm a full-time student and live in a house with four of my friends. I have never smoked and do not use recreational drugs. I drink 10-20 beers a week. I exercise regularly and I try to eat a healthy diet.

What is on your differential diagnosis so far?

What diagnoses are coming to mind?

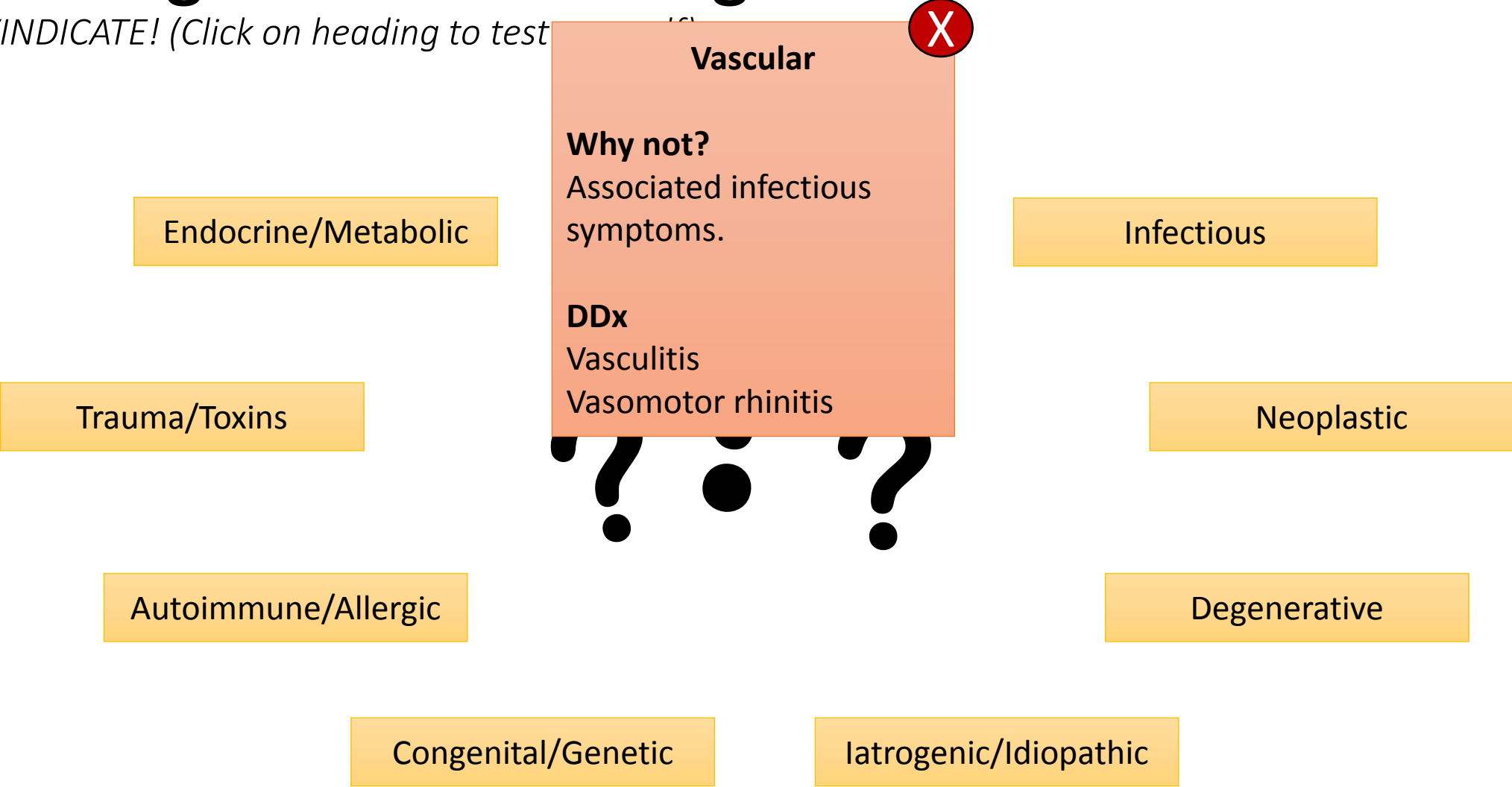
Think VINDICATE! (Click on heading to test yourself)



With your DDx in mind, proceed to focused physical exam.

What diagnoses are coming to mind?

Think VINDICATE! (Click on heading to test)



With your DDx in mind, proceed to focused physical exam.

What diagnoses are coming to mind?

Think VINDICATE! (Click on heading to test yourself)



Infectious

Why?

Eight day history, associated with a cold.

DDx

- Infectious rhinitis/acute rhinosinusitis
- Rhinoscleroma
- Chronic rhinosinusitis
- Adenoiditis
- Granulomatous disease

Vascular

Endocrine/Metabolic

Trauma/Toxins

Autoimmune/Allergic

Congenital/Genetic

Iatrogenic/Idiopathic

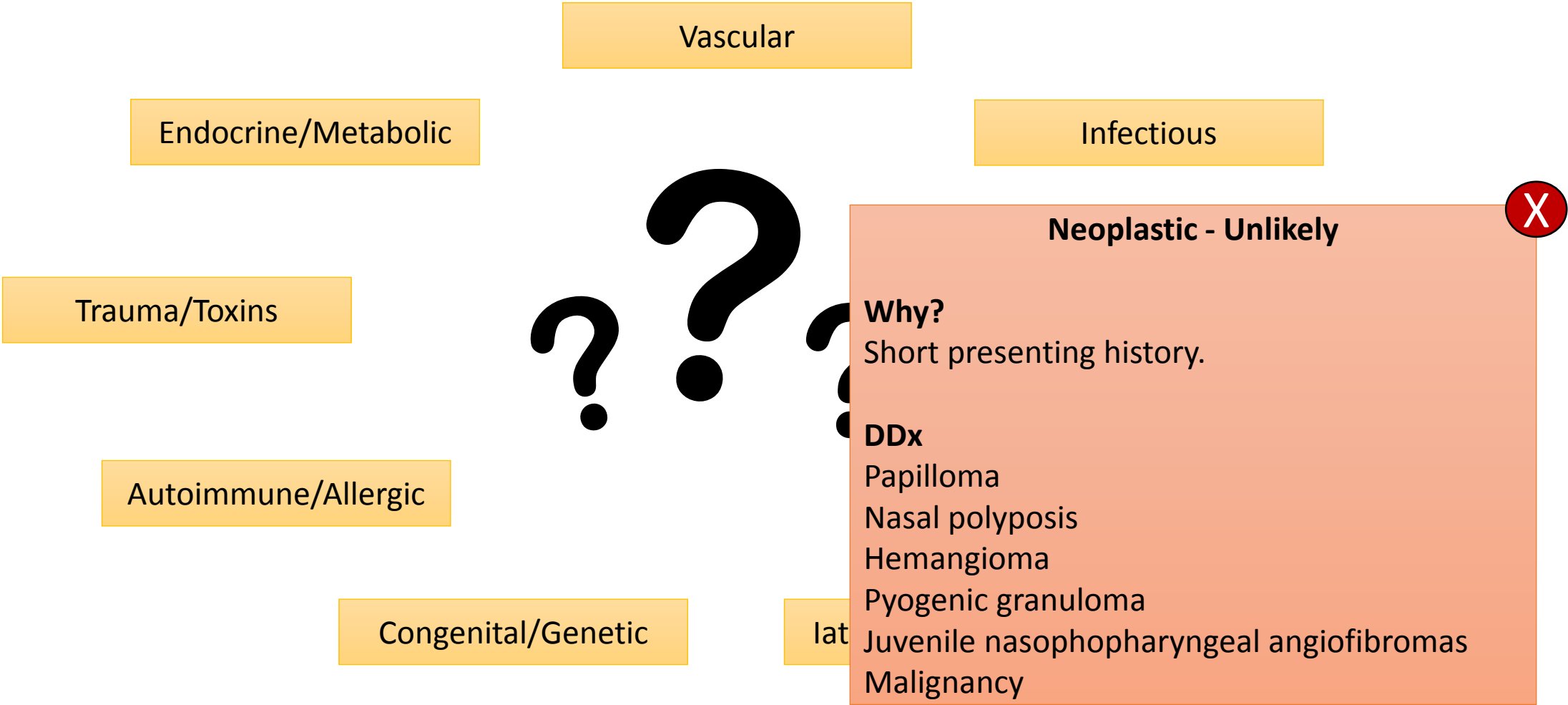
Degenerative



With your DDx in mind, proceed to focused physical exam.

What diagnoses are coming to mind?

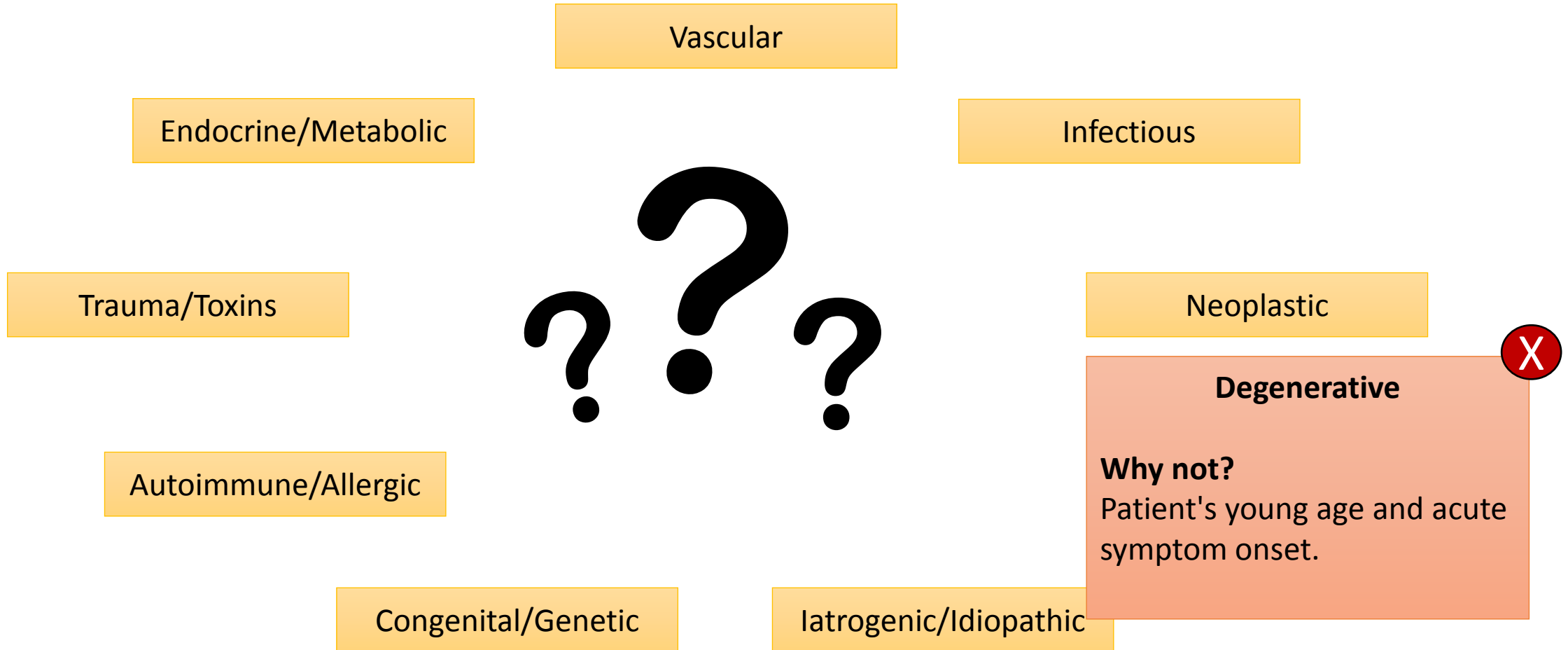
Think VINDICATE! (Click on heading to test yourself)



With your DDx in mind, proceed to focused physical exam.

What diagnoses are coming to mind?

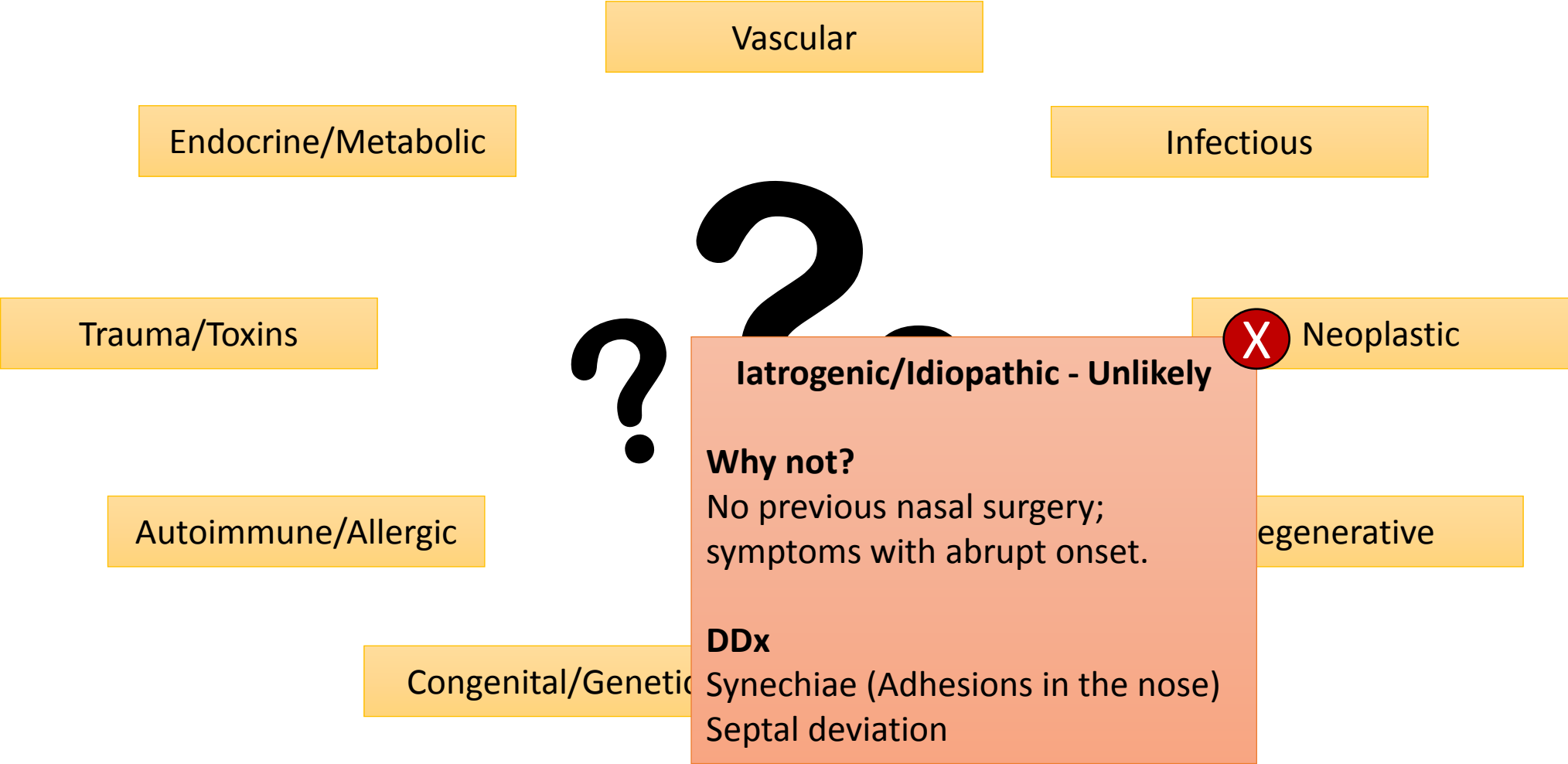
Think VINDICATE! (Click on heading to test yourself)



With your DDx in mind, proceed to focused physical exam.

What diagnoses are coming to mind?

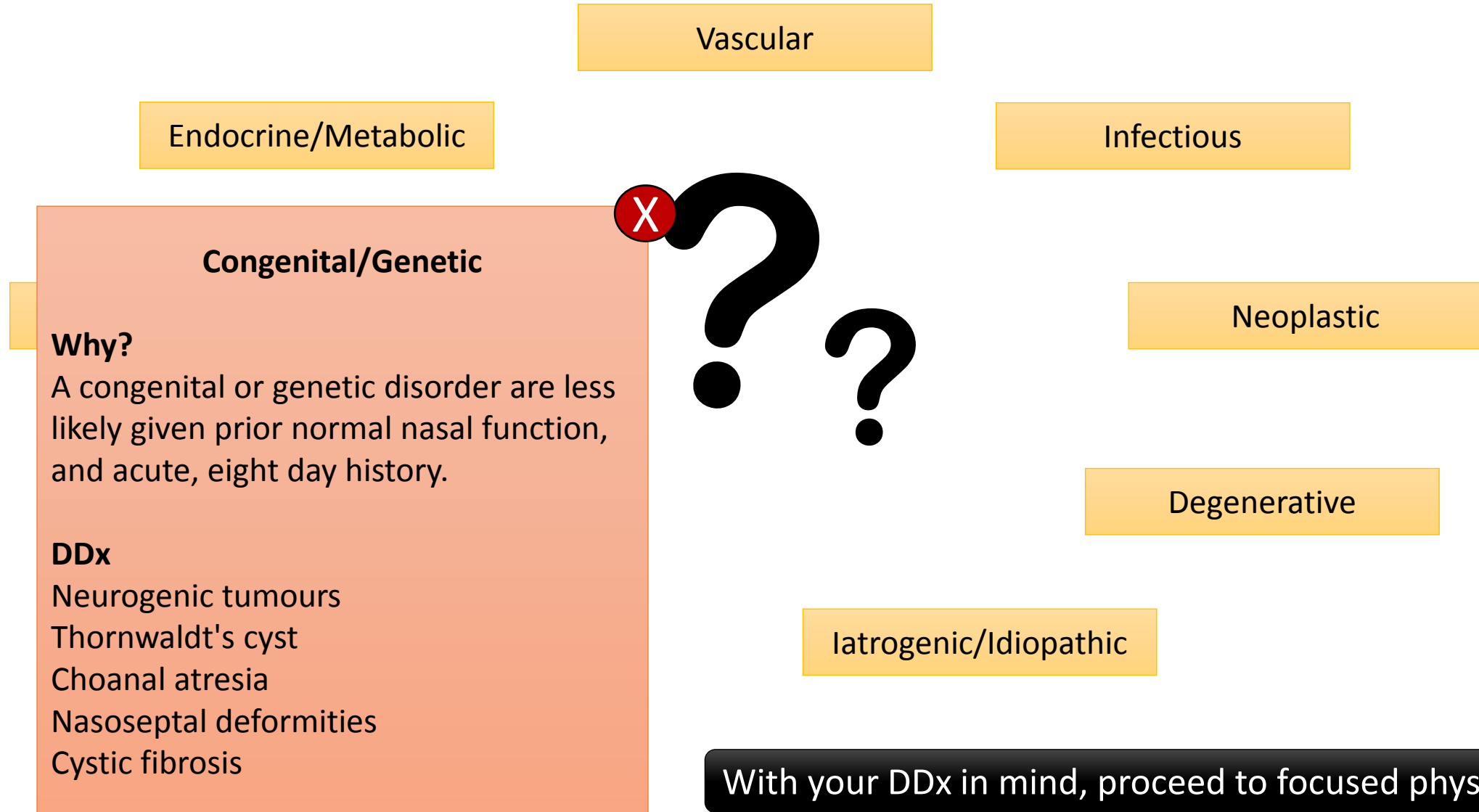
Think VINDICATE! (Click on heading to test yourself)



With your DDx in mind, proceed to focused physical exam.

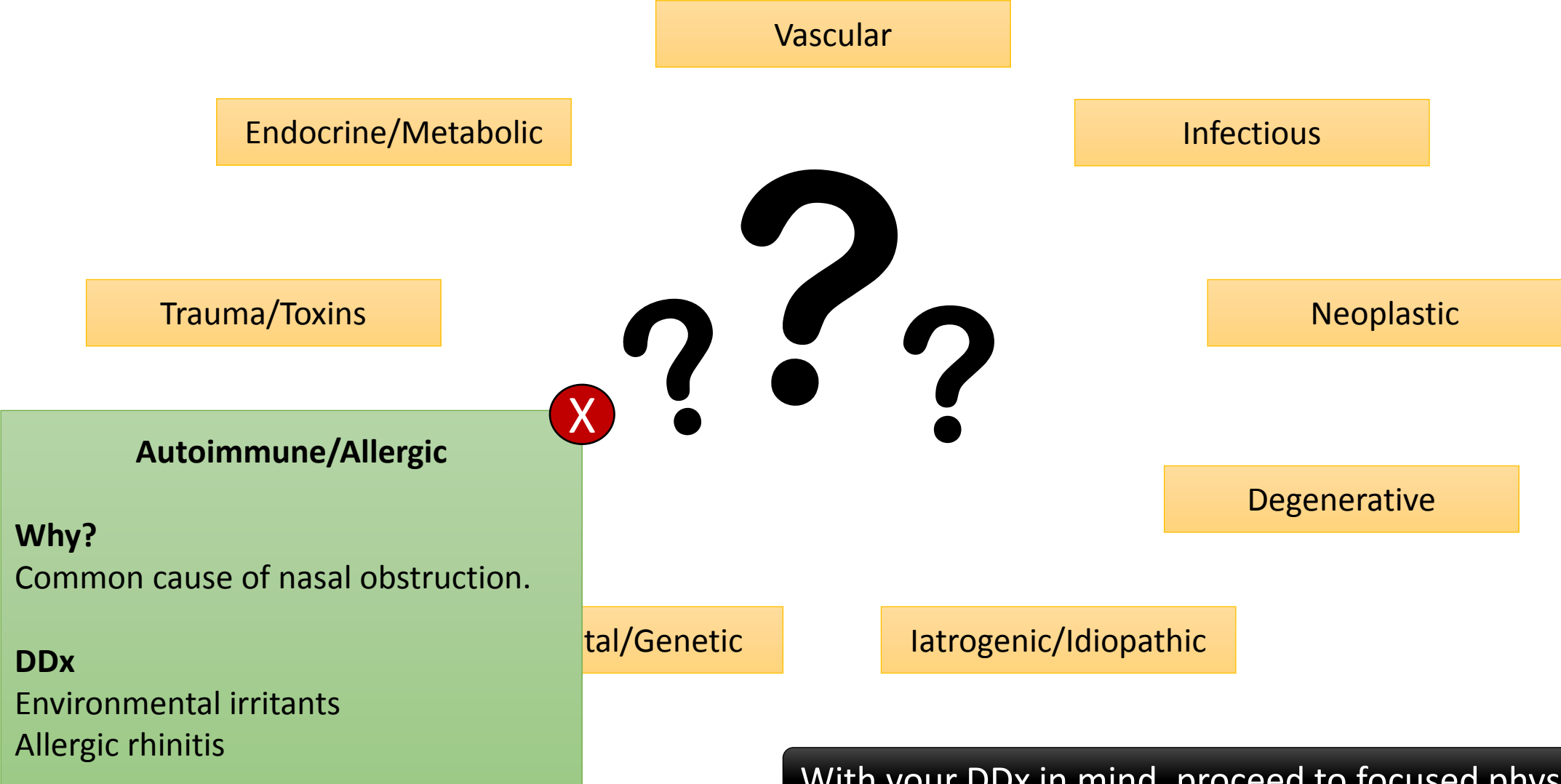
What diagnoses are coming to mind?

Think VINDICATE! (Click on heading to test yourself)



What diagnoses are coming to mind?

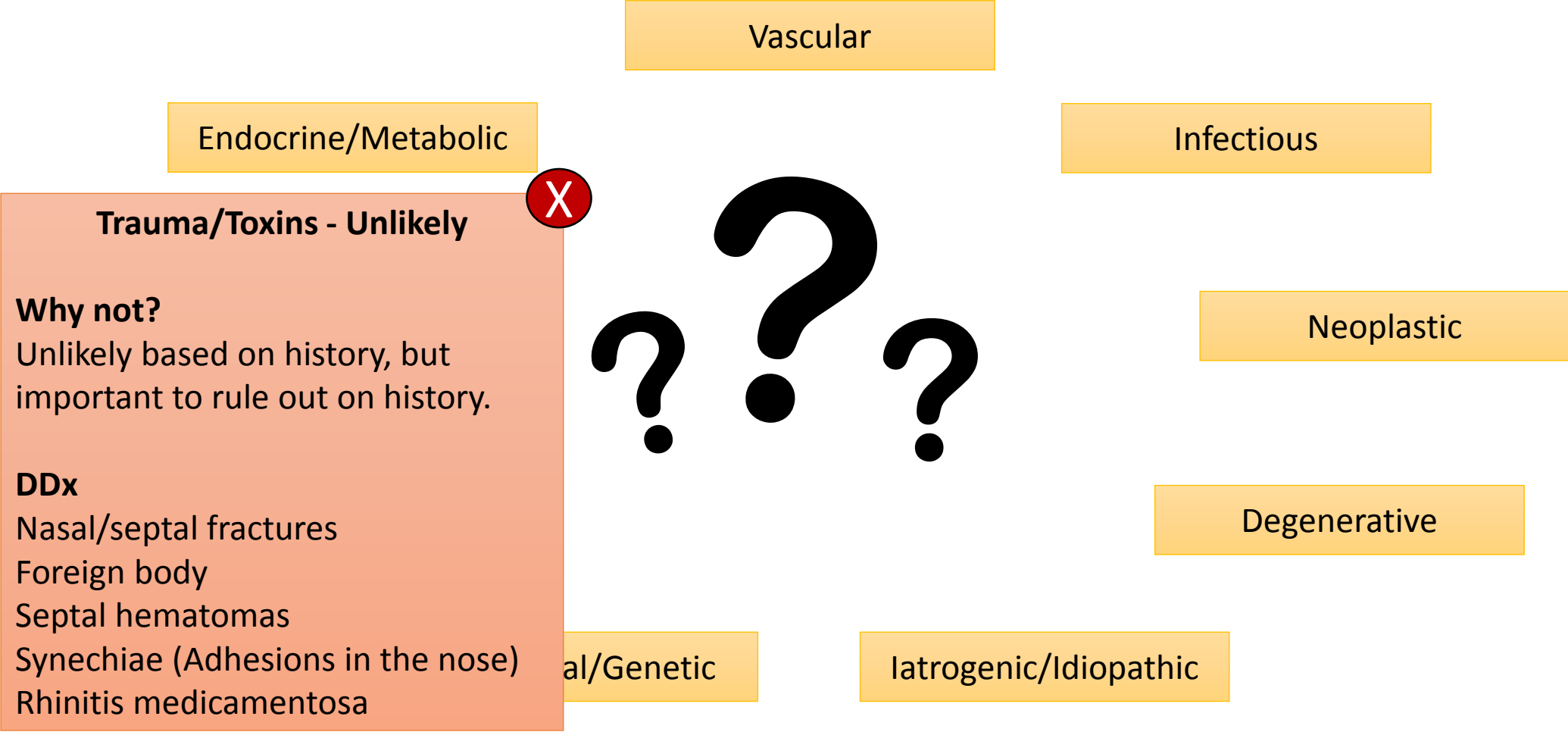
Think VINDICATE! (Click on heading to test yourself)



With your DDx in mind, proceed to focused physical exam.

What diagnoses are coming to mind?

Think VINDICATE! (Click on heading to test yourself)



With your DDx in mind, proceed to focused physical exam.

What diagnoses are coming to mind?

Think VINDICATE! (Click on heading to test yourself)

X

Endocrine/Metabolic - Unlikely

Why not?
Unlikely based on history and no suggestive associated symptoms.

DDx
Hypothyroidism
Diabetes
Pregnancy (Female)

Vascular

Infectious

Neoplastic

Degenerative

Congenital/Genetic

Iatrogenic/Idiopathic



With your DDx in mind, proceed to focused physical exam.

Physical Exam

(Click on the physical examinations.)

General inspection & Vitals

Cranial Nerve Exams

Ophthalmic Exam

Head & Neck Exam

Systems Review

[Proceed to investigations](#)

Physical Exam

(Click on the physical examinations.)

General inspection & Vitals

Cranial Nerve Exams

Ophthalmic Exam

Head & Neck Exam

Systems Review

Patient looks uncomfortable, but doesn't appear to be in distress.

Vitals:

HR: 68 bpm

RR: 12 per minute

BP: 120/80 mmHg

Temperature: 37°C

Proceed to investigations

Physical Exam

(Click on the physical examinations.)

General inspection & Vitals

Cranial Nerve Exams

Ophthalmic Exam

Head & Neck Exam

Systems Review

Cranial Nerve Exams:

CN II – XII: Intact

[Proceed to investigations](#)

Physical Exam

(Click on the physical examinations.)

General inspection & Vitals

Cranial Nerve Exams

Ophthalmic Exam

Head & Neck Exam

Systems Review

Ophthalmic Exam

Extraocular movements: normal

Pupil size: 3mm (L and R eyes)

Reactivity: Direct and consensual light reflex in both eyes, normal accommodation

Visual acuity: 20/20 left, 20/20 right

Proceed to investigations

Focused Head & Neck Exam

General:

Inspection

- No distress

Palpation

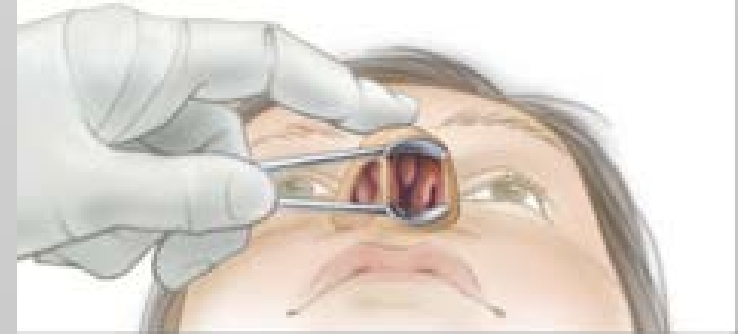
- No palpable lymph nodes

Oral Cavity Exam:



→ Normal oral cavity exam.

Nasal speculum exam:



View:



Interpretation?

Review: Nasal Cavity Anatomy

Focused Head & Neck Exam

General:

Inspection

- No distress

Palpation

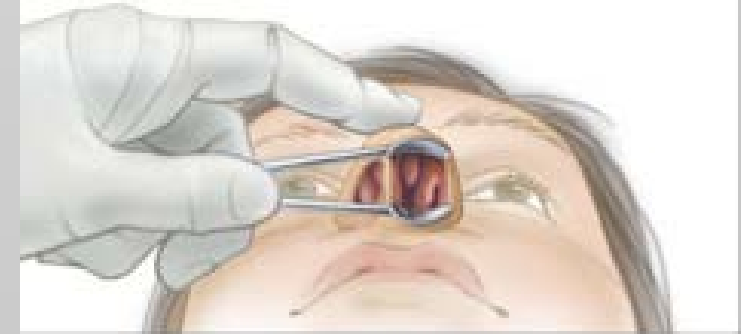
- No palpable lymph nodes

Oral Cavity Exam:



→ Normal oral cavity exam.

Nasal speculum exam:



View:



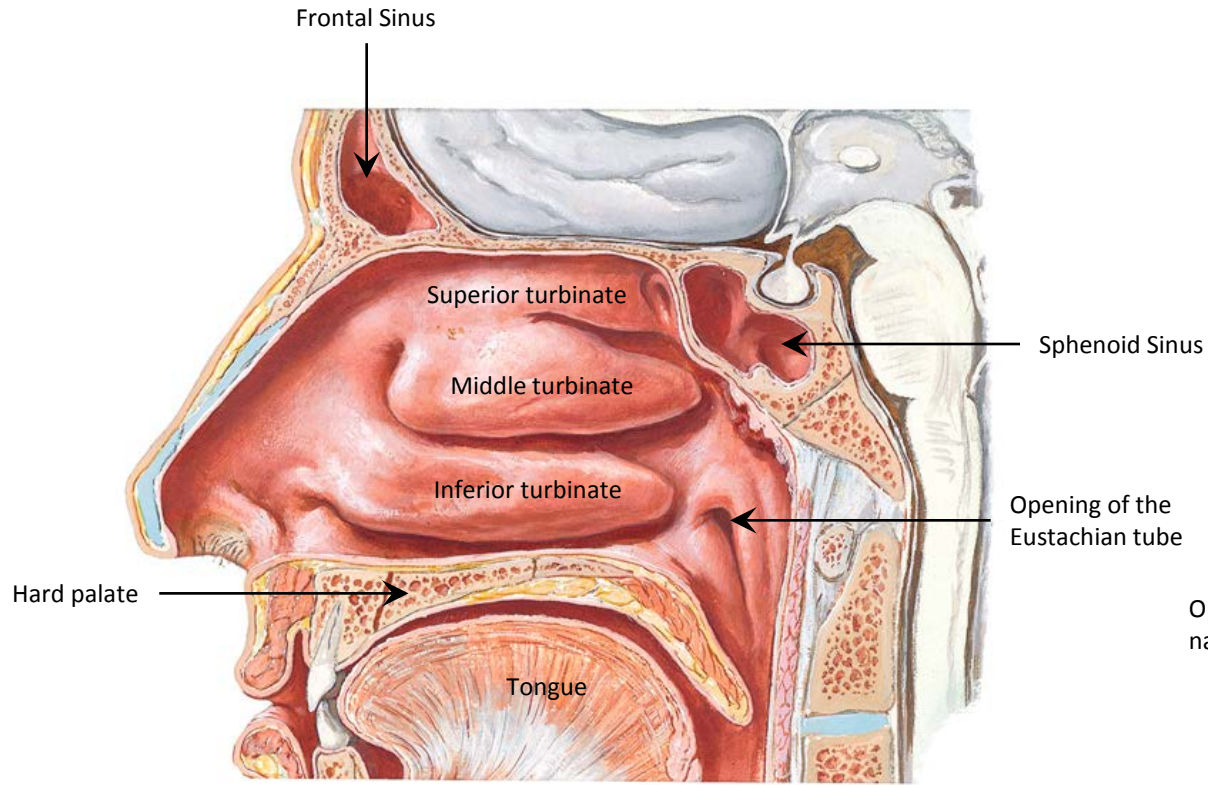
Swollen, erythematous inferior turbinate, with white exudate.

Review: Nasal Cavity Anatomy

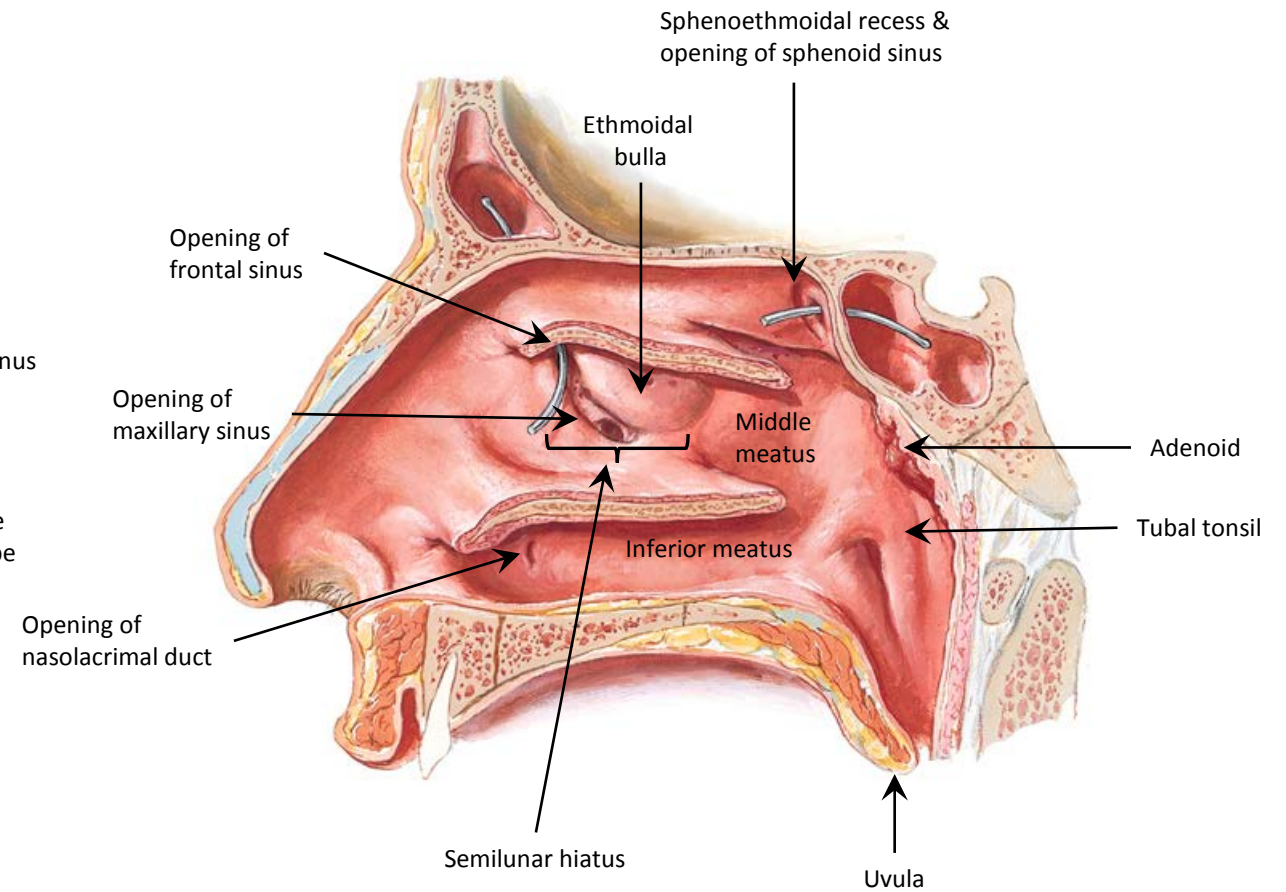
Review: Nasal Cavity Anatomy

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Lateral wall of nasal cavity – Sagittal view



F. Netter M.D.



Physical Exam

(Click on the physical examinations.)

General inspection & Vitals

Cranial Nerve Exams

Ophthalmic Exam

Head & Neck Exam

Systems Review

Systems Exams

CVS: Normal

Respiratory: Normal

Proceed to investigations

Investigations *(Click on the buttons to see investigation results.)*

Head MRI

CT of Paranasal Sinuses

X-ray of Paranasal Sinuses

Endoscopically Guided Culture

Biopsy

[Continue to Diagnosis](#)

Investigations *(Click on the buttons to see investigation results.)*

Head MRI

CT of Paranasal Sinuses

X-ray of Paranasal Sinuses

Endoscopically Guided Culture

Biopsy

Not required

Investigations *(Click on the buttons to see investigation results.)*

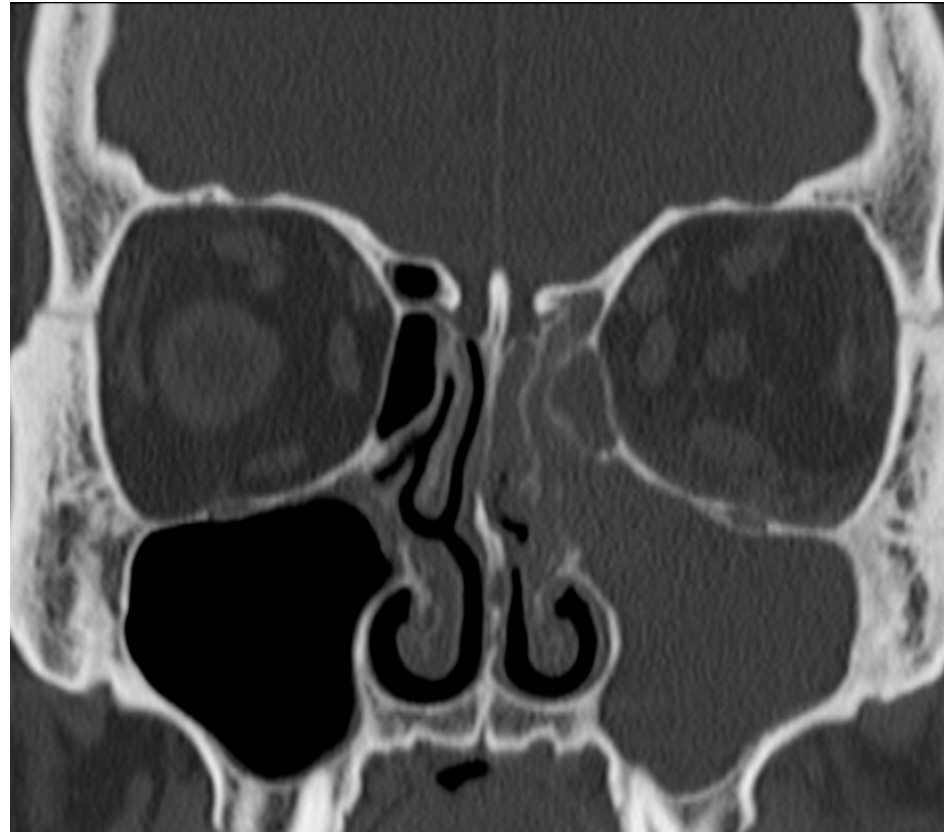
Head MRI

CT of Paranasal Sinuses

X-ray of Paranasal Sinuses

Endoscopically Guided Culture

Biopsy



Interpretation?

Review:
Paranasal Sinus Anatomy

[Continue to Diagnosis](#)

Investigations *(Click on the buttons to see investigation results.)*

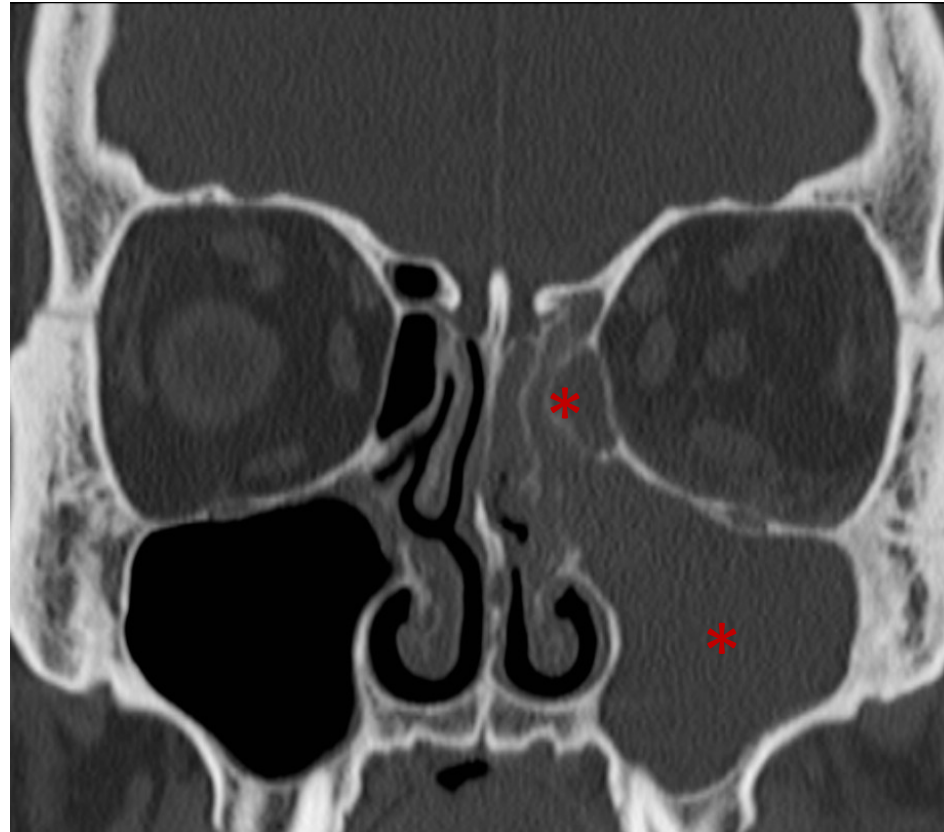
Head MRI

CT of Paranasal Sinuses

X-ray of Paranasal Sinuses

Endoscopically Guided Culture

Biopsy



Opacification of the left maxillary sinus and ethmoid sinuses.

Review:
Paranasal Sinus Anatomy

Continue to Diagnosis

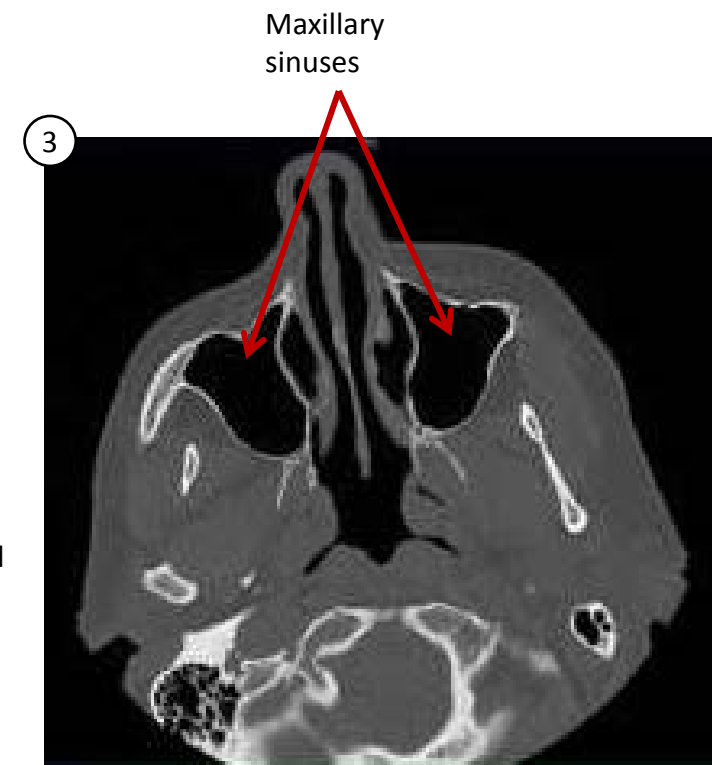
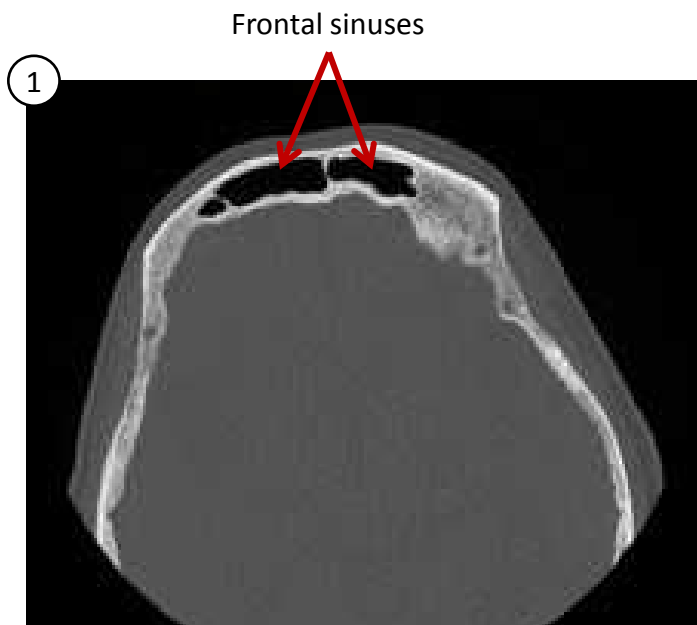
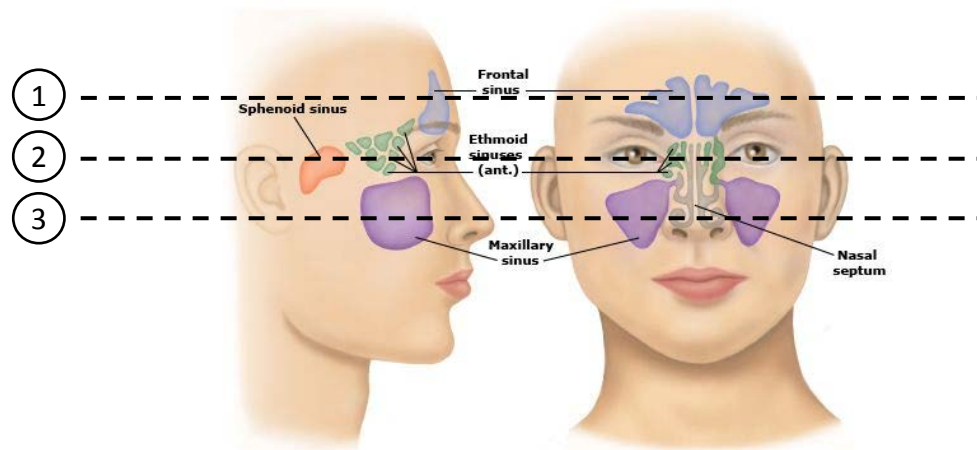
Review: Paranasal Sinus Anatomy

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Axial Plane

Coronal Plane

Sagittal Plane



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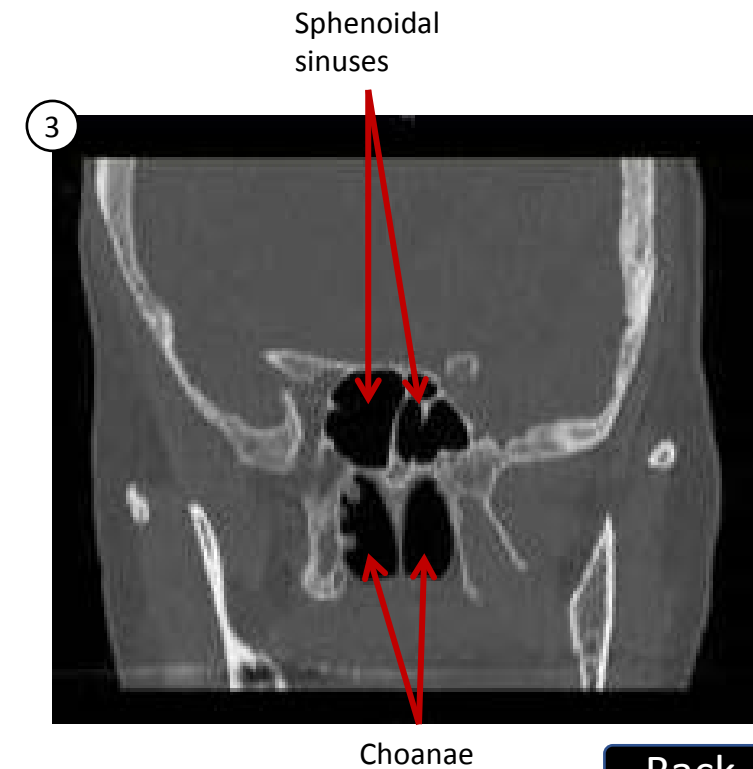
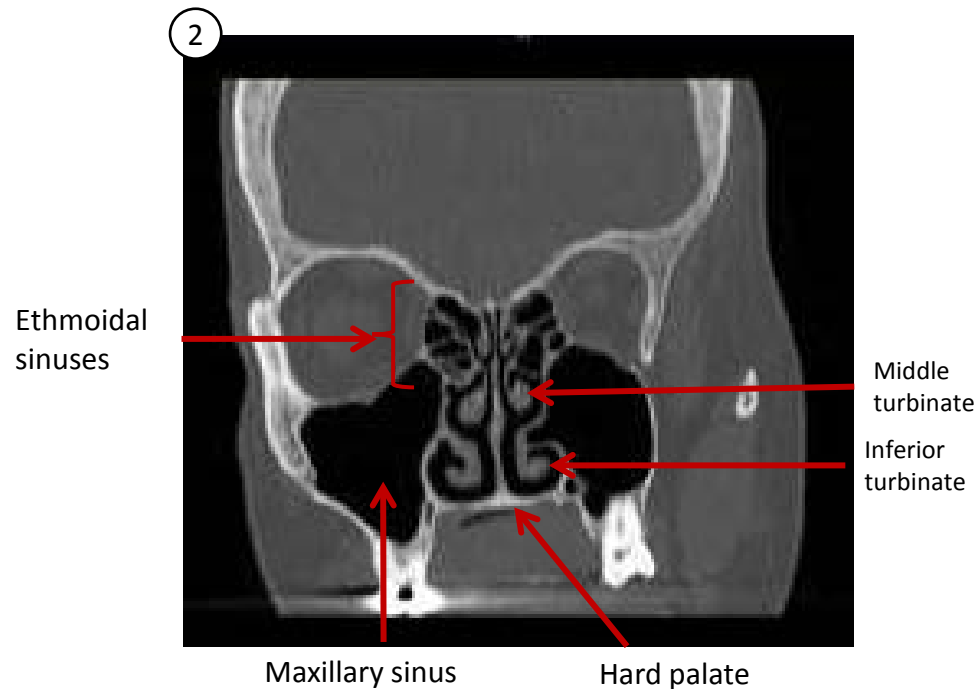
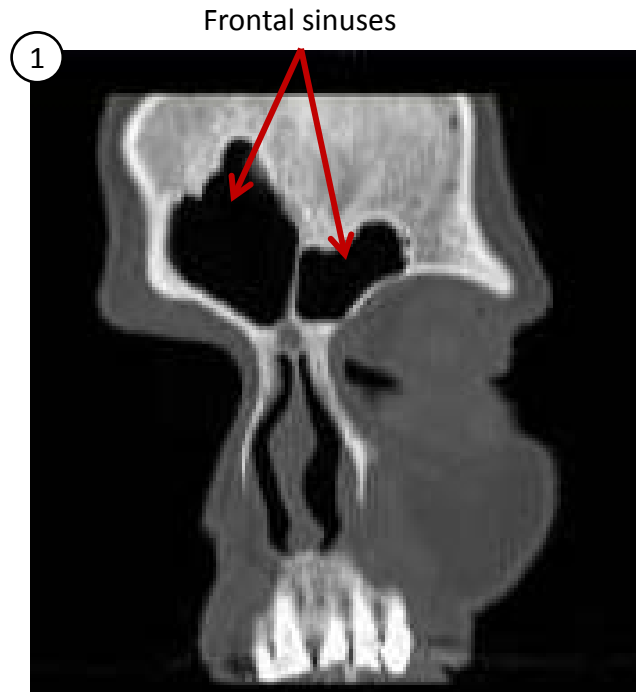
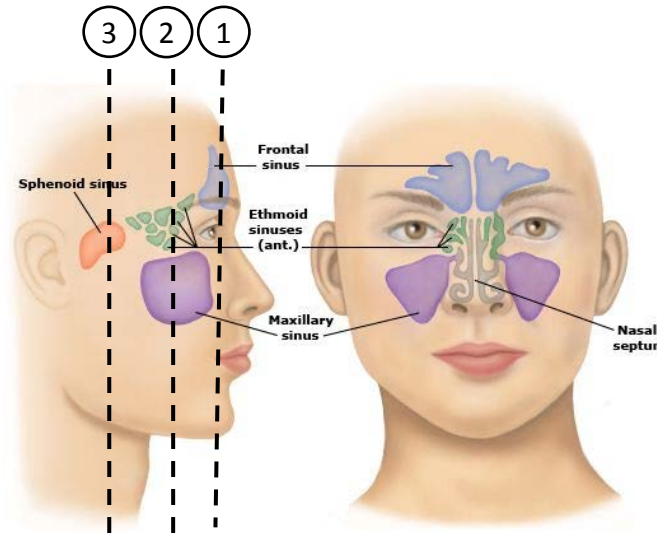
Review: Paranasal Sinus Anatomy

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Axial Plane

Coronal Plane

Sagittal Plane



[Back](#)

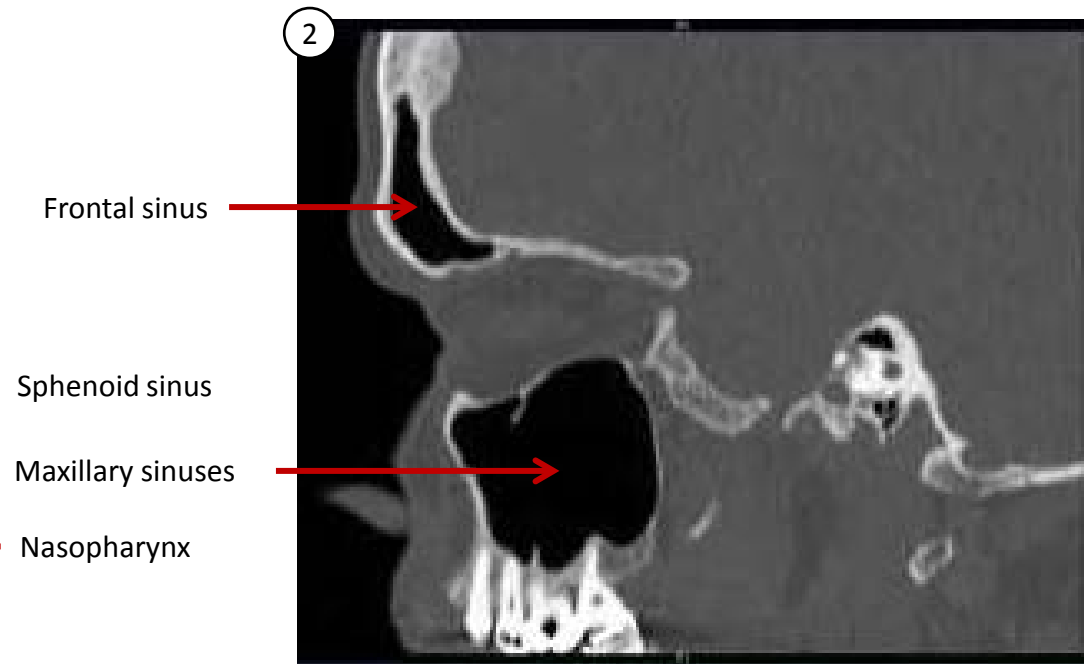
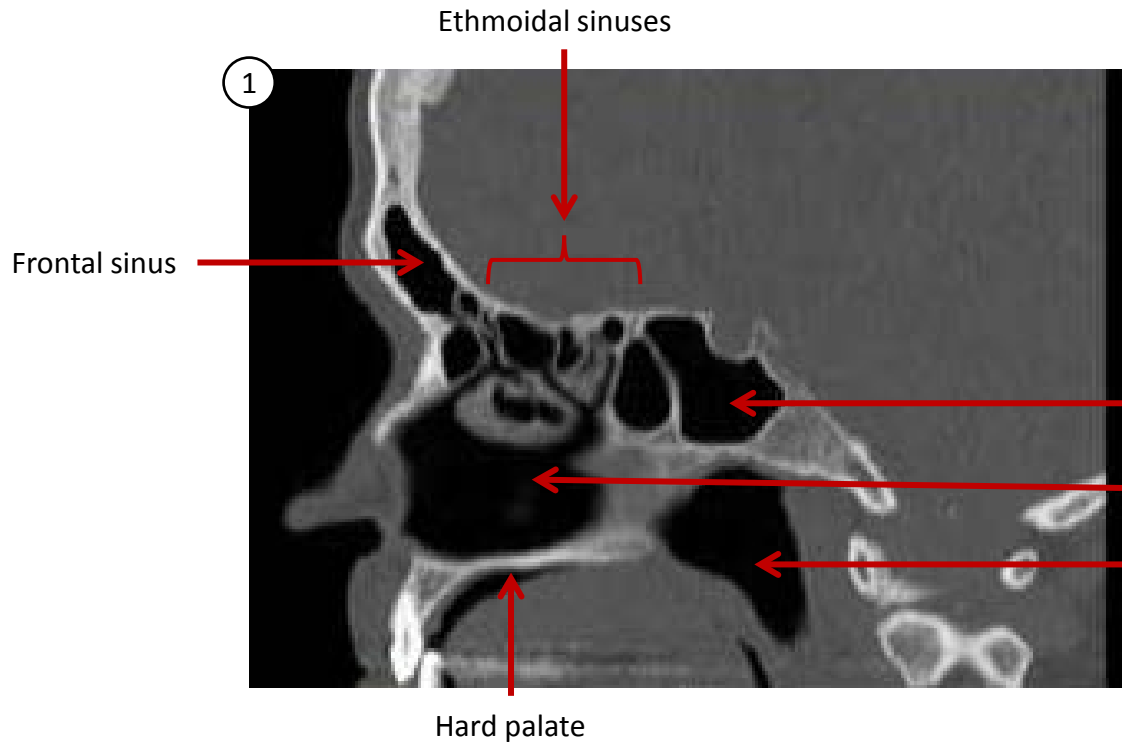
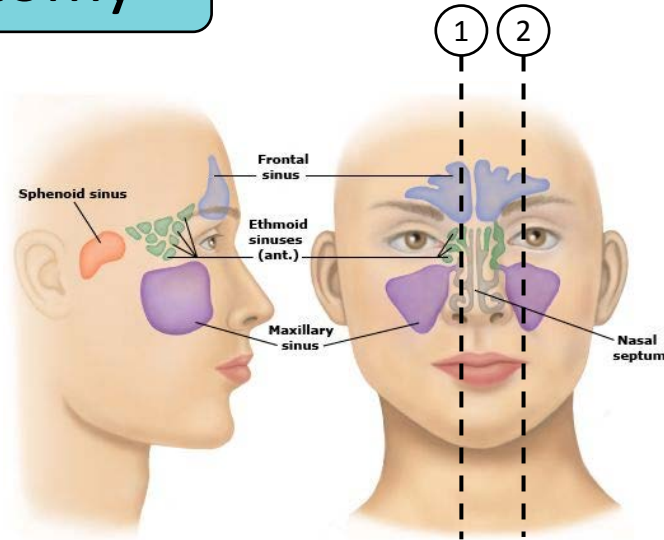
Review: Paranasal Sinus Anatomy

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Axial Plane

Coronal Plane

Sagittal Plane



[Back](#)

Investigations *(Click on the buttons to see investigation results.)*

Head MRI

CT of Paranasal Sinuses

X-ray of Paranasal Sinuses

Endoscopically Guided Culture

Biopsy



Interpretation?

[Continue to Diagnosis](#)

Investigations *(Click on the buttons to see investigation results.)*

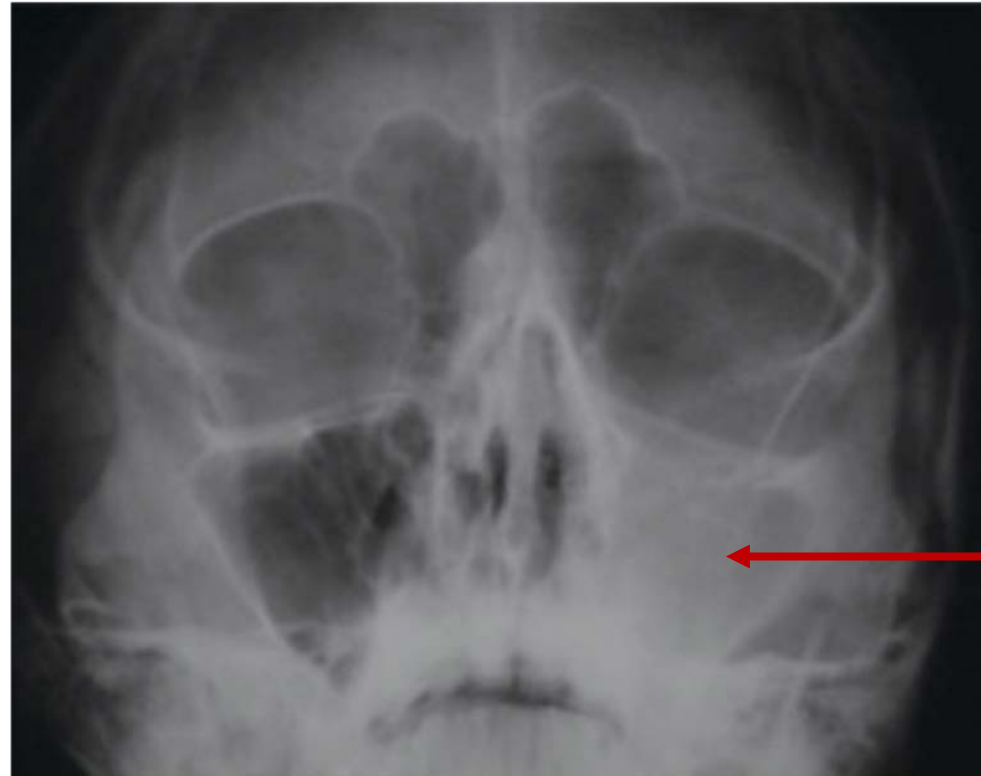
Head MRI

CT of Paranasal Sinuses

X-ray of Paranasal Sinuses

Endoscopically Guided Culture

Biopsy



Opacification
of the left
maxillary sinus

**note: sinus
X-ray is of
limited value*

[Continue to Diagnosis](#)

Investigations (Click on the buttons to see investigation results.)

Head MRI

CT of Paranasal Sinuses

X-ray of Paranasal Sinuses

Endoscopically Guided Culture

Biopsy

White purulent discharge



Results:

Streptococcus pneumoniae

**Note: culture is not required
for this diagnosis*

Continue to Diagnosis

Investigations *(Click on the buttons to see investigation results.)*

Head MRI

CT of Paranasal Sinuses

X-ray of Paranasal Sinuses

Endoscopically Guided Culture

Biopsy

Biopsy not indicated for this patient.

[Continue to Diagnosis](#)

Summary of findings

Chief Complaints:

- 8 day history of bilateral nasal obstruction, secondary to a 1 week cold

Physical Examination:

- Vitals and general inspection: Patient appears moderately unwell
- Cranial nerve exams:
 - CN II – XII were normal
- Ophthalmic exam: normal
- Head & neck exam:
 - Inspection & palpation: normal
 - Oral exam: normal
 - Anterior rhinoscopy:
 - Erythematous, swollen turbinates with white exudate
- Systems review: Normal

Investigations:

- Imaging:
 - Opacity in the left maxillary sinus
- Laboratory:
 - Endoscopically guided culture: Positive for *Streptococcus Pneumoniae*

**Based on your findings,
choose the most likely diagnosis:**

[a. Allergic rhinitis](#)

[b. Nasal polyposis](#)

[c. Rhinitis medicamentosa](#)

[d. Acute bacterial rhinosinusitis](#)

Diagnosis

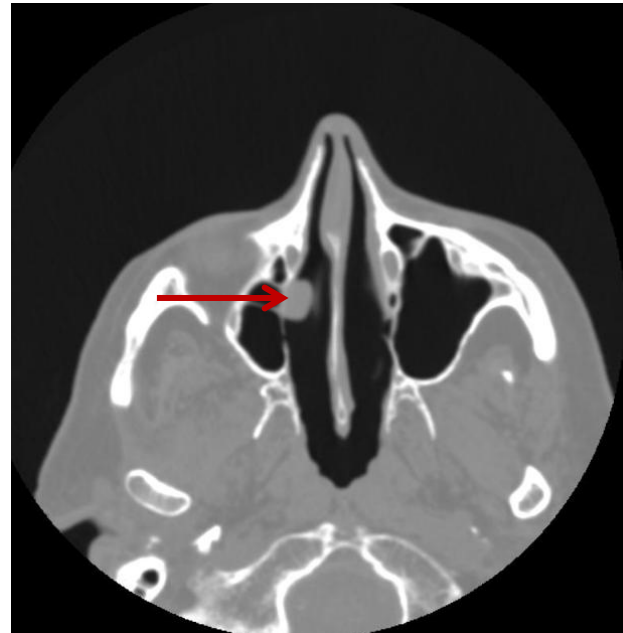
Incorrect. This patient does have some symptoms of allergic rhinitis including congestion and rhinorrhea. However, the patient's symptoms of facial pain and purulent discharge, plus the imaging findings, point to a different diagnosis.

Please choose again.

Diagnosis

Incorrect. Nasal polyps are painless, non-cancerous growths in the nasal cavity, typically found on the lateral wall. Symptoms of nasal polyposis include nasal obstruction, changes in smell, and rhinorrhea. Examination of this patient with anterior rhinoscopy did not reveal any polyps within the nasal cavity. Further, no polyps were seen on imaging.

Please choose a different diagnosis.



Example of a nasal polyp on axial CT.

Diagnosis

Incorrect. Rhinitis medicamentosa is a condition of rebound congestion secondary to prolonged use of topical nasal decongestants. Symptoms include: nasal obstruction, dryness, and irritation. Consequently, the use of topical nasal decongestants should be limited to 3 days.

In this case, the patient had only used Otrivin for 24 hours, which is unlikely to have caused rebound congestion. Further, his other symptoms and imaging findings point to a different diagnosis.

Please choose again.

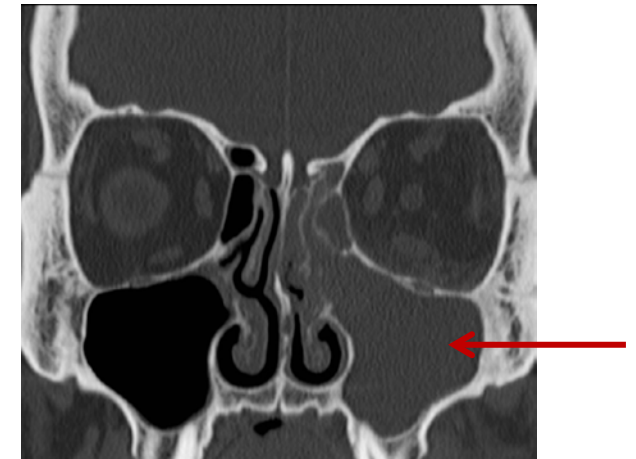
Diagnosis

Correct! This is a case of **acute bacterial rhinosinusitis** given the duration being less than 4 weeks.

This patient had classic symptoms of acute rhinosinusitis, including:

- Facial pain
- Pressure headache
- Nasal discharge
- Decreased sense of smell

Further, imaging revealed opacification in the patient's left maxillary sinus and ethmoidal sinuses.



Now that you have made the correct diagnosis, choose the best treatment for this patient.

Choose the best treatments for this patient:

Medical

Nasal Saline

Topical Antibiotics

Topical Decongestant

Oral Antibiotics

Analgesics

Nasal Steroids

Systemic Steroids

Surgical

Functional Endoscopic Sinus Surgery

Open Sinus Surgery

Choose the best treatments for this patient:

Medical

Nasal Saline

Topical Antibiotics

Topical Decongestant

Oral Antibiotics

Analgesics

Nasal Steroids

Systemic Steroids

Surgical

Functional Endoscopic Sinus Surgery

Open Sinus Surgery

Nasal saline reduces dryness and crusting of the nasal mucosa. It also may improve mucous clearance. Nasal saline may provide symptomatic relief for this patient, and may be prescribed at the physician’s discretion.

Choose the best treatments for this patient:

Medical

Nasal Saline

Topical Antibiotics

Topical Decongestant

Oral Antibiotics

Analgesics

Nasal Steroids

Systemic Steroids

Surgical

Functional Endoscopic Sinus Surgery

Open Sinus Surgery

A brief (**3 day**) course of a topical decongestant (such as topical oxymetazoline) may be given for symptomatic relief. Care must be taken due to the risk of rebound mucosal swelling (**rhinitis medicamentosa**). This would be recommended only under the physician’s discretion.

Choose the best treatments for this patient:

Medical

Nasal Saline

Topical Antibiotics

Topical Decongestant

Oral Antibiotics

Analgesics

Nasal Steroids

Systemic Steroids

Surgical

Functional Endoscopic Sinus Surgery

Open Sinus Surgery

Over the counter analgesics, such as acetaminophen or nonsteroidal anti-inflammatory medications, are helpful in treating associated discomfort.

Choose the best treatments for this patient:

Medical

Nasal Saline

Topical Antibiotics

Topical Decongestant

Oral Antibiotics

Analgesics

Nasal Steroids

Systemic Steroids

Surgical

Functional Endoscopic Sinus Surgery

Open Sinus Surgery

Topical antibiotics (such as gentamicin irrigation) may be considered in refractory cases. They would not be used in this case.

Choose the best treatments for this patient:

Medical

Nasal Saline

Topical Antibiotics

Topical Decongestant

Oral Antibiotics

Analgesics

Nasal Steroids

Systemic Steroids

Surgical

Functional Endoscopic Sinus Surgery

Open Sinus Surgery

Oral antibiotics are the **primary** treatment for acute bacterial rhinosinusitis. First-line therapy is amoxicillin with or without clavulanate for 10 days

Choose the best treatments for this patient:

Medical

Nasal Saline

Topical Antibiotics

Topical Decongestant

Oral Antibiotics

Analgesics

Nasal Steroids

Systemic Steroids

Surgical

Functional Endoscopic Sinus Surgery

Open Sinus Surgery

Nasal steroids are typically only prescribed for chronic rhinosinusitis. They would not be useful in this case.

Choose the best treatments for this patient:

Medical

Nasal Saline

Topical Antibiotics

Topical Decongestant

Oral Antibiotics

Analgesics

Nasal Steroids

Systemic Steroids

Surgical

Functional Endoscopic
Sinus Surgery

Open Sinus Surgery

Systemic steroids are used primarily to decrease mucosal inflammation in those patients with nasal polyps that are longstanding.

Choose the best treatments for this patient:

Medical

Nasal Saline

Topical Antibiotics

Topical Decongestant

Oral Antibiotics

Analgesics

Nasal Steroids

Systemic Steroids

Surgical

Functional Endoscopic
Sinus Surgery

Open Sinus Surgery

FESS is indicated only for select patients who fail thorough medical management. FESS would not be considered at this stage of the management of this patient.

Choose the best treatments for this patient:

Medical

Nasal Saline

Topical Antibiotics

Topical Decongestant

Oral Antibiotics

Analgesics

Nasal Steroids

Systemic Steroids

Surgical

Functional Endoscopic Sinus Surgery

Open Sinus Surgery

This is rarely used today, and would not be considered in this patient at this time.

Quiz – Q1

Where does the maxillary sinus drain in the nasal cavity?

- a. [Sphenoethmoidal recess](#)
- b. [Superior meatus](#)
- c. [Middle meatus](#)
- d. [Inferior meatus](#)

Quiz – Q1

Where does the maxillary sinus drain in the nasal cavity?

- a. [Sphenoethmoidal recess](#)
- b. [Superior meatus](#)
- c. [Middle meatus](#)
- d. [Inferior meatus](#)

Incorrect. The sphenoid sinus drains into the sphenoethmoidal recess.

Quiz – Q1

Where does the maxillary sinus drain in the nasal cavity?

- a. [Sphenoethmoidal recess](#)
- b. [Superior meatus](#)
- c. [Middle meatus](#)
- d. [Inferior meatus](#)

Incorrect. The paranasal sinuses do not drain into the superior meatus.

Quiz – Q1

Where does the maxillary sinus drain in the nasal cavity?

- a. [Sphenoethmoidal recess](#)
- b. [Superior meatus](#)
- c. [Middle meatus](#)
- d. [Inferior meatus](#)

Correct! The maxillary sinus drains into the semilunar hiatus found in the middle meatus. The frontal sinus and ethmoidal sinuses also drain into the semilunar hiatus.

Quiz – Q1

Where does the maxillary sinus drain in the nasal cavity?

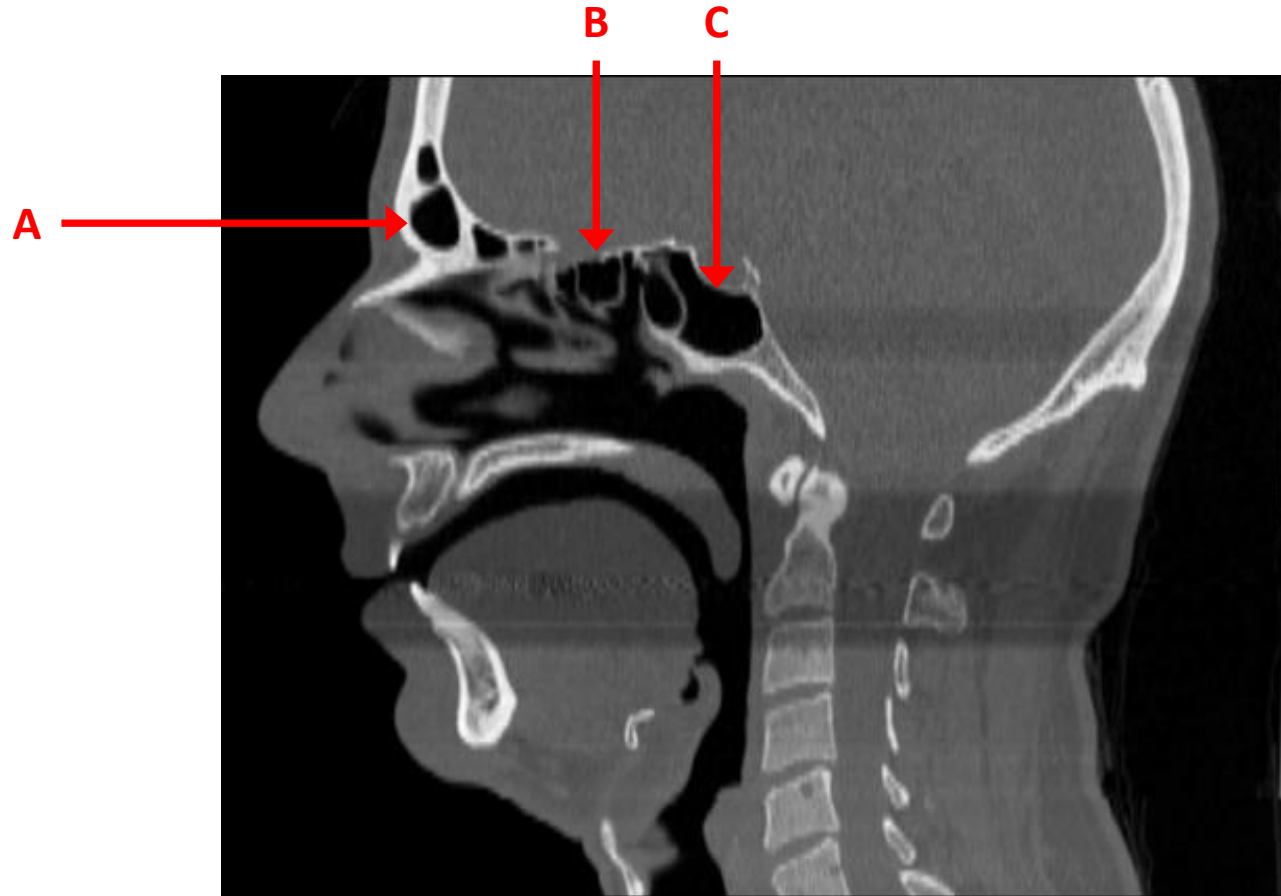
- a. [Sphenoethmoidal recess](#)
- b. [Superior meatus](#)
- c. [Middle meatus](#)
- d. [Inferior meatus](#)

Incorrect. The nasolacrimal duct drains into the inferior meatus.

Quiz – Q2

Identify the sphenoid sinus on this CT scan.

- a. A
- b. B
- c. C

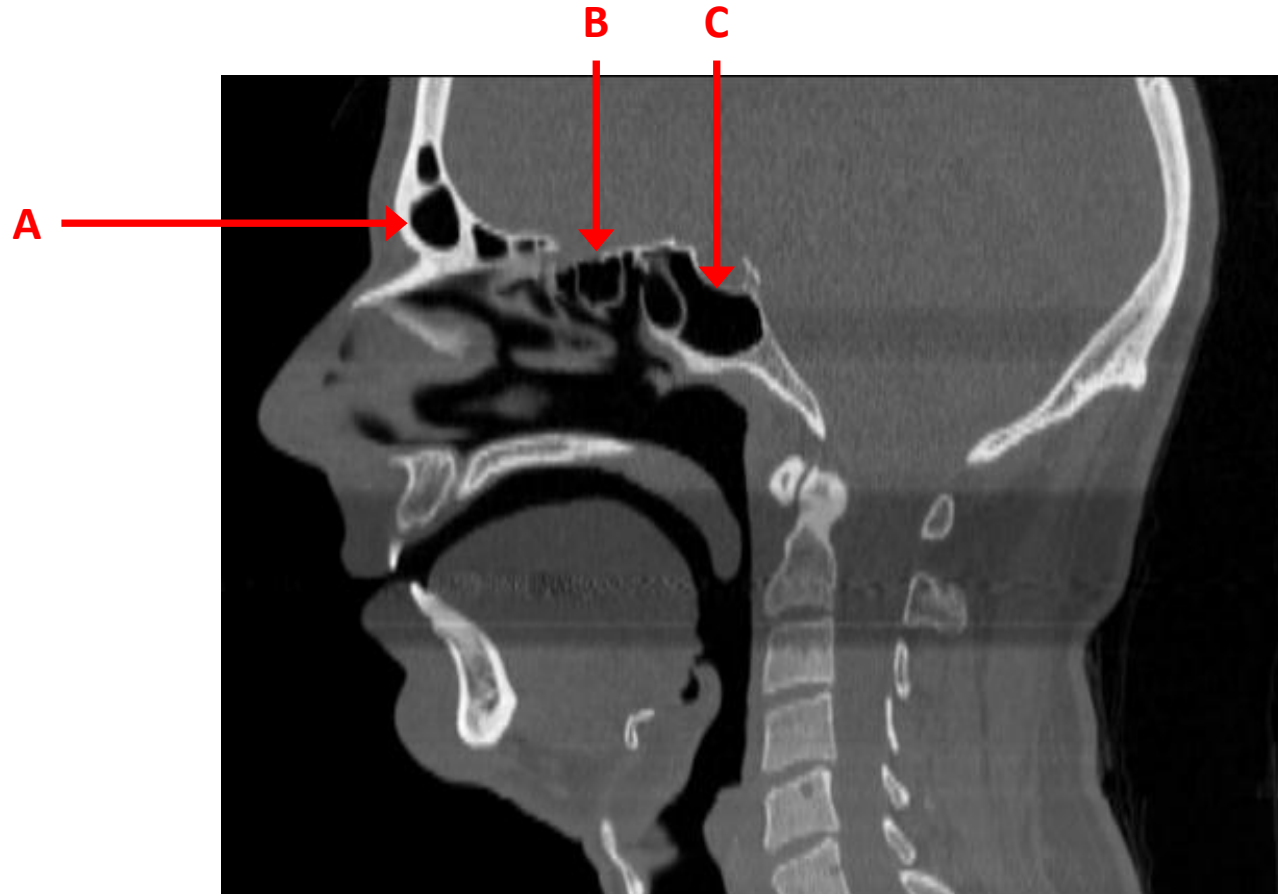


Quiz – Q2

Identify the sphenoid sinus on this CT scan.

- a. A
- b. B
- c. C

Incorrect. A is the frontal sinus.

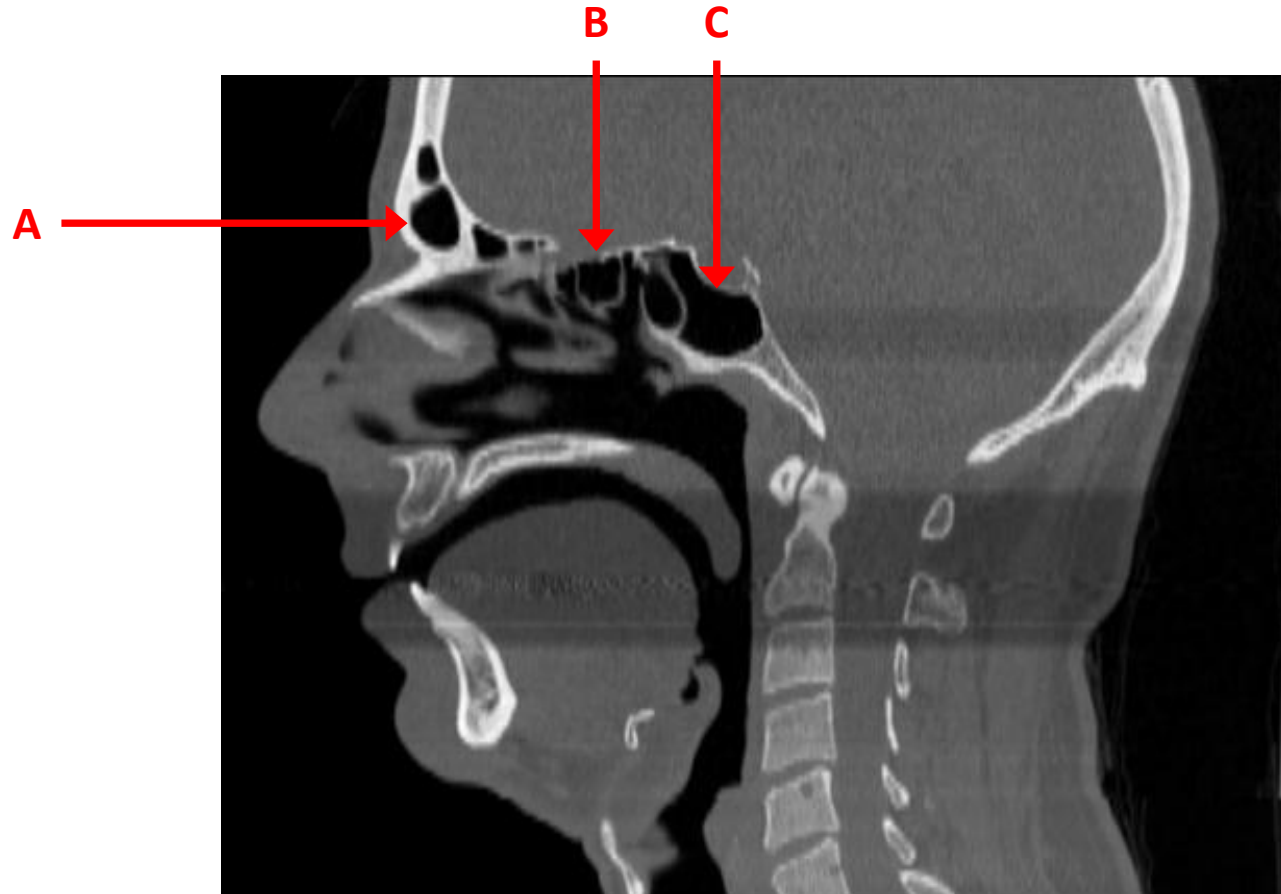


Quiz – Q2

Identify the sphenoid sinus on this CT scan.

- a. A
- b. B
- c. C

Incorrect. B is an ethmoidal sinus.

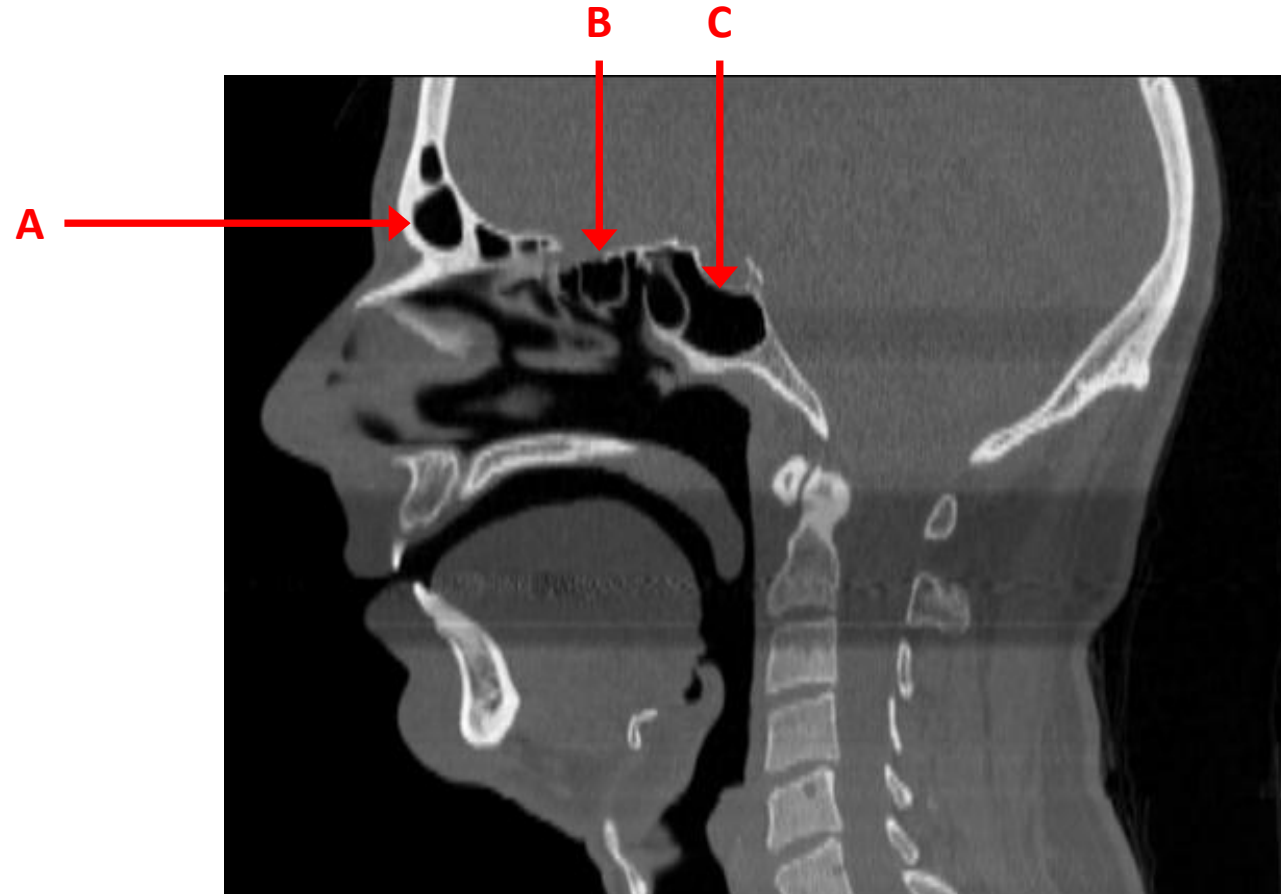


Quiz – Q2

Identify the sphenoid sinus on this CT scan.

- a. A
- b. B
- c. C

Correct!



Quiz – Q3

Which of the following is NOT a typical symptom of acute rhinosinusitis?

- a. [Poor sense of smell](#)
- b. [Obstruction](#)
- c. [Discharge](#)
- d. [Vision changes](#)
- e. [All of the above are typical symptoms of acute rhinosinusitis.](#)

Quiz – Q3

Which of the following is NOT a typical symptom of acute rhinosinusitis?

a. Poor sense of smell

b. Obstruction

c. Discharge

d. Vision changes

e. All of the above are typical symptoms of acute rhinosinusitis.

Incorrect. When recalling the symptoms of acute bacterial rhinosinusitis, think “**PODS**”:

- Facial **P**ain/pressure/fullness
- Nasal **O**bstruction
- Nasal purulence/discoloured **D**ischarge
- **S**mell disorder (hyposmia/anosmia)

**Patient should have at least 2 of the PODS symptoms, one of which must be “O” or “D”*

Quiz – Q3

Which of the following is NOT a typical symptom of acute rhinosinusitis?

a. Poor sense of smell

b. Obstruction

c. Discharge

d. Vision changes

e. All of the above are typical symptoms of acute rhinosinusitis.

Incorrect. When recalling the symptoms of acute bacterial rhinosinusitis, think “**PODS**”:

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- Nasal purulence/discoloured **D**ischarge
- **S**mell disorder (hyposmia/anosmia)

**Patient should have at least 2 of the PODS symptoms, one of which must be “O” or “D”*

Quiz – Q3

Which of the following is NOT a typical symptom of acute rhinosinusitis?

a. [Poor sense of smell](#)

b. [Obstruction](#)

c. [Discharge](#)

d. [Vision changes](#)

e. [All of the above are typical symptoms of acute rhinosinusitis.](#)

Incorrect. When recalling the symptoms of acute bacterial rhinosinusitis, think “**PODS**”:

- Facial **P**ain/pressure/fullness
- Nasal **O**bstruction
- Nasal purulence/dicoloured **D**ischarge
- **S**mell disorder (hyposmia/anosmia)

**Patient should have at least 2 of the PODS symptoms, one of which must be “O” or “D”*

Quiz – Q3

Which of the following is **NOT** a typical symptom of acute rhinosinusitis?

- a. Poor sense of smell
- b. Obstruction
- c. Discharge
- d. Vision changes
- e. All of the above are typical symptoms of acute rhinosinusitis.

Correct! Vision changes are not a typical symptom of rhinosinusitis. However, orbital complications may arise from rhinosinusitis, caused by acute spread of infection from an adjacent sinus.



Quiz – Q3

Which of the following is NOT a typical symptom of acute rhinosinusitis?

a. Poor sense of smell

b. Obstruction

c. Discharge

d. Vision changes

e. All of the above are typical symptoms of acute rhinosinusitis.

Incorrect. When recalling the symptoms of acute bacterial rhinosinusitis, think “**PODS**”:

- Facial **P**ain/pressure/fullness
- Nasal **O**bstruction
- Nasal purulence/discoloured **D**ischarge
- **S**mell disorder (hyposmia/anosmia)

**Patient should have at least 2 of the PODS symptoms, one of which must be “O” or “D”*

Quiz – Q4

What is the first-line therapy for acute rhinosinusitis?

- a. [Topical decongestants](#)
- b. [Systemic decongestants](#)
- c. [Nasal steroids](#)
- d. [Oral antibiotics](#)

Quiz – Q4

What is the first-line therapy for acute rhinosinusitis?

- a. [Topical decongestants](#)
- b. [Systemic decongestants](#)
- c. [Nasal steroids](#)
- d. [Oral antibiotics](#)

Incorrect. Nasal decongestants are not the primary therapy for acute rhinosinusitis. A brief (**3 day**) course of a topical decongestant (such as topical oxymetazoline) may be given for symptomatic relief. Care must be taken due to the risk of rebound mucosal swelling (**rhinitis medicamentosa**).

Quiz – Q4

What is the first-line therapy for acute rhinosinusitis?

- a. [Topical decongestants](#)
- b. [Systemic decongestants](#)
- c. [Nasal steroids](#)
- d. [Oral antibiotics](#)

Incorrect. While systemic decongestants may provide symptomatic relief, they are not the primary therapy for acute rhinosinusitis.

Quiz – Q4

What is the first-line therapy for acute rhinosinusitis?

- a. [Topical decongestants](#)
- b. [Systemic decongestants](#)
- c. [Nasal steroids](#)
- d. [Oral antibiotics](#)

Incorrect. Mild rhinosinusitis symptoms of less than seven days duration can be managed with supportive care, including analgesics, short-term decongestants, saline nasal irrigation, and intranasal corticosteroids

Quiz – Q4

What is the first-line therapy for acute rhinosinusitis?

- a. [Topical decongestants](#)
- b. [Systemic decongestants](#)
- c. [Nasal steroids](#)
- d. [Oral antibiotics](#)

Correct! Oral antibiotics are the **primary** treatment for acute rhinosinusitis. First-line therapy is amoxicillin with or without clavulanate for 10 days.

Continue

Congratulations! You have finished the nasal obstruction module.

Key points to remember:

- Acute rhinosinusitis is the inflammation of the mucosa of the paranasal sinuses and nasal cavity
 - It is often preceded by viral rhinitis/upper respiratory infection, which causes inflammation and obstruction of sinus outflow tracts

Pathogens of acute rhinosinusitis include:

- Viral (most common): rhinovirus, parainfluenza virus, RSV
- Bacterial: *S. pneumoniae*, *H. influenza*, *M. catarrhalis*
- Fungal

Diagnosis:

- For acute bacterial rhinosinusitis, think “PODS”:
 - Facial **P**ain/pressure/fullness
 - Nasal **O**bsturbation
 - Nasal purulence/dicoloured **D**ischarge
 - **S**mell disorder (hyposmia/anosmia)
- Patient should have at least 2 of the PODS symptoms, one of which must be O or D
- Direct visualization with endoscopy

Imaging:

- Radiographic imaging should not be used for routine evaluation of acute rhinosinusitis

Treatment:

- Antibiotics: amoxicillin with or without clavulanate
- Adjunctive treatments: Nasal saline, decongestants (*limit topical decongestants to 3 days), analgesics, intranasal corticosteroid

Module Review Sections

Anatomy:

Nasal Cavity Anatomy

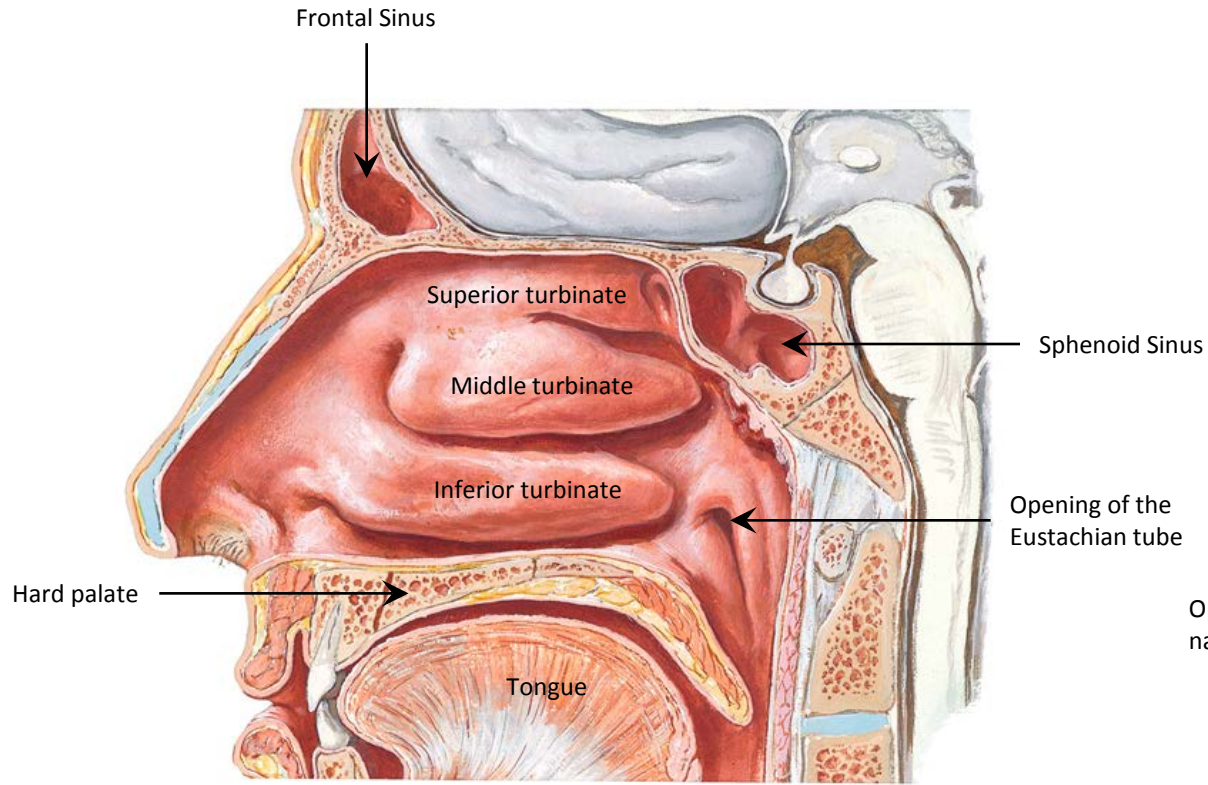
Paranasal Sinus Anatomy

Continue

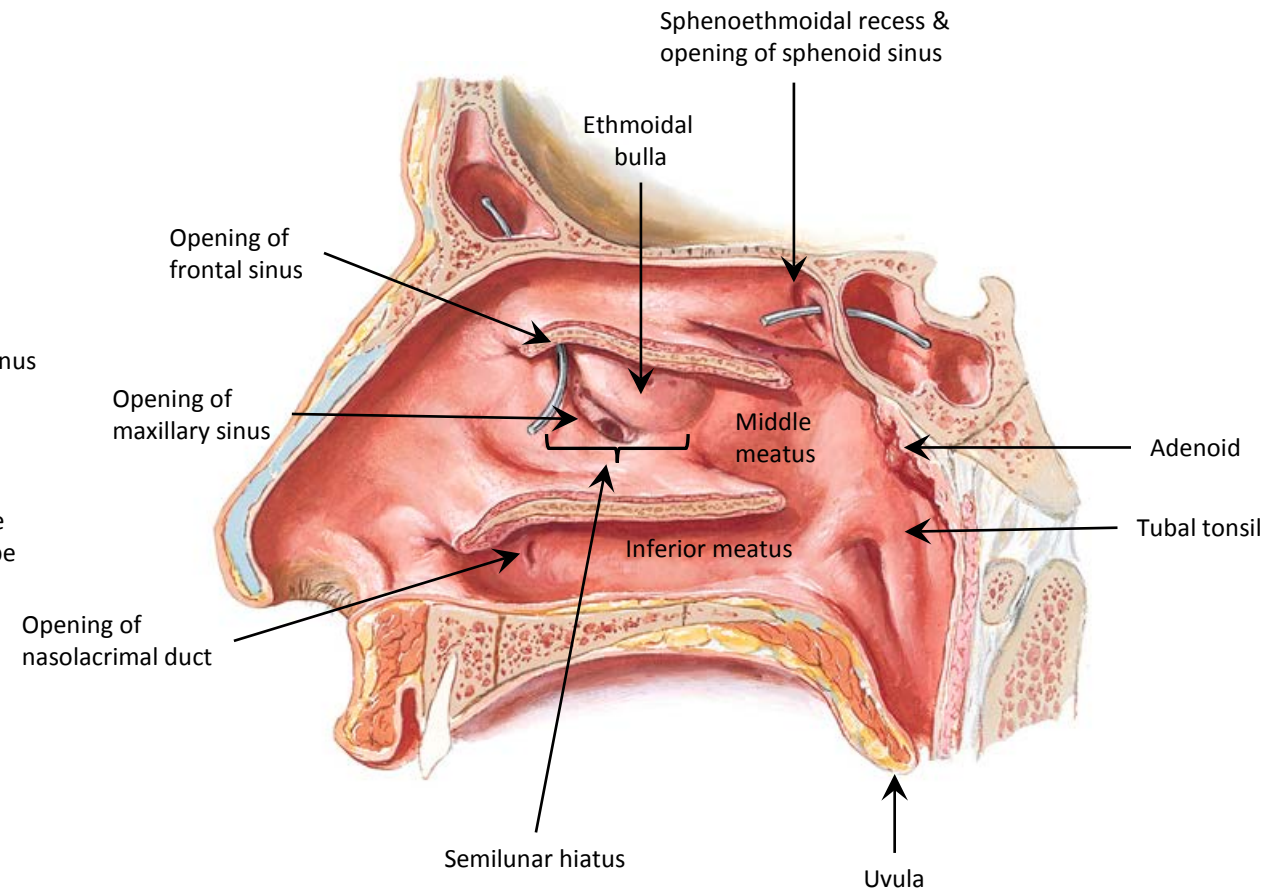
Review: Nasal Cavity Anatomy

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Lateral wall of nasal cavity – Sagittal view



F. Netter M.D.



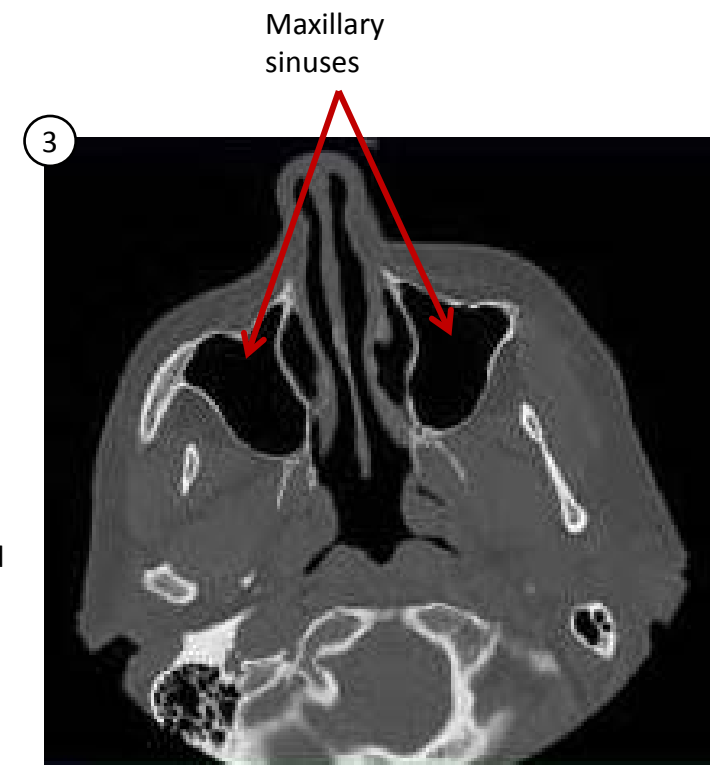
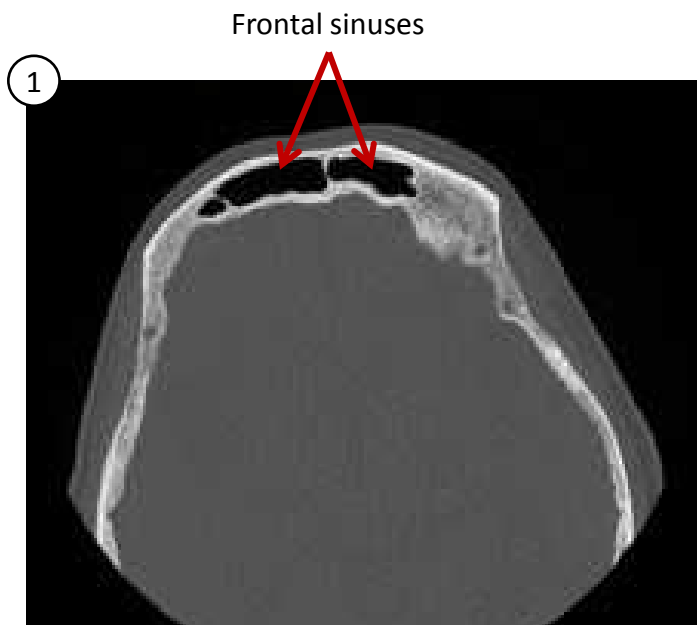
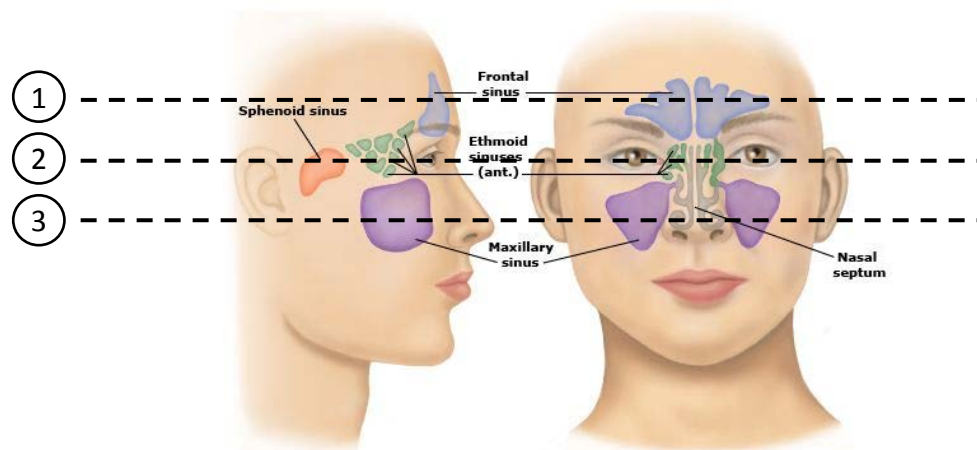
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Axial Plane

Coronal Plane

Sagittal Plane



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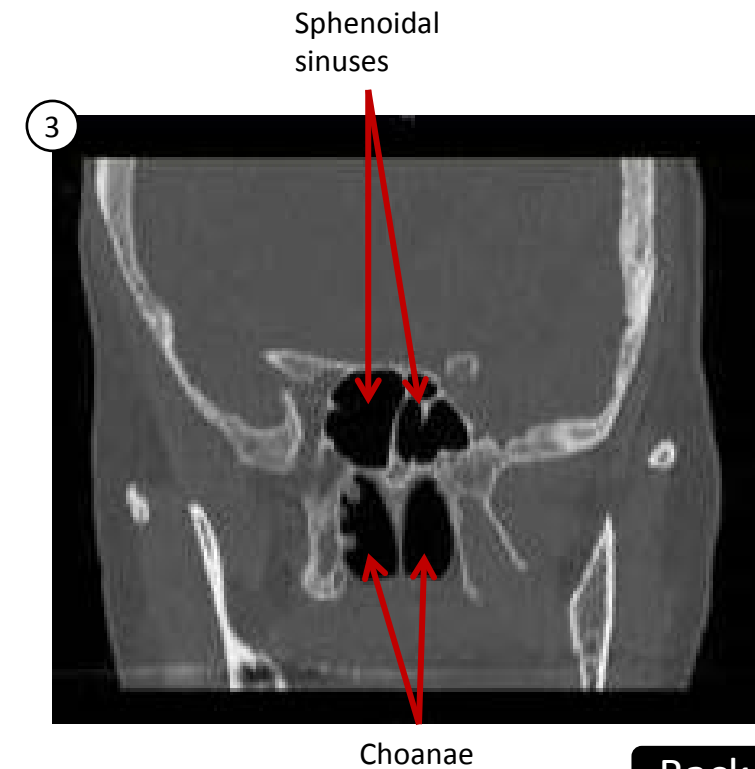
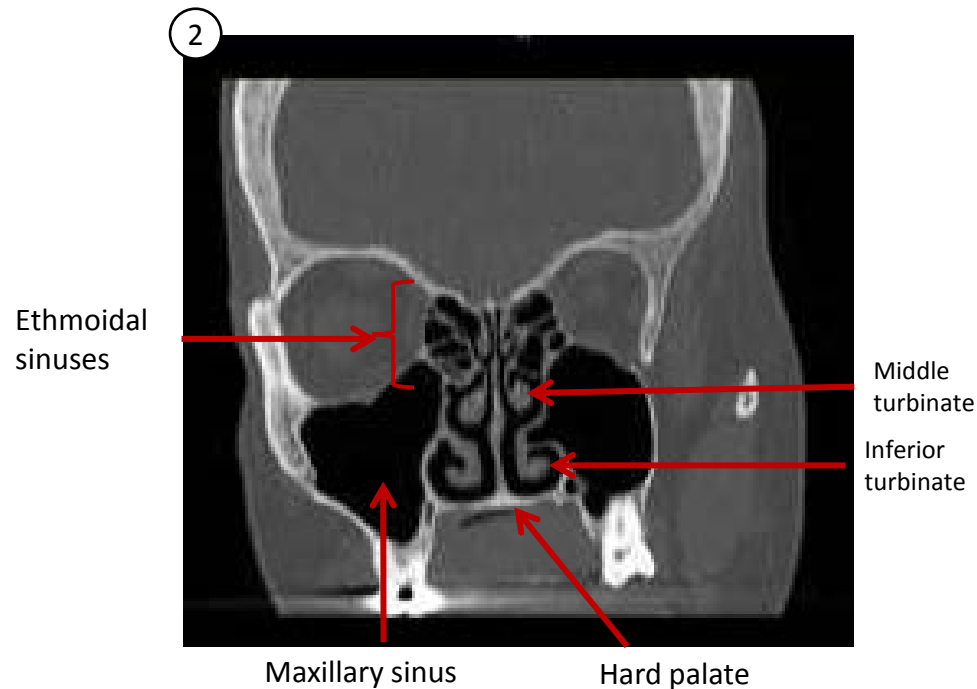
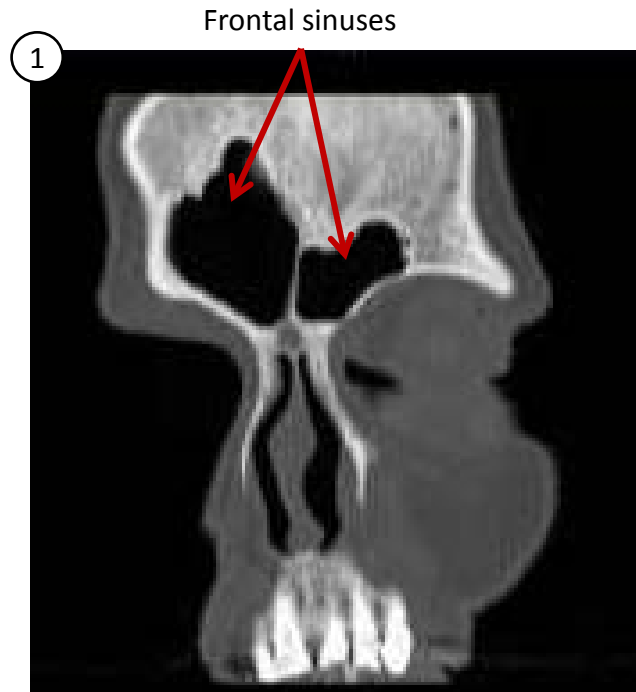
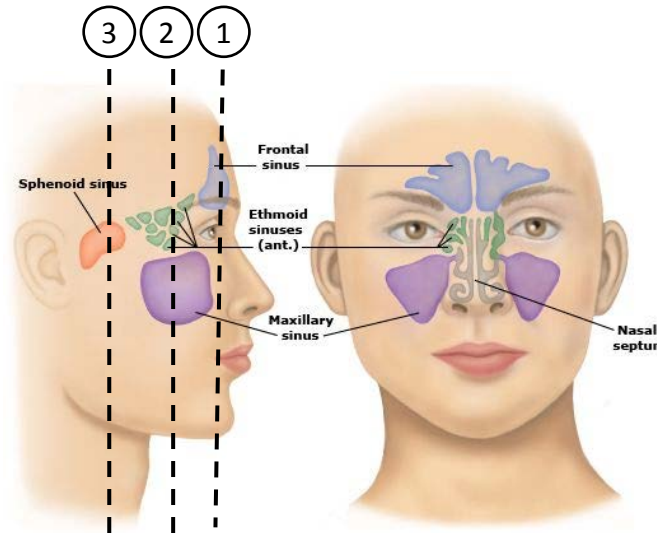
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Axial Plane

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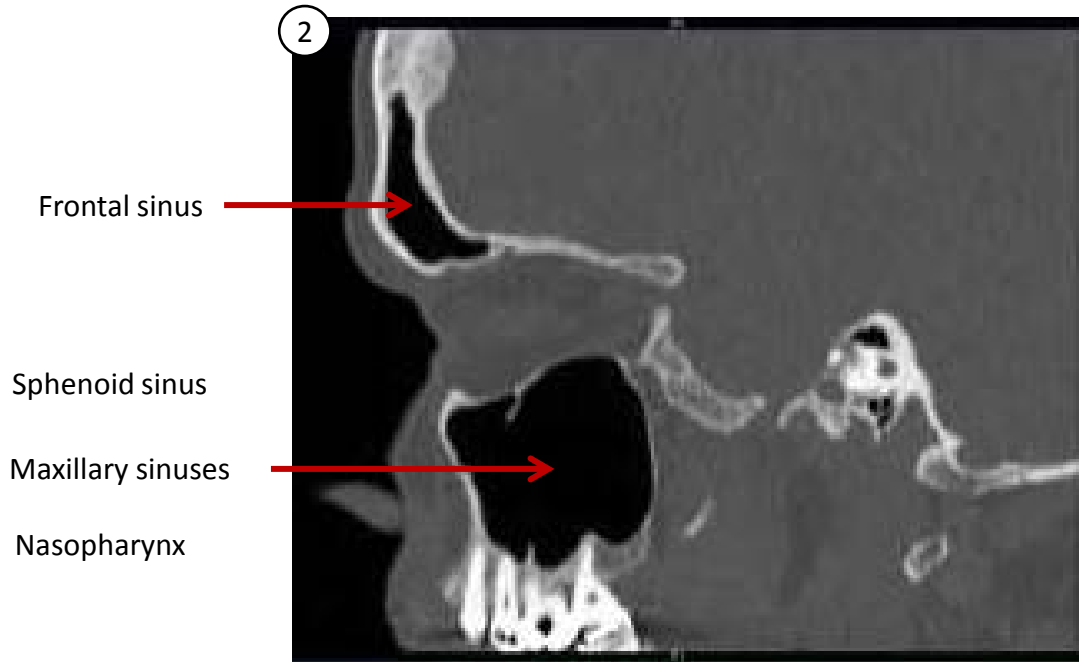
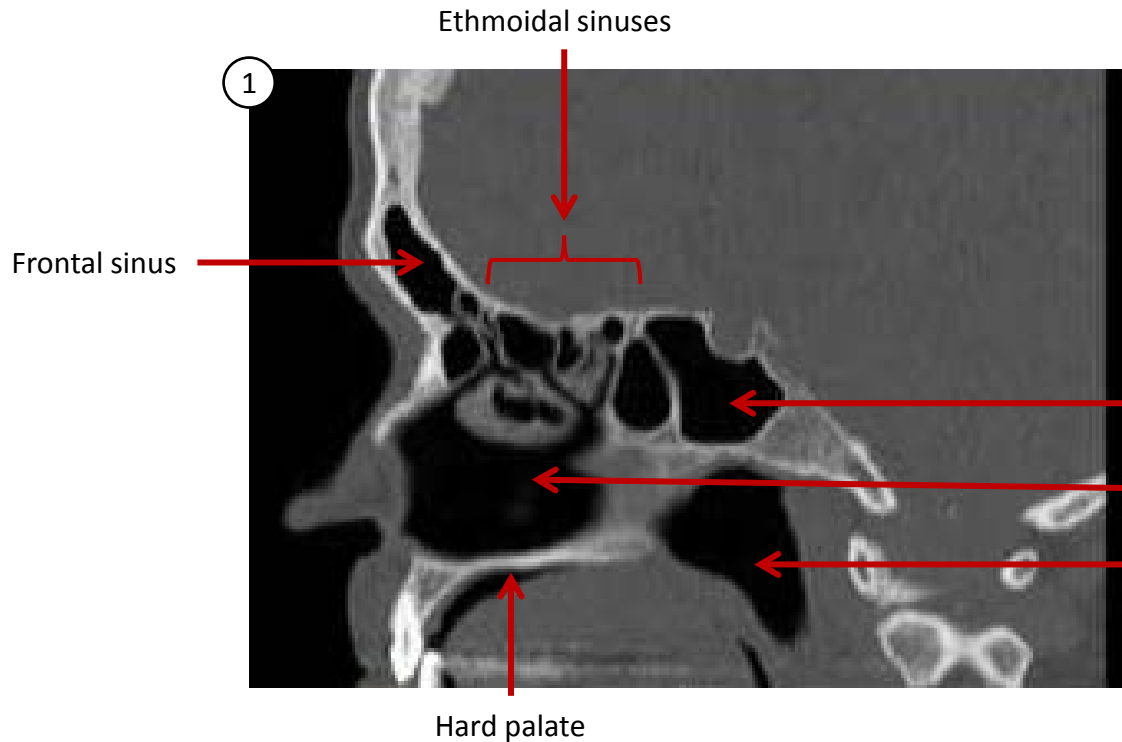
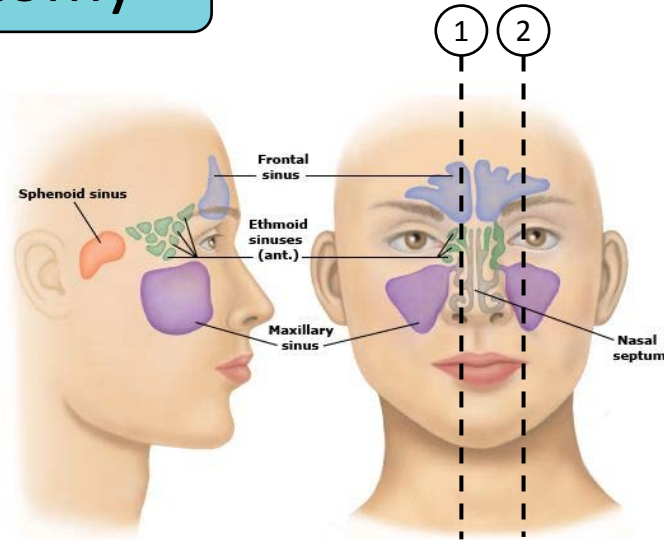
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Axial Plane

Coronal Plane

Sagittal Plane



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