Self-Paced Sinusitis Learning Module for Medical Students: Improving Otolaryngology Knowledge Across All Future Specialties

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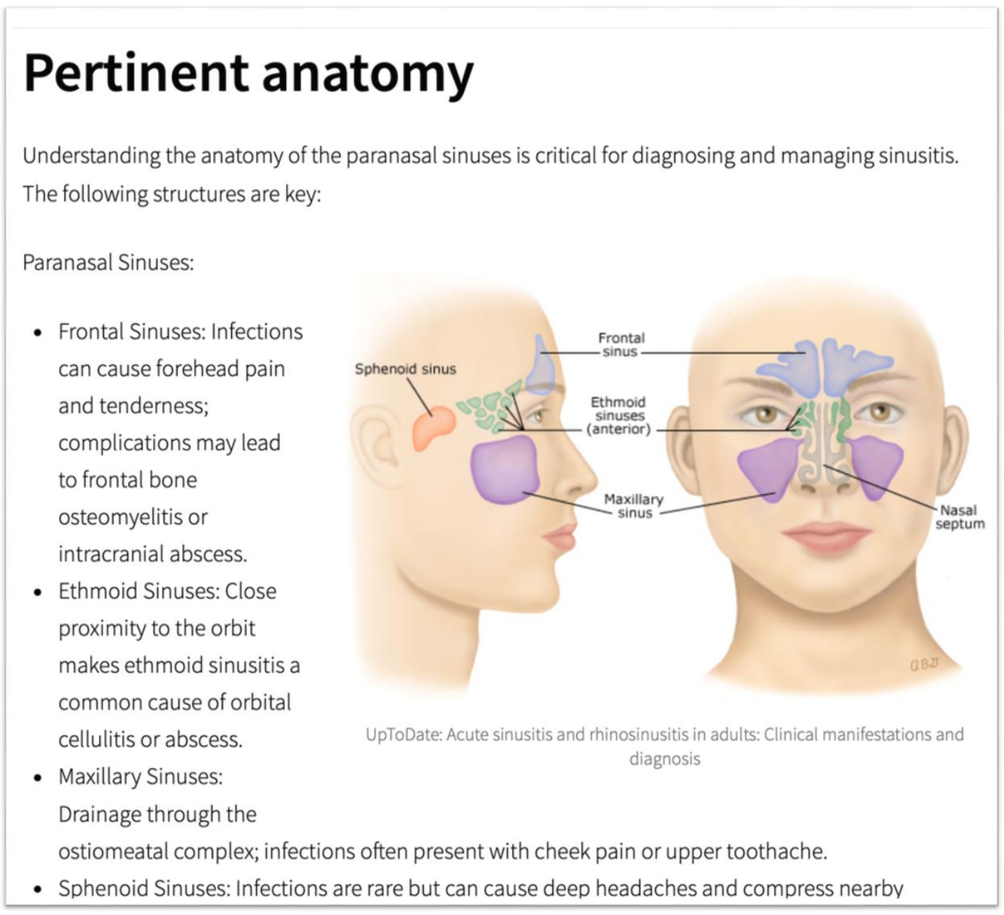
Background: 25% of adult and 50% of pediatric primary care visits are ENT-related, but most medical schools lack an ENT curriculum, contributing to future primary care physician unfamiliarity with basic ENT clinical practice guidelines.[1-4]

Aim: Assess and enhance medical students' exposure through an online learning module to a common ENT complaint (sinusitis)

Methods

Development of Learning Module

1. Self-paced online sinusitis module to 29 medical students
   - Learning objectives: relevant anatomy, differential diagnosis, workup, warning signs, when to refer, prognosis, treatment



Pertinent anatomy

Understanding the anatomy of the paranasal sinuses is critical for diagnosing and managing sinusitis. The following structures are key:

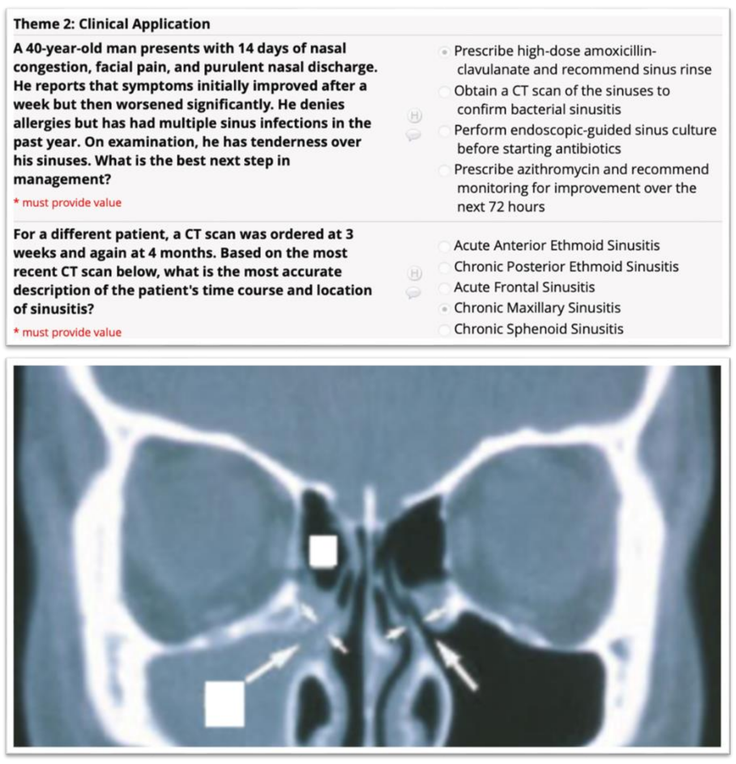
Paranasal Sinuses:

- Frontal Sinuses: Infections can cause forehead pain and tenderness; complications may lead to frontal bone osteomyelitis or intracranial abscess.
- Ethmoid Sinuses: Close proximity to the orbit makes ethmoid sinusitis a common cause of orbital cellulitis or abscess.
- Maxillary Sinuses: Drainage through the ostiomeatal complex; infections often present with cheek pain or upper toothache.
- Sphenoid Sinuses: Infections are rare but can cause deep headaches and compress nearby

UpToDate: Acute sinusitis and rhinosinusitis in adults: Clinical manifestations and diagnosis

Pre- and Post-Module Assessments

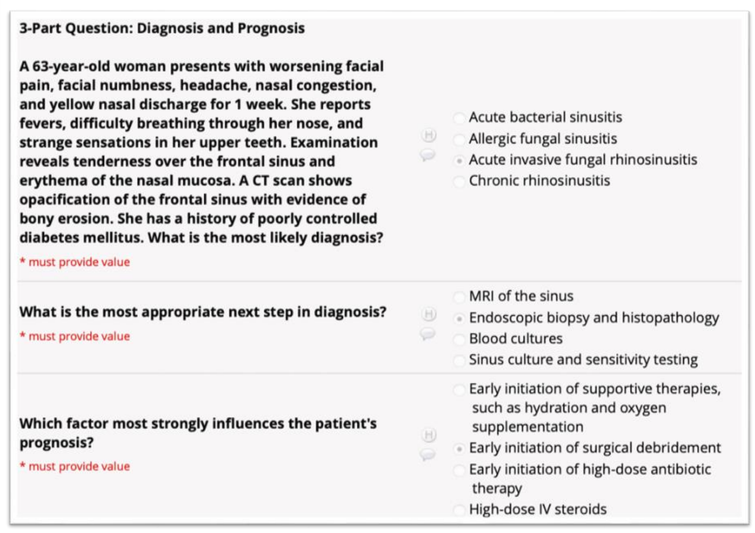
2. Demographics: year of study, specialty of interest, ENT exposure, clerkships/USMLE exams
   - Assessment: 10 multiple-choice questions incorporating pathophysiology and clinical scenarios administered before and after completing the module.
   - Pre- and post-intervention scores were compared using a paired t-test.



Theme 2: Clinical Application

A 40-year-old man presents with 14 days of nasal congestion, facial pain, and purulent nasal discharge. He reports that symptoms initially improved after a week but then worsened significantly. He denies allergies but has had multiple sinus infections in the past year. On examination, he has tenderness over his sinuses. What is the best next step in management?
* must provide value
- Prescribe high-dose amoxicillin-clavulanate and recommend sinus rinse
- Obtain a CT scan of the sinuses to confirm bacterial sinusitis
- Perform endoscopic-guided sinus culture before starting antibiotics
- Prescribe azithromycin and recommend monitoring for improvement over the next 72 hours

For a different patient, a CT scan was ordered at 3 weeks and again at 4 months. Based on the most recent CT scan below, what is the most accurate description of the patient's time course and location of sinusitis?
* must provide value
- Acute Anterior Ethmoid Sinusitis
- Chronic Posterior Ethmoid Sinusitis
- Acute Frontal Sinusitis
- Chronic Maxillary Sinusitis
- Chronic Sphenoid Sinusitis



3-Part Question: Diagnosis and Prognosis

A 63-year-old woman presents with worsening facial pain, facial numbness, headache, nasal congestion, and yellow nasal discharge for 1 week. She reports fevers, difficulty breathing through her nose, and strange sensations in her upper teeth. Examination reveals tenderness over the frontal sinus and erythema of the nasal mucosa. A CT scan shows opacification of the frontal sinus with evidence of bony erosion. She has a history of poorly controlled diabetes mellitus. What is the most likely diagnosis?
* must provide value
- Acute bacterial sinusitis
- Allergic fungal sinusitis
- Acute invasive fungal rhinosinusitis
- Chronic rhinosinusitis

What is the most appropriate next step in diagnosis?
* must provide value
- MRI of the sinus
- Endoscopic biopsy and histopathology
- Blood cultures
- Sinus culture and sensitivity testing

Which factor most strongly influences the patient's prognosis?
* must provide value
- Early initiation of supportive therapies, such as hydration and oxygen supplementation
- Early initiation of surgical debridement
- Early initiation of high-dose antibiotic therapy
- High-dose IV steroids

Results

Baseline Demographics

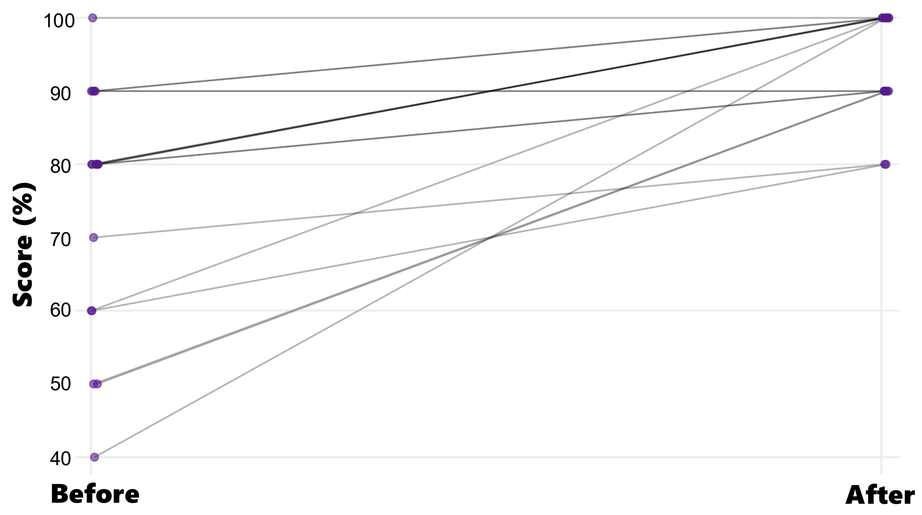
Pre- and Post-Module Assessments

Table 1. Respondent Characteristics and Assessment Performance

Variable	N (%)
Year in Medical School	
MS1	2 (6.9%)
MS2	4 (13.8%)
MS3	14 (48.3%)
MS4	5 (17.2%)
Dual degree (PhD, MBA, MPH)	3 (10.3%)
Current Specialty of Interest	
Internal Medicine	3 (10.3%)
Emergency Medicine	2 (6.9%)
General Surgery	2 (6.9%)
OBGYN	2 (6.9%)
Otolaryngology	8 (27.6%)
Other Surgical Subspecialty	6 (20.7%)
Radiology	3 (10.3%)
Psychiatry	2 (6.9%)
Undecided	1 (3.4%)
Board Exams Taken	
USMLE Step 1	20 (69.0%)
USMLE Step 2	20 (69.0%)
None	6 (20.7%)

Variable	N (%)
ENT Exposure	
2-week ENT Elective	10 (34.5%)
4-week ENT Elective	5 (17.2%)
Clinical Shadowing	7 (24.1%)
Operating Room shadowing	10 (34.5%)
ENT interest group member	12 (41.4%)
None	11 (37.9%)
Other	6 (20.7%)
Completed Clinical Clerkships	
Internal Medicine	25 (86.2%)
OBGYN	24 (82.8%)
Pediatrics	24 (82.8%)
Surgery	26 (89.7%)
Neurology	22 (75.9%)
Psychiatry	23 (79.3%)
None	2 (6.9%)
Module	
Median [IQR] duration (minutes)	8 [5.0-10.0]
Median [IQR] pre-intervention score	80% [60-90%]
Median [IQR] post-intervention score	90% [90-100%]
Median [IQR] score change	+10% [+10-20%], p<.001

Figure 1. Pre- and Post-Intervention Scores



Conclusion: Despite students completing most core clerkships and ≥1 USMLE exams, baseline sinusitis understanding could be improved. A brief educational adjunct increased sinusitis knowledge for students interested in various specialties without imposing a substantial time burden on educators or students.

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