



The Throat: What Could Possibly Go Wrong?

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Disclosures

I have nothing to disclose.

Acknowledgements

Special Thanks to Kim Kruger, MD

Objectives

- Be proficient in the identification, complications, and treatment of pharyngitis and tonsillitis in both children and adults
- Be familiar in the clinical features, complications, and treatment of snoring and obstructive sleep apnea
- Be knowledgeable in the identification, complications, and treatment of peritonsillar abscess and deep neck infections

PANCE/PANRE Blueprint

ENT Topic	Proficient	Familiar	Knowledgeable	Aware
Pharynx	Pharyngitis/ tonsillitis	Snoring/OSA as it relates to ENT	Peritonsillar abscess Deep neck infections	
Infectious diseases				

Question #1

A six year-old male presents to your office with his father, complaining of headache, abdominal pain, and vomiting for the past two days and decreased appetite. He has no history of medication allergies. No nasal congestion, or cough. On exam, his body temperature is 38 C orally, he has a sandpaper rash on his chest and abdomen, a red "strawberry" tongue and red, swollen tonsils with palatal petechial and tender anterior cervical lymph nodes. What do you do next?

- A. Treat with penicillin
- B. Obtain a rapid strep test
- C. Obtain a throat culture
- D. Reassurance and acetaminophen

Question #2

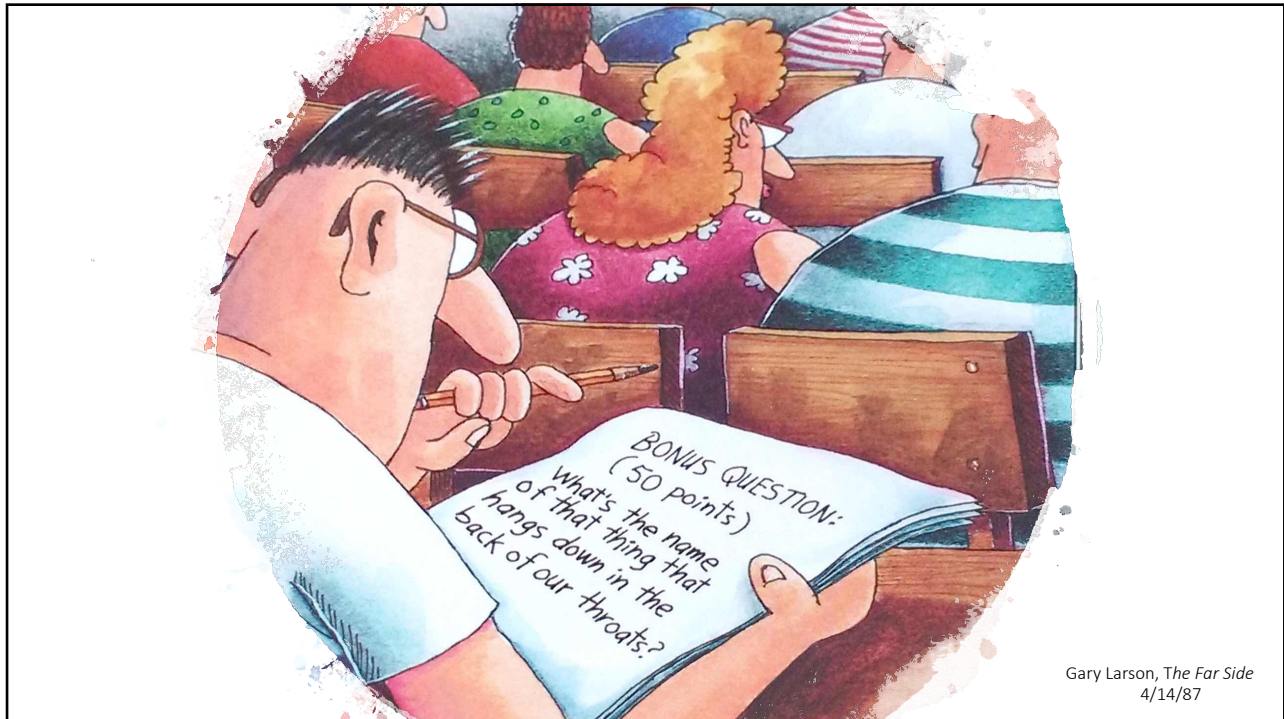
A 23 year-old female daycare provider presents to your office with a five day history of severe sore throat, along with nasal congestion and cough. She denies fever. She reports increased throat pain when she tries drinking orange juice. On exam, her temperature is 38 C orally, her nasal mucosa is hyperemic and congested, and she has erythematous 3+ tonsils with exudates, along with tiny ulcerations along her soft palate. She has no cervical lymphadenopathy. She also has an audible wet cough, but her lungs are clear on auscultation.

- A. Treat with azithromycin
- B. Obtain a rapid strep test
- C. Obtain an ASO titer
- D. Reassurance and ibuprofen

Question #3

A four year-old female presents with her mother to Urgent Care for further evaluation of possible strep tonsillitis. Her RST is positive for group A beta-hemolytic strep (GABHS) (run by the CA before you see her) and she has four of the Centor criteria on exam, including a fever of 101 F axillary. What is the primary reason for treating her with an antibiotic?

- A. Because strep throat hurts and makes the body feel awful
- B. Because she can't go back to daycare until she has been on an antibiotic for 24 hours
- C. Because she has a fever
- D. Because you want to prevent sequellae



The Case of the “Kissing Tonsils”



Source: Wikimedia Commons contributor, Fateagued. (2019). "File:Mono tonsils.JPG," Wikimedia Commons, the free media repository, https://commons.wikimedia.org/w/index.php?title=File:Mono_tonsils.JPG&oldid=346810603

Patient Presentation

- A 19-year-old female comes in with sore throat, nasal congestion, and earache. She also reports feeling exhausted with headache, body aches, and chills. She reports that her boyfriend was sick with the same symptoms about a month ago.

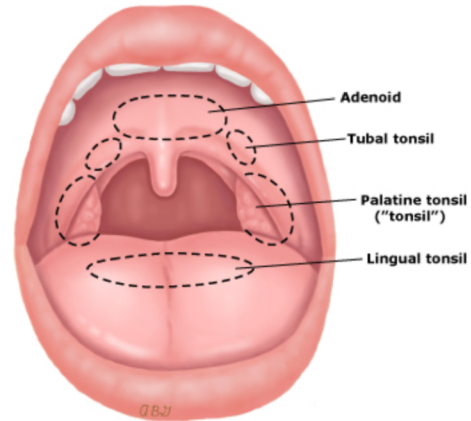
Relevant Clinical Findings

- On exam, she has a temp of 38.5 C and her tonsils are 4+ with exudates. Her adenoids are also enlarged and occluding her nasal choana. She has anterior and posterior cervical adenopathy, and her ears are clear on otoscopic exam.

Tonsils

- Small masses of lymphoid tissue around the pharynx
- Trap and remove bacteria and other foreign materials
- **Tonsillitis** is caused by congestion with bacteria

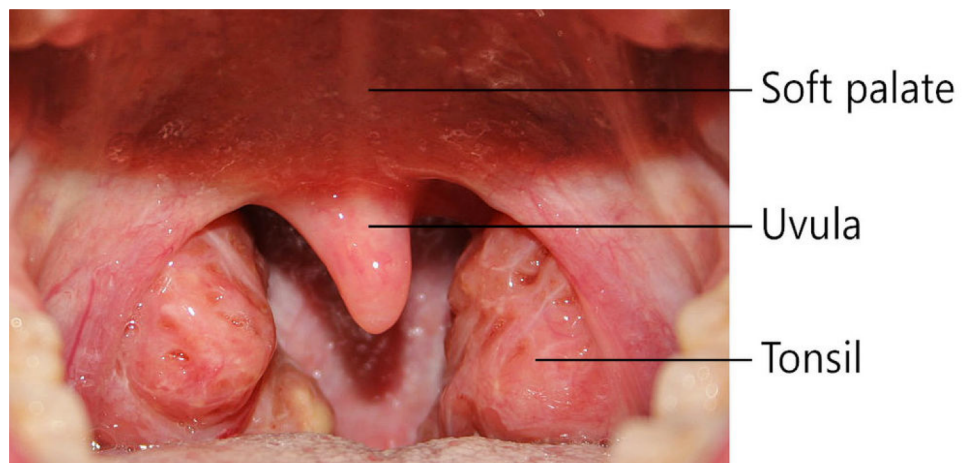
Waldeyer's ring



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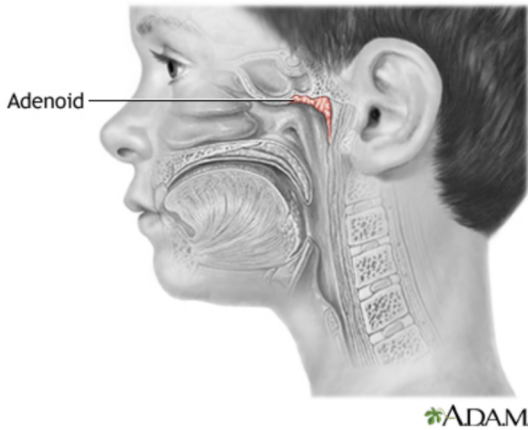
Graphic 75111 Version 2.0

Palatine Tonsil Anatomy



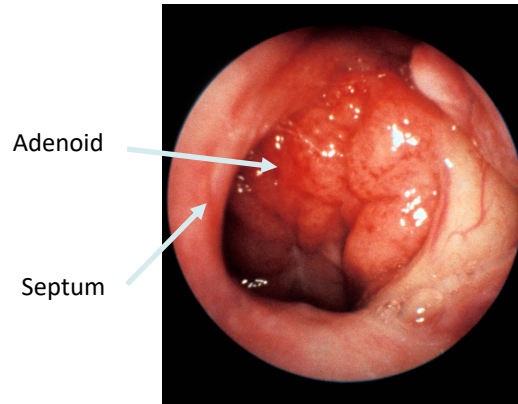
Source: Wikimedia Commons contributor, Klem. (2015). "File:Throat with Tonsils 00111.jpeg." Wikimedia Commons, the free media repository.
https://commons.wikimedia.org/wiki/File:Throat_with_Tonsils_00111.jpeg#/media/File:Throat_with_Tonsils_00111.jpeg

Pharyngeal Tonsil (Adenoid) Anatomy



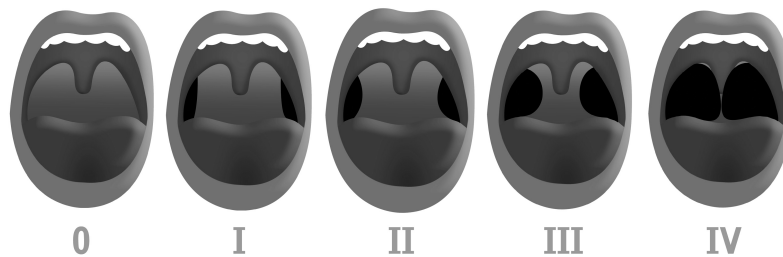
Source: Medline Plus, Medical Encyclopedia: Enlarged Adenoids
<https://medlineplus.gov/ency/article/001619.htm>

ADAM.



Nasal View

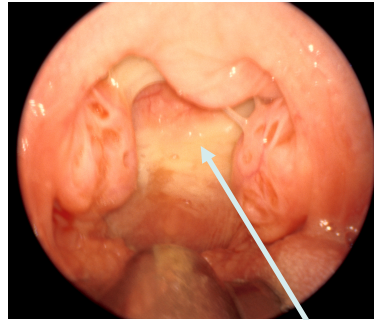
Tonsil Grade



Source: Mitchell, M. et al. (2019). *Otolaryngology-Head and Neck Surgery*, 160(1_suppl), 51-542. <https://doi.org/10.1177/014599818801757>

Adenoiditis

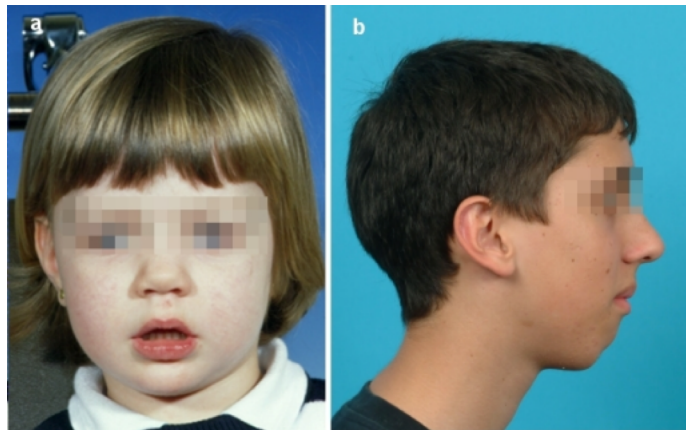
- “Junky Nose”
- Unable to breath through nose
- Ill feeling and appearing
- +/- Fever
- +/- “Swollen Glands”
(Cervical lymphadenopathy)



pus

Adenoid Facies

- Long face
- Gummy smile
- Mouth breathing
- Dry lower lip
- Nose “always stuffy”



Source: Stellzig-Eisenhauer, A. & Meyer-Marcotty, P. (2010). *GMS Current Topics In Otorhinolaryngology, Head And Neck Surgery*. doi:10.3105/ct0000068

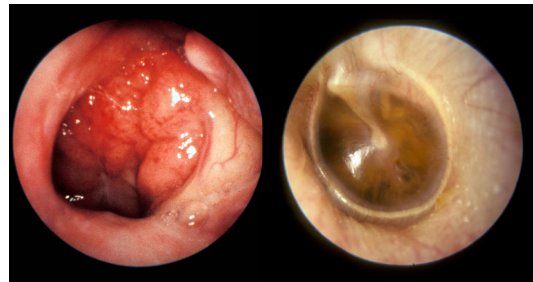
Dental Changes

- Open bite
- Cross bite
- Narrow hard palate



Adenoidectomy Indications

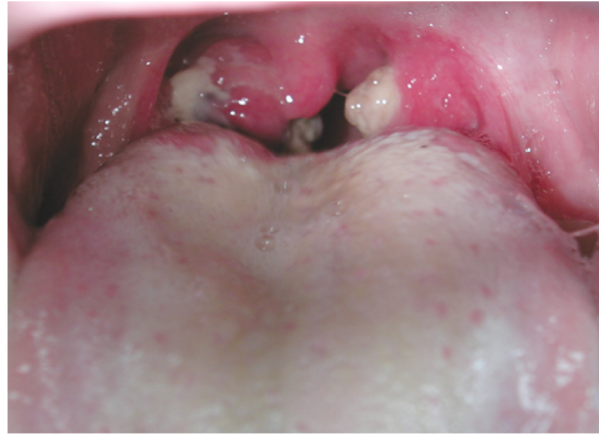
- Recurrent adenoiditis
- Recurrent sinusitis
- Persistent middle ear fluid
- Obstructive sleep apnea (OSA)



Source: Wikimedia Commons contributor, Hake, M. (2018). "File:Adult Serous Otitis Media.jpg," Wikimedia Commons, the free media repository, https://commons.wikimedia.org/wiki/File:Adult_Serous_Otitis_Media.jpg

van den Aardweg M. T. A., Boonacker C. W. B., Rovers M. M., Hoes A. W., & Schilder A. G. M. (2011). Effectiveness of adenoidectomy in children with recurrent upper respiratory tract infections: Open randomised controlled trial. *BMJ*; 343:d5154. <https://doi.org/10.1136/bmj.d5154>

Pharyngitis



Source: Usatine RP, Smith MA, Mayeaux EJ, Chumley HS: The Color Atlas of Family Medicine, Second Edition; www.accessmedicine.com
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Epidemiology

- Viral infections account for an estimated 60-90% of cases
- Bacterial infections are responsible for between 5- 30%
- Highest prevalence in winter
- Highest incidence in children between the ages of 4-7
- Acute rheumatic fever is rare in the US
- Up to 14% of deep neck infections result from *bacterial* pharyngitis

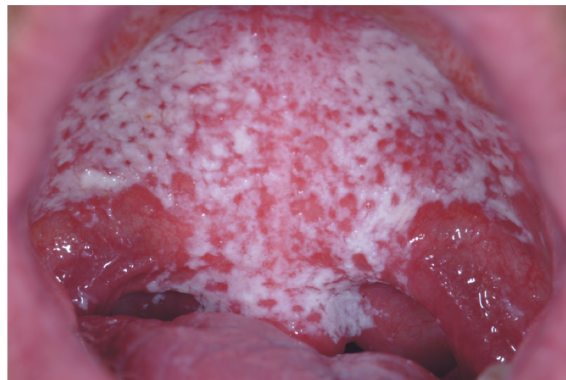
Etiology

- Streptococcal
- Viral (Herpes/Coxsackievirus, CMV, EBV) infection
- Oral Candida
- Sexually transmitted infections
- Other bacterial cause (Non-group A Streptococcus, Fusobacterium, Mycoplasma pneumoniae, Chlam. pneumoniae, and A. haemolyticum, Diphtheria)

Oral Thrush (Candida/Fungal)



Source: K.J. Knoop, L.B. Stack, A.B. Storrow, R.J. Thurman:
The Atlas of Emergency Medicine, 4th Edition,
www.accessemergencymedicine.com
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Source: K.J. Knoop, L.B. Stack, A.B. Storrow, R.J. Thurman:
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Viral Pharyngitis

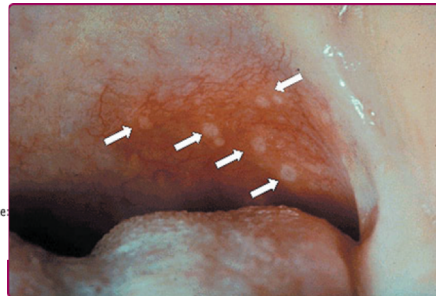


Source: Usatine RP, Smith MA, Mayeaux EJ, Chumley HS: *The Color Atlas of Family Medicine, Second Edition*: www.accessmedicine.com
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Viral Pharyngitis



Source: J.E. Tintinalli, J.S. Stapczynski, O.J. Ma, D.M. Yealy, G.D. Meckler, D.M. Cline: *Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 8th Edition* www.accessmedicine.com
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Source: Goldsmith LA, Katz SI, Gilchrist BA, Paller AS, Leffell DJ, Wolff K: *Fitzpatrick's Dermatology in General Medicine, 8th Edition*: www.accessmedicine.com
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Types of Streptococcal Bacteria

- Non-Hemolytic
 - Gamma
- Hemolytic
 - Alpha (no toxins)
 - S.viridans, S.pneumoniae
 - Beta (toxin producers)
 - Group A (S.pyogenes, throat)
 - Group B (neonates)
 - Group D (S.faecalis, GI symptoms)
 - Groups C, F, and G (little clinical significance)

Clinical Findings with Strep



Source: Wikimedia Commons contributor, Heilman, J. (2017). "File:Pos Strep.JPG," Wikimedia Commons, the free media repository, https://commons.wikimedia.org/wiki/File:Pos_strep.JPG

- Sore throat
- Dysphagia
- Fever
- Malaise
- Headache
- Rash
- Exudative tonsils
- Palatal petechiae
- Tender anterior cervical lymphadenopathy
- Abdominal pain
- Vomiting (especially kids!)

USUALLY IN THE ABSENCE OF OTHER URI SYMPTOMS!

Palatal Petechiae



Source: Centers for Disease Control and Prevention (CDC). (1958). Public Health Image Library (PHIL). Retrieved from <https://phil.cdc.gov/Details.aspx?zid=3184>

Erythema, Exudates and Petechiae



Source: Centers for Disease Control and Prevention (CDC). (1975). Public Health Image Library (PHIL). Retrieved from <https://phil.cdc.gov/Details.aspx?zid=6323>

Scarlet Fever: Scarlatiniform Rash



National Health Service (NHS). (n.d.). Healthier Together: Scarlet Fever. <https://what0-18.nhs.uk/parents/carers/worried-your-child-unwell/scarlet-fever>

Scarlet Fever: Strawberry Tongue



Source: K.J. Knoop, L.B. Stack, A.B. Storrow, R.J. Thurman:
The Atlas of Emergency Medicine, 4th Edition,
www.accessemergencymedicine
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Early Strawberry Tongue: looks like thrush



Source: J.E. Tintinalli, J.S. Stapczynski, O.J. Ma, D.M. Yealy, G.D. Meckler, D.M. Cline: Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 8th Edition www.accessmedicine.com Copyright © McGraw-Hill Education. All rights reserved.

Scarlet Fever: Desquamation



Source: Wikimedia Commons contributor, Feth, Metzigen. (2008). "File:Scharlach.jpg." Wikimedia Commons, the free media repository, <https://commons.wikimedia.org/wiki/File:Scharlach.jpg>

Laboratory Findings

- Rapid Strep Test (RST) PPV 90-99%
- RST is subject to quality of sample
- Culture is 90% sensitive, 99% specific
- Culture may give you other causes for sore throat like Mycoplasma, Chlamydia, Candida, Gonococcus
- Culture can help establish a carrier state

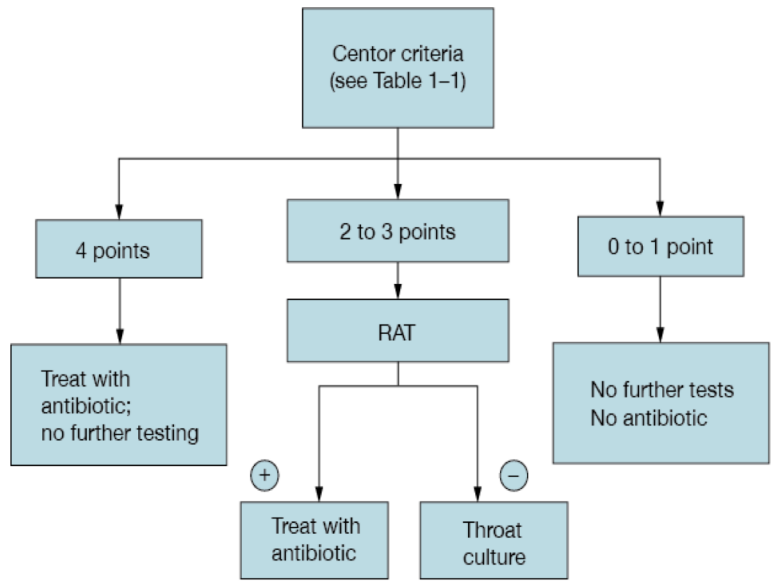
Centor Criteria - Strep Screening

- History of fever or temperature of 38°C (100.4°F) (1 point)
- Absence of cough (1 point)
- Tender anterior cervical lymph nodes (1 point)
- Tonsillar swelling or exudates (1 point)
- Age:
 - <15 years (1 point).
 - 15 to 45 years (0 points).
 - >45 years (-1 point)

Centor Criteria - Strep Screening

Centor Criteria Number	Probability of Infection w/GABHS
4 or 5	51 to 53%
3	28 to 35%
2	11 to 17%
1	10%
0	1%

Choby, B. A. (2009). Diagnosis and treatment of streptococcal pharyngitis [published correction appears in *Am Fam Physician*, 2013;88(4):222]. *Am Fam Physician*, 79(5):385.



Source: Toy EC, Simon BC, Takenaka KY, Liu TH, Rosh AJ:
Case Files®: Emergency Medicine, 3rd Edition
 www.accessemergencymedicine.com
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Pretest Probability	Patient Description	Recommended Management
>50%	Household contacts with symptoms, patients with scarlet fever.	No RST or culture. Neg result is likely a false negative. Treat empirically.
=50%	Exudative pharyngitis, no cough and 3 additional findings on exam.	RST+: Treat RST-: Send cx and treat until results available. May also treat empirically without culture.
25-50%	Exudative pharyngitis and hx and px consistent with GABHS but lacking a key finding (fever, adenopathy), may have a cough.	RST+: Treat RST-: Send cx and treat while awaiting results. Empiric tx acceptable during outbreaks but over treatment is likely.
10-20%	Acutely ill but no findings of GABHS.	RST+ is likely a carrier. Consider other causes.
<5%	Recurrent sx's and no GABHS findings.	RST + is certainly a carrier or false +. Treat according to carrier guidelines.

Shulman S. T., Alan L., Clegg H. W., Gerber M. A., Kaplan E. L., Lee G., Martin J. M., Van Beneden C. (2012). Clinical Practice Guideline for the Diagnosis and Management of Group A Streptococcal Pharyngitis: 2012 Update by the Infectious Diseases Society of America, *Clinical Infectious Diseases*, 55(10): e86–e102, [doi: 10.1093/cid/cir629](https://doi.org/10.1093/cid/cir629)

Treatment Options

Adults:

- Pen-V 250 mg po qid or 500 mg bid for 10 days
- Bicillin LA (≥ 27 kg) 1.2 mU IM x1 (Pen G)
- Amoxicillin 500 mg po bid x 10 days
- Cefalexin 500 mg po bid for 10 days
- Cefadroxil 1 gm po daily x 10 days

Children:

- PenV 250 mg po bid for 10 days
- Bicillin LA (<27 kg) 0.6 mU IM x1 (Pen G)
- Amoxicillin 50 mg/kg/day for 10 days
- Cefalexin 20 mg/kg po bid for 10 days
- Cefadroxil 30 mg/kg po daily for 10 days

Stanford T., Shulman, Alan L., Bisno, Herbert W., Clegg, Michael A., Gerber, Edward L., Kaplan, Grace Lee, Judith M., Martin, Chris Van Beneden, Clinical Practice Guideline for the Diagnosis and Management of Group A Streptococcal Pharyngitis: 2012 Update by the Infectious Diseases Society of America, *Clinical Infectious Diseases*, Volume 55, Issue 10, 15 November 2012, Pages e86–e102, <https://doi.org/10.1093/cid/cir629>

Just the facts, please!

- Incubation 1-3 days, may be as long as 7 days.
- Contagious until 24 hrs of antibiotics or for as long as symptoms persist if not treated.
- Antibiotic treatment may decrease duration and severity of symptoms if given within 48 hours.
- No known streptococcus-penicillin resistance in the USA. (but there is with Azithromycin!)
- Scarlet Fever does not require special attention, it is the effect of a toxin released by GABHS.

How to Identify a Carrier

- RST &/or culture is positive when asymptomatic or following treatment
- ASO titer (antistreptolysin O) – the antibody made by BHS
 - Is *HETEROGENOUS* in an acute infection
 - It is *HOMOGENOUS* in a carrier state
- When recurrence in a family, note if one member is unaffected
- Cats and dogs are not believed to transmit GABHS

Perianal Strep

- Consider in recurrent tonsillitis, family outbreaks
- Occasionally presents as rectal pain and constipation in children 3-5 yrs old
- Establish Strep by culturing throat and rectum. Treat as a chronic carrier



Lehman R. &, Pinder S. (2009). Streptococcal perianal infection in children *BMJ*; 338 :b1517

How to Treat a Carrier

- IM Bicillin LA .6 mU- 1.2 mU is treatment of choice.
- Augmentin for 10 days is the preferred oral method
- If Penicillin allergic, Clindamycin or 1st or 2nd generation Cephalosporins are preferred
- Change all toothbrushes and glassware

So What?

If not treated within 9 days of symptoms, possible sequelae includes:

- Rheumatic Fever (Mitral Valve Disease)
- Glomerulonephritis with Acute Renal Failure
- Peritonsillar Abscess (“Quinsy”)
- Pneumonia, otitis, sinusitis, osteomyelitis, mastoiditis, meningitis, or septic arthritis

Complications of Non-Treatment

- Inflammatory diseases that are not direct infections but where the immune response to streptococcal antigens causes injury to host tissues.
 - Rheumatic Fever (Mitral Valve Disease)
 - Glomerulonephritis with Acute Renal Failure
- Extension to deeper tissues
 - Peritonsillar Abscess (“Quinsy”), deep neck infection, osteomyelitis, mastoiditis
- Bacterial seeding/spread
 - pneumonia, otitis, sinusitis, meningitis, septic arthritis

Rheumatic Fever

- Prolonged febrile inflammation of connective tissues
- Characterized by fever, *carditis*, *subcutaneous nodules* and *migratory polyarthritis* (Jones Criteria diagnosis)
- Cardiac enlargement, valvular murmurs, and effusions are seen clinically

Rheumatic Fever

- Begins 3 weeks (range 1-5 weeks) after GABHS pharyngitis and lasts 2- 3 months
- The first attack usually occurs between the ages of 5-15
- Repeated attacks lead to progressive damage to the endocardium and heart valves, with scarring and valvular stenosis or incompetence (rheumatic heart disease) which can lead to heart failure

Jones Criteria

- Required Criteria:
 - Evidence of Strep infection: ASO / Strep group A throat culture
- Major Diagnostic Criteria:
 - Carditis
 - Polyarthritits
 - Chorea
 - Erythema marginatum
 - Subcutaneous Nodules

Jones Criteria

- Minor Diagnostic Criteria:
 - Fever
 - Arthralgia
 - Previous rheumatic fever or rheumatic heart disease
 - Acute phase reactions: ESR / CRP / Leukocytosis
 - Prolonged PR interval

Glomerulonephritis

- Poststreptococcal glomerulonephritis is primarily a disease of childhood that begins 1 to 4 weeks after streptococcal pharyngitis
- Characterized by hypertension, hematuria, proteinuria, and edema due to inflammation of the renal glomerulus

Glomerulonephritis

- Caused by deposition in the glomerulus of antigen–antibody complexes with complement activation and consequent inflammation
- Clinical course is usually benign, with spontaneous healing over weeks to months. Occasionally, a progressive course leads to renal failure and death.

Deep Tissue/Neck Infections

- GABHS has the capacity to be highly invasive
- Deep neck infections are usually extensions of infections within the pharynx or oral cavity
 - Often life threatening but difficult to detect at early stages, when they may be more easily managed

Deep Tissue/Neck Infections

- Three of the most clinically relevant spaces in the neck are the *submandibular (and sublingual) space, the lateral pharyngeal (or parapharyngeal) space, and the retropharyngeal space.*
 - These spaces communicate with one another and give easy access to areas that include the mediastinum, carotid sheath, skull base, and meninges.
- Once infection reaches these sensitive areas, mortality rates can be as high as 20–50%.
 - **Refer! Put in the hospital!**



Source: Updell KR, Smith HA, Naranjo EJ, Chaurasia HG. The Color Atlas of Family Medicine, Second Edition. www.accessmedicine.com
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Peritonsillar Abscess

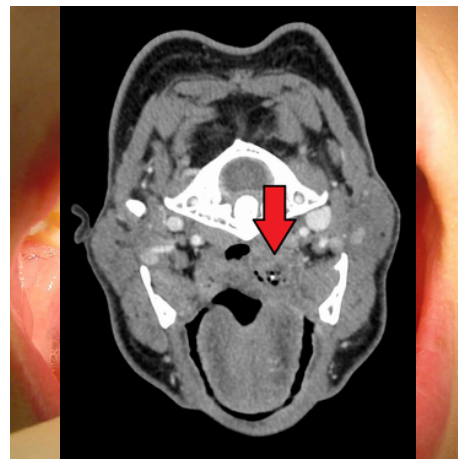
Peritonsillar Abscess

History

- Severe Odynophagia
- Dysphagia

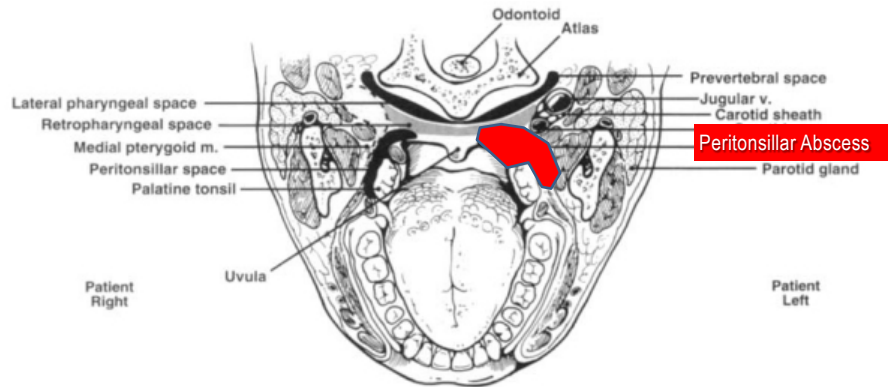
Physical

- Fever
- Unilateral edema
- *Hot Potato Voice*
- *Elevated white count (CBC)*
- CT Scan with contrast





Source: Lehmann M, Deyeb, MD
<https://commons.wikimedia.org/wiki/File:Peritonsillarabs.png>

Peritonsillar Abscess

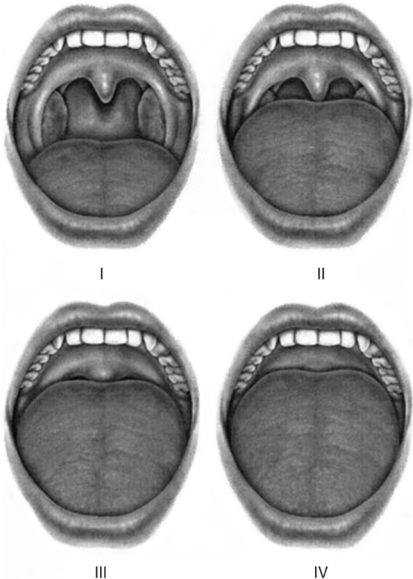


Peritonsillar Abscess

- Management options
 - Needle aspiration
 - Incision and Drainage
 - Quinsy tonsillectomy
- Choice will depend on site and location of abscess. Smaller, deep abscess are sometimes easier to reach with large bore needle.
- Both have similar success rates (Needle Aspiration 90-95% vs. I and D 90-100%)

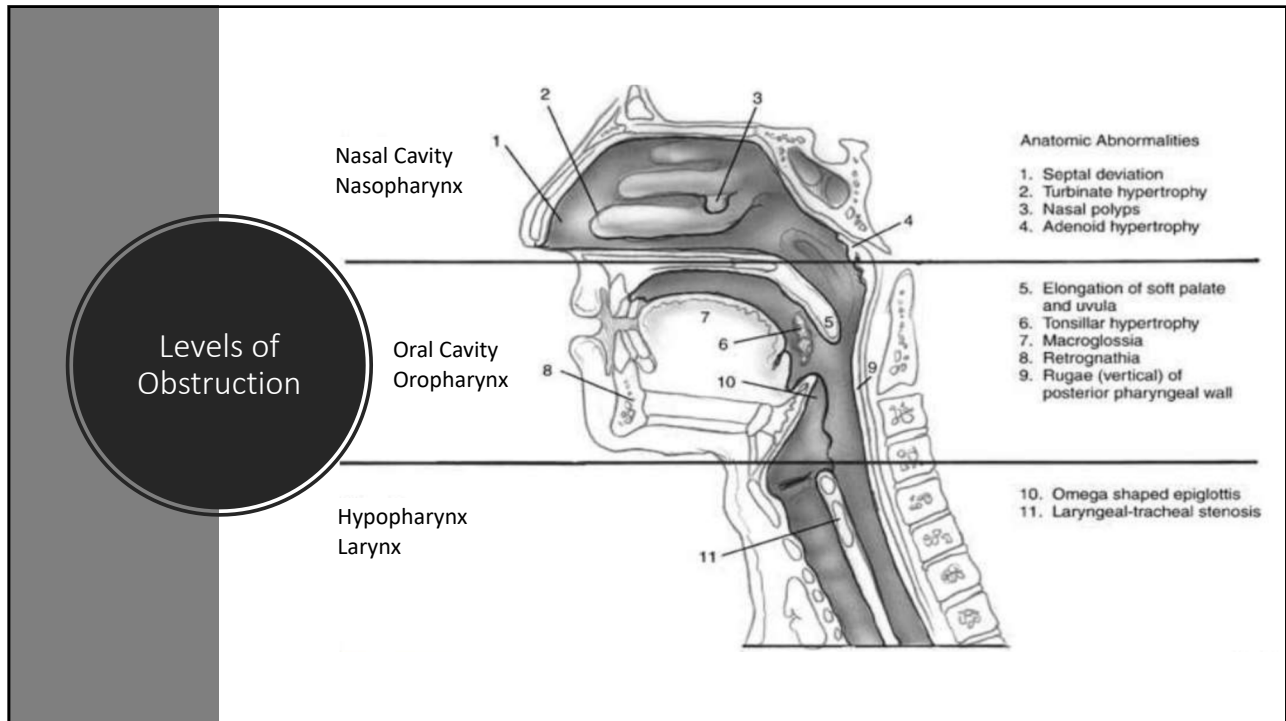
 Obstructive Sleep Apnea (OSA) 

Mallampati Occlusion



I II
III IV

Source: Friedman, M. et al. (2004). *Laryngoscope*. 114(3):454-9.



Pediatric Sleep Apnea

The American Academy of Pediatrics suggests that all children be screened for snoring.

Pediatric Sleep Apnea

Consequences of untreated sleep apnea in children:

- Snoring
- Sleep deprivation (causing moodiness, inattention, malaise, and behavior problems)
- Bedwetting (nocturnal enuresis)
- Growth
- Attention deficit disorder (ADD) / attention deficit hyperactivity disorder (ADHD)

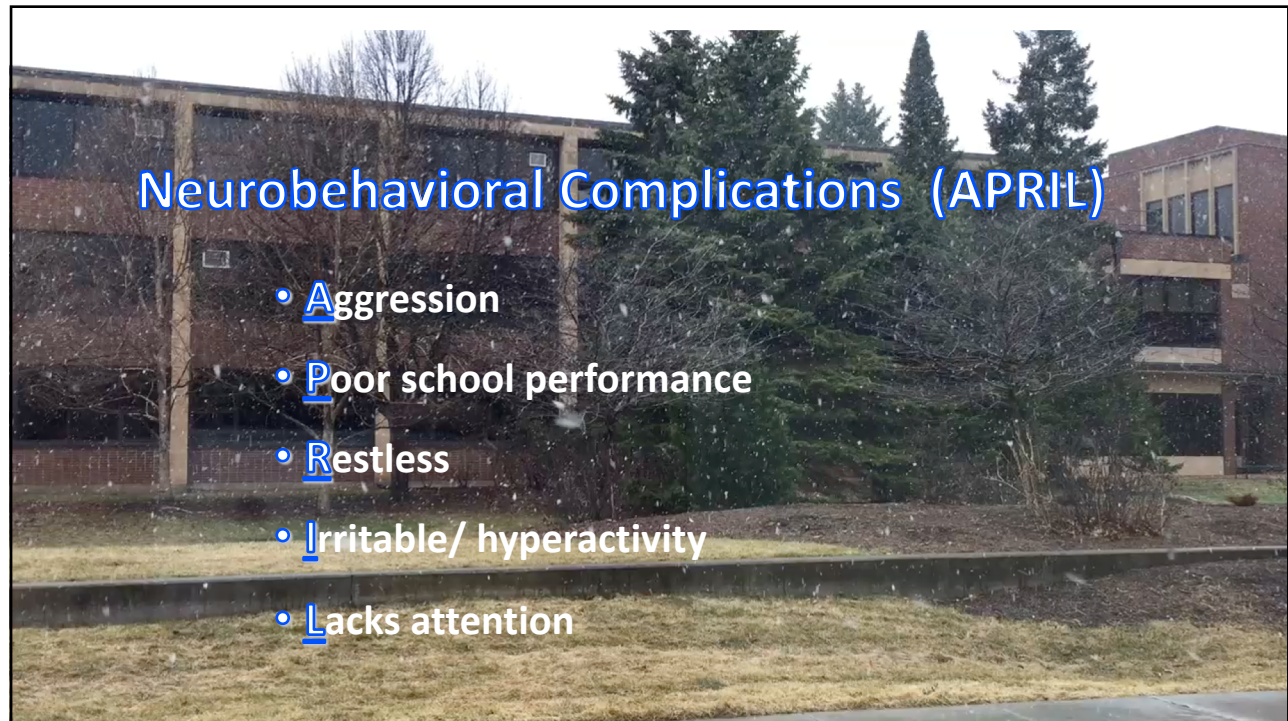
Symptoms of Sleep Apnea

Nighttime

- Snoring
- Pauses
- Night terrors
- Sweating
- Bedwetting

Daytime

- Mouth breathing
- Behavior problems
- Learning problems
- Headache
- Sleepiness



Tonsillectomy Indications

- Recurrent infections
- Obstructive sleep apnea
- Gagging/difficulty swallowing due to size
- One tonsil larger than the other
- Chronic Infections
- Bad breath (Halitosis)

Tonsillectomy Indications

Recurrent Infections

- 7 episodes/year x 1 year
- 5 episodes/year x 2 years
- 3 episodes/year x 3 years
- Mitigating circumstances



Source: Wikimedia Commons contributor, Heilman, J. (2010). "File:StrepAug2010.JPG," Wikimedia Commons, the free media repository, <https://commons.wikimedia.org/wiki/File:StrepAug2010.JPG>

MUST KNOW:

- Most pharyngitis cases are viral (up to 90%)
- Clinical findings are predictable
 - Sore throat
 - Exudate
 - Fever
 - Rash
 - Petechiae
 - Abdominal pain
 - Lymphadenopathy
 - Desquamation

MUST KNOW:

- GABHS can be have serious consequences:
 - Rheumatic Fever- know why we treat Strep (don't need to know Jones Criteria or treatment)
 - Glomerulonephritis- understand why it occurs
 - Deep neck infections and extension- know this is life threatening
- Centor Criteria can assist in treatment decisions
- Penicillin is currently the preferred treatment when able

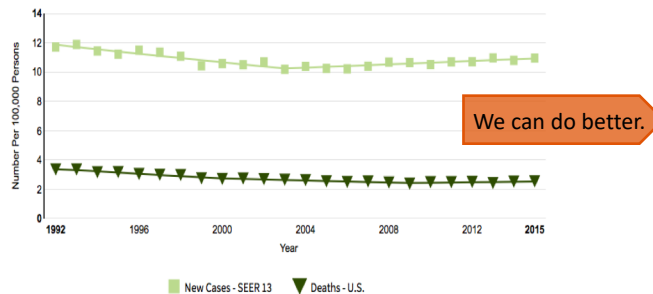
Cancers Caused by HPV per Year, U.S., 2011-2015

Cancer site	Percentage probably caused by any HPV type	Number probably caused by any HPV type		
		Female	Male	Both Sexes
Cervix	90%	11,866	0	11,866
Vagina	70%	846	0	846
Vulva	70%	3,934	0	3,934
Penis	60%	0	1,269	1,269
Anus*	90%	4,333	2,197	6,530
Oropharynx	70%	3,412	14,814	18,225
TOTAL		24,390	18,280	42,670

Data source: National Program of Cancer Registries SEER*Stat Database: U.S. Cancer Statistics Incidence Analytic file 1998–2015. United States Department of Health and Human Services, Centers for Disease Control and Prevention. Released June 2018, based on the November 2017 submission.

Oropharyngeal Cancer

- Oropharyngeal cancer is the most common HPV-associated cancer among men
 - 742,270 new cases and 407,037 deaths world-wide in 2015
 - 51,540 new cases and 10,030 deaths in the U.S. in 2018



- The median age is early 50s
 - One quarter occur in men younger than 55

<https://seer.cancer.gov/statfacts/html/oralcav.html>

Question #1

A six year-old male presents to your office with his father, complaining of headache, abdominal pain, and vomiting for the past two days and decreased appetite. He has no history of medication allergies. No nasal congestion, or cough. On exam, his body temperature is 38 C orally, he has a sandpaper rash on his chest and abdomen, a red “strawberry” tongue and red, swollen tonsils with palatal petechial and tender anterior cervical lymph nodes. What do you do next?

- Treat with penicillin
- Obtain a rapid strep test
- Obtain a throat culture
- Reassurance and acetaminophen

Question #2

A 23 year-old female daycare provider presents to your office with a five day history of severe sore throat, along with nasal congestion and cough. She denies fever. She reports increased throat pain when she tries drinking orange juice. On exam, her temperature is 38 C orally, her nasal mucosa is hyperemic and congested, and she has erythematous 3+ tonsils with exudates, along with tiny ulcerations along her soft palate. She has no cervical lymphadenopathy. She also has an audible wet cough, but her lungs are clear on auscultation.

- A. Treat with azithromycin
- B. Obtain a rapid strep test
- C. Obtain an ASO titer
- D. Reassurance and ibuprofen

Question #3

A four year-old female presents with her mother to Urgent Care for further evaluation of possible strep tonsillitis. Her RST is positive for group A beta-hemolytic strep (GABHS) (run by the CA before you see her) and she has four of the Centor criteria on exam, including a fever of 101 F axillary. What is the primary reason for treating her with an antibiotic?

- A. Because strep throat hurts and makes the body feel awful
- B. Because she can't go back to daycare until she has been on an antibiotic for 24 hours
- C. Because she has a fever
- D. Because you want to prevent sequellae

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Questions?

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Thank you!