

# SORE THROAT IN CHILDREN – CLINICAL CONSIDERATIONS AND EVALUATION

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# SORE THROAT IN CHILDREN – CLINICAL CONSIDERATIONS AND EVALUATION

## INTRODUCTION TO THE CLINICAL PROBLEM:

A sore throat is usually a symptom of an infective process. It refers to a painful problem of the child, usually in the pharynx and often begins as a swallowing complaint. A sore throat can occur in all age groups, but in less than 2 years of age the cause is most likely viral. Sore throat though may not originate in the pharynx but can be associated with disease problems such as esophagitis or other surrounding area abnormalities. These have to be considered in the workup of the sick child with a sore throat. The greatest incidence of the problem occurs in the 5-18 year range, the cause being mainly bacterial, spread via respiratory droplets and secretions, with an incubation period of 2-5 days.

While parents are often worried primarily about the implications of streptococcal infection (strep throat) when their child has a sore throat, there are also many viruses that cause infections that behave very similar to strep. A child that has a sore throat with fever and a red, swollen throat or tonsils with white pus on them should have a throat swab taken for streptococcal infection:

- If the tests are positive, the primary treatment is penicillin therapy for group A beta-hemolytic streptococcal pharyngitis (GABHS)
- If the tests are negative, then the child's throat infection is likely caused by a virus and antibiotics are not indicated, unless a second bacterial infection has become established.

Viral infections of the throat usually improve in three to five days without treatment.

**Can you tell if a child's throat has a strep infection just by looking at it? ... No!**

**TEACHING POINT:** Experience has shown that doctors and other health professionals are correct about half the time when they think a child has strep after just a physical exam. If the child is treated with antibiotics every time he/she is suspected to have a strep throat, then he/she would be overtreated or mistreated.

## WHAT ARE THE COMMON CAUSES OF SORE THROAT?:

**“Commonest things are commonest”:**

**Viral pharyngitis:** Viruses that cause sore throat include the common cold virus, other upper respiratory tract viruses, adenovirus (which can also cause pinkeye at the same time), and others. If the child has purulent tonsils and the strep test is negative, then he/she probably has a viral infection.

**Streptococcal Pharyngitis:** caused by the bacteria group A streptococci. It is most common in children over three years old and begins with a fever, a red, swollen throat and tonsils that can have a white coating of pus, swollen glands, decreased appetite and

energy level. If strep throat is suspected as the cause of tonsillitis in the child, a throat swab will confirm if there is infection with *streptococcus* bacteria. This infection is easily treated with antibiotics, usually penicillin. The child will no longer be contagious after being on an antibiotic for 24 hours. It is important to take a complete course of antibiotics to prevent the child from getting rheumatic fever.

### **Less common:**

**Infectious Mononucleosis:** a common illness usually caused by the Epstein-Barr virus (EBV). It typically infects teenagers and young adults, but also occurs in younger children, who have a much milder illness that is often not recognized as mono. Symptoms of mono consist of a high fever, sore throat, swollen tonsils with pus on them, fatigue, an enlarged spleen, and swollen glands that may be tender.

**Herpangina:** usually caused by the Coxsackie virus, causing painful blisters in the back of the child's throat.

**Gingivostomatitis:** caused by a herpes virus, which can also cause blisters in the mouth.

**Other less common but severe infections often progressing to pharyngeal swelling, or abscess formation, even approaching surgical emergencies:**

- Epiglottitis
- Retropharyngeal abscesses
- Lateral Pharyngeal abscesses
- Peritonsillar abscesses

### **Least common:**

These conditions are usually associated with high fever, drooling, severe pain and difficult breathing. Urgent evaluation and treatment is required:

- Pediatric epiglottitis
- Tracheitis
- Diphtheria
- Lemierre's Syndrome – mixed anaerobic infection with septic emboli from jugular venous thrombosis.
- Unusual infections – *N. Gonorrhoea*, tularemia, *mycoplasma*, *chlamydia*, herpes
- Even foreign bodies lodged in the throat – bone, sharp objects, etc.

### **Rarer causes to be considered:**

- Kawasaki disease
- Stevens–Johnson syndrome
- Behcet's syndrome
- Chemical exposure or burn
- Referred pain – dental abscesses, cervical adenitis, otitis media
- Immunosuppressed host with yeast superinfections, chronic antibiotic treatments

## **IMPLICATIONS OF STREP THROAT IN CHILDREN:**

TEACHING POINT: It is important to understand the serious implications of this more common infective cause of pharyngitis, which when diagnosed properly can be treated easily and successfully thus avoiding the possible life long sequelae which the toxins of group A beta-hemolytic streptococci can cause.

### **Scarlet Fever in Children**

Scarlet fever in children is a contagious infective illness characterized by sore throat, swollen painful tonsils and associated lymph nodes of the neck. It may be accompanied by a rough red rash in about 10% of cases, with sandpaper-like consistency. The illness is caused by a group A beta-hemolytic **streptococcal infection** of the upper respiratory passages manifesting a sore throat and upper airway symptoms. The serious part of the illness is the liberation of an exotoxin by the organism, capable of causing localized bullae (bullous impetigo), a systemic rash, or even a more serious lethal illness termed streptococcal toxic shock syndrome. Similar scarlet fever symptoms and signs can follow a streptococcal infection elsewhere, such as skin, soft tissue or surgical wound complications.

### **Rheumatic heart disease**

Rheumatic heart disease is the most serious complication of scarlet fever. Acute rheumatic fever follows 0.3% of cases of group A beta-hemolytic **streptococcal pharyngitis** in children. As many as 39% of patients with acute rheumatic fever may develop varying degrees of pancarditis with associated valve insufficiency, heart failure, pericarditis, and even death. If not recognized and treated properly, the end result of strep throat can become chronic rheumatic heart disease, with valve stenosis, atrial dilation, arrhythmias, and ventricular dysfunction. Chronic rheumatic heart disease, as a sequelae of scarlet fever, or strep throat, remains the leading cause of mitral valve stenosis and valve replacement in adults. Other rheumatic illnesses such as joint and soft tissue pain and swelling can occur. Neurologic changes can occur such as acute and chronic Sydenham's chorea, often called St. Vitus' dance, characterized by jerky incoordinate movements. This neuromuscular illness can be immediate or latent and usually occurs in the younger age group.

### **Glomerulonephritis**

Acute glomerulonephritis refers to a specific set of renal diseases as a result of a hemolytic group A-beta hemolytic streptococcal infection in which an immunologic mechanism triggers inflammation and proliferation of renal tissue leading to damage of the glomerular basement membrane, mesangium, or capillary endothelium. Historically this disease of children was called Bright's disease and was characterized by profound peripheral oedema, renal failure, heart failure and often death. Dropsy was another term used to describe the oedematous condition. In **streptococcal infection**, a streptococcal neuramidase may alter host immunoglobulin G (IgG). IgG then combines with host antibodies forming IgG/anti-IgG immune complexes which precipitate and block the glomeruli. Elevations of antibody titers to other antigens, such as antistreptolysin O or antihyaluronidase, DNase-B, and streptokinase, provide evidence of a recent streptococcal infection.

## **Some other antigenic illnesses confused as strep throat**

**Hand-foot-and-mouth disease (HFMD)** is a not uncommon viral illness with a distinct clinical presentation of oral and characteristic distal extremity lesions. Most commonly, the etiologic agents are Coxsackie viruses, members of the enterovirus family, namely enterovirus 71 (not related to the animal foot and mouth disease which is a different virus not involved in human disease). HFMD can manifest with high fever, paralysis even meningitis. The oral lesions may give rise to symptoms that are **confused with strep throat** but the small and scattered oral ulcerated lesions along with the peripheral cutaneous findings differentiate it from pharyngitis. An uncommon disease although it can give rise to large epidemics.

**Infectious Mononucleosis (IM)** is a common viral illness that can cause a persistent **sore throat** and fever. Usually seen in older young people, often occurring in dormitory living, it can present as a typical clinical syndrome in children – sore throat, fever, listlessness and on examination, splenomegaly. IM represents the immunopathologic expression that occurs under a specific set of circumstances and in response to infection with the Epstein-Barr virus. Following exposure, EBV infects epithelial cells of the oropharynx and salivary glands. B lymphocytes may become infected through exposure to these cells or may be directly infected in the tonsillar crypts. B-cell infection allows viral entry into the bloodstream, which systemically spreads the infection.

TEACHING POINT: In order to understand the clinical approach to history taking and examination of a child who has a sore throat, a differential diagnosis must be held in mind when approaching the problem. In a situation of a sore throat, the infective organisms must be considered also. The questions asked concerning the condition and the focus of the examination and investigation then makes more sense.

## **TAKING THE HISTORY – COMPLAINTS AND DURATION (symptoms):**

How long has the sore throat been present? Rapid or slower onset? Are there associated colds or coughs? Is there discoloured sputum? Has there been ear ache or runny nose? Has there been a fever? Has anyone else in the family had sore throat recently? Is the immunization schedule up to date? Are there known allergies? Are there other illness factors – fatigue, medications, immunosuppression, social problems, sexual abuse?

## **EXAMINATION FINDINGS – WHAT TO LOOK FOR (signs):**

- examine for fever, fast pulse, difficult painful breathing and swallowing
- swollen, tender cervical lymph nodes
- oral mucosal ulcers, blisters
- swollen purulent tonsils, evidence of foreign body? fishbone?
- red, painful pharynx
- nasal stuffiness, ear drums
- stridor, drooling, wheezing
- oral health, dental exam
- complete chest examination necessary

**CLINICAL FINDINGS:**

	<b>Bacterial</b>	<b>Viral</b>
<b>Fever</b>	> 39.5 °C	absent or present
<b>WBC</b>	< 5 or > 15	5 – 15
<b>Discharge, nasal or throat</b>	Pus (thick, dark yellow, orange or colour)	clear or light yellow, runny
<b>Seasonal</b>	–	+
<b>Petechiae</b>	+	–
<b>Gram stain / culture</b>	Blood, sputum, urinalysis	viral swab

TEACHING POINT: The history and physical examination will usually lead to the diagnosis but there are laboratory examinations that will be needed for diagnostic aid and for follow-up care.

**LABORATORY – GRAM STAIN AND CULTURE:**

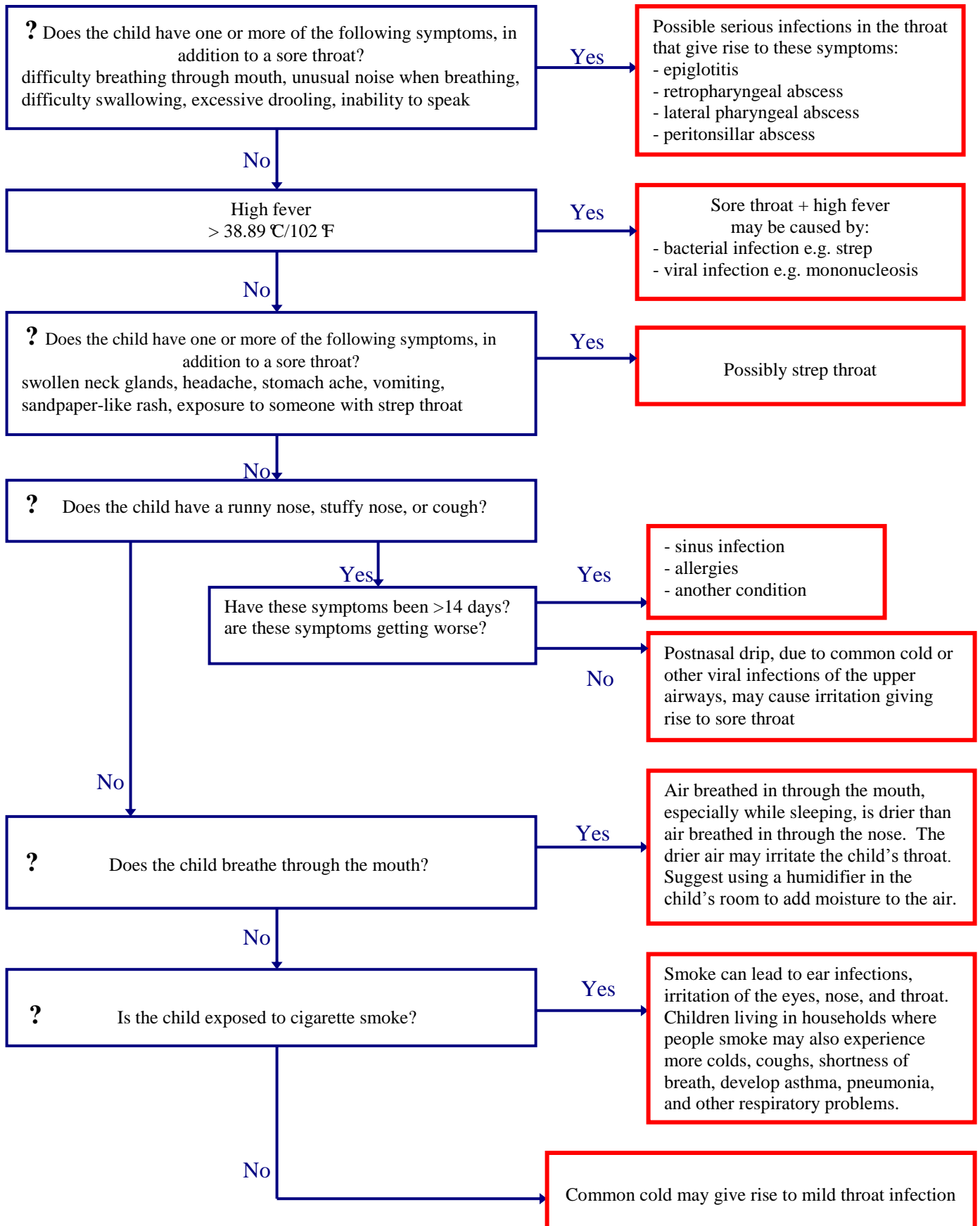
	<b>Bacterial (~ 30% of cases)</b>	<b>Viral (~ 40% of cases)</b>
Common	GABHS <i>Staphylococcus aureus</i> <i>(Moraxella) Branhamella catarrhalis</i> <i>Bacteroides fragilis</i> <i>Bacteroides oralis</i> <i>Bacteroides melaninogenicus</i> <i>Fusobacterium</i> species <i>Peptostreptococcus</i> species <i>Haemophilus influenzae</i>	Rhinovirus Adenovirus Parainfluenza virus Coxsackie virus Coronavirus Echovirus Herpes simplex virus Epstein-Barr virus (mononucleosis) Cytomegalovirus
Uncommon	Group C streptococci Group G streptococci <i>Neisseria gonorrhoeae</i> <i>Chlamydia trachomatis</i> <i>Mycoplasma pneumoniae</i>	
Rare	<i>Corynebacterium diphtheriae</i>	
Extremely rare	<i>Corynebacterium hemolyticum</i>	

No pathogen isolated: ~ 30% of cases

**PRINCIPLES OF MANAGEMENT:**

- 1) Symptomatic relief
- 2) Antibiotic choice dependent on culture, sensitivity and any drug allergies in the child
- 3) Urgent or emergency care depending on degree of respiratory symptoms

## CLINICAL PATHWAYS IN MANAGING SORE THROAT IN CHILDREN



## **FURTHER READINGS:**

1. el-Daher NT, Hijazi SS, Rawashdeh NM. Immediate vs. delayed treatment of group A beta-hemolytic streptococcal pharyngitis with penicillin V. *Pediatr Infect Dis J.* Feb 1991;10(2):126-130.
2. Gerber MA. Diagnosis and treatment of pharyngitis in children. *Pediatr Clin North Am.* Jun 2005;52(3):729-747, vi.
3. Snellman LW, Stang HJ, Stang JM. Duration of positive throat cultures for group A streptococci after initiation of antibiotic therapy. *Pediatrics.* Jun 1993;91(6):1166-1170.
4. Rimoin AW *et al.* Evaluation of the WHO clinical decision rule for streptococcal pharyngitis. *Arch Dis Child.* Oct 2005;90(10):1066-1070.
5. van Toorn R, Weyers HH, Schoeman JF. Distinguishing PANDAS from Sydenham's chorea: case report and review of the literature. *Eur J Paediatr Neurol.* 2004;8(4):211-216.
6. Rullan E, Sigal LH. Rheumatic fever. *Curr Rheumatol Rep.* Oct 2001;3(5):445-452.
7. Pichichero ME. Group A beta-hemolytic streptococcal infections. *Pediatr Rev.* Sep 1998;19(9):291-302.
8. Bezold LI, Bricker JT. Advances in acquired pediatric heart disease. *Curr Opin Cardiol.* Jan 1995;10(1):78-86.
9. Festekjian A, Pierson SB, Zlotkin D. Index of suspicion. *Pediatr Rev.* May 2006;27(5):189-194.
10. Skattum L, Akesson P, Truedsson L, Sjöholm AG. Antibodies against four proteins from a *Streptococcus pyogenes* serotype M1 strain and levels of circulating mannan-binding lectin in acute poststreptococcal glomerulonephritis. *Int Arch Allergy Immunol.* 2006;140(1):9-19.
11. Yoshizawa N *et al.* Nephritis-associated plasmon receptor and acute poststreptococcal glomerulonephritis: characterization of the antigen and associated immune response. *J Am Soc Nephrol.* Jul 2004;15(7):1785-1793.
12. Chen KT *et al.* Epidemiologic features of Hand-foot-mouth disease and herpangina caused by enterovirus 71 in Taiwan, 1998-2005. *Pediatrics.* Aug 2007;120(2):e244-252.
13. Wanner GK. Case of the month. Streptococcal pharyngitis and infectious mononucleosis. *JAAPA.* Aug 2008;21(8):72.
14. Amir J. Clinical aspects and antiviral therapy in primary herpetic gingivostomatitis. *Paediatr Drugs.* 2001;3(8):593-597.
15. Gerber P. Introduction to Infectious Diseases in Pediatrics. *Phar 454 Pediatric and Geriatric Drug Therapy Module 2008.*
16. Harold K Simon. Pediatrics, pharyngitis. [eMedicine.medscape.com/article/803258](http://eMedicine.medscape.com/article/803258) updated January 28, 2008.
17. <https://www.health.harvard.edu/>.
18. <http://www.healthcentral.com/> updated April 1, 2009.
19. Fleisher GR. Evaluation of sore throat in children. <http://www.uptodate.com/home/index.html>
20. Wald ER. Approach to diagnosis of acute infectious pharyngitis in children and adolescents. <http://www.uptodate.com/home/index.html>.

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