

PEDIATRIC ENT & YOU—A PATIENT CARE PARTNERSHIP

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October 25, 2013



Disclosure

Timothy McEvoy, MD has no relevant relationships
with commercial interests to disclose.

Learning Objectives

At the end of this presentation the
participant will be able to:

1. Discuss diagnostic methods for airway evaluation
2. Evaluate patients whose care may require the assistance of an otolaryngologist
3. Identify the role of the pediatric ENT in the patient care team

When Might you Need an ENT?

- Respiratory Symptoms
 - Noisy Breathing
 - Airway obstruction
 - Weak voice
 - Extubation failure
 - Chronic Aspiration
- Infectious Considerations
 - Neck swelling
 - Eye swelling
 - Recurrent throat infections
 - Recurrent ear infections
 - Recurrent rhinosinusitis
- Hearing Loss

Topics to Discuss Today

- Airway Evaluation
- Airway urgency/emergency
- Adenotonsillar disease
- Recurrent/chronic otitis media
- Foreign Bodies
- Patient care partnership topics

Definitions

- "Noisy breathing" could mean anything
- Definitions courtesy of Merriam Webster
 - Stertor –
 - the act of producing a snoring sound : [snoring](#)
 - from Latin *stertere* to snore
 - Stridor--
 - 1) a harsh, shrill, or creaking noise
 - 2) a harsh vibrating sound heard during respiration in cases of obstruction of the air passages

Types of Stridor

- Inspiratory
 - **Supraglottic**
- Biphasic
 - **Glottic/Subglottic**
- Expiratory
 - **Intrathoracic**

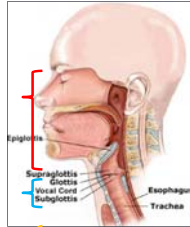


Image from: <http://www.advancedonc.com/larynx/>

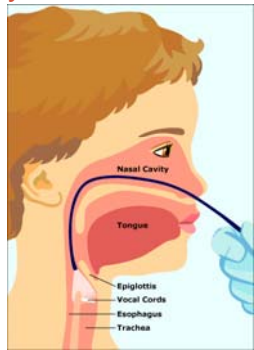
Dynamic Examination

- Flexible laryngoscopy
 - Patient Preparation:
 - Preferably 30 minutes or more after previous feeding
 - Local anesthetic/decongestant used depending on patient age
 - The patient should not be sedated as the goal is to evaluate vocal cord mobility, secretion management, and dynamic tone
 - Limitations:
 - Small diameter scope does not provide the best resolution
 - Limited evaluation beyond vocal cord level
 - Diagnostic tool only, not for interventions
 - Other Capabilities:
 - Assist with swallowing evaluations: Flexible Endoscopic Evaluation of Swallowing (FEES)

Flexible Laryngoscopy



**The
Booger
Cam!**



Images from <http://www.medwow.com> and <http://www.childrenscolorado.org/wellness/info/parents/72013.aspx>

Flexible Laryngoscopy

- Indications
 - Voice concerns
 - Breathing concerns (stridor, stertor)
 - Chronic cough
 - Aspiration
 - Globus sensation
 - Laryngopharyngeal reflux (LPR) and GERD
 - ALTE Workup
 - Otalgia

Completion of Airway Evaluation—Operative Direct Laryngoscopy and Bronchoscopy

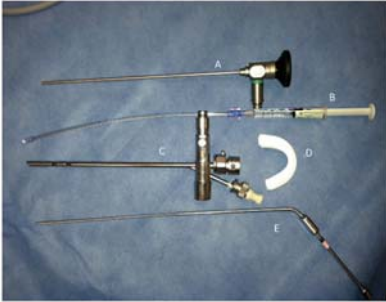
- Improved optics for greater resolution/detail
- Ability to evaluate subglottis, trachea and bronchi
- Ability to ventilate through the bronchoscope
- Ability to perform interventions
 - Foreign body removal
 - Airway sizing
 - Airway dilation
 - Biopsy/removal of lesions

Rigid Direct Laryngoscopy



Images from <http://www.interned.com> and <http://www.childrenscolorado.org/wellness/info/parents/72013.aspx>

Rigid Bronchoscopy Tools



Images from: www.karger.com

Anesthesia for Rigid Bronchoscopy



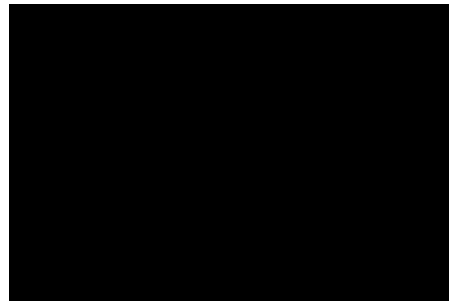
Images from: <https://wiki.uicwa.edu/display/protocols/Pediatric+Direct+Laryngoscopy>

Rigid Laryngoscopy and Bronchoscopy



Images from: <https://wiki.uicwa.edu/display/protocols/Pediatric+Direct+Laryngoscopy>

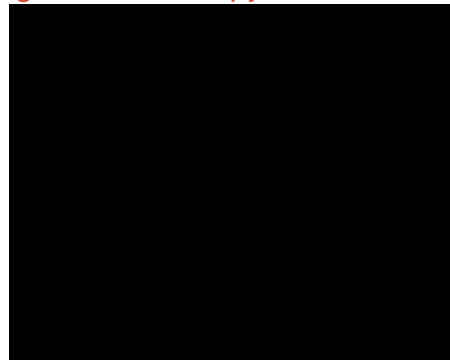
Flexible Laryngoscopy



Visualization Difference: Flexible vs. Rigid Instrumentation



Rigid Bronchoscopy



Common Airway Pathology

Table 4-1. Cause of stridor²

Diagnosis	Number of patients	Percentage
Congenital laryngeal anomalies	132	60
Congenital tracheal anomalies	35	16
Congenital bronchial anomalies	11	5
Infectious conditions	12	5
Internal laryngeal trauma	12	5
Other	17	7
Total	219	100*

* Percentages have been rounded off.

Table 4-2. Congenital laryngeal anomalies²

Diagnosis	Number of patients	Percentage
Laryngomalacia	72	60
Subglottic stenosis	27	20
Neurologic	17	13
Bilateral vocal fold paralysis (14)		
Unilateral vocal fold paralysis (3)		
Other	9	7
Total	132	100

From Holinger's Pediatric Laryngology and Bronchoesophagology. Lippincott, 1996.

Common Airway Pathology

Table 4-3. Congenital tracheal anomalies²

Diagnosis	Number of patients	Percentage
Tracheomalacia	16	45
Anterior compression	12	34
Aberrant innominate artery (11)		
Vascular ring	4	12
Tracheal stenosis	2	6
Tracheal diverticulum	1	3
Total	35	100

From Holinger's Pediatric Laryngology and Bronchoesophagology. Lippincott, 1996.

Subglottic Stenosis Grading

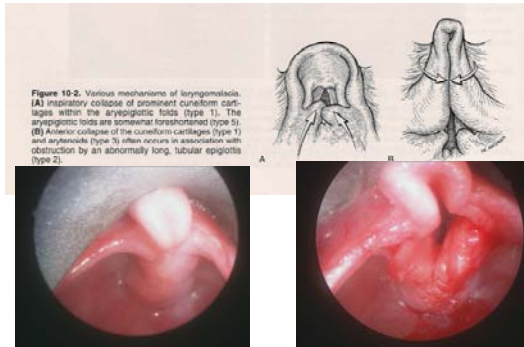
Classification	From	To
Grade I		
	No Obstruction	50% Obstruction
Grade II		
	51% Obstruction	70% Obstruction
Grade III		
	71% Obstruction	90% Obstruction
Grade IV	No Detectable Lumen	

Source: Lefkowitz AG. Current Diagnosis & Treatment in Otolaryngology—Head & Neck Surgery, 2nd Edition. <http://www.accessmedicine.com>
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Airway Sizing

Patient Age	ETT Size	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
Premature	ETT Size	2.0								
0-3 mos	ETT Size	2.5	3.0							
3 to 9 mos	ETT Size	3.0	3.5	4.0						
9 to 2 yrs	ETT Size	3.5	4.0	4.5	5.0					
2 yrs	ETT Size	4.0	4.5	5.0	5.5	6.0				
4 yrs	ETT Size	4.5	5.0	5.5	6.0	6.5	7.0			
6 yrs	ETT Size	5.0	5.5	6.0	6.5	7.0	7.5	8.0		
	ETT Size	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	

Laryngomalacia • Most common cause of stridor



Supraglottoplasty

- Surgery becomes necessary in less than 10 percent of patients with laryngomalacia
 - Apnea
 - Cyanosis
 - Failure to gain weight despite appropriate
 - Significant chest and neck retractions
 - Oxygen requirements
- Surgery will not eliminate stridor
 - Reduce the severity of the symptoms
 - Decrease apnea
 - Improve weight gain

Laryngomalacia Treatment-- Supraglottoplasty



Tracheomalacia

- Primary
 - Intrinsic anatomical abnormality (especially associated with esophageal atresia and tracheoesophageal fistula)
- Secondary
 - Extrinsic compression (vascular rings and slings)
- Acquired
 - Prolonged intubation, infections, relapsing polychondritis

Tracheomalacia Examples

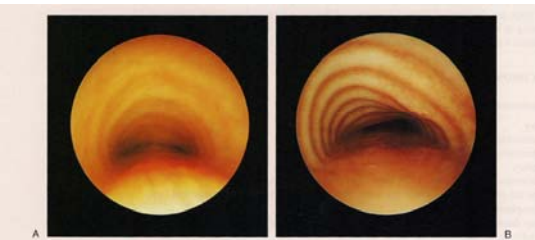
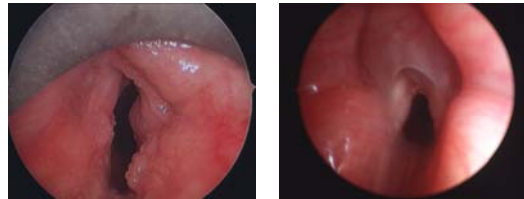


Figure 12-1. Tracheomalacia. (A) Endoscopic view of a 14-month old-boy shows the wide posterior membranous trachea, which collapses forward during expiration, producing symptoms of expiratory wheeze. (B) Right anterolateral compression of the midtrachea produces the classic endoscopic appearance of the aberrant innominate artery.

From Holinger's Pediatric Laryngology and Bronchoesophagology. Lippincott, 1996.

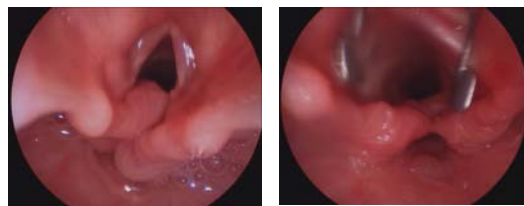
Hoarseness



Hoarseness



Cough & Chronic Aspiration

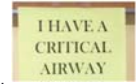


Airway Urgency & Emergency

- Contact ENT team sooner rather than later
- Keep the patient breathing spontaneously
- Consider a nasal trumpet or a LMA
- For pediatric patients at UHS a Formal Critical Airway Protocol is currently being drafted
 - Difficult to intubate patients
 - Patients with known or suspected airway pathology
- An Emergency Airway Cart with rigid instrumentation will be located in the OR and be taken to emergent situations throughout the hospital

Critical Airway Concept

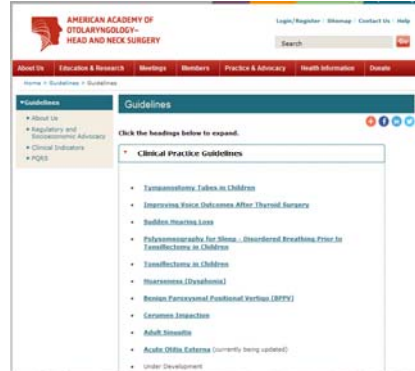
- Certain patients at UHS will be labeled as having a "Critical Airway"
 - Known difficult intubation by anesthesia
 - Acute airway issue
 - Anatomical abnormality where they cannot be intubated from above and are dependent on a tracheostomy
 - Patients who have just undergone an airway reconstruction
- Goal of "Critical Airway" label is to help facilitate care of patients who need rapid airway stabilization and increase vigilance for stabilized patients
- Patients with fresh tracheostomies do not necessarily meet criteria as a critical airway



24 Hour Coverage



AAO-HNS Guidelines



Tonsillectomy Guideline

STATEMENT 1. WATCHFUL WAITING FOR RECURRENT THROAT INFECTION: Clinicians should recommend watchful waiting for recurrent throat infection if there have been fewer than 7 episodes in the past year or fewer than 5 episodes per year in the past 2 years or fewer than 3 episodes per year in the past 3 years. *Recommendation based on randomized controlled trials with limitations and observational studies with a preponderance of benefit over harm.*

Criteria for Tonsillectomy

Table 5. Paradise Criteria for Tonsillectomy¹¹

Criterion	Definition
Minimum frequency of sore throat episodes	7 or more episodes in the preceding year, OR 5 or more episodes in each of the preceding 2 y, OR 3 or more episodes in each of the preceding 3 y
Clinical features (sore throat plus the presence of one or more qualifies as a counting episode)	Temperature > 38.3°C, OR Cervical lymphadenopathy (tender lymph nodes or >2 cm), OR Tonsillar exudate, OR Positive culture for group A β-hemolytic streptococcus
Treatment	Antibiotics had been administered in conventional dosage for proved or suspected streptococcal episodes
Documentation	Each episode and its qualifying features had been substantiated by contemporaneous notation in a clinical record, OR if not fully documented, subsequent observation by the clinician of 2 episodes of throat infection with patterns of frequency and clinical features consistent with the initial history ¹²

¹¹This list statement allows children who meet all other criteria for tonsillectomy except documentation to nonetheless qualify for surgery if the same pattern of reported illness is observed and documented by the clinician in 2 subsequent episodes. Because of this tendency to improve with time, a 12-month period of observation is usually recommended prior to consideration of tonsillectomy as an intervention.

Tonsillectomy Guideline

STATEMENT 3. TONSILLECTOMY FOR RECURRENT INFECTION WITH MODIFYING FACTORS: Clinicians should assess the child with recurrent throat infection who does not meet criteria in Statement 2 for modifying factors that may nonetheless favor tonsillectomy, which may include but are not limited to multiple antibiotic allergy/intolerance, PFAPA (periodic fever, aphthous stomatitis, pharyngitis, and adenitis), or history of peritonsillar abscess. *Recommendation based on randomized controlled trials and observational studies with a preponderance of benefit over harm.*

Otitis Media

- Definitions:
 - Recurrent acute otitis media
 - 3 episodes in 6 months or 4 episodes in 1 year
 - Chronic otitis media with effusion
 - Effusion that persists for 3 months or more

Table 3. Summary of guideline action statements.

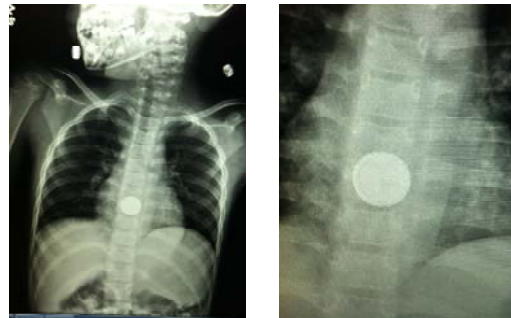
Statement	Action
1. OME of short duration	Clinicians should not perform tympanostomy tube insertion in children with a single episode of otitis media with effusion (OME) of less than 3 months' duration.
2. Hearing testing	Clinicians should obtain an age-appropriate hearing test if OME persists for 3 months or longer (chronic OME) OR prior to surgery when a child becomes a candidate for tympanostomy tube insertion.
3. Chronic bilateral OME with hearing difficulty	Clinicians should offer bilateral tympanostomy tube insertion to children with bilateral OME for 3 months or longer (chronic OME) AND documented hearing difficulties.
4. Chronic OME with symptoms	Clinicians may perform tympanostomy tube insertion in children with unilateral or bilateral OME for 3 months or longer (chronic OME) AND symptoms that are likely attributable to OME that include, but are not limited to, vestibular problems, poor school performance, behavioral problems, ear discomfort, or reduced quality of life.
5. Surveillance of chronic OME	Clinicians should reevaluate, at 3- to 6-month intervals, children with chronic OME who did not receive tympanostomy tubes, until the effusion is no longer present, significant hearing loss is detected, or structural abnormalities of the tympanic membrane or middle ear are suspected.

6. Recurrent acute otitis media (AOM) without middle ear effusion (MEE)	Clinicians should not perform tympanostomy tube insertion in children with recurrent AOM who do not have MEE in either ear at the time of assessment for tube candidacy.
7. Recurrent AOM with MEE	Clinicians should offer bilateral tympanostomy tube insertion to children with recurrent AOM who have unilateral or bilateral MEE at the time of assessment for tube candidacy.
8. At-risk children	Clinicians should determine if a child with recurrent AOM or with OME of any duration is at increased risk for speech, language, or learning problems from otitis media because of baseline sensory, physical, cognitive, or behavioral factors (see Table 2).
9. Tympanostomy tubes in at-risk children	Clinicians may perform tympanostomy tube insertion in at-risk children with unilateral or bilateral OME that is unlikely to resolve quickly, as reflected by a type B (flat) tympanogram or persistence of effusion for 3 months or longer (chronic OME).
10. Perioperative education	In the perioperative period, clinicians should educate caregivers of children with tympanostomy tubes regarding the expected duration of tube function, recommended follow-up schedule, and detection of complications.
11. Acute tympanostomy tube otorrhea	Clinicians should prescribe topical antibiotic eardrops only, without oral antibiotics, for children with uncomplicated acute tympanostomy tube otorrhea.
12. Water precautions	Clinicians should not encourage routine, prophylactic water precautions (use of earplugs, headbands; avoidance of swimming or water sports) for children with tympanostomy tubes.

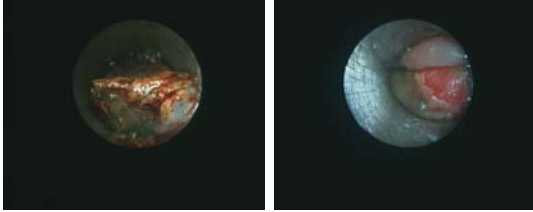
Foreign Bodies

- Certain Foreign Bodies constitute a surgical emergency:
 - Button batteries
 - Airway foreign bodies causing acute airway obstruction/distress
- Button battery injuries
 - External auditory canal and middle ear
 - Nasal cavity
 - Esophagus

Esophageal Foreign Body



Esophageal Injury



Sending Patients with Foreign Bodies to the Pediatric ENT Clinic

- Ear foreign bodies
- Nasal foreign bodies



- Protocol
 - Ensure that the object is not a button battery
 - Call Pediatric ENT Clinic and have the patient scheduled for the next clinic session. Foreign bodies will be added on during specific timeslots
 - Instruct the family to keep the patient NPO that morning in case in office removal is not successful

Images from <http://www.mefastina.com/nasal-foreign-bodies/> and http://www.entdoc.org/education/2011/06/01/Block_Links_4PC_Solar_Unusual_and_Interesting_Foreign-Body_Cases.html

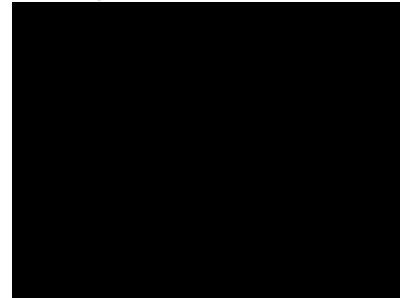
Patient Education/Partnership

- Nasal saline irrigation can help with
 - Nasal congestion
 - Post-Nasal Drip
 - Allergic Rhinitis
 - Chronic Sinusitis
 - Epistaxis



- It only works if patients use it!

Sinus Irrigation Demo



• From: <https://www.youtube.com/watch?v=aZquyuvJl5Q>

Nasal Saline

- Compliance with use can be difficult due to taste as concerns of a "drowning feeling"
- Stress importance of making nasal irrigation part of daily routine
- Encourage use with head tilted forward to keep salt water out of the throat
- Encourage irrigation to be done at bath time/during showers



Essential Trach Tenets

- Humidification is of the utmost importance
- Suctioning to an appropriate depth helps prevent mucosal irritation and injury



Images from: <http://sigone.blogspot.com/2012/10/tracheostomy-and-laryngectomy-vocabulary.html> & <http://www.tracheostomy.blogspot.com/>

Routine Trach Care

- ANY patient with a tracheostomy who is admitted should have the same equipment available

 1. Appropriately sized trach obturator taped to the bed to be used if accidental decannulation occurs
 2. Replacement tracheostomy tube equivalent in size and type to the trach tube currently in place. A second trach tube that is the next size smaller
 3. Suction equipment including an adequate number of appropriate sized suction catheters
 4. Oxygen or room air mist, as ordered
 5. Resuscitation bag with appropriate size mask
 6. Monitor appropriate for patient
 7. Surgical lubricant (Surgilube)
 8. Appropriately sized trach ties
 9. A placard denoting appropriate suction depth for the patient's particular trach. If in doubt about suction depth, measure obturator of the extra trach of the same size

Trach Care & Clinical Follow Up

- Patients with long-standing tracheostomies, should be seen in the ENT clinic at least every 6 months
- Follow up recommended sooner if:
 - Excessive stomal granulation tissue
 - Difficulty with trach changes
 - Difficulty suctioning
 - Bloody secretions
 - Any other concerns



In office procedures

- Ear and nose foreign body removal
- Flexible laryngoscopy & stroboscopy
- Nasal endoscopy
- Nasal cautery (limited)
- Cerumen removal
- Freulotomy (unless the child has teeth)

Management of Expectations

- Many ENT procedures can be done without general anesthesia
- However, this may require a brief period of assistance holding an anxious child still



- The ENT Clinic is NOT set up for conscious sedation

Clinic Scheduling

- Brady Green Clinic
 - 358-3505
- MARC Clinic
 - 450-9950



Current Health Plan Enrollment

- Aetna (commercial only)
- Amerigroup (commercial only)
- BCBS
- Carelink
- University Health Plan
- Community First Health Plan & CFHP CHIP
- Healthsmart
- Humana
- Medicare
- Nexcaliber
- Plan Vista
- + More soon....



How to Contact Me

- Pager (210) 513-1631
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- Email: mcevoy@uthscsa.edu



Note: Some night and weekend call coverage is being provided by Drs. Juan Bonilla and Don Moe. The ENT Resident on call will be able to direct consults to appropriate staff



Questions

