

Respiratory Examination

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Introduction

Hello and welcome to the respiratory module. I will be accompanying you through examination of the respiratory system in a cooperative child. Remember you must always adjust your approach and be flexible when examining a child, taking into consideration their age, personality and how well they are.

A complete examination of the respiratory system must always include an examination of the ears, nose and throat.

Acute Assessment

Your first encounter with a patient allows you to make some general observations. Most essential in immediate observation is the acute assessment of the child. This information determines the pace, the focus and the thoroughness of the exam. In emergency situations, an acute assessment may require direct medical intervention prior to the commencement of any further historical or physical investigations. If the child appears well you will likely have time to complete a thorough history and physical examination. Keep in mind that much of the diagnosis of the respiratory problem in a child is formed through your observations. In your initial observations you should obtain a general impression of the state of the child's health, observe the nature and effort of his or her breathing during both inspiration and expiration. Also observe any signs of respiratory problems, noisy breathing, the quality of any cough and the allergic salute or shiners.

It is also important to make a quick assessment of the parent accompanying the child. You can gain valuable information and build rapport by recognizing the emotional state of the parent.

History

Let's take a moment to briefly outline the major respiratory symptoms and historical points to be considered before conducting a physical exam. Age is an important factor when considering the common symptoms of childhood respiratory disease. Important presenting features of respiratory illness in children include cough, sputum, hemoptysis, dyspnea, chest pain, wheeze, and other forms of noisy breathing. Other symptoms that may be of importance include hyperventilation, eczema, exanthems, and symptoms associated with gastrointestinal disease. A history of recurrent or unusual respiratory infections, middle ear infections, or a previous history of croup can be clinically

important and should be elicited. It is important to identify any exercise or sleep related symptoms. A complete history of respiratory health should include information about the child's past medical history, labour and delivery history, prenatal history, family history and social history. Information regarding allergies, medications and immunizations should be sought.

Physical Exam Setup

Always ensure that your hands have been washed prior to the examination of any patient.

It is important to remember that in pediatrics you will encounter patients of widely varying ages and stages of development. Be sensitive to children's differing needs for privacy. Also provide the child with adequate covering during the examination.

Without revealing to the child that you are observing his or her breathing, note the respiratory rate as well as the depth, ease and rhythm of respiration. A reasonable approach to taking the respiratory rate is the number of breaths in 15 seconds multiplied by 4. In order to draw the child's attention away from breathing, you may palpate the radial pulse. Determine the respiratory rate and compare it with the normal values for the appropriate age group.

Normal Respiratory rates in children	
Age Group	Respiratory rate (breaths/min)
▪ 0 - 6 months	30 - 60
▪ 6 months – 1 year	30 - 50
▪ 1 - 3 years	24 - 40
▪ 3 - 5 years	22 - 34
▪ 5 – 12 years	14 - 25
▪ > 12 years	12 - 20

Inspection

Inspect the thorax both anteriorly and posteriorly, first noting movement of the chest wall, including symmetry, presence of retractions and the use of abdominal or accessory muscles in respiration. Next focus on the shape of the chest wall and any obvious deformities. Finally inspect the vertebral column for any irregularities.

Continue your inspection by examining the nose for nasal flaring. Examine the mucus membranes of the lips and the mouth for the presence of central cyanosis. Additionally, inspect the oropharynx for any signs of inflammation. In the case of a respiratory infection, it is common to have involvement of the ears. Always inspect the ears in the complete examination of the respiratory system.

Examine the nail beds for evidence of peripheral cyanosis, clubbing or any other abnormalities.

Palpation

The trachea can be palpated in the supra-sternal notch and should be palpated for mobility and any deviation from the midline. Palpate the lymph nodes of the head and neck. The entire neck and chest region should be palpated. Crepitations under the skin may be suggestive of an air leak. In most instances chest excursion can be evaluated by having the child take a deep breath. Note the degree of chest excursion and the left to right symmetry. If abnormal chest movement is suspected after observation, one can use palpation to measure chest excursion. Place your hands around the lower ribs posteriorly and oppose the thumbs on either side of the spine. On inspiration, both thumbs should move equal distances from their original positions.

When age allows palpate for tactile fremitus using the “99-test”. This is normally present on both sides equally. In order to assess all lobes of each lung, you must evaluate for tactile fremitus both posteriorly and anteriorly.

Pulsus paradoxus is not a routinely used test in children, although it is useful in restrictive pericarditis, cardiac tamponade, asthma or situations where serious airway obstruction is suspected.

Percussion

Percussion is a valuable technique if performed properly. It allows one to evaluate regions of the chest based on whether they sound hyper-resonant, dull or flat. Cardiac dullness is normally present. Remember, percussion in children calls for a much lighter touch than it does in adults. One should learn to feel as much as hear the audible sounds.

Auscultation

Each lobe of both lungs should be auscultated individually using the diaphragm of a pediatric stethoscope. Remember that the lower lung lobes must be auscultated posteriorly and that sounds from the right and left sides should be compared. Listen separately to inspiration and expiration. The normal ratio is 3:1. Characterise the normal breath sounds as bronchial, broncho-vesicular or vesicular. Listen for adventitious sounds such as crepitations, wheezes or rubs. Differentiate upper vs. lower airway obstruction. When consolidation is expected it is useful to auscultate for vocal resonance, if the child's age allows.

Conclusion

This concludes our examination of the respiratory system. You may choose to review an individual component or a technique used in the examination.