JoVE: Science Education

General Approach to Auscultation in the Physical Exam

--Manuscript Draft--

Manuscript Number:	10153
Full Title:	General Approach to Auscultation in the Physical Exam
Article Type:	Manuscript
Section/Category:	Manuscript Submission
Corresponding Author:	Jaideep Talwalkar UNITED STATES
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	
Corresponding Author's Secondary Institution:	
First Author:	Jaideep Talwalkar
First Author Secondary Information:	
Order of Authors:	Jaideep Talwalkar
Order of Authors Secondary Information:	

Author Name: Jaideep S. Talwalkar, MD
Clinical Skills Education Title: General Approach to Auscultation in the Physical Exam

Overview

Through auscultation, the clinician is able "to eavesdrop on the workings of the body" (Markel, 2006) to gain important diagnostic information. Historically, the term "auscultation" was synonymous with "immediate auscultation," in which the examiner's ear was placed directly against the patient's skin. Although this was standard practice for centuries, the method proved inadequate in nineteenth-century France, due to social norms and suboptimal diagnostic yield. This led René Laënnec to invent the first stethoscope in 1816 (**Figure 1**), a tool that has since become inseparable from auscultation in modern clinical practice, and patients hold it as a symbol of honor and trustworthiness among those who carry them (Jiwa, et al., 2012).

The stethoscope has undergone many technologic advances since Laënnec's initial hollow wooden tube. Practically speaking, the provider must understand the difference between the two sides of the modern stethoscope's chest piece: the diaphragm and the bell (**Figure 2**).

When applied firmly against the patient's skin, the diaphragm transmits high frequency sounds. Sounds from within the patient vibrate the membrane of the diaphragm. These vibrations result in the propagation of sound through the column of air inside the stethoscope and into the examiner's ears.

Conversely, when applied lightly, the bell transmits low frequency sounds. The bell acts as a cup that directly transmits sounds from within the patient through the tubing of the stethoscope. Pressing more firmly with the bell can stretch the underlying skin, essentially turning it into a diaphragm.

Auscultation is used in a wide variety of clinical settings. It most commonly plays a role in the examination of the chest, heart, abdomen, and vasculature.

Procedure

1. Throughout the entirety of the patient encounter, use your un-aided sense of hearing to identify findings that may be diagnostically useful (*e.g.*, hoarse voice or grunting with expiration).

2. Before patient contact, decontaminate the stethoscope by wiping it with a 70% alcohol pledget, a standardly available antiseptic rinse used for hand hygiene, or a hospital surface disinfectant (Maki DG, 2014).

3. Positioning of the Stethoscope

3.1 Place the stethoscope ear buds in your ears with the tips pointing forward in order to create a seal that drowns out ambient noise.

Commented [AS1]: The author included these references; I think they might be ok to use in the accompanying manuscript. AS

Commented [AS2]: The author asked if it would be possible to create an illustration here. For your consideration. AS

From the author: "I can't find anything on Shutterstock. This should be a drawing of a doctor with his ear on the patient's chest. Here's an example: http://circ.ahajournals.org/content/98/14/1449/F6.expansion.html

Commented [AS3]: I think this is an interesting piece of data but I perhaps wouldn't include it in the video script. AS

3.2 Confirm which side of the chest piece (*i.e.*, the bell or the diaphragm) is active by gently tapping on one side or the other.

3.2.1 Rotate the chest piece until you hear and feel a click to switch between the bell and diaphragm as needed. Certain stethoscopes (*e.g.*, 3M Littman Master Cardiology) have only one side to the chest piece, which can be used as a diaphragm and a bell depending on the amount of pressure applied against the patient's skin. Firm pressure makes the chest piece a diaphragm, while light pressure makes it a bell.

3.3 Hold the chest piece in your dominant hand. There are two commonly used handgrips for the chest piece:

3.3.1 Support the chest piece between the middle phalanges of your second and third fingers, with your thumb tucked under the tubing to keep it off of the patient's skin, which can potentially reduce noise artifacts.

3.3.2 Support the chest piece between the distal phalanges of your thumb and second finger. When using this grip, tuck the remaining fingers under the tubing to keep it off the patient's skin, though in certain maneuvers, these fingers need to be held in slight extension to keep the fingers themselves off of the patient's skin (*e.g.*, auscultation at the base of the heart).

4. Refer to the dedicated videos on the cardiac, pulmonary, abdominal, and vascular examinations for specific details on the techniques of auscultation for these areas.

Commented [TJ4]: I started typing these out but then realized that I was just duplicating what you must have listed in these other dedicated chapters.

4.1 As you listen, especially to heart sounds, consider the physiology and mentally picture the anatomy which may help to parse the variety of sounds that are heard simultaneously.

4.2 Train the mind to form a visual representation of the sounds being heard, as this may help to better clinically characterize the sounds (**Figure 3**). Certain electronic stethoscopes allow examiners to record sounds and actually create visual representations of the findings.

Summary

This video covered the general considerations related to auscultation during the physical examination. Auscultation is typically done with the aid of a stethoscope, though certain findings, especially on the respiratory examination, may be evident to the un-aided ear. While specific stethoscope techniques vary based on each individual portion of the exam, in all circumstances, the clinician must hold the stethoscope properly and recognize the difference between the bell and the diaphragm in order to optimize the diagnostic utility of auscultation. Additionally, in the interest of reducing nosocomial spread of infection, stethoscopes should be decontaminated regularly. Making meaning out of the variety of sounds that one appreciates with the stethoscope can seem daunting to the early learner. Through deliberate practice, with consideration of anatomy and physiology of the structures being examined, and possibly the

use of visual representation of sound, auscultation becomes a powerful diagnostic tool for the clinician.

Figures

Figure 1: A portrait of René Laënnec, the inventor of the stethoscope.
Credit: Wellcome Library, London.

Figure 2: Parts of a Stethoscope
A photograph of a stethoscope with its parts labeled.

Figure 3: Visual representation of heart sounds.
An example of a waveform image generated from heart sounds.

Commented [AS5]: Attached is an example of a figure. Perhaps it is possible to take a photograph during the video shoot and apply the labels?
AS

Commented [TJ6]: See examples here: http://www.easyauscultation.com/systolic-murmur

Commented [AS7]: One way to approach this is to just show a drawing, but perhaps it is possible to create an original waveform image corresponding to heart sounds. Some options for heart sounds recordings are:

Free samples at
http://www.littmann.com/wps/portal/3M/en_US/3M-Littmann/stethoscope/littmann-learning-institute/heart-lung-sounds/
Can be used with proper attribution

Or from here:
http://www.med.umich.edu/lrc/psb_open/repo/primer_heartsound/primer_heartsound.html

Also can be used with proper credit.

References

1. Markel H. The Stethoscope and the Art of Listening. New England Journal of Medicine. 2006;354: 551-553.

2. Jiwa M, et al. Impact of the Presence of Medical Equipment in Images on Viewers' Perceptions of the Trustworthiness of an Individual On-Screen. J Med Internet Res. 2012;14: e100.

3. Maki DG. Stethoscopes and Health Care-Associated Infection. Mayo Clinic Proceedings. 2014;89: 277-280.

Photo or Graphic File
Click here to download Photo or Graphic File: Jaideep Talwalkar_Auscultation_Figure 1.jpg

LAENNEC.

Photo or Graphic File
Click here to download Photo or Graphic File: Talwalkar_Auscultation_Figure 2.jpg