

Skill Building

Now hear this: How to identify heart sounds

FEELING A LITTLE uncertain about your technique for identifying normal heart sounds, extra heart sounds, and systolic and diastolic murmurs? In this article, we'll help you by going through the entire auscultation procedure step-by-step, including tips on the right equipment to use, how to position your patient correctly, and how to actually auscultate heart sounds.

Did you hear that?

Heart sounds are the result of turbulent blood flow through the heart. The “lub-dub” sounds are referred to as S_1 and S_2 . The S_1 heart sound (“lub”) occurs when the mitral and tricuspid valves shut; this is the beginning of systole (ventricular contraction). The S_2 heart sound (“dub”), indicating the beginning of diastole, occurs when the aortic and pulmonic valves shut. The ventricles are filling at this time.

Sometimes, you'll hear an extra heart sound at the end of S_2 . This is called S_3 , or ventricular gallop. It occurs in fluid overload (as in heart failure); the ventricle shudders as extra fluid is pushed into it.

You might also hear an extra heart sound right before S_1 . Called S_4 , it occurs when the atrium shudders to push blood into a tight ventricle, as in uncontrolled hypertension.



This position accentuates or brings out aortic murmurs. You may easily miss the soft diastolic murmur of aortic regurgitation unless you use this position.

A blowing sound heard between S_1 and S_2 is called a systolic murmur. If the blowing sound is heard after S_2 and before S_1 , the patient has a diastolic murmur. A continuous rubbing sound is a pericardial friction rub.

For more on heart sounds, see *Eavesdropping on the heart*.

Eavesdropping on the heart

Normally, the heart produces two basic sounds: S_1 and S_2 , or, less formally, “lub” and “dub.” On an ECG, S_1 normally occurs just after the QRS complex; S_2 is at the end of the T wave. S_3 and S_4 are less common.

S_1 (“lub”) is heard at the start of the cardiac contraction, called systole. It's generated by the closing of the mitral and tricuspid valves and vibration of the ventricle walls (caused by increased pressure).

S_2 (“dub”) is heard at the end of ventricular systole and signifies the begin-

ning of diastole. Ventricular pressure falls off, and a slight normal backflow of blood occurs from the aorta and pulmonary artery. In response, the aortic and pulmonic valves close. Vibration associated with these events produces the sound.

S_3 , often called a ventricular gallop, is sometimes heard after S_2 . It sounds like the word “Kentucky.” Vibration that occurs during rapid, passive ventricular filling causes it. Early in diastole, the mitral and tricuspid valves open, allowing blood to flow into the ventricles. S_3 is considered normal in children and young

adults, pregnancy, and highly trained young adult athletes. In older individuals, it's heard in heart failure. S_3 is best heard using the bell of the stethoscope, with the patient in the left lateral position.

S_4 , also called an atrial diastolic gallop, sounds like the word “Tennessee.” It's produced when there's resistance to ventricular filling and is heard just before S_1 . An S_4 sound may be heard in hypertension and left ventricular hypertrophy. It's best heard at the apex with the patient in the left lateral position.

When listening to heart sounds, you start over the aortic valve area, which is at the second intercostal space (ICS), right sternal border. Next, move to the pulmonic valve area. This valve is located at the second ICS, left sternal border. Then, listen at Erb's point, at the third ICS, left sternal border, and next move down to the tricuspid valve area at the fifth ICS, left sternal border. Finally, move to the mitral valve area, fifth ICS at the midclavicular line.

For more on auscultating heart sounds, see *The art of auscultation*.

So now you know what heart sounds you're listening for and where you should hear them. And, of course, you know that you're using your stethoscope to amplify the sounds. But do you know when it's better to use the diaphragm of the stethoscope and when it's better to use the bell? Let's take a closer look.

Know your stethoscope!

The diaphragm of the stethoscope is more sensitive to the relatively high-pitched sounds of S₁ and S₂, aortic

and mitral regurgitation murmurs, and pericardial friction rubs. Listen over the precordium with the diaphragm, pressing it firmly against your patient's chest.

The bell is more sensitive to low-pitched S₃ and S₄ sounds and the murmur of mitral stenosis. Apply the bell lightly, with just enough pressure to produce an air seal. To help maintain light pressure, try resting the heel of your hand on your patient's chest.

When you press the bell firmly, it functions more like the diaphragm, stretching the underlying skin. With this technique, low-pitched sounds, like S₃ and S₄, may disappear—an observation that may help with identification. High-pitched sounds, such as clicks and opening snaps, will persist or get louder.

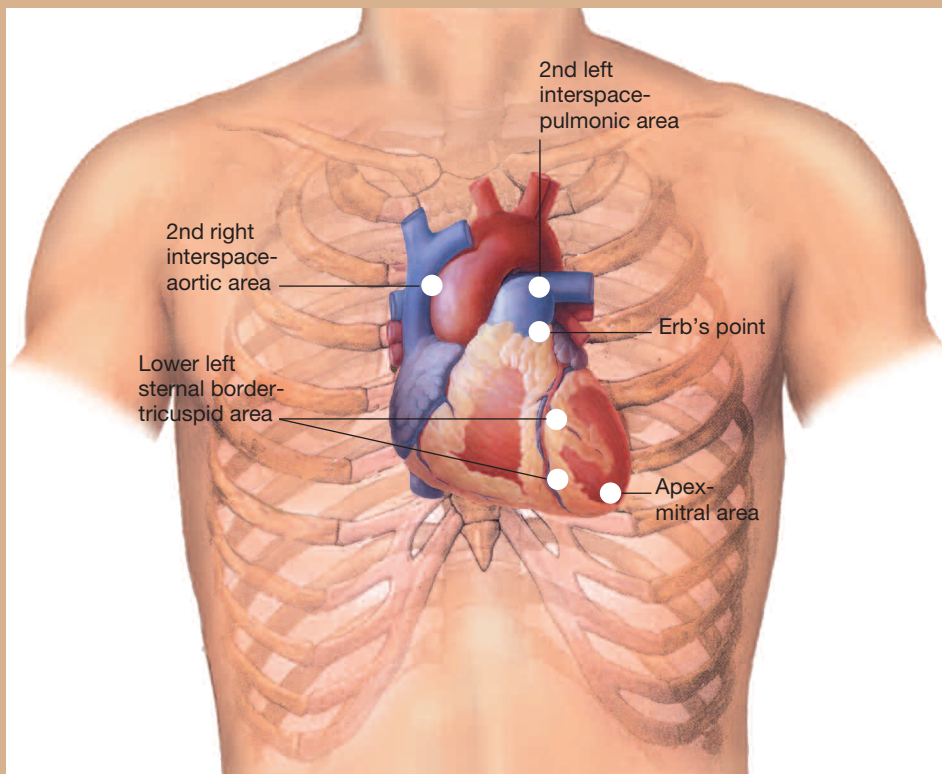
How you position your patient plays a big role in how well you can hear his heart sounds. Let's find out more about that.

Position matters

Listen for heart sounds with the patient supine or semi-recumbent. For new patients and patients needing a

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The art of auscultation



When auscultating for heart sounds, place the stethoscope over each of the four different valve sites and at Erb's point.

Always perform your cardiovascular assessment in this order:

- Place the stethoscope on the second intercostal space (ICS) along the right sternal border. This is the aortic valve area, and here, blood moves from the left ventricle during systole, crosses the aortic valve, and flows out and through the aortic arch.
- Put the stethoscope on the pulmonic valve area, located in the second ICS at the left sternal border. In the pulmonic area, blood ejected from the right ventricle during systole crosses the pulmonic valve and flows through the main pulmonary artery.
- Listen at Erb's point, located in the third ICS at the left sternal

border. At Erb's point, you can hear aortic and pulmonic sounds.

- Move the stethoscope to the tricuspid valve area, which lies in the fifth ICS along the left sternal border. You can hear sounds that reflect blood moving from the right atrium across the tricuspid valve and into the right ventricle during systole.
- The last auscultation point is the mitral valve, or apical, area. It's located in the fifth ICS near the midclavicular line. (Note: If the patient has an enlarged heart, the mitral area may have shifted closer to the anterior axillary line.) In the mitral area, sounds reflect blood flow across the mitral valve and into the left ventricle during diastole.

complete cardiac examination, the following positions will help you listen for mitral stenosis and aortic regurgitation:

- Ask your patient to roll partly onto his left side in the left lateral position. This brings the left ventricle close to the chest wall. Place the bell of your stethoscope lightly on the apical impulse. You'll be able to hear S_3 and S_4 heart sounds and mitral valve murmurs, especially mitral stenosis. If you don't use this position, you may miss these important findings.
- Ask your patient to sit up, lean forward, exhale com-

pletely, and stop breathing in expiration. Press the diaphragm of your stethoscope on your patient's chest, listening at each valve site. Remember to pause periodically so your patient can breathe. This position accentuates aortic murmurs; the soft diastolic murmur of aortic regurgitation may easily be missed if you don't use this position.

What to document

Be sure to document your findings in the medical record. If you hear an abnormality, include the follow-

ing characteristics in your documentation:

- location on the chest wall
- timing of the sound (during systole or diastole; described as early, middle, or late); sounds heard throughout systole are often referred to as pansystolic or holosystolic
- intensity of the murmur, identified as I, very faint; II, quiet; III, moderately loud; IV, loud; V, very loud; or VI, heard with a stethoscope off the chest
- pitch, described as high, medium, or low
- quality of the sound, described as blowing, harsh, or musical
- location of radiation of the sound away from where it is heard the loudest. **LPN**

Selected references

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