
The EKG: A Useful Electrical Snapshot of the Heart

By Gigi Reed, MD October 23, 2026

Please note that I am not a cardiologist and my explanation of the EKG might be faulty or too simplified. That having been said, I will say that few medical tests are as familiar—and at the same time as frequently misunderstood—as the electrocardiogram, better known as an EKG. It is quick, painless, inexpensive, and often the first test ordered when someone has chest discomfort, palpitations, dizziness, or shortness of breath. While an EKG can reveal a great deal, it is not a complete inspection of the heart. It is best understood as an electrical snapshot taken at one moment in time.

Every heartbeat begins with an electrical impulse. A natural pacemaker in the upper right chamber of the heart, called the sinoatrial node, fires an impulse that spreads through the upper chambers, then travels through a relay system to the lower chambers. The upper chambers contract first, moving blood into the lower chambers; the lower chambers then contract and pump blood to either the lungs or the rest of the body.

An EKG records that electrical activity - it does not send electricity into the body. A standard EKG depicts 12 different “views” of the heart’s electrical activity.

The familiar EKG tracing is made up of repeating waves, each corresponding to a part of the heartbeat.

The P wave is the small first bump. It represents electrical activation from the sinoatrial node, depicting contraction and relaxation of the atria. The presence of a P-wave indicates “sinus” rhythm, meaning the ventricles get paced by the sinoatrial node. The T wave represents the ventricles’ contraction and relaxation. The QRS complex is or are the tall, sharp spike(s) that follow(s). The QRS segment depicts the electricity between atria and ventricles.

All these possible waves and spikes can have different spaces in-between, heights, lows, widths, gradients, etc. For example, when the P-wave is missing, we suspect atrial fibrillation, or a-fib, meaning the ventricles are not paced by the atria anymore and they will now contract in irregular intervals. If the P-wave and R-spike (from the QRS complex) are too far apart, we might call it a heart block, meaning that the electrical impulse might be blocked or delayed when reaching the ventricle.

Although an abnormal EKG often raises concern about the heart, many non-cardiac factors can change the tracing.

Body habitus matters. In people with obesity, the thicker chest wall can weaken the electrical signal reaching the skin electrodes, producing low-voltage QRS complexes and sometimes making it harder to detect issues.

A raised diaphragm can also shift the heart's apparent electrical axis. Very muscular individuals may have similar signal effects.

Potassium, calcium, and magnesium imbalances can alter the EKG dramatically.

Medications can also leave their mark. Some heart drugs, antibiotics, antidepressants, antipsychotic medications, and antiarrhythmic drugs may alter intervals or provoke rhythm changes. Even lung problems, such as a pulmonary embolism, can possibly be seen on an EKG.

Finally, not every unusual tracing reflects disease. Muscle tremor, shivering, loose electrodes, movement, and electrical interference can create artifacts. And some findings, such as a slow resting heart rate in a well-trained athlete, may simply be normal variations.

A normal EKG is reassuring, but it does not guarantee a normal heart. Because it records only a few seconds of electrical activity, it can easily miss intermittent problems.

An EKG also cannot always "see" heart attacks, nor assess heart valves, measure pumping strength, or visualize structural defects. Valve stenosis or leakage, heart failure with a normal rhythm, small congenital defects, and coronary spasm may require other tests such as echocardiograms, stress testing, prolonged rhythm monitoring, blood tests, or cardiac catheterization.

The EKG is an electrical window into the heart. It can reveal much, but it cannot see everything - and is certainly a great tool to work with.

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