

# Carson and Appleton, MD

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## WHAT IS EKG AXIS DEVIATION?

The EKG that we obtain represents the electrical activity of the heart and it gives us valuable information in terms of the rhythm of the heart as well as the heart structure. The EKG represents 12 separate “electrical pictures” of the heart. The first 6 represents limb leads and the second 6 represent chest leads. There are occasions when an EKG, performed on a routine basis for either sports physicals or medication checks, show a right or left axis deviation. This may cause some concern that there is an abnormality of the heart. While these EKG’s are technically abnormal, most of the time, the heart itself is structurally normal.

There are times when we obtain EKGs that are abnormal, yet the heart itself may be actually quite normal. The two most common abnormalities we see are right or left axis deviation. The axis of the EKG represents the average direction of flow of electricity that is given off when the heart contracts. The heart is a muscle that contains millions of cells, each of which give off a small amount of electricity. This electricity given off has a voltage and a direction of flow. The axis of the EKG represents the average of the heart muscle cells flow of electricity. Normally, the axis of an EKG for children varies anywhere from 0 degrees to 90 degrees. Whenever the axis of an EKG is less than 0 degrees (or a negative number), this represents a left axis deviation. Whenever the axis is greater than 90 degrees, this represents a right axis deviation. Most of the time when our patients have either a right or left axis deviation, this represents a normal heart that during its development was slightly twisted either to the right or left. This twisting created this difference in the direction of flow when the heart contracts. On occasion, right axis deviation can mean that the right side of the heart is either enlarged or thicker than normal. Likewise, if there is left axis deviation, this can indicate either that the left ventricle is larger than normal or thicker than normal. When there is an abnormality of the heart, there is a corresponding increase in voltage independent of the axis of the EKG. Most of the time when we see right or left axis deviation, we do not see corresponding increase in voltage in the chest leads of the EKG. This tell us the heart is structurally normal but is slightly twisted to the right or left.

Results of the EKG are passed on to your pediatrician for further evaluation. The pediatrician will perform a physical exam to see if there are any additional findings suggestive of a cardiac abnormality. If other findings indicate a possible abnormality, then an echocardiogram (sonogram) of the heart is performed. An echocardiogram provides us with an actual picture of the heart. We are able to measure the size of the different chambers of the heart, wall thickness, function, structure of the valves and blood flow patterns within the heart.

The EKG can also show rhythm abnormalities. These include premature ventricular beats, premature atrial beats, skipped beats, dropped beats, faster than normal heart beats (tachycardia) or slower than normal heart beats (bradycardia). Some of these abnormalities are common and do not cause harm. Some of these abnormalities require further testing. This testing includes 24 hour holters which records the heart beat/EKG for 24 hours. This tells us how many normal and abnormal beats the patient has during normal daily activities.

An event monitor may be ordered to tell us what the EKG rhythm is when the patient has certain symptoms. A treadmill stress may be ordered as well. This is performed at the hospital with the cardiologist present. The patient runs on a treadmill while their EKG/blood pressure are recorded. This tells us how the patient heart responds to the activity.

If you have any questions concerning axis deviation, please feel free to talk with one of us.

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