

# Difference Between Tachycardia and Bradycardia

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## Key Difference – Tachycardia vs Bradycardia

During the clinical examination of the [cardiovascular system](#), the heart rate is measured by the clinician to identify any abnormal clinical signs related to it. Tachycardia and bradycardia are two such clinical features identified during the examination of a patient. **If the [heart rate](#) is more than 100 beats per minute it is called tachycardia and if it is less than 60 beats per minute it is identified as bradycardia.** This is the key difference between tachycardia and bradycardia. An important point that has to be emphasized is that these changes in the heart rate are more appropriate to be considered as clinical manifestations of various disorders and pathological conditions rather than individual disease entities. All the abnormalities related to the rate and the rhythm of the heartbeat can be easily identified using electrocardiograms.

## What is Tachycardia?

A heart rate that is greater than 100 beats per minute in an adult is identified as tachycardia.

The main causes of tachycardia are,

- Increased body temperature
- Stimulation of the [sympathetic nervous system](#) due to various causes such as [anxiety](#), blood loss and etc.
- Different toxic conditions of the heart such as [arrhythmias](#).



**Figure 01: ECG Showing Tachycardia**

The heart rate increases by 18 beats/min for each 1°C increase in body temperature up to a body temperature of about 45° C. Beyond that limit, the deterioration of the functional and structural stability of the [cardiac muscles](#) results in a progressive decline of the heartbeat. The physiological basis of this phenomenon is the increase in the rate of [metabolism](#) of the sinus node following the rise in body temperature.

## **What is Bradycardia?**

When the heart rate is less than 60 beats per minute that condition is termed as bradycardia.

### **Bradycardia in Athletes**

The heart rate of athletes has been found to be lower than that of an ordinary adult. To understand the physiological mechanism behind this, it is important to identify the factors that influence the heart rate.

The cardiac output is the volume of blood that is pumped out by the heart per unit time. The body tries to maintain this at a constant level in order to adequately supply the body's demand for oxygen.

The value of cardiac output is calculated as shown below.

$$\text{cardiac output} = \text{stroke volume} \times \text{heart rate}$$



**Figure 02: ECG showing Bradycardia**

Various endurance exercises that are included in the daily exercise schedule of the athletes considerably increase the size of the heart as well as the strength of the cardiac muscles. Thus, they have a very high stroke volume than that of a normal person. In order to maintain the cardiac output at the appropriate level, the heart rate has to go down significantly. Therefore, athletes have a low heart rate which is identified as the bradycardia in athletes. This condition is not a disease and is merely a physiological adaptation.

### **Role of Vagal Stimulation in the Occurrence of Bradycardia**

Various circulatory reflexes can stimulate the vagal nerve endings in the cardiac muscles and this results in the release of acetylcholine. Acetylcholine activates the [parasympathetic nervous system](#) and the end result is the abnormal decrease in the heart rate.

### **What is the Difference Between Tachycardia and Bradycardia?**

#### **Tachycardia vs Bradycardia**

A heart rate that is greater than 100 beats per minute in an adult is identified as

When the heart rate is less than 60 beats per minute that condition is termed as

tachycardia.	bradycardia.
<b>Heart Rate</b>	
The heart rate is abnormally high.	The heart rate is abnormally low.
<b>Nervous System</b>	
Sympathetic nervous system is usually activated.	Parasympathetic system is activated.

## Summary – Tachycardia vs Bradycardia

A heart rate that is greater than 100 beats per minute in an adult is identified as tachycardia. When the heart rate is less than 60 beats per minute that condition is termed as bradycardia. This is the basic difference between tachycardia and bradycardia. Different clinical conditions can result in these abnormalities of the heart rate. Therefore, the correct identification of the underlying pathology and the proper treatment of it are the key to getting rid of them.

### References:

1. Hall, John E., and Arthur C. Guyton. Guyton and Hall textbook of medical physiology. 12th ed. Philadelphia, PA: Elsevier, 2016.

### Image Courtesy:

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