

Vital signs measurements

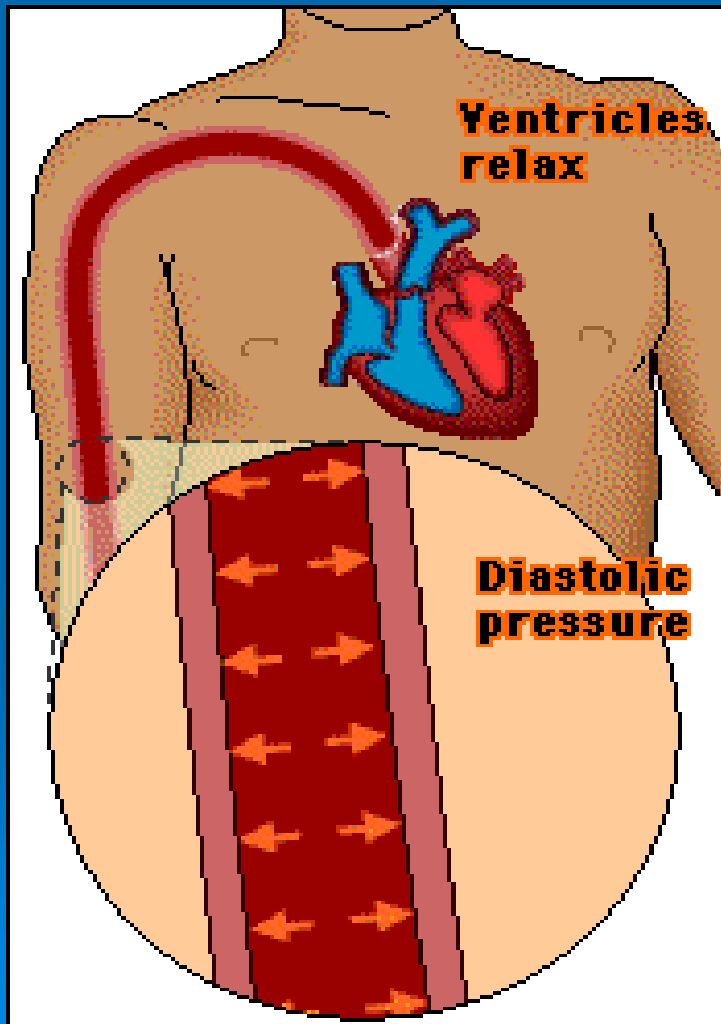


Blood pressure



- **What Is Blood Pressure?**
- Blood pressure is the force of blood against the walls of arteries. Blood pressure is recorded as two numbers — the systolic pressure (as the heart beats) over the diastolic pressure (as the heart relaxes between beats). The measurement is written one above or before the other, with the systolic number on top and the diastolic number on the bottom. For example, a blood pressure measurement of 120/80 mmHg (millimeters of mercury) is expressed verbally as "120 over 80."
- Normal blood pressure is less than 120 mmHg systolic and less than 80 mmHg diastolic.

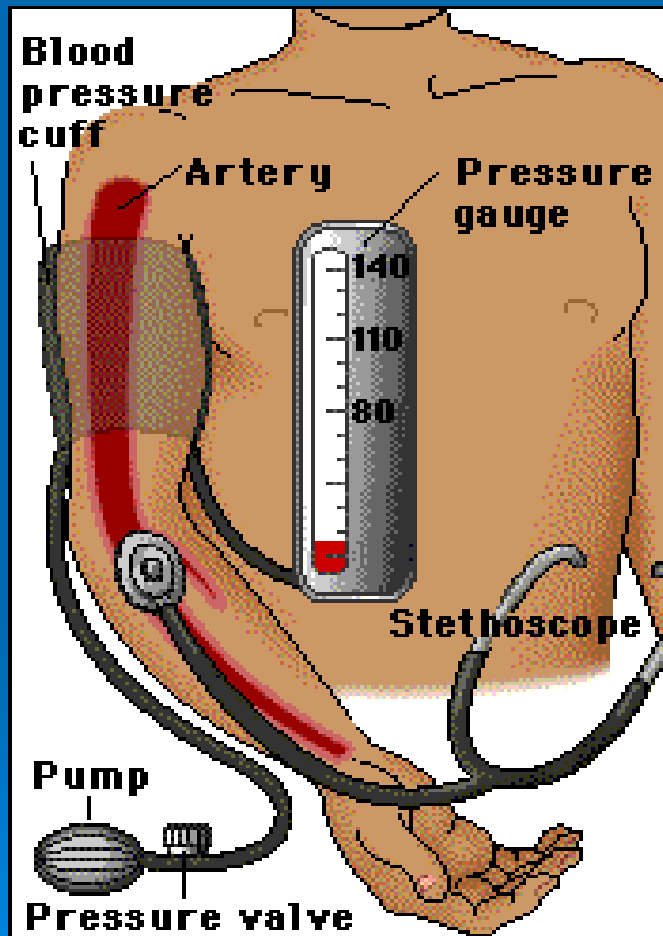
Measuring blood pressure



Systolic pressure: The pressure in the artery during the ventricular contraction phase of the heart cycle. The pressure in the vessel is highest at this time.

Diastolic pressure: The pressure in the artery when the ventricles are relaxed. The pressure is at its lowest point, though it does not drop all the way to zero.

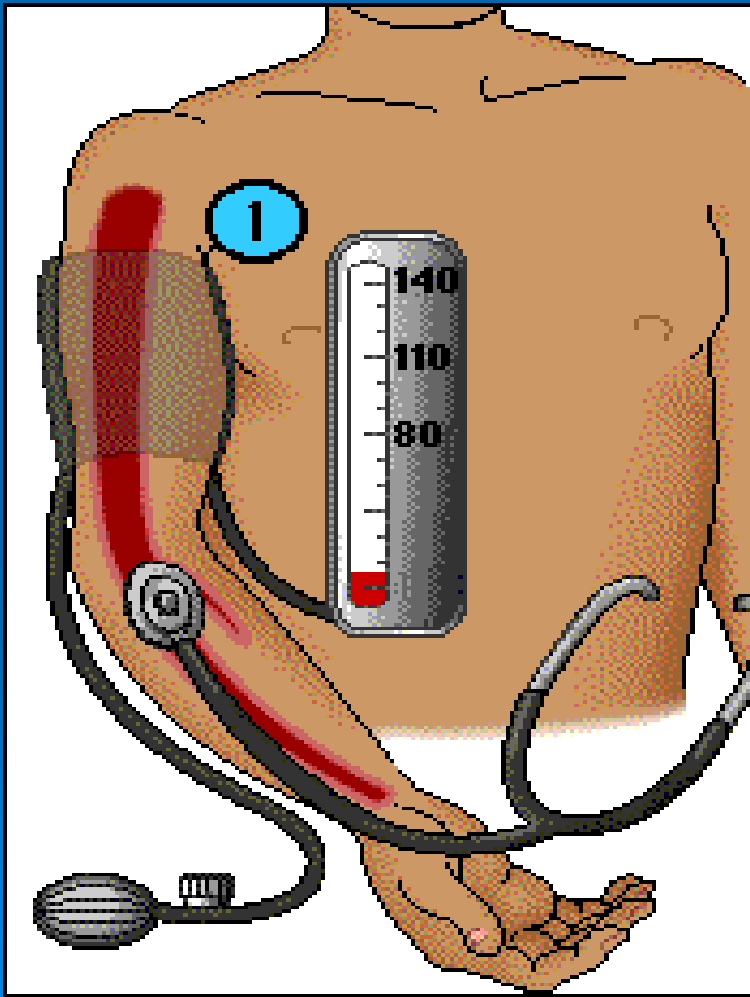
Measuring Blood Pressure



- We find the blood pressure by using an instrument called a sphygmomanometer (pronounced sfig-mo-muh-NAM-eh-ter). This device consists of an inflatable cuff that is wrapped around the upper arm and a gauge that measures pressure. A stethoscope is used to listen to the different sounds that occur.

Procedure for Measuring Blood Pressure

1. You begin by inflating the cuff. Once the pressure in the cuff is above the subject's systolic pressure (140 in this example), blood cannot flow below the cuff. You will hear no sound in the brachial artery when you listen with the stethoscope.
2. As you release the pressure valve and slowly deflate the cuff, blood begins to flow through the artery.
3. When the pressure in the cuff is between the systolic and diastolic pressure, you can hear a tapping sound with each pulse. The first tapping sound you hear indicates that blood has entered the artery. Record this reading as the systolic pressure. You continue to deflate the cuff until the tapping sounds cease.



Measuring blood pressure

1. Wash hands and identify patient
2. Explain procedure
3. Position patient comfortably, either seated or lying.
4. Position patient's arm by supporting it on the bed or arm of chair with the palm turned upward; push sleeve up to shoulder
5. Place cuff 2 to 3 centimetre above bend in elbow, wrap it around the arm smoothly, and secure it
6. Clean earpiece of the stethoscope and put earpiece in your ears; place diaphragm of stethoscope over brachial artery; hold in place with one hand
7. Close air valve and pump bulb to inflate the cuff; continue pumping until the gauge reads 180 or until you can no longer hear the pulse beat

Measuring blood pressure

8. Open air valve and allow the air to escape slowly
 9. Listen for first sound (systolic) and read the gauge as soon as the sound occurs
 10. Continue to release air; note muffled sound (or no sound, whichever comes first) and take a second reading (diastolic)
 11. Deflate cuff completely. Repeat steps 6 to 9 if you need to recheck to obtain an accurate reading
- Record the blood pressure as a fraction:

Systolic reading

Diastolic reading

- **The systolic pressure** is the maximum pressure in an artery at the moment when the heart is beating and pumping blood through the body.
- **The diastolic pressure** is the lowest pressure in an artery in the moments between beats when the heart is resting.

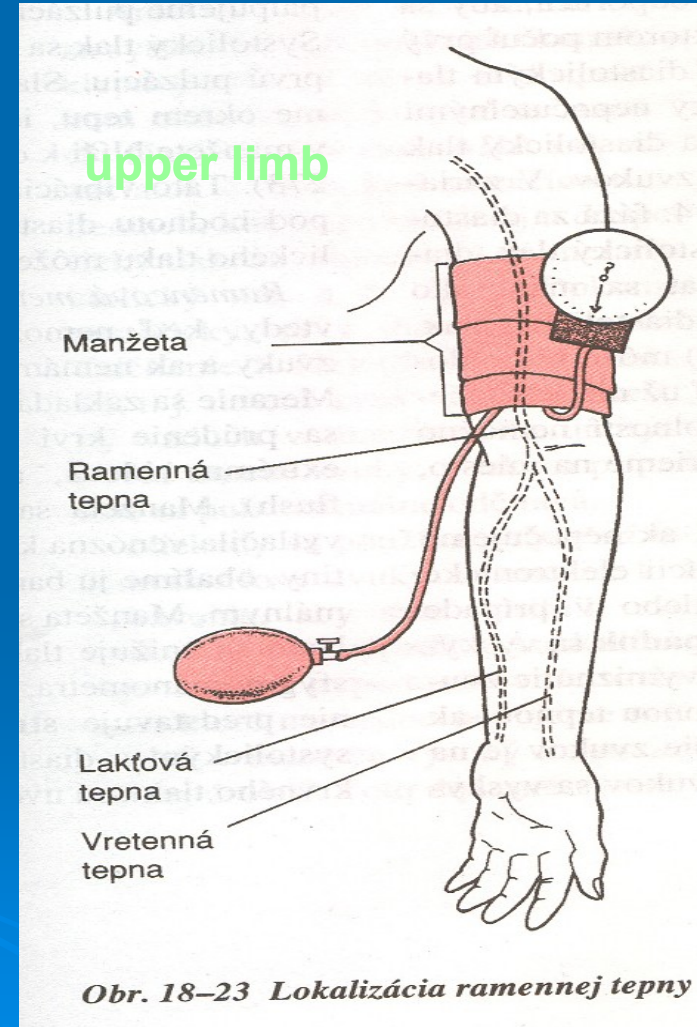
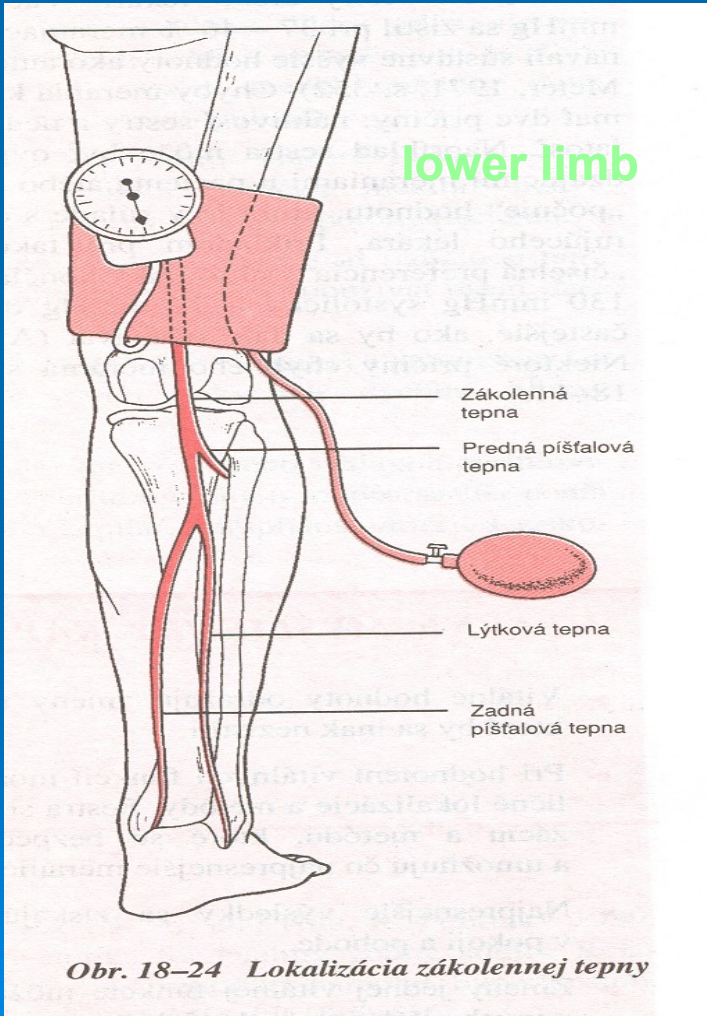
Categories for Blood Pressure Levels in Adults

legend: < means less than ...

> means greater than or equal to

Blood pressure level			
In millimeter in mercury (mmHg)			
Category	Systolic		Diastolic
Normal	<120	and	<80
Prehypertension	120 - 139	and	80 - 89
High blood pressure			
Stage 1 hypertension	140 - 159	or	90 - 99
Stage 2	> 160	or	> 110

Blood pressure measurements points (special)



Assesing the Pulse

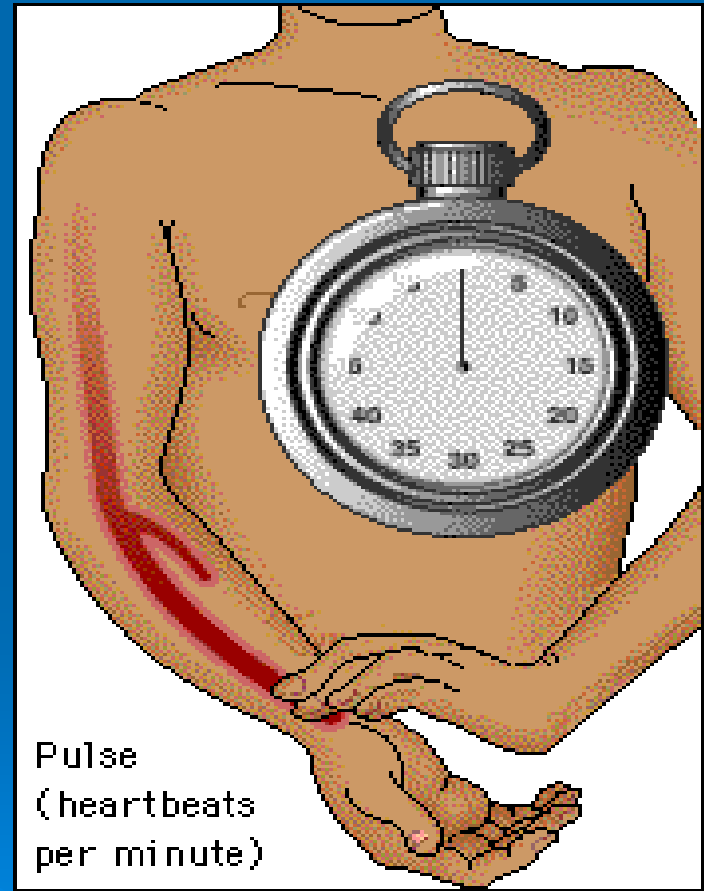
Equipment:

- Watch with second hand
- Pen and Pad
- Stethoscope (for apical pulse only)

PULSE


Alternative names

Heart rate; Heart beat



Pulse
(heartbeats
per minute)

Assesing the Pulse


1. Place your index and middle fingers in the groove on the inside of the wrist. Just slide your fingers across the tendons until they slip into soft tissue.
 2. Wait until you clearly feel beats coming with a regular rhythm.
 3. Count the number of beats for 15 seconds and multiply by 4 (or for 30 seconds and multiply by 2) to get the number of beats per minute.
- 
- The background of the slide features several concentric, light blue circular ripples that resemble water droplets hitting a surface, scattered across the lower half of the page.

Assesing the Pulse

Steps for radial pulse:

- Assist patient to a seated or lying position to ensure relaxation and comfort; explain the procedure
- Place patient's forearm palm downward, across the chest; using the index and third fingers, locate the radial pulse
- Exert firm but gentle pressure over the artery; pulsation will cease if pressure is the firm
- Count pulse for 60 seconds, assess rhythm and quality
- Record rate, rhythm and quality
- Repeat observation if rate is under 60 or over 100, if rhythm is irregular, or if quality is abnormal

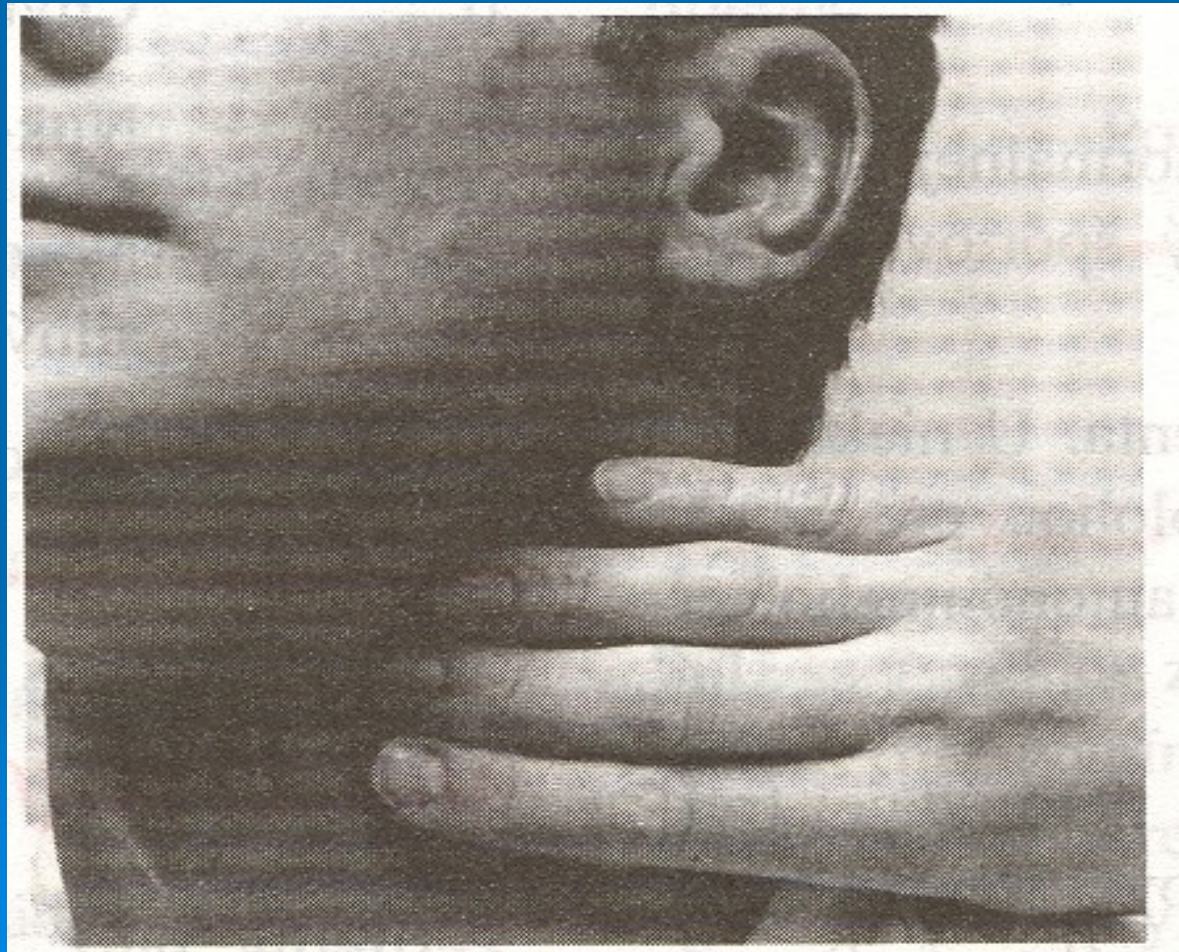
Assesing the Pulse

- a. temporalis
 - a. radialis
 - a. carotis
 - a. poplitea
 - a. femoralis
 - a. dorsalis pedis
 - Apex cordis
- 

a. carotis

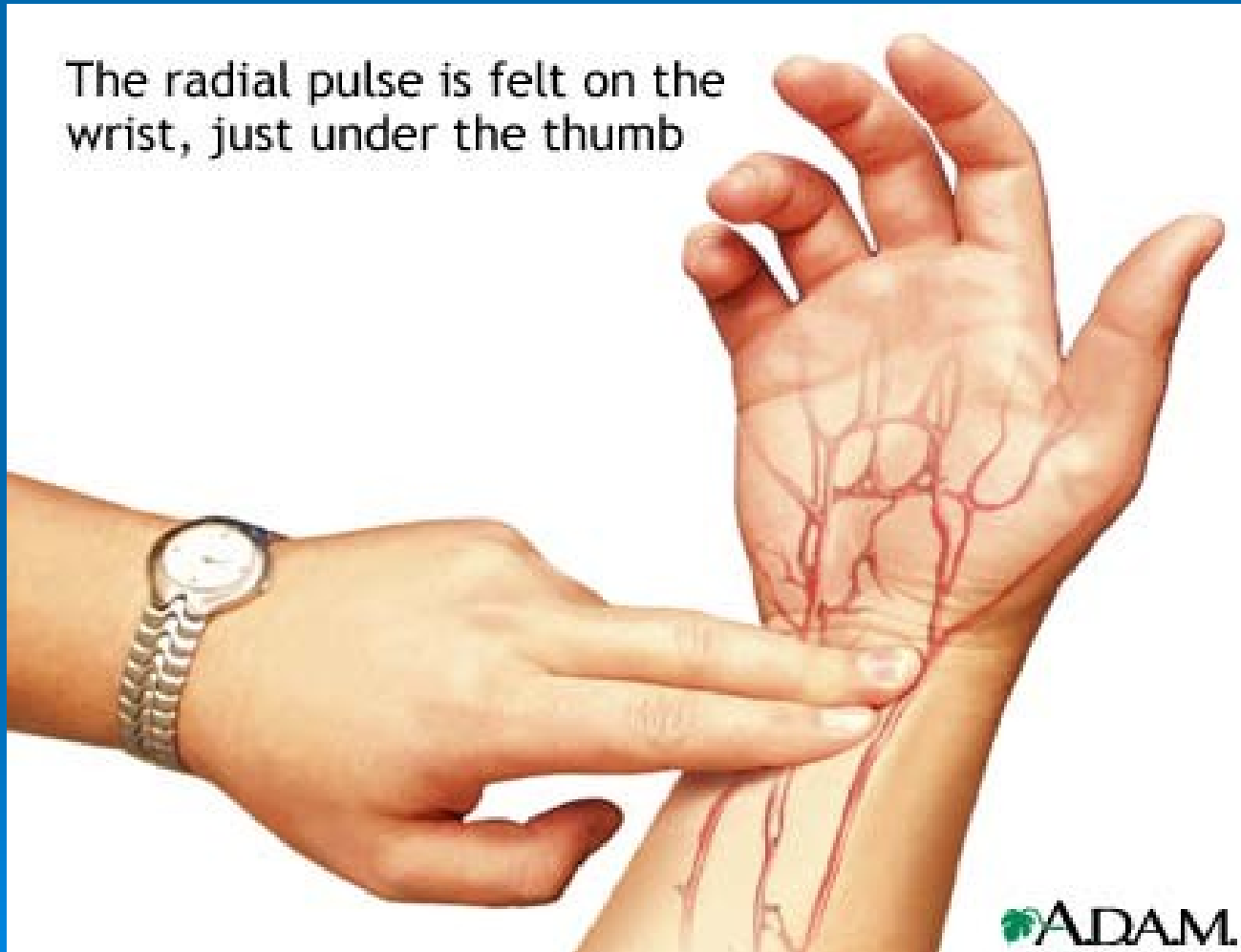


a. carotis



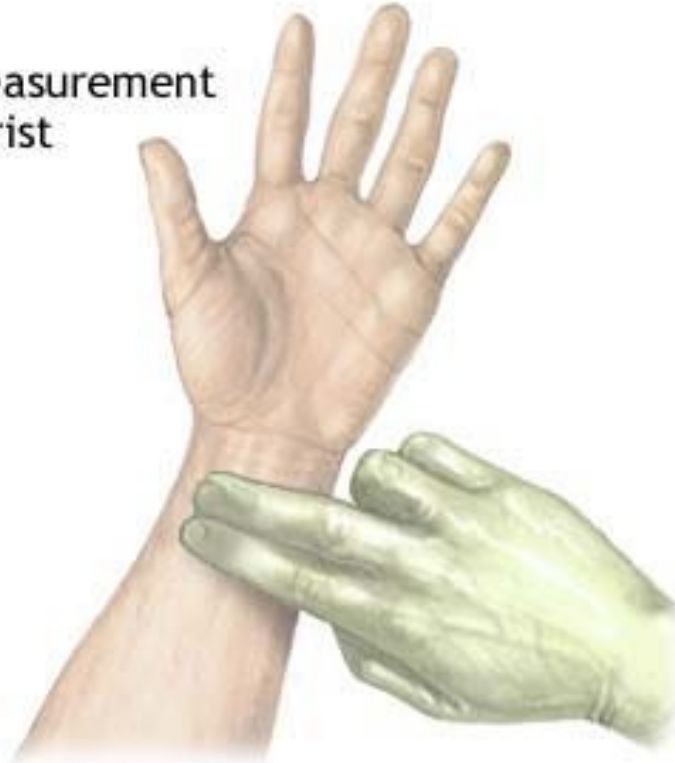
a. radialis

The radial pulse is felt on the wrist, just under the thumb

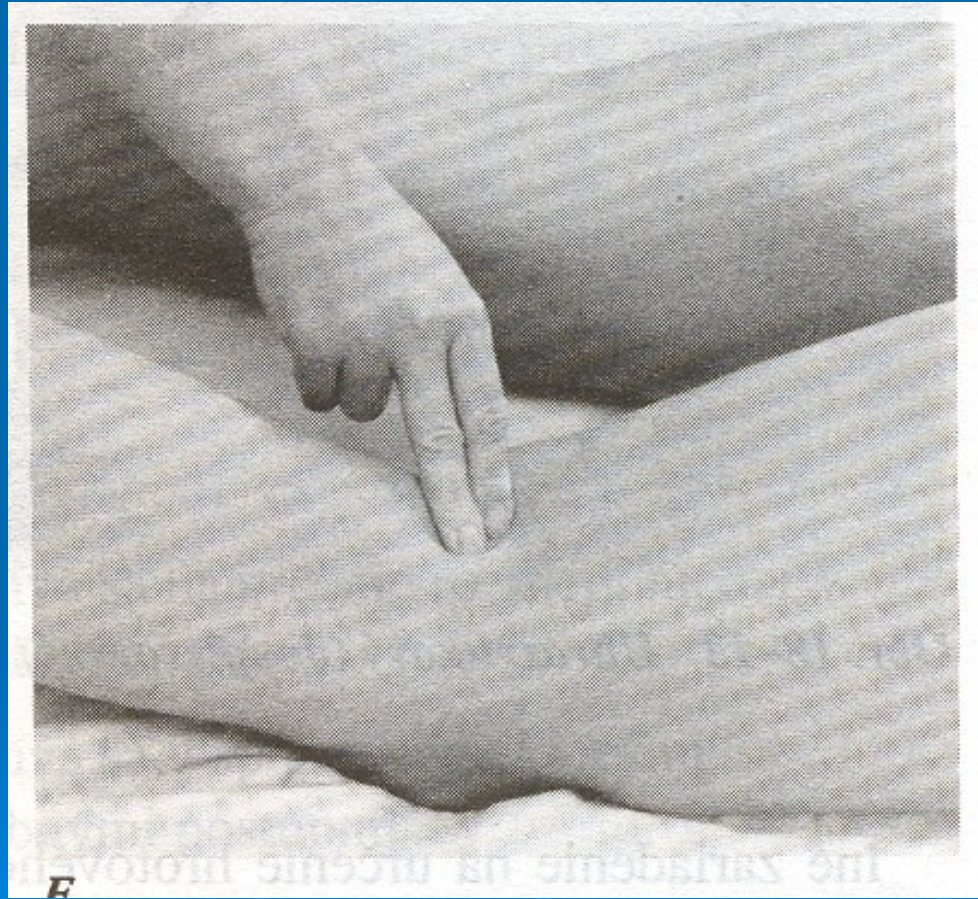


a. radialis

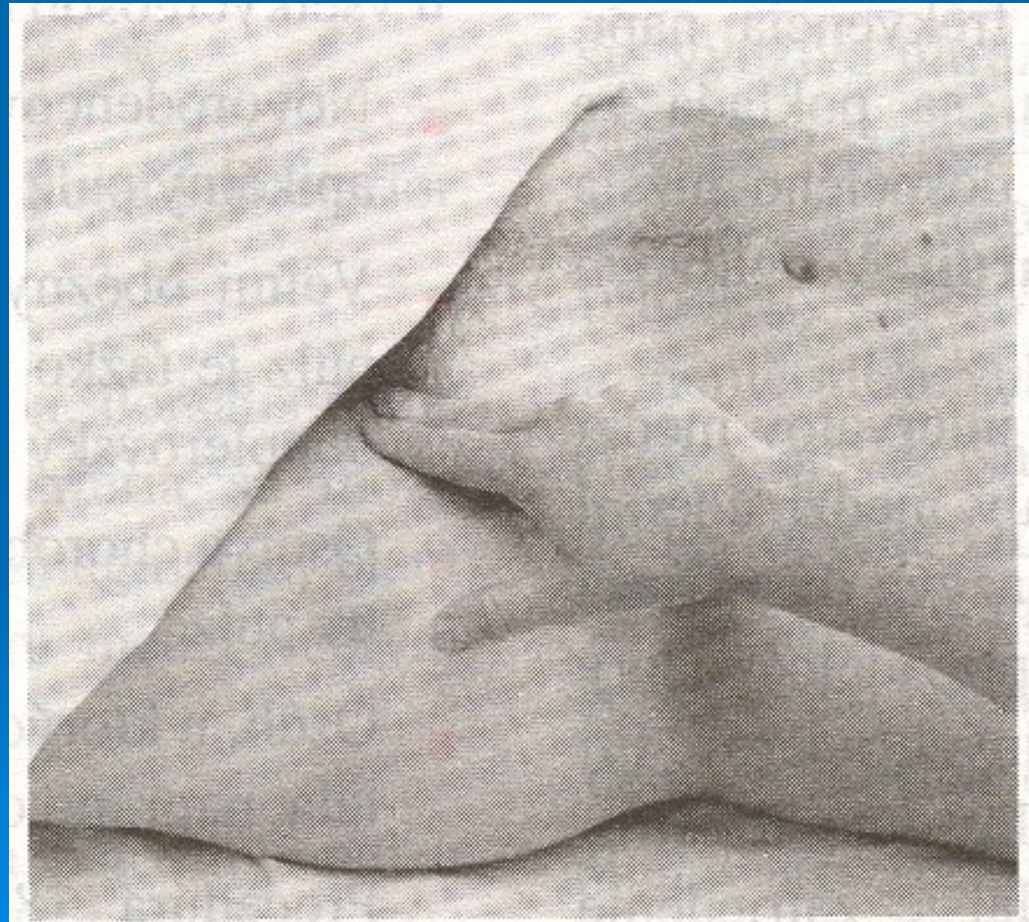
Pulse measurement
in the wrist



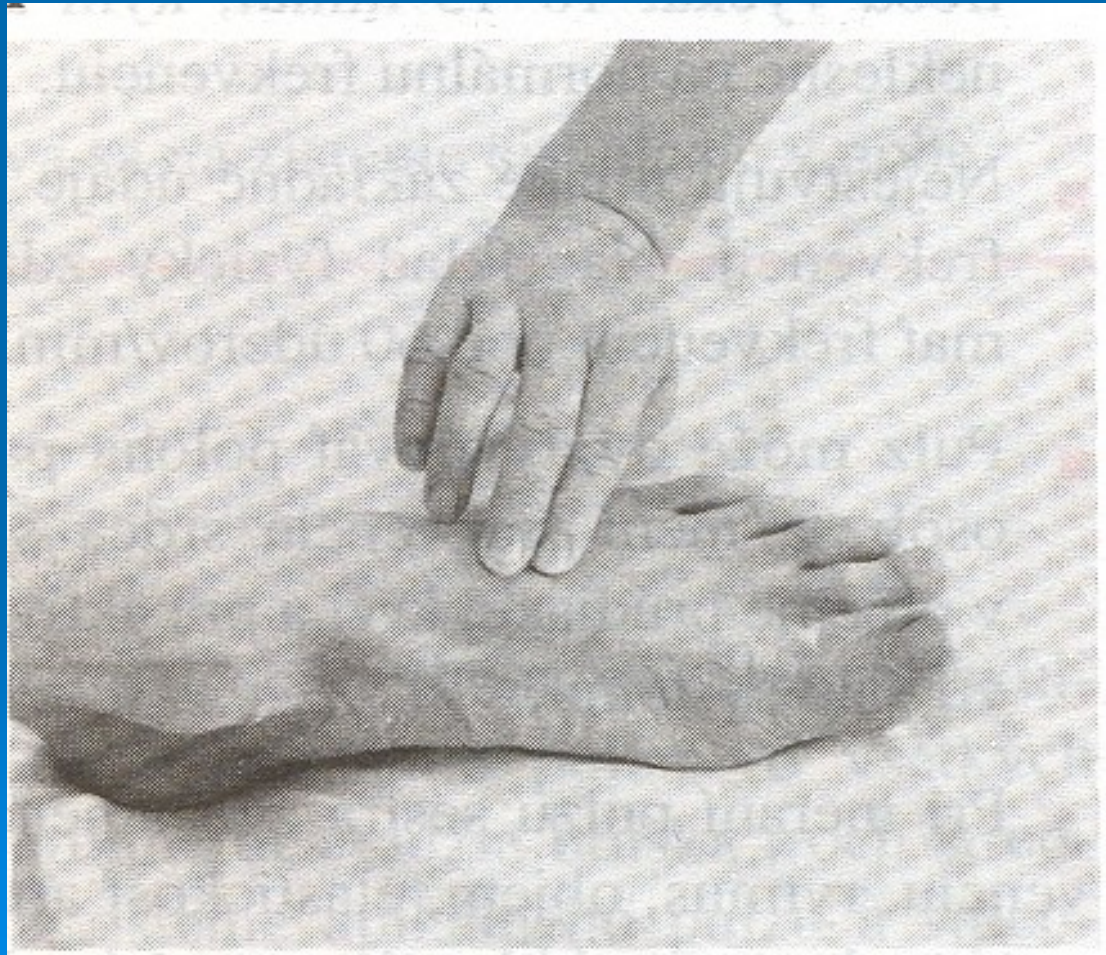
a. poplitea



a. femoralis



a. dorsalis pedis



NORMAL PULSE RATE

Average Beats per Minute

➤ **The Unborn Child**

140 to 150

➤ **Newborn Infants**

130 to 140

➤ **During first year**

110 to 130

➤ **During second year**

96 to 115

➤ **During third year**

86 to 105

➤ **7th to 14 year**

76 to 90

➤ **14th to 21st year**

76 to 85

➤ **21st to 60th year**

70 to 75

➤ **After 60th year**

67 to 80

➤ **Notes:**

➤ Pulse rates rise normally during excitement, following physical exertion and during digestion.

➤ The pulse rate is generally more rapid in females.

➤ The pulse rate is also influenced by the breathing rate.

➤ Variation of one degree of temperature above 98 F. is approximately equivalent to a rise of 10 beats in pulse

Assesing respirations

- Equipment
 - Watch with second hand
 - Pen and pad



Assesing respirations

1. Wash your hands
2. If patient is lying in bed, fold arm across the chest allow respirations to be felt as well as seen. If patient is in a chaire, observe respirations visually
3. Keep fingers on patient's wrist, as if counting pulse.
4. Count respiratory rate for 30 second and multiply by 2, if respiration is irregular, count 60 seconds
5. Observe character of respirations
6. Record rate, record character is there any significant deviation from normal.
7. Report adult rate under 8 or over 40 to the appropriate person

Normal respirations rate

- Adult (normal)- 12 to 20 breaths per minute
- Children - age 1 to 8 years 15 to 30
- Infants - age 1 to 12 months 25 to 50
- Neonates - age 1 to 28 days 40 to 60

Temperature

You can measure the temperature on three body locations:

- **Mouth** - This method is not recommended for children younger than 5 years old.
- **Rectum** - by the rectum
- **Armpit** - axillary method, under the armpit
- **Ear** - tympanic method, in the ear

Mouth Temperature

- place the thermometer under the tongue and close the mouth using the lips to hold the thermometer tightly. The patient must breathe through the nose. Leave the thermometer in the mouth for 3 minutes. The oral temperature is usually about 1/2 to 1 degree higher axillary.

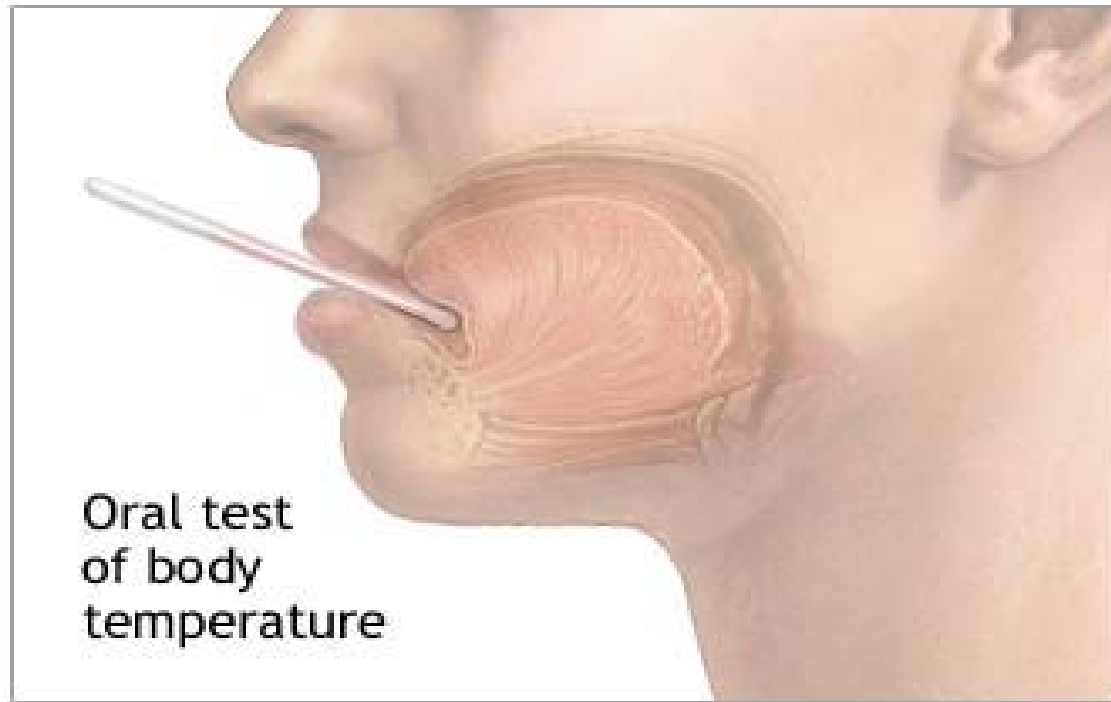
Rectal Temperature

- for this method, use a rectal thermometer. This method is for infants and small children who are not able to hold a thermometer safely in their mouths. Lubricate the bulb of the thermometer with petroleum jelly. Place the small child face down on a flat surface or lap. Spread the buttocks and insert the bulb end of the thermometer about 1/2 to 1 inch into the anal canal. Remove the thermometer after 3 minutes. The rectal temperature is usually about 1/2 to 1 degree higher than the oral

Armpitt – Axillary Temperature

- place the thermometer in the armpit, with the arm pressed against the body for 5 minutes before reading. This is the least accurate method for using a glass thermometer. The axillary temperature is usually about 1/2 to 1 degree below oral

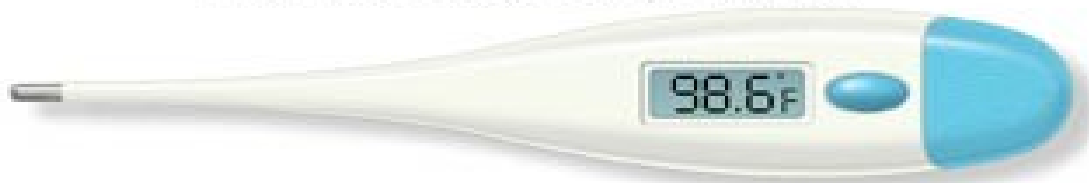
Temperature measurement



Oral test
of body
temperature

Thermometers

Normal body temp: 98.6 °F



Oral fever temp: > 100 °F



Rectal fever temp: > 100.5 °F



Normal Values

- The normal temperature varies by person, age, time of day, and where on the body the temperature was taken. The average normal body temperature is 98.6°F (37°C).
- Your body temperature is usually highest in the evening. It can be raised by physical activity, strong emotion, eating, heavy clothing, medications, high room temperature, and high humidity.
- **Daily variations change as children get older:**
- In children younger than six months of age, the daily variation is small.
- In children 6 months to 2 years old, the daily variation is about 1 degree.
- By age six, daily variations gradually increase to 2 degrees per day .
- Body temperature varies less in adults. However, a woman's menstrual cycle can elevate temperature by one degree or more.

Normal temperature range

Rectum 36.6°C to 38°C (97.9°F to 100.4°F)

Mouth 35.5°C to 37.5°C (95.9°F to 99.5°F)

Armpit 34.7°C to 37.3°C (94.5°F to 99.1°F)

Ear 35.8°C to 38°C (96.4°F to 100.4°F)

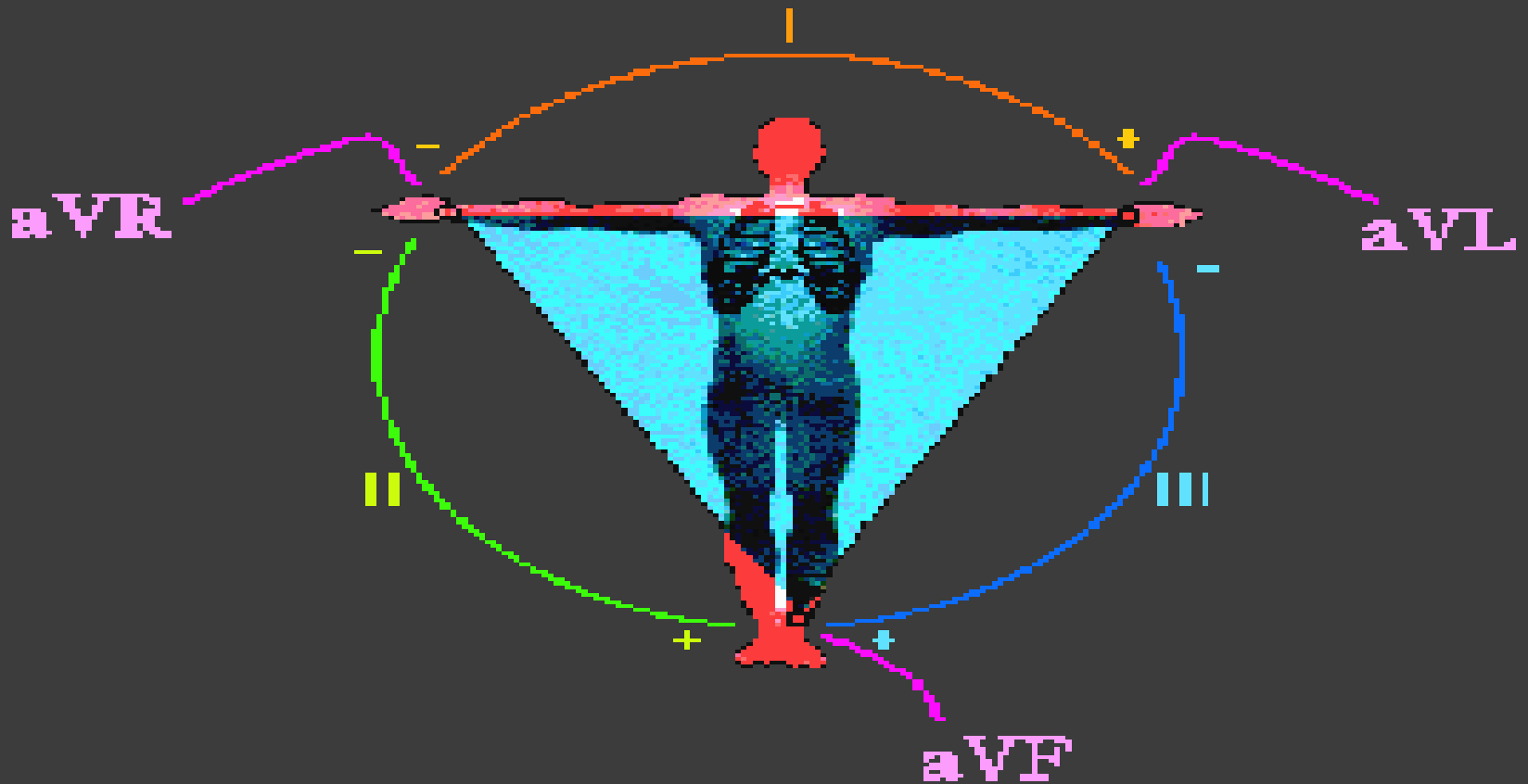
ECG

- An **electrocardiogram** (**ECG** or **EKG**, abbreviated from the German *Elektrokardiogramm*) is a graphic produced by an **electrocardiograph**, which records the electrical voltage in the heart in the form of a continuous strip graph. It is the prime tool in cardiac electrophysiology, and has a prime function in screening and diagnosis of cardiovascular diseases.

ECG

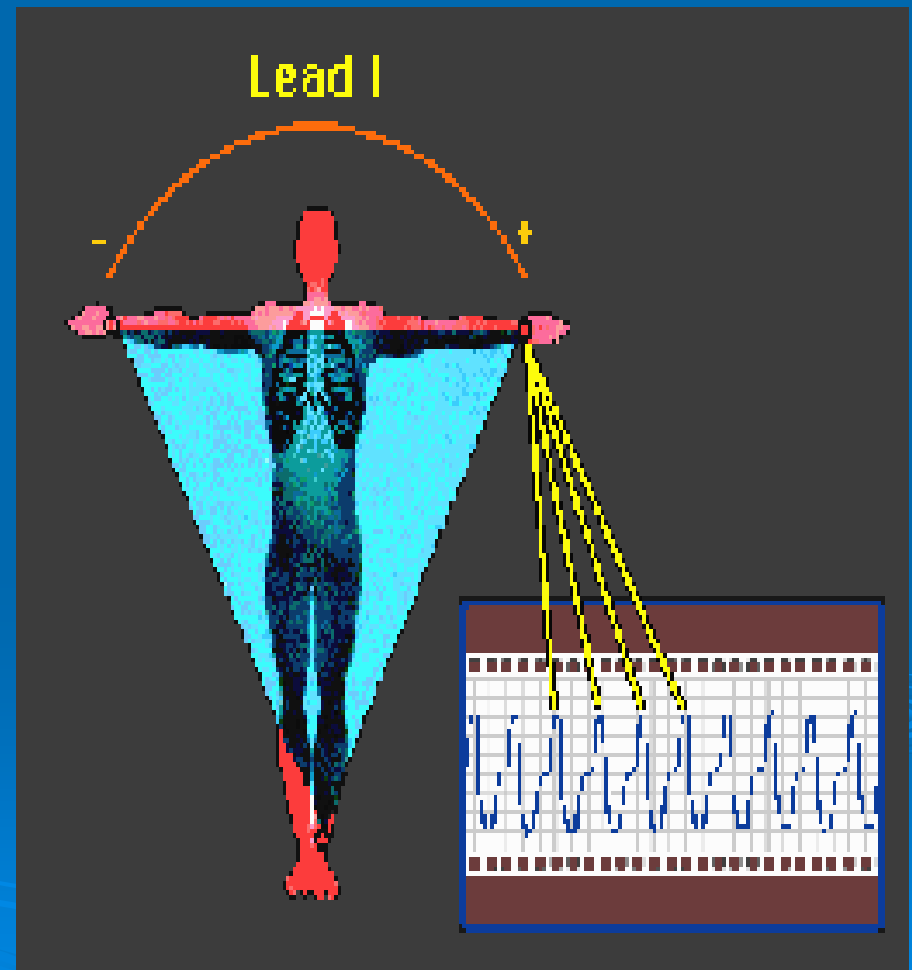
- The flow of positive electrical charges can be measured and tracked with strategically placed electrodes attached to the surface of the skin. There are at least 12 different lead pairs or positions for measurement on the body's surface: six limb leads; I, II, III, aVR, aVF and aVL, and six chest leads; V1 - V6.

Six limb leads



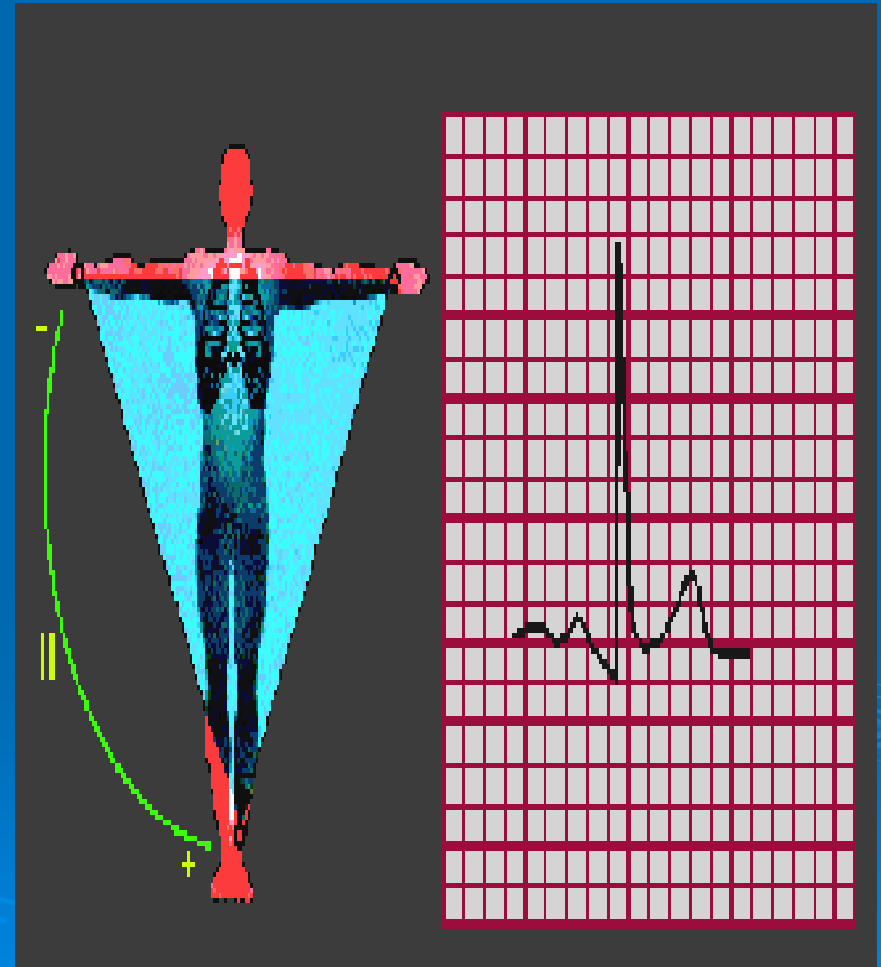
Six limb leads

- Lead I consists of a positive electrode attached to the left arm or shoulder and a negative one on the right arm or shoulder. A wave of depolarization on the heart that advances toward the positive lead causes a positive deflection on the ECG strip.



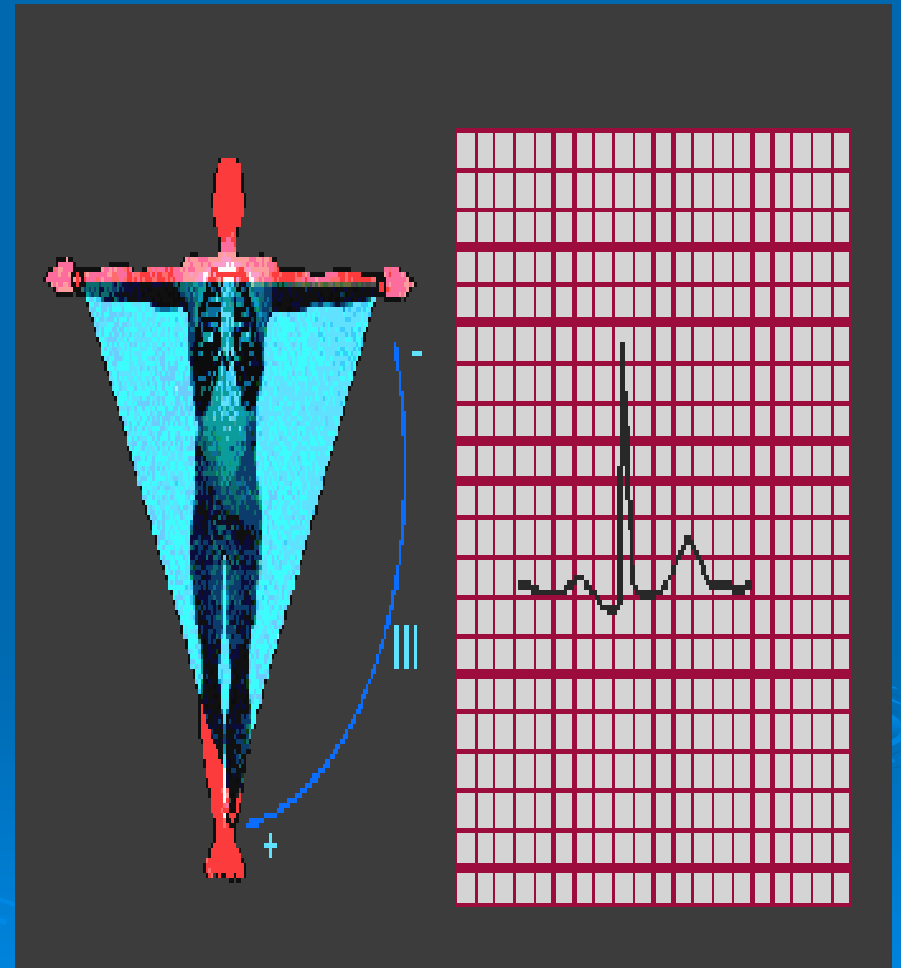
Six limb leads

- Lead II has its positive electrode at the left leg or lower left chest and its negative electrode at the right arm or shoulder. This pair is more in line with the long axis of the heart, thus the upward deflections are greater than in Lead I.



Six limb leads

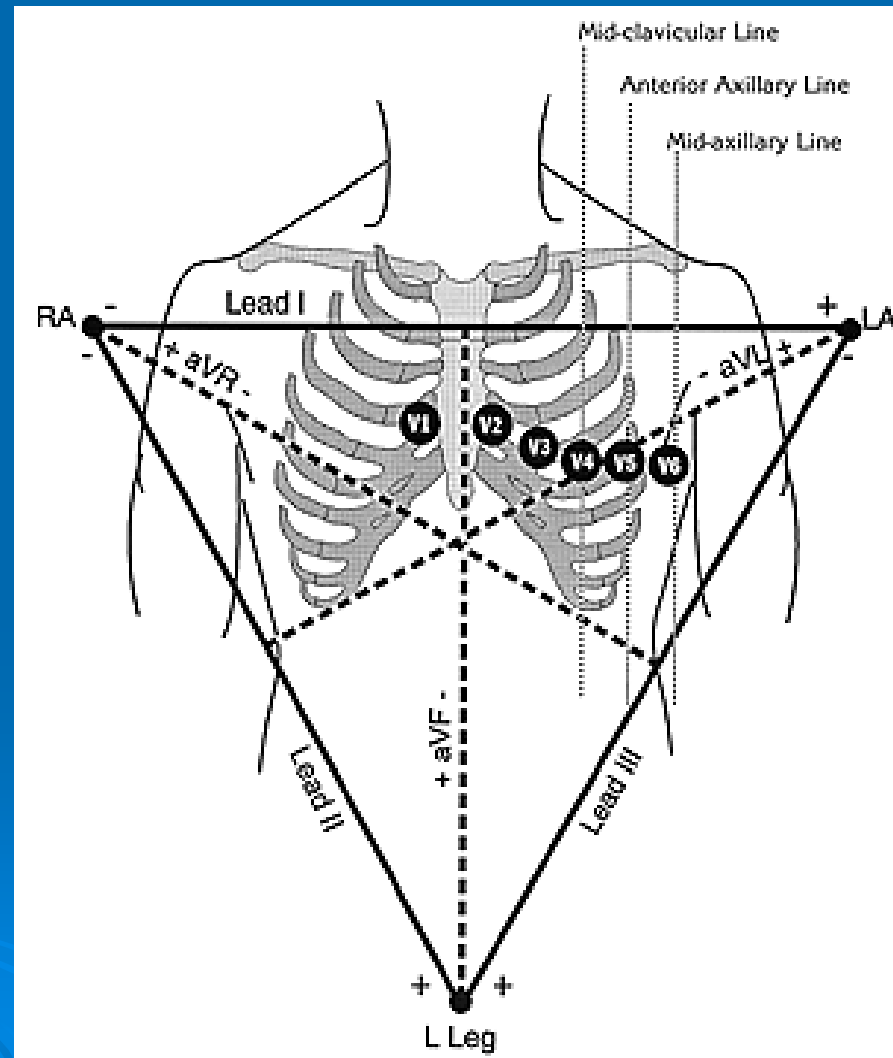
- Lead III has its positive electrode at the lower left leg or lower left chest and the negative electrode at the upper left arm or shoulder.



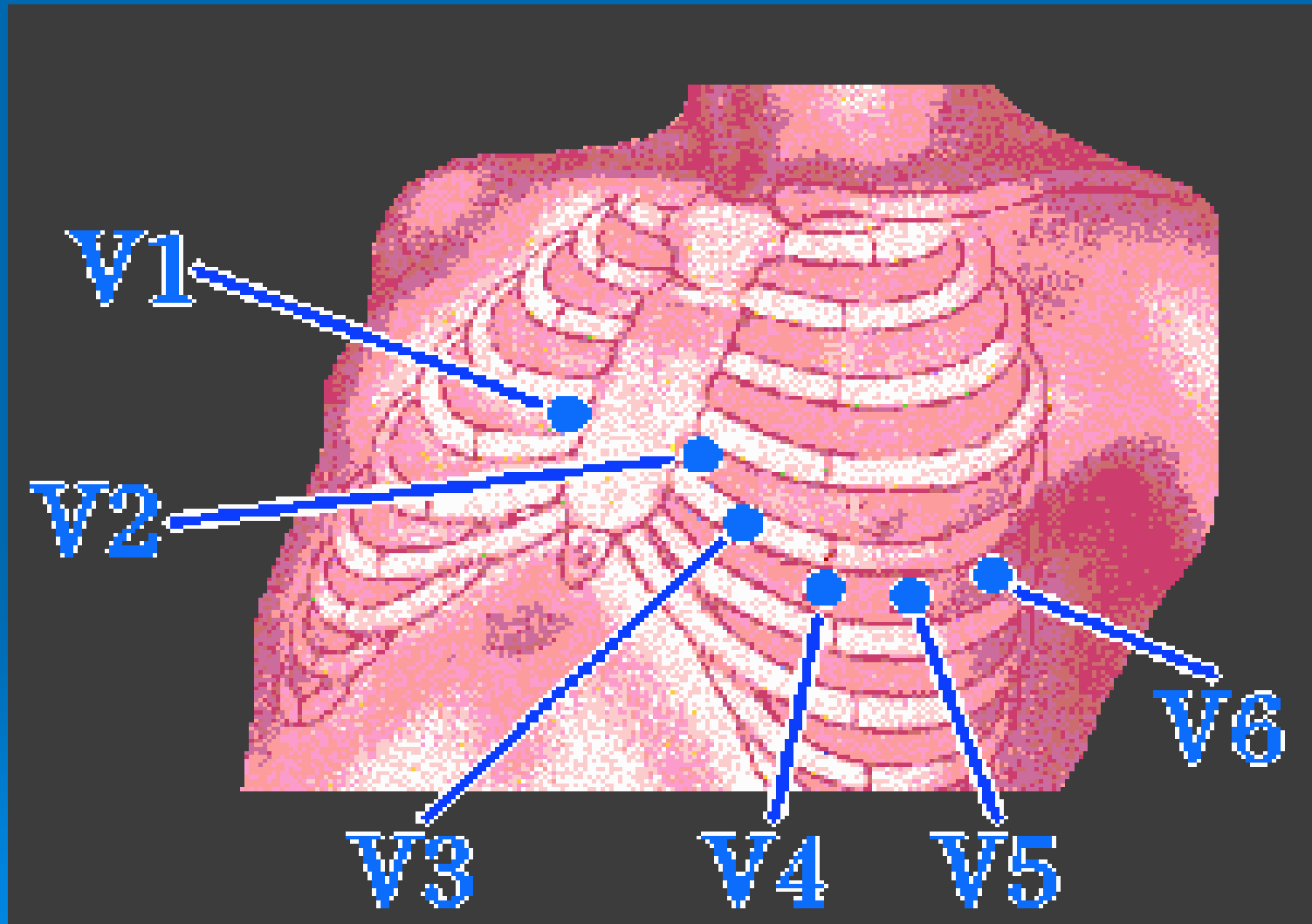
Six chest leads

LOCATION OF CHEST ELECTRODES IN 4TH AND 5TH INTERCOSTAL SPACES:

- **V1: right 4th intercostal space**
- **V2: left 4th intercostal space**
- **V3: halfway between V2 and V4**
- **V4: left 5th intercostal space, mid-clavicular line**
- **V5: horizontal to V4, anterior axillary line**
- **V6: horizontal to V5, mid-axillary line**

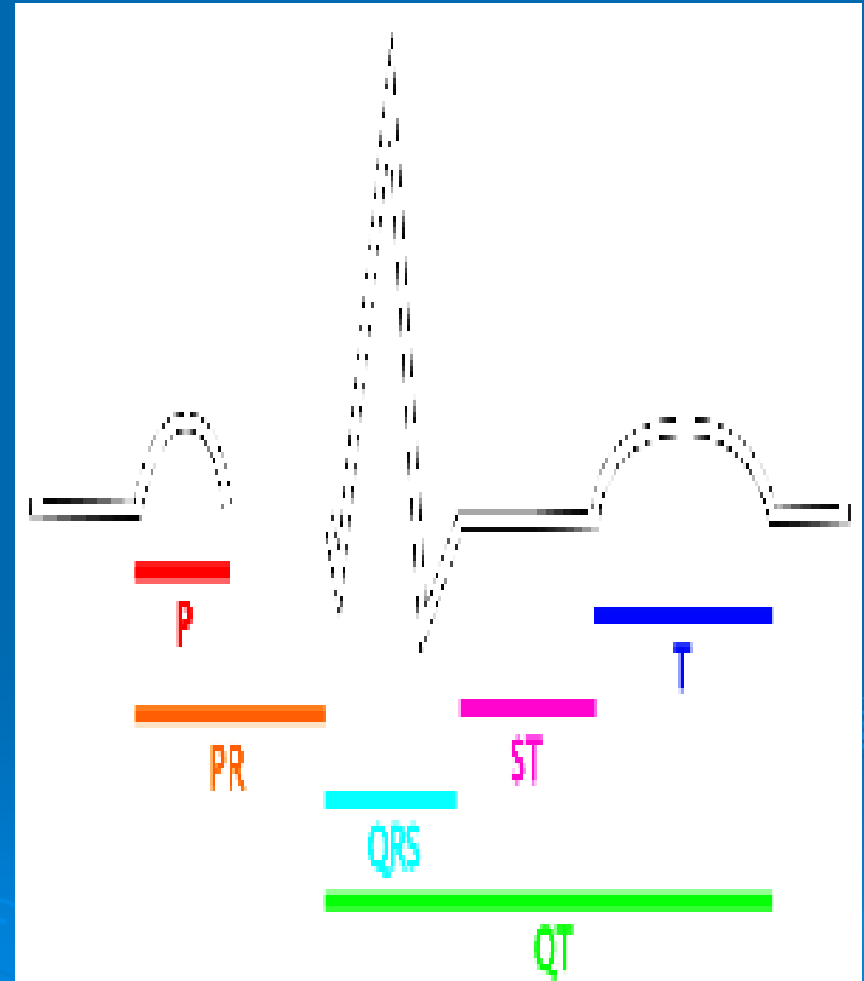


Six chest leads



The normal ECG

- A typical ECG tracing of a normal heartbeat consists of a P wave, a QRS complex and a T wave. A small *U* wave is not normally visible.



Electrocardiogram

