

Odessa National Medical University
Department of propaedeutic of inner
diseases

Symptoms and syndromes in
diseases of circulatory
system on the basis of
questioning, palpation,
percussion and
auscultation. Characteristics
of pulse and blood pressure.

CHIEF COMPLAINS (PRESENTING SYMPTOMS)

- Pain syndrome (Chest pain)
- Dyspnoea
- Rhythm disorders, palpitations
- Edemas
- Cough
- Attack of suffocation: interstitial pulmonary edema (cardiac asthma) and alveolar pulmonary edema
- Associations (shortness of breath, syncope, faints, nausea, sweating)
- Dizziness/blackouts (did patient lose consciousness?)

PAIN SYNDROME

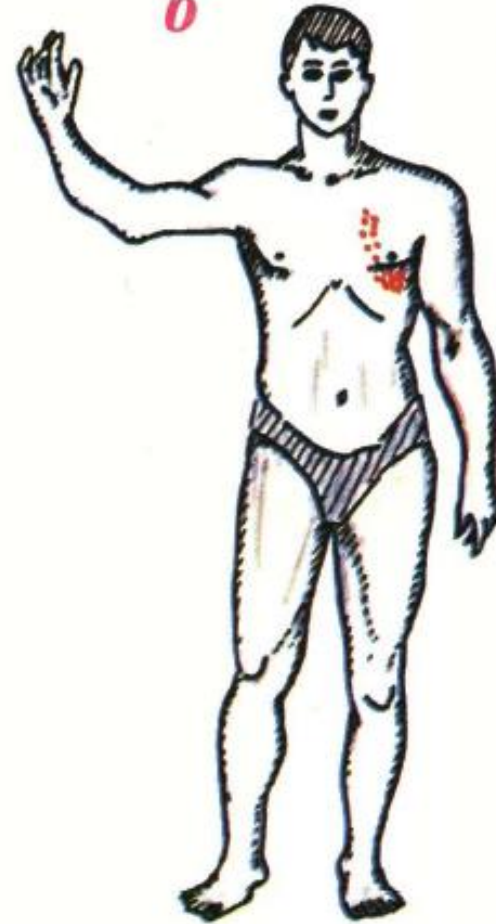
- Localization of pain – Site? Central?
- Onset – Sudden? Gradual? What was the patient doing?
- Radiation of pain
- Character of pain (ask patient to describe pain)
- Duration of pain, timing
- Provoking factors
- Curative factors
- Severity

LOCALIZATION AND RADIATION OF PAIN

a



б



LOCALIZATION AND RADIATION OF PAIN

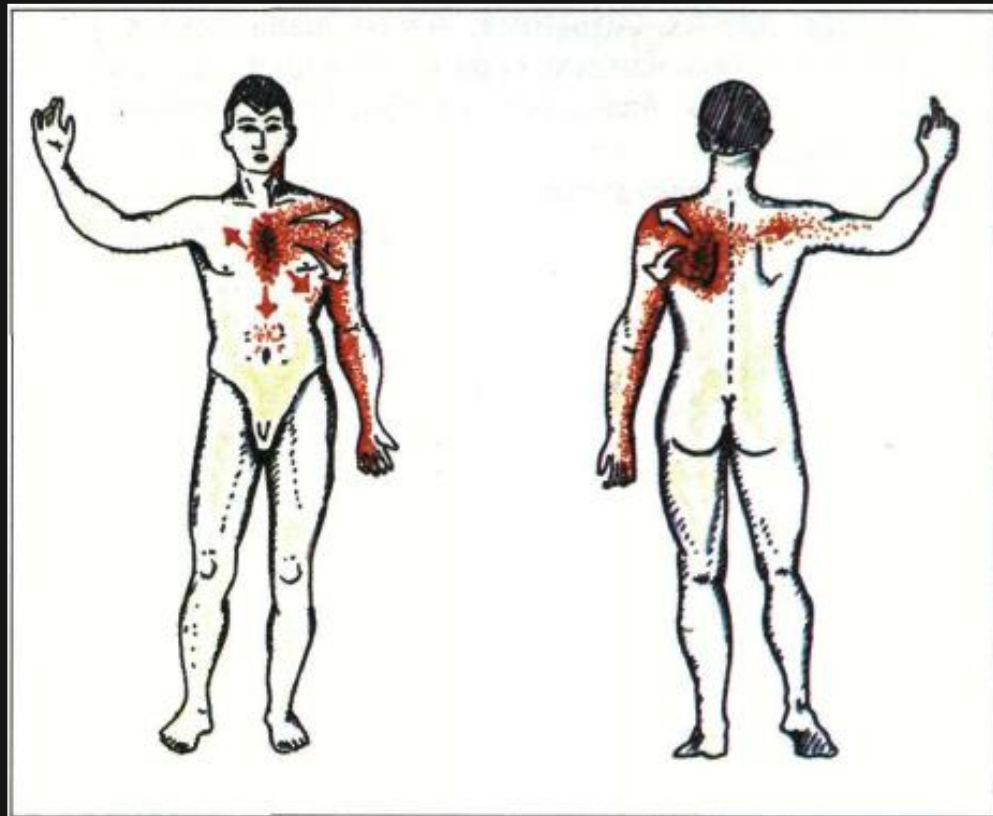


Рис.3.20. Наиболее характерная локализация и иррадиация болей при стенокардии.

TYPE (CHARACTER) OF PAIN

- Burning
- Pressure (clinch in fist)
- Heaviness
- Crushing
- Instantaneous, tearing

PROVOKING FACTORS

1. Emotional stress

2. Physical exercise - especially how patient is

tolerant to walk at the flat street and ascent

upstairs

CURATIVE FACTORS

- Nitroglycerine tablets sublingually
- Rest during several minutes

DIFFERENTIATION OF STENOCARDIA AND CARDIALGIA

Remember:

For a stenocardia of typical cases are characteristic:

- Short-term character of a heartache (seconds, minutes);
- Localization behind a breastbone with radiation to the left shoulder, a hand and under scapula;
- Good stopping effect of nitroglycerine;

At cardialgia, not connected with infringements of a coronary blood flow :

- Pain long (more than 20 - 25 minutes, till several ours);
- The pain is localized in the field of a top of heart and-or to the left of a breast;
- Pain is not stopped with nitroglycerine;

LEFT VENTRICULAR INSUFFICIENCY

Remember:

The major manifestations of chronic left ventricular insufficiency are:

- dyspnoea, cough, sometimes hemoptysis, moist not sonorous fine bubbling rales in low-back departments of lungs.

LEFT VENTRICULAR INSUFFICIENCY

Remember:

For cardiac dyspnoea and cough the most typical strengthening (or their occurrence) in horizontal position of patient, at which increase blood flow to the right heart, that promotes more overflow of small circle of blood circulation with blood.

Attacks of suffocation of cardiologic patient are connected usually with suddenly coming acute LV CI due to **myocardial ischemia or acute myocardial infarction, sudden heavy infringements of a rhythm of heart, acute lifting of BP and other reasons** conducting to interstitial (a cardiac asthma) or to an alveolar pulmonary edema.

Remember:

1) For interstitial pulmonary edema (cardiac asthma) is characteristic attack of dyspnoea, posture in the bed - orthopnea, moist fine bubbling rales in low-back part of lungs.

2) For the alveolar pulmonary edema accompanied with propagation of plasma into alveoli, and then its penetration in bronchial tubes and a trachea, suddenly coming asthma, bubbling breath, sticky cold sweat, foamy bloody (rose) sputum, coarse moist rales over all surface of lungs are characteristic.

INSPECTION



Рис.3.38. Лицо Корвисара. Определяются акроцианоз, одутловатость лица, набухание шейных вен.

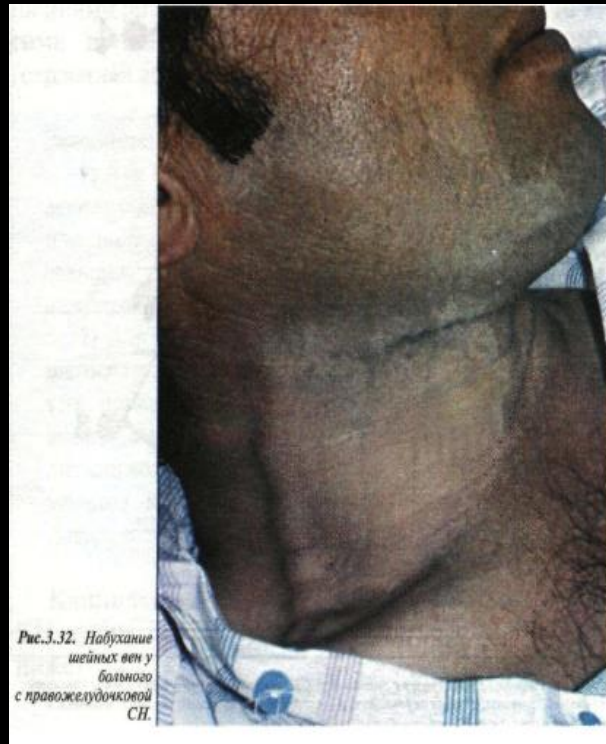


Рис.3.32. Набухание шейных вен у больного с правожелудочковой СН.



Рис.3.30. Отеки голени и стоп у больного с правожелудочковой сердечной недостаточностью.

1. Face of Corvisart
2. Swelling of neck veins
3. Edema of legs

INSPECTION

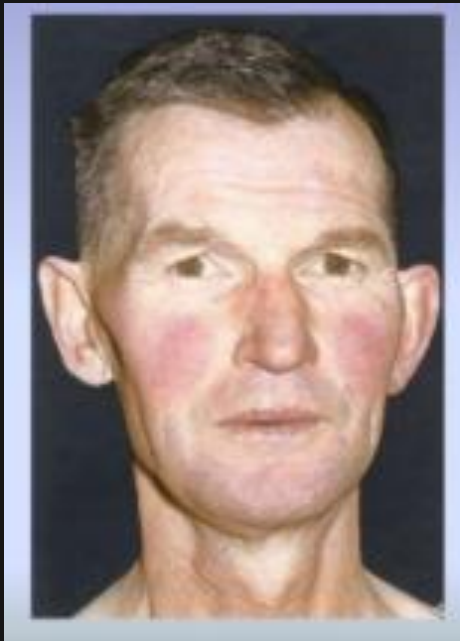


Corneal arcus



Xanthelasma

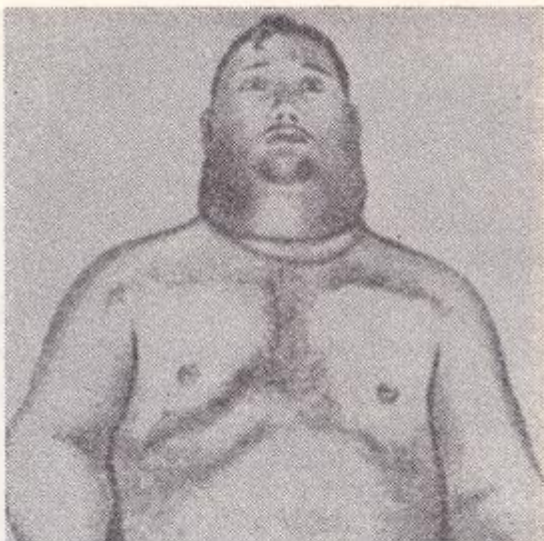
INSPECTION



Mitral flush



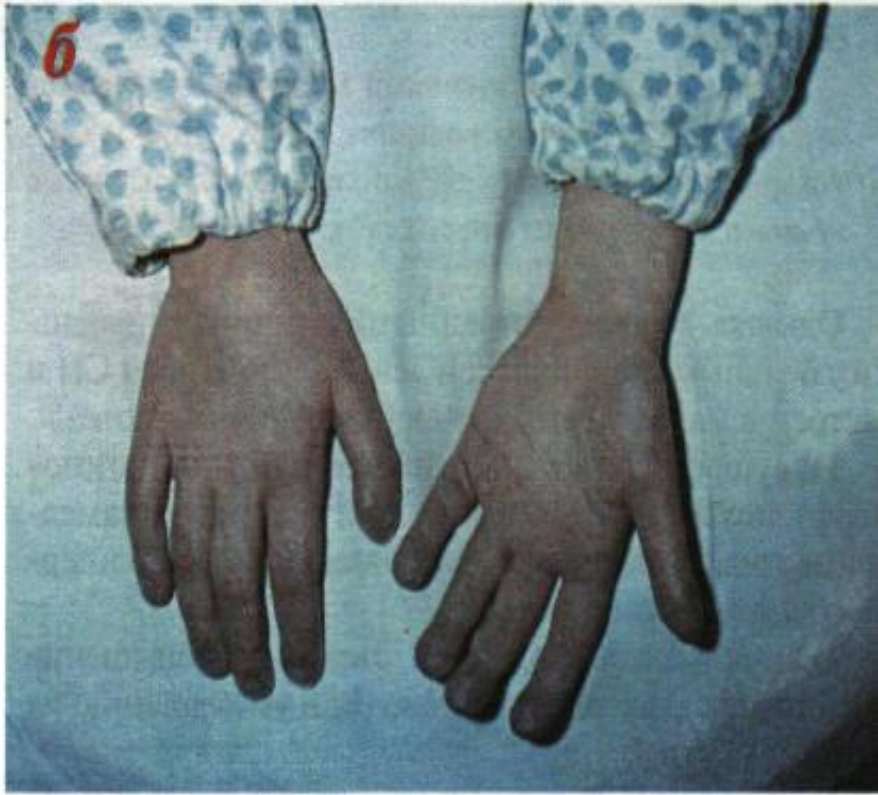
STOCKS' COLLAR



*Рис. 37. Воротник Стокса (по
А. Л. Мясникову, 1956).*



INSPECTION



пальцы в виде барабанных палочек и ногти в форме часовых стекол (б).

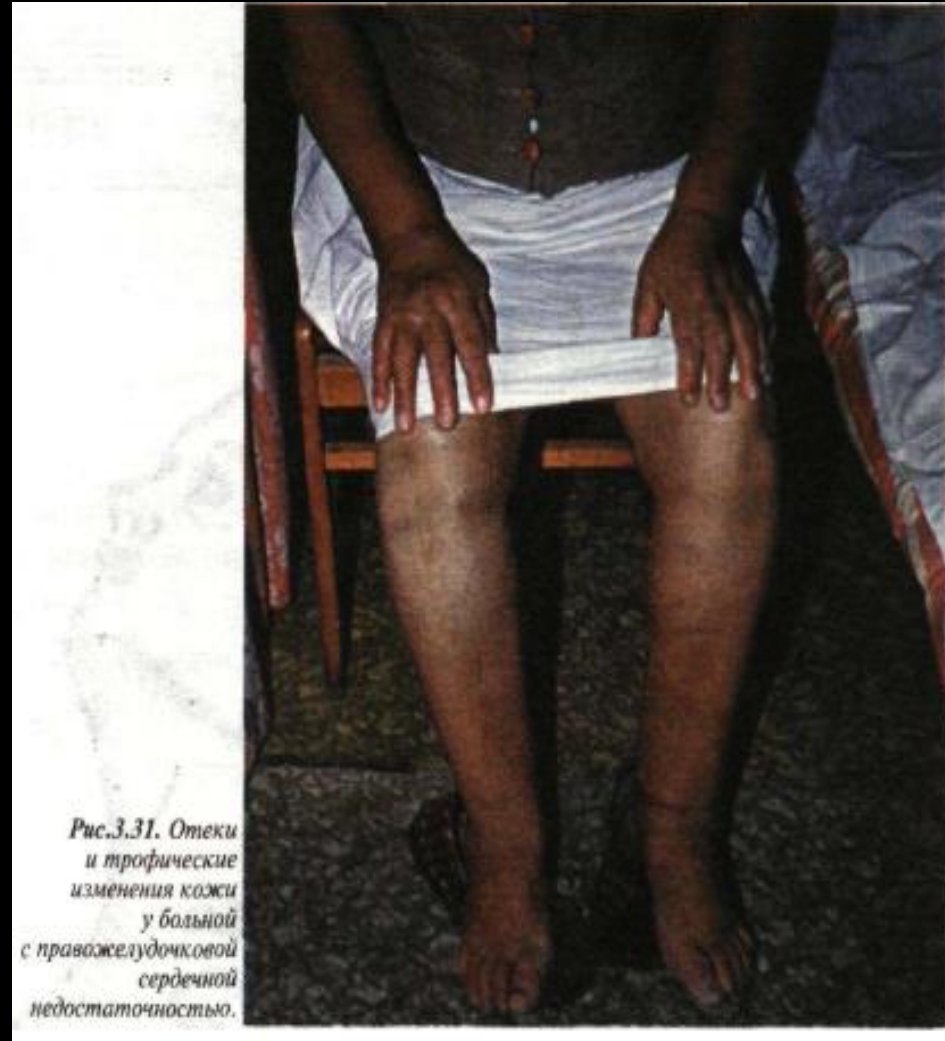


Рис.3.31. Отеки и трофические изменения кожи у больной с правожелудочковой сердечной недостаточностью.

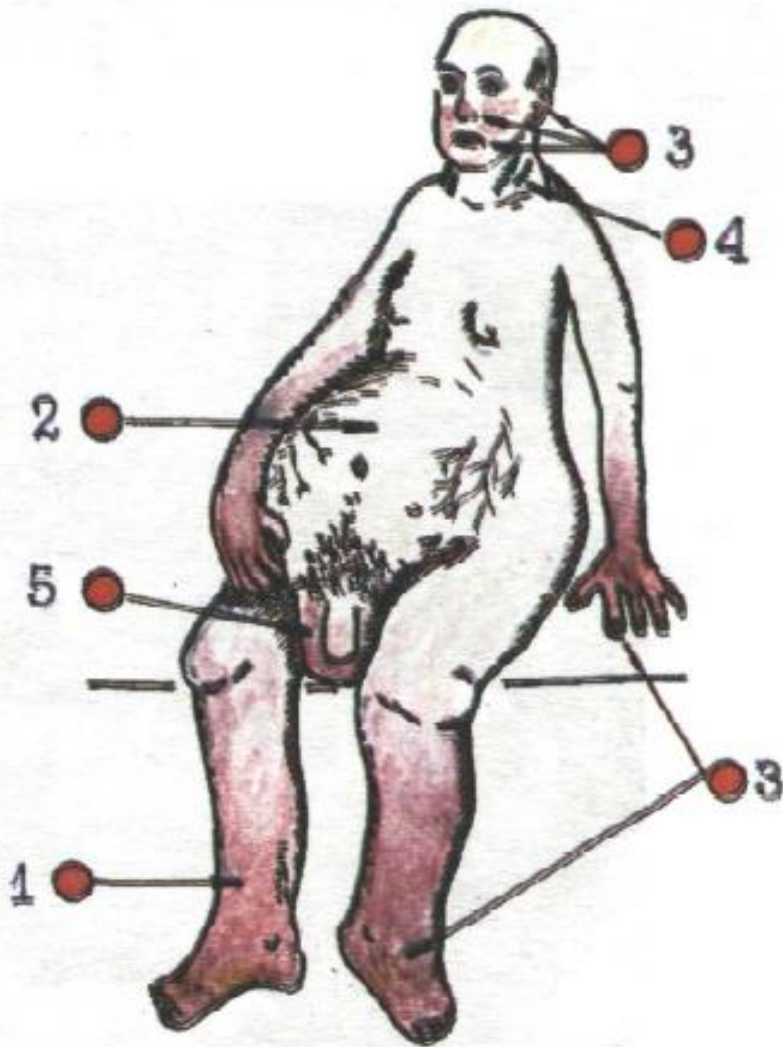
INSPECTION



Рис.3.25. Вынужденное положение (ортопноэ) у больного с инфарктом миокарда, осложненным острой левожелудочковой недостаточностью (сердечной астмой).

Orthopnea

ANASARCA



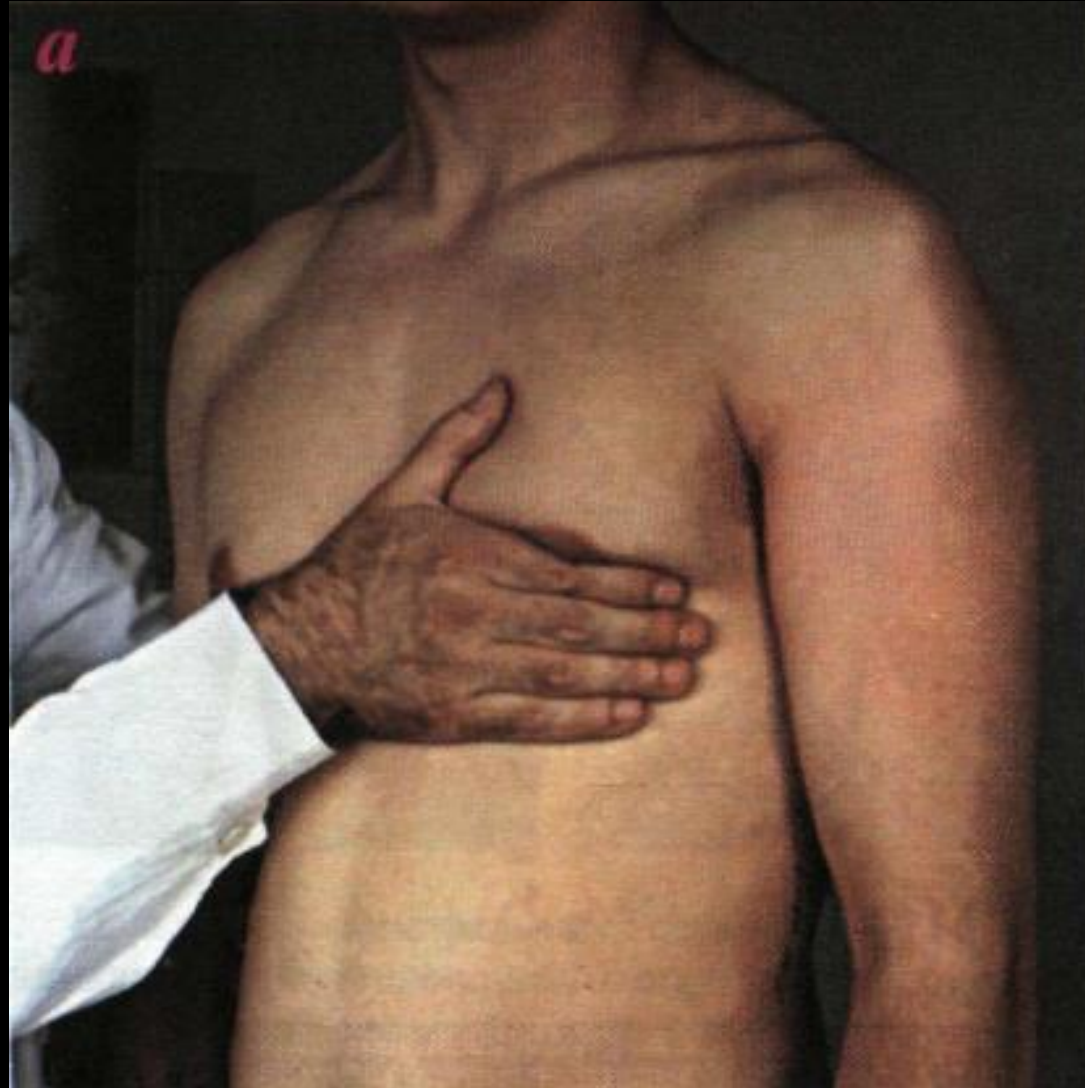
- Posture - orthopnea
- Acrocyanosis
- Vein dilation on the neck
- Edema of scrotum and penis
- Ascites
- Hydro thorax
- Hydro pericardium

Рис. 3.35. Внешний вид больного с тотальной СН: 1 - значительные отеки ног и поясницы; 2 - асцит; 3 - выраженный акроцианоз; 4 - набухание шейных вен; 5 - отек мошонки и полового члена. Больной занимает положение ортопноэ.

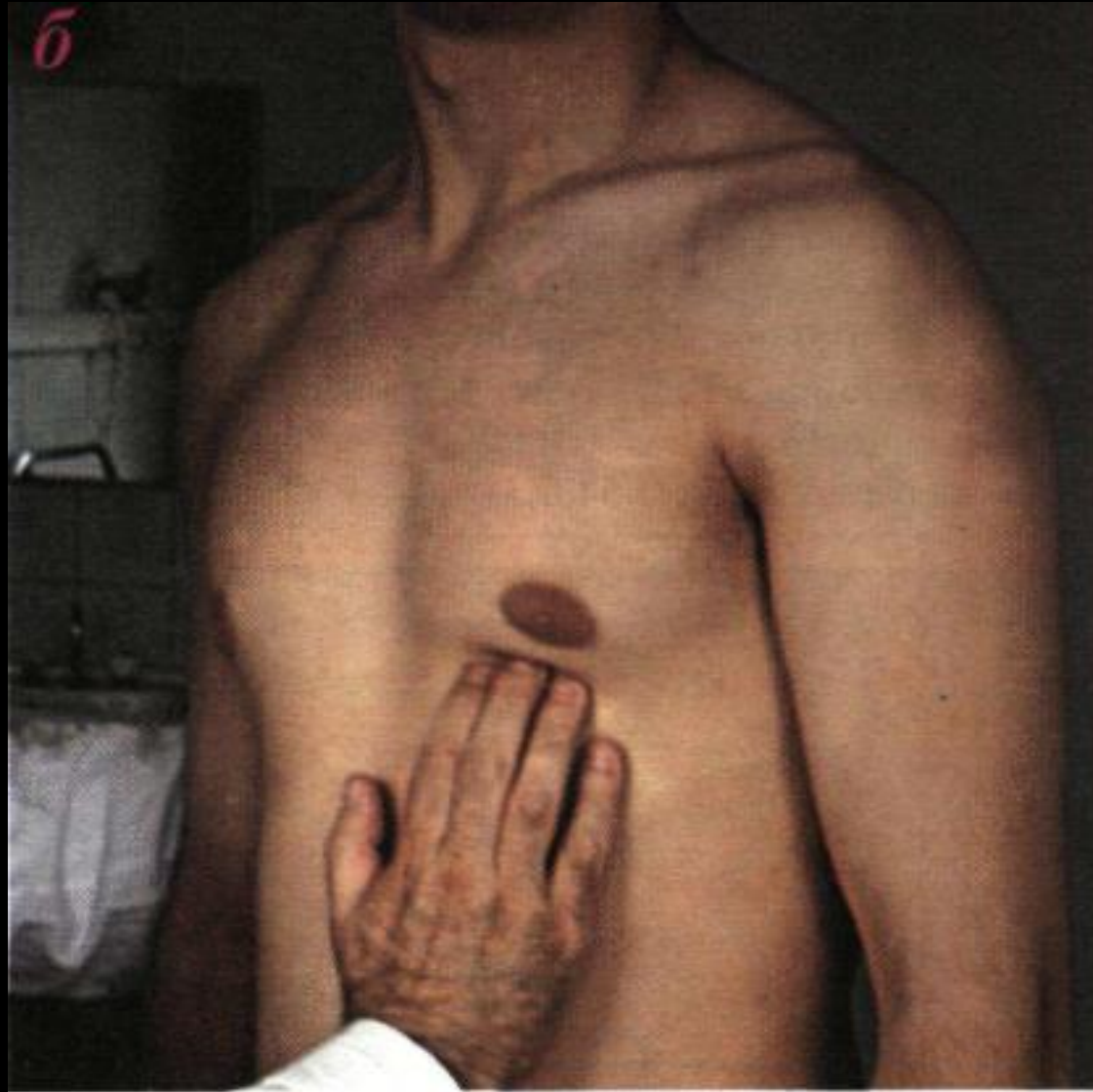


- Anasarca

PALPATION OF HEART AREA (APEX BEAT, APICAL IMPULSE)



PALPATION OF APEX BEAT (SECOND STEP)



PALPATION OF HEART BEAT

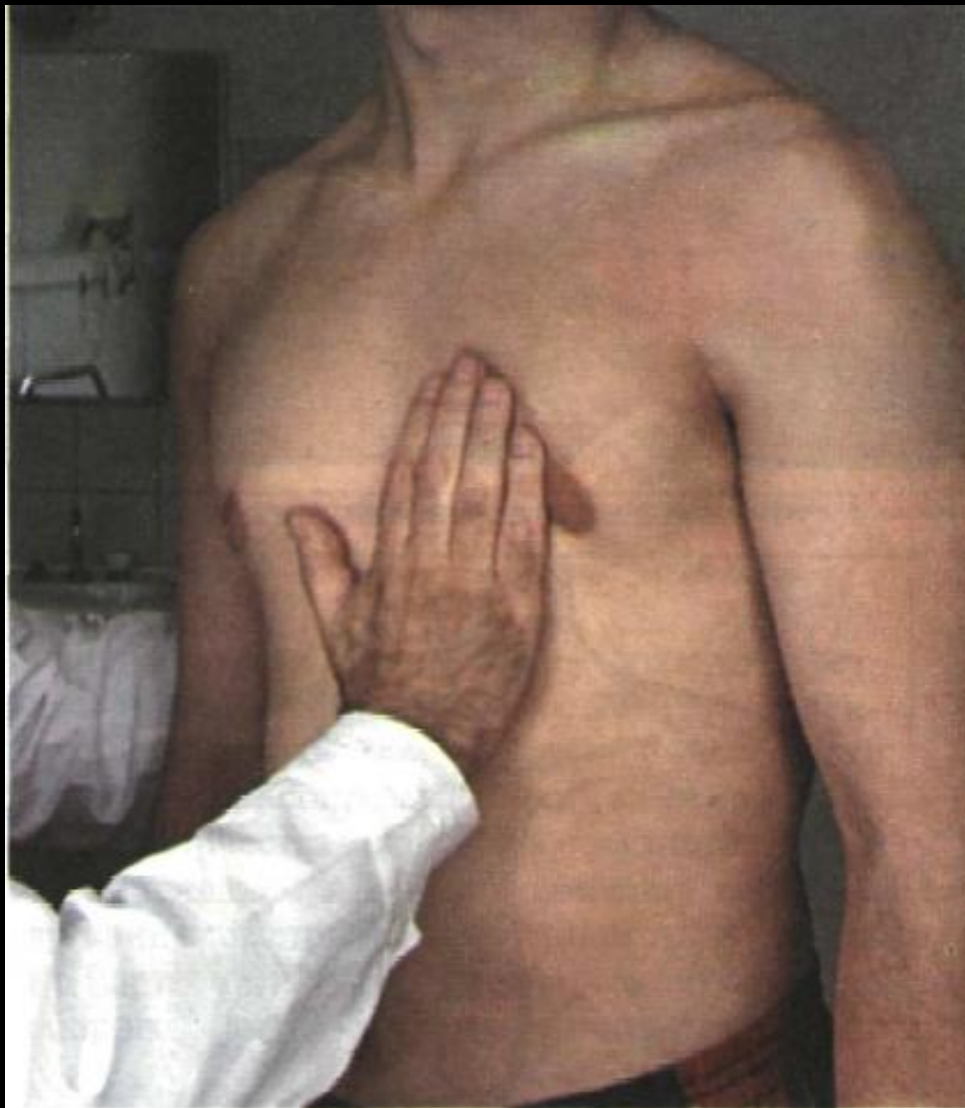


Рис.3.53. Пальпация сердечного толчка.

PALPATION OF EPIGASTRIC PULSATION

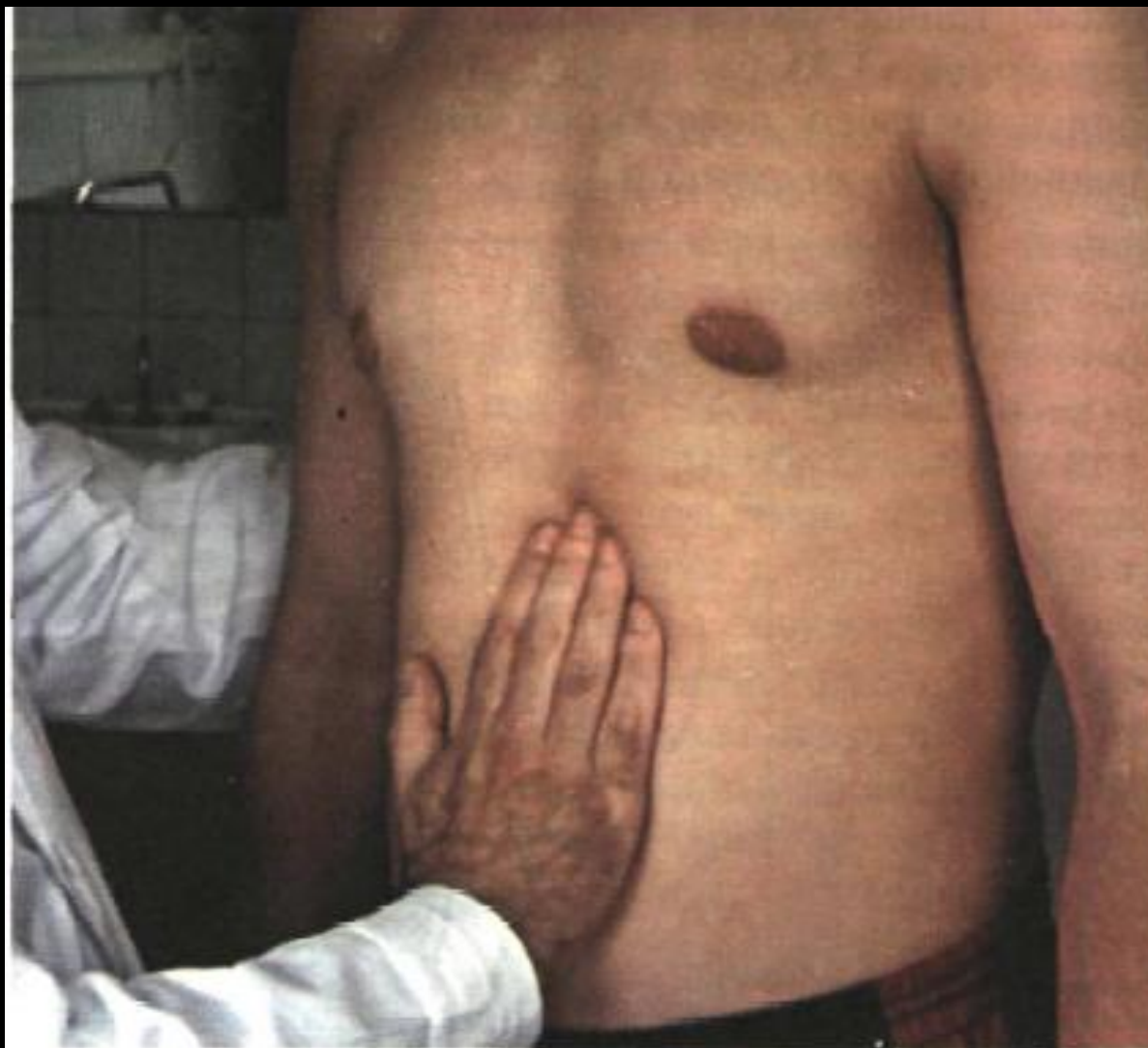
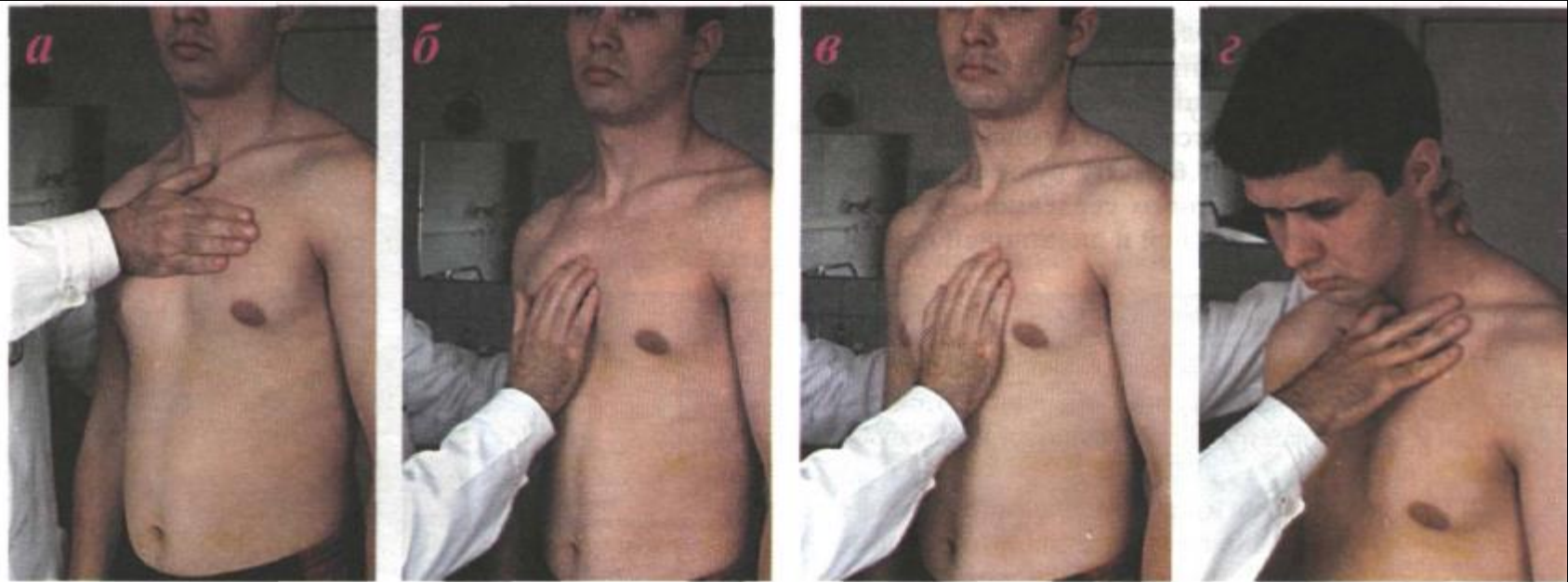


Рис.3.55. Определение эпигастральной пульсации.

PALPATION OF BIG VESSELS



*Рис.3.56. Пальпация магистральных сосудов:
а - ориентировочное определение пульсации и систолического дрожания в области основания сердца; б - пальпация восходящей части аорты; в - пальпация легочной артерии; г - пальпация в ягулярной ямке (дуга аорты).*

CHANGES OF APEX BEAT (BOUNDARIES)

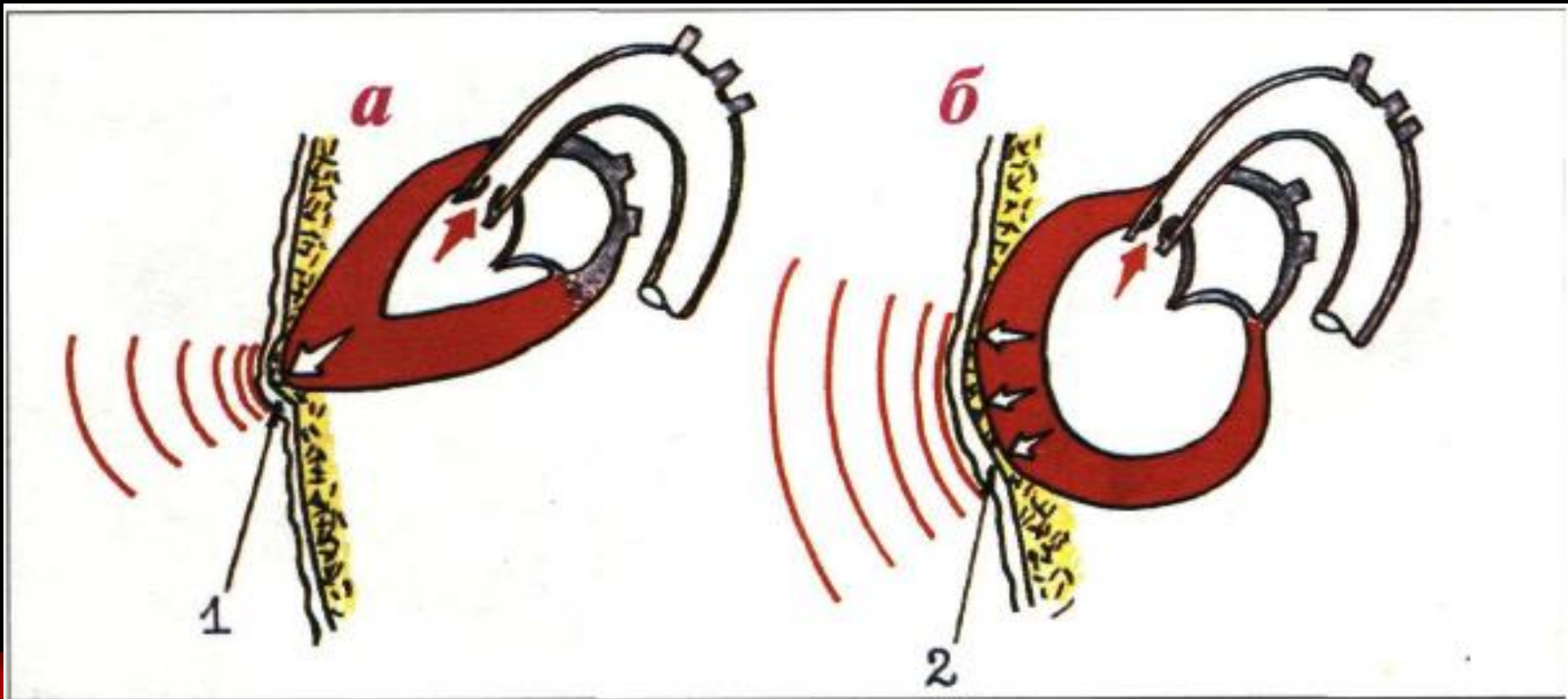


Рис.3.52. Характеристика верхушечного толчка при концентрической (а) и эксцентрической (б) гипертрофии миокарда левого желудочка. 1 - концентрированный усиленный и 2 - разлитой усиленный (куполообразный) верхушечный толчок.

1- concentrative increased; 2 - dome shaped

CLINICAL (PHYSICAL) DETERMINATION

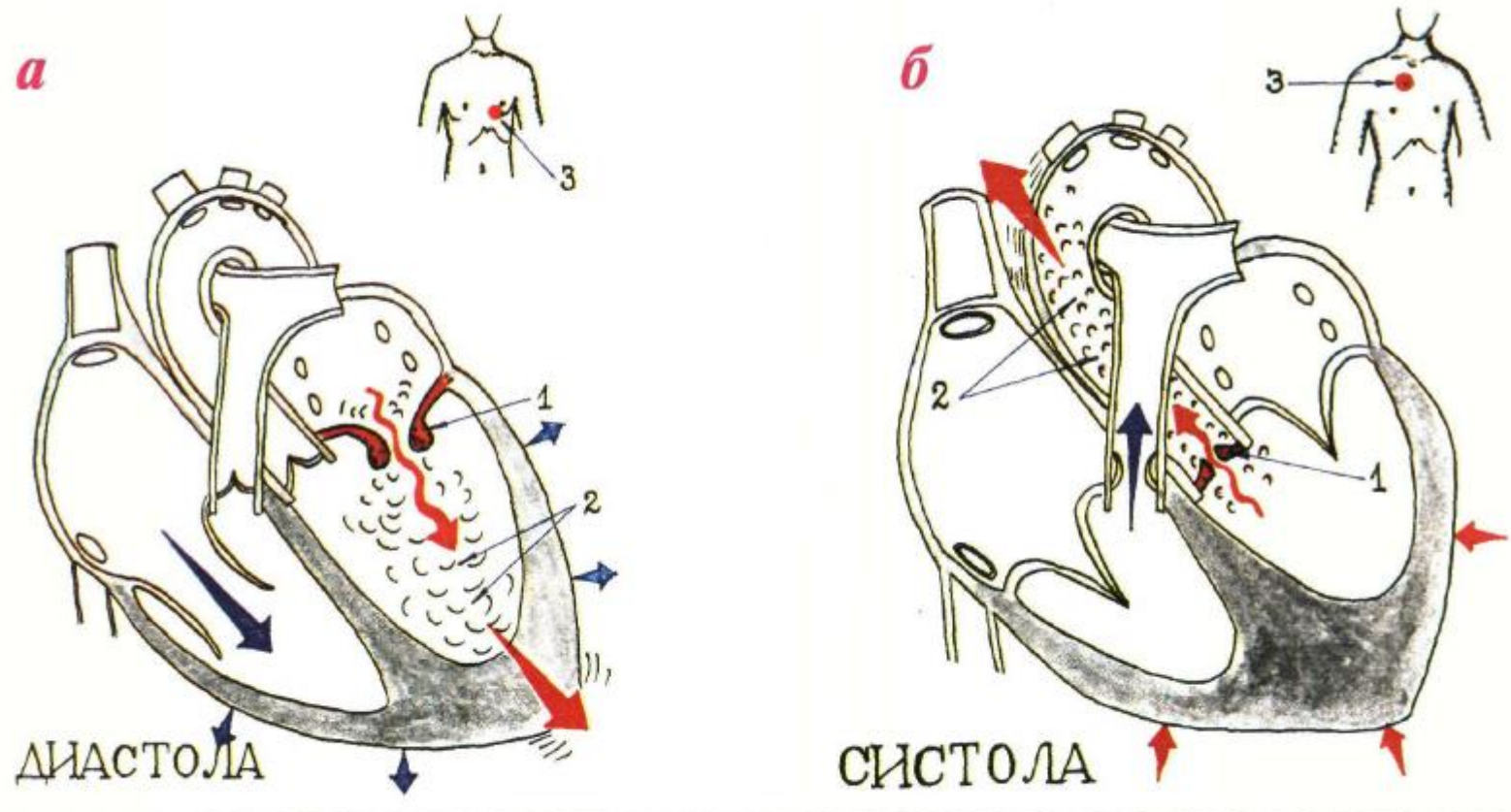
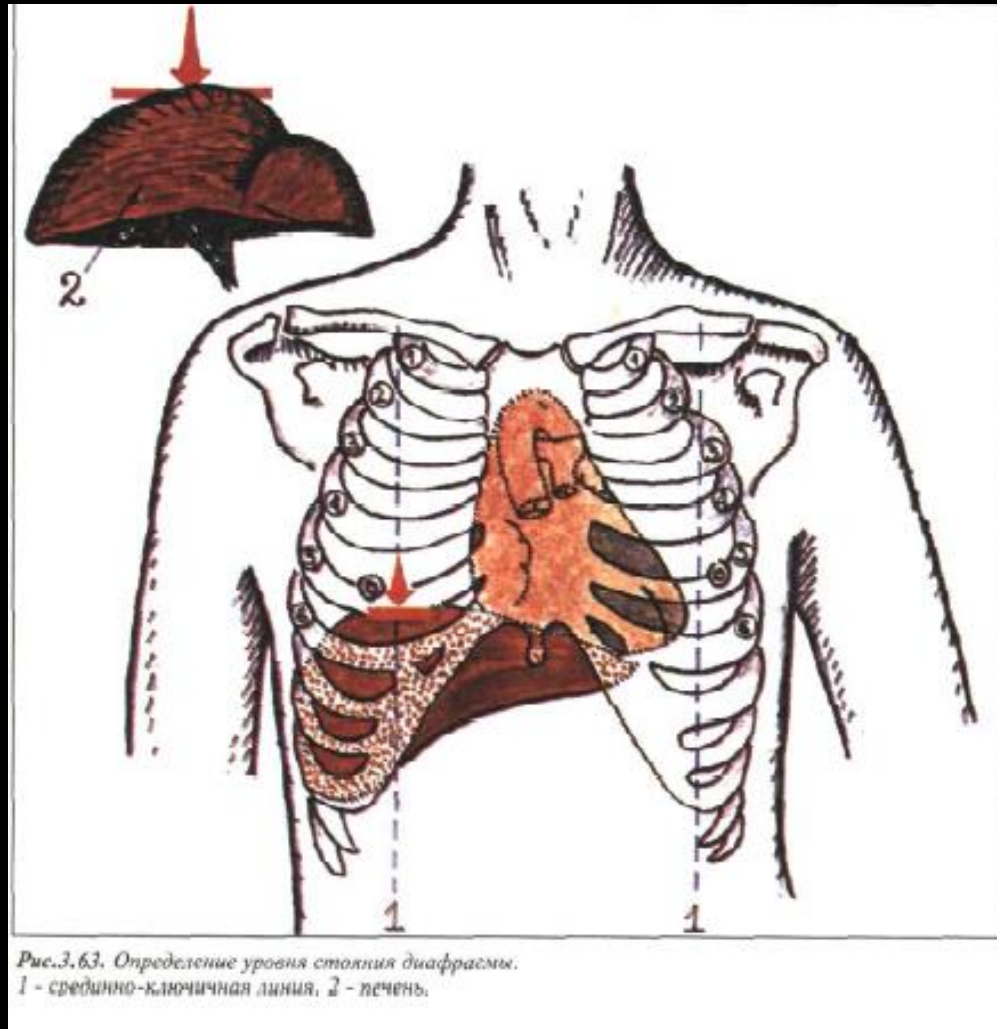


Рис.3.62. Диастолическое дрожание на верхушке при митральном стенозе (а) и систолическое дрожание во II межреберье справа от грудины при аортальном стенозе (б).
1 - сужение клапанных отверстий; 2 - турбулентный ток крови; 3 - локализация диастолического или систолического дрожания.

a-diastolic if mitral stenosis; b- systolic if aortal stenosis

PERCUSSION OF RIGHT BOUNDARY OF HEART DULLNESS (1ST STEP)



PERCUSSION OF RIGHT BOUNDARY OF RELATIVE HEART DULLNESS (2ND STEP)

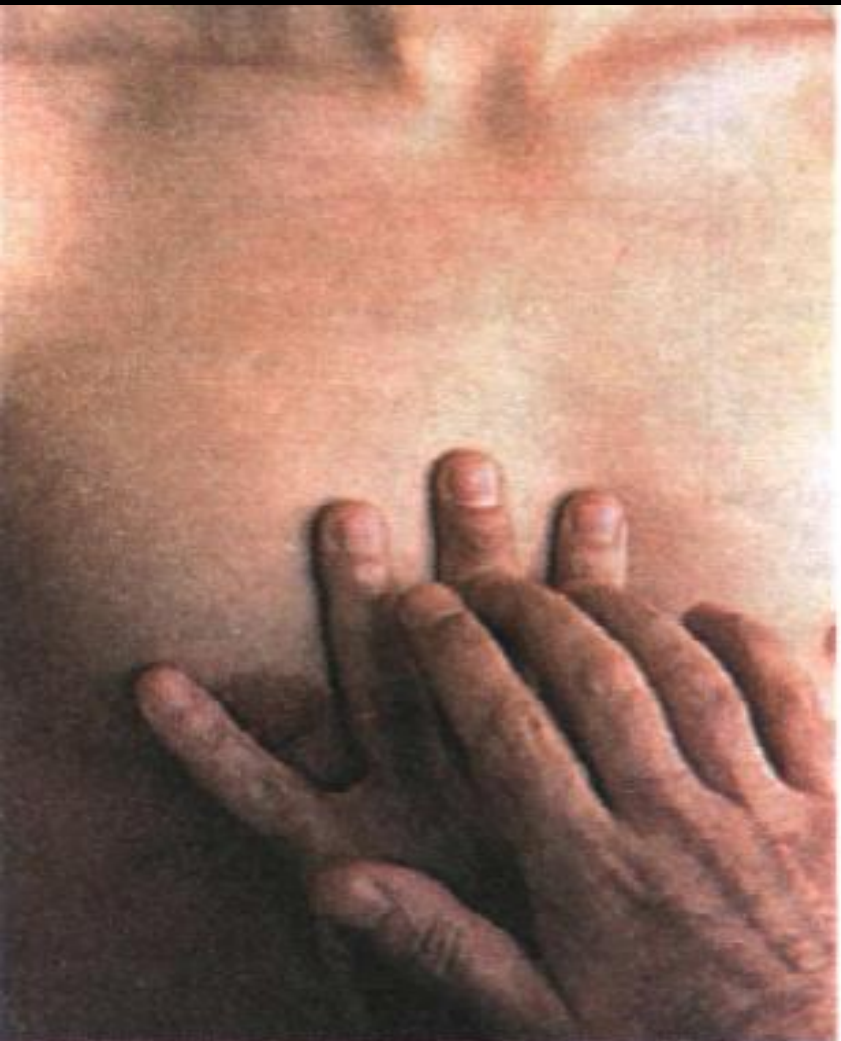


Рис.3.65. Определение правой границы относительной тупости сердца.

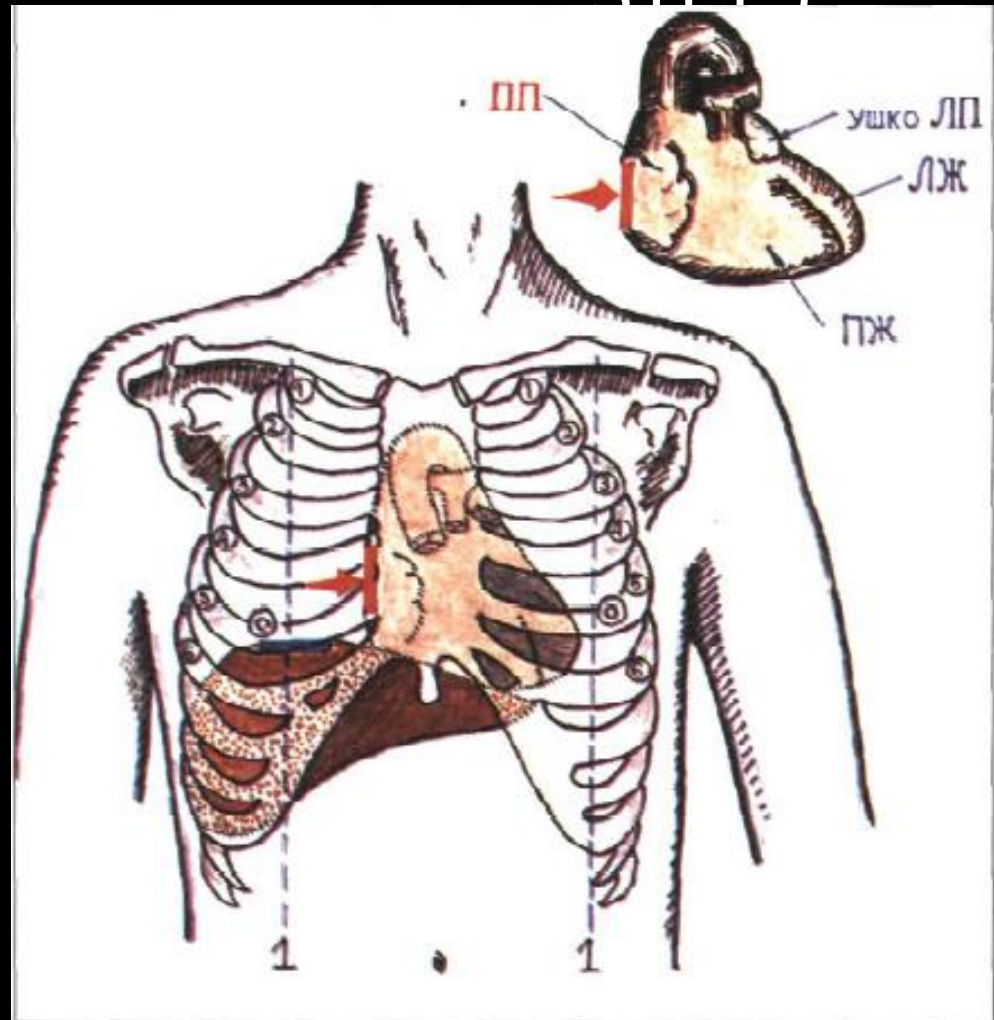


Рис.3.64. Определения правой границы относительной тупости сердца:
ПП - правое предсердие; ЛЖ - левый желудочек; ПЖ - правый желудочек; ЛП - левое предсердие; I - срединно-ключичная линия.

PERCUSSION OF LEFT BOUNDARY (RELATIVE)



Рис.3.67.
Определение
левой границы
относительной
тупости сердца

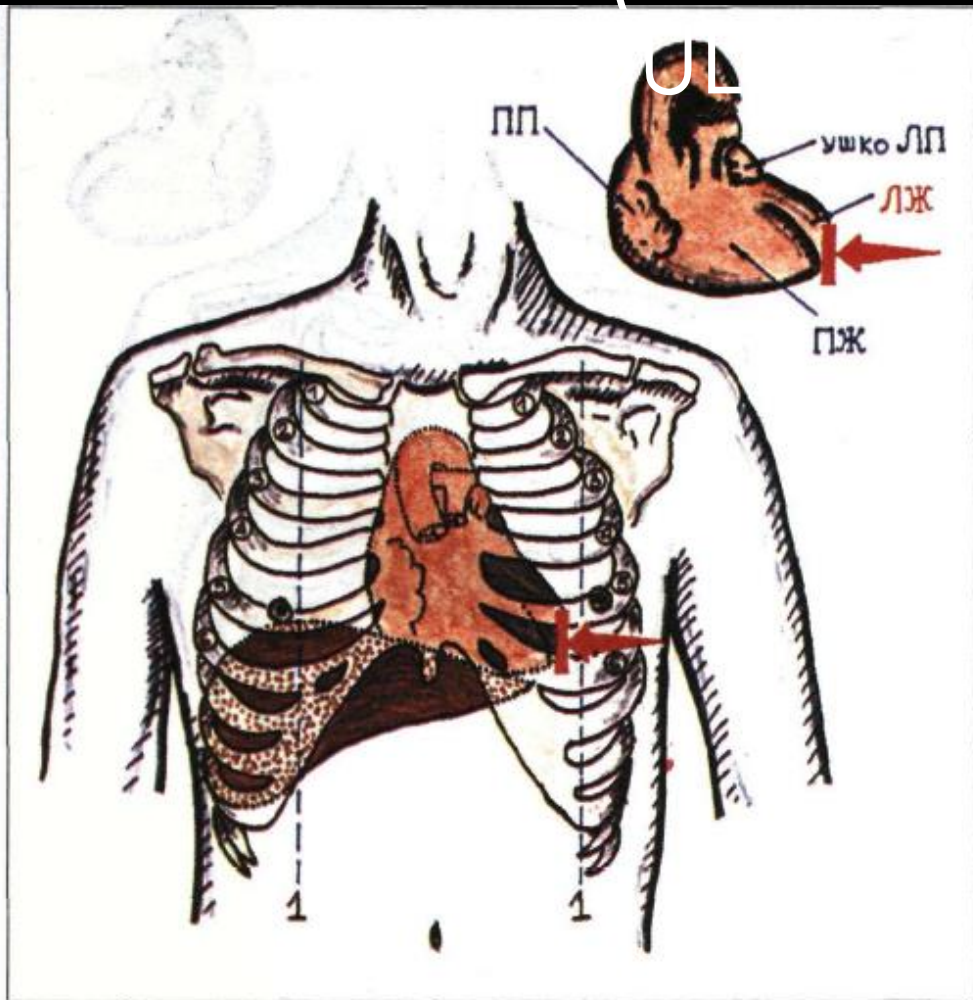
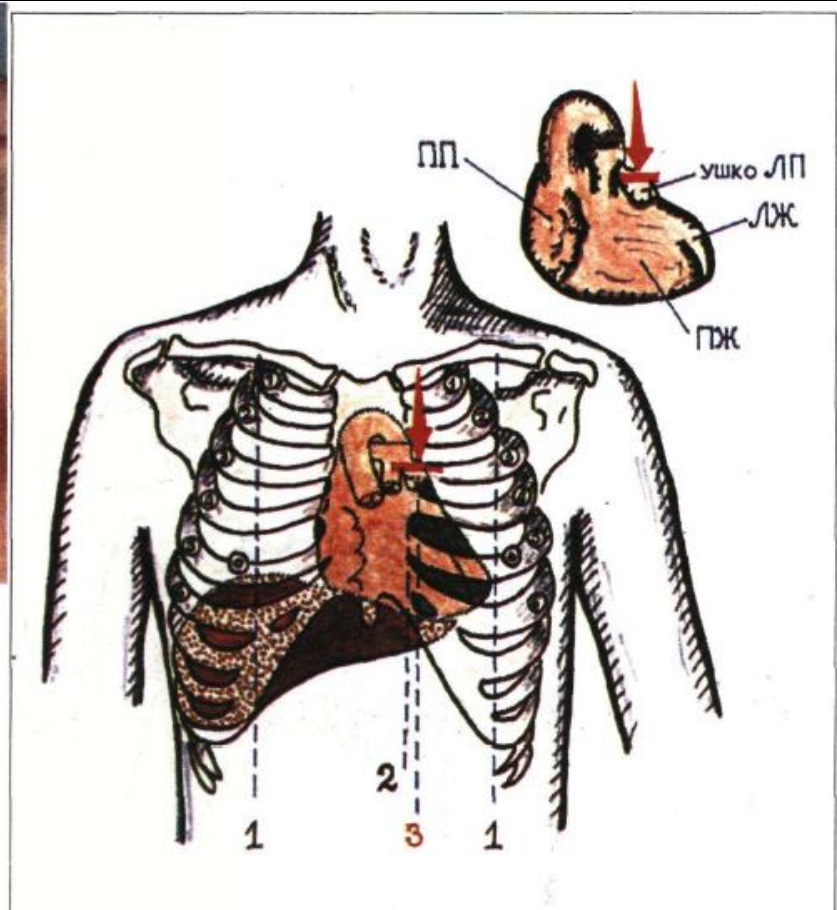


Рис.3.66. Схема определения левой границы относительной тупости сердца.
Обозначения те же, что и на рис.3.64.

PERCUSSION OF UPPER BOUNDARY (RELATIVE DULLNESS)



Рис. 3.69.
Определение
верхней границы
относительной
тупости сердца.



PERCUSSION OF VESSELS BUNDLE

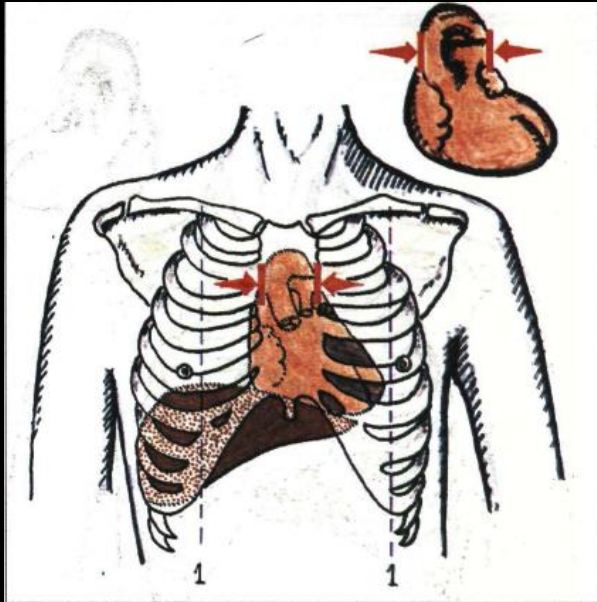
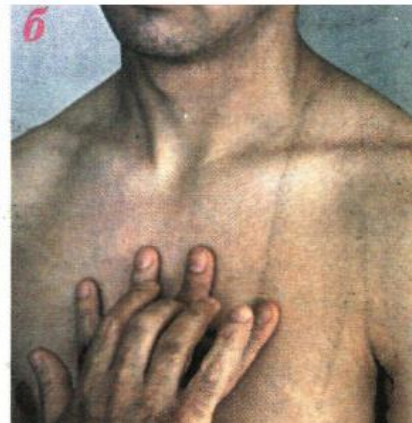
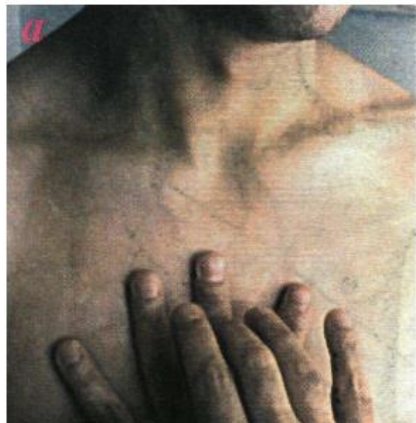
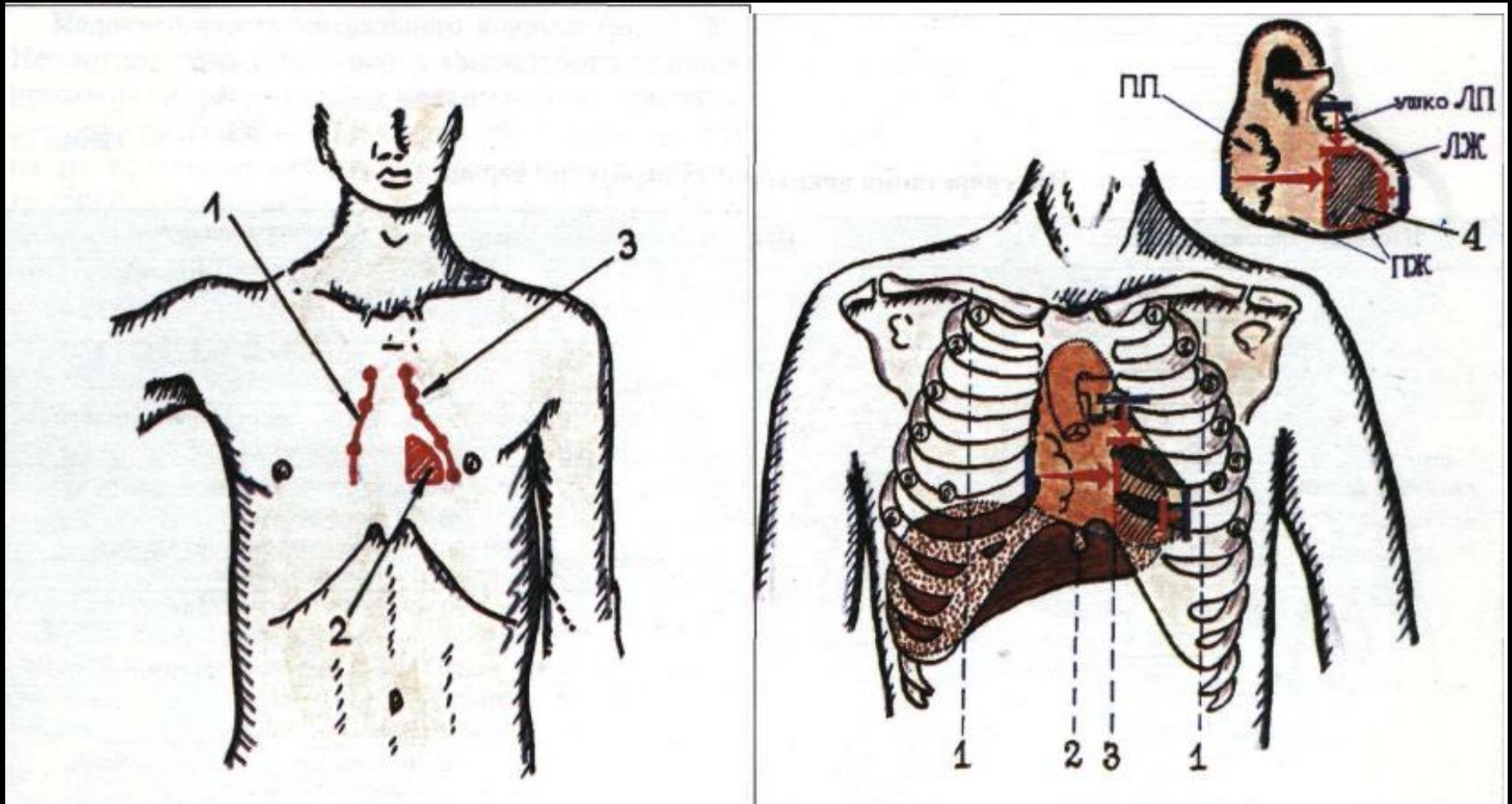


Рис.3.72. Определения границ сосудистого пучка. 1 - срединно-ключичная линия.



PERCUSSION OF ABSOLUTE HEART DULLNESS



CHANGES OF HEART DULLNESS IF MITRAL INSUFFICIENCY AND AORTA INCOMPETENCE

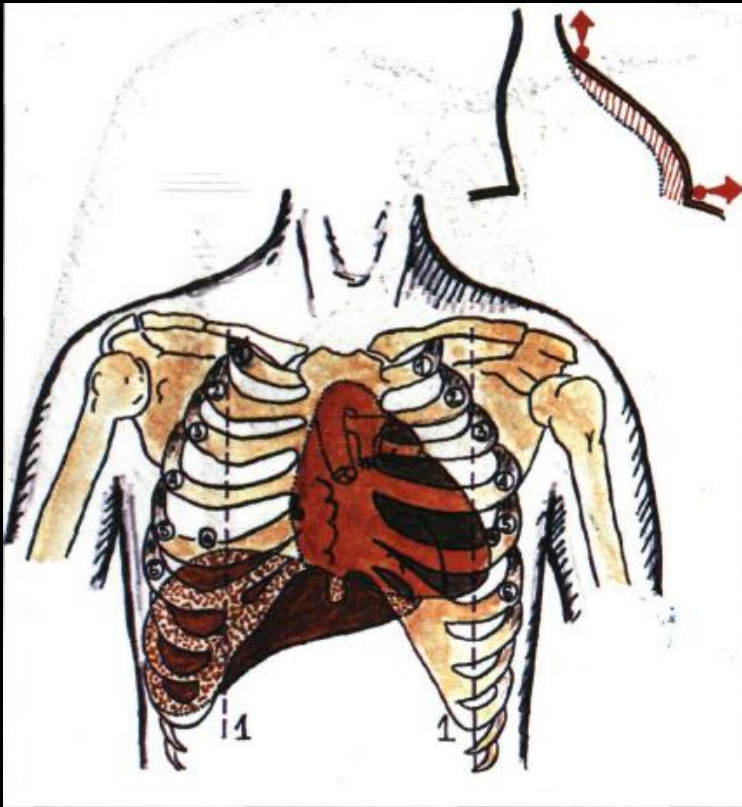


Рис.3.78. Изменение границ сердца при недостаточности митрального клапана.

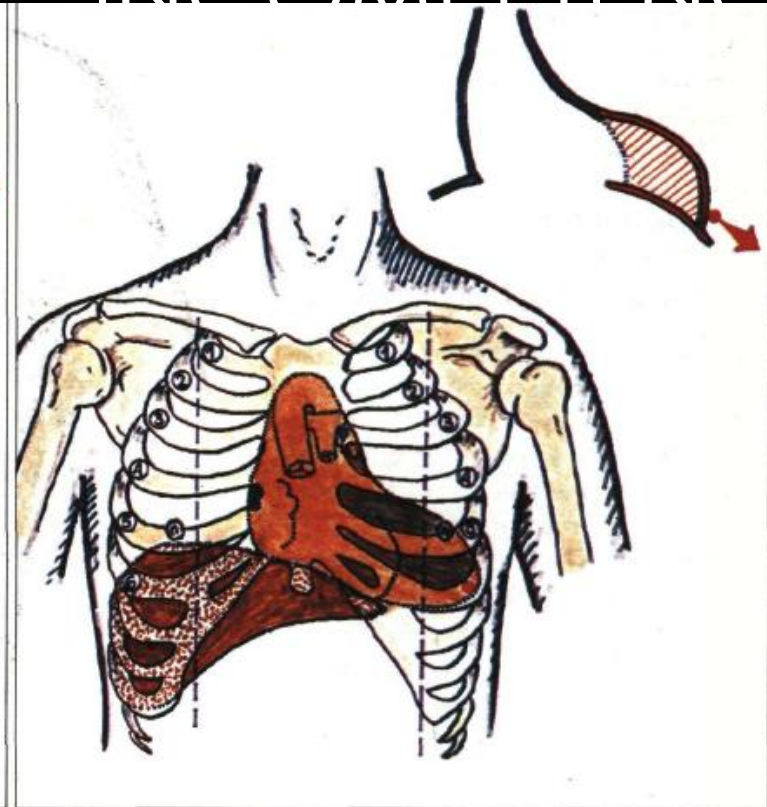


Рис.3.80. Изменение границ сердца при аортальной недостаточности.

CHANGES OF HEART DULLNESS IF MITRAL STENOSIS

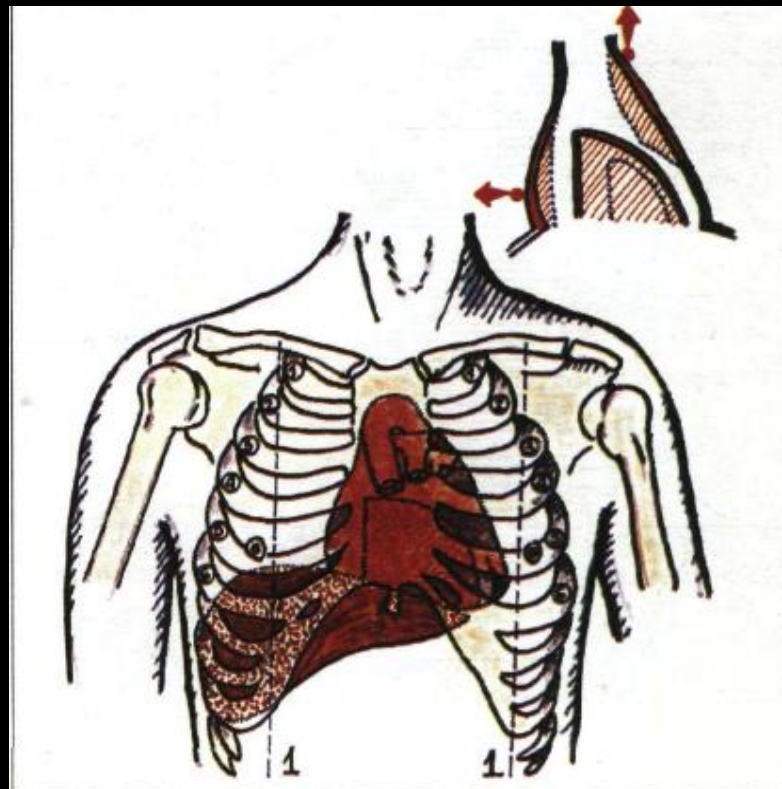


Рис.3.77. Изменение границ сердца при стенозе левого атриоventрикулярного отверстия (митральном стенозе). Объяснение в тексте.

CHANGES OF HEART DULLNESS IF AORTAL STENOSIS

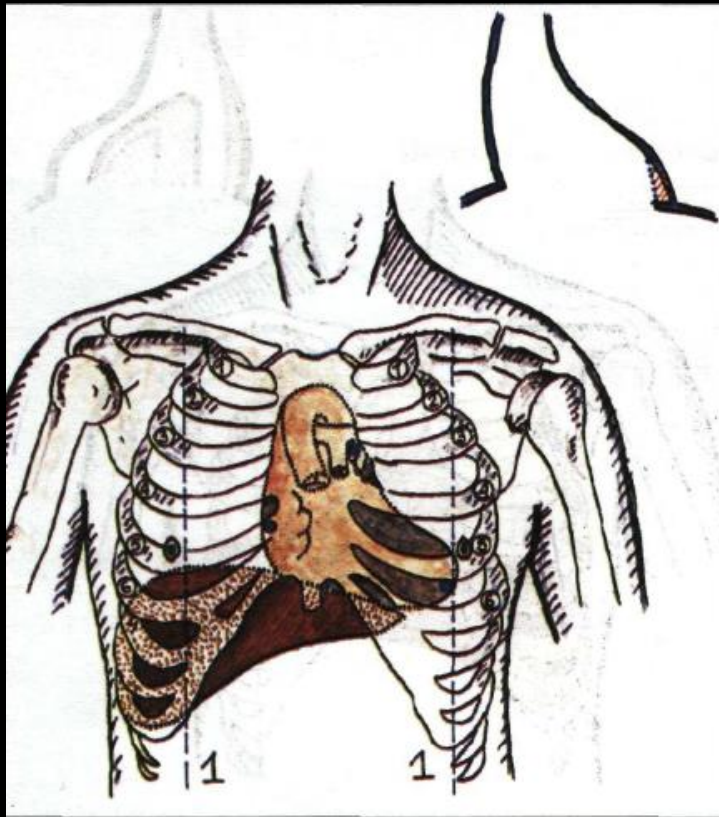


Рис.3.81. Границы сердца при стенозе устья аорты (стадия компенсации).

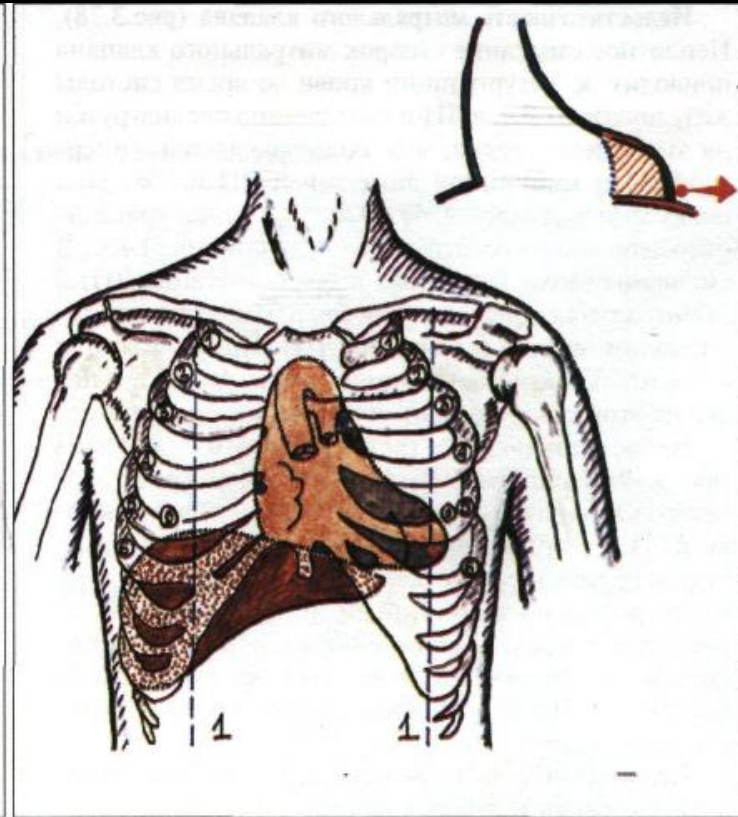


Рис.3.82. Изменение границ сердца при стенозе устья аорты (стадия декомпенсации).



PULSE

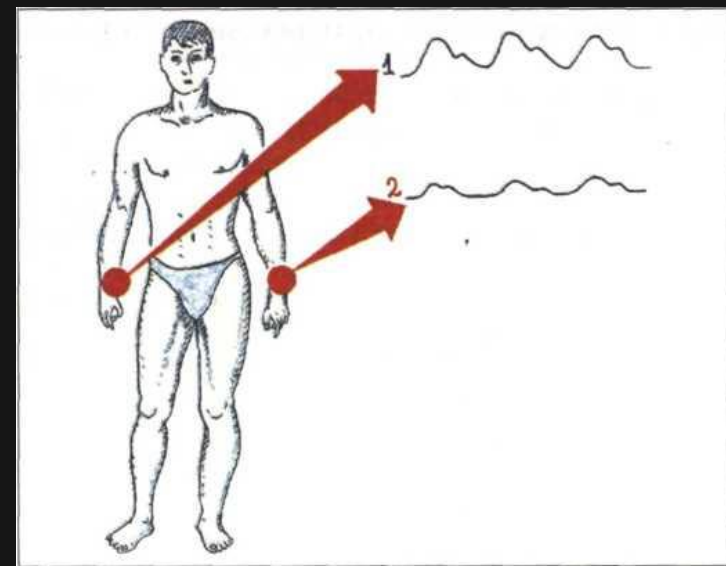
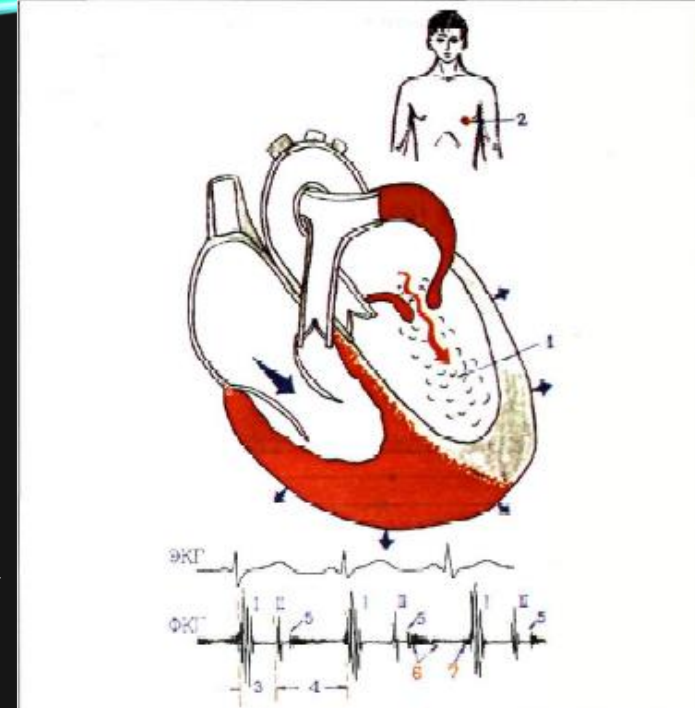
- **Pulse** is a rhythmic oscillation of the artery wall, caused by heart contraction, blood ejection to arterial system and changes of its pressure during of a systole and diastole

PROPERTIES OF ARTERIAL PULSE

1. **Definition of synchronism and similarity of pulse** on radials' arteries (the doctor covers with the right hand the left hand of sick above a wrist joint, and the left hand – on the right hand that tips of II-IV fingers have been located on a forward surface of radials' bone



- At the **healthy person pulse** on both radial arteries **synchronous and identical**
- Unequal and nonsynchronous pulse is called **pulsus differens** (due to **stenosis of mitral valve**, compression of L subclavian artery with L atrium; an **obliterative atherosclerosis** of a vascular wall- **syndrome of Takayasu**)





With a different pulse, his further research held on the arm where the pulse waves feel better

If the pulse is synchronous and the same, the rest pulse properties are determined by palpating one a hand

2. **A rhythm.** Determine whether pulse waves occur through equal (rhythmic pulse **pulsus regularis**) or unequal time intervals (**irregular pulse**).

- The appearance of separate pulse waves, smaller in magnitude and occurring earlier than usual, followed by a longer (compensatory) pause indicates **extrasystoles**.
- In **atrial fibrillation**,
- pulse waves occur through
- unequal intervals and
- different in size



- Corresponds to heart rate and equal to 60-80 / min.
- When tachycardia increases the number of pulse waves per minute, **rapid pulse** appears (**pulsus frequens**); in bradycardia, the **pulse** becomes **rare** (**pulsus rarus**).

3.PULSE RATE

Counting the pulse rate in one minute



4. Pressure of pulse (pulse tension) - is the effort that need to attach for complete compression of the artery

- Proximal located finger gradually press down an artery to a radial bone. A finger located distal, catch the moment of the termination pulsation of an artery.
- Pressure of pulse depends from systolic arterial pressure and elastic properties of an artery wall
- At high systolic BP **pulse is firm (pulsus durus)**, at low pressure – **soft (pulsus mollis)**
- When the artery wall is thickened, the **pulse is hard (firm)**.

5. Filling the pulse (pulse volume) – reflects filling the test artery with blood and depends on magnitude of stroke volume, total blood in the body .

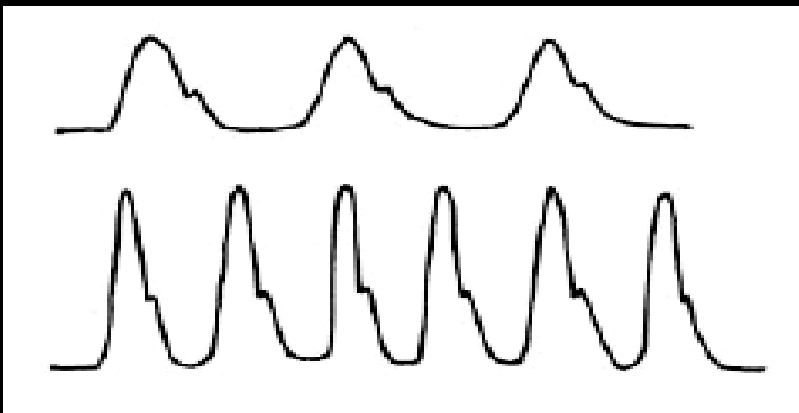
- **In the first stage** with a finger located on the hand of the patient proximally, completely compress the artery to cessation of pulsation. Moment of cessation of pulsation catches finger located distal.
- **In the second stage**, lift your finger to the level when the pad the palpating finger will barely feel the pulsation.
- **Filling judgment** - by the distance at which you want lift the gripping finger to recover the initial amplitude of the pulse wave. It corresponds full expansion of the artery.
- At high stroke volume **full pulse (pulsus plenus)**, at low – **empty pulse (pulsus vacuus)**.

6. The amplitude (size) of the pulse - the concept combining properties such as filling (volume) and tension (presse) and is determined by the strength of the pulse jolts

- Full firm pulse is big (pulsus magnus)
- Empty and soft - small (pulsus parvus)

7. The pulse form (shape) - depends on the speed changes in pressure in the arterial system in systole and diastole.

At decrease in vascular tonus and insufficiency of aortic valve pulse becomes fast (**pulsus celer et altus**), with aortic stenosis aortic pressure rises slowly and slow pulse is observed - **pulsus tardus**



-Normal pulse

-Pulsus celer, altus et magnus

-Pulsus parvus (filiformis)

8. UNIFORMITY OF PULSE

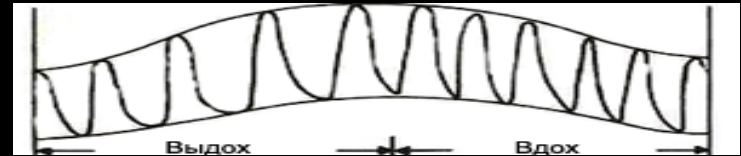
(IN NORM ALL PULSE WAVES ARE IDENTICAL (SAME))

Varieties of non-uniform pulse:

Alternant pulse characterized by alternation strong and weak pulse waves



Paradoxical pulse, at which pulse rate on exhalation increase, and on inhalation - decrease.



Dicrotic (pulsus dicroticus) pulse at which come 2 pulse waves (at fever, infectious diseases)



9. DEFICIT OF PULSE

If frequency of heart rate more than pulse rate, there is deficiency of pulse (**pulsus deficient**)

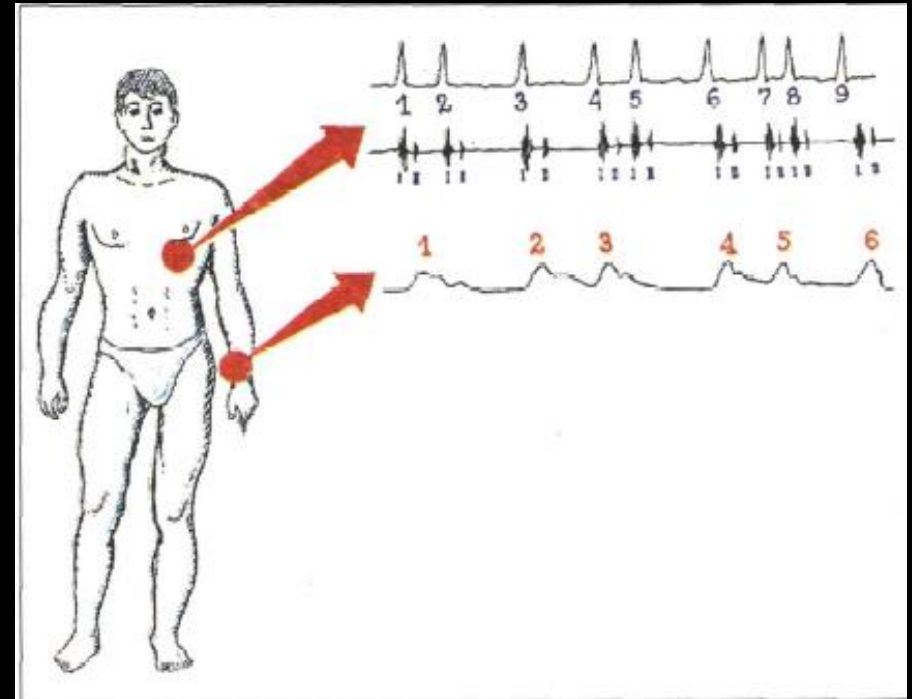


Рис. 3.121. Дефицит артериального пульса (ДП) у больного с мерцательной аритмией. Внизу - волны артериального пульса, вверху - сердечные сокращения (по данным ЭКГ и ФКГ).

DEFICIT OF PULSE

The investigator defines pulse rate, and his assistant simultaneously auscultatively counts the number of heart rate in 1 minute

The deficiency index is equal to a difference of these of these 2 values

The most frequent reason – heart arrhythmias (extrasystoly, atrial fibrillation)



Рис. 3.120. Определение дефицита артериального пульса.

F PULSE

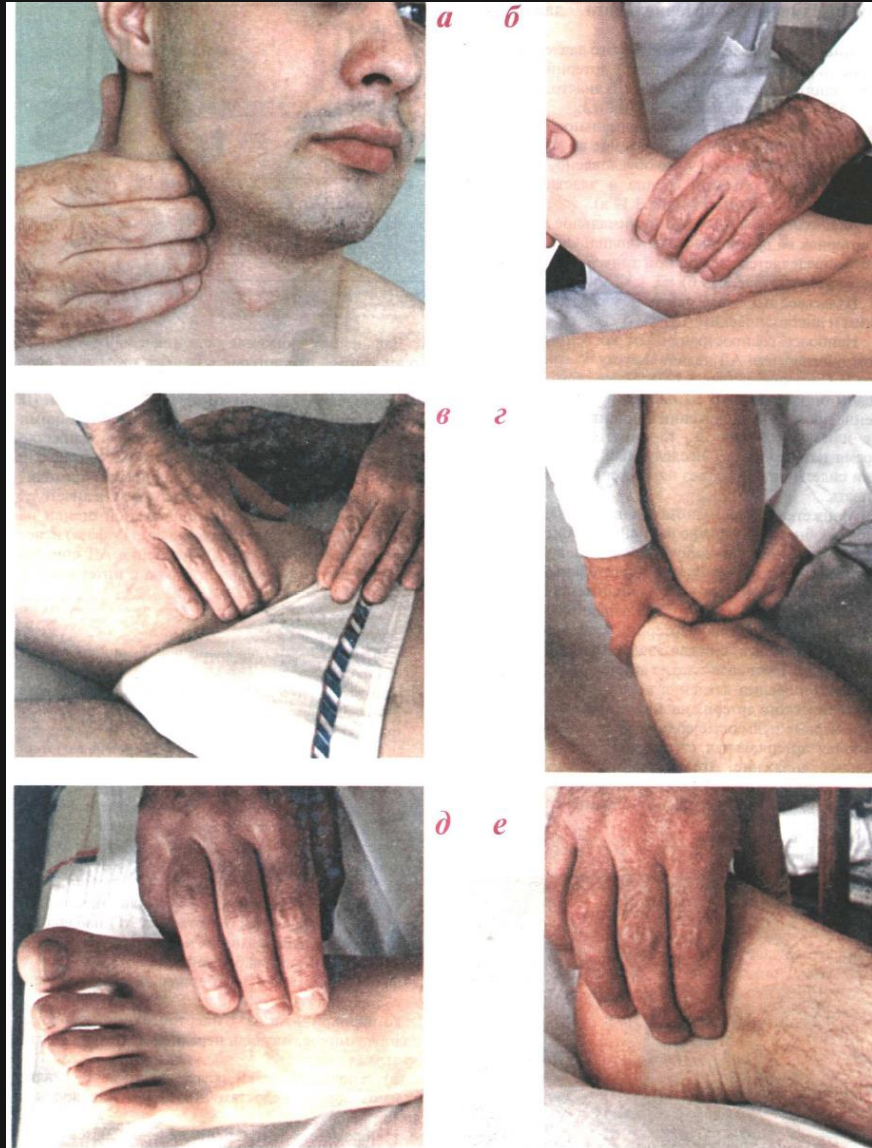
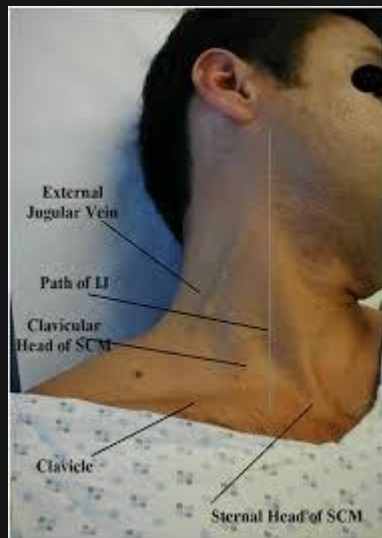
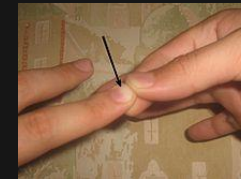


Рис. 3.122. Методика определения артериального пульса на сонных (а), плечевых (б), бедренных (в), подколенных артериях (г) и артериях стопы (д, е)

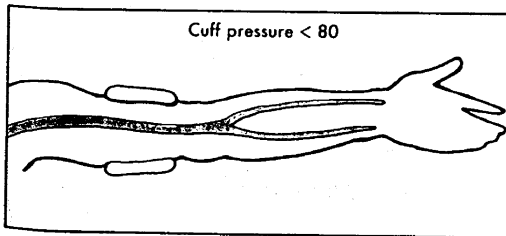
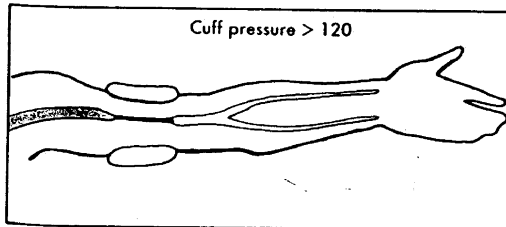
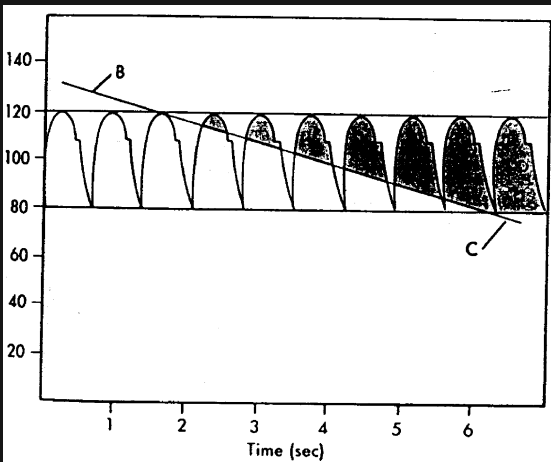
Venous pulse



Quincke capillary pulse

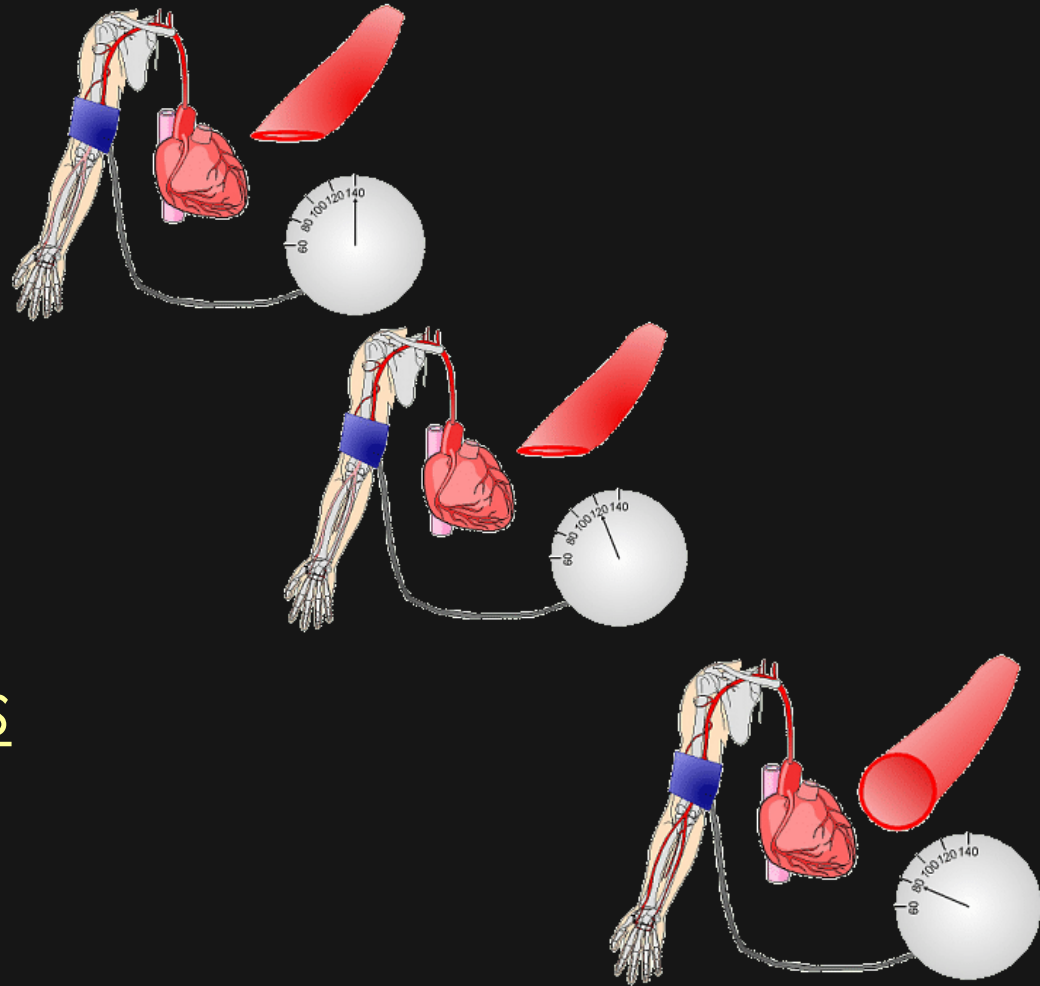


MEASUREMENT OF THE BP AFTER N.S.KOROTKOV METHOD BY MEANS OF DEVICE RIVA-ROCHCHI



THE SOUNDS HEARD AT MEASUREMENT OF BP, ARE CALLED AS KOROTKOV'S TONES. THEY PASS 5 PHASES:

1. Initial "knock"
(pressure in cuff = systolic pressure)
2. Intensity of sounds amplifies
3. The sound reaches the maximum force
4. The sound weakens
5. Tones vanish



ALGORITHM OF MEASUREMENT OF ARTERIAL PRESSURE

1. Position of the patient :

- Sitting with an emphasis, conveniently;
- The hand on a table, is fixed;
- A cuff at heart level, on 2 cm above an elbow bend.

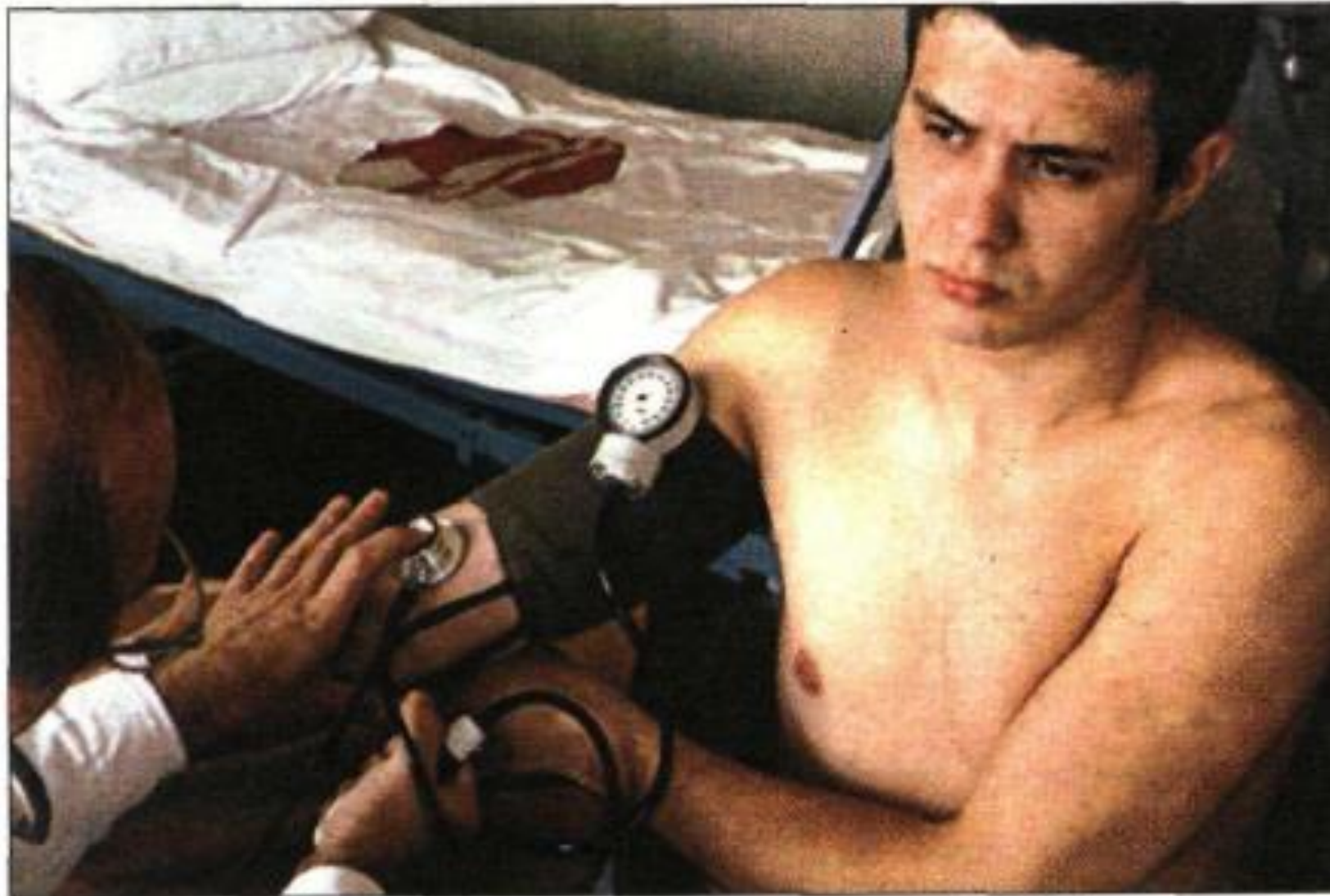


Рис.3.123. Измерение артериального давления на плече по методу Н.С.Короткова.

2. Circumstances:

- The use of coffee within an hour before measurement is excluded;
- Not to smoke within 15 minutes before measurement;
- Application of substances, influence upon heart and vessels, including a part nasal and eye drops is excluded;
- In rest after 5 minute rest.

3. Equipment:

- The device cuff should be the corresponding size: a rubber part not less than 2/3 lengths of a forearm and not less than 3/4 circles of a hand;
- sphygmomanometer should be exposed each 6 months to check, positions of a column of mercury or an arrow before the measurement beginning should be on zero.

4. Frequency rate of measurement:

- For an estimation of level of arterial pressure it is necessary to execute not less than three measurements with an interval not less than 3 minutes, and at a difference more than 5 mm Hg to make additional measurements; the average is accepted to final value from two last measurements;
- For diagnostics of an arterial hypertension should be executed not less than three measurements with week intervals

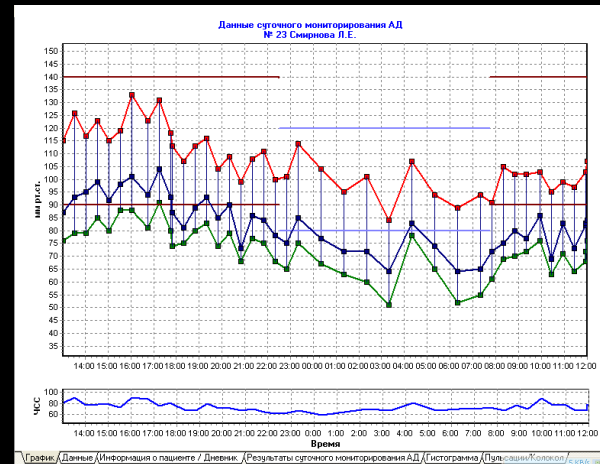
5. Actually measurement:

- Quickly to pump up air in a cuff to pressure level, on 20 mm Hg exceeding systolic BP (of pulse disappearance);
- To reduce pressure in a cuff with a speed of 2-3 mm Hg per second;
- Pressure level at which there is a first tone, corresponds to systolic pressure;
- Pressure level at which there is a disappearance of tones, accept as diastolic pressure;
- If tones are weak, the patient should raise a hand and sometimes to bend it and to unbend, and then measurement repeat; it is not necessary to squeeze strongly an artery with phonendoscope membrane;
- Originally it is necessary to measure pressure upon both hands;
(In norm the difference of arterial pressure on the left and right hand makes 5-10 mm hg)
- Further measurements become on that hand, where pressure above;

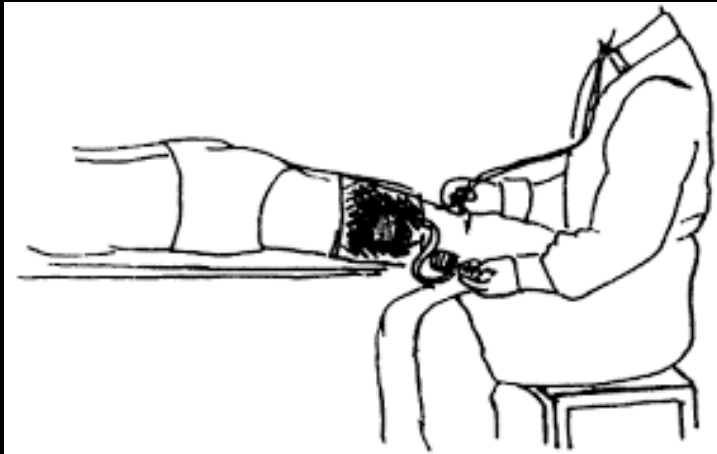
THE COMMENT

- Indications of aneroid device are verified with indications of the mercury standard (the difference in indications mercury and aneroid devices can be in 7 mm Hg)
- When measurement is finished, it is necessary to let out quickly air from a cuff that the venous system was not overloaded and dates of following measurement were not deformed.
- Sounds are is better audible at use of a phonendoscope without a membrane
- Excessive pressing by a stethoscope deforms indicators, belittles diastolic is more often
- At fast release air from a cuff systolic pressure is underestimated, and diastolic is overestimated

OTHER METHODS OF AN ESTIMATION OF BP



OTHER PLACES TO MEASURE BLOOD PRESSURE



CLASSIFICATION OF LEVELS OF ARTERIAL PRESSURE



Category	Systolic BP (mm Hg)	Diastolic BP (mm Hg)
Optimal	< 120	< 80
Normal	< 130	< 85
High normal	130-139	85-89
1 stage AH (mild) Subgroup – bordeline	140-159 140-149	90-99 90-94
2 stage AH (moderae)	160-179	100-109
3 stage AH (severe)	>180	>110
Isolated systolic AH Subgroup – bordeline	>140 140-149	< 90 < 90

- **Pulse pressure** is the difference between the maximum and minimum blood pressure (the norm is 40-50 mmHg).
- **Mean dynamic pressure (MDP)** is that constant pressure, which without pulsation could ensure the movement of blood in the vascular system at the same speed.

"TARGET" ORGANS OF HIGH BP

