

Theoretical part

Mechanisms of venous return

Blood from the capillaries is collected in the veins and returned to the heart. The driving forces for this venous return are:

- **Left ventricle activity (vis a tergo)**

The action of the systolic left ventricle is so strong that the arterial pressure is able to exert a force through the arterioles and capillaries on the blood flow in venules. Venous pressure is about 15 mmHg.

- **Suction effect of the ventricular systole**

During the ejection phase of cardiac contraction, the atrioventricular valves are pulled down, the atria expands and this causes the pressure values to decrease close to zero. Thus, the negative atria pressure against the pressure of the veins allows the passive suction of blood into the atria.

- **Muscle pump and artery**

Muscle pump – a contraction of skeletal muscle helps the return of blood. The correct direction of blood flow is ensured due to valves in the veins, which transmit blood in one direction only.

- **The arterial pulse wave** helps to empty veins due to the arterial pulse pressure that affects the veins.

- **Intrathoracic and abdominal pressure.**

During inspiration the diaphragm decreases, causing a positive pressure in the abdominal cavity. At the same time, pleural pressure decreases from -2.5 to -6 mmHg. Changes in intrathoracic and abdominal pressure affects the pressure in large veins, assisting in venous return.