

# Examination of the child's cardiovascular system

1. anamnesis (congenital heart defects, acquired heart disease in the family risk factors...)
2. patient appearance (height, weight, dysmorphism, skin color,...)
3. breathing (speed and method of breathing, chest shape,...)
4. examination of the abdomen (size and structure of the liver,...)
5. own cardiovascular examination

## General symptoms of heart and vascular disease

central cyanosis, peripheral cyanosis, respiratory disorders (tachypnea, dyspnoea), fatigue, weight failure, excessive sweating, palpitations, chest pain, hypoxic seizures (in Fallot's tetralogy), stick fingers, peripheral edema (in infants and young children initially periorbital, hepatomegaly)

## Physical exam

### Pulse palpation

- pulse frequency and amplitude (on all four limbs)

### Peripheral blood flow control

- color and temperature of the acral parts of the limbs

### Prepaid palpation

- we look for a heart vortex, we evaluate the heartbeat and the function of the right ventricle

### Auscultation of the heart

1. 2nd intercostal space at the right of the sternum (**aortic area**) – we determine the pulse rate, identify the echoes and determine the rhythm
2. 2nd intercostal space left (**pulmonary area**) – we evaluate mainly the second sound (cleft in inspiration?, Pulmonary flow murmur (innocent), the first sound (early systolic pulmonary click?))
3. lower left margin of the sternum (**tricuspid area**) – we are looking for a cleft of the first echo, systolic and diastolic murmur
4. tip area (**mitral area**) – early systolic aortic click?, mesosystolic click? third echo?
5. area above the large blood vessels in the neck

- **first echo** – cause by occlusion of atrioventricular valves (1st mitral, 2nd tricuspid)
  - in children it takes 0,07-0,1 seconds
  - pathological cleft of the first echo (distinguishing between mitral and tricuspid valve stenosis)
  - noisy first episode to inverted cleft - in mitral stenosis (valve closes with delay)
- **second echo** – caused by closure of the semilunar valves (1st aortic, 2nd pulmonary)
  - lasts 0,06 seconds by children
  - the cleft of the second echo is physiological if it disappears during exhalation (due to reduced venous return and subsequent shortening of the time when a smaller volume is expelled into lungs)
  - pathological cleft of the second echo (fixed) - eg in case of left-right short circuit (atrial septal defect) or in case of right ventricular failure
- **third echo** – caused by the oscillation of the relaxed myocardium of the ventricle at the beginning of diastole, at the time of its rapid filling
  - darker and deeper than the first two sounds, so it is difficult to hear under physiological conditions
  - best heard at the tip of the heart
  - it has a greater amplitude in children and adolescents than in adults, so it can be heard in up to 80% of healthy children
  - in newborns and infants it is pathological
  - accentuation in abnormal ventricular dilatation in heart failure
- **fourth echo** – occurs during massive atrial systole, which leads to a rapid rise in ventricular pressure and causes vibration of the ventricular muscle
  - not audible in healthy children or adults
  - audible in heart defects with atrial hypertrophy

### Additional sounds

- early systolic click (ejection click)
- atrioventricular opening tone (snap)
- heart murmurs - caused by either blood turbulence or tissue vibration
  - physiological heart murmurs:
    - systolic functional murmurs: vibrational murmur (Still's), pulmonary expulsive murmur, supraclavicular murmur
    - continuous functional murmurs: whirling venous murmur
    - pericardial friction murmur

### Palpation of femoral pulses

- to detect aortic coarctation

### Blood pressure measurement

- we assess the measured value according to the sex, age and height of the child
- watch out for white coat syndrome!
- hypertension is blood pressure equal to or greater than the 95th percentile for given sex, age and height of a child, measured in three different measurements

## Special examination methods

- EKG
- Xray examination of the heart and lungs
- echocardiography
- cardiac catheterization
- angiocardiology

## Links

### Related articles

- **Vyšetření dítěte:** Vyšetření respiračního systému dítěte ■ Vyšetření gastrointestinálního systému dítěte ■ Vyšetření uropoetického systému dítěte ■ Vyšetření endokrinního systému dítěte ■ Vyšetření pohybového systému dítěte ■ Vyšetření kůže a kožních adnex dítěte ■ Vyšetření zraku a sluchu dítěte

- Vrozené vady oběhové soustavy

## Literature

- LEBL, Jan – PROVAZNÍK, Kamil – HEJCMANOVÁ, Ludmila. *Preklinická pediatrie*. 2. edition. Praha : Galén, 2007. pp. 113-129. ISBN 978-80-7262-438-6.

## Links

[1] ([https://www.wikiskripta.eu/w/Vy%C5%A1et%C5%99en%C3%AD\\_kardiovaskul%C3%A1rn%C3%ADho\\_syst%C3%A9mu\\_d%C3%ADt%C4%9Bte](https://www.wikiskripta.eu/w/Vy%C5%A1et%C5%99en%C3%AD_kardiovaskul%C3%A1rn%C3%ADho_syst%C3%A9mu_d%C3%ADt%C4%9Bte)) Interní propedeutika (2. LF UK) – vyšetření srdce ([http://int-prop.lf2.cuni.cz/zof/vysetreni/srdce\\_n.htm#se](http://int-prop.lf2.cuni.cz/zof/vysetreni/srdce_n.htm#se))[https://www.wikiskripta.eu/w/Vy%C5%A1et%C5%99en%C3%AD\\_kardiovaskul%C3%A1rn%C3%ADho\\_syst%C3%A9mu\\_d%C3%ADt%C4%9Bte](https://www.wikiskripta.eu/w/Vy%C5%A1et%C5%99en%C3%AD_kardiovaskul%C3%A1rn%C3%ADho_syst%C3%A9mu_d%C3%ADt%C4%9Bte)

## Source

- ws:Vyšetření kardiovaskulárního systému u dítěte