

INTRODUCTION TO PHYSICAL EXAMINATION

Once we are done with history taking we continue with physical examination of the patient. It is essential to examine the patient thoroughly in order not to overlook some important sign that can help us to set the diagnosis correctly. There are 4 basic examination methods used:

1. **Inspection**
2. **Palpation**
3. **Percussion**
4. **Auscultation**

INSPECTION

Inspection is used to evaluate the health status of the patient from the very first contact. By inspection we evaluate patient's consciousness, position, gait, nutritional status, skin...

PALPATION

Palpation is an essential part of physical examination. It gives us important information on:

- Size of organ (e.g. hepatosplenomegaly – enlargement of liver and spleen; enlarged thyroid, lymph nodes...)
- consistency, elasticity (e.g. liver cirrhosis)
- pain (examination of n. trigeminus, positive Rousing's sign in appendicitis)
- temperature and humidity of skin (e.g. in fever, different temperature of lower limbs associated with change of colour is suspicious from occlusion in arterial system)
- presence of pathologic process (e.g. palpable mass in breast)

PERCUSSION

Percussion helps us to differentiate between the different character of tissues based on the presence of air, liquid and solid substance. It is also helpful when determining the size and borderlines of organs.

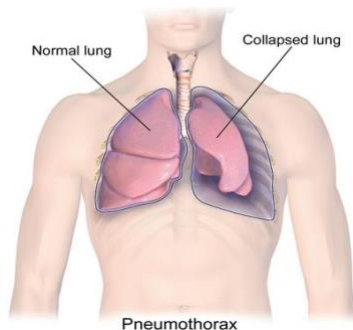
The correct technique of percussion is crucial when examining the patient. If the physician is right-handed he puts his left palm on the surface (body part) he is about to examine. Then he puts his left middle finger into hyperextension while pressing the middle phalange of the left middle finger against the surface. Then he "knocks" with the tip of his right index or right middle finger on the middle phalange of his left middle finger. In case the physician is left-handed he uses the hands vice versa.



Basic percussion findings are:

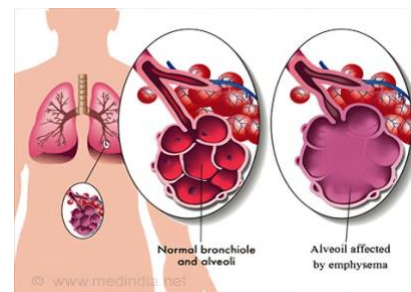
Resonant – percussion sound above healthy lungs

Hyper-resonant – in case of increased amount of air in lungs / pleural cavity (pulmonary emphysema, pneumothorax)



Pneumothorax – presence of air within pleural cavity with partial or complete collapse of lung.

Emphysema – as a result of degradation of alveoli walls, the air is accumulating within pulmonary parenchyme



Tympanic – Sound above the bowels filled with gas (ileus – in case of bowel occlusion, the gas is accumulating before the obstruction)

Differentially tympanic – Physiologic finding on the abdominal wall (the differences in sounds are due to different distribution of air in bowels)

Dull – Over solid tissues (muscle, bone)

- over solid organs (e.g. liver – the lower borderline of the liver can be identified by percussion when change of dull sound into tympanic sound)
- Over large liquid collection (pleural effusion, ascites)
- Over inflamed lungs (do not contain air)

AUSCULTATION

Auscultation is a method based on evaluation of different phenomenon due to organ / system function – heart, lungs, intestine (more in next chapters).

Direct auscultation – obsolete. The physician places his ear directly on examined body part.

Indirect auscultation – with the help of stethoscope

STATUS PRAESENS GENERALIS (SPG)

SPG evaluates:

- Vital signs: blood pressure, heart rate, body temperature, oxygen saturation, height, weight
- State of consciousness
- Body position
- Posture and gait
- Habitus and nutritional status
- Skin
- Breathing

CONSCIOUSNESS

Consciousness evaluation is based on the quality of contact with patient and patient's ability to respond. Physiologically, the patient should be fully alert, oriented in person, place, time and situation (he/she can tell his/her name, day of the week and month and where he/she is).

Consciousness impairment

- **quantitative**
 - somnolence – patient is sleepy; however, it is possible to wake him by calling his name or by soft touch. After waking he/she is able to respond the question in very few words, then he/she falls asleep again.
 - sopor – patient is sleeping, it is necessary to use an intensive stimulus (pain). Verbal contact is not possible, he does not respond to questions, he/she reacts to pain stimulus, he/she can, however, make some sounds, do some movements with his limbs.
 - coma – patient is not responding to questions, touch, pain stimulus, he can't be woken.
- **qualitative**
 - obnubilation
 - delirium
 - amentia

To objectively determine the depth of unconsciousness we use **Glasgow Coma Scale**. We evaluate eye opening, motor response, and verbal response.

15 – 13: no or mild consciousness impairment
12 – 9: moderate consciousness impairment
8 – 3: severe coma

Eye opening	Eyes open spontaneously	4 points
	Eye opening to verbal command	3 points
	Eye opening to pain	2 points
	No eye opening	1 point
Verbal response	Oriented	5 points
	Confused	4 points
	Inappropriate words	3 points
	Incomprehensible sounds	2 points
	None	1 point
Motor response	Obeys command	6 points
	Localises pain	5 points
	Withdraws from pain	4 points
	Flexion response to pain	3 points
	Extension response to pain	2 points
	None	1 point

It is important to mention if the contact with the patient is somehow limited (because of hypoacusis, deafness, dysarthry, lack of collaboration)

POSITION

- **active** – patient can put himself into any position, movements are not limited
- **passive** – patient cannot change the position voluntarily (coma, paresis)
- **forced**
 - a) ortopnoe – patient is heavily breathing in sitting position leant forward a little, he supports himself with his arms, using auxiliary breathing muscles (e.g. cardiac failure, asthmatic attack...)
 - b) lateral position – in pleuritis patient feels less of pain when lying on affected side because of decreased pleural movement
 - c) opisthotonus – position due to extreme contraction of perivertebral muscles (in tetanus), when the patient reminds the strained bow



Patient with tetanus in opisthotonus



Patient in orthopnoic position

If the patient is not able to sit, it is necessary to mention it (e.g. “patient examined in lying position”).

SPEECH

Normally, the speech should be well articulated with coherent answers. After the stroke patient can be dysarthric or aphasic. In case of parkinsonism the speech is monotonous, slow or rapid with pause after syllables. The most common cause of dysarthria is alcohol intoxication.

POSTURE AND GAIT

Physiologic posture is upright without any additional movements (titubations). Gait should be symmetrical without use of walking aids, without abnormal movements. The most common cause of posture and gait impairment is alcohol intoxication, neurologic disorders (stroke, Parkinson’s disease) and musculoskeletal diseases.

Posture examination

- *Romberg I.* – patient standing **on wider base** with arms raised forwards in the height of shoulders with **opened eyes**
- *Romberg II.* – patient **on normal base** with arms raised forwards in the height of shoulders with **opened eyes**
- *Romberg III.* – patient **on normal base** with arms raised forwards in the height of shoulders with **closed eyes**

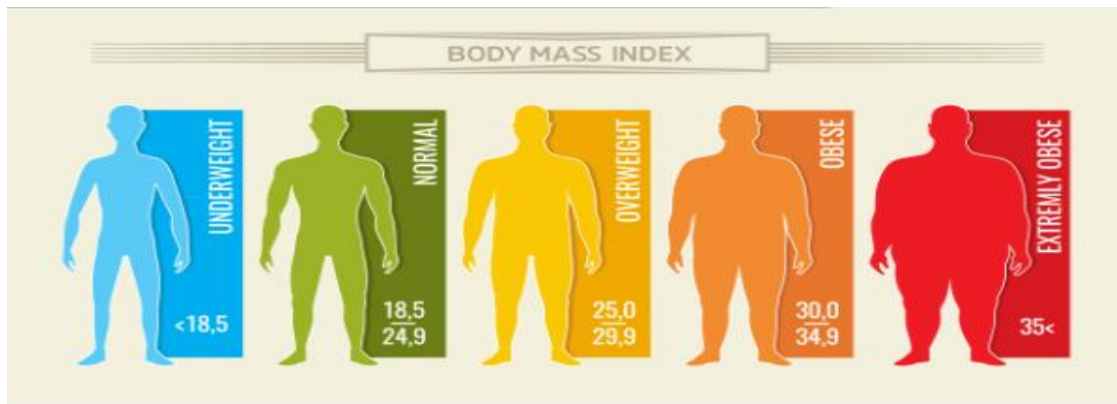
Gait examination

- *Gait I* – with opened eyes
- *Gait II* – with closed eyes

NUTRITION

To objectify the nutrition, we use:

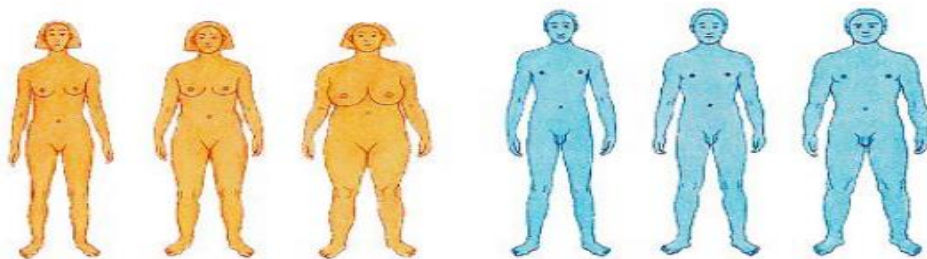
- **BMI (body mass index)** – patient’s weight in kg divided by his height in m (kg/m^2).
- **Broc index** – ideal weight (in kg) equals to patients height (in cm) minus 100. In women we further decrease it by 10%.



HABITUS

Habitus is the term to express the appearance and body shape of the patient.

- **normostenic** – normal, optimal shape of proportional height, weight and musculature
- **astenic** – slim, with less of body fat and little of muscles – might be the finding of malnutrition
- **hyperstenic** – shorter, wider skeleton, well developed musculature – often associated with obesity



Obrázok: Zlava habitus astenický, normostenický a hyperstenický

SKIN

We evaluate:

Colour – normal colour in Caucasian population is pinkish

- **red (erythema)**

localised

- most often is a sign of inflammation of different aetiology (venous thrombosis, erysipelas)
- skin diseases (erythema multiforme in herpes simplex infection)

- palmar erythema (chronic liver diseases, polycythaemia)



generalised – fever

- **icterus** – yellow coloured skin, mucosa and sclerae caused by increased level of bilirubin over 35 $\mu\text{mol/l}$. There are 3 basic types of icterus:

prehepatal – increased synthesis of bilirubin (e.g. as a result of haemolysis)

intrahepatal – impaired transport to hepatocyte, intracellular transport, conjugation or excretion (hepatitis of any aetiology)

posthepatal / obstructive – in biliary stasis (cholecystolithiasis, pancreatic tumour)

- **cyanosis** – blueish colour of skin and mucosa caused by increased concentration of reduced haemoglobin (above 50g/l – absolute number!). Patients with severe anaemia with Hgb < 50 g/L will not develop cyanosis.

Peripheral cyanosis – skin is cold, cyanosis is localised in acral parts (fingers, ears, lips, nose)

- Often observed in low cardiac output, circulatory failure (centralization of circulation to vital organs), as a result of increased extraction of oxygen from blood due to blood stagnation in ineffective circulation (typically disappears after massage)



central cyanosis – skin is warm, cyanosis is generalised

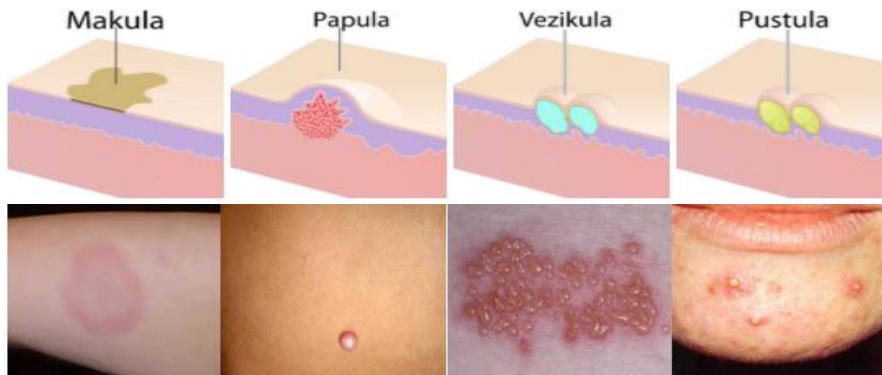
- Lung diseases – as a result of insufficient oxygenation of blood
- Heart diseases – esp. in congenital heart defects in children (mixing of oxygenated and deoxygenated blood in heart)

Pathologic efflorescence – is a sign of ongoing skin disease or secondary sign of other disease (e.g. infectious diseases). It is important to mention localisation, size, shape and dynamics. We use dermatologic terminology:

- **macule** – flat lesion of different colour compared to the rest of the skin
- **papule** – lesion with prominence over the surface



- **vesicle** – lesion containing serous liquid, if the vesicle has larger dimensions we describe it as **bullae**
- **pustule** – vesicle with purulent liquid
- **erosion** – superficial defect (affecting epidermis, mucosa)
- **ulcus (ulcer)** – deep defect of skin or mucosa
- **cicatrix (scar)** – recent scar is in pink colour (there should be no inflammation or secretion), older scars are whitish

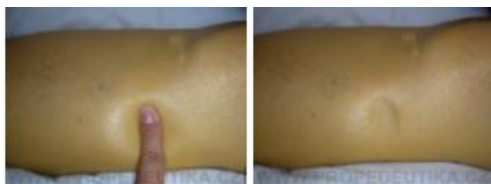


Haemorrhagic diathesis – are signs of bleeding due to decreased coagulation function (thrombocytopenia, hypocoagulation)

- **petechia** – dotted haemorrhage, typically due to severe thrombocytopenia
- **suffusion a ecchymosis** – more extensive confluent intradermal bleeding
- **hematoma** – in comparison with others it is localised deeper, it progressively changes colour and diminishes



Oedema – it is a collection extracellular fluid in interstitial space. There might be a pit forming after pressure (pitting oedema). The skin over the oedema is usually pale and shiny (except for inflammation).



- **symmetrical** – it is associated with congestive cardiac failure (right-sided backward heart failure), chronic liver diseases (hypoalbuminaemia) and renal diseases (retention of sodium and water)
- **localised** – e.g. due to obstruction in lymphatic vessels, in deep venous thrombosis, skin and soft tissues infection (SSTIs)...

- **anasarca** – massive, generalised oedema (legs, abdomen, thorax, arms, eyes/orbits)

Do not forget to describe oedema in details. E.g. if it is symmetrical, how much extensive (till the height of knees, perimaleolar...), what is the colour of the surrounding skin, skin temperature, presence of pain...

Skin turgor – it is indicative of hydration state. In case of moderate and severe dehydration, the skin turgor is decreased – it is demonstrated by pinching the skin, in normal condition the pinch disappears almost instantly, in case of dehydration it stays in place for short time. Increased turgor is found in case of hyperhydration or oedemas.



Skin temperature – it is examined by touch

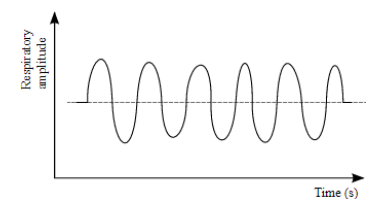
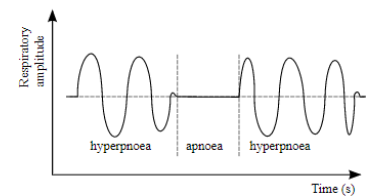
- locally increased – accompanied by erythema and oedema is caused by inflammation (deep venous thrombosis, erysipelas)
- locally decreased – accompanied by pale (or cyanotic) cold skin is a sign of ischaemia or ineffective circulation

Breathing

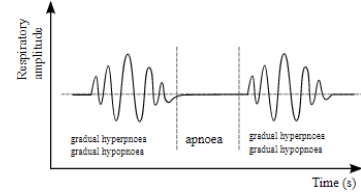
- eupnoea – normal physiologic type of breathing with rate of 14-30 per minute
- tachypnoea – fast breathing (over 20/min)
- bradypnoea – slow breathing (below 14/min)
- apnoea – transitory or permanent lack of breathing
- hyperpnoea – high amplitude of breathing
- ortopnoea – forced breathing with help of auxiliary breathing muscles

Specific breathing disorders

- Biot's breathing – succession of hyperpnoea and apnoea (seen in increased intracranial pressure, encephalitis, meningitis)
- Kussmaul's breathing – hyperpnoea + tachypnoea (seen in ketoacidosis)



- Cheyne-Stoke's breathing (periodic breathing) – progressively growing amplitude with decreasing amplitude followed by apnoeic pause and on again (severe cerebral stroke)



Example:

BP: 120/80Torr, HR: 70/min reg., Body temperature: 36 st.C, Respiratory rate: 16/min.

Patient is conscious, fully alert (somnolent, in sopor, comatose), oriented in person, place, time, situation (confused). Speech is articulated, with coherent answers (dysarthric, aphasia). Position is active (semi active, limited by pain, passive, orthopnoic). Posture is physiologic (hemiplegic, Parkinsonic), without titubation (with titubation). Gait is symmetric (on wide base). Habitus normosthenic (asthenic, hypersthenic), nutrition is optimal (obesity, cachexia), skeleton is symmetric (present deformities), muscles are eutrophic (hypotrophic, hypertrophic). Skin turgor is normal (decreased, increased, anasarca). Skin is without icterus, cyanosis (icteric, subicteric, acral/central cyanosis), with no pathologic efflorescence (exanthema) or haemorrhagic diathesis (petechiae, suffusion, hematomas), eupnoe (tachypnoe, bradypnoe, dyspnoe, hyperpnoe).