

UČEBNÍ TEXTY UNIVERZITY KARLOVY V PRAZE

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CLINICAL EXAMINATION IN INTERNAL MEDICINE

Manual for Lessons in Internal Propedeutics
for English Speaking Foreign Students Examining
Czech Patients



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Univerzita Karlova v Praze
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PREFACE

This quick guide is the third edition of a clear and concise manual for the busy English speaking foreign students of medicine in the Czech Republic. This manual summarizes basic knowledge of internal propedeutics. Its purpose is to provide a fast and efficient way to identify important clinical information particularly for practical lessons in internal propedeutics and internal medicine. Czech-English medical history (anamnesis) has been added for the need of students to communicate with Czech speaking patients. Consequently, it is not intended to substitute for the many excellent medical reference texts that form the cornerstone of one's medical education.

To limit the size of the manual to a pocket reference, less emphasis has been placed on pathophysiology and more emphasis on practical clinical information. A conservative approach to the various medical syndromes is followed throughout the book. Elegant but unnecessary words have been eliminated in favor of simple and accurate expositions of the various subjects.

We hope that the concise style of this manual will be of help to the medical student, particularly when time to study voluminous monographs is for him in the course of university education severely limited.

The authors

MEDICAL HISTORY (ANAMNESIS, CASE HISTORIES)

The patient anamnesis is an important tool when working with a patient because high quality patient history data is key to help establish the patient's diagnosis. Medical history makes up 60 to 90% of the diagnostic process in internal medicine. Anamnesis assessment creates an opportunity to establish good lines of communication with the patient, which are important for effective disease management.

You need a pleasant and silent room for discussion with the patient. The patient must have a good sitting posture and there must be enough light for you to be able to distinguish color changes in the patient's face, mimics etc. Enough time and patience are essential conditions for taking good medical history.

Start to record present diseases first, and then the personal history of your patient! Your focus must be on the patient at first, then on the family history. Record all diseases on a time line. Describe the patient's symptoms in the patient's own words. The medical history must be made in the patient's language!

1.1 Rodinná anamnéza

1.1 Family history

Žije váš otec (matka)?

Is your father (mother) still alive?

Jestliže žije, jaké má nemoci?

If yes, does he (she) suffer from any diseases?

Jestliže nežije, na jakou chorobu zemřel(a)?

If they are not alive, what did he (she) die of?

Jak byl(a) starý(-á), když zemřel(a)?

How old was he (she) when he (she) died?

Máte sourozence?

Do you have any sisters or brothers?

Jestliže žijí, mají nějaké nemoci?

If they are alive, do they suffer from any diseases?

Jste ženatý (vdaná)?
Jestliže ano, má váš manžel
(manželka) nějaké nemoci?
Pokud nežije, na co zemřel(a)?

Máte děti?
Kolik a jak jsou staré?
Mají nějaké nemoci?
Pokud již nežijí, na co zemřely?

Měl někdy někdo v rodině závažné
nebo dědičné choroby?
Např. ischemickou chorobu srdce,
cévní mozkovou příhodu, vysoký
krevní tlak, cukrovku aj.?

Are you married?
If yes, does your wife (husband) have
any diseases?
If he (she) is still not alive, what did
he (she) die of?
Do you have any children?
How many and how old are they?
Do they suffer from any diseases?
If they are not longer alive, what did
they die of?
Has anyone in your family ever had
any serious or inherited diseases?
E.g. coronary heart disease, stroke,
hypertension, diabetes etc.?

1.2 Osobní anamnéza

Jaké nemoci jste měl v dětství?

Jaké nemoci jste prodělal
v dospělosti a kdy to bylo?
Byl jste někdy v nemocnici?
Kde, kdy a proč?
Měl jste nějakou operaci?
Měl jste někdy nějaký úraz?

Jaký a kdy?

Životní návyky

Kouříte?

1. Ne, jsem nekuřák.
2. Ano, ale jen občas, jsem
příležitostný kuřák.

1.2 Personal history

Did you suffer from any diseases
during your childhood?

Did you suffer from any diseases as
an adult? which ones and when?

Have you ever been hospitalized?

Where, when and why?

Did you ever undergo any surgery?

Have you ever suffered from any
injury?

From what and when?

Lifestyle habits

Do you smoke?

No, I am non-smoker.

Yes, but only occasionally, I am
occasional smoker.

3. Ano pravidelně, jsem kuřák. Yes, regularly, I am smoker.
 Co kouříte: cigarety, doutník, What do you smoke: cigarettes, cigars
 dýmku? or a pipe?
 Kolik kouříte cigaret za den? How many cigarettes do you smoke
 per day?
 Kolik kouříte doutníků za týden? How many cigars do you smoke per
 week?
 Kolik gramů tabáku vykouříte How many grams of tobacco do you
 za týden? smoke per week?
 Od kolika let kouříte? How old were you when you first
 began to smoke?
4. Nyní nekouřím, ale dříve jsem I used to smoke but not now.
 kouřil. Jsem bývalý kuřák. I am ex-smoker.
- Notice: 1-year non-smoker = ex-smoker*
- V kolika letech jste začal a v kolika When did you start and when did you
 přestal kouřit? stop smoking?
 Kolik cigaret jste kouřil denně? How many cigarettes did you smoke
 daily?

Pijete pravidelně alkohol?

1. Vůbec ne, jsem abstinent. Never, I am an abstinent (non-drinker)
 2. Nepravidelně, jsem příležitostný Irregularly i.e. occasionally.
 piják. I am an occasional drinker.
 3. Ano, pravidelně. Jsem piják. Yes, regularly. I am a drinker.
 Kolik piv vypijete obvykle How many glasses of beer do you
 za týden? usually drink per week?
- Notice: 1 glass of beer = 1/2 L*
- Kolik decilitrů vína vypijete How many dl of wine do you
 obvykle za týden? usually drink per week?
 Kolik sklenek destilátu pijete How many glasses of spirits (i.e.
 obvykle za týden? liquor) do you usually drink per week?
- Notice: 1 glass of liquor = 5 cL*

Jaká je vaše pohybová aktivita?

Chodíte nebo procházíte se
 pravidelně?

What about your physical activity?

Do you walk regularly?

Cvičíte pravidelně?
Jakou aktivitu děláte?
Jak často se pohybujete?

Do you exercise regularly?
What type of activity do you do?
How often do you do it?

Držíte nějakou speciální dietu?
Jakou a jak dlouho?
Držím nízkotučnou (diabetickou,
vegetariánskou, redukční) dietu.

Are you on any special kind of diet?
What type and how long?
I keep low-fat (diabetic, vegetarian,
low-caloric) diet.

Jste na něco alergický(-á)?

Are you allergic to anything?

1.3 Pracovní anamnéza

Jaké máte vzdělání?
Kde jste všude pracoval?

1.3 Professional history

What is your education?
What is your occupation (all your jobs)?

1.4 Sociální anamnéza

Kde bydlíte?
– v rodinném domku
– v bytě
S kým bydlíte?

Máte někoho?
Navštěvuje vás někdo?

1.4 Social history

Where do you live?
– in a family house
– in a flat
Do you share your accommodations
with anybody?
Do you have some social support?
Does anybody visit you at home?

1.5 Gynekologická anamnéza

Od kdy do kdy jste měla
menstruaci (měsíčky)?
Menstruujete pravidelně?
Jsou vaše menstruace slabé,
normální nebo silné?
Máte při menstruaci bolesti?

1.5 Gynecological history

How old were you at the onset of
your periods?
Are your periods regular?
Are your periods weak, normal
or heavy?
Are your periods painful?

V kolika letech jste přestala
menstruovat?

Nastoupila menopauza samovolně
nebo po zákroku?

Kolik jste měla porodů?

Kolik jste měla potratů spontánních
a umělých?

Užívala jste nějakou antikoncepci?

Jak dlouho a jakou?

Měla jste nějakou gynekologickou
operaci?

Kdy jste měla poslední
gynekologickou prohlídku?

Měla jste někdy výtok z pochvy?

How old were you during your last
period?

Was your menopause spontaneous or
induced?

Total number of your pregnancies?

Total number of your abortions and
miscarriages?

Have you ever taken any
contraceptives or IUD?

How long and what type?

Have you ever had any gynecological
surgery?

When was your last
gynecological examination?

Have you ever had any vaginal
discharge?

1.6 Nynější onemocnění

1.6 Present disease

**The 1st question you will put to
the patient has to be:**

Proč jste byl(a) přijata do nemocnice
nebo proč jste přišel(a) k lékaři?

Why were you admitted to the
hospital or did you come to the
physician's office?

1.7 Useful questions for obtaining patient's complaints:

Bolest

Máte nějakou bolest?

Kde přesně cítíte bolest?

Kdy bolest začala?

Cítíte bolest spíše na kůži nebo
v hloubce? Šíří se bolest někam?

Pain

Do you have any pain?

Where exactly is the pain?

When did the pain start?

Do you feel the pain near to the skin
or deep inside? Is this pain spreading
anywhere?

Jak silná je bolest?
Jak byste bolest popsal(a)?
Je tupá, ostrá, pálivá nebo bodavá?
Je plošná nebo bodová?
Je vaše bolest stálá nebo se mění,
kolikovitá?

How severe is the pain?
How would you describe the pain?
Is it dull, sharp, burning or stabbing?
Is it flat or is located in a spotplace?
Is your pain persistent or is it je
changing in intensity, is it colicky
pain?

**Kardiovaskulární dotazník
(London School of Hygiene)**

Cardiovascular questionnaire

A. Chest pain on effort

Měl jste někdy nějakou bolest
nebo nepříjemný pocit na hrudi?
Máte ji když jdete do kopce nebo
spěcháte?
Máte ji když jdete svým tempem
po rovině?
Co uděláte když se bolest objeví
při chůzi? Zastavíte se?
Když se zastavíte, co se stane?
Uleví se vám?
Za jak dlouho?
Ukážete mi, kde jste měl bolest?
Cítíte ji ještě někde jinde?
Navštívil jste lékaře pro tuto bolest?

Have you ever had any pain or
discomfort in your chest?
Do you get it when you walk uphill
or hurry?
Do you get it when you walk at an
ordinary pace on the level?
What do you do if you get it while
you are walking? Do you stop?
If you stand still, what happens to it?
Do you feel relieved?
How soon?
Will you show me where it was?
Do you feel it anywhere?
Did you see a doctor because of this
pain?

B. Possible infarction

Měl jste někdy silnou bolest přes
celou přední stranu hrudníku trvající
půl hodiny nebo déle?
Navštívil jste lékaře kvůli této
bolesti?
Kolikrát jste měl tyto bolesti?

Have you ever had a severe pain
across the front of your chest lasting
for half an hour or more?
Did you see a doctor because of this
pain?
How many of these attacks have you
had?

C. Intermittent claudication

Bolely vás někdy nohy během chůze?	Do you get pain in either leg on walking?
Kde přesně se bolest nachází?	In what part of your leg do you feel it?
Cítíte bolest když stoupáte do kopce nebo spěcháte?	Do you get it if you walk uphill or hurry?
Cítíte bolest když jdete svým tempem po rovině?	Do you get it if you walk at an ordinary pace on the level?
Co uděláte, když se bolest objeví při chůzi? Zastavíte se?	What do you do if you get it when are you walking? Do you stop?
Co se stane když zastavíte?	What happens to it if you stand still?
Za jak dlouho bolest zmizí?	How soon the pain does go away?

Questions for the evaluation of Canadian Cardiological Society (CCS) classification of Ist–IVth stage of stable angina pectoris: CCS functional classification

Máte bolest na hrudi během velmi velké fyzické zátěže?	Do you have chest pain during very hard physical load? (CCS I st stage)
Máte bolest na hrudi během obvyklé námahy?	Do you have chest pain during usual activity? (CCS II nd stage)
Máte bolesti na hrudi během menší než obvyklé námahy?	Do you have chest pain during lower activity than usual? (CCS III rd stage)
Máte bolest na hrudi při sebemenší námaze?	Do you have chest pain during minimal activity? (CCS IV th stage)

Dušnost

Zadýcháváte se?
Je vaše dušnost stálá nebo záchvatovitá?
Je horší váš nádech nebo výdech?
Zadýcháváte se vleže?

Kolik polštářů potřebujete v noci?

Cítíte někdy pískoty při dýchání?

Dyspnoea

Do you become short of breath?
Is your breathlessness persistent or paroxysmal?
Is it worse when you inhale or exhale?
Do you get short of breath when you lie flat?
How many pillows do you sleep on at night?
Did you ever feel wheezes during breathing?

Questions for the evaluation of New York Heart Association (NYHA) classification of Ist–IVth stage of dyspnoea through left ventricle heart failure: NYHA classification

Zadýcháte se, když spěcháte po rovině nebo stoupáte do kopce?

Are you short of breath, when you hurry on the flat or walk uphill?

(NYHA Ist stage)

Zadýcháte se, když jdete normálním tempem po rovině?

Are you short of breath, when you walk at an ordinary pace on the flat?

(NYHA IInd stage)

Musíte se zastavit pro dušnost, když jdete pomalu po rovině?

Must you stop walking to catch your breath, if you walk slowly on the level ground?

(NYHA IIIrd stage)

Jste dušný, když se myjete nebo oblékáte?

Are you short of breath when you wash or dress yourself?

(NYHA IIIrd–IVth stage)

Jste dušný i v klidu?

Are you short of breath also at rest?

(NYHA IVth stage)

Kašel

Máte kašel každý den?

Kdy kašlete?

Každé ráno, při dušnosti,
při námaze
nezávisle na námaze

jen při nachlazení

Máte suchý nebo vlhký kašel?

Co vykašláváte?

Kašlal jste někdy krev?

Vazké hleny, bílé, žluté, šedé,
zelenavé, s příměsí krve

Kolik hlenu vykašlete?

Cough

Do you cough every day?

When do you cough?

Each morning, during the
breathlessness,
during workload, independently
of load

only when suffering from a cold

Is your cough dry or productive?

What do you cough up?

Have you occasionally coughed up
any blood?

Mucoid sputum (phlegm), white,
yellow, grey, greenish, with a dask of
blood

How much phlegm do you cough
up?

Gastrointestinální potíže

Máte chuť k jídlu?

Nezhubl jste v poslední době?

Máte pocit na zvracení nebo zvracíte?

Kdy zvracíte – nalačno, před jídlem, po jídle?

Jak vypadají zvratky?

– obsah žaludku se zbytky jídla

– příměs krve nebo jako kávová sedlina

Trpíte plynatostí?

Máte pálení žáhy?

V jaké poloze máte pálení žáhy?

Máte potíže s polykáním tekutin nebo pevných soust?

Máte zácpu?

Jak často chodíte na stolicí

a jak vypadá?

– je hnědá a formovaná

– tmavá (jako dehet) a řídká

– světlá s krví, s příměsí hlenu

– krvácení při stolici

Máte průjem?

Kolik stolic denně máte?

Močové potíže

Máte pálení nebo řezání

při močení? (dysurie)

Máte výtok z močové trubice?

Močíte častěji než obvykle?

(polakisurie)

Močíte více než obvykle?

(polyurie)

Gastrointestinal complaints

Do you have a good appetite?

Have you lost weight recently?

Do you suffer from nausea or vomiting?

When does the vomiting occur – in fasting, before food or after food?

How do the vomits look like?

– the contents of the stomach with food

– addition of blood or looks like coffee-grounds

Do you suffer from flatulence?

Do you have retrosternal burning?

Do you have this burning in certain postures?

Do you feel any problems with swallowing liquids or solids?

Are you constipated?

What is the frequency and consistency and color

of your stool? – it is brown and formed,

– dark (tarry black) and thin,

– pale with blood, mucal discharge

– bleeding during defecation

Do you have diarrhea?

How many stools daily?

Urinary troubles

Do you have any pain or bad feeling during urination? (dysuria)

Do you have any urethral discharge?

Do you urinate more frequently than usual? (polakisuria)

Do you urinate more than usual? (polyuria)

Máte krev v moči? (hematurie)

Is there your urine bloodstained?
(hematuria)

Je proud vaší moče silný nebo slabý?

Is your urine stream strong or weak?

Kolikrát musíte chodit močit v noci?

How many times do you have to pass
urine during the night?

Pomočil(a) jste se někdy?

Did you ever wet yourself?

Neudržíte moč při kašli?

Are you incontinent when you are
coughing?

Spaní

Spíte dobře?

Sleeping

Do you sleep well?

Usínáte dobře?

Do you fall asleep well?

Probouzíte se během noci?

Do you wake up during the night?

Užíváte léky na spaní?

Do you take any drugs for sleeping?

Otoky končetin

Otékají vám kotníky, dolní

Swelling of the legs or arms

Did you notice ankle (leg, arm)
swellings?

končetiny, paže?

One or both extremities (legs, arms)?

Jedna nebo obě končetiny?

Are the swellings more severe in the
morning or in the evening?

Jsou otoky větší ráno nebo večer?

Užívání léků

Jaké léky jste užíval doma?

Medicine use (drug use)

What medicine do you take at home?

Jste přecitlivělý (á)

Are you sensitive to any kind of
medicine?

tj. alergický)(-á) na nějaké léky?

1.8 Concrete example of the patient's present status

Physician (Ph): Jaké máte nyní
potíže?

What about your complaints now?

Patient (Pa): Mám bolest na hrudi.

I have got chest pain.

Ph: Kdy vaše bolest začala?

When did your pain start?

Pa: Začala dnes ráno v 6 hodin.

It has started today at 6 a.m.

Ph: Kde přesně bolest cítíte?

Where exactly is the pain?

Pa: Vpředu na hrudníku.

Ph: Vystřeluje bolest někam nebo se přesouvá?

Pa: Bolest mi vystřeluje do krku a levé paže.

Ph: Jak byste bolest popsal(a)?

Pa: Je to ostrá a svíravá bolest.

Ph: Je bolest stále stejná nebo se zhoršuje či zlepšuje?

Pa: Bolest je pořád stejná.

Ph: Měl jste někdy takovou bolest dříve?

Pa: Ano před pár roky.

Ph: Co vyvolalo tuto bolest?

Pa: Ano, chůze do schodů nebo spěch.

Ph: Co děláte, když dostanete tuto bolest?

Pa: Zpomalím nebo se zastavím.

Ph: Když se zastavíte, co se stane?

Pa: Uleví se mi, bolest přestane.

Ph: Jak brzo?

Pa: Za 10 minut nebo i dříve, dnes však bolest nepřestala.

Ph: Pociťujete bušení srdce?

Pa: Ano, poránu.

Ph: Byl váš rytmus rychlý, pravidelný nebo nepravidelný během bušení?

Pa: Já nevím, nezjišťoval jsem to.

Ph: Jste nyní dušný vleže?

Pa: Ano, od rána nemohu dýchat vleže.

In the front of my chest.

Does the pain spread or go anywhere or is it changing?

The chest pain is spreading to my neck and in my left arm.

How would you describe this pain?

It is sharp and gripping.

Is the pain constant or is it getting worse or better in severity?

The pain is not changing. It is still the same.

Did you ever have a similar pain before?

Yes, a couple of years before.

Does anything in particular start this pain?

Yes, when I go upstairs or if I am in a hurry.

What do you do if you get this pain?

I slow down or stop.

If you stand still, what happens to it?

I'm relieved, the pain stops.

How soon?

Within 10 min or less, but today the pain has continued.

Do you feel heart throbbing?

Yes, usually in the morning.

Was your heart rhythm rapid, regular or irregular during the palpitation?

I do not know, I didn't check it.

Do you get short of breath in lying flat now?

Yes, since this morning I can't breath when lying.

Ph: Budí Vás dušnost uprostřed noci?

Pa: Ano.

Ph: Je to záchvat náhle vzniklé dušnosti?

Pa: Ano, to je.

Ph: Kašlete během dušnosti?

Pa: Ano.

Ph: Je to suchý nebo vlhký kašel?

Pa: Občas vykašlu zpěněné hleny.

Does the breathlessness awake you in the middle of the night?

Yes, it does.

Is it an attack of a sudden arisen breathlessness?

Yes, it is.

Did you cough during the breathlessness?

Yes I did.

Is the cough dry or productive?

Sometimes I cough up foamy phlegm.

This is an example of a patient with a typical acute coronary chest pain and with a paroxysmal asthma cardiale in the past.

PHYSICAL EXAMINATION

Physical examination relies on your sense of sight (inspection), touch (palpation), hearing (auscultation), touch and hearing (percussion). The physical examination follows the medical history and it is influenced by information gained through the patient interview. The purpose of the physical examination is to establish what is normal for the specific patient and to discover if abnormalities indicate that a significant problem is present.

Hints for conducting the physical examination

Conducting of physical examination is a routine for the doctor and medical students.

Remember, however, that this is a new and unusual situation for the patient. That means that some patients may be nervous about the physical examination. They are afraid that the procedures might be painful. It is embarrassing for the most patients to be undressed in front of a strange person and to be touched on intimate parts of the body. Patients are also unsure whether a health problem will be found which could lead to further tests, hospitalisation, interruption of daily life, unpleasant therapies, and even shortened life span.

Try to examine the patient out of sight from other patients. If you have to examine a patient in the hospital bed, limit the number of people who accompany you during such an examination. On the other hand, you should have an assistant with you, a nurse or colleague (as chaperon), mainly when examining young boys or girls; one of you should be of the same sex as the patient. The lack of privacy and silence in most hospitals presents an additional problem. You should not forget to consider the patient's need during the examination.

You can use a sheet to cover the patient during the examination, leaving only the parts of the body examined exposed. During the examination

progresses, keep the patient covered. This has the effect of keeping the patient warm and protecting the feeling of privacy.

Be sure the room is warm and there is no draft. The temperature in the examination room should be warmer than it is comfortable for you, since the patient will not be fully dressed. Your hands should be warm as well (hot water helps to warm them quickly). Your fingernails should be cut short. Saying "Thank you": "Děkuji", when the patient does what you have requested, asking the patient to stand up, roll over, rather than giving orders, saying "that's fine": "Tak je to dobře" – all contribute to the patient's sense of well being.

The patient will be observing your face and movements as well, so be aware of the expressions that you show on the face. Frown or angry expressions will be noted by the patient and may cause the patient to become tense and worried. The physical examination is very important for your further cooperation with the patient. Physical examination increases your prestige, i.e. the patient will admire you that you are able with your senses and stethoscope to find normal or pathological signs in his (her) body. Every patient enjoys interest in his (her) health problems and also the fact that you try to find the causes of that problem 'with your hands and head'. Physical examination similar to medical history helps to create a fruitful relationship between the physician and patient. Physical examination is divided into general and regional examination.

2.1 General examination

General examination provides an overview of the general state of health and provides a framework for examining those systems that do not neatly fit into regional examination.

2.1.1 Level of consciousness, time and place orientation, disturbances of sleep

Consciousness is an expression of the overall activity of the central nervous system. There are following disturbances of consciousness: somnolence, stupor and coma.

In somnolence the patient is sleepy, with a low spontaneous activity, but can be awoken. The patient responds to your questions adequately but delayed.

In stupor the patient is in a deep sleep (sopor) but can be awoken by strong painful stimuli.

Coma may be light or deep. **In light coma** the patient responds to painful stimuli with defensive motion, but does not wake up; in **deep coma** the patient does not respond to external stimuli, is incontinent, reflexes are lost, respiratory and circulatory insufficiency may follow. There are a lot of causes of coma (hypoxia damage of the brain, renal failure – uremic coma, diabetic coma, hepatic coma, intoxication by drugs or carbon monoxide etc.).

Confusion is present, when the patient is disoriented in time, space and name (dementia in cerebral atherosclerosis, Alzheimer's disease or the start of hepatic encephalopathy or other metabolic disturbances e.g. hypoglycaemia). In **delirium** the patient suffers from impaired consciousness, performs purposeless movement, is agitated (e.g. delirium tremens in alcoholics, psychosis etc.).

You can assess **disturbances of sleep** in your patient. **Insomnia** occurs when the patient wakes up several times during the night and has trouble falling asleep (e.g. in patients with athero-cerebri, in neurotics, in patients with left ventricular heart disease, in patients with chronic bronchitis and cough etc.). In **hypersomnia** has the patient urgent need for sleep at any time (e.g. in patients with neurosis, hypothyroidism etc.).

Normally the patient is fully conscious, responds adequately, is oriented in name, time and space.

2.1.2 Speech, voice and face

Speech disorders

Aphonia means that the patient is not able to speak. **Aphasia (dysphasia is a milder degree of aphasia)** means that the patient is not able to form words (usually after stroke i.e. damage of the brain); in **motor aphasia** the patient understands spoken words but is not able to speak; in **sensor aphasia** the patient does not understand any spoken words. **Dysarthria** is the defect in articulation due to motor disorders of the muscles of pronunciation or due to damage of the brain center of speech (usually after stroke). You can find **slow speaking** typical for bradypsychic behavior or dementia. Fast and rich speech is **logorhea which** is typical for some psychiatric diseases.

Changes in voice

Hoarseness occurs in laryngitis or in laryngeal tumours. **Coarse voice** occurs in myxedema (hypothyroidism). **Nasal slur** occurs in patients with palsy of the soft palate (diphtheria, a split palate).

Kinds of typical faces

Febrile face (facies febrilis) – the patient has a high fever, face is burning, red and dry, the eyes glisten.

Pale face (facies pallida) – the patient has pallid face, light, without any colour.

Myxoedema face (facies myxoedematosa) – yellowish, doughy skin, periorbital oedema, hypomimia, thinned out lateral parts of the eyebrows.

Mitral face (facies mitralis) – face with malar flush and cyanosis of the ear lobes, lips and nose contrasts with pallor around eyes, mouth and on the forehead, slight jaundice especially in eye bulbs.

Abdominal face (facies abdominalis, Hippocratica) – in patients with acute abdominal disease (peritonitis) – pale face with sunken eyes, lips and tongue are dry, the nose is pointed; the patient is usually before death.

Cushingoid face – “moon face” in Cushing’s syndrome, the face is rounded and dusky, typical fat redistribution into face due to high level of corticosteroids.

Nephritic face (facies nephritica) – pale face with lid oedema, greyish yellow (café-olé).

Face in acromegaly (facies acromegalica) – the acral parts of the face are enlarged, supraorbital ridges are prominent, large and broad nose, widened chin and large tongue.

Typical face occurs also in the patient with **polycythemia** (Polycythemia vera – Vaquez-Osler’s disease) – dark blue ear lobes, tip of the nose, lips and mucous membranes of the mouth and conjunctiva.

2.1.3 Body habitus, position, gait and abnormal muscle movements

Body habitus: there are three main types of habitus in patients: normosthenic, hypersthenic and asthenic. **Normosthenic** i.e. average stature, normal habitus; **hypersthenic (pyknic)** means heavy set, short neck, tendency

to obesity or overweight; **asthenic** is slim statue, weak musculature, flat and elongated chest. Describe general **nutritional status** of the patient.

Obese and **overweight** see below (Anthropometric parameters). **Cachexia** is in patients with marked weight loss with a total loss of fat tissue, with atrophic muscles and prominent bones, dry and pale skin may be occur; causes of cachexia are especially malignant, anorexia, infectious diseases (e.g. tuberculosis), thyreotoxicosis etc. **Pickwick syndrome** is a combination of obesity and respiratory insufficiency. The accumulation of fat in abdominal cavity and on the chest causes a reduction of respiratory movements.

The patient is normally normostenic, has adequate nutritional status and hydration.

Describe **the position** of the patient in the bed or in your office.

Active position – the patient is able to move without any help and without any special effort.

Passive position – the patient is not able to change his position without the assistance of another person. **Obligatory posture** – the patient seeks a position which reduces his or her complaints. **Orthopneic posture** i.e. **sitting position due to dyspnea** (especially left ventricle heart failure – asthma cardiale) or **asthma bronchiale**, in which the patient is putting his (her) arms on the table to help to exhale. **Lying on the left or right side** – **typical for pleuritis** (patient is lying on the same side as pleuritis is, because it reduces the respiratory movements and the pleural pain decreases), in decubitus etc. **Prone position on the stomach or on all four extremities** – reduces pain from intraabdominal tumors (e.g. pancreatic cancer)

Supine position in patient with peritonitis (inflammation of the peritoneum)

Position with the head arched backwards with flexed extremities (opisthotonus) in patient with meningitis (meningeal inflammation).

Describe **the gait**. **Gait with small steps** begins slowly, then picks up in speed and the body leaning forward; it is a typical gait for parkinsonism, it is associated with tremor and muscular rigidity. **Gait with circumduction** occurs in patients with hemiparesis after stroke, the lower extremity is extended in the knee joint and hence has to move in a circular fashion to the side and is associated with a flexed upper extremity in the elbow joint on the same side.

Abnormal muscle movements

Tic represents a spontaneous unconscious movement of a muscle group (in the face or the shoulder); tic worsens during excitement, disappears during sleeping.

Tremor means an automatic shaking, involuntary oscillating movement of extremities, head or eyelids. *Parkinsonian tremor* is regular rhythmical shaking of the fingers, the head and the chin are at rest ('money counting'). *Tremor in thyreotoxicosis* represents rapid and very fine tremor of the fingers (it is better to palpate these vibrations) and eye lids; the hands are hot and wet. *Tremor of neurotics* is coarse tremor of the hands, the hands are wet but cold. *Convulsions – epileptic seizures (grand mal epilepsy)* are tonic-clonic generalized convulsions; the patient is incontinent, often injures himself, frequently with loss of consciousness.

2.1.4 Vital signs

2.1.4.1 Anthropometric parameters

Note the **weight** in kilograms, the **height** in cm, count the **Body mass index (BMI)** = $\text{weight/height}^2 (\text{kg/m}^2)$. *BMI 24–26 kg/m² means normal index*, BMI 26–30 kg/m² means overweight and BMI 30 kg/m² and more means obesity.

Measure **waist circumference** in cm: patient has to be upright, put measure in the middle of distance between chest and spina illica anterior superior, measure when the patient exhales! High waist means abdominal distribution of fat in *overweight* or obese subjects: waist in men more than 94 cm or 102 cm, waist in women more than 82 cm or 88 cm.

2.1.4.2 Body temperature

Normal axillar temperature is in ranges 36–37 °C. Oral or rectal temperature is usually 0.5 °C higher. There is a distinct diurnal variation of temperature; lowest at about 4.00–6.00 a.m. and highest at about 3.00–5.00 p. m. Axilla temperature 37 °C–38 °C is called *subfebrility*. Axilla temperature higher than 38 °C means *fever*.

Kinds of fever shows the Figure 1: *Continuous fever (a)* has diurnal variation lower than 1 °C.

Fever remittent (b) has diurnal variation higher than 1 °C (e.g. bacterial infection), *septic fever (c)* is a variety of remittent fever with high peaks e.g.

in suppurative processes. **Fever intermittent (d)** has diurnal variation higher than 1°C , but there are intervals with normal temperature e.g. malaria. **Fever undulant (e)** – some days is present persistent fever, some days normal temperature (e.g. Hodgkin's disease).

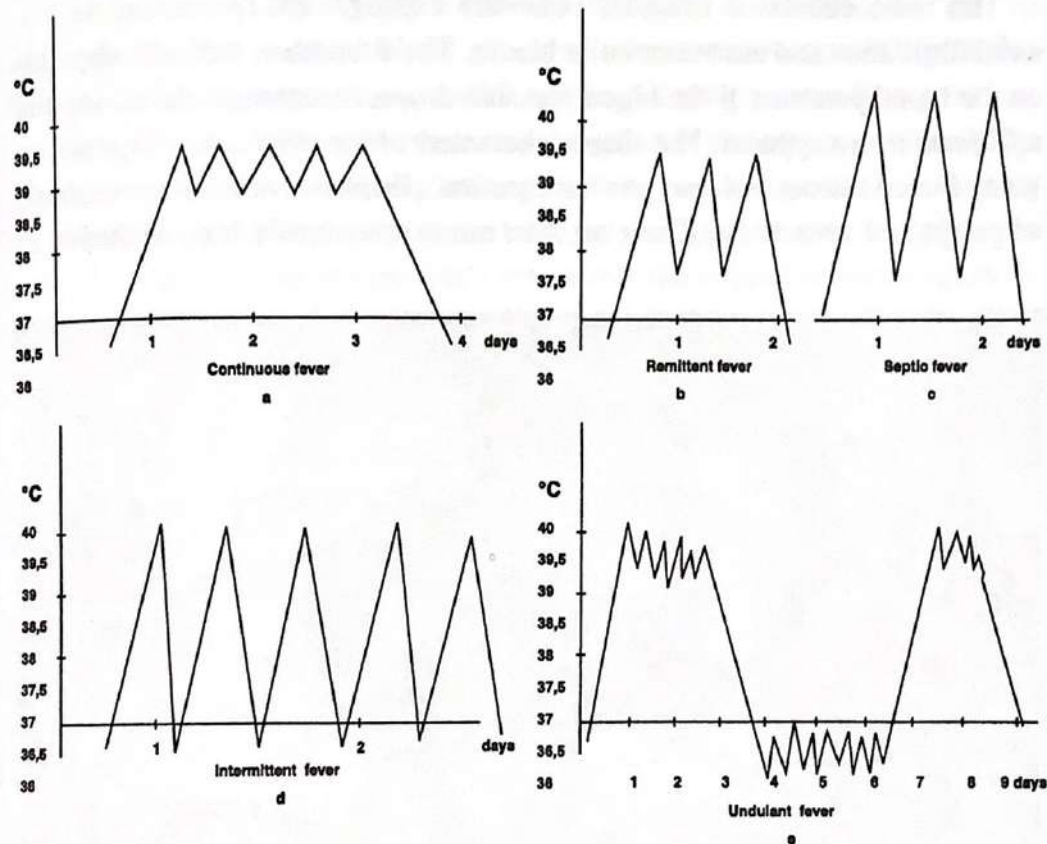


Figure 1: (a–d): Kinds of fever

2.1.4.3 Respiration

Note if the patient breathes normally, **normal number of respirations is 12 – 16 per min**, or if has breathlessness (dyspnea). Describe the regularity, the ease and depth of breathing.

2.1.4.4 Pulse – heart rate

Count the rate and describe the regularity, strength and character of the pulse. **Peripheral pulse** is usually assessed in the right radial artery: count regular pulse during 10 seconds and count 6 times the heart rate p.m. If the pulse is irregular, count the heart rate the whole minute. Put your 2nd and 3rd

finger over the artery (never use your thumb because the pulse in your own thumb may lead to mistake!). **Central pulse** is usually measured in the carotide artery or over the heart. Normal pulse is regular and the pulse rate should be between 60 and 80 beats p.m. in resting adult subject.

The main causes of irregular pulse are extrasystoles (premature beats), atrial fibrillation and atrioventricular blocks. The strength of the pulse depends on the blood pressure; if the blood pressure drops, the strength decreases and a **filiform pulse** appears. The shape (character) of the pulse wave depends on many factors: stroke volume, cardiac ejection, peripheral resistance, elasticity of peripheral vessels etc. There are two most typical pathological shapes of

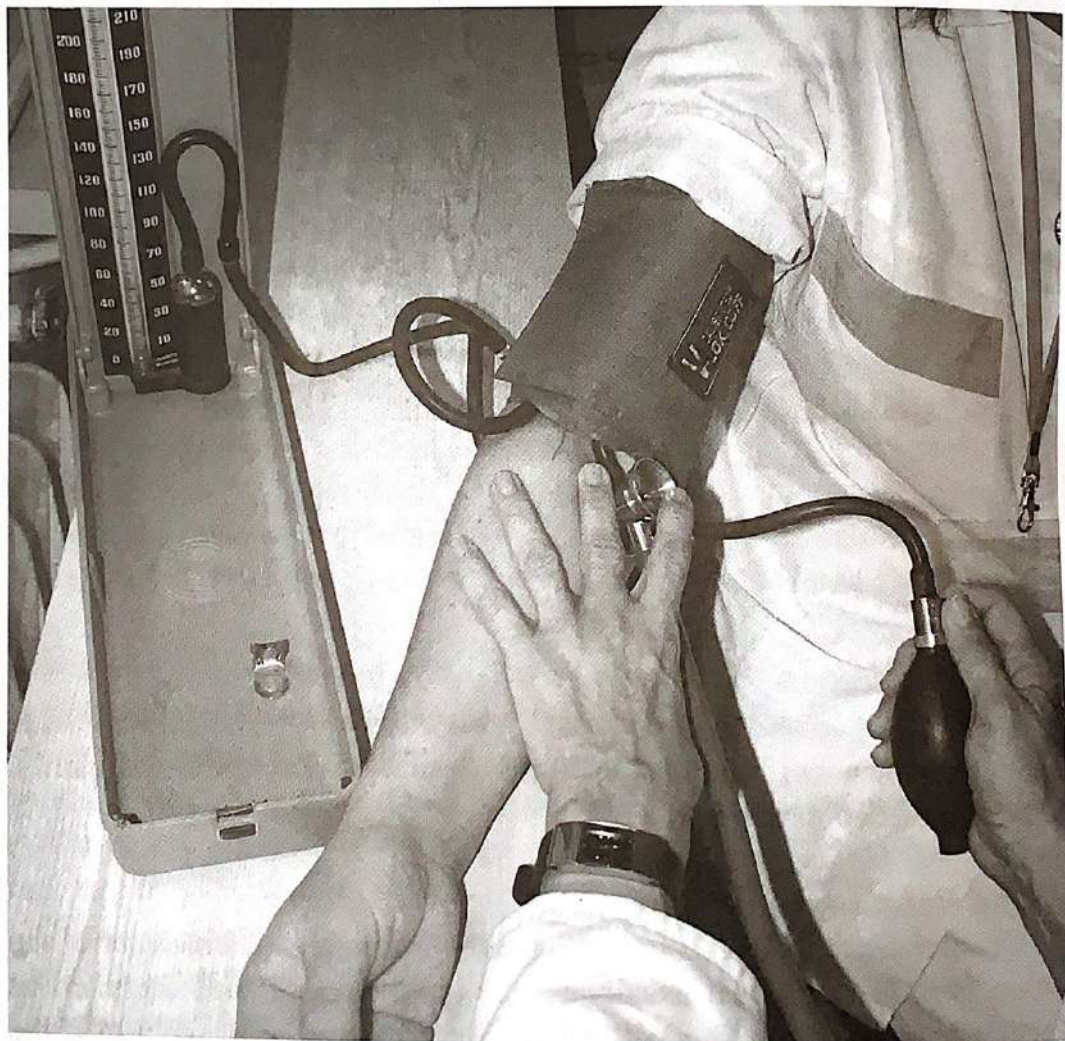


Figure 2: Blood pressure measurement in the sitting position

pulse: *slow rising pulse* due to aortic stenosis, *collapsing pulse* due to diminished peripheral resistance in aortic regurgitation.

2.1.4.5 Blood pressure

Standard mercury sphygmomanometer and a stethoscope are recommended for standard blood pressure measurement according to Korotkow. It is possible to measure BP in lying, sitting or standing position.

The most usual BP measurement is provided in the sitting position at the table. The patient removes all clothing from the arm and puts it comfortably on the table. You will also sit at the table on the opposite side and place the cuff of correct size on the patient's arm above the cubital region (Figure 2). Inflate the cuff until about 200 mmHg and then deflate it slowly, i.e. 2mm per second. Read systolic BP at the moment of the 1st Korotkow sound and diastolic BP at the moment of the last Korotkow sound disappears. These phases are called the 1st and the 5th phases: see Figure 3 for the explanation. It is necessary to measure blood pressure twice at 2 minute intervals. The second measurement is more important (the patient is more relaxed) and is usually lower than the 1st one. The most accurate measurement of casual BP is to take 3 measurements and calculate the average of the 2nd and the 3rd measurements. First measure BP in both the patient's arms and then select the dominant one for the next measurement, i.e. arm with higher BP.

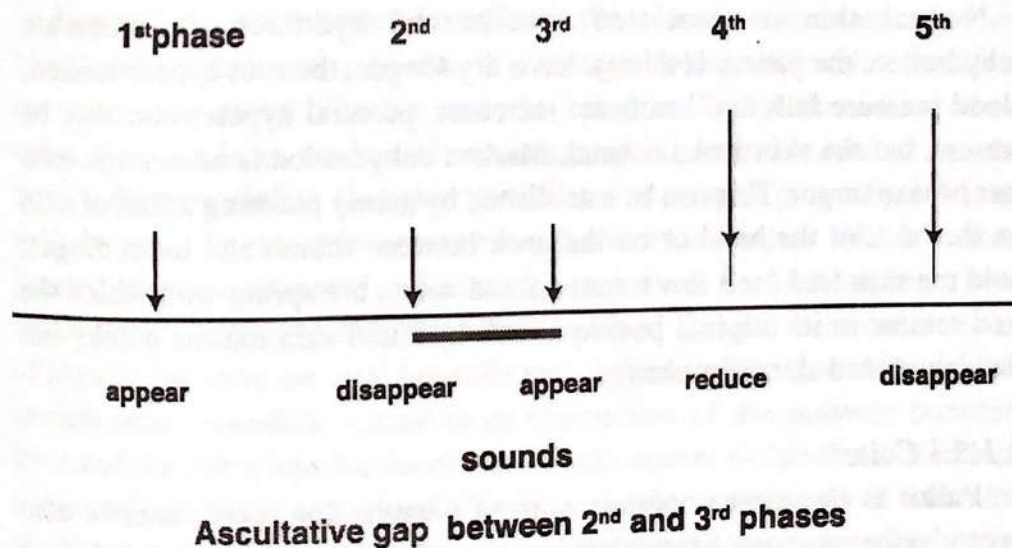


Figure 3: Five phases of blood pressure measurement

Blood pressure below 140/90 mmHg represents normal BP in adults. In patients with diabetes or high cardiovascular risk BP needs to be below 130/80 mmHg. Level of BP measured in the standing position is normally higher than level of BP measured in the sitting position.

2.1.5 Examination of the skin

Inspection is the most important examination of the skin. Observe temperature and moisture, turgor, colour, localized lesions, oedemas and nail disorders.

2.1.5.1 Temperature and moisture

Use the back of your hand to assess skin temperature. Normally the skin is warm and dry.

Hot, flushed and dry skin occurs in febrile patients; as the temperature subsides, sweating occurs and the skin temperature decreases. **Warm or hot and moist skin** is in patient with hyperthyroidism. **Cold, pale and dry skin** is in patient with hypothyroidism; myxoedema may be present in the face, on the forearms or on the crura. The skin is rough and scaly. **Cold and moist skin** is associated with circulatory collapse, hypoglycemic coma, anxiety etc.

2.1.5.2 Turgor

Normal skin is associated with normal hydration. In moderate dehydration, the patient is thirsty, has a dry tongue, the eyes appear sunken, blood pressure falls and heart rate increases, postural hypotension may be present, but the skin looks normal. Marked dehydration is associated with loss of skin turgor. This can be established by gently pinching a fold of skin on the back of the hand or on the neck between thumb and index finger; hold the skin fold for a few moments and watch the spring with which the fold returns to its original position: well-hydrated skin returns quickly but the dehydrated skin very slowly.

2.1.5.3 Color

Pallor is the most important sign of anemia; for severe anemia also breathlessness occurs. Examination of the palpebral conjunctivae under the lower eyelid; palpebral pallor should be accompanied by pallor of the nail

bed and palms. Pallor may be associated with circulatory insufficiency, aortic stenosis, sepsis etc.

Plethora is plum-coloured skin in patient with high hemoglobin concentration due to chronic arterial hypoxia, or due to polycythaemia. Plethora may be recognized by 'weather beaten' facial appearance and plethoric bulbar conjunctivae.

Cyanosis is bluish color of the skin and mucous membranes due to excessive amounts of reduced haemoglobin in the blood (50 g/L or more):

- a) **Central cyanosis** appears in patients with heart or lung diseases with a reduction in arterial oxygen saturation e.g. left ventricular failure, chronic obstructive bronchopulmonary disease, lung fibrosis etc. Tongue and lips also have a bluish discoloration. The limbs (fingers) are warm, i.e. *warm cyanosis*.
- b) **Peripheral cyanosis** is due to decreased circulation to the limbs, as seen in patients with slowing of the peripheral circulation e.g. right heart failure. Fingers and toes are blue, but the tongue and lips retain pink colour. The limbs are cold in peripheral cyanosis, i.e. *cold cyanosis*.

Jaundice or icterus is a condition characterized by increase of bilirubin in the blood above the normal range $22\mu\text{mol/L}$ – yellow coloration is visible first on bulbar conjunctivae and soft palate, and later on also skin becomes yellow on the trunk, arms and finally on the legs.

Haemolytic (prehepatic) jaundice – the excessive destruction of red blood cells (hemolysis) results in increased blood bilirubin; the liver excretes conjugated bilirubin into the intestine to the maximum of its capacity, but a large amount of unconjugated bilirubin accumulates in the blood. **Hepatocellular (hepatic) jaundice** – damaged parenchymal liver cells by toxic or infective agents are not able to conjugate bilirubin; conjugated and unconjugated bilirubin are increased, because necrotic liver tissue permit diffusion of bilirubin into the blood. The most common causes of hepatic jaundice are viral hepatitis and cirrhosis of the liver. **Obstructive (posthepatic) jaundice** – there is an obstruction of the pathway between liver and the entry into the duodenum. Stasis occurs within the dilated bile ducts and canaliculi, conjugated bilirubin and other constituents of bile enter the blood stream. The main causes of posthepatic jaundice are gallstones in the common bile duct or carcinoma of the bile duct, head of the pancreas or

ampulla of Vater. *Pseudojaundice* develops due to carotene pigment – skin is yellow but the sclerae are unaffected; it is caused by eating excessive amounts of carrots.

Pigmentation

There may be hyperpigmentation or hypopigmentation on the skin. Physiological causes of *hyperpigmentations* are sunburn and pregnancy. Pathological cause is Addison's disease, i.e. primary adrenal insufficiency, accumulation of melanin is seen in exposed areas e.g. hands, face, or in sites exposed to friction (belt areas) and in normally pigmented areas (axillae, nipples). Sometimes *graphite patches* are found on the mucose membranes in oral cavity (lips and cheeks). In haemochromatosis, excessive absorption and deposition of iron in various organs leads to pancreatic fibrosis, liver cirrhosis and bronnying of the skin due to deposition of iron pigment and melanin. *Hypopigmentation* occurs in generalized loss of pigment in genetic *albinism*, i.e. failure of melanocytes to produce melanin. The skin and hair are white, eyes are pink due to a lack of pigmentation of the iris. Localized depigmentations is called *vitiligo* and occurs as primary disease or associated with autoimmune disorders.

2.1.5.4 Localized skin lesions

You have to classify skin lesions. Describe their size, shape, colour, texture and position. Palpate the lesions and assess whether they are flat, raised, or fluid filled, fluctuant or tender.

Maculae, patches, erythema are flat circumscribed lesions; macules are less than 1 cm in diameter, patches are more than 1cm in diameter, erythema (redness) is caused by capillary dilatation and occurs with inflammation. *Erythematous flush* in the neck area is caused by anxiety.

Differentiate:

Petechiae – red-purplish flat small lesions (less than 5 mm in diameter) caused by seepage of blood of skin blood vessels. *Purpura* – lesions are more then 5 mm in diameter. *Ecchymoses* – large traumatic bruises. *Teleangiectasia* – are fine blanching vascular lesions caused by superficial capillary dilatation. *Erythema nodosum* – painful reddish nodules (2 cm in diameter) in lupus erythematosus, TB, sarcoid, ulcerative colitis etc.

Papule, nodule, wheal, plaque – raised circumscribed lesions can be palpated, less than 1cm in diameter is called **papule**, more than 1cm in diameter is called **nodule**, a transiently raised associated with scratching is **wheal** – **urticaria**, and disc-shaped lesions which may result from a confluence of papules is **plaque**.

Vesicle, bulla, pustule are raised circumscribe fluid filled lesions; **vesicles** are small (e.g. herpes zoster), **bulla** is a large fluid filled vesicle, **pustules** are pus – filled vesicles.

2.1.5.5 Oedema

Oedema is an increase in the extravascular (interstitial) component of the extracellular fluid volume. Two forces tend to promote a movement of fluid from the vascular to the extravascular space: the hydrostatic pressure in the vascular system and colloid oncotic pressure in the interstitial fluid. In contrast the factors which promote a movement of fluid into the vascular compartment are: colloid oncotic pressure due to plasma proteins and the hydrostatic pressure in the interstitial fluid (tissue pressure). All these forces are usually balanced so that a given steady state exists, and yet a large exchange between both compartments is permitted. However, should any one of the factors be altered significantly, one can see how there may be a net movement of fluid from one component of the extracellular space to the other and cause an expansion of the interstitial space, i.e. oedema. Lots of factors exist which contribute to fluid retention e.g. activation of the renin-angiotensin-aldosterone system, insufficiency to inactivate aldosterone and vasopressin in liver disease etc.

a) **Localized oedema** – e.g. periorbital oedema, oedema of one or both legs, oedema of face etc. Localized oedema originating from **inflammation or hypersensitivity** is usually readily identified. Inflammation increases capillary permeability, allowing movement of albumin and other proteins as well as fluid into interstitial space. This causes the sore swelling with redness, which invariably accompanies the inflammatory response. **Venous or lymphatic obstruction** (thrombophlebitis, deep vein thrombosis, lymphangitis, resection of the regional lymph nodes, filariasis etc.) may demonstrate in a local area all the characteristics of oedema occurring from generalized retention of salt and water. The skin with lymph oedema is peculiarly intractable and has an indurated thickness feel because restriction of lymphatic flow results in increased protein concentration in interstitial fluid.

b) **Generalized oedema** – the large general oedema is called *anasarca* (*dropsy*), there are also *ascites* (fluid in the peritoneal cavity), *hydrothorax* (fluid in the pleural cavity) and *hydropericard* (fluid in the pericardial cavity).

Clinically, oedema is detected in peripheral tissue by swelling which can be displaced by firm finger pressure and which leaves a pit when the finger is removed:

A. **Cardiac oedema** usually occurs due to right-sided heart failure. Oedema accumulates at the lowest part of the body namely the feet and ankles in ambulant patients or the sacrum in bed-bound patients. The more severe the oedema the further up the leg it tends to extend. It may involve the thigh, the scrotum in men, lower part of abdominal wall. Severe oedema is accompanied by ascites, hydrothorax, hydropericard. Cardiac oedema never involves the face, but is usually accompanied by raised jugular venous pressure.

B. **Hypoproteinemic oedema** is usually expressed in nephrotic syndrome. The oedema is typically soft and pits easily. It may involve the face (periorbital oedema) and arms, sometimes genital and very frequently ascites and pleural effusions are present.

C. **Hepatic oedema** is a common complication of liver cirrhosis. Respiratory distress may accompany tense ascites. Many patients also have peripheral oedema. A pleural effusion (usually on the right side) may infrequently be found.

2.1.5.6 Nail disorders

Splinter-haemorrhages may be caused by microemboli from infected heart valves e.g. in subacute bacterial endocarditis or vasculitis. *Pitting of the nail* (pinpoints pits) occurs in psoriasis. *Onycholysis* – premature lifting of the distal end of the nail. *Leukonychia* – white nails with loss of distinction of the lunule from the body of the nail (caused by hypalbuminemia). *Paronychia* – is an infection of the nail fold or skin adjacent to the nail. It is characterized by pain, swelling, redness and tenderness of the skin at the interface of the nail. *Koilonychia* – spoon shaped deformity of the nail in chronic iron deficiency. *Clubbing* – spheric nails resembling convex watch glasses are associated with the clubbed fingers; can be seen in lung diseases (bronchogenic cancer, bronchiectasis, lung abscess), in cyanotic congenital heart diseases, in subacute bacterial endocarditis etc.

2.2 Regional examination

2.2.1 Physical examination of the head

Examine the patient in the sitting position.

Inspection

Describe the size and shape of the head (skull). *Normocephaly* is a head without any alterations of size and shape. Enlargement of the head is called *macrocephaly*. A small head is called *microcephal* which may be a result of a lack of brain growth and development. *Dolichocephaly* is long and narrow skull with prominent brow and occiput due to premature closing of sagittal suture. *Brachycephaly* is wider than longer skull due to premature closing of coronal suture. *Turicephaly* is characterised by high tower like skull due to premature closure of all sutures and shallow orbits with bulging eyes.

Percussion

Percuss the head by your finger directly and ask the patient if it is painful: "Bolí to?". The percussion of the skull is normally painless. The sound could be changed if a fracture of the skull is present.

Palpation

Palpate the 1st (supraorbital), 2nd (infraorbital) and 3rd (mental) branches of the trigeminal nerve by both your thumbs and ask the patient, if it is painful: „Bolí to?“. It might be painful due to inflammation of the nerve. Normally the palpation of the trigeminal nerve branches is painless.

2.2.1.1 Examination of the eyes

Describe the color, position and movement of the eye bulbs. Normal finding is white bulbi in the intermediate position. *Yellow bulbi* is the first sign of jaundice. *Exophthalmos* are protruded bulbi e.g. in Grave's disease (i.e. hyperthyreosis). *Enophthalmos* are sunken bulbi; unilateral enophthalmos combined with ptosis of the upper lid and with a miosed pupil is called *Horner's syndrome* caused by the interruption of the cervical sympathicus. Describe the movement of the eyes: ask the patient to follow your finger only

with his (her) eyes (you can fix the patient's head): first move your finger in the horizontal plane and then in the vertical plane. The rhythmic oscillation of the eyes in the horizontal or vertical plane is called **horizontal or vertical nystagmus**; the movement may also be rotary, then it is the **rotary nystagmus**. We distinguish **jerk and pendular nystagmus**. In pendular nystagmus the movement phases are of equal velocity and amplitude. It is usually congenital, binocular and horizontal. Jerk nystagmus has a fast and slow component. The movement may be horizontal, vertical or rotary. Normally the axes of the eyes are parallel. The state, if the axes are no longer parallel, **strabismus (squint)** is present. The axes may be convergent (**convergent strabismus**) or divergent (**divergent strabismus**). Strabismus may be paralytic (incomitant) or nonparalytic (concomitant). **Paralytic strabismus** occurs as an impact of an acquired defect of the movements of an eye – paralysis of the eye muscles, and there is a varying angle between the visual axis during movements of the eyes in the paralytic squint. The patient usually complains of diplopia. In **nonparalytic strabismus** remains the angle the same in all directions of gaze. This squint begins in childhood and diplopia is almost never a symptom.

Look at the **eyelids** – you can find ptosis (the eyelids drops); unilateral ptosis is a part of Horner's syndrome (see above). In thyroid eye disease, lid retraction occurs: 'lid lag' (**Graf's sign**), i.e. failure of the upper eyelid to follow movements of the globe when patient looks down; it is typical sign for hyperthyreotic disease. Lid retraction may be accentuated by exophthalmos, which often appears in hyperthyreotic disease (Grave's disease) due to the hypertrophy of the retrobulbar tissue. In severe cases of thyroid eye disease, oedema of the conjunctivae develops and the lids are not able to close the eyes and the cornea may be damaged by exposure and drying.

Corneal arcus is a gray corneal ring, which represents deposits of lipids in the corneal stroma. However, it is normal finding in old people (**arcus senilis corneae**), in patients under the age 50 years suggests the possibility – of underlying hypercholesterolemia .

You can find **xantelasma** in the skin of the eyelids, which are irregular papules with a silver gloss surface. These signs are in association with hyperlipidemic diseases especially with hypercholesterolemia.

Pupils are normally circular, symmetrical and isocoric (i.e. without differences in size). Different pupils are called **anisocoria**. We test 2 pupillary reactions: the light reflex and the convergence reflex: a) **the light**



Figure 4: Corneal arcus (*arcus lipoides*)

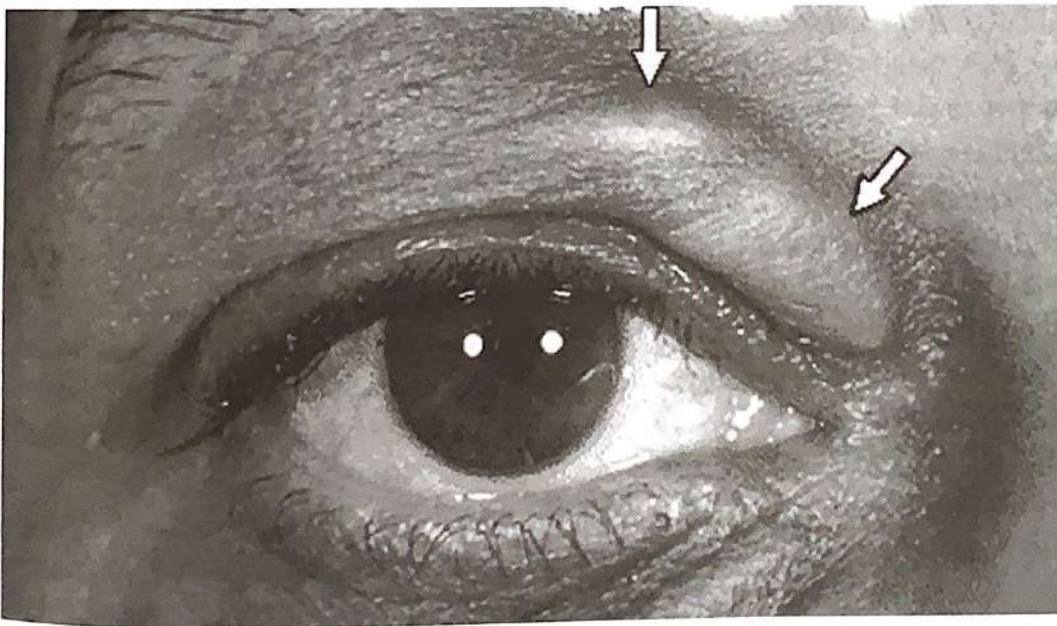


Figure 5: Xantelasma

reflex: direct light constrict the pupil of the eye being tested (direct reflex) and also the contralateral pupil (consensual reflex). B) **the convergence reflex:** fixation on a near object requires convergence of the ocular axes and

is accompanied by pupillary constriction (a reaction to accommodation). **Normal pupils are reactive to light and convergence.** Constriction of the pupils is called **miosis**; it appears in old age (senile miosis) or in subjects using morphine. Dilatation of the pupils is called **mydriasis**. Dilated pupils occur in deep coma or in brain death. **The Argyll Robertson pupil** – is a small irregular pupil that is fixed to light, but constricts on convergence. This is a typical sign for neurosyphilis.

Normal palpebral conjunctivae are pink and scleral conjunctivae are white. **Bluish palpebral conjunctivae** occurs in patients with cyanosis. **Fiery red palpebral conjunctivae** are in acute conjunctivitis, **pale** in anemias. **Yellowish scleral conjunctivae** occur in all cases of jaundice.

The corneal reflex: stimulation of the cornea produces both an ipsilateral and contralateral blink response. This reflex is elicited by lightly touching the cornea with cotton wool. In internal medicine, corneal reflex is tested mainly in unconscious patients (loss of corneal response).

2.2.1.2 Examination of the ears

In internal medicine the examination of the ears is concentrated only on the external parts – look at the auricles, their shape, position and colour changes, lesions or lumps in the earlobe. There may be lumps with **deposits of urates (tophi)** in the outer rims of the pinnae, which are characteristic signs in chronic gout. Look for lymph nodes before, behind and below the ears. Pull gently on the pinnae – elicited tenderness may suggest disease of the external ear. Look for any discharge from the ear (mucus, pus, blood, cerebrospinal fluid).

2.2.1.3 Examination of the nose

It is also confined to its external parts. Look for signs of deformities, for rash of a butterfly distribution (**'butterfly rash'** in systemic lupus erythematosus), enlarged nose (in acromegaly). Look for nasal discharge (mucus – **rhinitis**, blood – **epistaxis**, cerebrospinal fluid in trauma of the skull). Palpate the frontal and maxillary paranasal sinuses with your thumbs for evidence of tenderness (**sinusitis**). Assess nasal airflow (obstruction); ask the patient to breathe out nasally: "Prosím vydechněte jen nosem!" and observe the resulting moisture in a mirror positioned at the anterior nares.

2.2.1.4 Examination of the mouth

Face: look for deformities, masses, facial asymmetry (the 7th nerve).

Lips: note pigmentation, cyanosis, pallor, vesicles (*herpes simplex labialis*); painful small ulcers or fissures in the labial corners are called *cheilosis (angular stomatitis)* in sideropenic anemia, vitamin B₆ deficiency.

Teeth: ascertain how many teeth and fillings the patient has. Describe if the teeth are under cared for or defective, if the patient wears dentures (if yes, ask him or her to remove them for this part of examination: "Prosím, vyndejte si zubní protézu").

Gums (gingiva): note, whether the gums are pink. In pathological states they may be swollen, inflamed and necrotic with exulcerations and bleeding. Dental cavities and gingivitis may cause odor from the mouth – *foetor ex ore* ('bad breath').

Buccal mucosa: note, whether there are any pathological changes on the pink musosa: infection due to *Candida albicans* makes *thrush (moniliasis, candidiasis)* – soft white patches or plaques, that are easily removed and leave reddened surface. It is seen in seriously ill patients or immunocompromised patients, in patients after broad spectrum antibiotic therapy or inhaled steroids. **Dry buccal mucosa** of the mouth may be a sign of dehydration or may be associated with the total dryness of the mouth, stomatitis and glossitis and is called *xerostomia* (e.g. as a part of the Sjogren's syndrome, i.e. autoimmune rheumatic disease).

Leukoplakia are white patches, which cannot be easily removed are premalignant condition (precancerosis); biopsy should be undertaken. **Recurrent aphtous ulceration** are very painful, are in association with some gastrointestinal diseases e.g. Crohn's disease, ulcerative colitis. **Koplik's spots** are small red irregular lesions with blue-white centres in patients with measles 2-days before the rash occurred. **Graphite patches** are bluish black patches on the buccal mucous membrane in patients with Addison's disease.

Tongue: Ask the patient to stick out the tongue: "Prosím, vyplázněte jazyk!" **Dryness** of the tongue is a sign of dehydration. The tongue is coated with a **whitish yellow fur** in heavy smokers. In patients with febrile diseases the tongue is **dry and covered with dirty brownish fur**. The tongue deviates to the side in patient after stroke. **Atrophic glossitis** – the tongue is smooth, sore and lost filiform papillae, may occur in patients with hepatic cirrhosis and with iron, vitamin B₁₂ and folate deficiency (*Hunter's glossitis*). **Trush**

and leucoplakia are also common findings in the tongue. In scarlet fever – initially the tongue is heavily furred and greyish with prominent red papillae (*white strawberry tongue*). In 2–3 days it is changed to the red tongue (*red strawberry tongue*). In typhoid fever the white furred tongue except the rim, that remains pink (*typhoid V or W*). *Macroglossia* occurs in patients with acromegaly or in myxoedema. Healthy subject stick out their tongue centered, their tongue is pink and moist with only a slight white fur on the dorsum, the papillae are seen.

Posterior oral cavity and oropharynx:

Ask the patient to open their mouth and to say “Aaa”: “Prosím, otevřete ústa a řekněte Ááá”.

Inspect *the tonsils – normally are small and pink or invisible*. Pathological tonsils e.g. during *tonsillitis (sore throat)* are enlarged, reddened and coated. They may contain purulent specks, ulcers or scarrings. *Uvula, soft palate and posterior pharynx have to be symmetrical, without redness or swelling*. During pharyngitis these are *oedematous with diffuse redness*.

Sore throat and necrotic ulcers in the mouth and pharynx *with bleeding gums* and little evidence of pus is one of the characteristic manifestations of acute leukaemia and agranulocytosis!

2.2.2 Physical examination of the neck

Describe the shape, length and asymmetry of the neck. Examine patient in the sitting position! Asymmetrical neck is in subject with *torticollis* or congenital or acquired shortening of the sternomastoid muscle. We distinguish also between *antecollis* (the head is drawn forwards) or *retrocollis* (the head is drawn backwards).

Test the movement of the neck:

Ask the patient to bend his head forward (flexion): “Prosím, předkloňte hlavu!” Ask the patient to lean his head backward (extension): “Prosím, zakloňte hlavu!” Ask the patient to lean his head afterwards to the left and to the right (lateral flexion): “Ukloňte hlavu doleva a potom doprava.” Ask the patient to turn his head to the left and then to the right (rotation): “Otočte hlavu, prosím, doleva a potom doprava.”

2.2.2.1 Examination of the thyroid gland

The normal thyroid gland is neither visible nor palpable. An enlarged gland is called **goitre (struma)** – a visible mass. Ask the patient to swallow: “Prosím, polkněte si!” Upward movement with swallowing may be observed. Palpate the goitre – you can stay in the front of the patient (palpate by your thumbs) or behind the patient (palpate by your 2nd, 3rd and 4th finger of the both hands). Assess the consistency (hard, soft, elastic), nodularity (smooth, single or multiple nodules), symmetry and extent of the goitre. Ask the patient again to swallow: “Prosím opět polkněte.” You feel the upward movement of the goitre.

The thyroid gland may be enlarged behind the manubrium (**retrosternal goitre**) and may cause compression symptoms (dysphagia or breathlessness). In **Grave’s disease**, goitre may pulsate, a thrill may be palpable and arterial bruit may be heard over the gland by stethoscope.

2.2.2.2 Examination of the carotid pulse

Usually carotid pulse is not visible, but a very **large volume-pulse** may be apparent – pulsation of the neck = **Corrigan’s sign**, e.g. in aortic regurgitation or in aneurysma of carotid artery. A large volume-pulse with brisk rise and fall, i.e. **collapsing (waterhammer) pulse**, is found in the elderly when the aorta is rigid, in thyreotoxicosis, anaemia or fever, when the cardiac output is high. Palpate both the carotid arteries and describe, if the pulse is symmetrical! A **small-volume pulse** is seen in cardiac failure, shock and obstructive vascular or valvular disease, or during tachycardia.

2.2.2.3 Evaluation of the jugular venous pressure

The column of blood in the internal jugular system is a good measure of right atrial pressure; the normal pressure is equivalent to the blood column about 10 cm tall. When the patient is standing or sitting upright, the internal jugular vein is collapsed. If the patient lies supine at about 45°, the blood column becomes visible just above the clavicle, normally to the 1/3 of the distance between clavicle and inferior auricle.

If the jugular venous pressure is high, the **visible blood column is higher than just 1/3** of the distance between clavicle and inferior auricle. The commonest causes of raised jugular venous pressure are congestive heart failure and tricuspid regurgitation (rare causes are pericardial tamponade,

massive pulmonary embolism or superior cava obstruction). There is large systolic waves in tricuspid regurgitation and then **jugular venous pulsation** is visible and palpable. Sometimes a **hepatojugular reflux** of venous blood may be observed i.e. you will palpate over enlarged liver and look for increased filling of jugular veins.

2.2.2.4 Examination of the lymph nodes

Palpate the lymph nodes under the chin and in the neck submental, submandibular and superficial cervical nodes along the sternocleidomastoid muscles, and then supraclavicular nodes. An enlarged left supraclavicular node is called **Virchow's node** – should alert you to the possibility of stomach cancer!

Describe the size, consistency, mobility and tenderness of enlarged lymph nodes.

2.2.3 Physical examination of the chest and lung

2.2.3.1 Inspection of the chest

Describe the shape of the chest and deformities. Normal shape of the chest means, that the chest is symmetrical and anteroposterior diameter is smaller than the lateral one. **Asthenic chest** is a long and flat chest typical in lean subjects. **Hypershenic (pyknic) chest** is a short and wide chest typical in obese subjects. **"Barrel chest"** there is hyperinflation in the lungs through emphysema, chronic obstructive lung disease; the anteroposterior diameter is greater than the lateral. **"Funnel chest"** is "pectus excavatum" – the sternum is depressed. **"Pigeon chest"** is "pectus carinatum" – the sternum and costal cartilages project outwards. The cause of this type of chest may be severe childhood asthma. **Kyphosis** is enhanced backward curvature of the thoracic spine. **Scoliosis** is lateral curvature of the spine. **Kyphoscoliosis** is combination of kyphosis and scoliosis, this deformity can lead to respiratory insufficiency and failure.

Describe breathing pattern – rate and depth: **normal rate is 12–16 b.p.m.** We distinguish two kinds of **respiratory movements**: a) **abdominal type (diaphragmatic)** is typical in men, who use their diaphragm more than the intercostal muscles and b) **costal type (ribcage, costal)** is typical in women, who use the intercostal muscles more than diaphragm for respiratory

movement. In **tachypnea** breathing is faster than 16 breaths p.m. and the amplitude (depth) need not change; the causes of tachypnoea are various lung diseases, fever, hyperventilation etc. **Bradypnea** is slower breathing than 12 breaths p.m. **Hyperpnea** is deepened breathing. **Dyspnea** is shortness of breath; it may occur **inspiratory** or **expiratory** breathlessness. **Apnea** is temporary cessation of breathing. **Kussmaul (acidotic) respiration (a)** is a combination of tachypnea and hyperpnea, is typical for acidosis (diabetic ketoacidosis, renal failure, hepatic failure) or in acute massive pulmonary embolism. **Cheyne-Stokes periodic respiration (b)** is occurred in a failure of the central respiratory control in terminal diseases and **Biot respiration (c)** in serious central nervous diseases (Figure 6a-c).

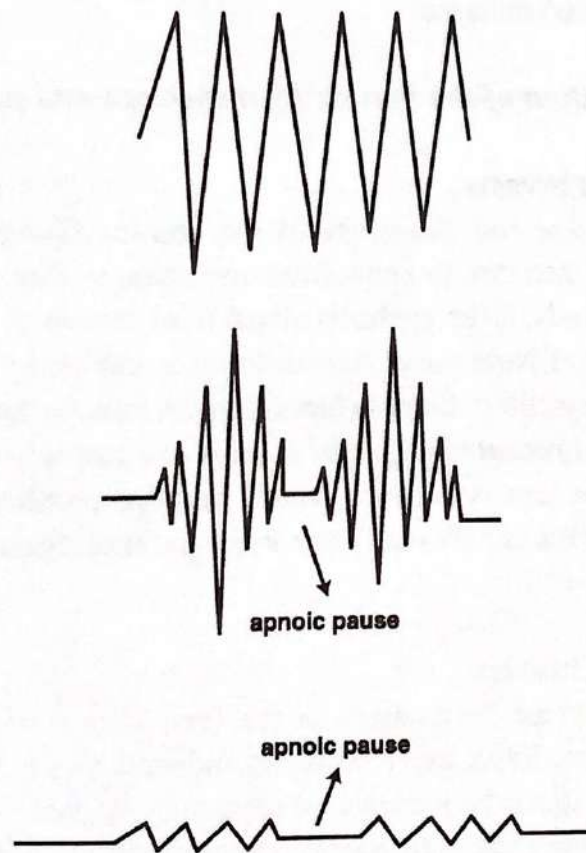


Figure 6: Kinds of respirations: a) Kussmaul respiration, b) Cheyn-Stokes periodic respiration, c) Biot respiration

2.2.3.2 Palpation of the chest and vocal fremitus

Palpate both breasts (see above). If the patient complains of chest pain, you have to palpate this place gently. If the pain worsens during palpation, it is usually diseases of the bones, muscles, cartilage or intercostal nerves.

Vocal fremitus

Place your hands (the palms of your hands) on the basal parts of the patient's chest bilaterally and ask patient to say words with letter "R" repeatedly: "Prosím řekněte opakovaně slova Praha, prkno, Brno." The chest vibrations are transmitted to your hands. Compare vibrations from the both sides. Vibrations are increased in unilateral pneumonia (*increased vocal fremitus*), vibrations are decreased (*decreased vocal fremitus*) if unilateral pleural effusion or if thickening is present, in pneumothorax or over the lung (lobar) collapse.

2.2.3.3 Examination of the breasts by inspection and palpation

Inspection of the breasts

Describe the size and symmetry of the breasts. *Gynecomastia* is enlarged breasts in men due to endocrinal disturbances (hormonal treatment with female steroids, liver cirrhosis, long term treatment by digitalis or spironolactone etc.) Note the skin and describe any pathological findings, such as redness, swelling, bulges (lumps), retraction, wrinkling, ulceration etc. *All unilateral recent changes of nipples are suspicious of malignant tumour!* Describe any secretion, which may be purulent (in mastitis), bloody (in cancer) or it may occur abnormal lactation (galactorrhea) in endocrinal disorder.

Palpation of the breasts

Palpate both breasts bimanually at the same time (while the patient is lying and later standing), use circulatory movements of your fingers and press gently, ask about the presence of tenderness or pain: "Cítíte tlak nebo bolest?" and compare the both corresponding areas. Describe the structure, density, consistency of the breast tissue. If you find any mass (lump), evaluate the size, shape, regularity, consistency and blunt or sharp margins, mobility of the mass against the background. A hard irregular mass with

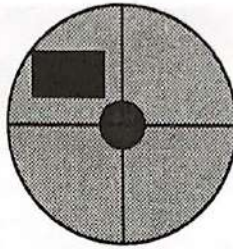


Figure 7: Schema of the right breast with a characteristic location of malignancy in the upper external quadrant

a ragged surface and indistinct margins in the upper external quadrant is typical for cancer (Figure 7).

Palpate the supraclavicular and axillar lymph nodes for the possible presence of metastases or inflammation. Breasts in women are usually asymmetrical in size. The skin has to be normal in color without any redness, without any lump in the tissue, without any retraction or deformation of the nipple, without any secretion.

Do not forget the breasts examination and remember, that it is important for breast cancer prevention especially in women, but breast cancer can occur also in men!!!

detection

don't forget that

2.2.3.4 Percussion of the chest and lungs

We ask the patient to lie on his (her) back: "Prosím, lehněte si na záda." Start to percuss the anterior chest wall by the technique as is seen on the Figure 8. We use for the description the sternum, clavulae, ribs and intercostal spaces. The 1st rib is located under the clavula and is not palpable, the 1st space below clavula is the 1st intercostal space, then follow the 2nd rib which is palpable, below that lies the 2nd intercostal space. Palpate the sternal prominence as site of the 2nd intercostal space. Percuss the anterior wall in all described lines (Figure 9).

down

Then ask the patient to sit: "Prosím, sedněte si" and start to percuss the posterior chest wall in the described lines (Figure 8). In the back various vertebral spines and their numbers are used for the orientation. First look for the C₇ spine (vertebra prominens): ask the patient to slightly lower his or her head: "Prosím, skloňte mírně hlavu dopředu" and then palpate C₇, which is usually the most prominent spine.



Figure 8: The technique of percussion

Remember: If there are two protruding vertebral processes, C_7 is the lower one; if there are three, C_7 is the middle one. The rest of the spinous processes are counted by sliding our index finger down.

We distinguish the **comparative and topographic percussion**. Compare the resonance in all intercostal spaces and in all described lines of the anterior and posterior chest wall – see Fig. 9.

Topographic percussion is done in the course of comparative percussion. In an area of dullness, we try to establish the borders of this dullness. Percuss vertically from the normal resonance to the dullness and from the dullness to the normal resonance; you will distinguish the change in character of the resonance and find the location of the pathologic process (pneumonia, atelectasis, tumour etc.). You can find the lower borders of the lung, the position of the liver, spleen, border of the heart etc. Heart shape is normally projected in the middle and partly left anterior wall, see below “Percussion of the heart”.

Percussion of the borders of the lung lobes is done on the anterior and also posterior chest walls. The right lung has 3 lobes, the left has 2 lobes. Assess the lower borders of lung by percussion in the parasternal line (level of the 6th rib), in the midclavicular line (level of the 6th intercostal space), in the midaxillary

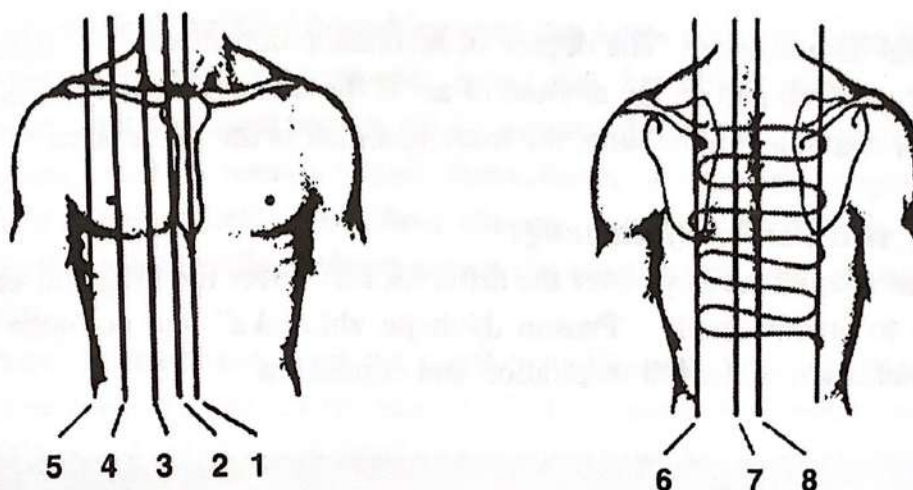


Figure 9: The lines on the anterior and posterior wall of the chest

1 middle, 2 sternal, 3 parasternal, 4 medioclavicular, 5 anterior axillar, 6 scapular, 7 paravertebral, 8 vertebral. The curve shows comparative percussion in the scapular lines on the posterior chest wall.

line (level of the 8th rib), in scapular line (level of the the 10th rib), in paravertebral line (level of the Th₁₀ on right side, level of the Th₁₁ on left side)

Inferior percussion borders move during respiratory excursions! The largest displacement occurs in both midaxillary lines (up to 8cm), less in the scapular lines (4cm) and least in the front. You can distinguish bilaterally or unilaterally diminished percussion displacement in various bilateral or

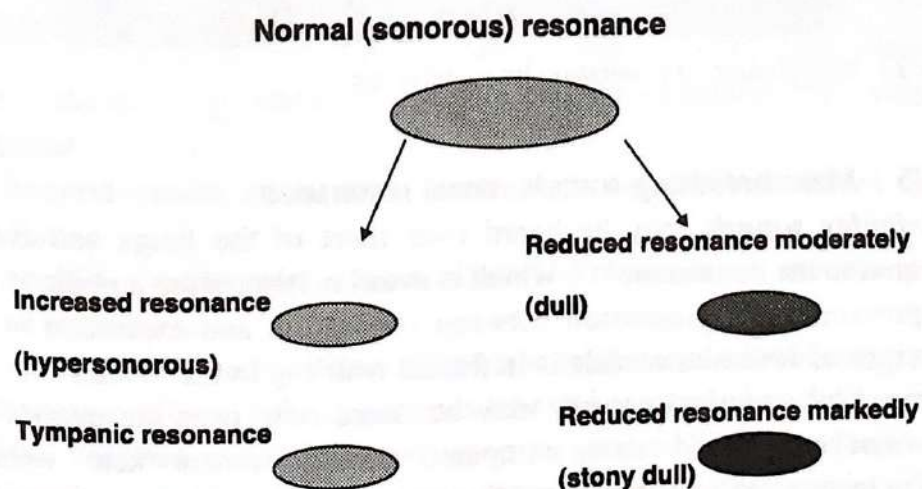


Figure 10: Percussion note possibilities

unilateral lung diseases. The degree of resonance depends on the thickness of the chest wall and on the amount of air in the underlying lung tissue; the more air contained in the lung, the more resonant is the percussion.

2.2.3.5 Auscultation of the lungs

Place your stethoscope over the different areas over the lung and ask the patient to breath deeply: “Prosím dýchejte zhluboka” and compare both sides and listen to the full inspiration and expiration.



Figure 11: Auscultation of respiration by stethoscope

2.2.3.5.1 Main breathing sounds, vocal resonance

Vesicular sounds may be heard over most of the lungs and can be compared to the consonant “f”, which is heard in inspiration and the 1st part of expiration; time proportion between inspiration and expiration is 3:1. The origin of vesicular sounds is in the air whirling in the alveoli.

Bronchial (tubular) sounds may be heard only over the trachea and main stem bronchi and can be compared to the consonant “kch”, which is heard in inspiration and expiration; time proportion between inspiration and expiration is 1:1.

Pathologic bronchial breathing over the lungs occur in some diseases: **consolidation from pneumonia** (vesicular breathing sounds are not developed, but bronchial sounds are transmitted through the lung substance – solid lung conducts sounds better), **hydrothorax** (alveoli are compressed by the fluid in interpleural space), **lung abscess – amphoric breathing**.

Vocal resonance (bronchophony) is the auscultatory equivalent of vocal fremitus.

Place the stethoscope on the chest (usually over the lower part of the lung) and ask the patient to count 1, 2, 3, ... silently: "Prosím, počítejte polohlasně od jedné..." Normally the sound is fuzzy (you are hearing, that the patient is talking, but you do not understand what is he or she saying).

Increased vocal resonance (you understand what is patient saying) occurs in consolidation e.g. in pneumonia, where is better transmission of sounds.

Decreased vocal resonance (you are not hearing anything) is in obstruction in the pleural space (hydrothorax, pleural thickening, pneumothorax, atelectasis).

2.2.3.5.2 Added pathologic sounds (rales)

Wheezes – dry rales – typical bronchial symptoms produced by narrowing of the bronchial lumen due to the contraction or spasm of bronchial smooth muscle or due to swelling of the bronchial mucosa and due to secretion of exudate adherent to bronchial walls. Wheezes are heard predominantly during expiration. Wheezes are **high pitched (whistles)** or **low pitched (rhonchi)** according to the diameter of the bronchi in which the sounds are produced. Their character and intensity may frequently change during respiration or cough and after coughing they may also disappear.

Common causes of airways obstruction: asthma bronchiale, chronic bronchitis.

Crackles – moist rales – are produced by secretion of exudate lying in alveoli or bronchi:

- a) **Coarse crackles** occur where a fluid is in the bronchi or pulmonary cavity; they are similar to bubbling sounds when blowing air into soap water.
- b) **Fine crackles** occur in late inspiration where there is a fluid in the alveoli e.g. in pneumonia or left ventricular failure; they can be imitated by rolling the hairs of your temple together between your fingers.

Pleural rub – pathologic sound from inflamed pleural layers (visceral and parietal); it is heard in inspiration and expiration. Pleural rub is similar to the sound occurred during walking on frozen snow. Continuous deep breathing may diminish the rub by smoothing out the pleural surfaces. The sound disappear as soon as exudation into pleural space begins.

Stridor – is a typical whistling sound heard predominantly in inspiration. It is a sign of narrowing of large airways i.e. during obstruction of larynx, trachea or main bronchi. You find clear vesicular breathing over the healthy lung.

Tab 1: Changes in examination of the lung in different diseases

Diseases	percussion resonance	auscultation breathing	fremitus	bronchophony
<i>Chronic bronchitis</i>	normal	wheezes	normal	normal
<i>Emphysema</i>	increased	reduced vesicular, prolonged exp.	normal	normal
<i>Bronchiectasis</i>	reduced	wheezes, coarse crackles	normal	normal
<i>Pleural effusion</i>	dullness	no breathing	decreased	decreased
<i>Lung cavity</i>	tympanic	amphoric	normal	normal
<i>Atelectasis</i>	dullness	reduced vesicular	decreased	decreased
<i>Pneumonia</i>	dullness	fine crackles	increased	increased
<i>Asthma bronchiale</i>	increased	whistles in exp. + prolonged exp.	normal	normal
<i>Pneumothorax</i>	tympanic	reduced vesicular	decreased	decreased
<i>Severe fibrosis</i>	reduced moder.	typical crackles	normal	normal
<i>Lung infarction</i>	normal (red.)	vesicular	normal (incr.)	normal (incr.)

2.2.4 Physical examination of the heart

2.2.4.1 Inspection of the cardial area

Look at the precordium – you can see a bulging (due to a congenital heart disease), heaving apex beat or scars.

2.2.4.2 Palpation of the heart

The patient has to lie supine while you palpate the precordium with your palm – left and right precordium, mesocardium and the basal part of the heart i.e. the upper part of precordium over the big arteries!

Locate the apex beat and qualify the impulse:

Position of the apex is dependent on the shape and size of the heart and chest; sometimes the apex is not palpable (in obese patients or in patients with emphysema etc.). **Normal position of the apex is in the 5th intercostal space just medial to the midclavicular line.** Displacement of the apex to the left is a sign of the heart enlargement, but other cause of this displacement needs to be excluded (fibrosis, pneumothorax, pleural effusion on the right side, scoliosis etc.) **Quality of the impulse:** A **forceful apex beat** indicates increased cardiac output (e.g. during fever, after exercise). A **heaving impulse** of the apex suggest hypertrophy of the left ventricle. A **tapping impulse** is due to closure of the mitral valve and corresponds in mechanism of the loud first sound. A **diffuse poorly localized apex** is commonly found after damage of the ventricular muscle (e.g. after myocardial infarction, in cardiomyopathy). Sometimes you can detect a “thrill”. **Thrill** is “palpable murmur” and is accompanied by easily heard murmur on auscultation (but not all murmurs are accompanied by a thrill). A thrill feels very like the sensation of stroking a purring cat. Thrills are frequently in association with valvular or congenital heart disease.

Note the position of maximal intensity. The most common thrills are in following **cardiac areas:** **mitral area** (apex) – systolic (mitral regurgitation) diastolic (mitral stenosis)

aortic area (upper right sternal border, 2nd intercostal space) – systolic (aortic stenosis)

pulmonic area (upper left sternal border, 2nd intercostal space) – systolic (pulmonary stenosis)

tricuspid area (lower edge of the sternum) – systolic (ventricular septal defect – Roger’s disease).

2.2.4.3 Percussion of the heart

You have to establish the right, left and upper borders of the heart. Percuss the chest on the right side approximately in the 4th intercostal space

from the mid-clavicular line to the sternum, your finger putting on the chest forms an angle of 90° with the ribs. Make sure the right border of the heart does not overreach the right margin of the sternum. To establish the left border of the heart by percussion is very difficult, because the left side of the heart is partially covered by the left lung; left border is usually stated by the location of the apex beat (apex beat is normally in the 5th intercostal space just medial to the mid-clavicular line). The upper border appears during the left lung percussion; the dullness over the heart occurred in the 3rd intercostal space in the sternal line and in the 4th intercostal space in the parasternal line; check whether there isn't any dullness in the mid-clavicular line, if the heart is not enlarged.

2.2.4.4 Auscultation of the heart

During auscultation you have to analyze cardiac rhythm, the first and second heart sounds, to detect and assess added sounds and murmurs. When you auscultate the heart, you should listen not only at the apex (mitral area), over the aortic, pulmonic and tricuspid areas, but also over the whole precordium. If anything abnormal is found, the stethoscope should be moved around other parts of the chest until it is heard most clearly.

2.2.4.4.1 Cardiac rhythm

Normal rate is between 60–80 p.m. **Tachycardia** is 90 and more p.m. and **bradycardia** means below 60 p.m. Rhythm may be **regular** or **irregular** – extrasystoles, atrial fibrillation, other disturbances.

2.2.4.4.2 Heart sounds

The 1st heart sound (closure of the mitral and tricuspidal valves) is low frequency sound. **The 2nd heart sound** (closure of the aortic and pulmonary valves) is higher pitch than the first heart sound. The sounds are like “da-ta” (accent on ta). **The 3rd heart sound** (in physiologic conditions – the active relaxation of the ventricular myocardium is responsible for the rapid expansion of the ventricles “ventricular suction”). It is physiologic heart sound **in children and young adults**. The pitch of the 3rd heart sound is low, maximum is in the area of apex. The complex of the 3 heart sounds can be likened to the sounds: “d t d d t”.

A **pathologic 3rd heart sound** is found in patients with mitral incompetence and a ventricular septal defect or very frequently in patients with left ventricle failure (especially in patients with dilated left ventricle – distension of dilated ventricle).

The 4th heart sound (contraction of the atria at the end of diastole, immediately before ventricular systole): “dd t dd t dd t”.

Gallop – tripple rhythm – is a tripple sound resembling the 3 beat run of a horse.

It is a combination of tachycardia with a 3rd (**protodiastolic gallop**) or 4th heart sound (**presystolic gallop**). The clinical significance of the gallop rhythm is its frequent occurrence in left ventricular failure, the most frequent is summation sound (i.e. summation of the 3rd and the 4th heart sound) – **summation gallop**.

Accentuation of the 1st heart sound is a loud 1st sound at the apex in mitral stenosis, emotion, thyreotoxicosis or hypertension. **Diminished 1st sound** occurs in mitral regurgitation, in low cardiac output or may be obscured by a loud systolic murmur.

Accentuation of the 2nd heart sound

- a) **aortic component** of the 2nd sound – is loud in hypertension, atherosclerosis and dilated aortic root; this sound may be **diminished** in aortic stenosis.
- b) **pulmonary component** of the 2nd sound – is loud in pulmonary hypertension (in mitral stenosis, left ventricular failure); this sound may be **diminished** in some cases of pulmonary stenosis.

2.2.4.4.3 Added sounds

Splitting of the 1st heart sound – it is due to asynchronous closure of the mitral and tricuspid valves. It must be distinguished from the presystolic gallop!

Splitting of the 2nd heart sound – is heard at the base of the heart (over aorta and pulmonalis valves) and is due to slightly asynchronous closure of the aortic and pulmonary valves. This splitting accompanies pulmonary stenosis and atrial septal defect.

Diastolic opening snap of the mitral valve – it is usually high pitched brisk “snapping” sound, typical finding in rheumatic heart disease, in mitral stenosis (sudden distension of a mobile but stenotic mitral valve, briefly vibration)

Early systolic (ejection) click – arise from abrupt, sudden distension of a mobile but stenotic valve, similar as diastolic opening snap of the mitral valve). Characteristic finding in aortic stenosis. It appears shortly after the 1st sound.

Late systolic click – develops most frequently by a distension of an abnormal mitral valvular leaflet that has ballooned into the left atrium during systole.

It is typical finding in mitral prolaps. The late systolic click is an indication for ECHO.

2.2.4.4.4 Heart murmurs

Murmurs are musical sounds, which result from turbulent blood flow. If a murmur can be heard it is important to note:

Timing i.e. where it occurs in the cardiac cycle. According to the timing, the murmurs are divided into **systolic and diastolic murmurs**.

Quality i.e. blowing or harsh.

Intensity: faint, moderate, loud. Systolic murmurs are divided according to their intensity into 6 grades: Grade 1 a very faint murmur, audible in a quiet room. Grade 2 a quiet but readily audible murmur. Grade 3 a medium loud murmur. Grade 4 a loud obvious murmur. Grade 5 a very loud murmur, often accompanied by a thrill. Grade 6 a very loud murmur, very often accompanied by a thrill and is heard also if the stethoscope is held at a distance (a few centimeters) from the chest wall “distant murmur”.

Position of maximal intensity.

Direction in which it is radiated.

Systolic murmurs:

Pansystolic (holosystolic) murmurs develop due to regurgitation of blood through a structure which is normally closed in systole e.g. incompetent mitral or tricuspid valve; these murmurs are of the same intensity, go right up to the second heart sound and have a blowing character (Figure 12).

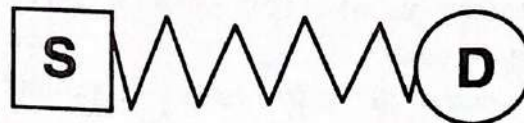


Figure 12: Pansystolic murmur

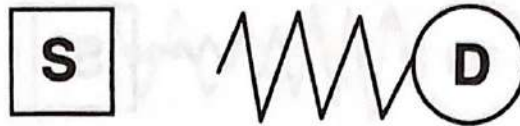


Figure 13: Mid-systolic murmur

Mid-systolic (late systolic) murmurs are produced in cases where the valve is competent at the start of the systole but starts to leak half way through. This is common in patients with mitral valve prolapse (Figure 13).

Ejection systolic murmur are generated by a blood flow through a valve which is normally open in systole but which: has become abnormally narrowed e.g. aortic or pulmonary stenosis.

There is increased blood flow through a normal valve – **innocent or flow murmurs** – they are not associated with any structural abnormalities of the valves, they are caused by an increased blood flow in pregnancy, anaemia, hyperthyroidism and also in children and young people. Flow murmurs are always systolic without radiation, always quiet (below grade 3), best heard at the left sternal edge; there is no ventricular hypertrophy and the ECG is normal during these murmurs. These murmurs are usually harsh in character and their intensity rises to a crescendo in mid systole and then become quiet decrescendo (Figure 14).

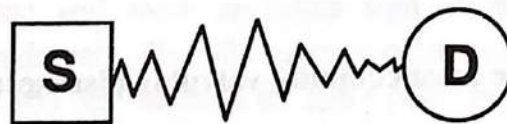


Figure 14: Ejection systolic murmur

Diastolic murmurs

Early diastolic – is due to the incompetence of either the aortic or the pulmonary valve. Its maximum is at the beginning of the diastole when aortic or pulmonary blood pressure is highest and rapidly becomes quieter (decrescendo) as the pressure in the great vessels falls. The aortic early diastolic murmur is best heard at the Erb's point and has a blowing character (Figure 15).

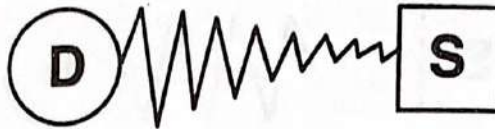


Figure 15: Early diastolic murmur

Mid-diastolic (praesystolic) murmur – is usually due to blood flow through a narrowed mitral or tricuspidal valve. The characteristic murmur of mitral stenosis is a harsh crescendo mid-systolic (pre-systolic) murmur leading to a sudden loud first sound (Figure 16).

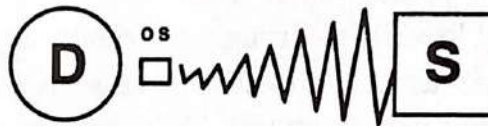


Figure 16: Mid-diastolic murmur

Patients with aortic reflux sometimes have a praesystolic murmur at the apex. This is caused by the regurgitant blood from the malfunctioning aortic valve, which turns back the anterior cusp from the just opened mitral valve and produces **an artificial mitral stenosis**, though the mitral valve is normal (*Austin Flint murmur*).

Physical signs of the most common valvular diseases:

Mitral regurgitation

A pansystolic murmur maximal at the apex and often conducted towards the left axilla. The 1st heart sound is faint (weak) or absent, i.e. it may be totally replaced by the systolic murmur (Figure 17).

Mitral stenosis

The apical impulse is often “tapping in quality”. The diastolic thrill is often palpable at the apex. A diastolic murmur maximal at the apex is characterized by a harsh, crescendo praesystolic (mid-systolic) murmur leading to a sudden loud first sound. The second heart sound at the base may

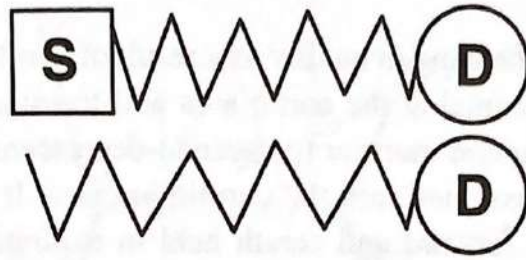


Figure 17: Mitral regurgitation

be accentuated from pulmonary hypertension. There is an “opening snap” of the mitral valve. It is produced by the diastolic ejection of the blood from the left atrium on the rigid, stenosed just opened mitral valve (Figure 18).

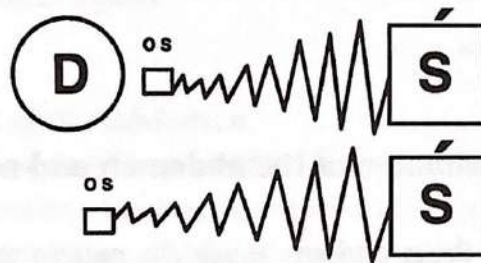


Figure 18: Mitral stenosis

Aortic regurgitation

The characteristic and most important sign of aortic regurgitation is a blowing decrescendo early diastolic murmur occurred immediately after the second heart sound and best heard in the Erb's point with the patient standing or sitting and the breath held in expiration. Enlargement of the left ventricle leads to a displacement of the apex downwards (6th intercostal space) and to the left (outside the mid-clavicular line) and to a heaving impulse. Low diastolic blood pressure with high pulse pressure (e.g. 170/50 mmHg) (Figure 19).

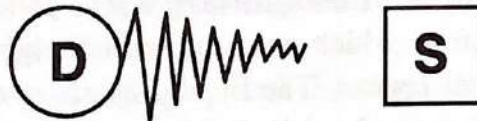


Figure 19: Aortic regurgitation

Aortic stenosis

The apex beat is heaving in quality as a result of ventricular hypertrophy. A systolic thrill maximal at the aortic area and transmitted into the neck. A harsh systolic ejection murmur (crescendo-decrescendo) maximal to the aortic area and transmitted into the carotid arteries. It is best heard with the patient leaning forward and breath held in expiration. Faint or absent 2nd heart sound. Pulse of small amplitude (e.g. 110/90) and rising slowly to a delayed peak (Figure 20).

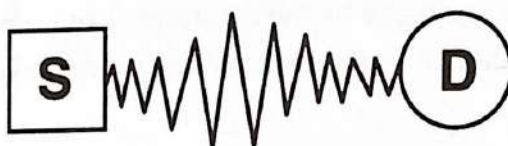


Figure 20: Aortic stenosis

2.2.5 Physical examination of the abdomen and abdominal organs

Before beginning the examination ask the patient to lie flat in bed with arms lying loosely at their side and ask the patient to bend his or her legs at the knees: "Prosím, ležte rovně, paže dejte podél těla a pokrčte si nohy v kolenou!" This position relaxes the abdominal wall so you can begin the examination. Be sure that your hands and stethoscope are not cold.

The abdomen is divided into nine areas (regions) for our orientation and description of pathological findings. Two horizontal lines – one is drawn in the subcostal plane and the second one joins the anterior superior iliac spines – divided the abdomen area in epigastrium, mesogastrium and hypogastrium. Vertical lines dropped from the mid-clavicular points on either side together with both horizontal lines divide the abdomen area in nine regions: the epigastrium is divided into middle, left and right parts; left and right parts are called **left and right hypochondrium**, the middle part stay **epigastrium**. The mesogastrium is also divided into middle, left and right mesogastrium which may be called **right and left lumbar regions** and **umbilical region**. The hypogastrium is divided into middle, right and left parts that may be called **right and left inguinal regions** and **suprapubic region** (Figure 21).

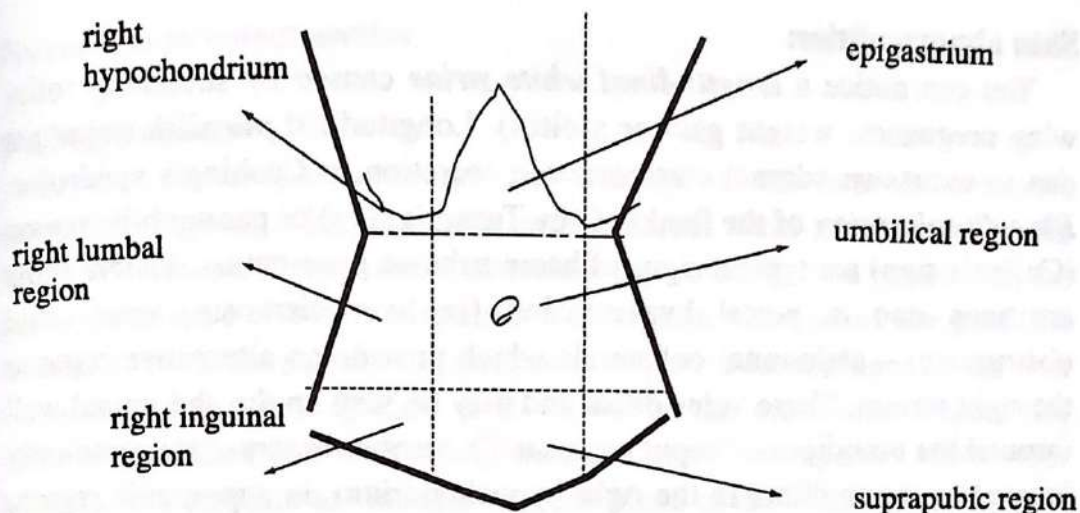


Figure 21: Nine abdominal regions

2.2.5.1 Inspection of the abdomen

Look at the abdomen wall and see if it lies level to the chest – flat abdomen, or is concave or protruding. Look at the wall and observe breathing movements, if there are any bulges, scars, pulsation, stretch marks (striae), hernias etc. – describe them, look at the umbilicus, if it is free of irritation and hernia.

A normal abdominal wall is symmetrical and concave or flat, moves gently with breathing and is without any pathological findings on the skin, umbilicus is inverted without any irritation or hernia.

Abnormal contours:

Umbilicus – **umbilical hernia** – describe, if the hernia is free, reponible or fixed, if it has redness etc. The umbilicus may be reverted due to fat tissue in obesity or due to fluid in the peritoneal space, i.e. **ascites**. **Ascites** change the shape of the abdomen (frog's abdomen) and make distension according to the amount of the fluid. The **gaseous distension** makes symmetrical enlargement of the abdomen with the typical high tympanic percussion (see below). **Suprapubic fullness** may indicate an enlarged uterus in pregnant woman, ovary cyst or carcinoma or overfilled urine bladder especially in elderly men. Periodic rippling movements – **visible peristalsis** – are caused by small bowel obstruction. **Hernias** may occur in inguinal areas, paraumbilical parts or in scars.

Skin abnormalities:

You can notice a **longitudinal white striae** caused by stretching following pregnancy, weight gain or ascites). Longitudinal **purplish striae** are due to excessive adrenal corticosteroid secretion in Cushing's syndrome. **Blue discoloration** of the flanks (Grey Turner's sign) or paraumbilic region (Cullen's sign) are typical signs of haemorrhagic pancreatitis. **Visible veins** are seen due to portal hypertension (in liver cirrhosis, vena caval obstruction) – abdominal collaterals which provide an alternative route to the right atrium. These veins dilate and may be seen on the abdominal wall (around the umbilicus – “caput medusae”!). **Surgical scars** – are commonly located in the midline, in the right hypochondrium, in suprapubic region, inguinal areas etc. (Figure 22).

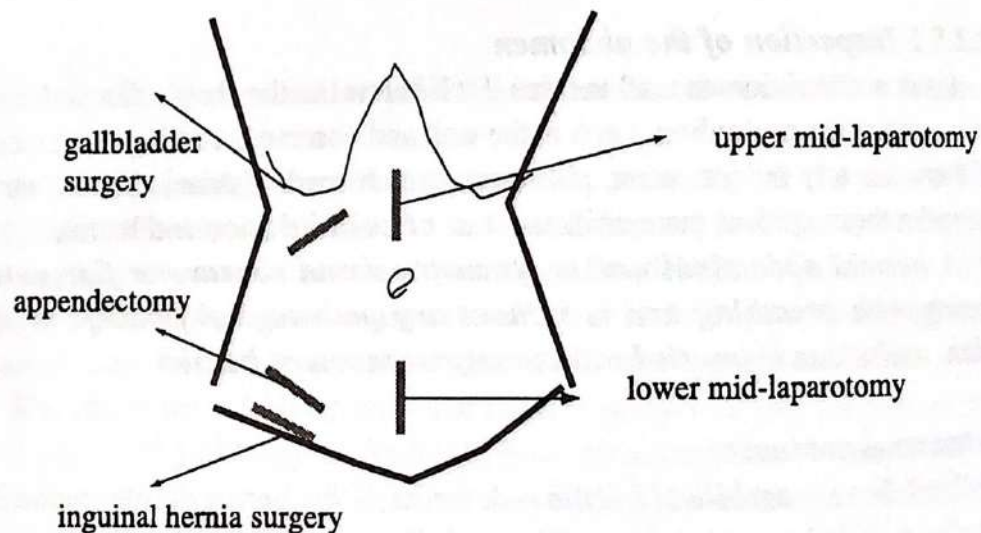


Figure 22: Description of the common scars following various type of surgery

2.2.5.2 Percussion of the abdomen

Percuss the midline vertically and then in parallel lines on both sides or percuss centrifugally from the umbilicus all around. Note all percussion note changes (dullness) and their positions carefully. The percussion note is normally tympanic.

Percussion to detect ascites

Shifting dullness

In the supine position gas accumulates in the bowels centrally (umbilical region) – high tympanic note, whereas fluid gravitates into the flanks – dullness. The presence of ascites can be confirmed by altering the patient's posture and demonstration a change in position of the gas-filled interface. With the patient supine, position your middle finger in the mid along the patient's long axis at the level of the umbilicus. This point overlies gas-filled bowel and the percussion note is tympanic. Move your finger to the left lateral side and find the place of dullness – it is the gas-fluid interface – mark this place and then turn the patient into right lateral position. If there are ascites, the fluid will gravitate to the right flank, the gas-filled bowel will float to the left flank and the original gas-fluid interface (i.e. place of the change from tympanic note to dullness) disappeared = shifting dullness.

Undulation (fluid wave)

It can be easier to detect ascites, if the patient is in an upright position. Place the palm of your left hand on the patient's right hypogastrium and with your fingers of the right hand percuss on the opposite side of the patient's left hypogastrium. You will feel the transmission of the fluid wave on your left palm, if ascites is present. A transmitted shaking of the abdominal wall is prevented by placing a third hand (of your colleague or the patient's own hand) by the ulnar surface over the lower midline.

2.2.5.3 Palpation of the abdomen

Palpation of the abdomen is the most important part of the physical examination of the abdomen. The patient should stay in the supine position with flexed knees in the bed. You can sit down on the patient's bed (to his or her right side) and place flat your hands on the abdomen wall: you can use only one hand (unimanual palpation) or your both hands (bimanual palpation) – the double handed technique is preferred. In the *light palpation* use your hands placed flat side by side, palpate with light, smooth movements. In *deep palpation*, it is useful to place the (right) hand on the top of the flat (left) hand;

the upper hand applying pressure, whilst the lower hand concentrates on feeling the structures placed in the abdomen deeply. Palpate all nine regions systematically and start to palpate in the hypogastric area and go up. **Light palpation** is useful to detect large masses or tenderness, i.e. increased diffuse rigidity of the abdominal wall (peritoneal irritation – peritonitis) is called **guarding (défense musculaire)**. The rigidity may be localized in one area (e.g. around the appendicitis). Tenderness is very painful. When the pressure of your hands is suddenly released, the pain is further aggravated. This sign is known as **rebound pain**. If the patient complains of localized pain start palpate first painless areas and at the end the painful area. **Deep palpation** is useful to detect deep tenderness and to identify masses and enlarged organs (Figure 23).

You can palpate in various regions the specific organs (Tab 2).

Describe any palpable mass very carefully, evaluate their size, shape and consistency, tenderness, mobility and whether it moves with respiration. The hernial orifice should be examined if intestinal obstruction is suspected.



Figure 23: Deep palpation of the abdomen

Tab 2: Places for the palpation of abdominal organs

Right inguinal area	caecum
Suprapubic area	bladder or uterus
Left inguinal	sigmoid, colon
Umbilical area	aorta
Left and right lumbal areas	bowel, kidneys
Right hypochondrium	liver, gallbladder
Left hypochondrium	enlarged spleen, splenic flexure
Epigastrium	stomach, duodenum, pancreas

Pulsatile masses:

Aorta in the midline above the umbilicus may be normally felt as a discrete pulsatile mass, a large pulsatile structure in the same location indicates an aortic aneurysm or a transmitted impulse to a mass overlying the aorta. To differentiate, use the tips of your finger to assess whether pulsation is expansible and if the finger splay with pulsation or transmitted (vertical movement of fingertip).

Finally palpate the inguinal and femoral areas for lymph nodes. They are mostly palpable, elastic, painless, move freely. Palpate the femoral pulse and do not forget to auscultate the femoral arteries. An arterial bruit (murmur) is present in an atherosclerotic narrowing.

2.2.5.4 Auscultation of the abdomen

Bowel sounds (peristaltic sounds) are heard over the abdomen wall and are caused by intestinal peristalsis; normally appeared within 15 sec. In pathological states, these peristaltic sounds may be increased, decreased or absent. **An increased** intensity and frequency ("active bowel sounds") may be an early sign of mechanical bowel obstruction, it is associated with colic abdominal pain. **Frequent "tinkling"** bowel sounds suggest paralytic ileus.

Absence of bowel sounds during prolonged listening indicates complete intestinal paralysis (paralytic ileus). **Abdominal arterial bruish.** Listen to the abdominal aorta and to the renal arteries in the umbilical area. The systolic murmur over the aorta suggests atherosclerotic plaque or aneurysm of the aorta. Renal arterial bruits suggest atherosclerotic renal artery stenosis or narrowing due to fibromuscular hyperplasia.

2.2.5.5 Physical examination of the abdominal organs

2.2.5.5.1 Liver

The liver is located in the right dome of the diaphragm in the right hypochondrium and partly in the epigastrium. **The upper border** of the liver projects on the anterior chest wall and you will detect it during chest percussion in the midclavicular line (the normal resonance changes to the dullness approximately in the level of 4th–5th ribs). **The lower edge** of the normal liver is in the right midclavicular line usually not palpable, i.e. the liver are under the costal margin. The liver may be pushed down e.g. by hyperinflated lungs in emphysema, then the liver are palpable but they are not enlarged. The distance between the upper border and the lower edge is the **liver span**, i.e. the size of the liver assessed by the physical examination; usual liver span is **8–10 cm in women** and **10–12 cm in men**. Sometimes the lower edge may become palpable below the right costal margin, more in the epigastrium in the deep inspiration – you palpate the edge with your fingertips of the both hands. Ask the patient to breathe deeply: “Prosím dýchejte zhluboka” and you will have a better chance of palpating the liver lower edge during deep inspiration, when the descent of the diaphragm is directly transmitted to the liver.

If the liver is enlarged (**hepatomegaly**) you will palpate a part of the liver tissue and then describe the size of the palpable liver, their surface (smooth or irregular), consistency (soft, firm, hard), presence or absence of tenderness and quality of the liver edge (sharp, rounded). In some pathological states, the liver size may be also diminished. A small cirrhotic liver or acutely atrophic liver may occur. **An example of an enlarged metastatic liver:** the size of the liver span is about 18 cm; the upper border is detected at the level of 4th rib in midclav. line, lower edge of the liver is palpable about 8 cm under the right costal margin. The liver surface is irregular, consistency is very hard (**stony liver**), the edge is rounded.

2.2.5.5.2 Gallbladder

The gallbladder lies under the point where the midclavicular line crosses the costal margin. A normal gallbladder is not palpable. Palpate with the fingertips of both hands and ask the patient to inspire deeply: “Prosím, nadýchněte se zhluboka!” Ask the patient about tenderness: “Bolí to?” You may palpate the gallbladder also by your thumb (Figure 24).



Figure 24: Palpation of the enlarged gallbladder

Palpable gallbladder is enlarged:

Painfull enlarged gallbladder: "**Murphy's sign**", i.e. cholecystitis, the patient has an intense pain sometimes accompanied by a guarding over the gallbladder region.

Painless enlarged gallbladder: "**Courvoisier's law**" is usually accompanied with obstructive jaundice due to a carcinoma of either the head of the pancreas or the common bile duct.

2.2.5.5.3 Spleen

The spleen is located in the left dome of the diaphragm. The spleen's long axis lies in the 9th intercostal space. The tip of a normal spleen is bordered anteriorly by the gas filled stomach and colon (**Traub's space**). This space may be percussed in the 9th intercostal space between midclavicular and anterior axillary lines and is normally tympanic. Normal-size spleen is not

palpable. The spleen size must be greater than 2,5 times and more enlarged before it is clinically detectable (*splenomegaly*).

Palpating for the spleen

Use the technique similar to that of the liver palpation, palpate the left hypochondrium with fingertips of the both hands and ask the patient to breathe deeply: "Prosím dýchejte zhluboka!" You can palpate the spleen edge during deep inspiration under the left costal margin. If the spleen is not felt, ask the patient to roll into right the lateral position with the knees drawn up and down left hand behind his or her head: "Prosím, lehněte si na pravý bok, pokrčte nohy v kolenou a přitáhněte je k tělu, pravou paži zvedněte a dejte ji za hlavu!"

In this position ask the patient to breathe deeply again and you stay on the patient's back and your fingertips input to the left hypochondrium. You can feel the spleen edge during the patient's deep inspiration.

Percussion of the spleen

Confirmation of splenomegaly may be aided by checking for splenic dullness in the 9th intercostal space, which is normally resonant. Percuss the 9th intercostal space between medclavicular and anterior axillary lines; usual tympanic sounds (*Traub's space*) becomes less resonant or dull with marked splenomegaly.

Causes of splenomegaly:

Spleen congestion due to portal hypertension

Infiltration e.g. lymphomas, leukemias, inborn metabolic errors

Infections e.g. typhoid fever, malaria, viral infections

Hypertrophy of the reticuloendothelial elements e.g. myelofibrosis

2.2.5.5.4 Kidneys

The kidneys lie bilaterally to the spine between the 11th–12th thoracic and 3rd lumbar vertebrae in the retroperitoneal space. The right kidney lies approximately 1–2 cm lower than the left one due to the size of liver. ***The normal-size kidney is not palpable*** due to the thickness of the abdominal wall and abdominal contents. But in lean subjects a normal sized kidneys may be felt especially in the right kidney, because it lies lower then the left one. ***A normal kidney has firm consistency and a smooth surface.***

Palpating the kidneys

To examine the kidneys use the kidney bimanual palpation in the patient lying on his or her back; your one hand pushes the kidney the from behind forward, the other hand tries to palpate the anterior surface of the kidney by deep exploration under the left (right) costal margin during expiration. Your hands palpate against each other (Figure 25). Palpate for the lower pole of each kidney in turn. If the kidney is palpable, the firm rounded lower pole with a smooth surface can be felt. Acutely infected kidney may be tender to bimanual palpation – it is a sign of pyelonephritis. Unilateral enlargement suggests cancer of the kidney. Bilateral enlargement with an irregular surface is due to polycystic kidneys.

Ask the patient to sit up: “Prosím, sedněte si!” Tenderness in pyelonephritic kidney may also be evoked by direct punching of the kidney in the lumbar regions on the patient’s back by the ulnar surface of your flat hand – *tapottement*. *Tapottement is usually bilateral painless.*



Figure 25: Palpation of the kidney (Israel's palpation)

2.2.5.6 Digital rectal examination

Don't forget about rectal examination in each patient over 40 years of age!

About half of all rectal carcinomas lie within reach of the index finger!

Rectal examination is extremely important for rectal cancer prevention!

Position of the patient: routinely the rectal examination is done in the left lateral position with the knees drawn up or in standing position slightly leaning forward over the examining table.

Before insertion of the finger observe the anal area, looking mainly for hemorrhoids, warts, fistula or fissures etc. While you pass the well-lubricated gloved index finger through the patient's sphincter, note the tonus of the sphincter and reach the ampulla. Check the contents of the ampulla, if any, and then the texture of the mucosa by rotating movement of your index finger. Location of the pathological findings is described in accordance with a clock dial, the 12 o'clock mark begins at the coccyx. You may feel an intrinsic tumour caused by a polyp or carcinoma. Describe the size and location if it. Rectal wall tenderness may be felt in perirectal sepsis or in thrombosis of the internal hemorrhoids. In patients with a fissure in ano, the slipping of the finger through the anus is very painful.

Describe the *prostate gland* in male patient, *normally the size of a chestnut (about 3 cm in diameter), smooth surface with a palpable medial sulcus and without any indurations, without any tenderness*. In female the uterine cervix may be palpated in this area. Finally the rectal content is evaluated after withdraw of your index finger. There may be not only fecal material but also blood, pus or mucosal secret. You can diagnosed e.g. *melena (black stool) or obstructive jaundice (white or pale stool)*.

2.2.6 Physical examination of the locomotor system

2.2.6.1 Physical examination of the upper limbs

Look at **the patient's hands** – describe colour of the skin (pallor, cynosis), look at the fingers, toes and palm, where may occur hard and painful subcutaneous swellings called *Osler's nodes* – embolic lesions in patients with infective endocarditis. *Palmar erythema*, i.e. red coloured thenar and hypothenar, may occur in patients with hyperdynamic circulation

e.g. in hepatic cirrhosis, or in pregnancy, thyreotoxicosis etc. **Dupuytren's contracture** is a fibrosis of palmar aponeurosis and is often seen in patients with alcoholic cirrhosis and diabetes. Look at any pathologic findings in the fingernails (see the Chapter: General examination – Examination of the skin). Then ask patient to move his hands in a circle first one way and then the other: "Prosím, můžete zakroužit vašima rukama doleva a potom doprava!" Ask the patient to open and close his (her) hands: "Prosím zavřete dlaň a otevřete ji!" Ask the patient to spread his (her) fingers and hold them for a moment – describe the motion of fingers, any shaking etc. Look at the small joints and describe any swelling, warmth, tenderness on pressure or movement, limitation of the movement, deformities: e.g. **Heberden's nodes** (in the distal interphalangeal joints) or **Bouchard's nodes** (in the proximal interphalangeal joints) due to osteoarthritis or rheumatoid arthritis. The joints are often red, warm, swollen and tender. Later on the inflammation disappear, leaving knobbly but often painless swelling. **Rheumatoid arthritis** is usually characterized by insidious onset of pain and morning stiffness in the small joints of the hands (and feet), i.e. typically in the proximal interphalangeal joints, in the metacarpophalangeal and wrist joints. Typical changes for this joints is pain, swelling and later there are wastings of the metacarpal interosseal muscles of the hands. The characteristic deformities of the rheumatoid hand are ulnar deviations and desaxations of the fingers, e.g. swan neck deformity.

Test the **elbows and the shoulders** whether there is full range of motion and whether there are any crackling feeling at your palpation or tenderness in these joints. Palpate the axilliar areas for **lymph nodes** and describe them if palpable. Finally ask the patient to take your hands and grasp them firmly: "Prosím, stiskněte mně co nejvíce moje ruce!" Establish whether the strength in both hands is approximately the same (of course there may be a slightly more strenght in the patient's dominant hand, i.e. in the hand for writing).

2.2.6.2 Physical examination of the lower limbs

Look at the feet, describe changes of colour, compare the temperature of both feet (put your dorsal part of your hand to feel the temperature). Look at the toenails and describe any pathological findings, look for any rash on the feet or between toes.

Ask the patient to move his (her) feet in a circle: "Prosím, zatočte oběma nohama v kotníčích na obě strany" – and ask if it is painful: "Bolí to?" Deformities in the feet are similar to those seen in the hands, e.g. in rheumatic arthritis. Press your finger lightly into the skin above malleolus and then above the tibia for some seconds and ascertain whether there is any sign of *oedema* and describe the level of it. Examine the motion of the lower limbs in knees and hips and palpate the knees if there are any cracklings and tenderness due to arthrosis of these joint. Deformities and swelling of the knees occur very often in osteoarthritis, rheumatic arthritis or iin haemophilia (due to frequent repeated spontaneous bleedings from early life).

Examine the legs' **venous system**: the most common diseases of the peripheral veins are: varicose veins, superficial thrombophlebitis and deep vein thrombosis.

Varicose veins: are dilated leg veins. They are more apparent when the patient is standing upright, and empty completely when the legs are raised above heart level. Varicose veins may lead to oedema of the legs. It is usually least apparent in the morning and gets worse as the day goes on. The oedema is distinguished from right heart failure because the jugular venous pressure is normal and then jugular vein filling is not high. **Chronic venous insufficiency** may result in a rise in tissue pressure in the skin and subcutaneous tissue which can interfere with adequate nutrient blood flow. This may lead to skin necrosis and ulceration (*crural ulcer*) mostly at the ankles just above the malleoli.

Superficial thrombophlebitis presents pain and redness along the course of superficial vein. The inflammation induced thrombosis and the thrombosed vein is palpable as a hard cord.

Deep vein thrombosis can occur in any vein of the leg. It may not cause symptoms in lying patients, but in walking patients there is a lot of pain from swelling in the leg with deep vein thrombosis. If the calf is affected you can use very easy test to confirm deep thrombosis.

Homan's sign: positive Homans means a pain in the calf during dorsiflexion of the foot. Except of frequent use of this test, the test is not so specific for deep thrombosis. Ultrasound, venography and other tests are often needed for a definite diagnosis. Complete occlusion due to deep thrombosis particularly of a large vein can lead to a cyanotic discoloration of the limb and severe oedema which is called: *phlegmasia coerulea*, which can rarely lead to venous gangrene.

Palpate **the arteries** of the lower limbs: dorsal pedial, tibial posterior, popliteal and femoral arteries and count pulses for both legs. Compare both legs. Do not forget to listen to the femoral artery with your stethoscope! An arterial bruit over them suggest the presence of atherosclerotic stenosis of these artery. Remember the position of the femoral artery (the most lateral), vein (in the middle) and nerve (the most medial position) in the femoral trigonum!

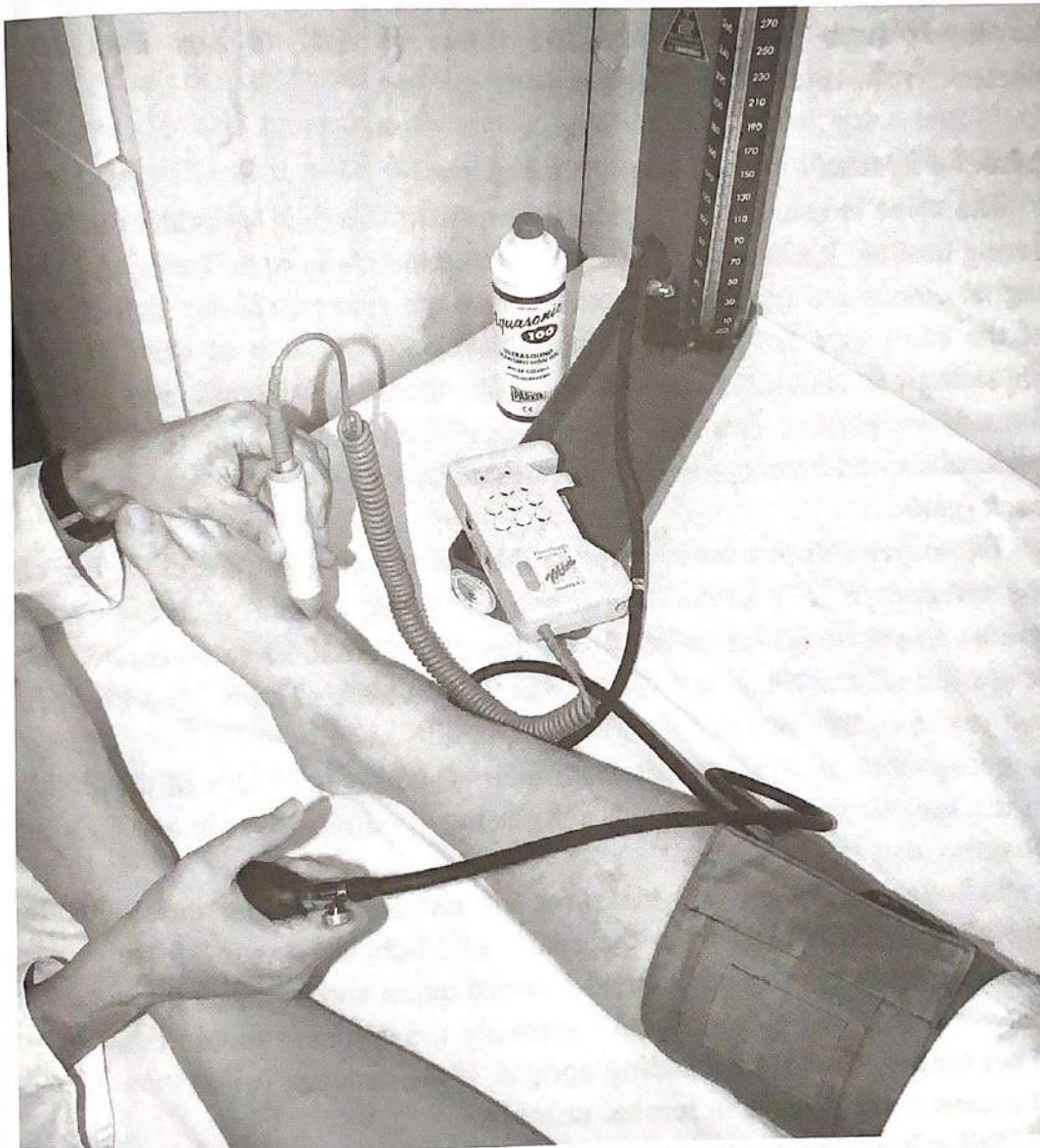


Figure 26: Measurement of distal arterial blood pressure

Palpate the inguinal areas for lymph nodes; small, free and elastic smooth lymph nodes in inguinal areas are usually present in healthy subjects.

Measurement of distal arterial blood pressure (systolic) using ultrasound is very useful for the early detection of occlusive arterial disease and also for the detection of preclinical atherosclerosis (Figure 26). The ratio of systolic blood pressure measured over distal arteries/systolic blood pressure measured over the brachial artery is called the **ankle-brachial index (ABI)**, **which is normally ≥ 1** , because systolic blood pressure has to be higher in the lower limb than in the upper limb. If **ABI is less than 0.9**, atherosclerotic arterial occlusion may be present.

2.2.6.3 Physical examination of the spine

The spine is usually examined in the patient standing upright as well as during motion. Look at the deviation of the patient's spine in the frontal and sagittal planes and describe any deviation to the side (**scoliosis**), deformities of the chest (see shape of the chest above) and rotation of the spine. In physiological condition cervical lordosis, thoracic kyphosis and lumbar lordosis are present. Increased curvatures in the sagittal plane are called **hyperlordosis** and **hyperkyphosis**, the extreme hyperkyphosis is named **humpback (gibbus)**.

Thomayer's distance test may roughly orient you about the unfolding of the spine, especially in the lumbar spine. Ask the patient to bend forward and try to put fingertips on the floor: "Prosím, předkloňte se co nejvíce dopředu a špičkami prstů se poskuste sáhnout na zem." Thomayer's distance test is considered negative (normal), if the distance between the patient's fingertips and the floor is not more than 10 cm. A total loss of unfolding in the lumbar spine develops in ankylosing spondylitis. This test may be positive also in coxarthrosis.

Schober's distance test measures the extent of lumbar unfolding. In upright patient marked from the center of Michaeli's route 10 cm proximally and ask the patient to bend forward again and measure the distance between these two points again. Normally the distance should be **at least 4 cm longer** than while standing upright. If the distance is less than 3.5 cm it means a disturbance in lumbar unfolding.

Stibor's distance test measures the size of a combined lumbar and thoracic arching. Measure the distance between the center of Michaeli-

li's route do the C₇ vertebra. In a forward bend, the original distance between these two points should exceed 6 cm.

Thoracic motion is the measurement of breathing excursions and it is very important parameter. Measure the thoracic circumference – in men at the level of the nipples and in women under the breasts – both at maximum inspiration and maximum expiration, the minimum difference should be 4 cm.

Chin – sternum test – ask the patient to lower the chin to the sternum: “Prosím, předkloňte hlavu a dejte ji co nejvíce na prsa!” Under normal conditions it is feasible. When the patient is not able to perform this, measure the distance between chin and the sternum during the cervical flexion.

Forestier test measures dorsal flexion of the cervical spine and partly also of the thoracic spine. Ask the patient to stand with the back and heels against the wall, then ask to dorsiflex the head and touch the wall: “Prosím postavte se zády a patami ke stěně a zakloňte hlavu tak, aby se dotkla stěny!” If dorsiflexion of the cervical spine is limited, a distance between the wall and occiput persists – measure this distance!

Examine the lateral motion of the patient's spine. Ask the patient to perform **lateroflexion**: “Prosím, ukloňte se do stran – nalevo, napravo!” With the extended arms and fingers the patient slides caudal. Minimum sliding distance should be 20 cm.

Lassegue's maneuver in a supine patient flex the lower limb at the hip joint with the knee continuously extended; ask the patient to report the start of pain in the elevated limb: “Prosím, řekněte mi, kdy Vás začne bolet končetina, kterou Vám budu teď zvedat.” Measure the angle above the examining bed at which the patient reports the beginning of pain. This maneuver is positive due to lumbosacral syndrome.

[3.]

EXAMPLE OF A NORMAL PHYSICAL EXAMINATION

The patient a 42-year old man – is fully conscious, responds adequately, is oriented in name, time and space. The patient has normostenic habitus, has adequate nutritional status and hydration. Patient's position is active, gait is normal without any pathological muscle movements.

Vital signs: Weight 75 kg height 172 cm BMI 25.4 kg/m²

Waist circumference 89 cm

Axillar temperature 36.4 °C

Blood pressure 138/78, 134/78

Heart rate 72/min regular

Respiration rate 14 p.m.

The skin is warm and dry, turgor is adequate, colour is normal. There is no jaundice, cyanosis, rash, purpura, unusual pigmentation or oedema noted. Lymph nodes: there are no cervical, supraclavicular, axillary and inguinal adenopathy, small loose lymph nodes in the inguinal region are presented.

Head is without any alterations of size and shape – normocephaly, percussion is painless, no lesions noted. The palpation of the trigeminal nerve branches is painless. Inervation of facial nerve is normal.

Eyes: Bulbi are in the intermediate position, without any strabismus or nystagmus. Sclera is white, palpebral conjunctiva is pinkish red and scleral conjunctiva is clear. Pupils are equal, circular, symmetrical and isocoric, reactive to light and accommodation.

Ears are normal in appearance. Auditory canal appears clear, without any discharge.

Nose is normal, without any discharge.

Mouth and throat: lips are without cyanosis or pallor. Bucal mucosa is normal in appearance. Teeth appear to be in good condition.

Tongue is stuck out in the midline, is pink and moist with only a slight white fur on the dorsum, the papillae are seen.

Pharyngeal mucosa is pink and does not reveal any lesions, exudates, erythema or evidence of inflammation.

Neck: full range of motion is present. There is no evidence of jugular venous distension or lymphadenopathy. Carotid pulses are equal bilaterally, without any bruits. Thyroid gland is normal in size; its palpation does not reveal any nodules or masses.

Chest: Thorax is symmetrical. Full expansion is noted bilaterally. **Lung** fields are resonant throughout. Breath sounds are normal – clear vesicular breathing. There are no wheezes or crackles. **Heart** – palpation reveals no heaves or trills. The point of maximum impulse is medial to the midclavicular line, the fifth intercostal space. Auscultation reveals the first and second sound of normal intensity. There are no added heart sounds or murmurs. Heart rate is approximately 72 beats per min. and rhythm is regular.

Abdomen: is of normal size and contour. There are no vein dilatations, skin lesions or surgical scars noted. Percussion reveals a tympanic resonance without any dullness. Palpation reveals no abdominal tenderness, guarding, or masses. Normal intestinal peristalsis appeared by auscultation.

The liver is not felt below the right costal margin in the right mid-clavicular line, but is palpable medially from this line; it is firm and smooth. The liver percusses to approximately 8–10 cm in total span.

The spleen is not palpable.

The kidneys are not palpable. Suprapubic region is normal by percussion and palpation. Tapottement is painless bilaterally.

Inguinal area is normal, there is no lymphadenopathy noted in inguinal area. Femoral arteries are palpable equal bilaterally. Auscultation reveals no femoral bruits.

Rectal examination: rectal examination reveals no external anal lesions. Sphincter tone is normal. There are no internal or external hemorrhoids. Rectal mucosa appears normal, and there are no nodules or masses present. Stool is brown and negative for occult blood.

Extremities: there is no clubbing, cyanosis or edema. Brachial, radial, popliteal, dorsalis pedis, and posterior tibialis pulses are palpable and equal bilaterally.

Musculoskeletal exam reveals no joint deformities and full range of motion. There is no bone, joint, or muscle tenderness noted.

Back: spinal curvatures are normal; percussion of spine is painless; there are no paravertebral contractures, spine motion is without any limits.