

Blood Sampling

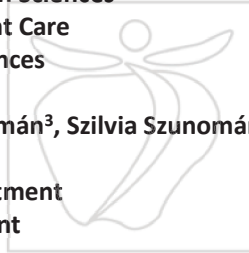
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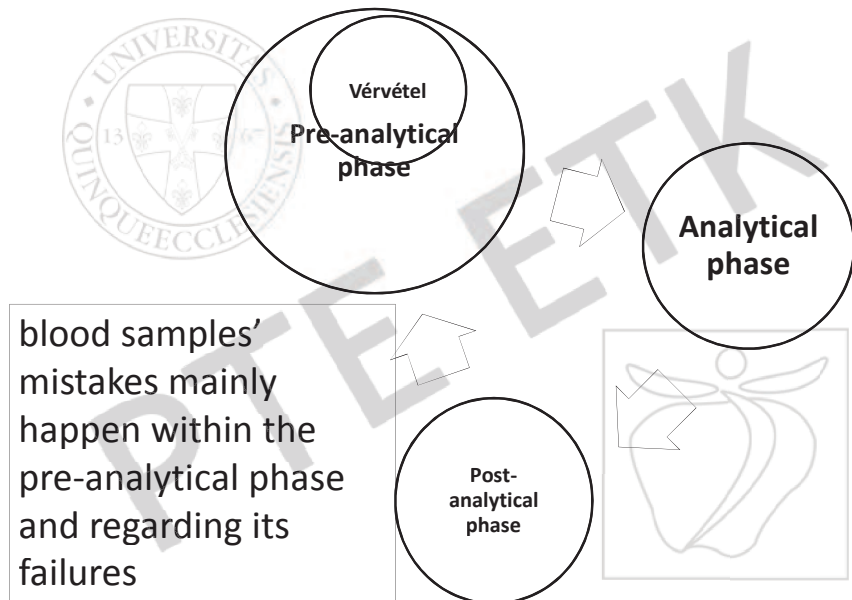
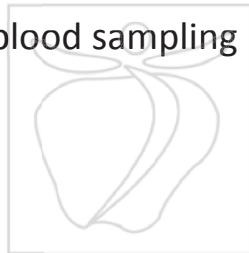
Taking blood from veins and arteries

- most common nursing intervention
- clinical chemical
 - electrolyte (Na, K, Cl)
 - osmolality
 - enzyme (LDH, amiláz, lipáz)
 - protein (albumin, kreatinin)
 - lipid (triglicerid, koleszterin)
 - acid-base balance
 - carbohydrates (glucose)
 - ...
- endocrinological
- haematological
 - hematocrit, haemoglobin, trombocytá
- coagulation
- microbiological
- parasitological



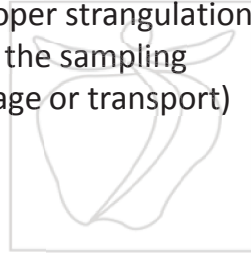
Taking blood from veins and arteries

- pre-analytical phase
 - analytical phase
 - post-analytical phase
-
- taking case history before the blood sampling
 - reference ranges
 - prepare the patient
 - time of the sampling



Pre-analytical phases

- incomplete anamnesis/medical history
- incorrect documentation to order the blood sampling
- incorrect order
- incorrect preparation of the patient
- incorrect blood sampling (e.g. improper strangulation, technique, sampling tube, order of the sampling tubes, wrong timing, improper storage or transport)



Presumable causes of the wrong laboratory analysis' results

- Age
- Day or night
- Menstruate period
- Climate
- Temperature
- Weight
- Geographical location
- Posture
- Hidration
- Eating
- Physical activity
- Drugs/Medicaments
- Stimulations
- Stress
- Diagnostical examinations and interventions



Taking blood from veins and arteries

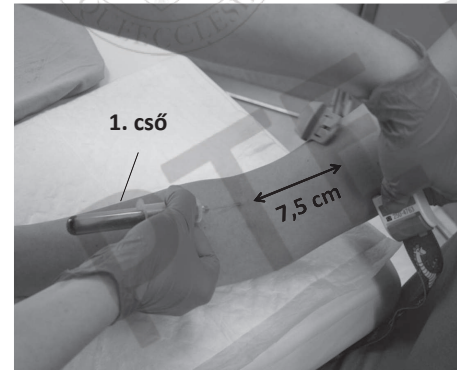
- sampling needles – closed and opened systems
- tourniquet – no longer than 1 min.
- blood culture bottles
 - anaerob
 - aerob
 - mycosis
 - for pediatric patients
- specimen tubes



Colour of the cap	Additional substance	Application
yellow	gel separator	- clinical, chemical, serology
red	without gel and additional substance	- Native tube - Biochemistry - Serology
purple	K2-EDTA, Na2-EDTA	- Complete blood count (CBC) - Hematocrit - Haemoglobin - Ammonium (storage: on ice) - Not used for: ion, Ca ²⁺ - and Mg ²⁺ -dependent enzymes (amylase, alcalical phosphatase) - PCR examinations
blue	Na-citrate, theophyllin, adenosin, dipyridamol	- Haemostaseologia (coagulation) - Not used for: haematological és clinical

green	Li-heparin	<ul style="list-style-type: none"> - Acid-base parametera - Blood-gas-analysis - Osmoticus fragilitas - Chromosoma-examinations - Histocompatibility tests - Ammonia (on ice) - Not used for: litium determination
green	NH4-heparin	<ul style="list-style-type: none"> - Acid-base parametera - Not used for: Na₂- és NH₄ determination
gray	Na-fluorid → against glycolisis, EDTA	<ul style="list-style-type: none"> - Serum glucose-conc. - Serum lactate-conc. (on ice) - Not used for: enzymactivity tests, ions, Ca- és Mg-dependent enzym determination
black	Na-citrate	<ul style="list-style-type: none"> - We - Not used for: haematological and chemical examinations

The technique of the sampling using the tourniquet



its time should be as short as possible

the actual point of the puncture/sampling should be at least 7,5 cm far from the tourniquet

The technique of the sampling

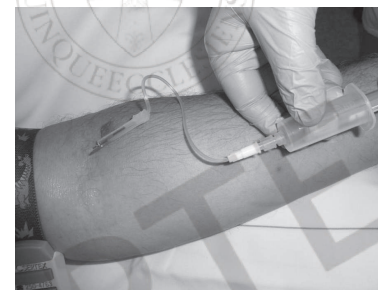
avoid from the powerful aspiration of the blood

- during the sampling it is not good to pump the fist
- the increase of the venous pressure cause haemoconcentration
- the blood's flow accelerates through the sampling needle what cause haemolysis



The technique of the sampling

Wrong sampling technique using winged needle



Failed to fill in the stem before sampling – less blood and much additional substances (wrong ratio)

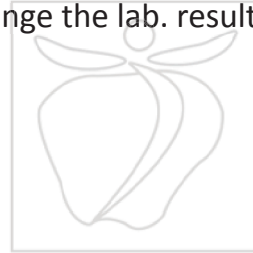


Using a winged needle without hub – needlestick injuries

The technique of the sampling order of the sampling tubes

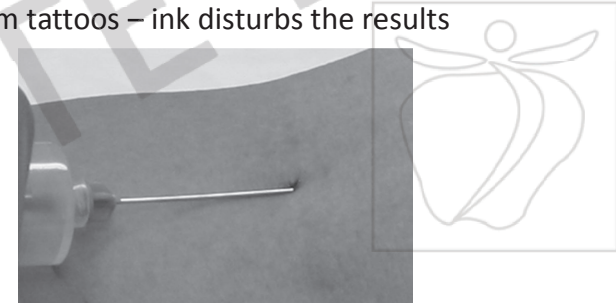


It is important to keep the order because the additional substances could be transferred to another tube and change the lab. results



The technique of the sampling

- Do not shake the tubes - haemolysis
 - transport and handling of the tubes
- Avoid from sampling from i.v. catheter or from the proximal part of this vein
 - the sample contaminate with the infusion solution/medicaments, sample can be diluted
- Too much disinfection solution can cause haemolysis
- Avoid from tattoos – ink disturbs the results



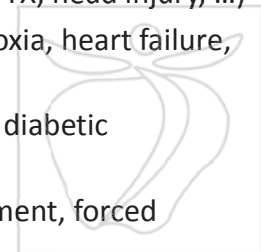
Taking blood from veins

- labelling the specimen tubes
- storage of the specimen tube
- ordering document
- the rules of safety work
- procedure of the sampling
- movement of the tubes (coagulation tubes 4 times, EDTA and homocistein tubes 8-10 times)



Taking blood from arteries – blood gas analysis

- pH, acid-base balance, blood gas parameters (CO_2 , O_2) can be determined
- acid base balance disturbances' risks factors
 - respiratoric acidosis (COPD, HTX, PTX, head injury, ...)
 - respiratoric alkalosis (anxiety, hypoxia, heart failure, ...)
 - metabolic acidosis (kidney failure, diabetic chetoacidosis, ...)
 - metabolic alkalosis (diuretic treatment, forced tansfusion ...)



Taking blood from arteries – blood gas analysis

- sites of the sampling (arterial, vein, capillary)
- contraindications
- Allen test
- apply O₂ th. at least for 15 min.
- waiting 20 min. after inhalation th.
- importance of FiO₂
- complications



from capillary

II–IV. finger (lateral part)
ear lobe, heel

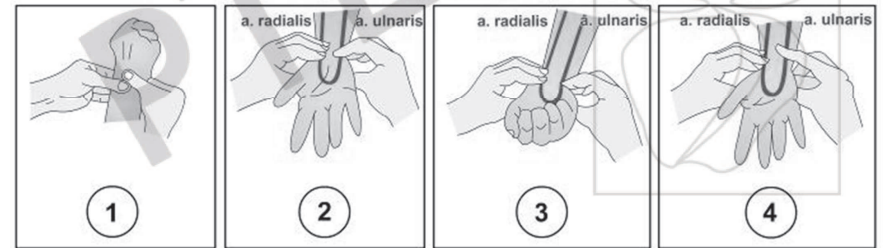
from artery

a. radialis, a. femoralis

from vein

CVC, periferial

ALLEN TESZT



ECG placement

Not within this course:

- anatomical and physiological basics
- electrophysiological basics



Leads

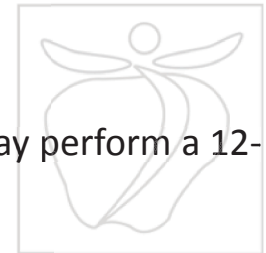
unipolar leads

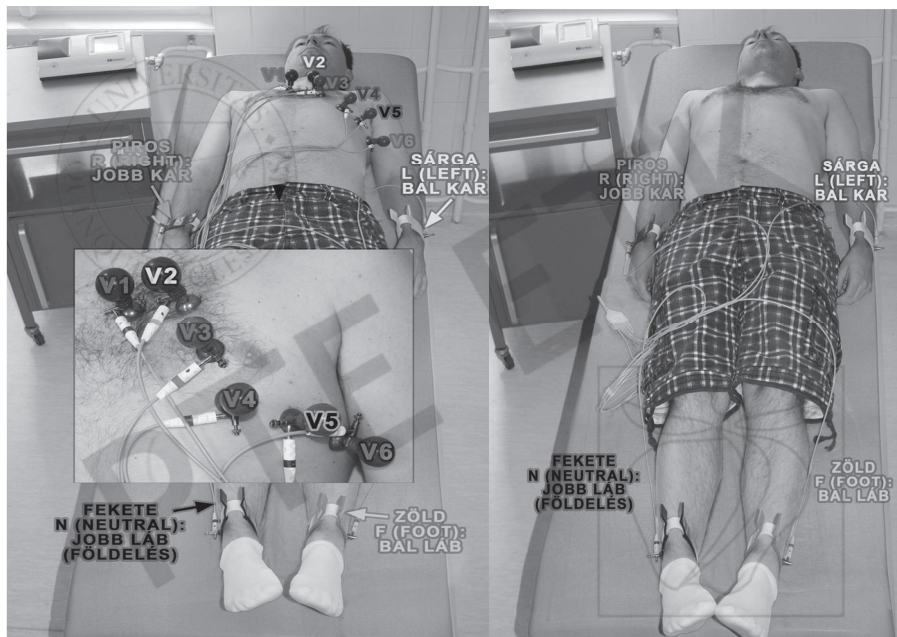
- limb leads (aVR, aVL, aVF)
- chest leads (V1-6)

bipolar leads

- limb leads (I. II. III.)

With the use of this leads we may perform a 12-
leads ECG





Placement of the leads

limb leads:

- black – right foot
- red – right arm
- yellow – left arm
- green – left foot



Placement of the leads

chest leads

- V1 – right side, IV. intercostal space, edge of the sternum
- V2 – left side, IV. intercostal space, edge of the sternum
- V3 – left side, midpoint between V2 and V4
- V4 – left side, V. intercostal space, medioclavicular line
- V5 – left side, V. intercostal space, anterior axillary line
- V6 – left side, V. intercostal space, medial axillary line

