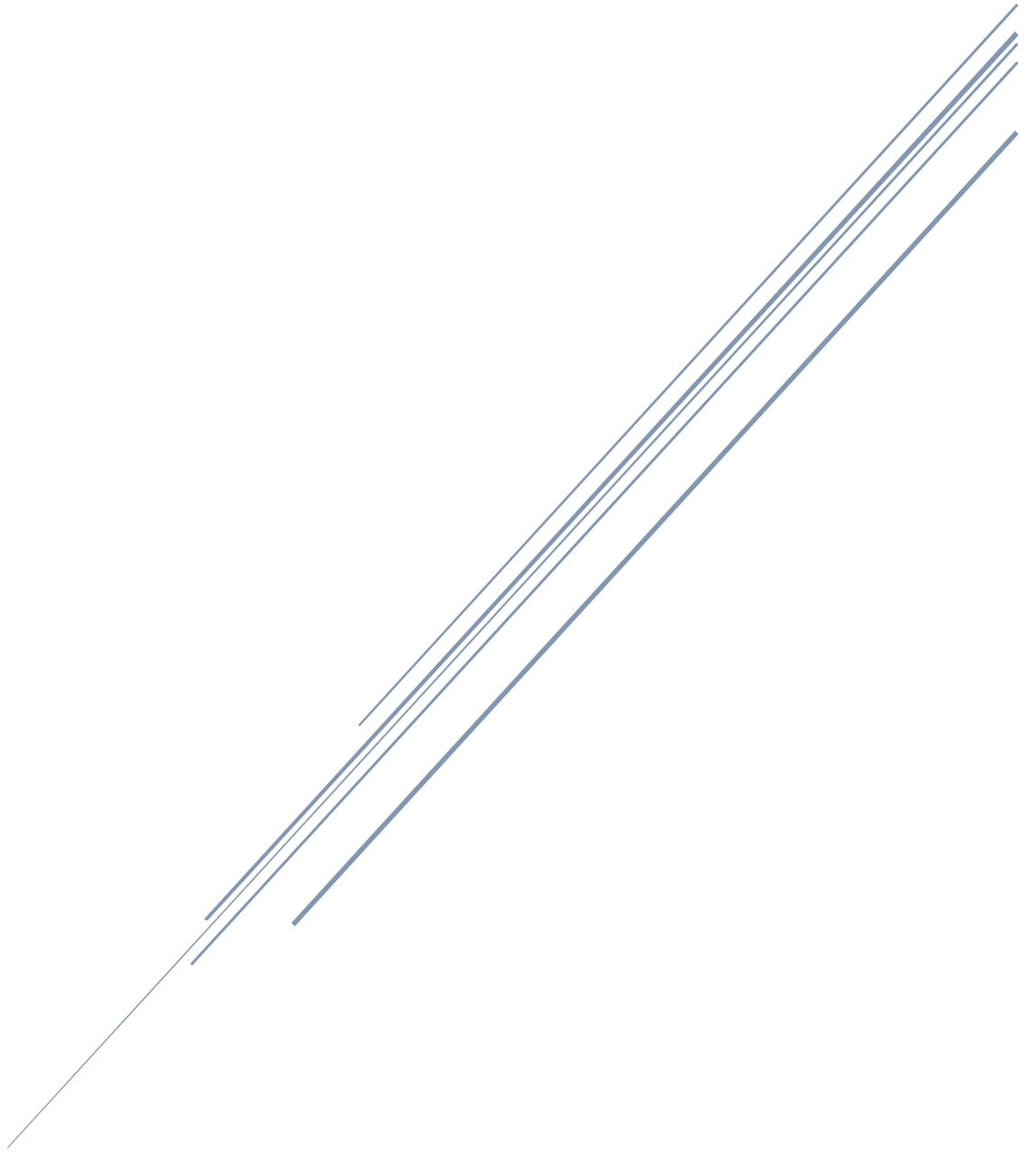


PROFESSIONAL SKILLS

ISTANBUL MEDIPOL UNIVERSITY INTERNATIONAL SCHOOL
OF MEDICINE



The students are going to attend the sessions programmed for the each of the skill. The attendance is mandatory. At the end of the committee a practical exam is going to be done and the performance will be graded over 100 points and 25% will affect the final committee grade.

The list and the checklist of the skills to be gained in this committee are given below:

1. Venipuncture
2. Peripheral blood smear
3. Performing a 12-lead ECG

VENIPUNCTURE

The equipment

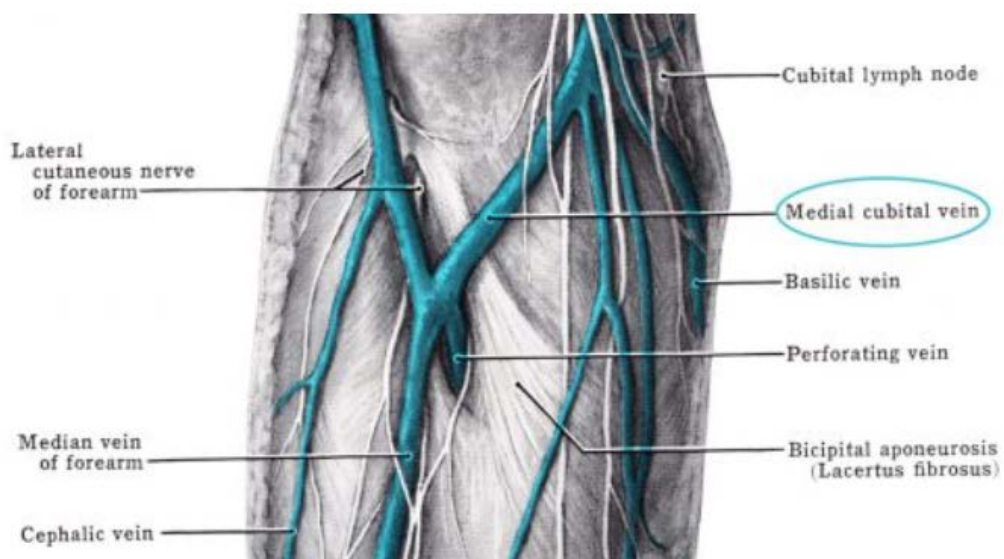
Collect all equipment needed for the procedure and place it within reach on a tray or trolley, ensuring that all the items are clearly visible:

- Clean procedure tray
- Non-sterile gloves
- Tourniquet
- Blood sampling device (e.g. butterfly needle and barrel): the size should be appropriate to the vein and sample requirements.
- Blood specimen bottles
- Sharps container
- Alcohol swab (2% chlorhexidine gluconate in 70% isopropyl)
- Gauze or cotton wool
- Sterile plaster
- Laboratory forms, labels, and transportation bag



1. Wash your hands using alcohol gel. If your hands are visibly soiled, wash them with soap and water.
2. Don PPE if appropriate.
3. Introduce yourself to the patient including your name and role.
4. Confirm the patient's name and date of birth.

5. Briefly explain what the procedure will involve using patient-friendly language: "Today I need to take a blood sample, which involves inserting a small needle into your vein. You may briefly experience a sharp scratch as the needle is inserted."
6. Gain consent to proceed with venipuncture.
7. Check if the patient has any allergies (e.g. latex).
8. Adequately expose the patient's arms for the procedure.
9. Position the patient so that they are sitting comfortably. If a bed is available, the patient can lay down for the procedure (this is sometimes preferable, particularly if the patient is prone to vasovagal syncope).
10. Ask the patient if they have any pain before continuing with the clinical procedure.
11. Inspect the patient's arm for an appropriate venipuncture site:
12. The median cubital vein in the antecubital fossa is commonly used for venipuncture.
13. Areas of broken, bruised, or erythematous skin should be avoided.
14. Areas in which two veins join should be avoided where possible, as valves are often present.
15. Position the patient's arm in a comfortable extended position that provides adequate access to the planned venipuncture site.
16. Apply the tourniquet approximately 4-5 finger-widths above the planned venipuncture site.
17. Palpate the vein you have identified to assess if it is suitable:
18. Tapping the vein and asking the patient to repeatedly clench their fist can make the vein easier to visualize and palpate.
19. An ideal vein feels 'springy'. A vein that feels hard is likely sclerosed, thrombosed or phlebitis (inflamed) and should be avoided.
20. Once you have identified a suitable vein you may need to temporarily release the tourniquet, as it should not be left on for more than 1-2 minutes at a time.
21. Wash your hands again.
22. Don gloves (gloves don't need to be worn for cleaning the site, but they should always be donned prior to performing venipuncture itself).
23. Clean the site with an alcohol swab for 30 seconds and then allow to dry completely for 30 seconds:
24. You should start cleaning from the center of the venipuncture site and work outwards to cover an area of 5cm or more.
25. DO NOT touch the cleaned site afterwards at any point, otherwise, the cleaning procedure will need to be repeated prior to venipuncture.



26. Re-apply the tourniquet if removed previously.
27. Attach the needle to the barrel (some blood collection systems come pre-assembled, such as the butterfly needle with barrel shown in the video).
28. Unsheathe the needle.
29. Anchor the vein from below with your non-dominant hand by gently pulling on the skin distal to the insertion site.
30. Warn the patient that they will experience a sharp scratch.
31. Insert the needle through the skin at a 30-degree angle or less, with the bevel facing upwards. You should see flashback into the needle's chamber and feel a sudden decrease in resistance as the needle enters the vein.
32. Advance the needle a further 1-2 mm into the vein after flashback is noted to ensure you are within the lumen.
33. Lower and anchor the needle to the patient's skin using the wings of the butterfly needle.
34. Attach each blood bottle, in the correct order of draw, to the barrel and allow them to fill to the appropriate level. Make sure to continue to anchor the needle to the skin as you remove each bottle from the barrel by gently pulling and twisting. If no blood begins to flow into the bottles, try slightly withdrawing or adjusting the angle of the needle.
35. Release the tourniquet.
36. Withdraw the needle and then apply gentle pressure to the site with some gauze or cotton wool.
37. Ask the patient to hold the gauze or cotton wool in place whilst you dispose of the needle into a sharps container.
38. Apply a dressing to the patient's arm (e.g., cotton wool, gauze, plaster).
39. Invert each of the blood bottles the suggested number of times based on its color.
40. Discard the used equipment into the appropriate clinical waste bin.

Number of times to invert blood bottles

Inversion aids the mixing of a blood sample with the blood bottle's additives. The recommended number of times a blood bottle should be inverted differs depending on the blood bottle colour:

- Light blue: 3-4 inversions
- Gold/yellow: 5-6 inversions
- Purple: 8-10 inversions
- Pink: 8-10 inversions
- Grey: 8-10 inversions

Blood tests and order of draw

Different blood tests require different types of blood bottles to be used. In addition, blood bottles need to be filled in a specific order to both reduce the chance of sample contamination and improve the accuracy of results.

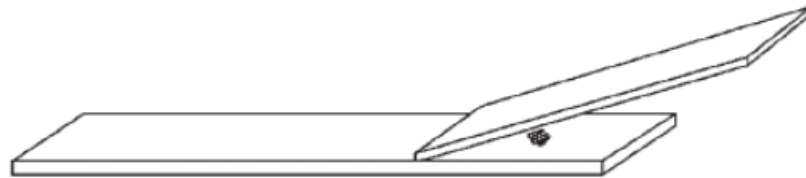
- Blood culture: these bottles should always be attached first, with the aerobic sample preceding the anaerobic one.
- Light blue: coagulation screen, INR, and D-dimer. *

- Gold/yellow: U&Es, CRP, LFTs, amylase, calcium, phosphate, magnesium, TFTs, lipid profile and troponins.
- Purple: FBC, blood film, ESR and HbA1c.
- Pink: group and save allowing for crossmatching.
- Grey: glucose and lactate.

*If your first bottle is light blue and you are using a butterfly needle you will likely need to use two of these blood bottles to obtain a full sample. This is because when you attach the first bottle it will draw in air from the tubing, resulting in a sample that is unable to fill with enough blood to reach the required level. To avoid this, you can initially attach a light blue blood bottle to remove the air (i.e. fill the tubing with blood), then detach this and fill a second blood bottle to the required level.

BLOOD SMEAR

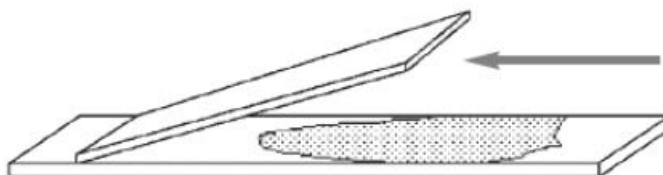
1. Place clean glass slide on a flat surface. Add one small drop of blood to one end.



2. Take another clean slide, and holding at an angle of about 45 deg, touch the blood with one end of the slide so the blood runs along the edge of the slide by capillary action. Push carefully along the length of the first slide to produce a thin smear of blood.



3. Make 2 smears, allow to air dry, and label clearly. Once dried place in the provided slide transport containers.



Giemsa staining

Preparation of the Giemsa Stain Stock solution (500ml)

1. Into 250ml of methanol, add 3.8g of Giemsa powder and dissolve.
2. Heat the solution up to ~60oC

3. Then, add 250ml of glycerin to the solution, slowly.
4. Filter the solution and leave it to stand for about 1-2 months before use.

Preparation of Working solution

Add 10ml of stock solution to 80ml of distilled water and 10ml of methanol

Staining procedure: Thin Film staining

1. On a clean dry microscopic glass slide, make a thin film of the specimen (blood) and leave to air dry.
2. Dip the smear (2-3 dips) into pure methanol for fixation of the smear, leave to air dry for 30seconds
3. Flood the slide with 5% Giemsa stain solution for 20-30 minutes.
4. Flush with tap water and leave to dry

NOTE: In case of emergencies, leave the Giemsa stain solution for 5-10 minutes

PERFORMING A 12-LEAD ECG

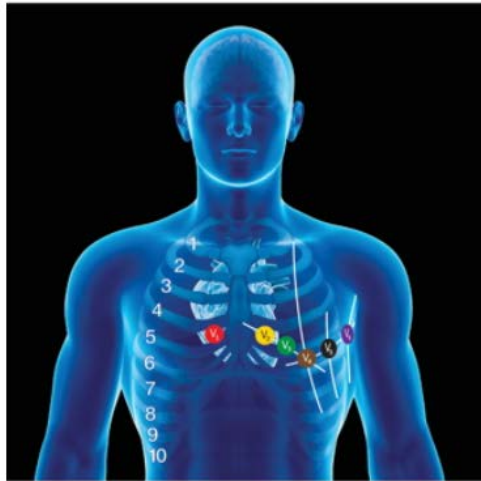
Electrocardiography (ECG or EKG) studies the heart's electrical activity produced during myocardial contraction and relaxation, usually recorded by electrodes on the skin. ECG/EKG signals are recorded to examine heart rate, heart rate variability, analysis of the waveform morphology, arrhythmia, and other similar functions.

But it can be a real challenge to record clean signals, especially when performing a 12-lead ECG. There are numerous elements to get right: the data recording equipment needs to be set up correctly, the subject needs to be comfortable, and you need to position the surface electrodes on the subject's torso and limbs precisely to get results that you can interpret accurately.

Prepare the skin

Before placing your electrodes, it is very important to prepare the subject's skin by wiping the chest area thoroughly with skin cleansing (alcohol) swabs. This removes any oil that may be on the skin and which can cause drift in your ECG/EKG signals.

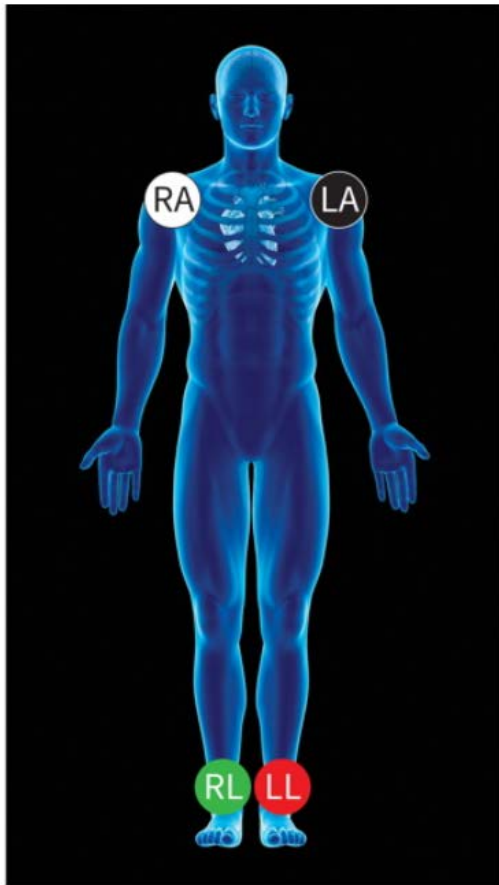
Once the skin is clean, find and mark the placements for the electrodes.



- **V₁** 4th intercostal space to the right of the sternum
- **V₂** 4th intercostal space to the left of the sternum
- **V₃** Directly between the leads V₂ and V₄
- **V₄** 5th intercostal space at midclavicular line
- **V₅** Level with V₄ at left anterior axillary line
- **V₆** Level with V₅ at midaxillary line
(directly under the midpoint of the armpit)

1. First, identify V1 and V2
2. Find the correct placement for the chest leads, starting with V1 and V2.
3. It is especially important to correctly place V1 and V2 because the remaining chest leads are placed in relation to these.
4. To determine the placement of V1 and V2, feel to identify the top of your subject's sternum. Approximately 4 centimeters below this, there is a ridge. This identifies the second intercostal space. Feeling down, you will come across the third and fourth intercostal spaces. Use a skin-safe marker to mark the fourth intercostal space as V2.
5. Mark V1 in the mirror position on the opposite side of the chest.
6. Next, find and mark V3 – V6
7. You can do this by identifying V4 and V6, then filling in V3 and V5 as outlined below...
8. V4 can be found one intercostal space lower than V2, in line with the middle of the clavicle. Mark V4 with your skin safe marker.
9. Next, track along the torso to the subject's left to find V6 at mid auxiliary on the same level as V4. Mark V6.
10. V5 can be marked at midway between V4 and V6.
11. Likewise, mark V3 midway between V2 and V4.
12. You should now have 6 marks for V1 to V6.

13. Apply electrodes to the chest at V1 – V6
14. Apply your electrodes to your 6 marks!
15. Connect wires from V1 to V6 to the recording device
16. The 6 electrode wires can now be connected to your recording device. In this case, we are using AD Instruments' Octal Bio Amp and connect the wires to channels 1 through to 6.



Place limb leads on soft tissue surfaces rather than the bone according to this diagram:

⊙ RA Upper Right Arm

● LA Upper Left Arm

● RL Lower Right Leg

● LL Lower Left Leg

17. Apply lead 1 to the left arm. We suggest the front of the left shoulder in a place where there is little muscle or muscle movement, to avoid any EMG signal disturbance.
18. Next, apply lead 2 to the right arm. Again, the front of the shoulder is suggested here, in a place with little or no muscle or movement.
19. Then connect the left leg. Place the electrode slightly above the ankle. This electrode is the reference for all of the augmented leads.
20. Finally, apply the "common" on the right-hand side ankle. This connects to the ground input on your recording device (Octal Bio Amp).