



Practical physiology

Determination of the packed cell volume (p.c.v)

session 5

MSc. Doua'a S. Altaee

تقنيات الأشعة
المرحلة الأولى

Pcv

- When anti-coagulated blood is centrifuged in a tube the cell are packed in the lower end due to centrifugal force . This separates the cell from the plasma and give the percentage of the cell in blood . The PCV can be determined for a sample of blood obtained either from a vein (venipuncture) or capillaries (finger prick).
- The PCV or hematocrit is the ratio between of blood cell to volume of blood plasma . The normal values varies according to sex and species . It is higher in males than females (the range 40-52%) while in female (the range 35-47%) children (the range 36 – 44 %) .

Objective

1. To determine the normal values of P.C.V.
2. Help in diagnosis in which P.C.V. is decrease e.g. in anemia and hemodilution or when P.C.V. increase e.g. during erythrocytosis & homoconcentration .

The factors that affecting on P.C.V value

1. Age
2. Sex
3. Pregnancy : the PCV level decrease
4. Dehydration and burns: the PCV increase because the plasma level decrease
5. Smoking

Instrument

❖ **Venous blood**

1. Wintrobe tube
2. Pasteur pipette
3. Centrifuge

❖ **capillary blood**

1. Heparinized capillary tube
2. Micro – centrifuge
3. Clay

❖ **anticoagulant** (potassium oxalate crystals – for venous blood.
(EDTA also can be used)

Pcv of venous blood

- Venipuncture is performed to collect 5 ml. of blood which is transferred to a test tube containing a pinch of oxalate crystals mixture. The blood is mixed with anticoagulant by rolling the tube between the palms of both hands .
- Blood is taken in the pasteur pipette and introduced into Wintrobe tube up to the mark (10) without introducing air bubble . This is achieved by dipping the pipette to the bottom of the Wintrobe tube and drawing the tip upwards as the blood is ejected into the tube . The tube with blood is centrifuged at 3000 r.p.m for 15 min.



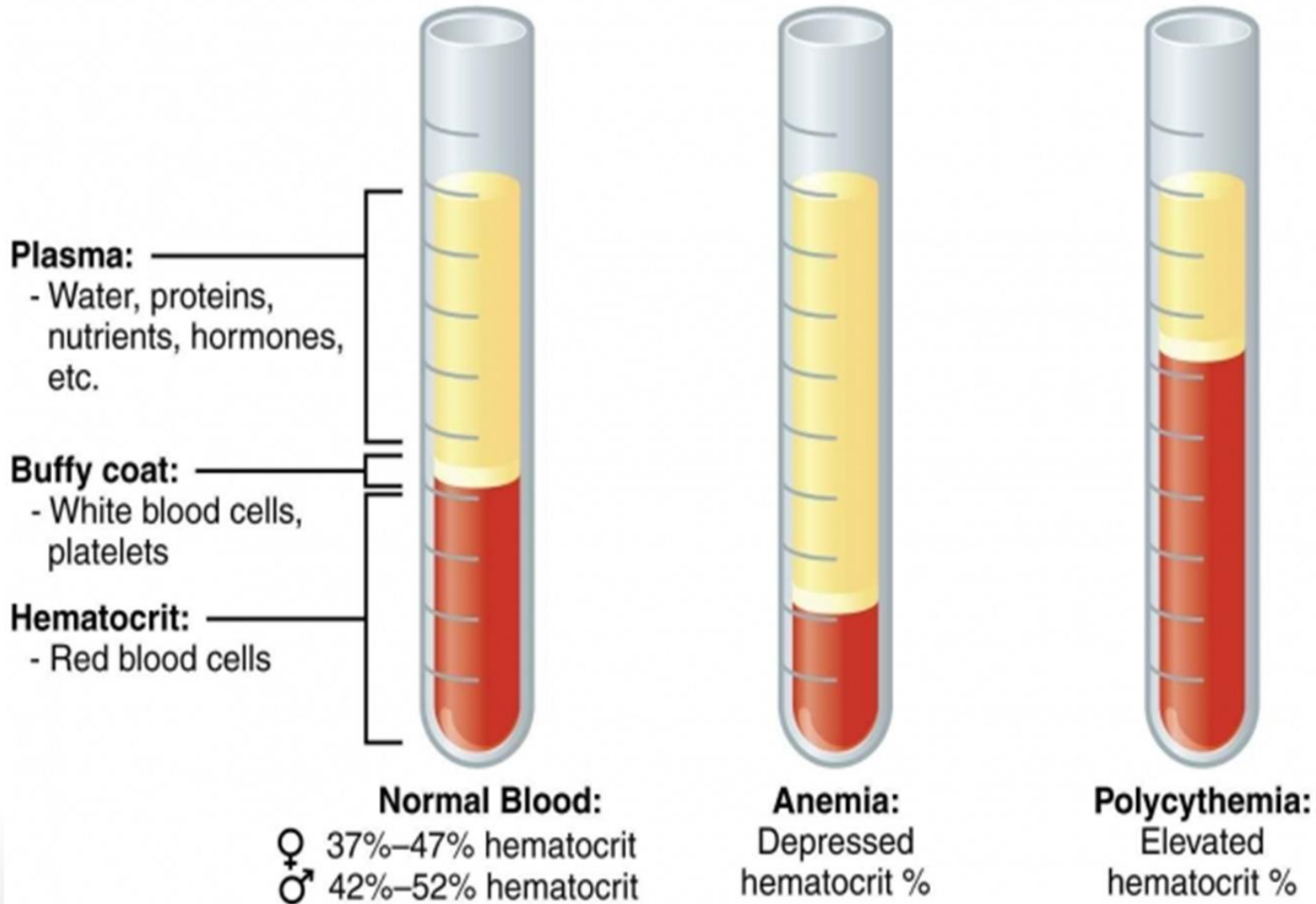
Capillary Centrifuge



Haematocrit Centrifuge



Wintrobe tube

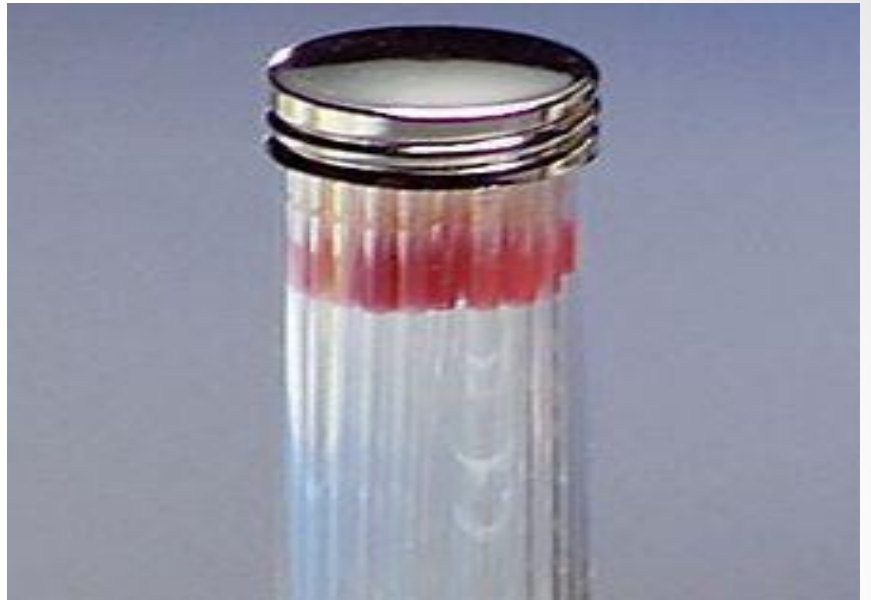


Pcv of capillary blood

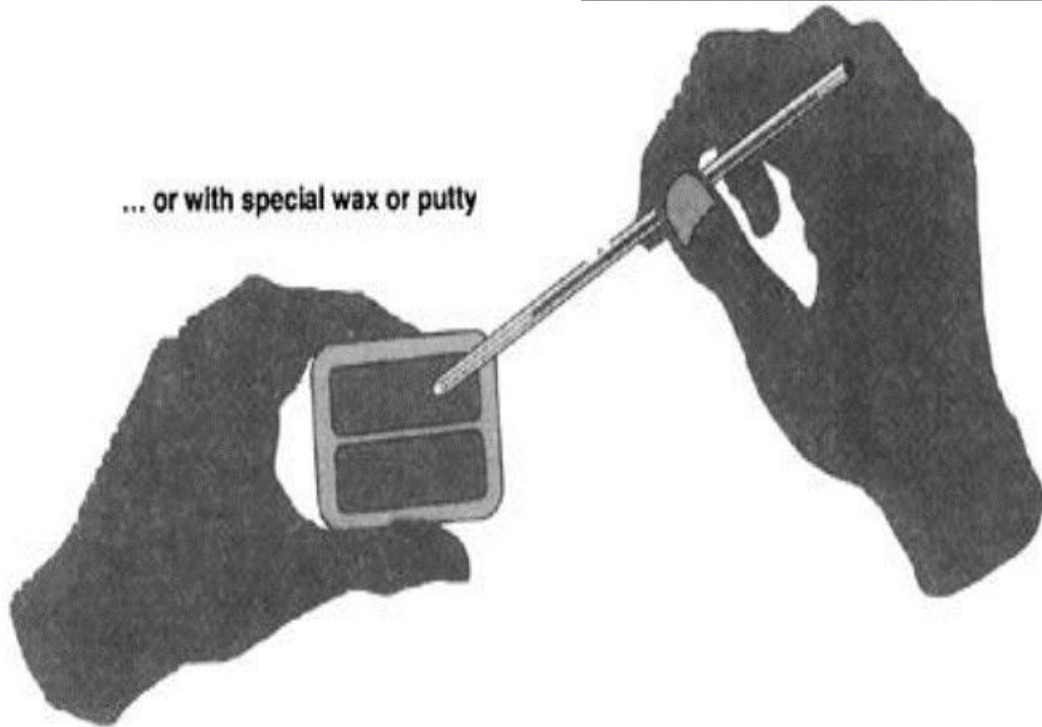
- Perform finger pick and collect blood into a heparinized glass capillary tube to about 75% of its length without any air bubble . Cover the end, through which blood was collected by a finger and hold the open end on the a source of heat (spirit lamp) in order to seal the tip without heating the blood. Once the tip is sealed keep the tube in a groove, the sealed end facing outwards in the micro centrifuge and note the number .

Pcv of capillary blood

- The centrifuge will be switched on when sufficient number of capillary tubes are loaded and centrifuged for five minutes . After centrifugation take your tube and read the percentage of packed cell with the help of the Micro – hematocrit reader (instruction for using the reader is found on the back of reader)



... or with special wax or putty

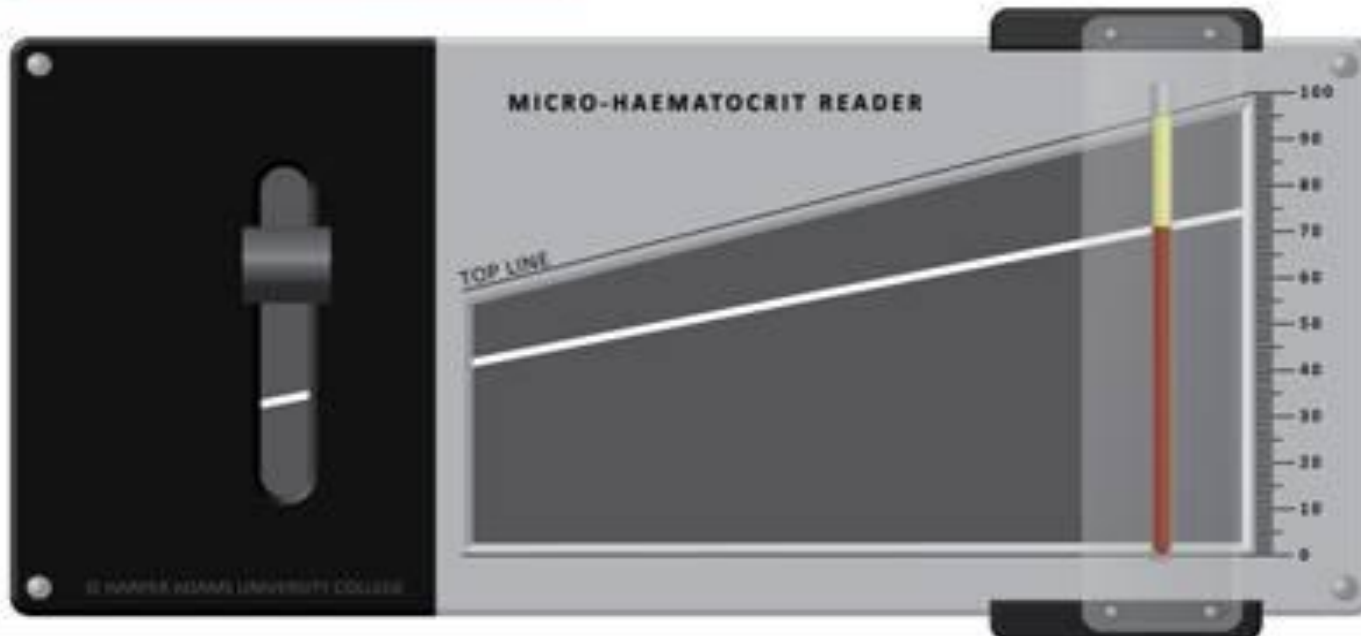


How to use the reader

How To Use The Reader:

- Drag and Drop a capillary tube from the right tray onto the reader's measurement plate.
- Drag the measurement plate horizontally to the position where the blood plasma level aligns with the black top line.
- Drag the vertical slider until the white line intersects the top level of the red blood cell pellet.
- The Ht/HCT/PCV can be read from the white line's position on the right scale.

Micro-Haematocrit Reader - Feedback:



يَا جِبَالُ أُوِّبِي مَعَهُ وَالطَّيْرَ وَالنَّائِلَةَ الْحَدِيدَ



THANK YOU