Packed Cell Volume (PCV) Or Hematocrit (HCT)

Lab -4-

by

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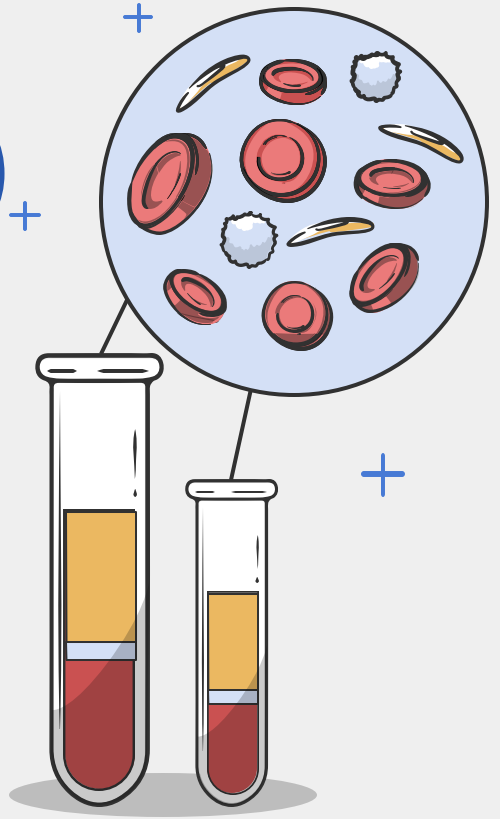
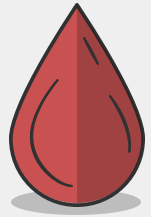


Introduction and principle

Anticoagulated capillary blood is centrifuged for maximum red blood cell packing. The space occupied by the red blood cells is measured and expressed as a **percentage** of the whole blood volume.

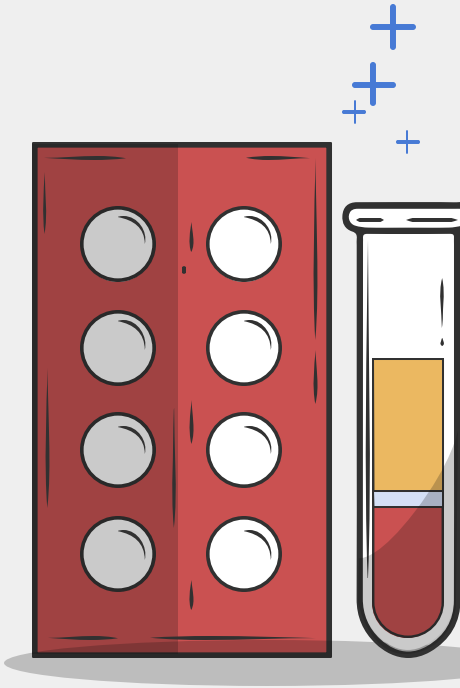
So PCV: is the volume of RBCs per 100 ml of whole blood.



A raised hematocrit reflects haemoconcentration. This may be relative due to **reduced plasma volume**, or **increased red blood cell mass:**

1. Reduced plasma volume - often result of dehydration e.g severe diarrhea and vomiting as in cholera due to loss of water in the stool.

2. Increased red cell mass - primary (polycythemia) or secondary e.g. chronic lung disease, smoking, altitude.

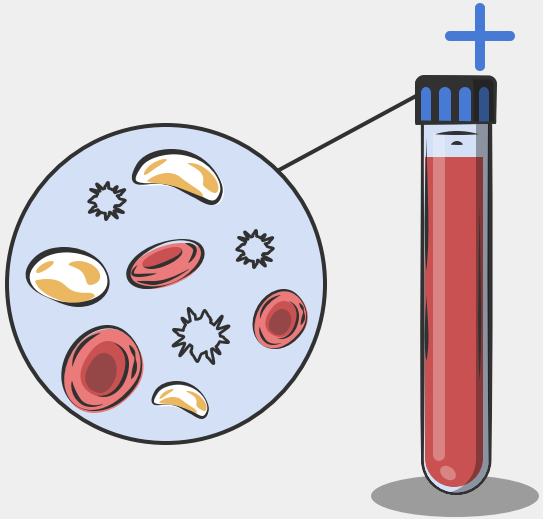


A low PCV

This may be relative due to **Increase in plasma volume**

Or Decrease in RBC

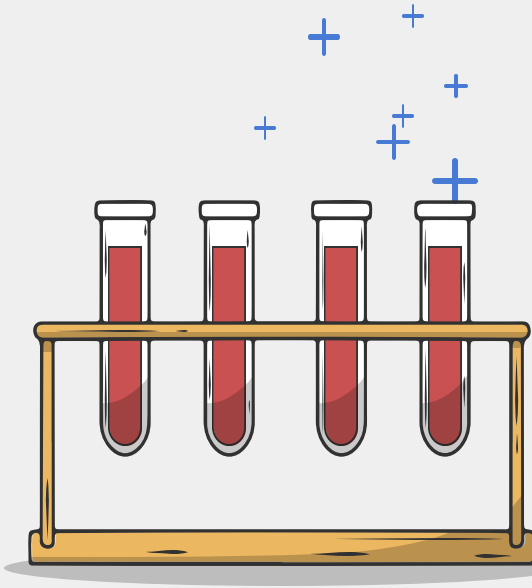
Ex: anemia, pregnancy, acute kidney & liver disease…..etc.



Normal range

Adult male: **40-54 %**

Adult female: **37-47 %**



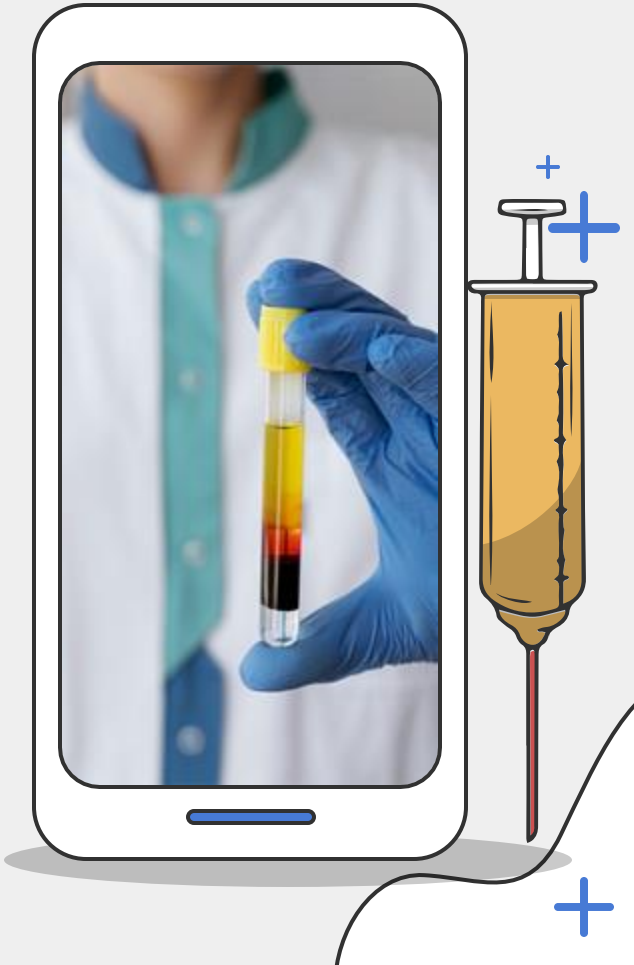
Notes:

True increased red cell mass can be assumed when the haematocrit is over **60% in males** and **56% in females**.

Individuals with a high haematocrit may be associated with an increase in thrombotic events and cardiovascular mortality.

Methods:

1. Microhaematocrit
2. Electronic cell counting



Microhaematocrit:

Materials and instruments

1. **Microhaematocrit tube (capillary tube)** 75mm in length and 1mm in diameter which contains heparin and show a red ring at the end of the tube.
2. **Microhaematocrit centrifuge device**.
3. **Plastic seal** to seal one end of microhaematocrit capillary tube.
4. **Microhaematocrit reader.**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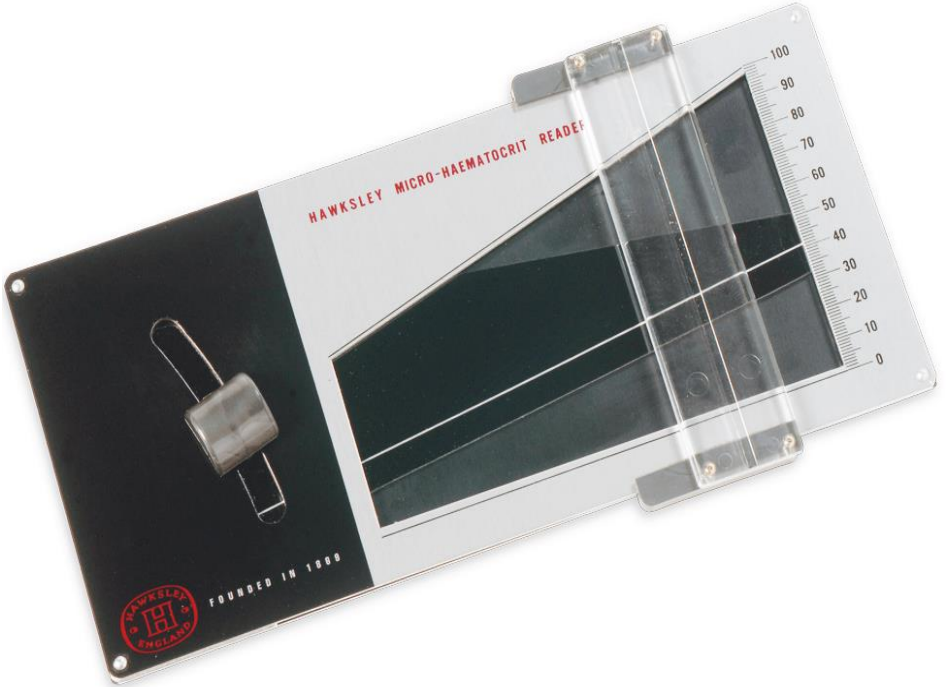
HAWKSLEY MICRO-HAEMATOCRIT READE
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FOUNDED IN 1860
HAWKSLEY
ENGLAND

Procedure:

1. Blood is drawn into the tubes by capillary phenomenon. By holding the tube in a horizontal manner and allow 2/3 to 3/4 to be filled with blood. Air bubbles denote poor technique but **do not affect the results of the test.**
2. Seal the dry end of the tube by plastic seal.
3. The sealed tube is then placed in the radial grooves of the Microhaematocrit centrifuge and centrifuge for 5 minutes.

4. When looking at a centrifuged haematocrit tube, you can see three distinct layers .A top layer of **clear slightly milky plasma**, a **thin buffy coat layer** (**consisting of WBC and platelets**) in the middle, and a **dark packed RBCs** layer in the bottom.

5. obtain the result using the microhaematocrit tube reading device adjust the movable line to touch the top of the RBCs in the tube


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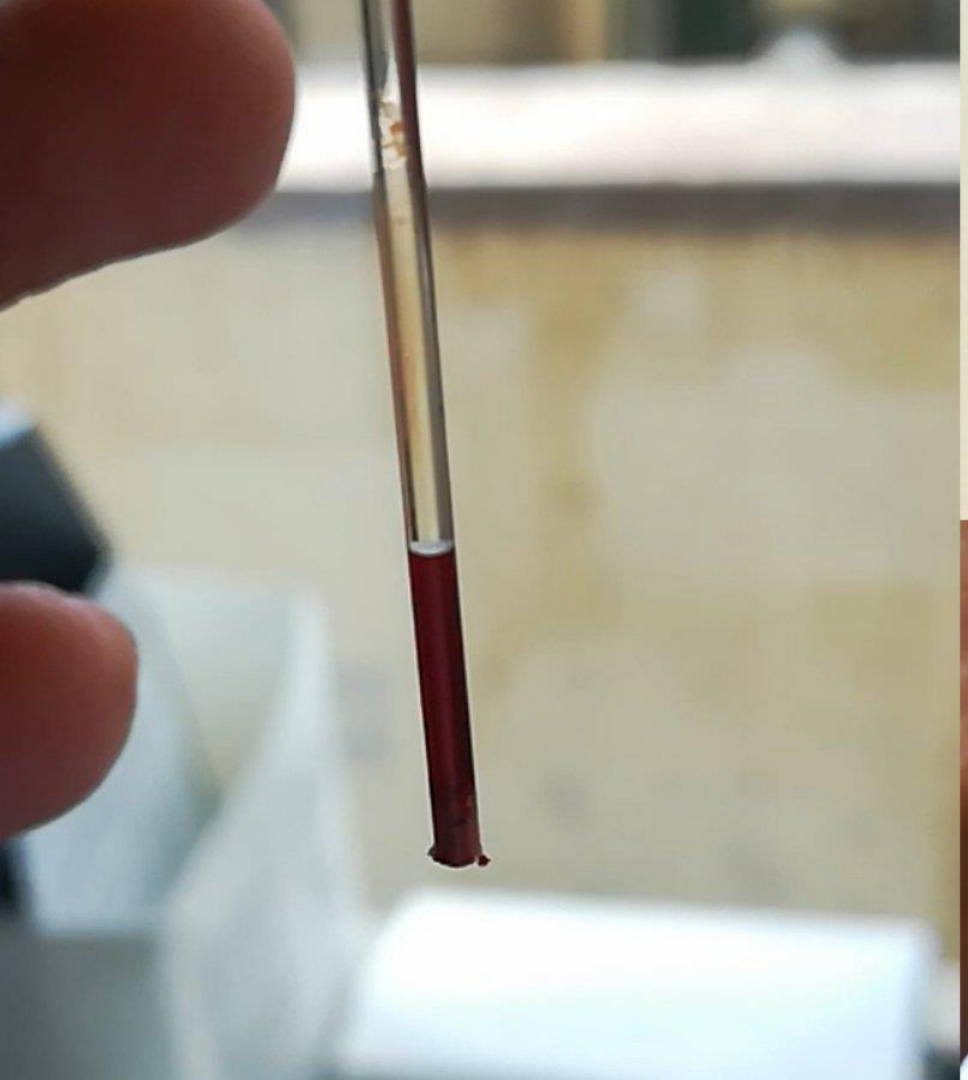

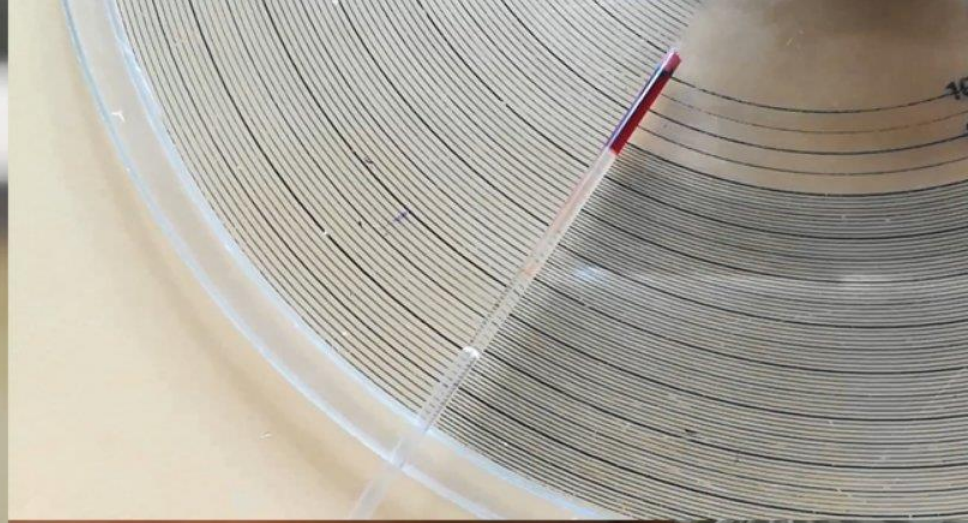


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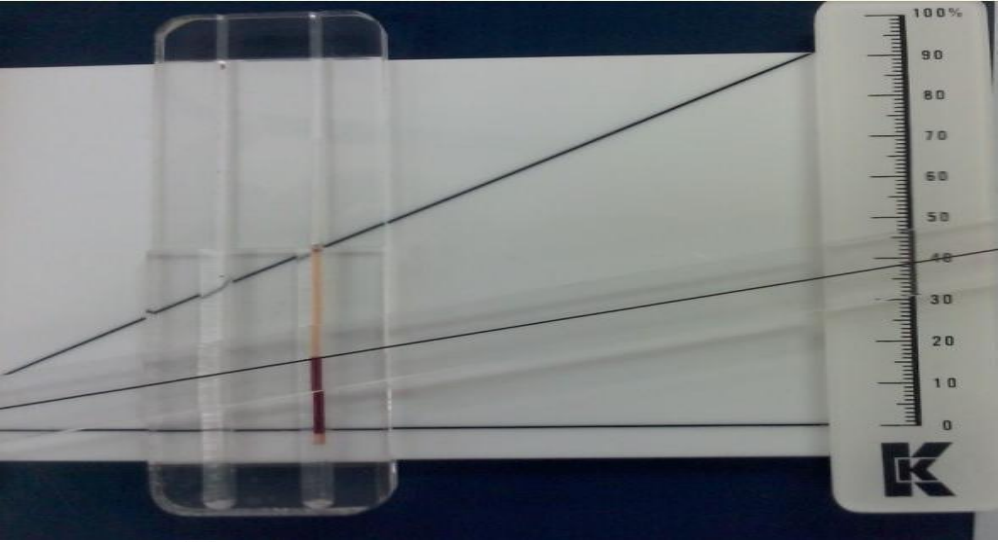

Determination of PCV by Microhaematocrit Method