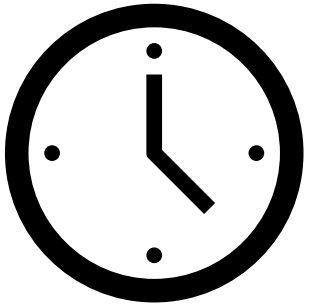






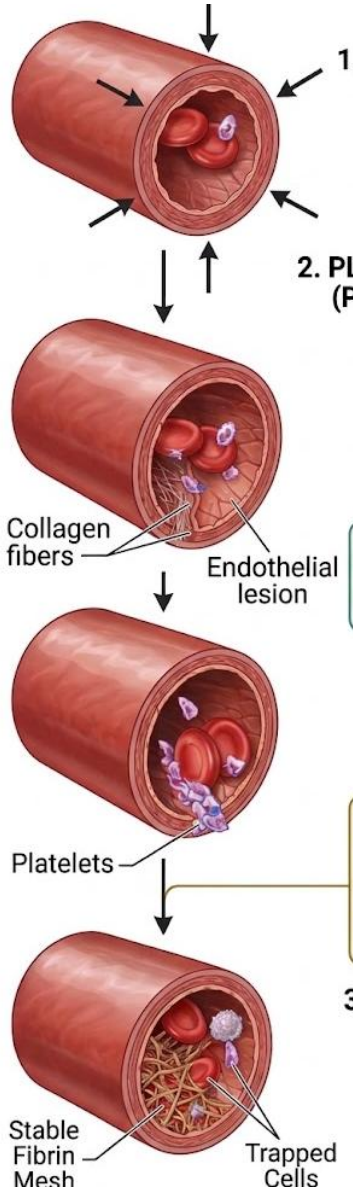
Physiology of the Blood and Lymphoreticular System

Lab (3) – Medical and Dental Students – 2026/2027

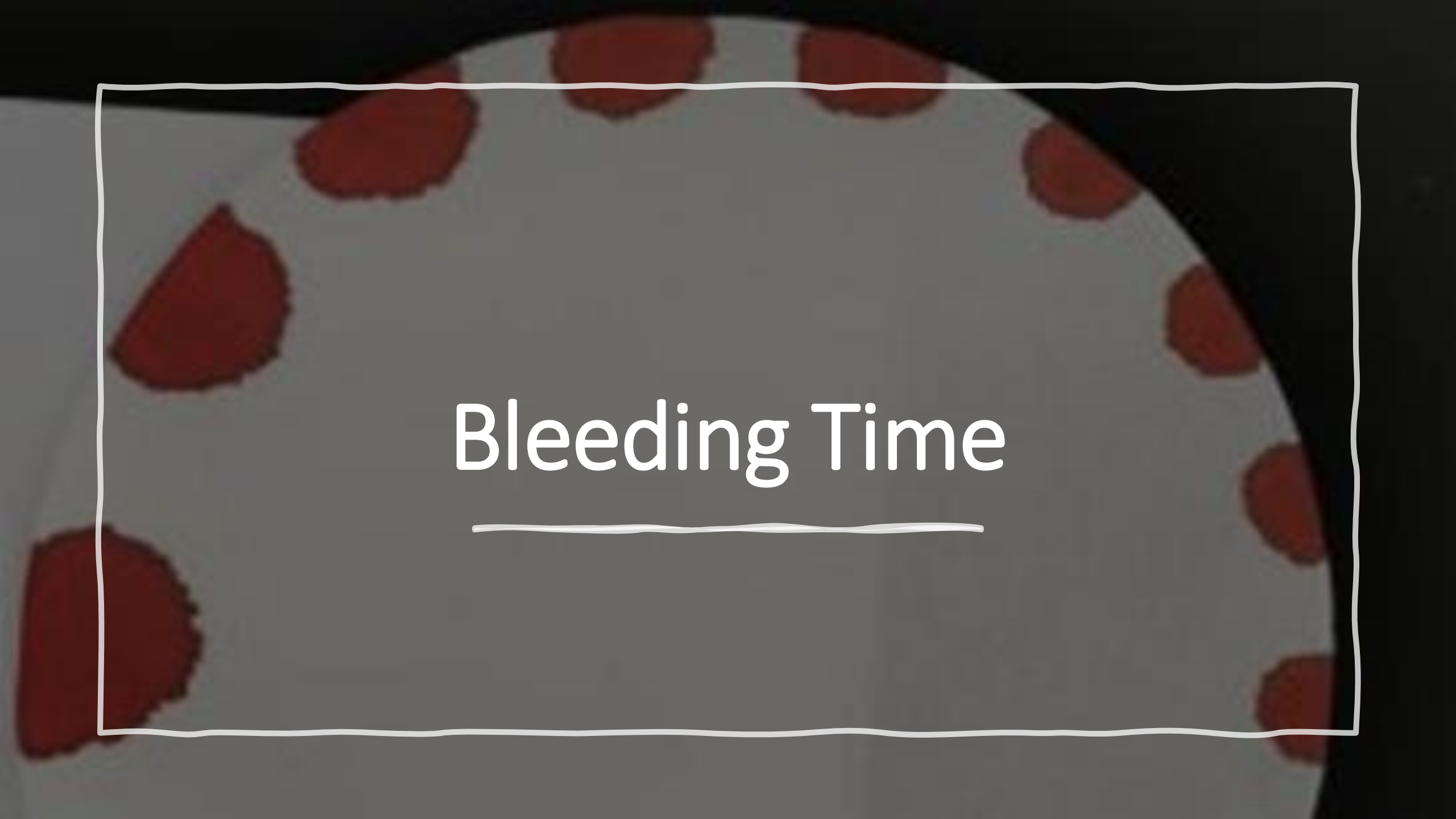
- Bleeding Time
- Clotting Time
- Blood Grouping

Dr. Abdullah Al-Jaouni

Hemostasis: *What Happens in Our Vessels When They Get Injured*



Following platelet adhesion to the exposed collagen, mediator release and platelet aggregation takes place forming **a *loose* plug**.



Bleeding Time

Bleeding Time

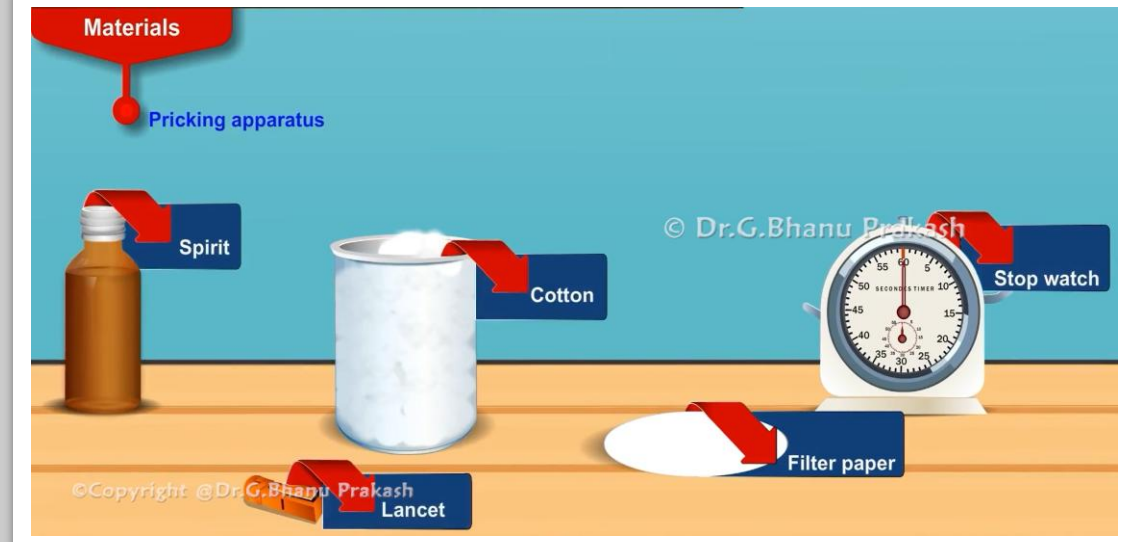
Bleeding Time

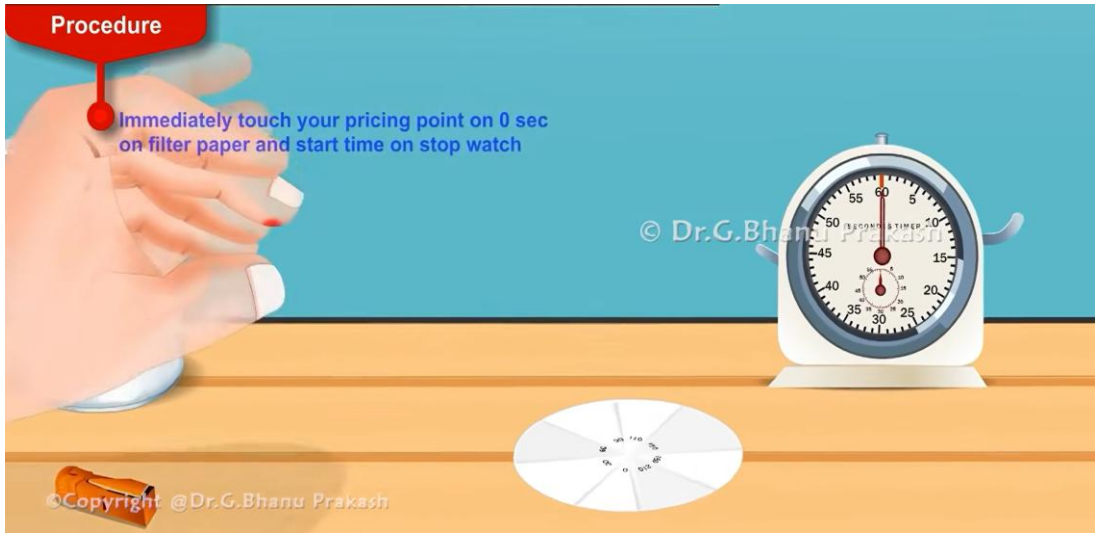
- Used to evaluate the second phase of hemostasis, which involves platelet adherence, activation, and aggregation (formation of a **plug**).
- **When is it increased**?
  - Platelets count is low (thrombocytopenia).
  - Platelet function is abnormal (including the use of antiplatelet drugs like aspirin).
- **Disadvantages of the test**:
  - Insensitive.
  - Invasive.
  - Operator dependent

Duke's Method

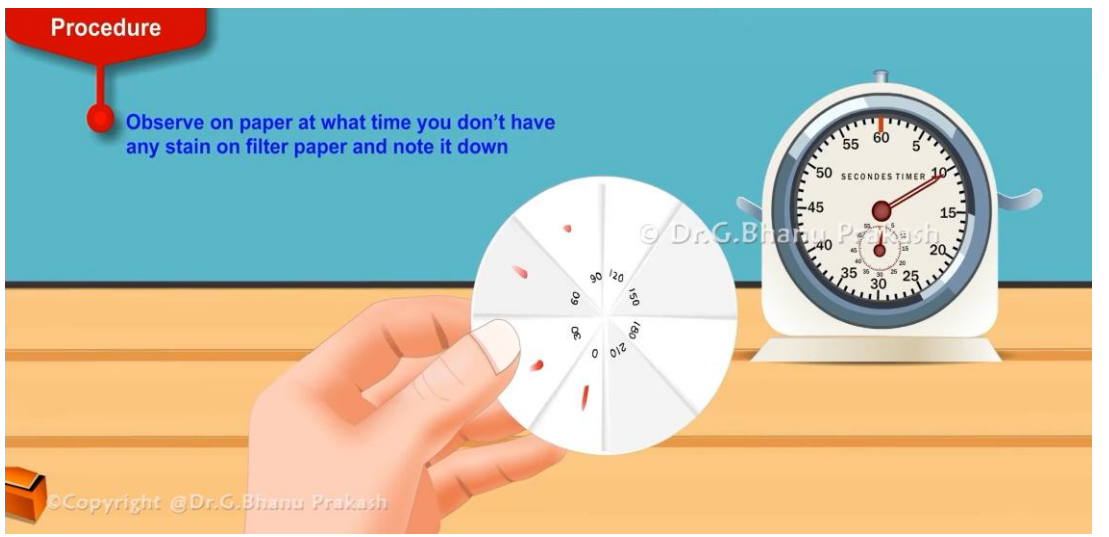
1. Clean the tip of the finger or the ear lobe with alcohol.
2. Puncture the skin with a special lancet. The wound should be 3–4 mm deep.
3. Wipe the blood drop by a filter paper every 30 seconds.
4. Repeat until no more blood is absorbed by the filter paper. Which indicates that a platelet plug has formed.
5. **To calculate the bleeding time**:
   - Multiply the number of blood drops by 30 seconds.
   - Or, Divide the number of spots of blood by 2 and that will give you the bleeding time in minutes.

Normal value is less than 5 minutes.

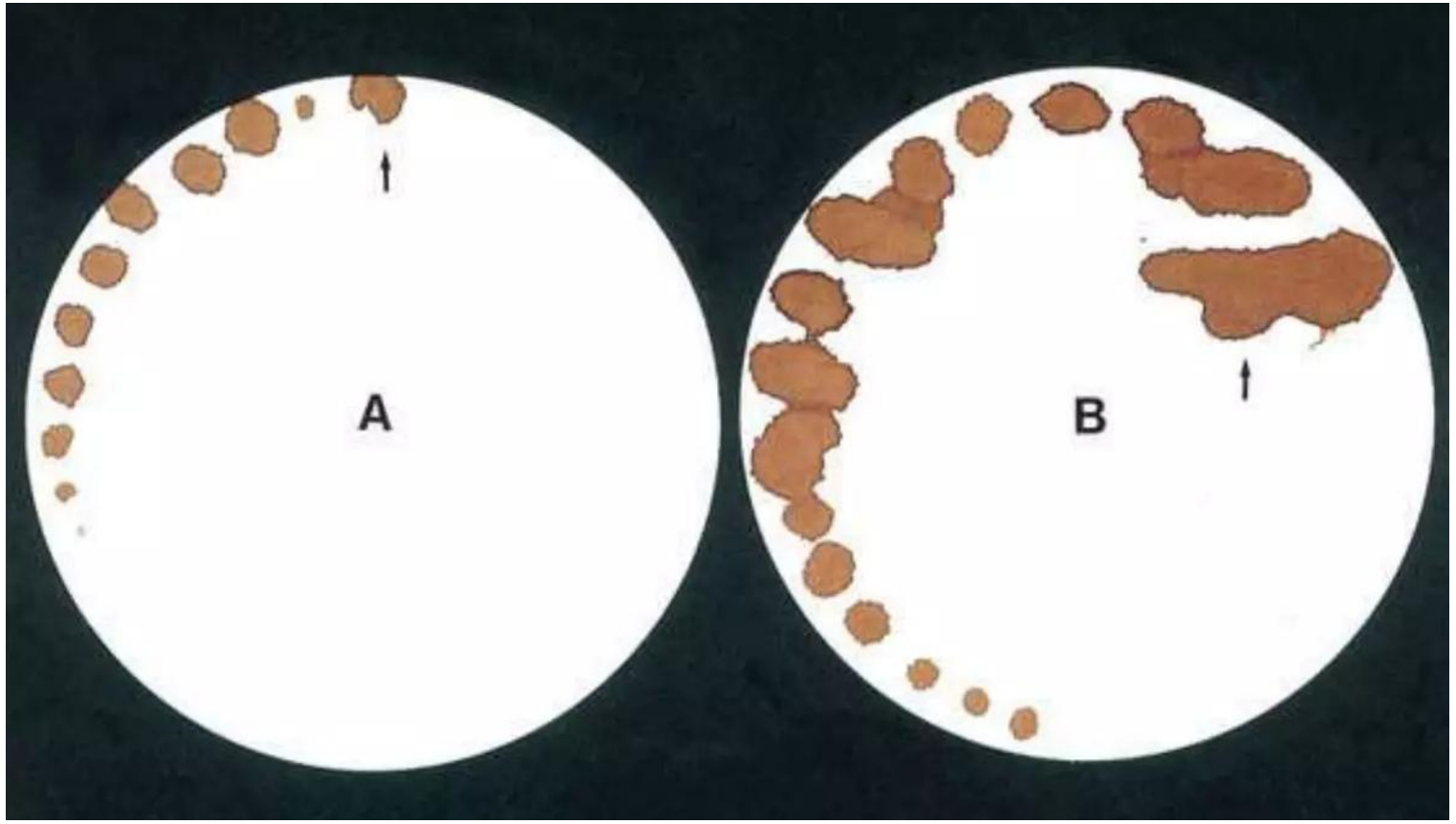

Materials
Pricking apparatus
Spirit
Cotton
Stop watch
Filter paper
Lancet
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Procedure
Immediately touch your pricing point on 0 sec
on filter paper and start time on stop watch
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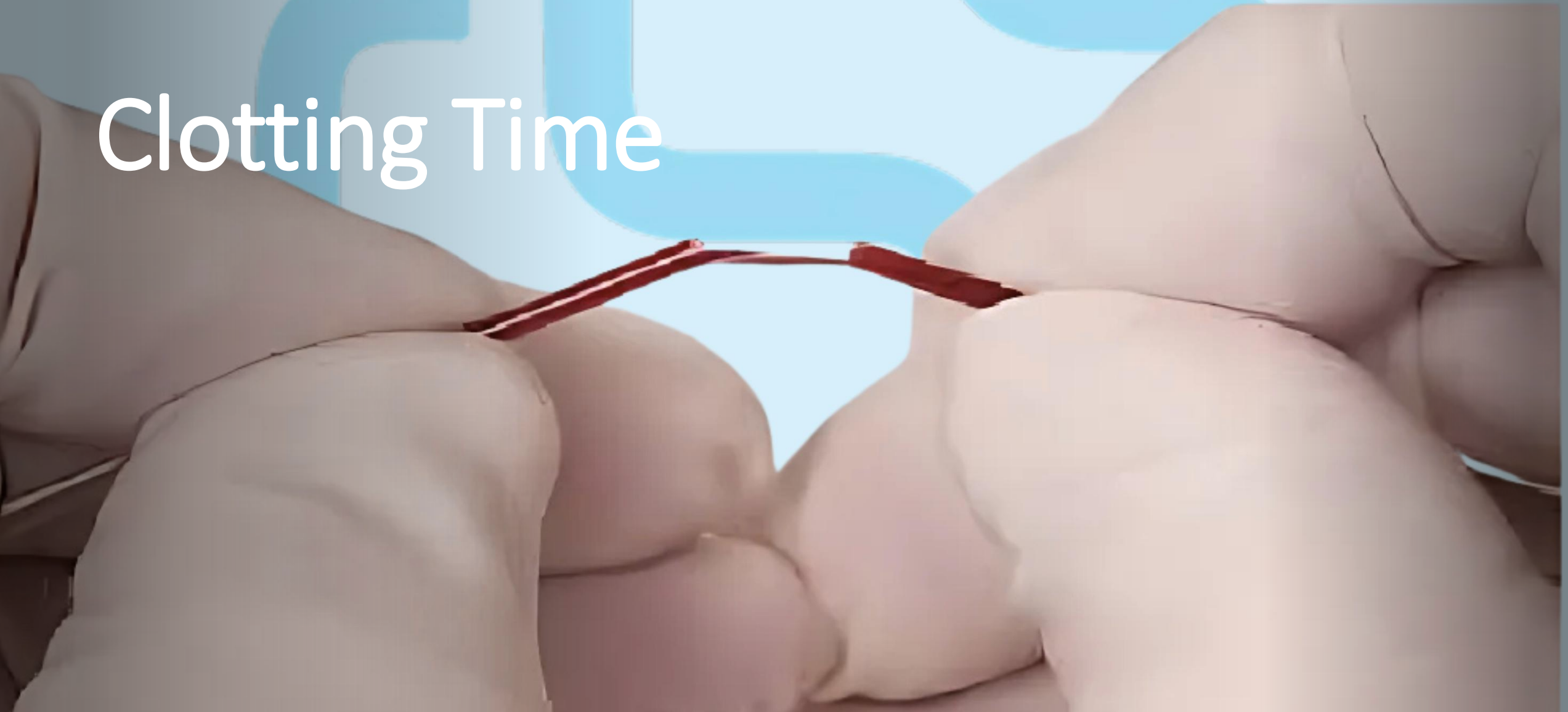

Procedure
Do not squeeze your finger and every 30 sec after above step,
touch pricking part of your finger to filter paper until there is no
presence of any blood stains on filter paper
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Procedure
Observe on paper at what time you don't have
any stain on filter paper and note it down
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Let’s Practice …



Clotting Time



Clotting Time

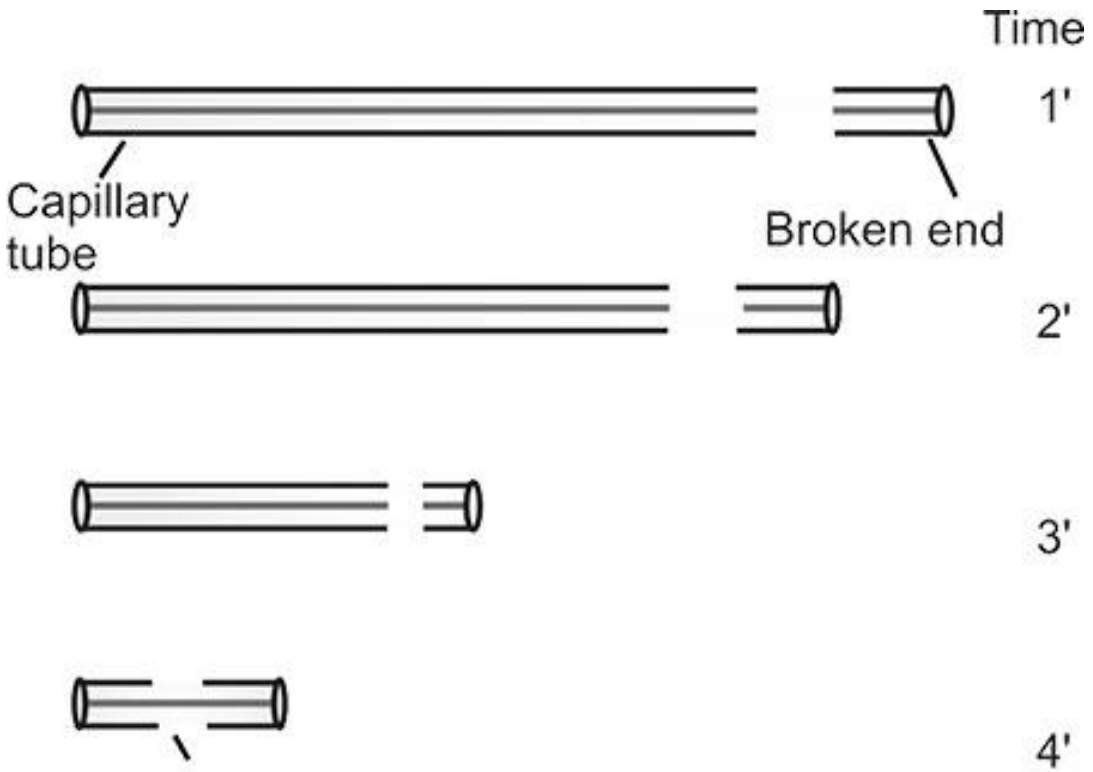
Clotting Time

- Used to evaluate the third phase of hemostasis, which involves clotting factors and coagulation cascades (formation of a **clot**).
- **When is it increased**?
  - Clotting factor deficiency: Hemophilia, Liver disease, Warfarin use, …
- **Disadvantages of the test**:
  - Non-specific; since there are more reliable methods to evaluate specifically for each coagulation cascade (prothrombin time (PT) test, and partial thromboplastic time (PTT) test).
  - Operator dependent.

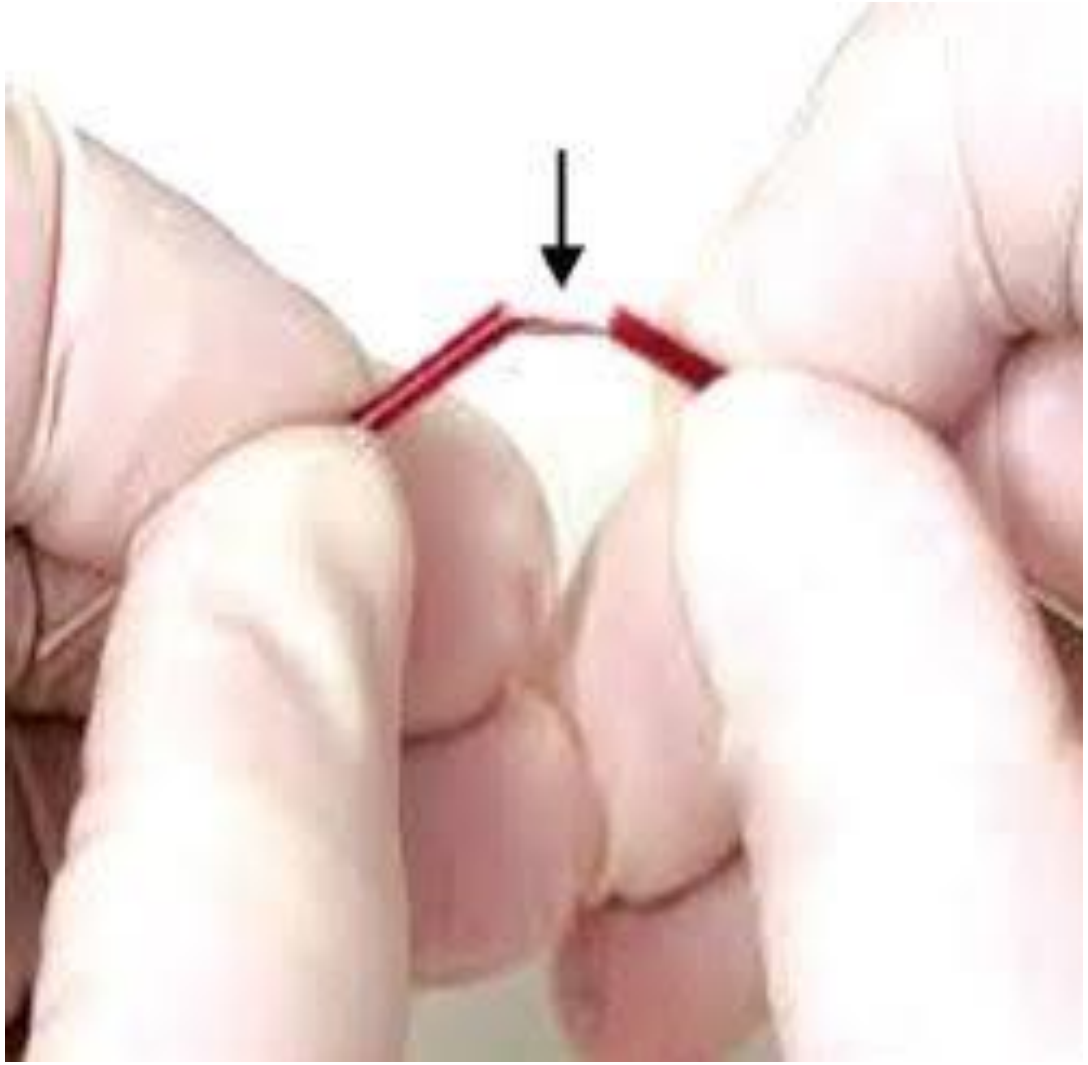
Capillary Tube Method

1. Clean the tip of the finger with alcohol then prick it with a lancet.
2. Draw blood into few non-heparinized capillary tubes.
3. After 2 minutes, start breaking the capillary tube at 1 cm distance.
4. Repeat at every 30 seconds to see whether a thread of coagulated blood is formed between the two broken ends.

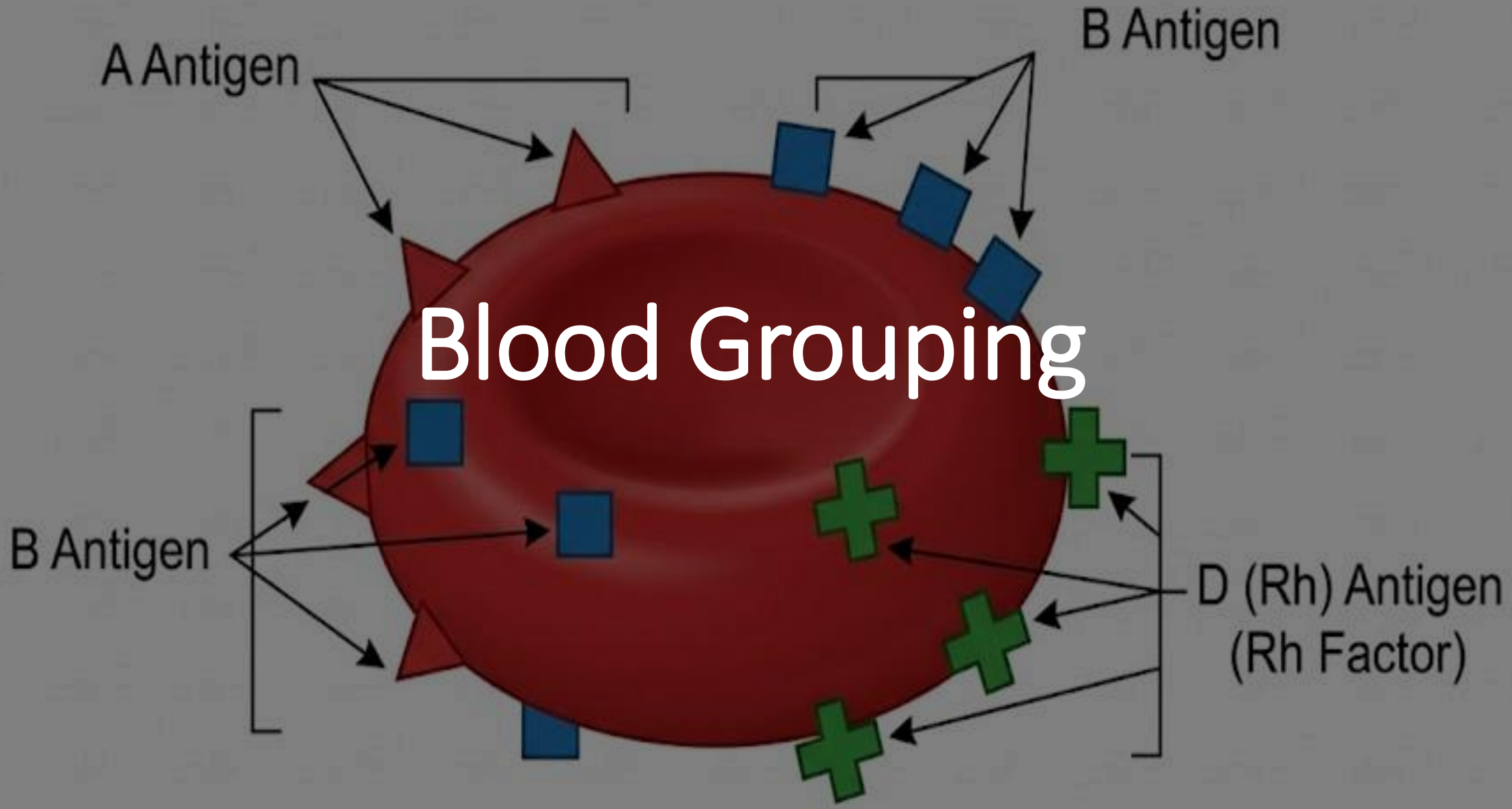
Normal value is less than 10 minutes.



Clotting time by capillary tube method



Blood Grouping



ABO/Rh Blood Grouping

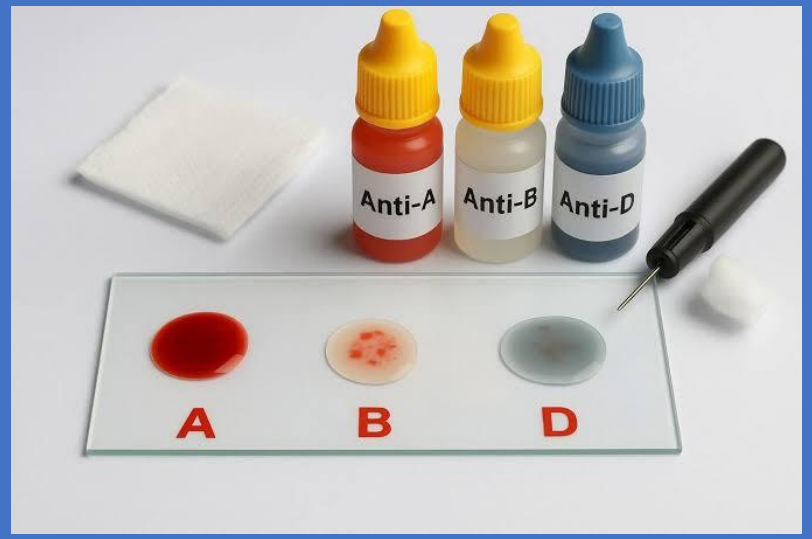
- The RBCs, as in any cell, may carry distinctive antigens on their surface, most notably the A antigen and the B antigen from the ABO system, and the D antigen from the Rh system.
- A body that ‘misses’ an antigen from the ABO system naturally forms antibodies against it (e.g., someone whose blood group is B has anti-A antibodies).
- On the other hand, a body that misses the D antigen, from the Rh system, doesn’t have anti-D naturally. It ONLY develops when Rh-positive RBCs are transfused into an Rh-negative individual, reaching a maximum concentration 2 - 4 months later.
- Transfusion reactions occur from the **antigen-antibody interaction**, mainly the donor’s RBCs antigens with the recipient’s antibodies.
- We use this concept to determine the blood group of each individual.

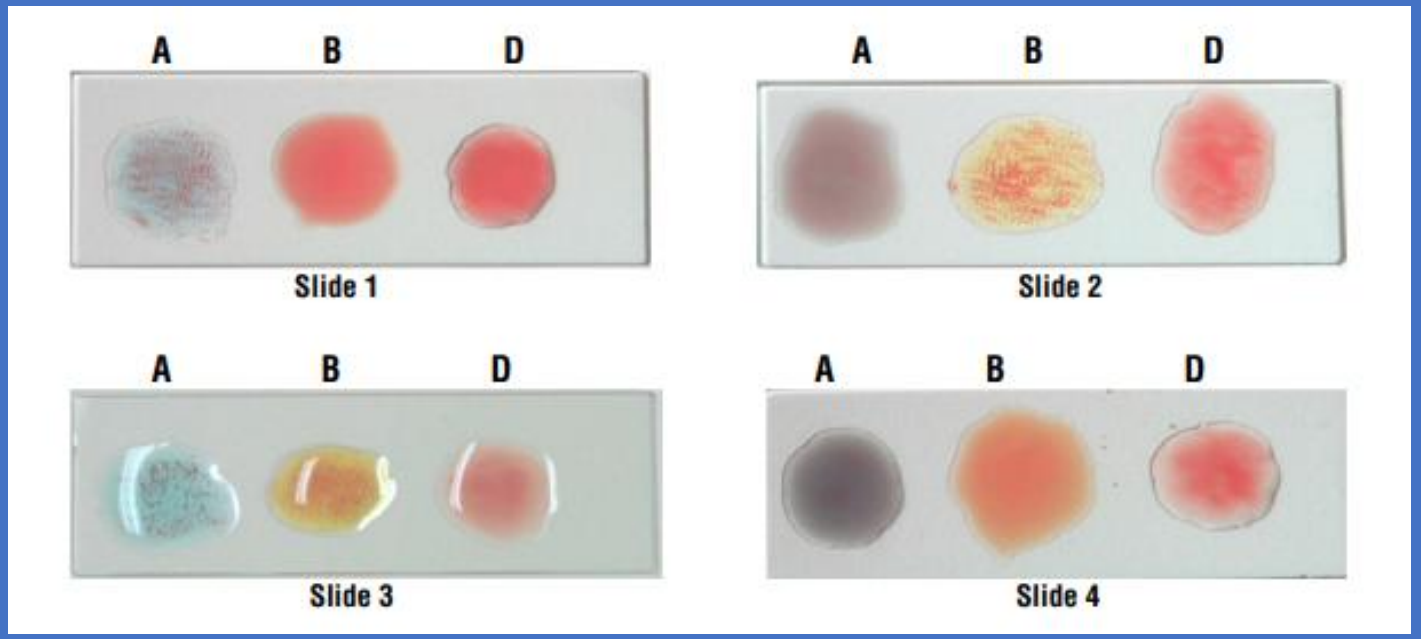
Determination of the Blood Group – The Procedure

- We will test for the presence of the A antigen, the B antigen and the Rh factor (D antigen) on the RBCs, so we need antibodies against these three antigens, Anti-A, Anti-B and Anti-D.

1. Prick the tip of a finger with a lancet and put three separate drops of blood on a clean microscopic slide.
2. Add one drop of Anti-A to the first drop, Anti-B to the second drop, and Anti-D to the third drop.
3. Mix well, using separate wooden sticks.
4. The results are read directly from the slide.

- If agglutination occurs in the first drop the blood type is A , if agglutination occur in the second drop the blood type is B, if it occurs in both it is AB and if it doesn't occur in any drop, the blood type is O.
- If agglutination occurs in the Rh drop the blood is considered as Rh +ve. (This reaction might take some time to develop)
    - The strength of agglutination reaction is not the same in all samples, so in some cases it may be necessary to examine the slide under the microscope to look for agglutination.


Anti-A
Anti-B
Anti-D
A
B
D


A
B
D
Slide 1
A
B
D
Slide 2
A
B
D
Slide 3
A
B
D
Slide 4