

13- Triple response

Introduction:

Scratching the skin produces a characteristic series of reaction in the skin. When the skin is stroked firmly with pointed instrument, reaction on stroke line occurs; mechanical stimulus initiates contraction of the precapillary sphincters. The reaction is white line which is due to displacement of blood from the skin capillaries. The response appears in about 15 second. This white line soon disappears followed by three reactions:

1- Red line.

2- Wheal.

3- Flare.

The red reaction appears at site of stimulus within 10 second due to capillary dilation, this is followed by local swelling (edema) around injury within few minutes due to increase permeability of the capillaries and post capillary venules with extravasation of fluid. The redness spreading out from the injury (flare) is due to arteriolar dilation. This three response (red, wheal and flare reactions) is called triple response.

Cell types involved are:

- Smooth muscle in the microcirculation
- Endothelium: capillary or venule
- Sensory nerve endings

Mechanism:

- Trauma may release an antigen that interacts with the membrane-bound immunoglobulin E of mast cells, which release inflammatory mediators, particularly histamine, into the tissues. This causes small blood vessels to leak, allowing fluid to accumulate in the skin.

Effect of histamine:

- Decreased peripheral *vascular resistance* (flushing, headache!)
- Increased vascular, *local edema*.
- Stimulation of vascular *permeability*, especially post-capillaries nerve endings (pain).

Objective:

To study the skin microcirculation.

Materials and instruments:

- 1- Pin or needle.
- 2- Alcohol 70%.
- 3- Cotton.

Procedure:

- 1- Choose the anterior aspect of the forearm in an area with less pigmentation and little hair.
- 2- Clean the skin with alcohol and let it dry.
- 3- With sterile needle draw a line on the skin, the pressure applied is just sufficient to

scratch the skin without oozing of the blood.

4- Watch the reaction on the skin. If the reaction is not clear, use a stronger stimulus.

See figure (1)

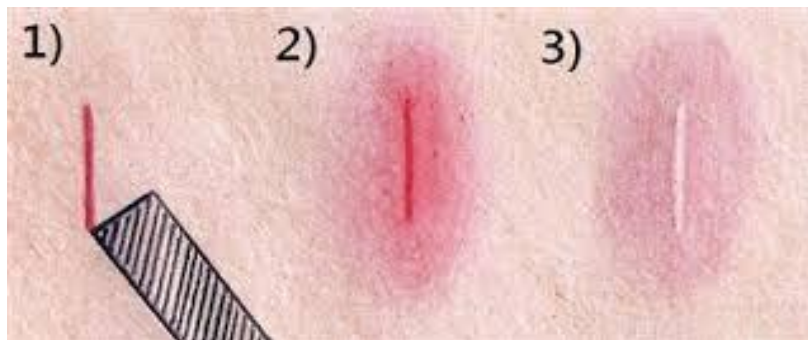


Figure (1): Triple responses.

