Fingertip oximeter

Pulse oximetry is a non-invasive and painless test that measures your oxygen saturation level, or the oxygen levels in your blood. It can rapidly detect even small changes in how efficiently oxygen isbeing carried to the extremities furthest from the heart, including the legs and the arms.

The pulse oximeter is a small, clip-like device that attaches to a body part, like toes or an earlobe. It's most commonly put on a finger, and it's often used in a critical care setting like emergency rooms or hospitals

The purpose of pulse oximetry is to check how well your heart is pumping oxygen through your body. It may be used to monitor the health of individuals with any type of condition that can affect bloodoxygen levels, especially while they're in the hospital. These conditions include:

- chronic obstructivepulmonary disease(COPD)
- asthma
- pneumonia
- lung cancer
- anaemia
- heart attack or heart failure
- congenital heart defects

Working

During a pulse oximetry reading, a small clamp-like device is placed on a finger, earlobe, or toe. Small beams of light pass through the blood in the finger, measuring the amount of oxygen. It does this by measuring changes of light absorption in oxygenated or deoxygenated blood. This is a painless process.

The pulse oximeter will thus be able to tell you your oxygen saturation levels along with your heart rate.

Procedure steps

Pulse oximetry may be used in both inpatient and outpatient settings. In some cases, your doctor may recommend that you have a pulse oximeter for home use.

The pulse oximetry process is as follows:

- Most commonly, a clip-like device will be placed on your finger, earlobe, or toe. You may feel a small amount of pressure, but there is no pain or pinching. In some cases, a small probe may be placed on your finger or forehead with a sticky adhesive. You may be asked to remove your fingernail polish if it's being attached to a finger.
- You'll keep the probe on for as long as needed to monitor your pulse and oxygen saturation. When monitoring physical activity capabilities, this will be during the extent of the exercise and during the recovery period. During surgery, the probe will be attached beforehand and removed once

you're awake and no longer under supervision. Sometimes, it will only be used to take a singlereading very quickly.

- Once the test is over, the clip or probe will be removed.

Pulse oximetry readings

Pulse oximetry is typically a fairly accurate test. This is especially true when using high-quality equipment found in most medical offices or hospital settings. It consistently provides results within a 2-percent difference either way of what it truly is. If your reading was 82 percent, for example, yourtrue oxygen saturation level may be anywhere from 80 to 84 percent. However, the quality of the waveform and assessment of the individual must be considered. Factors such as movement, temperature, or nail polish can impact the accuracy.

Typically, more than 89 percent of your blood should be carrying oxygen. This is the oxygen saturation level needed to keep your cells — and your body — healthy. While having an oxygen saturation below this temporarily is not believed to cause damage, repeat or consistent instances of lowered oxygen saturation levels may be damaging.

An oxygen saturation level of 95 percent is considered normal for most healthy individuals. A level of 92 percent indicates potential hypoxemia, or deficiency in oxygen reaching tissues in the body.

Erythrocyte Sedimentation Rate (ESR)

An erythrocyte sedimentation rate (ESR) is a type of blood test that measures how quickly erythrocytes (red blood cells) settle at the bottom of a test tube that contains a blood sample. Normally, red blood cells settle relatively slowly. A faster-than-normal rate may indicate inflammation in the body. Inflammation is part of your immune response system. It can be a reaction to an infection or injury. Inflammation may also be a sign of a chronic disease, an immune disorder, or other medical condition

An ESR test can help determine if you have a condition that causes inflammation. Theseinclude arthritis, vasculitis, or inflammatory bowel disease. An ESR may also be used to monitoran existing condition.

Why do I need an ESR?

Symptoms of an inflammatory disorder. These include:

- Headaches
- Fever
- Weight loss
- Joint stiffness
- Neck or shoulder pain
- Loss of appetite
- Anemia

What do the results mean?

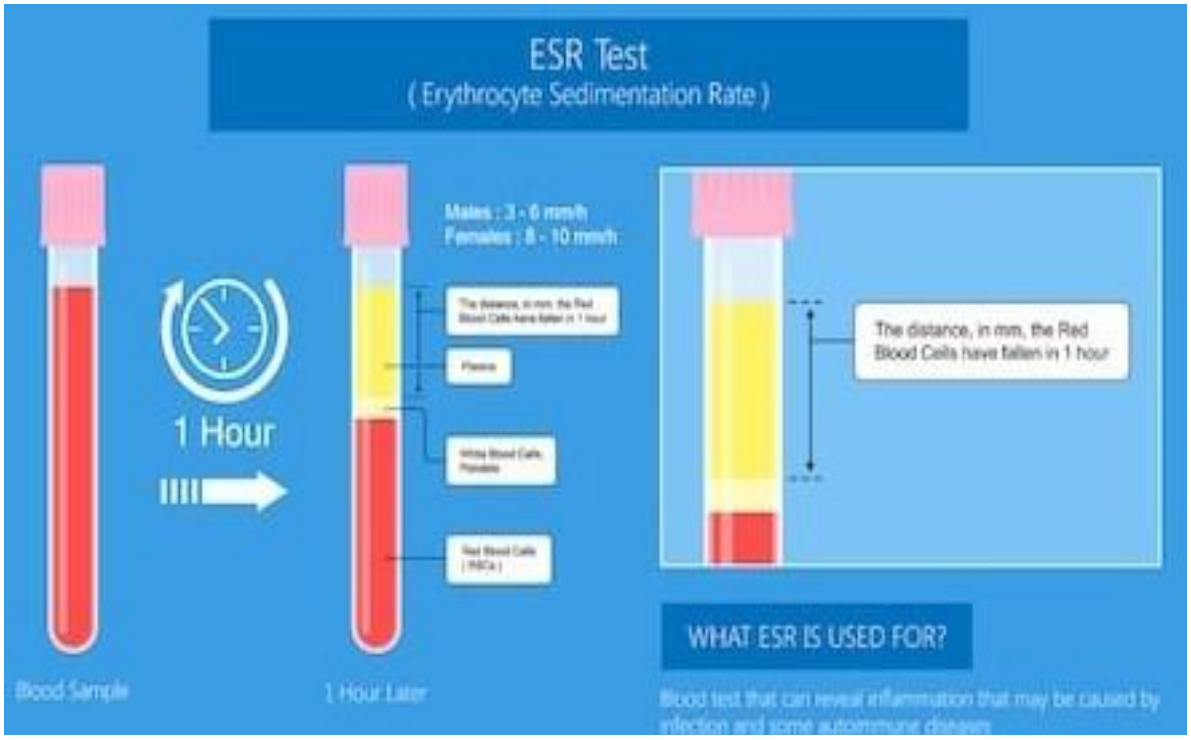
If your ESR is high, it may be related to an inflammatory condition, such as:

- Infection
- Rheumatoid arthritis
- Rheumatic fever
- Vascular disease
- Inflammatory bowel disease
- Heart disease
- Kidney disease
- Certain cancers

Sometimes the ESR can be slower than normal. A slow ESR may indicate a blood disorder, such as:

- Polycythemia
- Sickle cell anemia

- Leukocytosis, an abnormal increase in white blood cells



Galvanic Skin Response (GSR)

Whenever you experience an emotional reaction to a stimulus, your body responds by producing sweat, which increases your skin's electrical conductivity (called electrodermal activity). Galvanic Skin Response (GSR) is a measure of skin conductivity, and is perhaps most well-known as an element of the polygraph (lie-detector) test.

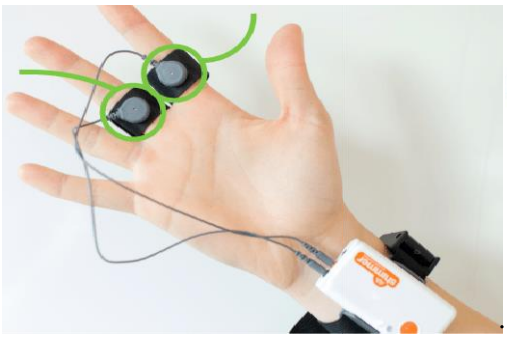
GSR is a major component of our biometric toolkit here at Moore DM Group's Neuro-FundraisingLab. We use GSR to understand what elements of fundraising campaigns are emotionally engaging for potential donors, and what elements fall flat.

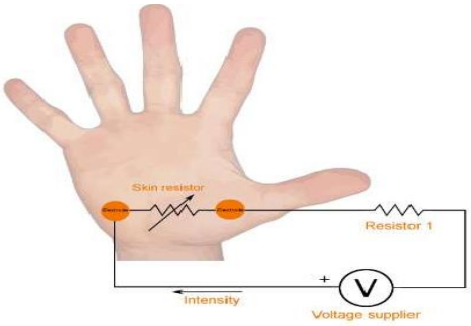
How does GSR work?

A GSR sensor allows us to measure sweat gland activity, which is related to emotional arousal. To measure GSR, we take advantage of the electrical properties of the skin. Specifically, how the skin resistance varies with sweat gland activity, i.e., the greater sweat gland activity, the more perspiration, and thus, less skin resistance. The most common measure of a GSR signal is not resistance, but conductance. Conductance is the opposite of resistance and is measured in siemens (Conductance = 1 / Resistance). The conductance makes the signal interpretation easier, since the greater the sweat gland activity, the higher the skin conductance.

The most common method to measure a GSR signal for emotional research purposes is based on a constant voltage system (exosmotic method). The GSR sensor applies a constant voltage—usually 0.5 V—to the two electrodes that are in contact with the

skin. The circuit also contains a very small resistance compared to the skin resistance that is in series with the voltage supplier and the electrodes. The purpose of this circuit is to measure the skin conductance and its variation by applying Ohm's law (Voltage = Intensity x Resistance = Intensity/Conductance). As the voltage (V) is kept constant, skin conductance (C) can be calculated by measuring the current (I) flow through the electrodes. With this setup, any fluctuation in the current flow is due to a change in the electrical properties of the skin, and therefore in the sweat gland activity.




Skin resistor
Resistor 1
Intensity
V
Voltage supplier