

Measurement of oxygen saturation of hemoglobin by pulse oxymetry

The principle of the pulse oxymetry is based on the fact that light absorption of hemoglobin is dependent on its oxygenation. Pulse oxymeter may be used in any situation where a non-invasive, fast and accurate reading of blood oxygen saturation and pulse rate is needed - for spotchecks and short-term monitoring in intensive care. Normal values of oxygen saturation vary in the range of 93-99 % (mean value of 95 %), that correspond with PaO₂ 80-90 mmHg.

Material and needs

Digital fingertip pulse oximeter™ (Onyx9500, NONIN Medical USA).

The pulse oximeter consists of light emitter and photodetector to estimate the proportion of oxygenated hemoglobin from the total hemoglobin value, as well as of sensor for measurement the heart rate. Numeric LEDs display shows value of oxygen saturation (%SpO₂) and heart rate (beats/min). LED tricolor diode below the display provides a visual indication of the pulse signal quality, while blinking at the corresponding pulse rate. The LED diode changes the colours to indicate the changes in pulse quality: *green* indicates a good pulse signal, *yellow* a marginal pulse signal, and *red* an inadequate pulse signal. In *yellow* and *red* colour of the diode, change a placing of the finger in the unit or try another finger.



Methods

Activate the pulse oximeter Onyx by inserting the student's fingertip nail side up into the oxymeter unit. For best results, keep the oxymeter at the student's heart or chest level. The pulse oximeter detects the inserted finger and automatically illuminates the display. Verify that all LEDs illuminate during the first phase of the startup sequence. After the stabilization the signal (approximately 10 s), read values of oxygen saturation and heart rate on the display and compare them to the standard values. When the finger has been removed, measured values stay on the display for 10 s, than disappear.

The results obtained by this method may be influenced by very bright light, moisture, anemia, nail polish and/or artificial nails.