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DEVELOPMENT AND CONSTRUCTION OF AN OXIMETER

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We present a single-channel device for monitoring noninvasively oxygen saturation (oximeter) in blood using near infrared (NIR) light. The amount of oxygen present in the blood can be detected due to changes in the deoxygenated hemoglobin blood component (HHb) and the oxygenated hemoglobin (HbO_2). HbO_2 absorbs infrared light and allows the red light to pass through. HHb allows the infrared light to pass through because strongly absorbs red light. This device measures the differential absorption of both oxi-hemoglobin (HbO_2) and deoxi-hemoglobin (HHb) concentrations using wavelengths within the biophotonic window. To achieve this, our oximeter is operating with both visible (λ_1 = 632 nm) and infrared (λ_2 = 940 nm) wavelength sources to obtain a system with two equations for two variables of interest. It works on either continuous wave (CW) or frequency domain (FD) modalities to illuminate the tissue simultaneously. Pulses from infrared (IR) source illuminate the tissue with a frequency of 10 Hz with a 20 % fill factor. The CW signal provides information related to the arterial pulse, whereas both CW and pulsed signal provide information about blood oxygenation. At this stage the detection is performed by transmission. Measurements of blood oxygenation measured in transmission on fingers tips are presented which are comparable to commercial devices.