

The colour change in cyanosis and its relationship to the confusions of congenital colour vision deficient observers

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Visual recognition of cyanosis is an important clinical activity. While pulse oximetry is almost universal in the hospital environment, there are circumstances where it is not available or may be unreliable. Cyanosis recognition is affected by lighting colour. In addition, there is, mainly anecdotal, evidence that people with greater colour vision deficiencies (CVDs) have particular difficulty and there is no effective lighting strategy to assist in the observation. The change of blood colour with oxygenation has been shown to lie close to the direction of colour confusions made by congenital red-green dichromats. The important sites of observation are lips, nail beds and palm creases. 10 subjects who were known to be chronically hypoxaemic were recruited from the chronic respiratory program. Their oxygen blood saturation (sO_2) varied from 84 to 96% pre-exercise and 61 to 84% post-exercise. 10 normal subjects were recruited whose sO_2 was 99 or 100%. The spectral radiances of lips, nail beds and palm creases were measured using a Topcon SR-3 telespectroradiometer and compared with the spectral radiances of a white tile of known spectral reflectances measured in the same location. This is a non-contact method of measurement, avoiding the blanching caused by pressure of contact methods. The spectral reflectances were calculated and the chromaticities calculated for a Planckian radiator $T=4000K$. Measurements on lips yielded the most consistent results. The colour changes pre and post exercise and compared with normal colour lie generally along a deutan confusion line. These results confirm the direction of the colour change and illustrate well the, previously anecdotal, difficulties in detecting cyanosis by observers with CVDs.

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