

The measurement of dyshemoglobins and total hemoglobin by pulse oximetry.

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PURPOSE OF REVIEW: Recent advances in pulse oximetry have made it possible to noninvasively measure total hemoglobin, as well as the two most common dyshemoglobins. This review will trace the development and clinical application of multiwavelength pulse oximetry.

RECENT FINDINGS: Until now, commercially produced pulse oximeters have utilized two wavelengths of light and could measure only the ratio of oxyhemoglobin to total hemoglobin, displayed as SpO₂. Pulse oximeters using up to 12 light wavelengths have recently been developed by Masimo Corp. (Irvine, California, USA). These new 'Rainbow Pulse CO-oximeter' instruments can estimate blood levels of carboxyhemoglobin, methemoglobin, and total hemoglobin (SpHb), as well as the conventional SpO₂ value. The accuracy of these new measurements has been studied in human volunteers and clinical trials. Some interesting case reports have documented the use of this new technology in diagnosis and treatment.

SUMMARY: The development of multiwavelength pulse oximeters, which can measure total hemoglobin as well as dyshemoglobins, should result in improved patient care.