

Supporting technologies — pulse oximetry

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Chapter 9

Supporting technologies

9.3 Pulse oximetry¹

9.3.1 History

For a detailed review of the long and fascinating history of blood gases, oximetry and pulse oximetry see Severinghaus (2002; 1986) and Severinghaus and Astrup (1987).

The first practical oximeter was the eight-wavelength ear-oximeter developed in 1964 by Robert Shaw and subsequently marketed by Hewlett-Packard in 1970 (Moyle 1994). In 1971 Takuo Aoyagi (1936–), a Japanese biomedical engineer at the Nihon Kohden Corporation (Tokyo), used the pulsatility of the absorption signal to separate arterial and tissue absorption and determine arterial saturation. Severinghaus describes it thus:

Takuo Aoyagi . . . attempted to eliminate arterial pulsatile ‘noise’ in his earpiece dye dilution curves by subtracting infra-red signals. He observed that the compensated noise varied with oxygen saturation and realised that it might be used to compute the arterial oxygen saturation.

Severinghaus (1989)

The first commercial pulse oximeter appeared in 1970 (Moyle 1994), and in 1982 the Stanford anaesthetist William New (1942–), with Jack Lloyd and engineer Jim Corenham, founded *Nellcor*² Incorporated to mass-produce clinically useful pulse-oximeters (Rendall-Baker and Bause 2002).

If a finger pulse-oximeter fails owing to significant peripheral vasoconstriction, then an ear-probe will usually be satisfactory. Alternatively, a digital nerve block may help (Erasmus 2003).

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¹<http://www.nickalls.org/dick/papers/thoracic/hand-pulseox.pdf>

²The name ‘Nellcor’ was derived from a synthesis of the surnames NEw, LLoyd, COrenham (Rendall-Baker and Bause 2002).

[pdf](#) [an interesting 4 page article in which Severinghaus describes how he became involved in MAC, blood gases and oximetry]

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