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## Re: pulse oximeter calibration

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- *To:* Multiple recipients of list <[anesthesiology@gasnet.med.yale.edu](mailto:anesthesiology@gasnet.med.yale.edu)>
  - *Subject:* Re: pulse oximeter calibration
  - *From:* "T. McCulloch" <[tmcc@u.washington.edu](mailto:tmcc@u.washington.edu)>
  - *Date:* Mon, 13 Jul 98 10:07:12 EDT
  - *Reply-To:* [anesthesiology@gasnet.med.yale.edu](mailto:anesthesiology@gasnet.med.yale.edu)
  - *Sender:* [anesthesiology@gasnet.med.yale.edu](mailto:anesthesiology@gasnet.med.yale.edu)
- 

2 points:

I always assumed the "p" stood for pulse??!

I thought that many ABG machines calculate the SaO2 based on the PO2, pH, pCO2 and temp (they have to assume a normal 2,3-DPG). These machines don't actually measure by co-oximetry. Perhaps this is no longer true of more modern machines?

Tim McCulloch

On Mon, 13 Jul 1998, Ian Seppelt wrote:

```
> > > know the pulse ox is not accurate at extremely low rates (see O2 sat
> curve
> > > relative to arterial O2),
> >
> > I wasn't aware of this. Can anyone explain why the saturation is
> > not accurate at low rates? BTW, how low did her heart rate go?
> >
>
> Did you actually mean pulse oximetry not accurate at low heart rates, or
> did you mean pulse oximetry not accurate at low saturations?
>
> Concerning the latter, my understanding is:
>
> The pulse oximeter merely measures relative transmittance through the
> finger at two different frequencies. The arbitrary ratio derived is
> translated into a number ("SpO2") by a purely empiric lookup table in the
> machine. (That's why we should be talking about SpO2 - 'p' for peripheral -
> when using a pulse oximeter; this is different to SaO2 - 'a' for arterial
> blood measured in a cooximeter).
>
> The lookup table was derived experimentally on "volunteers" (??prisoners)
> who were made hypoxic, SaO2 measured on arterial blood and correlated to
> the digital ratio the probe gave. It was considered unethical to drop the
> volunteers' saturations below about 70%. Numbers below 70% are extrapolated
> but there is no experimental evidence to confirm this.
>
> Cheers, Ian.
>
```