Oxygen Reserve Index™ (ORi™)

The First Noninvasive and Continuous Parameter to Provide Insight into the Oxygen Reserve of Patients Receiving Supplemental Oxygen

Masimo

Current Approaches to Assessing Oxygenation

- SpO_2, arterial oxygen saturation measured by noninvasive pulse oximetry, is unable to assess in the hyperoxic range (higher than normal oxygenation) due to the flattening of the oxyhaemoglobin dissociation curve (as seen in figure 1).
- PaO_2, the partial pressure of oxygen measured by arterial blood gas, can be used as an indication of oxygenation throughout all ranges. However, results are both intermittent and delayed.
- Between invasive samples, changes in PaO_2 cannot be assessed and therefore unexpected hypoxia or unintended hyperoxia can occur.

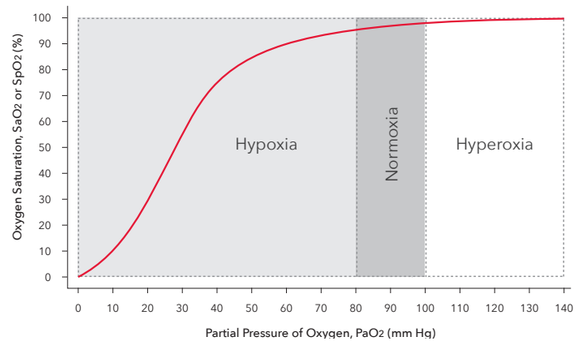


Figure 1. *The oxyhaemoglobin dissociation curve illustrates the relationship between SaO_2/SpO_2 and PaO_2.*

Oxygen Reserve Index

- ORi is a noninvasive and continuous parameter intended to provide insight into a patient's oxygen status in the moderate hyperoxic range (PaO_2 >100 and ≤200 mm Hg), defined as a patient's oxygen "reserve".
- ORi is an index with a unit-less scale between 0.00 and 1.00.
- ORi can be trended and has optional alarms to notify clinicians of changes in a patient's oxygen reserve.
- When utilised in conjunction with SpO_2 monitoring (as demonstrated in figure 2), ORi may noninvasively and continuously extend the visibility of a patient's oxygen status into ranges previously unmonitored in this fashion.
- ORi is an index that is intended to supplement, not replace, SaO_2/SpO_2 and PaO_2 measurements.

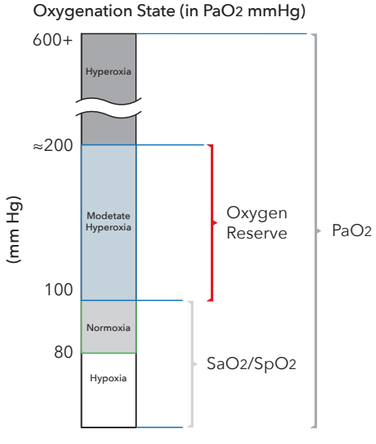


Figure 2. *Range of oxygenation states that can be assessed with SaO_2/SpO_2, ORi, and PaO_2. SaO_2/SpO_2 can assess hypoxia and normoxia, PaO_2 can assess all ranges of oxygenation, and SpO_2 with ORi provides real-time visibility from hypoxia to the moderate hyperoxic state.*

ORi Clinical Application

ORi with Masimo SET® pulse oximetry may provide:

- Expanded visibility during preoxygenation prior to intubation.
- Potential advanced warning of impending desaturation, helping clinicians intervene sooner.
- Insight into oxygen reserve when titrating patients who are receiving supplemental oxygen.

ORi was retrospectively obtained for this paediatric surgical case[1]

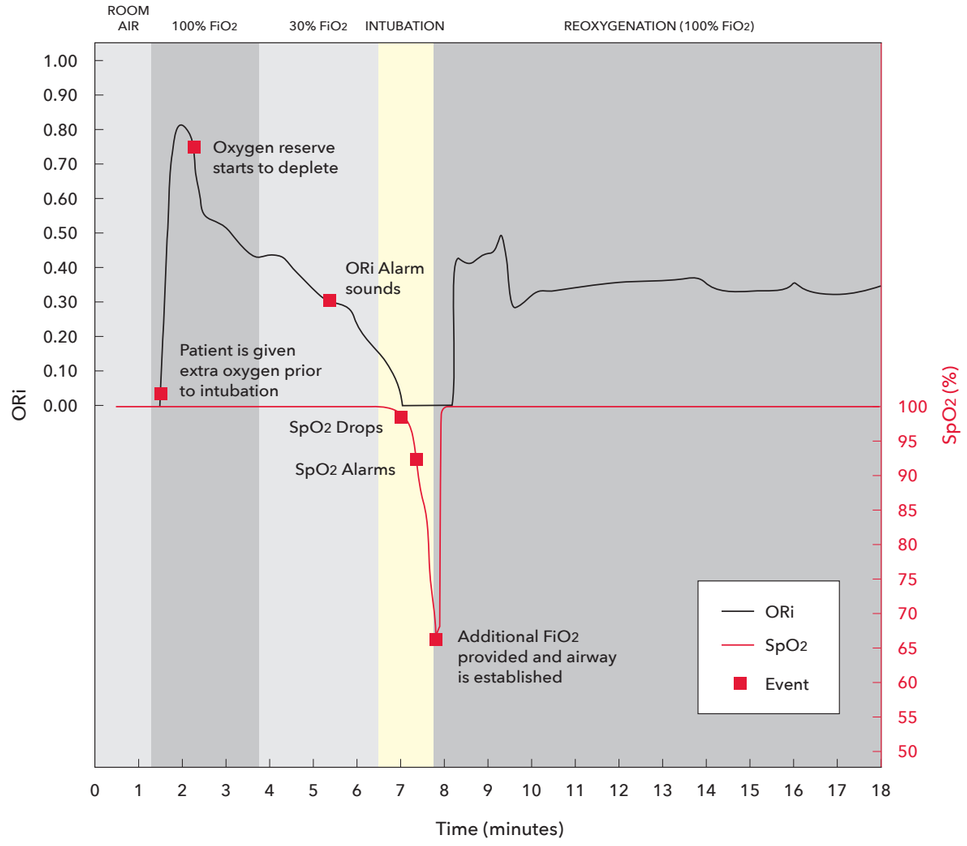


Figure 3. *ORi levels drop prior to "30% FiO_2" period and "intubation" period, and minutes before the SpO_2 drop. ORi then rises during re-oxygenation.*

ORi Clinical Utility

In a study published in *Anesthesiology*, researchers found:

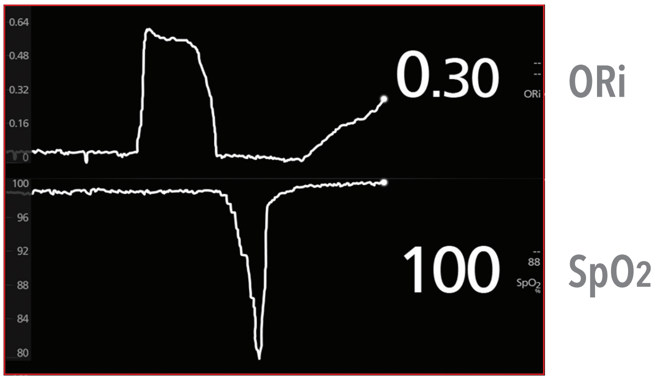
- During prolonged apnea in healthy anesthetized children, ORi detected impending desaturation a median of 31.5 seconds (IQR, 19 to 34.3 seconds) before noticeable changes in SpO_2 occurred.[1]

In a study published in *Anesthesia & Analgesia*, researchers found:

- ORi may provide an advanced indication of impending desaturation in adults undergoing surgery based on trends in the relationship between ORi and PaO_2.[2]
- "Decreases in ORi to near 0.24 may provide advance indication of falling PaO_2 when SpO_2 is still >98% and above the PaO_2 level at which SaO_2 declines rapidly."[2]

Product Details

When used with a compatible sensor, ORi displays a value between 0.00 and 1.00 and clinicians can trend this value over time.



Upgradable rainbow SET™ Technology Platform

Masimo rainbow SET is a noninvasive monitoring platform featuring Masimo SET® Measure-through Motion and Low Perfusion™ pulse oximetry with the option to measure multiple additional parameters:

- > Oxygen Saturation (SpO2)
- > Pulse Rate (PR)
- > Perfusion Index (PI)
- > Pleth Variability Index (PVi®)
- > Total Haemoglobin (SpHb®)
- > Methaemoglobin (SpMet®)
- > Oxygen Reserve Index (ORi)
- > Oxygen Content (SpOC™)
- > Carboxyhaemoglobin (SpCO®)
- > Acoustic Respiration Rate (RRa®)
- > Respiration Rate from the Pleth (RRp™)

[1] Szmuk P et al. *Anesthesiology*. 2016; 124:00-00. [2] Applegate et al. *Anesth Analg*. 2016 Mar 22.

ORi monitoring is not intended to replace laboratory blood testing. Blood samples should be analysed by laboratory instruments prior to clinical decision making.

ORi Parameter and RRp Parameter have obtained CE Marking. Not available in the U.S.

ORi is not licensed for sale in Canada.

For professional use. See instructions for use for full prescribing information, including indications, contraindications, warnings, and precautions.

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