

PULSE OXEMETRY



Ms. Rajathurai Jeya, RN

PULSE OXIMETRY

- Pulse oximetry is a non-invasive method of indirectly evaluating arterial oxygenation through measurement of peripheral saturation of haemoglobin.
- Provides an estimate of arterial oxyhemoglobin saturation by using selected wavelengths of light to noninvasively determine the saturation of oxyhemoglobin.

RED FLAG!

- *Values obtained by pulse oximetry are unreliable in the presence of vasoconstricting medications, IV dyes, shock, cardiac arrest, severe anemia, and dyshemoglobins (eg, carboxyhemoglobin, methemoglobin).*

Indication

- The basic rationale behind pulse oximetry is that hypoxaemia may be detected early and treatment can begin before serious or irreversible adverse effects occur.
- Because pulse oximetry is non-invasive it can be used in wards, continuously thus reducing the need for arterial blood gases (ABGs), Extremely important for critically ill patients & in smaller facilities with limited pathology support.
- Monitor adequacy of oxygen saturation & Evaluate response to therapy.
- Monitor unstable patient who may experience sudden changes in blood oxygen level.
- Determine supplemental oxygen needs at rest, with exercise, and during sleep.
- In many situations, such as during the admission process or when the client is receiving supplemental oxygen, pulse oximetry is considered a component of baseline vital signs.

Equipment

- Pulse oximeter device
- Sensor finger, toe, or ear clip (Transducer)
- Nail polish remover
- Alcohol wipes



Neonate's Probe/ sensor placement



Neonate's Probe/ sensor placement



Nursing and Patient Care Considerations

- Assess patient's hemoglobin. SpO_2 may not correlate well with PaO_2 , if hemoglobin is not within normal limits.
- Remove patient's nail polish because it can affect the ability of the sensor to correctly determine oxygen saturation, particularly polish with blue or dark colors.
- Correlate oximetry with ABG values and then use for single reading or trending of oxygenation (does not monitor $Paco_2$).
- Display heart rate should correlate with patient's heart rate.
- To improve quality of signal, hold finger dependent and motionless (motion may alter results) and cover finger sensor to occlude ambient light.

Nursing and Patient Care Considerations

- **Assess site of oximetry monitoring for perfusion on a regular basis, because pressure ulcer may occur from prolonged application of probe.**
- **Device limitations include motion artifact, abnormal hemoglobins (carboxyhemoglobin and methemoglobin), I.V. dye, exposure of probe to ambient light, low perfusion states, skin pigmentation, nail polish or nail coverings, and nail deformities such as severe clubbing.**
- **Document inspired oxygen or supplemental oxygen and type of oxygen delivery device.**

Nursing Procedure

Steps	Rationale
<p>Choose sensor appropriate for the client's size and location to be used (finger, toe, ear)</p>	<p>Inappropriate size or device may cause inaccurate results or pain</p>
<p>Remove any finger nail polish or artificial nails on the fingers to be used if possible</p>	<p>The sensor may be unable to provide an accurate reading through nailpolish or acrylic nails.</p>
<p>Before applying the sensor , use an alcohol wipe on the site, the sensor should be also cleaned as per manufacturer's instruction, allow alcohol dry.</p>	<p>Using alcohol ensures that the site is clean and dry. Cleansing the device helps prevent the spread of infection</p>
<p>Place the adhesive sensors and finger clip sensor for adults on the client's index, middle or ring finger. Adhesive sensor also can be placed on client's toe. A small earlobe clip is available for use on small adults, children's, and infants. If necessary place newborn adhesive</p>	<p>Appropriate location ensures accurate reading.</p>

<p>With any doubts about the chosen site , check the client proximal pulse and capillary refill.</p>	<p>Decreased circulation could skew oxygen saturation readings</p>
<p>Check the sensor's markings to make sure the light emitting diode and photo detector are correctly aligned they should be opposite each other</p>	<p>If sensor's are not aligned , the sensor will give inaccurate reading</p>
<p>Attach the sensor to client cable and turn it on. The digital readout or light bar should show readings and alarm settings. The type will depend on the specific monitor being used</p>	<p>Readout or light bar indicates that the machine is working</p>

Obtain a one time reading or keep the sensor in place and the monitor on continuous monitoring status, if ordered continuous monitoring make sure the alarm is on before leaving the patient. The monitor have preset alarm limits that can be changed per provider's order or facility policy. The continuous pulse oximeter gives audible and visual alarms can be silenced for 60 seconds.

Setting the alarm ensures notification of the nurse if the client value are out of the desired range, indicating the possible problem that requires intervention

Move an adhesive sensor every 4 hours and a clip type sensor atleast every 2 hours. Watch for signs of tissue breakdown or irritation from a adhesives or clips.

Moving the sensor helps to prevent tissue irritation an necrosis

Clean the sensor with alcohol wipes when it is removed.

Special reminder

- Documentation includes each oximeter reading and location of the sensor.
- If the client is not receive oxygen, the reading is documented “ on room air”
- Document if the client is receiving supplemental oxygen and if so, how much (e.g. O₂ @ 3LPM)
- Report any downward changes in oxygen saturation of 3% to 5%.
- Accuracy can be affected by ambient light, I.V. dyes, nail polish, deeply pigmented skin, patients in sickle cell crisis, jaundice, severe anemia, and use of antibiotics such as sulfas.