

A19**PULSE OXIMETRY**

- The implementation of the pulse oximeter has changed medical management and improved patient care. Oxygenation can be assessed almost immediately and treatment can be initiated quickly. If EMS Personnel understand the device's operation and the principles behind it, the pulse oximeter can be a useful tool in providing patient care. However, EMS personnel must remember that although the pulse oximeter is a useful tool the patient must be treated and not the number.

GENERAL

- simple, non-invasive method of monitoring the oxygen saturation of arterial capillary blood
- it is widely used in the pre-hospital setting
- effective way to monitor the patient's oxygenation status and determine changes before they are clinically apparent
- it is imperative that EMS personnel know how oximeters work in order to maximize their performance and avoid errors in the interpretation of the results
- use of the pulse oximeter should be deferred if resources are limited or there are more urgent assessment and care priorities
- personal protective equipment should be utilized, as appropriate
- body substance isolation techniques and equipment must be used
- obtain all pertinent information
 - patient's name
 - diagnosis
 - reason for transfer
 - any existing or anticipated problems
- primary survey
- consider load and go criteria
- secondary survey
- continuously monitor the patient for any complications or any change in status

Pulse Oximetry

- a pulse oximeter consists of a
 - computerized monitor
 - probe that can be attached to the patient's finger, toe, nose or ear lobe
 - the monitoring unit
- displays a digital percentage readout of a calculated estimate of the patient's hemoglobin (Hgb) that is saturated with oxygen (SpO₂)
- also displays a calculated heart rate
- the pulse oximeter may be used in a variety of situations that require monitoring of oxygen status
- it may be used continuously or intermittently
- it is not a substitute for conducting assessments of the patient
- it can be an early warning of decreasing arterial oxyhemoglobin saturation prior to the patient exhibiting clinical signs of hypoxia

- Reliance on pulse oximeter readings at the expense of clinical assessments can be injurious to the patient. e.g. If a patient is short of breath and cyanotic with a saturation reading of 100%, check for possible causes

Common Uses for the Pulse Oximeter

- useful adjunct to identify hypoxia
- guide for determining therapeutic oxygen requirements
- to monitor effectiveness of oxygenation and ventilation therapy
- never withhold oxygen from a patient in distress while waiting for a reading or if the reading indicates above normal
- results may be affected by any vascular impairment such as:
 - elevation of the extremity in relation to the heart
 - compression of the finger by the probe or excessive taping
 - vasoconstrictors such as cold, fear, hypothermia and medications
 - AV fistula decreasing distal flow
 - poor peripheral perfusion
 - carbon monoxide poisoning
 - hypovolemia

NOTE

Anemia will cause the oximeter to display a false high saturation when the patient is actually hypoxic

- potential causes for interference's with pulse oximeter readings
 - artificial nails
 - dark pigmentation
 - electrical
 - movement
 - CPR (pulse oximeters should not be used during cardiac arrest)
 - radiated (bright) light
 - edema
 - pigments and dyes

Use of a Pulse Oximeter

- set up the pulse oximeter
- place where display can be observed
- secure to avoid being dropped
- connect sensor cord to the monitor
- clip the sensor over the fingertip (or other appropriate location)
- initiate monitoring of oxygen saturation
- turn oximeter on
- position the sensor until the display indicates good sensing

Interpret Pulse Oximeter Readings

- in 3 - 6 seconds the pulse rate and oxygen saturation readings are displayed
- readings are averaged over 5 – 15 seconds
- normal oxygen saturation is considered to range between 97% - 99%
- readings of 90% or less may indicate that the patient needs ventilatory assistance
- any rapid change in oxygen saturation will take this long to register and be displayed

Equipment Malfunctions

- most are designed to provide either no reading or an unintelligible reading if any component fails
- oximeter readings should be compared regularly with a reference or reading from an alternate machine
- should be checked after they are dropped, damaged, inconsistent readings noted, or according to manufacturer's recommendations
- replacement of batteries
- inspection for loose or broken wires

Documentation

- the following readings must be documented on the patient care report
- initial reading
- any improved or deteriorating value
- any change in patient management based on oximeter reading
- any pulse oximeter difficulties or malfunction

NOTE

Oxygen saturation values are guidelines only: EMS personnel must consider the patient's overall condition