Pulse Oxymetry Clinical Skills

Pulse oximetry is a non-invasive, uncomplicated, and pain-free method of measuring the quantity of oxygen transported by the hemoglobin in the red blood cells. This is referred to as arterial blood oxygen saturation, abbreviated as SaO2. Ensuring a regular SaO2 level guarantees sufficient oxygen delivery to the body's tissues via the bloodstream.

OPERATING PRINCIPLE
A pulse oximeter comprises a probe that is connected to a pulse oximeter via a cable. The probe is equipped with an illuminator on one side and a photodetector, or sensor, on the opposite side. When the device is attached to a bodily component, it emits light that passes through the tissues. The sensor on the opposing side calculates the amount of light that the arterial blood in the tissues has absorbed. The underlying premise is that the presence of oxygen-bound hemoglobin results in increased light absorption compared to its absence.

Pulse oximeter probes and sites

Various types of probes exist, with their placement dependent on the specific site.

Digital probes: The most prevalent and convenient variety that can be worn on a finger or toe.

Earlobe probes: Connect to the client's ear

In rare cases where the fingers or earlobes cannot be accessed, a pulse oximetry probe can be placed on the forehead and fastened with a headband.

Sensor pads can be applied to several locations, such as an adult's earlobe or nose bridge, as well as a newborn's palms or soles.

Earlobe and forehead probes are generally more precise than digit probes when there is reduced blood flow to the extremities or when the client regularly moves their hands or feet, causing motion artifacts.

These probes can be classified as either disposable, which are recommended for examining numerous clients with the same oximeter, or reusable when used for a single client. Additionally, they are available in two variants: adhesive and clip sensors. Typically, sticky sensors are more suitable for younger children or for situations where the sensor needs to be attached to an earlobe, nose bridge, or toe. Clip sensors might not be the greatest for youngsters because they are very easy to take off.

NORMAL & LOW SPO2 VALUES

A pulse oximeter result, known as SpO2, of 95% or higher is regarded within the normal range. Anything below that threshold is deemed insufficient for the majority of clients. But, if it falls below 85%, it might get exceedingly risky for the customer. This can manifest in patients with several pulmonary disorders that impede gas exchange, which refers to the transfer of oxygen and carbon

dioxide between the bloodstream, lungs, and tissues.

However, in certain instances, measurements may inaccurately indicate low values due to inadequate blood circulation to the extremities, hence impeding the pulse oximeter's ability to detect a reliable signal. Possible causes for this could include:

peripheral vascular disease, which happens when one of the arteries supplying the extremities becomes narrowed hypotension, or low blood pressure hypothermia, or lowered body temperature
Multiple pharmaceuticals
Peripheral edema refers to the buildup of fluid and subsequent swelling in the limbs.
Inhaling smoke
Carbon monoxide poisoning
Inaccurate readings can also occur due to motion artifacts, such as when the client experiences shivering or restlessness, resulting in the generation of misleading signals. Readings can be unreliable if the customer is wearing nail paint or if there is intense illumination, such as sunshine, directly on the probe, which can impede the proper measurement of oxygen saturation.

COMMON CARE TIPS

Pulse oximetry can be employed either intermittently or constantly, depending on the client's condition. Intermittent usage involves periodically checking the client's SpO2 at specific intervals, whereas continuous usage entails the client being consistently attached to the pulse oximeter. In the second scenario, an alarm can be triggered to alert you if the SpO2 level drops below a specific threshold or if the probe becomes detached.

When dealing with a young client, it is important to consider their inclination for physical activity. Therefore, it is advisable to position the probe on their finger or toe to ensure accurate readings. Furthermore, it is advisable to refrain from utilizing forehead or nasal probes when working with these particular individuals.

It is important to safeguard the skin of children, particularly newborns, as it is sensitive and prone to injury. Therefore, it is crucial to ensure skin protection, periodically inspect the area under the probe for skin damage, and consistently change the placement of the probe.

Always certain to utilize the suitable probe for each of those locations.

To address restlessness or excessive movement in the client, it is advisable to encourage them to maintain a stationary position, provide assistance in stabilizing their limb, or alternatively, relocate the probe to another area.

Prior to attaching a finger probe, ensure that there is no nail polish or artificial fingernails present and remove them if necessary.

Generally, it is advised to avoid placing the probe on a thumb.
Avoid placing the probe on the same limb as a blood pressure cuff to prevent false readings when the cuff is inflated.

In order to obtain the most accurate reading, it is advisable to prevent the probe from being exposed to direct intense light.

PROCEDURE

Collect the necessary materials, such as the probe and the pulse oximeter.

Assess any client-related factors that could impact the precision of the reading, choose the appropriate type and placement of the probe, decide whether SpO2 should be taken continuously or at intervals, establish the alert thresholds, and establish the frequency for checking and documenting the SpO2 levels.

Engage in hand hygiene.

Position the probe, taking care to avoid placing it on compromised skin. Ensure that the two sides of the probe are positioned in an opposing manner when utilizing an adhesive sensor.

Connect the probe to the oximeter and activate it.

Pay attention to the discernible beeps and examine the waveform displayed on the oximeter screen. An optimal waveform will exhibit uniformity and regularity, devoid of abrupt discontinuities or constant levels.

Verify the client's pulse to determine if it corresponds with the auditory output of the oximeter. If the probe does not meet the desired criteria, readjust it until it does.

When continually measuring SpO2, ensure that the alarm is activated and regularly inspect the condition of the skin beneath the probe every two hours.

Relocate the probe to a different location every four hours.

For sporadic monitoring, follow these steps: 1. Power off the oximeter. 2. Detach the probe from the client. 3. Clean the probe if it is reusable, or dispose of it properly if it is disposable.

Practice proper hand hygiene.

DOCUMENTATION

When providing care for a client who is being monitored using pulse oximetry, it is important to communicate certain observations to the healthcare practitioner. This includes a SpO2 reading that falls below a client-specific threshold.

Monitor the condition of the skin, including its integrity, color, hydration, and temperature at the location where the probe is positioned. If there is evidence of skin breakdown, irritation, or if the skin appears pale, moist, or chilly, it is advisable to select an alternative location for the probe. Monitor for any alterations in vital signs, level of consciousness, abnormal respiratory sounds, and cyanosis of the skin or mucous membrane.

Document: the date and time SpO2 reading the observations you made while collecting the reading