

**Evaluation of oxygen saturation during the normal activity of a dentist with the use of AXELMED SAFECOMFORT surgical mask**

Oxygen is tightly regulated within the body because hypoxemia can lead to many acute adverse effects on individual organ systems. These include the brain, heart, and kidneys. Oxygen saturation measures how much hemoglobin is currently bound to oxygen compared to how much hemoglobin remains unbound. At the molecular level, hemoglobin consists of four globular protein subunits. Each subunit is associated with a heme group. Each molecule of hemoglobin subsequently has four heme-binding sites readily available to bind oxygen. Therefore, during the transport of oxygen in the blood, hemoglobin is capable of carrying up to four oxygen molecules. Due to the critical nature of tissue oxygen consumption in the body, it is essential to be able to monitor current oxygen saturation. A pulse oximeter can measure oxygen saturation. It is a noninvasive device placed over a person's finger. It measures light wavelengths to determine the ratio of the current levels of oxygenated hemoglobin to deoxygenated hemoglobin. The use of pulse oximetry has become a standard of care in medicine. It is often regarded as a fifth vital sign.

This study was undertaken to evaluate whether the oxygen saturation of hemoglobin was affected by the surgical mask or not during the daily working medical activity.

Repeated measures were performed on a 34-year-old dentist to evaluate oxygen saturation during daily work.

Oxygen saturation was assessed after 3 clinical interventions lasting respectively:

- 30 minutes
- 60 minutes
- 120 minutes

It was used with AXELMED SAFECOMFORT surgical mask and the position of the mask did not change during the procedures (never under the nose). The same pulse oximeter (Gima ABPM Pulse Monitor) was used to measure the saturation of O<sub>2</sub> in the blood during the study. The participant behaved in the usual way during the operation. For all measurements, the nger probe was applied to the second finger of the right hand. The

study was conducted in May, while the operating room ambient temperature ranged from 18 to 20 ° C.

Shortly before the operation, oxygen saturation and heart rate values were recorded. At the end of the operation, the pulse oximeter was re-applied and the values were recorded. When the values for oxygen saturation of the hemoglobin were compared, no statistically significant differences were found between the pre-operative and post-operative values. As the duration of the operation increased, the oxygen saturation of the hemoglobin decreased slightly. Neither the pre-operative values nor the post-operative values in themselves were different.

There was no significant difference between the pre-control and post-control values of the pulse and oxygen saturation (SpO<sub>2</sub>).

Time	SpO <sub>2</sub> Pre-operative	SpO <sub>2</sub> Post-operative
30 min.	99	99
60 min.	99	98
120 min.	98	97

The increased endogenous heat production of the dentist during operation, as well as many aspects of the situation in the operating room - even the environment close to the surgical mask - can adversely affect working conditions. Surgical masks may impose measurable airway resistance, but it seems doubtful that this significantly increases the breathing process. Although hypoxemia may seem likely to result from the increased CO<sub>2</sub> content of the inhaled air due to the exhaled CO<sub>2</sub> trapped under the surgical mask, no controlled studies have been conducted on the effect of surgical masks on the level of oxygenation of the blood. . In this study, we measured the oxygen saturation of arterial pulses (SpO<sub>2</sub>) from a pulse oximeter and a statistically significant decrease in the level of saturation of O<sub>2</sub> in the operator's blood was not found operationally.

Pulse oximetry, now considered a standard of clinical care, is a non-invasive method used to measure arterial oxygen saturation with clinically acceptable accuracy.

Despite some performance limitations, hemoglobin concentration and pulse pressure have little influence on the accuracy of pulse oximeters in detecting hypoxemia. Most pulse oximeters have an average absolute error of less than 1.0% compared to in vitro saturation measurements.

It is difficult to believe that these masks act as oxygen absorption reducers, but they can act as a psychological limitation on the spontaneous breathing of the active dentist.

In order to better clarify this condition, a randomized control study should be conducted in a more controlled environment with different types of workers of different types who are or are not used to wearing masks (such as anesthesiologists, nurses), even working in the same durations. Therefore, it is important not to generalize the results of this preliminary experiment and it is necessary to conduct further studies involving the measurement of gas voltages over time, both from the blood and from the samples obtained under the mask (in order to show an alleged accumulation of CO<sub>2</sub> under the mask) to solve this problem.

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