

تقنيات اجهزة تخدير الكورس الاول

PULSE OXIMETER

Sawa University

College of health and medical
techniques

Department of Anesthesia

Stage 4

جامعة ساوة

الاهلية

كلية التقنيات الصحية

والطبية

قسم تقنيات التخدير

المرحلة الرابعة

محاضرة رقم 3

Lecture No3.

الجانب النظري

Theoretical

استاذ المادة : م . د سامي رحيم حسن

Introduction

- ❖ Pulse oximetry is a **non-invasive method** to measure oxygen saturation (SpO_2)
- ❖ Provides continuous monitoring of **oxygenation and pulse rate**.
- ❖ Essential for **anesthesia, ICU, and recovery settings**.



Principle of Operation

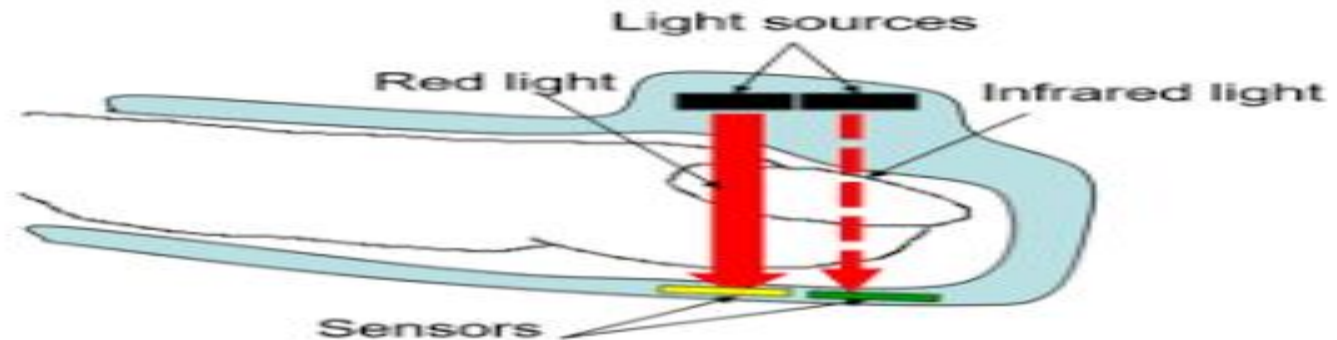
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- Measures light absorption at two wavelengths:
 1. - Red (660 nm): deoxygenated hemoglobin
 2. - Infrared (940 nm): oxygenated hemoglobin
- Rat



Components of Pulse Oximeter

1. **Light Source (LEDs):** red and infrared light.
2. **Photodetector:** detects transmitted light.
3. **Microprocessor:** calculates SpO_2 and pulse rate.

4. **Display:**



Types of Pulse Oximeters

1. Finger probe (portable)
2. Handheld oximeter
3. Tabletop oximeter
4. Integrated monitors in anesthesia machines



Normal Values

- SpO_2 : 95–100% (normal)
- $< 90\%$: hypoxemia (requires attention)
- Pulse rate: varies with patient's condition



Clinical Uses

1. **During anesthesia and surgery**
2. **In ICU and recovery rooms**
3. **During sedation and transport**
4. **For neonates and critical patients**



Factors Affecting Accuracy

1. **Poor perfusion (shock, hypothermia)**
2. **Motion artifact**
3. **Nail polish or artificial nails**
4. **Ambient light**
5. **Carbon monoxide poisoning (false high reading)**



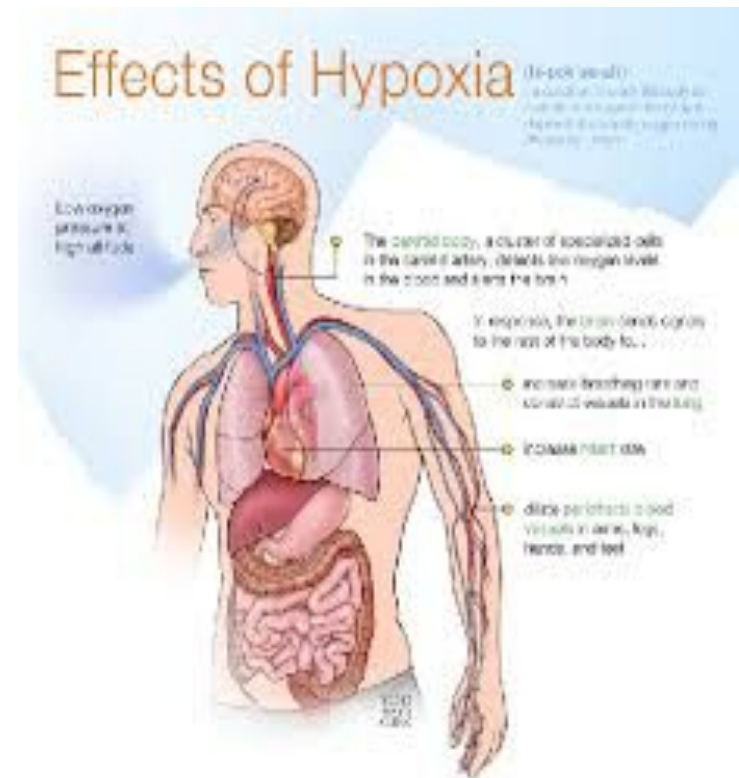
Advantages

1. **Non-invasive Continuous and real-time monitoring**
2. **Simple to use and portable**
3. **Early detection of hypoxia**



Limitations

1. Cannot detect hypercapnia (CO₂ buildup)
2. Inaccurate in low perfusion states
3. Delayed response compared to arterial blood gases



Maintenance & Safety

1. Regular cleaning of probes
2. Check cables and connections
3. Avoid liquid spills
4. Calibrate periodically (as per manufacturer)



References

1. Miller's Anesthesia, 9th Edition
2. Barash: Clinical Anesthesia
3. Morgan & Mikhail's Clinical Anesthesiology

