The Vascular Lab - Transcutaneous Oxygen (tcpO₂) in theory

I. What is tcpO₂?
Transcutaneous oxygen, tcpO₂ or TCOM, is a local non-invasive measurement reflecting the amount of O₂ that has diffused from the capillaries, through the epidermis, to a Clark-type electrode at the measuring site. It provides instant continuous information about the body’s ability to deliver oxygen to the tissue.

II. Why measure tcpO₂?
Transcutaneous oxygen measurement is a well-documented technique routinely used by clinicians for wound healing prediction, screening for vascular disease, assessing the success of revascularization, predicting amputation level, and qualification for hyperbaric oxygen therapy.

III. Reference values
- 50-70 mmHg Normal
- < 40 mmHg Impaired wound healing
- < 30 mmHg Critical Limb Ischemia

IV. Influencing factors
A low tcpO₂ value can be influenced by several factors:
- Peripheral Arterial Disease (PAD)
- Capillary impairment
- Cardiopulmonary disease
- Edema
- High consumption of O₂ due to infection/inflammation

V. Interpreting results
Oxygen challenge (tcpO₂ measurement during 100% oxygen inhalation), will distinguish low values due to a barrier to oxygen diffusion (edema and/or inflammation) from macrovascular disease (PAD). It can also determine candidates for HBO (Hyperbaric Oxygen) treatment.

Normal values: > 100 mmHg and/or > 100% increase from baseline.

Leg elevation for a duration of 5-15 minutes may be used to confirm macrovascular disease.

Normal values: Drop < 10 mmHg and/or < 20% from baseline.

Other methods to confirm macrovascular disease include toe and ankle pressure.

Reference electrode or oxygen saturation (pulse oximeter) will rule out arterial hypoxemia (due to pulmonary disease, for example).

A mean of several tcpO₂ values is a better predictor of wound healing potential than a single site value.

To predict benefit from HBO (Hyperbaric Oxygen) treatment.
The Vascular Lab - Transcutaneous Oxygen (tcpO₂) practically PeriFlux System 5000

I. Let the patient rest in supine position
   Keep feet and toes warm.

II. Turn on computer and instrument
   Calibrate electrodes. Allow the instrument 15 minutes to warm up. Calibrate electrodes again.

III. Attach fixation rings
   Remove body hair, blot with medical tape and wipe site with alcohol. Avoid bony prominences, areas of edema, large superficial vessels, calloused skin, plantar surface of the foot and infected or inflamed areas close to the wound.

IV. Start the PeriSoft for Windows Examination Manager
   Select patient from worklist, database or create a new patient.

V. Choose appropriate Examination Plan
   Choose attending staff.
   Enter appropriate information in the Examination Record, if available.

VI. Check instrument settings
   If necessary, rename channels and/or exclude tests/channels.

VII. Start measurement, follow instructions
   At least 15 minutes for stable baseline.
   Perform provocations if necessary - leg elevation/O₂ inhalation.

VIII. Print or export report

Calibration
Calibration ensures accurate measurements and should be performed:
- prior to each monitoring period
- when changing measurement sites
- every four hours
- when changing between patients
- every time an electrode has been remembraned (calibrate twice)

Cleaning and Maintenance of Electrode
Gently wipe the electrode and cable with a soft cloth or tissue moistened with water. Use clean tissues to remove any remaining moisture.

Note! Avoid exposing the electrode cable to any product (hand lotion or disinfection solution, for example) based on isopropanol/propyl alcohol/alcohol as frequent exposure to these products may damage the electrode cable.

To obtain reliable measurements, electrode remembraning is recommended every week.

Please refer to the instrument manual for complete instructions on cleaning and maintenance.

For detailed instructions, please refer to the instrument manual.

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