The tcpO\textsubscript{2} Handbook
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Introduction

This small handbook is a quick guide to transcutaneous oxygen (tcpO₂) in a clinical perspective.

The intention of this handbook is to give healthcare workers an overview and short-form information on how to use tcpO₂ in their daily work.

For more clinical details, please see the references. For a more detailed presentation of the technical issues and a troubleshooting guide of the TCM400, please look in the operator’s manual.

The validity of the measurement results from this instrument must be carefully examined by a clinician and related to the patient’s clinical condition before any clinical decisions are made on the basis of these results.

The tcpO₂ handbook is based on scientific literature and the operator’s manual and gives suggestions on how the procedures may be carried out according to clinical studies.

It is the intention that the users of the tcpO₂ handbook always make the relevant modifications according to local policies and procedures as well as review and approve the procedures suggested herein prior to their implementation.
tcpO₂ monitoring

Transcutaneous oxygen
Transcutaneous oxygen (tcpO₂) is a non-invasive monitoring of the oxygen tension in the skin. The monitoring is done by placing a Clark-type electrode on the skin so that it heats up the skin and provides tcpO₂ values.

tcpO₂ is a direct indication of the microvascular function. As opposed to pressure and volume assessments, tcpO₂ maps the actual oxygen supply available for the skin tissue cells. tcpO₂ also responds to macrocirculatory events, e.g. change in blood pressure and provocational maneuvers.

Practical application
Site selection – an ideal site would be located over a homogeneous capillary bed without large veins, skin defects, or hair. Placing the electrode directly over a bone may also give erroneous results, especially if a change in body position causes skin to be pulled against a protruding bone.

Severe edema can also give unreliable results.

The electrode
The electrode must be in contact with the tissue through the contact liquid. If there is air between the tissue and the electrode the tcpO₂ values will be questionable.

Initiation of monitoring
It takes about 15-20 minutes after the probe has been placed on the skin for the tcpO₂ to stabilize.

The clinical conditions
It is advisable to have standard conditions in order to have comparable results.

- Ambient temperature 21-23 °C (70-73 °F)
- Avoid prior smoking
- Avoid caffeine usage
- Stable patient status

Notes
How to place an electrode

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Calibrate the tcpO₂ electrode.</td>
</tr>
<tr>
<td>2.</td>
<td>Clean the selected measuring site with alcohol or other skin-preparation solution.</td>
</tr>
<tr>
<td>3.</td>
<td>Dry the site well with a gauze pad.</td>
</tr>
<tr>
<td>4.</td>
<td>Take a standard fixation ring.</td>
</tr>
<tr>
<td>5.</td>
<td>Remove the fixation ring from the protective film.</td>
</tr>
</tbody>
</table>
| 6.   | Apply the fixation ring to the measuring site as follows:  
   • Press the center of the fixation ring onto the measuring site with a finger.  
   • Run a finger around the rim circumference. |
| 7.   | Fill the hole in the fixation ring with 3-5 drops of the contact liquid. |
| 8.   | Affix the electrode into the fixation ring as follows:  
   • Align the arrow on the electrode with one of the marks on the fixation ring.  
   • Turn the electrode 90° clockwise to fasten it in the fixation ring. |
| 9.   | Repeat steps 1 to 8 if more electrodes are to be applied. |

Wait for a stable reading after the electrode has been affixed to the patient.

Note: The physiological stabilization time of a patient is 15-20 minutes for the tcpO₂ reading. During this time the electrode will slowly heat the skin, making the arteries dilate. Longer time may indicate an incorrect attachment of the electrode or a poorly selected measuring site.

Typical tcpO₂ mapping sites of the leg [1]

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Wound care
tcpO₂

tcpO₂ can be used in a number of clinical situations. In this section the clinical use of tcpO₂ is addressed in:
- Diagnosis of ischemia
- Diabetic foot syndrome
- Healing probability
- Prediction of wound healing (RPI)
- Spinal cord stimulation
- Hyperbaric treatment
- Evaluation of vasodilators
- Predicting amputation
- Suggesting amputation level
- Amputation level healing prognosis

Notes


tcpO₂ decision tree
The decision tree below gives an overview of the process of limb wound-care treatment. tcpO₂ is a useful aid in diagnosing ischemia, monitoring the treatment, and finally, evaluating the treatment.
Diagnosis of ischemia

Application
Mapping the oxygenation around the wound and extremities can recognize ischemia and severity of ischemia.

Diagnosing critical limb ischemia
tcpO₂ - criteria for critical limb ischemia [2]. Forefoot tcpO₂ in supine and dependency position to indicate critical limb ischemia [2].

tcpO₂ workflow
Use caution on patients with media sclerosis when measuring ankle pressure

![Workflow Diagram]

Critical ischemia should not be assumed
Critical ischemia may be assumed


Diabetic foot syndrome

Application
Determination of tcpO₂ appears to be a useful tool in screening type 2 diabetic patients for foot at risk.

Screening
The tcpO₂ value is monitored at the dorsum of the foot in supine and sitting position.

<table>
<thead>
<tr>
<th>tcpO₂ difference between supine and sitting (mmHg) [3]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic group with foot at risk</td>
<td>23.5 ± 2.0</td>
</tr>
<tr>
<td>Diabetic control group</td>
<td>15.0 ± 1.4</td>
</tr>
<tr>
<td>Control group</td>
<td>13.3 ± 1.1</td>
</tr>
</tbody>
</table>

Type 2 diabetic patient with foot at risk was defined as a foot with neuropathy but without ulceration or previous ulceration. Diabetic control group was type 2 diabetic patients without foot lesions or neuropathy and control group was normal subjects.

Notes

Healing probability

Application
By performing provocational maneuvers such as elevating the leg, the macro- and microcirculatory capacity can be evaluated. For tcpO₂ values between 20 and 40 mmHg in supine position it is advisable to measure tcpO₂ on an elevated leg to diagnose the healing probability [4].

How to do the provocational maneuver
tcpO₂ on elevated leg for three minutes.

Predicting healing possibility
According to T. Rooke [4] a supine measurement below 20 mmHg indicates problems in wound healing and values above 40 mmHg indicate that the wound will heal. In the area between 20 and 40 mmHg, leg elevation can predict outcome.

When the decrease is less than 10 mmHg, 80 % of the wounds will heal.
When the decrease is greater than 10 mmHg, 80 % of the wounds will fail to heal.

<table>
<thead>
<tr>
<th>Decrease of &lt; 10 mmHg</th>
<th>80 % healing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease of &gt; 10 mmHg</td>
<td>80 % fails to heal</td>
</tr>
</tbody>
</table>

Prediction of wound healing
Regional Perfusion Index (RPI)

Application of RPI
The Regional Perfusion Index (RPI) is used to eliminate the cardio-respiratory influence and simplify the $t_c p O_2$ interpretation.

Lim $t_c p O_2$ is normalized to chest values.

Calculation of RPI

\[
RPI = \frac{t_c p O_2 \text{(limb)}}{t_c p O_2 \text{(chest)}}
\]

\[
= \frac{35 \text{ mmHg}}{85 \text{ mmHg}} = 0.41
\]

RPI $< 0.4$ predicts a poor outcome [5]
RPI $> 0.6$ predicts an excellent outcome [5]
0.4 $<$ RPI $< 0.6$ some heal and some do not [5]

Notes

Spinal cord stimulation

Application
In a study by W. Amann et al [6] the effect of spinal cord stimulation (SCS) on patients with unreconstructable critical leg ischemia (CLI) is documented. The study indicates that in a preselected group of patients limb salvage, pain and wound care can be improved.

tcpO₂ in spinal cord stimulation treatment
- Selection of patients for SCS on the basis of microcirculation and microcirculatory response to test stimulation.
- Evaluate effect of treatment

Notes

Flow chart for patient selection based on tcpO₂ measured in supine position. [6]

Hyperbaric treatment

Application
tcpO₂ is widely used in hyperbaric oxygen (HBO) treatment of wounds and has gained importance as a tool for predicting potential candidates for hyperbaric oxygen therapy.

tcpO₂ in HBO
• Used to identify the presence of hypoxia in wounded tissue
• Predict the responders to hyperoxia
• In some instances to determine when HBO treatment is complete

Evaluation of vasodilators

Application
Until now the only way to document the effect of vasodilator therapy was improvement of the clinical symptoms. tcpO₂ measurements in the beginning of the treatment as well as during the course of treatment make it possible to monitor the effect of the treatment.

Therapeutic effects in pure conservative therapy (e.g. PGE₁) is to be expected on the microcirculatory level and can be documented through a significant increase in tcpO₂.

In the conservative therapy of arterial vascular diseases with expensive Prostaglandin products, an early prognosis of the success rate of the treatment can be estimated. If necessary a change in the therapy can be implemented, which can save a substantial amount of money.

Example

<table>
<thead>
<tr>
<th>Ambient pressure (Atm)/ Breathing media</th>
<th>1.0 Air</th>
<th>1.0 O₂</th>
<th>2.4 O₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air, mmHg</td>
<td>159</td>
<td>760</td>
<td>1824</td>
</tr>
<tr>
<td>Chronic wound⁴</td>
<td>5-20</td>
<td>200-400</td>
<td>1000-1700</td>
</tr>
<tr>
<td>Chest tcpO₂ ⁵</td>
<td>67 ± 12</td>
<td>450 ± 54</td>
<td>1312 ± 112</td>
</tr>
<tr>
<td>Foot tcpO₂ ⁵</td>
<td>63 ± 13</td>
<td>280 ± 82</td>
<td>919 ± 214</td>
</tr>
</tbody>
</table>

TABLE I: Tissue oxygen tension values [7]. ⁴ Implanted polarography. ⁵ tcpO₂.


Predicting amputation

Application
Predicting outcome of chronic severe ischemia of the lower limbs.

The provocation manuever
Patient is sitting.

tcpO₂ on leg dependency
- Useful test in classifying the severity of peripheral arterial occlusive disease (PAOD) or diagnosing critical ischemia.
- Test for the preserved hidden reserve to redistribute flow.

Predictive value
Patients with a tcpO₂ below 10 mmHg, measured at the dorsum of the foot in supine position, have poor prognosis. To improve predictions, measurements are done on sitting patients [9].

Forefoot > 40 mmHg  5 % PAOD patients required amputation [9].
Forefoot < 10 mmHg  85 % PAOD patients were amputated, in spite of 2.3 ± 1.51 arterial reconstructive operations [9].

Notes


Note: Avoid stasis in the legs
Suggesting amputation level

Application
The healing success after amputation is highly dependent on oxygenation of the tissue.

By mapping tcpO₂ levels on the leg an optimal amputation level can be suggested, reducing amputation of well-perfused tissue and reamputations.

In a study by A. Misuri et al [10] a reference level of 20 mmHg was evaluated as suitable for evaluation of the amputation level. The decision tree on the following page is from the article. For further information from the article, please see page 37 of this handbook.

Notes

Amputation level - healing prognosis

Application
Suggesting the right level of amputation.

The provocational maneuvre
tcpO₂ with oxygen inhalation:
100 % oxygen admission for 10 minutes.

Suggesting amputation level

For successful amputation stump healing

<table>
<thead>
<tr>
<th>Initial tcpO₂ values [11]</th>
<th>&gt; 10 mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased tcpO₂ after O₂ inhalation [11]</td>
<td>&gt; 10 mmHg</td>
</tr>
</tbody>
</table>

*Values from dorsum of the foot and 10 cm distal to the knee

For unsuccessful amputation stump healing

<table>
<thead>
<tr>
<th>Initial tcpO₂ values [11]</th>
<th>&lt; 10 mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased tcpO₂ after O₂ inhalation [11]</td>
<td>≤ 10 mmHg</td>
</tr>
</tbody>
</table>

*Values from dorsum of the foot and 10 cm distal to the knee

Use of TCM400

This section of the handbook gives an overview of how to work with the TCM400. For further information, please see the TCM400 Operator’s Manual.

Please refer to the operator’s manual of the TCM400 for further details prior to using TCM400.

After the electrode has been placed it takes 15-20 minutes for the measuring site to be thoroughly heated and stable results to be displayed on the monitor. A measuring temperature of 43-45 °C (109-113 °F) is recommended.

During monitoring, the results can be viewed as curves, trend table, and the current results.

A measuring sequence with TCM400 is easy:

1. Start the monitor
2. Calibrate
3. Apply the electrode to the measuring site
4. Wait 15-20 minutes
5. Measure and perform provocational maneuvers
6. Print report

The menu structure of the monitor:

- **Setup**
  - Change View
    - Normal View
    - Table View
    - Curve View
  - Options
    - View
    - Options
      - RPI
      - Power
      - Temp.
      - None
    - View
      - Options
        - Parameter
        - Time Interval
        - View Timer-active Measurements only
    - Options
      - Curve Scales
        - tcpO2 Upper Scale
        - tcpO2 Lower Scale
        - Power Upper Scale
        - Power Lower Scale
        - RPI Upper Scale
  - Setup
    - Technical Setup
      - Enter password
        - Auxiliary Setup
          - Backlight
          - O2 Unit
          - Humidity Correction Factor
          - Cal Gas Mixture
          - Bypass Calibration
          - System Setup
        - Utilities
          - Self-check
          - Restore Default
          - Memory Export
        - Service Mode
          - For Service Personnel only
    - Electrode Temp.
      - User Setup
      - Timer Setup
        - Timer Mode
        - Start Value
        - Countdown Timer Setup
      - Printer Setup
        - Print Time Interval
        - Start Time
        - Stop Time
        - Curve Scales
        - Patient ID
        - Print only Data with Events
        - Print in Color

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During monitoring, the results can be viewed as curves, trend table, and the current results.

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1. Start the monitor
2. Calibrate
3. Apply the electrode to the measuring site
4. Wait 15-20 minutes
5. Measure and perform provocational maneuvers
6. Print report
Calibration
Radiometer recommends performing a calibration:
• prior to each monitoring period
• when changing measuring sites
• every four hours
• every time an electrode has been remembraned

Follow the steps below to calibrate the electrode(s) with atmospheric air:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Connect the tcpO₂ electrode to the electrode socket on the TCM400 system.</td>
</tr>
<tr>
<td>2.</td>
<td>Insert the membraned electrode into the calibration chamber on the TCM400 system.</td>
</tr>
<tr>
<td>3.</td>
<td>Swing the electrode retainer into position over the electrode.</td>
</tr>
<tr>
<td>5a.</td>
<td>To calibrate all connected electrodes simultaneously, press <strong>Calibrate</strong>. Result: If six electrodes are connected, the following screen appears:</td>
</tr>
<tr>
<td>5b.</td>
<td>To calibrate one electrode at a time, press the number of the relevant electrode. Result: The Calibrate Single Electrode screen appears:</td>
</tr>
</tbody>
</table>

Press **OK** to start calibration, or press **Cancel** to return to the previous screen without initiating the calibration.

Note: While calibrating a single electrode, it is possible to monitor with the other electrodes.
Cleaning
Wipe the following parts gently with a soft cloth moistened with skin antiseptic, e.g. 70 % alcohol:
- the electrode head
- the cable

Note: Constant use of hand lotion containing isopropanol/propylalcohol and alcohol prior to handling the electrode may damage the cable. To avoid transferring lotion to the cable, dry your hands prior to handling the electrode.

Cleaning the exterior
When cleaning the monitor:
- Shut down the monitor.
- Use a cloth which has been lightly dampened with soapy water or a mild detergent.
- Do not use abrasive cleansers or pads: the finish may become damaged.
- Do not use ethanol-based substances or aggressive detergents. Extensive use may cause the plastic to become brittle and cracks may occur.

Cleaning the touch screen
A dry or lightly dampened soft, lint-free cloth may be used to clean the monitor’s touch screen. Simply wipe the screen gently to remove fingerprints and/or dirt. To avoid streaking, an approved screen cleaner is recommended.

Disinfection
Immerse the electrode and the cable in a 2-3 % aqueous solution of active dialdehydes.

WARNING/CAUTION: Do not immerse the electrode plug in the disinfection solution, as this will cause the electrode to fail.

WARNING/CAUTION: Do not heat sterilize as the electrode cannot tolerate temperatures exceeding 70 °C (158 °F), as this will cause the electrode to fail.

Maintenance of electrodes
To obtain reliable values, remembrane the electrode every week.

Follow the steps below to prepare the electrode for membraning:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Remove the old O-rings: Slide the O-ring remover under the O-ring, just above the arrow on the electrode house.</td>
</tr>
<tr>
<td>2.</td>
<td>Turn the O-ring remover clockwise to release the O-ring.</td>
</tr>
<tr>
<td>3.</td>
<td>Peel off the old membrane.</td>
</tr>
<tr>
<td>4.</td>
<td>Clean the electrode surface: Absorb the old electrolyte solution with the cleaning paper.</td>
</tr>
</tbody>
</table>
5. Rub the electrode measuring surface carefully two or three times to remove the thin layer of silver that has precipitated on the electrode.

6. Membrane the electrode as described in steps 3 to 6 in the membraning procedure below.

Use the D826 membraning kit to prepare a new electrode for use. Follow the steps below to membrane the electrode:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Unpack a new tcpO₂ electrode.</td>
</tr>
<tr>
<td>2.</td>
<td>Connect the electrode plug to the electrode socket at the rear of the monitor.</td>
</tr>
</tbody>
</table>
| 3.   | Apply two drops of the tcpO₂ electrolyte solution to the surface of the tcpO₂ electrode.  
Note: Check that the electrolyte solution covers the entire surface without air bubbles. |
| 4.   | Membrane the tcpO₂ electrode:  
• Place the membrane unit on a hard and stable surface.  
• Insert the electrode head into the top of the white tcpO₂ membrane unit. |

5. • Press the electrode firmly into the unit until a click is heard.  
• Remove the electrode from the unit and wipe off the surplus electrolyte solution with the cleaning paper.

6. Check that the system shows Calibration Required, and calibrate the electrode as described in chapter 5: Calibration.

Notes
Methods in diagnosis

tcpO₂ provides non-invasive monitoring of the oxygen tension of the skin:
- It gives direct indication of microvascular function.
- As opposed to pressure and volume assessments, tcpO₂ maps the actual oxygen supply available for the skin tissue cells.
- tcpO₂ responds to macrocirculatory events, e.g. change in blood pressure, provocational maneuvers and removal of plaque.

Ankle blood pressure – Blood cuffs are placed at the ankle and inflated to block blood flow. Measurements are made with a Doppler sensing unit placed distal to the cuffs when pressure is released. The method measures arterial circulation and is used to assess disease severity. The method may give falsely elevated values due to incompressibility of the arteries caused by calcification – often seen in diabetics – and can be painful to the patient.

Toe blood pressure – A small cuff is applied to the toe and inflated to above toe systolic pressure and then slowly deflated. A Doppler device registers when pressure is released. The method measures arterial circulation and is used in the diagnosis of occlusive diseases. It cannot be used if there are ulcers on the toes or if toe pulse is severely reduced or absent in critical ischemia.

Duplex scanning – Vessels are visualized by a two-dimensional ultrasound imaging. Blood flow is displayed on the screen as a picture. The method can be used to evaluate arterial and venous circulation and locate blockages. It does not quantify local oxygen perfusion.

Angiography – An invasive examination with the injection of a contrast agent through a needle or catheter into one or more arteries to make them visible by x-ray. The method provides a road map of blockages in the arteries. It does not quantify local oxygen perfusion and the contrast agent may cause discomfort.

Laser Doppler – The method is based on the principle of Doppler shift of laser light back-scattered by the movement of red blood cells. The perfusion is measured with laser probes.
Comparison of methods
– wound care

Kalani M et al.  
Transcutaneous oxygen tension and toe blood pressure as predictors for outcome of diabetic foot ulcers.  
Diabetes Care 1999; 22, 1; 147-51.  
N: 50 diabetic patients with chronic foot ulcers.  
**Conclusions:**  
“The results indicate that $tcpO_2$ is a better predictor of ulcer healing than toe blood pressure (TBP) in diabetic patients with chronic foot ulcers, and that the probability of ulcer healing is low when $tcpO_2$ is < 25 mmHg.”

<table>
<thead>
<tr>
<th></th>
<th>TBP $^1$</th>
<th>$tcpO_2$ $^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>15</td>
<td>85</td>
</tr>
<tr>
<td>Specificity</td>
<td>97</td>
<td>92</td>
</tr>
<tr>
<td>Positive predicted value (PPV)</td>
<td>67</td>
<td>79</td>
</tr>
<tr>
<td>Negative predicted value (NPV)</td>
<td>77</td>
<td>94</td>
</tr>
</tbody>
</table>

1. Cutoff points < 30 mmHg and ≥ 30 mmHg  
2. Cutoff points < 25 mmHg and ≥ 25 mmHg

“An accurate method is the radioisotope technique using Xenon, proposed by Lassen and Holstein. Recently, using this technique Dwars et al have reported a positive predictive value of 89 % and a negative predictive value of 99 %. Nevertheless, application of this technique is not widely spread, due to the fact that the necessary equipment is complex to use, expensive, requires specialized technicians, and use of a radioisotope.

Transcutaneous oximetry is a noninvasive method, which moreover is quantitative, easy to apply and with high diagnostic accuracy despite some false-positive or false-negative values, but in rare cases. It can be employed in all cases, including those with blood flow in distal (pedal) arteries not found by Doppler technique. It enables the evaluation of all presumed levels of amputation.

Finally, based on these data of transcutaneous oximetry and comparison of it with other methods, we can conclude that transcutaneous oximetry is close to being optimal. Unlike Doppler and radioisotope techniques, this investigation is noninvasive (as Doppler technique), easily carried out (while Doppler technique is not appropriate for calcified arterial wall and blood flow velocity less than 6 cm/sec). It is simple, does not generate radiation and is cost-effective.”

Comparison of methods
– amputation level

Misuri A et al.  
Predictive value of transcutaneous oximetry for selection of the amputation level.  
N: 30.  
**Conclusions:**  
“Following our observations and according to some reported studies, we believe transcutaneous oximetry to be the best method for selection of amputation level. This is a simple, noninvasive and accurate method, which has showed itself superior to other techniques (i.e. Doppler and radioisotope).”

“The lower PPV for TBP, compared with the PPV for $tcpO_2$, is most probably related to functional disturbances in skin microcirculation not detected by measurement of TBP. Another reason may be that a slight calcification is also present in the digital arteries, causing falsely elevated TBP and contributing to a low PPV for TBP. This may be one explanation of the findings of rather high TBP in the four patients who were amputated (20-90 mmHg) simultaneously, showing very low $tcpO_2$ levels (0-1 mmHg).”
**Cost savings with tcpO₂**

In this section examples of costs of wound care and amputation are presented.

**Wound care**

In a Dutch study [12] by Bouter et al the in-hospital cost of primary healing was USD 10,000, and Apelqvist et al found in a Swedish study [13] that the total direct costs until healing was USD 8,500.

Early identification of ineffective treatments and obtaining information to better decide how to treat a patient or when and where to send a patient for further analysis optimize the clinical process. The improved foundation for making the optimal decision may lead to cost savings and increased patient life quality.

**Amputation**

Several studies of the cost of amputation have been made. In a Dutch study [12] the in-hospital cost of an amputation was USD 15,000.

A Swedish study [13] investigated the total direct costs until healing and found the total average cost for patients who healed after a primary amputation was USD 48,000 compared with USD 74,000 for patients with reamputation. By decreasing the levels of reamputations costs can be reduced. In a Norwegian study [14] by Witso et al 19 % of patients having had an amputation were reamputated.

Evaluating the transcutaneous oxygen level prior to amputation gives quantitative information for selecting the right level of amputation. This may both save costs and increase patient outcome.

**Calculate cost savings – an example when decreasing reamputations**

<table>
<thead>
<tr>
<th>Example figures</th>
<th>Your figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amputations last year</td>
<td>36</td>
</tr>
<tr>
<td>Reamputations last year</td>
<td>7</td>
</tr>
<tr>
<td>Cost of surgery and stay in hospital [15] EUR</td>
<td>15,600</td>
</tr>
<tr>
<td>Average number of days in hospital [15]</td>
<td>25 days</td>
</tr>
<tr>
<td>Savings when decreasing reamputation by 50 % (number of reamputations x total costs x 50 %)</td>
<td></td>
</tr>
<tr>
<td>Total savings EUR</td>
<td>54,600</td>
</tr>
</tbody>
</table>

The above numbers are examples and may vary considerably between countries and healthcare facilities.

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Choosing the right transcutaneous monitoring solution is a matter of confidence — confidence in equipment performance, confidence in measurements, and confidence in your supplier.

At Radiometer, our focus is on providing customers with this confidence. We do that through reliable products, thorough product training, trouble-free implementation, effective customer support, and continuous knowledge sharing.

Because of our total approach to transcutaneous monitoring, hospitals around the world have placed their confidence in Radiometer’s solutions in this field for more than 30 years.

For more information on Radiometer, contact your local Radiometer office or go to:
www.radiometer.com

For more information on transcutaneous monitoring, visit:
www.radiometer.com/tc

bloodgas.org is a knowledge website for healthcare professionals working with blood gas and critical care testing. For articles on transcutaneous monitoring be sure to visit bloodgas.org today. bloodgas.org is sponsored and maintained by Radiometer.
www.bloodgas.org