

Lymphedema Assessment with Delfin LymphScanner

Lymphedema

Lymphedema is a medical condition characterized by swelling, especially in one or more extremities, that results from impaired flow of the lymphatic system. Lymphedema – particularly in breast cancer survivors and other cancer patients – presents a critical need for early detection and reliable monitoring. Traditional methods like limb circumference and water displacement are either too general, difficult to implement, or not sensitive enough to detect early-stage or localized fluid accumulation.

Lymphedema Stages:

1. Subclinical Stage: Abnormal flow in the lymphatic system. No signs or symptoms detectable by conventional methods
2. Mild Stage: Accumulation of fluid with swelling. Swelling resolves with elevation. Pressing on the area may leave a dent (pitting edema)
3. Moderate Stage: Permanent swelling that does not resolve with elevation. Pressing on the area no longer leaves a dent. Changes in the skin with scarring and thickening
4. Severe Stage: Elephantiasis (large, deformed limb), skin thickening with "wart-like" growth and extensive scarring

Lymphedema Detection with LymphScanner

The LymphScanner has been developed to offer a non-invasive, real-time measurement tool to assess local tissue water content rapidly and sensitively. It is a powerful instrument for both clinical practice and medical research as a handheld and easy-to-use device for measuring the water content in tissue.

The LymphScanner measures a value called PWC (Percentage Water Content) which indicates swelling in tissue. Measurements are performed by placing the probe head on the skin surface for a few seconds. The measured PWC value is shown on the display of the device when the measurement is complete.

The LymphScanner is also useful when comparing water content between two sites, e.g. operated site vs. healthy site. The device automatically calculates the PWC difference between healthy and swelling site when the scan mode of the LymphScanner is used.

With the LymphScanner you can

- Detect lymphedema locally in seconds
- Sensitively follow the stage of lymphedema and see even small differences
- Show the effects of the treatment easily to the patient and motivate the patient to use compression products

The LymphScanner is a portable, hand-held device immediately ready to use once switched on.

Benefits in Clinical Use

From Patient's Perspective

- Stay motivated by tracking clear, numerical results
- Easily see which treatments work best for oneself through objective measurements
- No more guessing whether a therapy is effective – the numbers speak for themselves
- Peace of mind: measurements show whether swelling is present or not, reducing unnecessary stress

From Hospital's Perspective

- Reliable and standardized assessment of lymphedema – no subjective aspects
- Consistent reporting directly into patient records for systematic follow-up
- Improved treatment outcomes and more accurate care planning
- Prevent costly complications by detecting swelling early
- Streamlined patient workflow for lymphedema monitoring
- Objective data supports clinical decisions: identify which patients need compression and manual therapy, and who can manage with compression alone

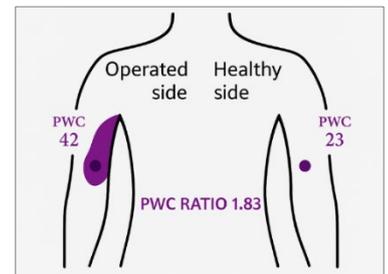
LymphScanner Measurement

Use either spot or scan mode. Spot mode is the best way to measure a single site. Scan mode enables automated calculation of PWC ratio of two measurement sites.

See the LymphScanner User Manual for detailed measurement instructions.

Simple steps in spot mode when comparing two sites are:

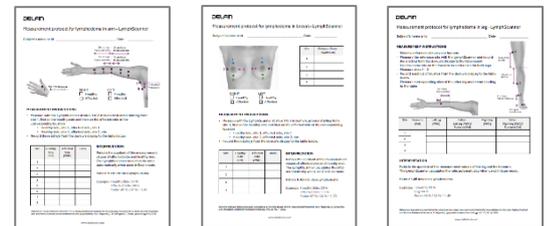
1. Measure reference site (healthy, control site)
2. Write down the reading
3. Measure operated site (affected)
4. Write down the reading
5. Calculate the ratio (Ratio = PWC in operated site/PWC in healthy site).
In the example figure on the right: Ratio = $42/23 = 1.82$, which indicates 82 % higher water content in the operated site compared to the healthy site.



Thresholds are based on literature (*)

Measurement Protocols

Measurement protocols for arm, breast and leg measurements are available for easy and clear data handling. Ask your local distributor for protocol forms.



Device Maintenance

- LymphScanner is a chargeable unit. Charge the device when low battery warning appears on the display.
- LymphScanner can be disinfected with alcohol.
- The manufacturer recommends calibration regularly to ensure high quality performance.
- Check Tool is provided for assessing the accuracy of the LymphScanner readings

See detailed instructions in the User Manual.

For further assistance contact your local representative or info@delfintech.com

(*) References

Tissue dielectric constant (TDC) measurements as a means of characterizing localized tissue water in arms of women with and without breast cancer treatment related lymphedema, H.N. Mayrovitz, D.N. Weingrad, S. Davey, Lymphology 47 (2014).

Breast Tissue Dielectric Constant as a Potential Breast Edema Assessment Parameter, H.N. Mayrovitz, C. Somarriba, D.N. Weingrad, Lymphatic research and biology, Vol. 20, No. 1, 2022.

Assessing Lower Extremity Lymphedema Using Upper and Lower Extremity Tissue Dielectric Constant Ratios: Method and Normal Reference Values, H.N. Mayrovitz, Lymphatic research and biology, Vol. 17, No. 4, 2019.