

Device Assesses and Monitors Lymphedema Noninvasively

The breakthrough technology is based on the use of bioimpedance spectroscopy.

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Lymphedema is the swelling that generally occurs in the arms or legs caused by the removal of or damage to lymph nodes as a part of cancer treatment. Treating it at the earliest possible stage is the best way to manage the condition and prevent it from leading to pain, recurrent infection, reduced mobility, and impaired function.

Lymphedema is caused by blockage in the lymphatic system, which is part of the immune system. The blockage prevents lymph fluid from draining well, and the fluid buildup leads to swelling. While there is presently no cure for lymphedema, it can be managed and often reversed with early diagnosis and diligent care of the affected limbs.

The Lymphedema Index (L-Dex) is breakthrough technology based on the use of bioimpedance spectroscopy (BIS), the most accurate and most sensitive type of bioimpedance. BIS provides a highly accurate measure of extracellular fluid (ECF) available in a rapid and non-invasive manner. It can determine fluid shifts, as small as ~36 mL in the human body, which are medically meaningful. For lymphedema, this means L-Dex can detect excess accumulation of ECF long before any visible or measurable swelling occurs.



The digital health platform technology uses L-Dex measurements, which are made by passing a harmless electrical signal of very low strength from the device through the patient's limbs. (Credit: Impedimed)

SOZO is a new digital health platform technology using ImpediMed's latest generation of BIS technology. It uses 256 unique frequencies that are sent through the body, and the impedance is measured at each one. It provides an accurate determination of solely the ECF compartment, which includes lymph fluid, as well as the impedance of intracellular fluid and total body water.

L-Dex technology has been the subject of numerous published studies and is now the recommended technology for the early assessment of lymphedema by organizations such as

the National Lymphedema Network (NLN), National Accreditation Program for Breast Centers (NAPBC), the American Physical Therapy Association (APTA), and many clinics and hospitals across the United States.

How L-Dex Works

L-Dex measurements are made by passing a harmless electrical signal of very low strength from the SOZO device through the patient's limbs. All limbs are measured, and the whole procedure only takes about 30 seconds to complete.

The electrical signal travels through the fluid surrounding the cells which make up the muscle and tissue of the limb. The amount of this fluid increases as lymphedema develops. Increased fluid means the electrical signal will travel more easily through the limb. A SOZO device compares how easily the electrical signal travels in the unaffected versus the affected (or at-risk) limbs and generates an L-Dex value from this comparison.

L-Dex measurements:

- Provide a quick and non-invasive method for aiding in the clinical assessment of unilateral or bilateral lymphedema of the arm or leg in women and men.
- Demonstrate extracellular fluid level differences, if present.
- Help healthcare professionals accurately measure extracellular fluid differences of the limbs at all stages of lymphedema.
- Can be used as routine monitoring during each physician visit.

The platform can be used by a medical provider as a series of L-Dex measurements over time to help make better decisions about a patient's therapy.

This article was written by Dennis Schlaht, Senior Vice President, R&D and Technology, ImpediMed, Carlsbad, CA. For more information, visit [here](#).