

## **Comparing Delfin Technologies' TDC Instrument and ImpediMed's BIS Device: Advancements in Fluid Assessment Technologies**

In the realm of healthcare, the ability to accurately assess fluid levels within the body is crucial for early detection, assessment, and management of chronic conditions. Two notable technologies, Delfin Technologies' Tissue Dielectric Constant (TDC) instrument and ImpediMed's Bioimpedance Spectroscopy (BIS) device, offer noninvasive approaches to this assessment, each with its own unique features and benefits.

### **Tissue Dielectric Constant (TDC) by Delfin Technologies**

Delfin Technologies' TDC technology takes a localized approach to fluid assessment, focusing on the measurement of water content in skin and subcutaneous tissue. The device operates on the principle of tissue dielectric constant (TDC), which is directly proportional to the amount of water in the tissue.

The TDC instrument offers several benefits, including high sensitivity in measuring water content and edema, non-invasiveness, and ease of use. With the ability to provide fast and local measurements on virtually all areas of the body, the device is suitable for a wide range of clinical and non-clinical research applications where changes in tissue water may occur.

### **Bioimpedance Spectroscopy (BIS) by ImpediMed**

ImpediMed's BIS technology, developed by ImpediMed, involves the measurement of impedance at various frequencies, which allows for the assessment of different types of fluid compartments within the entire body, including extracellular and intracellular fluids. By analyzing impedance at multiple frequencies, BIS can determine parameters such as total body water, extracellular fluid volume, and intracellular fluid volume.

### **A Comparative Analysis**

While both Delfin's TDC instrument and ImpediMed's BIS device offer valuable insights into fluid status, they serve different purposes and excel in different areas.

- **Scope of Assessment:** TDC focuses on localized measurements, making it ideal for assessing specific areas of interest, such as skin and subcutaneous tissue. On the other hand, BIS provides a comprehensive analysis of fluid compartments throughout the body, making it suitable for assessing systemic conditions and monitoring disease progression.
- **Depth of Measurement:** TDC allows for measurements at various depths, providing flexibility in targeting different layers of tissue. In contrast, BIS measures impedance throughout the body, offering an overview of fluid distribution.

- Clinical Applications: BIS has been studied for managing chronic conditions, particularly lymphedema. Meanwhile, TDC's localized approach makes it suitable for applications such as wound care management and dermatological assessments, providing localized measurements with high sensitivity and precision.

## **Comparative Analysis in Clinical Research**

Recent studies have sought to compare the efficacy of Delfin Technologies' TDC instrument with ImpediMed's BIS device in assessing conditions such as lymphedema. One notable article titled "Experimental and Analytical Comparisons of Tissue Dielectric Constant (TDC) and Bioimpedance Spectroscopy (BIS) in Assessment of Early Arm Lymphedema in Breast Cancer Patients after Axillary Surgery and Radiotherapy" sheds light on this comparison.

## **Study Overview**

The study aimed to evaluate the performance of TDC-based measurements and BIS in assessing early arm lymphedema in breast cancer patients following axillary surgery and radiotherapy. By comparing the two techniques, researchers aimed to identify the respective strengths and limitations of the two techniques in diagnosing and monitoring lymphedema progression.

## **Findings**

The study revealed discrepancies between TDC and BIS techniques in assessing lymphedema, attributed to differences in measurement techniques and the assessed tissue water components. Notably, the TDC technique demonstrated higher sensitivity than BIS in the early assessment of breast cancer-related lymphedema (BCRL). It highlighted that nearly 20% of early lymphedema cases are only superficially localized, underscoring the importance of comprehensive assessment methods. Additionally, the study highlighted the complementary role of TDC and arm volume measurements in diagnosing early lymphedema, emphasizing the importance of employing multiple diagnostic techniques for accurate assessment.

## **Conclusion**

The results of the study supported the complementary role of TDC and arm volume measurements as highly diagnostic methods for early lymphedema detection. While BIS offers a systemic view of fluid distribution, TDC-based measurements provide localized insights, particularly valuable in superficial lymphedema detection. The study underscores the importance of leveraging multiple assessment techniques to enhance diagnostic accuracy and improve patient outcomes in lymphedema management.

**May 2024**

## References

Lahtinen T, Seppälä J, Viren T, Johansson K. Experimental and Analytical Comparisons of Tissue Dielectric Constant (TDC) and Bioimpedance Spectroscopy (BIS) in Assessment of Early Arm Lymphedema in Breast Cancer Patients after Axillary Surgery and Radiotherapy. *Lymphat Res Biol.* 2015 Sep;13(3):176-85. doi: 10.1089/lrb.2015.0019. Epub 2015 Aug 25. PMID: 26305554.