

## Tissue Dielectric Constant (TDC) as an Index of Skin Water in Women with and without Breast Cancer: Upper Limb Assessment via a Self-Contained Compact Measurement Device

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**Objective:** Our goals were to use a hand-held TDC device to determine its use to evaluate; (1) differences between young healthy women vs. women with breast cancer (BC); (2) differences among sites and (3) differences between single vs. triplicate TDC measurements.

**Background:** Previous work showed TDC measurements at 300 MHz with this hand-held device to be similar to a multi-probe system in young subjects. However, its utility in other relevant groups has not been established.

**Methods:** Eighty four women were included; 42 were young ( $24.0 \pm 2.4$  years) self-described healthy women (group A) and 42 were older ( $65.5 \pm 1.6$  years) women with recently diagnosed BC who were awaiting surgery (group B). In both groups TDC values were assessed on the anterior forearm and in group B at the hand, forearm and biceps with all measurements bilateral and in triplicate.

**Results:** (1) Forearm TDC values were similar for young and older groups with no significant differences (NSD) between groups or between dominant and non-dominant sides or inter-arm ratios. (2) Hand TDC values were about 21% greater than forearm and biceps values but inter-arm ratios (at-risk/contralateral) are NSD among sites.

**Conclusions:** Based on limits of agreement analyses, single TDC measurements were adequate for most forearm and biceps evaluations but multiple measurements are needed for hand measurements. Theoretical detection thresholds for unilateral lymphedema using a 3SD limit of inter-arm ratios are 1.57, 1.20 and 1.24 for hand, forearm and biceps. These indicate useful forearm and biceps thresholds but a less useful ratio at the hand due to inter-subject variability.