

Tissue Dielectric Constant (TDC) as an Index of Localized Arm Skin Water: Differences between Measuring Probes and Genders

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Objective: Our goal was to compare measured tissue dielectric constant (TDC) values between multi-probe and compact-probe devices with respect to effective sampling depth, anatomical site and gender and to compare compact-probe TDC values measured on women with and without breast cancer (BC).

Background: An easily measured non-invasive quantitative estimate of local skin tissue water is useful to assess local lymphedema and its change. One method uses skin TDC values at 300 MHz that depend on free and bound water. Until now such measurements used a research-type multi-probe but recently a hand-held compact-probe has become available that is more clinically convenient. Since most published data is based on multi-probe measurements it is important to characterize differences between devices that unless known might lead to ambiguous quantitative comparisons between TDC values.

Methods: TDC was measured bilaterally on forearms and biceps of 32 male and 32 female volunteers and on 16 female patients awaiting surgery for breast cancer (BC).

Results: 1)TDC values at 2.5 mm depth were less than at 1.5 mm; 2)Female TDC values were less than male values; 3)TDC values were not different between females with and without BC and 4) dominant/non-dominant arm TDC ratios were not different for any probe among genders or arm anatomical site.

Conclusions: These findings indicate that probe-type differences in absolute TDC values are present and should be taken into account when TDC values are compared. But, comparisons based on inter-arm TDC ratios are not statistically different among probes with respect to gender or anatomical location.