

**Skin Water in Persons with Diabetes Mellitus (DM) Assessed by
Tissue Dielectric Constant (TDC) Measured at 300 MHz**

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Objective: To test the hypothesis that skin water is inversely related to HbA1c in persons with DM.

Background: Skin changes occur in about 1/3 of persons with DM. Glycation of proteins plays a role but it is unknown if skin water changes in proportion to HbA1c.

Methods: Skin-to-fat tissue water was measured by TDC at anterior forearm, lateral calf and foot dorsum in 42 DM patients to depths of 0.5, 1.5, 2.5 and 5.0 mm below epidermis. Total body fat (TBF) and water (TBW) were determined via bioimpedance at 50 KHz.

Results: TDC values monotonically decreased with measurement depth at all sites with TDC values at all depths significantly different from each other ($p < 0.001$). At all depths except 0.5 mm there were differences in TDC values among sites ($p < 0.001$) with foot values greater than leg and leg greater than forearm. TDC values were negatively correlated with HbA1c only for foot and then only at a 1.5 mm depth. There was also a small positive correlation between HbA1c and arm fat.

Conclusions: Our initial hypothesis is weakly supported since the foot TDC-HbA1c correlation explains only 11% of the observed variation. We conclude that over the range of HbA1c values evaluated there is little effect of HbA1c on skin water as judged by TDC measurements. This finding suggests that persons with DM may be evaluated with TDC methods without fear of possible confounding effects related to variations in HbA1c. Further, the TDC values herein obtained provide a DM-related TDC reference data set.