

RELIABILITY OF THE TEWAMETER TM300 FOR THE MEASUREMENT OF TRANSEPIDERMAL WATERLOSS IN BURN SCARS (P025)

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Introduction: Different measurement parameters and devices are available for clinical research to evaluate scar quality. Transepidermal water loss (TEWL) is a physiological characteristic to measure the efficiency of the skin barrier function and can be measured with the Tewameter TM300. The aim of this study is to investigate the reliability of the Tewameter TM300 for the assessment of TEWL (in grams per square meter per hour (g/h/m²)) in burn scars at 3, 6 and 12 months post-burn. Also the relation between TEWL scar values and scar quality parameters was investigated.

Methods: A cross-sectional study was performed in 40 adult patients with burn scars. Three different study areas (scar, healthy adjacent and contralateral skin) were assessed with the Tewameter TM300 by two observers. The inter-observer reliability was tested using the average- and single measures intra-class correlation coefficient (ICC) and the standard error of measurement (SEM). Agreement between observers was assessed using Bland-Altman plots with 95% limits of agreement (LoA). Correlations between mean TEWL scar values and scar quality parameters were investigated by Pearson's correlation coefficient.

Results: The inter-observer reliability for the three areas was excellent with ICC values between 0.88 and 0.98. SEM values were between 0.77-1.99. Bland-Altman plots showed relatively wide LoA values -8.6 to 6.9 g/h/m² for scar and -4.5 to 3.9 g/h/m² for healthy skin. Mean TEWL scar values were significantly higher compared to healthy skin ($p = 0.000$, Wilcoxon). Significant correlations were found between TEWL scar values and the erythema index measured with the DSMII ColorMeter ($p= 0.001$), POSAS Observer Overall opinion score ($p=0.040$) and a negative correlation for the number of weeks post-burn ($p=0.050$).

Conclusion: The Tewameter TM300 is a reliable device for the measurement of TEWL in burn scars. However, SEM values were high and relatively wide LoA values were observed. This indicates that the Tewameter TM300 is more appropriate for use in research settings than for the follow-up of individual patients or scars. Minor to moderate fluctuations in TEWL in individual patients may not be distinguished from measurement error using this current measurement setup.