

ASSESSING WOUND AREA PROGRESSION BASED ON LENGTH BY WIDTH: DIRECT WOUND VS. DIGITAL IMAGE MEASUREMENTS

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BACKGROUND and GOALS

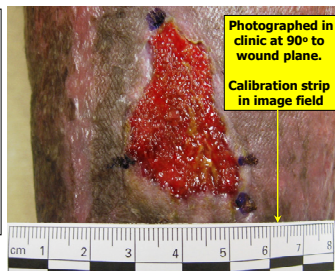
Methods to assess and document treatment-related changes in wound area vary among clinics. One widely used approach measures maximum length (L) and maximum width (W) perpendicular to the length axis and uses the LW product as a surrogate for wound surface area. Since digital photography is increasingly used for documentation purposes we sought to determine how well L and W could be estimated from such photos and determine how well LW estimates progressive treatment-related wound area changes.

SUBJECTS and METHOD OVERVIEW

Ten consecutive patients referred for treatment of leg wounds were studied after signing an IRB approved informed consent. Patients received treatment appropriate to their condition. Wounds were digitally photographed and L and W measured on the wound at each clinic visit for durations of 8 to 17 weeks. An investigator, "blinded" to the directly measured L and W values, determined L, W, LW and the wound's true area (Aw) from the digital images¹ via specialized wound area professional software (www.clinsoft.org). Initial values of Aw ranged from 4.6-30.4 cm².

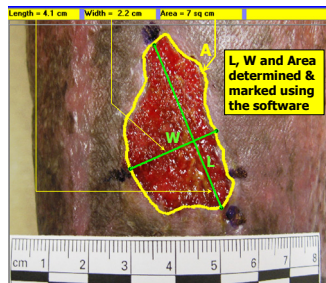
CLINIC PROCEDURES

1. Wound photographed at an angle of ~90° to the wound plane.
2. Wound length (Lc) and width (Wc) measured directly on wound.
3. Wound photo provided to analyst for processing
4. Wound treated

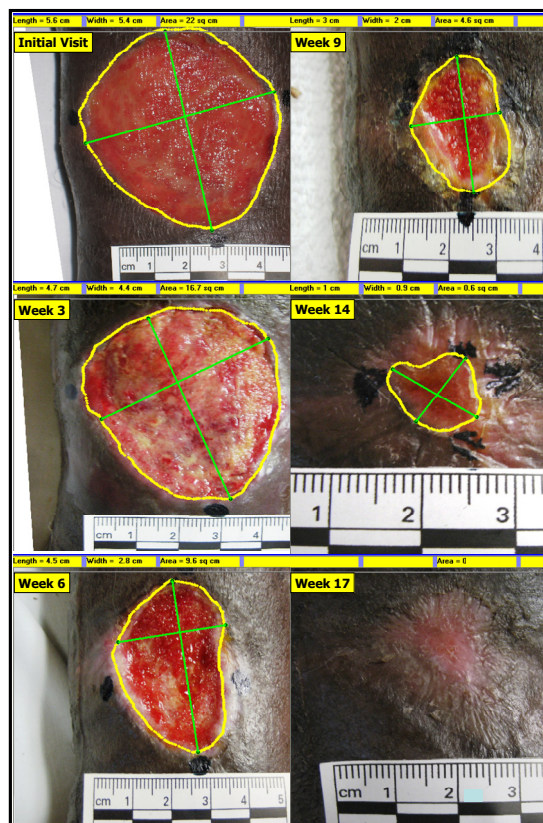


ANALYTICAL PROCEDURES

1. Raw image processed by analyst using software to obtain L, W and Area.
2. Photo derived L and W values subsequently compared to Lc and Wc values obtained at the clinic by direct measurement.
3. LW product compared to actual wound surface area



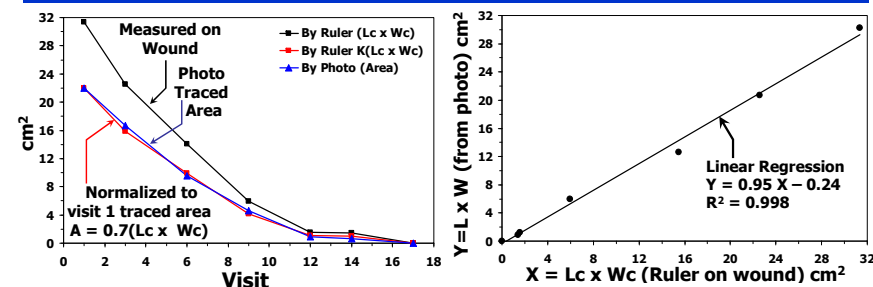
EXAMPLE IMAGE SEQUENCE



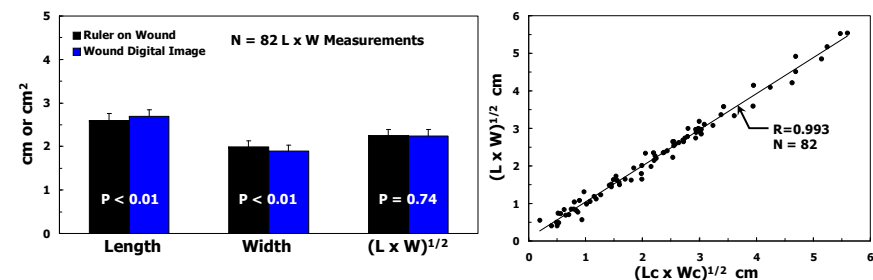
1. Mayrovitz HN and Soontup L. Wound areas by computerized planimetry of digital images: Accuracy and Reliability. *Advances in Skin & Wound Care* 2009;22:222-229

Dr. Mayrovitz invites you to e-mail him at mayovit@nova.edu with any questions or comments or to request an electronic copy of this poster.

EXAMPLE SEQUENTIAL PATTERNS



MAIN OVERALL RESULTS



1. Comparisons of the 82 ruler determined length and width values with the photo determined length and width values showed slight overall differences but very similar and non-significantly different values for the length x width products.
2. There was a high degree of correlation between the directly (ruler measured) wound $Lc \times Wc$ product and the $L \times W$ product obtained from the digital photograph of the wound. Correlations (R) among the wounds evaluated ranged from 0.96 to 0.99 for individual wounds and R was equal to 0.993 overall.
3. Progressive changes in LW with wound treatment, determined either directly of from digital images, matched the pattern and trend of true wound area changes determined by computer-aided planimetry for all patients.
4. However, length x width values, obtained either by direct wound measurements or by digital processing of wound images, greatly overestimated true wound areas determined by computer-aided planimetry. Initial areas (mean \pm sem) of the 10 wounds estimated as $L \times W$ were 13.3 ± 2.9 cm² whereas actual areas determined from planimetry using the software were 9.7 ± 2.0 cm² ($p < 0.001$).

SUMMARY AND CONCLUSIONS

Simple length by width measurements, made directly on the wound or determined from its digital photographic image, may adequately estimate the trend and pattern of treatment-related wound area changes but do not accurately determine actual wound areas. If accurate assessments of actual wound areas and actual wound area changes over time or with treatment are needed then the use of computer-aided planimetry or other true area determination method is required.