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Research Paper

Wound Measurement Techniques: Comparing the Use of Ruler Method, 2D Imaging and 3D Scanner

Aj Shah [a], C. Wollak BS [b], J.B. Shah MD, CWSP [c, d, e]

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Abstract

The statistics on the growing number of non-healing wounds is alarming. In the United States, chronic wounds affect 6.5 million patients. An estimated US $25 billion is spent annually on treatment of chronic wounds and the burden is rapidly growing due to increasing health care costs, an aging population and a sharp rise in the incidence of diabetes and obesity worldwide.[1] Accurate wound measurement techniques will help health care personnel to monitor the wounds which will indirectly help improving care.7, 9 The clinical practice of measuring wounds has not improved even today.2, 3 A common method like the ruler method to measure wounds has poor interrater and intrarater reliability.2, 3 Measuring the greatest length by the greatest width perpendicular to the greatest length, the perpendicular method, is more valid and reliable than other ruler based methods.[2] Another common method like acetate tracing is more accurate than the ruler method but still has its disadvantages. These common measurement techniques are time consuming with variable inaccuracies. In this study, volumetric measurements taken with a non-contact 3-D scanner are benchmarked against the common ruler method, ac

tracing, and 2-D image planimetry volumetric measurement technique. A liquid volumetric fill method is used as the control volume. Results support the hypothesis that the 3-D scanner consistently shows accurate volumetric measurements in comparison to standard volumetric measurements obtained by the waterfill technique (average difference of 11%). The 3-D scanner measurement technique was found more reliable and valid compared to other three techniques, the ruler method (average difference of 75%), acetate grid tracing (average difference of 41%), and 2D planimetric measurements (average difference of 52%). Acetate tracing showed more accurate measurements compared to the ruler method (average difference of 41% (acetate tracing) compared to 75% (ruler method)). Improving the accuracy in measuring chronic wounds might improve overall care of patients with non-healing wounds. This study consistently shows that the 3-D scanner is a more accurate, quicker, and safer method for measuring wounds.

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Keywords

Wounds; Measurement; Ruler method; Acetate tracing; 2D planimetry; 3D scanner

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