



The Relationship between Psychosocial and Emotional Factors and Wound Characteristics in Patients with Leg Ulcers

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BACKGROUND

Wound assessment is critical in determining progress toward wound healing. A common method used to measure wounds is the traditional linear approach. Evidence suggests this method may overestimate wound size (Miller et al., 2012). Changes in color or tissue composition also show effectiveness of treatment. There are newer methods available for measurement, one of which is digital photo-planimetry. According to both Miller et al. (2012) and Anghel et al. (2016), digital photo-planimetry is shown to have high reliability with ICC of .988 or higher.

The complexity of the wound and healing process points to a physical, emotional, and psychosocial experience, suggesting that wounds are multifaceted and can not be optimally treated when only one area is addressed. Rodriguez and Gamboa (2020) found that patients with venous leg ulcers expressed feelings of anxiety, depression, shame, and hopelessness. In addition, Brown (2005) reported feelings of isolation among those experiencing wounds, highlighting a social component of care that should be addressed.

PURPOSE

While objective wound measurements are an important part of the assessment, subjective psychosocial and emotional aspects may play a significant role in recovery. This pilot research had two aims: to determine reliability of wound measurement with digital photo-planimetry and to examine the relationship between feelings of powerlessness and wound characteristics exhibited in patients with leg ulcers.

METHOD

MATERIALS:

This was a quantitative, descriptive, reliability study. Methods included linear measurement, visual percentage estimation of tissue type, and digital photo-planimetry (Aranz SilhouetteStar™). Raters were blinded to each other's measurements. A self-reported survey instrument, the Powerlessness Assessment Tool (PAT), was administered to ascertain subjects' attitudes and beliefs about their personal healing experience.

SUBJECTS:

10 subjects (n=21 wounds), ages 57 to 99 years old, from an outpatient wound clinic.

PROCEDURE:

Four novice investigators working in pairs measured the surface area (SA) and depth with both the linear method and digital photo-planimetry. Measurements taken by two wound-certified clinicians served as a standard for comparison. Two images captured by the digital photo-planimetry device were saved onto computer software. The PAT survey was administered by paper and pen to the subjects.

MEASUREMENT METHODS:



Figure 1 & 2 Linear and Digital Photo-planimetry

A standard ruler was used to determine SA by multiplying the greatest length and greatest width in centimeters (Figure 1). Depth was measured using cotton swab and ruler. The images obtained with digital photo-planimetry were traced on the computer using software that calculated dimensions and estimated the percentages of each tissue type (Figure 2).

PAT DOMAINS & SCORING:

The PAT is a 5-point Likert scale with scores ranging from 12-60. The higher the score, the greater the feelings of powerlessness related to wound healing.

Capacity to Perform Behavior		Powerlessness Scores: Absent (12) Mild (13-24) Moderate (25-36) Strong (37-48) Very Strong (49-60)
E.g., Question 9	I feel I am able to take care of myself.	
Self-perception of Decision Making		
E.g., Question 6	Nothing I can do can change the situation I am in.	
Emotional Response to the Control of Situations		
E.g., Question 10	It makes me sad to think I need someone to help me.	

Table 1 Sample Items in the 3 Domains of PAT

DATA ANALYSIS:

Data was analyzed using the Statistical Package for the Social Sciences (SPSS). Intraclass correlation coefficients (ICC) were calculated to examine the intra- and inter-rater reliability of measurements between measurement methods. Independent T-tests, Pearson correlations, and one-way ANOVA were used to determine significance between the PAT scores, their domains, and measurement data.

RESULTS

Wound etiologies included venous leg ulcers (VLU), diabetic foot ulcers (DFU), arterial insufficiency (AI), trauma, and lymphedema (Figure 3).

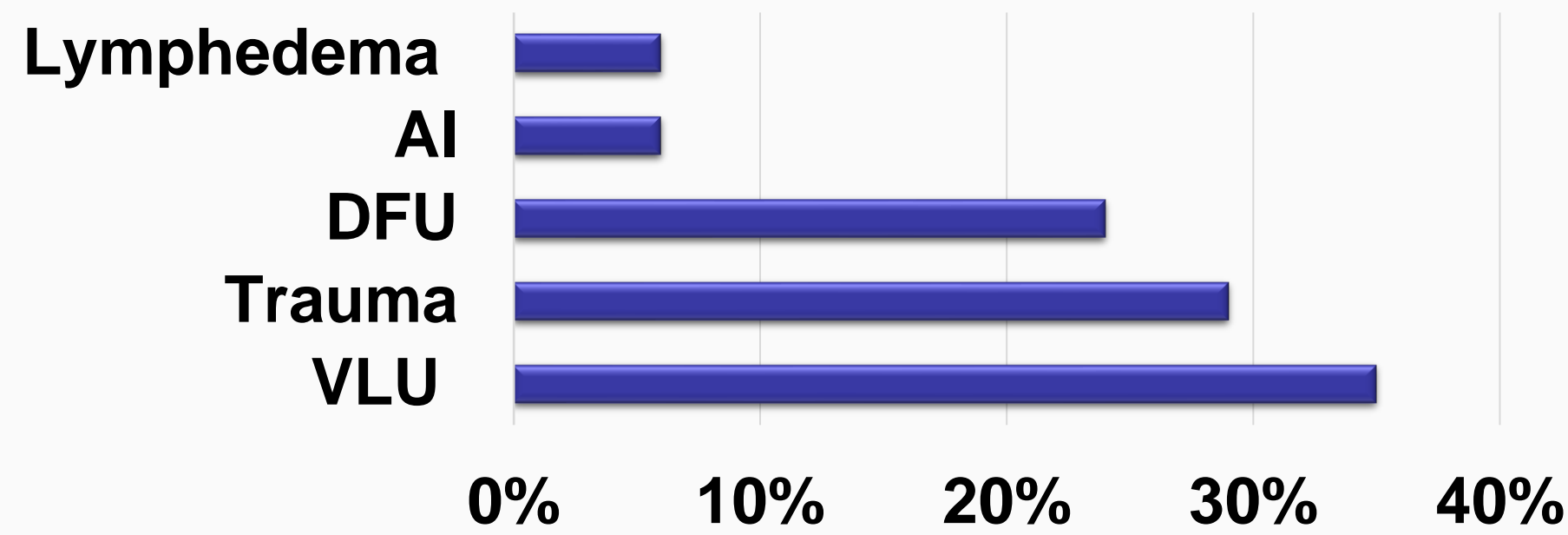


Figure 3 Wound Etiologies

Intra-rater reliability of novice SA measurements were .987 or better, ICC(3,1), with digital photo-planimetry, Intra-rater reliability of novice SA measurements between methods was .835 or better, ICC(3,1). Inter-rater reliability between methods was excellent for length, width, and SA, ICC(2,2) (Table 2).

Wound Dimension	Length	Width	Surface Area	Depth
Novice vs. Expert Linear	.999 (.997-1.0)	.993 (.975-.997)	.966 (.918-.986)	.870 (.673-.948)
Digital vs. Expert Linear	.991 (.971-.997)	.988 (.968-.995)	.948 (.860-.981)	.144 (-1.0-.690)

Table 2 Inter-rater Reliability between Methods

There were no significant relationships found between wound size and feelings of powerlessness (Table 3).

R value	PAT Total Score	Capacity to Perform Behavior	Self-perception of Decision Making	Emotional Response to Control of Situations
Novice linear LxW	-.024	-.006	-.200	.100
Expert linear LxW	.019	.035	-.177	.130
Digital SA	-.055	-.057	-.212	.091

Table 3 Correlation between Powerlessness & SA

When looking at specific PAT domains, significant differences were found between DFU and VLU along with DFU and lymphedema in the self-perception domain (Table 4).

Post Hoc Analysis (LSD)	DFU and VLU	DFU and Lymphedema	Traumatic and Lymphedema
Self-perception of Decision Making	p=.009	p=.012	p=.058

Table 4 Etiologies and Self-perception Domain

DFU also scored significantly higher than traumatic wounds in the emotional response domain (Table 5).

Post Hoc Analysis (LSD)	DFU and Traumatic	VLU and Traumatic
Emotional Response to Control of Situations	p=.004	p=.058

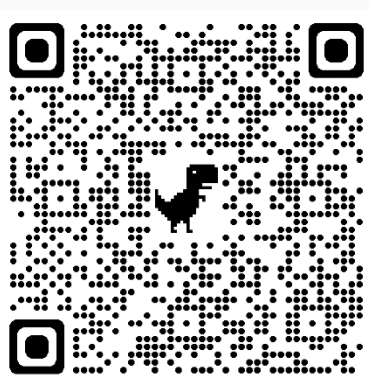
Table 5 Etiologies and Emotional Domain

A potential trend was observed between wound size and PAT scores with patients seen twice during data collection. For example, one subject had an initial wound size of 4.3 cm² and PAT total score of 20. One month later, the wound size and PAT total score had both increased.

A second potential trend was seen between living situation and the self-perception of decision-making domain. Those who lived alone, versus with someone, scored higher this in domain. These individuals may have had different coping mechanisms or levels of optimism.

DISCUSSION

Novices demonstrated excellent reliability utilizing digital photo-planimetry to assess lower extremity wounds. A correlation between SA and PAT total score was anticipated, however, there were no significant relationships found, possibly due to the small sample. Preliminary data suggests potential relationships between feelings of powerlessness and living situation and wound etiology. Findings were consistent with the literature indicating patients with DFUs report greater feelings of powerlessness. Further research is needed to explore the impact of psychosocial and emotional beliefs on healing.



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