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# Comparing LVHN Standard of Care Equipment and Delfin Technologies Equipment for Burn Scar Assessment

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## Introduction & Objectives

Elasticity and pigmentation of skin are qualities that are commonly used to evaluate scar progression and serve as a more objective measurement than the widely used Vancouver Scar Scale (VSS). The VSS accurately distinguishes healthy skin from scars, but does not effectively distinguish one scar from another. In the past, the LVHN Burn Center has used equipment such as the Cutometer MPA 580 and Cortex Technology Derma-Spectrometer to access elasticity and pigmentation. Still, newer pieces of equipment such as the Delfin Technologies line of skin measurement devices have been developed to take the same measurements.

The purpose of this study is to test the efficacy and user experience of the Delfin Technologies equipment and compare it to the equipment that LVHN Burn Center has used for years. The information gained from this experiment will contribute to future burn scar assessment studies at the LVHN Burn Center.

Scar characteristic	Score
Vascularity	
Normal	0
Pink	1
Red	2
Purple	3
Pigmentation	
Normal	0
Hypopigmentation	1
Hyperpigmentation	2
Pliability	
Normal	0
Supple	1
Yielding	2
Firm	3
Ropes	4
Contracture	5
Height (mm)	
Flat	0
<2	1
2~5	2
>5	3
Total score	13

Vancouver Scar Scale

## Methods

9 subjects had a series of three measurements taken with each instrument on healthy skin of the forearm

From the data, the mean value and standard deviation (SD) were used to assess the precision of each device.

Elasticity was measured with the Cutometer MPA 580 and Delfin ElastiMeter.

Pigmentation was measured with the Derma-Spectrometer and Delfin SkinColorCatch.

The ease with which each piece of equipment could be used was also noted to account for administrator and patient experience

### References:

- Cutometer MPA 580 information and Operating Instructions Dec 2008 PDF Download [Online]. BioClinical Services. <https://www.bioclinicalservices.com.au/ck-electronic-gmbh/skin-measurement-system/cutometer-mpa-580-information-and-operating-instructions-dec-2008> [26 Jul. 2022].
- Chae, Jin & Kim, Jeong & Kim, Eun & Park, Kun. (2016). Values of a Patient and Observer Scar Assessment Scale to Evaluate the Facial Skin Graft Scar. *Annals of Dermatology*, 28, 615. 10.5021/ad.2016.28.5.615.
- Products [Online]. Delfin Technologies. <https://delfintech.com/products/> [26 Jul. 2022].

## Results

### Cutometer MPA 580

- Easy to use/administer
- Complicated to set up and transport; needs to be attached to laptop computer for data display
- Capability for multiple attachments to gather other skin assessment data
- Precise measurements when used correctly; room for user error that dictates reliability of results

### Delfin ElastiMeter

- Measurements are sensitive, needs to be used carefully
- Easy design, only one button
- Small piece of equipment, no other equipment needed to supplement
- Not very precise measurements (large range of SD)

### Derma-Spectrometer

- Very easy to use/administer
- Provides information on Melanin and Erythema
- Larger/heavier piece of equipment
- More precise measurements (smaller range of SD)

### Delfin SkinColorCatch

- Very easy to use/administer
- Provides information on Melanin/Erythema and other qualities of pigmentation
- Smaller/sleeker piece of equipment
- Less precise measurements (larger range of SD)

	Cutometer MPA 580 (R2 value)	Delfin ElastiMeter (N/m)	Derma-Spectrometer (erythema) <sup>1</sup>	Derma-Spectrometer (melanin) <sup>1</sup>	Delfin SkinColorCatch (erythema) <sup>1</sup>	Delfin SkinColorCatch (melanin) <sup>1</sup>
<b>Average</b>	1.014547	52.8	15.6	35.8	433.1	595
<b>Standard Deviation</b>	0.1446 (0- 0.831)	5.75 (1.53-19.14)	1.22 (0.17- 2.58)	0.35 (0- 0.69)	3.65 (1.16- 6.81)	3.72 (0- 10.02)

<sup>1</sup>Cortex Technology and Delfin Technologies use different arbitrary ranges to measure melanin and erythema that both translate to scales of skin tone classifications.

Table 1: Average measurements recorded from each device and average standard deviations

## Discussion

- The Cutometer MPA 580, although cumbersome, gave more reliable measurements than the Delfin ElastiMeter.
- The Derma-Spectrometer gave more reliable measurements than the Delfin SkinColorCatch, however the Delfin device offers more information beyond the melanin and erythema displayed by the spectrometer.
- With more use and familiarity, the Delfin Technologies equipment may produce more precise data. Because the Delfin devices were less precise with measurements on flat, healthy skin, they may not be the best candidates to use on the texture of scars.
- To better understand the qualities of each piece of equipment, more than one individual should administer the measurements to rule out the possibility of one person's user error.
- Information on the experience using each piece of equipment and the precision of their results helps care providers work efficiently. Reliable equipment is conducive to better data and patient experiences during data collection.
- All four pieces of equipment used in this comparison can be used to measure elasticity and pigmentation of skin in future research pertaining to burns and scars at the LVHN Burn Recovery Center. Using the most reliable and easy-to-use equipment can allow for more data to be collected in the same amount of time. At the time being, the more reliable equipment will continue to be used for scar treatment studies.



Cutometer MPA 580 (top) vs. Delfin ElastiMeter (bottom)



Derma-Spectrometer (left) vs. Delfin SkinColorCatch (right)