TWO PROTOCOLS OF PHOTOTHERAPY (ASGA LASER 904NM) IN THE TREATMENT OF ULCERS: MULTIPLE CASES STUDY

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INTRODUCTION

This study evaluated the use of phototherapy associated to a manual lymphatic drainage in the healing of skin ulcers in four patients with different conditions whose where failed to respond to other therapies after at least six months of assistance. It was used two different laser protocols, followed by topical daily dressing. The protocol I was applied to cases I (Diabetes Mellitus type II), II (Duchenne dystrophy) and III (Spinal cord injury), and the protocol II was applied to case IV (Diabetes Mellitus type I).


Case I


Case II


Case III


Case IV

LASER PARAMETERS

Protocol I

Protocol II

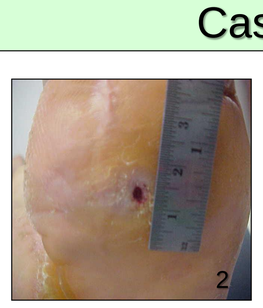
	Protocol I	Protocol II
Equipment	Laserpulse L42 -IBRAMED - Brazil	Laserpulse L42 -IBRAMED - Brazil
Wavelength/s (nm)	904nm	904nm
Power (W)	0.0035W	0.04W
Beam spot size (cm²)	0.1cm²	0.1cm²
Power Density (W/cm²)	0.035W/cm²	0.4W/cm²
Energy Density (J/cm²)	0.28J/cm²	4J/cm²
Frequency of pulses and duty cycle	pulsing mode of emission (2500Hz, duty cycle of 0.0175%)	pulsing mode of emission (9500Hz, duty cycle of 0.0571 %)
Treatment Time	80sec	12sec
Radiant energy per point (J)	0.28J	0.48J
Frequency of treatments	three times a week	three times a week
Total number of treatments	48	48
Aplication mode	noncontact mode	noncontact mode
Area treated	Local (target area)	Local (target area)
Probe Design	Single probe	Single probe
Location / number of points	Target area / area/0.5cm²	Target area / area/0.1cm²
Grid pattern	Sequential treatment (one point per 0.5cm²)	Sequential treatment (one point per 0.1cm²)

RESULTS

WOUND QUALITATIVE ASPECTS

Case I


1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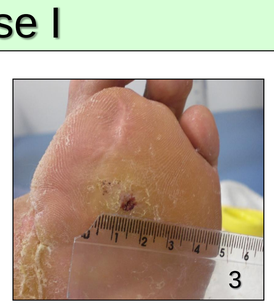
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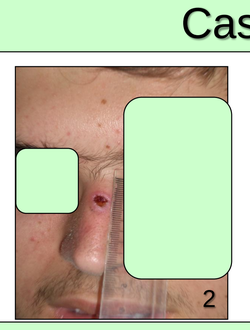
Case II


1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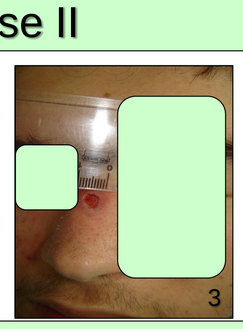
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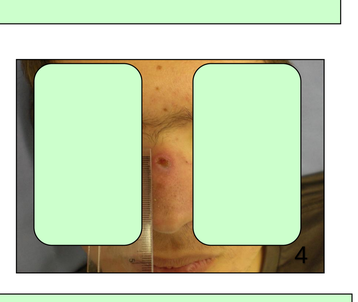
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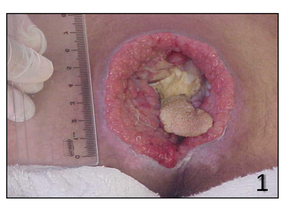
Case III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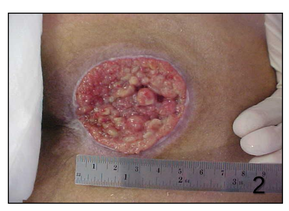
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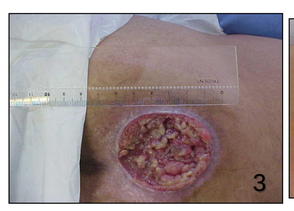
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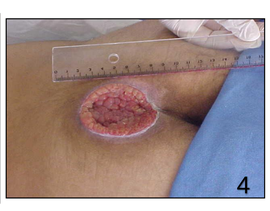
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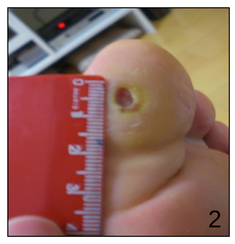
Case IV


1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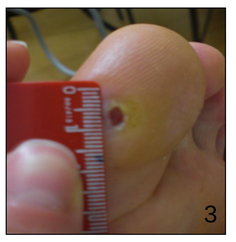
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Figures 1.2.3.4.: These figures represent each month of treatment. Although we can observe a faster progress in terms of area on the case number IV, we can see a progressive improvement of the wound healing quality in all cases studied. Observe on figures 1: the presence of swelling and erythema around the wound, the absence of granulation tissue and the wound dark color and depth. Figures 2, it is still possible to observe the wound depth but one can note a reddish color of the wound and a reduction on the inflammatory signs. At figures 3 and 4 the granulation tissue is more evident and it is possible to observe that it is growing from the edge to the center and from the depth to the surface.

WOUND QUANTITATIVE ASPECTS

Ulcers were assessed each day of treatment with a digital camera (Casio Exilim 8.1MP), mounted perpendicular to the ulcer. Image J software estimated the total area of the ulcers with the delimitation of edges and calculated monthly the ulcer healing rate [UHR=(Initial Area–Final Area)/Initial Area)], where UHR=1 represents total reepithelization; UHR=0 no signs of reepithelization; UHR>0 reduction and UHR< 0 increase of the ulcer area.

		Treatment			30 days	60 days	90 days	120 days
Case	**Location Treatment**	**Protocol**	**Initial area**		**UHR**	**UHR**	**UHR**	**UHR**
I	Sole	I	0.814		0.46	0.28	0.15	0.40
II	Nose	I	0.757		0.01	0.06	0.54	0.24
III	Sacral	I	8.060		0.07	0.11	0.15	0.13
				Average UHR Protocol I	*0.2*	*0.2*	*0.3*	*0.3*
IV	Hallux	II	0.613		*0.6*	*0.8*	*0.6*	*0.8*

CONCLUSIONS

The results of the present cases study suggested that phototherapy associated to a manual lymphatic drainage forms the base for the conservative skin wound treatment and that protocol II may have greater benefit in comparison with protocol I.

CONSIDERATIONS

Limitations of the present cases study include the lack of a control group receiving no treatment, this limitation constrain our ability to claim cause and effect.

The results of the present study are encouraging but other studies with greater samples, possible comparisons with other conservative interventions, with other wavelength diodo laser or placebo control groups are needed in the next future.

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