Parameter Study and Application Data Verification

Study: Increased Dermal angiogenesis after low intensity laser therapy for a chronic radiation ulcer determined by a video measuring system
Schindl A., et. al.

Specific Conditions: 1 dermal ulcer

2

3

	Units	1	2	3	4	5	6
Light Source(s):		HeNe					
Dose Specifications:	J/cm2	30 J/cm2 x 2/week x 4 weeks					
Wavelengths:	nm	632.8					
Other:	mW	10 mW					
BioFlex Dose Specifications:	Units	1	2	3	4	5	6
		LD-R25	LD-I75	LS-R250	LS-I500	LS-R750	LS-I1500
Class:		IIIb	IIIb	I	I	I	I
Optical Power:	mW	25	75	250	500	750	1500
Surface Area:	cm2	0.1	0.1	25	25	7	75
Power Density:	mW/cm2	250	750	10	20	10	20
# of Diodes:		1	1	59	59	179	179
Medium:		AlGaInP	GaAlAs	GaAlAs	GaAlAs	GaAlAs	GaAlAs
Type:		LD	LD	LED	LED	LED	LED
Coherence:	mm	1	1	0	0	0	0
Wavelength:	nm	680	830	660	840	660	840
Spectral width:	nm	0.3	0.3	25	50	25	50
Divergence:	deg	8,35	9,30	8,8	25,25	8,8	25,25
Device Power:	mw	25	75	4.2	8.5	4.2	8.5

Remarks: Complete healing of chronic radiation Ulcer
Single case

Journal of the American Academy of Dermatology
Volume 40, Number 3

Increased dermal angiogenesis after low-intensity laser therapy for a chronic radiation ulcer determined by a video measuring system

Andreas Schindl, MD,[a] Martin Schindl, MD,[d] Liesbeth Schindl, MD,[d] Wolfgang Jurecka, MD,[c] H. Hönigsmann, MD,[a] and Friedrich Breier, MD[b] *Vienna, Austria*

Acute and chronic radiation-induced dermatitis can occur after high doses of ionizing radiation of the skin. We describe a patient with a long-lasting radiotherapy-induced ulcer that healed after low-intensity laser therapy. A video measuring system was used to determine the number of dermal vessels in the ulcer before and after laser treatment. We found a statistically significant increase in the number of dermal vessels after low-intensity laser therapy in both the central and marginal parts of the ulcer compared with its pretreatment status. (J Am Acad Dermatol 1999;40:481-4.)

High doses of ionizing radiation of the skin can be followed by both acute and chronic radiodermatitis.[1] The incidence of radiation-induced necroses and ulcers after x-ray therapy depends on the radiation protocol and dose, as well as on the patient's age at the time of irradiation.[2] Moreover, there is evidence for an elevated risk of skin malignancies as a late complication after radiation therapy.[1,2] Treatment of hemangiomas with ionizing radiation was performed several decades ago but has been abandoned in the recent past because of possible acute and chronic radiation damage.[3,4] The histopathologic findings of chronic radiation dermatitis are characterized by thinning of the epidermis, fibrosis of the dermis, obliteration of small arteries, and reduction of capillaries in number and size. Moreover, partial or complete loss of skin appendages is noted.[1,5] Because of the poor healing tendency of radiation ulcers, surgical intervention may be necessary in some cases to close the defects. Recently, low-intensity laser irradiation using athermic radiation with wavelengths in the red and infrared region has gained increasing interest as a noninvasive method for the induction of wound healing in such cases.[6,7] We describe a patient with a long-lasting radiotherapy-induced ulcer that healed after low-intensity laser therapy. A video measuring system (VMS)[8] was used to determine the number of dermal vessels in the ulcer before and after laser treatment.

From the Departments of Dermatology, Divisions of Special and Environmental Dermatology[a] and of General Dermatology,[b] University of Vienna, and Lainz Municipal Hospital[c]; and the Institute for Lasermedicine.[d]

Reprint requests: A. Schindl, Dept of Dermatology, Division of Special and Environmental Dermatology, University of Vienna, Waehringer Guertel 18-20, A-1090 Vienna, Austria. E-mail: Andreas.Schindl@akh-wien.ac.at.

0190-9622/99/$8.00 + 0 16/54/95955

CASE REPORT

A 28-year-old female patient presented with an ulcer on the left cervical region, which had been present for 6 months. She had received a series of topical radium treatments for a hemangioma at this site 25 years earlier. The partially necrotic ulcer, measuring 18 mm^2, was surrounded by telangiectases. A 2-mm punch biopsy was taken that confirmed the diagnosis of an ulcerous radiodermatitis. In view of previously reported results with low-intensity laser irradiation for the induction of wound healing in recalcitrant radiation ulcers[6,7] and because other conventional treatments had failed to induce healing, we initiated low-intensity laser therapy.

MATERIAL AND METHODS

Laser therapy was carried out in an outpatient setting with a helium/neon (He:Ne) laser device (wavelength, 632.8 nm; power output, 10 mW; energy density at skin level, 30 J/cm^2) twice weekly.