2018
28-30 JUNE
VIENNA, AUSTRIA
SUPPORTIVE CARE MAKES EXCELLENT CANCER CARE POSSIBLE

Photobiomodulation therapy prevents severe acute radiodermatitis: a randomized, placebo-controlled trial in breast cancer patients

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Parallel Session 4: Young Investigator Awards
28/06/2018

LCRP | Limburg Clinical Research Program

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Faculty Disclosure

	No, nothing to disclose
x	Yes, please specify:

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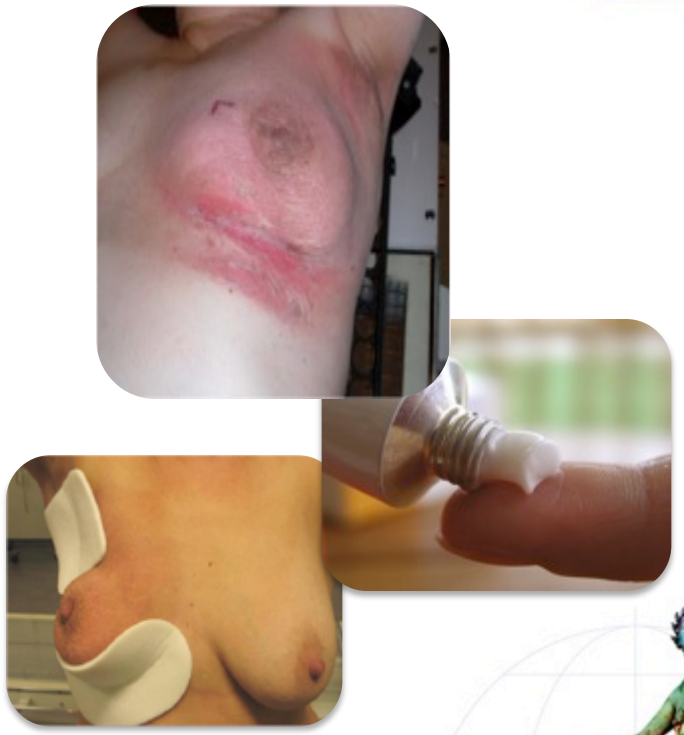
Limburg Clinical Research Program			x					
Limburgs Kankerfonds			x					
ASA srl			x					
Kom op Tegen Kanker			x					
MASCC Young Investigator Award								x

Introduction
Acute radiodermatitis (ARD)

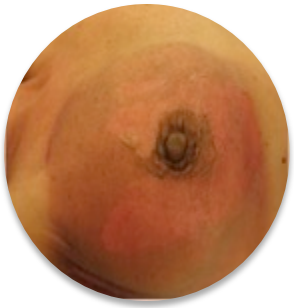
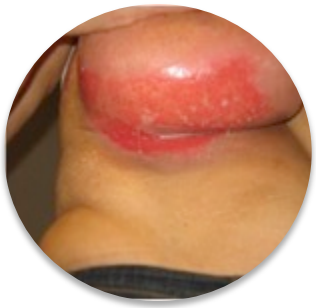
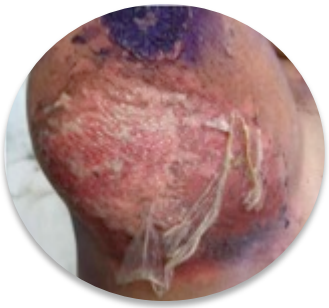
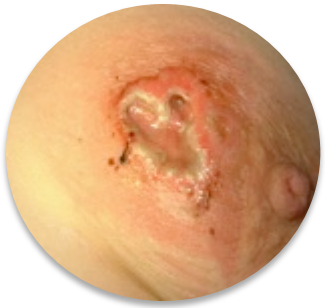
- **What?** Inflammatory skin reaction at the irradiated area
- **Incidence?** Affects 90-95% of radiotherapy (RT) patients
- **Associated with?**
  - Itchiness
  - Pain
  - Quality of life impairment
- **Consequences for the patient?**
  - Dose reductions
  - In rare cases, treatment interruptions
- **Prevention and treatment?**
  - General skin care advice
  - Topical steroids/ creams
  - Wound dressings



Robijns et.al. Egypt Women Dermatol Soc, 2018. 15(1):2-9
Wong et.al. Support Care Cancer (2013) 21:2933–2948

Introduction

ARD – Skin assessment

RTOG Grade 1	RTOG Grade 2	RTOG Grade 3	RTOG Grade 4
Acute follicular erythema/ depilation / dry peeling / decreased sweating	Bright erythema / moist desquamation in the skin folds/ moderate oedema	Confluent moist areas of peeling outside the folds / pitting oedema	Ulceration, bleeding, necrosis (rarely seen)
			

Cox et.al. Int J Radiat Oncol Biol Phys, 1995. 31(5): p. 1341-6.

Introduction
Photobiomodulation therapy (PBMT)

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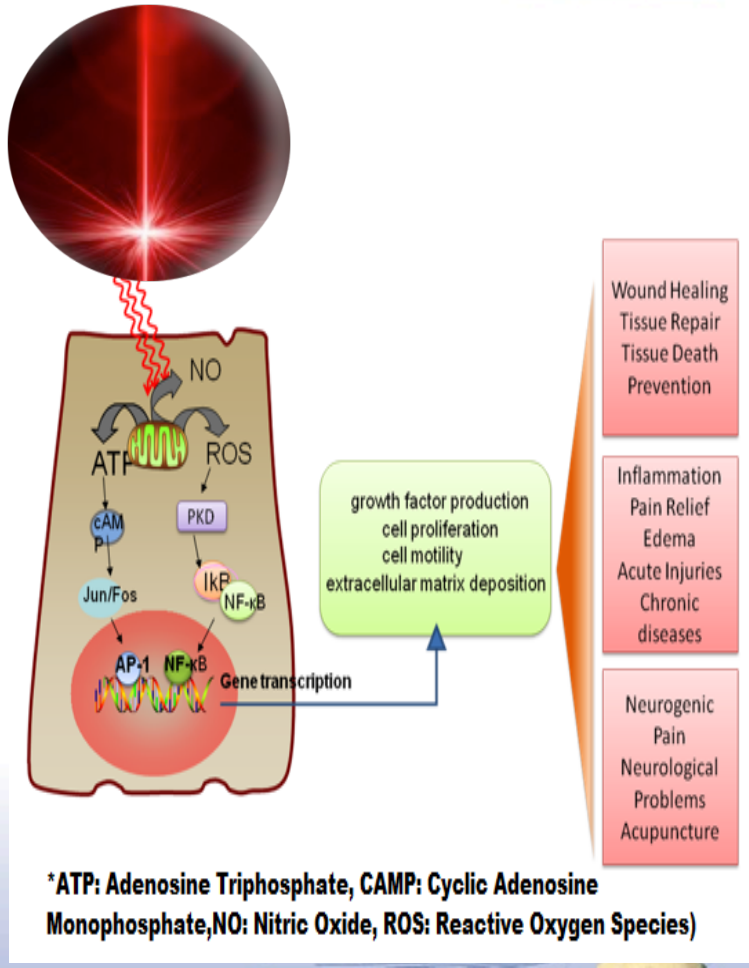
- **What?**
  - Light therapy based on visible and/or (near)-infrared light (600-1000 nm)
- **Light sources?**
  - Laser or Light-Emitting diodes (LEDs)
- **Biological effects?**
  - Anti-inflammatory
  - Pain reduction
  - Stimulates wound healing

  ➔ **BIOSTIMULATION**
- **Indications in oncology?**
  - Oral mucositis
  - Lymphedema
  - Osteonecrosis
  - Acute radiodermatitis
  - …



Hamblin, M. et al. Low-Level Light Therapy: Photobiomodulation., 2018.

Introduction

PBMT and acute RD

	Schindl et al. (1999)	DeLand et al. (2007)	Fife et al. (2010)	Censabella, Robijns et al. (2016) DERMIS trial	Strouthos et al. (2017)
PBMT type •Wavelength •Fluence •Irradiance	Laser diode •632.8 nm •30 J/cm^2 •3 mW/cm^2	LED •590 nm •0.15 J/cm^2 •Not specified	LED •590 nm •0.15 J/cm^2 •Not specified	Laser diode •808 + 905 nm •4 J/cm^2 •168 mW/cm^2	LED •660 + 850 nm •0.15 J/cm^2 •44.6 mW/cm^2
Patient type	Breast cancer	Breast cancer	Breast cancer	Breast cancer	Breast cancer
PBMT set up	3x/week until complete healing	Daily, after the RT session	Daily, before + after the RT session	2x/week starting at a RT dose of 40 Gy, after the RT session	2x/week starting at first day of RT, before the RT session
Control group	/	Retrospective	Placebo	Institutional skin care	Institutional skin care
Results	Accelerated wound healing	Significantly reduced incidence of RD grade ≥ 2	No significant effects	Significantly reduced incidence of RD grade ≥ 2	Significantly reduced incidence of RD grade ≥ 2

Schindl et. al. Photodermatol Photoimmunol Photomed 2000; 16: 34–37
DeLand et.al. Lasers in Surgery and Medicine, 2007. 39:164–168
Fife et. al. Dermatol Surg 2010;36:1921–1927
Strahlenther Onkol. 2017 Jun;193(6):491-498.
Censabella et.al. Support Care Cancer (2016) 24:3925–3933

Material and Methods

AIM
Investigate the efficacy of PBMT in the prevention of ARD in breast cancer patients undergoing RT

Study design: Prospective, randomized placebo-controlled trial (TRANSDERMIS trial)

EGILIBILITY CRITERIA

Inclusion criteria
- Female
- Breast cancer
- Lumpectomy
- Standard fraction RT regime: 66 Gy in 25 x 2Gy to whole breast + 8 x 2 Gy to the tumor bed)
- Signed informed consent

Exclusion criteria
- Mastectomy
- Previous irradiation to the same breast
- Metastatic disease
- Concurrent chemotherapy
- Use of bolus material during RT
- Brachytherapy boost

RANDOMIZATION 1:1

Stratification on breast volume (i.e. planned target volume, PTV):
- *Small: <450 cc*
- *Medium: 450-800 cc*
- *Large: >800 cc*

Placebo group (n=60)
- Standard skin care
- Sham laser

(2x/week, from the first until the last day of RT)

PBMT group (n=60)
- Standard skin care
- PBMT

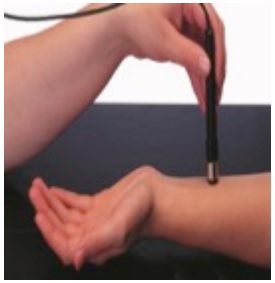
(2x/week, from the first until the last day of RT)

Material and Methods

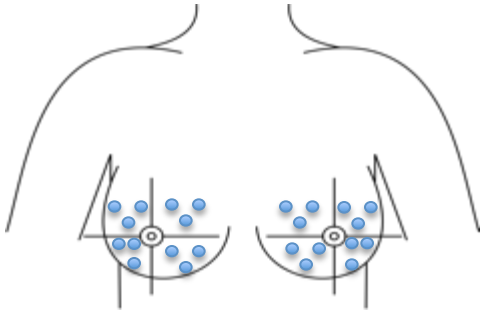
- **Outcome measures**
  - **What?**
    - RTOG criteria
    - Objective skin measures

Erythema
Melanin

Transepidermal
water loss (TEWL)



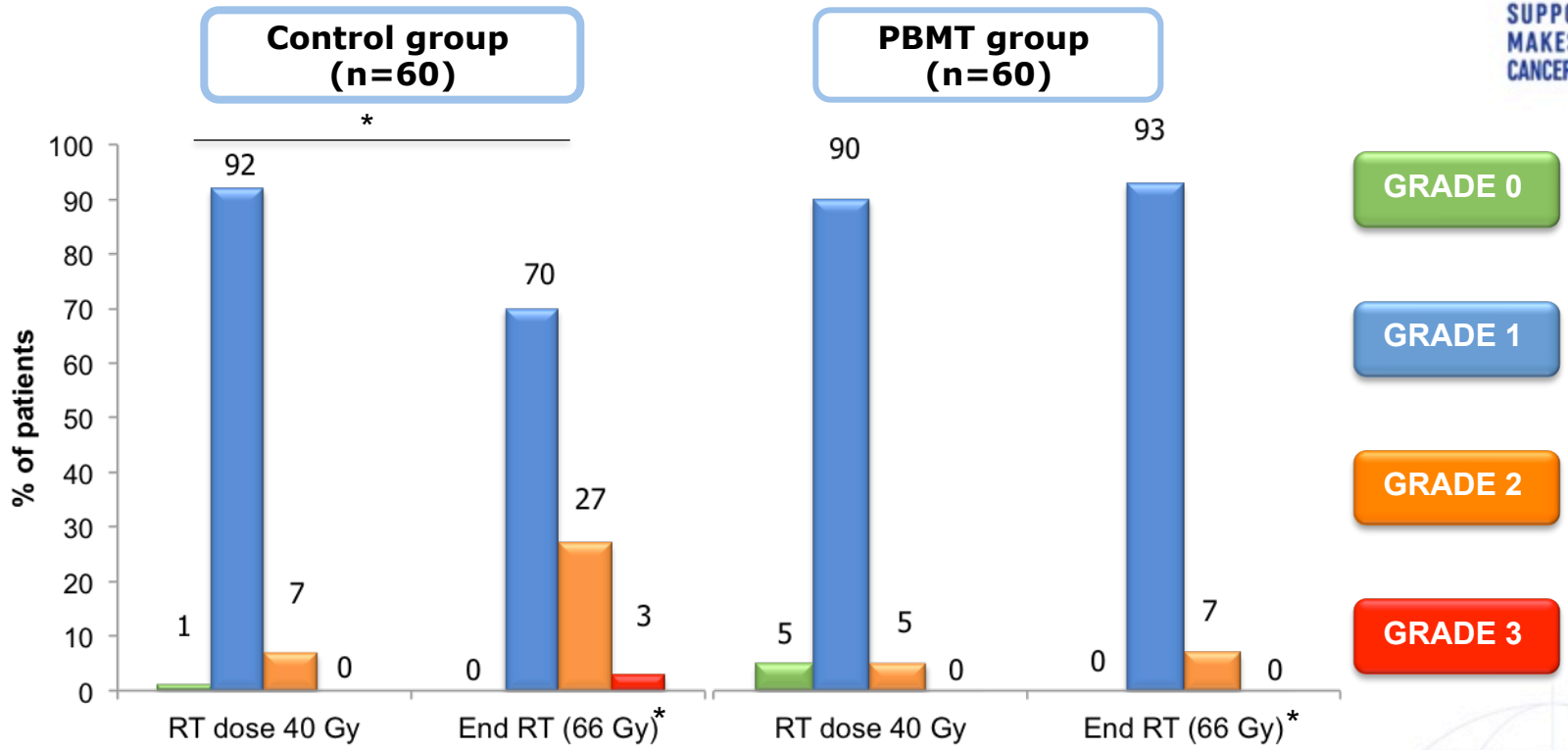
Hydration



  - **When?**

Baseline → **RT dose 40 Gy** → **End RT (66 Gy)**

Results
RTOG criteria

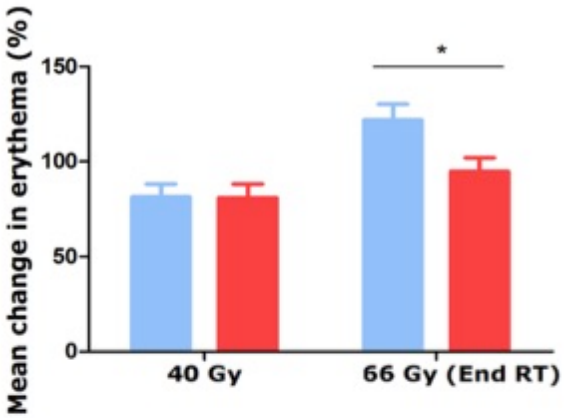


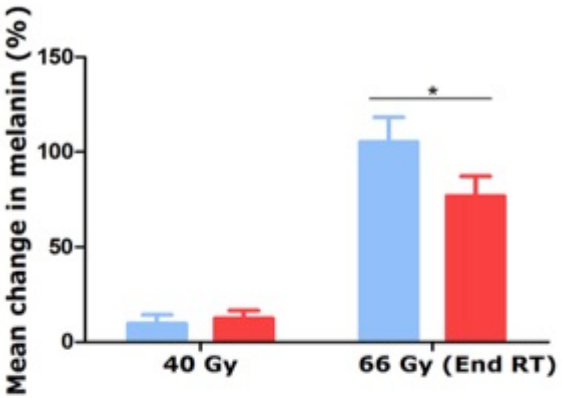
*p< 0.05 (chi-square test, two-tailed)

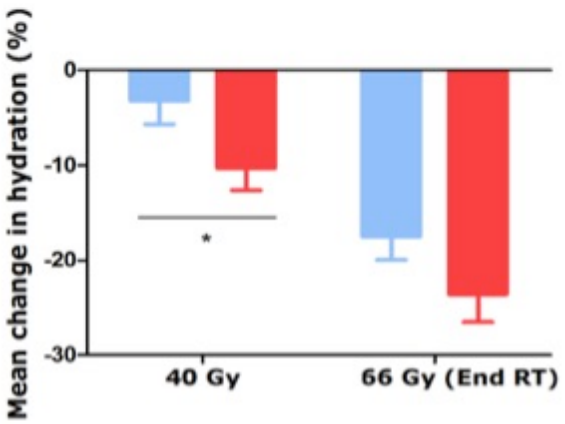
Robijns et al. Lasers Surg Med. 2018 Feb 10`

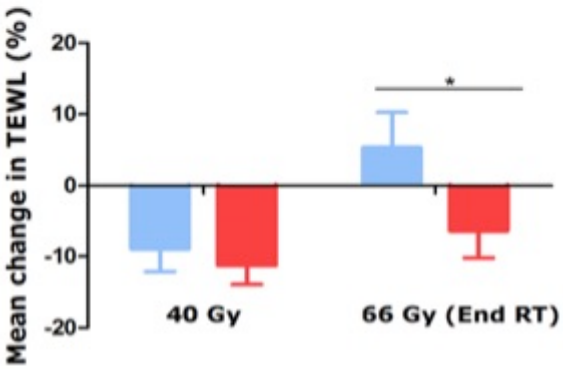
Results

Objective skin measures









Control group
PBMT group

*p< 0.05 (Wilcoxon-Mann-Whitney test, two-tailed)

Conclusion

- **Preventive PBMT significantly reduces the incidence of moist desquamation**
- **First RCT that shows by both a clinical and objective approach that PBMT is able to prevent aggravation of ARD in breast cancer patients**
- **Future RCTs are necessary to further investigate the effectiveness, feasibility, and safety of PBMT in the management of ARD in all cancer patients**

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jessa ZIEKENHUIS

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MET WETENSCHAP, TECHNOLOGIE, CREATIVITEIT & INNOVATIE

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