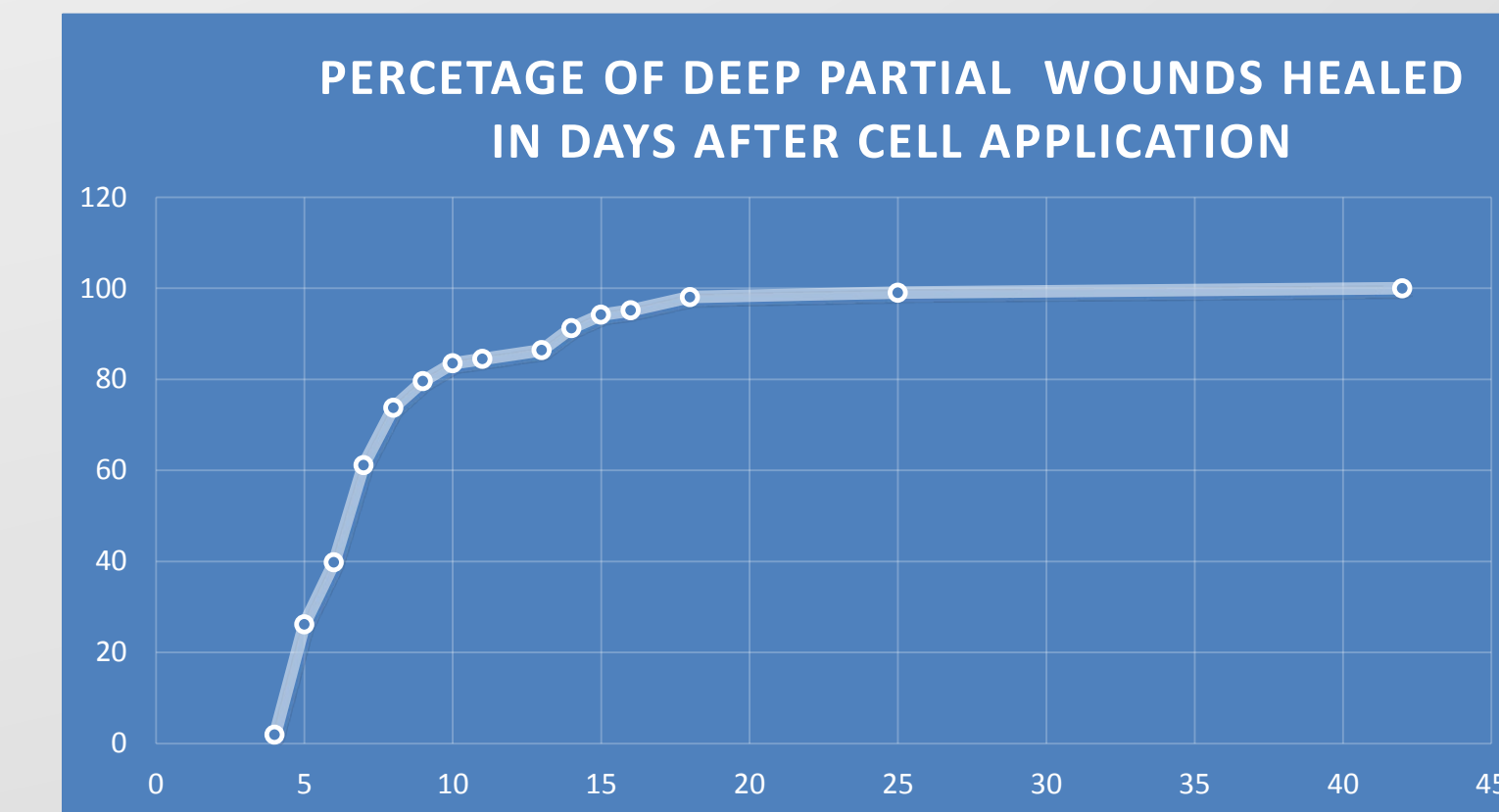


Use of Polylactic Membranes* as Dressing for Sprayed Keratinocytes—retrospective Review over 103 cases

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Polylactic membranes proved to be an adequate dressing for sprayed keratinocytes in deep partial thickness burns



103 patients with deep partial thickness burns
 Mean healing time: 8,04d
 75% healed within 8 days
 91% healed within 14 days
 Extreme values: 12,14, 15, 16, 18, 25, 42

Description of Patients:

	N=	Mean	median	Stddev.	95% CI	lower margin	upper margin	m/f *
Male	67							
female	36							
TBSA total	103	17,782	14	14,78	2,85	14,92	20,63	P=0,24
TBSA partial thickness	103	8,44	5	9,8	1,89	6,54	10,33	*p=0,04
TBSA full thickness	103	9,29	4	12,12	2,34	6,94	11,63	P=0,32
Age	103	38,96	42	21,82	4,21	34,74	43,17	P=0,33
ABSI	103	5,97	6	2,29	0,44	5,52	6,417	
ABSI male	67	5,52	6	2,03	0,39	5,12	5,91	*p = 0,008
ABSI female	38	6,81	7	2,53	0,49	6,32	7,29	

Ethiology of burn		number
explosion	18	
flame	55	
scald burn	17	
contact burn	2	
electricity	2	
suicide	6	
other	2	

Burned Area	number
Face	65
Arms	38
Back	25
Neck	22
Head	21
Hands	22
Abdomen	8
Shoulder	6
Foot	6
Buttocks	6
Thigh and knee	6
Lower leg	4
Chest	3

Introduction:

There is a lot of literature about the application of keratinocytes in deep second degree burns but there is still a lack about the effect of dressings on keratinocytes. Polylactic membranes have demonstrated usefulness in the treatment of superficial and partial thickness burns because of pain reduction, ease of application, reduced workload and good clinical results[5]

Type of study:

Retrospective quality control in 103 patients from 2003 to 2018, in which partial-thickness burns were treated with sprayed keratinocytes and covered with poly lactic membranes.

Evaluation:

From 2003 to 2015 evaluation of burn depth was done on clinical aspects, from 2016 to 2018 laser Doppler imaging was used. People were included, when the time of healing was expected to be longer than 15 days.

Four different cell culturing methods were used.

Aims of the study:

The study was intended to evaluate the time of healing in deep partial thickness burns sprayed with keratinocytes when polylactic membranes were used as a dressing. The influence of different cell types and methods of application was verified and outcome is described.

Treatment modalities:

Debridement after \bar{x} 3.9 days \pm 4,81 after injury

Cell Types used and healing time in days post application

Type of cells	Mean time of healing (d)	Standard deviation of healing time (d)	Median	N
Produced by Charite 1	8,25	4,03	7,0	4
Produced by UKB 2	8,56	6,17	7,0	51
SK 3	10,42	3,32	10,0	12
Produced by DIZG 4	6,97	2,70	7,0	36

Sprayed Area	number
Face	65
Hand	13
Leg	13
Arm	8
Neck	8
Ear	8
Abdomen, Thorax, Back	8
Hairy head	4
Shoulder	3
Penis	2

Paired test for significant difference in healing time (Wilcoxon):
 DIZG (4) compared to SK: superior(p<0,01)
 UKB (2) compared to SK: superior(p<0,05)
 SK showed a longer healing time due to the diversity and number of sprayed cells

Start of spraying	M	SD	N	Wilc. (ones.)
A: SK after injury	12.17	5.67	12	
B: Non-SK after injury	15.96	6.94	91	p = 0.0359 +
A: SK after first Operation	7.92	8.36	12	
B: Non - SK after first operation	12.57	7.40	91	p = 0.0314 +

Sprayed non-cultured keratinocytes could be applied significantly earlier due to no culturing time needed
The total healing time from injury was shorter when using Sprayed Non-cultured Keratinocytes (SK)
 (20,92 days versus 24,01days)

How did LDI influence the time of application?

Group	Mean	Standard dev.	SEM	MEDIAN	N
A: <=2016 (Non LDI)	16.06	6.80	0.70	16.0	93
B: >=2016 (LDI)	9.78	5.17	1.72	9.0	9

When using LDI spraying was done earlier (p=0,0022)

How did LDI influence the time of healing?

Group	Mean	Standard dev.	SEM	Median	n
Without LDI 2003-2015	8,01	5,02	0,52	7,0	94
With LDI 2016-2019	8,33	1,12	0,37	9,0	9

When using LDI healing time was longer(p=0,013) due to more accurate diagnosis of deep partial thickness

Did the age of patients influence the time of healing

Group	Mean	Standard dev.	SEM	Median	n
Age < 15a	8,37	3,47	0,8	7,0	1
Age ≥ 15a	7,96	5,07	0,55	7,0	8

Age of Patient did not influence the time of healing (p=0,17))

Did not wound-associated infections influence the time of healing?

Group	Mean	Standard dev.	SEM	Median	n
Concom. Infection	7,82	4,03	0,65	7	39
No concom. Infection	8,17	5,24	0,66	7	64

Not wound-associated infections did not influence time of healing (p=0,36)



Male 40 J, Flame burn, Cell spray graft 16 days after Trauma, the new spray device, result after 6M

Associated complications

Type of infection	Number
Visible scar	4 (4%)
Pigment changes	9 (9%)
Hypertrophic scarring	5 (5%)
Infections suspected or confirmed	6 (6%)

Comparison to literature

	Berlin	Holmes[1]	Berlin	Berlin	Wood [2][3]	Tan[4]
Regime	SCK + PLM	PET + BiPET	SK + PLM after LDI	SK + PLM clinical	SK + BB	SK +BB (37/47) MG (27/47) AG (10/47), SW (8/47)
Spraying d	15,96±6,93	2-19	10,29	14,8	2	2
Mean area sprayed	3,02±2,16%	168cm ² ± 1%	3,14±2,02%	1,6±0,62%		
N =	91	101	5	7	5	47
% healed within days after spray	99,03% after 28 days	97,6% after 28 days	100% after 14 days	100% after 14 days	100% after 21 days	
Median healing time in days	7,0 ± (2- 42) after appl.		10,00 after appl.	7,0 after appl.	16 (11-18) (14 after appl.)	25 (4-102) after Injury
Mean time of healing	8,04 after appl.		10,0 after appl.	7,0 after appl.	15 (13 after appl.)	-

SCK: Sprayed cultured keratinocytes SK: Sprayed non cultured Keratinocytes ** PLM: Polylactic membrane PET: Polyethylenterephthalate, BiPET: Wisumth petrolatum BB: biosynthetic dermal replacement SW: Sandwichtehnik, MG: Meshgraft AG: Allografit, 1)Charite= Charité – Universitätsmedizin Berlin (Medical University), 2) UKB = Trauma Hospital Berlin, 3) Sprayed non cultured Keratinocytes 4) German Institute for Cell- and Tissue replacement

Lessons Learned

- Polylactic membranes supported a short healing time in deep partial thickness burns after spraying with keratinocytes independent from cell type used
- Polylactic membranes protected the wounds from infections from not wound-associated sources
- Polylactic membranes showed a low complication rate

Implications for further PRCT:

- Use of sprayed keratinocytes and dressing with polylactic membranes could shorten wound healing and maybe inpatient time
- Use of **sprayed keratinocytes without culturing**** and dressing with polylactic membranes can shorten healing time and maybe inpatient time more effectively compared to culturing keratinocytes
- Results only difficultly comparable to literature., PRT needed.

Limitations:

Retrospective evaluation over 15 years with different treatment standards

Literature:

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