"News in the treatment for chronic wounds"

WMCS - a new treatment method for chronic wounds

31. Roundtable Wundverbund Südwest e.V.

Dr. Th. Zehnder, Spital Thun, Schweiz

Facharzt für Angiologie und Innere Medizin

20. Juni 2012

Translated version – original 'German language'

spitalSTSAG

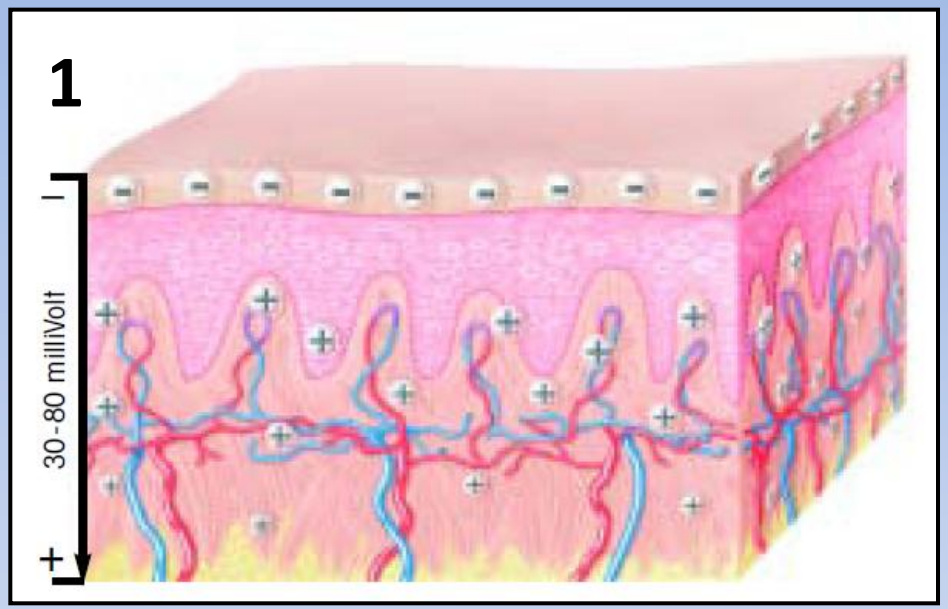
Agenda:

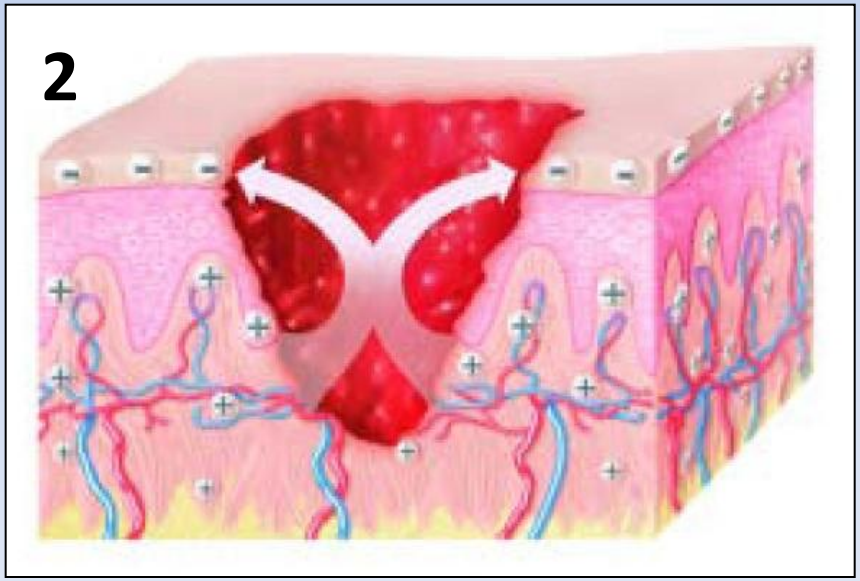
WMCS - a new treatment method for chronic wounds

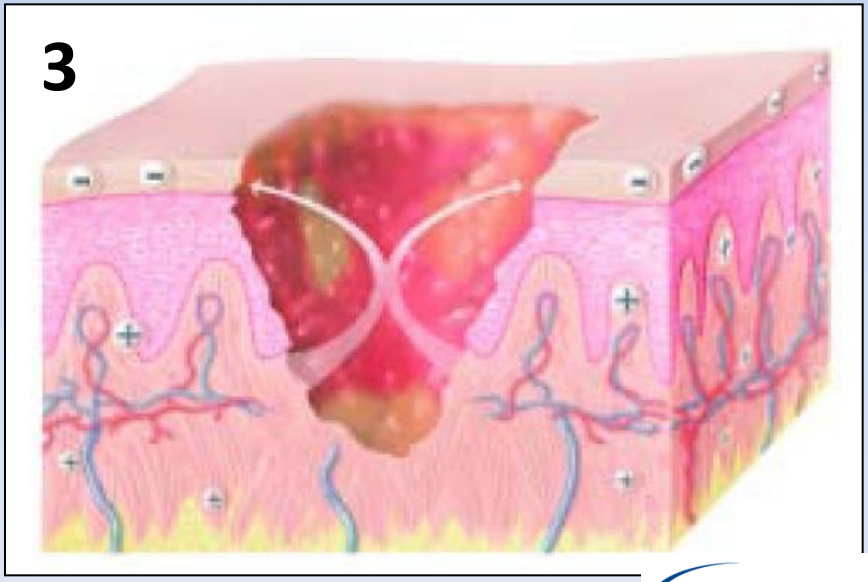
1. Basic information, electrical stimulation
2. Clinical evidence for electrical stimulation
3. Technology of WMCS
4. Own experiences with WMCS
5. Assessment of the method and discussion

1

Basic information, electrical stimulation‘



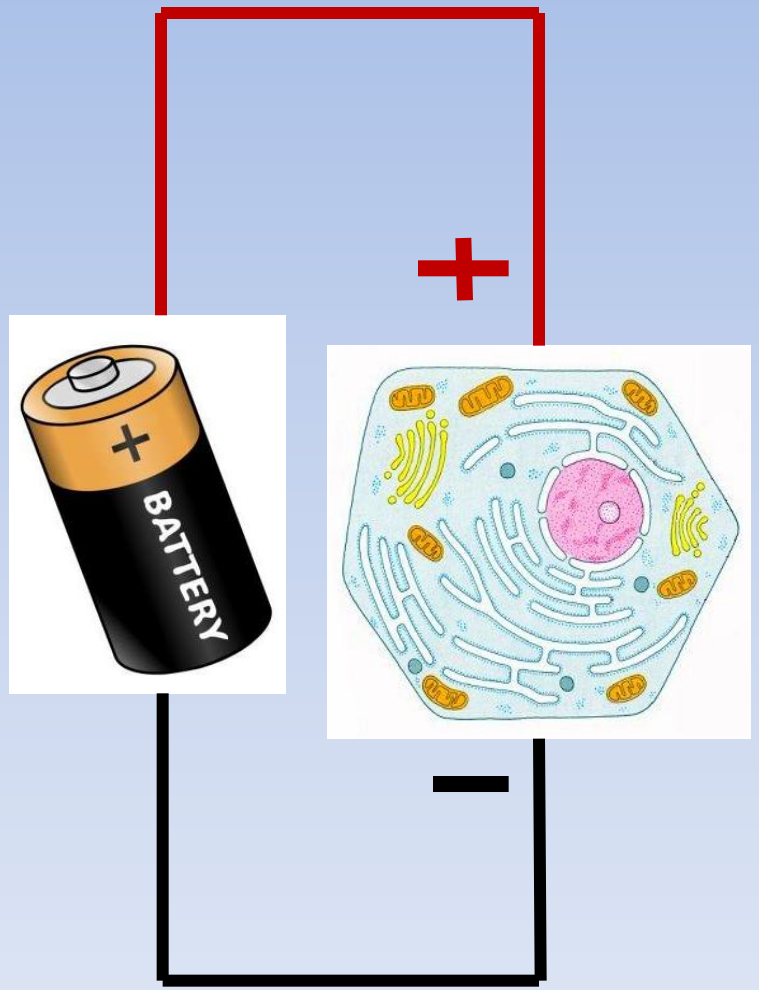




spitalSTSAG

1

Effects of electric stimulation on a cellular level



Effects on Flow of Cells
1. <u>Cell Migration</u> • Chemotaxis of Macrophages+Granulocytes • Proliferation of Fibroblasts • Stimulation of Epithelial cells+Keratinocytes • Production of growth factors
2. <u>Protein synthesis</u> • DNA-/Collagen synthesis ↑ 20% • ATP-concentration ↑ 5x • Amid acid uptake 3-40% ↑
3. <u>Reorganization of cells</u> • Longitudinal alignment of myoblast and endothelial cells to flow field
4. <u>Neurogenesis</u> • Nerves sprout towards the wound edge

Clinical evidence for ES: Meta-Analysis

Table 2. Meta-analyses of ES and control samples by study design

	Blinded, placebo-controlled RCTs		
	ES samples	**Control samples**	**Net effect**
Number of samples	10	8	
Number of ulcers	318	159	
$\overline{PHW}$*	22.51	9.01	13.50
Standard Deviation	11.41	11.43	
SE of mean	3.61	4.04	
95 % confidence interval	15.44–29.58	1.09–16.93	

*Average percent healing per week.

	All study designs		
	ES samples	**Control samples**	**Net effect**
Number of samples	24	15	
Number of ulcers	591	212	
$\overline{PHW}$*	22.22	9.10	13.12
Standard Deviation	10.32	10.44	
SE of mean	2.11	2.70	
95 % confidence interval	18.08–26.35	3.82–14.38	

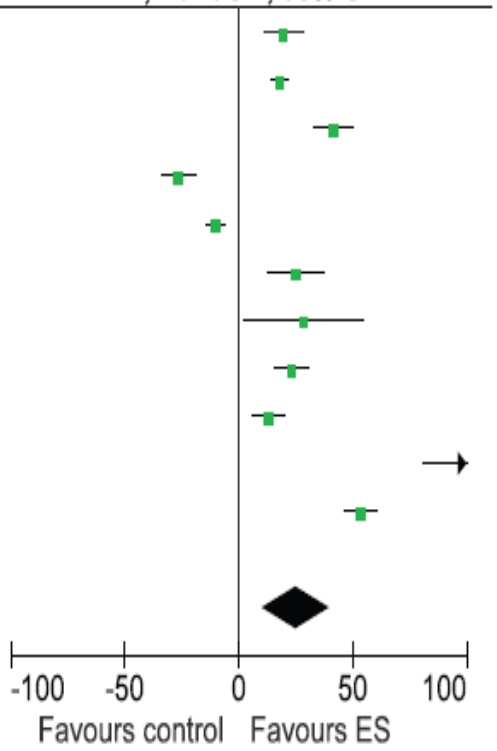
Gardner S, Frantz R, Schmidt F: Effect of electrical stimulation on chronic wound healing: a meta-analysis. Wound Rep Reg 1999;7:495-503

Clinical evidence for ES: pressure ulcer

Study or Subgroup	Experimental Mean	Experimental SD	Experimental Total	Control Mean	Control SD	Control Total	Weight	Mean Difference IV, Random, 95% CI
Adegoke 2001	22.15	8.86	4	2.6	1.04	3	9.4%	19.55 [10.79, 28.31]
Adunsky 2005	25.17	10.68	35	7.31	2.92	28	9.6%	17.86 [14.16, 21.56]
Ahmad 2008	62.35	24.94	45	20.76	8.3	15	9.4%	41.59 [33.18, 50.00]
Asbjornsen 1990	1.34	0.536	7	27.74	11.09	9	9.5%	-26.40 [-33.66, -19.14]
Baker 1996	27.68	11.07	125	37.84	15.13	67	9.6%	-10.16 [-14.27, -6.05]
Barczak 2001	56	22.4	16	30.8	12.32	17	9.1%	25.20 [12.76, 37.64]
Griffin 1991	80.34	32.13	8	52.03	20.81	9	7.5%	28.31 [2.22, 54.40]
Houghton 2010	37.02	14.8	18	13.83	5.53	16	9.5%	23.19 [15.84, 30.54]
Jercinovic 1994	48.78	19.51	48	35.84	14.33	42	9.5%	12.94 [5.92, 19.96]
Kloth 1988	96.78	38.71	9	-9.76	3.9	7	7.6%	106.54 [81.09, 131.99]
Wood 1993	60.37	24.14	43	6.77	2.7	31	9.5%	53.60 [46.32, 60.88]
Total (95% CI)	**47.1**		358	**22.3**		244	100.0%	24.93 [10.03, 39.82]

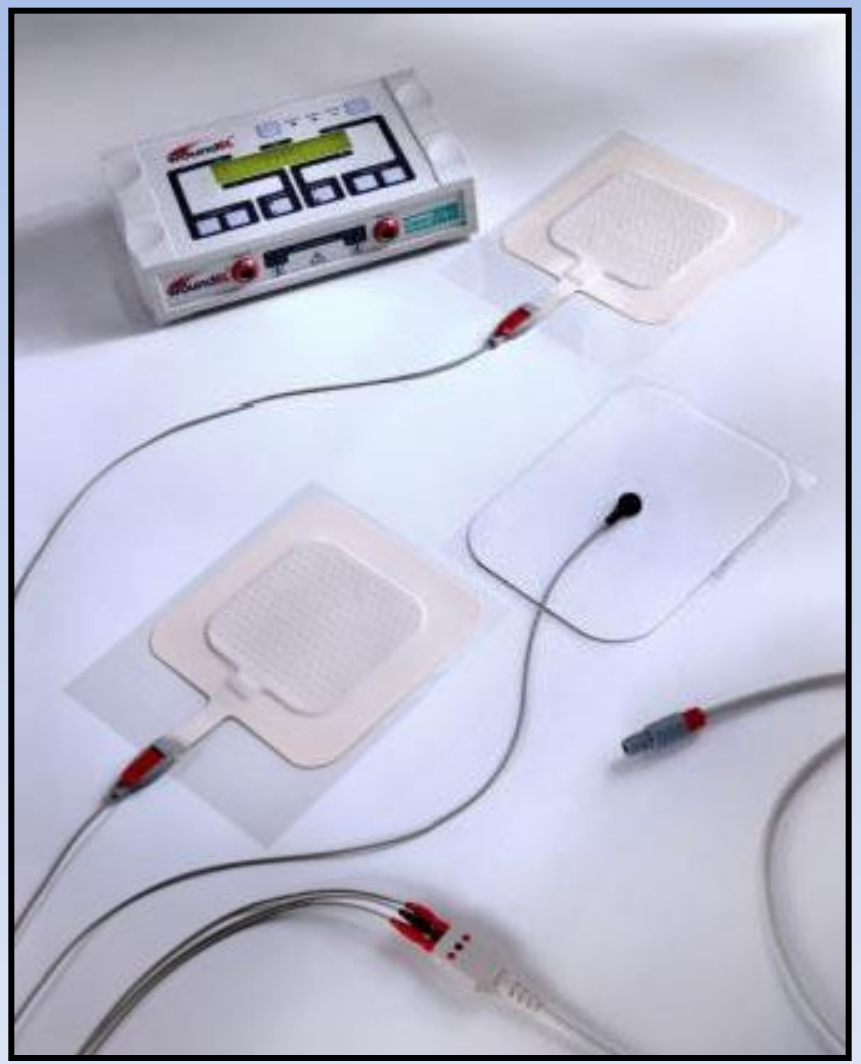
Heterogeneity: $Tau^2 = 595.95$; $Chi^2 = 472.14$, df = 10 ($P < 0.00001$); $I^2 = 98\%$

Test for overall effect: Z = 3.28 (P = 0.001)



Koel G: A systemaic review: effectiveness of electrical stimulation for Wound healing, Cochrane review 077; 13th annual meeting EPUAP 2010 Birmingham

Existing methods of ES



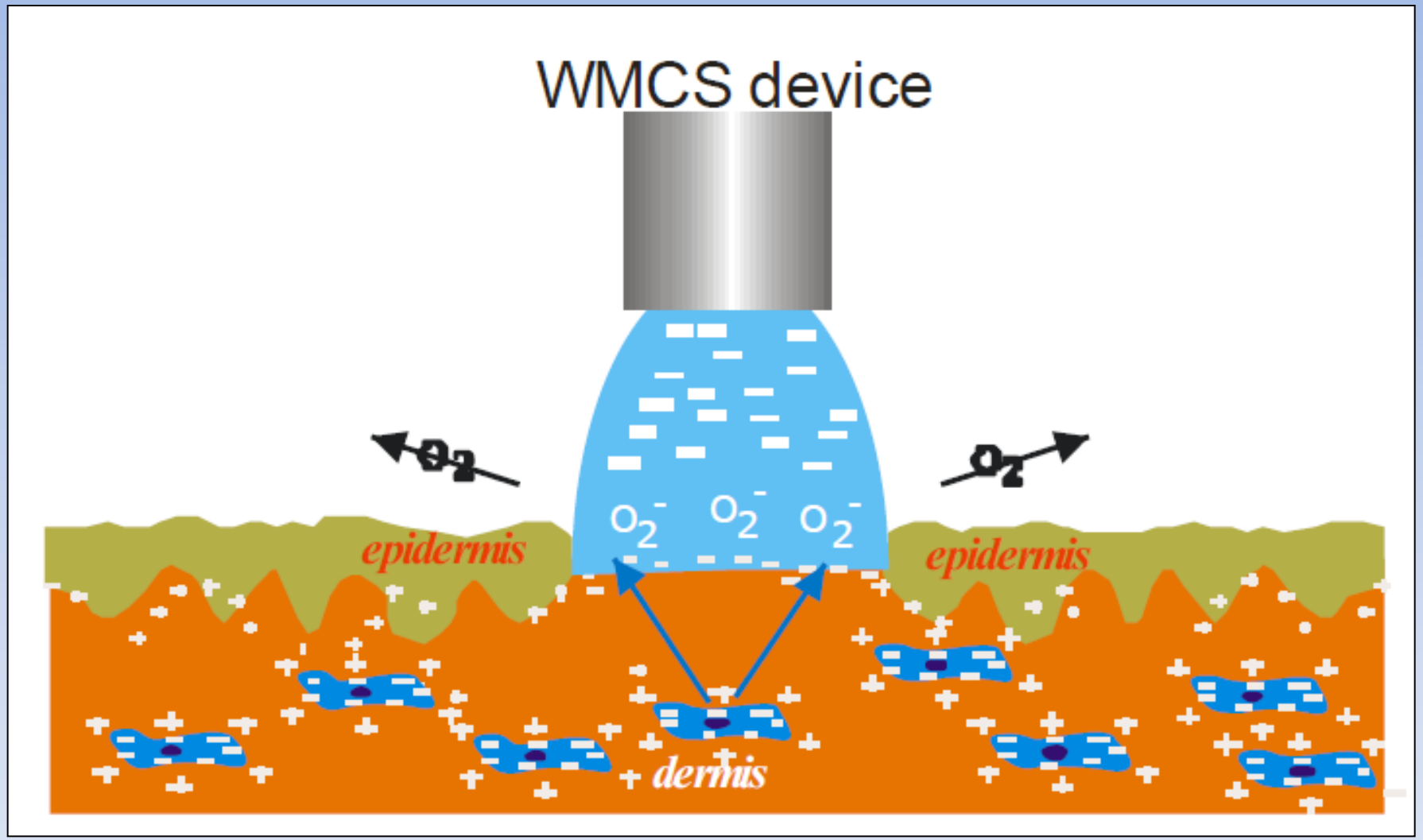
System woundEL, Germany

System Synapse Accel-Heal, England

The WMCS method

WMCS System, Wetling, Denmark

The WMCS method



WMCS System, Wetling, Denmark

Own experiences with WMCS/ES: Pilot Study

Patients:
- n=13, age 79 years, 85% female
- Most “hard-to-heal Ulcer“
- Ulcer time 3-24 months

Etiology:
- Different: venous, pressure ulcers, post-traumatic, Martorell

Treatment schedule:
- 3x/week, each 45 minutes
- 12/13 outpatient cases
- Always in addition to optimized local wound care (including compression)
- Treatment duration: approximately 8 weeks
- Setting: 1.5 µA, no additional light

Primary Endpoint:
- Monthly reduction in % (digital photography, synedra view)
- Healing of ulcer

Results: Patient No. 2, over the ulcer for ten weeks

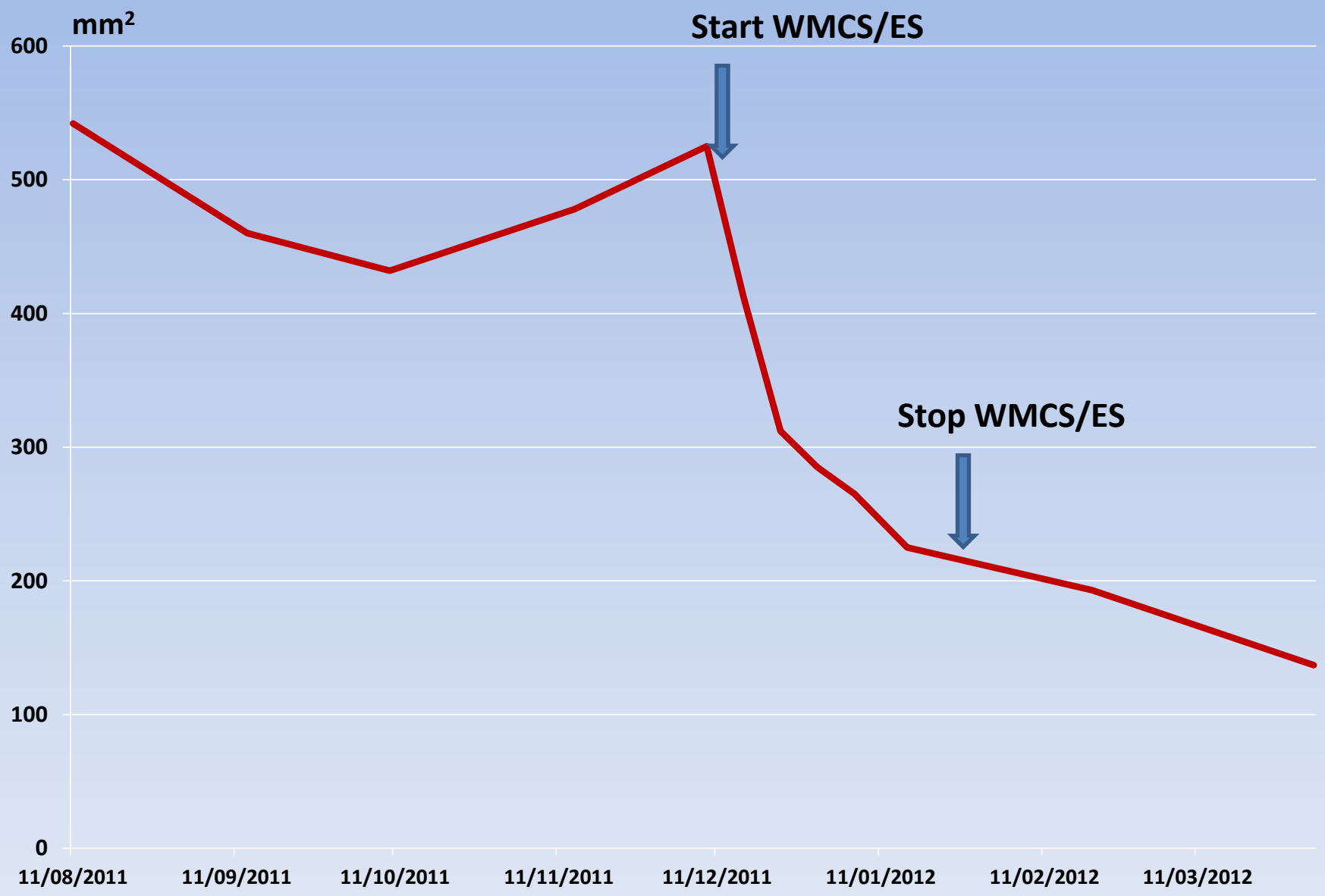
Video from Swiss TV

Example 1: 86 year old female

Parameter	
Localization	Right lower leg medially
Ulcer Since	7 months
Etiology	Chronic post-thrombotic venous
Risk factors	None
Medication	Marcoumar, Fosamax, MST
Previous Therapy	VAC, Unna‘s boot
Compression	Kompressionsverbände
Remarks	2xLE, Varicosis Magna bds.

Course of Example 1

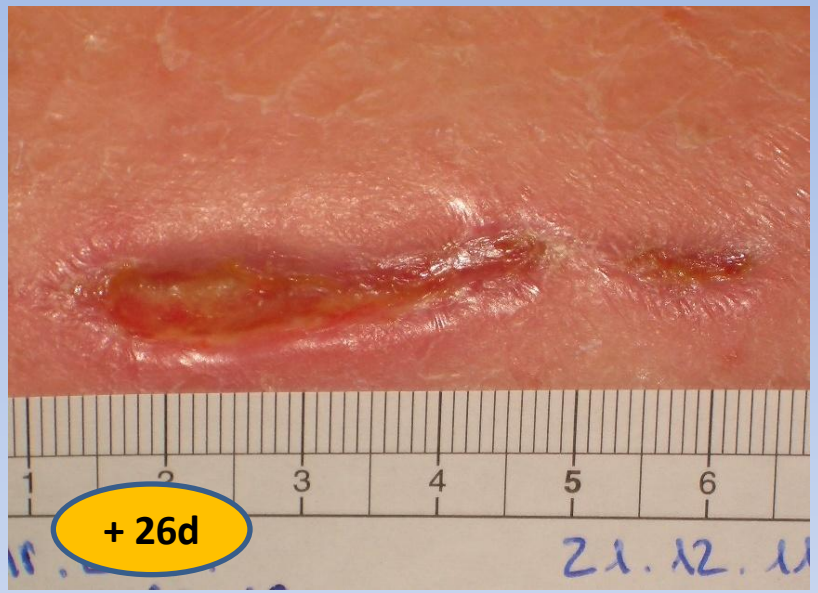
Course of wound size Pat 1



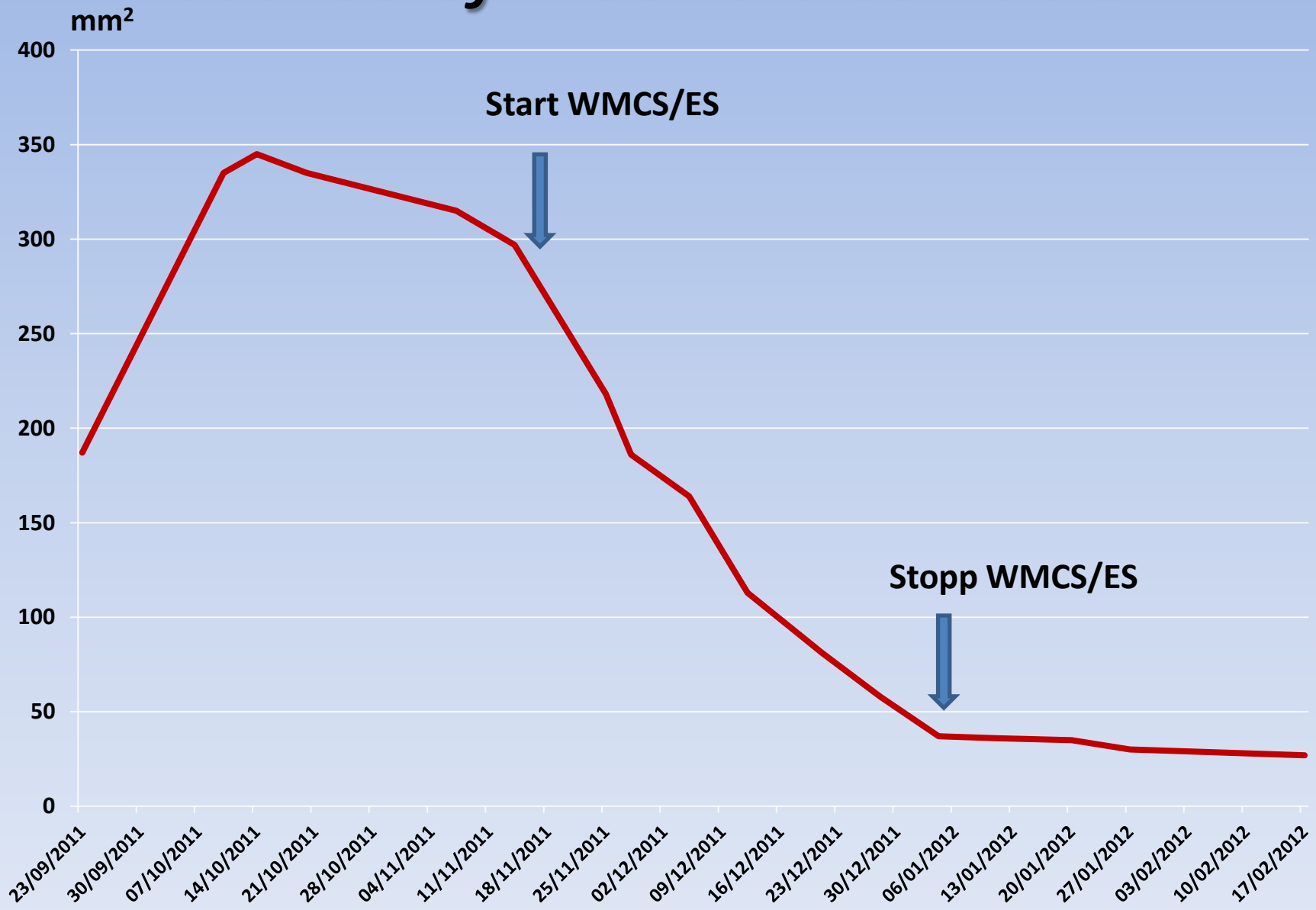
Example 2: 60 year old male

Parameter	
Localization	Right lower leg medially
Ulcer Since	4 months
Etiology	Posttraumatic + Infections
Risk factors	Diabetes Type I, Hypertonie, Hypercholesterinämie
Medication	Atacand, Kardegic, Metoprolol, Sortis, Insulin
Previous Therapy	Conservativ, Spital mit iv-Antibiose (resistant Pseudomonas)
Remarks	Emerged after vein removal at ACB 18.8.

Course of Example 2



Course of wound size Pat 2

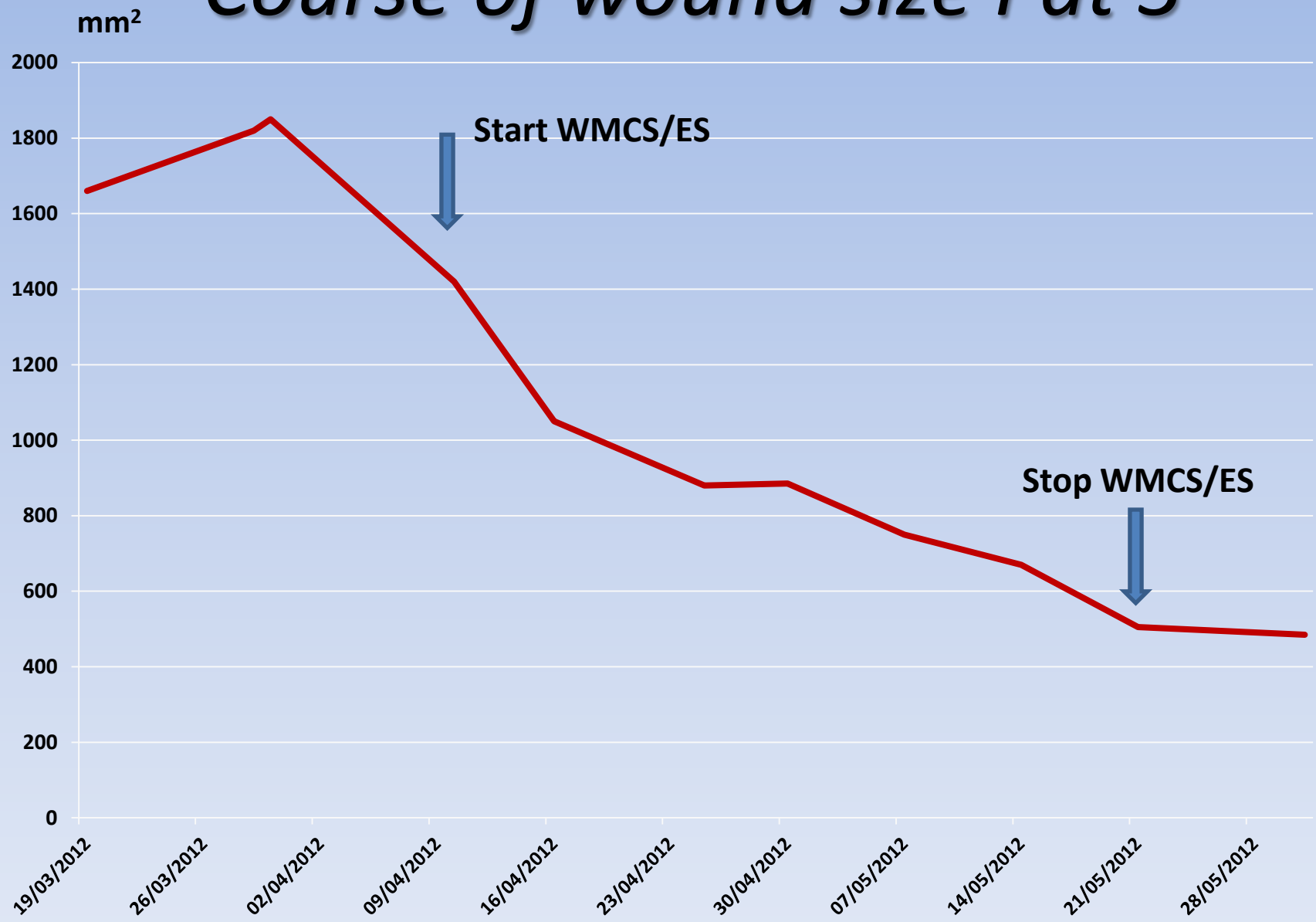


Example 3: 82 year old female

Parameter	
Localization	Right lower leg medially
Ulcer Since	22 months
Etiology	Chronic venous insufficiency
Risk factors	Hypertension
Medication	Felodil, Atacand, Beloc zok, Calcium, Torasis
Previous therapy	Inpatient treatment , Antibiosis at infection, max local therapy
Compression	Yes, sufficient
Remarks	Add. St. after OSG-Fracture right

Course of Example 3

Course of wound size Pat 3



Results

#	Age	Gender	Area reduction Before WMCS/ES in %/Mt	Area reduction after WMCS/ES in %/Mt	Etiology	Clinical Success
1	85	F	22	32	Venous	Yes
2	88	F	40	71	Posttraumatic	Yes
3	74	F	15	56	Venous	Yes
4	72	F	31	54	Martorell	Yes
5	70	F	30	0	Venous	No
6	76	F	0	8	Pyoderma ?	No
7	60	M	44	63	Posttraumatic	Yes
8	86	F	X	50	Venous	Yes
9	75	F	X	47	Unclear	Yes
10	79	M	X	4	Pressure Ulcer	No
11	92	F	X	55	Venous	Yes
12	82	F	14	51	Venous	Yes
13	91	F	14	28	Venous	Yes
mean	**79**	**85%**	**23.3±14.5%**	**40 ±24.1% p=0.605**		**10/13 (77%)**
mean	**Only clin. success**		**22.5±14.8%**	**50.7±12.9% p=0.009**		

X = no pre data , as pre-treatment not with us

Assessment of the method

1. The WMCS technique shows as an adjunct to standard therapy. In over 70% of cases with "hard-to-heal 'ulcers' it has a positive effect on wound healing.
2. Often, an effect even after a short time (within 2 weeks) visible.
3. The positive effect seems to decrease after a certain time.
4. Wounds with strong coverings are not suitable for the WMCS, it requires a sufficient granulation.
5. The method is easy to use.
6. The ES with the WMCS technique is subjectively tolerated very well.

The End

Thanks for Your Attention


Juan

Assessment of the method

Simulation based on Thuner experience:

Basic area ulcers with d=5cm, area reduction with WMCS 51%/Mt, w/o WMCS 23%/Mt