

Supplemental Table 1. METHODOLOGY AND RESULTS OF CLINICAL TRIALS USING HVMIPC

Variable	Kloth and Feedar, ³³ 1988	Griffin et al., ³⁴ 1991	Ahmad, ³⁵ 2008	Houghton et al., ³⁶ 2010	Franeek et al., ³⁷ 2012	Polak et al., ³⁸ 2016	Polak et al., ³⁹ 2016	Karsli et al., ⁴⁰ 2017	Polak et al., ⁴¹ 2017	Polak et al., ⁴² 2018
PEDro scale score	4	4	4	7	6	7	6	4	9	8
Total no. of patients/PIs	16/16	17/17	60/60	34/34	50/50	49/49	77/88	27/47	63/63	61/61
No. of patients/PIs in the ESG	9/9	8/8	45 min ES, 15/ 15; 60 min ES, 15/15; 120 min ES, 15/15	16/16	26/26	25/25	24/29	15/25	CESG: 23/23 C + AESG: 20/ 20	CESG: 21/21 AESG: 20/20
No. of patients/PIs in the USG						n/a	25/28	12/22	n/a	n/a
No. of patients/PIs in the CG	7/7	9/9	15/15	18/18	24/24	24/24	28/31	n/a	20/20	20/20
Patient ages, y	20-89	10-70	30-50	23-79	14-87	60-95	60-95	NR, the mean age of all patients was 32.63 ± 15.96	60-95	NR
Patient age in the ESG, mean (SD), y	71 ± 21	32.5	1st ESG, 38.4 (6.82); 2nd ESG, 38.47 (1.68); 3rd ESG, 39.4 (1.74)	50.3 (17.3)	59.0 (18.16)	79.92 (8.5)	79.93 (10.21)		CESG: 79.35 (8.48) C + AESG: 79.65 (11.44)	CESG: 55.67 (17.83) AESG: 53.2 (13.82)
Patient age in the USG, mean (SD), y						n/a	77.11 (10.36)		n/a	n/a
Patient age in the CG, mean (SD), y	66 (21)	26.0 (NR)	39.4 (1.69)	50.8 (11.6)	56.2 (19.7)	76.33 (10.57)	79.13 (9.57)		77.55 (12.24)	52.5 (17.83)
PI classification method	n/a	DeLisa Classification System	Yarkony-Kirk	NPIAP	NPIAP	NPIAP	NPIAP	NPIAP	NPIAP	NPIAP
PI stages	4	2-4	2	2-4	2-3	2-3	2-4	2-4	2-4	2-4
No. of PIs by stage in the ESG	Stage 4, n = 9	Stage 2, n = 2; stage 3, n = 5; stage 4, n = 1	Stage 2, n = 45; (a total of three ESGs)	Stage 2, n = 1; stage 3, n = 6; stage 4, n = 7; unstageable, n = 2	Stage 2, n = 17; stage 3, n = 9	Stage 2, n = 11; stage 3, n = 14	Stage 2, n = 19; stage 3, n = 7; stage 4, n = 7	Stage 2, n = 5; stage 3, n = 13; stage 4, n = 7	CESG: Stage 2, n = 12; stage 3, n = 9; stage 4, n = 2. C + AESG: Stage 2, n = 11, n = 2, stage 3, n = 13; stage 4, n = 3 n = 5	CESG: Stage 2, n = 4; stage 3, n = 12; stage 4, n = 5. AESG: Stage 2, n = 2, stage 3, n = 6; stage 4, n = 3 n = 5

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Supplemental Table 1. METHODOLOGY AND RESULTS OF CLINICAL TRIALS USING HVMP, CONTINUED

Variable	Kloth and Feudar, ³³ 1988	Griffin et al., ³⁴ 1991	Ahmad, ³⁵ 2008	Houghton et al., ³⁶ 2010	Franeck et al., ³⁷ 2012	Polak et al., ³⁸ 2016	Polak et al., ³⁹ 2016	Karsli et al., ⁴⁰ 2017	Polak et al., ⁴¹ 2017	Polak et al., ⁴² 2018
No. of Pls by stage in the USG	n/a	n/a	n/a	n/a	n/a	n/a	Stage 2, n = 18; stage 3, n = 8; stage 4, n = 2	Stage 2, n = 9; stage 3, n = 13; stage 4, n = 0	n/a	n/a
No. of Pls by stage in the CG	Stage 4, n = 7	Stage 2, n = 2; stage 3, n = 6; stage 4, n = 1	Stage 2, n = 15	Stage 2, n = 4; stage 3, n = 4; stage 4, n = 10	Stage 2, n = 16; stage 3, n = 8	Stage 2, n = 11; stage 3, n = 13	Stage 2, n = 23; stage 3, n = 7; stage 4, n = 1	n/a	Stage 2, n = 13; stage 3, n = 6; stage 4, n = 1	Stage 2, n = 3; stage 3, n = 13; stage 4, n = 4
Pl locations	n/a	Pelvic region (gluteal, ischial, sacral, coccygeal)	n/a	Lower extremity (sacrum, coccyx, hip, ischial tuberosity, foot, ankle, knee)	Lower extremity (legs, feet, ankle, greater femoral trochanter)	Lower extremity (sacrum, coccyx, ischial tuberosity, trochanter major)	Various sites (buttocks, trunk, elbow, lower extremity)	Lower extremity (sacrum, ischial, trochanter, heel, lateral tuberosity, malleolus, head of fibula)	Lower extremity (sacrum, ischial, trochanter major)	Lower extremity (sacrum, ischial, trochanter, tuberosity, trochanter major, lower leg, lower foot)
Pl cause	Mixed	SCI	Unknown	SCI	Orthopedic surgery	Advanced age	Advanced age	Neurologic diseases (SCI, traumatic brain injury, cerebral stroke, myelitis)	Advanced age	Central nervous system injury (SCI, cerebral stroke, head injury)
Wound healing criteria	WSA reduction, healing rate	WSA reduction	WSA reduction	WSA reduction	Reduced WSA and volume, Gilman parameter, change in granulation tissue area	WSA reduction, Gilman parameter	WSA, healing rate	WSA reduction	WSA reduction, healing rate	WSA reduction, periwound skin blood flow, time required for WSA to decrease by 50%
Treatment site for Pls	Medical/ rehabilitation center	Medical/ rehabilitation center	Medical/ rehabilitation centers	Home care	Medical/ rehabilitation center	Medical/ rehabilitation center	Medical/ rehabilitation center	Medical/ rehabilitation centers	Medical/ rehabilitation center	Medical/ rehabilitation center
Treatment in the CG	SWC + sham HVMP	SWC + sham HVMP	SWC + sham HVMP	SWC	SWC	SWC + sham HVMP	SWC	n/a	SWC + sham HVMP	SWC + sham HVMP
Treatment in the USG	n/a	n/a	n/a	n/a	n/a	n/a	SWC + US ^a	SWC + US ^b	n/a	n/a
Treatment in the ESG	SWC + HVMP	SWC + HVMP	SWC and HVMP in three ESGs, which differed in ES session duration	SWC + HVMP	SWC + HVMP	SWC + HVMP	SWC + HVMP	SWC + HVMP	cathodal HVMP cathodal + anodal HVMP	cathodal HVMP anodal HVMP

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Supplemental Table 1. METHODOLOGY AND RESULTS OF CLINICAL TRIALS USING HVMPIC, CONTINUED

Variable	Kloth and Feeder, ³³ 1988	Griffin et al, ³⁴ 1991	Ahmad, ³⁵ 2008	Houghton et al, ³⁶ 2010	Franeck et al, ³⁷ 2012	Polak et al, ³⁸ 2016	Polak et al, ³⁹ 2016	Karsli et al, ⁴⁰ 2017	Polak et al, ⁴¹ 2017	Polak et al, ⁴² 2018
Waveform	Twin-peak pulses	Twin-peak pulses	Twin-peak pulses	Twin-peak pulses	Twin-peak pulses	Twin-peak pulses	Twin-peak pulses	Twin-peak pulses	Twin-peak pulses	Twin-peak pulses
Pulse duration, μ s	50 (interphase time)	n/a	50 (interphase time)	50	100	154	154	10 on-50 off-100 on	154	154
Pulse frequency, pps	105	100	120	100/20 min and 10/20 min	100	100	100	100	100	100
Amperage or voltage	100-175 V	200 V	100-175 V	50-150 V	>100 V	0.25 A/100 V	0.25 A/100 V	50-150 V	0.25 A/100 V	0.36 A/100 V
Charge, μ C/s	342	500	n/a	n/a	n/a	250	250	n/a	250	360
Intensity of ES	Sensory; no visible muscle contractions					Sensory; no visible muscle contractions	Sensory; no visible muscle contractions	Sensory; no visible muscle contractions	Sensory; no visible muscle contractions	Sensory; no visible muscle contractions
Location of the electrodes	Treatment electrode, on the PI; dispersive electrode, 15 cm from the PI	Treatment electrode, on the PI; dispersive electrode, the patient's medial thigh	Treatment electrode, on the PI; dispersive electrode, the patient's medial thigh	Treatment electrode, on the PI; dispersive electrode, at least 20 cm from the PI	Treatment electrode, on the PI; dispersive electrode, at least 20 cm from the PI	Treatment electrode, on the PI; dispersive electrode, at least 20 cm from the PI	Treatment electrode, on the PI; dispersive electrode, at least 20 cm from the PI	n/a	Treatment electrode, on the PI; dispersive electrode, at least 20 cm from the PI	Treatment electrode, on the PI; dispersive electrode, at least 20 cm from the PI
Treatment electrode polarity	Anodal (changed to cathodal if no healing observed)	Cathodal	Cathodal for the first 3 d, then anodal. If healing plateaued, cathodal and anodal applied every 3 d	Cathodal in the first wk; thereafter, alternated between cathodal and anodal	Cathodal in the first 1-2 wk to stimulate granulation tissue; thereafter anodal	Cathodal for the first 5 d, then anodal	Cathodal for the first 5 d, then anodal	n/a	CESG, cathodal; C + AESG, cathodal for the first 5 d, then anodal	CESG, cathodal; AESG, anodal
Duration of ES session, min	45	60	ESG 1: 45 ESG 2: 60 ESG 3: 120	40	50	50	50	60	50	50
Frequency of ES sessions	Once daily, 5 d/wk	Once daily, 7 d/wk	Once daily, 7 d/wk	8 times a day (5.3 h per d, 7 d/wk)	Once daily, 5 d/wk	Once daily, 5 d/wk	Once daily, 5 d/wk	Once daily, 3 d/wk	Once daily, 5 d/wk	Once daily, 5 d/wk
Weekly duration of ES	3.75 h	7 h	ESG 1: 5.25 h ESG 2: 7 h ESG 3: 14 h	37.1 h	4.2 h	4.2 h	4.2 h	3 h	4.2 h	4.2 h

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Supplemental Table 1. METHODOLOGY AND RESULTS OF CLINICAL TRIALS USING HVMPG, CONTINUED

Variable	Kloth and Feedar, ³³ 1988	Griffin et al, ³⁴ 1991	Ahmad, ³⁵ 2008	Houghton et al, ³⁶ 2010	Franeck et al, ³⁷ 2012	Polak et al, ³⁸ 2016	Polak et al, ³⁹ 2016	Karsli et al, ⁴⁰ 2017	Polak et al, ⁴¹ 2017	Polak et al, ⁴² 2018
Duration of treatment	Average of 7.3 wk	20 consecutive d	5 wk	12 wk	6 wk	6 wk	6 wk	4-12 wk	6 wk	8 wk
Total duration of ES	Average of 27.4 h	20 h	ESG 1: 26 h 15 min ESG 2: 35 h ESG 3: 70 h	445.2 h	25.2 h	25.2 h	25.2 h	12-36 h	25.2 h	25.2 h
Results	In the ESG, all Pls closed in a mean of 7.3 wk at a mean rate of 45% per week In 7 patients in the CG, Pls increased in size by a mean of 29% over a mean of 7.4 wk	Mean PAR measured on days 5 ($P = .03$), 15 ($P = .05$), and 20 ($P = .05$) was greater in the WSA than in the CG reductions in the 60-min and 120-min ESG were greater than the 45-min ESG ($P < .001$); WSA reduction did not differ between the 120-min ESG and the 60-min-ESG ($P > .05$)	In all three ESGs, WSA decreased more than in the CG ($P < .001$). The WSA reductions in the 60-min and 120-min ESG were greater than the 45-min ESG ($P < .001$); WSA reduction did not differ between the 120-min ESG and the 60-min-ESG ($P > .05$)	WSA reduction at week 12 was significantly greater in the ESG (70% $\pm$ 25%) than in the CG (36% $\pm$ 61%); $P = .048$	After 6 wk, the value of Gilman parameter, WSA; and wound length, width, and volume were smaller in the ESG than in the CG (all P s $< .01$). There was no between-group difference in granulation tissue area ($P = .18$)	The USG and the ESG had higher PAR at week 6 (77.48% $\pm$ 11.59% and 76.19% $\pm$ 32.83%, respectively) than the CG (48.97% $\pm$ 53.42%); $P = .024$ and $P = .030$. The USG and ESG did not differ in week 6 PAR	After 6 wk, ESG had higher PAR (80.31% $\pm$ 29.02%) than the CG (54.65% $\pm$ 42.65%); $P = .046$	PAR of 43% in ESG and 63% in USG ($P > .05$). Wound volume decreased by 16 cm ³ in the ESG and 12 cm ³ in the USG ($P = .798$)	After 6 wk, the C + AESG both had higher PAR than the CG. WSA decreased by 50% over 1.92 wk in the C + AESG, and 4.3 wk in the C + AESG, compared with the C + AESG 9.86 wk in the CG ($P < .05$). Both ESGs had a greater PSBF healing than the CG ($P < .01$). The ESGs were not significantly different	After 8 wk, the C + AESG both had higher PAR than the CG. WSA decreased by 50% over 3.86 wk in the C + AESG, and 4.3 wk in the C + AESG, compared with the C + AESG 9.86 wk in the CG ($P < .05$). Both ESGs had a greater PSBF healing than the CG ($P < .01$). The ESGs were not significantly different

Abbreviations: AESG, anodal electrical stimulation group; C + AESG, cathodal + anodal electrical stimulation group; CEG, cathodal electrical stimulation group; HVMPG, high-voltage monophasic pulsed current; n/a, not applicable; NP/AP, National Pressure Injury Advisory Panel; NR, not reported; PAR, percent wound area reduction; PI, pressure injury; PSBF, periwound skin blood flow; SC, spinal cord injury; SWC, standard wound care; US, ultrasound; USG, ultrasound group; WSA, wound surface area.

^aPeriwound and the wound area: 1 MHz: 0.5 W/cm²; 20%; 1-3 min/cm²; 5 d/wk; US.

^bWound bed: 3 MHz: 0.3 W/cm²; 20%; 1-2 min/cm²; 3 d/wk; periwound: 1 MHz: 1.5 W/cm²; 100%; 2-3 min/cm²; 3 d/wk; CEGS and C + AESG.