



**ICC Meeting in Bari Oct 9, 2015,
CINDERELLA INDICATIONS FOR COMPRESSION**

compression in mixed ulcers

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mixed ulcers

in mixed ulcers arterial and venous systems are simultaneously involved

venous disease needs compression

arterial disease contraindicates compression especially when severe (ABPI < 0.5)

compression in mixed ulcers: what we already know

kind of expert agreement:

-apply compression normally when $ABPI > 0.85$

-apply reduced compression in case of:

- ✓ expert “bandagers”

- ✓ <0.80 $ABPI >0,50$

-address the patient to vascular surgeon when $ABPI < 50$

compression in mixed ulcers: what we already know

compression pressure must be lower than the perfusion pressure in order to avoid a reduced arterial flow and increase skin damage.

It must be:

- reduced (≤ 40 mm Hg)
- applied when perfusion pressure is $60 \geq$ mm Hg
- accurately protecting bone and tendon prominences

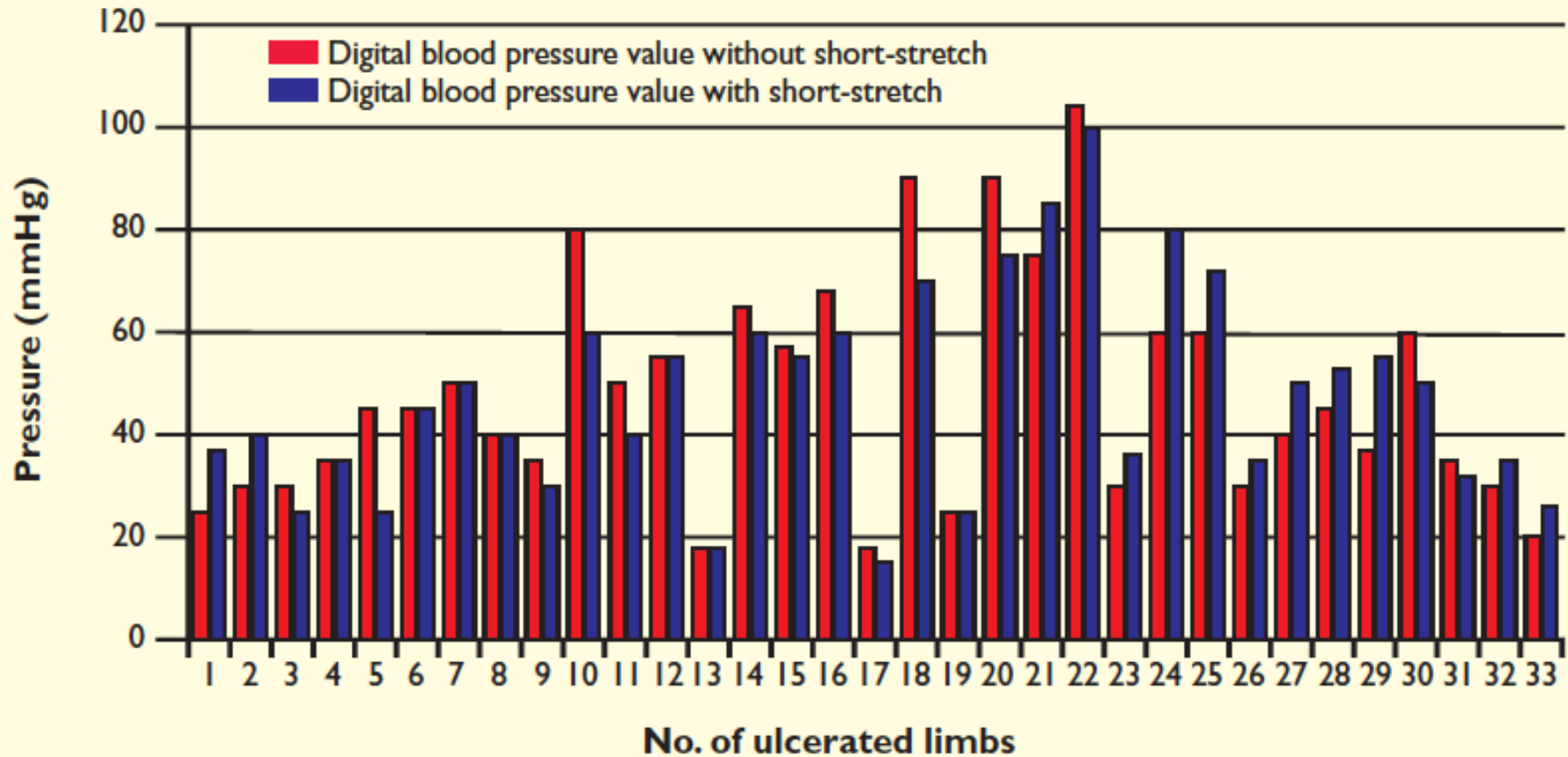
compression in mixed ulcers: what we already know

when these indications are respected, compression:

- doesn't impair but increases the arterial skin perfusion
- is still able to increase the venous pumping function

compression in mixed ulcers: what we already know

Fig 1. Distal blood pressure values



Top S, Arveschoug AK, Fogh K. Do short-stretch bandages affect distal blood pressure in patients with mixed aetiology leg ulcers? J Wound Care. 2009 Oct;18(10):439-42.

aim of new work

reporting the clinical outcome:

- ulcer healing
- pain control

in 180 patients with:

- “pure” VLU (pVLU): 109 patients
- associated with moderate arterial disease (mixed leg ulcers (MLU)): 71 patients

aim of new work

treated by compression therapy and foam sclerotherapy
of the incompetent superficial veins with reflux directed
to the ulcer bed

neglecting the arterial disease

aim of new work

- pure venous leg ulcers (pVLU): 109 patients (30 men; 79 females; mean age 72.4 ± 13.8 years; range 31-90 years)
- venous leg ulcers with a simultaneous moderate arterial involvement ABPI was < 0.8 but > 0.5 (MLU group): 71 patients (22 males; 49 females; mean age 75.8 ± 9.8 years; range 43-92 years)

inclusion criteria

- both sex
- any age
- affected by VLU both without and with moderate arterial involvement, with an ABPI < 0.8 and > 0.5
- ulcers in inflammatory stage (ulcer bed partially or totally covered by necrotic slough with sign of local infection/ inflammation as defined by blocked healing, malodour, moderate to severe exudate, redness of periwound skin)
- ulcer size up to 100 cm^2
- ulcer duration more than 6 months.

exclusion criteria

- minimal arterial impairment with ABPI >0.8
- severe arterial disease with an ABPI < 0.5
- ulcer surface $>100 \text{ cm}^2$
- ulcer duration shorter than 6 months
- type 1 diabetes mellitus
- immunosuppressive drugs assumption
- cancer coexistence
- life expectancy lower than 6 months

vein sclerotherapy

- foam sclerotherapy of the veins with reflux directed to the ulcer bed
- Sodium Tetradecyl Sulphate (STS) 3% in the trunk, 1% in the tributaries
- a maximum of 12 ml of foam was injected per session
- Duplex assessment performed during dressing changes and injection were repeated until a complete occlusion was achieved.

local treatment

- ulcer was washed and cleansed by means of saline solution or of a weak antiseptic isotonic solution containing 0.05% sodium hypochlorite
- the same dressing (polyurethane foam) was applied to all patients at every dressing change
- in patients with infected ulcers Cadexomer powder containing 0.9% Iodine was used until clinical signs of infection disappeared
- no systemic antibiotic treatment

compression therapy

all the patients were treated by compression therapy by means of inelastic materials.

pVLU patients: compression consisted of a short stretch bandage (Rosidal K®) applied with full stretch on top of a subbandage padding layer made up with synthetic cotton and a cohesive short stretch bandage (Cellona® and Mollelast Haft®)

MLU patients: compression made up with Cellona® and Mollelast Haft®.

compression therapy

all the bandages were applied from the base of the toes to the knee in a spiral fashion with full stretch and measuring the compression pressure

the target supine pressure at application was > 60 mm Hg in patients with pVLU and around 40 mm Hg in patients with MLU

compression measurement

Picopress® (Microlab; Padua, Italy) was used with pressure probe in the B1 area

compression pressure was measured in supine and standing position

Static Stiffness Index (SSI) was calculated

in the patients where the ulcer did not involved the B1 area the probe was left in place and compression pressure measured again before bandage removal

wound size measurement

ulcer size was measured at visit 1 and every two dressing change by means of Visitrak® (Smith&Nephew; Hull; England), a wound measurement system which calculates the area based on simple tracings of wounds

pain evaluation

pain ulcer-related was evaluated by means of the Visual Analogue Scale (VAS) at 1 visit, and after 2, 4, 8, 12 and 16 weeks

pain or discomfort compression-related was measured at the first application and removal of compression devices and after four weeks when the patients were used to wear compression

results

	Sex: M/F (%)	Age (median/IQR)	SVI (%)	DVI (%)	SVI+DVI (%)	ABPI	Ulcer surface (median/IQR)	Ulcer duration (median/IQR)	Inflammation /infection (%)	>60 u.s. covered by necrotic slough (%)	Ulcer recurrence (%)
pVLU	28/72	76 (68-81)	61	19,5	19,5	>1	40 (24.565)	8 (6-18)	55	72	42
MLU	31/69	77 (70-83)	65	20	15	0.63 (0.59-0.69)	40 (20-60)	8 (6-15)	53	75	39
S.S.	n.s.	n.s.	n.s.	n.s.	n.s.	P<0.0001	n.s.	n.s.	n.s.	n.s.	n.s.

case series demographic characteristics

results

16 pVLU patients (14.6%) were lost at follow up
9 MLU MLU (12.6%) (one death)

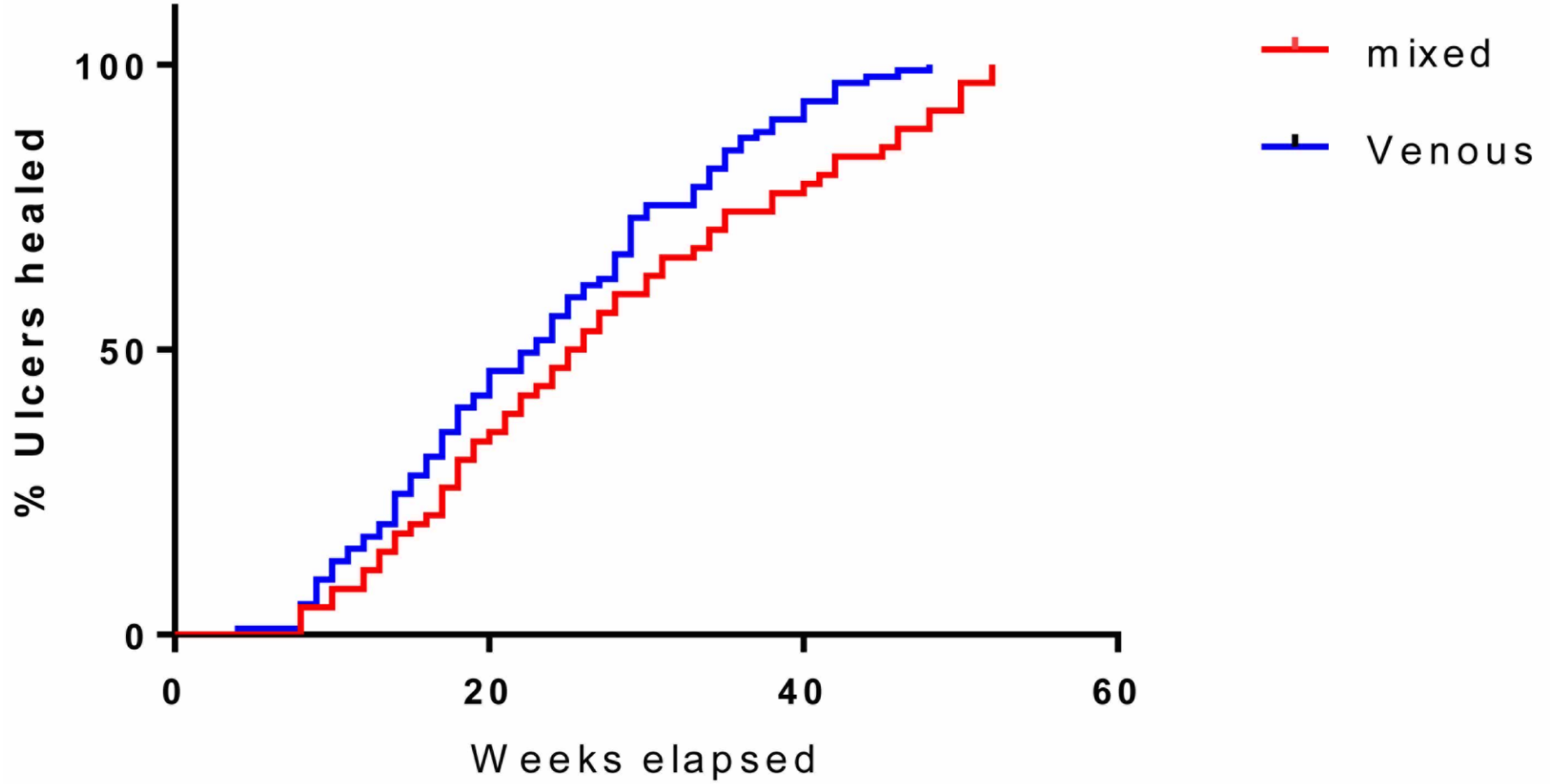
outcomes analysed in the remaining 155 patients
concordant with the treatment protocol

93 pVLU patients (85.4%)

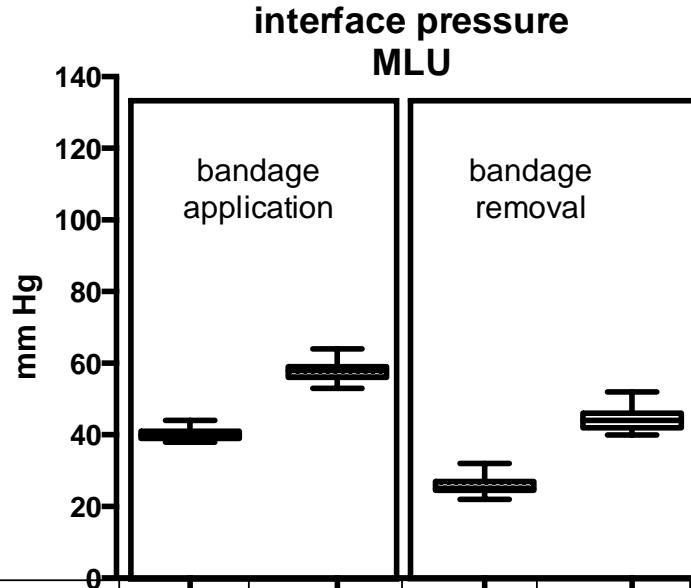
62 MLU patients (87.4%)

results

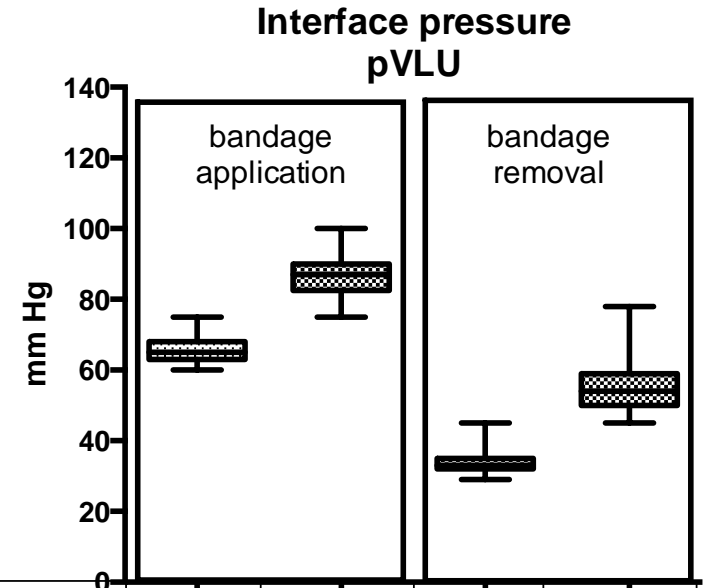
Ulcer healing: venous vs mixed



results



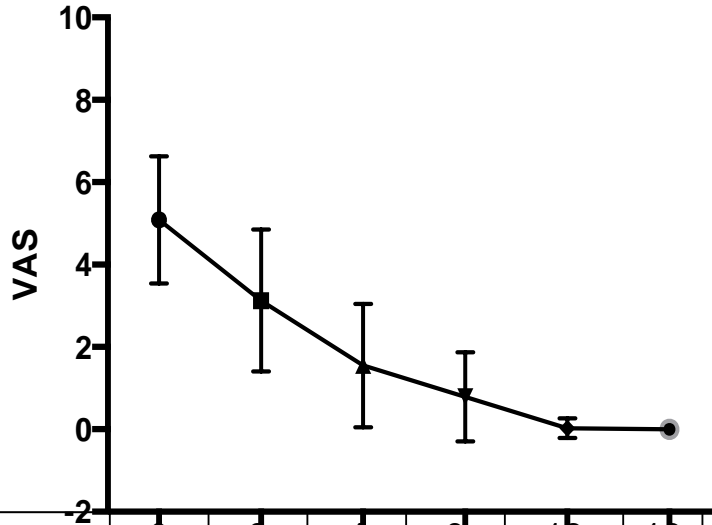
	supine	standing	supine	standing
Number of values	71	71	25	25
Minimum	38.00	53.00	22.00	40.00
25% Percentile	39.00	56.00	24.50	42.00
Median	40.00	58.00	25.00	44.00
75% Percentile	41.00	59.00	27.00	46.00
Maximum	44.00	64.00	32.00	52.00
Mean	40.06	57.68	25.84	44.48
Std. Deviation	1.611	2.540	2.285	3.331
Std. Error of Mean	0.1912	0.3014	0.4571	0.6661



	supine	standing	supine	standing
Number of values	109	109	45	45
Minimum	60.00	60.00	29.00	43.00
25% Percentile	63.00	80.00	32.00	49.00
Median	65.00	85.00	33.00	51.00
75% Percentile	68.00	90.00	35.00	57.50
Maximum	75.00	100.0	45.00	78.00
Mean	65.26	84.72	33.44	53.49
Std. Deviation	3.247	6.414	2.865	7.307
Std. Error of Mean	0.3110	0.6144	0.4271	1.089

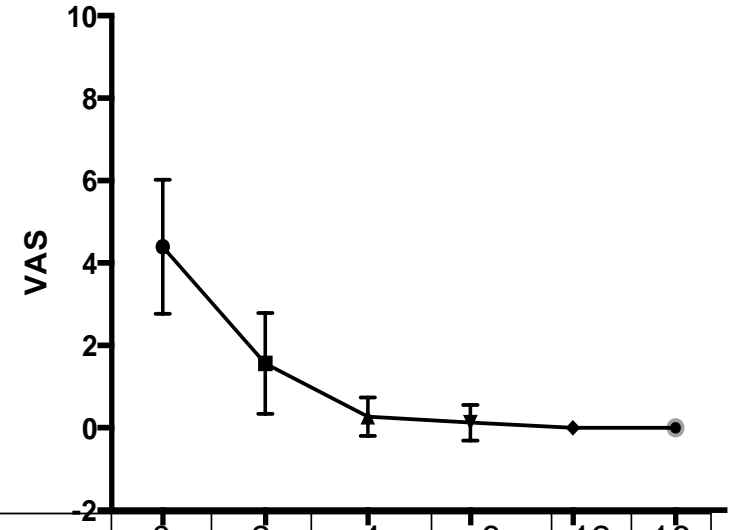
results

pain MLU-related over time



	0	2	4	8	12	16
Minimum	2.0	0.0	0.0	0.0	0.0	0.0
25% Percentile	4.0	2.0	0.0	0.0	0.0	0.0
Median	5.0	3.0	1.0	0.0	0.0	0.0
75% Percentile	6.0	4.0	3.0	2.0	0.0	0.0
Maximum	8.0	8.0	5.0	5.0	2.0	0.0
Mean	5.1	3.1	1.5	0.79	0.028	0.0
Std. Deviation	1.5	1.7	1.5	1.1	0.24	0.0
Std. Error of Mean	0.18	0.20	0.18	0.13	0.028	0.0

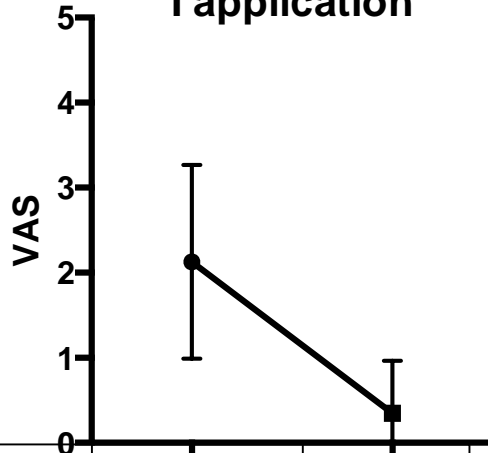
pain pVLU-related over time



	0	2	4	8	12	16
Minimum	1.0	0.0	0.0	0.0	0.0	0.0
25% Percentile	3.0	0.0	0.0	0.0	0.0	0.0
Median	4.0	2.0	0.0	0.0	0.0	0.0
75% Percentile	6.0	2.0	1.0	0.0	0.0	0.0
Maximum	8.0	4.0	2.0	2.0	0.0	0.0
Mean	4.4	1.6	0.27	0.12	0.0	0.0
Std. Deviation	1.6	1.2	0.46	0.43	0.0	0.0
Std. Error of Mean	0.15	0.11	0.043	0.042	0.0	0.0

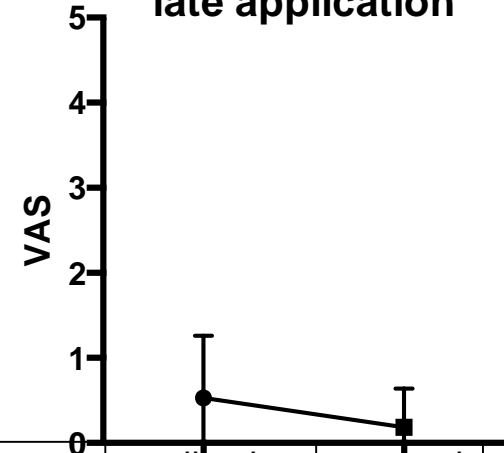
results

**pain CD related in pVLU
I application**



	application	removal
Number of values	109	109
Minimum	0.0	0.0
25% Percentile	1.000	0.0
Median	2.000	0.0
75% Percentile	3.000	1.000
Maximum	4.000	2.000
Mean	2.128	0.3486
Std. Deviation	1.139	0.6143
Std. Error of Mean	0.1091	0.05884

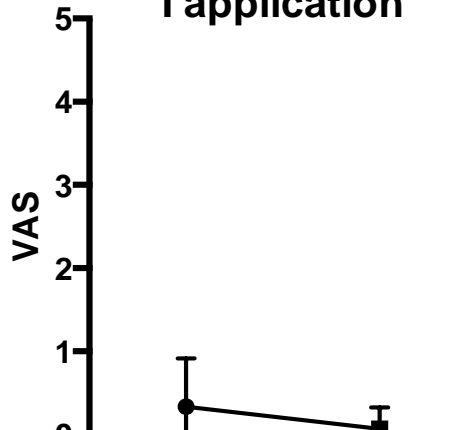
**pain CD related in pVLU
late application**



	application	removal
Number of values	109	109
Minimum	0.0	0.0
25% Percentile	0.0	0.0
Median	0.0	0.0
75% Percentile	1.000	0.0
Maximum	4.000	2.000
Mean	0.5321	0.1835
Std. Deviation	0.7274	0.4547
Std. Error of Mean	0.06967	0.04355

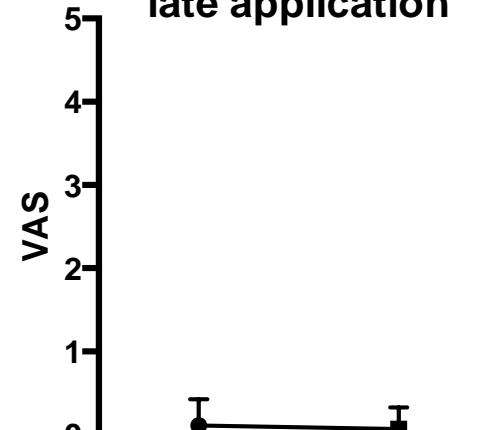
results

pain CD related in MLU
I application



	application	removal
Number of values	72	72
Minimum	0.0	0.0
25% Percentile	0.0	0.0
Median	0.0	0.0
75% Percentile	1.000	0.0
Maximum	2.000	1.000
Mean	0.3333	0.06944
Std. Deviation	0.5814	0.2560
Std. Error of Mean	0.06852	0.03017

pain CD related in MLU
late application



	application	removal
Number of values	72	72
Minimum	0.0	0.0
25% Percentile	0.0	0.0
Median	0.0	0.0
75% Percentile	0.0	0.0
Maximum	1.000	1.000
Mean	0.1111	0.06944
Std. Deviation	0.3165	0.2560
Std. Error of Mean	0.03730	0.03017

conclusions

contraindication of compression in mixed ulcers with moderate arterial involvement is a myth to dispel

compression can be applied and may fasten, more than delaying, mixed ulcer healing, provided arterial involvement is not severe and compression pressure reduced

conclusions

venous disease treatment by compression and foam sclerotherapy is the main objective to target

arterial revascularization may be neglected and postponed only in patients not showing any improvement and eventually healing

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