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Systematic review and meta-analysis of the efficacy of Unna boot in the treatment of venous leg ulcers

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Abstract

This systematic review determined the effectiveness of the Unna boot in the treatment of venous leg ulcers (VLUs) by assessing the quality of the available evidence. A systematic search of studies published between August 2019 and February 2020 was conducted using the PubMed, PubMed/PMC, BVS/BIREME, CINAHL, Web of Science, MEDLINE, Embase, Cochrane, ProQuest, BDTD, CAPES Thesis and Dissertation, OPEN THESIS, Centre for Reviews and Dissemination and SciELO databases. Studies were eligible if they reported primary studies, controlled clinical trials, quasi-experimental studies or observational studies (cross-sectional studies or cohort studies). We identified 302 articles. After screening and critical appraisal, eight articles were included in this review, while six articles were included in the meta-analysis. Four studies were included in the outcome of complete ulcer healing rate with a weighted estimate of the odds ratio of 0.43 (95% CI = 0.188–1.01). No evidence of the presence of considerable heterogeneity was observed (p = 0.35, I^2 = 32%). Two studies were assigned to the outcome time to complete ulcer healing (days) with a weighted estimated mean difference of 41.3 days (95% CI = 21.62–61.04). Evidence of the presence of considerable heterogeneity was observed (p = 0.01, I^2 = 85%). The results showed a moderate degree of evidence that there is no difference in the healing rates of VLUs with the use of the Unna boot. For the time to complete ulcer healing, the low number of studies and low classification impaired the reporting at any level of evidence.

KEYWORDS
bandages, inelastic compression, leg ulcer, Unna boot, wound healing

1 | INTRODUCTION

Among chronic wounds, venous leg ulcers (VLUs) have the most frequent occurrence. Several factors have been associated with the development of VLUs, including venous insufficiency, obesity, and venous thrombosis.[1,2] According to studies, the prevalence of VLUs ranges between 0.5% and 1%, and individuals aged 65 or older exhibit the worst prognosis in the lengthy run.[3-5] Compression therapy is

considered the gold standard for treating patients with VLUs. Its categories include elastic and inelastic compression and intermittent pneumatic compression boots.[6-8]

In elastic compression therapy, bandages composed of elastic fibres provide compression during movement and at rest. During ambulation, calf muscles contract; accordingly, the bandage expands, dissipating the force exerted by muscle contraction. This release in pressure favours the venous return to the heart.[2] Intermittent pneumatic compression boots reduce venous stasis in the lower extremities, increase the speed of venous return, and stimulate local endogenous fibrinolytic activity, inhibiting the aggregation of platelets.[9,10] Conversely, inelastic compression therapy increases pressure and assists drainage and venous support.[11] It produces high pressure with muscle contraction and low pressure at rest. The advantages of inelastic compression therapy include protection against trauma and little interference with daily activities.[11,12] Its disadvantages include the increased pressure exerted on the leg for an extended period of time and inadequacy of this device for highly exudative wounds.[11-13]

Many brands are available on the market for inelastic compression therapy, also known as the Unna boot. The technique was developed in 1896 by German dermatologist Paul Gerson Unna and consisted of a low compression bandage (18–24 mmHg) containing 10% zinc oxide paste, gelatine, glycerine, and water.[13,14] The bandage adjusts itself to the leg, calf, and foot, even during muscle compression. The bandage should be changed every 3–7 days, depending on the exudate and oedema.[13,14]

Nowadays, many reviews are available in the literature about the use of elastic compression therapy for treating VLUs.[15-17] However, no systematic review has investigated the effectiveness of inelastic compression for treating VLUs and how it compares with other types of bandages used for treating VLUs.

The specific question addressed by this review is as follows: Is the use of the Unna boot effective in the treatment of chronic VLUs in adults? Therefore, this systematic review aims to determine the effectiveness of the Unna boot in the treatment of VLUs by assessing the quality of the available evidence.

2 | MATERIALS AND METHODS

This systematic review and meta-analysis was conducted according to a standard protocol registered on PROSPERO (CRD42019127947) and previously published.[18] The review followed the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).[19] This article included a discussion of previous studies and did not involve any experiments on human participants or animals.

2.1 | Eligibility criteria and exclusion criteria

The PICOS question was as follows: P-population: patients with VLUs; I-intervention: Unna boot; C-control: other types of bandages for treating VLUs; O-outcomes: complete ulcer healing rate and time to complete healing; S-study designs: controlled clinical trials, quasi-experimental studies or observational studies (cross-sectional studies or cohort studies).

This review includes studies that reported the use of the Unna boot for treating VLUs in patients of both genders, age ≥ 18 years, and whose ulcer aetiology was confirmed with Doppler ultrasound. The considered studies included primary studies, controlled clinical trials, quasi-experimental studies or observational studies (cross-sectional studies or cohort studies) published between January 1999 and February 2019 in English, Portuguese, or Spanish.

Studies that reported patients with ulcers in the lower limbs of different causes, such as arterial and pressure ulcers and those stemming from diabetes mellitus or mixed causes, were excluded from this review.

2.2 | Search strategy

Between August 2019 and February 2020, the following databases were accessed: PubMed, PubMed/PMC, Virtual Health Library (BVS/BIREME), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, MEDLINE, Embase, Cochrane Library, ProQuest, Brazilian Digital Library of Theses and Dissertations (BDTD), CAPES/Thesis and Dissertation Catalogue Sao Paulo Research Foundation/ Thesis and dissertation, OPEN THESIS, a service of the U.S. National Institutes of Health (Clinical Trial), Centre for Reviews and Dissemination - the University of York, and Scientific Electronic Library (SciELO). In addition to the literature search, the reference lists of the selected studies were examined to identify other relevant studies.

For each database, the controlled vocabulary (healing and varicose ulcer) and the keywords (Unna boot) were used in English, Portuguese and Spanish, combined with the Boolean operators AND & OR. A librarian helped develop the search strategy to identify the literature, and the methods have been adapted to the specificities of selected databases (Chart 1).

2.3 | Study selection

For the selection and categorization of studies, the on-line EndNote™ software (Clarivate Analytics) and Rayyan web (http://rayyan.qcri.org) were used. Two researchers independently screened the titles and abstracts of the selected articles. If studies were a response or the data were available, the study was included. In case of questions or disagreements, a third reviewer evaluated the study with regard to inclusion or exclusion. The PRISMA flux diagram model was used to report the study selection process (Figure 1).

Databases	Search strategy
PubMed	((((((("Unna Boot") OR "Unna's boot") OR "Unna's paste") OR "Unna paste")) AND (((((Wound Healing[MeSH Terms]) OR "Wound Healing"[Title/Abstract]) OR "Healing, Wound"[Title/Abstract]) OR "Healings, Wound"[Title/Abstract]) OR "Wound Healings"[Title/Abstract])) AND ((((((((((((((((((((((((((Varicose Ulcer[MeSH Terms]) OR "Varicose Ulcer"[Title/Abstract]) OR "Ulcer, Varicose"[Title/Abstract]) OR "Ulcers, Varicose"[Title/Abstract]) OR "Varicose Ulcers"[Title/Abstract]) OR "Venous Stasis Ulcers"[Title/Abstract]) OR "Stasis Ulcer, Venous"[Title/Abstract]) OR "Stasis Ulcers, Venous"[Title/Abstract]) OR "Ulcer, Venous Stasis"[Title/Abstract]) OR "Ulcers, Venous Stasis"[Title/Abstract]) OR "Venous Stasis Ulcer"[Title/Abstract]) OR "Venous Hypertension Ulcers"[Title/Abstract]) OR "Hypertension Ulcer, Venous"[Title/Abstract]) OR "Hypertension Ulcers, Venous"[Title/Abstract]) OR "Ulcer, Venous Hypertension"[Title/Abstract]) OR "Ulcers, Venous Hypertension"[Title/Abstract]) OR "Venous Hypertension Ulcer"[Title/Abstract]) OR "Venous Ulcer"[Title/Abstract]) OR "Ulcer, Venous"[Title/Abstract]) OR "Ulcers, Venous"[Title/Abstract]) OR "Venous Ulcers"[Title/Abstract]) OR "Stasis Ulcer"[Title/Abstract]) OR "Stasis Ulcers"[Title/Abstract]) OR "Ulcer, Stasis"[Title/Abstract]) OR "Ulcers, Stasis"[Title/Abstract]))
BVS / BIREME	(tw:("Unna Boot" OR "Unna's boot" OR "Unna's paste" OR "Unna paste" OR "Bota de Unna" OR "Bota de Unna")) AND (tw:("Wound Healing" OR "Cicatrización de Heridas" OR cicatrização)) AND (tw:("Varicose Ulcer" OR "Úlcera Varicosa" OR "Úlcera Varicosa")) AND (instance:"regional")
Embase	('unna boot'/exp OR 'unna boot' OR 'unnas boot' OR 'unnas paste' OR 'unna paste') AND ('wound healing'/exp OR 'wound healing'/syn) AND ('varicosis'/exp OR 'varicosis'/syn)
CINAHL	"Unna Boot" OR "Unna's boot" OR "Unna's paste" OR "Unna paste" AND (MH "Wound Healing") OR "Wound Healing" OR "Healing, Wound" OR "Healings, Wound" OR "Wound Healings" AND (MH "Venous Ulcer") OR Varicose Ulcer OR "Ulcer, Varicose" OR "Ulcers, Varicose" OR "Varicose Ulcers" OR "Venous Stasis Ulcers" OR "Stasis Ulcer, Venous" OR "Stasis Ulcers, Venous" OR "Ulcer, Venous Stasis" OR "Ulcers, Venous Stasis" OR "Venous Stasis Ulcer' OR "Venous Hypertension Ulcers" OR "Hypertension Ulcer, Venous" OR "Hypertension Ulcers, Venous" OR "Ulcer, Venous Hypertension" OR "Ulcers, Venous Hypertension" OR "Venous Hypertension Ulcer" OR "Venous Ulcer Ulcer, Venous" OR "Ulcers, Venous" OR "Venous Ulcers" OR "Stasis Ulcer" OR "Stasis Ulcers" OR "Ulcer, Stasis" OR "Ulcers, Stasis"

CHART 1 Search strategy according to the selected databases, in English, Portuguese, and Spanish

2.4 | Data extraction and quality assessment

Two reviewers extracted the information from articles systematically and independently. A summary table was prepared by the authors with the following information: title and abstract; scientific background, rationale, and objectives; study design; inclusion and exclusion criteria of participants, setting, interventions performed, hypotheses, sample size, randomization, blinding and statistical analysis; recruitment, baseline data, outcome measurement, estimates and analyses of auxiliary effects and unwanted damage to the groups analysed; limitations and interpretation of results; and conclusion.

Extracted data included the author, year of inclusion, country of publication, study design, intervention and control groups, inclusion and exclusion criteria, results, sociodemographic and clinical characteristics of participants (average age, gender, comorbidities, and number of treated ulcers), wound characteristics (time duration and size, granulation tissue, pain, bandage performance, and discontinuity of monitoring), author conclusions, conflicts of interest and stratification of chronic venous disease, which was evaluated in some studies by clinical, aetiological, anatomical, and pathological elements (CEAP) classification.

2.5 | Evaluation of the risk of bias and methodological quality of included studies

Two independent reviewers evaluated the risk of bias following six domains of the Cochrane Risk of Bias (ROB-2) tool[20] for clinical trials included in this review. For this review, the Excel spreadsheet developed by Cochrane was used. At the end of the evaluation, the studies received one of the following classifications of bias: low, some concerns, or high. The figures obtained by the Excel spreadsheet showed the results of this evaluation. The Newcastle-Ottawa Scale[21] was applied for the included observational study and evaluated by two independent reviewers. The methodological quality score for the Newcastle-Ottawa Scale was calculated with three components: selection (0–4 points), comparability (0–2 points), and outcome (0–3 points). The maximum score is nine points, which represents high methodological quality.[21] A third evaluator solved the disagreements between reviewers.

2.6 | Data analysis and synthesis

Data synthesis was performed in a narrative and quantitative way. Quantitative data were analysed with Review Manager 5.3.5 software. Data on the complete ulcer healing rates were analysed through meta-analysis, in which an estimated weighted odds ratio and its respective confidence interval were obtained. Besides, another meta-analysis, in which a weighted estimate of the mean difference and its respective confidence interval were obtained, was employed on the data in time to complete the healing of VLUs.

In the meta-analyses, random effect models and a 5% significance level were considered. The results were presented in forest plots. The chi-square test and I^2 statistic were calculated to evaluate the

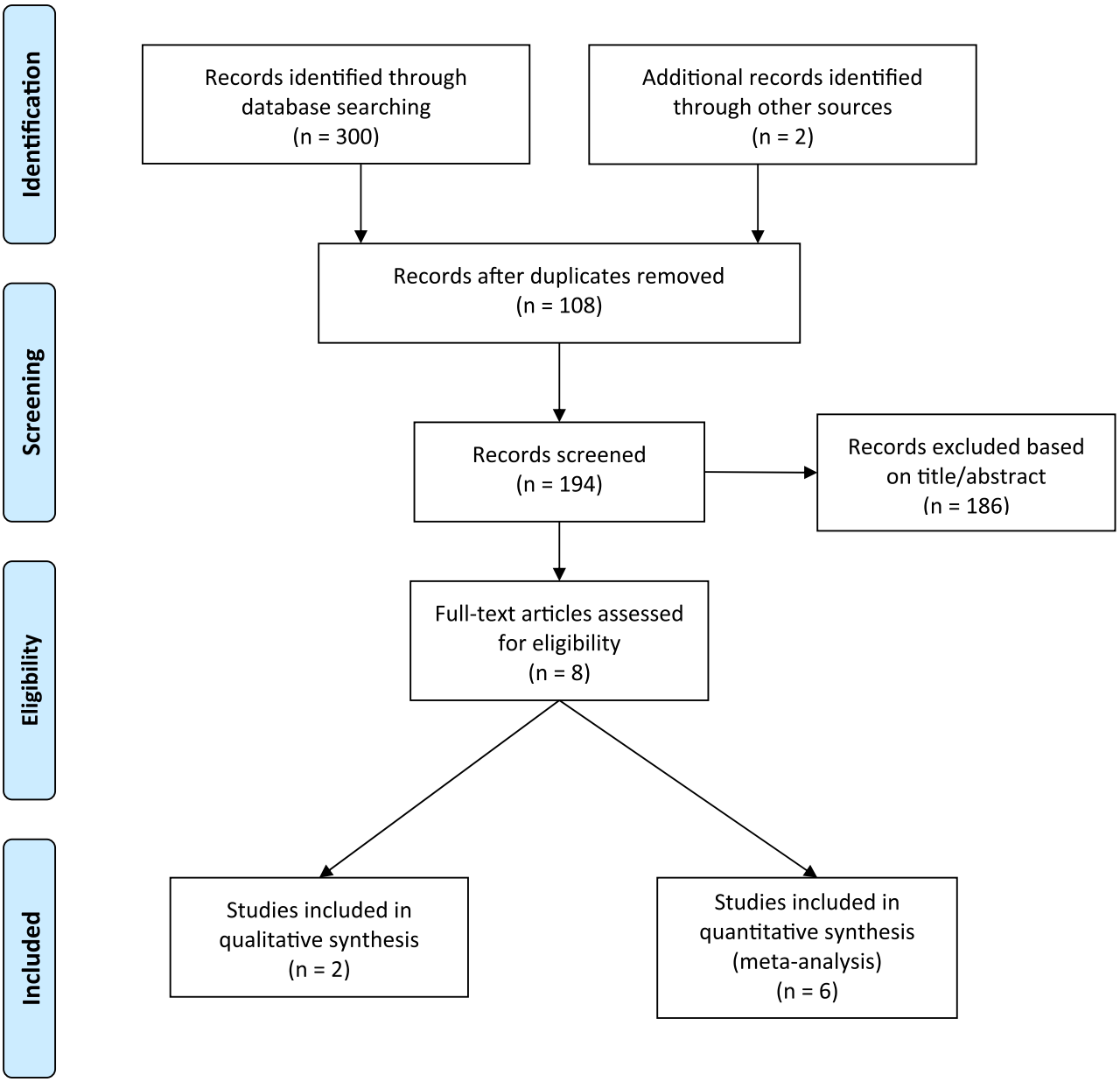

FIGURE 1 PRISMA flowchart showing the process of study identification and inclusion for this Systematic Review and Meta-analysis [Color figure can be viewed at wileyonlinelibrary.com]

presence of heterogeneity. For the I^2 statistic, values lower than 30%, from 30% to 60%, from 61% to 75%, and higher than 75% were considered low, moderate, substantial, and considerable heterogeneity, respectively.[22]

The quality of evidence was evaluated with the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach,[23,24] which classified the evidence quality as high, moderate, low, or very low. To that end, the following criteria were analysed: risk of bias, inconsistency, indirect evidence, imprecision, and publication bias. In case mistakes related to the criteria (as mentioned earlier) were observed in the studies, they would be classified as serious or very serious, and the evidence quality would be downgraded by one or two levels, respectively.

3 | RESULTS

3.1 | Search results

A total of 302 articles were initially selected as eligible for this systematic review. After the exclusion of duplicated studies, 194 articles were identified; 186 were excluded after the review of the title and abstracts. A total of eight articles with complete texts were evaluated for eligibility, constituting the final sample of the systematic review; two articles were included in the narrative synthesis,[25,26] four in the quantitative synthesis (meta-analysis) for the outcome complete ulcer healing rate,[27-30] and two in the meta-analysis for the outcome time to complete ulcer healing (days). [31,32] Of the studies, four were

TABLE 1 Characteristics of the included studies

Author	Year	Study	Control intervention	Control size	UB size	Dressing/Bandage protocol	Skin barrier	Follow-up	Outcome measures	Main results
Dolibog et al[27]	2013	RCT	G1: intermittent pneumatic compression therapy G2: stocking system G3: multilayer short-stretch bandage G4: two-layer short-stretch bandage	G1: 28 G2: 30 G3: 30[a] G4: 29	30	G1: 40–60 mmHg, 60 min,5 d/w, G2: 30–40 mmHg, 10–12 h, daily G3: 45–55 mmHg, 10–12 h, daily G4: 20–30 mmHg, 10–12 h, daily UB: weekly	NI	8 weeks	UA, UHR, UD, and UBA	The reduction of UA was superior in the pneumatic compression group; the worst performance was in the UB group
Kucharzewski et al[31]	2013	RCT	Propolis short-stretch bandage	28	28	GC: 25–35 mmHg, daily UB: weekly	GC: gauze pads UB: Not applied	16 weeks	UA, UHR, and UD	The reduction of UA was superior in the propolis and short-stretch bandage group
Franek et al[25]	2000	RCT	G1: high voltage stimulation + compression bandage G2: topically applied medicines + compression bandage	G1: 33 G2: 32	14	G1: impulses 0.1 ms, 100 Hz, voltage around 100 V, 50 min, 6 d/w G2: daily UB: weekly	G1: NI G2: wet dressings of rivanol and 0.1% copper sulphate UB: NI	7 weeks	UA, UHR, UBA, and UD	Reduction of UA was superior in the high voltage stimulation group (NS)
Kerstein and Gahtan[26]	2000	O	G1: hydrocolloid dressing + compression hosiery G2: saline dressing + compression hosiery	G1: 32 G2: 16	33	G1: 30 mmHg, 2–3 days G2: 30 mmHg, daily UB: weekly	G1: hydrocolloid G2: saline dressing UB: Not applied	36 weeks	UA, UHR, recurrence, and costs	The reduction of UA was superior in the hydrocolloid group (NS)
Mosti, Crespi and Mattalianno[28]	2011	RCT	Two-component bandage	50	49	40–50 mmHg, weekly	Polyurethane foam dressing (3M™ Tegaderm™ Foam Dressing (nonadhesive), 3 M Health Care, St. Paul, MN)	12 weeks	UA, UHR, UD, UBA, AC, CC, pain level, and discomfort	Reduction of UHR among groups (NS)
Polignano et al[29]	2004	RCT	Four-layer compression	39	29	Weekly	NI	24 weeks	UA, UHR, pain level, ease of application, and discomfort	Reduction of UHR superior in the four-layer compression group (NS)
Slezak et al[32]	2004	QE	G1 (larger ulcers): cellulose membrane + elastic bandage G2 (smaller ulcers): cellulose membrane + elastic bandage	G1: 31[a] G2: 31	31	G1 and G2: weekly, but the dressing was moistened with isotonic saline several times a day to keep it moist UB: weekly	G1: Bioprocess® membrane G2: Bioprocess® membrane UB: NI	18 weeks	UA, UHR, UD	The reduction of UA was superior in the cellulose membrane group
Abreu and Oliveira[30]	2015	RCT	Elastic bandage	9	9	GC: 10–12 h, daily UB: weekly	GC: Petrolatum® dressing UB: Not applied	13 weeks	UA, UHR, UD, UBA, level pain, and oedema	The reduction of UA was superior in the UB group (NS)

Abbreviations: AC, Ankle circumference; CC, Calf circumference; d/w, days per week; G, group; GC, group control; NI, not informed; NS, no statistically significant differences; O, observational; QE, Quasi-experimental; RCT, randomized controlled trial; UA, ulcer area; UB, Unna boot; UBA, ulcer bed appearance (presence of necrosis or fibrin, granulation tissue, and epithelization), UD, ulcer duration; UHR, ulcer healing rate.

[a]Allocated in meta-analysis.

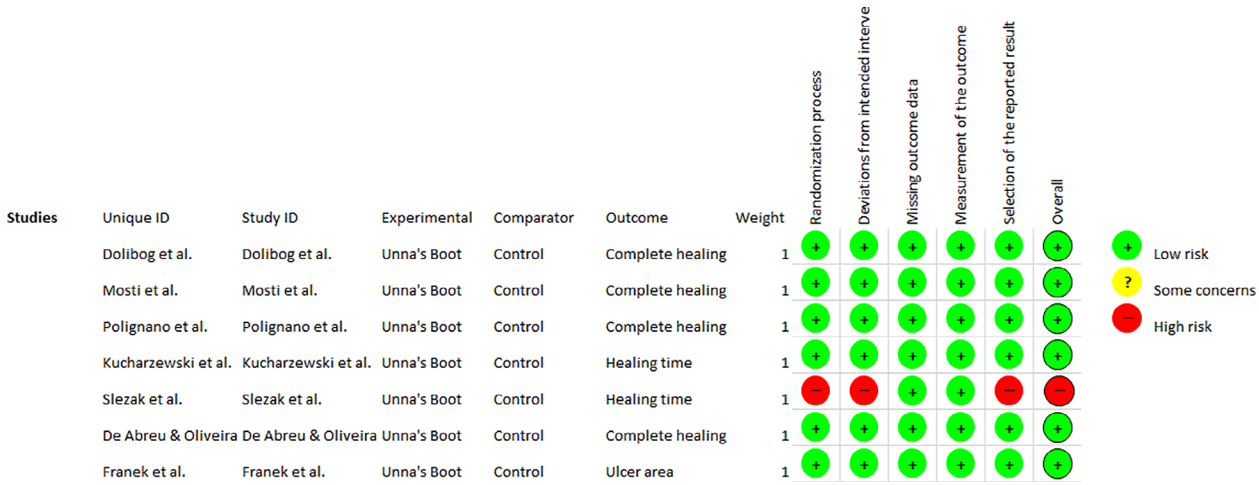

FIGURE 2 Risk-of-bias quality summary [Color figure can be viewed at wileyonlinelibrary.com]

conducted in Poland,[25,27,31,32] two in Italy,[28,29] one in the USA,[26] and one in Brazil.[30]

3.2 | Characteristics of included studies

Table 1 summarizes the characteristics of the eight included studies. A total of 643 patients were included in these studies. The sample size varied between 18 and 149 patients with a clinical diagnosis of VLU, whose aetiology was confirmed with Doppler ultrasound. These studies were published in English between 2000 and 2015. The treatment duration varied between 7 and 36 weeks and averaged 14.8 weeks. Of the eight selected studies, six studies were designed as randomized controlled trials (RCTs),[25,27-31] one as quasi-experimental,[32] and one as observational.[26]

For stratification of patients with chronic venous disease, two studies[27,31] used the CEAP classification for each patient included and most ulcers were classified as $C_6E_PA_{S2,3}P_R$; the other two studies[25,26] reported, at least, one episode of deep venous thrombosis post-thrombotic; and, in the remaining studies,[28-30,32] this information was not found.

Among the studies that evaluated pain, all treatments promoted improvement with no statistically significant difference across groups.[28-30] The study[25] compared three groups. One treatment group used high voltage electrostimulation and compression socks; another group used different topical medicines, including potassium permanganate baths, and wet dressings of rivanol and 0.1% copper sulphate (but colistin sulphate, fibrinolysin, Iruxol® mono, gentamicin, etc. were used on the dressings), depending on medical indications; and the third group used the Unna boot; all treatments showed a reduction of ulcer area. However, the treatment with high voltage electrostimulation was superior in the formation of the granulation tissue when compared to the treatment with the Unna boot.[25] Conversely, in a study[30] that compared the Unna boot vs. elastic bandage with Petrolatum®, an increase in granulation tissue was observed in the Unna boot group, but the there was no statistically significant difference between the two groups with regard to wound healing rate.

Two studies[28,29] analysed the application and comfort of the bandage. In the first one,[28] easier removal of the bandage (3M™ Coban™ 2 Layer Compression System) was observed compared with the Unna boot; however, in the second one with four-layer compression (Profore),[29] there was no difference in application or comfort.

Finally, a study[26] compared three groups, a saline group, a hydrocolloid group, and an Unna boot group. The saline and hydrocolloid groups had a gradient compression of 30 mmHg. The Unna boot group did not utilize medications or dressings and had static compression. The hydrocolloid group, when compared with the Unna boot and saline groups, was more effective in the healing period. When comparing the last two groups, the Unna boot showed a shorter healing period compared with the saline group.

3.3 | Risk of bias and quality assessment of the included studies

The evaluation of the risk of bias in clinical trials was performed according to the ROB-2[20] tool and is shown in Figure 2. One study was classified as having high bias risk[32] and the rest as having low. The observational study[26] obtained a score of 6 (out of a possible total of 9) in the Newcastle-Ottawa Scale,[21] resulting from a sum of scores across three domains: selection, comparability, and results.

3.4 | Meta-analysis

In the evaluation of the outcome complete ulcer healing rate, four studies[27-30] were included, amounting to 215 patients who received different interventions, but only 128 patients participated as a control in the meta-analysis and 117 in the Unna boot group.

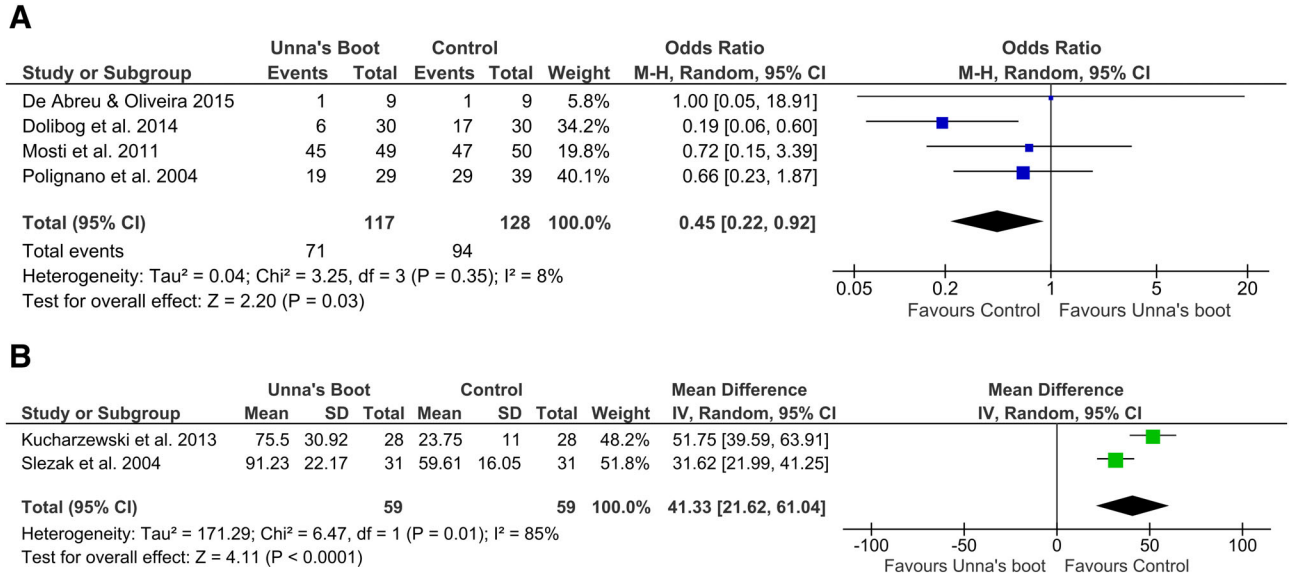

FIGURE 3 Pooled odds ratio for complete ulcer healing rate (A) and Time to complete ulcer healing (B) [Color figure can be viewed at wileyonlinelibrary.com]

A weighted estimate of the odds ratio of 0.45 (95% CI = 0.23–0.92) was obtained. This result does not indicate whether there are differences across groups in the chance of exhibiting complete healing. No evidence of the presence of considerable heterogeneity was observed ($p = 0.35$, $I^2 = 8\%$) (Figure 3A).

The results from two studies[31,32] were used to evaluate the time for complete ulcer healing (in days). In total, 59 subjects who participated in the Unna boot group and 90 who received different interventions, but only 59 subjects were considered as a control in the meta-analysis. A weighted estimate of the mean difference of 41.3 days (95% CI = 21.63–61.04) was obtained. This result indicates a long average time for complete healing in the Unna boot group compared with the control group. Evidence of the presence of considerable heterogeneity was observed ($p < 0.01$, $I^2 = 85\%$) (Figure 3B).

In the evaluation of the quality of the evidence performed by the GRADE tool,[24] the outcome complete ulcer healing rate was initially classified with high-quality evidence, because the included studies were clinical trials. In evaluating studies as to whether to downgrade the level of evidence, no major flaws were observed for risk of bias, inconsistency, indirect evidence, and publication bias. Nonetheless, for the inconsistency criterion, one study[32] was classified as showing a serious risk due to the length of the confidence interval; as a result, the criterion was downgraded one notch, and the study's quality of evidence was classified as moderate.

For the outcome time to complete ulcer healing, the quality of evidence was also initially classified as high. However, one study[32] was classified as having a severe inconsistency in the risk of bias, therefore, three points were deducted from the level of evidence, and the quality of evidence was classified as low for this outcome.

4 | DISCUSSION

The use of bandages in patients with VLUs and ankle-brachial pressure indexes (ABPIs) > 0.5 is the gold standard for preventing or optimizing the healing of active and/or recurring wounds.[33,34] In this systematic review, eight studies met the inclusion criteria. Of these, six studies were included in the meta-analysis,[27-32] four studies were used in the evaluation of the primary outcome complete ulcer healing rate,[27-30] and two studies were used for the outcome time to complete ulcer healing.[31,32] Two studies were evaluated narratively.[25,26]

For the studies on the outcome complete ulcer healing rate,[27-30] the monitoring of patients lasted from 2 to 6 months. The result of the meta-analysis did not indicate differences among groups in the chances of complete healing. One study[28] compared two systems for inelastic compression, and another study[29] compared the Unna boot with a four-layer high compression bandaging system.

The study[30] comparing an elastic bandage with Petrolatum® vs. the Unna boot observed the best results for wounds with areas above 10 cm^2, and the elastic bandage with Petrolatum® group had the best results for wounds with areas below 10 cm^2. Regarding granulation tissue, the Unna boot had better results compared with the elastic bandage with Petrolatum®. The remaining study[27] compared five types of compression bandages, with the best healing rates being obtained with the use of intermittent pneumatic compression.

The results of this meta-analysis are consistent with the 1998[35] systematic review that analysed several types of bandages for the treatment of VLUs and observed that the use of the Unna boot was not efficacious in the treatment of ulcers among the studied groups. In the intermittent pneumatic compression group, a high percentage of the ulcers were healed, but there was no statically significant difference when compared with the control group. In studies in which multilayer compression was compared with single-layer compression, the

highest number of healed wounds belonged to the multilayer group. When comparing the results between elastic and inelastic bandages, the best healing outcomes were with the use of elastic bandages.[35]

For the outcome time to complete ulcer healing,[31,32] the result indicated a longer average time for complete healing in the Unna boot group compared to the control group. Among the studies, one study investigated topical treatment with membrane dressing with no compression compared with the Unna boot and found a better result with the use of the bandage.[32] Another study compared a short-stretch bandage and topical propolis vs. the Unna boot and found that, in the short-stretch bandage group,[31] the wounds took up to 6 weeks to heal, whereas in the Unna boot group, they took up to 16 weeks to heal.

Systematic reviews of wound care management demonstrated that high multilayer compression is more effective than single-layer compression, and high compression hosiery was more effective than moderate compression hosiery in preventing ulcer recurrence.[36] Another systematic review and meta-analysis[3] that investigated the effectiveness of two types of bandages, four-layer bandage and short-stretch bandage, in people with VLUs, showed that the use of the four-layer bandage increased the chances of healing by 30%, independent of prognostic factors.

Few RCTs have compared the use of the Unna boot with other therapies, hampering the generation of high-quality evidence. Conversely, the lack of investments in clinical research in developing countries hurts studies of this nature.

Among the studies of qualitative synthesis, the use of the Unna boot was favourable to wound healing. However, in the study with high voltage electrostimulation treatment,[25] the granulation tissue was superior in the Unna boot group. Lastly, the study[26] comparing the use of the Unna boot and treatment with hydrocolloid and compression hosiery, the healing period with the hydrocolloid and compression hosiery group was better than in the Unna boot group.

There are no doubts about the benefits of compression therapy for the treatment of VLUs; on the other hand, compressive therapies with better technology are more efficient than the Unna boot. Therefore, the Unna boot stands out for being low-cost and reducing venous hypertension and oedema, which favours the treatment of VLUs, being an option for countries with reduced public health resources. However, the effectiveness of the Unna boot depends on the correct application technique, multi-professional involvement, cooperation, and patient compliance.

The strong point of this review was the rigorous application of the method for developing a systematic review. Nevertheless, this review presents some limitations. First, the pressure exerted by the bandages was controlled in just one study. Second, the lack of homogeneity of the findings impaired the inclusion of all eligible studies in the meta-analysis. Third, the results obtained from the meta-analysis for time to complete ulcer healing had considerable heterogeneity, which may be related to the variety of control groups. Lastly, the considerable variability in the control groups was notable, but all had improved venous return and consequently healed. On the other hand, the considerable variability in the control groups was due to the lack of consensus on the ideal prescription of compressive therapy for this patient population.

According to the literature, elastic, long-stretch, and multilayer bandages seem to be more efficacious than inelastic, short-stretch, and single-layer bandages in terms of healing time. However, the choice of bandage is influenced by the availability of material at the healthcare facilities and by the preference and skill of healthcare professionals. Therefore, it is recommended that the healthcare professional be up-to-date about the available evidence for decision making.

In conclusion, the results showed a moderate degree of evidence that there is no difference with the use of the Unna boot with regard to the healing rates of VLUs. For time to complete ulcer healing, the low number of studies and their low classification impaired the reporting of any level of evidence.

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None.

CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

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