

Healing process of venous ulcers of difficult healing in treatment with an Unna's boot*

Processo cicatricial de úlceras venosas de difícil cicatrização em tratamento com bota de Unna

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 Érica do Nascimento Sousa¹
 Solange Gurgel Alexandre²
 Renan Alves Silva³
 Thiago Moura de Araújo⁴
 Marina Guerra Martins⁵
 Joselany Áfio Caetano⁵

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¹Hospital das Clínicas de Uberlândia.
Uberlândia, MG, Brazil.

²Hospital Universitário Walter Cantídio.
Fortaleza, CE, Brazil.

³Universidade Federal de Campina Grande.
Cajazeiras, PB, Brazil.

⁴Universidade da Integração Internacional da Lusofonia
Afro-Brasileira. Redenção, CE, Brazil.

⁵Universidade Federal do Ceará.
Fortaleza, CE, Brazil.

Corresponding author:

Érica do Nascimento Sousa
Rua Leonardo Bezerra, 1688.
CEP: 61604000. Caucaia, CE, Brazil.
E-mail: ericanascimento.ufc@gmail.com

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ABSTRACT

Objective: to analyze the healing process of venous ulcers treated with an Unna's boot. **Methods:** longitudinal study, prospective, with 14 individuals with chronic venous ulcers, followed at four different moments of time. Data collection was based on clinical and sociodemographic profile and clinical evaluation of the lesions. Data were analyzed using the Friedman test. Wilcoxon's signed ranks test was used to compare means, and for multiple comparisons Bonferroni's correction was used ($p < 0.05$). **Results:** the Bonferroni post hoc test revealed a reduction in pain scores ($p = 0.038$), amount of exudate ($p = 0.005$) and dry border ($p = 0.044$). Improvement in healing was observed by means of the Pressure Ulcer Scale for Healing ($p = 0.004$) after use of the Unna boot between the first and fourth moments. **Conclusion:** there was a reduction in the Pressure Ulcer Scale for Healing indicators, pain, amount of exudate and dry border of the lesion in patients using Unna's boot after four weeks. **Contributions to practice:** the need to manage indicators such as Pressure Ulcer Scale for Healing classification, pain, amount of exudate, and dry border based on the Unna Boot is highlighted.

Descriptors: Wound Healing; Lower Extremity; Technology; Ulcer; Varicose Ulcer.

RESUMO

Objetivo: analisar o processo cicatricial de úlceras venosas tratadas com bota de Unna. **Métodos:** estudo longitudinal, prospectivo, com 14 indivíduos acometidos de úlcera venosa crônica, acompanhados em quatro momentos distintos. A coleta de dados foi realizada com base no perfil clínico, sociodemográfico e avaliação clínica das lesões. Dados analisados por meio dos testes de Friedman. Para a comparação das médias, utilizou-se o teste dos postos assinalados de Wilcoxon e, para as comparações múltiplas, utilizou-se a correção de Bonferroni ($p < 0,05$). **Resultados:** o teste post hoc de Bonferroni revelou redução nos escores de dor ($p = 0,038$), quantidade de exsudato ($p = 0,005$) e borda seca ($p = 0,044$). Observou-se melhora da cicatrização por meio da escala *Pressure Ulcer Scale for Healing* ($p = 0,004$) após uso da bota de Unna entre o primeiro e quarto momento. **Conclusão:** houve redução dos indicadores da *Pressure Ulcer Scale for Healing*, dor, quantidade de exsudato e borda seca da lesão em paciente em uso de bota de Unna depois de quatro semanas. **Contribuições para a prática:** evidencia-se a necessidade de manejar indicadores como classificação de *Pressure Ulcer Scale for Healing*, dor, quantidade de exsudato e borda seca com base na Bota de Unna.

Descritores: Cicatrização; Extremidade Inferior; Tecnologia; Úlcera; Úlcera Varicosa.

Introduction

Ulcers can be classified as arterial, venous, mixed, or neuropathic. Venous ulcers are the most common type of lesion in the lower limbs, with a prevalence of 80 to 85%. The lesions occur in regions of the skin where there are alterations in the flow or reflux of blood vessels, and are caused by several reasons, such as venous return obstruction, gastrocnemius muscle pump failure, or venous hypertension⁽¹⁻³⁾.

In addition to the high chronicity, lesions may recur in about 15 to 71% or never heal (15%)⁽²⁾. The etiology of these lesions is multifactorial, that is, besides chronic venous insufficiency, other etiopathogenesis are observed. A cohort in Ireland found 90% of a sample of 50 patients suffering from one or more chronic diseases⁽⁴⁻⁵⁾. The most common coexisting aspects and pathologies observed were increased age, female gender, hypertension, diabetes mellitus, musculoskeletal disorders, hypercholesterolemia, genetic factor, obesity, and progressive inflammatory processes⁽⁴⁻⁶⁾.

Chronic venous ulcers are, therefore, a serious public health problem, and their high incidence and prevalence cause a financial burden to the state and society, since treatment is costly, prolonged, and results in early retirement due to disability, besides causing reduced quality of life, emotional changes, and social exclusion in the affected population⁽¹⁻²⁾.

There are therapeutic methods that can be adopted in the treatment of chronic venous ulcers, among them, the main ones are: conservative compression therapy (elastic, inelastic, or pneumatic); local treatment with several types of dressings; systemic treatment with antibiotics for cases of bacterial colonization and for the more severe cases of skin grafts and vascular surgery⁽⁷⁻⁸⁾.

Several studies suggest that compression treatment increases the healing rate when compared to non-compression treatment, and the ankle-brachial index should be measured in all patients before compression is applied to exclude the risk of arterial com-

promise⁽⁹⁾. For patients with venous ulcers, zinc oxide dressings are considered first line to promote venous wound healing⁽¹⁰⁻¹¹⁾.

The Unna's boot dressing is one of the compression methods that uses a zinc oxide dressing with non-elastic bandages that provide sufficient pressure both in activity and at rest and accelerate the healing process of the venous ulcer allowing ambulation. Besides the healing benefits, Unna's boot is a low-cost treatment^(3,10-11).

A systematic review conducted with seven studies sought to evaluate the time to complete healing during the 12-month period with the Unna boot. This showed a combined risk ratio for healing of 2.17. Moderate heterogeneity suggests that there is probably a shorter time to complete healing of venous leg ulcers in people who wear Unna's boot compared to those who do not. Regarding the proportion of wounds completely healed (follow-up from one day to 12 months), ten studies reported a pooled hazard ratio of 1.77. Complete healing in those treated is 70.29% compared to those not treated (40.25%). There is moderate certainty evidence that people treated with the boot have more completely healed venous leg ulcers during the 12-month follow-up than people not wearing it during the follow-up period⁽¹²⁾.

Another systematic review with meta-analysis identified eight studies of which six investigated the rate of complete healing and time to venous ulcer healing. The rate of complete healing was 0.45, although no evidence of the presence of considerable heterogeneity was observed between the intervention and control groups. Regarding time to complete healing, two studies attributed an estimated weighted mean difference of 41.3 days to the outcome time to complete ulcer healing (days), demonstrating the presence of considerable heterogeneity ($p=0.01$; magnitude of heterogeneity by $I^2 = 85\%$)⁽¹³⁾.

Despite the existence of studies on the subject in question, there is a scarcity in the literature that analyze other secondary outcomes of the effect of Unna's boot on the healing process of venous ulcers,

such as: area; depth; appearance of perilesional skin; classification of the wound border; type of scar tissue present in the venous ulcer bed; type and amount of exudate; odor; and pain. These results impact on the quality of life of the individual with venous ulcer. Thus, we sought to investigate: how is the healing process of venous ulcers treated with an Unna's boot?

Given the problem raised, the development of studies that analyze the effect of the Unna boot on the healing process of chronic venous ulcers is justified, to give greater visibility to nursing practice in wound care, with interventions and prevention measures that facilitate the healing process and the appropriate use of technologies. Therefore, the present study aimed to analyze the healing process of venous ulcers treated with an Unna's boot.

Methods

This was a longitudinal, prospective study of individuals with chronic venous ulcers in the lower limbs, registered and followed-up in the vascular surgery outpatient clinic of a university hospital, located in the city of Fortaleza-CE, Brazil.

The collections occurred during the months of March to June 2019 by a previously trained team composed of two nurses and three nursing course students. The sample was consecutive and convenient (non-probabilistic), composed of individuals seen at the site during the collection period and who met the following inclusion criteria: ambulatory patients, older than 18 years; with a medical diagnosis of chronic venous insufficiency; with palpable pedal and posterior tibial pulses, with ankle-brachial index >0.9 ; presence of venous ulcer; in use of Unna boot as primary coverage and in weekly outpatient care for dressing changes. Exclusion criteria were presenting necrosed tissue with indication for limb amputation; undergoing radiotherapy; wounds due to radiotherapy; pregnant women; with metallic implants in the region; diagnosis of deep vein thrombosis; hemophiliacs or with risk of hemorrhage, patients with alteration in the ankle-brachial index and/or diagnosis of arterial

ulcer. Fifteen patients and 19 ulcers were followed up; however, one patient died, resulting in a total of 14 patients and 18 ulcers in the study.

It is noteworthy that there was no interference of researchers in the assistance provided to patients. Therefore, all steps of dressing, wound cleaning and placement of the Unna boot were performed by the nurses of the outpatient clinic following the institutional protocol of the service.

For the collection of information, we collected the signature on the Informed Consent Form and authorization for the photographic recording of the lesion. A specific instrument was used to record the socio-demographic characteristics and clinical conditions including gender, age, years of study, employment status, marital status, comorbidities, risk factors, body mass index (BMI), ankle-brachial index, as well as the characteristics of the lesion, including area, location, type of scar tissue, presence and type of exudate, edema, pain, among others.

The Pressure Ulcer Scale for Healing (PUSH) was also used as a healing assessment tool, originally created to assess pressure ulcers, but validated and adapted in Brazil to assess chronic venous ulcers⁽¹⁴⁾. The parameters evaluated are wound area, amount of exudate, and tissue type. The components generate scores ranging from 0 to 17. Higher scores indicate worse conditions of venous ulcers and, when decreasing, indicate evolution in the healing process⁽¹⁵⁾.

The removal/change of the Unna boot was performed every seven days at the outpatient clinic. In some cases, when there was excess exudate, the patient changed the bandage and gauze at home to avoid discomfort and embarrassment due to the odor of the secretion.

The follow-up of scar evolution in this study occurred in four moments: the first meeting on the recruitment day; the second moment, 21 days after the first meeting; the third, 36 days after the first meeting; and finally, the fourth moment, 66 days after the first. The interval of the evaluations aimed to better observe the scar changes.

Regarding the categorization of the lesions, for

the purposes of the analysis of the size of the chronic venous ulcers, this study adopted the classification small, medium, and large, being considered small those measuring between 0.1 and 10cm², medium: 10.1 to 100cm², and large those >100cm². Two different ulcers were those at more than two centimeters from each other, even if they were in the same anatomical region. The area in square centimeters was obtained by multiplying the measurements of length versus width, obtained with a ruler on the lesion bed, in vertical (foot cephalon) and horizontal directions, from border to border⁽¹⁶⁾.

As for depth, those that reached only the epidermis and dermis were classified as superficial; partial, when they reached the subcutaneous tissue; and total depth, when they reached muscle tissue and adjacent structures such as bones, cartilage, and tendons. The amount of exudate was defined by its presence in the secondary gauze as: absent, when the gauze was clean; little, when present in 25% of the gauze; moderate, when exudate was present in more than 25% up to 75% of the gauze; and abundant, in more than >75% of the secondary gauzes⁽¹⁶⁾.

Regarding perilesional skin appearance; wound border grading; type of healing tissue present in the venous ulcer bed, type, and amount of exudate; depth; odor; and pain, were assessed using instruments and protocols at the collection site.

The measurement of pain in the lesion was evaluated by the numerical scale, which classifies pain on a scale from 0 to 10, with the minimum and maximum being, respectively, no pain and unbearable pain⁽¹⁷⁾. In patients with more than one lesion, pain was evaluated for each one.

After cleaning the wound with saline and gauze by the nurses, the lesion was photographed according to the standard technique adopted and measured linearly with a sulphite paper ruler placed in direct contact with the wound bed. It is noteworthy that in the follow-up of the study, the PUSH was used to evaluate the ulcers at each moment of the study follow-up. The photographic recording was performed with a

Full HD camera, cell phone used for this purpose, with 12 megapixels of resolution and obeyed the following criteria: positioning the camera perpendicular to the wound at a 90° angle and 50cm away from the wound, measuring with a tape measure, or ruler, increasing or approaching the wound as needed.

The baseline and clinical assessment variables of the ulcers were entered into Microsoft Excel® spreadsheets and then analyzed using descriptive and inferential statistics. For outcome analysis, the data were evaluated by the Friedman test, which assesses the proportion of the outcomes along the observed time points. The Shapiro Wilk test was used to assess adherence to normal distribution of the data. Due to the asymmetry of the data, Wilcoxon's signed ranks test was used. For multiple comparisons, the Bonferroni correction was used. A significance level of 5% (p<0.05) was adopted for all analyses.

The project was approved in the Research Ethics Committee under Opinion number: 3,358,174/2019 and Certificate of Ethical Appraisal Submission No. 09516019,2.0000,5054/2019 respecting the ethical aspects of the research.

Results

A total of 14 patients and 18 venous ulcers were followed up since some patients had more than one chronic venous ulcer. The sociodemographic variables were male; 71-80 years old, with a mean age of 61 years (±12.7); married; retired; and less than five years of education.

Most participants were found to be hypertensive, alcohol and tobacco users, and overweight. Of the 18 ulcers, 10 were in the right lower limb (55.6%), 12 predominantly in the medial malleolus region (66.7%), and 14 were single ulcers (78%). Moreover, it was observed that only four presented two ulcers. The time of chronicity showed a central tendency of nine years, with the minimum time found being three years and the maximum time of chronicity, 20 years.

Table 1 – Evolution of ulcer healing, according to area (cm²), pain score, and Pressure Ulcer Scale for Healing score at each moment. Fortaleza, CE, Brazil, 2019

| Evaluation | Minimum | Median | Maximum | p-value* |
|-----------------------------|---------|-------------------|---------|----------|
| Venous ulcer area (moments) | | | | |
| First | 4.50 | 15.90 | 84.00 | 0.000 |
| Second | 2.50 | 17.25 | 78.00 | |
| Third | 2.56 | 11.50 | 84.90 | |
| Fourth | 2.00 | 6.50 [§] | 72.00 | |
| Pain score (moments) | | | | |
| First | 0 | 5 | 8 | 0.032 |
| Second | 0 | 5 [†] | 8 | |
| Third | 0 | 3 [‡] | 7 | |
| Fourth | 0 | 1 [§] | 8 | |
| PUSH score (moments) | | | | |
| First | 11 | 13 | 16 | 0.000 |
| Second | 10 | 13 | 17 | |
| Third | 9 | 12 | 15 | |
| Fourth | 7 | 11 [§] | 15 | |

*Friedman test; [†]Bonferroni post hoc test between the first and second time points; [‡]Bonferroni post hoc test between the first and third time points; [§]Bonferroni post hoc test between the first and fourth time points; PUSH: Pressure Ulcer Scale for Healing

As for the ulcer areas, the median was used because it was a small sample. It was found that there was a reduction in the area scores between the four moments (Table 1). When assessing the difference between these moments, a statistically significant difference was found only between the first and the fourth moment in which the mean rank values showed positive ranks of 4.00 and negative ranks of 9.31, Z statistic of -3.437 and p=0.001. Progressive improvement was identified, in which the initial scores were higher than the final scores. However, when the Bonferroni post-hoc test was applied, the mean difference between these moments was 9.33 and the standard error was 7.81, with a p value of 1.00. Thus, the differences detected are not likely to be adopted as true-positive.

Regarding pain, there was a reduction in the score between the second and the third moment. This difference was statistically significant. The mean rank values showed positive ranks of 6.67, while negative ranks of 3.00; Z statistic of -2.43 and p=0.015. Between the third and first time points, mean rank values showed positive ranks of 8.00, while negative ranks of 5.67; Z-statistic of -2.24 and p=0.025. For the comparison between the first and fourth time points, the mean rank values with positive ranks was 7.96, and

negative ranks 1.50; Z-statistic of -3.21 and p<0.001. When applying Bonferroni's post hoc test between the moments, the only statistically significant difference was found between the first and the fourth moment, where the mean difference was 2.388 and standard error of 0.84, with a p-value of 0.038.

In the evaluation of healing through the PUSH scale, we observed a reduction in scores between the four moments evaluated (Table 1). When evaluating the difference between the moments, significant statistics were found only between the first and the fourth moment. The mean rank values showed positive ranks of 4.50, while negative ranks were 9.28, Z statistic of -3.42 and p=0.001. The Bonferroni post-hoc test showed a mean difference between these moments of 2.388 and a standard error of 0.66, with p=0.004.

Thus, it is observed that the initial scores were higher than the final scores in pain and in the PUSH scale, demonstrating significant statistics and proven by the post-hoc test. However, in this study other variables that may have interfered in the healing process were not controlled.

Table 2 – Evaluation of the wound regarding the amount and type of exudate, healing tissue, odor, and border type at each time point. Fortaleza, CE, Brazil, 2019

| Wound evaluation | Moments | | | |
|---------------------------|-----------|------------|-----------|------------|
| | First (%) | Second (%) | Third (%) | Fourth (%) |
| Amount of exudate | | | | |
| Absent | 0 | 1 (5.6) | 0 | 0 |
| Slight | 5 (27.8) | 1 (5.6) | 10 (55.6) | 14 (77.8) |
| Moderate | 9 (50.0) | 11 (61.1) | 8 (44.4) | 4 (22.2) |
| Abundant | 4 (22.2) | 5 (27.8) | 0 | 0 |
| Classification of exudate | | | | |
| Serous | 17 (94.4) | 15 (83.3) | 15 (83.3) | 18 (100.0) |
| Sanguinolent | 1 (5.6) | 0 | 0 | 0 |
| Serosanguinolent | 0 | 3 (16.7) | 3 (16.7) | 0 |
| Healing Tissues | | | | |
| Granulation | 9 (50.0) | 10 (55.6) | 10 (55.6) | 12 (66.7) |
| Sphacelus | 6 (33.3) | 5 (27.7) | 5 (27.7) | 2 (11.1) |
| Epithelial | 1 (5.6) | 1 (5.6) | 2 (11.1) | 3 (16.7) |
| No granulation | 2 (11.1) | 2 (11.1) | 1 (5.6) | 1 (5.5) |
| Odor | | | | |
| Absent | 3 (16.7) | 3 (16.7) | 4 (22.2) | 7 (38.9) |
| Characteristic | 11 (61.1) | 14 (77.8) | 13 (72.2) | 11 (61.1) |
| Fetid | 4 (22.2) | 1 (5.6) | 1 (5.6) | 0 |
| Border Types | | | | |
| Dry | 2 (11.1) | 4 (22.2) | 4 (22.2) | 10 (55.6) |
| Wet | 5 (27.8) | 4 (22.2) | 3 (16.7) | 4 (22.2) |
| Macerated | 5 (27.8) | 6 (33.3) | 4 (22.2) | 2 (11.1) |
| Scaled | 1 (5.6) | 1 (5.6) | 2 (11.1) | 1 (5.6) |
| Intumescent | 5 (27.8) | 3 (16.7) | 5 (27.8) | 1 (5.6) |

Table 3 – Multiple comparisons regarding depth, amount and type of exudate, odor, and border type between the first moment and the others. Fortaleza, CE, Brazil, 2019

| Characteristics | Initial moment (I) | Rated moment (J) | Median difference (I-J) | Standard template | Bonferroni test |
|--------------------------|--------------------|------------------|-------------------------|-------------------|-----------------|
| Depth | 1 | 2 | 0.05556 | 0.16667 | 1.000 |
| | | 3 | 0.11111 | 0.16667 | 1.000 |
| | | 4 | 0.27778 | 0.16667 | 0.601 |
| Amount of exudate | 1 | 2 | -0.16667 | 0.20721 | 1.000 |
| | | 3 | 0.50000 | 0.20721 | 0.111 |
| Odor | 1 | 3 | 0.72222* | 0.20721 | 0.005 |
| | | 2 | 0.16667 | 0.17850 | 1.000 |
| | | 3 | 0.22222 | 0.17850 | 1.000 |
| Dry border of the lesion | 1 | 4 | 0.44444 | 0.17850 | 0.091 |
| | | 2 | 0.38889 | 0.46236 | 1.000 |
| | | 3 | 0.05556 | 0.46236 | 1.000 |
| | | 4 | 1.27778* | 0.46236 | 0.044 |

*Bonferroni post hoc test significant

As for depth, it was identified that the presence of superficial tissue was 33.3% in the first moment, followed by 38.9% in the second, 44.4% in the third, and 61.1% in the fourth moment compared to partial tissue (Table 2). When evaluating the difference between the moments, a statistically significant difference was found only in the first and fourth moment, in which the mean rank values showed positive ranks of 3.00 and negative ranks of 0.00, Z statistic of -2.23 and $p=0.025$. However, when applying the Bonferroni post-hoc test comparing the moments among themselves, it was not possible to identify statistically significant differences between ulcer depths with the moments ($p=0.100$) (Table 3).

As for exudate on the gauze at the first moment, the moderate aspect predominated, with modification in the amount as of the third meeting (Table 2). When assessing the difference between the moments, significant statistics were found between the first and the third moment, in which the mean rank values showed positive ranks of 7.30 and negative ranks of 6.00, Z statistic of -2.06 and $p=0.039$. Also, between the first and fourth moments, it was identified that the mean rank values showed positive ranks of 8.50 and negative ranks of 6.00, Z-statistic of -2.50 and $p=0.012$.

Submitting these results to the Bonferroni post hoc test comparing the moments among themselves, it was possible to identify statistically significant differences between the amount of exudate only between the first and fourth moment after the application of Unna's boot (Table 3).

Serous exudate always prevailed, as did granulation tissue (Table 2). When evaluating the difference between the moments, we did not identify statistically significant through the Wilcoxon's non-parametric test. As for the evaluation of odor, we observed a characteristic odor in most ulcers (Table 2). When evaluating the difference between the moments, statistically significant was found only in the first and fourth moment. The mean rank values showed positive ranks of 3.50 and negative ranks of 0.00, Z statistic of -2.27 and $p=0.023$. When applying the Bonferroni post hoc test comparing the moments with each other, no statistically significant differences could be identified between the odor characterization at the moments (Table 3).

In the perilesional area, eleven types of characteristics were observed when pigmentation, humidity, edema, or swelling were evaluated. Thus, it was observed that the dry border had a higher occurrence

at the fourth moment when compared to the first moment. Regarding moisture and maceration, slight changes were found throughout the treatment. As for swelling, there was a reduction in the number of cases treated at the end of the fourth stage (Table 2).

The chronic venous ulcers showed borders with varied characteristics, and it was not possible to identify a predominantly significant characteristic common to all, except for adherence to the bed, and diffuse aspect, difficult to delimit considered for effect evaluation (Table 3). When evaluating the difference between the moments, statistical significance was found only the first and the fourth moment. The mean rank values showed positive ranks of 6.90 and negative ranks of 4.50, Z statistic of -2.37 and $p=0.018$. Submitting these differences to the Bonferroni post hoc test comparing the moments among themselves, it was possible to identify significant statistics between the borders of the lesion between the first and the fourth moment after the application of Unna's boot (Table 3). Thus, it is observed progressive improvement in reducing the amount of exudate and presence of dry border in the lesion during the monitored period, especially in the fourth moment of evaluation.

Discussion

Collaborating with the results found, a randomized clinical trial and a comparative trial in the central-western and southeastern regions of Brazil found similar results with the use of Unna's boot as inelastic therapy in the Brazilian population, also observing a reduction of approximately 69% and 80%, respectively, in the wound area in square centimeters^(16,18).

Pain is one of the most common and worrisome symptoms in individuals with venous ulcers, because it interferes with treatment compliance, mobility, quality of life, social life, family relationships, libido/sexuality, as well as the self-esteem and self-image of these individuals^(2,10).

The data found show good results regarding the reduction of pain during treatment, especially between the first and fourth moments. Similarly, in a clinical

trial carried out in which 80% of the sample reported pain, a reduction of pain was evidenced in the group that used Unna's boot from the fifth week on, ranging from 0-4 scores. Consequently, the reduction of pain evidenced using therapy has a crucial influence on the quality of life of patients⁽¹⁶⁾.

The assessment of the healing process, by means of the PUSH scale, showed that the scores varied between the first and the last assessment, presenting better results in the last assessment and with statistical significance between the first and the fourth moment. The scale previously used to evaluate pressure ulcers proved to be useful in the follow-up and during the weeks of chronic venous ulcers, as well as in another study in which the Unna's boot presented a decrease in the scores of the scale, demonstrating a significant improvement of the ulcer evaluated^(14-15,18).

The presence of exudate is closely linked to the condition of the lesion, the perilesional skin and healing. Since it is a physiological process, exudate is beneficial in acute wounds, but can be harmful in chronic wounds, favoring skin maceration, infection, and the presence of odor when not managed correctly^(10,19).

There was a decrease in the amount of exudate between the first and fourth moments after the application of the Unna boot. Similar results were found in a randomized clinical trial conducted in Brazil, where the decrease in exudate was more noticeable in the group that used Unna's boot, besides the exchange of the secondary dressing^(16,19).

As expected, results, in relation to the use of Unna boot technology, there was an increase in granulation tissue and, although there were no significant results, it is known that the granulation tissue indicates progress of epithelialization, with improvement of local circulation, presenting a good prognosis and the beginning of wound closure. The appearance of the border and perilesional skin also showed the expected results, a decrease in the amount of macerated tissue and prevalence of dry border at the fourth moment. The use of secondary dressings may possibly have reduced the amount of exudate over the follow-

-up period, proving to be a protective factor for wound maceration⁽¹⁹⁾.

With the correct use of the Unna boot therapy, the evolution of healing occurs perfectly as demonstrated in the results of this study. However, the efficiency of the therapy depends entirely on adherence to treatment. Social and clinical factors are important in treatment adherence, since the warmth of the boot, lack of understanding of instructions, and lack of resources compete with the care routinely provided by nursing staff^(1,3,20-21).

Thus, holistic care, planning and nursing systematization are extremely important in the treatment with Unna boot. Promoting strategies that allow greater adherence to treatment and regular treatment follow-up are the difficulties to be worked out in the daily care of patients with difficult-to-heal ulcers^(1,3,20-21).

Study limitations

The limitations of the study are the small sample size, which became limited due to the difficulty in attracting individuals to perform the therapy in the respective care unit, the type of sampling (non-probabilistic) as well as the lack of a control group and the absence of control of possible confounding variables, which generate results restricted to the scenario studied, since we adopted a convenience sample.

Contributions to practice

Despite the small sample size, the study showed positive results regarding the initial objective, contributing to the practice of the nursing team, and providing scientific basis for the care plan provided in clinics using the therapy studied. Therefore, it is suggested that healing be evaluated in a sample with a larger number of patients and for a longer period, following up until healing is complete and observing the recurrence. It is evident the need to manage indicators such as: Pressure Ulcer Scale for Healing classification; pain; amount of exudate; and dry border in individuals treated with Unna's boot

Conclusion

Based on the venous ulcer follow-up, there was a reduction in the Pressure Ulcer Scale for Healing scores, pain, amount of exudate, and dry border of the lesion during the follow-up period of the patient wearing the Unna boot, especially at the fourth moment of evaluation, that is, after 66 days.

Authors' contribution

Conception, design and writing of the article: Sousa EM.

Writing of the article: Alexandre SG, Silva RA, Araújo TM.

Analysis and interpretation of the data: Silva RA.

Writing of the article and relevant critical review of the intellectual content: Silva RA, Martins GM.

Relevant critical revision of the intellectual content and final approval of the version to be published: Silva RA, Caetano JA.

Agreement to be responsible for all aspects of the manuscript related to the accuracy or completeness of any part of the work so that it may be adequately investigated and resolved: Silva RA, Caetano JA.

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