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Case Study

Combatting Vascular Ulcer Recurrence: The Efficacy of Double Focal Compression Bandaging

Carlos Sánchez Fernández de la Vega*

Fingoi Centre/Primary Care-Galego Health Service, Lugo, Spain

***Corresponding Author:** Carlos Sánchez Fernández de la Vega, Fingoi Centre/ Primary Care-Galego Health Service, Lugo, Spain.

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Abstract

This article complements my previous publication, Venous Ulcers on the Ankle: Double Focal Compression Bandaging [1]. In that study, ulcers treated with this technique, combined with the use of strong compression stockings after healing, showed a lower tendency to recur. However, the persistence of venous hypertension implies a persistent risk of recurrence throughout the patient's life. If the ulcer reappears, it is likely to occur in a different location from the previously treated area.

The study presents two clinical cases that received the same treatment but showed significant differences in adherence to post-healing recommendations, particularly regarding the use of strong compression stockings: one patient followed the instructions, while the other did not. It is crucial for patients to understand that, even though the ulcer has healed, the underlying pathology—whether venous, arterial, or mixed—remains. Discontinuation of compression therapy can trigger ulcer recurrence in a short period. Notably, many patients treated with this technique did not experience recurrences, although they eventually died from other comorbidities.

The first case confirms that suspending compression therapy leads to ulcer recurrence. In the second case, despite the proper use of strong compression stockings, the ulcer reappeared, probably due to trauma. However, healing was achieved within four months using the same treatment applied two years earlier.

Keywords: Vascular Leg Ulcers; Adherence; Recurrence; Double Focal Compression Bandaging

Introduction

Venous leg ulcers (VLUs) are one of the most severe manifestations of chronic venous disease, characterized by open skin lesions located between the ankle and knee, caused by trauma to a leg affected by venous hypertension [2,3]. Recurrence rates for VLUs are alarmingly high: estimates indicate that 22% will recur within three months, 57% after one year, and up to 78% in patients monitored over a three-year period [4,5]. This persistent and recurrent condition significantly impacts the quality of life of those affected, while its management not only undermines patients' well-being but also places a considerable financial burden on healthcare systems [6].

Findings from various studies indicate that providing comprehensive education to patients significantly improves adherence to treatment protocols for VLUs, which is crucial in preventing ulcer recurrence [7]. Recommended strategies for preventing and reducing the reappearance of VLUs include lifelong use of high-pressure compression treatments, complemented by exercise therapy and thorough health education to promote self-care [8]. However, the effective implementation of these strategies depends on the healthcare system's ability to provide the necessary resources and on patients' sustained commitment.

Materials and Diagnostic Tools

The following materials are described for generating pressure, along with the diagnostic tools illustrated in the corresponding images (Figures 1 and 2).

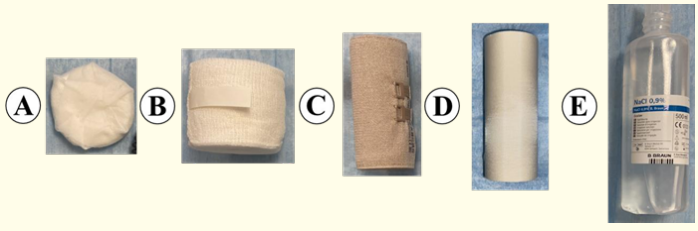

Figure 1: Material: A/ Gauzes (padding). B/ An adhesive bandage. C/ A 10 x 10-centimeter inelastic bandage (short stretch). D/ Adhesive tape. E/ Physiological saline solution.

Figure 2: Diagnostic tools: F/ A camera. G/ 128 Hz Tuning fork. H/ Monofilament. I/ Hand- held Doppler. J/ Edinburgh Claudication Questionnaire. K/ Weight-control scale.

Throughout my more than two decades of clinical practice in treating vascular ulcers in the lower limbs, I have systematically employed these materials and diagnostic tools, making only minor modifications [9]. The simplicity and effectiveness of these resources are noteworthy, as they allow primary care professionals to easily access and implement them across various clinical settings. This accessibility underscores their importance in daily practice and highlights their role in the effective management of these conditions.

Method

After conducting a differential diagnosis and ruling out severe peripheral arterial disease through the measurement of the ankle-brachial index, the next step is to establish a clinical diagnosis. In cases of chronic venous insufficiency, the CEAP classification is used, with the letter 'C' indicating the evolutionary stage. The clinical progression of the ulcer is documented with photographs at the outset and during each dressing change.

Figure 3 illustrates the technique step by step: Two packs of gauze are prepared (Figure 3/1), each cut slightly larger than the ulcer (Figure 3/2). The gauze is wrapped in an additional layer to create padding (Figure 3/3), which is then placed over the wound bed (Figure 3/4). The padding, 0.5 cm to 1 cm thick, is secured to the leg with an adhesive bandage (Figure 3/5).

The compression bandaging begins at the front of the foot, wrapping halfway around the heel and then back over the front of the foot, ascending toward the knee (Figure 3/6). The bandage is applied upward at an approximate angle of 45 degrees, extending to about two centimetres below the knee crease. Each turn of the bandage overlaps one- third of the previous layer to ensure uniform pressure. Finally, the bandage is secured with adhesive tape along the sides, back, and front of the toes, preventing displacement (Figure 3/7, 8, 9, 10, 11).

Case Report 1

An 87-year-old male patient with a history of hypertension, depression, and prostate cancer treated 18 years ago presents with significant sequelae from a traffic accident 53 years earlier. These include recurrent ulcers and chronic venous insufficiency in his left leg, which have progressively worsened over time.

Figure 3: Application of the double focal compression bandaging technique.

In November 2019, the patient developed an ulcer on the external malleolus of the left ankle. Despite multiple treatments, including antibiotics, no complete closure of the ulcer was achieved, and only transient improvement was observed. It is notable that compression therapy was not applied during this period. Familiar with our therapeutic method, the patient sought medical consultation at our clinic.

On November 24, 2021, after a comprehensive clinical evaluation, including physical examination and the exclusion of peripheral arterial disease with an Ankle-Brachial Index of 0.94, treatment was initiated using the focused double compression technique. Continuous monitoring of the patient throughout the treatment allowed for the assessment of clinical progress. Complete healing of the ulcer was achieved within nine months, as illustrated in Figure 4.

At discharge, the patient was strongly advised to consistently use high-compression stockings, a critical measure for preventing recurrence and ensuring long-term management of his condition. Proper implementation of this therapy will help mitigate the disease's consequences and prevent ulcer reappearance, significantly improving the patient's quality of life.

Recently, I contacted the patient to inquire about the condition of his leg. He informed me that the ulcer had recurred five months after discharge, in March 2023, and that he was now receiving treatment from other professionals. I was surprised that he had not returned to our clinic, especially considering that the previous treatment had been effective and was provided altruistically at no cost. At the time of discharge, he had been instructed to return to us if he experienced any leg-related issues.

I asked him if he had been using the strong compression stockings we prescribed. He admitted that he had not, citing intolerance as the reason. This was puzzling, as he had tolerated the compression bandaging without difficulty during the ten months of treatment. I suspect there may be other underlying reasons for his non-compliance.

Figure 4: The ulcer healed within nine months with the exclusive use of double focal compression bandaging.

The patient did not seem to understand that, although the ulcers had healed, his underlying venous disease persisted, and effective management required the continued use of strong compression stockings. I requested a recent photograph of the ulcer, and upon examination, I noted that its size and location were similar to those observed before treatment began in November 2021 (Figure 5). This highlights the critical role of compression therapy in preventing recurrence.

It is perplexing that the therapy, which had previously successfully healed the ulcer, was not utilized this time. The healthcare professionals involved opted not to use this technique. It is possible that the patient misunderstood the recurrence of the ulcer as a failure of the treatment.

Given the apparent loss of confidence from the patient in this approach, I have decided not to proceed with any further interventions. I wish the patient the greatest success in his current treatment. The patient, now 89 years old, remains under the care of other professionals.

Figure 5: A photographic sequence documenting the ulcer's healing, and subsequent recurrence as the patient did not use compression stockings after the initial healing.

In contrast, the following case demonstrates a completely opposite outcome. Despite the patient adhering to our recommendation to use strong compression stockings after the ulcers had healed, they recurred. However, upon reapplying the same treatment— double focal compression—the ulcers were successfully healed once again.

Case Report 2

An 85-year-old female patient with obesity, metabolic syndrome, and a surgically treated right-sided pheochromocytoma in 2021 presents with over 30 years of chronic venous insufficiency,

characterized by recurrent venous ulcers on both legs, previously managed by the angiology department at her referral hospital.

The patient has undergone surgical interventions for chronic venous insufficiency: the first on the right leg in 2007 and the second on the left leg in 2015. Despite medical recommendations to use strong compression stockings to enhance circulation and prevent the formation of new ulcers, adherence to this treatment has been inconsistent. The patient reported experiencing intolerance to the stockings, which significantly hindered compliance. This irregular use of compression stockings has likely contributed significantly to the high recurrence rate of ulcers in both lower extremities.

On February 2, 2022, the patient presented to our clinic with ulcers on both ankles, specifically located in the supra-malleolar external region. Despite receiving multiple treatments, including antibiotics, the ulcers showed no favourable progression. Notably, the patient was not using strong compression stockings at this time. Prior to the physical examination, we assessed her willingness to adhere to the therapeutic instructions, given her medical history. She affirmed her commitment to promptly report any incidents that may arise during treatment.

After a comprehensive physical examination and ruling out peripheral arterial disease through the measurement of the ankle-brachial index (ABI: 0.94), we initiated treatment with double focal compression bandaging, confirming the diagnosis of venous ulcers.

Over a period of four months, the patient attended scheduled consultations, beginning with daily visits during the first week to assess her clinical progress. The frequency of visits was subsequently reduced to twice a week, allowing for continuous monitoring and adjustments to her treatment based on her response. The ulcer on the right ankle showed progressive reduction, achieving complete healing in three and a half months (Figure 6).

Figure 6: The ulcer on the right ankle completely healed after three and a half months of treatment.

The ulcers in the supra-malleolar region of the left ankle, treated simultaneously, healed within four months (Figure 7). This significant reduction in healing time, compared to previous treatments, underscores the effectiveness of this technique and suggests a potential shift in clinical practice for managing similar conditions.

Adopting this strategy among healthcare professionals could lead to improved patient outcomes and a decrease in the burden on healthcare systems by reducing ulcer recurrence and associated treatment costs. Enhanced training and awareness regarding this method could facilitate more consistent application and better patient education, ultimately promoting adherence to treatment protocols.

In summary, this approach not only demonstrates a promising advancement in the management of venous ulcers, but also offers a

Figure 7: The ulcers on the left ankle, completely healed after four months of treatment.

pathway to improving the quality of life for patients. By integrating this technique into standard practice, healthcare providers may achieve more efficient and effective care for those suffering from chronic venous insufficiency.

Months after the healing of the ulcers, a comprehensive follow-up evaluation was conducted to assess the patient's condition. During this evaluation, the absence of recurrences was confirmed, which is significant considering the patient's history of recurrent venous ulcers. Additionally, a notable reduction in oedema was observed in the affected extremities, indicating an improvement in venous circulation and the overall condition of the legs (Figure 8).

Figure 8: The clinical course of the legs shows a reduction in oedema since the beginning of treatment.

These findings not only highlight the effectiveness of the treatment but also reflect a positive trajectory in the patient's recovery. The sustained absence of ulcer recurrences is particularly encouraging, as it suggests a successful long-term management strategy. Moreover, the reduction in oedema points to enhanced venous function, which may contribute to the patient's overall quality of life.

In summary, the follow-up evaluation provides valuable insights into the patient's progress and underscores the importance of ongoing monitoring in managing chronic venous insufficiency. Further studies could explore the correlation between these improvements and specific treatment protocols to enhance clinical practice.

We did not have further contact with the patient until March 2024, when we reached out to assess her leg condition and check for any recurrence of the ulcers. Follow-up was not conducted after the ulcers had healed, as she was managed by another team of professionals. She reported that, despite adhering to our recommendations regarding the use of strong compression stockings, the ulcers reappeared on her left leg approximately one year after healing. In contrast, her right leg remained ulcer-free due to her continued use of the compression stocking as instructed. Over several months, she underwent various treatments, including occasional antibiotic therapy, but with limited success. When we inquired whether double focal compression bandaging had been applied, she responded negatively.

On March 13, 2024, upon returning to our clinic, the ulcers presented as follows: one located in the upper region of the left lateral malleolus and two small ulcers on the lower third of the left lateral leg. We were struck by the resemblance of these lesions to those previously treated on February 2, 2022. As in previous instances, her physician had prescribed an antibiotic, attributing the lack of progress to a possible infection, and requested a culture of the ulcer exudate. On the same day, upon initiating compression therapy, I decided to discontinue the antibiotic while awaiting the results, which subsequently confirmed the presence of *Staphylococcus aureus* (Figure 9).

Figure 9: Ulcer on the outer malleolus of the left ankle, with exudate testing positive for *Staphylococcus aureus.*

A common cause of delayed ulcer healing is infection, prompting physicians to request cultures of the ulcer exudate when progression is unfavourable to confirm the presence of an infection. Typically, the identification of bacteria leads to the prescription of antibiotics based on antibiogram findings. However, this intervention can often be circumvented through the application of focalized compression over the wound bed, which I have observed to effectively prevent infection [10].

It is essential to emphasize that the presence of bacteria in the exudate, in the absence of clinical symptoms or signs, merely indicates bacterial contamination.

Figure 10a shows the appearance of the gauze dressing used in the treatment of the ulcer, which suggested a possible infection with Pseudomonas aeruginosa, later confirmed through exudate cultures. These cultures revealed the presence of *Staphylococcus aureus, Streptococcus pyogenes*, and *Pseudomonas aeruginosa*. However, no antibiotics were administered due to the absence of clinical signs of active infection.

This situation highlights the importance of careful clinical evaluation to differentiate between bacterial contamination and active infection. Proper wound management, along with the use of focalized compression on the wound bed, is essential for preventing infections and enhancing the healing process.

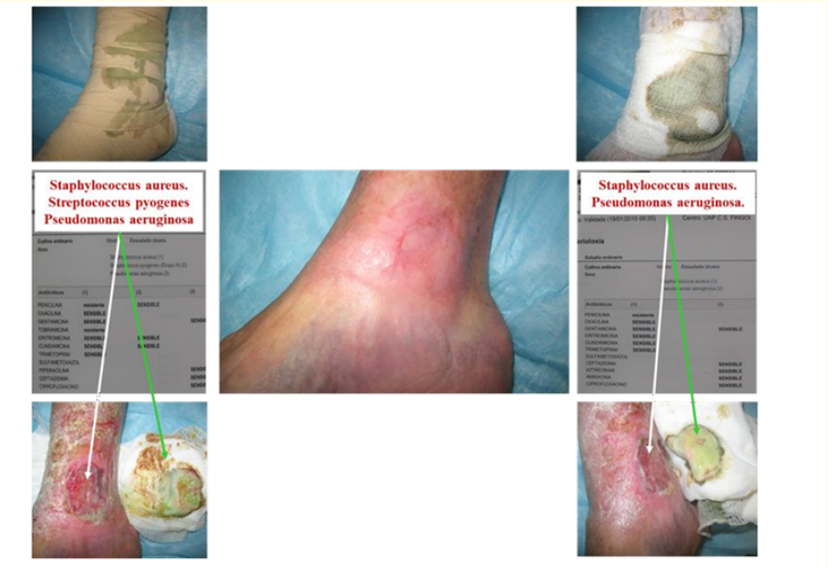

Figure 10a: The gauze padding exhibited a greenish appearance during dressing changes.

A photographic sequence documents the clinical evolution of the ulcer until its complete healing, achieved nine months after applying the double focal compression technique (Figure 10b). During this period, cultures were performed at various stages of the clinical process, which tested positive for the previously mentioned bacteria. The blue stars indicate the specific moments when these cultures were requested, highlighting critical points in the treatment timeline.

Figure 10b: A photographic sequence documenting the clinical course of the ulcer until complete healing.

Despite the positive culture results, antibiotics were not utilized in the treatment of the ulcer, demonstrating that focal compression can be effective in promoting healing, even in the presence of bacteria. However, it is essential to note that although the ulcer healed, bacteria persisted in the exudate. This phenomenon suggests that wound healing does not always entail the complete elimination of the bacterial load, which may have implications for ongoing patient management and monitoring.

Revisiting this second case, we sought to illustrate the ineffectiveness of antibiotic therapy by consistently requesting cultures of the ulcer exudate throughout the clinical course until complete healing was achieved. These cultures revealed various bacterial species, including *Staphylococcus aureus, Klebsiella pneumoniae, and Serratia marcescens* (Figure 11). Notably, the administration of antimicrobial agents was unnecessary, as there were no clinical signs or symptoms indicative of infection.

We must highlight the importance of distinguishing between bacterial contamination and actual infection, as this differentiation is essential for preventing the unnecessary prescription of antibi-

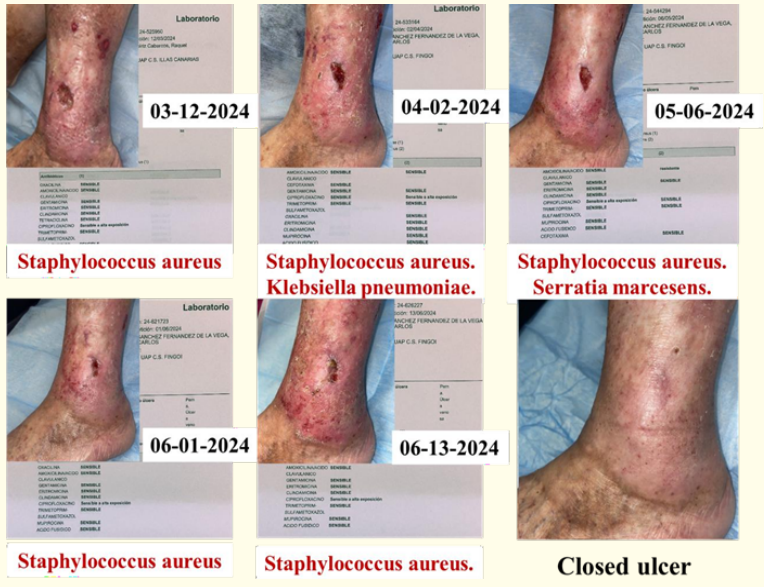

Figure 11: Ulcer exudate swabs revealed bacterial contamination; however, the patient showed no signs of infection.

otics. Remarkably, the ulcer healed successfully without the use of antimicrobial agents, marking a significant advancement in the management of such lesions. However, it is important to acknowledge that, despite the successful healing of the ulcer, the presence of bacteria within the ulcer bed remains (Figures 9, 11).

The photographic sequence illustrates the clinical evolution of the ulcers located on the left ankle (Figure 12) and the lower third of the left lateral leg (Figure 13). Both ulcers closed within a period of four months following the application of the double focal compression bandaging, the same technique that had previously

Figure 12: The ankle ulcer successfully healed within four months.

Figure 13: The ulcers on the lower third of the left lateral leg also healed within four months.

demonstrated significant effectiveness. For the second time, we have successfully achieved complete healing of the patient's ulcers, highlighting the importance of this method in managing venous ulcers and improving the patient's overall quality of life.

Two months after initiating treatment for the previous ulcers (on April 6, 2024), a new ulcer developed on the internal malleolus of the treated leg. We initiated treatment for this new ulcer similarly, while continuing to manage the existing ones. Ultimately, both ulcers took four months to close (Figure 14).

Figure 14: The ulcer demonstrated healing after four months of applying double focal compression bandaging.

The appearance of a new ulcer in a location different from the treated leg is a phenomenon that may occur when applying this type of treatment. An explanatory hypothesis is that: The pressure gradients generated by focal compression at the base of the ulcer may reduce blood flow due to a redistribution of circulation in areas with preexisting vascular abnormalities, potentially leading to the formation of a new ulcer.

However, this did not represent a setback; on the contrary, it proved beneficial as it allowed for the extension of compression bandaging use for an additional two months, even though the other ulcers had already healed (Figure 15). This extension optimized the conditions for a more consolidated recovery before transitioning to the use of strong compression stockings.

Figure 15: After two additional months of compression bandaging treatment, a notable improvement was observed after the ulcer had healed.

During the treatment of the most recent ulcer, a small lesion was identified and promptly addressed with focal compression. This early intervention not only prevented the lesion's progression into a more severe ulcer but also underscores the critical importance of early detection and management of vascular conditions [10]. Remarkably, the lesion resolved completely after just two weeks (Figure 16). This case serves as a compelling reminder that timely intervention can significantly improve patient outcomes and may influence future treatment protocols.

Figure 16: A minor lesion was identified, which could have evolved into an ulcer without early intervention using focal compression.

Similarly, erythema developed on the treated leg (Figure 17). The presence of erythema in a patient undergoing compression bandaging indicates increased blood flow to the affected area, as the applied compression enhances circulation. However, it is essential to recognize that erythema can also indicate irritation, inflammation, or infection. Therefore, a thorough assessment of the clinical context and accompanying symptoms is necessary to rule out potential complications, such as cellulitis. While erythema may be expected and even beneficial in certain circumstances, rigorous monitoring is vital to ensure patient safety. Implementing specific monitoring practices can help identify any adverse reactions early, ensuring timely intervention if needed. Over time, the erythema will subside.

The treatment of the patient, initiated on February 2, 2022, resulted in the healing of her venous ulcers within four months. The patient was an adult with comorbidities such as diabetes and obesity, which complicated her situation. Nine and a half months after starting compression therapy, significant improvement was observed in her lower extremity and a marked reduction in oedema (Figure 8). This case highlights the efficacy of compression therapy in managing ulcers and the importance of continuous follow-up.

Following a second intervention two years later, the ulcers healed again within a similar timeframe (Figures 6, 7, and 18). This experience underscores the need to maintain compression therapy and other preventive measures to avoid recurrences and improve the patient's quality of life. Compression therapy is confirmed as an essential tool in clinical practice for the effective management of venous ulcers. The patient, currently 89 years old.

Figure 17: The erythematous area is an expression of increased blood flow.

Figure 18: The appearance of the legs at the time of the patient's initial treatment, a few months later, and two and a half years later is documented.

Discussion and Conclusion

These two cases exemplify analogous situations with contrasting outcomes. Both patients have a long-standing history of chronic leg ulcers spanning several years. Although both cases exhibited ulcer recurrence, the differences in adherence to therapeutic recommendations are noteworthy.

- In the first case, the patient acknowledged not adhering to our recommendation for the permanent use of compression stockings. It is crucial to clarify that this does not imply continuous use but rather lifelong application. He attributed his non-adherence to intolerance, which is perplexing given his previous tolerance of compression. I do not have information about the communication with the patient or the healthcare professionals' decision not to utilize the previously effective treatment (Figure 5). Consequently, the patient misinterpreted the ulcer recurrence as a failure of compression therapy.
- In the second case, we achieved ulcer healing within just four months using this technique (Figures 6 and 7). This patient had been dealing with this condition for many years and had undergone various treatments with unfavourable results. Despite adhering to our recommendation to use strong compression stockings after healing, the ulcers recurred one year later. Upon recontacting the patient in March 2024, we discovered that compression therapy was not being applied to the affected leg; however, she was using strong compression stockings on the other leg, as advised. After reapplying the same treatment, we successfully achieved ulcer healing within a similar timeframe (Figures 12 and 13).
- Patients must understand that while ulcer healing may occur, the underlying condition persists. Therefore, they should maintain the use of strong compression stockings, ideally indefinitely, to prevent ulcer recurrence.

- In neither case was the prescription of antimicrobial agents necessary, as no signs or symptoms of infection were observed. In the second case, upon resuming treatment with double focal compression, the patient was under antibiotic therapy prescribed by her primary care physician, who had requested a culture of the ulcer exudate. I discontinued the antibiotic upon initiating compression bandaging while awaiting the culture results, which were positive for various bacteria. However, antibiotics were not administered, as the patient exhibited no signs of infection. Throughout the treatment until healing, we continued to request cultures of the exudate, obtaining positive results without the need for antibiotics. This suggests bacterial contamination rather than active infection (Figure 11). In my experience, focal compression on the wound bed has proven effective in preventing infections. Antibiotics are only indicated in cases of cellulitis or fever; conditions absent in both cases.
- The appearance of new ulcers during focal compression treatment allows for their management using the same therapeutic approach. The patient maintained the compressive bandage for over six months before transitioning to strong compression stockings. Although ulcers may heal before completing the recommended three-month period, it is advisable to continue using double focal compression bandaging throughout this time.
- These cases highlight the importance of continuing compressive therapy after the healing of a vascular ulcer, as the underlying cause persists. It is perplexing that the medical staff opted for alternative therapies instead of double focal compression bandaging, which has consistently proven effective. This decision reflects a concerning lack of commitment to evidence-based practice, given their awareness of the positive outcomes associated with this approach.

Failing to apply a proven technique, and delaying its use during ulcer recurrence, not only exacerbates unnecessary suffering but also prolongs the healing process, significantly impacting patients' well-being and quality of life. The attached photograph illustrates patients whose lower extremities deteriorated, in my opinion, due to inadequate treatment (Figure 19). This situation should prompt serious reflection among healthcare professionals.

Figure 19: Should the responsibility be attributed to the patient for non-adherence to instructions, or to the healthcare professionals for the quality of care provided?

It is particularly concerning that patients reach such unfavourable states due to the omission of compression therapy, essential for managing vascular pathologies, whether venous, arterial, or mixed in origin. Compression therapy can be safely applied in patients with peripheral artery disease, provided they have an ankle-brachial index of 0.5 or greater. Close clinical monitoring is mandatory during the initial weeks; if the patient experiences intolerance, they should remove the bandage and attend a follow-up appointment the next day [14-17].

With extensive experience treating patients with lower limb vascular pathologies, I strive to prevent avoidable complications through appropriate care, including compression therapy and obe-

sity management. My clinical practice demonstrates that preventing such issues is feasible and should be a fundamental objective in patient care. As healthcare professionals, we are responsible for ensuring that each patient receives the best possible care, thereby avoiding unfavourable outcomes. The lack of prevention and inadequate treatment represents deficiencies in management that require thorough review and improvement.

Bibliography

1. Sánchez Fernández de la Vega. "Ankle Venous Ulcers. Double Focal Compression Bandaging". *Acta Scientific Clinical Case Reports* 5.7 (2024): 16-34.

2. O'Donnell TF Jr., *et al*. "Management of venous leg ulcers: clinical practice guidelines of the Society for Vascular Surgery (R) and the American venous forum". *Journal of Vascular Surgery* 60.2 (2014): 3S-59S.

3. Lim CS., *et al*. "Diagnosis and management of venous leg ulcers". *BMJ* 362 (2018): k3115.

4. Finlayson K., *et al*. "Identifying risk factors and protective factors for venous leg ulcer recurrence using a theoretical approach: a longitudinal study". *International Journal of Nursing Studies* 52.6 (2015): 1042-1051.

5. Finlayson K., *et al*. "Factors associated with recurrence of venous leg ulcers: a survey and retrospective chart review". *International Journal of Nursing Studies* 46.1078 (2009): 1071-1078.

6. Renner R., *et al*. "Changes in quality of life for patients with chronic venous insufficiency, present or healed leg ulcers". *Journal der Deutschen Dermatologischen Gesellschaft* 7.11 (2009): 953-961.

7. Behairy AS and Masry SE. "Impact of educational nursing intervention on compression therapy adherence and recurrence of venous leg ulcers: a quasi-experimental study". *Ocular Oncology and Pathology* 8.2 (2022): 120-132.

8. Bingyang He., *et al*. "Prevention strategies for the recurrence of venous leg ulcers: A scoping review". *International Wound Journal* 21 (2024): e14759.

9. Sánchez Fernández de la Vega C. "Venous leg ulcers". Double focal compression bandaging. Conference: 15th World Congress Union Internationale de Phlebologie at: Rio (Brazil) (2005).

10. Sánchez Fernández de la Vega C. "An Early Detection and Treatment are Essential for Healing Vascular Leg Ulcers. Double Focal Compression Bandaging Technique". *Acta Scientific Clinical Case Reports* 3.7 (2022).

11. Sánchez Fernández de la Vega C. "Focalized pressure on the wound bed prevents infection. Double focal compression bandaging". *International Journal of Information Research and Review* 07.10 (2020): 7113-7120.

12. Sánchez Fernández de la Vega C. "Bacterial contamination does not necessarily mean infection". September 2013 International Journal of Angiology 32.1.5 (2013).

13. Susan O'Meara., *et al*. "Antibiotics and antiseptics for venous leg ulcers". *Cochrane Database System Review* 1 (2014): CD003557.

14. Sánchez Fernández de la Vega C and Hugo Partchs. "Healing of an arterial leg ulcer by compression bandaging: a case report". *Journal of Wound Care WUWHS Supplement* 26.2 (2017).

15. Sánchez Fernández de la Vega C. "Is compression bandaging contraindicated for healing arterial ulcers? 10th Annual Conference of Venous Association of India (VAICON 2017)". Varanasi, Uttar Pradesh, 2nd- 4th March (2017).

16. Sánchez Fernández de la Vega C. "Compression to reduce leg oedema in patients with arterial occlusive disease. Double focal compression bandaging". *Veins and Lymphatics* 7 (2018): 7980.

17. Sánchez Fernández de la Vega C. "Peripheral Artery Disease. Double Focal Compression Bandaging Technique". *Acta Scientific Clinical Case Reports* 4.7 (2023).