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Case Study

Ankle Venous Ulcers. Double Focal Compression Bandaging

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Abstract

In this article, I clearly and visually present the clinical progression of venous ulcers located in the malleolar region. It is important to note that most of these ulcers are found in the medial malleolar region [1]. Among the many cases I have treated, I detail a series of ten relevant clinical cases that have been healed exclusively using a simple technique known as double focal compression. I have used this technique for over 24 years, consistently achieving excellent results [2].

The epidemiological data regarding venous leg ulcers, especially their low healing rates and frequent recurrences, are surprising given the recent advances in managing this complication [3]. An important finding is that there have been no ulcer recurrences in the treated areas when patients have consistently adhered to the recommendations of permanently wearing strong compression stockings after the ulcer has healed [4]. Compression therapy can alleviate the clinical effects of venous hypertension, but it cannot fully reverse the condition. However, initiating treatment at an early stage (CEAP classification, C1, C2, C3) can significantly mitigate its impact.

I developed a working hypothesis based on vascular pathophysiology. Applying pressure to the ulcer bed stimulates arteriogenesis and angiogenesis in the affected area, which are the physiological principles supporting this technique. Blood flow is redirected through vessels in optimal condition, compensating for the tissue perfusion deficit caused by damaged vessels. This tissue perfusion deficit is the cause of ulcer formation.

Keywords: Venous Leg Ulcers; Malleolus; Double Focal Compression Bandaging

Introduction

Chronic venous leg ulcers (VLUs) often present a significant challenge in terms of healing, especially in cases characterized by advanced age, obesity, nutritional deficiencies, colder climates, preexisting venous disease, deep venous thrombosis, and larger wound sizes. Additionally, recurrence rates for VLUs are notably high, ranging from 50% to 70%. This elevated rate is primarily attributed to factors such as non-adherence to compression therapy, ineffective surgical interventions, misdiagnosis of ulcers, progression of venous disease, and an incomplete understanding of their pathophysiology [5].

Patients with venous leg ulcers often face a recurrent cycle of ulcer formation, healing, and recurrence throughout their lives. With over 50% of these ulcers reappearing within 12 months of initial healing, it is essential for healthcare professionals caring for these patients to thoroughly understand the comprehensive risk factors that contribute to recurrence [6]. The use of strong compression stockings below the knee has proven to be highly effective in preventing the recurrence of venous leg ulcers after healing. To prevent the reappearance of ulcers, it is essential that patients maintain rigorous use of these stockings for an extended period, regardless of the treatment approach used, whether surgical or conservative. The underlying hypothesis suggests that the application of external pressure through compression on the calf muscle increases interstitial pressure, thereby optimizing venous return and reducing venous hypertension. This mechanism, therefore, plays a crucial role in the prevention of venous ulcers [7].

To understand the pathophysiological basis of this technique, it is necessary to consider two key processes: arteriogenesis and angiogenesis. In adult organisms, blood vessel growth occurs through

these two mechanisms, which vary depending on the initial stimulus. Angiogenesis, induced by hypoxia, leads to the formation of new capillaries. In contrast, arteriogenesis is activated by physical forces, especially fluid shear stress. This chronic shear stress has been identified as the most potent stimulus under experimental conditions. Arteriogenesis involves the remodelling of preexisting arterio-arteriolar connections into fully developed and functional arteries [8].

This article examines the clinical evolution of ten patients with venous ulcers located in the malleolar region, an area with a high prevalence of such lesions. Photographic sequences are presented to illustrate the clinical progress and confirm the absence of recurrence in the treated areas. The technique used was applied to over 230 patients, achieving healing of venous ulcers that had been resistant to conventional therapies. Since most patients were not part of my assigned cohort, they were under the care of other physicians. Once the ulcers were healed, the subsequent follow-up was carried out by their respective primary care physicians. In some cases, follow-up was not possible due to the patients' death.

The observed effects following the implementation of focused compression demonstrate immediate and sustained improvements (Figure 1, 2). The importance of the active involvement of primary care physicians and nursing staff in the timely identification and management of lower extremity ulcers is emphasized, underscoring that extensive and prolonged ulcerative lesions often originate from smaller ulcerative foci. Consequently, early detection and prompt intervention are crucial for enhancing the prognosis of these ulcers [9].

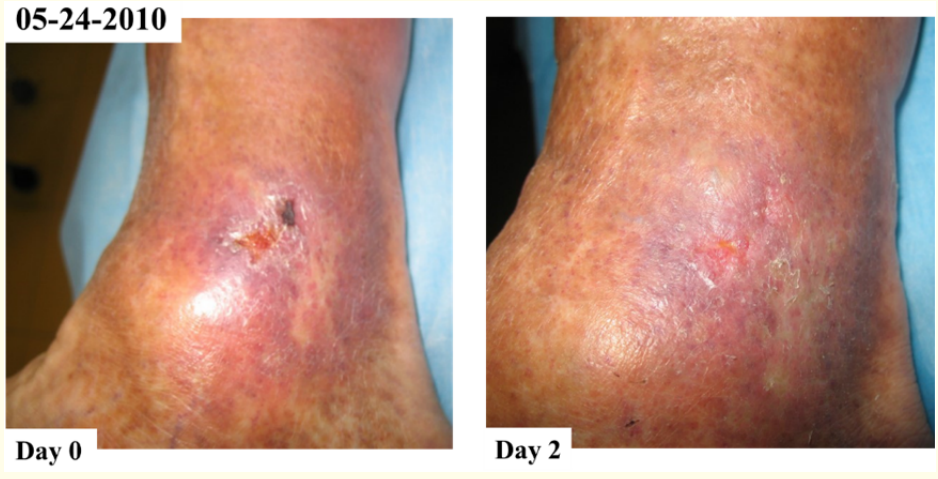

Figure 1: Forty-eight hours after applying focused compression to the ulcer site.

Figure 2: Three years after applying the technique to another patient.

In primary care, the successful treatment of vascular ulcers requires a collaborative approach involving physicians, nurses, and the patient's family.

Material and diagnostic tools

To apply this technique, only bandages and gauze are needed, which are simple and inexpensive materials [2]. The components used are:

- Gauze is used to create padding that is placed directly over the ulcer to apply targeted pressure.
- An adhesive bandage is applied to securely fasten the padding to the leg.
- A 10 x 10-centimeter inelastic bandage (short stretch) is used, designed to gradually apply external compression, starting from the toes, and extending up to 2-3 centimetres below the knee bend.
- Physiological saline solution for wound bed cleaning.
- Adhesive tape to reinforce the bandage and achieve gradual external compression.

Diagnostic tools for assessing venous chronic insufficiency and ruling out severe peripheral artery disease comprise:

- **Hand-held Doppler:** This device is used to evaluate peripheral pulses and calculate the ankle-brachial index, aiding in the diagnosis of severe peripheral artery disease.
- **Weight-control scale:** This tool allows for monitoring changes in body weight. Obesity and overweight negatively impact the venous system, increasing the risk of conditions such as deep vein thrombosis, chronic venous insufficiency, and varicose veins. Managing excessive weight is crucial for maintaining optimal venous health.
- **Edinburgh Claudication Questionnaire:** A standardized questionnaire designed to assess symptoms related to peripheral artery disease, facilitating the collection of valuable patient information.
- **Camera for clinical documentation:** Used to capture photographic sequences of the clinical course, providing visual documentation for accurate evaluation and monitoring of disease progression.

Method

We employ a straightforward compression bandaging technique known as the double focal compression bandaging. The initial bandage is used to apply focused compression on the ulcer bed, while the secondary bandage is placed over it to achieve gradual external compression from the toes to the knee. Each wrap of the bandage overlaps the previous one by 50-70%. This method ensures the ulcer area receives pressure from three layers: the compression on the ulcer bed and the dual effect of gradual external compression. To safely implement this technique in primary care, adherence to three key steps is crucial and requires specific medical.

- First/Establish a differential diagnosis.
- Second/Determine a clinical diagnosis (using the CEAP classification).
- Third/Measure the Ankle-Brachial Index to rule out severe peripheral arterial disease.

Case Report 1

Twenty-one years ago, I encountered one of my earliest cases and chose to employ the double focal compression technique. At that time, I could not have anticipated the surprisingly successful outcomes I would achieve by applying focused pressure to vascular ulcers. Over time, this method, using only bandages and gauze, has demonstrated remarkable efficacy. This case is particularly noteworthy, as it has consistently shown straightforward evidence of the absence of ulcer recurrence in the treated areas over time. Twenty-one years have elapsed since the patient's initial consultation at our clinic (Figure 3).

A 68-year-old male presents with recurrent ulcers on the lateral malleolus of his left foot, with a history spanning over 30 years. Despite undergoing various treatments that successfully healed the ulcers, they recurred over time. In 1975, he underwent a right internal saphenectomy following a work-related accident. In 1984, he received a left hip prosthesis. Additionally, he has a history of deep vein thrombosis episodes.

Once peripheral artery disease was ruled out (ABI:0.96), we initiated treatment with double focal compression bandaging. The ulcers resolved in just three months; a remarkably brief period compared to previous treatments.

We provided detailed instructions on managing potential ulcer recurrences, including the application of the double focal compression technique if necessary. We recommended the continuous use of strong compression stockings to prevent ulcer recurrence, and we are pleased to note that he has followed this recommendation.

Since the patient was not included in my assigned patient list, once the ulcer healed, he returned to the care of his primary care physician. Twenty-one years later, we contacted him to verify if the

ulcers had recurred. He confirmed that they never reappeared. He stated that his progress had been, and continued to be, excellent. No new ulcers were observed in the treated areas, and any small ulcer that appeared elsewhere on the leg was successfully treated using the method we taught him. He expressed his deep gratitude for the treatment he received and for having learned such an efficient and effective method. Previously, he had undergone venous surgery and various treatments that proved ineffective, as the ulcers, although they eventually healed, would rapidly reappear. Notably, since the treatment began 21 years ago, the ulcers have not recurred in the treated area, and his venous pathology has improved significantly. He is currently 89 years old.

Figure 3: Venous ulcer on the ankle, three months, and twenty-one years after applying the technique.

Case Report 2

A 68-year-old female patient, diagnosed with arterial hypertension, dyslipidaemia, and depression, experienced trauma to her right leg, which resulted in the formation of an ulcer at the level of the medial malleolus. The ulcer had an unfavourable progression, prompting the patient to seek medical attention at our clinic on August 3, 2009. After ruling out peripheral arterial disease using the ankle-brachial index (ABI:0.89), we proceeded to treat the patient exclusively with the double compression technique, successfully healing the ulcer in just 4 months (Figure 4).

Figure 4: The ankle ulcer healed after 4 months of applying the technique.

No antimicrobial agents were used, as there were no signs or symptoms of infection at any point. Focused compression on the wound bed helps prevent infection [10].

I recommend that all patients, once the ulcer has healed, use strong compression stockings permanently to prevent ulcer recurrence. The ulcer did not reappear for nearly 5 years (Figure 4). Since the patient is under the care of another colleague, he managed the subsequent follow-up. However, it was advised that in the event of new ulcers emerging, the patient should promptly return to our clinic.

On August 5, 2015, the patient presented to our clinic with an ulcer located in a site like the one previously treated. The patient had previously received various treatments without improvement, prompting him to seek our medical attention again. It is important to note that the patient did not follow the instructions provided during the initial ulcer treatment; in the event of a recurrence of new ulcers, he should have sought our assistance immediately. Early intervention is crucial in such lesions to prevent complications and promote a quicker and more effective recovery [9].

The ankle-brachial index had improved (ABI:0.94). After a thorough physical examination, we proceeded to apply the same treatment. However, on this occasion, the ulcer required a longer healing period, extending over nine months (Figure 5).

Figure 5: The venous ulcer on the ankle healed after 9 months of treatment.

Despite the absence of symptoms or signs of infection and due to the patient's reported pain, I requested cultures of the ulcer exudate throughout the clinical course until complete healing was achieved. The greenish appearance of the dressings during wound care suggested a possible Pseudomonas infection (Figure 6). Contamination does not men infection [11].

We have identified positive cultures for the following bacteria: Staphylococcus aureus, *Pseudomonas aeruginosa*, and *Streptococcus pyogenes* group A (Figure 7). Antimicrobial agents were not administered despite the presence of positive cultures in the exudate, as no signs or symptoms of infection were observed; this suggests bacterial contamination. As previously mentioned, focused compression prevents infection.

The ulcer healed using only double focal compression bandaging; however, bacterial eradication was not achieved. She is currently 74 years old.

Figure 6: This is the appearance of the packing gauzes (pad), when changing them.

Figure 7: Positive ulcer exudate culture for bacteria.

Case Report 3

An 80-year-old female patient presents to our clinic with chronic ulcers located in the mid-third of the right leg and the right medial malleolus, which have shown no improvement despite various treatments. The most recent treatment was a solution to combat Pseudomonas. Green residue from the ulcer exudate can be seen saturating the gauze upon wound cleansing. Since the patient did not present signs or symptoms of infection, the treatment was discontinued, and only double focal compression bandaging, or focused dual compression therapy, was used. Initially, elastic bandages were utilized, which were later replaced with inelastic ones. The patient had a normal ankle-brachial index (ABI:1.05) (Figure 8).

The ulcer located in the mid-third of the leg healed within 2 months, using only this technique (Figure 9).

In the clinical course, it is important to highlight the appearance of pronounced green exudate, which significantly decreased with

Figure 8: Ulcers located in the mid-portion of the right leg and the right medial malleolus.

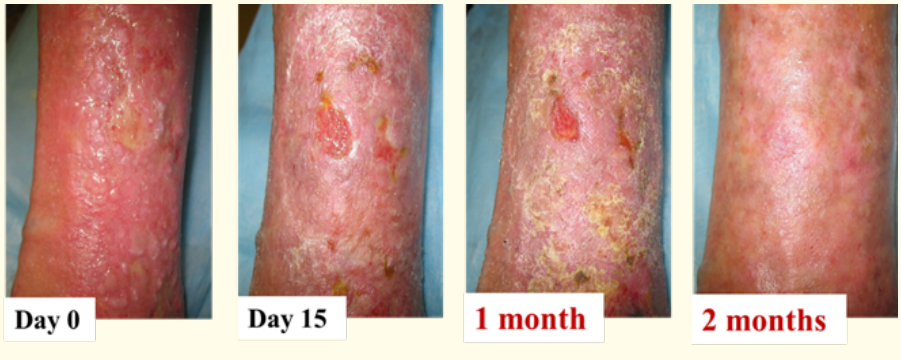

Figure 9: Ulcer healed in just 2 months.

Figure 10: Green exudate, due to colonization by *Pseudomonas aeruginosa.*

focused compression. Antimicrobial agents were not used due to the absence of signs or symptoms of infection (Figure 10).

On the other hand, the ulcer located on the malleolus took three and a half years to heal. This prolonged duration may have been attributed to the patient's difficulty in attending our scheduled appointments. We found it necessary to instruct the patient's daughter in the technique of double focal compression bandaging. The daughter would apply the bandages and attend our clinic for us to supervise the clinical course. This way, we adapted to the visits the patient could attend.

It is important to note that for three years, we treated the patient exclusively with double focal compression bandaging. Although the progression was slow, the results were satisfactory. The use of antimicrobials was not required, as the patient did not present clinical signs of infection. At the end of the third year of treatment, in week thirty-eight, we observed an increase in the size of the ulcer. In response, we intensified the treatment and personally supervised the application of the bandaging, monitoring the clinical progress daily until complete healing was achieved, which occurred four months later (Figure 11). This underscores the importance of continuous treatment overseen by adequately trained professionals.

Figure 11: The clinical course of the ulcer, until complete healing, lasted three and a half years.

We strongly recommend that the patient continues to use strong compression stockings indefinitely, except when sleeping or in situations where their use is hindered. The patient remained under the care of her primary care physician for the management of her various health issues. As shown in the images, there were no recurrences in the treated areas during the 7 years following healing (Figure 12). We had no contact with the patient during this time until 7 years later, when a small ulcer appeared on the right lateral malleolus.

It is important to note that, seven years after having been treated by us, the patient developed a small ulcer on the right lateral malleolus and sought our consultation immediately. This prompt intervention allowed for timely treatment. It is crucial to remember that every significant ulcer began small, underscoring the importance of initiating compression therapy early [9]. We applied the same treatment, double focal compression bandaging, and the ulcer healed within four months (Figure 13). The patient passed away at the age of eighty-nine due to causes unknown to us.

Figure 12: Absence of recurrence in the treated area after 7 years.

Figure 13: The ulcer located on the right lateral malleolus healed after 4 months of applying the technique.

Case Report 4

A 75-year-old patient with a medical history of over two decades of arterial hypertension, was diagnosed with stage 3b renal insufficiency in 2014, and underwent left knee prosthesis implantation that same year. More recently, in 2022, the patient received a cardiac pacemaker due to symptomatic high-grade 2:1 AV block.

The patient presented at our clinic on November 1, 2009, with a chronic ulcer located on the inner aspect of the left malleolus, persisting for several months and unresponsive to previous treatments. After ruling out peripheral arterial disease by calculating the ankle-brachial index (ABI:0.95), we began treatment using only compressive bandaging, specifically double focal compression bandaging. However, the patient reported discontinuing the bandaging and applying various ointments, which worsened the ulcer. The patient returned for a follow-up consultation 24 days later. The ulcer's appearance was not favourable. We emphasize the importance of following our instructions and attending scheduled appointments. Failure to comply with these recommendations could lead to the suspension of treatment. The patient committed to following them, and the ulcer healed completely within six months (Figure 14).

Figure 14: The venous ulcer on the left ankle healed after 6 months of treatment, with compressive bandaging.

Of the cases described in this article, this is the only one belonging to the pool of patients under my care. Continuous monitoring of the ulcer's progression confirmed the absence of recurrence, as seen in the photographic sequences (Figure 15). In my experience, after ulcer healing, consistent use of strong compression stockings by the patient prevents recurrence in the treated area. If an ulcer recurrence occurs in a different location, it is likely due to a preexisting underlying lesion revealed by the compression. This allows us to treat it. Many therapies achieve ulcer reepithelization but do not address the underlying pathology, such as venous hypertension.

Fourteen months after the healing of the ulcer on the left ankle, another emerged on the lateral aspect of the left calf. We treated it similarly and achieved its healing in two and a half months. During subsequent follow-up, we confirmed the absence of ulcer recurrence in the ensuing years (Figure 16).

It is important to note that focused compression can heal ulcers and facilitate the repair of the affected area, but it cannot cure chronic venous insufficiency. Therefore, we recommend the permanent use of strong compression stockings. She may refrain from wearing them in critical situations, such as extreme heat or going to the beach, but only for brief periods. She is currently 90 years old.

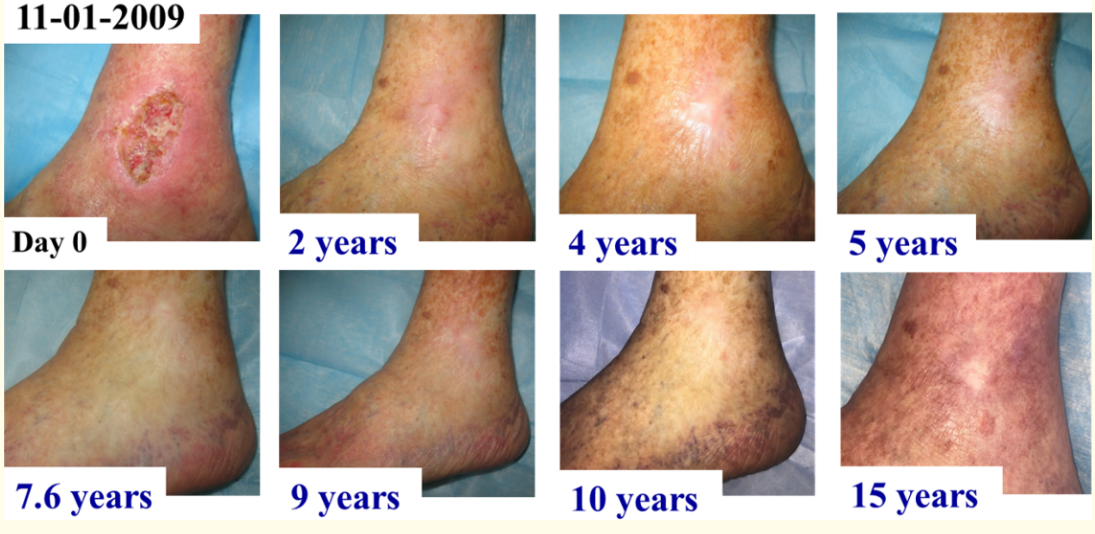

Figure 15: In the past 14 years, there has been no observed recurrence of the treated left ankle ulcer.

Figure 16: Recurrence of the ulcer in a different area of the leg, 14 months after healing of the ulcer on the left ankle. The latter healed within two and a half months, without recurrence in the treated area, even 13 years later.

Case Report 5

An 86-year-old woman, previously diagnosed with chronic venous insufficiency and with a history of recurrent ulcers, was referred to our clinic by her primary care physician due to a small ulcer located on the external malleolus of the right ankle. This lesion had persisted for several months, despite various treatments applied. On September 15, 2014, we initiated treatment using the double focal compression bandaging technique, after ruling out peripheral arterial disease with an ankle-brachial index (ABI:0.95). Compressive therapy alone achieved ulcer healing in just 25 days (Figure 17). The compressive bandage is maintained for a minimum of three months, even if the ulcer heals before that period.

Figure 17: The venous ulcer, located on the external malleolus, healed 25 days after applying the technique.

The patient was advised to continuously wear strong compression stockings. Ten years have passed since she received treatment at our clinic, and she has stated that she has followed this recommendation, although we have not been able to confirm it. According to the most recent photograph (Figure 18), it appears there has been a recurrence of the ulcer (white atrophy), which has been treated similarly. The patient is currently 96 years old.

Figure 18: Venous ulcer on the ankle: a decade after treatment.

Case Report 6

This patient, diagnosed with type 2 diabetes and insulin-dependent, presents a persistent ulcer on the right external malleolus with 18 months of evolution. Despite different previous treatments, these have been unsuccessful. The patient reported sustaining a gunshot wound to the right foot in 1985, with multiple pellets and gunpowder residue that could not be removed. Additionally, he mentioned having an ulcer nine years later, which healed, but unfortunately has recurred multiple times.

Initially, I had reservations about the effectiveness of the technique in this patient due to his diagnosis of diabetes and the absence of venous issues in the lower extremities, which could suggest the presence of peripheral arterial disease. Although the case was complex, after performing a clinical evaluation and ruling out severe peripheral arterial disease through the calculation of the ankle-brachial index (ABI: 0.85), I decided to initiate treatment on December 1, 2009. Moreover, since the patient was not under my direct supervision for other conditions, our focus was primarily on monitoring the clinical progression of the ulcer. The patient continued to attend regular appointments with his primary care physician for the management of his other medical conditions.

Instructions were provided on the proper application of the bandage to both the patient and their family. Daily follow-ups were conducted for two weeks, during which the patient and cohabiting family members were trained in bandage application techniques. Once their proficiency was confirmed, weekly follow-up visits were carried out until the ulcer healed.

As shown in the photographic sequence, after 3 months, the ulcer had healed using solely double focal compression bandaging (Figure 19). It is important to highlight the short healing time compared to previous treatments. To check for recurrences, annual follow-up was conducted with the patient until his death, ten years after treatment (2019). There were no recurrences (Figure 20). I do not know the cause of his death, as the subsequent clinical course was managed by his primary care physician.

Case Report 7

The significance of this case lies in the swift healing of the ulcer, within a mere 2-month period using this technique. The patient, 96 years old, with a long history of recurrent ulcers, despite having received various treatments, including that provided by the angiology department of her hospital, presented to our clinic with a persistent ulcer on her right ankle. With an ankle-brachial index of 0.92, we began treatment by exclusively applying this technique on February 9, 2013. Two months later, the ulcer had healed (Figure 21).

The patient did not understand why this treatment had not been used earlier. She noted that only bandages and gauze were used. I could not provide her with a logical explanation. We conducted a follow-up after the healing process, lasting 10 months, to observe the progression; however, we lost contact, as the patient was not part of our assigned patient group. Given her advanced age, she is likely deceased.

Figure 19: The venous ulcer on the ankle, healed three months after applying the technique.

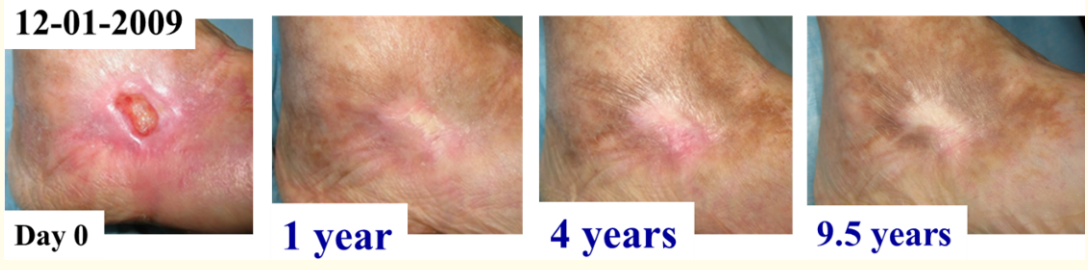

Figure 20: Ankle venous ulcer, with no evidence of recurrence.

Figure 21: Ankle venous ulcer: healing and subsequent follow-up.

Case Report 8

A 58-year-old male with a history of chronic venous insufficiency, who underwent bilateral varicose vein surgery 18 years ago and gastrectomy for gastric cancer in 2013. He was referred to our clinic by his nurse due to the poor healing of an ulcer located on the right medial malleolus, which has not responded to conventional treatments. After ruling out severe peripheral arterial disease through the ankle-brachial index (ABI) calculation (0.90), double-layered compression bandaging was initiated, leading to the ulcer healing within 49 days (Figure 22).

Figure 22: Healing of the ulcer occurred 49 days after initiating the treatment.

Unfortunately, because the patient was not part of my patient panel, we were unable to confirm whether they followed the recommendations we provided regarding the continuous use of strong compression stockings. The responsibility for clinical follow-up after our intervention fell to their primary care physician. We intended to schedule a follow-up appointment to assess the potential recurrence of the ulcer, but we were unable to contact the patient. Unfortunately, we were informed of their recent passing in March 2024, which occurred because of complications following surgery for Candy-Cane syndrome.

Case Report 9

A 61-year-old female patient has been diagnosed with grade 2 obesity, type 2 diabetes, arterial hypertension, and chronic venous insufficiency. She presents a history of recurrent ulcers in both lower limbs, over the past 20 years. In 2008, she underwent surgical intervention to treat varicose veins in her left lower limb. On June 18, 2017, she underwent a second surgery to treat varicose veins. Subsequently, on June 14, 2019, a third procedure was necessary, due to varicose vein recurrence.

On September 10, 2019, the patient visited the vascular surgeon, who had previously treated her. The surgeon reported that the patient has had an extensive ulcer, on the lateral aspect of the right leg, for several months, secondary to right post-thrombotic syndrome. Despite receiving wound care and antibiotic treatment, the progression has been unfavourable. The possibility of performing a new venous intervention is not being considered.

On September 12, 2019, the patient attended our clinic. After excluding severe peripheral arterial disease, confirmed by ankle-brachial index measurement (ABI: 0.95), we initiated treatment using exclusively the double focal compression bandaging technique. The photographic sequence shows a clear increase in vascularization in the affected area attributable to focused compression. The ulcer healed within a period of three months, and bandaging continued for several additional months before using strong compression stockings (Figure 23). No antimicrobial agents were used.

Since we began treating her in December 2019, the patient was assigned to my group, which facilitated the monitoring of her ul-

Figure 23: Supra-malleolar ulcer on the right foot. Healing observed after three months of treatment.

cer evolution over the years. The photographic sequence shows the clinical progression of the ulcer up to the current date, April 1, 2024, with no signs of recurrence (Figure 24).

In this context, it is important to emphasize that the patient has rigorously followed our instructions regarding the use of strong compression stockings, which she continues to wear. Although we can heal the ulcers, chronic venous insufficiency persists.

Figure 24: Ankle venous ulcer. After a period of four and a half years, there has been no recurrence of the ulcer.

Surgery was not a viable option for this patient, who had already undergone three prior surgical procedures. For the past four years and six months, we have treated the ulcer exclusively with bandages and gauze, and there has been no recurrence. The patient is currently 66 years old.

Case Report 10

This 86-year-old patient presents with multiple comorbidities, including stage 4 chronic kidney disease, hypertensive heart disease with aortic valve sclerosis and moderate aortic insufficiency, as well as heart failure with moderately reduced ejection fraction (LVEF 48%) (NYHA class II). Additionally, the patient is on anticoagulant therapy due to atrial fibrillation, and due to the ischemic stroke, he experienced in 2007 in the right middle cerebral artery, of cardioembolic ethology, which progressed with haemorrhagic transformation but without sequelae.

On December 23, 2023, the patient presented to our clinic seeking medical attention due to chronic ulcers on both legs. The patient reports a history of recurrent ulcers on both legs, present for over 20 years, which have been treated with various therapies without satisfactory results. Although the ulcers healed temporarily, they would reappear over time. The clinical outcome showed evident hemosiderosis and frequent ulcer recurrence (Figure 26). The ulcers were predominantly of venous origin, although a possible arterial origin was also suspected due to the initial weakness of the peripheral pulses and an ankle-brachial index (ABI) of 0.80. However, after applying compression therapy, the pulses became strong and clear, and the ABI improved to 0.88. Peripheral artery disease is not necessarily a contraindication for the use of compression therapy unless the ankle-brachial index is 0.5 or lower [12-15].

The most significant aspect of this case involves the ulcers on both ankles, which healed in a brief period of just six weeks with the exclusive application of focused double compression (Figure 25). Currently, I am treating the patient for his vascular ulcers, which will be the focus of a forthcoming publication that visually explains the pathophysiological concepts behind this technique.

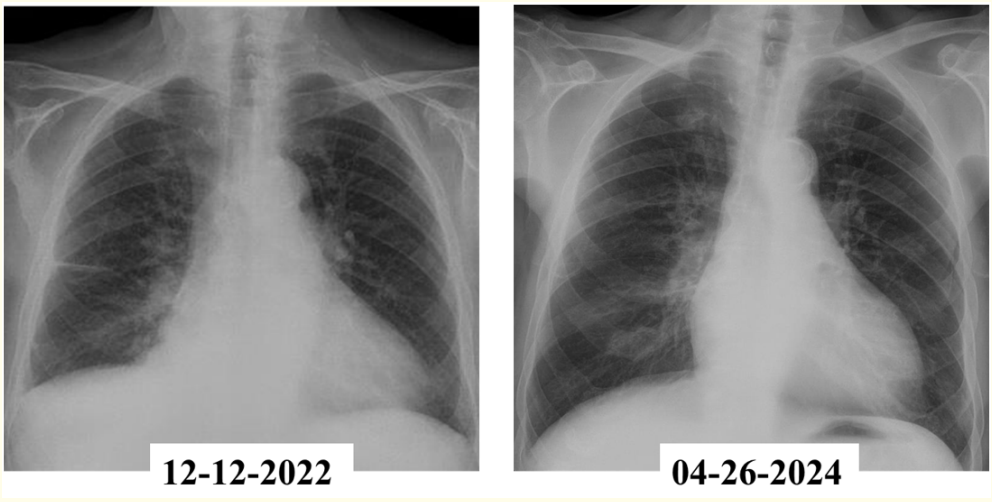

Figure 25: Chest X-rays taken before and after using the double focal compression bandaging technique reveal a noticeable improvement in the size of the cardiac chambers following the compressive therapy.

Since I began treating patients with vascular ulcers in the lower extremities, using compression therapy, I have observed a notable improvement in their health. However, the specific reasons why patients report feeling better, remain ambiguous to me.

I propose a hypothesis, which might explain this improvement: Compression in the lower extremities promotes venous return, which increases blood flow to the cardiac chambers, thereby raising cardiac preload. This can lead to distension of the cardiac chambers, which, in turn, triggers the release of natriuretic peptides such as atrial natriuretic peptide (ANP) or brain natriuretic peptide (BNP). These peptides have positive effects on regulating blood pressure and fluid balance. It is important to note that this physiological response to compression may vary among individuals and depends on factors such as the patient's cardiovascular health [16].

Figure 26: The ulcers on both ankles have been healed in less than two months.

Discussion and Conclusion

A vascular ulcer occurs due to impaired perfusion in a specific region of the skin. Venous hypertension is one of the most common causes of vascular ulcers in the lower extremities, resulting from an anatomical alteration in the venous valves caused by obstruction, blood reflux, or a combination of both. The ulcers are typically located in the lower half of the leg, particularly affecting the peri-malleolar area and are prevalent in the inner supra-malleolar region.

In this study, I present relevant and representative clinical cases from my primary care experience, emphasizing the following key considerations:

- Throughout my career, I have faced the challenge of treating vascular ulcers in patients who were under the care of other physicians. My involvement was limited to managing these ulcers until they fully healed, followed by recommending the continuous use of strong compression stockings to prevent recurrence. Most of the patients mentioned in this article are not part of my clinical panel. In cases of vascular ulcers in my patients, we apply this therapy promptly, leading to effective healing. Patients are instructed to visit the clinic if they experience a wound that does not heal within a brief period, approximately two weeks. Early treatment of ulcers with this technique is essential for achieving a positive prognosis. There is often a history of minor leg trauma, although the patient may not be aware of it.
- If the patient adheres to our recommendation of using strong compression stockings continuously after the ulcer has healed, recurrence in the treated area is unlikely. However, new ulcers may emerge in other untreated areas. While compression therapy heals the ulcer, it does not address advanced venous insufficiency. The patient should remove the stockings before sleeping and in situations where their use is challenging, such as during periods of extreme heat or in exceptional circumstances.
- The application of this technique renders the use of antimicrobial agents unnecessary, as focused compression on the ulcer bed increases blood flow and prevents infection through the action of monocytes. In all treated cases, the administration of antimicrobial agents was not required, as no signs or symptoms of infection were observed.
- This treatment demonstrates benefits in cardiac function. Although it will be analysed, in more detail, in an upcoming publication, the proposed hypothesis focuses on the physiological stimulation of natriuretic peptides, to counteract the effects of increased cardiac preload caused by lower limb compression therapy.

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