

MEDICINAL BIOMAGNETISM FOR ANALGESIA - APPLICATION OF STATIC MAGNETIC FIELDS THROUGH THE LYMPHATIC PROTOCOL FOR PERIPHERAL EDEMA

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Abstract: Dysfunctions in the lymphatic system can cause primary or secondary lymphedema, derived from chronic edema, when the lymphatic system is unable to adequately drain lymph from the tissues, resulting in swelling and pain. Through a cross-sectional experimental clinical study, we sought to evaluate the effect of the Adapted Lymphatic Protocol of Medicinal Biomagnetism on pain in the lower limbs of patients with peripheral edema of lymphatic origin. Medicinal Biomagnetism is a therapeutic system developed in 1988 by Dr. Isaac Goiz Durán that uses static magnetic fields generated by medium intensity magnets. These magnets are applied in pairs, one with a north pole,

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with a calming effect, and the other with a south pole, which activates areas with organic deficiencies, known as Biomagnetic Pairs. Carried out on four female participants, the study applied the protocol in three sessions, spaced weekly. The results demonstrated a reduction in the measurements of the lower limbs, relief in the intensity of pain and discomfort in the legs, although the lymphedema did not disappear completely. It was concluded that Medicinal Biomagnetism proved to be a non-invasive, accessible approach with few side effects, with the potential to alleviate pain and improve quality of life in patients with peripheral edema of lymphatic origin.

Keywords: Medicinal Biomagnetism; Biomagnetic Pair; Static Magnetic Fields; Magnets; Lymphatic System; Pain; Analgesia; Edema; Complementary Treatment; Integrative Therapy.

INTRODUCTION

Pain is an experience that affects the quality of life of human beings. It can be classified according to its temporal duration, acute or chronic, and by its pathophysiology. Pain is unpleasant, complex and subjective, it appears physiologically as a warning and survival signal. It is a widely researched subject, as it is a broadly encompassing public health issue associated with all diseases (Varandas, 2013), such as those derived from lymphatic system dysfunctions.

According to Ashwell (2016), the lymphatic system is a network of vessels, capillaries, ducts, tissues, nodes and organs such as the spleen, tonsils and thymus, responsible for cleansing and draining interstitial fluid back into the circulatory system. Interstitial fluid is filtered from blood vessels, bathes the body's tissues, and is absorbed by lymphatic vessels in a continuous recycling process. The movement of lymph is a result of the "compression" action caused by adjacent skeletal muscles, changes in pressure in the thoracic cavity during breathing and the pulsations of surrounding arteries. Lymph flow always occurs toward the heart (Glanville, 2008).

According to Douketis (2022), when the lymphatic system is unable to adequately drain lym-



ph from the tissues, it causes edema, an increase in the volume of soft tissues due to the accumulation of interstitial fluid, known as swelling. When it becomes chronic, lymphedema develops. Primary lymphedema is classified when caused by the underdevelopment of the lymphatic system, and when caused by a blockage, it is termed secondary. Primary lymphedema results from a reduction in lymphatic vessels that cannot process all the lymph, most commonly affecting the legs. It can be caused by hereditary disorders and differs based on the age at which swelling manifests. Secondary lymphedema accounts for 95% of cases and often occurs after surgical intervention or the formation of scars in lymphatic vessels resulting from repeated infections. The skin appears healthy but is swollen, and this can be observed by pressing the area with a finger.

Diagnosis is typically based on symptomatology and can reach a high degree of discomfort and pain. It can be identified through imaging tests such as computed tomography or magnetic resonance imaging. Lymphedema treatment aims to relieve symptoms and reduce edema. As it is considered a chronic condition with no cure, accepted treatments to date include lymphatic drainage, limb exercises, compression bandages or stockings, and massage (Douketis, 2022).

There is an estimate that globally, 450 million people have lymphatic disorders (Carvalho et al., 2011). In Brazil, there are few scientific documents reporting the association of lymphedema with social and economic factors (Andrade, 2002).

Traditional medicine has sought the integration of complementary treatments into integrative therapies, which are defined by the World Health Organization (WHO) as Traditional, Complementary, and Integrative Medicines (TCIM) (Brazil, 2018). Mendes and colleagues (2019) highlighted the benefits of these practices in promoting relaxation, well-being, pain relief, anxiety reduction, decreasing medication use, strengthening the immune system, and improving quality of life.

Among these complementary therapies are techniques that use Static Magnetic Fields (SMF) generated by magnets, one of them being Medicinal Biomagnetism (MB), which is easily applicable, non-invasive, painless, and cost-effective. It utilizes pairs of magnets on areas with bioelectromagnetic dysfunctions for the treatment of certain health conditions such as pain, dysfunctions, injuries,



and inflammations, referred to as Biomagnetic Pair (BMP) (Durán, 2008; Ribeiro, 2016; Macedo et al., 2023; Franco et al., 2023; Ravagnani Filho et al., 2023; Barbosa et al., 2023; Bueno et al., 2023; Pelissari et al., 2023; Drum et al., 2023; Corrêa et al., 2023; Santos et al., 2023a; Moreira et al., 2023).

Medicinal Biomagnetism (MB) is a technique developed in 1988 by the Mexican physician, physiotherapist, and acupuncturist Dr. Isaac Goiz Durán (1941-2021), and it was simplistically defined as “the depolarization of biomagnetic poles” (Durán, 2008, p. 113). This therapeutic system involves “studying, detecting, classifying, measuring and correcting fundamental pH alterations in living organisms, specifically in human organisms, recovering organic entropy” (Durán, 2008, p. 13).

In the face of the potential results that MB therapy generates in the body and with the aim of adding a new solution to peripheral edema analgesia treatment, this study employed the Lymphatic Protocol (LP) described by Almeida and colleagues (2023). The objective of this study is to evaluate the effect of applying the Medicinal Biomagnetism Lymphatic Protocol on pain in the lower limbs in individuals with peripheral edema resulting from lymphatic alterations.

METHODOLOGY

This study is characterized as a cross-sectional experimental clinical trial conducted by the Par Magnético Institute (IPM) and the Faculdade de Governança, Engenharia e Educação de São Paulo – FGE/SP. Data collection took place in São Paulo, in an office for Integrative and Complementary Therapies.

Inclusion criteria for participation in the research included being between 20 and 80 years old, having lymphatic alterations with symptomatic complaints of pain due to peripheral edema, having no contraindications for the use of static magnetic fields such as intracorporeal batteries, not being pregnant, not using diuretic medication within 6 months before the start of data collection, having no physical and/or cognitive limitations that would hinder the execution of the proposed methodology, and agreeing to participate in the study by signing the Informed Consent Form (ICF). Those



who initiated drug treatment during the data collection period were excluded.

After applying the inclusion and exclusion criteria, four female were selected to undergo treatment with the Adapted Lymphatic Protocol (ALP) (Figure 1) of Medicinal Biomagnetism (MB). The ALP was named as such because it is based on the Lymphatic Protocol by Almeida and colleagues (2023), with the inclusion of the application of double-polarity magnets on the kidneys.

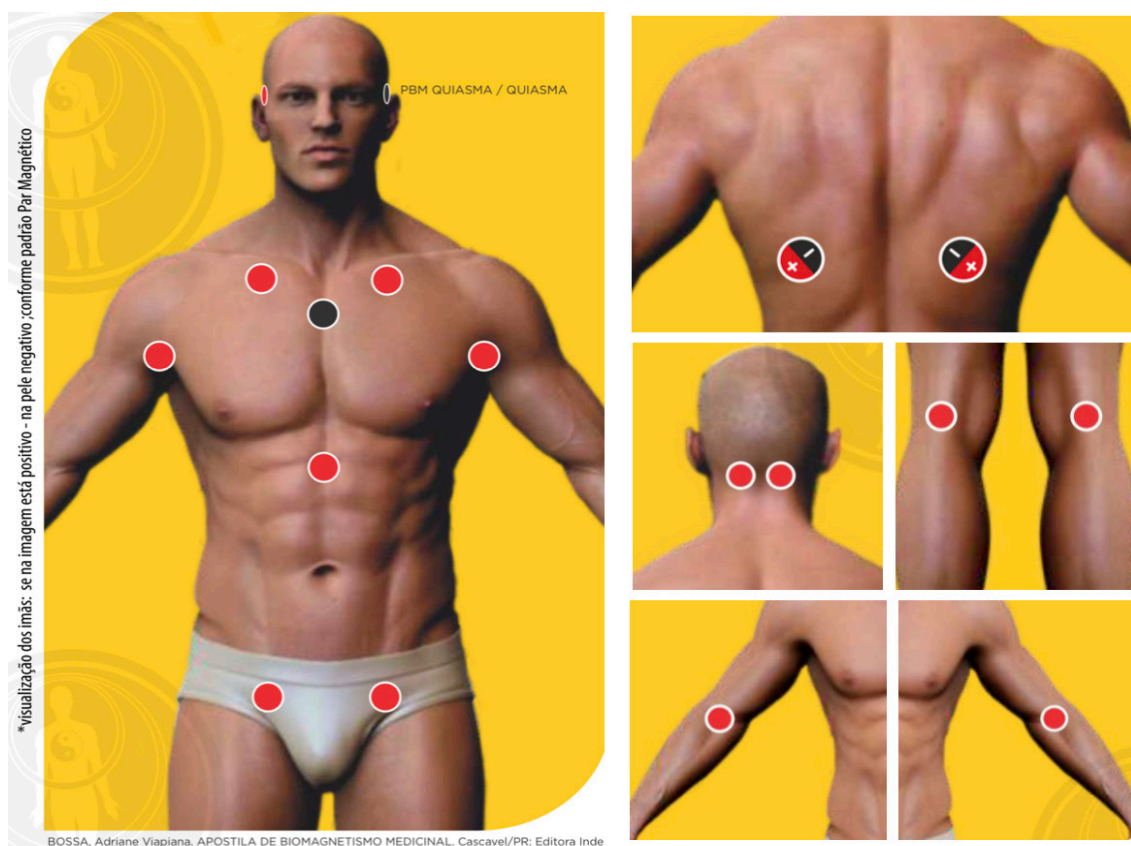


Figure 1: Adapted Lymphatic Protocol (ALP)

Caption: The convention for applying MB magnets follows that of Calegari and colleagues (2023). Where magnets with a north polarity (black, denominated negative) are seen in the image, the skin has a south polarity (red, denominated positive), and where the south polarity is visible, the skin has a north polarity. The ALP uses a south polarity magnet applied to the Thymus and thirteen



north polarity magnets applied to the lymph nodes areas in the brachial, cervical, axillary, subclavian, inguinal, popliteal (right and left hemispheres), and central abdominal region. The ALP also includes the BMP Chiasm/Chiasm following the Lymphatic Protocol by Almeida and colleagues (2023). For this study, the protocol was adapted by including a double magnet on both kidneys. Image source: Bossa (2021).

To initiate the schedule of activities, participants signed the Informed Consent Form (ICF) and responded to the anamnesis developed by the researchers conducting the study. The Venous Insufficiency Epidemiological and Economic (VEINES) questionnaire (Moura et al., 2011) was completed on the initial day of the sessions and 28 days after the start of the treatment. This questionnaire aims to collect data on the frequency of symptoms and their impact on the participants' quality of life, providing a detailed assessment of the past four weeks.

In each of the interventions, consistently conducted at the same time, both at the beginning and at the end, bilateral lower limb perimetry was performed as a reference for comparison before and after the application of the ALP. Measurements were taken at the distal thigh, calf, and ankle, using a measuring tape, as described by Freitas Júnior (2018).

The Visual Analog Scale (VAS) (Martinez; Grassi; Marques, 2011; Gift, 1989) is used to measure the intensity of perceived pain at a specific moment, using a scale from 0 to 10. It was conducted in all interventions at five different time points: at times 0, 15, 30, 45, and 60 minutes, where time 0 represents the moment of magnet application and time 60 represents the moment of their removal. The Brief Pain Inventory (BPI) (Huskisson, 1974; Martinez; Grassi; Marques, 2011) was completed at the beginning of each intervention to assess how pain relates to the participants' daily lives in the past 24 hours, using a scale from 0 to 10. This inventory also identifies the use of any treatment and/or medication between sessions, providing a comprehensive overview of pain management during the evaluated period.

Each session took place with the participants lying comfortable on a massage table in the



supine position (Figure 2), where the ALP was applied for a period of 1 hour. Three interventions were conducted with a 7-day interval between each session.



Figure 2: Practical Application of the ALP

Caption: Actual image of a participant lying on a massage table in the supine position, with magnets positioned according to the ALP. Source: The authors.

For this study, round neodymium magnets were used, with medium intensity (Zhang; Yarema; Xu, 2017), with a strength of 2,800 Gauss, encased in leather, having a diameter of 25 mm, height of 5 mm, a circumference of 78.5 mm, and axial polarization.

RESULTS

Participant 1: 66 years old, with a primary complaint of chronic pain and swelling in the



ankles for the past 10 years. She has a history of cardiac issues, hypertension, and stress. According to the VEINES questionnaire (day 1 of treatment), she reported feeling heavy, swollen, and “very severe” painful legs “every day” and experiencing a sensation of heat/burning “several times a week”. She had “difficulty” performing work or other activities, “constantly” felt concerned about the appearance of her legs, influencing her choice of clothing. She was “most of the time” concerned about bumping into things and felt irritated a “good part of the time”. When compared to 1 year ago, she rated her overall condition as “much better”.

After 28 days from the start of the treatment, a new VEINES questionnaire was administered, and the participant continued to experience heavy and swollen legs “every day.” However, the pain, which was previously reported as “very severe”, occurred “several times a week” and was now described as “very mild”. The sensation of heat/burning reduced to “once a week”. There was no longer a limitation in work or other activities, and she continued to be “constantly” concerned about the appearance of her legs, influencing her choice of clothing. The concerns about bumping into things and irritation decreased in frequency from “most of the time” and “a good part of the time,” respectively, to “a little bit of the time”. She continued to feel “much better” than one year ago.

Participant 2: 51 years old, with a primary complaint of chronic swelling and burning in the feet and legs for 30 years. Reported stress. According to the VEINES questionnaire (day 1 of treatment), she stated that “every day” she felt heavy, swollen legs with a sensation of heat/burning, throbbing, and tingling, and “several times a week” she had “moderate” pain and restless legs. When compared to one year ago, she rated it as “approximately the same”. She reported that the problem “moderately” interfered with social activities. She felt “constantly” concerned about the appearance of her legs, influencing her choice of clothing.

After 28 days from the start of the treatment, a new VEINES questionnaire was administered, and the participant continued to experience swollen legs “every day”, but the other symptoms of heavy and restless legs, throbbing, tingling, and now reported as “mild” pain occurred “1 time” or “less than 1 time a week”. The sensation of heat/burning decreased from “every day” to “several



times a week”. The problem “slightly” interfered with social activities. She continued to feel “constantly” concerned about the appearance of her legs, influencing her choice of clothing. Comparing with one year ago, the overall problem is “a little better”.

Participant 3: 77 years old, with a primary complaint of chronic pain and swelling in the legs for 5 years. Undergoing treatment for diabetes and experiencing hypotension, varicose veins, hypothyroidism, arthritis in the hands and stress. According to the VEINES questionnaire (day 1 of treatment), she reported feeling heavy legs “every day”, with “severe” intensity of pain and tingling, and “several times a week” she had a sensation of heat/burning, swelling, throbbing, and cramps. When compared to one year ago, she rated it as “a little better” overall. She had “difficulty” performing work or other activities. “Most of the time” she felt like a burden to family or friends and was concerned about the appearance of her legs, influencing her choice of clothing. “A good part of the time” she felt irritated.

After 28 days from the start of the treatment, a new VEINES questionnaire was administered, and the participant felt heavy, swollen, tingling, cramps, sensation of heat/burning and “moderate” intensity painful legs “several times a week”. The throbbing decreased from “several times a week” to “1 time”. She continued to feel “a little better” than one year ago. The limitation in work or other activities was “little”. Still, “most of the time” the appearance of her legs influenced her clothing choices. She reported feeling “a little” like a burden to family or friends and “some of the time” felt irritated.

Participant 4: 61 years old, with a primary complaint of chronic pain and swelling in the knees for 10 years. Undergoing treatment for asthma and hormonal replacement therapy. According to the VEINES questionnaire (day 1 of treatment), she reported feeling swollen legs with “severe” pain “every day”, and “several times a week” she experienced cramps. When compared to one year ago, she rated it as “approximately the same” overall. The problem “moderately” interfered with social activities. “Some of the time” the appearance of her legs influenced her clothing choices.

After 28 days from the start of the treatment, a new VEINES questionnaire was adminis-



tered, and the participant felt swelling and “very mild” pain “every day” in the legs, and cramps occurred “1 time a week”. The problem “slightly” interfered with social activities. She felt “a little” concerned about the appearance of her legs, influencing her clothing choices. When compared to one year ago, she rated it as “much better” overall. The overall results of the VEINES questionnaire collections can be seen in Table 1.

		Participant 1	Participant 2	Participant 3	Participant 4
Difference in the comparison of VEINES before and after the application of ALP	Leg pain	++	+	+	++
	Leg swollen	=	=	=	=
	Leg heat/burning	+	++	=	NA
	Heavy leg	=	++	++	+
	Leg throbbing	NA	++	++	NA
	Leg tingling	NA	++	+	NA
	Work performance/social issues	++	++	++	+
	Irritation	++	NA	+	NA
	Leg appearance	=	=	=	+

Table 1: VEINES general summary results

Caption: Interpretation of VEINES questionnaire data comparing the application of ALP before and after (28 days from the start of treatment), indicating whether there was significant improvement (++) when the participant’s perception differed by 2 levels on the scale (e.g., “every day” vs. “1 time a week”); improvement (+) when the participant’s perception differed by 1 level on the scale (e.g., “every day” vs. “several times a week”); remained the same (=); or NA (not applicable, as the participant did not report a complaint).

The results of the BPI questionnaire for all 4 participants, answered in every session assessing the last 24 hours, can be observed in Table 2.



PAIN	PARTICIPANT 1			PARTICIPANT 2		
	SESSION 1 Previous 24h (from 0 to 10)	SESSION 2 Previous 24h (from 0 to 10)	SESSION 3 Previous 24h (from 0 to 10)	SESSION 1 Previous 24h (from 0 to 10)	SESSION 2 Previous 24h (from 0 to 10)	SESSION 3 Previous 24h (from 0 to 10)
Worst	8	10	8	7	3	6
Lowest	8	10	0	4	3	5
Interfered with overall activity	0	4	0	5	3	5
Interfered with humor	0	0	0	4	0	2
Interfered with the ability to walk	7	10	0	6	3	3
Interfered with work	0	4	0	1	3	0
Interfered with relationships	0	0	0	1	0	0
Interfered with sleep	0	0	0	3	0	2
Interfered with the ability to appreciate life	0	4	0	0	0	0

PAIN	PARTICIPANT 3			PARTICIPANT 4		
	SESSION 1 Previous 24h (from 0 to 10)	SESSION 2 Previous 24h (from 0 to 10)	SESSION 3 Previous 24h (from 0 to 10)	SESSION 1 Previous 24h (from 0 to 10)	SESSION 2 Previous 24h (from 0 to 10)	SESSION 3 Previous 24h (from 0 to 10)
Worst	9	7	8	6	4	3
Lowest	6	5	6	3	0	0
Interfered with overall activity	7	5	5	0	1	0
Interfered with humor	7	7	7	0	0	0
Interfered with the ability to walk	9	5	5	1	1	0
Interfered with work	7	5	5	0	0	0
Interfered with relationships	2	7	6	0	0	0
Interfered with sleep	8	2	2	0	2	1
Interfered with the ability to appreciate life	8	6	6	0	1	0

Table 2: BPI results

Caption: Results of subjective pain perception on a scale from 0 to 10 regarding the impact of listed activities, assessing the last 24 hours before each ALP application session. The highest perceived pain is represented in red, and the lowest in green, irrespective of the session.

In Table 3, you can observe the results of perimetry conducted in each session before and after treatment and Figure 3 illustrates the evolution of the average difference in measurements of the lower limbs. Another point of note was a smaller reduction in perimetry (Table 3) in the week with an increase in climatic temperature (session 2 for participants 1, 2, and 3, and session 1 for participant 4).



PARTICIPANT 1																		
	SESSION 1						SESSION 2						SESSION 3					
	Right leg			Left leg			Right leg			Left leg			Right leg			Left leg		
	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference
Circumference of the distal thigh	53	51	-2	53	53	0	51	49	-2	51	51	0	48	47	-1	48	47	-1
Calf circumference	45	43	-2	45	44	-1	44	43	-1	43	43	0	43	42	-1	43	42	-1
Ankle circumference	35	32	-3	28	26	-2	32	31	-1	27	26	-1	33	31	-2	26	26	0

PARTICIPANT 2																		
	SESSION 1						SESSION 2						SESSION 3					
	Right leg			Left leg			Right leg			Left leg			Right leg			Left leg		
	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference
Circumference of the distal thigh	40	37	-3	39	37	-2	37	37	0	36	36	0	39	37	-2	38	36	-2
Calf circumference	38	36	-2	37	37	0	37	36	-1	36	35	-1	36	36	0	37	34	-3
Ankle circumference	24	22	-2	23	22	-1	23	22	-1	22	22	0	24	23	-1	24	23	-1

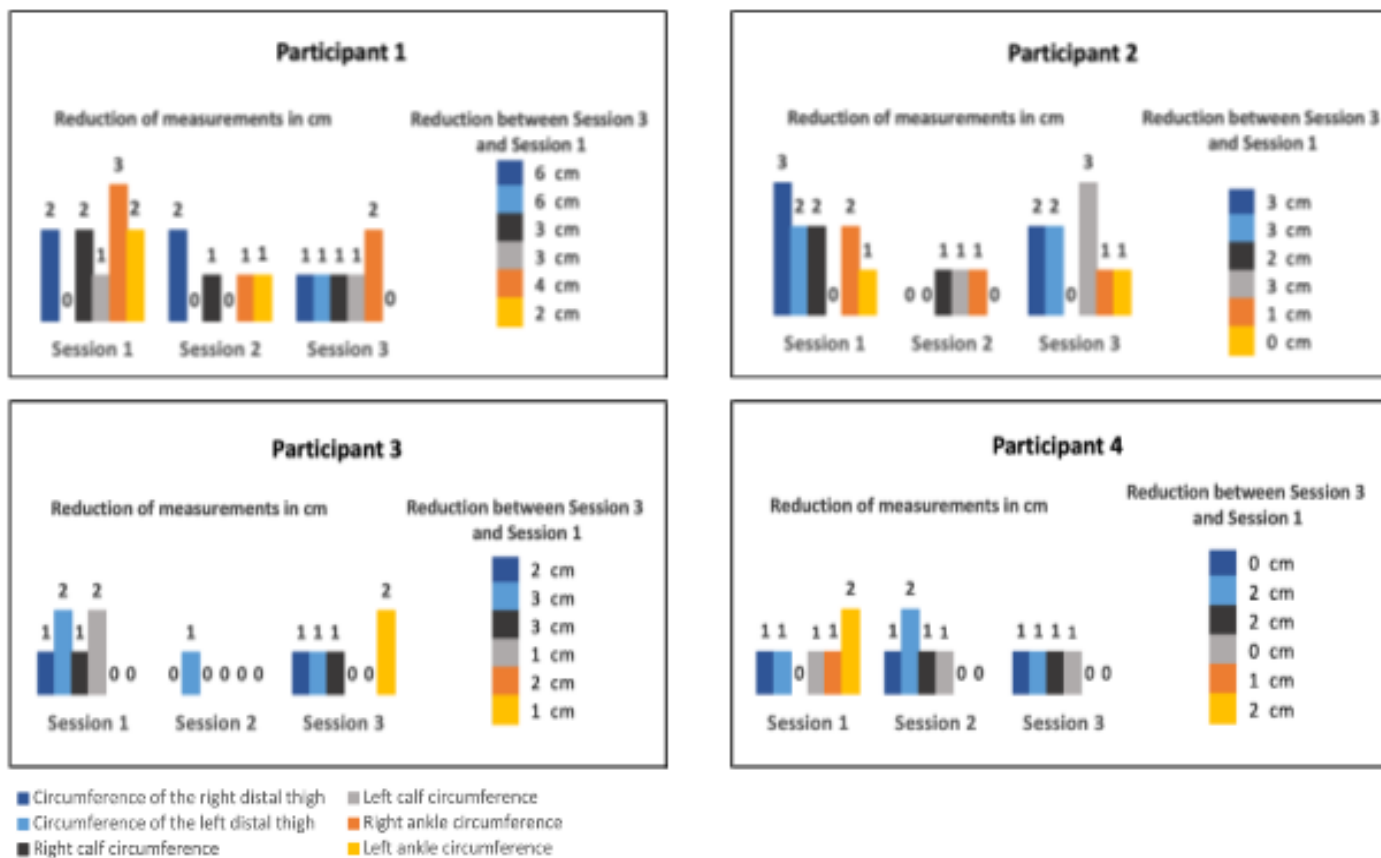
PARTICIPANT 3																		
	SESSION 1						SESSION 2						SESSION 3					
	Right leg			Left leg			Right leg			Left leg			Right leg			Left leg		
	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference
Circumference of the distal thigh	47	46	-1	47	45	-2	46	46	0	46	45	-1	46	45	-1	45	44	-1
Calf circumference	42	41	-1	41	39	-2	40	40	0	40	40	0	40	39	-1	40	40	0
Ankle circumference	27	27	0	28	28	0	27	27	0	28	28	0	26	25	-1	27	27	0

PARTICIPANT 4																		
	SESSION 1						SESSION 2						SESSION 3					
	Right leg			Left leg			Right leg			Left leg			Right leg			Left leg		
	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference	Before	After	Difference
Circumference of the distal thigh	43	42	-1	45	44	-1	43	42	-1	45	43	-2	44	43	-1	44	43	-1
Calf circumference	41	41	0	42	41	-1	40	39	-1	42	41	-1	40	39	-1	43	42	-1
Ankle circumference	24	23	-1	26	24	-2	24	24	0	24	24	0	23	23	0	24	24	0

Figure 3: Difference between the perimetric measurements of the lower limbs, in centimeters, before and after treatment with ALP.

Legenda: Acompanhamento da perimetria por sessão e área corporal para cada uma das quatro participantes.





Finally, Table 4 demonstrates the results obtained through the Visual Analog Scale (VAS), where the intensity of the participants' subjective pain perception during treatment was assessed.

Participant	SESSION 1					SESSION 2					SESSION 3				
	0 min	15 min	30 min	45 min	60 min	0 min	15 min	30 min	45 min	60 min	0 min	15 min	30 min	45 min	60 min
1	8	0	0	0	0	9	1	1	1	0	0	0	0	0	0
2	7	7	5	3	3	7	0	0	0	0	6	6	4	3	3
3	7	6	6	6	5	7	6	6	5	5	6	6	5	5	2
4	6	5	3	0	0	4	3	2	2	1	3	1	1	0	0

Table 4: VAS results (subjective pain perception on a scale from 0 to 10)

Caption: The highest perceived pain is represented in red, and the lowest in green, irrespective of the collection time.



DISCUSSION

In this study, the aim was to evaluate the analgesic effect on lower limb edema through the application of the Adapted Lymphatic Protocol (ALP) from Medicinal Biomagnetism (MB). Reduction in participants' measurements was observed through perimetric evaluation in all sessions, suggesting a reduction in edema acutely after 60 minutes under the influence of the static magnetic fields (SMF), as demonstrated in Table 3. Although the edema condition was still present, there was no return of measurements to the initial state of treatment for all participants during the three sessions. Therefore, the application of the proposed protocol shows therapeutic potential in reducing peripheral edema.

The therapeutic action of ALP positively influenced the perimetry of the regions, in line with results from other studies on lower limbs. The study by Bertelli and colleagues (2013), aimed at evaluating the effects of two different types of lymphatic drainage in women with morbid obesity after bariatric surgery. The one by Tacani and colleagues (2012), was done and monitored for three months to observe the effect of Complex Decongestive Therapy (CDT), and Casley-Smith's study (1996), the only one conducted with a follow-up of 12 months, analyzing the effectiveness of CDT.

The mentioned studies report a considerable difference in the measurements performed in edema volumetry, a measurement method considered the gold standard by Brandão and colleagues (2020), and suggest that a longer follow-up period may bring even more effective results. In a comparison of the results, it is observed that ALP achieved the fastest results, already on the first day of intervention, followed by Bertelli and colleagues, whose positive result appeared after 3 sessions. Casley-Smith's study was the one that maintained the benefit for the longest period, 12 months.

It is worth considering the inclusion of external variables such as climate and gender, as a lower reduction in perimetry was observed (Table 3) in the week with an increase in climatic temperature. These factors can interfere with edema, as identified by Cruz and colleagues (2023), who found that 56.6% of participants in their study experienced worsening lower limb edema on days with



higher temperatures.

Medicinal Biomagnetism (MB) is a technique that proposes the search for the causes and treatment of bioelectromagnetic dysfunctions through a comprehensive scanning (Corrêa et al., 2023; Cossenza et al., 2023) of more than 400 biomagnetic pairs (Santos et al., 2023a). In this study, the lack of application of the complete scanning is a limitation concerning the obtained results. Another limiting factor in the study is the number of applications of the PLA used. If the results could be observed gradually in just 3 sessions (Table 3), a larger number of interventions could potentially lead to a more promising outcome.

The application of SMF in cases of lymphedema and pain in the lower limbs has achieved positive effects, such as a reduction in perimetry and reports from participants regarding a decrease in pain perception. Pain regressed in the first 15 minutes of magnet application in 3 out of 4 cases (Table 4), and in all cases, after 60 minutes, there were reports of pain reduction. Participant 1 (P1) reported that the pain was completely gone after 60 minutes in sessions where there was pain. Participant 2 (P2), at the same moments, had a 50% reduction in reported pain in two sessions, and the pain disappeared in one session. Participant 3 (P3), in just one session, reported a 67% reduction in pain (intensity 6 to 2), and in the other two sessions, the reduction was 28% (7 to 5). Finally, Participant 4 (P4) reported a 75% reduction in pain in one session, and in the other two sessions the pain was eliminated.

A possible explanation for the observed analgesic effect could be the application of the north pole of the magnets in key regions with the presence of lymph nodes. According to Philpott, Kalita, and Lothrop (2000), Broeringmeyer (1991), and Mondelo (2016), the energy of the magnetic fields from the north pole of a magnet produces a calming effect on the body, involving high-frequency electrical currents, which can be applied in cases of hyperactivity and in pain control in a specific region. Magnetic stimulation from this pole is applied to rectify impulses going to the brain or the involved organ, restoring homeostasis and can be used in areas with fluid accumulation, edema, trauma, and pain, contributing to the normalization of the region's pH, which tends to return to its normal level.

Rambo and colleagues (2023), in a case study, observed complete remission of the incompe-



tent great saphenous vein by applying the north pole of medium-intensity magnets along the path of venous return, also noting analgesic effects. Another study that identifies this pain reduction effect is that of Santos and colleagues (2023a), which observed pain relief after 15 minutes of applying PTM (Modern Trauma Pair), even in cases of extremely severe pain caused by burns. In this study, it is also shown that, after a few hours under the influence of static magnetic fields generated by the magnets, there was complete remission of pain.

Other studies that observed analgesia through the application of SMF generated by magnets and specific protocols of MB include pain relief in urinary tract infection by *E. coli* (Cazella et al., 2023), sequelae of Covid-19 (Lima et al., 2023), endometrial polyps (Santos et al., 2023b), tuberculous meningitis (Gomes et al., 2023), and various types of pain and dysfunctions (Araújo; Ferreira; Bossa, 2023), supporting the findings of this study.

Analyzing the results of the BPI questionnaire (Table 2), the assessment of pain in the last 24 hours at the beginning of each session did not show any pattern of results within the 7-day interval. P1 reported a pain level of 8 intensity in session 1, in session 2, the pain level in the last 24 hours was 10, and in the last session, the pain returned to intensity 8. P2 reported a pain level of 7 intensity in session 1, 3 in session 2, and 6 in the last session. P3 reported a pain level of 9 in session 1, in session 2, 7, and in the last session, 8. P4 reported levels 6, 4, and 3, consecutively.

Despite the BPI questionnaire being a widely used tool to assess pain and its impact on the lives of research participants (Ferreira et al., 2011), the methodology used in this study, regarding the frequency of BPI application, did not allow for the observation of the duration of the analgesic effect provided by the application of PLA after each session. Thus, a methodological correction would be the daily use of the BPI questionnaire to assess the intensity of pain between sessions, identifying when the pain returns after the application of PLA and adjusting the ideal frequency between them. Based on the results obtained, it was observed that a reduction in the interval between sessions, changing from once a week to twice a week, is necessary, given that the result found within the 7-day interval did not sustain the acute analgesic effects generated by SMF.



When analyzing the VEINES results (Table 1), it can be seen that all participants had an improvement in the perception of the intensity of pain in the lower limbs over a period of 4 weeks, with two reporting improvements even when compared to 1 year ago. There were also reports of other gains with the treatment, such as complaints of heavy legs, heat/burning sensation and tingling sensation, similarly observed in the study on superficial venous system disorder by Rambo and colleagues (2023), demonstrating an improvement in the quality of life felt and reported by the participant with the remission of symptoms such as pain, tingling, burning sensation, edema and redness, confirmed by the diagnosis comparing the reports of color doppler ultrasonography performed before and after treatment.

In view of these gains, the participants reported an improvement in the quality of life, with a reduction in “limitations in work performance” and also in the social sphere, such as “feeling like a burden to the family” and “improvement in irritation”. These results reinforce those described by Araújo, Ferreira, and Bossa (2023) in a study that evaluated 290 patients who underwent MB therapy. The authors conclude that through the MB therapeutic system, it is possible to demonstrate a favorable relationship in restoring health at any age and gender.

The positive result is evidenced in the quality of life that MB, as a tool for the treatment of edema and analgesia, was able to produce in this study through the results of VEINES, EVA, and perimetry of the lower limbs. Other studies that reinforce these positive results through MB include Lima and colleagues (2023), in a case report that followed a patient with post-Covid19 respiratory sequelae with low oxygen saturation, achieving improvement in health after receiving 14 sessions of the TOP10 Dyspnea protocol, and Midding and colleagues (2023), with the 3D MB protocol, which aims to de-swell, de-inflate, and detoxify the body, in which the participant was treated weekly, with 15 interventions, with satisfactory results in the measures evaluated in the treatment of obesity.

Despite the mentioned limitations, the study results are encouraging. Participants reported not only a reduction in pain but also an improvement in the quality of life, suggesting that PLA could have multifaceted benefits. The application of PLA in the context of MB shows potential as an adju-



vant therapy for peripheral edema and pain control. More studies and other methodological approaches are needed to refine the protocol, elucidate the mechanisms of action, and establish the medium and long-term benefits of this treatment. Exploring daily variations in pain and a more frequent application schedule could optimize the therapeutic protocol and contribute to a more personalized approach in managing lymphedema.

CONCLUSION

This study demonstrates the results of the association of Medicinal Biomagnetism (MB) with the reduction of lymphedema and pain, through the use of the Adapted Lymphatic Protocol (PLA), especially in reducing the intensity of painful conditions and discomfort in the lower limbs such as tingling, heat/burning, throbbing, and heavy legs, providing an improvement in the quality of life. It was not possible to determine the duration of the analgesic effect provided by the 60-minute application of PLA.

MB is a non-invasive, painless, cost-effective tool with few side effects. PLA is one of the MB protocols within a diverse range that is being studied in various clinical conditions. However, more methodologically robust studies are needed to prove its effects and evaluate whether it could become a complementary alternative in the treatment of lymphatic system dysfunctions.

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