MEDICINAL BIOMAGNETISM FOR ANALGESIA IN MUSCULOSKELETAL DISORDERS OF THE SPINE – APPLICATION OF STATIC MAGNETIC FIELDS USING THE SPINE PROTOCOL

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Abstract: Introduction: Spinal pain affects approximately 80% of the population at some point of their lives. It's the second biggest cause of absenteeism in professional or academic environments, directly impinging upon reduced productivity, psychological states and quality of life. Allopathy is

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the most widely used treatment, however its adverse effects are recurrent. Medicinal Biomagnetism (MB) is a therapy that uses static magnetic fields (SMF) provided from magnets, which have minimal side effects, assisting in the restoration of health, yielding an analgesic effect. Goal: Evaluate the effect of SMF usage by means of the Spine Protocol (SP) from MB applied onto pain deriving from musculoskeletal disorders of the vertebral column. Methodology: Longitudinal study with clinical trials of 15 participants assessed using the Visual Analogue Scale (VAS) and Brief Pain Inventory, followed up after treatment for 30 days. Result: A reduction in pain perception was observed in 91% of the sample, representing 21 treatments of spinal segments, from just 15 minutes of exposure to the SP procedure, with a significative difference for the VAS variables (p=0.0000014). Most participants were female and the most common pain was located around the lumbar segment region. Conclusion: The SP procedure has therapeutic potential in both short and long term for the treatment of acute and chronic pain of any intensity, and it can be considered as a primary or supporting intervention in musculoskeletal disorders of the spine. It has demonstrated a shorter initial time and a longer duration for its analgesic effect when compared with the drug action reported in the literature.

Keywords: Medicinal Biomagnetism; Biomagnetic Pair; Static Magnetic Fields; Magnets; Spine Protocol; Musculoskeletal Disorder of the Spine; Pain; Analgesia.

Introduction

The spine, or vertebral column, belongs to the neuro-musculoskeletal system, it's located at the human back (dorsum) from the head to the pelvis, and it establishes the main supporting axis of the human body, comprising one of its most complex and functional parts (Pontes, 2012). It's the support and movement axis, also acting as bone protection for the spinal cord. Research states it's susceptible to disorders arising from adaptive response to what everyday life imposes (Alexandre; Moraes, 2001).

Spine biomechanics don't favor staying for long periods in a sitting position, possibly causing fatigue, lower back pain and cramps, as the load over the spine is always greater in a sitting position than in a standing counterparts. Disorders of the musculoskeletal system, especially spinal pain, is a serious problem in modern society (Vey; Silva; Lima, 2013).

Pain can be traditionally distinguished into either a mechanical or an inflammatory pattern. Mechanical pain intensifies throughout the day while joint load activities are carried out and it gets better with rest, whereas inflammatory pain comes up stronger in the morning, showing joint stiffness for the first hour of the day and decreasing during daily activities, worsening again at night while resting, which can affect sleep quality (Brasil, 2022).

Mechanical pain can be observed in painful scenarios caused by the deterioration of intervertebral discs (spondylosis), in mechanical low back pain, in osteoarthritis aside to its aggravation period, and in myofascial pain. On the other hand, concerning the inflammatory pain, joints may have edema with hypertrophy of the synovial membrane, which occurs in illness conditions such as rheumatoid arthritis, septic arthritis, spondylitis, gout, osteoarthritis in its aggravated periods, and diabetic or infectious neuropathy (Brasil, 2022).

Pain can be deemed acute or chronic, depending on its duration. It's acute if it lasts up to three months and starts abruptly. It will be considered chronic after this cut-off date (Argoff; Dubin; Pilitsis, 2019; Preuss; Kalava; King, 2023). Chronic pain consists of a repeated stimulus to nociceptors messaging disorders to the central nervous system, producing an adaptation in this continuous or recurrent condition of pain (Brasil, 2001), like neuropathic pain that arises from dysfunction of the peripheral or central nervous system, or from inadequacy of nerves responsible for identifying or transmitting pain, such as compression of a nerve due to disk herniation (Teixeira; Yeng; Kaziyama, 2008; Argoff; Dubin; Pilitsis, 2019).

Pain intensity can vary as mild, moderate or severe (Argoff; Dubin; Pilitsis, 2019). The new ICD-11 classification, which shares standardized information and is a reference for identifying health-related trends and statistics worldwide (Pan American Health Organization, 2022), introduces the

concept of primary and secondary chronic musculoskeletal pain, integrating the biomedical aspect to the psychological and social ones.

Spinal pain is the second leading reason for work leave. Brazilian Institute of Geography and Statistics (IBGE) reports that around 27 million brazilians aged 18 onward address musculoskeletal pain in the spinal region (Morais; Dalmolin; Andolhe, 2019). Backache is one of the most common complaints, globally affecting most people at different ages, achieving epidemic levels.

It's estimated that around 70% to 85% of all people is going to be affected by this instability at some point of their lives (Andersson, 1999), it's disabling and a leading work absenteeism cause (Hartvigsen et al., 2018).

In allopathic medicine, pain is treated with common analgesics or opioids (Preuss; Kalava; King, 2023), while anti-inflammatories are currently more used for backache treatment and relief; however, using these medicines has several side effects for health. In recent years, there has been an increase in searches for more natural solutions in order to control and relieve spinal pain, emphasizing complementary therapies (Tolentino, 2016; Moura et al., 2018; Fernandes et al., 2021).

A technique that uses magnetotherapy and has shown an analgesic therapeutic potential to regard is Medicinal Biomagnetism (MB), which uses static magnetic fields (SMF) generated by medium intensity magnets (from 1,000 to 7,500 gauss) (Santos et al., 2023a; Santos et al., 2023b; Lima et al., 2023; Rambo et al., 2023; Gomes et al., 2023; Araújo; Ferreira; Bossa, 2023; Cazella et al., 2023).

Complete Scanning (CS) is MB's gold standard exam that accounts for each organism individually (Corrêa et al., 2023). In order to increase the technique effectiveness in mid and long term, specific protocols were developed for various complaints, signs and symptoms. These protocols were created based on Dr. Goiz's clinical practice, from the analysis of his scanning's results. Biomagnetic pairs (BMP) that repeated the most while treating a specific complaint were grouped while forming BM's Protocols, including the SIS Spine Protocol (Goiz Martínez, 2017a; 2017b; Bossa, 2023). These protocols don't invalidate exams with CS, but they complement and enhance its effects (Goiz Martínez, 2017b; Bossa, 2023).

This work aims to evaluate the effects of applying Static Magnetic Fields following the Spine Protocol from Medicinal Biomagnetism onto pain resulting from musculoskeletal disorders of the spine.

Methodology

This research was carried out by the Magnetic Pair Institute (IPM, Instituto Par Magnético) and by the Faculty of Governance, Engineering and Education (FGE-SP, Faculdade de Governança, Engenharia e Educação de São Paulo), and data were collected from clinics in the cities of Santo André/SP and Curitiba/SP. This work consists of an longitudinal study with experimental clinical trials (Freitas, 2017) whose research participants received treatment with Static Magnetic Fields (SMF) following the Spine Protocol (SP) from the Medicinal Biomagnetism (MB) technique, a protocol that aims to treat spinal pain through exposure of medium intensity neodymium magnets (from 1,000 to 7,500 gauss) during 60 minutes limit timeboxed sessions occurring once, twice or three times per week, for four weeks.

Before initiating their participation in this research, volunteers received all information concerning goals, risks, benefits and methodological procedures, the non-intrusive characteristic of SP, and that none of these would negatively affect their health. They were properly informed about the nondisclosure applied o all information collected during the study, protecting their anonymity; and, after agreeing to participate, they signed the Informed Consent Form (TCLE, Termo de Consentimento Livre Esclarecido) together with the researcher responsible for data collection. They then filled their anamnesis with personal data, pain history and preexistance of other pathologies, as well as characteristics, location and intensity of the pain, using the Brief Pain Inventory (BPI) (Huskisson, 1974; Ferreira et al., 2011) and the Visual Analogue Scale (VAS) (Gift, 1989; Farrar et al., 2010) as references.

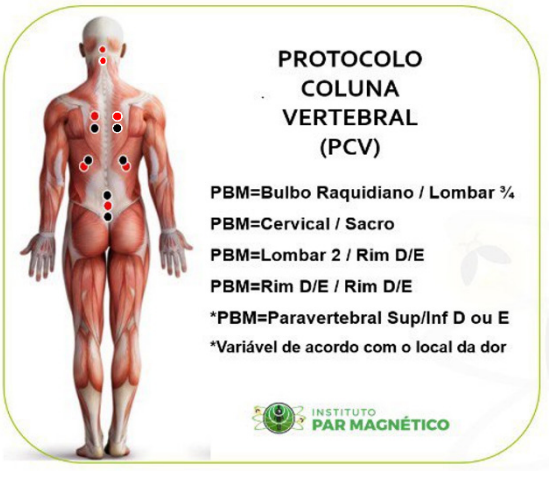
This study counted with 18 participants who had musculoskeletal pain in cervical, thoracic, lumbar or sacral regions, resulting from any type of spine disorder, aged over 18 years, from both

sexes, who were not in the gestational period, who were not using any device requiring intracorporeal battery, and who were not undergoing any other procedure for spinal analgesia. Participants who took analgesics or anti-inflammatories less than 24 hours before the session, or who did not comply with the appointment schedule, were excluded from the study. After applying the criteria, 15 participants remained included.

Research participants were split into three non-overlapping groups: those who had three weekly sessions, two weekly sessions and one weekly session; all groups making a four week schedule total. Their pain intensity was assessed before interventions start time through BPI, and it was also assessed through VAS before, during and after sessions.

The SP, shown in Figure 1 (Bossa, 2023), consists of applying SMF generated by moderate intensity neodymium magnets (Zhang; Yarema; Xu, 2017), and it's made up from 13 or 17 disc-shaped magnets with axial polarization, coated with non-toxic flexible PVC, sanitizable with 70% pure ethyl alcohol, and washable. The north polarity of the magnets is covered in black, and the south one in red, following the convention described by Calegari et al. (2023). Magnets used in this study are 6.4cm long, 0.5cm thick and 3.8cm wide.

Figure 1: Spine Protocol - SP



Legend: BMP = Biomagnetic Pair; R = Right; L = Left; ¾ = between the 3rd and 4th lumbar verte-

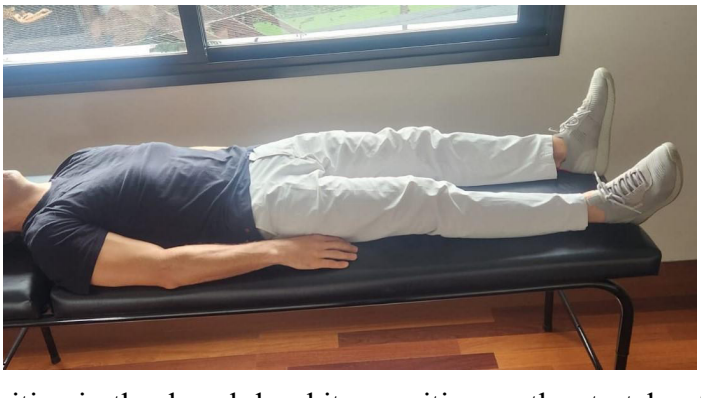
brae. Image Source (originally in Brazilian Portuguese): Bossa (2023).

The figure illustrates the magnets being applied over the body; while observing the north pole, called negative (black in the image), it's known that the south pole, called positive (red in the image), touches the participant's body (Calegari et al., 2023). BMP's application method and semiology are thoroughly described in the work of Corrêa et al. (2023) and Cossenza et al. (2023).

At the beginning of each intervention, before applying the SP, research participants answered to BPI and VAS; and, from the exposure to magnets (time 0) onward, pain levels were assessed through the VAS tool every 15 minutes until reaching the 60 minutes total of the SP application, when the magnets are removed and the intervention ends. Follow up was carried out after each session, via text messaging (WhatsApp), where the participant was asked about the pain level, based on the VAS, six, 24 and 48 hours after the session, as well as seven days after it and during the follow up period that comprised 30 days after the last session of the protocol. Data collection started in July 2023 and finished in October 2023.

The SP was applied with the participants lying on a bed stretcher (Figure 2), in the supine position (dorsal decubitus), with the magnets placed on the posterior part body for 60 minutes, according to Figure 1.

Figure 2: Research participant during SP application

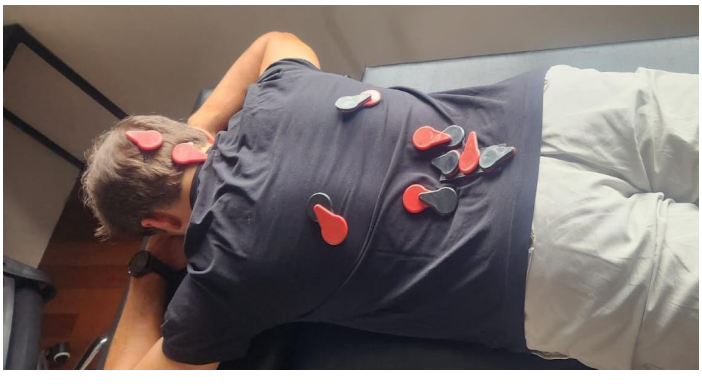


Legend: Participant position in the dorsal decubitus position on the stretcher for SP application. The

magnets are between the participant and the stretcher. Image Source: the authors.

Figure 3 illustrates the magnets positioning on the posterior portion of the participant's body. Common masking tape was used to ensure the fixation of the magnets, in order to prevent their movement.

Figure 3: Exhibition of the SP's magnets positioning applied to the back region



Legend: Illustrative image of the position of magnets for the SP, as in clinical practice the participant remains lying in dorsal decubitus on the stretcher instead. The application of the Paravertebral Biomagnetic Pair (BMP) can be seen bilaterally to the spine, in the dorso-lumbar region. Image Source: the authors.

The SP was adapted for this study by including two or four pairs of variable magnets, applied onto the paravertebral muscle, in the superoinferior position, bilaterally, depending on pain location. Therefore, the total number of used magnets was 13 or 17, depending on the anatomic region, or regions, with pain complaints reported by participants. In MB's technique, the paravertebral biomagnetic pair (BMP) is a special pair (Santos et al., 2023a) that aims treating bioelectromagnetic dysfunctions related to spinal pains due to radiculopathies.

A longitudinal analysis of the results was conducted by applying the Student's t-test from statistics, calculated by means of the Microsoft Excel 365 function "T.TEST(array1; array2; tails; type)",

in which the arrays were set as the columns concerning the initial values presented before the first SP intervention, and concerning the final values assessed one week after the last attendance; adopting a two-tailed test of the paired type.

Result

The final sample consisted of 15 participants, as two individuals from the initial group have not attended to all sessions and one used analgesic medication less than 24 hours before the intervention, reasons for excluding them from the study, following the previously defined criteria. Table 1 shows the distribution of participants by weekly attendance.

Table 1: Distribution of participants by number of sessions

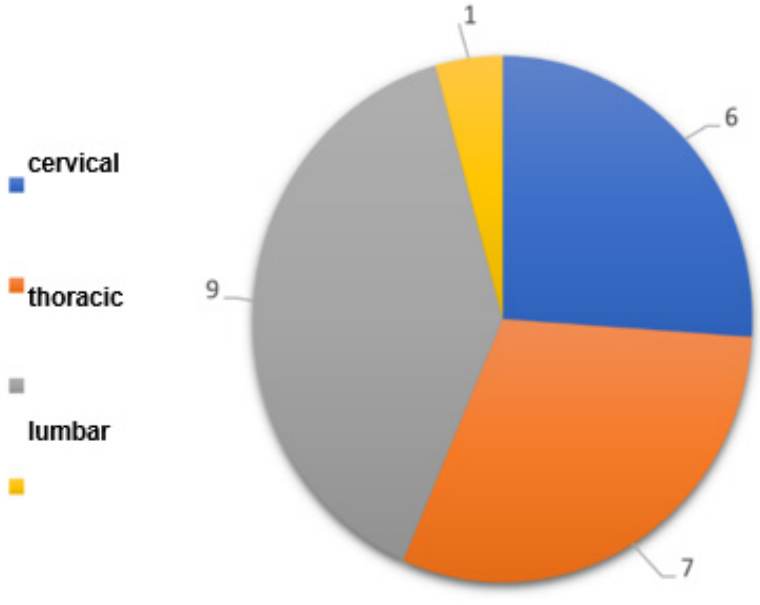
Number of weekly sessions	1 session	2 sessions	3 sessions
Number of participants	11	3	1
Interventions total	4	8	12

Source: the authors.

What follows is the characterization of the 15 participants in this study; it indicates that 67% of the sample was composed by female individuals and 33% by male individuals; 20% were aged from 20 up to 40 years old, 67% from 41 to 60 years old, and 13% from 61 to 80 years old. The participants' education level distribution consists of 7% with just elementary school education, 20% with highschool level education, and 74% were either studying or completed a university course. In terms of participants' body mass index (BMI), 33% were in the ideal weight range (eutrophic), 40% were overweight, 20% had grade I obesity, and 7% had grade III obesity. Seven participants didn't practice physical activities regularly, while eight did practice regularly.

To identify the area to be treated, the classic anatomic division of the spine was used, which we call in this study as "segment"; these are cervical (C1-C7), thoracic (T1-T12), lumbar (L1-L5) and sacral (S1-S5). Figure 4 shows the distribution of treatments by spine region.

Figure 4: Spinal segments with the highest pain complaint incidence treated by SP



Source: the authors.

While applying the SP another variable was the exposure to more than one Paravertebral BMP (upper and lower, right and left) and in more than one segment due to pain complaints in multiple regions of the spine from eight participants, totaling 23 treatment assessments, as shown in Table 2. It was noted that the lumbar spine was the one with the highest incidence, in addition to the greatest number of associations with other segments.

Table 2: Treated segment by research participant

ID	Segment	
1	lumbar	-
2	lumbar	-
3	lumbar	cervical
4	cervical	thoracic
5	lumbar	thoracic

ID	Segment	
6	thoracic	-
7	lumbar	-
8	lumbar	cervical
9	sacral	-
10	cervical	-
11	lumbar	thoracic
12	cervical	thoracic
13	lumbar	thoracic
14	lumbar	cervical
15	thoracic	-

Legend: ID – Participant identification number; Segment: anatomic region of the spine. Source: the authors.

A qualitative analysis was conducted based on the input collected from VAS targeting a measure of the subjective perception of pain and its tendency, comparing the pain assessments collected at the beginning of the first session of SP application (time zero) with the one seven days after completion of the last session. In 21 (91%) of the treatments of spinal segments evaluated there was a reduction in pain perception to some noticeable degree, whereas in two treated spinal segments (9%) no change was observed. Table 3 shows this trend analysis.

Table 3: Trend analysis

ID	Segment	A	B	Trend
1	lumbar	4,5	0	**1**
2	lumbar	2	0	**1**
3	cervical	3	0	**1**
3	lumbar	3	0	**1**
4	cervical	6	0	**1**
4	thoracic	2	1	**1**

ID	Segment	A	B	Trend
5	thoracic	8	8	-1
5	lumbar	8	8	-1
6	thoracic	6	0	1
7	lumbar	9,5	0	1
8	cervical	4	0	1
8	lumbar	1	0	1
9	sacral	9	0	1
10	cervical	9	0	1
11	lumbar	2	1	1
11	thoracic	5	0	1
12	cervical	3	0	1
12	thoracic	3	0	1
13	thoracic	7	1	1
13	lumbar	7	1	1
14	cervical	4	2	1
14	lumbar	3	2	1
15	thoracic	8	0	1

Legend: ID – Participant identification number; A: VAS pain level just before starting the first session; B: VAS pain level one week after the last session; Trend: if B < A, it's a positive trend (1) meaning a perception of improvement, and if B ≥ A, it's a negative trend (-1) meaning an unchanged pain condition. Source: the authors.

With the goal of evaluating the hypothesis that the interventions had an important impact on the data collected by this study, regarding the perception of pain in response to the SP application, a paired two-tailed Student's t-test was conducted on the sample composed by 23 treatments of spinal segments (n=23), with initial (before SP application) and final (seven days after the last session) measurements obtained from the VAS reported by each respective participant. A 95% Confidence Interval (CI=0.95) was defined, with a significance level (α) of 5%. The test resulted in a p-value of 0.0000014, which is significantly smaller than α.

By monitoring the values reported by participants in each step during the process, an improvement in perceived pain level was noticed since the early sessions. Table 4 shows the sessions evolution according to the VAS value assigned by participants in each time interval.

Table 4: Evolution between sessions based on assigned VAS values (continued)

Identification			Time interval during the session					Follow up after the session				
ID	Segment	Session	00min	15min	30min	45min	1h	6h	24h	48h	BNS	30 days
1	lumbar	1	4,5	2	2	2	0	0	2	4		
1	lumbar	2	4	2	2	0	0	0	0	0		
1	lumbar	3	3	2	0	0	0	0	0	0		
1	lumbar	4	0	0	0	0	0	0	0	0	0	0
2	lumbar	1	2	0	0	0	0	0	0	3		
2	lumbar	2	3	0	0	0	0	0	0	0		
2	lumbar	3	0	0	0	0	0	0	0	0		
2	lumbar	4	0	0	0	0	0	0	0	0	0	2
3	cervical	1	3	3	3	2	2	0	0	0		
3	cervical	2	4	3	2	2	1	0	0	0		
3	cervical	3	0	0	0	0	0	0	0	0		
3	cervical	4	0	0	0	0	0	0	0	0	0	0
3	lumbar	1	3	3	3	2	2	0	0	0		
3	lumbar	2	4	3	2	2	1	0	0	0		
3	lumbar	3	0	0	0	0	0	0	0	0		
3	lumbar	4	0	0	0	0	0	0	0	0	0	0
4	cervical	1	6	4	4	3	0	8	6	6		
4	cervical	2	0	0	0	0	0	0	0	0		
4	cervical	3	0	0	0	0	0	0	6	6		
4	cervical	4	1	1	1	1	0	0	0	0	0	
4	thoracic	1	2	2	0	0	0	0	0	0		
4	thoracic	2	0	0	0	0	0	0	0	0		
4	thoracic	3	5	5	3	2	1	4	4	4		
4	thoracic	4	1	1	1	1	0	0	0	0	0	0
5	thoracic	1	8	6	6	2	0	4	4	2		
5	thoracic	2	0	0	0	0	0	0	0	0		

Identification			Time interval during the session					Follow up after the session				
ID	Segment	Session	00min	15min	30min	45min	1h	6h	24h	48h	BNS	30 days
5	thoracic	3	0	0	0	0	0	0	7	7		
5	thoracic	4	0	0	0	0	0	0	0	0	8	null
5	lumbar	1	8	6	9	9	9	4	4	2		
5	lumbar	2	0	0	0	0	0	0	0	0		
5	lumbar	3	0	0	0	0	0	0	7	7		
5	lumbar	4	0	0	0	0	0	0	0	0	8	null
6	thoracic	1	6	5	4	4	0	0	5	0		
6	thoracic	2	0	0	0	0	0	0	2	5		
6	thoracic	3	5	2	0	0	0	0	0	0		
6	thoracic	4	0	0	0	0	0	0	0	4		
6	thoracic	5	0	0	0	0	0	0	0	0		
6	thoracic	6	5	3	2	0	0	0	0	0		
6	thoracic	7	0	0	0	0	0	0	0	0		
6	thoracic	8	0	0	0	0	0	0	0	0	0	0
7	lumbar	1	9,5	7	7	7	6	5	5	5		
7	lumbar	2	5	4	4	3	2	1,5	1,5	1,5		
7	lumbar	3	2	0	0	0	0	0	0	0		
7	lumbar	4	0	0	0	0	0	0	0	0	0	
7	lumbar	5	0	0	0	0	0	0	0	0		
7	lumbar	6	0	0	0	0	0	0	2	2		
7	lumbar	7	0	0	0	0	0	0	0	0		
7	lumbar	8	0	0	0	0	0	0	0	0	0	0

Table 4: Evolution between sessions based on assigned VAS values (conclusion)

Identification			Time interval during the session					Follow up after the session				
ID	Segment	Session	00min	15min	30min	45min	1h	6h	24h	48h	BNS	30 days
8	cervical	1	4	4	3	3	2	2	2	2		
8	cervical	2	6	1	0	0	0	5	3	0		
8	cervical	3	0	0	0	0	0	0	0	0		
8	cervical	4	0	0	0	0	0	0	0	0	0	0
8	lumbar	1	1	1	0	0	0	0	0	0		
8	lumbar	2	7	2	1	0	0	5	3	0		

Identification			Time interval during the session					Follow up after the session				
ID	Segment	Session	00min	15min	30min	45min	1h	6h	24h	48h	BNS	30 days
8	lumbar	3	0	0	0	0	0	0	0	0		
8	lumbar	4	0	0	0	0	0	0	0	0	0	0
9	sacral	1	9	5	2	0	0	0	4	10		
9	sacral	2	10	5	1	0	0	0	4	5		
9	sacral	3	9	5	2	0	0	0	4	5		
9	sacral	4	5	0	0	0	0	0	0	0		
9	sacral	5	2	0	0	0	0	0	2	2		
9	sacral	6	2	0	0	0	0	0	2	2		
9	sacral	7	0	0	0	0	0	0	0	0		
9	sacral	8	8	5	1	0	0	0	0	0	0	null
10	cervical	1	9	10	9	5	0	10	3	3		
10	cervical	2	3	3	4	0	0	0	4	4		
10	cervical	3	6	7	1	1	0	0	1	2		
10	cervical	4	2	5	1	1	1	0,5	1	1		
10	cervical	5	1	2	1	1	0	0	1	1		
10	cervical	6	1	0	0	0	0	0	0	0,5		
10	cervical	7	0,5	0	0	0	0	0	0	0		
10	cervical	8	0	0	0	0	0	0	0	0		
10	cervical	9	0	0	0	0	0	0	0	0		
10	cervical	10	0	0	0	0	0	0	0	0		
10	cervical	11	0	0	0	0	0	0	0	0		
10	cervical	12	0	0	0	0	0	0	0	0	0	0
11	lumbar	1	2	3	1	2	0	2	0	6		
11	lumbar	2	3	1	2	2	3	2	2	2		
11	lumbar	3	2	3	1	2	1	1	2	4		
11	lumbar	4	2	1	1	0	0	4	2	5	2	1
11	thoracic	3	5	3	2	1	1	1	2	3		
11	thoracic	4	0	0	0	0	0	5	2	3	0	0
12	cervical	1	3	0	0	0	0	0	1	0		
12	cervical	2	0	0	0	0	0	0	0	0		
12	cervical	3	0	0	0	0	0	0	0	0		
12	cervical	4	0	0	0	0	0	0	0	0	0	0
12	thoracic	2	3	0	0	0	0	8	2	0		
12	thoracic	3	3	0	0	0	0	0	0	0		

Identification			Time interval during the session					Follow up after the session				
ID	Segment	Session	00min	15min	30min	45min	1h	6h	24h	48h	BNS	30 days
12	thoracic	4	0	0	0	0	0	0	0	0	0	0
13	thoracic	1	7	0	0	0	0	0	5	2		
13	thoracic	2	6	6	6	3	1	0	0	0		
13	thoracic	3	4	2	2	0	0	0	0	0		
13	thoracic	4	2	2	1	1	0	0	0	0	1	1
13	lumbar	1	7	0	0	0	0	0	5	2		
13	lumbar	2	7	4	0	0	0	0	5	2		
13	lumbar	3	1	1	0	0	0	0	0	0		
13	lumbar	4	0	0	0	0	0	0	0	0	1	1
14	cervical	1	4	4	5	4	4	3	3	3		
14	cervical	2	3	0	5	3	3	3	3	3		
14	cervical	3	3	2	3	3	3	4	3	2		
14	cervical	4	0	0	0	0	0	0	2	0	2	0
14	lumbar	1	3	0	0	0	0	0	3	1		
14	lumbar	2	5	0	2	2	1	3	1	1		
14	lumbar	3	5	0	0	1	1	2	0	0		
14	lumbar	4	0	0	0	0	0	0	1	2	2	1
15	thoracic	1	8	6	5	4	3	6,5	6,5	5		
15	thoracic	2	3	6	5	4	4	0	0	0		
15	thoracic	3	4	0	0	0	0	0	2	2		
15	thoracic	4	1	0	0	0	0	1	0	0	0	3

Legend: ID: Participant identification number. Segment: anatomic region of the spine. Session: sequence number of the session. BNS: pain level value at the Beginning of the Next Session, considering one week after the last session. Red cells indicate pain values other than zero, and green cells highlight the value zero during applications and in the positive result at the final follow up period. null refers to a value that was not measured because there was a need for therapeutic intervention before the end of the follow up period, caused by pain relapse. Source: the authors.

Discussion

This study concerns a therapeutic treatment that is both integrative and complementary to conventional medicine; it uses static magnetic fields (SMF) to apply the Spine Protocol (SP) from Medicinal Biomagnetism (MB) in the treatment of spinal pain, aiming to improve the quality of life of participants. At the end of the treatment, evidence from this study has shown a pain decrease in 91% of the sample under analysis.

Pain in the spinal region is the second leading cause of absence from work and it's among the most common complaints, affecting most people at different ages, globally, reaching epidemic levels. Pain condition is closely linked to inflammatory processes, which can be a consequence of changes in pH, where a more acidic state yields lower electrical conductivity, promoting cellular hypoxia and opening calcium channels. Calcium, when released into the extracellular environment, sets up the inflammatory process (Goiz Durán, 2014; 2008; De La Cal, 2004; Broeringmeyer, 1991). According to Gonzales de Castejón (2015), the response of a neuromuscular tissue can be modified from a membrane resting potential to an action potential by a chemical, electrical or physical stimulus, which is related to its state of neuromuscular excitability; in this context, Goiz Durán (20178 apud Bossa, 2019, p. 8) clarifies that BMP "[...] is a biochemical structure formed by two charges, one acidic and one alkaline, separated by a dielectric , generated by the human organism's own metabolism under normal conditions". When such bioelectromagnetic structure is eliminated through exposure of magnets with the correct polarity, involved tissues are guided to return to their Normal Energy Level (NEL), providing homeostasis and returning to their regular functioning (Bossa et al., 2023; Foltran et al., 2023; Broeringmeyer, 1991).

In pain treatments, allopathy is the most adopted and commonly associated approach, whether explicitly prescribed or not. Regarding this context, a study was carried out in 2018 concerning medication consumption, and it was found that the highest rate of self-medication in Brazil was related to pain relief, with analgesics reaching a 48% self-medication rate, anti-inflammatories 31%, and

8 GOIZ DURÁN, Isaac. **Curso de formação em Biomagnetismo e Bioenergética**: levels 1 and 2. Brasil, 2017. Handwritten notes made by participant Professor Adriane Viapiana Bossa.

muscle relaxants 26% (ICTQ, 2018). Self-medication, when unhindered and taken without guidance of a healthcare professional, can lead to more harmful effects, as it doesn't take into account peculiarities from each organism, which can react in a particular distinct way to the same medication, from allergic reactions to life-threatening scenarios. According to Santos et al. (2023c) "Some powerful remedies have aggressive side effects, making them not viable as a first option when other effective yet less harmful ones are available". However, not even some common medicines, which are sold without prescription, are free from causing adverse effects. Statistically, 29% of poisonings are caused by medication and 18.3% of death cases are related to this fact in Brazil (Tavares; Gomes; Freitas, 2020).

Every medication has its own specificity, establishing its effectiveness for each type of pain and for how long would it take for the body to achieve the greatest analgesic response. This highest response level to the drug is called Maximum Plasmatic Level or Maximum Concentration (Cmax) (Lorenzi, 2006). Santos et al. (2023c) summarized data from drug package inserts and, together with their analysis of the work of Lorenzi (2006), they exposed the action time and duration between each drug administration and its Cmax. They describe that Dipyrone and Paracetamol are indicated for mild to moderate pain, reaching Cmax in 45 min (+/- 15 min) with an action time of four to six hours; Tramadol, indicated for moderate to severe pain, has a Cmax ranging from 45 minutes (intramuscular) to 4.9 hours (extended release) depending on how the medicine is administered. A muscle relaxant based on Cyclobenzaprine Hydrochloride, widely used for acute low back pain, has its initial effect three hours after administration, with action duration around 12 to 24 hours (ANVISA, [2023a]).

In the present SP application study, temporary, total or partial pain relief was observed since the first session for 67% (ten) participants in at least one of the treated segments, where three participants (ID-2, ID-12 and ID-13) informed full relief since the 15 minutes query, remaining pain-free for the next period ranging from six to 24 hours. Distinction should be made to ID-12, who reported total relief from 15 minutes onward in the first session, this participant felt a slight pain (level 1) after 24 hours, but went into total remission by the end of the follow up period. Pain reduction reached 100% for 14 (61%) of the 23 treated segments analyzed until finishing the follow up period. That is, at

least 30 days after the last session, not requiring any medication, and without any type of side effect report, there was total pain relief. When SP treatment is compared with the drug treatment, a shorter analgesic response time is evident, as well as a longer duration for its effect.

Analgesics have proven efficacy toward mild pain, but in more intense conditions, their efficacy decreases to less than 10%, and they are associated with adverse reactions such as nausea, vomiting, abdominal pain, liver damage and hematological problems (Cecin; Ximenes; 2008). Nonsteroidal anti-inflammatory drugs (NSAIDs) provide both analgesic and anti-inflammatory effects in low back pain, however, they can affect the digestive tract and kidneys, especially for elderly patients, and they can cause drowsiness, attention deficit and intestinal constipation, in addition to the risks related to drug interactions.

Nonsteroidal anti-inflammatory drugs (NSAIDs) are among the most prescribed medicines worldwide, and results from prospective clinical studies and meta-analyses corroborate that these drugs have important adverse cardiovascular effects, including an increased risk of myocardial infarction, stroke, heart failure, kidney failure, and arterial hypertension, especially in patients with a previous history of cardiovascular disease or at high risk of developing it (Batlouni, 2010). Its association with Omeprazole can lead to subacute myopathies (Tavares; Gomes; Freitas, 2020).

Muscle relaxants are options for acute low back pain, but they can cause drowsiness, dizziness and intestinal constipation, and its prolonged use is not recommended, apart from causing neurological changes such as mental confusion, dry mouth, visual changes and abnormal heartbeats (Cecin; Ximenes, 2008). On the other hand, opioids are indicated in the treatment of low back pain and severe acute sciatica pain that didn't improve with NSAIDs (Tavares; Gomes; Freitas, 2020), but they also present risks and side effects, the most common of which are drowsiness, attention deficit and intestinal constipation (Cecin; Ximenes, 2008). Relevant side effects were neither reported during the SP application, nor after its completion, only a mild sensation of discomfort either at the throat (ID-10), or as heaviness in the legs (ID-5), which have solved immediately after removing the magnets. It should be noted that MB is a painless, non-intrusive, practical, economical, and low-risk method,

which does not cause any type of dependence, it relies on magnets that are easy to apply, sanitizable, reusable and they can last for many years without losing its magnetic power (Goiz Martínez, 2017a).

As previously shown in Table 4, two participants (ID-7 and ID-12) who had acute pain ended the last session with total pain remission and no relapses until the end of the follow up period. The remaining ones (13) presenting chronic pain had mixed results: six (ID-1, ID-3, ID-4, ID-6, ID-8, ID-10) had complete remission, without relapses until the end of the follow up period; two participants (ID-11 and ID-14) had complete remission in at least one of the two treated segments; ID-13 did not reach total remission, but a reduction from level 7 to level 1 in VAS; and four (ID-2, ID-5, ID-9 and ID-15) had some type of relapse during the follow up period. Based on the types and levels of pain intensity, it can be said that SP contributes to attenuate both acute and chronic pain conditions, significantly reducing the perception of pain reported by research participants.

Nine (ID-5, ID-6, ID-7, ID-9, ID-10, ID-12, ID-14 and ID-15) out of 15 participants had been using some type of analgesic, anti-inflammatories or muscle relaxant before starting treatment with SP's exposure; notwithstanding, they reported that the effects were suspended when a medication was stopped, apart from complaints regarding to its adverse effects. ID-12 had a medical recommendation for Codeine with Paracetamol, to be taken every 12 hours, combined with dipyrone to relieve chest pain in case of a crisis; however, as the effect was not as expected, this participant chose to not use the medication during this study, and reported that, after SP's exposure, it will no longer be necessary to resort to analgesics. ID-14 occasionally used Paracetamol (Tylenol) three days before the 3rd session, and Dipyrone linked with Orphenadrine and Caffeine (Dorflex) 27 hours before the last session, for migraine attacks; this participant was not considered excluded due to the period of action of these medications ranging from four to six hours (ANVISA, [2023a]; [2023b]). ID-15 had a relapse 18 days after the last session, with a level 6 pain, and this participant used anti-inflammatory and muscle relaxant medication for seven days, with total pain remission right after the start of the medication, which did not happen previously until undergoing SP treatment, corroborating with the idea that the protocol may have an effect on strengthening the drug response.

Van der Gaag et al. (2020), in an update to a Cochrane review, first published in 2008, identified a small but significant effectiveness of NSAIDs for low back pain, focusing on acute pain, compared to the use of placebo to reduce pain in short term and to improve participants with pain at that stage. They report that the quality of evidence varied between high and very low, suggesting that further investigation has the potential to generate more confidence in effect estimates.

In this study, SP applied to lower back pain in nine participants showed promising results for pain relief. ID-7, which had acute pain level 9.5 in the VAS, regressed to level 0 (zero) after 15 minutes of the third session, keeping this state until the end of the follow up period. The remaining participants had chronic pain. Three of them (ID-1, ID-3 and ID-8) had a relevant result with total pain remission (level 0), also with results lasting at least up to the end of the follow up period. It's worth emphasizing that ID-8 was diagnosed with lumbar wear in L4-L5 and migratory pain, starting treatment with pain level 1, but this participant had a pain peak of 7 at the beginning of the second session. Despite being monitored by a personal profissional following medical advice, there have been no improvement prior to the SP exposure, whose result improved over the course of the sessions. However, this participant experienced an episode of level 6 pain during the follow up period because of a facial aesthetic surgery, with short term remission after administrating a muscle relaxant, suggesting there's a potential improvement factor for improving drug response.

ID-5 had low back pain for over 25 years, but it intensified in the post-pandemic period due to the need to stay sitting for a long time during remote work activities. However, despite the positive result starting from the second session onward, this participant went through hyper stress one day before the last intervention, which resulted in a relapse three days after treatment, requiring additional therapeutic intervention (Complete Scanning – CS, and Magnetic Emotional Unlocking – MEU), explaining why this result was not considered for calculation regarding its follow up period.

ID-11, ID-13 and ID-14 didn't reach complete remission of low back pain, however, pain levels reduced from 2 to 1, from 7 to 1 and from 3 to 1, respectively. ID-13, who presented a medical diagnosis of lumbar arthrosis (L4-L5) and bulging vertebrae five months ago, after treatment with

the SP, no longer had the intense pain that used to be a limitation preventing the participant from remaining standing for a long time in daily activities. In table 4, participant ID-2's progress was noticed from 15 minutes of the second session until the end of the fourth session, showing total remission in such evaluated period, but with a relapse in the follow up period because the participant drove a car for four consecutive hours, returning three days later, driving for the same time and in the same condition. According to Marques, Hallal and Gonçalves (2010), staying in a sitting position for long causes the adoption of inappropriate postures and overloads structures of the musculoskeletal system, which can lead to pain and injury to the lumbar spine. This fact may justify the pain relapse reported by participant ID-2.

Cecin and Ximenes (2008) emphasize that resting is effective for attenuating low back pain and acute sciatica pain, however, the lack of activity and basic daily movement can cause damage to the locomotor system. In a study carried out on the practice of physical exercise to relieve chronic low back pain, Hayden et al. (2021) concluded that physical activity contributes to analgesia. Ferreira, Costalonga and Valenti (2013) carried out a descriptive and retrospective research, through a literature review of six articles, published between 2000 and 2010, and concluded that the practice of motor control exercises can be indicated as part of the treatment of pain acute low back pain, to prevent relapses and chronic low back pain, with the aim of improving pain, function and quality of life. This corroborates with Arins et al. (2016), who evaluated the effects of a treatment program for chronic low back pain based on isometric contraction exercises in 25 participants, who performed 16 sessions of a segmental stabilization (SS) program, scheduled twice a week, for approximately 60 minutes. Such study reported that patients showed improvement in their pain since the first day of treatment with SS, maintaining a stable pain level during the intervention. The aforementioned authors concluded the study stating that there was an improvement in functional capacity, in quality of life, in the reduction in pain, in addition to a reduction of the concomitant use of drugs for most participants.

During the present study regarding the SP application, it was noted that eight individuals in the sample (ID-1, ID-2, ID-6, ID-8, ID-9, ID-10, ID-12 and ID-14) were practitioners of physical

activities, and that still didn't produce any sensible results in pain relief. Particularly ID-8, who was monitored by a professional specialized in pain treatment and under medical guidance to practice physical exercise, combined with the prescription of allopathy, have not achieved the expected relief, reaching analgesia only after the association with SP.

Due to the diversity of problems related to the indiscriminate usage of medicines, the World Health Organization (WHO) defined a global strategy, called the Global Patient Safety Challenge on Medication Safety, in an attempt to reduce serious avoidable harm linked to this practice in all countries by 2025; and, to achieve this goal, a broad mobilization and engagement of health institutions, professionals, regulatory institutes, and the population is necessary (Tavares; Gomes; Freitas, 2020). Allied to this vision, the WHO encourages the adoption of Integrative and Complementary Health Practices (ICHP) existing in Western medicine and traditional medicine systems. In 1978, at the Alma-Ata Conference, the WHO formally recommended the use of traditional and popular medicine resources by national health systems, even recognizing practitioners of this medicine as important allies in the organization and implementation of actions to improve health in the community (Queiroz, 2000).

ICHP are therapeutic approaches to prevention, promotion and recovery of health, which are based on the individual as a whole, taking into account their physical, emotional, mental and social aspects (Brasil, [2023]). In Brazil, this movement gained strength in 1986, in order to show that it is possible to implement other health-related practices, and since then it has been expanding. Currently, the Brazilian Unified Health System (SUS, Sistema Único de Saúde) offers, free of charge, 29 Integrative and Complementary Practice procedures (Telesi Júnior, 2016).

Notably, ICHP have been disseminated as alternatives or even adjuncts in the treatment of chronic pain, in which allopathies have not led to a satisfactory result and which have become an option for multifactorial approaches, associating the pharmacological with the non-pharmacological, and the correct use of this association is a reality increasingly present in medical prescriptions (Braz et al., 2011). Related to this context, the results presented in the present work propose that the use of

SMF, associated with MB protocols, can be a complementary therapy to be used by health professionals in countering pain, and one that deserves to be included in the SUS, as well as made available to the population.

Fernandes et al. (2021) presented an integrative review study, based on 12 articles, on the role of ICHP in the treatment of low back pain in pregnant women, and they summarized beneficial effects of acupuncture, reflexology, hydrotherapy, acupressure and osteopathy, whose effects went beyond reducing pain, helping to improve general well-being and sleep quality.

Yeh et al. (2012) developed a study in search of proof and acceptance of auricular point acupressure (APA) aiming to reduce chronic low back pain. A group of 74 participants was selected and they received such treatment for seven days, applying vaccaria seeds to ear points customized for each individual according to the location of the pain. They should be stimulated for seven consecutive days, at least three times a day for 3 minutes, even in the lack of pain, or at all times in case of pain. Its follow up period ended on the eighth day. Ten individuals withdrew from the study in the intervention phase for various reasons, such as not noticing the effect of the APA treatment, unbearable pain in the outer ear, and allergy to the adhesive tape, lasting 64 participants (87%) of the initial sample. Out of these 64, 46% reported a reduction in their worst pain recorded through the BPI and 62.5% of participants reported reduced use of pain medications.

Relating the same to the SP application, using the value of the most intense pain recorded in the BPI at the beginning of each session as a parameter, it was noticed that, from the 18 initial participants, two gave up due to total pain remission in the second and third session. Out of the 15 participants in the final sample, 9 (60%) were used to some type of medication (ID-5, ID-6, ID-7, ID-8, ID-9, ID-10, ID-12, ID- 14 and ID-15), and out of these, six (67%) no longer used the medication until the final part of the follow up period (ID-5, ID-6, ID-7, ID-10, ID-12 and ID -14). At the beginning of the last session, the analysis of the BPI results has already shown that 12 participants (87%) had a significant improvement in pain levels and, among these, eight (53%) reported zero perception of pain (ID-1, ID -2, ID-3, ID-6, ID-7, ID-10, ID-12 and ID-13), while three (20%), despite the significant reduction,

haven't fully eliminated the pain (ID-4 , ID-14, ID-15).

These values are confirmed by the results described in the evolution analysis from Table 4. It's worth mentioning that the 15 participants were followed up for a period of 30 days after the end of the last session with the SP. For 11 of them, there was no need for any further intervention aiming at analgesia during this period. No discomfort was reported with SP interventions, and statistical data reveal potential results for the application of this MB protocol, a therapy to be considered by health professionals in the treatment of spinal pain.

Data resulting from SP application show that, out of the 11 members of the group that did a weekly session, three (27%) had an analgesic effect in the second session, four (36%) in the third session and the remaining four (36%) in the fourth session. Concerning the group that underwent two weekly sessions, three participants had an analgesic effect in the third, sixth and seventh sessions, respectively, and ID-10, which underwent 12 sessions, had an analgesic effect in the seventh session. These data are insufficient to determine the best frequency and application interval between the first and last SP session during treatment. It's worth highlighting that eight participants (53%) continued with the analgesic effect until the end of the follow up period. So, after analgesia was achieved, it was maintained for 30 days. The period for evaluating the maintenance of analgesia could be longer, with the possibility of measuring the analgesic effect over a longer period.

Lima et al. (2021) evaluated 18 participants between 19 and 50 years old, mostly female. These received chiropractic sessions for four weeks, at intervals of seven to 10 days. They found improvement in cervical (neck) pain after chiropractic adjustment, bringing immediate relief of painful symptoms in this region after the first session. The best results were obtained between the 1st and 4th session, where the values gradually decreased over the sessions, starting the first session with a pain level varying between 2 and 7, and in the fourth session varying from 0 to 2, indicating a significant reduction in the p-value < 0.0001. Using the same statistical parameter, it was found that the process involving the SP application resulted in a p-value equal to 0.0000014 when evaluating the values for analgesia through VAS. As shown in Table 4, these statistical data reveal that the SP presented a gre-

ater perception of relief for 91% of the treated sample, with the same number of sessions reported by Lima et al.

The analgesic and anti-inflammatory effects of applying SMF to regions with pain complaints have been widely studied. Through a systematic review, Eccles (2005) evaluated the quality of 18 randomized control studies and he has summarized analgesic effects of the application of magnet-generated SMF in various types of pain, such as inflammatory, neuropathic, musculoskeletal, rheumatic, fibromyalgic, and post surgery. Oliveira et al. (2018) applied SMF with double-polarity neodymium magnets of 3000 gauss intensity in 15 elder individuals who felt various pains in different parts of the body (lumbar pain, cervical pain, shoulder pain, and knee pain). Participants were followed for seven days up and reported relief and even remission of pain.

Research articles related to the effects of Medicinal Biomagnetism (MB) and published in 2023 have shown an evolution of studies on SMF generated by magnets applied to various pains, with promising results. Among them, Rambo et al. (2023), in a case study concerning a 65 years old female patient with a disorder of the superficial venous system who had an incompetent great saphenous vein, is a highlight. In three interventions with the MB protocol lasting 45 minutes each, scheduled at weekly intervals, it was possible to notice pain reduction in the dorsum region of the foot and right calf, in paresthesia in the right hallux, less sensation of heaviness, burning, edema and redness in the region of ankle, in addition to completely reversing the diagnosis to a competent saphenous vein, as observed in a color Doppler exam performed before and after exclusive intervention with the technique.

Santos et al. (2023b) observed a reduction in abdominal pain caused by endometrial polyps with the application of MB in a 48 years old female individual, performed as two sessions with 21 day intervals and daily application of the Endometrium/Left Kidney BMP, specific for endometriosis, which resulted in total remission of the pathology and secondary symptoms of mood changes, excessive tiredness and irritability. Cazella et al. (2023) reported in a case study that treated urinary infection caused by E. coli in three individuals, where two reported abdominal and suprapubic pain and a

relief of these symptoms after a session of BMP, specific to the MB, aiming to eliminate the infection caused by the mentioned bacteria. In such study, the urine culture test that indicated the presence of the bacteria was negative after a single intervention with the MB.

Santos et al. (2023c) in a case study verified the effect of treatment to relieve pain caused as the consequence of flaying the hand fingertips, using the Modern Trauma Par, one of the BM protocols. In the study, pain was classified as severe acute superficial somatic nociceptive based on the intensity measured by the VAS and 15 minutes later, a pain of intensity eight was completely reduced, and a pain in another region went from intensity 10 to two, indicating that the protocol in discussion has positive results and rapid action, thus it can be considered a first-line treatment option.

While analyzing the results of this SP study, it was noted that in 14 (61%) of the 23 treated segments there was a 100% reduction in pain with the application of the protocol, as they remained pain-free until the end of the follow up period. Results presented in Table 4 show a decreasing trend in pain intensity throughout the sessions, pointing that in 20 of the treated segments (91% of the sample) there was an improvement in pain perception (zero intensity) even before the end. of the scheduled sessions. Three treated segments (15%) had zero pain in the first week, five (25%) in the second week, another five in the third week, and seven (35%) in the fourth week. It is worth mentioning that the participant ID-12 showed a functional improvement in cervical rotation, extension and flexion movements just after 15 minutes of the first session and this result remained until the end of the follow up, and this participant also reported improved performance in physical activities, mood, libido and appetite. However, participant ID-5, who started with zero pain intensity in the second session, had a relapse of a level 8 pain before the end of the follow up period.

ID-1 and ID-4 had remission in the fourth (last) session, also maintaining a pain level of 0 until the end of the follow up period. ID-14 showed positive results, achieving zero pain during the sessions, but relapsed during the follow up period, although with lower levels than before; even so, reporting an improvement of more than 50% in pain perception and secondary benefits, such as greater relief from morning muscle stiffness that limited her to stand upright during the first few minutes of

the day, as well as improved sleep quality, and remission of daily migraine attacks, which often used to led her to self-medicate with painkillers; the participant isn't presenting more of such episodes after the end of treatment. In summary, secondary gains were noticed during the treatment, reflecting in the quality of life of the participants, evidencing an improvement in mood, disposition and satisfaction in performing tasks that were previously painful.

Due to the need for new interventions (Complete Scaning and Magnetic Emotional Unlocking) for participants ID-5 and ID-9, who had relapse of pain near to the end of the follow up period, mainly because of emotional factors, the measurement of the last follow up value was not collected, and this assessment was disregarded for that period. However, there was a decline in the pain during the sessions, especially in relation to ID-5, who already noticed pain remission at the end of the first session, and ID-9 reported 100% pain elimination in the fourth session. For these cases, a greater frequency of interventions with the SP could have had a more promising result. This was observed in ID-10, who started the process with severe pain (between 9 and 10) and limited movement in cervical rotation and flexion. From the third session onward, this participant reported reduction in joint limitation, and, in the seventh of 12 sessions, he was no longer presenting any pain in the cervical segment, lasting up to the end of the follow up.

Two participants reported a return to the initial level of pain (ID-5 and ID-9) after having experienced situations of emotional stress, denoting an influence of the psychological aspect on the response to treatment, corroborating with Crofford (2015) and Esperidião-Antonio et al. (2008), who pointed out the existence of a relationship between the exacerbation of pain and homeostatic, emotional and cognitive processes, as the perception and duration of pain is increased when it directly interferes with the individual's quality of life and productivity. In these specific cases, due to the personality and behavioral characteristics observed in the anamnesis, it was inferred that joint sessions addressing psychological issues may result in longer lasting effects, or perhaps it can even associate the gold standard physical examination of MB with this protocol (Corrêa et al., 2023) which is the CS, for identifying and treating possible BMP associated with back pain and psycho-emotional changes.

Therefore, to better verify the analgesic effect of SMF generated by magnets in the SP, it's required to expand the tests and sample size in order to validate the results. It's important to mention that results from this work are based on a small specific sample, and it may not apply to the entire population. Factors such as sample size and study design may affect the interpretation of results. When conducting tests, one must consider the uncontrolled environment and various variables such as lifestyle, efforts, repetitive movements and other pathologies presented, as well as the absence of a group for control and placebo, in addition to the lack of comparative evaluations, before and after treatment. Such factors may have impacted the results of this study.

In the present study, all participants reported, spontaneously at the end of treatment, some type of improvement since the first sessions, including improvements in mood, disposition, joy in life, as well as a reduction in joint movement limitations or immediate analgesic sensation. There were reports of a great feeling of well-being and relaxing during the session, including deep sleep, and these reports are closely linked to improved quality of life. ID-10 reported discomfort in the throat causing difficulty for breathing, and ID-5 reported a feeling of heaviness in legs. Although the side effects generated by SMF are rare, they may be a consequence of the intervention, as described by Philpott, Kalita and Lothrop (2000), however, they are immediate, ceasing to exist after the removal of the magnets.

Two individuals who were excluded from the final sample stopped attending the following sessions because they noticed a 100% improvement in pain in the second and third sessions, but they were not considered because they did not attend all interventions, failing to comply with the proposed schedule.

One of the participants was excluded from the study for using analgesics and anti-inflammatory drugs before the session, as this participant felt intense pain in the inguinal and sciatic region. The participant is diagnosed with right-handed scoliosis in the lumbosacral region, with accentuation of lordosis and reduction of the coxofemoral spaces, more evident on the left side, causing shortening of the left lower limb. This participant occasionally used a walking stick as a support, as to compensa-

te the an irregular gait and effort to maintain balance, however, this participant declared taking about three painkillers doses when the pain was very intense, and even after that the desired effect was not felt. After applying the SP, this participant reported feeling improvements in the joint range of motion of his shoulders, which was another segment treated, and less discomfort while staying in a sitting position for a long time.

Embracing this whole context, it's being assumed that an increase of the duration of the SP treatment, combined with a complete MB scanning (Corrêa et al., 2023) and a multidisciplinary follow up, can bring more positive and long-lasting effects. Results from this research are promising and deserve to be studied, considering a larger sample to build bases that allow validating the use of the SP with greater reliability and effectiveness, including the exploration of emotional and other factors as variables that interferes with the return of pain.

Conclusion

The present study concludes that the Spine Protocol (SP) from Medicinal Biomagnetism (MB) is a promising tool for the treatment of pain conditions that affect all spinal segments. Based on the results of statistical analysis (p-value of 0.0000014), which evaluated the data obtained through the analysis of VAS and BPI, combined with the follow up carried until 30 days after the last session, long lasting effects have been made explicit for pain condition, functional condition and quality of life, including better sleep time, overall disposition, mood, physical and libido performance, besides long term effect on other types of pain, such as migraines and other inflammations, as well as reduced medication usage for spinal analgesia.

The interventions resulted in a steep decrease of the perceived pain level, and in an analgesic therapeutic potential for the SP in 91% of the sample. In this study, the SP needed a short time to start its analgesic action, observed from 15 minutes onward, and its effect had a longer duration when compared to reports in the published literature regarding the effect of allopathic drugs.

The protocol is a tool can be used alone or as an adjunct in the treatment of acute or chronic pain of any intensity. It can be used as a primary intervention option, apart from being a possibility for those who are unable to take medication due to a restriction of any type; it deserves to be studied with greater methodological rigor In order to better understand its effects and action mechanisms.

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