

## **COST-EFFICIENCY STUDY OF A MINIMALYL INVASIVE TECHNIQUE CALLED THE ABE TECHNIQUE OF MANIPULATIVE NEUROMODULATION OF PAIN BY PROPRIOCEPTIVE RELOAD**

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### **ABSTRACT**

This report presents the results of the implementation of the Abe Manipulative Pain Neuromodulation Technique in the treatment of patients with chronic pain, highlighting its clinical efficacy and its positive impact on public finances. The project, already underway in the municipality of Mauá, demonstrated a 50% reduction in operating costs, with a reduction in the number of sessions from 10 to 5 and in the service time from 60 to 20 minutes per session. In addition, the waiting list for treatment fell from 1,700 to 127 patients in just one year. The financial analysis shows that, when treating about 55 thousand people affected by low back pain (prevalence of 21.6% among SUS users), the projected savings with the adoption of the technique can reach up to R\$ 10.6 million about conventional treatment. The cost of care for each patient was significantly reduced, while the effectiveness of the treatment provided pain relief for 91% of patients. With these results, city halls have the opportunity to implement a service that not only improves the quality of life of the population, but also optimizes the use of public resources, reducing costs with prolonged treatments and directly impacting the municipality's ability to serve more people quickly and efficiently.

**Keywords:** Abe technique. Manipulative neuromodulation of pain. Chronic pain disorders.

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## INTRODUCTION

Chronic pain is a complex and widespread health condition that results in higher costs to the health system and reduced productivity among working-age adults, compromising the individual's ability to perform daily activities and limiting their permanence in paid employment. Adding to this, patients with chronic pain often face mental health issues, such as intensifying symptoms of depression and anxiety.

The costs associated with chronic pain impose a considerable burden on public health in several countries. Data in Australia shows that chronic pain affected up to 3.2 million adults in 2018, costing the economy \$12.2 billion

Australian in health costs and \$48.3 billion in productivity losses. In the United States, an estimated 50.2 million adults suffered from chronic pain, resulting in a significantly higher number of days lost from work due to chronic pain (10.3 days vs 2.8) and a cost to the economy of \$300 billion in 2019<sup>1</sup>.

In Brazil, chronic pain is a significant public health problem: it is estimated that the prevalence of chronic pain ranges from 23.02% to 76.17%, with a national average of about 45%. The pain is more frequent among women and intensifies with advancing age, especially after the age of 50. The most common type of chronic pain identified is possibly nociceptive pain, followed by neuropathic and nociplastic. Epidemiological studies indicate that the region of Brazil (Table 1) with the highest prevalence among the included studies was the Midwest (56.25%), followed by the South (46.70%), Southeast (42.20%) and Northeast (41.70%)<sup>2</sup>.

Table1. Prevalence of chronic pain by geographic region (Aguiar DP et al, 2021)<sup>2</sup>

Regions of the Country	Average prevalence	95% IC
Northeast	41.70	23,02 a 42,30
Midwest	56.25	12,41 a 100,1
Southeast	42.2	30,05 a 54,34
Sul <sup>a</sup>	46.70	36,07 a 57,34
North	-	-
<b>Total</b>	<b>45.59</b>	<b>39,44 a 51,74</b>

CI = Confidence Interval; a = single-sample T-test; b = Wilcoxon test; c = single-sample T-test, however, only 2 studies were included.  
inclusos.

Studies by CAPESESP (Pension and Assistance Fund for Employees of the National Health Foundation) on the budgetary aspect of chronic pain, carried out with a

sample of 2,188 individuals who responded to an online survey on the presence of pain without apparent food, showed that the estimated annual impact of chronic pain on the Operator was more than R\$ 7.3 million/year4.

Systematic review and meta-analysis articles have shown that the cost of a patient with chronic pain in a public health system such as the Unified Health System (SUS) in Brazil is essential to take into account a series of factors and variables associated with treatment, including consultations, procedures, supplies and the allocation of human resources. The methodology for this calculation may vary according to the objective of the study, but a simplified approach, adjustable to the particularities of each clinical and management scenario, can be used to provide an initial estimate of the costs involved<sup>1,4,5</sup>.

As a base formula for cost-efficiency calculations, we have:

$$\frac{C_{tratamento\ i} = (C_{consultas\ i} + C_{insumos\ i} + C_{rh\ i} + C_{infraestrutura\ i}) \times N_{sessões\ i}}{R_{eficácia\ i}}$$

Where:

i = individual, patient

Treatment i = Total cost of treatment i adjusted for efficacy

Consultations i, Cconsumos i, Crh i, Cinfrastructure i = Detailed costs for treatment i

Sessions i = Number of sessions required for treatment i

Efficacy i = Efficacy of treatment i (in terms of pain reduction or clinical improvement)

## DEPLOYMENT

In March 2023, a project to implement care for patients with chronic pain using a new efficiency and effectiveness technique was presented to the Health Department of the Municipality of Mauá (SSM)-SP, where 15 professionals would be trained and qualified to apply the methodology in the Basic Health Units (UBS) and the Specialized Rehabilitation Center (CER). Going through a bidding process (ELECTRONIC AUCTION 032/2023), the work began in August 2023, with the coordination of Primary Care, where initially the services were centralized in Specialized Care. The Chronic Pain Disorders Treatment Center (CTD) was installed on the premises of the CER, responsible for the general administration of the patients specifically referred.

## BASE CALCULATIONS

According to the IBGE, the Municipality of Mauá has 429,380 inhabitants, 60% of whom use SUS (257,628).

For a cost-efficiency comparison, the workloads, time and number of consultations/day of physiotherapists were considered according to the norms of RESOLUTION No. 444, of April 26, 2014 of the Federal Council of Physiotherapy and Occupational Therapy (COFFITO), fees established by the SSM for Physiotherapist II/Grade C.

- Weekly workload: 30 hours
- Attendance: 6 to 12 patients/day
- Monthly fee R\$4580.04

As a treatment reference, we addressed low back pain (ICD M63.8) because it is the pathology with the highest prevalence of chronic pain in Brazil. The treatment time of chronic low back pain described in the literature was 2 sessions for low-risk patients, 8 sessions for medium-risk patients, and 12 sessions for high-risk patients<sup>6</sup>. Considering that the patients referred are medium and high risk, we established 10 treatment sessions as an average for the consultations.

Therefore, performing a simple calculation for the value of a patient's care, we have:

- 1 physiotherapist: 30h/week x 4 weeks (1 month) = 120h 1 h of care = 120h:
- 1 hour of service = 120h: R\$ 4.4580,04 = R\$ 38.17

In the 2019 study by Malta et al., analyzing the National Health Survey with 88,531 adults, it was found that 19,123 (21.6%) were affected by chronic back pain<sup>3</sup>.

Considering that of the 257,608 SUS users in Mauá, 21.6% are affected by low back pain, we have 55,647 people, which means that R\$ 2,124,070.72 of resources would be needed for care for 1 session of this population. If each affected individual is included in the number of sessions indicated for physiotherapy of 10 sessions, the values must be multiplied by 10, or 21.2 million reais.

## EXECUTION

Before the execution of the project, the waiting list for physiotherapy care was 1,700 people.

The CTD-Mauá project began on July 3, 2023, where pilot services began in September of the same year, adding up to a total of 312 services by December. In the period between January and July 2024, 896 consultations were carried out.

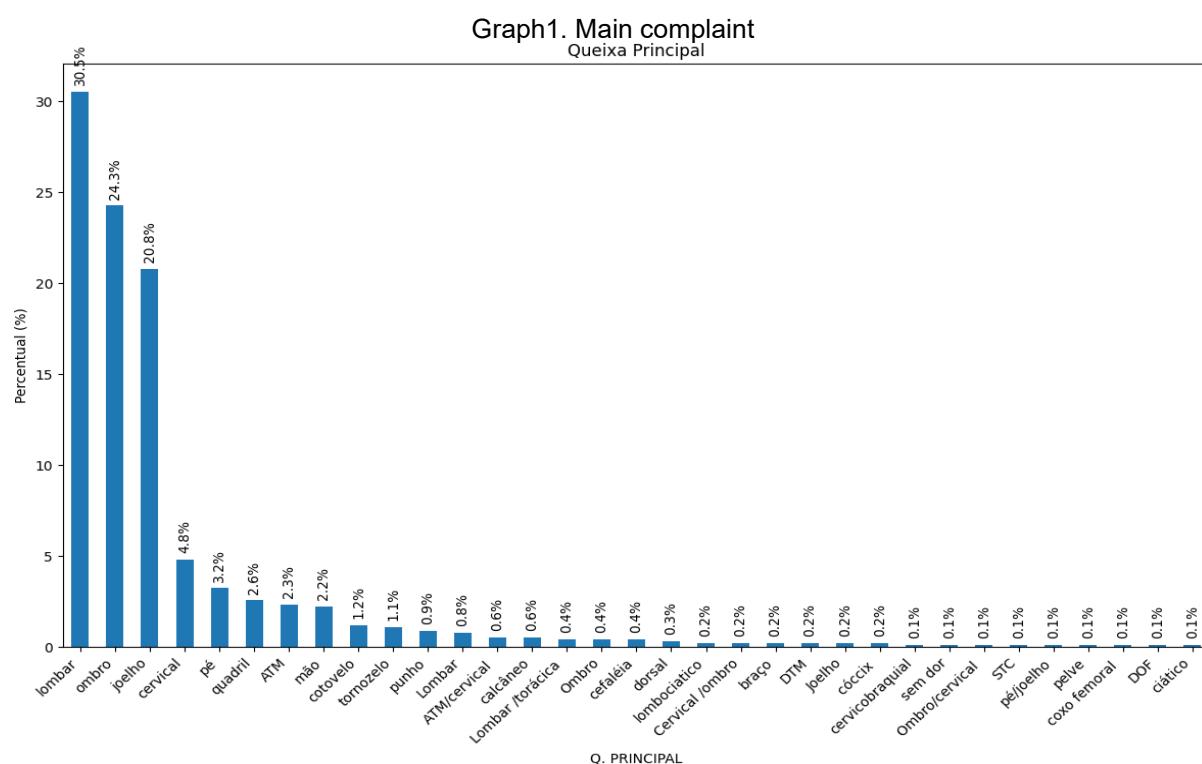
## METHODOLOGY

The treatment protocol was established based on:

- in 1 session time: 20 minutes
- Number of Sessions: 5 sessions

## RESULTS

Considering only the data of the 896 patients treated from January to July 2024, 309 (30.5%) were cases of low back pain (Graph 1).



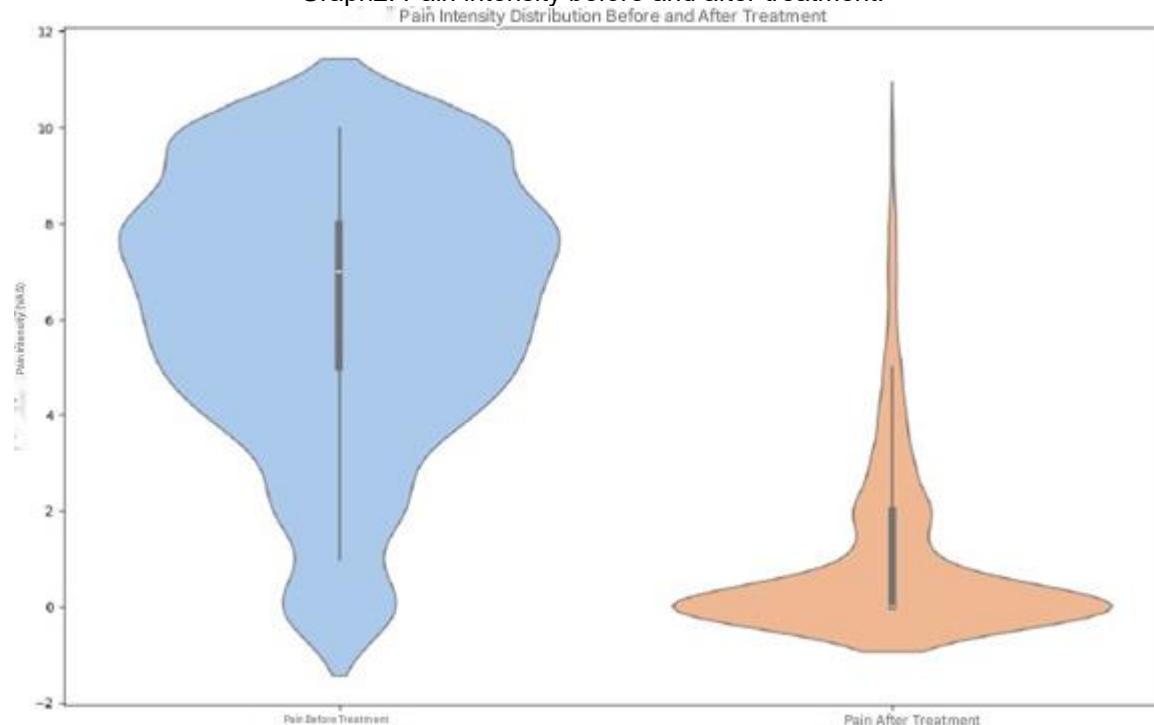
Information related to the duration of pain persistence, it was observed that 48.10% of the patients (430) suffer from persistent pain from 3 to 8 years, highlighting this range as the most common among those attended; 32.55% of patients (291) report persistent pain for 10 years or more, indicating a significant number of chronic cases. Only 10.18% (91) of the patients have had pain for less than 1 year, while 9.17% (82) have experienced pain for 1 to 2 years (Table 2).

Table 2. Time of pain.

PAIN Time Category	Frequency (n)	Percentage (%)
Less than 1 year	91	10.18
From 1 to 2 years	82	9.17
From 3 to 8 years old	430	48.10
10 years or more	291	32.55

The evolutionary analysis of the 896 patients attended, as illustrated in the following graph, demonstrates a significant reduction in pain intensity after the intervention. Initially, patients had a wide distribution of pain levels, with a higher concentration in the range of 6 to 8 on the visual analogue scale (VAS). After treatment, most patients reported significantly lower pain intensity, with values concentrated between 0 and 2 on the VAS scale (Graph 2).

Graph2. Pain intensity before and after treatment.

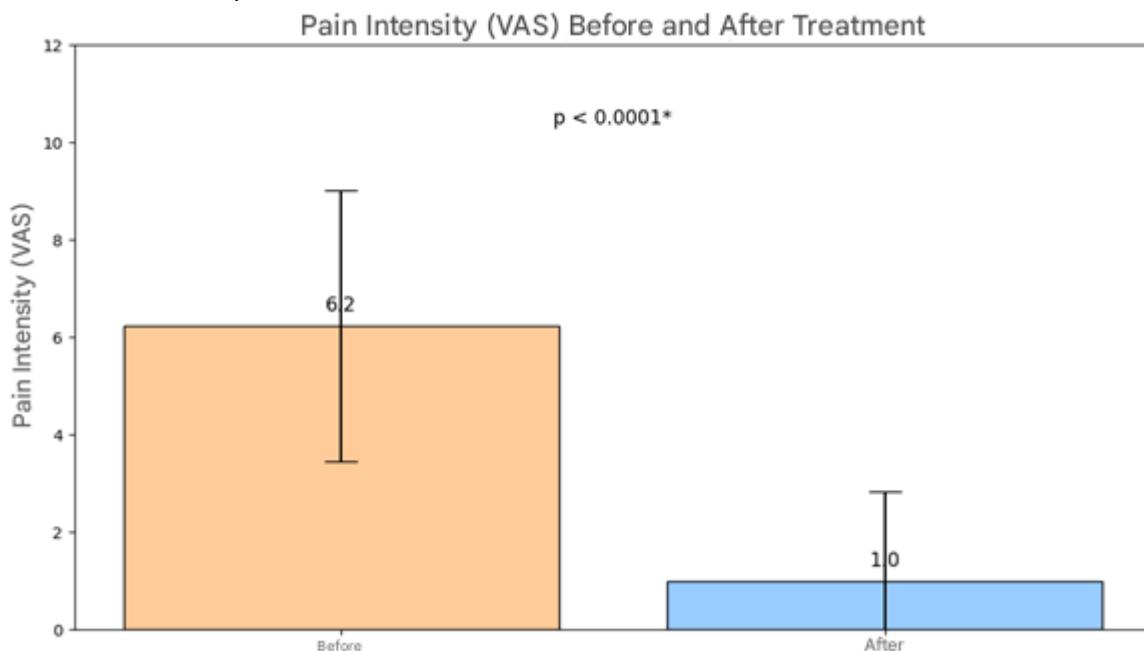


The data indicate that the intervention was effective for most patients, with a significant reduction in median pain intensity. More than 91% of patients experienced a decrease in pain sensation, while only 8.7% (approximately 78 patients) did not respond to treatment satisfactorily.

Therefore, the intervention provided a significant improvement in the quality of life of most patients, reducing pain to minimal levels for many of them.

Graph 3 below shows that the mean pain intensity increased from 6.25 (before) to 1.00 (after) the treatment. This significant reduction in mean pain is corroborated by the table of descriptive statistics, which shows a median that evolved from 7.0 (before) to 0.0 (after the intervention).

Graph 3. Mean and standard deviation, before and after treatment.



## DISCUSSION

It was possible to observe the effectiveness of the technique and the reduction of the time of one session (60 minutes to 20 minutes) and the number of sessions from 10 to 5 sessions when applying the new methodology, meaning a reduction in operational costs and savings of 50% of the resources used for care, not only of one, but a range of chronic painful pathologies.

In July 2024, it was found that the waiting list for care was reduced from 1,700 to 127 cases, resulting in the renewal of the contract for another 12 months.

## CONCLUSION

Given the data, it is possible to verify the improvement in the cost-efficiency ratio in the system, which is focused on outpatients.

The next challenge lies not only in the decentralization of Specialized Care to Primary Care (care in the UBSs) with outpatients, but also in the care of hospitalized patients.

However, it was observed that for the complete establishment and systematization it will be necessary 2 more years of work (cycle of 3 years per project).

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