

# Evaluation of acute low back pain in women after treatment with interferential current

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## Abstract

**Introduction and objectives.** Low back pain has become one of the major public health problems worldwide. Treatment is by the use of analgesics and non-steroidal anti-inflammatory drugs, but it must be taken into account that these have side-effects. Therefore, non-pharmacological therapies may be beneficial in patients at greater risk of developing chronic pain and disability, aiming to decrease pain. The objective of this study was to assess the effect of the Interferential current in women with acute low back pain.

**Materials and method.** The study included female patients, aged 18 – 35 years, who had acute low back pain. The Visual Analogue Scale (VAS) of Pain and the Oswestry Disability Index (ODI) were used for evaluation. The patients received Interferential current in the bipolar form, the parameters were base current of 2 kHz, AMF 50 Hz, which was performed for 20 minutes daily, for 3 non-consecutive days in the week, for 4 weeks, totaling 12 therapies.

**Results.** For evaluation of pain intensity, no difference was observed in the control group with a small effect size, but the treated group had a large effect size. For the ODI, comparison within the group showed no difference for the control group, but there was a decrease in the values for the treated group.

**Conclusion.** It was found that the Interferential current was effective in the reduction of acute low back pain and functional improvement.

## Key words

pain management, musculoskeletal pain, acute pain, low back pain, transcutaneous electric nerve stimulation, electric stimulation therapy.

## INTRODUCTION

Lumbar pain, or low back pain, has become one of the major public health problems in the Western world during the mid-20th century, and currently seems to be spreading throughout the world, with costs rising sharply. The prevalence, depending on the literature consulted, may reach 84%, affecting all age groups. Non-specific low back pain is defined as low back pain not attributable to a recognized cause or specific disease (infection, tumour, osteoporosis, fracture, structural deformity, inflammatory disorder, root syndrome, or equine tail syndrome), is generally associated with sedentary occupations, smoking and obesity, with higher incidence in the low socio-economic classes [1–4]

Acute mechanical low back pain may originate from one or more structures of the spine, including ligaments, joints, intervertebral discs, musculature and paravertebral fascia, and spinal nerve roots. For treatment, there is the use of analgesics and non-steroidal anti-inflammatory drugs, muscle relaxants, and opioids, but it must be taken into account that these have side-effects. Therefore, non-pharmacological therapies may be beneficial in patients at greater risk of developing chronic pain and disability, aiming to decrease pain [5, 6].

The mechanisms of action of many treatments are unclear, considering both patient preference and evidence for pain control. Most people recover from acute low back pain, but

10 – 33% may develop chronic symptoms, and it is considered that only exercise can be considered a preventive factor [1], then therapeutic treatment gains importance and may provide conditions for its development.

The interferential current is a medium frequency alternating current therapy with low-frequency amplitude modulation. It has been applied to pain relief and increased blood flow to the tissues. It penetrates deeper into the skin than low-frequency equipment, such as TENS, with less discomfort [7–8]. However, its clinical impact is still controversial in low back pain, with few studies substantiating its efficacy, especially in relation to acute pain [10–11]. Thus, the objective of the present study was to evaluate its effect on young women with acute low back pain.

## MATERIALS AND METHOD

The study was characterized as a randomized, cross-sectional clinical trial. The research was conducted at the Physical Rehabilitation Center of the State University of Western Paraná (Unioeste), in the city of Cascavel – Paraná – Brazil, with female volunteers who had acute, non-specific low back pain.

A total of 44 women were selected, with 2 dropouts and 1 who did not reach the pre-established criteria, totalling 41 volunteers (Fig. 1), aged 18 – 35 years. Inclusion criteria were: low back pain of less than 3 months, female gender, age between 18 – 35 years, did not use any analgesic medication or other forms of therapy during the research period. Women with previous lumbar spine surgery, the use of a pacemaker,

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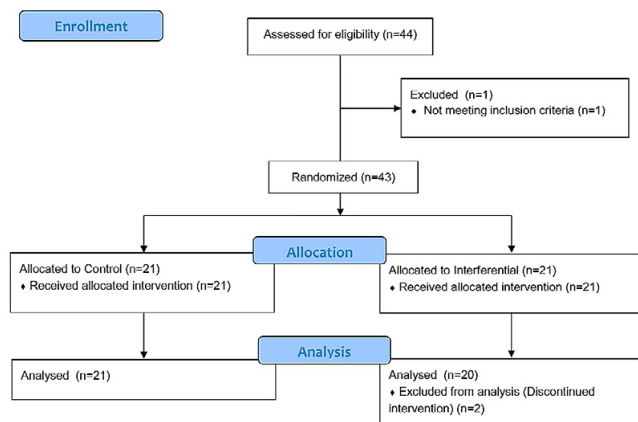


Figure 1. Study flow chart, according to Consort

presence of deep venous thrombosis, tuberculosis or tumours, were excluded from the study. The volunteers were divided into 2 groups: a control group (n=21), in which the volunteers only performed the evaluations, without any type of therapy, only offered therapy at the end of the experiment period; and a group treated with interferential current (n=20).

At the beginning of the study, each volunteer was informed about the intentions and procedures that would be performed during the research, as well as being questioned about their interest in participating in the study. Upon acceptance of the invitation, the participants signed an informed consent form. The study was approved by the Research Ethics Committee of UNIOESTE (Opinion No. 2,858,177).

**Electro Stimulation Protocol.** In order to perform the therapy, the volunteers were placed in a ventral decubitus position on a stretcher with the lower back bare, to which 70% alcohol aseptis was applied with cotton wool. Two channels were used, with four rubber-silicon electrodes of 8 cm<sup>2</sup>, arranged longitudinally on the lumbar spine, attached with adhesive tape. Two electrodes were positioned in the T12 region and the other two in the L5 region; water-soluble gel was added to each electrode. The patients were then given Interferential current in the form, using Ibramed® brand equipment. The treatment parameters were: base current of 2 kHz, AMF 50 Hz, performed for 20 minutes daily for 3 non-consecutive days in the week for 4 weeks, a total of 12 therapies. The intensity was established according to the patient's sensitivity, and should be referred to as a noticeable and strong, but comfortable sensation.

**Analyzed variables.** During the first week, the volunteers were submitted to initial evaluation (EV1). Afterwards, separation was performed in the treated (Interferential) and control groups by means of an opaque envelope draw. At the end of the fourth week, they were again evaluated (EV2).

Pain assessment was performed using the Visual Analogue Pain Scale (VAS), which was explained by the researcher and the volunteer reported her pain in the last 24 hours, according to an illustrated scale numbered from 0 (no pain) to 10 (maximum pain) in both EV1 and EV2.

Evaluation of the impact of pain on the activities of daily living was calculated by the Oswestry Disability Index (ODI), which is an instrument for functional evaluation of the lumbar spine. The first question assesses the intensity of pain and the other nine, the effect of pain on daily activities,

ranging from 0 – 5. The score is classified as minimum disability (0–20%), moderate disability (21–40%), severe disability (41–60%), invalid (61–80%), and bed restricted [12].

**Statistical analysis.** For the sample size calculation, difference in the means of 1.0, standard deviation of 1.6, test power of 80% and the significance level of 5% was used, with a total of 22 people per group. The groups were presented with descriptive analysis, and the paired t-test (intra-group comparison) and non-paired t-test (comparison between groups) were used for statistical analysis of the VAS, and the Wilcoxon test used for the Oswestry Disability Index (intragroup) and Mann-Whitney (between groups). Significance level was set at 5%, using the programme BioEstat 5.0. In addition, Cohen effect size calculation was performed.

## RESULTS

In the pain intensity evaluation, no difference was observed in the control group with a small effect size, but was observed for the treated group, with a large effect size. When comparing the groups for the first evaluation, there was again no significant difference, but there was a moderate effect size, and in the final evaluation, there was a significant difference with a large effect size (Tab. 1).

Table 1. Mean and standard deviation values observed for VAS at different assessment moments (EV1 and EV2) for the two groups studied

	EV1	EV2	p-value	ES
Control	9±1.6	2±1.6	1860	-0.19
Interferential	9±2.1	1±1.5	<0.0001	-0.99
p-value	0954	0354		
ES	-0.54	71		

ES – effect size.

For the ODI, comparison within each group showed no difference for the control group, but there was a decrease in the values for the treated group. There were no significant differences between the groups (Tab. 2).

Table 2. Presentation of values observed for ODI, in the median (below 1st and 3rd quartiles), at different moments of evaluation (EV1 and EV2) for the two groups studied

	EV1	EV2	p-value
Control	8 3–15	9 3–15	1
Interferential	5 7–18.0	0 7–15.2	0076
p-value	1922	9169	

## DISCUSSION

Most people obtain relief from acute low back pain fairly quickly, and only about 10–15% develop chronic symptoms. However, about 1/3 of patients may not fully recover after 1 year. One of the major problems is recurrence, and physical exercise is an important preventive factor [1]. In the presented study, the aim was to evaluate whether the interferential

current could lead to conditions of reduction of the pain for this type of patients, which could provide conditions for such activities as physical exercise. The result was that a significant reduction of pain was observed.

Two assessment tools were used in the study at two different moments, at the beginning of the treatment when it was intended to obtain the values of the visual analogue scale (VAS) and the Oswestry Disability Index (ODI) using the questionnaire. At the end of the treatment, a new evaluation was carried out using the same instruments in order to compare the 1st and 2nd evaluations. This justified the single use of the current as a form of therapy, i.e, it was intended only to visualize possible analgesic effects of the current, without other forms of associated therapy.

Interferential current is used for various purposes, such as improvement in intestinal transit [13], dysphagia [14], increase in vascular flow [15] and muscle strengthening [16], but its main use is to produce analgesia [17]. However, there are conflicting results about its use, as presented by Kadi et al. [17] who used the interferential in the post-operative period of knee arthroplasty, which showed less use of paracetamol in only one of the evaluations, without advantages for other variables used in relation to pain. Similarly, Nazligul et al. [18] did not observe any advantages in applying the interferential on a protocol with exercises, cryotherapy and non-hormonal anti-inflammatory in patients with impact syndrome.

Concerning chronic lumbar pain, the reports indicate the advantages of interferential current, as in the study by Rajfur et al. [8], who compared TENS, high voltage, diadinamic and interferential, evaluating the intensity of pain, range of motion and spine function, and report that the use of interferential was effective in the treatment. Albornoz-Cabello et al. [10] observed reduction in the perception of pain and functional disability. Lara-Palomo et al. [19] also observed an improvement in pain, disability and quality of life when they used a massage technique with interferential current. Yet Franco et al. [20], observed that interferential may produce early reduction of pain when performed prior to Pilates exercises, but over time they did not observe advantages for pain intensity, pressure pain threshold, and disability [21]

Records of acute low back pain are scarce [11]. Hurley et al. [22] evaluated the use of interferential alone or in combination with spinal manipulation, reported that there were improvements in functional disability, analgesic medication consumption, pain, quality of life and participation in exercises, but without differences between groups. However, regardless of the studies cited in chronic or acute pain, the base frequency of the interferential current was 4,000 Hz [8, 10, 19–22]. This variable is the target of studies since there is uncertainty about which current parameter degenerates the efficacy of the same [23, 24]. In this way, the current study presents as a novelty the use of interferential current with base of 2,000 Hz, intended as an analgesia. This frequency is quoted as being less comfortable than higher frequencies [23]; however, for the volunteers in this study, it showed a reduction in pain intensity and disability, observed by intra and intergroup comparisons and corroborated by the effect sizes found. Also, the use of bipolar current was used despite the fact that this technique has less penetration [25] and less ability to produce changes in pain thresholds [26], due to the fact that there is no need for crossover and interference within the body, and is simpler and more practical to use in the clinical setting.

The use of VAS is widely accepted as an easy-to-use and reliable instrument for evaluating pain intensity and is widely used in the literature [10]. ODI is also widely used, but it allows a better evaluation of more severe pain in patients [12], which may have disrupted the comparison, especially among groups in the presented study, since both groups had already started with a score regarding minimum disability.

It is suggested that future studies should make comparisons with other variables, aimed at identifying the repercussions of this therapeutic modality, as well as its association with restorative physical exercises.

## CONCLUSION

The study demonstrated that the use of Interferential current was effective in reducing acute low back pain in women, as well as improving aspects related to disability.

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