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PAIN MANAGEMENT IN PATIENTS WITH LUMBAR PAIN SYNDROME THROUGH COMBINED PHYSICAL AND KINETIC THERAPIES

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Abstract: *The aim of this study is to highlight the importance of associating various means of electrotherapy and kinesiotherapy in patients with low back pain. The study included 30 patients, diagnosed with low back pain syndrome, who underwent a complex treatment of physical therapy and kinesiotherapy associated with drug treatment. A questionnaire based on a series of standard questions, marked with 0-5 points, ranging from no pain and reduced functionality to intense pain and functional impairment, was used to quantify the intensity of pain and limitation of functionality due to pain. Data centralization, analysis and comparison allowed us to identify the dynamic evolution of the monitored parameters so that after the application of associated therapies we found that if at the beginning of the treatment the majority of patients 70% (21 cases) were in severity class I established on the basis of the scores obtained by the patients in the questionnaire applied, at the end of the treatment only 13.3% (4 cases) remained in severity class I. In conclusion, the use of electrotherapy ensures the rapid achievement of optimal local conditions in the affected structures, removing the algesic component and thus preparing them for the kinetic program, thus creating a perfect symbiosis between the two methods of recovery of patients with low back pain syndrome.*

Key words: *kinesiotherapy, electrotherapy, algesic syndrome, functional impairment, spine*

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1. Introduction

Acute lumbar pain is one of the reasons patients go to the doctor. [1] It covers a wide spectrum and several types of pain can be detected: nociceptive, neuropathic, and non-specific [6].

Lumbar pain is usually non-specific, and is usually caused either by the vertebral discs or the surrounding soft tissues. The diagnosis is established after a thorough evaluation, which in more complicated cases that do not respond to the initial treatment prescribed by the specialist includes imaging tests to discover the nature of the pain [6].

Given the complexity of low back pain, a multidisciplinary approach [2] involving medication, electrotherapy and kinesiotherapy is required.

The very high - and increasing - frequency of spinal disorders can be explained by the risk factors mentioned, which are becoming increasingly topical in our society: obesity, height (over 1.70 for women and 1.80 for men), static disorders, driving, motor vehicles, stress, anxiety, depression, place of work, etc. [5].

Studies show that applying a sustained exercise programme led to positive results after about 20 weeks and the beneficial effects were maintained over a long period of time. [9]

All patients with acute or chronic low back pain should be advised to remain active and the approach should be multidisciplinary to prevent impairment of movement function and hence disability [4].

Therefore, an assessment of the nature of the pain and a correctly established diagnosis will be able to effectively guide the type of therapy appropriate to each individual patient. [7]

Electrotherapy is one of the most commonly used treatments alongside kinesiotherapy for patients with low back pain [3].

In addition to existing therapies, attention should also be focused on educating patients with low back pain, as they are at risk of relapse, with the aim of improving pain and function. [10]

2. Objectives

The main purpose of this study is to highlight the importance of combining various means of electrotherapy and kinesiotherapy in patients with low back pain.

3. Material and Methods

The hypothesis from which the research started was that if, in addition to the classic drug treatment with anti-inflammatory drugs, we use kinesiotherapy programmes with physical procedures, and we can improve the symptoms of low back pain.

The study was conducted on 30 patients diagnosed with low back pain syndrome who underwent a complex treatment of physical therapy and kinesiotherapy combined with drug treatment. Of these, 26 patients (86.7%) were admitted with the diagnosis of lumbar-sciatica and only 4 patients (13.3%) with the diagnosis of

acute lumbago. A percentage of 81% of the cases of lumbar-sciatica (21 patients) occurred as a result of disc-radicular conflict through disc herniation. In the remaining 19% of cases (5 patients) in which the diagnosis of disc herniation was refuted, laboratory, clinical and radiological data were correlated and the following pathogenesis was established: 3 cases of spondylosis and 2 cases of interapophyseal arthrosis.

Of the sample of 30 patients, 19 were men (63.3%) and 11 were women (36.7%). This gender distribution can be explained by biological but also social differences, as occupational exposure to risk factors is higher in men.

The age of the patients ranged from 29 to 74 years (average age of the sample is 51.5 years)

A unidimensional verbal scale (referring exclusively to the painful sensation) was used to quantify pain intensity.

The simple verbal scale allows self-assessment of pain by the patient's response to a series of standard questions, marked with 0-5 points, ranging from no pain to severe pain.

Also, pain on percussion and limitation of functionality (based on a questionnaire on daily activities) were introduced as parameters, considering that these two parameters add to the picture of the algesic phenomenon.

By managing a variable (independent variable) the kinesiotherapy's follows its effects (dependent variable, expressed in the subjects' reactions). In our case, the experiment is medical, the independent variable being the lumbosacral complex recovery program.

The independent variable is represented by the changes that occur as a result of manipulating the independent variable. The following characteristics of the dependent variable were followed:

1.Fighting pain;

2. Increased joint mobility;

3.Gaining joint stability;

4.Toning the back muscles with emphasis on the lumbosacral muscles.

The treatment was carried out in 3 consecutive stages, depending on the intensity of the algesic phenomenon.

1. Acute stage - on average up to 10 days after the onset of algesic phenomena, treatment was based on symptomatic medication, as appropriate (analgesics, relaxants, sedatives, tranquilizers) and rest.
2. Post-acute stage- after about 10 days, the followingwas used:
   - Galvanic currents: simple galvanization therapy in 24 cases (80%), iongalvanization in 2 cases (6.7%), and galvanic baths (13.3%). The number of sessions applied varied between 8-17 sessions, in daily applications, for 5 days per week.
   - diadynamic currents: in order to obtain the analgesic effect with diadynamic current, the patients in the study group were given the formula: current DF = 2 minutes; current PS = 2 minutes; current PL = 4 minutes. The duration of the treatment session was short, to avoid accommodation (8 minutes); a longer duration could decrease the effectiveness of an analgesic application. For the same

reason only 10 sessions were indicated, applied daily for 5 days per week.

It should be emphasised that although low-frequency current treatment produces significant and fairly rapid pain relief, the subacute period represents a highly variable stage of evolution, in which there is a risk of relapse. Thus, a consolidation of the remission of symptoms and a prophylaxis of relapses was achieved by a kinesiotherapy programme making the transition to the chronic phase of the disease easy.

3. Chronic phase - the pain has allowed patients to mobilise their spine, with these mobilisations producing tolerable, mild or moderate pain. Exercises from the Williams program and the Mackenzie program, classical massage was used.

To relax the lumbar muscles with a concomitant reduction in lumbosacralgia, T. Sbenghe recommends applying the modified hold-relax exercise with moderate to minimal resistance [8]. The kinesiotherapy sessions were held 3 times a week and lasted 45 to 50 minutes.

4. Results

In order to highlight the analgesic effect of combined therapies, a series of clinical parameters were monitored that record pain with subjective evolution; and for a more unified study of the improvement of the initial condition, objectively measurable clinical parameters were also introduced, which are directly correlated with pain, depending on it or determining it, considering them important for this reason in the global clinical evaluation.

Patients were assessed on the basis of the parameters listed in Table 1 at the beginning and at the end of the treatment, obtaining an initial and final score for each parameter.

Post-treatment score improvement was calculated for each individual parameter, and based on the summation of each patient's initial and final scores, patients were classified into severity classes that allowed the overall clinical improvement to be assessed.

Based on the summed score, cases were classified into 3 severity classes:

- 0-12 points: class I→ high severity;
- 13-19 points: class II→ medium severity;
- 20-26 points: class III→ low severity.

Thus, the evolution of severity classes following the applied therapies (Figure 1) shows that while at the beginning of the treatment the majority of the patients 70% (21 cases) were in severity class I, 23.3% (7 cases) were in severity class II and only 6.7% (2 cases) were in severity class III; at the end of the treatment 50.4% (15 cases) were in severity class III, 23.3% (11 cases) were in severity class II and only 13.3% (4 cases) were in severity class I (Figure 1).

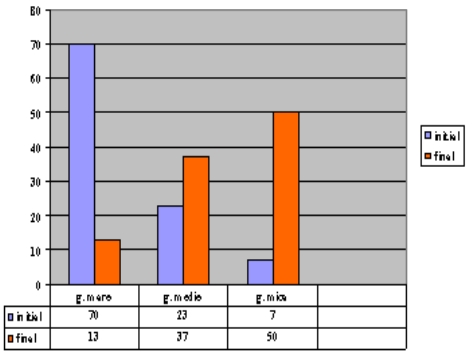

Fig. 1. *Evolution of severity classes*

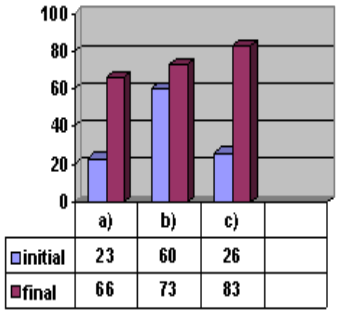

Fig. 2. *Static spine syndrome in scores Percentage*

a. straightness of the lumbar spine;
b. scoliotic attitude;
c. antalgic paravertebral contracture

a. The straightness of the lumbar spine, with the removal of physiological lordosis, is a modification whereby the patient reduces the weight on the posterior aspect of the lumbar discs, thereby reducing radicular irritation arising from disc protrusion or vertebra-radicular contact. At the end of the treatment period, we achieved improvement in this parameter in 43% (20 cases, i.e. 66.7% showed minimal straightness or disappearance of the sign) (Figure 2).

In improving the straightness of the lumbar spine, an important role is played by the use of galvanic current, which exerts a hyperemic vasomotor effect, followed by increased resorption of local exudates and oedemas, allowing the reduction of radicular inflammation, with an improvement of more than 43% of this parameter being eloquent (Figure 2).

b. Scoliosis was initially present in 12 cases (40%), but remained present in 8 cases (26.7%); only 13.4% of cases improved (Figure 2).

The reduced improvement in this parameter is also partly due to a learned attitude, the correction of which is the responsibility of kinesiotherapy.

c. Contracture of the paravertebral muscles was initially present in 73.3% of cases (22 patients), and finally in 26.7% of cases (8 patients), so there was an improvement of more than 56% of the parameter, leaving only 5 cases (16.7%) with some degree of contracture (Figure 2). Contracture of the paravertebral muscles can be uni- or bilateral, in the first case being more marked on the affected side.

Of the 22 cases initially recorded, 21 cases had the pathogenesis determined by disc herniation. The percentage of patients with disc herniation who presented with paravertebral contracture is lower in this statistic than in the literature data (84% versus 97% after Golob) [4].

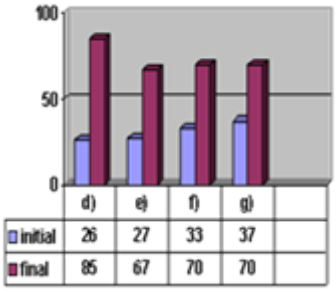

Fig. 3. *Pain limitations in percentage scores; dynamic spinal syndrome*

d. flexion;

e. extension;

f. lateral tilt;

g. extension

d. Flexion-limiting pain is due to anterior flexion of the intervertebral space, which causes posterior bulging of the disc and narrowing of the conjugation foramen. The improvement of this parameter was 58.9% (Figure 3).

e. Painful extension was initially presented in 73.3% of cases, this high percentage being natural in the context that any extension movement means accentuation of lumbar lordosis. At the end of treatment, extension was painfully limited in only 33.3% of cases (10 patients), resulting in a 40% improvement.

f. Lateral tilt is measured by the distance between the fingers and the ground. Lateral inflection was initially limited in a smaller number of cases (66%) compared to flexion and extension. At the end of treatment, lateral tilt was still painfully limited in only 30% of cases, with 36.7% improvement in this parameter (Figure 3).

g. Rotation is the least algesic restricted movement, because the participation of the lumbar spine in this movement is very small. At the beginning of treatment rotation pain occurred in 63.3% of cases (19 patients) and at the end of treatment only in 30% of cases (9 patients). Improvement of this parameter occurred in 33.3% (Figure 3).

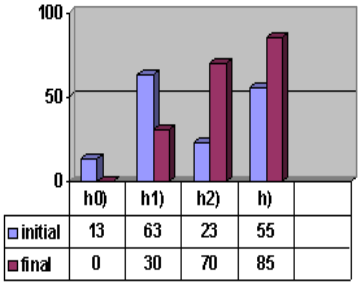

Fig. 4. *Dural syndrome (Lasègue manoeuvre)*

h0. frequency for m. Lasègue positive under 45º;

h1. frequency for m. Lasègue positive at 45º-60º;

h2. frequency for m. Lasègue;

h. percentage score for m. Lasègue.

In this statistic, this parameter showed an overall improvement of 30%, resulting from the following data: at the beginning of treatment the Lasèguemanoeuvre was positive below 450 in 13.3% of cases (4 patients), between 450-600 in 63.4% of cases (19 patients) and negative in 23.3% of cases (7 patients) (Figure 4).

At the end of the treatment no patient had a positive Lasèguemanoeuvre below 450, only 30% (9 cases) had a positive Lasèguemanoeuvre between 450-600, and 70% (21 cases) had a negative Lasèguemanoeuvre (Figure 4).

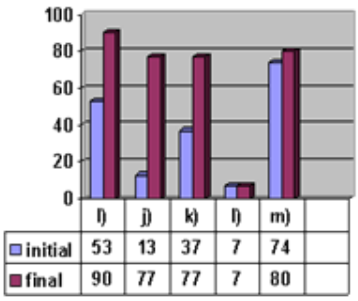

Fig. 5. *Neuro-radicular syndrome in percentage scores*

i. lumbosacral pain;

j. sciatic and/or crural irradiated pain;

k. hypoesthesia; reflex disorders; m. muscle strength.

i. Lumbosacral pain was initially present in all cases investigated, with the following intensities: mild 63.3% (19 cases); medium 33.3% (10 cases); severe 3.3% (1 case). After treatment with low frequency currents for analgesic purposes, pain remission was observed in only 7 cases, of which 5 cases (16.7%) experienced mild pain and only 2 cases (6.7%) experienced medium intensity pain. The overall improvement of this parameter was 36.7% (Figure 5).

j. Irradiated sciatic pain was initially present in 26 cases (86.7%), persisting after treatment in only 7 cases (23.4%). The improvement in this parameter was 63.4%. (Fig. 5) In the 7 cases where irradiated pain was still present at the end of treatment, there was a decrease in intensity compared to the time of the start of treatment

k. In this study, subjectively-accused paresthesias overlapped with the objective parameter of dermatomal cutaneous hypoaesthesia, with the same improvement in score.

Hypoaesthesia rarely concerns thermal sensitivity, frequently tactile and painful sensitivity. Complete anaesthesia occurs very rarely: either in old discopathies with longstanding neurological distress, or in vascular pathologies with complete functional radicular siderosis. In this statistic, hypoaesthesia was initially present in 63.3% of cases (19 patients). (Figure 5). This percentage was determined by comparison with the healthy contralateral area.

The same parameter was present at the end of treatment in only 23.4% of cases (7 patients). The improvement achieved was 40% (Figure 5).

l. Regarding the reflex disorders considered, it was found that initially reflex disorders were detected in 2 cases (6.7% of patients) and at the end of the treatment we found that this parameter did not improve at all (Figure 5). This result confirms once again the data in the literature that claims that the loss of a reflex is in most cases irreversible.

A chance of recovery of this parameter belongs to kinesiotherapy, considering that the improvement of muscle strength in the corresponding territory would also allow the corresponding recovery of function.

m. Muscle strength was initially impaired to varying degrees in 26 cases compared to healthy controls, both in the corresponding myotome and in an overall decrease in lower limb muscle strength.

Of the cases studied only one case was in the paretic lumbosciatica study. At the

end of the treatment there was improvement by severity class, with an overall improvement of 6%.

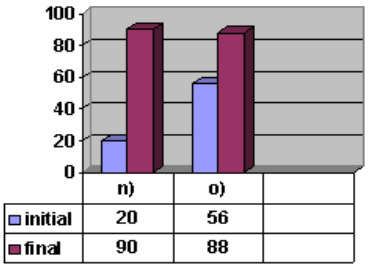

Fig. 6. *Percentage improvement in algesic parameters*

n) percussion pain;

o) pain, assessed from a clinical-functional point of view.

n. Percussion of the lumbar spine at the level of the hernia or vertebro-discal conflict causes local pain with radiation along the sciatic.

At the initial evaluation of the cases, pain on palpation was present in 24 cases (80%) and at the final evaluation in only 3 cases (10%). The improvement of this parameter was 70% (Figure6).

o. On the basis of a questionnaire on daily activities, we assessed pain from a functional point of view, dividing patients into severity classes. While at the beginning of the treatment pain prevented activity in only one case (3.3%), limited activity in 24 cases (80%) and only in 5 cases patients declared that their daily activity was not affected, at the end of the treatment the situation improved, with 23 cases (76.7%) declaring that they were no longer limited by pain and could carry out normal activity, only 7 cases (23,3%) stated that the pain limited their daily activity (need not to stand or walk a longer distance) and the patient who initially stated that the pain was so intense that it often limited his daily activity stated that during the period of hospitalisation and low frequency current treatment he no longer experienced such painful episodes (Figure 6).

5. Discussions

The results of this study demonstrate the local and reflex analgesic effect of low-frequency current in the treatment of lumbar spine disorders, as well as its positive influence on the whole clinical picture of the disorder in combination with kinesiotherapy.

6. Conclusions

Pathogenesis of the lumbar spine is an important public health problem, generally affecting working age.

Treatment started early prevents the quasi-chronic and progressive progression of low back pain, which otherwise requires ongoing maintenance through physical treatment.

The use of low-frequency currents ensures that optimal local conditions are quickly achieved in the affected structures, removing the algesic component and thus preparing them for the kinetic programme. The result is a substantial shortening of hospitalisation time where appropriate and a significant increase in overall therapeutic effectiveness.

The association of low-frequency current therapy as a precursor to kinesiotherapy within the general treatment favours the distribution of cases in classes of minimum severity, in the sense of a favourable overall clinical evolution, expressed on all clinical parameters within the algesic syndrome and correlated with it. Specifically, the number of patients initially classified in the high severity class decreased at the end of treatment by 57% and the number of patients classified in the low severity class increased by 43%.

The net favourable evolution of the parameters followed was also targeted by an increase in the overall clinical score from 45% (334 points at the beginning of treatment) to 78% (585 points at the end of treatment). The improvement of the overall clinical score following the complex treatment was 33%.

The average percentage improvement in pain was good (48%), divided by the following components: lumbar pain improved 63.4%, sciatic irradiated pain improved 63.4%, percussion pain improved 70%, paravertebral antalgic muscle contracture improved 56.7% and painful limitation of mobility improved in all axes of motion as follows: flexion 58.9%, extension 36.7% and rotation 33.3%. The improvement in pain from a clinical-functional point of view also included a psychological component resulting from self-appraisal, improved by 31.6%.

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