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REHABILITATION THERAPY VERSUS DRUG THERAPY IN PATIENTS WITH LUMBAR DISC DEGENERATION

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Abstract

Lumbar disc degeneration is a disorder whose clinical manifestations are represented by episodic pain in the lumbar spine, without lumbar blockage and minor muscle contraction. Because lumbalgia caused by lumbar disc degeneration is not always very high intensity pain, the easiest to apply treatment is drug therapy. The aim of this study was to analyze the potential role of rehabilitation treatment in the recovery of patients and the prevention of complications compared to drug therapy alone. The study included 28 patients (17 women and 11 men) aged between 23-60 years, assigned to two groups: 20 patients who received rehabilitation treatment (consisting of massage, kinesiotherapy, hydrokinesiotherapy, electrotherapy and medication) and 8 patients who received drug treatment consisting of anti-inflammatory and analgesic drugs. The treatment duration was 10 days. For the evaluation of pain, the visual analogue scale was used, for the degree of disability, the Oswestry questionnaire, and for joint mobility and muscle strength, articular and muscular testing. At the end of treatment, the study group compared to the control group had a statistically significant result for pain (p=0.001), as well as for the Oswestry score (p=0.030). The mean age of the patients was 35.51±3.026, which shows an increased incidence among young adults. A possible connection between the development of the disease in women and age less than 45 years was also investigated, but the result was not statistically significant, p=0.22. Our data suggest the fact that rehabilitation treatment plays an important role in the reduction of pain and the improvement of the quality of life of patients with lumbar disc degeneration by decreasing the degree of disability. In the future, it can be proposed to monitor patients with lumbar disc degeneration over a longer time period in order to see the effects of kinetic rehabilitation programs in relation to the delay of chronicization. As studies show, genomic medicine is gaining ground and in the future we will probably witness genetic testing for lumbar disc disease and lumbosciatica, which will allow for personalized treatment.

Keywords
low back pain, lumbar disc degeneration, drug therapy in lumbar pain, medical rehabilitation in lumbar disc degeneration
Introduction:

Lumbargia is a major health problem, with medico-social as well as economic implications. One of the diseases that cause lumbargia is lumbar disc degeneration, in which pain is not very intense, but annoying, followed by a remission episode and later, an acute lumbar blockage phase, with intense pain and significant functional loss [1-3].

The prevalence of low back pain is 60-80%, so an individual will have at least one lumbargia episode during the course of life [4, 5].

The increasing incidence of lumbargia in the young population has oriented researches towards finding generating factors of the disease, by moving from a biomechanical, psychosocial and economic level to a genetic level. Thus, recent studies show associations between lumbar disc disease and the mutation of genes encoding the α-2 and α-3 subunits of collagen IX. The α-2 sequence variation has been associated with dominantly inherited lumbar disc disease and the α-3 variation with an increased risk of sciatica, being the first genetic factor for lumbar disc disease [6, 7].

The efficiency of both drug therapy and rehabilitation therapy on low back pain is known, so there is a wide basis for fighting pain [8]. All this leads to searching for the best treatment method with the most effective results in delaying the onset and development of disability.

The objectives of the study were to show the importance and the role of administering rehabilitation therapy compared to drug therapy and to improve the medical education of patients.

Material and method

The study included 28 patients (17 women and 11 men) aged between 23 and 60 years, diagnosed with lumbargia caused by lumbar disc degeneration, which were assigned to two groups. The study group consisted of 20 patients with a mean age and SE of 37.65±2.76, who received rehabilitation therapy and drug therapy, and the control group comprised 8 patients with a mean age and SE of 33.37±3.11, who only received drug therapy.

The environment of origin was in a proportion of 85% urban and 15% rural for the study group, and 100% urban for the control group. This was a prospective study, carried out at the Clinical Rehabilitation Hospital in the period January 2013 – July 2013.

In order to assess the disability degree, the Oswestry questionnaire was used, and for the evaluation of pain, the Visual Analogue Scale (VAS). For joint mobility, articular testing was performed for flexion, extension, lateral inclinations and rotations, and for muscle strength, muscular testing was carried out. Evaluation was performed two times, before the initiation of treatment and after its completion.

For both groups, the treatment duration was 10 days. The treatment of the study group consisted of antiinflammatory and analgesic medication and massage, kinesiotherapy, hydrokinesiotherapy, electrotherapy procedures (interferential currents/ultrasound/Tens), and for the control group, medication comprised analgesics and antiinflammatory drugs.

In order to help the patients better understand the importance of the exercises, they were informed through informative flyers about rules for back protection from the school of the back.

Statistical analysis was carried out with SPSS 20.0 for Windows, using the $\chi^2$ test for qualitative data and Student t test for quantitative data.
Results
After the completion of treatment, the mean ± SE of the Oswestry questionnaire score in the study group was 22.4±0.81 compared to 26.75±1.01 before the initiation of treatment. In the same group, the visual analogue scale values were 3.5±0.25 compared to 5.4±0.26.
In the control group, the results of the Oswestry questionnaire were 32.25±0.59 compared to 31.75±0.958 before the beginning of treatment, and for VAS, 6.25±0.31 - 5.87±0.22.
Articular testing and muscular testing had normal values in both groups both before and after treatment.
The Oswestry questionnaire values were statistically significantly higher in the study group compared to the control group, p=0.030 (Fig. 1) and VAS values were statistically significant, p=0.001 (Fig. 2).
The mean age and SE of the two groups was 35.51±3.026 (Fig. 3).
A correlation was made between the development of the disease in women and age less than 45 years, but the result was not statistically significant p=0.22 (Fig. 4).
The urban environment and female sex were the most frequently affected by lumbalgia.

Conclusions
The reduction of pain and the improvement of the physical status of the patients were the main benefits of treatment.

This study attempted to show that drug therapy associated with medical rehabilitation therapy has a better effect on the improvement of the quality of life of the patients. In order to see whether there is a connection between the early administration of rehabilitation treatment and the delay of complications in lumbar disc disease, further investigations are proposed.

Young adults are the most affected by lumbar disc disease.

The urban environment proves to be the place where lumbar disc disease is the most frequent, probably because of the diversity of professions found here.

As studies show, genomic medicine is gaining ground and in the future we will probably witness genetic testing for lumbar disc disease and lumbosciatica, which will allow for personalized treatment.

Limitations of the study
The main limitation of the study consists of the small group of patients and the location of the clinic in an urban area, which may lead to a poor representation of patients from the rural environment, in the absence of occupational heterogeneity, which must be corrected in the future by multicenter studies.

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Fig. 1. Mean Oswestry score on day 10 in the two groups.

Fig. 2. Mean visual analogue scale score on day 10 in the two groups.

Fig. 3. Age distribution of the study groups.

Fig. 4. Correlation between age less than 45 years and sex
ROLE OF KINESIOThERAPY IN THE RECOVERY OF PATIENTS WITH PRIMARY COXARTHROSIS

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Abstract:
Primary coxarthrosis is a disorder of the hip that may lead to a decrease in the quality of life due to the presence of pain, vicious positions, joint stiffness, and decrease in the joint range of motion. In this article, the role and importance of kinesiotherapeutic treatment along with drug therapy in the recovery of patients with primary coxarthrosis was studied. Kinesiotherapy administered to patients in the study group (medication and kinesiotherapy) contributed to the increase of the joint angle values at the level of the coxofemoral joint and muscle strength. The Womac test performed at the end of treatment (day 12) in the study group shows a decrease in pain intensity and a reduction of joint stiffness compared to day 1, before the initiation of treatment. The Lequesne functional index applied at the end of the 12 days of treatment from statistical analysis shows that patients can easily walk longer distances and can perform daily activities more easily, which results in an increase in their quality of life.

Key words: primary coxarthrosis, kinesiotherapy, recovery.

Introduction:
Coxarthrosis is a disorder of the hip that results from an imbalance between stress mechanisms exerted on the hip and the exercise resistance capacity of cartilage and bone tissue. Two groups of coxarthrosis are distinguished: primary coxarthrosis, also termed idiopathic, and secondary coxarthrosis. Studies on the etiology of coxarthrosis have shown a frequency of 40% for primary coxarthrosis and 60% for secondary coxarthrosis [1].

When no cause can be established at the origin of the syndrome, coxarthrosis is considered to be “primary” or “essential”. This type of coxarthrosis is caused by general factors that are little known, which alter the metabolism of joint cartilage and induce premature senescence lesions, through the early wear of joints subjected to maximal strain. In all disease forms, the presence of a joint imbalance is admitted, which depends on the intervention of several risk factors: heredity, nutrition, hormonal status, bone density, cartilage and bone metabolism, obesity, the mechanical joint environment, cartilage loading, joint trauma and deformation, professional strain, sports activities, muscle weakening [2].

Progressive degenerative changes in the hyaline cartilage remain asymptomatic for a long time period. The major symptoms with variable functional implications are pain, which initially occurs after marked mechanical strain, prolonged monotonous standing positions, and which progressively accompanies the patient during the day, and joint stiffness with progressive joint limitation, with a tendency to develop vicious positions (hip flexum in external rotation) [1].
From a clinical-functional point of view, three stages are described: initial, middle, and final.

If diagnosis in the period of active disease generally poses no problem, the early diagnosis of the disease that is based on anamnesis, frequently unspecified and inaccurate, as well as on radiographic findings, generates discussions and uncertainties, particularly in its essential forms.

The objectives of treatment in coxarthrosis are the reduction of pain and inflammation, the increase of joint mobility and the maintenance of function, the prevention of physical disability, the avoidance of drug toxicity, the improvement of the quality of life [3].

Treatment involves several aspects: removal of favoring factors, drug therapy, physiotherapeutic treatment and surgical treatment.

The kinesiotherapy program in primary coxarthrosis is aimed at meeting all the four objectives of the treatment of this disease, i.e. the reduction of pain, the increase of mobility and stability, the improvement of coordination and balance during walking.

The evolution of coxarthrosis is slow and progressive. As a rule, it is difficult to evaluate the onset, which is frequently insidious, sometimes marked by acute episodes followed by remission for months or years [4].

**Objectives:**

The objectives of the study are the demonstration of the essential role of kinesiotherapy in patients with primary coxarthrosis, which contributes to the prevention of the vicious positions of the hip, the recovery of the function of the coxofemoral joint by kinesiotherapy, the increase of joint mobility, the increase of muscle strength, the improvement and fighting of pain.

**Material and method:**

We applied the case study to a study group consisting of 20 patients with primary coxarthrosis from the “Sfântul Iosif” Center of Physiotherapy and Kinesiotherapy in Cluj-Napoca, Romania, in the period April-June 2013. The subjects received drug treatment (anti-inflammatory drugs) as well as kinesiotherapeutic treatment.

In order for the study to be as relevant as possible, we included a control group with a comparable level to that of the study group – a number of 10 patients with primary coxarthrosis, with drug treatment (anti-inflammatory drugs), patients of various family doctors.

The inclusion criterion for patients was the diagnosis of primary coxarthrosis, and the exclusion criterion was represented by patients who had physiotherapy, massage and kinesiotherapy contraindications.

We administered to both groups a patient evaluation record that included: a questionnaire regarding sex, age and the environment of origin, articular testing, muscular testing of the coxofemoral joint, Womac scale for the assessment of pain, stiffness and reduction of joint mobility, Lequesne functional index.

For statistical analysis, we used the technique of parallel groups, using two subject groups (study group – patients with drug treatment and kinesiotherapeutic treatment, and control group – patients with drug treatment).

In this intersubject study design, we comparatively studied the evolution of the two groups, by monitoring the variation of dependent variables (increase of muscle strength, joint angles and improvement of pain and joint stiffness) according to the independent variable (application of a kinesiotherapy program) in the study group, and the variation of dependent variables in the absence of the independent variable in the control group.
Results:

The values of joint angles, muscle strength, Womac scale and Lequesne functional index increased in the patients of the study group after the 12 days of drug and kinesiotherapeutic treatment compared to day 1 before the beginning of treatment (p<0.05). (Fig.nr.1,2,3,4).

After the 12 days of drug therapy, no changes in muscle strength, joint angles, pain and joint stiffness were found in patients of the control group.

Conclusions:

1. The kinesiotherapeutic treatment administered to patients of the study group (drug treatment and kinesiotherapy) contributed to the increase in joint angle values at the level of the coxofemoral joint.

2. After 12 kinesiotherapy sessions, we obtained an increase of muscle strength in patients of the study group compared to the control group.

3. The Womac test performed at the end of treatment (day 12) in the study group shows a decrease in pain intensity and a reduction in joint stiffness compared to day 1 before the beginning of treatment.

4. The Lequesne functional index applied at the end of the 12 days of treatment shows the fact that patients can easily walk longer distances and can perform daily activities more easily, which results in an increase of their quality of life.
Mean joint angle values of the study group before and after treatment

Fig. 1. Mean joint angle values of the study group before and after treatment

Womac scale values for the assessment of pain in both groups after treatment

Fig. 2. Womac scale values for the assessment of pain in both groups after treatment
Womac scale values for the assessment of stiffness in both groups after treatment

Fig. 3. Womac scale values for the assessment of stiffness in both groups after treatment

Mean values of the Lequesne functional index before and after treatment in the study group

Fig. 4. Mean values of the Lequesne functional index before and after treatment in the study group
THERAPEUTIC EXERCISE IN CHRONIC LOW BACK PAIN

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ABSTRACT
Rehabilitation of patients with low back pain is very important because the incidence of this symptom is very high among all ages, but especially after forty years. The rehabilitation team must perform a detailed clinical exam and an assessment of the functional limitations and functional goals to achieve at the end of the treatment for every patient. The goals of the therapy are normalization of impairments in flexibility, strength and endurance, and of course, reducing of pain.

KEY-WORDS: low back pain, therapeutic exercise, functional improvement.

INTRODUCTION
Low back pain is a symptom, not a disease, and has many causes, being described as pain between the costal margin and the gluteal folds. It is extremely common because studies had shown a lifetime prevalence as high as 84%. Onset usually begins in the teens to early forties and most patients have short attacks of pain that are mild to moderate and do not limit activities, but tend to recur over many years. A small percentage of low back pain becomes chronic and causes significant disability (1).

The percentage of patients disabled by low back pain, as well as the costs for it, have steadily increased during the last 30 years. The two most commonly factors are the increasing social acceptance of back pain as a reason to become disabled and the social system that pays benefits to patients with this pathology (2).

PATHOLOGIC CHANGES IN LOW BACK PAIN
Degeneration of the structures of the spine is associated with aging, being accelerated in patients with previous trauma or injury to the lumbar spine. The most commonly involved levels are L4-L5 and L5-S1, because there are the greatest torsion and compressive loads.

The zygapophyseal joints may develop osteoarthritis. The intervertebral disk experiences progressive dehydration in the normal aging process of the spinal structures. Fissures in the annulus fibrosus may develop, causing an inflammatory response and further degeneration may result in the progression of the disease or complete annular tears, which provoke discogenic low back pain, also named internal disk disruption syndrome (39% of the patients with low back pain).

The loss of segmental integrity may lead to further degeneration of the disk, with narrowing of the intervertebral disk space. Because of increased loads on the posterior elements, facet arthropaty may develop, a source of low back pain. The loss of disk height may cause subluxation of the facet joints, resulting in degenerative spondylolisthesis, most commonly at the L4-L5 level.

Other factors associated with lumbar degeneration include environmental, occupational and psychosocial influences. Environmental factors include cigarette smoking and occupational activities that involve repetitive bending, sitting or vibrational stresses. Psychosocial factors are well known to contribute to significant disability in low back pain.
FUNCTIONAL LIMITATIONS IN LOW BACK PAIN

Functional limitations in degenerative diseases of the lumbar spine depend on the anatomic structures involved. All aspects of daily living, including self-care, work, sports activities and recreation may be affected (2).

Symptoms are typically exacerbated during bending, twisting and forward flexion in patients with primary discogenic pain. Patients with facet arthropathy or instability report increased pain with extension-based activities, including standing and walking. Pain is often relieved with sitting and forward-flexed positions.

Patients with myofascial or soft tissue syndromes report pain that is worsened with static and prolonged physical activity. Symptomatic improvement is associated with rest and modalities as heat, cold and pressure.

Patients with contributing psychological factors, such as depression and somatization disorders, report pain out of proportion to the underlying pathologic process, poor sleep and significant disability in their daily activities (3).

REHABILITATION TREATMENT

The most important treatment of any low back pain is education and reassurance of the patient. Most of the acute low back pain symptoms are self-limited and resolve in 4-6 weeks. Therapy is directed toward management of the symptoms rather than the disease.

Initial therapy for lumbar degenerative disease should consist of anti-inflammatory medications, muscle relaxants, occasionally opioid medications for severe symptom exacerbation and a functionally oriented physical therapy program. Most patients feel well with these measures and do not require invasive procedures. Other useful initial treatments may include trigger point injections as well as heat and cold modalities. Low-dose tricyclic antidepressants can help with improvement of sleep (1).

Rehabilitation of lumbar degenerative disc disease includes a thorough assessment of functional limitations and functional goals for each patient. A full assessment of occupational and recreational activities demands and goals should also be made. Occasionally, lumbar orthotics can be prescribed, but these are not beneficial in the treatment of the degenerative disc disease unless there is a significant spondylolisthesis or some other specific indications.

The treatment focus on normalization of impairments in flexibility, strength and endurance and of course, on healthy lifestyle modifications. Physical modalities such as ultrasound and electrical therapy can be used for the acute cases, however, the focus of therapy should be on an active program rather than on the passive treatments (3).

Exercise

Multiple studies have found that exercise results in positive outcomes in the treatment of chronic low back pain, including pain relief (although modest, with a mean difference of 10 points on a 100 point scale), improvement in function and slightly reduced sick-leave.

The most effective exercise for low back pain includes an individualized treatment learned and performed under the supervision of a therapist that includes stretching and strengthening. The purpose of exercises for the treatment of low back pain is to strengthen and increase endurance of muscles that support the spine and improve flexibility in areas that have stiffness. These exercises are combined with motor retraining to establish normal patterns of motor activity (4).
The exact dose and number of exercises and the ideal length of treatment is not known. Because endurance is a significant problem with many patients with chronic low back pain, activity levels should be increased in function of realistic goals rather than on symptoms. Beyond the physiologic benefits of exercise, increasing activity has positive effects on behaviors about pain. Adverse effects of exercise for low back pain are rarely reported, so is a very safe form of treatment.

**Specific exercise treatment for low back pain**

Exercise prescriptions for mechanical low back pain begin with the goal of improving alignment and posture, because the exercises are more effective if they are done from a position of proper alignment that promotes optimal joint function and movement patterns (6). Many postural faults begin as habitual, and then become structural as tight muscles and tendons do not allow immediate correction, and weak muscles cannot maintain the proper position. This happens in long-standing lordosis, in which hip flexors and lumbar paraspinals become tight from prolonged positioning in lordosis, and abdominal muscles become long and weak from disuse and lengthened position. These types of faults can be addressed with the proper exercises to stretch tight areas and strengthen weak areas (7).

Lumbar stabilization and core strengthening exercises that strengthen the muscles that support the spine are the most common exercises used to treat low back pain. Because the deep stabilizers (multifidi and transversus abdominus) do not function well, some programs begin with the training of these muscles. Then the exercises progress to more complex dynamic and functional tasks, sometimes called motor control exercises because the precision of movement is the goal, rather than simply gaining global strength or flexibility (8).

**Aquatic exercises for mechanical low back pain**

Patients who have not tolerated land-based exercises are often able to participate in pool exercises, which have several benefits: buoyancy and reduction of gravitational stress. The greater the amount of the body is submerged, the greater the effect. There is a reduction of 90% in gravitational stresses when the patient is in vertical position and is immersed in water to the neck (5).

Water can decrease pain and muscle overactivity is also decreased in warm water. The same principles for progressing therapy apply to aquatic exercise as to land-based exercise. Patients can learn neutral position, stabilizing and other strengthening exercises, and by walking, jogging or swimming can add an aerobic component (9). Multiple studies have found a beneficial effect on pain and function for patients with low back pain who exercise in the water.

**PROGNOSIS OF LOW BACK PAIN**

Prognosis is difficult to ascertain for many reasons. One is that low back pain is a symptom caused by a large spectrum of pathology with many prognostic outcomes and another is that the pain experience is individual and treatment expectations may vary. There are many complex cultural, psychologic and economic factors that influence pain and rehabilitation outcome. After rehabilitation treatment, most patients are improving their function within 1 month, and the most continue to have pain decrease, although more slowly, until about 3 months. From 3 months to 1 year, little change in pain is seen. The risk of recurrence within 3 months is between 19% and 34%, and increases after 1 year between 66% and 84% (6).
CONCLUSION

Exercise has generally been found to be one of the most effective treatments for decreasing pain and increasing function in chronic low back pain. The many other health benefits of exercise, along with the low risk of causing harm, make it a first-line treatment for mechanical low back pain.

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ROLE AND IMPORTANCE OF REHABILITATION TREATMENT IN PATIENTS WITH PARKINSON’S DISEASE

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Abstract
Parkinson’s disease is a neurodegenerative disorder of the extrapyramidal system, which occurs following the slow and progressive destruction of the pigmented dopaminergic neurons in the brain stem, particularly the substantia nigra and the presence of Lewy bodies. Parkinson’s disease has a progressive evolution and its signs and symptoms develop in time. The aim of this study was to analyze the potential role of rehabilitation treatment for the prevention of complications in patients with Parkinson’s disease, compared to patients with drug therapy alone. The study included 30 patients aged between 50 and 82 years, divided into two groups: group A, including 15 patients who received both anti-Parkinson drug treatment and rehabilitation treatment consisting of massage, kinesiotherapy and occupational therapy, and group B, patients who received only anti-Parkinson drug treatment. The duration of treatment was two weeks. The study included patients with stages I-IV (the Hoehn and Yahr scale). The evaluation scale used was the Garden City Scale for the testing of tremor, bradykinesia, stiffness, gait, posture, facies, upper limb balance, speech, vegetative disorders and the self-care ability. At the end of the study, the study group, with rehabilitation treatment, had statistically significant improvements compared to the control group, with drug treatment alone. The highest improvements were found in the items “stiffness” and “bradykinesia”, and due to these, the quality of gait was also improved. The exercises for the increase of facial mobility are extremely important, because they improve the verbal and non-verbal communication function. Our data suggest the fact that early individualized rehabilitation treatment plays an important role in the improvement of the quality of life of patients with Parkinson’s disease, by the reduction of the degree of disability, the prevention of complications and the increase of the quality of life. Each patient should benefit from rehabilitation treatment that should be continued at home for better results.

Keywords
Parkinson’s disease, Garden City Scale, anti-Parkinson therapy, medical rehabilitation in Parkinson’s disease
Introduction:
Parkinson’s disease is a major health problem, with medico-social as well as economic implications. It is a neurodegenerative disease of the extrapyramidal system, which occurs following the slow and progressive destruction of pigmented dopaminergic neurons in the brain stem, particularly the substantia nigra and the presence of Lewy bodies [1]. The existence of a nigrostriatal dopaminergic neuronal system, whose disturbance generates many extrapyramidal manifestations (Parkinson’s disease), is unanimously recognized [1]. During the course of the disease, many patients encounter mobility difficulties, including transfer, arm mobility and gait difficulties. Due to the frequency of these symptoms, a fear of falling, getting hurt, as well as a loss of independence and inactivity develop, which leads to social isolation and the increase in the risk of osteoporosis and cardiovascular disease [2]. Parkinson’s disease causes not only motor disorders such as rest tremor, stiffness, bradykinesia and gait disorders, but also cognitive disorders, autonomous dysfunction: constipation, orthostatic hypotension, postprandial hypotension, perspiration, depression, sleep disorders, dementia. Given that these manifestations occur as early as in stage I of the disease, the idea that these non-motor symptoms are prior to the diagnosis of Parkinson’s disease can be supported [4]. There are clear indications that motor disorders cannot be treated with drug therapy alone, which is why the best rehabilitation treatment method must be chosen [5, 6].

The aim of the study is to show the importance and the role of rehabilitation therapy in patients with Parkinson’s disease compared to drug therapy and to improve the medical education of patients, through a kinesiotherapy program to be followed at home.

Material and method
The study included 30 patients aged between 50 and 82 years, diagnosed with Parkinson’s disease stages I-IV according to the Hoehn and Yahr classification, who were assigned to two groups. The exclusion criteria were patients with Parkinson’s disease stage V and those with contraindications for the physical-kinetic rehabilitation therapy methods.

Group A, the study group, included 15 patients who received, in addition to anti-Parkinson drug therapy, rehabilitation therapy. Group B, the control group, included 15 patients who were treated only with drug therapy. This was a prospective study that was carried out at the Clinical Rehabilitation Hospital in the period November 2012 – July 2013. In order to establish the degree of physical deficiency, we used for evaluation the Garden City Scale that tested 10 items: tremor, stiffness, bradykinesia, gait, posture, upper limb balance, facies, speech, vegetative disorders, self-care ability. The total score of the scale is obtained by adding up the scores from 0 to 3 for each item; the lower its value, the better the general status of the patient; the maximal score (30) corresponds to a highly disturbed clinical-functional status, with multiple dysfunctions. The evaluation test was performed twice, before the beginning of rehabilitation therapy and after the last session.

For both groups, the duration of treatment was 10 days. The study group benefited in addition to anti-Parkinson medication from rehabilitation therapy consisting of kinesiotherapy, massage and occupational therapy, while for the control group, treatment consisted of anti-Parkinson drug therapy.

Limitations of the study
The major limitation of the study consisted of the short treatment period (10 days). The continuation of an individualized rehabilitation program at the patient’s home is recommended.
Results
After the completion of treatment, the total score of the Garden City Scale in the study group was 210 compared to 267, the total score recorded before treatment. In the control group, the total score of the Garden City Scale was 301 initially, and after treatment it was 291, which was statistically significant (p<0.05).
At the final testing, 54% of the patients of group A had improvements, which means a 5 point decrease of the final score compared to the initial score. In the case of moderate improvements, there was a 3 point decrease of the score, and for partial improvements, a 1 point decrease was recorded (Fig. 1). The items for which the highest improvements were obtained were bradykinesia and stiffness.
The diagram of bradykinesia showed an increase of the 0-1 score segment from 27% to 60% at the final testing (Fig. 2).
The diagram of stiffness showed the following results: the 0-1 score segment increased from 4 to 10 patients, the 1-2 score segment decreased from 9 to 5, and the 2-3 score segment decreased from 2 to 0 patients (Fig. 3).
Due to the fact that the rehabilitation program of the study group A also included exercises in the mirror for the mobilization of facial muscles, a 4 point improvement in the facial mimicry score of these patients on the Garden City Scale was recorded (Fig. 4).
Following the improvement of the stiffness and bradykinesia items, an improvement in the quality of gait could also be seen in the study group A. Thus, if at the initial testing only 8 patients ranged within the 0-1 score interval, at the final testing, their number increased to 11 (Fig. 5).
Conclusions
The study shows that rehabilitation treatment associated with drug therapy had a beneficial effect on the quality of life of the patients and the reduction of the degree of disability.
The results show that the functions that were best recovered were stiffness and bradykinesia. Due to these two, the quality of gait was also improved.
The facial mimicry exercises contributed to the improvement of the verbal and non-verbal communication function of the patients.
The initiation of an early individualized therapy helps patients improve their self-care ability, maintain independence in ADL, and increase their quality of life in a statistically significant proportion compared to those without rehabilitation treatment.
The best results were found in patients with less advanced disease, those at stages I and II according to the Hoehn and Yahr classification.

Bibliography
Fig. 1 Garden City score on day 10 in the two groups.

Fig. 2 Evaluation of the bradykinesia score at the initial and final testing for the study group A
Fig. 3 Diagram of the stiffness score evaluated on the Garden City Scale

Fig. 4 Evaluation of the total facies score on the Garden City Scale

Fig. 5 Evaluation of gait on the Garden City Scale
Mycosporine like amino acids in brown algae

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Seaweed, also known as macroalgae, represents organisms that share similarities with plants, that can exist as single cell organisms or groups of cells forming a colony. They can usually be found attached to rocks or other hard enough substrata in seashore.

In the middle of the XIX century, the Irish botanist William Henry Harvey (1811-1866) divided macroalgae in 3 distinct groups. This division was based on the pigmentation:
- phylum Ochrophyta (green algae)
- phylum Rhodophyta (red algae)
- phylum Phaeophyceae (brown algae)

The members of this three groups are different in more than just pigmentation, like biochemical aspect regarding photosynthetic pigments, compound in the cells walls, chloroplasts structure, connections between cells in colony, storage compounds, presence of flagella or the absence of it.

Phaeophyceae represents a group of macroalgae that, besides chlorophyll a and chlorophyll c, contains the xanthophyll pigment fucoxanthin that cause the characteristic greenish-brown color. The color can range from dark brown to olive green, depending on the proportion in which the pigments are found.

Most brown algae adapted to marine environment, very few species are found in freshwaters. The brown pigmentation apparently is an important adaptation to deep sea.

There are approximately 1500-2000 species of brown algae throughout the world, mostly been found in temperate zones in the Northern Hemisphere.
Alginate is used in fabric printing, as a stabilizer in baking and ice cream industry, toothpaste, soap, meat preservation.

Phaeophyta is also used in agriculture for manufacturing agriculture sprays. Laminaria is also used in the food industry. Man-made algal pond are use to cultivate and harvest the brown algae for production of food supplements and alginates. The harvested algae are processed in order to prepare seaweed meals. The high protein seaweed meals are then exported to various countries, especially to solve malnutrition.

Brown algae are also used in cosmetics, there is a wide variety of products based on algae extract.

Ultraviolet radiation represents a type of electromagnetic radiation that can cause much harm to living organisms, interfering with metabolic reactions, causing atomic bonds to split, etc. The genetic information codified in the molecular structure of nucleic acids can be altered by exposure to UV light.

UV light can lead to cancer and premature skin aging. UVA region, which has a lower energy but it can penetrate deeper the skin, is responsible for the premature skin aging effect of sun light.

Organisms exposed to solar radiation can experience harmful doses of UV in their natural habitats.

In order to protect themselves from the damaging effects of radiation different organisms have developed defence mechanisms.

One such mechanism is the biosynthesis of compounds called mycosporinelike amino acids, defence used by different types of microorganisms.

Biosynthesis of mycosporine and accumulation in cells serves as protection, by shielding the cells sensitive molecules. Mycosporine-like aminoacids (MAAs) are derived compounds of mycosporine that contains an amino-cyclohexenimine ring linked to an amino acid, amino alcohol or amino group. They present absorption maximum between 320 and 360 nm.

MAAs have been reported in different types of organism, such as cyanobacteria, algae and animals. MAA represents a family of secondary metabolites that ,directly or indirectly, absorb the energy of harmful radiation, protecting the organisms from them. MAAs are small intracellular compounds, with a mass of approximate 400 Da, colorless and water-soluble.

In general, MAAs has a glycine subunit at the third carbon atom, although some MAAs contains sulphate esters or glycosidic linkages.

MAAs are prefered as photoprotective compounds, not only because their absorption UV maximum, but also because they have a high molar extinction coefficient (e=28,100-50,000 per M cm), can dissipate absorbed radiation efficiently in form of heat without producing reactive oxygen species, are photostable and presents resistance to several.

Studies indicates that this compounds manifest their protecting properties not only in the organism that produces them but also in the primary and secondary consumers in the food Helbling.

Each MAA generally contain a glycine moiety on the C3 of the cyclohexenimine ring and a second amino acid (ex: porphyra-334, shinorine, mycosporine-2-glycine, mycosporine-glycine-glutamic acid). Instead of secondary amino acid it can contain an amino alcohol (ex: palythinol; asterina-330) or an enamino system (palythene, usujirene) linked to the C1. It has been discovered that in some corals the glycine radical has been replaced by methyl amine (mycosporine-methylamineserine, mycosporine-methylamine-threonine) (Teai T, Raharivelomanana P, Bianchini JP, Faura R, Martin PMV, Cambon).

Another exception is the apparently unique MAA that is commonly found in several sea anemones, mycosporine-taurine.

In the past decades there have been an interes in the shielding properties of MAA.
Many scientist have been performing experiments with extracts that contains MAA obtained from different species.

In order to obtain an MAA extract from algae, the most used method is the one used by Carreto, Carignan, and Montoya (2005).

According to them, the algae samples where soaked overnight before in water. Then methanol was added over and the solution sonicated on ice-bath. After sonication, the samples were centrifuged. The supernatant was collected, and the remaining algae samples were processed twice more with methanol and sonication.

The resulting supernatant was the concentrated using rotary evaporation.

Another method that can be used to obtain an MAA extract is by soaking the samples overnight in water, and then adding a 20% methanol solution and leaving the samples 2 hours at 45 degrees. The solution is collected and the algae samples are extracted twice more. The collected solution is then concentrated using rotary evaporation.

Afterwords, the MAA can be separated and analysed based on their absorption and molecular mass, using HPLC analysis and MS analysis.

With the recent climate changes, the destruction of ozone layer, there is an increase in the need to develop new methods of protection against harmful agents like solar radiation.

MAAs proprieties makes then a perfect candidate for countermeasures against UV radiation.

The fact that this compounds offers protection not only in the organisms that synthesis them but can also exert their protective properties in organisms that dont. They can prove to be quit usefull in preventing UV exposure caused diseases, mutations, photoaging induced by reactive oxygen species, and improve our life and protect it.

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Fig. 1 Brown algae

1 (Mycosporine-Gly)  2 (Mycosporine-Tau)  3 (Palythine)  4 (Palythine-Ser)

5 (Asterina-330)  6 (Palythiol)  7 (Mycosporine-2Gly)  8 (Mycosporine-Gly:Val)

9 (Shinorine)  10 (Porphyra-33-4)  11 (Mycosporine-Glu/Gly)  12 (Usujirene)

Fig. 2 Mycosporine-like amino acids
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