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Patients' opinions on the effectiveness of kinesitherapy in multiple sclerosis

Skuteczność kinezyterapii w stwardnieniu rozsianym w opinii pacjentów

Summary

Multiple sclerosis (MS) is a demyelinating disease of the central nervous system. In the course of the disease there are neurological deficits leading to patient's disability. In addition to essential medical treatment, rehabilitation, including kinesitherapy (movement therapy), is significantly improving the clinical condition of MS patients'. The aim of this study is to know the opinion of MS patients on the effectiveness of kinesitherapy to which they were subjected. The study involves 60 people with MS. The method of study was a questionnaire survey. Balance exercises were frequently performed for MS patients, and general exercises to improve and strengthen the lower limbs. Most of MS patients observed the decrease in the severity of the symptoms after kinesitherapy. The greatest improvement concerned the imbalances and dysfunctions of the lower limbs and kinesitherapy found impact on the patients whose disease has lasted for a relatively short time. The improvement of physical function and self-activity was observed after kinesitherapy usually in the type of secondary progressive disease. In conclusion, the best effects of kinesitherapy were observed in patients with secondary progressive type of MS.

Key words: multiple sclerosis, rehabilitation, kinesitherapy

Streszczenie

Stwardnienie rozsiane (SM) jest chorobą demielinizacyjną ośrodkowego układu nerwowego. W przebiegu choroby występują ubytkowe objawy neurologiczne prowadzące do inwalidztwa chorego. Oprócz leczenia farmakologicznego istotne znaczenie w poprawie stanu klinicznego chorych na SM przypisuje się rehabilitacji, w tym kinezyterapii (leczeniu ruchem). Celem pracy było poznanie opinii chorych na SM na temat skuteczności przeprowadzonej u nich kinezyterapii. W badaniu uczestniczyło 60 osób chorych na SM. Metodą badania był kwestionariusz ankiety. Najczęściej wykonywanymi ćwiczeniami przez chorych na SM były ćwiczenia równoważne oraz ogólnousprawniające i wzmacniające kończyny dolne. Większość chorych na SM obserwowała zmniejszenie nasilenia wszystkich objawów choroby po kinezyterapii. Największa poprawa dotyczyła zaburzeń równowagi i zaburzeń funkcji kończyn dolnych. Najlepiej oceniły wpływ kinezyterapii na sprawność fizyczną osoby, u których choroba trwała stosunkowo krótko. Poprawę sprawności fizycznej oraz czynności samoobsługowych po kinezyterapii najczęściej obserwowano w typie wtórnie postępującym choroby. Podsumowując, największą skuteczność kinezyterapii obserwowali u siebie chorzy z wtórnie postępującym typem SM.

Słowa kluczowe: stwardnienie rozsiane, rehabilitacja, kinezyterapia

Introduction

Multiple sclerosis (multiple sclerosis, MS) is a disease of the central nervous system. The cause of the disease is myelin destruction as a result of the immune process. In clinical terms, the disease is characterized by a variety of symptoms. These are:

- spastic paresis with the intensification of tensions often on both lower limbs, rarely one, three or four limbs. Sometimes pyramidal symptoms are discreet and only express increased fatigability, exaggerated reflexes and presence of Babinski symptom,
- damage to the cerebellar symptoms as slurred speech, intentional tremors, dysmetria, ataxia and disorders of balance,
- sensory disorders: paresthesia, numbness, pain and weakness feeling in different locations. Moreover, the impression of strapping, hand clumsiness with proper strength, Lhermitte sign (electric current passing feeling along the spine when tilting the head) and trigeminal neuralgia,
- signs of damage to the brain stem: the abolition of double vision eye adduction and nystagmus in the abducted eye (damage to the medial longitudinal fasciculus), facial muscle weakness (damage to the endotrunk fibers of facial nerve), acceleration of heart rate, vomiting, hiccups (damage to the autonomic nuclei trunk),
- bladder dysfunction in the form of urgency, intermittent urination, urinary incontinence and residual urine in the bladder. Abnormal function leads to a rectal constipation, and a sexual dysfunction - impotence,
- retrobulbar optic nerve inflammation, manifested by weakness and impaired vision in the visual field,
- mental disorders such as depression, euphoria and cognitive impairment, usually to a small extent.

Among the MS patients the increase of transient neurological symptoms with the body temperature growth are observed (Uthoff phenomenon). Some patients complain of fatigue, which does not correlate with the state of the present, or the results of neuroimaging studies (Kazibutowska 2008).

Based on the clinical course of MS the following types of diseases are distinguished (Bonek, Maciejek 2009):

- relapsing-remitting, which is characterized by the occurrence of relapses or acute symptoms of neurological damage. They can cause new deficits or a worsening of existing ones. Symptoms occur when the output can withdraw completely or partially remain. Recurrences are separated by periods of relative stabilization of neurologic state,
- secondary progressive form, which affects about 80% of patients with the relapsing-remitting form after several years of illness in old age. It leads to progressive disability by cumulative losses of symptoms that occur after many recurrences,
- primary progressive form that affects 10% of patients after the first signs of a gradual increase of disease symptoms without explicit projections there are short periods of stabilization and temporary remissions. No obvious exacerbations have been observed. Thus, the deterioration of the patients' health is gradual,
- progressive relapsing form that affects 6% of patients in whom the disease progresses from the very beginning, with some periods of exacerbation, with or without symptoms. In the period between relapses there is a gradual deterioration of the clinical condition.

In the course of the disease various defecting symptoms of the nervous system cause the disability of patients. For this reason, physiotherapy along with the general medical treatment plays an important role. The aim of physiotherapy of patients with MS is to improve their muscle strength and a general physical condition, compensation of the problems with coordination, maintenance of an active range of motion in the joints, normalization of the muscle tone, balance, prevention of muscle atrophy and fatigue. Physiotherapy should be carried out continuously. Excessive physical exertion or fatigue is contraindicated. Active exercises should be carried out without any weight (in relieving position or with the weight – block system). During exercises patients should avoid overheating of the body. Elevated temperature may increase spasticity and fatigue. Thus, patients should exercise in a cool, well-ventilated room and use alternate dynamic and breathing exercises together with relaxation. In kinesitherapy neuromuscular priming proprioceptive input (PNF) and NDT Bobath methods can be used. Both methods may be used interchangeably and their selection depends on the form, duration of the disease and its period, the dominant type and severity of symptoms, general condition of patients, and concomitant diseases. Physiotherapy should start as soon as possible. Currently, it is assumed that during the MS relapse patient usually remains in the hospital, and the improvement of the movement is limited to individual exercises, which should include: frequent changes of a body position in bed (every 2-3 hours), breathing exercises (breath support), cautious passive exercises in limited circumstances, self exercises in bed (Woszczak 2008).

Kinesitherapy (movement therapy) among patients with MS is used in the form of muscles training not only those affected by the weakness but also comprehensively all the muscles of the body, including those not covered by spastic paralysis or hypotension. The exercise consists of (Woszczak 2008):

- stretching exercises, increasing muscle flexibility and a range of motion in the joints and reducing spasticity,
- dynamic exercises, increasing muscle strength, improving the nutrition of tissues by strengthening the muscle – vascular pump, and improving overall efficiency and immunity,
- breathing exercises, increasing the efficiency of the respiratory tract, stretching, relaxing and increasing the efficiency of dynamic exercises,
- equivalent exercises, enhancing balance, facilitating self-control of the body and the stability of the movement,
- coordination exercises, improving the coherence of motion, making it easier to move and eliminating the excessive energy consumption caused by a lack of coordination.

The aim of this study was to learn the opinion of MS patients about the effectiveness of kinesitherapy they were subjected to.

Material and research methods

The study included 60 patients (40 women, 20 men) with diagnosed MS. The largest group consisted of people aged 18-30 years - 30%. However, the smallest group of patients consisted of persons aged 40-50 years - 20%. The middle groups included patients aged 30-40 years - 23% and above 50 years - 27%. People with MS who participated in the study

were in the process of rehabilitation or immediately after rehabilitation. Participation in the study was voluntary and anonymous. The study was carried out at the health centers in Lublin. The method of study was a questionnaire consisting of 30 questions.

Results

In 20 (33%) respondents the duration of the disease was 10-15 years, with 12 (20%) of the duration of the disease ranged from 1-5 years, 10 (17%) of disease duration up to 1 year, in 8 (13%) respondents the duration of the disease was 15-20 years, also in 8 (13%) the duration of the disease was more than 20 years.

Secondary progressive type was present in 10 (17%) men and 16 (27%) women. Relapsing-remitting type occurred in 4 (7%) men and 16 (27%) women. Primary progressive type appeared in 4 (7%) men and 6 (10%) women. The least frequently occurring type was progressive relapsing - in 2 (3%) females and 2 (3%) men.

Most patients - 40 (67%) exercise at home. Twenty-two people (55%) exercise several times a week. Ten patients (17%) perform exercises daily, and 8 (13%) perform once a week. Twenty-two (55%) persons practice an average of 15-30 minutes, 12 (30%) practice an average of 30-60 minutes, 4 (10%) persons practice an average of 15 minutes, the average time of exercise per 2 (5%) persons is more than 60 minutes.

The majority of respondents - 44 (73%) had previously participated many times in kinesitherapy treatment outside their homes. Only 16 (27%) respondents participated for the first time in this type of treatment outside the home. According to the data collected during the recent rehabilitation of patients they usually attended kinesitherapy treatments in hospitals - 18 (30%) and in clinics - 16 (27%) patients, less in sanatoriums - 20 (33%), while the number of patients practicing at home equals 14 (23%). In most cases, rehabilitation lasted for about two weeks - for 14 (23%) patients. A smaller percentage of respondents participated in kinesitherapy with a duration of 2-4 weeks - 16 (27%) patients, and over one month - 20 (33%) patients. Twenty-six (43%) patients used daily kinesitherapy treatments, 24 (40%) made use of treatments several times a week, and 4 (7%) people - once a week. The types of exercises performed by patients with MS are presented in Table 1.

Tab. 1 Types of exercises performed by patients with MS

Type of exercise	Percent MS patients who were practicing
Breathing	73%
Kegl's	37%
Passive, active-passive	43%
Stretching	33%
General improvement	80%
Relaxation	77%
In aqueous	67%
Self-supportive	50%
Gait re-education	53%
Equivalent	90%
Hand manipulative	53%
Strengthening the upper limbs	73%
Legs strengthening	80%

The results show that the most common exercises performed by patients with MS were equivalent and general exercises to improve and strengthen the lower extremities, followed by relaxation, breathing and strengthening of the upper limbs. The least frequent exercises performed were stretching exercises and Kegel's.

Half of the patients (50%) said that after the exercises they felt quite well. For 14 (23%) respondents the well-being was good. Ten (17%) respondents identified their well-being did not improve while 14 (23%) patients did not notice any changes.

Thirty-six (60%) respondents said that the physical exercise was enough, 16 (27%) respondents said that the physical exercise was not enough. According to 6 (10%) respondents there was too much exercise, and 2 (3%) patients did not provide the response to the questions.

Evaluation of changes in MS symptoms after kinesitherapy is shown in Figure 1.

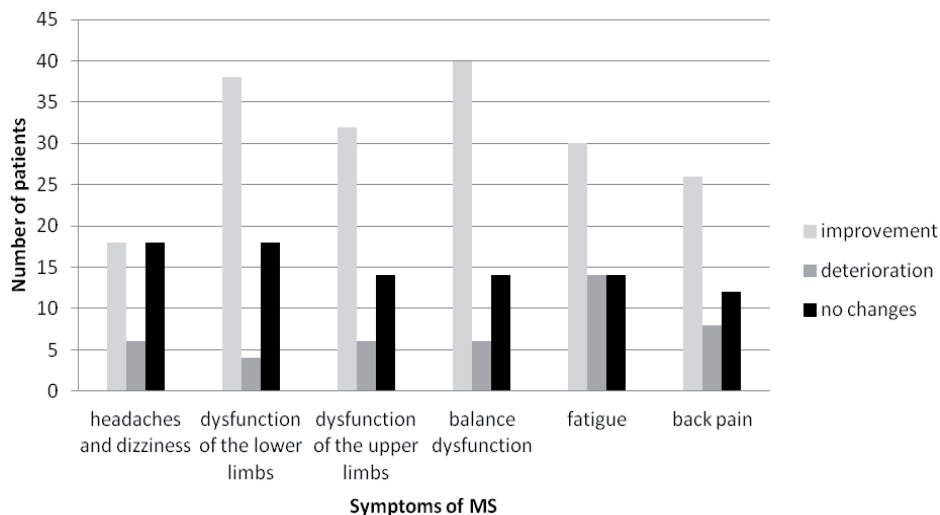


Fig. 1 Evaluation of changes in the severity of symptoms of MS after kinesitherapy

More than half (55%) of the patients noticed the decrease of the intensity of their symptoms, 13% of respondents noted deterioration while 32% respondents did not notice any changes. The improvement concerned all symptoms but the greatest improvement included balance disorders and impaired function of the lower extremities.

Assessment of the impact of physical kinesitherapy among MS patients depending on the duration of the disease is shown in Figure 2.

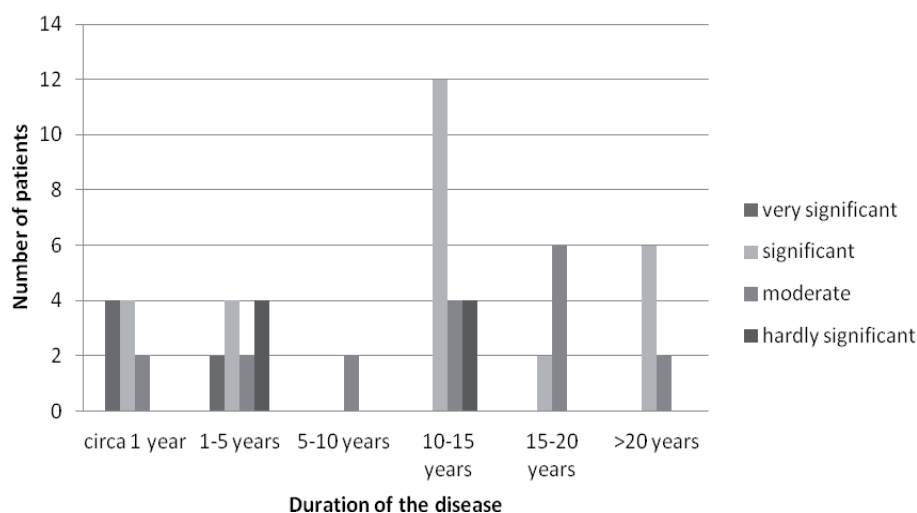


Fig. 2 Impact assessment on the physical efficiency of kinesitherapy among MS patients depending on the duration of the disease

The best effect of kinesitherapy on physical efficiency was among patients with the disease duration of an about 1 year and 1-5 years.

The assessment of physical changes after kinesitherapy based on the type of the disease is shown in Figure 3.

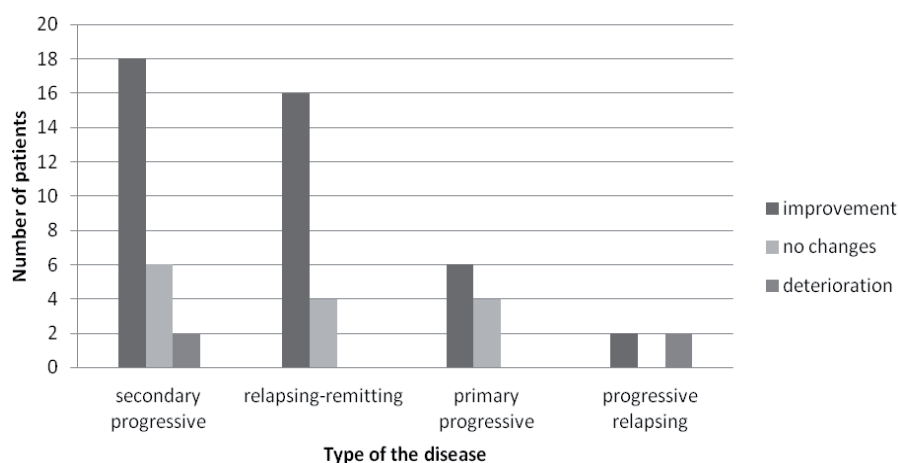


Fig. 3 The assessment of physical changes after kinesitherapy based on the type of the disease

The improvement of physical function after rehabilitation was usually observed in secondary progressive type, the least - in the progressive relapsing type.

The assessment of the positive influence of kinesitherapy on physical condition of the patients depending on the type of MS is presented in Figure 4.

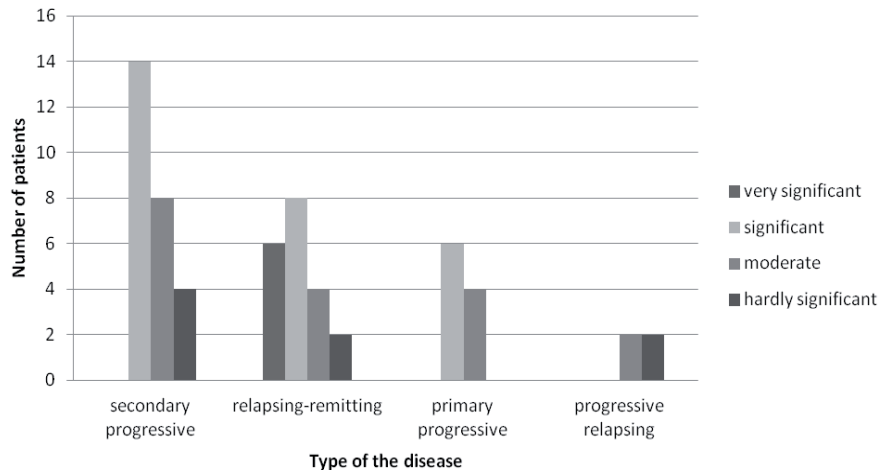


Fig. 4 The assessment of the influence of kinesitherapy on the physical condition of patients depending on the type of MS

Majority of patients suffering from the secondary progressive type of MS determined that the impact on their physical condition was very significant. Patients with relapsing-remitting type of the disease felt that the impact was also significant. Patients with the primary progressive type of the MS mostly determined that the effect of physiotherapy on physical condition was high. Patients with progressive relapsing type of the disease concluded that the effect of physiotherapy was moderate or hardly significant.

Evaluation of the changes in the self-performance among patients with MS after kinesitherapy based on the type of the disease is presented in Figure 5.

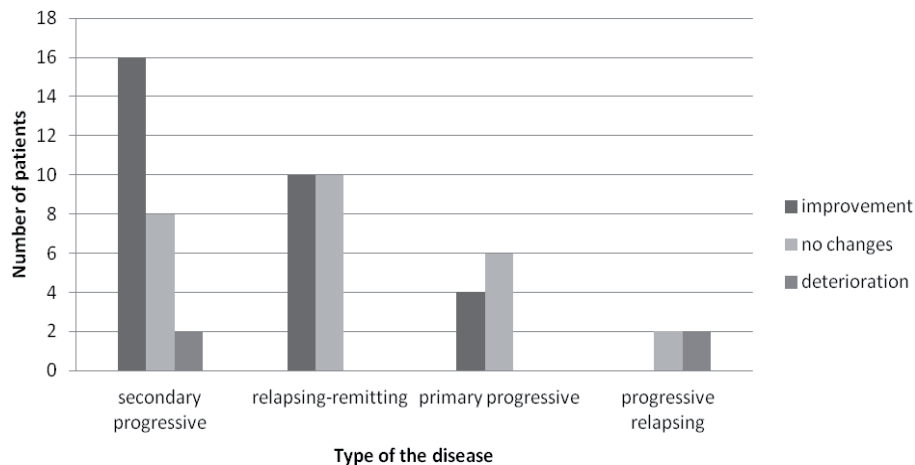


Fig. 5 The evaluation of changes in the self-performance in patients with MS after kinesitherapy based on the type of the disease

Self-improvement of activities after kinesitherapy was usually observed in secondary progressive type while in the progressive relapsing type it was not observed at all.

Evaluation of the effectiveness of kinesitherapy depending on the clinical type of MS is presented in Figure 6.

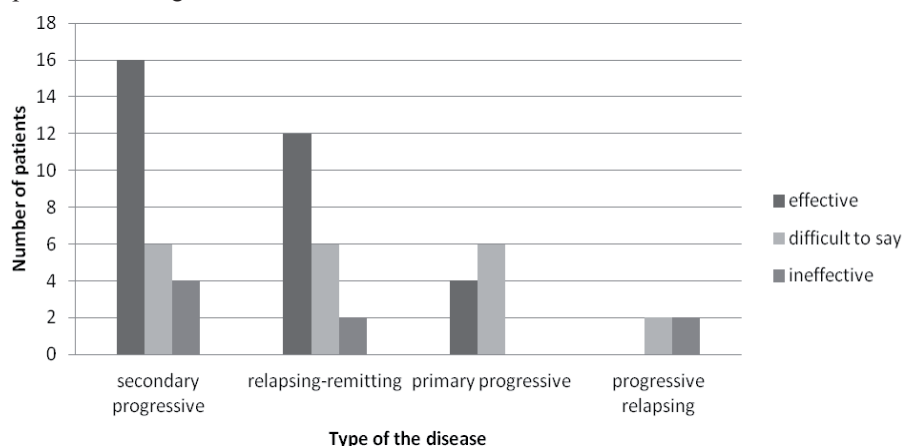


Fig. 6 Evaluation of the effectiveness of kinesitherapy depending on the type of the disease

The best results of kinesitherapy were observed among patients with secondary progressive MS. None of the patients with progressive relapsing type confirmed the effectiveness of kinesitherapy in their case.

Discussion

Our findings indicate that the most common exercises performed by patients with MS were equivalent and general exercises to improve and strengthen the lower limbs. More than half of the patients observed the decrease of the symptoms after performing kinesitherapy. The improvement concerned all symptoms but the greatest improvement included balance dysfunctions and impaired function of the lower extremities. Kinesitherapy was found to have the greatest impact on patients who were sick for a short period of time. This is related to the presence of a small degree of disability in the early stages of the disease. Improvement in the physical function after rehabilitation was usually observed in secondary progressive type of the disease. The majority of patients suffering from secondary progressive, relapsing-remitting and primary progressive MS determined that the impact on physical condition was large while those with progressive relapsing type of the disease concluded that the effect of kinesitherapy was moderate or insignificant. Self-improvement activities after kinesitherapy were usually observed in secondary progressive type but were not observed in the progressive relapsing type. The best results of kinesitherapy were observed among patients with secondary progressive MS.

The results show that the efficiency of kinesitherapy depends on the type of the disease. In the case of primary progressive and progressive relapsing there was a rapid and noticeable deterioration of health and functioning of the body. This is primarily due to the loss of sight or limb dysfunction after 6-8 years of illness. In the course of relapsing-

remitting MS there is a serious disability over time, but the period may be extended by 2-3 times at an average of 20 years. The literature shows that patients with MS after admission to rehabilitation because of their clinical deterioration have the same beneficial effect as in the case of rehabilitation of patients clinically stable. The authors believe that the ability to move, that is the degree of disability not the type of MS and disease duration, seems to have a significant impact on the results of rehabilitation (Gaber et al. 2012).

Previously, it was thought that exercise may cause the output of MS. Thus, patients were advised to avoid physical exertion. However, published reports from recent years indicate the importance of aerobic exercises for the improvement of the cardiovascular efficiency among patients. These exercises are performed on a treadmill and bicycle ergometer. In a randomized Italian study, 50 patients participated in a rehabilitation program carried out in the hospital or at home. Significant improvement in terms of the clinical condition of patients was observed in those who received treatment in the hospital. The effect of rehabilitation persisted to about 6 months whereas a positive effect on quality of life and emotional well-being had a longer duration (Solari et al. 1999).

The literature shows that while providing constant monitoring of aerobic exercises with increasing applied load causes the improvement of exercise capacity without a significant risk of neurological deterioration of the patient. This training should, however, take at least a few weeks and preferably several months (Snook, Motl 2009).

In one study, the evaluation of the effectiveness of rehabilitation in MS was carried out using three scales: a functional assessment, the assessment of lower limb muscle strength and physical failure rate. The study involved patients with MS who were subjected to rehabilitation in the Department of Rehabilitation in Łódź. Statistical analysis showed a significant improvement including all the scales after the rehabilitation. The author concludes that a comprehensive rehabilitation in the group of MS patients effectively resulted in reducing the level of disability, functional improvement and increased lower limb muscle strength (Miller 2009).

In the British study, which included 66 patients, the treated group underwent short 25-day hospital ward rehabilitation. After six weeks, the group showed a significant improvement in the Functional Independence Scale - FIM and the disability (London Disability Scale) (Freeman et al. 1997).

MS patients believe that physical activity is beneficial for them but in the course of the disease the disability substantially limits their ability to perform physical exercise (Kasser, Kosma 2012).

Research on the impact of physical therapy to maintain a balance in patients with MS showed a small but significant effect in patients with low and medium level of disability. But there is no evidence of a beneficial effect of physiotherapy on balance among patients with more advanced degree of disability (Paltamaa et al. 2012).

There was also a study on the effect of exercise on quality of life in women with MS. It was shown that the exercise improved gait and muscle strength and benefited the quality of life of women (Giacobbi et al. 2012).

Randomized study of exercise in patients who are at an intermediate MS clinical status was conducted. Results showed that the 12-week exercise program caused a significant improvement in the level of physical activity and affected the balance of patients and muscle strength in a positive way (Learmonth et al. 2012).

Fatigue is a common symptom reported by patients with MS. There is little research on the effect of kinesitherapy concerning the above mentioned symptom. The literature shows that exercise can potentially decrease fatigue in patients with MS but the results are varied (Andreasen et al. 2011).

The studies on patients with MS concerning the impact of physical activity of varying intensity on clinical condition of patients showed no significant differences. It is believed that the greater benefits may be associated with higher exercise intensity. However, in the case of MS patients such intensive practice may be less well tolerated (Collett et al. 2011).

Clinical symptoms of MS result in a reduction of physical activity of patients. On the other hand, increased physical activity and exercise can improve their clinical condition including gait function in this disease (Motl et al. 2010).

The duration of an exercise as well as its type should be individually adjusted to the stage of the disease and the depth of functional deficits. Rehabilitation in MS should be commenced as soon as possible. It can limit the degree of disability and improve the quality of life of patients with MS (Beer et al. 2012). The literature shows that there is a relationship between physical activity and the progression of disability in patients with MS (Motl, McAuley 2011).

The study on the anti-inflammatory and regulating the immune system influence of physiotherapy in patients with MS was conducted. The authors have demonstrated significant changes in IgG subclasses in the number of neutrophils and lymphocytes in subpopulations of T and B cells and NK cells. The study also showed a significant correlation between changes in clinical symptoms and changes in the IgG1. The authors suggested that physiotherapy could be used as an immune-active therapy that affects the psycho-neuro-immune-endocrine response in patients with MS (Rasova et al. 2012).

Conclusions

1. The most frequently performed exercise for MS patients were equivalent and general exercises improving and strengthening the lower limbs.
2. The majority of patients with MS after kinesitherapy observed the decrease in severity of the symptoms. The greatest improvement concerned the improvement in balance disorders and impaired function of the lower extremities.
3. Patients who noticed the greatest impact of kinesitherapy on their physical condition were suffering from MS for a relatively short time - about 1 year and 1-5 years.
4. The improvement of physical well-being and self-activity after kinesitherapy was usually observed in secondary progressive MS type.
5. Kinesitherapy is an effective form of treatment for patients with MS.

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