

ICPEK 2018
International Congress of Physical Education, Sports and
Kinotherapy. Education and Sports Science in the 21st
Century, Edition dedicated to the 95th anniversary of UNEFS

MULTIPLE SCLEROSIS – A PHYSIOTHERAPEUTIC
CHALLENGE

Gigi Teodoru (a), Mariana Cordun (b), Carmen Liliana Gherghel (c)*

*Corresponding author

(a) National University of Physical Education and Sports, 140 Constantin Noica St., Bucharest, Romania

b) National University of Physical Education and Sports, 140 Constantin Noica St., 140, Bucharest

Romania, c) National University of Physical Education and Sports, 140 Constantin Noica St., Bucharest
Romania

Abstract

Multiple sclerosis (MS) is an autoimmune inflammatory condition that, while following a typical evolution of bursts and remissions, also shows a constant progress which leads, over time, to a cluster of functional deficits. Around 35-40/100,000 people in Romania are affected by this disease. Its aetiopathogenic and clinical complexity, as well as therapeutic intervention, require an in-depth approach to both the patient assessment issues and the selection of means of action that will allow the setting of prophylactic and curative medical rehabilitation protocols. This approach can only be achieved within interdisciplinary teams to carry out a thorough analysis of the posture, the way forward to anticipate possible unfavorable developments that can be prevented. Multiple sclerosis patients could achieve positive results with the help of physiotherapy, namely by using its means: kinotherapy, hydrotherapy, occupational therapy. Different types of physical exercise show beneficial effects on MS patients, namely on their disabilities and quality of life. There is strong evidence that aerobic training improves the maximum capacity (VO₂max) of people with ambulatory MS, while inactivity worsens it (Braddom, 2015, p. 1310). In this paper, we aim to carry out an analysis of specific literature on the means of medical recovery treatment used in multiple sclerosis.

© 2019 Published by Future Academy www.FutureAcademy.org.UK

Keywords: Multiple sclerosis, physiotherapy, treatment, physical exercise.



This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 Unported License, permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

1. Introduction

Multiple sclerosis is the most common demyelinating disease of the central nervous system (CNS), representing the second cause of disability of young adults after trauma. MS starts with the young adult aged 20-40 years and is 2-3 times more common in females than males. The prevalence of MS in Romania is around 35-40/100,000 inhabitants (Băjenaru, Popescu, Tiu, Marinescu, & Iana, 2008). Approximately 85% of MS patients have either relapsing-remitting remission (RR) or secondary-progressive (SP) forms. Secondary-progressive multiple sclerosis (SPMS) usually develops many years after the RR phase.

Multiple sclerosis is a chronic CNS disorder characterised by episodes of inflammation and focal demyelination with multiple time-disseminated localisations associated with a process of degeneration, oligodendrocyte dysfunction and axonal damage in people showing genetic predisposition to this condition.

The primary issue of the patient is his/her inability to properly perform day-to-day activities, as a consequence of multiple neurological deficits.

Handling MS patients is possible only in interdisciplinary teams. One characteristic is the “time and space” dissemination of lesions in the brain and spine, leading to a myriad of clinical symptoms, with any kind of neurological deficit as a sign: typical pyramidal syndrome, cerebellar ataxia, central vestibular disorder, oculomotor nerve palsy, optic neuritis, autonomic nervous system syndrome and psychiatric disorders.

The aetiopathogenic and clinical complexity of this disease, as well as therapeutic intervention, require an in-depth approach to both the patient assessment issues and the selection of means of action that will allow the setting of prophylactic and curative medical rehabilitation protocols.

2. Problem Statement

There still is an old clinical practice controversy between neurologists and rehabilitation physicians, in the sense that neurologists claim an increase in MS patient’s fatigue during the rehabilitation program, while rehabilitation physicians advocate the benefits of kinetherapy on the functional status of MS patients if the rehabilitation schedule is tailored for the needs of each patient, after a thorough evaluation.

3. Research Questions

Although multiple sclerosis is a progressive disease, its development and prognosis vary. Therefore, there are patients who show good progress over a number of years without treatment, with no impaired functionality or quality of life. At the opposite end, there are patients whose disease progresses furiously even after intensive therapy and who do not survive the complications of this chronic neurological condition (bedsores, pneumonia and kidney failure).

The aim of rehabilitation therapy for MS patients can be hard to reach as the condition of patients tends to worsen over time.

No other neurological disease affects so many functions of the central nervous system. MS management is currently focusing on a better understanding of the condition and raising awareness of its effects on family, friends, profession and the community itself to select the best therapeutic methods.

4. Purpose of the Study

Considering the raise in the cost of health services and the increasingly frequent use of outpatient care, MS patients are currently only rarely included in the system of rehabilitation services with hospital admission. This usually occurs only after a severe exacerbation or after surgery.

Numerous studies show the short-term benefits of the rehabilitation process on the functions, mobility and quality of life of admitted MS patients. Generally speaking, the most impressive effects were shown in retrospective, uncontrolled clinical studies including post-exacerbation rehabilitation patients (Aisen, Sevilla, & Fox, 1996).

Studies focused on an extended transfer effect have shown that positive effects disappear within 6 to 10 months without follow-up therapy. In some studies, this finding was attributed to disease progression, while other studies considered that the progression of the disease was not a possible explanation.

5. Research Methods

Physiotherapists must teach MS patients undergoing rehabilitation how to maintain and manage their functionality in order to obtain long-term effects on their quality of life. Physiotherapists assess each patient from a functional point of view and draw up a protocol, using methods and techniques to promote movement, reduce pain, restore function and prevent other dysfunctions. In selecting the means and methods, one should consider: the MS type, the severity of the disease, existing dysfunctions (muscle: low strength, low endurance; joints: pain, mobility limitation), balance, coordination, movement. In the case of highly disabled patients, multidisciplinary outpatient protocols could provide better outcomes than an exercise-based program, but these are not widely available. There is even less data on exercise effects on admitted and semi-outpatient MS individuals, however it seems that they do not show as many positive effects (White, 2004). This may be due to the fact that they cannot mobilise enough muscle mass to get the effect of aerobic training. These exercise programs are not usually custom-made or they are not properly followed.

Aerobic exercise is extremely important for overweight MS patients. Recommended exercises must be adapted to individual circumstances.

Active exercise with resistance is used to increase movement, muscle strength, the re-training of coordination and balance (Cordun, 1999). Free exercise must be effortless, but correctly done according to a set schedule, with multiple reps in the same session and a progressively increasing speed.

In order to sustain joint range of motion, free exercise and stretching are appropriate ways of working (DeLisa & Gans, 1998). It is also important to design simple activities that address less addressed issues in order to avoid forgetfulness and deconditioning. Increased focal muscle strength will be tackled by progressive exercise, which can be effective for motivated patients with mild or even severe disabilities. Three sets of 10 reps can be a good part of the program. Carefully addressing certain muscles, no more than two for each limb and no more than two limbs for each session, strength exercises may be effective in muscle toning, even when low muscle strength is diffuse. The schedule must be completed at least three times a week.

Open air walks, aerobic exercise and breathing techniques, such as Tai Chi, are very useful for balance training in MS patients. Active exercises can also be performed from different positions by modifying the support base or by changing the gravity center with core control.

In view of the complexity of the disease, breathing exercises play an important role in the medical recovery of MS patients. These exercises are simple: the patient can be asked to whistle or sing, or one can also inhale, followed by an expiration that should take 20-30 seconds. Exercises can be done at any time of the day, while watching TV. Static physical exercise in the form of stretching/orthostatic stretching exercises, the stretching of two transverse articular muscles towards both joints, is imperative for performing a good stretch (the gastrocnemius muscle must be stretched with fully extended knee). Yoga can improve flexibility and reduce spasticity. Good stretching exercises should occupy up to 20 minutes of a training schedule, with a focus on the leg, calf and back muscles. Occupational therapy has been extensively used for MS research, especially during clinical trials on admitted patients, where it was consistently incorporated into the medical recovery program. A study published in 2001 has found that treatments related to occupational therapy have a strong positive effect on MS symptoms, but little research on the effects of occupational therapy separated by multidisciplinary approach has been done (Braddom, 2015). Randomised controlled clinical trials on patient education on energy conservation (one-hour, weekly or six-weekly meetings for 6 to 8 weeks) have identified a decreasing in fatigue. Positive effects on the efficiency of actions, quality of life and social involvement were also observed (Baker & Tickle-Degnen, 2001). The use of different orthotics is useful for people with multiple sclerosis in the stage of partial paralysis. Therefore, ankle, knee and hip orthoses (Braddom, 2015) can be used.

Hydrotherapy (swimming, aqua gym and water walking) is an excellent form of integrated exercise, especially for cases where ataxia may threaten the patient safety. Even tetraparetic MS patients can make use of floatability to sit up straight, as well as swimming in dorsal decubitus position using assistive devices. The water temperature must be carefully supervised against overheating. (Braddom, 2015)

6. Findings

This is a review-type research, and therefore we will analyse the studies regarding medical recovery in MS. Our analysis shows that non-specific exercise programs without an ambulatory component are ineffective for improving leg movement. Exercises for walking re-training should include orthostatic poses and walking. Interventions for balance and gait depend on the specific impairments, and maintaining postural control is an important outcome (Lord, Wade, & Halligan, 1998). Programs such as Tai Chi (Husted, Pham, Hekking, & Niederman, 1999) and Feldenkrais can have good results in maintaining gait and balance function.

In the case of MS patients with major disability, the activities of daily living could be the only regular physical activity. Occupational therapy can help patients improve their activities of daily living. Practical techniques and assistive devices ease activities like dressing, bathing, eating, household chores and daily care.

Strategies to prevent falls must be tailored for each patient through a detailed medical history and an adequate examination including the functional assessment of patient walking and transfers. It was also found that 54% of subjects reported at least one fall in the previous 2 months, while 32% fell frequently.

Disturbed balance was the most reliable predictive factor for a fall, followed by the use of a support device. Recommendations for mobility devices should aim at increasing stability and walking (Braddom, 2015).

The appropriate combination of exercise and adequate rest is added to the treatment. Fatigue can be prevented by adjusting activity schedules so as to avoid overheating; cooling techniques, e.g. cool baths, sucking on ice chips and wearing cooling devices, such as a vest (Kraft & Alquist, 1996) can be combined with specific rehabilitation therapy programs.

Muscle weakness and fatigue are reduced through exercise (Petajan et al., 1996). Exercise can encompass many forms, beginning with a warm-up period to decrease strain and spasticity. Flexibility exercises, such as muscle stretching, can diminish spasticity and prevent future painful contractions. Aerobic training is designed to improve endurance, balance, flexibility and strength. Low-to-moderate aerobic training can result in improving aerobic fitness and reducing fatigue in MS patients affected by mild or moderate disability. Even patients in wheelchairs can usually benefit from a well-planned exercise program and reduce the risk of developing bedsores. Passive range-of-motion stretching exercise can be helpful in initial programs for those who are relatively more disabled. Progressive resistance exercises are more likely to be effective in patients with only mild disability (Burks, Bigley, & Hill, 2009).

Appropriate exercise can lead to important improvements in different areas of cardiorespiratory fitness (aerobic fitness), muscle strength, flexibility, balance, fatigue resistance, cognition, quality of life and respiratory function in MS patients (Halabchi, Alizadeh, Sahraian, & Abolhasani, 2017). Some general guidelines exist for exercise in MS patients. The individualised exercise program should be designed to address a patient's chief complaint, improve strength, endurance, balance, coordination and reduce fatigue.

Rehabilitation improves functional independence of MS patients, but has only limited results, improving the level of neurological impairment. Usually, benefits are not long-lasting. Severely disabled people derive equal or more benefit than those who are less disabled, but cognitive problems and ataxia tend to be refractory. There is now good evidence that exercise can improve fitness and function for those with mild MS and helps to maintain function for those with moderate to severe disability. Therapy can be performed over 6 to 15 weeks in outpatient or home-based settings or as a weekly day program lasting several months. Generally, aerobic exercise that incorporates a degree of balance training and socialisation is recommended (Brown & Kraft, 2005).

7. Conclusion

People suffering from MS can obtain positive results through kinotherapy, namely through its available means. Different forms of physical exercise have beneficial effects on the patient's disability and quality of life. It has been proven that aerobic training increases the maximum volume of O₂ in MS patients, while inactivity tends to lower it.

There still is an old clinical practice controversy between neurologists and rehabilitation physicians, in the sense that neurologists claim an increase in MS patient's fatigue during the rehabilitation program, while rehabilitation physicians advocate the benefits of kinotherapy on the functional status of MS patients if the rehabilitation schedule is tailored for the needs of each patient, after a thorough evaluation.

All deriving factors, including the complexity of pathology, uncertainty, progression, symptoms, overlapping disability and socio-professional aspects, turn multiple sclerosis into the most problematic

disease in the medical recovery process, but, at the same time, one of the most rewarding for therapists in this specialty.

The documentation produced shows that a supervised and individualised exercise program can improve fitness, functional capacity and quality of life in MS patients. Exercise should be considered as a safe and effective means of rehabilitation for MS patients.

Interdisciplinary team rehabilitation is an integral component of the continual care for the MS patient. Numerous studies have documented the effectiveness of rehabilitation that addresses impairments, disabilities and handicaps. Early in the disease course, in addition to specific MS therapies, the focus includes adapting to changes in the patient's body, their families, vocations and professional pursuits, as well as their psychological state. A proactive approach to health, education and maintenance, exercise and energy conservation, employment and relationships will minimise the impact of future symptoms.

References

- Aisen, M. L., Sevilla, D., & Fox, N. (1996). Inpatient rehabilitation for multiple sclerosis. *Neurorehabilitation and Neural Repair*, *10*, 1-7.
- Baker, N. A., & Tickle-Degnen, L. (2001). The effectiveness of physical, psychological, and functional interventions in treating clients with multiple sclerosis: A meta-analysis. *American Journal of Occupational Therapy*, *55*(3), 324-331.
- Băjenaru, O., Popescu, C. D., Tiu, C., Marinescu, D., & Iana, G. (2008). *Ghid de diagnostic și tratament pentru scleroza multiplă*. Retrieved from <https://www.emcb.ro/article.php?story=20080801123113532>
- Braddom, R. L. (2015). *Medicină fizică și de reabilitare*. București: Elsevier.
- Brown, T. R., & Kraft, G. H. (2005). Exercise and rehabilitation for individuals with multiple sclerosis. *Physical Medicine and Rehabilitation Clinics of North America*, *16*(2), 513-555.
- Burks, J. S., Bigley, K. B., & Hill, H. H. (2009). Rehabilitation challenges in multiple sclerosis. *Annals of Indian Academy of Neurology*, *12*(4), 296-306.
- Cordun, M. (1999). *Kinetologie medicală*. București: AXA.
- DeLisa, A. J., & Gans, B. M. (1998). *Rehabilitation medicine* (3rd ed.). Philadelphia, USA: Lippincott Williams & Wilkins.
- Halabchi, F., Alizadeh, Z., Sahraian, M. A., & Abolhasani, M. (2017). Exercise prescription for patients with multiple sclerosis; potential benefits and practical recommendations. *BMC Neurology*, *17*(1): 185. Retrieved from <https://dx.doi.org/10.1186%2Fs12883-017-0960-9>
- Husted, C., Pham, L., Hekking, A., & Niederman, R. (1999). Improving quality of life for people with chronic conditions: The example of Tai Chi and multiple sclerosis. *Alternative Therapies in Health and Medicine*, *5*(5), 70-74.
- Kraft, G. H., & Alquist, A. D. (1996). Effect of microclimate cooling on physical function in multiple sclerosis. *Multiple Sclerosis Clinical Laboratory Research*, *2*, 114-115.
- Lord, S. E., Wade, D. T., & Halligan, P. W. (1998). A comparison of two physiotherapy treatment approaches to improve walking in multiple sclerosis: A pilot randomized controlled study. *Clinical Rehabilitation*, *12*(6), 477-486.
- Petajan, J. H., Gappmaier, E., White, A. T., Spencer, M. K., Mino, L., & Hicks, R. W. (1996). Impact of aerobic training on fitness and quality of life in multiple sclerosis. *Annals of Neurology*, *39*(4), 432-441.
- White, A. (2004). Exercises and MS: Challenges and opportunities. *Mult Scler Q Rep.*, *23*, 18-20.