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Hippotherapy as a Complementary Intervention for Multiple Sclerosis: A Review

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Abstract

Introduction: Multiple sclerosis is a chronic autoimmune disease of the central nervous system (CNS). The pathogenesis of multiple sclerosis is complex and incompletely understood. The major factors that lead to the disease seem to be inflammation and neurodegeneration. Multiple sclerosis is diagnosed by meeting diagnostic criteria. They are based on demonstrating the involvement of 2 or more areas of the CNS at different time points. There remains no cure for multiple sclerosis. Treatment has three aspects: symptom management, relapse management, and disease-modifying therapy. Despite the benefits of pharmacological and non-pharmacological treatments, studies indicate that several complementary therapies may also be promising. One such therapy is hippotherapy, an equine-assisted form of physical therapy that uses the characteristic movements of a horse.

Aim of the study: The aim of this study was to review the published literature on the impact of hippotherapy on multiple sclerosis.

Materials and methods: A review of available studies examining the relationship between hippotherapy and multiple sclerosis was conducted. To identify relevant literature, the PubMed and Google Scholar databases were used.

Results: Several studies investigating the effect of hippotherapy as a complementary intervention on the course of multiple sclerosis indicate that this intervention can be beneficial for affected patients. Patients in the hippotherapy intervention group showed improvements in balance, fatigue, spasticity, walking performance, spatiotemporal gait parameters, processing of sensory cues for postural control, trunk and upper-limb control, dynamic control, facilitated movement, and quality of life.

Conclusions: Hippotherapy may be a useful complementary treatment for improving walking and other functional outcomes in people with multiple sclerosis, but the available evidence remains limited and further studies are needed.

Keywords: hippotherapy, equine-assisted therapy, multiple sclerosis

Introduction

Multiple sclerosis is a chronic autoimmune disease of the central nervous system (CNS) [1]. It mostly affects individuals in their early adult life [2].

The pathogenesis of multiple sclerosis is complex and incompletely understood. The major factors that lead to the disease seem to be inflammation and neurodegeneration. Research has shown that axonal and neuronal loss occurs at the earliest stages of the disease, which results in cognitive impairment and other early disabilities [3-8]. The pathologic hallmark of multiple sclerosis is the sclerotic plaque. It is believed to result from inflammation, demyelination, remyelination, oligodendrocyte depletion, astrogliosis, axonal damage, and neuronal loss affecting white and gray matter CNS structures [10].

Epstein-Barr virus, tobacco use, and low levels of vitamin D are considered risk factors in genetically predisposed individuals.

Multiple sclerosis is diagnosed by meeting diagnostic criteria. They are based on demonstrating the involvement of 2 or more areas of the CNS at different time points. The MRI is standard to show the presence of dissemination in space and in time. This enables earlier diagnosis [11]. Patients with multiple sclerosis mostly experience recurrent episodes (relapses) of neurological impairment, but in 60-80% of cases, the course of the disease becomes chronic and progressive with time, which leads to cumulative motor disability and cognitive deficits [9].

There remains no cure for multiple sclerosis. Treatment has three aspects: symptom management, relapse management, and disease-modifying therapy [12]. There are disease-modifying therapies for relapsing-remitting MS and progressive MS that develop after the onset of relapsing-remitting MS. These therapies include interferons, glatiramer, teriflunomide, S1P receptor modulators, fumarates, cladribine, and several types of monoclonal antibodies [13].

Despite the benefits of pharmacological and non-pharmacological treatments for symptoms in patients with multiple sclerosis, there is a need for better control of these symptoms [14]. Studies indicate that there are some promising complementary therapies, such as physical therapy and therapeutic physical exercises, that can improve many of the deficiencies observed in multiple sclerosis. One such therapy is hippotherapy [15].

Hippotherapy is an equine-assisted form of physical therapy that uses the characteristic movements of a horse. Variable, rhythmic, and repetitive movements of the horse provide graded, effective, and sensory stimulation for its rider. Slow, rhythmic movements of the horse's body have a positive influence on the development of paraspinal muscles. The horse's multifaceted gait has a swinging rhythm that strongly influences three-dimensional pelvic motion. That leads to improvements in balance, mobility, and posture [16,17].

Clinical evidence

The effect of hippotherapy on the course of multiple sclerosis has been assessed in several studies. In a multicenter randomized controlled trial (MS-HIPPO) by Vermöhlen and colleagues (2018), participants were divided into two groups: hippotherapy once a week in addition to standard care, and a control group that received standard care only.

The study lasted for 12 weeks in Germany. The patients were adults (57 females and 13 males) with stable multiple sclerosis, lower-limb spasticity, and an Expanded Disability Status Scale (EDSS) score between 4 and 6.5. The intervention group included 32 patients, and the control group included 38 patients.

The primary endpoint was balance. Between the intervention and control groups, the change in BBS from baseline to week 12 was 2.33 (95% confidence interval (CI): 0.03–4.63, $p = 0.047$).

The secondary endpoints were fatigue, spasticity, pain, and quality of life. In the intervention group, authors observed improvement in fatigue (-6.8 , $p = 0.02$) and spasticity (-0.9 , $p = 0.03$). In physical health score, the mean difference in change between groups was 12.0 ($p < 0.001$), and in mental health score it was 14.4 ($p < 0.001$).

Despite being below the minimal clinically important difference, hippotherapy in addition to standard care, notably improved balance, fatigue, spasticity, and quality of life in patients with multiple sclerosis [14].

Another study from 2020 by Gomes Moraes and colleagues evaluated the effects of an 8-week hippotherapy on walking performance and gait parameters in people with multiple sclerosis.

The study included 33 people with relapsing-remitting multiple sclerosis. The final analysis included 17 participants from the intervention group and 16 from the control group who completed the observation time.

The measures used in the study were walking performance (assessed by the T25FW and 6MWT) and spatiotemporal gait measured by the GAITRite (CIR Systems). The hippotherapy group attended sixteen sessions of 30-minute hippotherapy twice a week. They used two horses with similar movement and temperament characteristics. The aim of the intervention was to progressively improve the participants' motor skills.

The authors of the study observed that the hippotherapy group, compared to the control group, significantly increased the 6MWT distance ($+9.70\%$, $p < 0.001$) and decreased T25FW time (-15.86% , $p < 0.001$). In spatiotemporal gait parameters, the hippotherapy group showed significantly better improvements in most parameters ($\Delta\%$ from 3.66 and 41.43%; all $p < 0.005$) than the control group.

The study indicated that hippotherapy had a positive influence on walking performance and spatiotemporal gait parameters in people with relapsing-remitting multiple sclerosis. The authors observed a reduction in stance time and double support time and an increase in balance time [18].

In another study by Muñoz-Lasa and colleagues (2019), the authors assessed the influence of hippotherapy on patients with multiple sclerosis in aspects such as gait, spasticity, pelvic floor, fatigue, depression, and quality of life.

The study lasted for 6 months and included 10 participants, 6 in therapy, and 4 in a control group. The recruitment of the patients was made by the Neurology Service of the University Hospital of Torrejón (Madrid).

The assessment was performed using the following scales: Timed 25-foot walk (T25-FW) for gait assessment, Modified Ashworth Scale for spasticity assessment, Beck Depression Inventory (BDI), Multiple Sclerosis Quality of Life-54 (MSQOL-54), Fatigue Impact Scale (FIS), King's Health Questionnaire (KHQ), Constipation Quality of Life (C-QOL-20).

Participants attended the hippotherapy once a week for 6 months. The sessions lasted 20–25 minutes, and up to 35–40 minutes at the end.

The results of the study showed a statistically significant positive effect in the hippotherapy group in: spasticity pre-post assessed by the modified Ashworth scale ($p = 0.01$), fatigue impact ($p < 0.0001$) assessed by FIS, in general perception of health outcome in urinary quality of life scale KHQ ($p=0.033$), and in subscales 2, 3 and 4 of MSQOL-54 ($p=0.011$). In the control group, they did not observe improvement in any scale [19].

The next study by Silkwood-Sherer and Warmbier examined postural instability in patients with multiple sclerosis. It was a nonequivalent pretest-posttest comparison group design. The intervention group consisted of 9 individuals (4 males, 5 females). The hippotherapy intervention lasted for 14 weeks, once a week. The comparison group consisted of 6 individuals (2 males, 4 females). The patients were recruited by MS support groups of the Michigan Chapter of the National Multiple Sclerosis Society.

The assessment was performed by the Berg Balance Scale (BBS) and Tinetti Performance-Oriented Mobility Assessment (POMA) at 0, 7, and 14 weeks. Hippotherapy intervention provided by the American Hippotherapy Association (AHA) consisted of a warm-up time (5-minute), a treatment session (30 minute), and a cool-down time (5 minute). Participants experienced direction changes, sudden stops and starts, walking over ground poles, changes in speed of the horse, from a slow walk to a trot (150 steps/min), if they tolerated it. Participants who tolerated difficult tasks in their postural control, changed positions on the horse. They stood in their stirrups with hands on the horse's shoulders, sat sideways, and rode backward.

The intervention group showed statistically significant improvement on the BBS (mean increase 9.15 points) and POMA scores (mean increase 5.13). The comparison group had no significant changes on the BBS or POMA (mean decrease 0.13) [20].

The study by Lindroth and colleagues (2015) evaluated the effect of hippotherapy on sensory information for balance in people with multiple sclerosis. The study was a pre-test, non-randomized design study. The study included three individuals: two women and one man. The participants were diagnosed with relapsing-remitting or progressive multiple sclerosis. The age range was between 37 and 60 years. They received hippotherapy twice a week for 6 weeks as the intervention strategy. The session lasted 40 minutes.

The assessments were done prior to the intervention, directly after, and 6 weeks after discharge. It was made by tests such as the Sensory Organization Test (SOT), Berg Balance Scale (BBS), and the Functional Gait Assessment (FGA). The SOT assesses balance and fall risk in an environment that changes. It uses patients' ability to respond to sensory cues (somatosensory, visual, and vestibular).

The results of the study showed improvement in all three participants in SOT, BBS, and FGA scores. The follow-up assessment indicates the maintenance and continuation of this benefit.

The results indicate that hippotherapy may lead to improvement in balance, functional gait, and processing of sensory cues for postural control [21].

The study by Gencheva and colleagues (2015) took place in Sofia at the Sports Riding Center "Han Asparouh". It was a non-controlled pilot study.

The participants were ten patients with multiple sclerosis (4 men, 6 women). They attended the hippotherapy intervention weekly. There were 16 sessions, each lasting 20 minutes.

To assess the results, they used tests such as the Berg Balance Scale (BBS), Fatigue Severity Scale (FSS), Bertoti Posture Assessment Scale (PAS), and Test for Emotionality (TE). During the hippotherapy, the horses walked at a pace only. The patients were taught how to achieve the correct horseback riding position. The exercises were performed on horseback in positions such as prone, side-lying, or sitting.

The results of the study showed significant differences between the initial and final tests of all four parameters. Hippotherapy and exercises on horseback led to positive effects in trunk and upper-limb control, balance reactions, dynamic control, and facilitated movement. BBS scores rose from 34.7 in the beginning to 43.3 points. Participants' posture while riding and the position of the head significantly improved. Fatigue Severity Scale (FSS) showed that hippotherapy reduced the levels of fatigue, which contributed to more effective riding time [22].

Conclusions

In conclusion, several studies investigating the benefits of hippotherapy on the course of multiple sclerosis indicate that this intervention can be beneficial for affected patients.

The study by Vermöhlen and colleagues showed that hippotherapy, when added to standard care, improved balance, fatigue, spasticity, and quality of life from baseline to the 12-week follow-up. The study by Gomes Moraes and colleagues indicated that hippotherapy had a positive influence on walking performance and spatiotemporal gait parameters, including a reduction in stance time and double-support time, as well as an increase in balance time. Analysis of the results of the study by Muñoz-Lasa and colleagues (2019) showed beneficial effects on spasticity, fatigue impact, general perception of health, and outcomes on the urinary quality-of-life scale (KHQ). The study by Silkwood-Sherer and Warmbier revealed that participants who received hippotherapy demonstrated significantly higher BBS scores (mean increase of 9.15 points) and improved POMA scores. The results from Lindroth and colleagues (2015) indicate that hippotherapy can positively influence balance, functional gait, and the processing of sensory cues for postural control. The study by Gencheva and colleagues (2015) reported improvements in trunk and upper-limb control, balance reactions, dynamic control, facilitated movement, and reductions in fatigue levels.

Overall, hippotherapy may be a useful complementary treatment for improving walking and other functional outcomes in people with multiple sclerosis; however, available data are still limited.

Disclosure

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