DOI: 10.4274/jmsr.galenos.2024.2024-2-1

Journal of Multiple Sclerosis Research 2023;3(3):46-48

CASE REPORT

Effects of Aerobic Exercise on Restless Legs Syndrome Severity in Individuals with Multiple Sclerosis: A Case report

Asiye Tuba Ozdogar

Van Yuzuncu Yil University Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Van, Turkey

Abstract

The primary focus in treating restless legs syndrome (RLS) is medical interventions. Although the benefits of physical activity are becoming increasingly evident, studies on the impact of exercise in people with both multiple sclerosis (MS) and RLS are limited. In this case report, we explored the effects of aerobic activity on RLS severity and related symptoms in a woman with RLS and MS. The RLS diagnostic criteria guided the diagnosis. Given the extensive impact of RLS symptoms, comprehensive assessment tools were utilized. Over 24 sessions, the patient performed aerobic exercise using a reclined exercise bike under the supervision of a physical therapist. Initially, each session lasted 20 min and consisted of 2-3 min of warm-up, 15 min of activity, and 2-3 min of cool-down. The duration of each session gradually increased to 30 min over 12 weeks. The study findings indicate that aerobic exercise may alleviate RLS severity, enhance sleep quality, reduce daytime sleepiness, improve gait, and enhance the quality of life in people with RLS and MS.

Keywords: Multiple sclerosis, restless legs syndrome, aerobic exercise, rehabilitation, sleep quality

Introduction

Multiple sclerosis (MS) is a chronic inflammatory condition that affects the central nervous system and causes diverse symptoms (1). Restless legs syndrome (RLS) commonly occurs in patients with MS (pwMS), affecting 13.3% and 65.1% of these patients (2). Despite its prevalence, RLS often goes unnoticed during neurological examinations, making its diagnosis and treatment challenging. Although medical interventions are traditionally preferred in the management of RLS, the increasing recognition of the benefits of exercise has prompted studies into the various forms of physical activity for patients with RLS. However, studies on exercise and its impact on RLS in pwMS are limited. In this case report, we aimed to explore the effects of aerobic exercise on RLS severity and related symptoms in a female patient diagnosed with both RLS and MS.

Case Report

A 42-year-old female initially presented to our MS center in 2013 with complaints of weakness. The patient was confirmed to have MS and treated with interferon beta-1b. In 2019, due to treatment inefficacy, fingolimod was discontinued and ocrelizumab was initiated. The severity of RLS symptoms was assessed using the RLS Rating Scale (RLSRS) (3). At the last routine visit, the patient scored 32 out of 40 on the RLS, indicating very severe symptoms despite ongoing medical treatment. Considering the limited efficacy of medical interventions, a collaborative decision was made by the physical therapist and neurologist to incorporate aerobic exercise in the patient's treatment regimen. With worsening RLS symptoms, even with medical treatment, aerobic exercise training was first introduced in August 2022. The first assessments were performed before initiating the 12-week personalized aerobic exercise program.

Address for Correspondence: Asiye Tuba Ozdogar, Van Yuzuncu Yil University Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Van, Turkey
E-mail: tuba.ozdogar@yahoo.com **ORCID-ID:** orcid.org/0000-0003-0043-9374
Received: 01.03.2024 **Accepted:** 19.04.2024

Aerobic exercise was chosen as the therapeutic intervention on the basis of a protocol from previous RLS study. The exercise program involved a recumbent exercise bike and was conducted twice a week for 12 weeks under the supervision of a physical therapist. The exercise intensity was gradually increased from 60% to 75%. Each session initially lasted 20 min, consisting of 2-3 min of warm-up, 15 min of exercise, and 2-3 min of cool-down. The duration of each session was gradually increased until each session lasted 30 min at the end of 12 weeks. The patient's heart rate was monitored using a heart rate sensor (Polar H10). The patient completed all 24 sessions with high motivation and no adverse events.

RLS is diagnosed on the basis of five criteria outlined by the International RLS Working Group in 2014. The patient met all the criteria, and the RLS diagnosis was confirmed on June 29, 2019 (4). Comprehensive assessments were employed to evaluate various aspects affected by RLS symptoms before and after the 12-week aerobic exercise program. The assessments included the RLS severity (RLSRS score) (3), daytime sleeplessness (Epworth Sleepiness Scale) (5), sleep quality (Pittsburgh Sleep Quality Index) (6), walking speed (timed 25-foot walk test) (7), functional mobility (timed up and go test) (8), walking capacity (6-minute walk test) (7), quality of life (Multiple Sclerosis International Quality of Life) (9), and aerobic capacity (estimated VO_{2max}) (10). The results of these tests are presented in Table 1, and they demonstrate a 25% improvement in RLSRS scores and positive changes in all outcome measures. The patient signed a consent form for the publication of this report and the use their medical data.

Discussion

Managing RLS in pwMS includes diverse non-pharmacological methods such as infrared therapy, compression devices, exercise, and traditional acupuncture. However, the efficacy of these approaches remains debatable due to methodological shortcomings in current research (2). Evidence-based studies are urgently required to develop customized rehabilitation programs for such patients and identify their efficacy and optimal treatment duration. Despite the absence of robust evidence, numerous studies have suggested a potential reduction in RLS severity following aerobic exercise programs (11-13). Thus, we chose to implement aerobic exercises in our patient with both MS and RLS. The outcomes in our study suggest that aerobic exercises may alleviate RLS severity, improve daytime sleepiness and sleep quality, enhance gait, and elevate the quality of life.

Cederberg and Motl (14) explored the feasibility and effectiveness of physical activity modification in enhancing sleep outcomes and reducing RLS severity in pwMS. The 15 pwMS who had developed RLS and were included in the study were further divided into two groups: behavioral intervention (n=8) and control (n=7). The behavioral intervention method consisted of watching videos on a special website and attending 12 synchronous treatment sessions with a behavioral coach for 16 weeks. The participants were given a pedometer and asked to report their weekly step count on the special website. They reported enhancements in RLS severity, time in bed, sleep satisfaction, and sleep duration. They theorized that MS and RLS's shared pathways could benefit from the exercise-induced increase in dopaminergic signaling (14). The results in our patient support this idea. Our patient demonstrated a reduction in RLS severity and improvement in sleep symptoms and physical functions such as gait and estimated VO_{2max}. However, this mechanism should externally validated via randomized control trials with large sample sizes.

In conclusion, our case report demonstrates the impact of a 12-week aerobic exercise program on a woman with MS and RLS and highlights it's potential for enhancing overall health. The results indicate the need to consider RLS symptoms alongside MS symptoms and understand how MS symptoms may affect the assessment and intervention of such patients. The favorable study results suggest the need for thorough randomized controlled trials on aerobic exercise in pwMS and RLS, which could offer valuable insights and validate its benefits. Although

Table 1. Outcomes of the patient before and after the 12-week aerobic exercise program

	Before the program	After the program	Percentage of change
RLSRS (0-40 points)	32	24	25%
ESS (0-24 points)	13	6	54%
PSQI (0-21 points)	11	8	27%
T25FW (sec)	8.74	8.66	1%
TUG (sec)	16.57	15.13	9%
6-MWT (meter)	240	321	34%
MusiQoL (0-100 points)	33.22	42.25	27%
Estimated VO_{2max} (mL/kg/min)	38.10	42.00	10%

RLSRS: RLS Rating Scale, ESS: Epworth Sleepiness Scale, PSQI: Pittsburgh Sleep Quality Index, T25FW: Timed 25-foot walk, TUG: Timed up and go, 6-MWT: 6-minute walk test, MusiQoL: Multiple Sclerosis International Quality of Life

this case report demonstrates that aerobic exercise can improve RLS symptoms, the findings cannot be generalized to pwMS or other neurological conditions.

Ethics

Informed Consent: Informed consent was obtained from patients.

Financial Disclosure: The author declared that this study received no financial support.

REFERENCES

1. Hunter SF. Overview and diagnosis of multiple sclerosis. Am J Manag Care 2016;22:s141-150.
2. Ozdogar AT, Kalron A. Restless legs syndrome in people with multiple sclerosis: An updated systematic review and meta-analyses. Mult Scler Relat Disord 2021;56:103275.
3. Walters AS, LeBrocq C, Dhar A, Hening W, Rosen R, Allen RP, Trenkwalder C; International Restless Legs Syndrome Study Group. Validation of the International Restless Legs Syndrome Study Group rating scale for restless legs syndrome. Sleep Med 2003;4:121-132.
4. Allen RP, Picchietti DL, Garcia-Borreguero D, Ondo WG, Walters AS, Winkelman JW, Zucconi M, Ferri R, Trenkwalder C, Lee HB; International Restless Legs Syndrome Study Group. Restless legs syndrome/Willis-Ekbom disease diagnostic criteria: updated International Restless Legs Syndrome Study Group (IRLSSG) consensus criteria--history, rationale, description, and significance. Sleep Med 2014;15:860-873.
5. Johns MW. A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep 1991;14:540-545.
6. Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res 1989;28:193-213.
7. Scalzitti DA, Harwood KJ, Maring JR, Leach SJ, Ruckert EA, Costello E. Validation of the 2-Minute Walk Test with the 6-Minute Walk Test and Other Functional Measures in Persons with Multiple Sclerosis. Int J MS Care 2018;20:158-163.
8. Sebastião E, Sandroff BM, Learmonth YC, Motl RW. Validity of the Timed Up and Go Test as a Measure of Functional Mobility in Persons With Multiple Sclerosis. Arch Phys Med Rehabil 2016;97:1072-1077.
9. Simeoni M, Auquier P, Fernandez O, Flachenecker P, Stecchi S, Constantinescu C, Idiman E, Boyko A, Beiske A, Vollmer T, Triantafyllou N, O'Connor P, Barak Y, Biermann L, Cristiano E, Atweh S, Patrick D, Robitail S, Ammoury N, Beresniak A, Pelletier J; MusiQol study group. Validation of the Multiple Sclerosis International Quality of Life questionnaire. Mult Scler 2008;14:219-230.
10. Legge BJ, Banister EW. The Astrand-Ryhming nomogram revisited. J Appl Physiol (1985) 1986;61:1203-1209.
11. Aukerman MM, Aukerman D, Bayard M, Tudiver F, Thorp L, Bailey B. Exercise and restless legs syndrome: a randomized controlled trial. J Am Board Fam Med 2006;19:487-493.
12. Mortazavi M, Vahdatpour B, Ghasempour A, Taheri D, Shahidi S, Moeinzadeh F, Dolatkhah B, Dolatkhah S. Aerobic exercise improves signs of restless leg syndrome in end stage renal disease patients suffering chronic hemodialysis. ScientificWorldJournal 2013;2013:628142.
13. Xu XM, Liu Y, Jia SY, Dong MX, Cao D, Wei YD. Complementary and alternative therapies for restless legs syndrome: An evidence-based systematic review. Sleep Med Rev 2018;38:158-167.
14. Cederberg KLJ, Motl RW. Feasibility and efficacy of a physical activity intervention for managing restless legs syndrome in multiple sclerosis: Results of a pilot randomized controlled trial. Mult Scler Relat Disord 2021;50:102836.