



# YOGA TRAINING HAS POSITIVE EFFECTS ON POSTURAL BALANCE AND ITS INFLUENCE ON ACTIVITIES OF DAILY LIVING IN PEOPLE WITH MULTIPLE SCLEROSIS: A PILOT STUDY

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**Context:** There is a little evidence about the influence of yoga as a complementary therapy for postural balance and its influence on activities of daily living in multiple sclerosis (MS) patients.

**Objective:** To evaluate the influence of a six-month yoga program on postural balance and subjective impact of postural balance impairment on activities of daily living in people with MS.

**Design:** Randomized controlled pilot study.

**Setting:** Protocol developed at the Adaptive Physical Activity Study Department, College of Physical Education, State University of Campinas, Brazil.

**Subjects:** A total of 12 (11 women) yoga naive people with MS randomly divided into two groups as follows: Control (C—waiting list,  $n = 6$ ) and Yoga (Y—Yoga training,  $n = 6$ ).

**Interventions:** Yoga group practiced postures, breathing exercises, meditation, and relaxation on weekly 60-min classes for a six-month period.

**Main Outcome Measures:** The following evaluations were performed at study entry (baseline), and after six months (six

months): Berg Balance Scale (BBS), Expanded Disability Status Scale (EDSS), and self-reported postural balance quality and influence of postural balance on activities of daily living.

**Results:** There was a significant improvement in BBS score from baseline to six months only in the Yoga group, especially in subjects with higher EDSS score, with increased quality of self-reported postural balance, and decreased influence of postural balance impairment on activities of daily living. In conclusion, a six-month yoga training is beneficial for people with MS, since it improves postural balance and decreases the influence of postural balance impairment on activities of daily living. A greater sample size is necessary to increase generalization, but it seems that yoga could be included as a feasible complementary therapy for people with MS.

**Key words:** multiple sclerosis, hatha yoga, postural balance, meditation, pranayama

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## INTRODUCTION

Multiple sclerosis (MS) is a chronic inflammatory and degenerative disease.<sup>1-3</sup> It is an immune-mediated disease of the central nervous system,<sup>4</sup> characterized by multiple inflammation injuries, demyelization, and incidence of scars in the white matter of the

central nervous system.<sup>5,6</sup> According to a recent review,<sup>4</sup> MS has a prevalence of 1/1000 adults in the United States, while it affects approximately 1,000,000 individuals worldwide,<sup>7</sup> with a prevalence rate of 110/100,000, which makes MS one of the most frequent neurological disease.<sup>8</sup> Its symptoms are broadly varied, but fatigue, walking and postural balance impairment are highly incident, and debilitating ones,<sup>1,4,9-13</sup> since approximately 84% of people with MS have postural balance impairment, and 61% have experienced at least one falling incident, among whom 17% had some type of fracture.<sup>6</sup> Such balance and/or mobility impairments greatly impact the quality of life of people with MS.<sup>14,15</sup> These clinical symptoms are related to impairments of both the vestibular and visual systems,<sup>16</sup> since MS may affect the individual's set of visual, vestibular, and proprioceptive information.<sup>17</sup> Structural losses may include impairment of cerebellum, brainstem, and visual cortex, accompanied by

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hypotonia or spasticity of lower limbs.<sup>5</sup> Since multiple sclerosis has no cure, and pharmacological treatment has limited effects on disability and physical impairment, symptomatic and supportive therapies have gained a growing importance on scientific and clinical communities.<sup>18</sup> Examples of such approaches are physical exercises and yoga.

Usually, when such clinical symptoms begin, patients are young and barely feel functionality decreases, but along with the evolution of the disease, there is a marked decrease in physical activity and conditioning.<sup>19</sup> Furthermore, some authors state that people with MS should avoid physical exercise, since an increase in body temperature might lead to exacerbation of the symptoms.<sup>20</sup> However, weakness and atrophy are usual consequences of physical inactivity that may also cause physical impairment and increased disease severity.<sup>21</sup> In fact, recent researches have addressed the beneficial role of physical exercise for MS patients,<sup>1,4</sup> and a recent study has proven exercise to be beneficial to MS patients, decreasing fatigue and increasing quality of life,<sup>22</sup> and another study by Briken et al.<sup>23</sup> also state that exercise may be beneficial for physical fitness and cognition of MS patients. Furthermore, an elegant review by Motl and Pilutti<sup>1</sup> state that exercise training has positive effects on muscle strength, aerobic capacity, walking performance, fatigue, gait, balance, and quality of life of MS patients. Thus, nowadays there is no reason to avoid exercise training for MS patients. Although not essentially an exercise, the use of yoga as a complementary intervention, adjunct to medical treatment, has gained increased interest since it may offer the benefits of a light exercise, with the psycho-cognitive support of a philosophic-practical system.<sup>24</sup> In fact, some studies have demonstrated positive effects of yoga on fatigue, pain, psychosocial status,<sup>25</sup> and mood,<sup>26</sup> while others<sup>27</sup> have addressed yoga as a method for MS symptoms management, such as pain, fatigue, spasticity, balance, bladder control, and sexual function. The same authors conclude that yoga is as safe and inexpensive as physical exercise, and may be even more accessible for patients with spasticity and impaired mobility than other forms of exercise.

The greatest aim of yoga is to harmonize mind and body, which is obtained through practices such as postures (asanas), breathing exercises (pranayamas), and meditation.<sup>28</sup> Yoga postures must follow the guidelines of Patanjali Yogasutra,<sup>29</sup> which include stability and comfort, thus including neuromuscular training during both movement and stabilization (permanence) phases. Furthermore, such practices may be performed with eyes closed, emphasizing the action and entrainment of other sensory systems, such as the vestibular one.<sup>30</sup>

Yoga practices are designed in such a manner that all of them lead to a common goal, which includes reduction in spasticity, battling fatigue, improving cognitive function, and increasing range of motion.<sup>31,32</sup> This approach toward a controlled and comfortable condition provides those who practice yoga the possibility of being aware of their limits, as well as their potentialities within such limits.<sup>33</sup> Nowadays, yoga is considered viable for people with MS, since there are reports of high satisfaction related to its practice in this population, although a body of evidence is still limited, and requires further investigation.<sup>26,27,34–36</sup>

Thus, a working hypothesis was formulated: a six-month yoga program leads to significant improvement of postural balance in people with MS. Besides that, a qualitative question was posited: does a six-month yoga program decrease the subjective impact of postural balance impairment on activities of daily living in people with MS? Hence, the purpose of this study was to evaluate the influence of a six-month yoga program on postural balance and on the subjective impact of postural balance impairment on activities of daily living in people with MS.

## MATERIAL AND METHODS

### Subjects

Subjects were recruited at Campinas Multiple Sclerosis Group (CMMSG) during its monthly meetings. There are approximately 150 patients in this center; however, only 10% use to attend such meetings with the purpose of discussing issues related to multiple sclerosis, in an opportunity for exchanging experience.

*Inclusion criteria:* Multiple sclerosis patients with confirmed neurological diagnosis of multiple sclerosis; both genders; age  $\leq 55$  years; under neurological medical care; Expanded Disability Status Scale (EDSS) score  $\leq 6$ , without disease aggravation at the beginning of the program; clinically able to take part of the program; and yoga naive, or absent of practicing it for more than one year.

*Exclusion criteria:* Class attendance lower than 75%; disease aggravation during the protocol; outbreak occurrence within two years before the beginning of the protocol; and changes on drug therapy or physical activity level during the protocol.

The protocol was approved by the Research Ethics Committee of the State University of Campinas—Brazil (UNICAMP—registration number 062/2006—[www.fcm.unicamp.br](http://www.fcm.unicamp.br)). In the first session, volunteers were informed about the protocol. The consent form presented the objective of investigating the influence of yoga practice on postural balance, and granted the volunteers: anonymity, data confidentiality, and complete freedom to refuse to participate or quit the protocol at any time/stage, without any prejudice or retaliation. All volunteers signed an informed consent before entering the research.

### Randomization

Randomization was performed in a stratified way (each group received three patients with EDSS scored below 3, and three patients with EDSS scored above 3). For that, the six patients with EDSS  $< 3$  blindly took a paper from an envelope (it had three papers with numbers from 1 to 3—determining Yoga group, and three other with numbers from 7 to 9, determining Control group). The same procedure was carried out with the patients with EDSS  $> 3$ , but numbers were 4–6, determining Yoga group, and 10–12, determining Control group). Evaluations were conducted in the morning both at study entry (baseline) and at the end of the study (six months). At the end of the protocol, Control group was offered the same intervention as it was given to the Yoga group.

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