



## YOGA AND MULTIPLE SCLEROSIS

By Dalia Zwick, PT, PhD

Several symptoms of Multiple Sclerosis are amenable to rehabilitation treatment; this article will present a rehabilitation approach via a case report, where the physical aspect of yoga, various poses – postures and exercises – are employed. Symptoms of MS that potentially respond well to this approach include fatigue<sup>1</sup>, muscle weakness, spasticity, and pain. With MS, muscle weakness results from direct damage to the central nervous system (CNS), or indirectly from either disuse or muscle imbalance. Lesions to the CNS are due to inflammation of the myelin sheath, which is an insulating material. This injurious process, known as demyelination, predominantly affects the brain's white matter<sup>2</sup>. These lesions disrupt electrical impulses from nerves producing weakness and other deficits depending on the nerve involved e.g., motor, sensory, autonomic and coordination (causing Cerebellar, Vestibular or Proprioceptive ataxia<sup>3</sup>).

The muscle weakness associated with myelin damage is aggravated by atrophy in neighboring healthy muscle fibers<sup>4</sup>. This weakness is also a cause of soft tissue contractures<sup>5</sup> and/or limitations in the range of motion in joints. Traditionally, rehabilitation approaches which target muscle weakness, contractures and spasticity, can minimize some of these symptoms. However, in my clinical experience as a physical therapist, I have found that yoga may be productively modified for people with MS and integrated into rehabilitation with considerable benefit. In particular, yoga postures may be employed with great success to decrease fatigue, abnormally high muscle tone, and spasticity, promote muscle relaxation, elongate soft tissues and thereby or indirectly improve muscle strength.

Particularly appropriate for this purpose is the therapeutic approach of the Iyengar School of yoga<sup>6</sup>. These teachings emphasize precision and symmetry in exercises, which may be both static and dynamic<sup>7</sup>. In static variations, muscle activity is either isometric or relaxed, with poses held for approximately 5 to 10 breaths, or about 30 to 60 seconds. When static yoga poses (also called restorative poses) are employed with patients who have MS-related muscle weakness, spasticity and soft tissue tightness, the patients may be assisted into the yoga pose, and they stay in each pose longer. They are then passively supported in maintaining the poses through the use of props such as yoga mats, bolsters, chairs or ropes. In dynamic variations, muscle activity may be either isotonic or isometric and may or may not employ gravity as resistance. Therapists provide instructions or assistance to movement into and out of the pose in synchrony with the breath.

The use of yoga postures with symptoms of MS is illustrated in my work with SK. SK is a 40 year-old woman whose Expanded Disability Status Scale score was 8.0-8.5<sup>8</sup>. Her symptoms included severe fatigue after staying

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seated in her wheelchair even for a short period of 10-20 minutes. She also demonstrated weakness in the upper extremities and trunk muscles (3-/5 Manual Muscle Testing). Her lower extremities demonstrated spasticity (3/4 Ashworth Scale<sup>9</sup>) with no volitional motor control. SK had severe limitation of middle to end range of motion in all major joints with muscle tightness, particularly in the regions of shoulders, trunk, pelvis, hips, knees and ankles. Her breathing appeared shallow due to soft tissue tightness and weakness of intercostal muscles. SK also had severe discomfort while sitting, due to abnormally high and asymmetric trunk muscle tone. As a result of this, SK had a poor sitting posture, even in a custom-fitted wheelchair with her knees held in severe adduction, and her pelvis and trunk mal-aligned. When starting treatment, SK's goal was to reduce the discomfort caused by the tightness and tone in her trunk and extremities. She also expressed her desire to improve her stamina and reduce her fatigue so that she will be able explore her ability to stand. Standing at that time did not seem to be a realistic goal because of contractures, spasticity and weakness of her lower extremities and trunk.

The Dandasana (Figure 1-a and 1-b) and Paschimottanasana (Figure 2) are some modified sitting poses used in the sessions. SK was helped into a position with her legs extended, and this position was supported through the use of props. Then she was assisted to bend forward toward her feet. This pose is aimed at elongating the hamstrings and the lumbosacral region musculature by moving the pelvis into anterior tilt and flexing at the hips with knees held in full extension. This resulted in a temporary reduction in spasticity and in greater flexibility, which typically lasted for a few days. The long-term effects of flexibility at the lower extremities and lumbosacral region eventually resulted in allowing the rehabilitation program to explore standing poses with SK.



**Figure 1-a**



**Figure 1-b**

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**Figure 2**

Following the treatments, SK has better sitting posture, and her pelvis and trunk are symmetrically aligned. She reported improved stamina and greater comfort sitting for a longer period of time. In addition, she demonstrated increases in the range of motion at her hips (abduction at the hip in supine improved by 25 degrees for each leg, and hip extension improved by 20 degrees, which allowed her to stand upright), knees (extension improved by 60 degrees) and ankles (dorsi flexion improved by 10 degrees). This improvement in the ranges of motion was sufficient to allow her to be helped into a standing position and remain standing with support for more than one hour. SK can stand on a tilt table, with good postural alignment when in therapy, and is able to stand with knee-ankle-foot orthoses and stall bars at home. Her upper extremities strength has improve by half a grade to 3/5. While standing, SK is able to practice breathing exercises, coordinated with upper extremities exercises, thus assisting improved oxygenation of the blood. This has greatly reduced her risk of secondary disability of osteoporosis and improved her psychological outlook. However, the EDSS scale was unable to capture the improvements in SK's condition that followed the yoga approach (the sensitivity of the scale has been challenged by various physical therapists and neurologists <sup>10</sup>). Nonetheless, it appears that patients like SK can benefit from the integration of yoga postures into physical therapy.

Guidance is important because yoga exercises are numerous, and most often individuals with severe disabilities cannot perform these exercises without professional assistance. However, it does appear that people with MS may benefit from yoga as a therapeutic approach when they are assisted by a professional who can match the unique

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symptoms of the patient with the appropriate exercises. Some practitioners have begun to apply yoga techniques routinely<sup>11</sup>, but there is a need for formal empirical research regarding the efficacy of yoga for MS patients.

### **APPENDIX:**

#### **Treatment Rationale Summary:**

**Goal :** To be able to stand and tolerate upright posture for 20 minutes daily – with proper alignment of lumbar and pelvic region in addition to hips, knees, ankle on a Tilt table or with Ankle Foot Orthoses with hands holding onto a bar. This posture will also have the additional weight bearing – benefits

#### **What are the modifiable factors that limit the goal?**

Abnormal Muscle tone such as Spasticity – Lower Extremities Range of Motion limitation of soft tissue in joints structures and muscles (tightness and contractures)

#### **How should these factors be modified to meet the goal?**

Yoga poses and exercises to maintain or regain length in musculature;

These stretches can be done actively or passively with or without another person. Restorative Yoga postures have elements of stretching and relaxation with gravity assistance.

Theoretical Rationale – with the Physical Stress Theory PSA - the abnormal muscle tone causes undue stress on the body (12)

#### **Intervention Yoga poses**

1. One of the first poses - Supta-Baddha-Konâsana –(Figure 3) (5-10 minutes passive supine posture; hips abducted & externally rotated; knees flexed; soles of feet together or hips adducted & internally rotated; knees flexed).
2. The final pose - Tadasana – (standing up straight; with feet together; arms by the side of the body) supported on a Tilt Table.

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**Figure 3**

### **Outcome:**

Improved trunk, pelvis, hips, knees and ankle range of motion and muscle length so that the patient will be able to participate in daily program of standing.

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