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The effects of Tai Chi on physical and psychosocial function among persons with multiple sclerosis: A systematic review

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ABSTRACT

Objectives: Conduct a systematic review to evaluate the effects of Tai Chi on physical and psychosocial function among individuals with Multiple Sclerosis.
Methods: An electronic literature search of 12 databases using controlled vocabulary function and keywords from inception through August 2016. All Tai Chi intervention studies assessing physical and psychosocial function among persons with Multiple Sclerosis were included. Study quality was scored using an established tool examining 16 study elements (range = 0–32).
Results: A total of 91 articles were retrieved, with 3 additional articles identified through reviewing bibliographies of relevant articles. A total of 8 studies (randomized controlled trials, n = 3; quasi-experimental, n = 5) enrolled 193 participants with Multiple Sclerosis. Studies were conducted in the USA (n = 3), Europe (n = 3), Iran, (n = 1), and India (n = 1). A total of 3 studies reported using the Yang style of Tai Chi (not specified, n = 5 studies). The Tai Chi intervention averaged 27 sessions over 11 weeks. Study quality scores for the randomized controlled trials had a mean score of 23 (range 19–26), while quality scores for quasi-experimental studies had a mean score of 20 (range 13–26). Overall, participants enrolled in Tai Chi had better balance, gait and flexibility, less fatigue and depression, and better quality of life after the intervention; though mixed results were reported.
Conclusion: The results indicate that Tai Chi is likely safe and may provide physical and psychosocial benefits in individuals with Multiple Sclerosis. Further research is needed using more rigorous study designs to assess the benefits of Tai Chi for individuals with Multiple Sclerosis.

Contents

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1. Introduction

Multiple Sclerosis (MS) is a chronic, long-term, autoimmune disease that is characterized by destruction of the myelin in the central nervous system.[1] Prevalence and incidence of MS is increasing worldwide, with an estimated 2.3 million people affected.[2,3] The average age of the development of the first symptoms is 29 years and the average age of diagnosis is 37 years.[4] Women are more likely to be diagnosed with MS, than men.[2,5,6] The etiology of MS is believed to be a combination of genetic and environmental factors.[1,2,5]

In clinical practice, the McDonald criteria are used for diagnosis with two or more lesions noted on Magnetic Resonance Imaging (MRI), presence of oligoclonal bands or elevated Immunoglobulin G index in Cerebrospinal Fluid, and presentation of patient-reported symptoms consistent with MS that last greater than 24 h.[7] Four types of MS classifications exist: Clinically Isolated Syndrome (CIS), Relapsing-Remitting MS (RRMS), Secondary Progressive MS (SPMS), and Primary-Progressive MS (PPMS).[8] CIS is characterized by a single clinical episode consistent with demyelination; RRMS is characterized by a relapse of symptoms and a full recovery to baseline; SPMS is diagnosed by an original relapsing course of the disease and as the disease gradually progresses the symptoms remain present; PPMS is characterized by a continual worsening of symptoms without remission.[8]

Common psychosocial symptoms associated with MS are depression,[9,10] fatigue,[4,9,10] anxiety,[11] and cognitive impairment.[9,12] The most common comorbidity at diagnosis is depression.[11] Common physical symptoms associated with MS include impaired mobility,[4,9] falls,[13] visual impairment, impaired bowel and bladder function, sensory impairment, spasticity, and pain.[9]

One of the most devastating and widespread sequela of MS is disability, which is generally measured with the Expanded Disability Status Scale (EDSS). The EDSS is used to determine the impact on a person's functional systems and level of impairment.[14] Functional systems include pyramidal, cerebellar, brain stem, sensory, bowel and bladder, visual, cerebral functions, and ambulation. Healthcare providers evaluate functional systems and assign a score from 0 (normal neurological exam) to 10 (death due to MS) to indicate level of disability. An EDSS score of 3 indicates moderate disability in one functional system, but the individual is fully ambulatory; while a score of 5 indicates that an individual can walk 200 m without an aide, but the individual has limitations with daily activities.[14]

Level of disability is a major predictor of activity level and exercise in individuals with MS over the age of 55.[15] Physical activity recommendations for individuals with MS include 20–60 min of aerobic exercise 3–5 times weekly.[16] Among individuals with MS, 80% are not meeting physical activity recommendations.[17,18] An increase in quality of life (QOL) has been identified when individuals with MS engage in exercise.[19] Improvements in MS-associated symptoms, including fatigue, depression, and anxiety, have been noted among individuals engaged in a 6-month exercise program.[20] Exercise is associated with improvements in aerobic capacity and muscular strength,[21] and a decrease in relapse symptoms with 4.6% of individuals that exercise reporting relapses, compared to 6.3% for controls.[22] One type of physical activity that may provide physical and psychosocial benefits for individuals with MS is Tai Chi.

Tai Chi is a low impact exercise and multiple studies conducted among older adults without MS indicate that Tai Chi decreases depressive symptoms,[23] reduces falls,[24–26] improves aerobic endurance,[25] decreases perceived stress,[27] and improves sleep quality.[27] Tai Chi has also been associated with improved executive function in older adults.[28] Tai Chi has been studied in individuals with a variety of chronic diseases including Chronic Obstructive Pulmonary Disease (COPD),[29] Osteoarthritis of the knee[30] and hip,[31] Stroke,[32] Diabetes Mellitus,[33] Parkinson's Disease,[34] Cancer,[35] and Cardiovascular disease.[36] Before Tai Chi can be recommended as an adjunctive therapy for MS patients, it is important to first evaluate the current body of research evidence for potential benefits. Therefore, the purpose of this systematic review was to evaluate the effects of Tai Chi on physical and psychosocial function among individuals with Multiple Sclerosis.

2. Methods

A comprehensive electronic literature search was conducted with the assistance of a medical librarian. Databases searched included: PubMed, CINAHL, PsycINFO, Web of Science, Embase, Academic Search Complete, AMED, Proquest Dissertations and Abstracts, clinicaltrials.gov, SPORTDiskus, PROSPERO, and Google Scholar; using controlled vocabulary function and keywords including "Tai Chi" or "Tai Ji" and "Multiple Sclerosis" (See Appendix A). The literature search included all studies from inception through August 30, 2016 that were published in English. Abstracts of the studies were reviewed to determine if a Tai Chi intervention was offered among persons with MS and if physical or psychosocial function was assessed. The following types of articles were rejected: abstracts; reviews; commentaries; case-reports; book chapters; and studies not-related to the topic. Data abstracted from the studies meeting the inclusion criteria were: country of study origin; study design; participant details (e.g.; type of MS; MS duration; age; gender; EDSS); Tai Chi style and length of the intervention; physical and psychosocial function variables measured; study results; intervention adherence rates; attrition; and serious adverse events. Physical function was defined as balance; gait; flexibility; and strength. Psychosocial function was defined as fatigue; quality of life; disease symptoms; perception of disease; and mood.

2.1. Study quality

Study quality was determined with an established tool[37] that examines 16 study elements. Study elements assessed included: the purpose of the study, sample selection technique, description of study participants, subject allocation to groups, comparability of groups, pre- and post-intervention data collection, procedure