Beyond drugs: can Tai Chi mind–body exercise be an alternative treatment for rheumatoid arthritis?

"*As a multicomponent mind–body exercise, Tai Chi may modulate complex factors and improve health outcomes in RA by reducing pain and improving physical and psychological health and well-being.*"

KEYWORDS: complementary and alternative medicine ■ mind–body exercise ■ pain management ■ rheumatoid arthritis ■ Tai Chi

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Tai Chi, as an original Chinese martial art, has been practiced in China for many centuries. It is considered a complex, multicomponent therapy integrating physical, psychosocial, emotional, spiritual and behavioral elements, and promoting the mind-body interaction [1]. According to the 2007 National Health Interview Survey, around 2.5 million Americans practice Tai Chi for health reasons and the number is increasing [2]. Furthermore, individuals with musculoskeletal conditions are even more likely to practice Tai Chi [3].

Treatment of rheumatoid arthritis (RA), a systemic, diverse and dynamic disorder, has made major progress over the past few decades. Early active treatment with disease-modifying antirheumatic drugs and biological agents can be highly beneficial for control of inflammatory activity and preventing disability in many patients [4]. However, the most effective new drugs are expensive and many patients with RA continue to have significant pain, restricted mobility, reduced muscle strength and low endurance. In addition, it is increasingly recognized that comorbid conditions play a pivotal role in RA outcomes. For example, cardiovascular complications are the leading contributor to mortality in RA [5], accounting for approximately one half of all deaths [6]. Osteoporosis resulting in bone fractures also represents a major source of morbidity in RA [7]. Indeed, complementary and alternative medicine treatment and lifestyle behavioral modification may play a role in preventing RA-associated comorbidities and their complications [8]. Tai Chi may be especially applicable to patients with RA as a result of its effects on pain reduction, muscle strength, stress reduction, cardiovascular and bone health, as well as improved health-related quality of life.

In the past two decades, literature has consistently recognized the potential therapeutic benefits of Tai Chi mind–body exercise. Significant improvements have been reported in balance, strength, cardiovascular and respiratory function, mood, depression and anxiety, self-efficacy, pain reduction and quality of life for patients with a variety of chronic medical conditions in eastern and western populations [3,9].

Several clinical trials have examined the effects of Tai Chi on RA. One early publication by Kirsteins and colleagues [10] reported that 10 weeks of Tai Chi training appears to be safe for RA patients and may serve as a suitable weight-bearing exercise with the additional potential advantages of stimulating bone growth and strengthening connective tissue. Two Korean randomized controlled trials showed that either 6 weeks or 12 weeks of Tai Chi significantly decreased pain and fatigue and improved mood and sleep quality compared with usual care controls [11,12]. The results from another randomized controlled trial of 20 patients with functional class I or II RA found that five of ten patients (50%) randomized to Tai Chi achieved an American College Rheumatology 20% response compared with zero of ten (0%) in the attention control ($p = 0.03$). Similar trends to improvement were also observed for disease activity, disability index, depression, functional capacity and quality of life. No adverse events were observed and no patients withdrew from the study, suggesting that Tai Chi is safe, well tolerated and may be beneficial for functional class I or II RA [13]. A Cochrane review further examined the evidence and suggested that Tai Chi does not exacerbate symptoms of RA and has statistically significant benefits on lower extremity range of motion for people with RA, with ankle range of motion in particular [14].

As a chronic disorder characterized by inflammation leading to joint destruction, RA has clinically important comorbidities, including cardiovascular complications and osteoporosis. Numerous studies have evaluated the effects

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of Tai Chi on cardiovascular and respiratory function [9,15]. Since 1979, results related to the effects of Tai Chi on cardiovascular and pulmonary function have been reported in 43 eastern and western publications [9,15]. Among them, one study reported that the metabolic intensity of the activity seems insufficient to generate improvements of cardiorespiratory fitness in healthy young adults. Yet, other studies suggested that regular Tai Chi practice may preserve cardiorespiratory function in older individuals and may be prescribed as a suitable exercise for older adults. Systematic reviews of the literature have shown that Tai Chi can reduce blood pressure and increase cardiovascular exercise capacity [9,15,16]. Thus, encouraging evidence suggests that Tai Chi may be a safe and beneficial adjunctive therapy to conventional care for patients with RA-associated cardiovascular disease and its complications. The completion of several large ongoing trials studying Tai Chi for patients with cardiac conditions will provide more information on the role of Tai Chi's benefits and mechanisms in the prevention and management of cardiovascular disease.

There are potential beneficial effects of Tai Chi for osteoporosis, another common RA-associated comorbidity. A recent randomized trial, by Woo and colleagues, of 180 community-living elders found that individuals who practiced either Tai Chi or resistance exercise had less total hip bone mineral density (BMD) loss after 12 months of training, compared with the no intervention controls [17]. In a second randomized trial among 28 sedentary elderly adults, comparing the effects of Tai Chi and resistance training, Shen *et al.* found that a treatment regimen of three sessions of Tai Chi per week for 24 weeks increased serum bone-specific alkaline phosphatase and parathyroid hormone compared with resistance training after 6 or 12 weeks. Results also revealed a reduction in urinary calcium levels with Tai Chi at 24 weeks and suggested that Tai Chi is beneficial for increased bone formation in the elderly [18]. A longitudinal randomized prospective trial also showed that 12 months of 108-form Tai Chi slowed bone loss in weight-bearing bones in 132 healthy postmenopausal woman compared with sedentary controls [19]. Among early postmenopausal Chinese women in Hong Kong, Qin *et al.* demonstrated that Tai Chi practitioners with more than 4 years experience had significantly higher BMD in the lumber spine, proximal femur and distal tibia than sedentary controls [20]. Overall, regular long-term Tai Chi practice was associated with higher BMD and better neuromuscular function. Similar positive findings of short- and long-term Tai Chi have been well documented on balance control, flexibility, muscular strength and endurance [9], which all have important benefits for patients with RA.

In addition, the high level of chronic pain in RA is commonly accompanied by psychosocial stress, anxiety and depression. Therapeutic approaches with a psychological and behavioral impact such as Tai Chi mind–body therapy could improve patients' emotional health outcomes. A recent meta-analysis reviewed 33 randomized and nonrandomized trials and suggested that regular Tai Chi practice is significantly associated with improvements in psychological well-being including reduced stress (effect size: 0.66; 95% CI: 0.23–1.09), anxiety (effect size: 0.66; 95% CI: 0.29–1.03), depression (effect size: 0.56; 95% CI: 0.31–0.80) and mood disturbance (effect size: 0.45; 95% CI: 0.20–0.69) in healthy participants and patients with chronic conditions including individuals with RA and depression disorders, and elderly participants with cardiovascular disease risk factors [21]. Notably, improvement of psychological status was also associated with improvements in symptoms and physical function as well as other clinical outcomes such as arthritic pain and health status. One of the included studies also found an improvement in immune response with a 50% improvement in varicella zoster virus-specific cell-mediated immunity (T-cell-dependent response) after 15 and 25 weeks of Tai Chi in healthy elderly Americans [22]. However, the vast majority of the studies suffer from less rigorous designs and two studies report participants with clinical depression. Nevertheless, the potential mental health benefits of Tai Chi support its inclusion as a key component of a multidisciplinary medical approach to promote psychological health, treat chronic pain and better inform clinical decision-making for RA [21].

In summary, as a complex immunologically mediated disorder, RA consists of complex interplay between psychological and biologic aspects and is still a therapeutically challenging chronic condition to control. Many patients experience high levels of pain and psychological distress that are incompletely relieved by current pharmacologic or physical interventions.

Emerging evidence supports the concept that the development of better lifestyle-modifying strategies such as Tai Chi could affect progression of disease and decreased morbidity among individuals with RA. As a multicomponent mind–body exercise, Tai Chi may modulate complex factors and improve health outcomes

in RA by reducing pain and improving physical and psychological health and well-being. However, there is no evidence to support the use of Tai Chi as a replacement for conventional care or for postponing consulting a doctor about a medical problem. Furthermore, there is no current standard training for instructors, and providing patients with access to experienced Tai Chi instructors is essential. Scientific research is under way to learn more about the effects of Tai Chi on RA and its ideal clinical implementation. Despite the noted limitations in the evidence, and the need for further methodologically rigorous studies, Tai Chi mind–body exercise may be safely recommended to patients with RA and its comorbidities as an adjunctive therapy to promote both physical and psychological well-being. Further exploration of the mechanisms for successful mind–body medicine is important to better inform clinical decision-making for patients with RA.

Disclosure

The contents of this manuscript are solely the responsibility of the author and do not necessarily represent the official views of the National Center for Complementary and Alternative Medicine or the National Institutes of Health. The sponsors had no role in the design and conduct of the study; collection, management, analysis and interpretation of the data; and preparation, review or approval of the manuscript.

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