



Understanding others is knowledge, understanding oneself is enlightenment

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This Taoist proverb from Lao Tzu inherently characterizes the nature of Tai Chi, an inner Chinese healing and martial art since Tai Chi teaches body and mind awareness. In the 21st century, humans have developed a fast-paced lifestyle often characterized by too many stressful events. Too much and diversified information, as well as various other external stimuli, tend to result in a decoupling of body and mind and in an increased risk for rumination. However, body and mind awareness are essential for our well-being, and Tai Chi can foster that since it is a multi-component rehabilitation approach comprising correct breathing technique, balance and neuromuscular training as well as stress—and emotional management (1).

The article by Wang *et al.* thoroughly analyzed the scientific literature about Tai Chi over the last 30 years (2). The authors pinpoint the hotspots of Tai Chi research in terms of countries, institutions, and lead authors. They also provide a publication burst analysis, indicating which publications caused the highest impact in the scientific community. With this approach, the authors could identify 4 central topics of Tai Chi research: prevention of falls in older adults, promotion of physical fitness, promotion of psychological well-being, and chronic disease intervention.

Convincing and cumulative research over the last decades has shown that Tai Chi is superior in reducing the

risk of falls in the elderly (3). Both the rate of falls and the number of fallers decreased upon exercising Tai Chi and the preventive effect increased with the frequency of training. In one case, a Tai Chi-based training for fall prevention, “Tai Chi—Moving for Better Balance” (TCMBB), has been established and disseminated into the larger community. Its value was confirmed in a large-scale clinical trial (4). This is an important example of how results gained from clinical trials can be translated for persons in need. However, as Wang *et al.* point out, in general, there is unfortunately a lack of efforts to disseminate the results from Tai Chi-based clinical trials to the intended recipients, how to attract program participants, and how to ensure maintenance and institutionalization. Therefore, Wang *et al.* correctly conclude that more studies aimed at narrowing the research-to-practice gap are urgently needed.

In this respect, the authors have recently discussed the possibility of establishing Tai Chi rehabilitation for long coronavirus disease (COVID) patients (5). In addition, the first author of this editorial has successfully implemented Tai Chi for pulmonary rehabilitation of chronic obstructive pulmonary disease (COPD) patients in a specialized hospital for pulmonary diseases (Fundación Neumológica Colombiana, Bogotá, Colombia). This is a necessary and important effort fostering the institutionalization of Tai

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Chi for rehabilitation purposes. In addition, the authors set up a clinical trial to analyze the impact of Tai Chi on the molecular disease hallmarks of COPD, such as oxidative stress, the immune response, and fibrosis, as well as on clinical parameters such as exercise and pulmonary capacity, exercise self-efficacy, and life quality.

Promotion of physical fitness is an evident strength of Tai Chi training, especially in elderly persons and persons with chronic diseases who are limited in using classical strength and endurance training methods such as weightlifting or running. Tai Chi improves muscular strength, fosters the activation of muscular slings through whole-body movement, and strengthens the cardiovascular system through moderate training intensity.

In addition, Tai Chi training is efficient in reducing the risk for and has a positive impact on cardiovascular (6,7), pulmonary (8) and metabolic conditions (9). It is well known that low-grade inflammation and oxidative stress are drivers of various chronic diseases. In this respect, it has been demonstrated that Tai Chi modulates the immune response in general (10), downregulating proinflammatory mediators such as cytokines as well as lipid and peptide mediators. In addition, it has been demonstrated that Tai Chi diminishes oxidative stress and DNA damage in persons with sedentary lifestyles and obese patients, respectively (11,12).

While occasional high-intensity physical activity has been shown to promote oxidative stress, regular exercise with moderate intensity (40–59% VO_{2max}) decreases the reactive oxygen species (ROS) load and DNA damage, respectively, and stimulates critical antioxidant enzymes such as superoxide dismutase (SOD) and glutathione peroxidase (Gpx) (13). Thus, Tai Chi is well suited as rehabilitation training for various chronic diseases, highlighted by Wang *et al.* as the 4th hotspot of Tai Chi research. While Tai Chi has beneficial effects on numerous chronic and complex diseases such as COPD, cardiovascular diseases, fibromyalgia, and chronic pain we want to introduce the idea of a Tai Chi rehabilitation program for multiple sclerosis (MS) patients. MS, the major neurological disorder in young adults, is a severe, incurable autoimmune and demyelination disease of the central nervous system (CNS) leading to physical disabilities and mental health problems (14). A landmark study in *Lancet* showed that a “troubled mind” co-exists with a “troubled body” (15) with two-thirds of persons with multiple sclerosis (pwMS) describing a subjective feeling of exhaustion both physically and mentally (16), and almost half of pwMS suffering from depression or anxiety (17). Importantly, the COVID-19 pandemic resulted in an even

higher burden of depressive symptoms, worse sleep quality, and increased MS fatigue in pwMS compared with the general population (18). This idea perfectly aligns with the 3rd focus of Tai Chi research, as described by Wang—the promotion of psychological well-being. As Wang *et al.* outlined, it has already been demonstrated that Tai Chi reduces anxiety and depression (19,20).

Difficulties of self-management in pwMS are considered one of the most critical factors contributing to low rehabilitation efficacy, more severe long-term complications, and an increase in healthcare costs (21). The basis of enabling patients to become active partners in their ongoing care is to build knowledge and skills that they can use on their own to improve their health status as well as their ability to cope with the disease. Tai Chi embraces these needs because it generates “knowledge” through “skill” training. More precisely, Tai Chi is defined as a self-knowledge practice since it proficiently trains basic embodied skills that enable a practical embodied self-knowledge (1,22). Such embodied training is considered a foundation for sustainable self-regulation, self-management, and exercise self-efficacy, which enables meaningful and long-lasting behavioral changes which will provide pwMS the skills and tools to better cope with a pandemic situation, ultimately improving their quality of life.

We argue, therefore, for the crucial role of embodied self-knowledge in the rehabilitation of pwMS and in rehabilitation in general. Thus, Tai Chi and related arts can play a critical role since they foster positive emotions by activating the psychology of optimal experience (flow). The flow state is defined as the holistic sensation that people feel when they act with total involvement (23).

We suggest that Tai Chi encompasses all 9 dimensions of flow such as merging between action and awareness, the exclusion of distraction from consciousness and the autotelic nature of the activity, which fosters intrinsic motivation and thereby strengthens the state of flow (24). One reason for Tai Chi’s potential to activate flow is that the higher cognitive centers of the prefrontal cortex are not needed for tasks requiring substantial bodily motion. This is strengthened by the hypothesis of Dietrich who suggests that the defining characteristics of flow are consistent with implicit execution and a transient hypofunction of the explicit system and thus inhibition of the higher cognitive processes (25). Performing Tai Chi trains the implicitness of skills execution by focusing the attention on the embodied task at hand, thus decreasing other phenomenological input computed by the explicit system to enter consciousness. In

addition, while training Tai Chi, activities in brain regions that are not critically needed for the task at hand are to a large extent inhibited since the sensory-motor integration processes take over from the explicit system. We suggest that these characteristics of Tai Chi represent one of the critical reasons for the benefit of Tai Chi's approach to the rehabilitation field.

In this respect, Lao Tzu's proverb "*Understanding others is knowledge, understanding oneself is enlightenment*" can be interpreted as a means for empowerment of patients suffering from chronic disease. Tai Chi can enable this empowerment by fostering self-management, exercise self-efficacy, and self-regulation.

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Footnote

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Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at <https://apm.amegroupp.com/article/view/10.21037/apm-22-1443/coif>). JPC reports that he is holding rehabilitation classes at Fundación Neumológica Colombiana for COPD and post COVID patients. In addition, he has his own Tai Chi classes. The other author has no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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