



## REVIEW ON THE IMPORTANCE OF PRACTICING TAI JI QUAN, IMPACT ON HEALTH AND APPLICATION OF MODERN TECHNIQUES FOR BETTER IMPLEMENTATION

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### **Abstract:**

Tai ji Quan is characterized by slow movements synchronized with meditation, all coordinated with breathing exercises to achieve spiritual tranquillity. This kind of training exercise is light-to-moderate-intensity exercise with metabolic activity varying between 2.5 and 6.5, thus making it suitable for all age groups. It has excellent health benefits and can provide a wonderful alternative to lots of health-related problems. Existing result shows how its practice can increase the state of health of our body, as well as economic and social development. Finally, this work illustrates the way by which its implementation can be achieved with the use of modern techniques.

**Keywords:** Tai Ji Quan, health benefits, modern techniques, physical fitness

### **1. Introduction**

With the present rapid development, the demand for an easy and effective way to improve the global health situation has become alarming [1, 2]. For these reasons, the improvement of healthcare development facilities plays an important role in the achievement of a healthy and strong population. Therefore, it is necessary to provide a suitable and convenient set of exercises that can help the population to better understand the importance of physical fitness [2-4]. The practice of physical fitness and exercise can have a direct and indirect impact on health, which can have immediate or long-term benefits. Most importantly, constant physical fitness can improve our quality of life, mobility, and health conditions [5-7], thereby improving self-awareness and self-organization. Physical fitness can affect health in several ways. It varies from health-related functions such as body balance, flexibility, muscular endurance, co-ordination, body composition, and cardio-vascular endurance, to skill related functions such as

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speed, strength, reaction time, agility, and power. Therefore, physical fitness is a set of attributes that are either health- or skill-related. It can equally be a set of exercises or a form of health promoting martial art such as: Tai Ji Quan, Ba Duan Jin, Qi gong [8, 9], or Yoga that can be adapted to both the young and the older individuals at any given period. According to the Chinese culture, physical fitness has a more profound meaning. It describes the correlation between human beings and their environment [10]. In ancient Chinese culture, the term physical fitness was associated with mind and Qi (Chi) training [11], and was accompanied by a series of internal and external moves which had the aim of improving the Qi (life energy) [12]. The Chinese culture is characterized by a lot of great and extraordinary health care methods based on the fundamental principle of Yin and Yang, and is applied in any aspect: Newton's third law of motion, physics; day and night, Geography; male and female. It equally shows the equilibrium that exists in any life energy which flows through everything in creation [13].

According to the World Health Organization (WHO), more than a quarter of the adult population in the world (1.4 billion adults) are not sufficiently active. Wherein, around 1 woman out of 3. And 1 man out of 4 don't do enough physical activity to stay healthy [14]. Statistics from the WHO show that about 28% of adults aged 18 and above were not active enough in 2016 (men 23% and women 32%). Meanwhile, in the adolescent group, about 81% of adolescents aged 11-17 years were not sufficiently physically active. With the appearance of the present COVID-19, these values will become more alarming due to lockdown restrictions, especially in China, where 21.8% of urban Chinese adults are physically active [14, 15]. It is very important for countries and communities to take action to provide the majority of the population with more opportunities to be physically active in order to improve their physical fitness capacity. For this to be achieved, it requires a collective effort, both national and local, across different sectors and disciplines to implement policy and solutions based on the country's cultural and social environment to promote, enable and encourage physical activity.

The purpose of this review is to bring up the awareness and the importance of implementing some aspects of Chinese traditional physical fitness in our day-to-day life. Tai ji Quan is characterized by slow movements synchronized with meditation, all coordinated with breathing exercises to achieve spiritual tranquility. This kind of training exercises has a light-to-moderate-intensity exercise with a metabolic activity varying between 2.5 and 6.5 [16, 17], thus suitable for all age group. This aspect of Chinese martial arts has great health benefits and can provide a wonderful alternative to lots of health-related problems. In this work, we bring up existing results that show how its practice can be useful to our health, economic and social development. Finally, this work illustrates the way by which its implementation can be achieved with the use of modern techniques.

## **2. The concept of Tai Ji**

Tai Ji is a form associated with the universe when it is in an unexciting state to a form dominated by the interaction of bodies that mutually interact with each other; it describes the relation that exists during the interaction process. The phrase “Tai Ji”, literally gets its meaning from Tai (太) and Ji (极), where they both mean extreme; thus, Tai Ji means “supreme ultimate or extreme” [18]. As outlined in the Book of Change [19], the universe creates itself from the principle of material energy, which alternates into cycles of Yin and Yang, so it constitutes objects and lives which are self-dependent. Tai Ji concepts originated from China and can be used in many dualities of nature such as days and night, light and dark expansion and contraction, female and male, etc., to characterize and outline how the Yin and Yang can occur naturally [20].

### **2.1 The yin yang principle**

The Yin and Yang are very important figures in Chinese culture, especially in Chinese traditional medicine and Chinese martial arts. From the Chinese philosophy, it is considered that all things exist in complementary and opposite states, which creates an equilibrium or engenders harmony [21]. This duality gives birth to many branches of classical Chinese science and philosophy, Chinese martial art (Wushu or Kung Fu), and is a fundamental guideline of traditional Chinese medicine. Yin and Yang serve to qualify the fundamental rhythm that animates Qi, while Qi originated from. For the practice of Tai Ji Quan, the Qi plays an important role by animating human organs [13].

### **2.2 Practice characteristic**

For any given form of martial art, it generally requires persistence and hard work in order to benefit from its extraordinary features, so Tai Ji Quan does not make an exception. The practice of Tai Ji Quan is fundamentally based on Static-stance Practice, Breathing Method, Slow Movement, Single-form practice, Combination Practice, Routine Practice, and Push-hand Moves.

#### **2.2.1 Static-stance practice**

Static stances may be considered as a part of static posture exercise and are very beneficial for the body because it deals with maintaining a given exercise for a given period of time [22]. When put in practice, their benefits extend to numerous parts of the body, from muscle strengthening to improvements in posture and core strength, and even reduced blood flow to the vertebral tissues by controlling the glucose level in the blood [23, 27]. Although movement and cardio can play a vital role in improving fitness through the burning of calories and keeping you healthy, but there are equally more gains to be made when predicating static stance during the practice of Tai Ji Quan. This static stance is essential for the understanding and proper practicing of Tai Ji Quan. The basic stand in Tai Ji Quan is called Zhan Zhuang, which relies on standing on our feet while breathing and relaxing the muscles. This exercise may be a good way to induce warm

muscles before practicing the single or routing forms of Tai Ji Quan to avoid injury. This exercise leads to posture improvement, especially around the shoulder blades, neck, and middle and lower back [28, 29]. This improvement is generally beneficial to fitness gains because it strengthens the body core through the development of muscularity, thus enabling the body to face up to its weight of lifting and, therefore, improving its flexibility, posture, and motion stability.

### **2.2.2 Breathing**

Every living thing relies on breathing, which is incredibly essential for the metabolism and well-functioning of the organs. Inappropriate breathing can affect the dioxide and oxygen exchange and might be a crucial aspect that will influence our health, such as contributing to physical and emotional disturbances [30, 31]. The control of breathing is the most significant aspect of Tai Ji Quan because it improves mental clarity, helps in sleepiness, digestion of food, and reduction of stress and equally improves the immune system [32]. Breathing is the bridge that links the systems together because energy generation within the body starts from breathing, and all the systems within the body depend on oxygen [33]. During the practice of Tai Ji Quan, the level of oxygenation within the body is improved [33]. According to the Chinese philosophy, the practice of Tai Ji Quan is characterized with an inner and outer interaction which are linked by the breathing system thus contributing to the regulation of the inner part (organs), meanwhile the outer part (muscles, bones, etc.) are strengthened by the movement of the body and gives rise to an efficient oxidation of the muscles [34]. It connects to the boxing form to create a series of continuous move that needs internal strength [35, 36]. When practicing the routines, it's necessary to exhale when extending the arm and inhale when withdrawing the arm; inhale when rising and exhale when sinking; inhale when lifting-up inhale, putting-down exhale; when opening, inhales, when closing, exhale. According to Tianyang Tan et al.. Tai Ji Quan Training in elderly people could improve their cardiorespiratory fitness [37], and this is often achieved through rhythmic breathing combine with slow-paced aerobic exercises with reasonable intensity and slight physical movements [38]. The results showed that Tai Ji Quan significantly decreased systolic pressure level, resting vital sign, and stress as compared with the control group encourages.

### **2.2.3 Slow movement**

When we rush, it's very difficult to remember and learn from our experience. We are less expected to note signs of stress and changes occurring in our body, and far more likely to return to stressful movement without even being conscious of what we do. By moving too quickly, we reduce the chance to boost the quality of our movements, but the main problem is that rushing instead slows us down [39]. Slowing enables us to be attentive to the changes that are happening in our self and environment. If we don't slow down, it's very easy to impose on our body a brand-new model of movement instead of allowing our brain to adapt and incorporate new connections and enable us to realize mindfulness.

This, in turn, affects the connection between us and our body; therefore, it's necessary to start promoting a positive relationship and having a deep communication between the mind and, therefore, the body, so as to attain a healthy nervous system with relaxed muscles, thus preventing unnecessary anxiety and stress. The healing effect of slowing or slow movement could be a great possibility to reduce anxiety and tension, increasing the vascular system and respiratory system [40]. The development and use of slow-motion technology can increase the educational capacity of the learners to assist them in adapting to the slow movements of Tai Ji Quan, playing an excellent role within the understanding of the advantage of slowing down. Slow movement, being a peculiarity in Tai Ji Quan, has attracted many learners thanks to its relative less use of strain and speed, making it a good sport for the aging population.

Investigation on an art based on slow motion, which requires the arms, limbs, and also the head to be harmonized has explored the results of the utilization of slow, soft and repetitive painting movements related breaks during this paint process [41]. Five participants finished four painting sessions that were filmed; this result shows that it's difficult to paint slowly. Equally, there was a rise within the link with the consciousness of this moment and immersion; a state of meditative painting was induced, there was an increased link with oneself and embodiment, the role of the witness and, therefore, the fact of being witnessed was significant [41, 42].

#### **2.2.4 Single-form practice and Combination practice, Routine practice**

The five basic principles of Tai Ji Quan are: relax and relax breath, move from the waist, separate full and empty, straight spine, and wrist [43]. For the accurate practice of Tai Ji Quan, it's important to begin from the forms, comprised of a single set of exercises/moves. For example, Cloud Hand uses the waist as a pivot and drives the arms for coordination, exercising the torso and shoulder joints. White Crane Spreads its Wings, Playing the Pipa, etc. However, it can equally combine a group of separate but indispensable moves that combine to form one form. For example, grasp Peacock's Tail posture as indicated in the figure bellow [44]. Meanwhile, the combined forms a collection single form or movement which mixes together to create a routine. The most popular variety of Tai Ji Quan is that of the 24-form Tai Ji Quan [45].

### **2.3 Importance of Tai Ji Quan**

The practice of Tai Ji Quan has numerous advantages to our health: cognitive, cardiovascular, organ regulations, fitness, and diseases curing therapy. It can equally act as an interacting tool between one another. Presently, lots of researches are being carried on the advantages of Tai Ji Quan, generally many of those results are obtained within a period of 12 weeks. However, constant practice has proven to be very beneficial to the health.

### **2.3.1 Self-defense**

With the high historical background of Chinese self-protection, Tai Ji Quan takes its root from such great martial arts with the identical aim of providing offensive and defensive ways to guard oneself [46]. It combines kicks, strikes, subdues, and pulls down. These techniques must be practised skillfully to grasp the use of their internal force. When executing a movement, it is necessary to take control of those to generate an internal force instead of looking forward to the external physical force.

### **2.3.2 Fitness-enhancement**

Because Tai Ji Quan involves continuous dynamic moves with mindfulness (state of meditation) and is governed by a set of exercises that are synchronized and coordinated [47]. It has been proven that long-term practice of taijiquan has excellent benefits for the health by improving the immune system, respiratory system, cardiovascular and the musculoskeletal system, thus enhancing the physical fitness, the quality of life, and longevity [48]. This is achieved through the slow movement principle, which needs a lot of self-control and breathing between each move.

### **2.3.3 Cardio-pulmonary function**

The cardiopulmonary function is the interrelation between the functioning of the heart and the pulmonary organs and regulates the flow of blood between the heart and the lungs, in the result published by Lan et al. [49,50]. The practice of Tai Ji Quan for men showed 19% higher peak oxygen uptake ( $\dot{V}O_{2\text{peak}}$ ) in comparison with their sedentary counterparts ( $26.9 \pm 4.7\text{mL/kg/min}$  vs  $21.8 \pm 3.1 \text{ mL/kg/min}$ ). Women equally showed 18% higher  $\dot{V}O_{2\text{peak}}$  than in the sedentary group ( $20.1 \pm 2.9\text{mL/kg/min}$  vs  $16.5 \pm 2.0\text{mL/kg/min}$ ) [50]. The Tai Ji Quan group had higher oxygen uptake at the ventilatory threshold and showed an overall improvement in their fitness. These result shows a major benefit for health-related fitness and suitable for elderly individuals [51-53].

### **2.3.4 Blood pressure and blood lipids**

The practice of Tai Ji Quan could reduce blood pressure, result in favorable lipid profile changes and improve subjects' anxiety status [54, 55]. This experiment was carried out within a period of 12 weeks of Tai Ji Quan training. The experimental group showed a significant decrease in systolic blood pressure of 15.6 mm Hg and diastolic blood pressure 8.8 mm Hg, and the serum total cholesterol level decreased 15.2 mg/dL and high-density lipoprotein cholesterol increased 4.7 mg/dL. The practice of Tai Ji Quan equally reduces the blood triglyceride while decreasing the blood total cholesterol level and having the potential to significantly influence the blood lipid level, thus reducing blood pressure [56, 57]. Tai Ji Quan also reduces waist circumference, body mass index, glucose level, and insulin resistance, consequently helping in diabetes or obesity control [58, 59]. Thus, it can be employed in the treatment of individuals littered with these diseases.

### **2.3.5 Mindful nurturing of well-being**

The fundamental principle that governs Tai Ji Quan is based on Taoism and Confucianism; thus, it has deep roots in Chinese philosophy and traditional Chinese medicine. Based on this theoretical principle, Tai Ji Quan could be very healthy and provides an enormous aspect within the state health and tranquility of the learner [48]. The tranquility in physical activity is extremely important because it contributes to making a link within and out of the body. This can only be achieved when one has complete control of the respiratory system because it is the bridge that exists between the outside and inner part of the body [57-59]. This total control of breathing induces the body to react in a very slow and exceedingly continuous flow, releasing stress and tension, thus enhancing the awareness of the body in relation to its environment [40]. Therefore, the continued practice of Tai Ji Quan is essential to promote physiological well-being.

### **2.3.6 Cognitive**

Cognitive impairment is considered to be a problem faced by older people [60]. The aging process also reduces precise brain area sizes, such as in the lateral prefrontal cortex, caudate nucleus, hippocampus [61] and cerebellar hemispheres. The practice of Tai Ji Quan has the potential of improving cognitive function in the elderly, especially in the field of executive functioning and in individuals without significant impairment [60]. Research has shown how it affects the mindfulness cognitive-behavioral based therapeutic tool for treating patients suffering from cothymia [62], as well as prevention and control at the clinical level. It has also been shown to be effective in improving the mental parameters of college-age individuals [63]. Long-term Taijiquan exercise can significantly improve the cognitive function of the practitioners when done regularly 3 times a week or more [64].

### **2.3.7 Decreased stress, anxiety, depression, and enhanced quality of sleep**

The practice of Tai Ji Quan has shown to be very beneficial in stress, anxiety and depression control. This may only be achieved because of the slow and continuous movements which help to extend the extent of self-awareness. It's been related to sadness, anger, and fear reduction, which contribute to the improvement of self-happiness and self-esteem [65]. Experiment showed that changes in mood state have also been accompanied by decreased cortisol [66]. The enhancement of sleep quality is achieved when stress and anxiety are decreased. Regular practice of Tai Ji Quan can improve sleep quality. Tai Ji Quan practice helped overcome sleep disorders and shortened the time to go to sleep [67].

From the above knowledge Tai Ji Quan is essentially very beneficial to the whole body starting from the main with cognitive feature to the hearth with regulation of tension to the blood with the control of lipids to the bone by increasing it strength the joints by increase in its flexibility and reducing the stress on the joints through the development of core strength and the improve of stability. It plays an important role in

helping in the improvement of the function of our organs and helps in the maintenance of our health through the improvement of the immune system, bone health, cancer, sleep, brain health, etc. Derivative of taijiquan simplify application in move and control of body reflexes and sensitivity based on the slow movement because to find a closer relationship to our body may deepen our sensations, help us to be more fully in the present moment, and help us to be with others with more sensitivity. Therefore, adopting the right posture can help in many ways, such as pain reduction and injury prevention. Good posture maintains joints and bones in the right configuration so that the muscles are used efficiently [68]. Slow movement, in turn, lowers fatigue of the muscle and stimulates energy. It equally helps decrease tension on the ligaments that hold the joints of the spine together and compensate for abnormal wear and tear on the joint surfaces [68-70]. Static stance, being the fundamental of Tai Ji Quan, not only builds the strength of the legs and hips but also helps to establish a solid posture and a foundation to learn and practice more complicated forms/movements [48].

### **3. Discussion**

The practice of Taijiquan combines a numerus domain such as Taiji philosophy, psychology, health science, social science, sport science and biomechanics. To effectively explain the mechanism which results in health improvement, it is very necessary to determine the mechanism through which taijiquan will affect the body. From the above analysis, we noticed that the first change that happens when we practice Taijiquan is self-awareness. The state of self-awareness is achieved when we learn how to relax and practice relaxed abdominal breathing. During this stage, changes that happen within and around us seem to be clearer and more perceptible. The second change is self-control. Self-control is manifested as a result of slow moves practice. This is because slowing down enables us to have control of what is happening within and around us. This stage is the most important face of taijiquan practice because it will determine whether you have the ability to free your mind and to synchronize your thoughts, breathing and moves. So, it is advisable to practice a single move while you are able to synchronize your thoughts, breathing and moves. Self-control at this stage enables us to take control of our emotions, which will result in a decrease in stress, anxiety, and depression and enhance the quality of sleep. Self-control can equally increase our cognitive function and improve mindfulness and well-being. The last change is the improvement in the physical condition. In this stage, we believe that the first changes will be the fitness enhancement, followed by the improvement of the circulatory system via the reduction of blood lipid level, next will the improvement of the cardio-pulmonary function and finally, the improvement of our immune system, thereby serving as a disease prevention tool. The outline mechanism can be an important tool to determine the correct mechanism for how taijiquan affects our health.



#### **4. Recommendations for Taijiquan implementation**

Use of recent technology to form and develop apps that may help control and analyze the posture of a body and propose Tai Ji Quan moves for its correction, equally, by determining specific moves supported by the Chinese medicine and modern medicine to assist target specific region of the body. Design, implementation, and evaluation of a web-based, condition teleconsultation system may play an excellent role in improving the environment of fitness facilities, thus having an impact on the attitude of the fitness industry. This practice has already been put in situ in several treating aspects [48].

Broad implementation of Tai Ji Quan programs would require widespread support and active dissemination by a range of stakeholders. Partnerships could help provide cooperation with existing fitness organizations for the creation of a particular environment for practicing Tai Ji Quan, such as the creation of specialized gym equipment to implement the practice of Tai Ji Quan. This will assist learners in understanding the way to use one's internal energy correctly, helping promote Tai Ji Quan through the creation of jobs.

Design and implementation of fitness programs for firefighters. Because of slow movements and mindfulness exercise. The implementation of easy and basic moves of various combinations can enable a fighter to improve his skills. This could improve the knowledge on the way to use correctly the inner energy and can equally be used as warming exercises to the prevention of injuries that may arise during training.

#### **5. Conclusion**

Tai ji describes the relation that exists during the interaction process. It is as basic the Yin and Yang which are vital figures in Chinese culture. Consequently, Tai Ji Quan takes its root from Tai Ji and follows the identical basics of yin and yang. The five basic principles of Tai Ji Quan are relaxation, moving from the waist, mindfulness, a straight spine, and wrist. However, its practice is governed by Static-stance practice, breathing method, slow movement, single form and routines. The constant practice of Tai Ji Quan has uncountable benefits to the body, varying from self-defense to health-related properties such as fitness-enhancement, cardio-pulmonary function, vital signs and blood lipids to enhance overall well-being and enhance the system and reduce stress, anxiety, depression, and enhance quality of sleep.

#### **Acknowledgments**

We thank our group members for technical support and thanks the Wushu College of Henan University. Darrin Sime Nkemeni, Hao Hong wrote and designed the review.

#### **Conflict of Interest Statement**

The authors declare no conflicts of interest.

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