

Qigong

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Owing to work intensification and an accelerated pace of life, individuals in many western countries are often overactivated and find it difficult to switch off. However, recovery from physiological and mental activation is critical to prevent stress symptoms, and maintain one's physiological and mental well-being. Extensive research evidence indicates that Qigong, a traditional Chinese movement practice for promoting health, provides an effective means to recover from work and off-work demands. The main objective of this entry is to explain Qigong and its core components, and show how Qigong can impact practitioners' physical and mental health.

stress prevention

recovery

well-being

Qigong

meditative movement

1. What is Qigong?

Qigong is a collective term for a long-established, extensive set of exercises first created in China more than 2000 years ago ^{[1][2]}. Qigong is part of traditional Chinese Medicine, a holistic health promotion system that also includes other therapies such as acupuncture, herbs, massage, and nutrition ^[3]. Central to Qigong is the term “Qi”, the Chinese word for the life energy that is believed to flow through the body. “Gong” means work or benefits acquired through perseverance and practice. Qigong can thus be described as working with the life energy in order to improve one's health and mind–body balance ^[2] and is considered a typical preventive means for maintaining good health. While Qigong is an important part of Chinese history and health practices, its appeal and scope extend beyond the confines of traditional Chinese culture ^[4]. Nowadays, Qigong is practiced around the world as a means for improving health and the mind–body balance. Four components of Qigong exercises in particular appear essential for individuals' recovery from physiological and psychological overactivation and improved well-being: physical training; active relaxation; focused attention; and conscious breathing ^{[1][5][6][7]}.

Physical training. Qigong entails performing slow, controlled, soft, and sometimes complex movements at a moderate aerobic level, although some styles also use fast and strong movements. Most movements, however, are smooth and coordinated, with rotations starting from the stomach, and postural changes and weight shifts that seamlessly follow each other ^{[2][8]}. Together, the Qigong movements contribute to relaxation, coordination, balance, strength, flexibility, and health ^{[9][10][11]}. The saying goes that, through Qigong practice, one will become strong as a woodcutter, flexible as a child, and calm as a sage.

Active relaxation. The Qigong movements must be performed as relaxed as possible, although there are some exceptions. Of course, muscles are tightened, but then they are released again. By actively relaxing the muscles and allowing the full body weight to sink into the earth, unnecessary tension is released, not just physically but also

mentally. As Jacobson (p. 3, ^[12]) claimed: “An anxious mind cannot exist in a relaxed body”. This aspect of Qigong has similarities to muscle relaxation techniques, which are used therapeutically to reduce pain and stress complaints ^[13].

Focused attention. During Qigong, practitioners’ attention is focused on the movements, body positions, and breathing pattern. This focused attention creates an awareness-in-the-moment (mindfulness) in which past and future are disregarded. For this reason, Qigong is also referred to as “meditation in motion” ^{[2][7][8]} and “meditative movement” ^{[1][5]}. An important outcome of Qigong is therefore a state of mental peace, or “*Rujing*” ^[14].

Controlled breathing. Characteristic of Qigong is a conscious and generally calm breathing pattern. The smooth movements in Qigong are synchronized with this calm breathing, for instance, inhaling while slowly raising the arms and exhaling when the arms are slowly lowering ^[47]. This component of Qigong is related to medical breathing interventions aimed at improving health complaints such as high blood pressure and anxiety ^{[15][16][17][18]}.

While each component may evoke health benefits, the combination of all four elements may bring more benefits than a single element ^[6]. During the training, often a reinforcing process takes place, whereby breathing slowly and moving quietly creates increased relaxation, which in turn deepens and slows down breathing and movements even more.

2. Health Effects of Qigong

In recent decades, scientific research into Qigong has increased as researchers have become increasingly aware of Qigong as a possible intervention for different ailments, such as hypertension, anxiety, and depression (e.g., ^{[18][19][20][21]}). Most studies reported below are Randomized Controlled Trials, whereby participants are randomly assigned to either the Qigong intervention group or a control group. Findings indicate that practicing Qigong can provide benefits to stressed and overactivated workers, improving their physical and psychological well-being ^{[1][22]}.

Hypertension. A consistent outcome of Qigong is lowered blood pressure ^[23]. Meta-analytic review studies (e.g., ^[23]) show that practicing Qigong significantly lowers systolic and diastolic blood pressure. For instance, Lee et al. ^[24] found that a 10-week intervention, in which participants practiced a half-hour Qigong series three times a week, significantly lowered the blood pressure of the Qigong group, while the blood pressure of the control group showed no difference.

Cardiovascular and respiratory systems. Relatedly, Qigong has beneficial effects on the cardiovascular system (heart, blood vessels, and blood) ^[1]. Increased heart rate variability was found after a 12-week program of one-hour Qigong training three times a week, suggesting increased parasympathetic activity ^[25]. Practicing Qigong also appears to support the respiratory system as it increases lung capacity, oxygen intake and improves breathing patterns ^[22].

Immune function. Research shows that Qigong has a positive effect on the immune function [26][27] and thus helps reduce the deleterious influence of cortisol. Practicing Qigong is associated with increased numbers and functional activities of white blood cells, including lymphocytes, monocytes, and natural killer cells [27]. Manzanique et al. [26] observed improved immune functions after a month of a half-hour daily Qigong training program. Yang and colleagues [28] noticed that practicing Qigong enhanced the effect of the flu shot, which also points to improved immune functions.

Stress levels. Practicing Qigong is associated with a reduction in both perceived stress [29][30][31][32] and hormone levels (adrenaline, noradrenaline and cortisol) [29]. Studying a group of computer operators, Skoglund and Jansson [33] found that Qigong reduced noradrenaline excretion in urine and influenced the heart rate and temperature, indicating decreased activity of the sympathetic nervous system. Together, these findings suggest that Qigong has an inhibitory effect on the stress response.

Sleep quality and fatigue. Qigong leads to improved sleep quality and a reduction in fatigue and exhaustion complaints [34][35], which are important indicators of burnout. At the end of a nine-week intervention program with two one-hour Qigong training sessions a week, participants reported improved sleep quality and sleep latency (i.e., the time to fall asleep) and less fatigue than before the intervention; this effect was still noticeable after three months.

Anxiety. Meta-analytic review studies suggest beneficial effects of Qigong on both momentary (i.e., state) anxiety and chronic (i.e., trait) anxiety [36]. Johansson and colleagues [36] observed an immediate effect of a single Qigong training on state anxiety. Chow et al. [70] found a long-term effect of an eight-week Qigong training program on participants' anxiety levels.

Depression. Findings indicate that Qigong can alleviate depressive complaints [37][38]. Chan et al. reported a reduction in depressive symptoms immediately and three months after a 16-week Qigong intervention. A 10-week Qigong training for nursery and midwifery students resulted in reduced depressive mood [39]. The effectiveness of Qigong in relieving depression has been attributed to a reduction in cortisol levels and activation of the parasympathetic nervous system [40].

Cognitive functioning. Because Qigong is associated with focused attention and a reduced stress response, it may also provide cognitive benefits. A study with healthy, older adults showed that the practice of Qigong was related to an improvement in cognitive functioning that was maintained over a 12-month period [41]. Ladawan and colleagues similarly found that Qigong exercise improved cognitive functioning (attention, brain processing speed, and maximum workload) of healthy practitioners. However, this effect disappeared 12 weeks after discontinuation of Qigong, which suggests that performing Qigong regularly is an important condition for maintaining an effect.

Desensitization and positive appraisal. In addition to diminished physical and psychological responses to stress and sustained activation, it is likely that the condition of mental peace (*Rujing*), achieved through Qigong practice, will help people deal with demanding situations differently. An accumulation of chronic strain and an

inability to deactivate sufficiently can result in an increased level of sensitivity to stressors, i.e., stress sensitization [10]; as a result, people may react too strongly to situations and conflicts. As Qigong lowers practitioners' stress and activation levels, people might be better able to distance themselves from a situation, appraise it more positively [42], and generally show improved emotion regulation [43]. Following, they will experience less mental stress [9], and their responses to situations will be less intense [44]. In this way, Qigong practice may contribute to a positive spiral that enhances individuals' well-being.

3. Health Effects of Qigong's Components

In addition to research that focuses directly on the effects of Qigong, several literature works have studied the effects of the components of Qigong. As this literature may provide more insight into how Qigong works, it is included in this review.

Physical training. There is increasing evidence for the positive effects of physical activities on health and functioning (e.g., [45]). Whereas initially the focus was on heavier physical (aerobic) training, there is now support for the beneficial effects of more moderate physical activities, as is the case with Qigong. Physical activity causes a more active hippocampus through, among other things, an increase in neurotransmitters, improved blood flow, and the production of new nerve cells and longer and more complex dendrites [46]. A more active hippocampus, in turn, has been shown to decrease the harmful influence of cortisol on its' feedback loop [47], such that less cortisol is produced and the stress response diminishes [48]. As such, physical exercise helps reduce the dysfunctional mechanism as described by the glucocorticoid cascade hypothesis [47]. Moderate physical activity also has a positive effect on the cardiovascular system [49], decreasing sympathetic overactivity and blood pressure [50]. Exercise has a positive influence on cognitive performance as well; especially, the executive functions of the brain that relate to attention, impulse regulation, and working memory benefit from physical activity [51]. To achieve these positive effects, the physical training does not have to be intensive; the movements must be dynamic (using the large muscles for at least 20 minutes), take place at least three times a week, and should be continued, as these positive effects will disappear when people stop exercising [49]. Together, these findings suggest that the physical exercise component of Qigong has benefits for many processes related to stress and overactivation.

Active relaxation. The active relaxation that is emphasized in Qigong resembles other muscle relaxation techniques. Progressive muscle relaxation was introduced by Jacobson [12], who discovered that, by systematically tensioning and releasing different muscle groups and learning to distinguish the resulting sensations of tension and relaxation, people are able to largely eliminate muscle contractions and achieve a sense of deep relaxation [52]. While muscle relaxation techniques are often used for complaints that have a muscle component, such as pain, they also appear effective for reducing physiological activation, anxiety, stress, and heart problems [53][54]. Studying the impact of a 20-minute muscle relaxation program for highly stressed college students, Dolbier and Rush [55] noticed that the muscle relaxation group demonstrated significantly greater increases in mental and physical relaxation, improved heart rate variability, lowered anxiety and cortisol, compared to the control group. Muscle relaxation can also improve sleep quality, with decreased fatigue and increased energy as a result [56]. Together,

this evidence suggests that contracting and releasing muscles during Qigong contributes to the well-being of the Qigong practitioner [6][7].

Focused attention. Owing to its focused attention to movements and breathing, Qigong has a direct link with mindfulness and meditation. Mindfulness is a state of mind characterized by deliberate attention to the present moment with an open, non-judgmental awareness of the inner and outer experiences [57]. Mindfulness training includes meditation and other exercises that are aimed at promoting open, non-evaluative perception [58].

Research shows that the effects of mindfulness and meditation are similar to the effects of Qigong, including reduced fatigue, stress, tension, emotional reactivity, rumination, anxiety and depressive symptoms, and improved immunity, sleep quality, and relaxation [58][59][60][61]. In particular, the breath-oriented meditation, more than other forms of meditation, is effective in reducing activation [62]. Meditation also has an influence on a wide scale of cognitive processes, resulting in increased creativity, cognitive flexibility, and problem-solving capacity [63]. More than is the case in Qigong research, mindfulness and meditation studies have focused on the brain. Mindfulness and meditation training appears to cause an increase in alpha and theta brain waves, indicating a relaxed state of alertness that promotes mental health [61], and an increase in left-sided activation in the anterior cortical area, which has a relationship with positive emotions, adaptive responses to stress, and a faster recovery from a stressful provocation. Together, these findings indicate that mindfulness and meditation, and possibly Qigong, can affect functions of the brain, such that deactivation and recovery is enhanced and homeostasis is restored.

Controlled breathing. Most Qigong movements are accompanied by a controlled and slow breathing pattern. During situations of stress and overactivation, breath frequency increases in an effort to quickly distribute oxygen-rich blood to the body [64]. To recover from stress, breathing techniques are used that focus on slowing down the breath frequency [17]. Regular and conscious practice of calm breathing has been shown to promote physical and psychological well-being by reducing sympathetic activation and increasing parasympathetic activation; that is, it decreases stress hormones and hypertension and improves the cardiovascular and respiratory condition [15][16][65][66]. Psychological effects relate to increased comfort, relaxation, vigor and alertness, attention and concentration, and a decrease in arousal, anger, anxiety, and depressive symptoms [15][17][65]. Research also shows that it matters whether one breathes through the nose, as is common practice in Qigong, or through the mouth. When inhaling through the nose, neurons in the limbic system (especially the amygdala, hippocampus, and olfactory cortex) are stimulated; these are brain areas where emotions, memory, and scents are processed. Subjects in Zelano et al.'s [67] study who were breathing through the nose performed better on memory tasks and responded less strongly to emotional stimuli than subjects who were breathing through the mouth.

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