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Practising Qi-Gong, Taijiquan and Meditation - Powerful essential for any effective self-defence programme - May body mind exercisses be able to counterbalance the physical effects of stress in stressful situations?

KEY TERMS:
adrenocorticotropic hormone, bare hand forms, Bodhidharma, body awareness, Huang Di, hypothalamic-pituitary-adrenal axis, meditation, mindfulness, psychosocial demand, salivary cortisol levels, self-defence, sham intervention, Shaolin, shen, stress, Taijiquan qi, Qi-Gong, Wing Tsun

Introduction

This article emphasises the importance of regular Qi-Gong, Taijiquan, or meditation practice and an effective self-defence programme to counterbalance the effects of stress-induced cortisol levels in the human body. The article summarises evidence from different studies on Qi-Gong, Taijiquan and meditation on stress-induced salivary cortisol levels. It concludes that a good self-defence programme might entail an accompanying method to become more stress-resistant since real-life situations are known to be life-threatening. It suggests that further experimental research is needed to investigate whether the exercise of Sli Nim Dao, Chum Kiu and Bjiu Ji, the three primary Wing Tsun forms, might function as mind-body practices, defined "as methods focusing on the interactions among the brain, mind, body, and behaviour, with the intent of using the mind to affect physical functioning and promoting health (U.S. National Institutes of Health, 2010 cited in Nedeljkovic et al., 2010) and considered by Larkey (2009), cited in Payne(2013) to be gathered under the abbreviation of "MM - Meditative Movement". MM is meant to teach the student to agent the increase of cortisol levels released in a fight. In other terms, to become more resistant to stressful circumstances and situations.

Several studies investigated the possible agency of Qi-Gong, Taijiquan, and meditation practice on stress-induced cortisol levels in humans. These studies mainly deal with stress, anxiety, and depression (Lee et al., 2004). According to McGrath (1970), cited in Weinberg and Gould (2015), an exhibition of demanding circumstances with essential consequences in a case of failure that individuals cannot cope with is termed stress. Research has shown that stress causes the higher hormonal output of cortisol which is suggested, for example, to be a reason for cardiovascular diseases (Nedeljkovic et al., 2012). A long history of research in professional athletes has shown that anticipated stress leads to adverse physical reactions like stiffness, earlier muscle fatigue, a narrowed visual field - termed tunnel view, and coordination difficulties. Consequences of acute physical effects might be severe injuries, depression and lower self-esteem (Weinberg and Gould, 2015). The assumption this paper builds on is that a real-life threat - like being attacked physically or mentally - would always put a high demand on the attacked person, consequentially causing 1). acute physical reactions like stiffness, tunnel view, or coordination

problems which might affect decision making, response time to an attack, or inability to balance the body unless the attacked person is highly skilled and trained to counterattack or defend; and 2).longterm effects like decreased self-esteem, depression and consequences to the social system the attacked person belongs to.

Some of the terms and their contents used in this article need to be explained:

Qi

Lee et al. (2004) explain that as derived from the ancient Chinese perspective, Qi is the vital energy necessary for normal, healthy physical and psychological functioning. Meridians are considered Qi's ways through humans' bodies. Further, Lee explains that the functionality of biological processes in the body is related to a smooth, undisturbed flow of Qi and illnesses are accounted to disrupted, unbalanced energetic flow. Therefore, from a Chinese medicine perspective, the most vital aspect of health preservation is to adjust a patient's Qi balance. The dialogue of the yellow emperor Huang Di and his minister Qi Bo emphasises:

"Overindulgence in the five emotions—happiness, anger, sadness, worry or fear, and fright—can create imbalances. Emotions can injure the qi, while seasonal elements can attack the body. Sudden anger damages the yin qi; becoming easily excited or overjoyed will damage the yang qi. This yang qi causes the qi to rebel and rises to the head, squeezing the shen (神) out of the heart and allowing it to float away. Failing to regulate one's emotions can be likened to summer and winter failing to regulate each other, threatening life itself. "(Ni, 1995, p.20)

Qi-Gong

Based on Acton MW (2009), cited in Ponzio et al. (2015), Qi-Gong is a practice that comprises movement, controlled breathing, and meditation. Its practice gives practitioners the ability to control Qi and thus promote physical and psychological health stability. Referring to Lei (2009), the practice of Qi-Gong was given by Bodhidharma to the Shaolin monks to strengthen their health to reach enlightenment. The first forms taught were Yi Jin Jing (Muscle/ Tendon Changing Classic) and Xi Sui Jing (Bone Marrow Cleansing Classic). According to Lei (2009), taking care of the body positively affects the mind. Referring to a study conducted at Baylor Medical School, Texas, Lei (2009) points out that results showed that cells from Qi-Gong practitioners had five times longer longevity.

Ponzio et al. (2015) concede that the mechanisms involved are not fully understood up to this point. Further, it has to be acknowledged that a wide variety of different schools promote different historical accounts of Qi-Gong development, styles, and forms of teaching. There is inconsistent methodology and terminology. The most prominent branches that Qi-Gong might be rooted in are Daoist and Buddhist schools.

Taijiquan

According to Jahnke(nd.) Taijiquan is, translated to the Supreme Ultimate, a practice that teaches the practitioner the balance of universals' forces. Taijiquan is acknowledged as a rich martial art system that strengthens physical appearance, calms the mind by its meditating character, is famous for its medical effect on disbalances in the body, and is known for its "mindful and gentle" (Nedeljkovic, 2011,p.1172) slow-motion like movements. Several branches and styles are promoted by different families, schools, and even official bodies. These are Chen, Yang, Wu, Sun, Shaolin-Style, which are considered family styles or Peking, 19th, 38th forms, created by official Chinese health committees in support of public health. Since its healing qualities are long known, Taijiquan is often exclusively taught in many courses worldwide today without its martial background. German public health services like the DAK promote certified training courses in Taijiquan and Qi-Gong for health prevention (DAK, 2018).

Meditation

The term meditation entails as many inconsistent concepts as some schools and lineages promote their different teachings. Jung (2003) claims in the preface of Suzuki's book "Introduction to Zen Buddhism" that religious views of eastern and western cultures differ to that extent that translations of particular terms and their corresponding meanings are complex. Thus he suggests it might benefit from leaving them in their original language and meaning.

Keown (2004) defines meditation from a Buddhist perspective as the English term that translates as "a range of more specific indigenous terms denoting techniques and practices designed to concentrate and focus the mind." Johnson (2009) expands on the Hinduistic approach of the auto-manipulation of the mind in order to obtain specific effects, such as inner transformation."

There are well-known meditation methods derived from Christian, Muslim or Judaistic schools. Theravādin Buddhist societies in south Asia use simple methods that emphasise breathing practices and body mindfulness. Tibetan methods are more complex and involve visualisations, transformations, gestures and ritual formulas (Blakemore and Jennett, 2001). It might suggest that no kind of meditation has the same effect on the mind and body or mind or the body. According to Sleczek (2018), the Buddha instructed his students according to their mental abilities and different teachings based on their developmental state. Thus, the author of this article focuses on calming meditations like mindfulness meditation, which can reduce the effects of stress on the body.

Wing Tsun - Basic Forms

Wing Tsun (Wing Chun, Vin Tsun and Weng Chun) is one Chinese martial system known to the public as Kung Fu. Its most prominent practitioner was Bruce Lee. A legend holds that Yim Wing Chun - a female - and disciple of a Buddhist nun, Ng Mui, learned and developed a basic self-defence programme; and invented the Wing Chun system (Lee, 1972). It is comprised of several forms. The three primary forms -

the bare hand forms - are called Sli Nim Dao, Chum Kiu and Bjiu Ji. The Sli Nim Dao is the first, the Chum Kiu the second, and the Biju Ji the third teaching in the IUEWT (International Union for Escrima and Wing Tsun) and Kwok Wing Chun System (Knight, 2013). The forms are intended to teach the disciple stances, body positions, hand, elbow and arm positions. At the same time, they aim to strengthen the students' legs, hips and waist. Body movements and basic arm positions are combined for efficient tactical movements. Advancing in the studies, higher levels of body control become curriculum while the body is in motion or still (Knight, 2013). Some schools and teachers like Dr Baker (2000) promote and perform the first form - Sli Nim Dao - in a languid manner (20 to 60 minutes), claiming a similar effect on the mind and body well-being to Qi-Gong exercises.

The Studies

The studies this article draws on investigated, among others, salivary cortisol levels in healthy men and women of different ages (mainly between 18 to 78 years) from Korea, Italy, Switzerland, and the USA. According to Lee et al. (2004), most physical or mental stress cause an immediate and marked increase in ACTH secretion and a raised adrenocortical secretion of cortisol. Since the physical and mental effects of stress might be regarded as similar no matter how they arose, it seems valid to draw on that body of research for conclusions concerning the hypothesis that any effective self-defence programme has to teach a method to cope with physical and mental symptoms of stress or has to develop more resilience for stress in the practitioner.

The first study was a randomised placebo-control pilot study conducted by Myeong Soo Lee, Chang-won Kang, Hyun-Ja Lim, and Myung-Suk Lee in Korea in 2004. It investigated the effects of Qi-training on anxiety, and plasma concentrations of adrenocorticotropic hormone (ACTH), cortisol, and aldosterone in 32 healthy young men aged between 20 and 40 years.
One group was randomised to a Qi-Gong intervention that was taught to work consciously with Qi, while the other group did a sham intervention which consisted of the same movements but disregarded consciousness working with Qi. Independent researchers assessed all participants on their pre and post anxiety levels. The basal anxiety level of both groups was similar. Blood hormone levels were assessed pre-intervention and immediately after the Qi-exercises, too. The results showed that anxiety levels dropped significantly in the experimental group by 26%, while the sham group (control group) decreased by only 9%. A significant decline was found in the Qi-training group for blood concentrations of ACTH, cortisol, and aldosterone. There was no significant effect in the control group. Both findings were in line with results from previous studies. The researcher pointed out that other studies found similar effects on cortisol levels in response to transcendental meditation, yoga and taijiquan (Lee et al., 2004). The data suggest that "reduced concentrations of ACTH and cortisol may reflect modification of the hypothalamic-pituitary-adrenal axis by Qi-training." (Lee et al., 2004, p.247) Further, the researcher suggests that more

research is needed to examine the mechanisms of the effect of Qi-Training on hormonal levels and sympathetic activity.
The limitation of this study was that all participants might have been familiar with the underlying concepts due to their upbringing in a socio-cultural space that is familiar with Qi-Gong techniques.
On the other hand, the placebo-control group's strength emphasised the significant effect of visualisation. Future research might need to investigate whether only visualisation might have the same effects on the hypothalamic-pituitary-adrenal axis.

The second study, an uncontrolled, before-and-after study, investigated the effect of 12 weeks Qi-Gong training on the "hypothalamic–pituitary–adrenal (HPA) axis activity and reactivity to stress" (Ponzio et al., 2015, p.194) in 28 healthy participants (7 men and 21 women, aged 53-78 years) without prior experience in Qi-Gong in Italy. The participants were assessed on their perceived stress level by the PSS-10. In addition, salivary cortisol levels were tested multiple times a day during a challenging mental task.
The participants exercised two hours a week under the instruction of an experienced Qi-Gong instructor for 12 weeks. Additionally, they were asked to exercise independently on days without instructions for half an hour. The goal of the intervention was to "increase the level of coordination between body movement, breathing activity, and mental concentration." (Ponzio et al., 2015, p.195) The exercises were suited for the age and thus were a low physical effort. All exercises comprised physical motion, breathing control and visualisation of Qi-flow through the meridians. Cortisol levels were taken four times a day, beginning half an hour after awakening between 7.00 and 8.00 am. The Raven's advanced progressive matrices were used under tightened circumstances to assess the stress response. Significant effects on cortisol levels were found in previous studies under similar conditions. Salivary samples were taken four times during the test.
The intervention resulted in lower salivary levels in all participants, especially in the morning. Enhancing well being and reducing symptoms of depression. According to Ponzio et al. (2014), higher morning cortisol levels are associated with anxiety disorders. The effects were stronger in participants with a lower stress threshold. All findings were in line with those from previous studies.
The researcher emphasised that studies investigating the effect of aerobic exercise programmes on well being showed no significant effects on cortisol levels. Concluding that the main effect was not exclusively due to the physical activity of the Qi-Training (Ponzio et al.2015).
One of the limitations of this study is the lack of a control group. In addition, a confounding variable due to uncontrolled practice in private spaces is a further limitation. Another limitation was that participants were novices in the practice of Qi-Gong. The last limitation was that visualisation ability might be stronger or weaker in different participants.

The third study, conducted by Nedeljkovic, M., Ausfeld-Hafter, B., Streitberger, K., Seiler, R., Wirtz, P. H., was designed as a randomised, standardised control trial 2011 in Bern. It investigated the effect of Taijiquan on the psychobiological reactivity to stress in a healthy, well-educated sample aged between 28 and 50 years. Randomly 26 (8 men / 18 women) participants were assigned to a Taijiquan intervention. The control group, a waiting list, comprised 23 (9 men / 14 women)participants. All participants were instructed to avoid new and additional physical activities during the study. After three months, all participants were assessed by the Trier Social Stress Test (TSST): a 10 min preparation phase followed by a 5 min mock job interview and a mental arithmetic exercise of 5min. according to Kirschbaum et al., (1993) cited in Nedeljkovich(2011). Both tasks were performed in front of two evaluative panel members dressed in white laboratory coats, a video camera and a microphone, and presented the panel members as experts in evaluating nonverbal behaviour (Nedeljkovic, 2011).

Salivary cortisol and a-amylase, heart rate, and psychological responses to psychosocial stress were measured. The study found significantly lower levels of salivary cortisol, reduced heart rates, and lower a-amylase levels in the intervention group compared to the control group. In addition, participants of the Taijiquan group were calmer in situations with increased psychosocial demand.

The Taijiquan intervention was designed for twelve weeks with two classes each 60 minutes. Additionally, the participants were asked to exercise at home. The teacher was a trained and certified Taijiquan instructor with ten years of experience who taught the group the first 18 movements of the Chen Man-Ch'ing Yang Style Taijiquan form, which is already recognised for its health benefits in previous research according to Robinson (2006) and Wolf et al. (1997), cited in Nedeljkovic (2011). All classes consisted of a warm-up, Taijiform practice, theoretical teachings, breathing and relaxation.

The study found that the practice of Taijiquan had a significant positive effect on stress reactivity which was expressed by reduced salivary cortisol levels, heart rate, a-amylase levels, and the perceived stressfulness. Based on Cheng (1982), cited in Nedeljkovic (2011), the effects might even increase with years of practice. Furthermore, Gyllensten et al. (2010), cited in Nedeljkovic (2011), suggest that the practice of Taijiquan results in increased body awareness that, in turn, might enhance a resource activating embodiment which, according to Carney et al. (2010), cited in Nedeljkovic (2011) was found to reduce cortisol levels under no physical activity.

On the one hand, one of the study's limitations was the lack of the sample's generalisability, and on the other hand, only novices to Taijiquan were studied. As a result, how Taijiquan experts react psychologically to stress remains uncertain. Other limitations were due to confounding variables like self-reports on the home practice of Taijiquan or other activities that might influence stress reactivity. Another limitation was that the breathing and relaxation stage, which took 10min each class, was uncontrolled for its effect on the psychobiological reactivity. Further studies might examine the effects of breathing and relaxation. However, the fundamental strength of the research was the randomised, experimental design with a control group.

The fourth study was experimental research conducted by Creswell, J.D., Pacilio, L.E., Lindsay, E.K., Warren Brown, K. on 66 young (18-30 years), healthy, and well-educated participants (male and female) from Pittsburgh University, the USA in 2013. The study was designed to explore the effects of a brief mindfulness intervention compared to an analytic cognitive training intervention on self-perceived social stress and physical stress reactivity tested by the TSST. The participants were randomly assigned to either mindfulness training or the development of critical thinking by analysing poetry. The intervention took three days. All participants were assessed on their baseline mindfulness previously. The mindfulness intervention was a computer-based training with 25 minutes of exercise each day. The intervention focused on breathing experience and physical and emotional awareness. The control intervention consisted of three stages where the participants learned to analyse poems critically. All participants were observed and assessed on their reactions right after the training. Salivary cortisol levels and blood pressure were tested on the third day prior to training to establish a baseline. Salivary cortisol levels were tested 25min., 35min. And 60min. After the TSST. Additionally, the participants were asked to complete a questionnaire on self-perceived stress after the speech and the math test.
The researchers concluded that either dispositional or trained mindfulness was able to raise mental stress resilience. Salivary cortisol levels increased in all conditions, but they dropped faster in the experimental condition, with participants with higher levels of dispositional mindfulness. Contrary to the hypothesis, salivary cortisol levels were highest in the experimental condition, especially for those participants with low levels of dispositional mindfulness. The researchers concluded from this that the mindfulness training might raise engagement and active coping, resulting in raised salivary cortisol levels. They pointed out that the findings were consistent with previous research according to Akinola and Mendes (2012), cited in Creswell et al. (2014). Chambers et al. (2009), cited in Creswell et al. (2014), claimed that mindfulness training improves the ability to regulate emotions and supports perceiving stressful situations more positively.
The most substantial limitation of the research was that mindfulness training was compared to cognitive training, while the methods to foster stress were cognitive tasks. In this sense, it might have been possible that participants of the control group were better prepared for the task at hand and could cope with the demands with less effort. Future studies might examine how the results change when the experimental group receives mindfulness training and cognitive-analytical training.

Reflexivity

The author of this paper has studied Wing Tsun for twelve years, Taijiquan in the Yang family style for ten years and Chen family-style for ten years. Further studies of Judo, MMA, Shaolin Kung Fu and Qi-Gong accompany the studies. In his early teens, the author was a disciple of the Shotokan Karate lineage.

In 2016 the author turned to Tibetan Buddhist Teachings of the Diamond Way Kagyü League to support his development; and took refuge in Lama Ole Nydahl.
Due to economic and social pressure and significant chronic health issues, the author was suffering from what is known in Asian literature as the "monkey mind", which might be translated as a restless mind that cannot focus. A Whipple surgery was necessary to overcome irreparable autoimmune pancreatitis in 2002. A subsequent gastric ulcer caused an intense haemorrhage. The health conditions had caused an intense depression that the author could not get rid of by himself. Psychological interventions by public health services were unavailable in acute situations. However, continuous daily practice and confidence in the teachings supported the author in overcoming the severe issues. The practice liberated the author from the stress caused by the conditions. One key element from the author's point of view was to ensure the complete relaxation of body and mind by reflecting impermanence and fearlessness. Another critical element that supported the studies was to train the ability to discriminate between object and subject while acknowledging that they are not separate from each other. Another important aspect was to understand that it might be more beneficial to adapt to stress levels by creating the possibilities to serve the demands than to try to reduce the demands that cause the stress.

Discussion

All studies demonstrated that physical and mental reactivity to increased demands could be elicited, measured, and mediated. Mediation of perceived and measurable stress was partly done by learning and exercising either Qi-Gong, Taijiquan or mindfulness meditation. Although the mechanisms of how MM methods affect the body and mind are not fully understood, there are still more questions to investigate and answer. There is practicality in the methods to generalise to self-defence training. The effect of a good self-defence programme should be to increase the resilience of its participants to harmful situations. Thus it was suggested that an intervention that supports the participants in regulating the physical and mental effects of stress might be necessary.

A remaining question is whether the stress induced in the participants by laboratory conditions has the same quality as - or is perceived as - stress experienced due to a real-life threat, which is a question of validity. Ethical guidelines are restrictive when it comes to circumstances where participants or third parties might experience physical or mental demands that might result in trauma or harm. Thus this point might need to be focused on in future research.

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