

Anti-Aging Benefits of Qigong

Kenneth Sancier Ph. D.

Introduction

In the early 1980's, scientists in China began to study the medical benefits claimed for qigong. Since then, research on hundreds of medical applications of qigong have been reported in the Chinese literature. Of special interest for the present article are clinical reports of the medical benefits of qigong that claim to retard or reverse some diseases associated with aging.

Most of the original research was reported in Chinese, but access in English to most of this material is possible by reference to the proceedings of international conferences of qigong. Since 1986, ten such proceedings contain about 840 abstracts of talks given at the conferences, more than half of which are in English. These abstracts, along with about 160 abstracts of articles in the scientific literature, have been organized as a computerized database. The database enables searches and development of bibliographies across this entire body of information by using any key word. The clinical outcomes reported in this article are partly based on material in the database and partly on the author's person contacts with researchers.

The word qigong is a combination of two ideas: qi the vital energy of the body, and gong the skill of working of the qi. Medical qigong for health and healing consists primarily of meditation, physical movements, and breathing exercises. Qigong practitioners develop an awareness of qi sensations in their bodies and use their mind, i.e., intention, to guide the qi in the body. The benefits of qigong are said to extend beyond health and healing to enhance spiritual life and even special abilities, such as psychic powers.

Medical qigong is divided into two parts: internal and external. Internal qi is developed by individual practice of qigong exercises. When qigong practitioners have sufficiently mastered the skill, they can "emit" qi (external qi or waiqi in Chinese) for the purpose of healing another person. There are many scientific reports of the medical existence and efficacy of emitted qi. The present article focuses mainly on internal qi because almost everyone can learn qigong exercises for maintaining health and for self-healing, whereas, there are a limited number of skilled qigong masters available for healing.

There are numerous reports of the effects of emitted qi on living systems and the functions and organs of the human body. The present author reviewed some examples of medical applications of qigong and emitted qi on humans, animals, cell cultures, and plants, and he also published some of his experimental research on physiological effects of qigong. He discussed some clinical and experimental evidence showing that qigong exercise and external qi affects various functions and organs of the body. A short list of some of the functions and organs affected by qigong, and the measurement techniques employed (in parentheses), include: the brain (EEG and magnetometer); blood flow (thermography, sphygmography, and rheoencephalography); heart functions (blood pressure, EKG, and UCG); kidney (urinary albumin assay); biophysical (enzyme activity, immune function, sex hormone levels (laboratory analysis); eyesight (clinical); and tumor size in mice.

Clinical studies indicating the anti-aging benefits of qigong:

Several clinical studies will be described to illustrate the scope of research on medical applications of qigong to treat chronic medical conditions that may affect the aging process. Some details may be omitted because of space limitations. The critical evaluation of the research studies will be left to medical specialists.

1) Therapeutic balancing of the meridians and functions of the body by qigong.

The profound effect that internal qigong practice may have on balancing the energies of the organs and functions of the body is illustrated by measurements using Electroacupuncture According to Voll (EAV). In EAV the electrical conductance of the skin above individual acupuncture points is measured using low voltage and low current. Diagnosis depends on measuring the relative electrical conductance and its time dependence. An important diagnostic criterion of degeneration of an organ is an “indicator drop” that may occur during the measurement when the conductance reaches an apparent maximum value but then decreases before leveling off.

Measurements were made at 24 acupuncture points at the ends of the 12 meridians in the fingers and toes of subjects and were made by the same operator and equipment. The subjects were asked to perform a qigong exercise of their choosing for 10 to 15 minutes, for example, sitting or standing meditation or moving qigong. Two series of EAV measurements were made before and after healthy subjects practiced qigong.

In the first series, four subjects were examined by EAV before and after they practiced qigong. Qigong exercise decreased the average of the EAV measured values of the four subjects in the range of -19 to -31% ($p < 0.004$). Qigong eliminated almost all the indicator drops.

In the second series, each of seven subjects was examined by EAV three times in a blind protocol so that the operator did not know whether a subject had practiced qigong before the second or third examination. The results showed that qigong exercise changed the average EAV measured values in the range of -17 to -35% for four subjects and in the range of 4 to 15% for three subjects. Indicator drops again were markedly decreased.

These preliminary results show that internal qigong practice can make significant changes in the therapeutic balancing of the meridian and organ systems.

In a similar type of study, the electric current at acupuncture points on 14 meridians was measured using a single square wave voltage pulse technique. Both a qigong master, who emitted qi, and a qi-receiver were measured simultaneously and continuously. The results show that internal and external qigong produce different values in some measurement parameters, and also some synchronous behavior was observed between the sender and receiver.

2) Clinical studies of effects of qigong on hypertensive patients.

Several groups in China have investigated the effects of qigong on hypertension (i.e., high blood pressure). The research of Wang, Xu and coworkers of the Shanghai Institute of Hypertension was selected for discussion because it serves as a model for the many different effects that qigong may have on organs and functions of the body. For these studies, the patients practiced “Yan Jing Yi Shen Gong” for 30 minutes twice a day. This qigong is claimed to be especially valuable for therapeutic purposes and delaying senility. The qigong exercise consists of a combination of sitting meditation and gentle physical movements that emphasizes a calm mind, relaxed body, and regular respiration.

In 1991, the Shanghai group reported a 20-year controlled study of the anti-aging effects of qigong on 204 hypertensive patients. Subsequently, they reported a 30-year follow-up on 242 hypertensive patients, and more recently, the researchers reported an 18-22 year study of 536 patients. The patients were randomly assigned to the two groups. To control blood pressure, the patients were given the same hypotensive drug and in the same hospital. None of the patients smoked.

a. Blood Pressure

The effect of qigong exercise on blood pressure is shown graphically in Fig. 1. The blood pressure (systolic and

diastolic) in millimeters mercury is plotted as a function of time over 20 years for the group consisting of 242 patients, 122 in the qigong group and 120 in the control group. During the first two months, the blood pressure of all patients dropped in response to the hypotensive drug. Subsequently, and over the period of 20 years, the blood pressures of the qigong group stabilized while that of the control group increased. Remarkably, during this period the drug dosage for the qigong group could be decreased, while the dosage for the control group had to be increased.

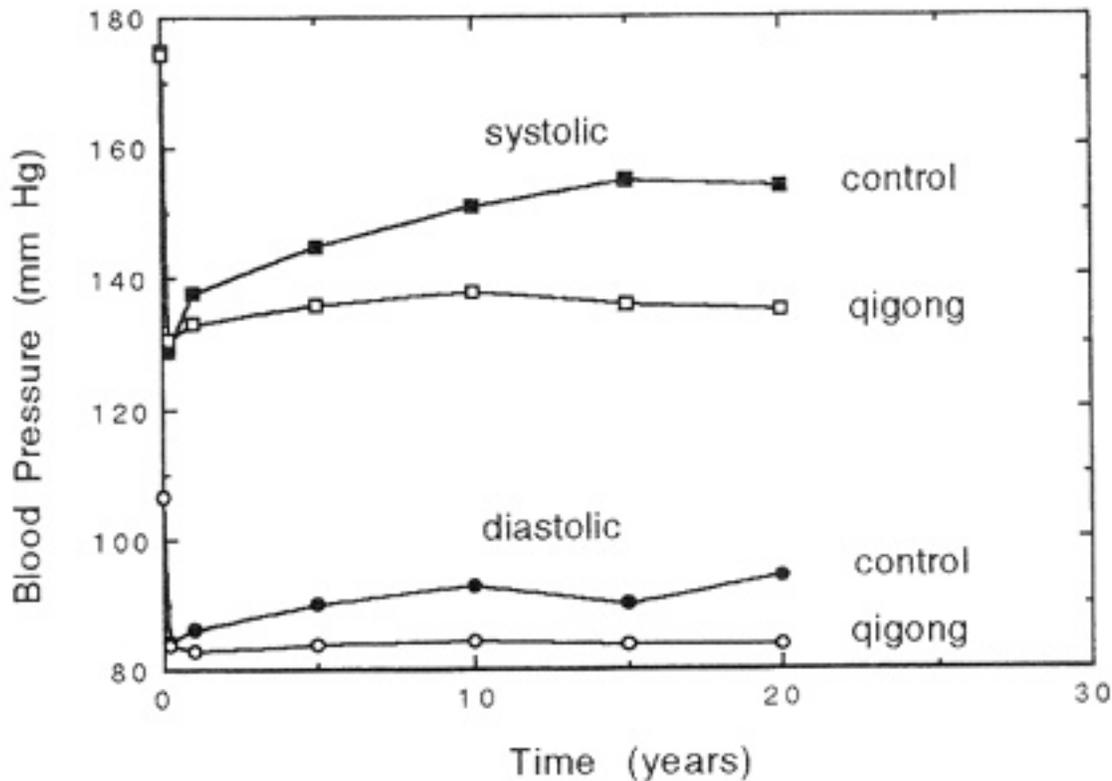


Fig. 1. Effect of qigong on blood pressure of hypertensive patients over 20 years. Qigong group (n=104) practiced 30 min/day twice/day, control group (n=100).

b. Mortality and Stroke

The incidences of mortality and stroke for the 30-year study are shown in Fig. 2. These results show that qigong exercise decreased by about 50 percent the incidence of total mortality, mortality due to stroke, and morbidity due to stroke. At the end of 30 years, 86 patients survived in the qigong group and 68 in the control group.

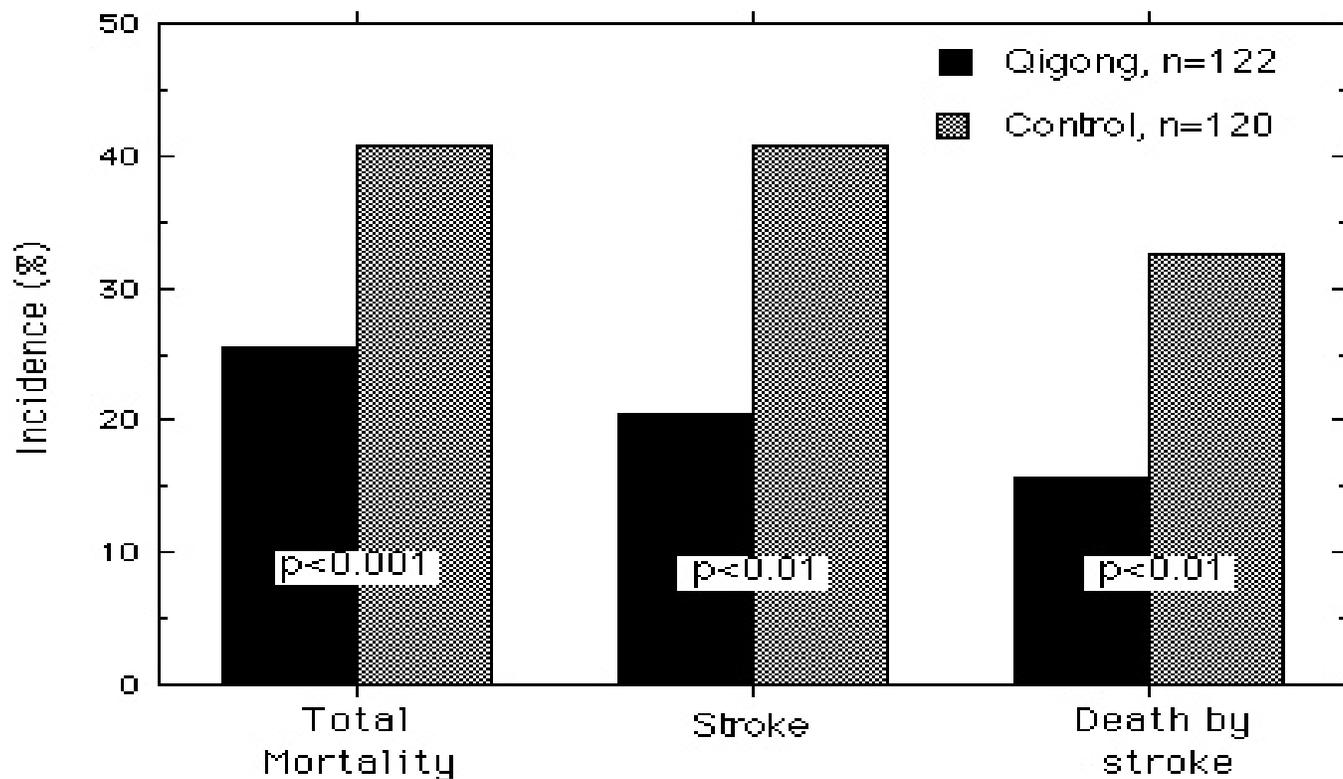


Figure 2. A 30-year follow-up of the effect of qigong on mortality and stroke of 242 hypertensive patients. Both groups received drug therapy (ref. 15).

These results clearly show that qigong has significant potential for preventing strokes and extending life.

c. Improvements in heart function and microcirculation

Aged hypertensive patients usually are found to have a deficiency of Heart-energy, which often leads to a weakened function of the left ventricle and a disturbance of microcirculation. The researchers evaluated the effects of qigong for 120 aged patients by using ultrasonic cardiography (UCG) and indices of microcirculation.

Experiments showed that the left ventricular function (LVF) in the hypertensive aged group (80 cases) was lower than that in the aged normal blood pressure group (40 cases), while the LVF in the deficiency of Heart-energy hypertensive patients (46 cases) was lower than in the non-deficiency Heart-energy hypertensive patients (34 cases).

After practicing qigong for one year, cardiac output was increased, the total peripheral resistance decreased, and the ejection fraction mitral valve diastolic closing velocity and the mean velocity of circumferential fiber shortening tended to be increased. Significant changes did not occur in the group without Heart-energy deficiency.

Quantitative evaluation of nailfold disturbances in microcirculation was made on the above groups by observing 10 indices of abnormal conditions: configuration of micrangium, micrangium tension, condition of blood flow, slowdown of blood flow, thinner afferent limb, efferent limb and afferent limb ratio, color of blood, hemorrhage, and petechia. The results showed that hypertension had an accelerating effect on the disturbance of microcirculation. The incidence of disturbance of microcirculation disturbance was 73.9% in the deficiency of Heart-energy hypertensive patients. After a year of qigong practice, the incident of disturbance was 39.1% (p < 0.01).

The results suggest that qigong exercise has beneficial effects on Heart-energy and regulation of the blood channel, and qigong seems to have improved abnormal conditions of blood circulation.

d. Improvement in sex hormone levels

One consequence of aging is that the levels of sex hormones change in unfavorable directions. For example, female sex hormone (estrogen) levels tend to increase in men and decrease in women. Three studies indicate that qigong exercise can reverse this trend. The effect of qigong exercise on plasma sex hormone levels was determined for hypertensive men and women. The sex hormones levels were measured before and after qigong practice for one year.

Seventy male patients with essential hypertension (ages 40 to 69; disease stage II) were divided into two groups. For the qigong group (n=42), which practiced qigong for one year, the estradiol level (E2) decreased from 70.1 to 47.7 pg/ml, a decrease of 32% ($p<0.01$), while no significant changes occurred in the control group (n=20). The

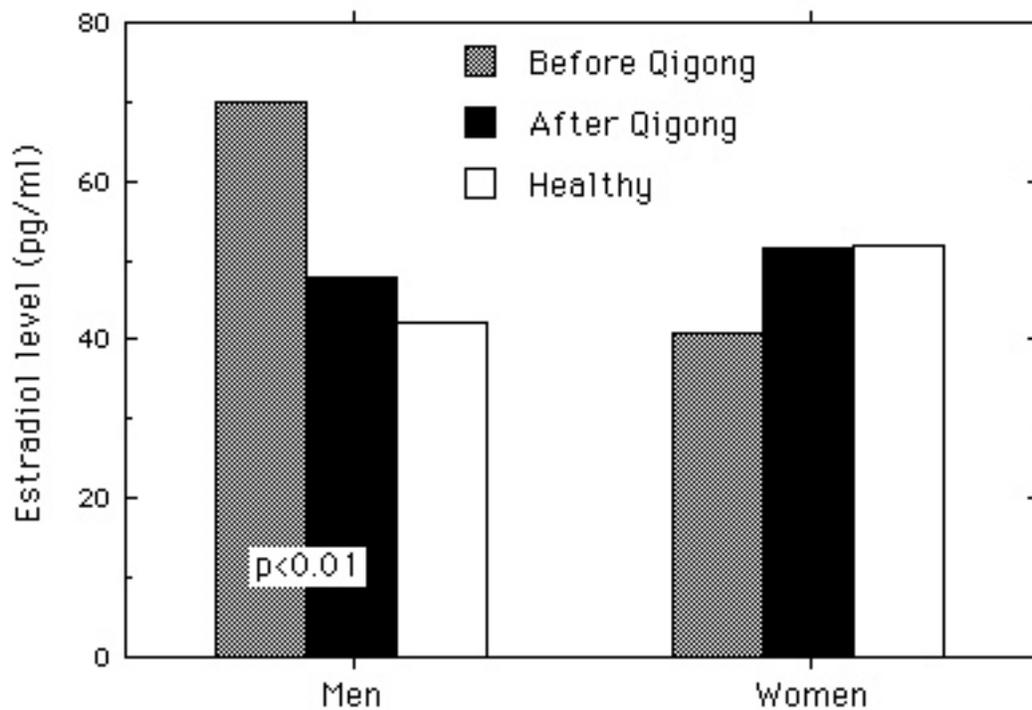


Fig. 3. Serum estradiol levels of hypertensive men (ages 40–69) and women (ages 51–67) who practiced qigong one year compared to healthy controls.

testosterone levels (T) of both groups decreased about 7%. The value of E2 for the qigong group (47.7 pg/ml) approached that of healthy men (42.2 ± 5.8 pg/ml) of the same age but without hypertension or cardiovascular, pulmonary, hepatic, renal, or endocrine diseases ($p<0.05$).

For women (ages 51 to 67, the number in the group is not available), the aging process was associated with failure of ovarian function manifested by decreased E2 and increased T levels. Qigong practiced one year resulted in an increase of E2 from 40.9 ± 3.5 to 51.6 ± 3.5 pg/ml, a value about equal to that of normal menopausal controls without hypertension or cardiovascular, pulmonary, hepatic, renal, or endocrine diseases. The value of T was also increased by qigong from 25.5 ± 2.2 to 37.2 ± 2.2 ng/dl.

The favorable changes in estradiol levels, E2, brought about by qigong are summarized in Fig. 3 for both men

and women.

In an auxiliary study, the 24-hour urinary estradiol levels were determined in 30 men ages 50 to 69. Qigong for one year resulted in a decrease of 31% in E2 and a decrease of 54% in the estradiol/testosterone ratio (E2/T). These changes were accompanied by improvements in symptoms associated with Kidney deficiency hypertension, such as soreness, dizziness, insomnia, hair loss, impotence, and incontinence. The average score for these symptoms was changed favorably by qigong from 5.5 ± 2.3 to 2.8 ± 1.3 ($p < 0.001$).

Ye Ming and co-workers reported similar favorable changes in plasma sex hormone levels E2 in 77 male and female qigong exercisers after 2 months qigong compared with 27 controls. They did not observe significant changes in testosterone.

The three studies above show that qigong exercise can help restore the sex hormone levels that had deteriorated because of aging.

e. Changes in blood chemistry in hypertensive patients

Wang, Xu and co-workers made a series of determinations indicating the profound effects that qigong exercise may have on blood chemistry of hypertensive subjects. Improvements were noted in plasma coagulation fibrinolysis indices, blood viscosity, erythrocyte deformation index, levels of plasma tissue-type plasminogen activator (tPA), plasminogen activator inhibitor (PAI), VIII factor related antigen (VIII R:AG), and anti-thrombin (AT-III). In another study, they reported that qigong exercise beneficially changed the activities of two messenger cyclic nucleotides (cAMP and cGMP).

Reversing symptoms of senility

To study the mechanism of keeping fit by qigong, a controlled study was made of 100 subjects classified either as presenile or with senile impaired cerebral function. The subjects were divided into two groups of 50 people each with a mean age of 63 years and with a similar distribution of age and sex. The qigong group practiced a combination of static and moving qigong. The control group exercised by walking, walking fast, or running slow. According to TCM method of classifying the vital energy, more than 80% of the patients in each group were classified as deficient in vital function and vital essence of the Kidney. Criteria for judging outcome were based on measuring clinical signs and symptoms including cerebral function, sexual function, serum lipid levels, and function of endocrine glands.

After six months, 8 of the 14 main clinical signs and symptoms in the qigong group were improved above 80%, whereas none of the symptoms in the control group were improved above 45%. These results suggest that qigong can reverse some symptoms of aging and senility. In this regard, qigong exercise is superior to walking or running exercises.

Enhanced activity of anti-aging enzyme SOD

Superoxide dismutase (SOD) is produced naturally by the body but its activity declines with age. SOD is often called an anti-aging enzyme because it is believed to destroy free radicals that may cause aging. The effects of qigong exercise to treat disorders of retired workers were studied by Xu Hefen and coworkers and included determinations of plasma SOD.

For their study, 200 retired workers, 100 males and 100 females, ranging in age from 52 to 76 were divided into 2 groups: the qigong exercise group and the control group, and each group consisted of 50 males and 50 females. The main qigong exercise was Emei Nei Gong (one kind of qigong exercises of the Emei School), and was practiced at least 30 minutes a day.

The result showed that the mean level of SOD was increased by qigong exercise. For example, the SOD level was larger in the qigong group (about 2700 μ /g Hb) and than in the control group (1700 μ /g Hb), and this difference was significant ($p < 0.001$). This study shows that qigong exercise can stimulate physical metabolism, promote the circulation of meridians and regulate the flowing of qi and blood, thus preventing and treating disorders of aging and promoting longevity.

Cardiovascular function

Several studies reveal the potential benefits that qigong may have for improving the cardiovascular function of those with heart disease as well as old people. This conclusion is based on three studies reporting that qigong exercise can protect healthy pilots from altitude stress when they flew rapidly from a low altitude to the high altitude of the Tibetan highlands.

Before entering the Tibetan highland, 66 healthy young men were divided into two groups: a qigong group of 32 men who did Qiyuan Qigong exercise for 4 weeks, and a control group of 34 men who exercised to radio music. The two groups of men rapidly entered the highlands from a lower altitude. Before and after entering the highland, measurements were made of symptoms of altitude sickness and physiological changes. The qigong group suffered less altitude stress than the control group as measured by blood pressure, heart rate, oxygen consumption, microcirculation on the apex of tongue and the nail fold, and the temperature at the Laogong point of the left hand ($p < 0.01$). The researchers suggest that qigong can prevent stress from altitude changes.

In another study of changes in altitude, healthy young men were divided into three groups. Forty males were in the qigong group and practiced Qiyuan qigong for 4 weeks prior to entering the highlands; 40 men were in the control group and exercised to radio music for 4 weeks prior to entering the highlands; and 40 males were residents living at high altitudes. The results show that the integral value of symptoms of acute mountain sickness was lower in the qigong than in control group ($p < 0.01$ to 0.05). Pulmonary ventilation of the qigong group was significantly improved compared with the control group ($p < 0.01$ to 0.05), and nearly equal to the resident group.

In another study, air force pilots were randomly divided into two groups: a qigong group of 22 men who had practiced Qiyuan Qigong exercise for eight weeks, and a control group of 18 men who did physical exercise for eight weeks before entering the Tibetan highlands. Microcirculation was measured at tongue apex and the nail fold, and also from the temperature at the Laogong point in palm of the left hand. When the men entered the high altitude, abnormal blood pressure and microcirculation of tongue apex and nail fold occurred in both groups. The abnormalities were statistically less in the qigong group than in the control group ($p < 0.01$). The temperature at Laogong kept steady in the qigong group, but was reduced in the control group ($p < 0.05$).

The results of these three studies with healthy subjects lead to the conclusion that qigong also should be effective in improving the health of people with cardiovascular conditions including the aged. In fact several research studies have reported such beneficial effects of qigong on cardiovascular diseases. The three studies also provide evidence that qigong exercise is superior to physical exercise such as calisthenics.

Blood flow to the brain

Qigong exercise has been shown by rheoencephalography to increase blood flow to the brain. For 158 subjects with cerebral arteriosclerosis who practiced qigong for 1 to 6 months, improvements were noted in symptoms such as memory, dizziness, insomnia, tinnitus, numbness of limbs, and vertigo headache. During these studies, a decrease in plasma cholesterol was also noted. These results may offer hope to people with cerebral arteriosclerosis.

Cancer

Feng Lida pioneered in research showing that emitted qi from qigong masters produced marked changes in cell cultures of cancer cells from mice. Several studies reported the effects of emitted qi on tumors in animals. For

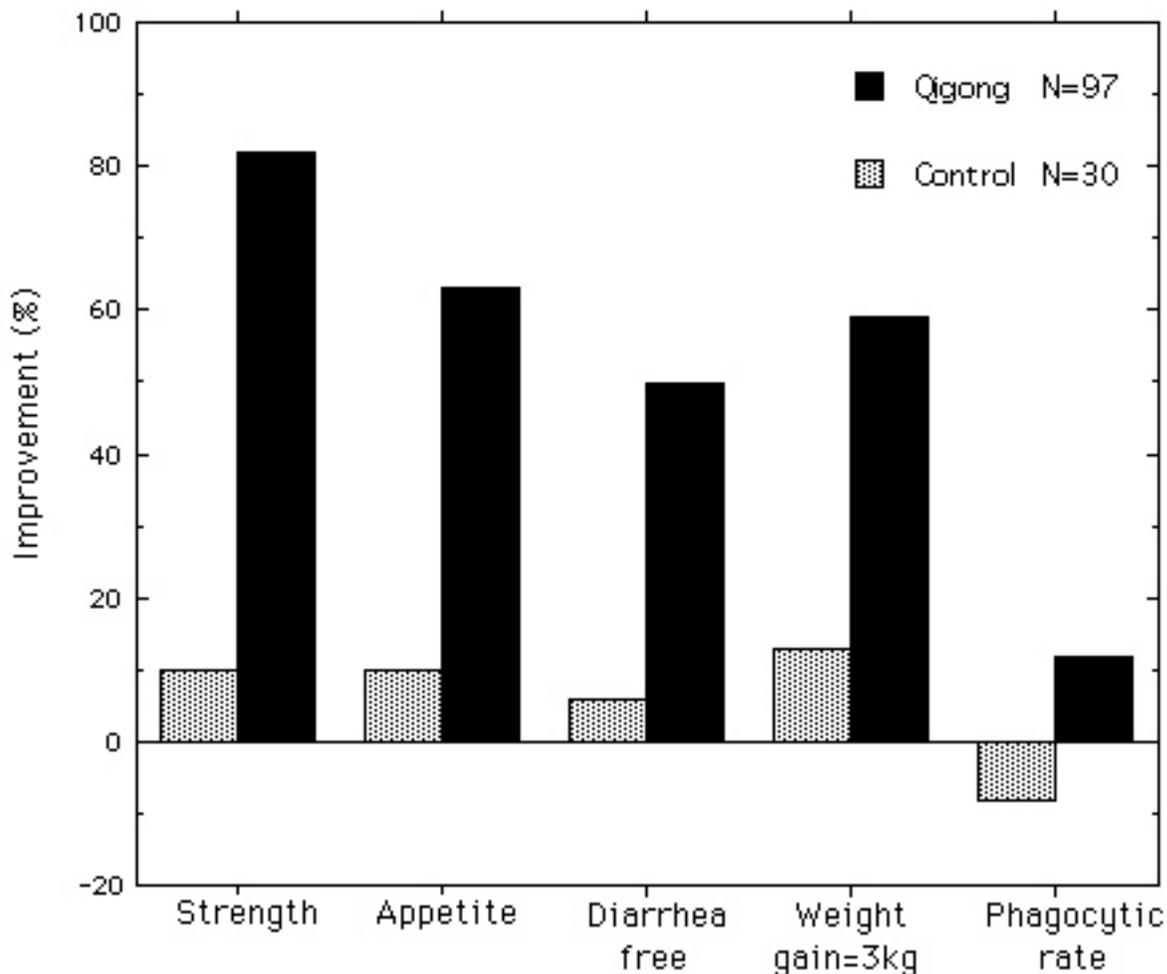


Fig. 4. Improvements in patients with advanced cancer treated with qigong & drugs compared with drugs alone.

example, emitted qi was reported to inhibit the growth of implanted malignant tumors in mice but did not destroy the tumors. Encouraged by the results with animals, researchers carried out clinical research on the effects of qigong on human subjects with cancer.

In a clinical study of qigong as a therapeutic aid for patients with advanced cancer, 127 patients with medically diagnosed malignant cancer were divided into a qigong group of 97 patients and a control group of 30 patients. All patients received drugs, and the qigong group practiced qigong for more than 2 hours a day over a period from 3 to 6 months. The results summarized in Fig. 4 show that both groups improved, but the qigong group showed improvements four to nine times greater than the control group in strength, appetite, diarrhea free, and weight gain of 3 kg. The phagocytic rate, which is a measure of the immune function, increased in the qigong group but decreased in the control group. There are claims that qigong can cure cancer. Researchers, who seem to be more conservative, generally express the opinion to the author that qigong can at least slow the growth of cancerous tumors and reduce their size.

Combination therapy of qigong & drugs is superior to drug therapy alone

There is ample evidence in the literature that therapy by a combination of qigong exercise and drugs is superior to that of drugs alone. The advantages of a combination therapy of qigong and drugs over drugs alone were discussed earlier in this paper for hypertension and cancer.

The mechanism of this apparent synergism is not entirely understood, but undoubtedly relates to the fundamental mechanism of qigong. Qigong is believed to remove blocks to the ready flow of the qi (energy), blood, oxygen and nutrients to all cells of the body as well as to promote removal of waste products from cells of the body. Blocks to energy (qi) flow may result from injury, disease or stress.

Increases in qi flow and blood circulation help

nourish diseased or stressed tissue, providing a means for the body to heal itself. This mechanism suggests that qigong also could promote drug uptake to tissue and cells via increased blood circulation. Omura's research shows that drug uptake was increased by using qigongized paper (i.e., paper to which emitted qi was sent) applied to afflicted area of the body.

Conclusions

This review deals with a small fraction of the large collection of clinical research on medical applications of qigong. The information presented is intended to illustrate the potential of qigong exercise for restoring normal body functions in people with chronic conditions, many of which accelerate the aging process. The main conclusion from many studies is that qigong exercise helps the body to heal itself. In this sense, qigong is a natural anti-aging medicine. Two studies indicate that qigong exercise is superior to some physical exercises.

Qigong can complement Western medicine in many ways to provide better healthcare. For example, qigong has special value for treating chronic conditions and as a preventive medicine, whereas Western medicine has special value for treating acute conditions. There are many medical applications of qigong that can complement Western medicine to improve health care. Some examples include chronic problems such as hypertension, cardiovascular disease, aging, asthma, allergies, neuromuscular problems, and cancer. These areas of public health deserve consideration by the Western medical establishment.

References:

Footnotes

1. Kenneth M SANCIER, Ph.D., Copresident & Director of Research, 561 Berkeley Avenue, Menlo Park, CA 94025, USA. Phone/Fax +1-415-323-1221.
2. Some of the material in this article was adapted from the article, "Medical Applications of Qigong," by K.M. Sancier, Ph.D., and published in *Alternative Therapies in Health and Medicine*. 1996;2 (1): 40-46.
3. Qigong Database^a is available from the Qigong Institute, East West Academy of Healing Arts, 450 Sutter Street, Suite 2104, San Francisco, CA 94108, USA.
4. The p-value is the probability that two quantities are not the same: the smaller the p-value smaller the probability and the more significant the result.
5. Wang C, Xu D. Private communication, May 1995.
6. Duration of the study is not available.

Endnotes

- [1] Sancier K M, Hu B. Medical Applications of Qigong and Emitted Qi on Humans, Animals, Cell Cultures, and Plants: Review of Selected Scientific Studies. *Am J Acupuncture*.1991;19 (4) 367-377.
- [2] Sancier, KM, Medical applications of qigong. *Alternative Therapies in Health & Medicine*. 1995; 2(1) in press.
- [3] Sancier KM, Chow EPY. Healing with qigong and quantitative effects of qigong. *J. American College of Trad. Chinese Medicine*. 1989: 7(3):13-19.
- [4] Sancier KM. The effect of qigong on therapeutic balancing measured by electroacupuncture according to Voll (EAV): a preliminary study. *Acupuncture & Electro-Therapy Res Int J.*:1995;19:119-127.
- [5] Sancier K M. The effect of qigong on human body functions. *Proceedings, Fifth International Symposium on Qigong, Shanghai, China.*1994:179.
- [6] Kido M. Meridian measurements of qi-gong operation and synchronous phenomena. *J. Mind-Body Science*: 1993: 2(1): 19-26.
- [7] Wang Chongxing, Xu Dinghai, Qian Yuesheng, Medical and health care qigong, *J Traditional Chinese Medicine*. 1991:11(4) 296-301.
- [8] Kuang Ankun, Wang Chongxing, Xu Dinghai, Qian Yuesheng. Research on the anti-aging effect of qigong. *J. Traditional Chinese Medicine*. 1991:11 (2) 153-158.
- [9] Hong Shunhua, et. al. Microcirculation of nail fold and immunogenicity after qigong practice for short periods. *Proceedings, First World Conference for Academic Exchange of Medical Qigong, Beijing, China*. 1988: 56-57.
- [10] Li Ziran, Li Liziang, Zhang Boli. Group observation and experimental research on the prevention and treatment of hypertension by qigong. *Proceedings, First World Conference for Academic Exchange of Medical Qigong, Beijing, China*. 1988: 113-114.
- [11] Jing Guinian. Observations on the curative effects of qigong self adjustment therapy in hypertension *Proceedings, Proceedings, First World Conference for Academic Exchange of Medical Qigong, Beijing, China*. 1988: 115-117.
- [12] Bian Huangxian. Clinical observation of 204 patients with hypertension treated with qigong. *Proceedings, First International Congress of Qigong, Berkeley, Calif., 1990*: 101
- [13] Wang Chongxing, et. al. The beneficial effect of qigong on the hypertension incorporated with coronary heart disease. *Proceedings, Third International Symposium on Qigong, Shanghai, China*. 1990: 40.
- [14] Wu Renzhao, Liu Zhewei. Study of qigong on hypertension and reduction of hypotension. *Proceedings, Second World Conference for Academic Exchange of Medical Qigong, Beijing, China*. 1993: 125.
- [15] Bornoroni Corrado, et. al. Treatment of 30 cases of primary hypertension by qigong techniques. *Proceedings, Second World Conference for Academic Exchange of Medical Qigong, Beijing, China*. 1993: 126.

- [16] Zhang Guifang. Development and application of a series of qigong feedback tapes Proceedings, Second World Conference for Academic Exchange of Medical Qigong, Beijing, China. 1993: 125.
- [17] Wang Chongxing, et. al. Effects of qigong on preventing stroke and alleviating the multiple cerebro-cardio-vascular risk factors--a follow-up report on 242 hypertensive cases over 30 years. Proceedings, Second World Conference for Academic Exchange of Medical Qigong, Beijing, China. 1993: 123-124.
- [18] Wang Chongxing, Xu Dinghai, et al. Beneficial effects of qigong on the ventricular function and microcirculation of deficiency in heart-energy hypertensive patients. Private communication, January 1994.
- [19] Xu Dinghai, Wang Chongxing, et al. Clinical study of delaying effect on senility by practicing ÓYang Jing Yi Shen GongÓ in hypertensive patients. Proceedings, Fifth International Symposium on Qigong, Shanghai, China, 1994:109.
- [20] Ye Ming, et al. Relationship among erythrocyte superoxide dismutase activity, plasma sexual hormones (T, E2), aging and qigong exercise. Proceedings, Third International Symposium on Qigong, Shanghai, China.. 1990:28-32 (in English and Chinese).
- [21] Kuang Ankun, Wang Chongxing, Xu Dinghai, Qian Yueshang. Research on Óanti-agingÓ effect of qigong. J Traditional Chinese Medicine. 1991:11 (3) 224-227.
- [22] Xu, Hefen; Xue, Huining; Bian, Meiguang; Zhang, Chengming; Zhou, Shuying. Clinical study of the anti-aging effect of qigong. Proceedings, Second World Conference for Academic Exchange of Medical Qigong. Beijing, China. 1993: 137.
- [23] Mo Feifan, Xu Yongchun, Lu Yongpin, Xu Guang. Study of prevention of cardiac function disorder due to immediate entry into highlands by qigong exercise. Proceedings, Second World Conf on Academic Exchange of Medical Qigong, Beijing, China.. 1993: 78.
- [24] Mo Feifan, Lu Yongpin, Zhao Guoliang. Effect of exercise with qigong on lung function of persons entering highland. Proceedings, Fifth International Symposium on Qigong, Shanghai, China..1994:186.
- [25] Mo Feifan, Wan Lurong, Jia ZiZi, Xu Guang. Study of prevention of microcirculation disorders of pilots in highlands by qigong. Proceedings, Second World Conf on Academic Exchange of Medical Qigong, Beijing, China.1993: 78.
- [26] Chu Weizong, et. al. Changes of blood viscosity and RCG in 44 cases with cardiovascular diseases after qigong exercises. Proceedings, First World Conference for Academic Exchange of Medical Qigong, Beijing, China. 1988: 57-58.
- [27] Qin Chao, et. al. Bidirectional adjustment of blood pressure and heart rate by daoyin tuina on the arterial blood and heart rate. Proceedings, First World Conference for Academic Exchange of Medical Qigong, Beijing, China. 1988: 107.
- [28] Wang Chongxing, et. al. Beneficial effect of qigong on improving the heart function and relieving multiple cardiovascular risk factors. Proceedings ,Third International Symposium on Qigong. Shanghai, China. 1990: 42 (in Chinese).
- [29] Zhang Shengbing. Effects of mind-regulation by qigong on the human body. Proceedings, Fifth International Symposium on Qigong, Shanghai, China, September. 1994:68.