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Full Length Research Paper

Beneficial effect of eight trigrams boxing exercise on cardiac function and blood indexes of old practitioners

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The purpose of this study was to evaluate the effects of the eight trigrams boxing on cardiac function and blood indexes of old practitioners. Subjects, aged 50 years or over, were recruited from a local community. Forty-six participants joined the eight trigrams boxing exercise class five to seven times a week for 1 to 2 h each day for 5 months. Cardiac and blood indexes were measured at the end of each month. Results showed that Participants experienced significant improvements in Cardiac and blood indexes. It could be concluded that elderly people should be encouraged to exercise using eight trigrams boxing for maintaining physical function and improving quality of life.

Key words: Eight trigrams boxing, cardiac and blood indexes, Qigong.

INTRODUCTION

Heart disease is a leading cause of death. As we age, our heart compensates for clogged arteries by working harder and raising blood pressure. Human aging is associated with increased vascular stiffening (Joshi, 2007; Hong et al., 2009), which results in elevation of systolic blood pressure and progressive widening of the arterial pulse (Shah et al., 2009). Each is a recognized risk factor for cardiovascular disease and stroke (Kantor and Redington, 2010; Kuo and Lee, 2009), and likely contributes to the independent risk from aging in postinfarction patients with or without left ventricular (LV) dysfunction (Bohl and Schulz-Menger, 2010). These changes put the heart at risk and impact our quality of life.

Qigong is the Mandarin Chinese term used to describe various Chinese systems of physical and mental training for health, martial arts and self -enlightenment (Trott et al., 2009; Yu et al., 2009). There are many forms of qigong originating from different segments within Chinese society. The traditional Chinese Medical community uses qigong for preventive and curative functions (Johansson et al., 2008; Lee et al., 2009). The Chinese martial arts community considered qigong training an important component in enhancing martial abilities. The religious community, including both Taoist and Buddhist traditions, uses qigong as part of their meditative practice. Confucian scholars practice qigong to improve their moral character (Jahnke et al., 2010). This study was therefore designed to investigate the beneficial effect of eight trigrams boxing on cardiac function and blood indexes of old practitioners.

Participants

The sample was composed of 46 older people (19 women and 27 men; mean age of 52.1 ± 8.81 years) who were living at the city of Guangzhou, China. Before recruitment, all subjects had not practiced eight trigrams boxing. In this study, all participants were requested to regularly practiced eight trigrams boxing five to seven times a week for 1 to 2 h each day. At the end of each month, cardiac and blood indexes were measured. This study lasted for 5 months.

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Table 1. Eight trigrams boxing exercise reducing systolic pressure, average pulse pressure and static pressure of practicer.

Time (month)	Systolic pressure (SP)	Average pulse pressure (APP)	Static pressure (SP)
0	28.281 ± 0.637	12.02 ± 3.28	7.032 ± 1.261
1	28.194 ± 0.529	12.02 ± 5.21	6.921 ± 1.099
2	28.132 ± 0.623 *	11.89 ± 3.19	6.826 ± 1.052 *
3	27.626 ± 1.142 #	11.39 ± 4.07 #	6.405 ± 0.827 #
4	26.127 ± 1.654 #	10.93 ± 3.79 #	6.284 ± 0.842 #
5	25.824 ± 1.047 #	10.03 ± 5.28 #	5.893 ± 1.032 #

*P < 0.05, #P < 0.01, compared with control (0 month).

Table 2. Eight trigrams boxing exercise enhancing heart rate, contraction rate, HR×CR of practicer.

Month	Heart rate (HR)	Contraction rate (CR)	HR×CR
0	76.2	16.382	1192.48
1	76	16.397	1203.27
2	75.2	16.428	1243.16
3	75.2	16.839	1294.01
4	73	17.327	1333.991
5	72.4	17.839	1368.325

Data analysis

SPSS (14.0) for Windows was used for data analysis. Demographic data were analyzed by descriptive statistics. To examine the differences in outcome indicators among measurements, repeated measure analysis of variance (ANOVA) was applied if the normality assumption was fulfilled for the data of measured indicators. Normality for each variable was tested by Kolmogorov-Smirnor test. If the normality assumption was violated, a Friedman test was used to test the difference among the four measures. A p value less than 0.05 was considered statistically significant.

RESULT AND DISCUSSION

Systolic blood pressure is the amount of pressure that blood exerts on vessels while the heart is beating (Giles and Robinson, 2004). As shown in Table 1, systolic pressure, average pulse pressure and static pressure of practicer were decreased with prolonged exercise time. Compared with control (0 month), systolic pressure, average pulse pressure and static pressure of practicer were significantly lower from the 2nd month on.

Cardiac output is the volume of blood pumped by the heart per minute (ml blood/min). Cardiac output is a function of heart rate and stroke volume. The heart rate is simply the number of heart beats per minute. The stroke volume is the volume of blood, in milliliters (ml), pumped out of the heart with each beat (Hoffman et al., 2005; Mayda-Domaç et al., 2010) . Increasing either heart rate or stroke volume increases cardiac output. As shown in Tables 2 and 3, heart rate, contraction rate, HR×CR, stroke volume, cardiac output, cardiac index and ejection fraction of practicer were decreased with prolonged exercise time. Compared with control (0 month), these indexes of practicer were significantly higher from the 2nd month on. Cholesterol is a waxy fat like substance that is important for normal body functioning. Cholesterol is used for cellular functions and the production of hormones. High cholesterol levels are strong indicators of those individuals that are prone to coronary heart disease. Elevated total cholesterol is a risk factor for coronary heart disease. The build- up of plaque in the artery may lead to narrowing (high blood pressure) or complete blockage (heart attack) of the vessel (Vance et al., 2005; Amrani et al., 2009). Triglycerides are the chemical form in which most fat exists in food as well as in the body. They are also present in blood plasma and, in association with cholesterol, form the plasma lipids. Excess triglycerides in plasma is called hypertriglyceridemia. It is linked to the occurrence of coronary artery disease in some people. Elevated triglycerides may be a consequence of other disease, such as untreated diabetes mellitus (Onat et al., 2006; Yibchok- anun et al., 2009) . Low-density lipoprotein (LDL) is one of the five major groups of lipoproteins, which in order of size, largest to smallest, are chylomicrons, VLDL, IDL, LDL and HDL that enable lipids like cholesterol and

Table 3. Eight trigrams boxing exercise enhancing stroke volume, cardiac output, cardiac index and ejection fraction of practicer.

Month	Stroke volume (SV)	Cardiac output (CO)	Cardiac index (CI)	Ejection fraction (EF)
0	2.13	6.02	3.51	51
1	2.18	6.13	3.52	51
2	2.27	6.58	3.61	53
3	2.64	6.92	3.67	59
4	2.89	7.54	3.69	63
5	3.32	8.02	3.75	65

Table 4. Eight trigrams boxing exercise reducing TC, TG, LDL-c and enhancing HDL-c levels of practicer.

Month	TC (mmol/ L)	TG (mmol/ L)	LDL-c (mmol/ L)	HDL-c (mmol/ L)
0	0.92 ± 0.06	3.91 ± 0.32	2.35 ± 0.13	1.93 ± 0.09
1	0.90 ± 0.07	3.24 ± 0.65 *	2.33 ± 0.09	1.99 ± 0.13
2	0.78 ± 0.12 *	3.08 ± 0.46 #	2.03 ± 0.09 #	2.18 ± 0.17 *
3	0.68 ± 0.09 #	2.78 ± 0.33 #	1.87 ± 0.12 #	2.84 ± 0.11 #
4	0.61 ± 0.08 #	2.43 ± 0.37 #	1.51 ± 0.08 #	3.38 ± 0.28 #
5	0.56 ± 0.09 #	1.87 ± 0.42 #	1.35 ± 0.09 #	3.76 ± 0.52 #

*P < 0.05, #P < 0.01, compared with control (0 month).

triglycerides to be transported within the water-based bloodstream. Blood tests typically report LDL-C, the amount of cholesterol contained in LDL. In clinical context, mathematically calculated estimates of LDL-C are commonly used to estimate how much low density lipoproteins are driving progressions of atherosclerosis (Lu et al., 1999). Because HDL can remove cholesterol from atheroma within arteries, and transport it back to the liver for excretion or re-utilization, they are seen as "good" lipoproteins (Zhang et al., 2005; Chatterjee et al., 2009).

As shown in Table 4, TC, TG, and LDL-c of practicer were decreased with prolonged exercise time, whereas HDL-c was increased. Compared with control (0 month), these indexes of practicer were significantly lower and higher from the 2nd month on.

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