2006

Zhang, J. G., K. Ishikawa-Takata, et al. (2006). "The effects of Tai Chi Chuan on physiological function and fear of falling in the less robust elderly: an intervention study for preventing falls." Arch Gerontol Geriatr 42(2): 107-16.

The aim of this report is to investigate the effects of 8 weeks of intensive Tai Chi Chuan (TCC) training on physiological function and fear of falling (FOF) in the less-robust elderly. Forty-nine community-dwelling elderly, aged 60 or older, were classified randomly into a TCC training or control group. Physical performance measures (including one-leg stance, trunk flexion, and walking speed) and interviews were conducted before and after the intervention. The TCC group showed significant improvements in balance and flexibility, and a reduced FOF, when compared with the control group after the intervention. However, walking speed did not change significantly. The results suggest that a high-frequency, short-term TCC training program can improve balance, flexibility, and increase the confidence of less-robust elderly. These suggest the effectiveness of TCC for intervention as a means to prevent falling among high-risk elderly populations.

Zeeuwe, P. E., A. P. Verhagen, et al. (2006). "The effect of Tai Chi Chuan in reducing falls among elderly people: design of a randomized clinical trial in the Netherlands [ISRCTN98840266]." BMC Geriatr 6(1): 6.

ABSTRACT: BACKGROUND: Falls are a significant public health problem. Thirty to fifty percent of the elderly of 65 years and older fall each year. Falls are the most common type of accident in this age group and can result in fractures and subsequent disabilities, increased fear of falling, social isolation, decreased mobility, and even an increased mortality. Several forms of exercise have been associated with a reduced risk of falling and with a wide range of physiological as well as psychosocial health benefits. Tai Chi Chuan seems to be the most promising form of exercise in the elderly, but the evidence is still controversial. In this article the design of a randomized clinical trial is presented. The trial evaluates the effect of Tai Chi Chuan on fall prevention and physical and psychological function in older adults. METHODS: 270 people of seventy years and older living at home will be identified in the files of the participating general practitioners. People will be asked to participate when meeting the following inclusion criteria: have experienced a fall in the preceding year or suffer from two of the following risk factors: disturbed balance, mobility problems, dizziness, or the use of benzodiazepines or diuretics. People will be randomly allocated to either the Tai Chi Chuan group (13 weeks, twice a week) or the no treatment control group. The primary outcome measure is the number of new falls, measured with a diary. The secondary outcome measures are balance, fear of falling, blood pressure, heart rate, lung function parameters, physical activity, functional status, quality of life, mental health, use of walking devices, medication, use of health care services, adjustments to the house, severity of fall incidents and subsequent injuries. Process parameters will be measured to evaluate the Tai Chi Chuan intervention. A cost-effectiveness analysis will be carried out alongside the evaluation of the clinical results. Follow-up measurements will be collected at 3, 6 and 12 months after randomization. DISCUSSION: As far as we know this is the first trial in Europe considering Tai Chi Chuan and fall prevention. This project will answer a pragmatic research question regarding the efficacy of Tai Chi Chuan regarding fall reduction.

Yeh, S. H., H. Chuang, et al. (2006). "Regular tai chi chuan exercise enhances functional mobility and CD4CD25 regulatory T cells." Br J Sports Med 40(3): 239-43.

BACKGROUND: The duration and vigour of physical exercise are widely considered to be critical elements that may positively or negatively affect physical health and immune response. OBJECTIVES: To investigate the effect of a 12 week programme of regular tai chi chuan exercise (TCC) on functional mobility, beliefs about benefits of exercise on physical and psychological health, and immune regulation in middle aged volunteers. METHODS: This quasi-experimental research design involving one group with testing before and after the programme was conducted to measure the effect of 12 weeks of TCC exercise in 14 men and 23 women from the normal community. RESULTS: Regular TCC exercise had a highly significant positive effect on functional mobility ($p = 0.001$) and beliefs about the health benefits of exercise ($p = 0.013$) in the 37 participants. Total white blood cell and red blood cell count did not change significantly, but a highly significant ($p<0.001$) decrease in monocyte count occurred. A significant ($p = 0.05$) increase in the ratio of T helper to suppressor cells (CD4:CD8) was found, along with a significant ($p = 0.015$) increase in CD4CD25 regulatory T cells. Production of the regulatory T cell mediators transforming growth factor beta and interleukin 10 under specific antigen stimulation (varicella zoster virus) was also significantly increased after this exercise programme. CONCLUSIONS: A 12 week programme of regular TCC exercise enhances functional mobility, personal health expectations, and regulatory T cell function.

Xu, D. Q., J. X. Li, et al. (2006). "Effects of long term Tai Chi practice and jogging exercise on muscle strength and endurance in older people." Br J Sports Med 40(1): 50-4; discussion 50-4.

OBJECTIVES: To investigate the influence of regular Tai Chi (TC) practice and jogging on muscle strength and endurance in the lower extremities of older people. METHODS: Twenty one long term older TC practitioners were compared with 18 regular older joggers and 22 sedentary counterparts. Maximum concentric strength of knee flexors and extensors was tested at angular velocities of 30 degrees/s and 120 degrees/s. Ankle dorsiflexors and plantar flexors were tested at 30 degrees/s and the dynamic endurance of the knee flexors and extensors was assessed at a speed of 180 degrees/s. RESULTS: The differences in the muscle strength of the knee joint amongst the three experimental groups were significant at the higher velocity. The strengths of knee extensors and flexors in the control group were significantly lower than those in the jogging group and marginally lower than those in the TC group. For the ankle joint, the subjects in both the TC and jogging groups generated more torque in their ankle dorsiflexors. In addition, the muscle endurance of knee extensors was more pronounced in TC practitioners than in controls. CONCLUSION: Regular older TC practitioners and joggers showed better scores than the sedentary controls on most muscle strength and endurance measures. However, the magnitude of the exercise effects on muscles might depend on the characteristics of different types of exercise.

Wolf, S. L., M. O'Grady, et al. (2006). "The influence of intense Tai Chi training on physical performance and hemodynamic outcomes in transitionally frail, older adults." J Gerontol A Biol Sci Med Sci 61(2): 184-9.

BACKGROUND: Few data exist to evaluate whether Tai Chi (TC) training improves physical performance and hemodynamic outcomes more than a wellness education (WE) program does among older fallers transitioning to frailty. METHODS: This 48-week randomized clinical trial was provided at 10 matched pairs of congregate living facilities in the Atlanta metropolitan area to 291 women and 20 men, who were transitionally frail, >or=70 years old, and had fallen at least once within the past year. Pairs of facilities were randomized to either TC exercise ($n = 158$) or WE (control) interventions ($n = 153$) over 48 weeks. Physical performance (freely chosen gait speed, reach, chair-rises, 360 degrees

turn, picking up an object from the floor, and single limb support) and hemodynamic outcomes (heart rate and blood pressure) were obtained at baseline and after 4, 8, and 12 months. RESULTS: Mean percent change (baseline to 1 year) for gait speed increased similarly in both cohorts (TC: 9.1% and WE: 8.2%; p =.78). However, time to complete three chair-rises decreased 12.3% for TC and increased 13.7% for WE (p =.006). Baseline to 1 year mean percent change decreased among TC and increased within WE cohorts for: body mass index (-2.3% vs 1.8%; p <.0001), systolic blood pressure (-3.4% vs 1.7%; p =.02), and resting heart rate (-5.9% vs 4.6%; p <.0001). CONCLUSIONS: TC significantly improved chair-rise and cardiovascular performance. Because TC training reduced fall occurrences in this cohort, factors influencing functional and cardiovascular improvements may also favorably impact fall events.

Tseng, S. C., W. Liu, et al. (2006). "Muscle activation profiles about the knee during Tai-Chi stepping movement compared to the normal gait step." J Electromyogr Kinesiol.

The purpose of this study was to investigate knee muscle activity patterns in experienced Tai-Chi (TC) practitioners during normal walking and TC stepping. The electromyographic (EMG) activity of vastus lateralis (VL), vastus medialis (VM), bicep femoris (BF), and gastrocnemius (GS) muscles of 11 subjects (five females and six males) during the stance phase of normal walking was compared to stance phase of a TC step. Knee joint motion was also monitored by using an Optotraktrade markmotion analysis system. Raw EMG was processed by root-mean-square (RMS) technique using a time constant of 50ms, and normalized to maximum of voluntary contraction for each muscle, referred to as normalized RMS (nRMS). Peak nRMS and co-contraction (quantified by co-contraction index) during stance phase of a gait cycle and a TC step were calculated. Paired t-tests were used to compare the difference for each muscle group peak and co-contraction pair between the tasks. The results showed that only peak values of nRMS in quadriceps and co-contraction were significantly greater in TC stepping compared to normal walking (Peak values of nRMS for VL were 26.93% for normal walking and 52.14% for TC step, p=0.001; VM are 29.12% for normal walking and 51.93% for TC stepping, p=0.028). Mean co-contraction index for VL-BF muscle pairs was 13.24+/-11.02% during TC stepping and 9.47+/-7.77% in stance phase of normal walking (p=0.023). There was no significant difference in peak values of nRMS in the other two muscles during TC stepping compared to normal walking. Preliminary EMG profiles in this study demonstrated that experienced TC practitioners used relatively higher levels of knee muscle activation patterns with greater co-contraction during TC exercise compared to normal walking.

Tsang, W. W. and C. W. Hui-Chan (2006). "Standing balance after vestibular stimulation in Tai Chi-practicing and nonpracticing healthy older adults." Arch Phys Med Rehabil 87(4): 546-53.

OBJECTIVE: To compare the effects of vestibular stimulation on standing balance control between Tai Chi practitioners and older subjects. DESIGN: Cross-sectional study. SETTING: University-based rehabilitation center. PARTICIPANTS: Tai Chi practitioners (n=24; age +/- standard deviation, 69.3+/-5.0y) and control subjects (n=24; age, 71.6+/-6.1y) were recruited. INTERVENTIONS: Not applicable. MAIN OUTCOME MEASURES: Subjects stood on a force platform with eyes closed before and after stimulation of their horizontal semicircular canals, applied by means of whole head-and-body rotation at 80 degrees /s for 60 seconds, with subjects seated in a rotational chair. Body sway during stance was measured as total sway path, peak amplitudes, and mean velocities of sway in both anteroposterior (AP) and mediolateral (ML) directions. RESULTS: After head-and-body rotation, significant within-group increases were found in all measures in both AP and ML directions during stance with eyes closed in older control subjects but not in Tai Chi practitioners along the AP direction. In fact,

significantly smaller increases in total sway path, peak amplitude, and mean velocity of body sway in the AP direction were found in the Tai Chi practitioners when compared with those of control subjects. CONCLUSIONS: Our results show that long-term Tai Chi practitioners had better AP standing balance control after vestibular stimulation than older control subjects.

Taylor-Piliae, R. E., W. L. Haskell, et al. (2006). "Hemodynamic responses to a community-based Tai Chi exercise intervention in ethnic Chinese adults with cardiovascular disease risk factors." Eur J Cardiovasc Nurs 5(2): 165-74.

BACKGROUND: Cardiovascular disease (CVD) is the leading cause of death among older adults worldwide, including Europe, Asia, and North America. In the United States (US), CVD is also the leading cause of death among Asian-Americans. Physical activity has been shown to reduce CVD risk factors. Reduction in blood pressure (BP) in response to Tai Chi (TC) exercise in persons with CVD risk factors have been reported, though not in ethnic Chinese living in the US. AIM: Hemodynamic responses to a 12-week community-based TC exercise intervention among ethnic Chinese with CVD risk factors were examined. METHODS: Quasi-experimental design. Ethnic Chinese >45 years old with at least 1 major CVD risk factor, living in the San Francisco Bay Area, attended a TC intervention three times a week for 12 weeks. A 2-min step-in-place test assessed aerobic endurance. BP and heart rate were measured at rest, and within 1-min after the step-test. Data were collected at baseline, 6 and 12 weeks. RESULTS: A total of 39 subjects (69% women), 66+/-8.3 years old, with hypertension (92%), hypercholesteremia (49%), and/or diabetes (21%), and 1 current smoker participated. Adherence to the intervention was high (87%). Subjects were sedentary at baseline, though had a statistically significant improvement in aerobic endurance over-time (eta(2)=0.39). At baseline, the average BP at rest was 150/86, while BP in response to the step-test was 178/99. Clinically and statistically significant reductions in BP at rest (131/77), and in response to the step-test (164/82) were found over 12 weeks of TC ($p<0.01$). No significant change in heart rate was observed. CONCLUSIONS: This innovative, culturally relevant, community-based 12-week TC exercise intervention, appealed to Chinese adults with CVD risk factors, with significant reductions in BP and improvement in aerobic endurance. Given the number of persons estimated to have HTN and other CVD risk factors, the identification of new approaches to improve health, combined with risk factor reduction is needed. This is particularly important, given the rise in HTN among adults in the US and the associated public health burden of HTN. TC has the potential to reduce expenditures associated with CVD by facilitating a lifestyle that promotes physical activity, while remaining a low-tech, low-cost alternative to exercise.

Taylor-Piliae, R. E., W. L. Haskell, et al. (2006). "Improvement in balance, strength, and flexibility after 12 weeks of Tai chi exercise in ethnic Chinese adults with cardiovascular disease risk factors." Altern Ther Health Med 12(2): 50-8.

CONTEXT: Declines in physical performance are associated with aging and chronic health conditions. Appropriate physical activity interventions can reverse functional limitations and help maintain independent living. Tai chi is a popular form of exercise in China among older adults. OBJECTIVE: To determine whether tai chi improves balance, muscular strength and endurance, and flexibility over time. DESIGN: Repeated measures intervention; data collected at baseline, 6 weeks, and 12 weeks. SETTING: Community center in the San Francisco Bay Area. PARTICIPANTS: Thirty-nine Chinese adults with at least 1 cardiovascular disease (CVD) risk factor. INTERVENTIONS: A 60-minute tai chi exercise class 3 times per week for 12 weeks. MAIN OUTCOME MEASURES: A battery of physical fitness measures specifically developed for older adults assessed balance, muscular strength and endurance, and flexibility. RESULTS: Subjects

were 65.7 (+/- 8.3) years old, Cantonese-speaking (97%) immigrants, with 12 years or less of formal education (87%) and very low income (67%). Reported CVD risk factors were hypertension (92%), hypercholesteremia (49%), diabetes (21%), and 1 current smoker. Subjects were below the 50th percentile of fitness at baseline compared to age- and gender-specific normative US data. Statistically significant improvements were observed in all balance, muscular strength and endurance, and flexibility measures after 6 weeks, and they increased further after 12 weeks. CONCLUSIONS: Tai chi is a potent intervention that improved balance, upper- and lower-body muscular strength and endurance, and upper- and lower-body flexibility in these older Chinese adults. These findings provide important information for future community-based tai chi exercise programs and support current public health initiatives to reduce disability from chronic health conditions and enhance physical function in older adults.

Taylor-Piliae, R. E., W. L. Haskell, et al. (2006). "Change in perceived psychosocial status following a 12-week Tai Chi exercise programme." J Adv Nurs 54(3): 313-29.

AIM: This paper reports a study to examine change in psychosocial status following a 12-week Tai Chi exercise intervention among ethnic Chinese people with cardiovascular disease risk factors living in the United States of America. BACKGROUND: Regular participation in physical activity is associated with protection against cardioavascular disease, and improvements in physical and psychological health. Increasing amounts of scientific evidence suggests that mind-body exercise, such as Tai Chi, are related to improvements in mental health, emotional well-being, and stress reduction. No prior study has examined the effect of a Tai Chi exercise intervention on psychosocial status among people with cardiovascular disease risk factors. METHODS: This was a quasi-experimental study. Participants attended a 60-minute Tai Chi exercise class three times per week for 12 weeks. Data were collected at baseline, 6 and 12 weeks following the intervention. Psychosocial status was assessed using Chinese versions of Cohen's Perceived Stress Scale, Profile of Mood States, Multidimensional Scale of Perceived Social Support, and Tai Chi exercise self-efficacy. RESULTS: A total of 39 participants, on average 66-year-old (+/-8.3), married (85%), Cantonese-speaking (97%), immigrants participated. The majority were women (69%), with < or =12 years education (87%). Statistically significant improvements in all measures of psychosocial status were found (P < or = 0.05) following the intervention. Improvement in mood state (eta2 = 0.12), and reduction in perceived stress (eta2 = 0.13) were found. In addition, Tai Chi exercise statistically significantly increased self-efficacy to overcome barriers to Tai Chi (eta2 = 0.19), confidence to perform Tai Chi (eta2 = 0.27), and perceived social support (eta2 = 0.12). CONCLUSIONS: Tai Chi was a culturally appropriate mind-body exercise for these older adults, with statistically significant psychosocial benefits observed over 12-weeks. Further research examining Tai Chi exercise using a randomized clinical trial design with an attention-control group may reduce potential confounding effects, while exploring potential mechanisms underlying the relaxation response associated with mind-body exercise. In addition, future studies with people with other chronic illnesses in all ethnic groups are recommended to determine if similar benefits can be achieved.

Robins, J. L., N. L. McCain, et al. (2006). "Research on psychoneuroimmunology: tai chi as a stress management approach for individuals with HIV disease." Appl Nurs Res 19(1): 2-9.

Psychoneuroimmunology is a framework for mind-body practice and research that combines cutting-edge scientific exploration with holistic philosophy to appreciate and understand stress responses. The rapidly growing research literature provides a foundation for building an integrative stress management

model with the potential to positively influence the stress-disease relationship and, ultimately, health outcomes. This article introduces a novel tai chi intervention and provides quantitative and qualitative data from a randomized clinical trial indicating its effects on psychosocial variables in individuals living with various stages of HIV disease.

Mustian, K. M., J. A. Katula, et al. (2006). "A pilot study to assess the influence of tai chi chuan on functional capacity among breast cancer survivors." J Support Oncol 4(3): 139-45.

Treatment of breast cancer can significantly diminish functional capacity in patients months and even years after the completion of treatments. Tai chi chuan (TCC) is a moderate form of exercise that may be an effective therapy for improving functional capacity among breast cancer survivors. We sought to provide pilot data comparing the efficacy of TCC and psychosocial therapy (PST; physical activity control) for improving functional capacity among breast cancer survivors post treatment. Twenty-one women who had completed treatment of breast cancer were randomized to receive TCC or PST 3 times/wk for 12 weeks. Functional capacity was assessed at baseline and at 12 weeks. The TCC group demonstrated significant improvement in functional capacity (specifically aerobic capacity, muscular strength, and flexibility) whereas the PST group showed significant improvement in flexibility only. These data suggest that TCC may be an efficacious intervention for enhancing functional capacity among breast cancer survivors and may support the need for larger randomized, controlled clinical trials to further elucidate these relationships.

Morris Docker, S. (2006). "Tai Chi and older people in the community: a preliminary study." Complement Ther Clin Pract 12(2): 111-8.

This paper outlines a qualitative exploratory study of the individual experiences of older people who practise Tai Chi for health. The study aimed to identify factors that influence the attraction of Tai Chi for older people. Participants were recruited from a selection of Tai Chi clubs in the north of England. Participant and non-participant observation of a selection of Tai Chi practice sessions was undertaken along with interviews with 7 older people. Findings show that individuals who practice Tai Chi report a variety of immediate and lasting physical and mental benefits. Being part of a group that both learns and practises Tai Chi together appears to be important to the experience and awareness of the spiritual nature of Tai Chi was also reported. It is argued that older people who practise Tai Chi may have a particular view on ageing, health and well-being that the activity of Tai Chi allows them to express and future study intends to investigate this in more detail.

Mao de, W., Y. Hong, et al. (2006). "Characteristics of foot movement in Tai Chi exercise." Phys Ther 86(2): 215-22.

BACKGROUND AND PURPOSE: The concept of proper foot movement is always emphasized in practicing Tai Chi (TC). The purposes of this study were to describe the foot movement characteristics of TC and to compare duration of single- and double-limb support time during TC and during walking. SUBJECTS: Sixteen experienced TC practitioners participated in the study. METHODS: The participants' performance of a whole set of 42-form TC movements was recorded with 2 cameras. A motion analysis system was used to identify the supporting and stepping characteristics of the foot during the practice. RESULTS: Seven foot support patterns and 6 step directions were identified. The results revealed that, compared with normal walking, TC movement had more double-limb support and less single-limb support in terms of total duration. The duration of each support pattern was longer, and movement from one pattern to the next was slow. The duration of each step direction was short, and changes of direction were frequent. DISCUSSION AND CONCLUSION: Support patterns changed slowly, and,

combined with various step directions, they were found to be better than those of walking in simulating the gait challenges that may be encountered in daily activities.

Mao de, W., J. X. Li, et al. (2006). "Plantar pressure distribution during tai chi exercise." Arch Phys Med Rehabil 87(6): 814-20.

Mao DW, Li JX, Hong Y. Plantar pressure distribution during Tai Chi exercise. OBJECTIVES: To describe and quantify the plantar pressure distribution characteristics during Tai Chi exercise and to explain the beneficial effect of Tai Chi on balance control and muscle strength when compared with normal walking. DESIGN: Description and within-subject design. SETTING: A biomechanics laboratory. PARTICIPANTS: Sixteen experienced Tai Chi practitioners. INTERVENTIONS: Not applicable. MAIN OUTCOME MEASURES: Pressure-time integral, ground reaction force, and displacement of center of pressure (COP). RESULTS: During Tai Chi movements, the loading of the first metatarsal head and the great toe were significantly greater than in other regions (P<.05). The ground reaction forces varied between the Tai Chi movements and normal walking. Compared with normal walking, the locations of the COP in the Tai Chi movements were significantly more medial and posterior at initial contact (P<.05), and were significantly more medial and anterior at the end of contact with the ground (P<.05). The displacements of the COP were significantly wider (P<.05) in the mediolateral direction in the forward, backward, and sideways Tai Chi movements. The displacement was significantly larger (P<.05) in the anteroposterior direction in the forward movement. CONCLUSIONS: The plantar pressure characteristics of Tai Chi movements found in this study may be one of the important factors that Tai Chi exercise improves balance control and muscle strength.

Mao, D. W., J. X. Li, et al. (2006). "The duration and plantar pressure distribution during one-leg stance in Tai Chi exercise." Clin Biomech (Bristol, Avon).

BACKGROUND: Tai Chi exercise improved the balance control and muscle strength of the lower extremities. The aim of this study is to quantify the one-leg stance duration and plantar pressure distribution during the one-leg stance in Tai Chi and to try to elaborate on its probable effects on the ability to balance on one leg. METHODS: Sixteen experienced Tai Chi practitioners participated in this study. The Novel Pedar-X insole system was used to record the plantar forces during the execution of a set of 42-form Tai Chi movements and during normal walking. The one-leg stance duration and plantar pressure distribution during the one-leg stance were analyzed. FINDINGS: In Tai Chi exercise, the total duration spent in the one-leg stance was less ($p<0.05$), the duration of each one-leg stance was longer ($p<0.01$) and the medial-lateral displacement of the centre of pressure was greater ($p<0.05$) than during normal walking. The peak pressure and pressure-time integral of the second and third metatarsal heads and the fourth and fifth metatarsal heads were significantly greater ($p<0.05$) than those of other plantar regions during the one-leg stance in normal walking, whereas the peak pressure and pressure-time integral of the first metatarsal head and the great toe were significantly greater ($p<0.05$) than those of other plantar regions during the one-leg stance in Tai Chi exercise. INTERPRETATION: The longer duration of each one-leg stance and the plantar pressure distribution characteristics during the one-leg stance in Tai Chi exercise may be associated with an improved ability to balance on one leg. The findings may provide useful information toward the development of strengthening programs, strategies for the prevention of falls, and the promotion of a physically active lifestyle.

Lee, K. Y. and O. Y. Jeong (2006). "[The effect of tai chi movement in patients with rheumatoid arthritis.]." Taehan Kanho Hakhoe Chi 36(2): 278-85.

PURPOSE: This study was performed to verify the effect of Tai Chi exercise on patients with rheumatoid arthritis particularly their level of pain, fatigue, sense of balance and daily life performance (ADL). METHOD: It employed a non-equivalent control group pre- and post-test design. The research instruments used in this study were pain, fatigue, sense of balance and ADL. Thirty-two patients in the experimental group carried out 50 minutes of Tai Chi exercise for 12 weeks, and 29 patients in the control group did not. Before and after the experiment, both groups were tested for pain, fatigue, sense of balance and ADL. Collected data were processed using the SPSS/WIN 10.0 program analyzed by the frequency, percentage, chi2-test, and t-test. RESULTS: Pain and fatigue significantly decreased in the experimental group. However the improvement in ADL of the rheumatoid arthritis patients was not statistically significant but their sense of balance was enhanced significantly. CONCLUSION: Tai Chi exercise is an effective nursing intervention that can be used for rheumatoid arthritis patients.

Ko, G. T., P. C. Tsang, et al. (2006). "A 10-week Tai-Chi program improved the blood pressure, lipid profile and SF-36 scores in Hong Kong Chinese women." Med Sci Monit 12(5): CR196-199.

Background: Physical activity is associated with a better longevity and reduced morbidity. In addition, exercise has a mood-elevating effect, which improves self-esteem. Tai-Chi is a traditional Chinese aerobic exercise. We aimed to assess the short-term effects of Tai-Chi on the clinical parameters and health-related quality of life (QOL) in Hong Kong Chinese. Material/Methods: Twenty Chinese healthy female subjects were recruited. There were 2 Tai-Chi sessions per week for 10 weeks. Each session lasted for one hour. Health-related QOL was assessed with SF-36 questionnaire. Results: Of the 20 subjects, their mean age was 40.8+/-5.9 years (median 42.5 years, range 30-50 years). At the end of the study, systolic blood pressure, total cholesterol and low-density lipoprotein cholesterol levels significantly reduced (114+/-9 to 108+/-9 mmHg, p=0.012; 4.7+/-0.8 to 4.4+/-0.5 mmol/L, p=0.020 and 2.7+/-0.6 to 2.2+/-0.5 mmol/L, p=0.001, respectively). Among all SF-36 items, Vitality and Mental Health significantly improved after the 10-week Tai-Chi program (64.9+/-8.1 to 68.4+/-6.6, p=0.038 and 64.4+/-6.9 to 69.1+/-1.4, p=0.003, respectively). Conclusions: A 10-week Tai-Chi exercise program improved systolic blood pressure, lipid profiles and some of the parameters of health-related QOL in Hong Kong Chinese women. Tai-Chi is likely to be a useful choice of physical activity. We need a larger study that covers a wider range of populations to confirm our results.

James, C. R., C. L. Shen, et al. (2006). "Effects of a 6-week Tai Chi Exercise Intervention on Gait Kinematics in Knee Osteoarthritic Individuals: 9:45AM-110:00AM: 585." Med Sci Sports Exerc 38(5 Suppl): S1.

Gemmell, C. and J. M. Leathem (2006). "A study investigating the effects of Tai Chi Chuan: individuals with traumatic brain injury compared to controls." Brain Inj 20(2): 151-6.

OBJECTIVE: To explore the effects of a 6-week course in Tai Chi associated with traumatic brain injury (TBI) symptoms. METHOD: Eighteen participants, with TBI assigned to a control (waiting list) group (n = 9) or Tai Chi group (n = 9) completed the Medical Outcome Scale Short Form 36 (SF-36) and Rosenberg Self-Esteem Scale (RSES) before, during, immediately after and 3 weeks after completion of the Tai Chi course. The Tai Chi group completed the Visual Analogue Mood Scales (VAMS) before and after each class. RESULTS: Tai Chi was associated with significant improvement on all VAMS scores (except fatigue) with

decreases in sadness, confusion, anger, tension, fear and increases in energy and happiness. There were no significant between-group differences on the SF-36 or RSES. CONCLUSIONS: Tai Chi provides short-term benefits after TBI, with rigorous outcome measurement needed to examine long-term benefits.

Gatts, S. K. and M. H. Woollacott (2006). "Neural mechanisms underlying balance improvement with short term Tai Chi training." Aging Clin Exp Res 18(1): 7-19.

BACKGROUND AND AIMS: Though previous research has shown that Tai Chi reduces falls risk in older adults, no studies have examined underlying neural mechanisms responsible for balance improvement. We aimed to determine the efficacy of Tai Chi training in improving neuromuscular response characteristics underlying balance control in balance-impaired older adults. METHODS: Twenty-two balance-impaired older adults were randomly divided into Tai Chi (TC) or control groups. Nineteen subjects (age 68-92, BERG 44 or less) completed the study. TC training included repetitive exercises using TC motor and biomechanical strategies, techniques, and postural elements. Control training included axial mobility exercises, balance/awareness education and stress reduction. Groups trained 1.5 hours/day, 5 days/week for 3 weeks. After post-testing the control group received TC training. Subjects walked across a force plate triggered to move forward 15 cm at 40 cm/sec at heel strike. Tibialis anterior (TA) and medial gastrocnemius (GA) responses during balance recovery were measured with electromyograms (EMGs). Four clinical measures of balance were also recorded. RESULTS: TC subjects, but not controls, significantly reduced both TA response time from 148.92 +/- 45.11 ms to 98.67 +/- 17.22 ms ($p < or = 0.004$) and occurrence of co-contraction of antagonist muscles ($p < or = 0.003$) of the perturbed leg. Clinical balance measures also significantly improved after TC. CONCLUSIONS: TC enhanced neuromuscular responses controlling the ankle joint of the perturbed leg. Fast, accurate neuromuscular activation is crucial for efficacious response to slips or trips.

Gatts, S. K. and M. H. Woollacott (2006). "How Tai Chi improves balance: Biomechanics of recovery to a walking slip in impaired seniors." Gait Posture.

BACKGROUND AND AIMS: This study examined the effect of Tai Chi (TC) training on biomechanical responses to large, fast walking perturbations in balance-impaired seniors. METHODS: Twenty-two seniors (age 68-92, BERG 44 or less) with surgical interventions to knees, hips, and back were randomly divided into control or TC groups. Groups trained 1.5h/day, 5 days/week for 3 weeks. Controls received TC training after post-control testing. Subjects walked across a force plate triggered to move forward 15cm at 40cm/s at right heel strike (RHS). Kinematics, center of pressure (COP) and center of mass (COM) responses were measured. RESULTS: TC but not control training significantly reduced tripping ($p</=0.005$), medial cross-step distance ($p</=0.038$), and increased use of swing leg heel strike ($p</=0.001$). COM anterior-posterior (A/P) path significantly increased after TC ($p</=0.017$) but not control training. TC training showed a trend toward increased COM-COP A/P angular separation at RHS ($p<0.067$). CONCLUSIONS: Tai Chi training significantly enhanced balance responses by more efficacious use of mechanisms controlling stepping strategies of the swing leg. COM A/P path significantly increased after TC implying improved ability to tolerate unsteadiness. COM-COP A/P separation angle at RHS increased suggesting a longer step and increased mechanical loading at the hip.

Fong, S. M. and G. Y. Ng (2006). "The effects on sensorimotor performance and balance with Tai Chi training." Arch Phys Med Rehabil 87(1): 82-7.

OBJECTIVES: To compare the effects of short-term and long-term Tai Chi training on the sensorimotor and balance performance of able-bodied subjects. DESIGN: A nonrandomized cross-sectional controlled trial. SETTING: Sport laboratory. PARTICIPANTS: Forty-eight healthy subjects, 16 with 3 months of

experience in Tai Chi training, 16 with 1 to 3 years of experience in Tai Chi training, and 16 with no experience in Tai Chi training. INTERVENTION: Experimental. MAIN OUTCOME MEASURES: The reflex contraction latencies (reaction time) of medial hamstrings and gastrocnemius after perturbation, the active knee joint angle-repositioning error, and the balance time on a tilt board were measured and analyzed with 1-way analysis of covariance. Significant results were further analyzed with post hoc linear contrasts. RESULTS: Long-term Tai Chi practitioners had a significantly faster reflex reaction time in hamstrings (P<.000) and gastrocnemius (P=.043) muscles and a longer balance time on a tilt board (P<.000) than short-term Tai Chi practitioners and nonpractitioners. Both long- and short-term Tai Chi practitioners had significantly less knee joint angle-repositioning error than nonpractitioners (P=.001 and P=.027, respectively). CONCLUSIONS: Tai Chi training of more than 1 year might have the benefits of faster hamstrings and gastrocnemius reflex reaction and improved knee joint position sense (JPS). These changes might be associated with an improved dynamic standing balance. Better knee JPS was shown in subjects with 3 months of Tai Chi practice, but this had not led to a significant improvement in balance.

Cheng, T. O. (2006). "Chi in tai chi does not mean energy." Int J Cardiol 107(1): 119.

Cheng, T. O. (2006). "Tai Chi for chronic heart failure." Int J Cardiol 110(1): 96.

Chau, K. W. and D. W. Mao (2006). "The characteristics of foot movements in Tai Chi Chuan." Res Sports Med 14(1): 19-28.

This study examines how the characteristics of the foot movements in Tai Chi Chuan (TCC) contribute to a practitioner's health by improving his or her balance and reducing the risk of fall. Ten TCC masters are video-taped, and the time spent on different support patterns (step stance) and stepping directions (footwork) while performing the 42-form TCC is analyzed. In support patterns, it is found that a larger percentage of time is spent on the double leg stance (35.08 +/- 4.92) than on the single leg stance (Left: 17.67 +/- 7.71; Right: 17.29 +/- 2.23) and one leg support with another leg partially supporting type of stance (6.51 +/- 8.77). With regard to stepping directions, the centre footwork (25.25 +/- 10.20) requires a larger percentage of time than the forward (18.29 +/- 3.36), sideway (20.80 +/- 4.76), grinding (20.42 +/- 7.61), upward (11.55 +/- 1.49), and backward footwork (3.67 +/- 1.33). The movements classified are shown to simulate balance, flexibility and proprioception, and functional training. The findings partially explain the relationship between practising TCC and its health benefits. Further studies are suggested to investigate the health benefits that can be derived from other specific TCC movements.

Audette, J. F., Y. S. Jin, et al. (2006). "Tai Chi versus brisk walking in elderly women." Age Ageing.

Purpose: To compare the effects of a short style of Tai Chi versus brisk walking training programme on aerobic capacity, heart rate variability (HRV), strength, flexibility, balance, psychological status and quality of life in elderly women. METHODS: Nineteen community-dwelling, sedentary women (aged 71.4 +/- 4.5 years) were randomly assigned to Tai Chi Chuan (TCC; n = 11) or brisk walking group (BWG; n = 8). A separate group of elderly women was recruited from the same population to act as a sedentary comparison group (SCG; n = 8). The exercise groups met for 1 h, three days per week for 12 weeks. Outcomes measured before and after training included estimated VO2max, spectral analysis of HRV (high-frequency, low-frequency power as well as high- and low-frequency power in

normalised units) as a measure of autonomic control of the heart, isometric knee extension and handgrip muscle strength, single-leg stance time, the State Trait Anxiety Inventory (STAI), Profile of Mood States (POMS) and Short Form-36 (SF-36) questionnaires. RESULTS: Significant improvement was seen in estimated VO2max in the TCC group (TCC versus SCG P = 0.003, TCC versus BWG P = 0.08). The mean within-person change of high-frequency power in normalised units (HFnu) increased [8.2 (0.14-16.3)], representing increased parasympathetic activity, and low-frequency power in normalised units (LFnu) decreased [-8.7 (-16.8-0.5)], representing decreased sympathetic activity, in the TCC group only. Significant gains were also seen in the non-dominant knee extensor strength and single-leg stance time (TCC versus BWG P<0.05). CONCLUSIONS: A short style of TCC was found to be an effective way to improve many fitness measures in elderly women over a 3-month period. TCC was also found to be significantly better than brisk walking in enhancing certain measures of fitness including lower extremity strength, balance and flexibility.

Arthur, H. M., C. Patterson, et al. (2006). "The role of complementary and alternative therapies in cardiac rehabilitation: a systematic evaluation." Eur J Cardiovasc Prev Rehabil 13(1): 3-9.

BACKGROUND: Presently, complementary and alternative medicine, including both therapies and herbal/oral supplements, is used globally. Few studies have examined the use of specific therapies, separate from herbal/oral supplements, in cardiac rehabilitation. This paper presents a systematic evaluation of current research evidence related to use of specific complementary and alternative medicine therapies in secondary prevention of cardiovascular disease, with a view to making recommendations for cardiac rehabilitation. DESIGN AND METHODS: A literature search was conducted using complementary and alternative medicine websites, Medline, Allied and Complementary Medicine, CINAHL, Cochrane databases, EMBASE, SportDiscus, Clinical Evidence, and Evidence-Based Practice to locate research-based scientific evidence related to the use of complementary and alternative medicine in cardiac rehabilitation. Search keywords included heart, cardiac, cardiovascular, coronary, myocardial and rehabilitation, combined with particular therapies. Herbal/oral supplements were not included in this evaluation. RESULTS: Some complementary and alternative medicine therapies may be useful to patients by themselves or coupled with traditional cardiac rehabilitation. Tai chi, as a complement to existing exercise interventions, can be utilized for low and intermediate risk patients. transcendental meditation may be used as a stress reduction technique. There was insufficient evidence found for the use of acupuncture or chelation therapy in cardiac rehabilitation or secondary prevention. CONCLUSIONS: Some complementary and alternative medicine therapies hold promise for patients in cardiac rehabilitation. Further research is essential, however, in all areas of complementary and alternative medicine to confirm its usefulness as an adjunct to cardiac rehabilitation.

Adler, P. A. and B. L. Roberts (2006). "The use of Tai Chi to improve health in older adults." Orthop Nurs 25(2): 122-6.

Tai Chi is a slow and gentle exercise that is suitable for older adults with chronic illness. This exercise offers the benefits of flexibility, muscle strengthening, and endurance training. Tai Chi has the capability of improving the health of elders without exacerbating existing impairments. Therefore, older adults may be more inclined to participate in and maintain an exercise program. The purpose of this article is to (1) compare Tai Chi to muscle-strengthening and aerobic exercise, (2) describe possible mechanisms for the effects of Tai Chi on factors that contribute to disability, and (3) identify nursing interventions to promote the use of Tai Chi.