

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.

Audette, J. F., Y. S. Jin, et al. (2006). "Tai Chi versus brisk walking in elderly women." Age Ageing **35**(4): 388-93.

**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 VO<sub>2</sub>max, 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 VO<sub>2</sub>max 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.

Brismee, J. M., R. L. Paige, et al. (2007). "Group and home-based tai chi in elderly subjects with knee osteoarthritis: a randomized controlled trial." Clin Rehabil **21**(2): 99-111.

OBJECTIVE: To evaluate the effects of tai chi consisting of group and home-based sessions in elderly subjects with knee osteoarthritis. DESIGN: A randomized, controlled, single-blinded 12-week trial with stratification by age and sex, and six weeks of follow-up. SETTING: General community. PARTICIPANTS: Forty-one adults (70 +/- 9.2 years) with knee osteoarthritis. INTERVENTIONS: The tai chi programme featured six weeks of group tai chi sessions, 40 min/session, three times a week, followed by another six weeks (weeks 7 -12) of home-based tai chi training. Subjects were requested to discontinue tai chi training during a six-week follow-up detraining period (weeks 13-18). Subjects in the attention control group attended six weeks of health lectures following the same schedule as the group-based tai chi intervention (weeks 0 -6), followed by 12 weeks of no activity (weeks 7-18). MAIN OUTCOME MEASURES: Knee pain measured by visual analogue scale, knee range of motion and physical function measured by Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) were recorded at baseline and every three weeks throughout the 18-week study period. Data were analysed using a mixed model ANOVA. RESULTS: The six weeks of group tai chi followed by another six weeks of home tai chi training showed significant improvements in mean overall knee pain ( $P = 0.0078$ ), maximum knee pain ( $P = 0.0035$ ) and the WOMAC subscales of physical function ( $P = 0.0075$ ) and stiffness ( $P = 0.0206$ ) compared to the baseline. No significant change of any outcome measure was noted in the attention control group throughout the study. The tai chi group reported lower overall pain and better WOMAC physical function than the attention control group at weeks 9 and 12. All improvements disappeared after detraining.

Chen, K. M., W. T. Chen, et al. (2006). "Development of the simplified Tai Chi exercise program (STEP) for frail older adults." Complement Ther Med **14**(3): 200-6.

OBJECTIVE: To develop a simplified Tai Chi exercise program for frail older adults. DESIGN: For phase I, using a focus group, 40 frail Taiwanese older adults were interviewed to explore their viewpoints on Tai Chi and have been reported elsewhere. This paper emphasized on the phase II of the study in which

the older adults' perspectives were validated by 10 experts using an evaluation survey. SETTING: Long-term care facilities. RESULTS: The newly developed simplified Tai Chi exercise program (STEP) included three stages-(1) warm-up: comprised nine exercises specifically designed to loosen up the body from head to toe; (2) Tai Chi movements: encompassed 12 easy-to-learn and easy-to-perform movements; (3) cool-down: included three activities to cease the chi and rest the body. CONCLUSIONS: The STEP should be further evaluated for its effectiveness in enhancing the relative well being and quality of life of frail older adults and its applicability as a floor activity in long-term care facilities.

Faber, M. J., R. J. Bosscher, et al. (2006). "Effects of exercise programs on falls and mobility in frail and pre-frail older adults: A multicenter randomized controlled trial." Arch Phys Med Rehabil **87**(7): 885-96.

OBJECTIVES: To determine the effects of moderate intensity group-exercise programs on falls, functional performance, and disability in older adults; and to investigate the influence of frailty on these effects. DESIGN: A 20-week, multicenter randomized controlled trial, with 52-week follow-up. SETTING: Fifteen homes for the elderly. PARTICIPANTS: Two hundred seventy-eight men and women (mean age +/- standard deviation, 85+/-6y). INTERVENTIONS: Two exercise programs were randomly distributed across 15 homes. The first program, functional walking (FW), consisted of exercises related to daily mobility activities. In the second program, in balance (IB), exercises were inspired by the principles of Tai Chi. Within each home participants were randomly assigned to an intervention or a control group. Participants in the control groups were asked not to change their usual pattern of activities. The intervention groups followed a 20-week exercise program with 1 meeting a week during the first 4 weeks and 2 meetings a week during the remaining weeks. MAIN OUTCOME MEASURES: Falls, Performance Oriented Mobility Assessment (POMA), physical performance score, and the Groningen Activity Restriction Scale (GARS) (measuring self-reported disability). RESULTS: Fall incidence rate was higher in the FW group (3.3 falls/y) compared with the IB (2.4 falls/y) and control (2.5 falls/y) groups, but this difference was not statistically significant. The risk of becoming a faller in the exercise groups increased significantly in the subgroup of participants who were classified as being frail (hazard ratio [HR] = 2.95; 95% confidence interval [CI], 1.64-5.32). For participants who were classified as being pre-frail, the risk of becoming a faller decreased; this effect became significant after 11 weeks of training (HR = .39; 95% CI, .18-.88). Participants in both exercise groups showed a small, but significant improvement in their POMA and physical performance scores. In the FW group, this held true for the GARS score as well. Post hoc analyses revealed that only the pre-frail participants improved their POMA and physical performance scores. CONCLUSIONS: Fall-preventive moderate intensity group-exercise programs have positive effects on falling and physical performance in pre-frail, but not in frail elderly.

Fransen, M., L. Nairn, et al. (2007). "Physical activity for osteoarthritis management: a randomized controlled clinical trial evaluating hydrotherapy or Tai Chi classes." Arthritis Rheum **57**(3): 407-14.

**OBJECTIVE:** To determine whether Tai Chi or hydrotherapy classes for individuals with chronic symptomatic hip or knee osteoarthritis (OA) result in measurable clinical benefits. **METHODS:** A randomized controlled trial was conducted among 152 older persons with chronic symptomatic hip or knee OA. Participants were randomly allocated for 12 weeks to hydrotherapy classes (n = 55), Tai Chi classes (n = 56), or a waiting list control group (n = 41). Outcomes were assessed 12 and 24 weeks after randomization and included pain and physical function (Western Ontario and McMaster Universities Osteoarthritis Index), general health status (Medical Outcomes Study Short Form 12 Health Survey [SF-12], version 2), psychological well-being, and physical performance (Up and Go test, 50-foot walk time, timed stair climb). **RESULTS:** At 12 weeks, compared with controls, participants allocated to hydrotherapy classes demonstrated mean improvements (95% confidence interval) of 6.5 (0.4, 12.7) and 10.5 (3.6, 14.5) for pain and physical function scores (range 0-100), respectively, whereas participants allocated to Tai Chi classes demonstrated improvements of 5.2 (-0.8, 11.1) and 9.7 (2.8, 16.7), respectively. Both class allocations achieved significant improvements in the SF-12 physical component summary score, but only allocation to hydrotherapy achieved significant improvements in the physical performance measures. All significant improvements were sustained at 24 weeks. In this almost exclusively white sample, class attendance was higher for hydrotherapy, with 81% attending at least half of the available 24 classes, compared with 61% for Tai Chi. **CONCLUSION:** Access to either hydrotherapy or Tai Chi classes can provide large and sustained improvements in physical function for many older, sedentary individuals with chronic hip or knee OA.

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 ( $p < \text{or} = 0.004$ ) and occurrence of co-contraction of antagonist muscles ( $p < \text{or} = 0.003$ ) 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.

Greenspan, A. I., S. L. Wolf, et al. (2007). "Tai chi and perceived health status in older adults who are transitionally frail: a randomized controlled trial." Phys Ther **87**(5): 525-35.

**BACKGROUND AND PURPOSE:** Tai chi, a Chinese exercise derived from martial arts, while gaining popularity as an intervention for reducing falls in older adults, also may improve health status. The purpose of this study was to determine whether intense tai chi (TC) exercise could improve perceived health status and self-rated health (SRH) more than wellness education (WE) for older adults who are transitionally frail. **SUBJECTS:** Study subjects were 269 women who were  $\geq 70$  years of age and who were recruited from 20 congregate independent senior living facilities. **METHODS:** Participants took part in a 48-week, single-blind, randomized controlled trial. They were randomly assigned to receive either TC or WE interventions. Participants were interviewed before randomization and at 1 year regarding their perceived health status and SRH. Perceived health status was measured with the Sickness Impact Profile (SIP). **RESULTS:** Compared with WE participants, TC participants reported significant improvements in the physical dimension and ambulation categories and borderline significant improvements in the body care and movement category of the SIP. Self-rated health did not change for either group. **DISCUSSION AND CONCLUSION:** These findings suggest that older women who are transitionally frail and participate in intensive TC exercise demonstrate perceived health status benefits, most notably in ambulation.

Irwin, M. R., R. Olmstead, et al. (2007). "Augmenting immune responses to varicella zoster virus in older adults: a randomized, controlled trial of Tai Chi." J Am Geriatr Soc **55**(4): 511-7.

**OBJECTIVES:** To evaluate the effects of a behavioral intervention, Tai Chi, on resting and vaccine-stimulated levels of cell-mediated immunity (CMI) to varicella zoster virus (VZV) and on health functioning in older adults. **DESIGN:** A prospective, randomized, controlled trial with allocation to two arms (Tai Chi and health education) for 25 weeks. After 16 weeks of intervention, subjects were vaccinated with VARIVAX, the live attenuated Oka/Merck VZV vaccine licensed to prevent varicella. **SETTING:** Two urban U.S. communities between 2001 and 2005. **PARTICIPANTS:** A total of 112 healthy older adults aged 59 to 86. **MEASUREMENTS:** The primary endpoint was a quantitative measure of VZV-CMI. Secondary outcomes were scores on the Medical Outcomes Study 36-item Short-Form Health Survey (SF-36). **RESULTS:** The Tai Chi group showed higher levels of VZV-CMI than the health education group ( $P < .05$ ), with a significant rate

of increase ( $P < .001$ ) that was nearly twice that found in the health education group. Tai Chi alone induced an increase in VZV-CMI that was comparable in magnitude with that induced by varicella vaccine, and the two were additive; Tai Chi, together with vaccine, produced a substantially higher level of VZV-CMI than vaccine alone. The Tai Chi group also showed significant improvements in SF-36 scores for physical functioning, bodily pain, vitality, and mental health ( $P < .05$ ). CONCLUSION: Tai Chi augments resting levels of VZV-specific CMI and boosts VZV-CMI of the varicella vaccine.

Kluding, P. and P. Q. McGinnis (2006). "Multidimensional exercise for people with Parkinson's disease: a case report." Physiother Theory Pract **22**(3): 153-62.

The primary impairments associated with Parkinson's disease occur in combination with the secondary, preventable effects of immobility. A community-based fitness program may help increase activity and maintain function in people in the early or middle stages of the disease. This article describes a unique program designed to reduce fall risk and promote independent exercise for people with Parkinson's disease. Two 66-year-old males, both community ambulators and in early or middle stages of Parkinson's disease, participated in 3 months of various physical activities. Group balance classes were held twice weekly during the first month, participants joined a fitness center and self-directed their exercise program during the second month, and group Tai Chi classes were held twice weekly during the third month. At conclusion of the program, participants were given suggestions for continued physical fitness activities. After the 3-month program, improvements were noted for both individuals in functional reach, Timed Up and Go, and Berg Balance scores. Both participants continued to exercise regularly for at least 8 months following the program. Two individuals with Parkinson's disease demonstrated improvement in their balance test performance over a 3-month period. Perhaps most importantly, these participants independently continued exercising after completing this program.

Kuramoto, A. M. (2006). "Therapeutic benefits of Tai Chi exercise: research review." Wmj **105**(7): 42-6.

The majority of studies on Tai Chi conducted between 1996 and 2004 had focused on health and well being of Tai Chi exercise for senior adults. The results show that Tai Chi may lead to improved balance, reduced fear of falling, increased strength, increased functional mobility, greater flexibility, and increased psychological well-being, sleep enhancement for sleep disturbed elderly individuals, and increased cardio functioning. Wang, Collet, and Lau did a systematic review on Tai Chi research and found some limitations or biases existing in some of the studies, and it was difficult to draw firm conclusions about the benefits reported. Therefore, more well-designed studies are needed in the future. There need to be studies on the effects on younger and middle-aged people. More longitudinal studies are needed, since time is an important factor of physical and psychological interventions. Studies on the effects of Tai Chi on the immune system and bone loss reduction are still very exploratory and will be

especially useful for arthritis patients and others with immune disorders. Future studies should investigate outcomes associated with Tai Chi training as a function of different instructional techniques, different Tai Chi styles, different diagnostic groups, and different age groups. It is not yet clear which of the components in Tai Chi makes the exercise form especially effective for seniors. Tai Chi exercise is a relatively "low tech" approach to preventing disability and maintaining physical performance in older adults. The positive effects of Tai Chi may be due solely to its relaxing, meditative aspects. The current data suggest that Tai Chi can influence older individuals' functioning and well being and provide some appreciation for why this exercise form has been practiced by older Chinese for more than 3 centuries.

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.

Lee, M. S., M. H. Pittler, et al. (2007). "Is tai chi an effective adjunct in cancer care? A systematic review of controlled clinical trials." Support Care Cancer.

**BACKGROUND:** Tai chi is a form of complementary and alternative medicine with similarities to aerobic exercises, which has been recommended for relieving cancer-related symptoms. The aim of this systematic review is to summarize and critically evaluate the evidence available from controlled clinical trials of tai chi as a supportive therapy for cancer patients. **METHODS:** We have searched the literature using 19 databases from their respective inceptions through October 2006, without language restrictions. Methodological quality was assessed using Jadad score. **RESULTS:** The searches identified 27 potentially relevant studies. Three randomised clinical trials (RCTs) and one non-randomised controlled trial (CCT) met our inclusion criteria. All of these trials assessed patients with breast cancer. Two RCTs reported significant differences in psychological and physiological symptoms compared to psychosocial support control. Most trials suffered from methodological flaws such as small sample size, inadequate study design and poor reporting. **CONCLUSION:** The evidence is not convincing

enough to suggest that tai chi is an effective supportive treatment for cancer. Further research should attempt to answer the many open questions related to the usefulness of tai chi for supportive cancer care.

Lin, M. R., H. F. Hwang, et al. (2006). "Community-based tai chi and its effect on injurious falls, balance, gait, and fear of falling in older people." *Phys Ther* **86**(9): 1189-201.

**BACKGROUND AND PURPOSE:** It is important to determine the effect of adherence to a tai chi program on falls and related functional outcomes in older people. This study examined the effect of a community-based tai chi program on injurious falls, balance, gait, and fear of falling among people aged 65 years and older in Taiwan. **SUBJECTS AND METHODS:** In 6 rural villages in Taichung County, 1,200 subjects participated in the initial assessment. During a 1-year intervention period, all study villages were provided with education on fall prevention. Two villages had been provided tai chi exercise (n=472 participants or "tai chi villagers"), and 4 villages served as control villages (n=728 participants or "control villagers"). Injurious falls were ascertained by telephone interviews every 3 months over a 2-year study period; additionally, balance, gait, and fear of falling were assessed in 2 follow-up assessments. **RESULTS:** Eighty-eight subjects, 83 from the tai chi villages and 5 from the control villages, participated and practiced in the tai chi program (the group labeled "tai chi practitioners"). After the tai chi program, injurious falls among the control villagers significantly declined by 44% (adjusted rate ratio [RR]=0.56; 95% confidence interval [CI]=0.36-0.92). Compared with the results for the control villagers, the decline was 31% greater (RR=0.69; 95% CI=0.30-1.56) among the tai chi villagers and 50% greater (RR=0.5; 95% CI=0.11-2.17) among the tai chi practitioners; the results did not reach statistical significance. Furthermore, compared with the scores for the control villagers, the scores for the tai chi practitioners increased by 1.8 points (95% CI=0.2-3.4) on the Tinetti Balance Scale and increased by 0.9 point (95% CI=0.1-1.8) on the Tinetti Gait Scale. No significant changes in the fear of falling were detected among the tai chi practitioners, tai chi villagers, and control villagers. **DISCUSSION AND CONCLUSION:** Tai chi can prevent a decline in functional balance and gait among older people. However, the reduction in injurious falls attained with tai chi did not reach statistical significance; the statistical inefficiency may have resulted partly from the large decline in injurious falls in control villagers. Finally, the unexpected effect of educational intervention on reducing injurious falls in different settings needs to be further examined.

Lu, W. A. and C. D. Kuo (2006). "Comparison of the effects of Tai Chi Chuan and Wai Tan Kung exercises on autonomic nervous system modulation and on hemodynamics in elder adults." *Am J Chin Med* **34**(6): 959-68.

The health of the middle-aged and elderly people is a major concern given the rapid aging population and rising costs of medical care. Low-impact exercise on a regular basis is ideal for maintaining the well-being of an aging population. Tai Chi Chuan (TCC) is the most well-known and most widely practiced form of low-



impact martial arts therapy and has been shown to have positive health effects. A lesser-known form of martial arts therapy is Wai Tan Kung (WTK), which our previous study found to have positive health effects as well. The present study compares the effects of TCC and WTK on autonomic nervous system modulation and on hemodynamics in adults among non-exercising control (30), TCC practitioners (30) and WTK practitioners (30). Our study found that in a short-term, WTK and TCC exercises enhanced the vagal modulation, lowered the sympathetic modulation and lowered arterial blood pressures in the practitioners. It was also observed that the forced vital capacity of TCC practitioners was significantly higher than that of WTK practitioners before exercise. There were no significant differences in the percentage changes in HRV measures and hemodynamics between WTK and TCC practitioners 30 and 60 min after exercise, indicating that the effects of WTK and TCC were similar in magnitude. In conclusion, TCC and WTK are comparable to each other in terms of their effects on autonomic nervous system modulation and hemodynamics, thus suggesting that WTK can be just as beneficial as TCC as a form of low-impact exercise for elderly adults.

Mansky, P., T. Sannes, et al. (2006). "Tai chi chuan: mind-body practice or exercise intervention? Studying the benefit for cancer survivors." Integr Cancer Ther **5**(3): 192-201.

Tai chi chuan (TCC) has been used as a mind-body practice in Asian culture for centuries to improve wellness and reduce stress and has recently received attention by researchers as an exercise intervention. A review of the English literature on research in TCC published from 1989 to 2006 identified 20 prospective, randomized, controlled clinical trials in a number of populations, including elderly participants (7 studies), patients with cardiovascular complications (3 studies), patients with chronic disease (6 studies), and patients who might gain psychological benefit from TCC practice (2 studies). However, only the studies of TCC in the elderly and 2 studies of TCC for cardiovascular disease had adequate designs and size to allow conclusions about the efficacy of TCC. Most (11 studies) were small and provided limited information on the benefit of TCC in the settings tested. There is growing awareness that cancer survivors represent a population with multiple needs related to physical deconditioning, cardiovascular disease risk, and psychological stress. TCC as an intervention may provide benefit to cancer survivors in these multiple areas of need based on its characteristics of combining aspects of meditation and aerobic exercise. However, little research has been conducted to date to determine the benefit of TCC in this population. We propose a model to study the unique characteristics of TCC compared to physical exercise that may highlight characteristic features of this mind-body intervention in cancer survivors.

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

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.

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.

Motivala, S. J., J. Sollers, et al. (2006). "Tai Chi Chih acutely decreases sympathetic nervous system activity in older adults." J Gerontol A Biol Sci Med Sci **61**(11): 1177-80.

BACKGROUND: Aging is associated with increases of sympathetic nervous system activation implicated in the onset of hypertension and cardiovascular disease. The purpose of this study was to examine whether the practice of Tai Chi Chih (TCC), a movement-based relaxation practice, would acutely promote decreases of sympathetic activity in elderly persons. METHOD: The sample included two groups of older men and women (age  $>$  or  $=$  60 years): TCC practitioners ( $n = 19$ ) and TCC-naive participants ( $n = 13$ ). Participants were recruited after completing a 25-week randomized trial of TCC or health education. TCC practitioners performed TCC for 20 minutes, and TCC-naive

participants passively rested. Preejection period, blood pressure, and heart rate were measured before and after the task. A subsample (n = 8) returned for a second evaluation and performed videotape-guided stretching for 20 minutes to evaluate the effects of slow-moving physical activity on sympathetic activity. RESULTS: Results showed that TCC performance significantly decreased sympathetic activity as indexed by preejection period (p = .01). In contrast, there was no change in preejection period following passive rest or slow-moving physical activity. Neither blood pressure nor heart rate changed after TCC performance. DISCUSSION: This study is the first to our knowledge to assess the acute effects of TCC practice on sympathetic activity in older adults. TCC performance led to acute decreases in sympathetic activity, which could not be explained by physical activity alone. Further study is needed to determine whether the acute salutary effects of TCC on autonomic functioning are sustained with ongoing practice in older adults.

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.

Nnodim, J. O., D. Strasburg, et al. (2006). "Dynamic balance and stepping versus tai chi training to improve balance and stepping in at-risk older adults." J Am Geriatr Soc 54(12): 1825-31.

OBJECTIVES: To compare the effect of two 10-week balance training programs, Combined Balance and Step Training (CBST) versus tai chi (TC), on balance and stepping measures. DESIGN: Prospective intervention trial. SETTING: Local senior centers and congregate housing facilities. PARTICIPANTS: Aged 65 and older with at least mild impairment in the ability to perform unipedal stance and tandem walk. INTERVENTION: Participants were allocated to TC (n = 107, mean age 78) or CBST, an intervention focused on improving dynamic balance and stepping (n = 106, mean age 78). MEASUREMENTS: At baseline and 10 weeks, participants were tested in their static balance (Unipedal Stance and Tandem

Stance (TS)), stepping (Maximum Step Length, Rapid Step Test), and Timed Up and Go (TUG). RESULTS: Performance improved more with CBST than TC, ranging from 5% to 10% for the stepping tests (Maximum Step Length and Rapid Step Test) and 9% for TUG. The improvement in TUG represented an improvement of more than 1 second. Greater improvements were also seen in static balance ability (in TS) with CBST than TC. CONCLUSION: Of the two training programs, in which variants of each program have been proven to reduce falls, CBST results in modest improvements in balance, stepping, and functional mobility versus TC over a 10-week period. Future research should include a prospective comparison of fall rates in response to these two balance training programs.

Orr, R., T. Tsang, et al. (2006). "Mobility impairment in type 2 diabetes: association with muscle power and effect of Tai Chi intervention." Diabetes Care **29**(9): 2120-2.

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.

Siu, A. M., C. C. Chan, et al. (2007). "Evaluation of the chronic disease self-management program in a Chinese population." Patient Educ Couns **65**(1): 42-50.

OBJECTIVE: This study evaluated the 6-week Chronic Disease Self-Management Program (CDSMP) in Hong Kong. METHODS: A total of 148 subjects with chronic illness were recruited. Subjects were matched on duration of illness and gender, and then randomly allocated to experimental and comparison groups. The experimental group participated in the CDSMP, while the comparison group joined a Tai-Chi interest class in a mass-activity format. Subjects completed evaluation questionnaires before beginning their program and 1 week following the program. RESULTS: Analysis of covariance showed that the CDSMP participants demonstrated significantly higher self-efficacy in managing their illness, used more cognitive methods to manage pain and symptoms, and felt more energetic than the subjects in the comparison group. The CDSMP participants also demonstrated changes in their profile of coping strategies, having a tendency to adopt the cognitive methods of diverting attention, reinterpreting pain, ignoring sensations, and making positive self-statements. CONCLUSION: The short-term evaluation results showed that the CDSMP primarily increased the self-efficacy, exercise behavior, and application

of cognitive coping strategies of the participants. PRACTICE IMPLICATION: The effect of the CDSMP in a Chinese population is similar to that found in studies in Western cultures, and the CDSMP could be applied effectively in a Chinese population.

Taylor-Piliae, R. E. and E. S. Froelicher (2007). "Methods to optimize recruitment and retention to an exercise study in Chinese immigrants." Nurs Res **56**(2): 132-6.

BACKGROUND: To counter pervasive disparities in healthcare and guide public health prevention programs, culturally sensitive recruitment and retention strategies for Chinese immigrants participating in health-related research studies are needed. OBJECTIVES: The aim of this study was to develop and implement recruitment and retention strategies with Chinese immigrants in a Tai Chi exercise study. METHODS: After substantial project planning and incorporating community-based research principles, a multidimensional approach was used to ensure minimal loss to follow-up. Recruitment strategies included partnering with a community-based agency, distributing study information using a multimedia approach, communicating in the native language, and demonstrating cultural sensitivity. Retention strategies included establishing a tracking method during recruitment, providing personalized feedback, maintaining the same location for all aspects of the study, eliminating potential linguistic barriers, providing personal attention and encouragement, monitoring attendance, utilizing a charismatic Tai Chi instructor, respecting Chinese culture, providing appropriate incentives, and maintaining good communication. RESULTS: Sixty persons showed interest in the study, 52 persons were screened, and 39 persons were enrolled. Recruitment was completed within 3 weeks. An advertisement in the Chinese newspaper was the most fruitful recruitment source, yielding approximately 60% of the study participants. Retention in the study was also very high (97%, n = 38). DISCUSSION: The successful recruitment and retention of Chinese immigrants in this Tai Chi exercise study are due to a variety of factors on many levels, including the participants, study investigator, and community-based agency.

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 cardiovascular 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 ( $\eta^2 = 0.12$ ), and reduction in perceived stress ( $\eta^2 = 0.13$ ) were found. In addition, Tai Chi exercise statistically significantly increased self-efficacy to overcome barriers to Tai Chi ( $\eta^2 = 0.19$ ), confidence to perform Tai Chi ( $\eta^2 = 0.27$ ), and perceived social support ( $\eta^2 = 0.12$ ). **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.

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.

Wayne, P. M., D. P. Kiel, et al. (2007). "The effects of Tai Chi on bone mineral density in postmenopausal women: a systematic review." Arch Phys Med Rehabil **88**(5): 673-80. OBJECTIVE: To evaluate the evidence for Tai Chi as an intervention to reduce rate of bone loss in postmenopausal women. DATA SOURCES: Literature search using Medline, Science Citation Index, Cochrane databases, China Biological Medicine Database, and additional manual reference searches of retrieved articles and personal libraries. STUDY SELECTION: Randomized controlled trials (RCTs), prospective cohort studies, and cross-sectional studies that included Tai Chi as an intervention, and had at least 1 outcome related to measurement of bone mineral density (BMD). DATA EXTRACTION: Authors critically reviewed studies, evaluated methodologic quality, and synthesized study results in a summary table. DATA SYNTHESIS: Six controlled studies were identified by our search. There were 2 RCTs, 2 nonrandomized prospective parallel cohort studies, and 2 cross-sectional studies. The 2 RCTs and 1 of the prospective cohort studies suggested that Tai Chi-naive women who participated in Tai Chi training exhibited reduced rates of postmenopausal declines in BMD. Cross-sectional studies suggested that long-term Tai Chi practitioners had higher BMD than age-matched sedentary controls, and had slower rates of postmenopausal BMD decline. No adverse effects related to Tai Chi were reported in any trial. CONCLUSIONS: Conclusions on the impact of Tai Chi on BMD are limited by the quantity and quality of research to date. This limited evidence suggests Tai Chi may be an effective, safe, and practical intervention for maintaining BMD in postmenopausal women. In combination with research that indicates Tai Chi can positively impact other risk factors associated with low BMD (eg, reduced fall frequency, increased musculoskeletal strength), further methodologically sound research is warranted to better evaluate the impact of Tai Chi practice on BMD and fracture risk in postmenopausal women.



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,  $\geq 70$  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.

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.

Yeh, S. H., H. Chuang, et al. (2007). "Tai chi chuan exercise decreases A1C levels along with increase of regulatory T-cells and decrease of cytotoxic T-cell population in type 2 diabetic patients." Diabetes Care **30**(3): 716-8.

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**: 6.

**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/DESIGN:** 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.

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.

Zijlstra, G. A., J. C. van Haastregt, et al. (2007). "Interventions to reduce fear of falling in community-living older people: a systematic review." J Am Geriatr Soc **55**(4): 603-15.

The objective was to assess which interventions effectively reduce fear of falling in community-living older people. An extensive search for relevant literature comprised a database search of PubMed, EMBASE, PsycINFO, and the Cochrane Central Register of Controlled Trials; expert consultation; and manually searching reference lists from potentially relevant papers. Randomized, controlled trials that assessed fear of falling in community-living older people were included. Two independent reviewers extracted data from full papers on study characteristics, methodological quality, outcomes, and process characteristics of the intervention. The search identified 599 abstracts, and 19 papers met the inclusion criteria. Seven of those papers were identified using expert consultation. Fifty-five percent of all validity items and 39% of process characteristic items were fulfilled across the 19 trials. Twelve of the 19 papers were of higher methodological quality. In 11 of these trials, fear of falling was lower in the intervention group than in the control group. Interventions that showed effectiveness were fall-related multifactorial programs (n=5), tai chi interventions (n=3), exercise interventions (n=2), and a hip protector intervention (n=1). Three of these interventions explicitly aimed to reduce fear of falling. Several interventions, including interventions not explicitly aimed at fear of falling, resulted in a reduction of fear of falling in community-living older people. Limited but fairly consistent findings in trials of higher methodological quality showed that home-based exercise and fall-related multifactorial programs and community-based tai chi delivered in group format have been effective in reducing fear of falling in community-living older people.