

Transforming traditional Tai Ji Quan techniques into integrative movement therapies[©]

Fuzhong Li, Ph.D.
Oregon Research Institute

Tai Ji Quan

- *Tai Ji* reflects the ancient idea of Yin and Yang interaction; an intertwined duality that creates harmony and balance
- *Quan* implies “fist” that literally means “combative movements” or “exercise movement”

Tai Ji Quan

- *Tai Ji Quan* links Tai Ji Yin-Yang concepts to martial arts to describe the interplay between *stillness and motion*, *softness and hardness*, *emptiness and fullness*, *stability and instability*, and *defensive and offensive* in combat movements aimed at achieving the highest state of human harmony and equilibrium

Traditional Applications

Part of traditional Chinese Martial Arts – Self-defense



Long evolutionary process has resulted in a variety of schools or styles that share basic tenets but represent the diversity and enrichment of the traditional martial art

Chen, Yang, Wǔ, Wú, Sun, He



Traditional Applications (cont.)

Common methods of practice



Form Routine



Push-Hands

Equipment



Contemporary Applications

Competition



Fitness Enhancement

Cultural Exchange



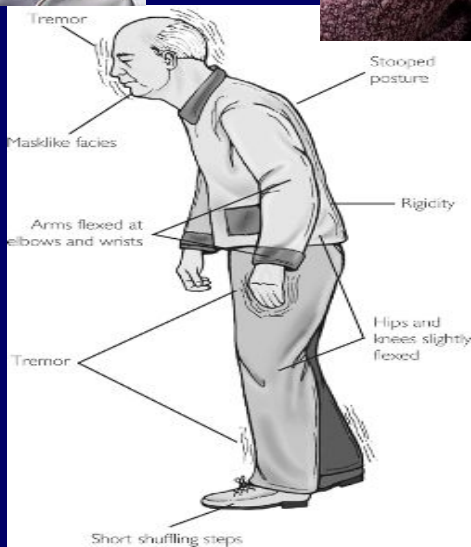
Tai Ji Quan: *Public Health Focus*

Emphasis on protecting, promoting, and maintaining overall health, reducing health risks, and preventing chronic disease

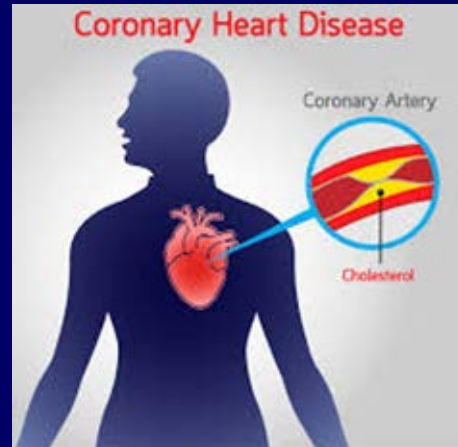


Tai Ji Quan: *Clinical Focus*

A paradigm shift in application – developing tailored interventions that target chronic disease conditions or health risk factors



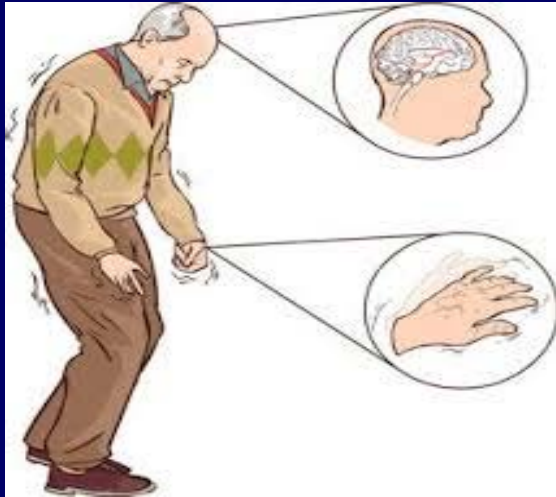
Tai Ji Quan and Coronary Heart Disease



- Safe and effective for patients with
 - myocardial infarction, coronary bypass surgery, and heart failure
- Improve
 - endurance, heart rate, left ventricular ejection fraction

Tai Ji Quan and Neurodegenerative Disease

Parkinson's Disease



- Improve
 - strength, balance, & mobility
- Ameliorate
 - symptoms
- Reduce
 - incidence of falls

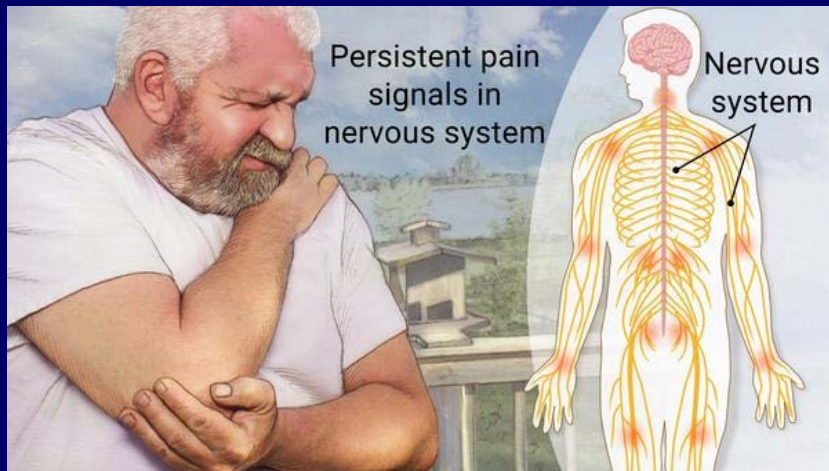
Cognitive Impairment



- Improve
 - functional connectivity
 - memory and cognition
 - executive function, multitasking, decision-making
- slowdown progression to dementia

Tai Ji Quan and Pain and Diabetes Control

Chronic Pain



- Relieve chronic pain from
 - osteoarthritis
 - Fibromyalgia
 - lower back pain
 - osteoporosis

Diabetes Control



- Improve
 - blood glucose metabolism
- Reduce
 - glycated hemoglobin levels

Tai Ji Quan and Physical Health



- lower-extremity strength
- balance and postural control
- Aerobic capacity
- flexibility
- physical performance (mobility)

Tai Ji Quan and Prevention of Falls



- Reduce
 - fear of falling
 - risk of falling
 - incidence of falls

Falls – a major public health problem

The leading cause of TBI, nonfatal trauma-related hospital admissions, and fetal injury

- In 2014, 29 million falls reported resulting in 7 million injuries with 2.8 million injuries being treated in ER
- every 11 seconds an older adult is treated in ER for a fall
- 800,000 hospitalizations
- adult dies from a fall



More than

27,000

older adults died as a result of falls —that's 74 older adults every day.

Medical Costs of Treating Falls

- Estimated cost of annual per-faller:
\$9,389 to \$30,000 for the US.
Medicare beneficiaries
- \$50 billion total cost of fall injuries
in 2015
 - expected to reach \$67.7 billion by
2020



Tai Ji Quan: Moving for Better Balance (TJQMBB)

- **An evidence-based fall prevention intervention**
 - adapted mainly from contemporary 24-form routine
 - specifically tailored toward balance training
- **A hybrid approach that integrates elements of Tai Ji Quan action, movement control characteristics, and sensory-motor and cognitive functions**
- **A patient-oriented approach targeting functional movements used daily routine activities**

Program Component

Core routine: Tai Ji Quan: Moving for Better Balance® - a set of adapted “Yang Style” Tai Ji Quan (TJQ) forms with built-in practice variations that focus on exercising functional and therapeutic movements

Subroutine: Tai Ji Quan - Mini Therapeutic Movements® - an augmented set of exercise activities that focuses on integration of TJQ and therapeutic training of balance and mobility

Core 8-Forms Routine

1. *Move a Ball*
2. *Part Wild Horse's Mane*
3. *Single Whip*
4. *Wave Hands like Clouds*
5. *Repulse Monkey*
6. *Brush Knees*
7. *Fair Lady Works at Shuttles*
8. *Grasp Peacock's Tail*
 - *Ward-off, Pull, Press, Push*

Practice Variations

1. Seated
2. Sit-to-stand
3. Standing
4. Forms with intermittent steps
5. Forward-backward loop
6. Spatial orientation
7. Single-sided forms
8. Stepping with forms
9. Group walking
10. Advanced routines

Mini Therapeutic Movements®

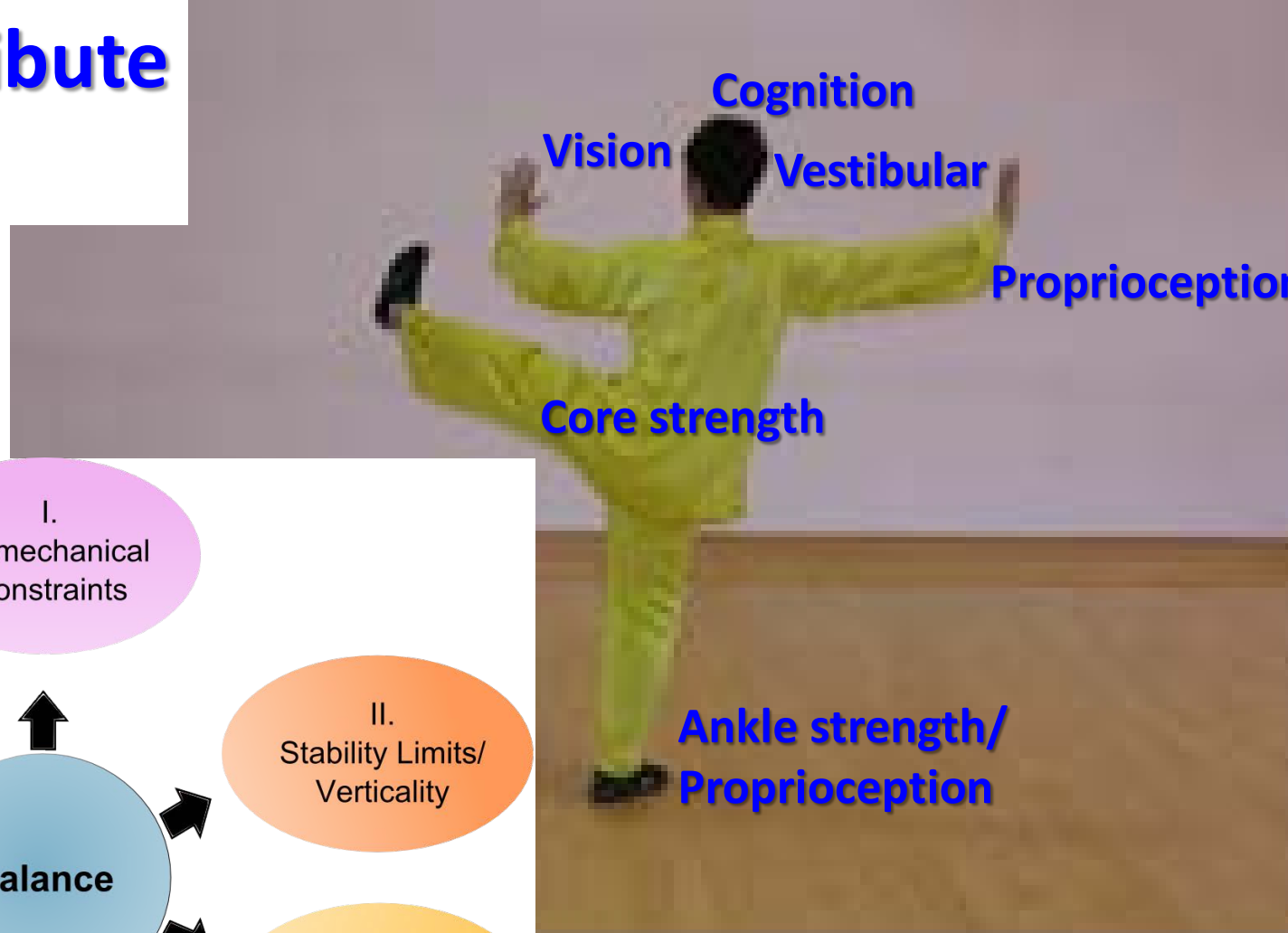
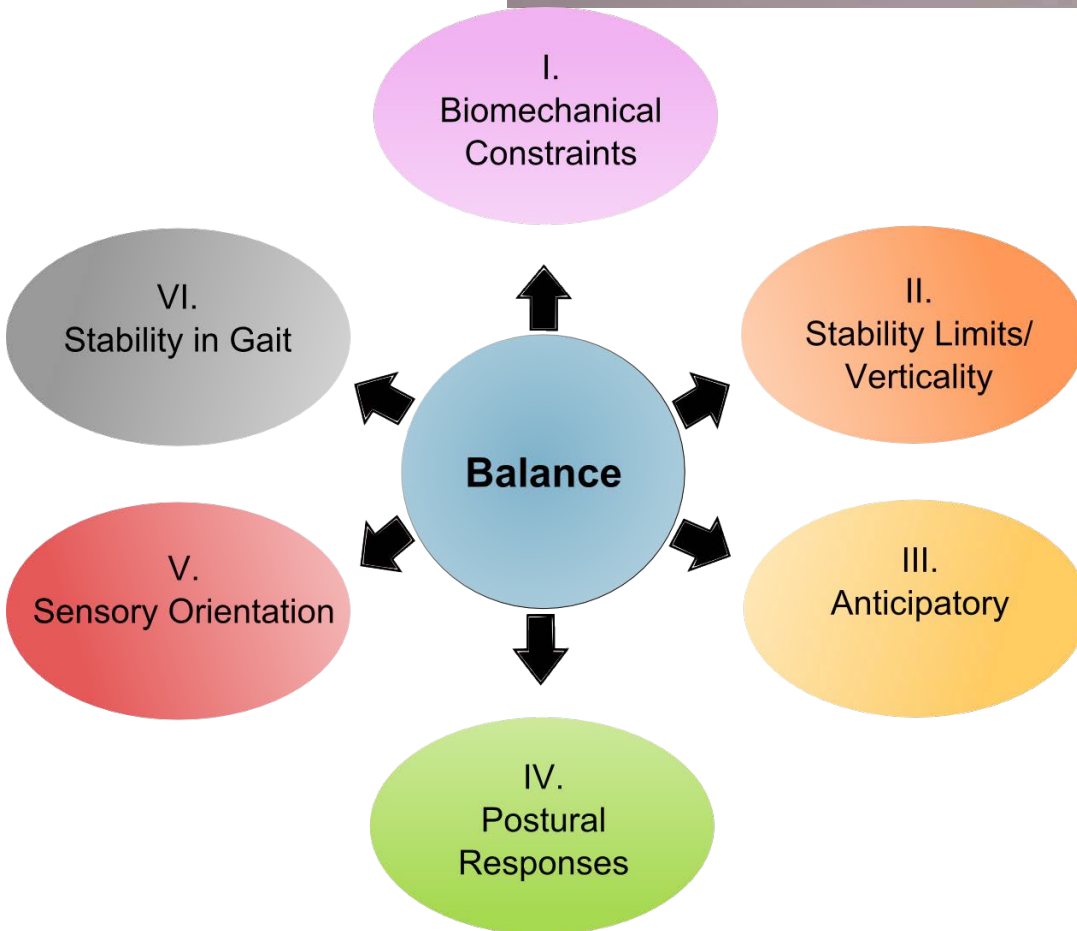
1. Body Sway around Ankle Joints
2. Eye-Head Movements
3. Sit-to-Stand, Stand-to-Sit
4. Step-and-Turn
5. Chair Up-and-Walk
6. Multidimensional Head Movements
7. Single-Leg Stance with *Brush Knees*
8. Stepping exercises
9. Pushing Hands
10. Sensory Integration Exercises
11. Stepping maneuver around a Chair



TJQMBB

Unique Characteristics that Make the TJQMBB a Tai Ji Quan- Based Balance Training Program

What Contribute to Balance?



Emphasis on moving body's center of mass (balance) around the edge of base of support

Centered



Away from center



Emphasis on training balance-recovery reactions
via self-induced ankle-sway based exercises

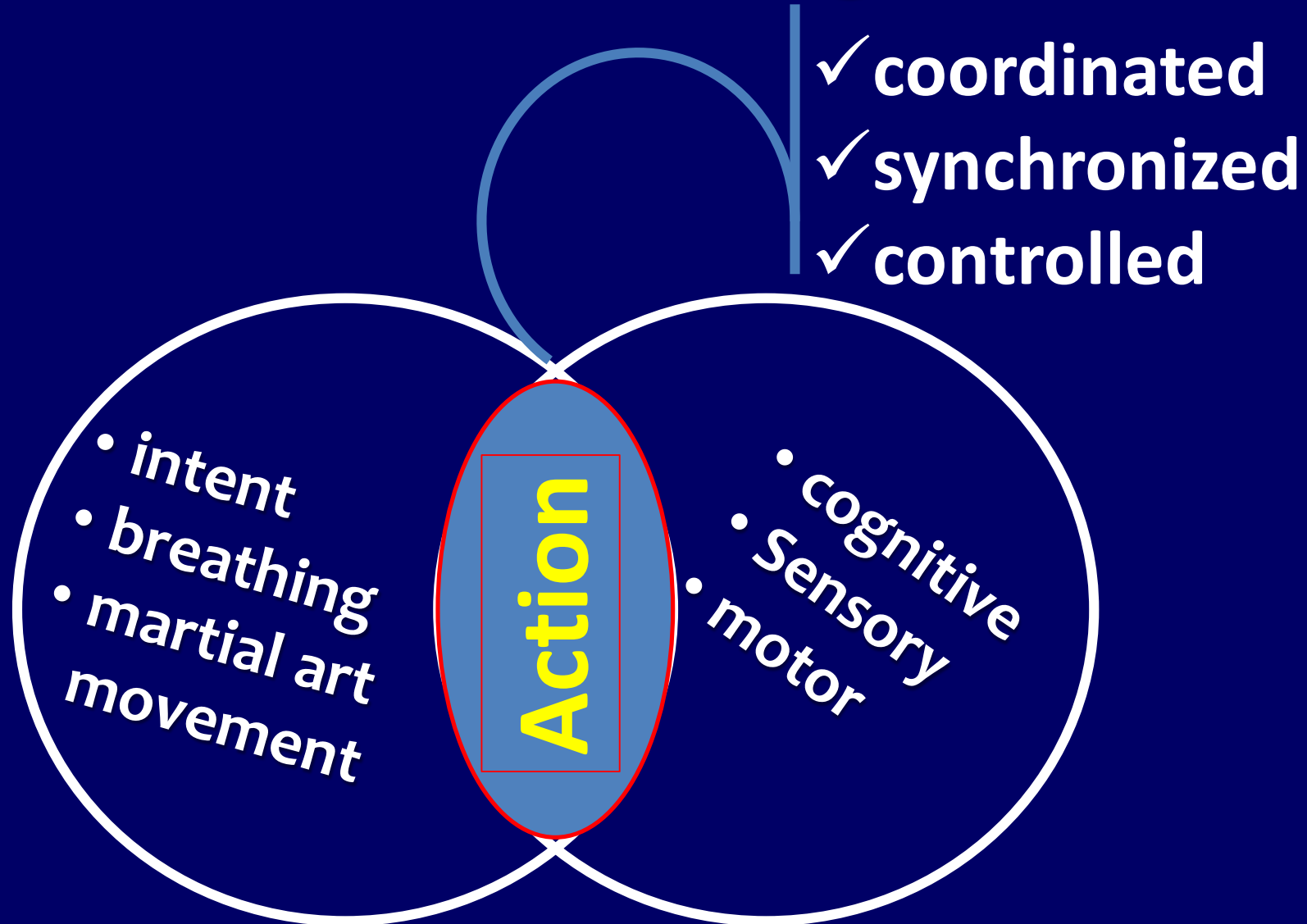


Before perturbation
(steady)



After perturbation
(unsteady)

Tai Ji Quan and Postural Control Integration



Functional

- Applicable to activities of daily living

Modifiable

- Practiced in seated or chair assisted



Scalable

- Practiced in home, community, or clinical settings

Research Evidence from clinical trials

Ultimate goal: converting Tai Ji Quan forms into daily functional activities

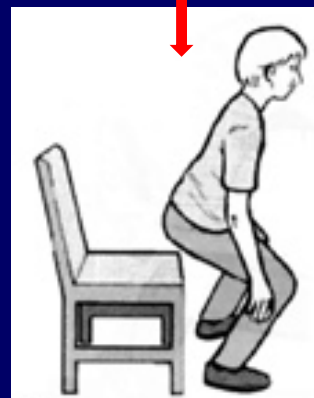
Stepping



Turning



Sit-to-stand
Stand-to-sit



Reaching

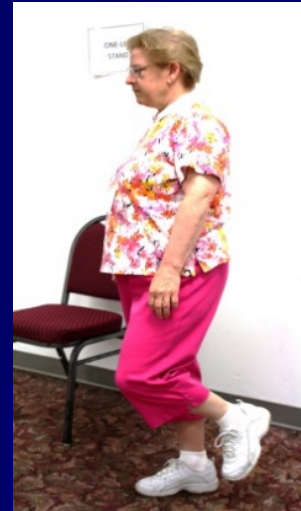


TJQMBB improves

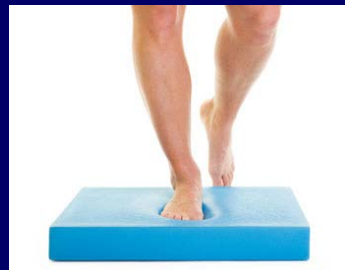
- leg strength



- balance



- ability to use various senses to control balance



TJQMBB improves

- mobility – better performance of activities of daily living



- cognitive ability



TJQMBB reduces

- fear of falling by **55%**



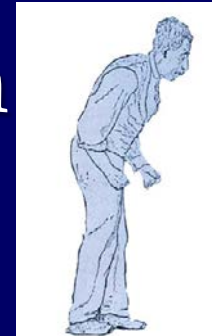
- incidence of falls by **58%**



- incidence of injurious falls by **75%**



- incidence of falls by **67%** in Parkinson's patients

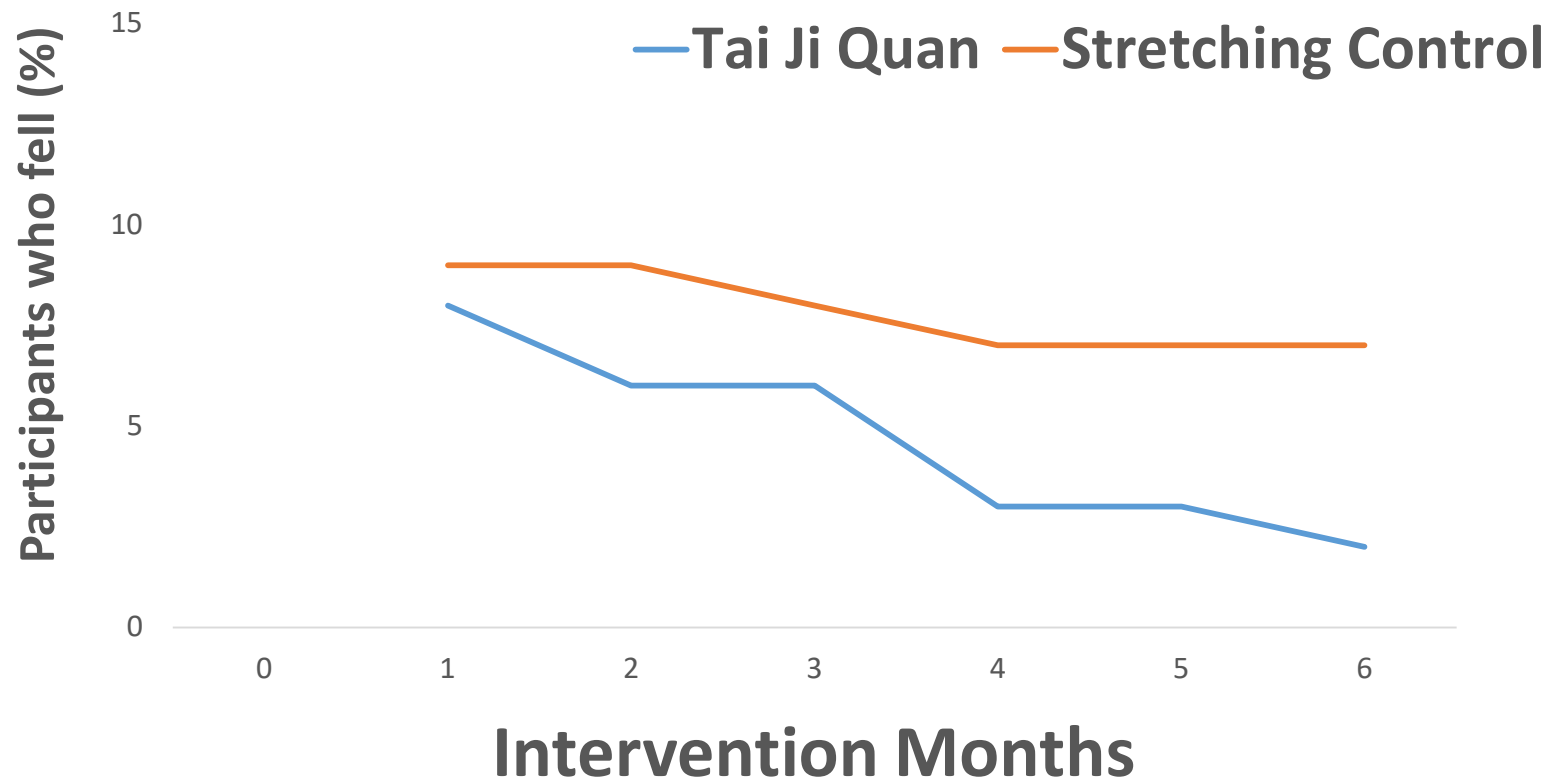


From Research to Practice

- **Is it safe and effective?**
- **Can it be implemented in community and clinical practice?**
- **Is it cost effective?**

Is TJQMBB effective in reducing falls?

- Findings from the 2004 efficacy study
 - 55% reduction in risk of falling



Can TJQMBB be adopted and effective in community and clinical settings?

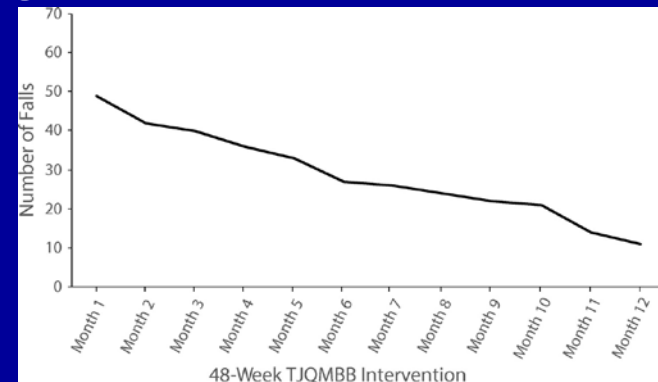


Findings from community dissemination studies

- Excellent adoption by senior centers (89-100%) and reach of the older adult population (90%)
- 49% reduction in the total No. of falls

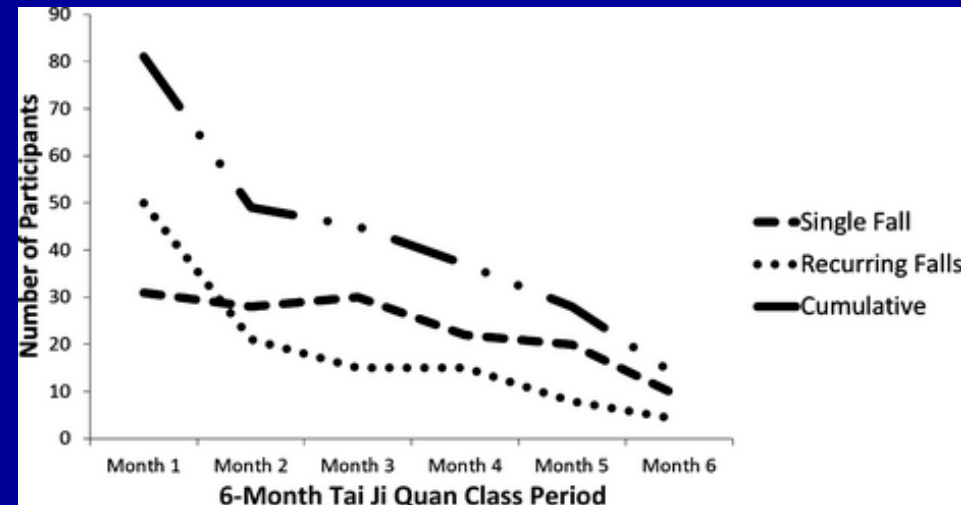
- Well maintained

- 68% among individual participants
- 55% among adopted senior centers



Findings from clinical settings

- 62% (157/252 providers) adoption rate by healthcare providers
- 67% (379/564 referrals) reach of target patient population
- 51% reduction in the total No. of falls



- Evidence of high maintenance
 - 61% among individual participants
 - 94% among adopted providers

Is TJQMBB cost effective?



- **Cost benefit**

- A net benefit of \$529 per participant for the TJQMBB program and a 509% return on investment for per dollar invested (see the reference [1] in the note)

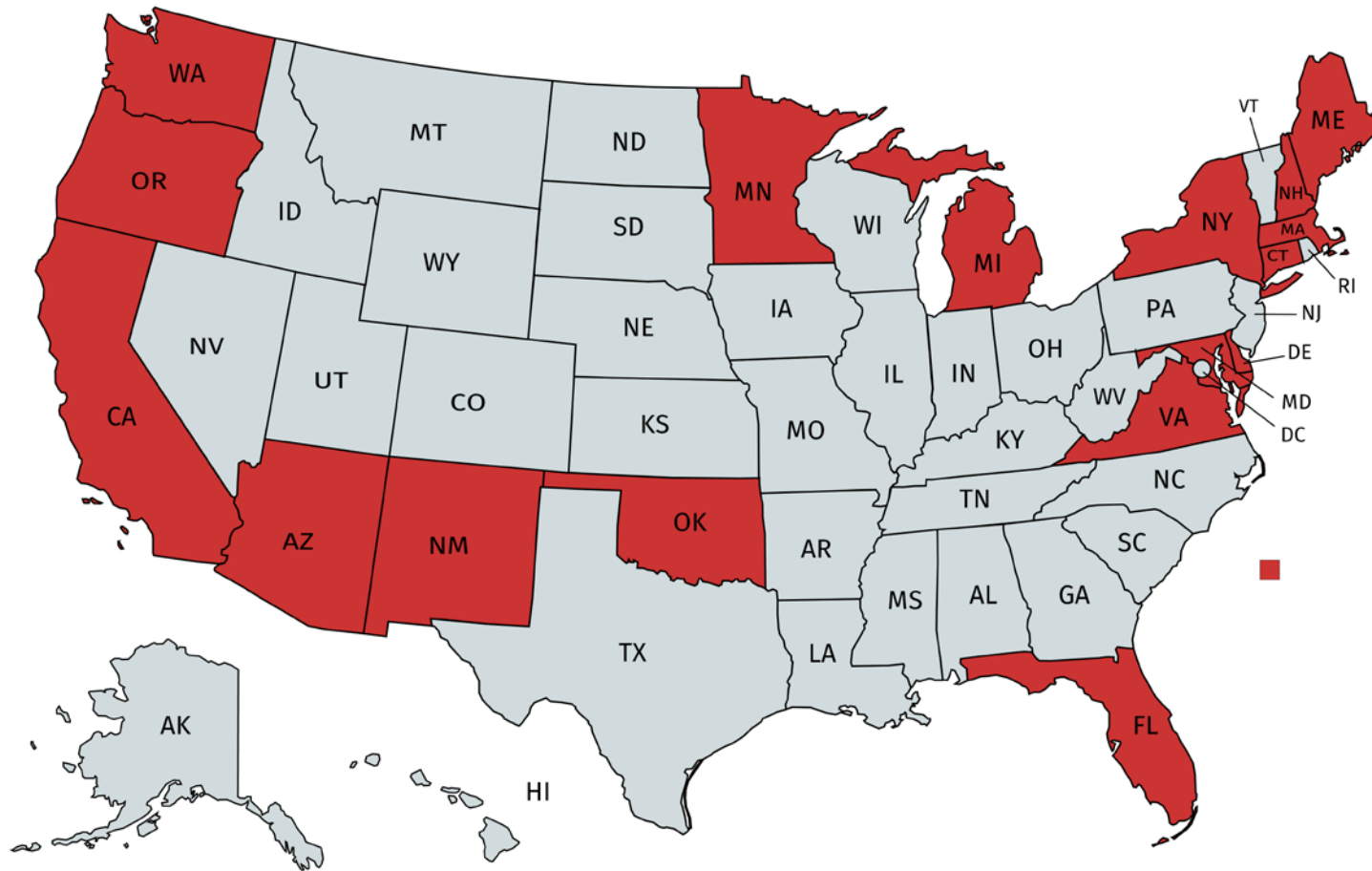
- **Cost effectiveness**

- TJQMBB was the most economically dominant strategy (i.e., having lower cost and being clinically more efficacious) compared with multimodal and stretching exercises with regard to cost per additional fall prevented and per additional QALY gained.
 - TJQMBB had a 100% probability of being cost-effective, relative to Stretching, at a threshold of \$500 per each additional fall prevented and \$10,000 per additional QALY gained (see the reference [2] in the note).

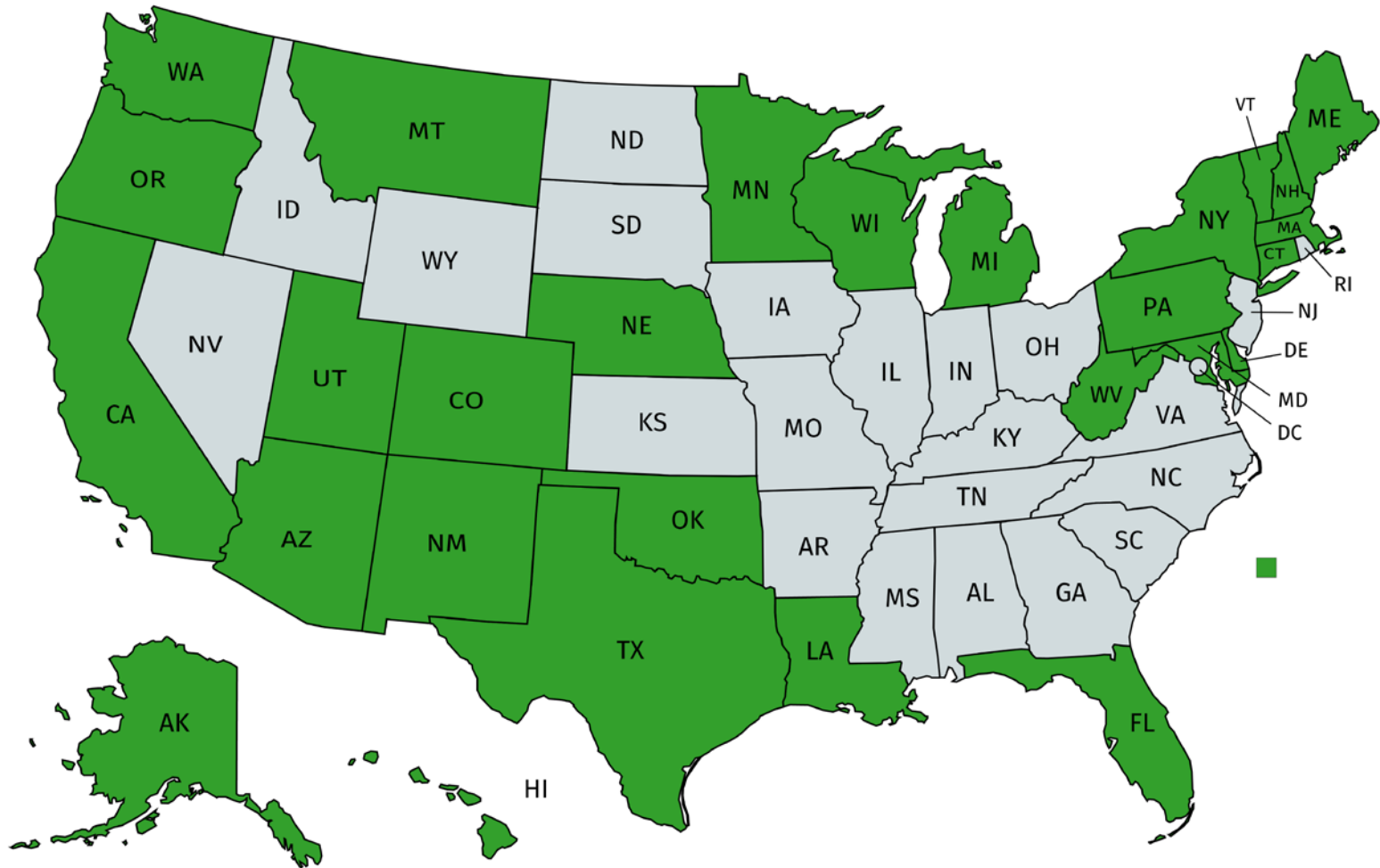
Dissemination in Broad Setting

Nationwide Implementation

- implemented in over 10 states



TJQMBB Instructors Trained



- TJQMBB is a low cost, clinically tailored, effective public health program for fall prevention in community-dwelling older adults and those at high risk of falling
- It can be broadly implemented in community and clinical settings for primary prevention
- It has the potential to provide the highest “value for money”



TJQMBB

Thank You