Adapted Therapeutic Balance Training for Fall Prevention in Older Adults: A Guide to *Tai Ji Quan: Moving for Better Balance™* for Health Care Professionals

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Version: 1.31  
August 2014
Part I: Introduction to *Tai Ji Quan: Moving for Better Balance™*

The increased risk for falling in older adults is associated with changes in a variety of sensory, motor, and cognitive variables that eventually compromise their ability to recover from a loss of balance or perform daily functional activities. *Tai Ji Quan: Moving for Better Balance™* (TJQMBB) is an effective, practical, and evidence-based exercise training program specifically designed for older adults and individuals with movement disorders. The program has a strong clinical focus and is supported by continually evolving and accumulating research evidence.

**Therapeutic Focus**

TJQMBB integrates postural control theories and rehabilitation approaches to convert traditional Tai Ji Quan exercises into therapeutic applications for clinical and community practice, with the goals of:

- maximizing sensory integration within the central nervous system
- increasing range of motion, strength in the ankle joints, and limits of stability boundaries during sitting, standing, and walking
- making effective use of balance strategies to prevent falls
- improving gaze stabilization
- challenging cognitive function through multi-tasking and mind-directed actions
- linking actions of Tai Ji Quan forms to functional activities essential for daily living

**Research Driven**

Published research of controlled and uncontrolled studies have shown that TJQMBB:

- improves strength and balance, limits of stability, sensory integration, cognitive ability, and functional activities of daily living
- reduces risk of multiple falls by 55% in older adults and 67% in people with Parkinson’s disease, and fear of falling by 55%
- is widely implementable and scalable in community and clinical settings
- is low cost and potentially cost-effective in terms of the cost of falls averted by the program

For more information about TJQMBB research and program content and materials, please visit tjqmbb.org.

Part II: Introduction to Adapted *Tai Ji Quan – Mini Therapeutic Movements®*

The set of therapeutic exercises introduced and recommended for health care professionals (see Part III, also the accompany DVD) constitute key components contained in the *Tai Ji Quan: Moving for Better Balance™* core and *Tai Ji Quan – Mini Therapeutic Movements®* sub-core routines. These exercises are specifically adapted for implementation in a clinical setting where a one-on-one (clinician-patient) relationship is assumed. Sequence training that focuses on specific Tai Ji Quan-based movement patterns begins with seated exercises, progressing to transitional movements from seated to upright stance and “in place” standing exercises, then to pre-gait, gait initiation, negotiation, and navigation activities. Exercises incorporate closed and open kinetic chain movements that are performed with variations in movement magnitude, speed, direction, and base-of-support, and rehabilitation-focused activities aimed at training effective weight transfer, leg strength, limits of stability, multi-joint reposition sense, postural control, range of motion, gait, and mobility. The ultimate goal is to transfer these movements into functional activities of daily living. All exercises are done with coordinated breathing and directed thinking that leads to self-initiated and controlled Tai Ji Quan actions.
Part III: Adapted *Tai Ji Quan – Mini Therapeutic Movements®* Exercises

1. Seated Exercises
   Position: In a seated upright position with the arms in the frontal plane as if cradling a large beach ball (right arm on top), engage in the following exercises:
   
   1.1. **Weight Shifting**: anterior/posterior, medial/lateral (moving the trunk from side to side along the frontal plane), and rotational weight shifting (switch arm position around the “ball” with rotation – right hand on top for rotation to the right, left hand on top with rotation to the left).
   
   1.2. **Weight Shifting in a Butterfly Pattern**: directional and rotational weight shift (lean) in a sequence of: (1) forward lean; (2) backward lean; (3) diagonally forward and rotational lean with *Part Wild Horse’s Mane* left; (4) diagonally forward and rotational lean with *Part Wild Horse’s Mane* right; (5) diagonally backward and rotational lean with *Repulse Monkey* left; and (6) diagonally backward and rotational lean with *Repulse Monkey* right. Describe the outline of butterfly wings with the arms fixed in the “holding ball” position for exercises 3-6 (switch arm position with rotation to right and left).
   
   1.3. **Stepping**: sideways and diagonally forward leg stepping. In moving sideways, begin stepping from one side (either right or left), focusing on hip flexion (knee lift), dorsiflexion of the ankle (toes up), and abduction of the thigh of the moving (stepping) limb. In moving diagonally forward, begin with a leading leg, focusing on torso rotation, and dorsiflexion and knee extension of the leading leg.

   **Training focus**: weight shifting, pelvic tilt (anterior/posterior), postural control, trunk stability and mobility
   **Instructional notes**: Begin with a small range of motion and slowly progress to increase the range of motion. Leaning exercises should also emphasize a mix of varying speeds (i.e., slow pace, moderate pace, fast pace).
   **Exercise duration**: 10 minutes

2. Sit-to-Stand, Stand-to-Sit Exercises
   Position: In a seated position, engage in the following two forms of exercise:
   
   2.1. **Three Arm Swing Method**: use the following three move sequence to rise from the chair: (1) lean forward to put the nose over knees and lean back; (2) without stopping lean further forward to push the nose beyond knees and rock the buttocks slightly off the chair and rock back to sitting; and (3) maintaining the rhythm of rocking forward completely lift the body off the chair to rise to an upright stance and then use an arm forward-push method to lower the body vertically down to the chair;
   
   2.2. **Part Wild Horse’s Mane**: perform this form to rise to an upright stance to the left. Then perform *Repulse Monkey* to the right to lower the body down to the chair. Repeat these ascending and descending actions to the other side.

   **Training focus**: leg strength, trunk stability and mobility
   **Instructional notes**: Each exercise should be practiced in stages with a focus on developing arm-swing momentum to help rise to a standing position.
   **Exercise duration**: 5 minutes on each
3. **Ankle Sway Exercises**
   Position: In a balanced standing position with the arms in the frontal plane as if cradling a large beach ball (right arm on top) engage in the following exercises:
   3.1. **Ankle Sway**: anterior/posterior, medial/lateral, and rotational (at the hip) ankle sway (refer to 1.1 for arm position and movement);
   3.2. **Ankle Sway in a Butterfly Pattern**: “butterfly wing” movement (as described in 1.2 under Seated Exercises);
   3.3. **Ankle Sway with Hand Push-Pull**: move the whole body along with a hand push-pull motion in anterior/posterior (alternate between leaning towards the toes and heels), medial/lateral (lean toward sides of metatarsals), and rotational (turn torso left and right) directions. Begin with a very slow-to-slow pace of shifting the center of gravity, progressing to varied (random) movement patterns with variations in speed, direction, and movement magnitude.

   Training focus: ankle strength, expansion of limits of stability, trunk stability and mobility

   Instructional notes: Begin with small range of motion and slowly progress to increase the range of motion. Leaning exercises should also emphasize a mix of varying speeds (i.e., slow pace, moderate pace, fast pace). As the patient becomes more confident and proficient with the exercise, begin to vary the patterns of movement (e.g., perform randomly).

   Exercise duration: 5 minutes on each

4. **Gait Exercises**
   Position: In a balanced standing position with the arms in the “holding the ball” position, engage in the following exercises (one side at a time):
   4.1. **Pre-Step and Step Initiation**: a sideward weight shift followed by a slightly accelerated outward (laterally) preload action, step forward, with the unloaded swing leg, into Part Wild Horse’s Mane.
   4.2. **Multi-directional stepping**:
      a. step with a straight step;
      b. step with a semicircular step;
      c. step with heel pivoting (of the extended leg);
      d. step in small (mini) steps and large steps;
      e. step with Part Wild Horse’s Mane (forward);
      f. step with Repulse Monkey (backward);
      g. step with Brush Knees (turning);
      h. step combining all of the above.

   Training focus: pre-gait, gait/step initiation, locomotion

   Instructional notes: Movements in 4.1 involves pre-gait and gait initiation, whereas movements in 4.2 are designed for gait training with an emphasis on engaging in (1) lateral and rotational weight shift, (2) high stepping, (3) steps with varying stride length and speeds, and (4) active head movement.

   Exercise duration: 5-10 minutes on each
5. **Reactive Balance Recovery Exercises**

5.1. **Pelvic Tilt**: move the center of gravity to the balls of the feet followed by an anterior pelvic tilt. Recover the instability from the forward “tipping point” to an upright position by a posterior pelvic tilt.

5.2. **Turn with a Backward Step**: a sideways weight shift followed by a slightly accelerated inward (medially) preload action, step backward, with the unloaded swing leg, into *Repulse Monkey*. Complete the exercise on both sides.

5.3. **Forward Limit with a Step**: slowly move center of gravity diagonally to the right (1 o’clock position) to reach the forward limit. Once reached, step slightly to the left (about 12 o’clock position) to finish with *Part Wild Horse’s Mane* (keep the rear heel down). Complete the exercise on both sides.

5.4. **Backward Limit with a Step**: slowly move center of gravity diagonally to the right to reach the forward limit. Now, bring center of gravity backward toward the heel of the support leg until it reaches the backward limit. Once reached, take a step backward to finish with *Repulse Monkey* to the left. Complete the exercise on both sides.

5.5. **Triggered Stepping**: use exercise 3.3 to add a recovery step, that is, push the patient from a static forward or backward leaning (limit) position so that the patient has to make a recovery with a single step.

**Training focus**: reactive recovery to stability

**Instructional notes**: A slow start that focuses on teaching the movement sequence for each exercise listed is strongly recommended to prepare the patient mentally to take on more challenging movements as the exercise session progresses. For example, begin with body lean without stepping, lean with a pelvic tilt/torso rotation without stepping, progress to lean with slow controlled stepping, and proceed to forced stepping.

**Exercise duration**: 5 minutes on each

6. **Stepping around a Chair**

**Position**: Standing at the back of a chair facing forward, perform the following exercises (on both sides) beginning to the left side of the chair:

6.1. **Stepping with Two Forms**: stepping left into *Part Wild Horse’s Mane*. Then bring the right foot around the chair into a narrow semi-tandem-like stance, followed by performing *Part Wild Horse’s Mane* to the right (without stepping). Now, perform *Repulse Monkey* with the right foot stepping toward the back of the chair.

6.2. **Stepping with Three Forms**: adding *Brush Knees* after *Part Wild Horse’s Mane* to the above exercise.

**Training focus**: step or navigate around obstacles

**Instructional notes**: In performing each step, encourage the patient to watch each step taken (visually guided). As the performance becomes more proficient, encourage the patient to mentally focus on the stepping movement without looking (using proprioception to guide the movement).

**Exercise duration**: 10 minutes
Part IV: Exercise Guidelines

1. As part of developing an initial plan of care, it is recommended that, before any therapy treatment begins, the patient’s physical ability to perform the various exercises listed be determined through an initial evaluation.

2. In the initial stage of therapy, e.g., the first 2-3 weeks, a sequential, incremental approach in teaching that follows the order of the exercises as listed is recommended.

3. A minimum of 45 minutes of exercise training is highly recommended for each session, even though it is not feasible to cover all exercises within a single visit.

4. To foster continuity of care, home exercises are encouraged. Exercises 2, 3, and 4 are recommended as solo home exercises for patients who are mobile and don’t use assistive devices. For patients with limited balance and mobility capabilities, Exercise 1 can be used as a starting point, supplemented by a portion of the exercises in Exercise 3 (i.e., 3.1, 3.3).
Research References

All articles are available online at: tjqmbb.org\publications.html.