Fall Prevention through: Environmental Adaptation & Balance Remediation

Cavenaugh Kelly
MS, OTR/L, Occupational Therapist, Assistant Professor: Husson University
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Personal Choice

Environmental Risks

Balance Deficits
Tai Chi Exercises – Part One:  
*Sunset Breath*
Home Assessment Overview

You are a guest in their home
- Have to justify the worth of OT
- In the hospital, the OT is more in control

Older adults generally do better with a prioritized, small list of recommendations

Motivational interviewing generally more effective
- Let them feel like they are in control
Determine the client’s readiness for change level:

- **Pre-contemplation:** Not considering possibility of change, does not feel there is a problem
- **Contemplation:** Thinking about change in the near future
- **Preparation:** Making a plan to change, setting gradual goals
- **Action:** Implementation of specific action steps, behavioral changes
- **Maintenance:** Continuation of desirable actions or repetition of periodic recommended steps
Determine the client’s level of compliance:
• The client is likely to follow through with recommendations and use compensatory strategies to complete daily tasks
• The client is not likely to follow through with recommendations (due to poor insight, or readiness for change level)
Determine the client’s personal assistance preferences:
Client is amenable to personal assistance to complete the task (formal or informal assistance)
Prefers to be independent or no personal assistance present

Determine the client’s level of social support
Family, friends, neighbors available, able, and willing to provide assistance
Active in a community organization (social clubs, religious organization)
Lives with able bodied others
Lives with adults with a disability
Determine the client’s ability to maintain home modifications

Has adequate personal resources to maintain solutions (e.g., financial, functional, cognitive)

Does not have personal resources to maintain the solution in good working order (e.g., financial, functional, cognitive)
Person Centered Changes

What are the financial resources of the client?
• Limited income
• Has financial resources (or family does) to afford modifications
• Is a veteran or has a disease-specific organization (e.g., Multiple Sclerosis Society, American Parkinson Disease Association) or age- and residency-specific organizations (Eastern Area Agencies on Aging)
Person Centered Changes

What is the client’s clinical course of disease? Determines type/degree of home adaptations to make

• Chronic—Static disease process (ex. SCI)
• Chronic—Progressive disease process (ex. Parkinson’s Disease)

Is it a temporary health condition, or an aggressively progressing, terminal disease?
Person Centered Changes

What is the client’s concern for aesthetics?
• Do they place a high value placed on appearance of home (rejection of “medical-looking” devices)
• Do they emphasize function valued over appearance

What is the structural condition of the client’s home?
• Is the home in disrepair
• Does the home have unsafe flooring conditions
• What is the overall integrity of the interior walls, ceilings, plumbing, and drainage
Person Centered Changes

What is the client’s housing type?
Is it a rental unit,
Privately owned, single-family home,
Privately owned, multifamily home

What is the available space and layout of the client’s home?
Is there a limited amount of space or floor plan,
What is the availability and characteristics of land adjacent to the client’s home
Person Centered Changes

What is the Client’s need for portability?
Does the client want/need equipment to be used in different places (both in their own house and others’ houses)

What is the client’s literacy level?
Are they fully literate,
Are they unable to read a home safety list of recommendations
Tai Chi Exercises – Part One: *Embrace The Moon*
Tai Chi Exercises – Part One: Cannon
Environmental Issues: vehicle access

Need to consider all of the following when assessing home safety:

Client’s ability to get in and out of the vehicle:
Should sit backside first, then bring in legs,
If they have problems turning in car seat, consider swivel seat, or garbage bag under seat,
If they have problems getting in and out consider:
- Transportable wooden platform (on a rope)
- Partially rolling down a window
- Hooking a hangar in the opened window
- Adapted seating (swivels, moves out, lowers/raises)
- Adapted grabbing devices, loops
Also consider mobility access to and from the vehicle,
Adapted vehicles for driving
Environmental Issues: Entering the home

When entering the house, consider:
- Railings on stairs,
- Sturdiness of stairs, railings,
- Width of doorway,
- Outside door/screen door transition,
- Grab bar support,
- Door knob,
- Mailbox access,
- Contrast on stair edges,
- Height of lip, threshold,
- Lighting (LED bulbs ideal, photo/motion sensitive lights)
Environmental Issues: Wheelchair Ramps

Slope of ramp:
Height from ground to door: Slope of ideally 1:16, minimum 1:12
- For every inch up, 12 inches out
Consider switchback design if limited room

Ramp width: 36

Rails:
- 28 inches height children
- 34-48 for adults

Landings:
- Need on the top, bottom, turns, every 30 feet
- 5 feet by 5 feet

Resistive surface for ice, rain
Environmental Issues: Hallways

Hallways:
Reduce clutter, improve access, width of space in hallway,
Consider railings along hallway,
Remove throw rugs on slippery tile flooring,
Add contrast on floor (pros/cons to moving objects for cognitive/visually impaired)
Consider bumps, ridges, for room to room transitions,
Consider lighting
Consider chairs for rest breaks down hall,
Consider marking lips, thresholds, sharp edges clearly with contrast tape
Living room:

Access/Clutter,
Ability to get up and down from chairs/couch (sinking cushions, lack of arm rests):
- Consider electric lift chairs
- Wooden platforms/pallet
- Plywood under sagging cushions,
Eating meals in the chair (consider lap tray, TV dinner tray),
TV remote access, vision,
Fall proof sharp edges, glass (consider padding, child proofing)
Telephone access (consider Lifeline around neck, cellphone in pocket)
Environmental Issues: bedroom

**Bedroom:**
Assess client’s ability to get on/off bed and maneuver in bed:
- Consider removing box spring, adding bed rails, side rails, trapeze, wedges, rope to pull themselves up)
Assess potential skin breakdown and mattress
- Consider air mattress, egg crates, padding feet
Leg lifter
Environmental Issues: bedroom

Bedroom:
Night lights,
Assess their ability access clothes in closet and bureau,
Phone access,
Stability when getting dressed by the bed,
Access to laundry basket,
Toileting at night: urinal, commode beside bed, etc.
Environmental Issues: Inside Stairs/Pets

**Inside Stairs:**
Railings (consider height, grip, need for dual railings),
Sturdiness of rails,
Consider electric chair seat,
Consider walker/wheelchair at the top/bottom of stairs,
Contrast on stair edges

**Animals:**
Under feet, fall risk,
Kitty litter box access,
Feeding/water dish access,
Ability to put animals out/in and hook leash
Environmental Issues: Bathroom

Bathroom:

Access into bathroom,

Floor mats,

Toilet height:
- Consider bars, versa frame, commode over toilet, raised toilet seat, supporting structure

Stability when managing clothes,

Stability when performing hygiene

Commode over toilet

Versaframe
Environmental Issues: Bathroom

Bathroom:
Shower access need for grab bars when:
- Stepping in/out
- Washing hair, backside

Need for LH hose with hose control,

Shower seats versus transfer bench,

Shower floor: skid matt, contrast (all white background)

Shower faucets: access, hot water (sensation)

Grab bars:
- Drilled into studs versus suction
- Angle, grip
- Place them where the person reaches
Environmental Issues: Kitchen

**Kitchen:**
Access into cabinets to food/dishes, cups
– Consider brining everything down to shoulder height, prioritizing

Access in drawers to silverware
- Consider visual perceptual issues and clutter, sensory issues and knives

Access into refrigerator to food
- Consider moving regularly used items into front, easier reach
Environmental Issues: Kitchen

**Kitchen:**

**Stove:**
- Reminders to turn it off
- Tactile, large print, contrast to use controls
- Access to back burners
- Access to maneuvering items in and out of stove (consider reaching device)

Ability to use pots and pans
- Consider handle shape, grips

**Faucets:** access, strength, grip, sensory awareness of temperature

**Wash cloth:** access, strength, stability when standing to washing dishes, wiping counters, stove

**Dish detergent:** access, stability when performing
Environmental Issues: Laundry

**Thermostat:**
Visual (contrasts/tactile)

**Laundry:**
Access to laundry room,
Weight of detergent/bleach
- Consider smaller containers
Access/stability into washing machine/dryer
  - Consider reacher, different machines
Transporting dirty/wet/dry clothes
  - Consider wheeled cars, smaller loads
Issues with folding, putting away, hanging clothes
Environmental Issues: Walker

**Walker:**
Carrying items such as food, cell phone, tissue box, cup with fluids:
- Consider rollator (also good for sitting breaks or working at the sink/table)
- Consider tray or walker basket
- Consider cardboard modifications
- Consider sliding along counter

**Room access:**
- Consider removing doors and putting up a curtain
- Consider reversing door hinges
- Consider moving walker wheels to the inside

**Oxygen line**
- Consider looping line to the side
- Consider lightweight, portable tank
Environmental Issues: Measurements

Wheelchair accessibility:
Reach
- Standing Reach
- Sitting Reach
- Sitting Reach Forward
- Sitting Reach to Side
Wheelchair
- Length, width, seat height
- Turn around box

Height of bed
Height of toilet
Height of sinks/space
Height of tables
Hallway width
Doorway width
Tub side height
Smart Homes - Environmental Control Units (ECUs):
Use of keypads, switches, smart phones/computers, Ipad, scanning technology, voice activation, visual monitors, motion detectors, health sensor monitors

Can control:
lights, wall sockets, opening windows, intercoms, alarms, elevator, TV, VCR, phone, thermostat, reminder alerts, etc.

Tele-health - Robotics
A Brief of History of Tai Chi

Thousand year history:
Self Defense System

Soft versus hard (karate)

Ch’uan Family
- Tai Chi offshoots

Ch’uan style

Hundreds of forms

3rd Most Popular Exercise in the world
General Characteristics of Tai Chi

Chi – Life Energy,
Merging with Nature,
Moving Meditation,
Meaningful by itself,
Low Impact,

West:
Looking outside for fulfillment:
- World of 10,000 things
- Fast, More, Never Enough

East:
Looking within for fulfillment:
- Harmony within the world
- Three treasures of Taoism: compassion, moderation, humility
Research supporting Tai Chi & health

Sixty six different randomized trials indicated:
- Improved bone health
- Reduced blood pressure/stress
- Improve balance/factors related to falls
- Confidence in ability to perform activity

Two Major Studies on Balance:
NIH sponsored study in 2012
Over 195 individuals with mild to moderate Parkinson’s Disease over 6 months
Compared to control groups with resistance training and stretching:
Reduced number of falls, improved stride length, functional reach, postural control

NIH sponsored

700 community dwelling seniors receiving Tai Chi 1 x week for 4 months (2007)
Compared to control with no Tai Chi
Less falls, improved on 5 of 6 balance measures compared to controls
Tai Chi Exercises – Part Two: *Bow Stance*
Tai Chi Exercises – Part Two: 

Turning the Wheel
Tai Chi Exercises – Part Three: 
*Swimming*

Bow stance variation
Tai Chi Exercises – Part Three: Gathering Energy
Why is Tai Chi so effective in fall prevention?

What is balance?
- Victory over gravity: controlled fall
- Base of support over center of gravity

Brains works through whole body/system coordination

Higher level, cortex driven skill

Brain learns through movement patterns, not isolated joints

Nerves that fire together, wire together

What are the major systems/components involved with balance?
Functional Balance Components

**Vestibular** (think: head movement)

**Sensory** (think vision, tactile or feeling floor under feet)

**ROM** (especially hips, knees, ankles)

**Strength** (especially core, quads, hips)

**Ankle/hip strategies** (think walking on uneven ground)

**Righting reactions** (catching yourself with leg, arms from a sudden loss of balance)

**Weight shifting** (think hula dancing, common loss with elderly)

**Controlled fall** (think able to pick something off the floor without falling)

**Integrated** (think movements that combine the upper and lower body, think tai chi and functional tasks)

**Dynamic** (opposite of static, requires movement)

**Proprioception/kinesthesia** (awareness of body in space)

**Diagonal versus linear** (think movements that are not straight, more across the body)
Why is balance important for OT?

Functional Movement Patterns

- Showering
- Sweeping
- Meal prep
- Bed making
- Loading dishwasher
- Dusting
- Watering plants
Common PT/OT exercises

Integrating versus Isolating
Challenging versus Supporting
Comparing: Tai Chi, exercises, IADL/ADL movement

**Exercise Balance Components**
- Knee extension, flexion
- Hip abduction/adduction
- Hip extension, flexion
- UE shoulder flexion

**ALD/IADL Balance Components**
- Sweeping, vacuuming
- Walking the dog
- Bed making
- Unloading dishwasher

**Tai Chi Balance Components**
- Arrow, Bow Stance
- Polishing
- Gathering, Swimming
- Wheel
Tai Chi and other health benefits

Why does Tai Chi improve mineral bone density?

Why does Tai Chi reduce stress?

Why does Tai Chi improve cardiopulmonary capacity?

Why does Tai Chi work so well with older adults?
Tai Chi and OT implications

No ruling Tai Chi body, or specific certification

Dr. Paul Lamb certification program

Ideally, attend workshop presented by OT/PT
Tai Chi Exercises – Part Three:
Polishing the Table
Tai Chi Exercises – Part Three:

Bow and Arrow

Bow and arrow right

Transition

Bow and arrow left
Tai Chi Exercises
– All together:

Sunset Breath
Embrace the moon
Cannon

Bow Stance rock
Turning The Wheel
Swimming
Gathering Energy

Polishing the table top
Bow and Arrow
Contact Information

Cavenaugh Kelly
Assistant Professor
Husson University
kellyca@husson.edu