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Understanding the Role of Occupational Therapy in Fall Prevention for Community-Dwelling Older Adults

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ABSTRACT
Occupational therapy practitioners are uniquely prepared to contribute to fall prevention efforts because of their attention to diverse influences on occupational performance. This article is intended for occupational therapy practitioners who seek to deliver evidence-based fall prevention programs to community-dwelling older adults and features descriptions of best practice in fall risk assessment and intervention. Interventions to improve home safety and mobility skills are highlighted, as are shared features of two community-based programs: Matter of Balance and Stepping On.

OBJECTIVES
After reading this article, you should be able to:
1. Recognize the personal and societal consequences of falls.
2. Identify key fall risk factors among community-dwelling older adults.
3. Select evidence-based approaches to assessing fall risk.
4. Identify evidence-based approaches to fall prevention intervention for community-dwelling older adults.
5. Identify strategies to reduce falls and improve falls self-efficacy, drawing from the Matter of Balance and Stepping On programs.
6. Identify gaps in current fall prevention research.

INTRODUCTION
Fall-induced injuries are one of the most common causes of restricted activity, disability, and death in elderly populations (Gill, Allore, Holford, & Guo, 2004; Kannus, Niemi, Palvanen, Parkkari, & Järvinen, 2005). The problem of falls among older adults stems from a combination of high incidence and high susceptibility to trauma (Rubenstein, 2006). About one third of persons 65 years of age and older living in the community fall at least once a year (Tinetti, Speechley, & Ginter, 1988). Both the incidence and the severity of fall-related complications increase with age, level of disability, and extent of functional impairment (van Weel, Vermeulen, & van den Bosch, 1995).

The high personal and societal cost of falls has been recognized at a national level. Fall-related deaths and injuries have been targeted for reduction in the *Healthy People 2010* Objectives for Improving Health (U.S. Department of Health and Human Services, 2000). The National Council on Aging (2005) has led the development of a national action plan to reduce fall dangers for older adults. Fortunately, a surge in fall-related research has dramatically improved understanding of fall risk factors and effective intervention strategies. Current practice in fall prevention is now informed by findings from more than 60 randomized trials and meta-analyses of the most scientifically rigorous studies (Chang et al., 2004; Gillespie et al., 2003).

FALL RISK FACTORS
Fall risk factors, which typically are classified as intrinsic or extrinsic, vary by disability group and by setting (e.g., community vs. nursing home) (Koski, Luukinen, Laippala, & Kivela, 1998). Because falls generally are the result of multiple, diverse, and interacting risk factors, a multifactorial approach to falls assessment and intervention is needed for most populations (Chang & Ganz, 2007).

Intrinsic fall risk factors include impairments in muscle strength, balance, gait, cognition, and vision; depressive symptoms; fear of falling, postural hypotension; arthritis; and the use of four or more prescription medications or benzodiazepines (Bergland & Wyller, 2004; Campbell et al., 2005; Friedman, Munoz, West, Rubin, & Fried, 2004; Sattin, 1992; Tinetti, Doucette, Claus, & Marottoli, 1995; Tinetti et al., 1988). Extrinsic risks are environmental in nature. Because most falls occur in and around the home, consideration of environmental hazards in these areas is important. The top three home-based fall hazards identified through a content analysis of fall studies (Clemson, 1997) are slippery surfaces, obstacles in pathways, and poor illumination. Of note is that the existence of home hazards alone is insufficient to cause falls. Instead, the *interaction* between an older person's physical abilities and his or her exposure to environmental stressors appears to be more important (Lord, Menz, & Sherrington, 2006). Thus, it is essential to consider older adults' ability to make good decisions about which activities to

engage in. Also important is learning about an older adult's fall history because older adults who have fallen once are at high risk of falling again (Rubenstein & Josephson, 2003).

EVALUATION FOR FALL RISK: AN OCCUPATIONAL PERSPECTIVE

Fall prevention guidelines emphasize the need for careful evaluation of an individual's risks and deficits. In particular, consideration of the interaction and probable synergism between multiple risk factors is needed (American Geriatrics Society [AGS], British Geriatrics Society [BGS], and American Academy of Orthopaedic Surgeons [AAOS] Panel on Falls Prevention, 2001). The Person–Environment–Occupation (PEO) model (Stewart et al., 2003) is a useful framework to apply to fall risk evaluation. The model's key assumption is that the person, environment, and occupation interact continuously across time and space in ways that increase or decrease their congruence: the closer the fit, the greater the overlap or occupational performance. Improving occupational performance in the context of fall prevention focuses on reducing fall risk and enhancing clients' confidence in their ability to engage in valued activities without falling. PEO-based fall assessment considerations are highlighted in the section that follows.

The Person: Specific Considerations in Fall Risk Evaluation

Understanding Capacities, Past Fall Experiences, and Physical Risk Factors

Occupational therapy practitioners must ask older adults about their recent fall experiences and listen carefully to their responses. Specifically, clients can be asked, "In the past month, have you had any fall including a slip or trip in which you lost your balance and landed on the floor or ground or lower level?" (Lamb, Jorstad-Stein, Hauer, & Becker, 2005, p. 1619). The AGS, BGS, and AAOS Panel on Falls Prevention (2001) recommended that fall evaluation be included as part of routine care provided to older adults who are at relatively low risk. Use of the Timed Up and Go (TUG) test (Podsiadlo & Richardson, 1991) is recommended by the panel. The TUG test requires the client to stand up from a chair without using the arms (if possible), walk several paces, and return. Persons who have difficulty performing the TUG or presenting with one or more falls or gait and balance abnormalities should be assessed further. This more detailed assessment of fall risk, involving clinicians and physicians with appropriate skills and experience, features measures of acute and chronic medical problems, neurological and cardiac status, medication, vision, and lower-extremity joint function.

Understanding Falls Self-Efficacy

Falls self-efficacy refers to the degree of confidence a person has in performing common activities of daily living without falling (Tinetti, Richman, & Powell, 1990). The Falls Efficacy Scale–International (FES–I), a 16-item instrument that assesses the intensity of concern about falling when performing easy and more-demanding physical and social activities, is the recognized standard for measuring falls self-efficacy (Zijlstra et al., 2007). The FES-I has excellent internal and test–retest reliability (Cronbach's alpha = 0.96) (Kempen et al., 2007).

Understanding Behavioral Fall Risk Factors

A range of behaviors contribute to fall risk (Clemson, Manor, & Fitzgerald, 2003). Protective behaviors, as described by Clemson, Cumming, and Heard (2003), are presented in Table 1. Each dimension also could be described in terms of its opposing risk-taking behaviors.

There are many ways that occupational therapy practitioners can support clients' efforts to explore and use new fall prevention strategies. In addition to evaluating a client's level of confidence in his or her ability to participate in daily activities without falling, it is helpful to explore whether the client thinks a particular strategy will be useful. If a client reports that he or she has doubts about the effectiveness of a fall prevention strategy, the practitioner should take time to understand the client's reasoning and address concerns (Lachman et al., 1997). Because using new fall prevention strategies often requires changes in routine and habitual behaviors, practitioners can help clients to create new routines that

Table 1. Dimensions of Protective Behaviors (Clemson, Cumming, & Heard, 2003).

Dimension	Description
Cognitive adaptations	Behaviors associated with reflection, intention, and planning (paying attention to changes in balance, level of alertness, etc., when trying a new medication)
Protective mobility	Negotiating the environment in a supportive or protective way (using defensive walking strategies, e.g., walking away from crowds)
Avoidance	Avoiding risky situations (e.g., peak hour on the buses)
Awareness and being observant	Behaviors associated with noticing hazards, such as spills on the floor, or scanning ahead for potential hazards when walking
Pace	Slow walking pace to cope with reduced physical functioning
Practical strategies	Anticipating problems and finding solutions (e.g., using a wide-based stepladder for climbing instead of reaching from a chair)

work well for them and strategies to remember *when* to change the behavior. Lastly, clear, measurable objectives are essential to target the true behavior for change. Occupational therapy practitioners can identify the "just-right challenge" for older adults to develop detailed and realistic fall prevention goals.

The Falls Behavioural (FaB) Scale for Older People assesses the kinds of subtle, day-to-day behaviors, both habitual and intentional, that offer an older person protection from falling during daily activity. It has demonstrated content and construct validity and high test–retest reliability (Clemson, Bundy, Cumming, Kay, & Luckett, in press; Clemson et al., 2003). The FaB supports fall risk evaluation and can be used as a prompt to discuss goal setting related to fall prevention. The instrument helps to increase the client's and therapist's awareness of a broad range of safety strategies already in place.

The Environment: Specific Considerations in Fall Risk Assessment

Using valid and reliable assessments is an important component of evidence-based practice. Fortunately, several tools are available to occupational therapists seeking to better understand environmental fall risk factors, including the SAFER (Letts & Marshall, 1995) and the Comprehensive Assessment and Solutions Process for Aging Residents (Caspar, n.d.). This article features the Westmead Home Safety Assessment because occupational therapists have used it in two successful fall prevention trials (Campbell et al., 2005; Clemson, 1997; Cumming et al., 1999). The Westmead (available at www.therapybookshop.com) was developed through a content analysis of falls studies and an expert review process (Clemson, Fitzgerald, & Heard, 1999) and has high interrater reliability (Clemson, Fitzgerald, Heard, & Cumming, 1999). The Westmead authors' experiences suggest that background knowledge of home hazards and appreciation of the context for judging hazards are crucial to successful use of this assessment.

The Westmead helps the client and therapist to identify and prioritize hazards collaboratively. The assessment manual outlines how the environment can contribute to fall risk as well as the evaluation process. It is important to note that although the process leads to an understanding of environmental hazards, the assessment reviews the client's personal capacities (i.e., mobility, functional vision), fall history, beliefs about causes of falls, and patterns of home use and community access.

Occupation and Occupational Performance: Specific Considerations in Fall Risk Assessments

The concept of full participation in society is becoming increasingly important and represents a key goal and vision for many stakeholders, including occupational therapists (Hammel et al., in press). Occupational therapists have access to a number of assessments that, when viewed through the lens of fall prevention, can inform development of occupation- and participation-based intervention plans. *Conceptualizing and Measuring Participation* (The Participation Team, 2005) is a resource that describes assessments focused on participation-level outcomes. Table 2 lists additional assessments.

Table 2. Assessments Based on Occupation/Occupational Performance and Participation

Type	Assessment
Occupation based	Assessment of Motor and Process Skills (Fisher, 2005)
Participation based	• Community Participation Indicators Version V4.0 (Heinemann, 2007) • Craig Hospital Inventory of Environmental Factors (CHIEF) (Whiteneck et al., 2004) • Occupational Questionnaire (Smith, Kielhofner, & Watts, 1986) • The Occupational Self Assessment (OSA) (Version 2.2) (Baron, Kielhofner, Iyenger, Goldhammer, & Wolenski, 2006) • Role Checklist (Oakley, Kielhofner, & Barris, 1985)

INTERVENTION

Meta-analyses of clinical trials have concluded that both multifactorial and single factor interventions (e.g., physical exercise, withdrawal of psychotropic medication, cardiac pacing) are effective in preventing falls among community-dwelling older adults (Chang et al., 2004; Gillespie et al., 2003). The evidence supporting a multifactorial intervention strategy that includes risk factor assessment and management of identified risk factors for community-dwelling older adults with a history of falls but without known cognitive impairment is particularly strong (Tinetti, 2006). Based on their recent review of the literature, members of the current AGS/BGS Expert Panel on Fall Prevention recommended that the following be included in multifactorial interventions, if indicated by risk factor assessment: environmental assessment conducted by a health care professional; balance training, resistance (strengthening) exercises, and gait training; reductions in psychoactive and other medications; management of vision problems, including early referral for cataract surgery; postural hypotension; and other cardiovascular and medical problems (Tinetti, 2006). The following section highlights two fall prevention strategies that occupational therapy practitioners use widely: environmental interventions and interventions to improve mobility

skills. Regardless of the approach, clients are more likely to welcome and accept fall prevention advice if it is offered in a positive, constructive manner and if suggestions suit different lifestyles and preferences (Ballinger & Clemson, 2006).

Environmental Interventions

Evidence pointing to the important role of home safety in fall prevention has grown in recent years. Several interventions featuring a strong environmental component have been shown to reduce falls through randomized trials (Campbell et al., 2005; Cumming et al., 1999; Nikolaus & Bach, 2003). Those interventions have included high-intensity interventions, used comprehensive and validated assessment approaches (e.g., the Westmead), targeted persons at high risk, and involved occupational therapists. Campbell et al. (2005) targeted persons with severe vision impairment and demonstrated that home safety interventions can be beneficial when tailored to specific needs. Considering the interventions that have effectively reduced falls and exploratory studies to date, we can draw a picture of a best practice approach (see Table 3).

Adherence

Adherence to occupational therapy home safety recommendations has been shown to be just over 50% (Cumming et al., 2001), with a client's belief that home modifications can prevent falls a predictor of follow-through. Additionally, help from relatives supports adherence to home safety recommendations (Cumming et al., 2001). No associations have been found between health status or physical function and adherence to home modifications (Cumming et al., 2001; Gosselin, Robitailee, Trickey, & Maltais, 1993), suggesting adherence is more likely influenced by subjective factors.

A qualitative study involving interviews with women who had not followed through with occupational therapy home safety recommendations found that the phenomenon of exerting control influenced follow-through (Clemson, Cusick, & Fozzard, 1999). This sense of control was mediated by a number of factors: past experiences of falling, the meaning ascribed to aspects of home, and the influence of others in the household. To maximize outcomes, therapists can address fall prevention in positive and empowering ways by working with clients on mutual goals, understanding clients' unique perspectives, and understanding clients' needs to exert control and exercise choice.

Table 3. Characteristics of a Best Practice Approach To Reducing Environmental Fall Risks

Approach	Characteristic
Take into account the person–environment fit.	Ladder safety or alternatives to climbing may be an appropriate focus for an active person; tripping hazards may be more important for a person who is more frail.
Understand clients' fall experiences and beliefs about causes of falls.	Challenge clients to appraise their risk and to explore understanding of potential causes of falls.
Use a problem-solving approach.	Audit the home collaboratively with the client to address behavioral and environmental concerns and develop priorities.
Understand the meaning of home, activities and roles, and sense of control.	Understand the client's context for activity.
Consider risk-taking behaviors and encourage protective adaptations.	Use situational cues and target the behavior to be changed.
Have up-to-date knowledge on options for important hazards that are frequently involved in falls.	Be knowledgeable, for example, about slip-resistant products, strategies to fix loose floor coverings, and new home safety products.
Use environmental redesign strategies.	Remove or relocate, for example, furniture to reduce clutter and allow turning space.
Encourage awareness raising and generalization to other situations.	Encourage awareness and safe behaviors in a wide range of situations.
Assess and practice safe mobility strategies at home and in the community.	Include such strategies as scanning ahead and heel–toe walking.
Encourage the right kind of exercise and physical activity.	Incorporate exercises and activity into daily life routines and in safe ways.

Interventions To Build Mobility Skills

Interventions to improve balance, transfers, and gait are vital components of a multifaceted approach to falls prevention (Feder, Cryer, Donovan, & Carter, 2000). People of all ages, including those in their nineties, can make great gains in muscle power and balance. Strength training requires overloading muscles, and ankle cuff weights or a Theraband can be used for this purpose. Balance training only occurs when clients challenge their postural control; for example, by engaging in activities that progressively reduce the base of support. Occupational therapy practitioners' understanding of these principles is crucial to providing appropriate and effective interventions. In addition, it is important to help older adults explore ways to incorporate exercises into daily life routines (Clemson, Singh, Bundy, & Munro, 2006), self-monitor abilities, and plan in advance for times when exercise commitment will relapse (Singh, 2000). A full discussion of exercise-based interventions to reduce falls is beyond the scope of this article; however, evidence-based exercise-related fall prevention resources are provided at the end of the References section.

Group-Based Interventions

Matter of Balance and Stepping On are two examples of evidence-based programs delivered to groups of community-dwelling older adults. Although the programs were developed for use by interdisciplinary health care practitioners, both were created with strong input from occupational therapists.

Matter of Balance (available at www.bu.edu/hdr/products) is a nine-session, group-based intervention developed and evaluated by an interdisciplinary team at Boston University. The program was evaluated through a cluster randomized field trial and has been shown to safely increase falls self-efficacy and activity levels among community-dwelling older adults who have restricted their activity due to fear of falling (Tennstedt et al., 1998). The successful results of the original randomized trial evaluating this program have been replicated (Zijlstra, van Haastregt, van Eijk, & Kempen, 2006). Through funding from the Administration on Aging (AoA), the Matter of Balance program has been revised and evaluated in a format featuring carefully selected older adult lay leaders. Currently, the program is being disseminated nationally with support from AoA. Evaluation of the Matter of Balance lay model indicates that program participation is associated with adaptive changes in attitudes, beliefs, and behaviors (Healy, 2006).

Stepping On (available at www.care4elders.com) is a community-based program that uses a small-group learning environment to improve falls self-efficacy, encourage behavioral change, and reduce falls (Clemson & Swann, 2007). A feature of the program is its use of a decision-making model to facilitate adoption of safety strategies (Janis & Mann, 1977). Stepping On runs for seven sessions, with a booster home visit contact and a 3-month follow-up session. The program, developed at the University of Sydney in Australia, was evaluated through a randomized trial that involved community residents 70 years of age and older who had a fall in the previous 12 months or who were concerned about falling (Clemson et al., 2004). Results showed that the intervention group experienced a 31% reduction in falls.

Clemson currently is leading a team of researchers at the University of Sydney in a study to explore Stepping On implementation and sustainability with minority groups. A team led by Jane Mahoney, MD, of the University of Wisconsin–Madison and including Clemson as a research consultant has secured 4 years of funding from the Centers for Disease Control and Prevention to undertake dissemination research with Stepping On and to further development for the U.S. context.

Table 4 highlights the shared features of the Matter of Balance and Stepping On programs. These features are examples of strategies to reduce falls and improve falls self-efficacy that

Table 4. Shared Features of the Matter of Balance and Stepping On Programs

Shared Feature	Description
Emphasis on multifactorial approaches	Instead of focusing on one approach to reducing falls (i.e., increasing leg strength), several fall prevention strategies are used.
Dedication to client-centered practice	Collaborative approaches that actively involve the older adult in the process of identifying and mitigating fall risk factors are used, and individualized fall prevention plans are developed.
Use of social cognitive theory	Both programs apply Bandura's (1997) social cognitive theory. The theory emphasizes the importance of enactive mastery experiences (learning by practicing new skills and experiencing positive outcomes), vicarious experiences (listening to and watching others), and verbal persuasion, which can occur as peers relay their successful efforts to reduce fall risk. Participants explore motivational factors linked to activity, including myths about aging.
Use of groups	Both programs use the group process, which may be particularly beneficial to older adults learning to manage fall risk. By observing peers, older adults can preserve or enhance a sense of self-efficacy in the face of changing abilities (Frey & Ruble, 1989).
Improved falls efficacy as an outcome	Both programs aim to reduce concerns about falls and increasing falls self-efficacy.

occupational therapy practitioners who work in a variety of settings can use.

GAPS IN FALL PREVENTION RESEARCH

Although understanding effective intervention strategies for community-dwelling older adults has grown tremendously, clear practice directives to prevent falls and fall-related injuries among older adults at high risk for falls have not yet emerged. Cost-effective, evidence-based fall prevention programs are needed for elderly persons who are frail or institutionalized as well as for persons living with cognitive impairment or chronic diseases, such as multiple sclerosis (Peterson, Cho, von Koch, & Finlayson, in press). More research is needed to understand the process of building falls self-efficacy, cultural differences influencing effectiveness of interventions, and strategies to market and disseminate fall prevention programs. Finally, hip protectors warrant further investigation because older adults would greatly benefit from an intervention that can prevent fractures by reducing the impact of a fall (Andrews, 2007).

CONCLUSION

Falls are a serious threat to the health and quality of life of older adults. Fall risk evaluation is complicated because risk factors typically act together to increase a person's fall risk. To address the challenges associated with fall risk evaluation, occupational therapists can draw from existing evidence to identify high-priority risk factors warranting evaluation and select valid and reliable assessments. Upon identifying the specific risk factors that are operating for a client, occupational therapy practitioners can use a variety of evidence-based strategies and approaches to create individualized, multifactorial fall prevention plans designed to reduce fall risk and promote clients' safe engagement in valued activities. ■

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Understanding the Role of Occupational Therapy in Fall Prevention for Community-Dwelling Older Adults

February 18, 2008

Learning Level: Intermediate
Target audience: Occupational therapists and occupational therapy assistants
Content Focus: Category 1: Domain of Occupational Therapy, Performance Skills
Category 2: Occupational Therapy Process, Evaluation and Intervention

1. The problem of falls among older adults stems from both high incidence and high susceptibility to trauma:
   A. True
   B. False

2. Fall-related death and injury have been targeted for reduction in the *Healthy People 2010* Objectives for Improving Health.
   A. True
   B. False

3. Fall risk factors are very similar for older adults with and without disabilities.
   A. True
   B. False

4. Which statement most accurately reflects current evidence?
   A. Benzodiazepine use increases fall risk.
   B. Fear of falling contributes to inactivity, but it is not a fall risk factor.
   C. Postural hypotension is not a fall risk factor.
   D. Three or more home hazards increases fall risk.

5. An occupational perspective on fall prevention focuses on:
   A. Eliminating intrinsic risk factors
   B. Developing compensatory strategies
   C. Maintaining engagement in valued activities
   D. Improving activity-related mobility skills

6. The best match when applying the Person–Environment–Occupation model to fall assessment is:
   A. *Environmental* considerations: Can the client perform the Timed Up and Go test?
   B. *Environmental* considerations: Can the client participate in meaningful activities?
   C. *Person-specific* considerations: Can the client use protective mobility (i.e., use defensive walking strategies)?
   D. *Occupation-specific* considerations: Are curb cuts present in sidewalks?

7. The term *falls self-efficacy* refers to the degree of confidence a person has in:
   A. Reducing fall risk
   B. Recognizing situations that can increase fall risk
   C. Recovering from a fall
   D. Performing activities of daily living without falling

8. Which of the following statements is most accurate?
   A. The Falls Behavioural Scale is a valid and reliable instrument that can be used as a prompt to discuss goal setting related to fall prevention.
   B. Measuring participation requires informal assessment.
   C. Clients should complete the Westmead Home Safety Assessment independently.
   D. Only people at high fall risk should be asked about recent fall experiences.

9. According to the AGS/BGS Expert Panel on Fall Prevention, components of multifactorial fall prevention programs include each of the following *except*:
   A. Balance, resistance (strengthening), and gait training
   B. Home safety screenings conducted by representatives of community-based agencies
   C. Management of cardiovascular and other medical problems
   D. Management of vision problems

10. In the context of fall prevention, best practice for environmental intervention includes:
    A. Involving emergency response teams
    B. Providing stipends for home safety improvements
    C. Teaching patients in hospitals about fall hazards in the home
    D. Providing clients with opportunities to generalize knowledge of environmental fall hazards and solutions to many situations

11. The Matter of Balance and the Stepping On programs emphasize that
    A. Directive group leaders are most effective.
    B. Exploring myths about aging and fall prevention is important.
    C. Nursing home residents need fall prevention education.
    D. Enactive mastery experiences are not required to build fall prevention skills.

12. Which of the following statements is true?
    A. Strategies to effectively market and disseminate fall prevention programs are well understood.
    B. Features of cost-effective fall prevention programs are well understood.
    C. Evidence-based clinical guidelines for assessment of fall risk emphasize the need to consider how fall risk factors work together to increase overall fall risk.
    D. Cultural influences on the effectiveness of fall prevention programs are well understood.