



## AOTA Critically Appraised Topics and Papers Series Alzheimer's Disease

*\*A product of the American Occupational Therapy Association's  
Evidence-Based Literature Review Project*

### CRITICALLY APPRAISED TOPIC (CAT)

#### ***FOCUSED QUESTION***

**What is the evidence for the effect of interventions to prevent falls in persons with dementia?**

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#### **Clinical Scenario:**

About one third of community-dwelling people over 65 years old, or 5.8 million persons, fall each year (Centers for Disease Control and Prevention [CDC], 2008; Gillespie et al., 2008). A fall is “an unexpected event in which the participant comes to rest on the ground, floor, or lower level” (Lamb, Jorstad-Stein, Hauer, & Becker, 2005, p. 1618). Fall-related injuries are a significant cause of morbidity and mortality in older populations (McClure et al, 2005). About 14,000 persons aged 65 years or older die from falls each year, and 1.8 million are treated in emergency departments for nonfatal injuries from falls (CDC, 2006). About one third of older adults who sustain a fall-related injury require help with activities of daily living (ADL) as a result, and among them, nearly two thirds require help for at least 6 months (Schiller, Kramarow, & Dey, 2007). Falls also can have psychological consequences: fear of falling and loss of confidence that can result in self-restricted activity levels resulting in reduction in physical function and in social interaction (Vellas, Wayne, Romer, Baumgarner, & Garry, 1997). Falling puts a strain on the family and is an independent predictor of admission to a nursing home (Gaugler, Duval, Anderson, & Kane, 2007). The estimated total direct annual cost of all fall injuries for people 65 and older exceeds \$19 billion (Stevens, Corso, Finkelstein, & Miller, 2006).

Many risk factors appear to interact in those who suffer falls, including age, acute and chronic illness, reduced vision, and cognitive status, amongst others (Tinetti, Doucette, Claus, & Marottoli, 2005). Dementia is an independent risk factor for falling because of its associated impairments in judgment, gait, visual-spatial perception, and the ability to recognize and avoid hazards (van Doorn et al., 2003). The annual incidence of falls for people with Alzheimer's Disease (AD) is around 60% (twice that of elders without cognitive impairments; Shaw et al., 2003). The risk of falling for this population is especially high shortly after admission and after transfer to another hospital unit, increases with severity of the dementia and physical impairment, and decreases for very severely demented or physically disabled patients (van Dijk, Meulenberg, van de Sande, & Habbema, 1993).

Given the growing numbers of elders who have AD and the fact that they are more likely to fall, one can expect more falls, more morbidity and mortality related to falls, and higher costs of care in the future. Occupational therapy practitioners have a special opportunity for prevention and

intervention because they are educated in the assessment and treatment of many of the factors associated with falls. In order to meet the needs of this specific population, research evidence is needed to inform practice and justify the use of interventions designed to prevent falls of persons with AD.

### **Summary of Key Findings:**

#### Summary of Levels I, II, and III

- Multifaceted interventions (removal of physical restraints, fall alarm, exercise, change in environment, etc.) moderately reduce the rate of falls in hospital settings. The evidence is inconclusive for the effectiveness of these interventions in the community and nursing homes (Oliver et al., 2006; Level I Systematic Review).
- Physical interventions such as gait, strengthening, balance, and flexibility training have a small but positive effect on gait variables and, therefore, indirectly on the incidence of falls (Hauer, Becker, Lindemann & Beyer, 2006; Level I).
- Fewer falls with less severe injuries occur on specialized geriatric hospital units with the intervention of a multidisciplinary team (nurses, physiotherapists, occupational therapists, dieticians, and geriatricians) who assess the patient twice weekly and actively prevent falls (Stenval et al., 2007; Level I).
- Intense fall-focused supervision of nursing home residents with AD resulted in a statistically significant decrease in the number of falls. This supervision included attention to environmental and personal factors, as well as methods of keeping the patient occupied (Detweiler, Kim, & Taylor, 2005; Level III).
- Falls-prevention program embedded within healthy lifestyle dementia respite programs did not appear to have an influence on incidence of falls. Intentional programs focused specifically on fall prevention are more likely to have a positive effect (Mackintosh & Sheppard, 2005; Level III).

#### Summary of Levels IV and V

None available for review

### **Contributions of Qualitative Studies:**

None available for review

### **Bottom Line for Occupational Therapy Practice:**

There is a paucity of research related to falls in people who have AD. The available research suggests that close supervision and involvement in activity-based intervention may be effective in reducing the number of falls of high-risk dementia patients (Detweiler, Kim, & Taylor, 2005). While evidence is available regarding only effectiveness of multifaceted interventions in reducing falls in hospital settings, such strategies may also be effective in community settings. Embedding physical training focused on improving gait, strength, balance, and flexibility in occupation-based interventions has some effect on reducing falls (Hauer, Becker, Lindemann, & Beyer, 2006). Occupational therapy practitioners should participate in the design of comprehensive programs for home, community, and care home settings, and particularly contribute to the structure of activities that keep the patients engaged (Oliver et al., 2006). This is particularly important in postoperative intervention programs during inpatient stays after femoral neck fractures, when multidisciplinary teams are the most effective in preventing

further falls. Occupational therapy practitioners can provide basic ADL routine training and environmental restructuring with particular attention to fall risk factors. There appear to be very little increased costs associated with multidisciplinary intervention program in inpatient settings (Stenval et al., 2007). More research should be conducted on this type of program, but limited evidence suggests a falls-prevention program embedded in respite day programs may be a useful model to prevent falls and decrease caregiver burden if transportation, language assistance, small group size, and individual supervision are available (Mackintosh & Sheppard, 2005).

**Review Process:**

Procedures for the selection and appraisal of articles:

- Titles and abstracts of those articles retrieved from database searches were reviewed.
- Copies of titles and abstracts of retrieved articles were printed.
- Abstracts that appeared to match the criteria and question being addressed were marked for additional review.
- Full-text copies of articles that appeared to be relevant were located and printed for review.
- Based on this review, some articles were eliminated since they did not meet the criteria.
- Those articles meeting the criteria were selected for the evidence table and analyzed.

**Inclusion Criteria:**

- Published from 1987–2008
- Research participants were caregivers of persons with AD.
- Included an intervention focused on preventing falls of people with AD. Interventions were those occupational therapy professionals are legally able to implement.
- Meta-analyses or systematic literature reviews
- Written in English

**Exclusion Criteria:**

- Published prior to 1987
- Did not include an intervention
- Interventions were not specifically targeted to caregivers of people with AD.

**Search Strategy**

Categories	Key Search Terms
Patient/client population	Alzheimer’s, dementia, cognitive impairment, elderly
Intervention	Fall prevention, intervention, safety
Comparison	Not searched
Outcomes	Fall reduction, fall prevention, injury reduction

Databases and Sites Searched
Academic Search Premiere, AgeLine, CINAHL, Google Scholar, EBSCOhost, Medline, OT Search, PsycINFO, PubMed, ScienceDirect, Web of Science, Cochrane Library

### ***Quality Control/Peer Review Process:***

- A Creighton University doctor of occupational therapy (OTD) student developed search terms in consultation with the course instructor for OTD 541: Critical Analysis of Occupational Therapy Practice;
- The student conducted searches in the databases;
- A medical librarian reviewed the group's search strategies and results to improve them;
- AOTA staff and project consultant reviewed results of the search and provided additional suggestions for search strategies;
- The instructor conducted a follow-up literature search to assure no research had been overlooked. Two articles were eliminated because they were contained in a systematic review;
- A student intern at AOTA completed an evidence table with selected articles;
- The instructor completed the CAT;
- AOTA staff and project consultant reviewed the CAT.

### **Results of Search:**

#### ***Summary of Study Designs of Articles Selected for Appraisal***

<b>Level of Evidence</b>	<b>Study Design/Methodology of Selected Articles</b>	<b>Number of Articles Selected</b>
I	Systematic reviews, meta-analysis, randomized controlled trials	3
II	Two groups, nonrandomized studies (e.g., cohort, case-control)	0
III	One group, nonrandomized (e.g., before and after, pretest–posttest)	2
IV	Descriptive studies that include analysis of outcomes (single subject design, case series)	0
V	Case reports and expert opinion, which include narrative literature reviews and consensus statements	0
	Qualitative studies	0
	<b>TOTAL</b>	<b>5</b>

### **Limitations of the Studies Appraised:**

Levels I, II, and III

- Baseline and intervention period were short (Detweiler, Kim, & Taylor, 2005),
- Small sample size (Detweiler, Kim, & Taylor, 2005; Stenval et al., 2007)
- High dropout rate (Mackintosh & Sheppard, 2005)
- Likely recorder bias; assessment and intervention conducted by same individuals or group allocation not blinded (Mackintosh & Sheppard, 2005; Oliver et al., 2006; Stenval et al., 2007)
- Heterogeneous samples, not all had AD (Oliver et al., 2006)
- Heterogeneity of interventions, dementia screening not performed (Hauer, Becker, Lidemann, & Beyer, 2006)

None available for review
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### Articles Selected for Appraisal

Detweiler, M. B., Kim, K. Y., & Taylor, B. Y. (2005). Focused supervision of high-risk fall dementia patients: A simple method to reduce fall incidence and severity. *American Journal of Alzheimer's Disease and Other Dementias*, 20, 97–104.

Hauer, K., Becker, C., Lindemann, U., & Beyer, N. (2006). Effectiveness of physical training on motor performance and fall prevention in cognitively impaired older persons: A systematic review. *American Journal of Physical Medicine & Rehabilitation*, 85, 847–857.

Mackintosh, S. F., & Sheppard, L. A. (2005) A pilot falls-prevention programme for older people with dementia from a predominantly Italian background. *Hong Kong Physiotherapy Journal*, 23, 20–26.

Oliver, D., Connelly J. B., Victor, C. R., Shaw, F. E., Whitehead, A., Genc, Y., et al. (2007). Strategies to prevent falls and fractures in hospitals and effect of cognitive impairment: Systematic review and meta-analyses. *British Medical Journal*, 334(7584), 82

Stenval, M., Olofsson, B., Lundstroom, M., Englund, U., Borssén, B., Svensson, O., et al. (2007). A multidisciplinary, multifactorial intervention program reduces postoperative falls and injuries after femoral neck fracture. *Osteoporos International*, 18, 167–175.

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Centers for Disease Control and Prevention. (2008). Self-reported falls and fall-related injuries among persons aged > or =65 years—United States, 2006. *Morbidity and Mortality Weekly Report*, 57, 225–229.

Gaugler, J., Duval, S., Anderson, K., & Kane, R. (2007). Predicting nursing home admission in the U.S: A meta-analysis. *BMC Geriatrics*, 7, 13. Retrieved July 31, 2008, from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1914346>

Gillespie, L. D., Robertson, M. C., Gillespie, W. J., Lamb, S., Gates, S., Cumming, R. G., et al. (2008). Interventions for preventing falls in older people living in the community. (Protocol). *Cochrane Database of Systematic Reviews*, Issue 2. Art. No.: CD007146. DOI: 10.1002/14651858.CD007146.

Lamb, S. E., Jorstad-Stein, E. C., Hauer, K., & Becker, C. (2005). Prevention of Falls Network Europe and Outcomes Consensus Group. Development of a common outcome data set for fall injury prevention trials: The Prevention of Falls Network Europe consensus. *Journal of the American Geriatrics Society*, 53, 1618–1622.

McClure, R., Turner, C., Peel, N., Spinks, A., Eakin, E., & Hughes, K. (2005). Population-based interventions for the prevention of fall related injuries in older people. *Cochrane Database of Systematic Reviews*, Issue 1. Art.No.:CD004441. DOI: 10.1002/14651858.CD004441.pub2.

Schiller, J. S., Kramarow, E. A., & Dey, A. N. (2007). Fall injury episodes among non-institutionalized older adults: United States, 2001–2003. *Advanced Data*, 392, 1–16.

Shaw, F., Bond, J., Richardson, D., Dawson, P., Steen I., McKeith, I., et al. (2003). Multifactorial intervention after a fall in older people with cognitive impairment and dementia presenting to the accident and emergency department: Randomized controlled trial. *British Medical Journal*, 326, 73–90.

Stevens, J. A., Corso, P. S., Finkelstein, E. A., & Miller, T. R. (2006). The costs of fatal and non-fatal falls among older adults. *Injury Prevention*, 12, 290–295.

Tinetti, M. E., Doucette, J., Claus, E., & Marottoli, R. (2005). Risk factors for serious injury during falls by older persons in the community. *Journal of the American Geriatric Society*, 53, 1214–1221.

van Dijk, P., Meulenberg, O, van de Sande, S., & Habbema, J. (1993). Falls in dementia patients. *The Gerontologist*, 33, 200–204.

van Doorn, C., Gruber-Baldini, A., Zimmerman, S., Hebel, R., Port, C., Baumgarten, M., et al. (2003). Dementia as a risk factor for falls and fall injuries among nursing home residents. *Journal of the American Geriatric Society*, 51, 1213–1218.

Vellas, B. J., Wayne, S. J., Romer, L. J., Baumgarner, R. N., & Garry, P. J. (1997). Fear of falling and restriction of mobility in elderly fallers. *Age & Ageing*, 26, 189–193.

### **Additional Resource**

Alzheimer’s Association. (2008). *2008 Alzheimer’s disease facts and figures*. Chicago: Author.

This work is based on the evidence-based literature review completed in July 2008 by René Padilla, PhD, OTR/L, FAOTA with contributions from Jennifer Kunswiler, Kami Bogenrief, Gillian Cave, Erin Hiatt, Samuel Kim, and Mary Worthy who were doctoral students in the occupational therapy program at Creighton University at the time of this work.

CAT format adapted from a template provided by Dr. Annie McCluskey and freely available for use on the OT-CATS website (<http://otcats.com>).

For more information about the Evidence-Based Literature Review Project, contact the American Occupational Therapy Association, 301-652-6611, x 2052.



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