



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 designed to modify and maintain perceptual abilities on the occupational performance of persons with dementia?

Clinical Scenario:

Occupational therapists working in hospitals, long-term-care facilities, and the community assess individuals with dementia and make recommendations on interventions that enable optimal occupational performance. Perceptual impairments in individuals with dementia have varying effects on occupational performance, depending in part on the stage of the disease. Deficits in perception experienced by individuals with dementia may have an impact on behavior and functional ability, which can result in caregiver burden and stress. This in turn may influence the quality of life of individuals with dementia as well as their caregivers. Evidence on the effect of interventions designed to modify or maintain perceptual abilities on occupational performance will have useful implications for formal and informal caregivers, individuals with dementia, and health care professionals.

Summary of Key Findings:

The findings are grouped under two headings according to the level of evidence:

1. Interventions that aim to change perceptual abilities, and thereby maintain or improve the outcome of occupational performance.
2. Interventions that use remaining perceptual abilities (but do not aim to change perception), thereby offering compensation to maintain or improve the outcome of occupational performance.

Interventions that aim to change perception

Summary of Levels I, II, and III

▶ **Multisensory or snoezelen interventions:**

- Six Level I studies (Baillon, van Diepen, Prettyman, Redman, Rooke, & Campbell, 2004; Baillon, van Diepen, Prettyman, Rooke, Redman, & Campbell, 2005; Baker, Bell, Baker, Gibson, Holloway, Pearce, et al 2001; Baker, Dowling, Wareing, Dawson, & Assey, 1997; Chung & Lai, 2002; van Diepen, Baillon, Redman, Rooke, Spencer, & Prettyman, 2002); and two Level III studies (Heyn, 2003; Hope, 1998) were found in the literature.
 - There is a lack of evidence on the effectiveness of Snoezelen intervention in relation to occupational performance outcomes in individuals with dementia.
 - Research comparing Snoezelen and reminiscence therapy in individuals with dementia reports no significant differences in terms of occupational performance and levels of agitation (Baillon et al., 2004; van Diepen et al., 2002). Short-term effects on mood and behavior when individuals with dementia are exposed to Snoezelen or reminiscence therapy exists (Baillon et al., 2004), but the evidence does not support long-term effectiveness of the intervention.
 - In a study examining the long- and short-term effects of Snoezelen versus activity in individuals with dementia (Baker, et al., 1997; Baker et al., 2001), little change in behavior was reported in the group receiving Snoezelen. An increase in speech was seen during the intervention, but it deteriorated post-intervention. Short-term effects do not demonstrate that either intervention outweighs the other, and research is required on long-term effects and outcomes in terms of occupational performance if occupational therapists need to use the intervention with individuals with dementia. Heyn (2003) reported an increase in engagement in activity in groups of individuals exposed to multisensory environments; however, evidence on functional gains is warranted. Based on a study by Hope (1998), individuals with low mood and/or anxiety, as well as individuals who demonstrate beneficial results of relaxation, can be exposed to a multisensory environment. Occupational therapists may be able to identify people who would benefit from a multisensory environment but the effectiveness of the intervention is limited in the literature.
- ▶ One Level I study compared **sensory integration** to leisure activity in individuals with dementia (Robichaud, Hebert, & Desrosiers, 1994). No significant differences were noted in the intervention group compared to the control.

- ▶ Two Level I studies (Pomeroy, 1993; Rosswurm, 1990) and one level II study (Lantz, Buchalter, & McBee, 1997) focus on group intervention that aim to change perceptual abilities on occupational performance outcomes were identified. Rosswurm (1990) reported significant improvement in performance of visual exercises and group activities in individuals with dementia following an **attention-focusing group** intervention. This contributes to the initial evidence of outcomes on occupational performance since social interactions were reported. There is, however, no transfer of the results to activities of daily living, which is also an outcome of interest to occupational therapists. An improvement in mobility skills in individuals with severe dementia was reported in the treatment phase and not in the control phase of a study that examined the outcomes of music, body awareness, **mobility/functional training** in individuals with dementia (Pomeroy, 1993). In a **group program** focused on modified meditation, relaxation, guided imagery, and body awareness (Lantz, Buchalter, & McBee, 1997), a reduction in levels of agitation was reported in the group receiving the intervention, but the results cannot be attributed to the intervention per se. The program is cost-effective but a more rigorous study design is required to confirm the effectiveness of the intervention.
- ▶ One Level III study that examined responses to different **auditory stimuli** (Sherratt, Thornton, & Hatton, 2004) exists in the literature. Live music was found to be most beneficial in decreasing time spent in meaningless activity or sleeping and in increasing levels of well-being. Although the results support the use of live music as an intervention in individuals with dementia, it is questionable if this is an occupational therapy intervention. The results can be applied in a nursing home and outcomes in terms of occupational performance should be observed.

Summary of Levels IV and V

- ▶ One Level IV study was identified that evaluated the effectiveness of **Snoezelen versus relaxation** (music) in manipulating mood and behavior in individuals with dementia (Pinkney, 1997). Both interventions were found to be effective. However, music is less expensive and potentially more cost-effective.

Interventions that use remaining perceptual abilities (compensation) but do not change perception

Summary of Levels I, II, and III

- ▶ Wandering is an ongoing problem that poses safety risks for individuals with dementia and can result in caregiver stress, and may in part be caused by perceptual impairments. **Way-finding programs** are used with individuals with dementia to enable them find their way in a nursing home or their place of residence. Research examining way-finding abilities in individuals with dementia exists in the literature (Gibson, MacLean, Borrie, & Geiger, 2004; McGilton, Rivera, & Dawson, 2003; Passini, Pigot, Rainville, & Tetreault, 2000; Passini, Rainville, Marchand, & Joannette, 1998). Evidence of one Level I study (McGilton et al., 2003) and one Level II study (Passini et al., 1998) examining way-finding abilities exists in the

literature. McGilton et al. (2003) reported a way-finding program consisting of backward chaining, communication, and use of locational maps that enabled residents of a nursing home locate their way to the dining room, but the results were short term. Post-relocation, a decrease in agitation was reported in individuals with dementia, but after 3 months an increase was reported. It can be hypothesized that the decrease in agitation post-relocation was due to the initial change in an unfamiliar environment and once familiarity increased agitation increased. Further evidence of the use of locational maps is warranted.

- ▶ Evidence exists on the use of **environmental design** to compensate for deficits in perception experienced by individuals with dementia (Cohen-Mansfield & Werner, 1998; Elmstahl, Annerstedt, & Ahlund, 1997). Elmstahl, Annerstedt, and Ahlund (1997), in a Level II study, examined individuals' responses to an L-shaped versus a corridor-like design unit for individuals with dementia and found that less disorientation was reported in individuals in an L-shaped unit after 6 months and a deterioration in identity was reported after 12 months for individuals in a corridor-like design unit. Larger communication areas were associated with less memory, time, and identity disorientation. In terms of occupational performance outcomes, research is required on the benefits of different floor plans in enabling individuals with dementia to engage in meaningful activity in addition to reduction in disorientation that has been reported. Exiting behavior is commonly reported by caregivers of individuals with dementia. Exiting is a safety concern for the individual as well as the hospital or nursing home where the individual with dementia may be a resident. The behavior results in stress for the caregivers.
- ▶ Evidence exists in the literature on the use of **visual barriers** to minimize the number of exits reported in individuals with dementia (Dickinson, McLain-Kark, & Marshall-Baker, 1995; Kincaid & Peacock, 2003; Namazi & Johnson, 1992a; Namazi & Johnson, 1992b; Namazi, Rosner, & Calkins, 1989). One Level II study (Namazi & Johnson, 1992b) and four Level III studies (Dickinson, McLain-Kark, & Marshall-Baker, 1995; Kincaid & Peacock, 2003; Namazi & Johnson, 1992a; Namazi, Rosner, & Calkins, 1989) exist in the literature. Namazi and Johnson (1992b) reported a decrease in agitation and number of exits when individuals encountered an unlocked door versus a locked door. The results should be interpreted with caution and the results provide limited evidence to support influence on occupational performance and behavior. Research indicates that the use of visual barriers in the form of concealment of a doorknob, painted doorknob, use of a cloth barrier or wall mural on an exit door results in a decrease in number of attempts at exiting by individuals with dementia (Dickinson, McLain-Kark, & Marshall-Baker, 1995; Kincaid & Peacock, 2003; Namazi & Johnson, 1992a; Namazi, Rosner, & Calkins, 1989). The results are low-cost and easy to implement, but further research on the long-term benefits of the use of visual barriers in reducing the number of attempts at exiting is warranted. Namazi and Johnson (1992a) found that the use of visual barriers in the form of a divider facilitated engagement in meaningful activities and a decrease in attention to auditory stimuli in individuals with mild to moderate Alzheimer's disease. The results look promising for occupational therapists working on occupational performance in individuals with dementia and can be implemented to facilitate engagement in tasks.

- ▶ Evidence exists in the literature of one Level III study (Koss & Gilmore, 1998), that reported that **increasing light** intensity during meal times results in increase in consumption of food in individuals with Alzheimer's disease. The results can be trialed in individuals who are noncompliant at meal times to decrease levels of agitation reported in individuals with Alzheimer's disease.

Summary of Levels IV and V

- ▶ Evidence of two Level IV studies examining way-finding abilities in individuals with dementia exists in the literature (Gibson, MacLean, Borrie, & Geiger, 2004; Passini, Pigot, Rainville, & Tetreault, 2000). Individuals with severe cognitive impairment fluctuate in way-finding ability in familiar and semi-familiar environments (Passini, et al., 2000). In a descriptive study examining room orientation and intrusion into other rooms, it was found that **environmental cues** were used to find the way to individuals' own rooms and intrusion in other rooms was a way of seeking social stimulation (Gibson et al., 2004). Further research is needed to examine how environmental cues and orientation to the environment impacts social stimulation in individuals with dementia.
- ▶ In a Level IV study, Cohen-Mansfield and Werner (1998) reported that environmental designs in the form of **wall murals and posters** increase time spent in corridors and on benches, and decrease the exiting behavior in individuals with dementia. Further research is warranted on the engagement in activities when individuals sit on benches and spend time in corridors in a nursing home or hospital to validate the findings of the decrease in number of exit attempts.
- ▶ In a Level IV study examining the benefits of **optical intervention** for treatment of visual hallucinations in individuals with a combined diagnosis of visual hallucinations and dementia (Pankow, Pliskin, & Luchins, 1996), a decrease in the frequency of hallucinations was reported and individuals were less upset. The results are useful when working with individuals with similar clinical features; however, engagement in occupational performance following decrease in visual hallucination and long-term benefits need to be examined.

Contributions of Qualitative Studies:

One qualitative study reports that **background music and caregiver singing** (well-matched to cultural background of the patient) are useful interventions for late-stage dementia patients (Gotell, Brown, & Ekman, 2003). Patients showed better posture, improved competence, and increased sensory awareness. The authors suggested that singing might be a powerful (non-pharmacological) treatment approach.

Bottom Line for Occupational Therapy Practice:

- ▶ There is limited high-level evidence in the literature on interventions that aim to change perception with outcomes specific to optimizing occupational performance in individuals with dementia. Beginning evidence is found in the literature on increasing engagement in activity in groups of individuals exposed to multisensory environments; however, more evidence on functional gains is needed.
- ▶ There is more evidence available about interventions that aim to change perception with non-occupational performance outcomes such as impairment measures (e.g., behaviors, agitation, cognition). To some extent, occupational therapists can use this evidence to understand the effect of interventions and hypothesize about the concomitant changes that can be expected in occupational performance. However, there is need to confirm these hypotheses through further research.
- ▶ Considering the costs associated with purchasing and installing Snoezelen, evidence in the literature does not justify purchase of the equipment in terms of occupational performance outcomes for individuals with dementia. There are no indications of harmful effects from the intervention and in settings in which the equipment has already been purchased; Snoezelen may be used with adults with dementia if they seem to enjoy the experience. However, varying responses to Snoezelen are described, suggesting that not all adults with dementia will have positive experiences.
- ▶ Music can be implemented for older adults who are cared for in nursing homes, as evidence exists that live music decreases time spent in meaningless activity or sleeping, and increases levels of well-being. The use of background music and singing may be a useful intervention for caregivers to ease morning care sessions for people with late-stage dementia and can be recommended to the caregivers that assist with self-care of individuals. This may reduce or cease any aggression encountered during morning care.
- ▶ The use of an attention-focusing program with persons with advanced dementia is worth further investigation and consideration in occupational therapy.
- ▶ Evidence exists on interventions that use remaining perceptual abilities that are geared toward enabling individuals with dementia to find their way in a facility and reduce the number of exit attempts.
- ▶ Wandering is an ongoing problem that poses safety risks. The use of visual barriers decreased number of exit attempts. Visual barriers, which involve concealment of a doorknob, a painted doorknob, or a cloth barrier on the door, were associated with fewer exit attempts and can be implemented in a hospital or nursing home where individuals attempt to exit. The intervention is low cost and can be trialed to provide short-term benefits of exiting behavior reported in individuals with dementia. The use of visual barriers is worth considering and can be recommended by occupational therapists who work with individuals with dementia and when exit-seeking behavior is reported by nursing staff.

- ▶ Way-finding strategies are commonly used to orient and direct individuals to their rooms within a facility. Occupational therapists can train paraprofessionals working with individuals with dementia in way finding strategies, but so far, evidence suggests that the results are only short-term.
- ▶ Evidence exists on short-term benefits of strategies to decrease agitation and exiting behavior and can be implemented when working with individuals with dementia. However, there is lack of evidence on the benefits of environmental cues and strategies to engage individuals in meaningful activities and occupational performance.

Review Process:

Procedures for the selection and appraisal of articles

Inclusion Criteria:

Articles were included if they:

- Described and evaluated interventions that *target perception* (either improving or maintaining perception, or using remaining perceptual abilities);
- Included functional or occupational performance outcomes;
- Included people with dementia in the sample;
- Were published between 1994–2005;
- Were published in English.

Exclusion Criteria:

Articles were excluded if they:

- Had no mention of functional or occupational performance outcomes;
- Described perceptual status with no mention of an intervention;
- Described an intervention with no data collection;
- Did not mention perception as a component being targeted in the intervention

Search Strategy

Categories	Key Search Terms
Patient/Client Population	Dementia (exploded) key word and text word
Intervention	Perception, perceptual abilities or perceptual impairment (including searching for the terms: perceptual discrimination, apraxia, agnosia, stereognosis, spatial discrimination, spatial relations, depth perception, color perception, visuospatial impairment, hemianopsia, hemianopia, way finding, body awareness, body image, body scheme, auditory priming, auditory perception, left right discrimination, speech perception, visual perception, sensory integration)
Comparison	Not included in search terms
Outcomes	Not included in search terms

Databases and Sites Searched
Medline
Embase
Cumulative Index of Nursing and Allied Health Literature (CINAHL)
Allied and Complementary Medicine (AMED)
PsychInfo
Cochrane Library
OT Seeker
Ageline
Health Star

Quality Control/Peer Review Process:

- The first and second authors were responsible for conducting all literature searches.
- A research librarian with a specialty in rehabilitation science was initially consulted to finalize search strategies.
- Review group members reviewed all titles and abstracts (n=3,766). Articles were acquired for any that potentially met the inclusion criteria (n=111).
- Complete articles were reviewed by the review group members to select articles meeting the inclusion criteria. Group consensus was used to resolve any uncertainties.
- Review group members discussed the searches and findings to ensure that key articles or areas of research had not been overlooked.
- Reference lists of selected articles were reviewed to identify any other articles that might meet the inclusion criteria. These were then acquired and reviewed to see if they met the inclusion criteria.
- One of the members of the review group completed the CAP worksheet or Qual-CAP for each article that met the inclusion criteria (n=28).
- A second member of the review group then reviewed the article and the completed CAP to look for unanswered questions and discrepancies in interpretation of the results, and to ensure that the implications were clear.
- Evidence tables were drafted by the second author and reviewed by the principal investigator and then by the entire review group.
- The CAT was drafted by the first and second authors after discussion of the evidence tables with the review group. It was then reviewed by all members of the review group and discussed in a group meeting on two occasions.

Results of Search:

Summary of Study Designs of Articles Selected for Appraisal

Level of Evidence	Study Design/Methodology of Selected Articles	Number of Articles Selected
I	Systematic reviews, meta-analysis, randomized controlled trials	10
II	Two groups, nonrandomized studies (e.g., cohort, case-control)	4
III	One group, nonrandomized (e.g., before and after, pretest, and posttest)	8
IV	Descriptive studies that include analysis of outcomes (single subject design, case series)	5
V	Case reports and expert opinion, which include narrative literature reviews and consensus statements	0
	Qualitative Studies	1
	TOTAL	28

Limitations of the Studies Appraised

Levels I, II, and III

Inadequate sample size and justification using a power analysis is lacking in many of the studies. Biases in sample selection, facility where research was carried out, and people involved in the research is likely to affect results. The psychometric properties of outcome measures used are not reported in many of the studies, which leads to questions about the findings. Details on recruitment of participants and long-term effects of intervention are lacking and are beneficial in research. The effects of confounding variables have not been documented to be controlled in some of the studies, and thereby the results from the studies may not be attributed to intervention per se.

Levels IV and V

Inadequate sample size justification limited statistically significant results and clear reporting of data collection and analysis is beneficial and has not been consistently followed through in the studies. Biases in sample selection and observation of participants need to be controlled and reported in the studies.

Articles Selected for Appraisal

- Baillon, S., van Diepen, E., Prettyman, R., Redman, J., Rooke, N., & Campbell, R. (2004). Comparison of the effects of snoezelen and reminiscence therapy on the agitated behaviour of patients with dementia. *International Journal of Geriatric Psychiatry, 19*, 1047–1052.
- Baillon, S., van Diepen, E., Prettyman, R., Rooke, N., Redman, J., & Campbell, R. (2005). Variability in response to older people with dementia to both snoezelen and reminiscence. *British Journal of Occupational Therapy, 68*, 367–374.
- Baker, R., Bell, S., Baker, E., Gibson, S., Holloway, J., & Pearce, R. et al. (2001). A randomized controlled trial of the effects of multi-sensory stimulation (MSS) for people with dementia. *British Journal of Clinical Psychology, 40*, 81–96.
- Baker, R., Dowling, Z., Wareing, L. A., Dawson, J., & Assey, J. (1997). Snoezelen: Its long-term and short-term effects on older people with dementia. *British Journal of Occupational Therapy, 60*, 213–218.
- Chung, J. C. C., & Lai, C. K. Y. (2002). Snoezelen for dementia. *Cochrane Database of Systematic Reviews*, Issue 4. Art. No.: CD003152. DOI: 10.1002/15651858.CD003152.
- Cohen-Mansfield, J., & Werner, P. (1998). The effects of an enhanced environment on nursing home residents who pace. *Gerontologist, 38*, 199–208.
- Dickinson, J. I., McLain-Kark, J., & Marshall-Baker, A. (1995). The effects of visual barriers on exiting behavior in a dementia care unit. *Gerontologist, 35*, 127–130.
- Elmstahl, S., Annerstedt, L., & Ahlund, O. (1997). How should a group living unit for demented elderly be designed to decrease psychiatric symptoms? *Alzheimer Disease & Associated Disorders, 11*, 47–52.
- Gibson, M. C., MacLean, J., Borrie, M., & Geiger, J. (2004). Orientation behaviors in residents relocated to a redesigned dementia care unit. *American Journal of Alzheimer's Disease & Other Dementias, 19*, 45–49.
- Gotell, E., Brown, S., & Ekman, S. (2003). Influence of caregiver singing and background music on posture, movement, and sensory awareness in dementia care. *International Psychogeriatrics, 15*, 411–430.
- Heyn, P. (2003). The effect of a multisensory exercise program on engagement, behavior, and selected physiological indexes in persons with dementia. *American Journal of Alzheimer's Disease & Other Dementias, 18*, 247–251.
- Hope, K. (1998). The effects of multisensory environments on older people with dementia. *Journal of Psychiatric and Mental Health Nursing, 5*, 377–385.
- Kincaid, C., & Peacock, J. R. (2003). Effect of a wall mural on decreasing four types of door-testing behaviors. *Journal of Applied Gerontology, 22*, 76–88.

- Koss, E., & Gilmore, G. C. (1998). Environmental interventions and functional ability of AD patients. In B. Vellas, J. Fitten, & G. Frisoni (Eds.), *Research and practice in Alzheimer's disease* (pp. 185–193). New York: Springer.
- Lantz, M. S., Buchalter, E. N., & McBee, L. (1997). Wellness group: A novel intervention for coping with disruptive behavior in elderly nursing home residents. *Gerontologist, 37*, 551–556.
- McGilton, K. S., Rivera, T. M., & Dawson, P. (2003). Can we help persons with dementia find their way in a new environment? *Aging & Mental Health, 7*, 363–371.
- Namazi, K. H., & Johnson, B. D. (1992a). The effects of environmental barriers on the attention span of Alzheimer's disease patients. *American Journal of Alzheimer's Care and Related Disorders & Research, 7*, 9–15.
- Namazi, K. H., & Johnson, B. D. (1992b). Pertinent autonomy for residents with dementias: Modification of the physical environment to enhance independence. *American Journal of Alzheimer's Care and Related Disorders and Research, 7*, 16–21.
- Namazi, K. H., Rosner, T. T., & Calkins, M. P. (1989). Visual barriers to prevent ambulatory Alzheimer's patients from exiting through an emergency door. *Gerontologist, 29*, 699–702.
- Pankow, L., Pliskin, N., & Luchins, D. (1996). An optical intervention for visual hallucinations associated with visual impairments and dementia in elderly patients. *Journal of Neuropsychiatry, 8*, 88–92.
- Passini, R., Pigot, H., Rainville, C., & Tetreault, M. (2000). Way finding in a nursing home for advanced dementia of the Alzheimer's type. *Environment & Behavior, 32*, 684–710.
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- Pomeroy, V. M. (1993). The effect of physiotherapy input on mobility skills of elderly people with severe dementing illness. *Clinical Rehabilitation, 7*, 163–170.
- Robichaud, L., Hebert, R., & Desrosiers, J. (1994). Efficacy of a sensory integration program on behaviors of inpatients with dementia. *American Journal of Occupational Therapy, 48*, 355–360.
- Rosswurm, M. A. (1990). Attention-focusing program for persons with dementia. *Clinical Gerontologist, 10*, 3–16.
- Sherratt, K., Thornton, A., & Hatton, C. (2004). Emotional and behavioural responses to music in people with dementia: An observational study. *Aging & Mental Health, 8*, 233–241.

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This work is based on the evidence-based literature review completed in August 2005 by Lori Letts, PhD, OT Reg. (Ont.); Jacqueline Minezes, BSc (OT), OT Reg. (Ont.); Julie Berenyi, BHSc (OT) OT Reg. (Ont.); Mary Edwards, MHSc, OT Reg. (Ont.); Kathy Moros, BHSc (OT), OT Reg. (Ont.); Colleen O’Neill, BSc (OT), OT Reg. (Ont.); and Colleen O’Toole, MSc (OT), OT Reg. (Ont.).

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, 901-652-6611, x 2052.



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